CITY OF HAMILTON
PUBLIC WORKS DEPARTMENT
Hamilton Water Division

TO:	Chair and Members Public Works Committee
COMMITTEE DATE:	February 27, 2017
SUBJECT/REPORT NO:	Communal Well System in the Community of Lynden, Schedule 'C' Municipal Class Environmental Assessment (PW17015) - (Ward 14)
WARD(S) AFFECTED:	Ward 14
PREPARED BY:	Carmen Vega (905) 546-2424, Extension 1301
SUBMITTED BY: **SIGNATURE:**	Stuart Leitch Acting Director, Water & Wastewater Planning & Capital Public Works Department

RECOMMENDATION

(a) That the General Manager, Public Works Department, be authorized and directed to file the Notice of Completion and issue the Communal Well System in the Community of Lynden, Schedule 'C' Municipal Class Environmental Assessment Study Report for the mandatory 30-day review period;

(b) That upon completion of the 30-day public review period, the General Manager, Public Works Department, be authorized and directed to proceed with the implementation of the preferred alternative within the Communal Well System in the Community of Lynden, Schedule 'C' Municipal Class Environmental Assessment provided that no substantial comments by the public or Part 2 Orders received by the Ministry of the Environment and Climate Change (MOECC) are received;

(c) That an additional $930K be included in the 2018 Rate Budget to supplement Project ID No.5141666608 in order to update the total budget requirement to $4.18M (including $3.8M design/construction budget and $380K for internal resource/staffing) for the preferred design concept outlined in the Environmental Assessment Study Report.

EXECUTIVE SUMMARY

The City of Hamilton (City), Hamilton Water Division assisted by WSP Canada Inc. (previously GENIVAR) initiated in 2007 the Communal Well System in the Community of Lynden, Schedule 'C' Municipal Class EA as directed by the 2002 Master Plan to address the following issues:

- Construction of a backup well;
- Treatment to reduce the treated water turbidity and improve the reliability of the treated water quality;
- Ensure sufficient underground reservoir storage to meet future demand requirements.

Three design alternatives were identified that meet the objective of "Upgrading the Existing Well System" and that satisfy the design objectives of incorporating a new and redundant back-up well (FDL03), provide for the treatment of hydrogen sulphide and turbidity and provide for the treatment of lead in the raw well water. These three design alternatives include:

1. Alternative 1 – Expansion of the Existing Pumping Station and Utilizing the Existing Reservoir
2. Alternative 2 - Expansion of the Existing Pumping Station and New Reservoir
3. Alternative 3 - New Pumping Station and New Reservoir

Once the three (3) alternatives were evaluated based on natural environment, social environment, economic and technical criteria (see Appendix B – Evaluation of Alternatives), the preferred design concept is Alternative 3 - Construction of a New Pumping Station and a New Reservoir.

Based upon preliminary analysis the construction of a new pumping station and a new reservoir (Alternative 3) can be accommodated within the existing City own property at 3618 Governors Rd and can be constructed with minimal impact on the operation of the existing pumping station located on this property. The preferred treatment method incorporated in the new pumping station design will be finalized once water treatment pilot testing is concluded in Q2 2017. Conceptual design cost estimates for the construction of a new pumping station and a new reservoir are estimated at $4.18M (including $3.8M design/construction budget and $380K for internal resource/staffing).

The information contained in Historical Background below includes detailed information on the nature of the project area and the development of alternative solutions identified in the EA process.

Alternatives for Consideration – See Page 9

The recommendations contained in this report support the Mission Statement of the Public Works Business Plan "Innovate Now" - "Provide safe, strategic and environmentally conscious services that bring our communities to life".

FINANCIAL – STAFFING – LEGAL IMPLICATIONS

Financial:

The current approved Capital Project No. 5141666608 currently includes a total approved budget of $3.25M for the purposes of upgrading the Lynden communal well system. Based on the construction budget information provided in the EA Study Report, an additional $930K is recommended to be included in the 2018 Rate Budget to supplement Project ID No.5141666608 in order to update the total budget requirement to $4.18M (including $3.8M design/construction budget and $380K internal resource/staffing). This project has been submitted under the Clean Water and Wastewater Fund (CWWF) for a total grant of $1.95M ($1.3M Federal, $650K Provincial).

Staffing:

The implementation of the preferred alternatives will be carried out with existing staff and as such there are no staffing implications.

Legal:

The City is bound by the *Municipal Act, 2001* to provide water of a quality meeting Ontario Drinking Water Standards to residents currently served by a municipal supply.

Establishing a backup well provides system security and meets the requirement of supply redundancy or "Firm Capacity" as described in MOECC Design Guidelines for Drinking-Water Systems (2008).

Furthermore, municipal undertakings such as road improvements and water and wastewater projects are subject to Ontario's *Environmental Assessment Act (1990, amended 2010)* which dictates that a municipality is required to undertake a Class Environmental Assessment before proceeding with an undertaking such as the construction of a new water treatment and pumping station facility.

HISTORICAL BACKGROUND

The Lynden Rural Settlement Area (RSA) at present contains about 200 homes. The Lynden municipal communal water system services approximately 140 homes within the RSA and a few homes located along the water main outside the RSA. The remainder of homes are currently serviced by individual private wells and/ or cisterns. The total future build-out of the Lynden RSA is expected to reach approximately 235 homes with many of the current private water-serviced homes likely to transition over time to the municipal communal system.

The Lynden community water system consists of one well FDL01, a treatment plant and pumping station located at 3618 Governors Road and associated distribution mains (see Study Area, Appendix A). The production well FDL01 is situated to the east of the community and located next to the pumping station, treatment plant and reservoir on

3618 Governors Road. Well FDL01 was drilled in 1984 in a deep sand and gravel aquifer atop bedrock at a depth of 54.5 m. The Permit to Take Water dated December 16, 2009 states a maximum pumping rate of 3.8 L/s.

The Lynden underground reservoir includes two (2) interconnected treatment/storage cells complete with High Lift Pumps (HLPs).

Turbidity recorded in raw water is very low ranging from 0.01 to 0.05 NTU. The Ontario Drinking Water Standards sets a Maximum Acceptable Concentration (MAC) for turbidity at 1.0 NTU for treated water to ensure the efficiency of the disinfection process. An Engineering Report for the Lynden Well System (MacViro, 2001) indicated that 35 of the 100 turbidity samples for the treated water exceeded 1.0 NTU. It was concluded that the current treatment process increases the turbidity in the finished water to the degree that exceedances of ODWS have been reported. Thus it was recommended that the City investigate treatment options that reduce the sulphide levels in the groundwater without impacting negatively on the turbidity levels.

The above recommendation and the security of supply issue were advanced through the Comprehensive Water Servicing Master Plan for the Lynden Rural Settlement Area by Totten Sims Hubicki Associates, 2002. The Master Plan considered the existing water servicing area, the present water demand and the additional future connections, and the following alternatives were developed:

- Do Nothing
- Water Conservation
- Upgrade Existing Well Supply
- New Groundwater Supply
- Connection to an Adjacent Water Distribution System

Based on the community input, technical, environmental and economic criteria, it was recommended that the City of Hamilton upgrade the existing well to include treatment to reduce the treated water turbidity, and the addition of a backup well.

The recommendations of the Master Plan (2002) were re-assessed in 2008 and 2016 and it was found that there have been no significant modifications that would change the recommendations of the Master Plan, and that the recommendation to "Upgrade the Existing Well System" is still the preferred alternative.

Subsequent to the Comprehensive Water Servicing Master Plan for the Lynden Rural Settlement Area, 2002 a number of studies were completed (2004 to 2016) in order to better characterize the groundwater resources in the area and to identify possible sites for a new municipal well.

The groundwater exploration process led to the acquisition of land behind the FDL01 site and the drilling and testing of a new well (FDL02) approximately 125 m south of FDL01. However, Barium levels in this well exceeded the ODWS maximum acceptable

concentration. Due to concerns over the cost of the Barium treatment measures and public perception of raw water ODWS exceedances in FDL02, further exploration on the property to identify a location with lower levels of Barium was initiated.

A new production well (FDL03) was constructed and tested by WSP (Lynden FDL03 Hydrogeological Report, 2016). The results of the test indicated that the well can sustain a rate of 6 L/s. Water quality results indicated aesthetic and operational guideline exceedances for hydrogen sulphide and hardness (naturally soft water). Barium and Lead were both measured to be well below the maximum acceptable concentrations (MAC) under the ODWS guidelines. A preliminary evaluation of the well indicated that FDL03 is likely not under the influence of surface water (GUDI).

POLICY IMPLICATIONS AND LEGISLATED REQUIREMENTS

This study does not result in any new policy; however, existing source protection updates will need to be implemented within the FDL03 Wellhead Protection Areas (WHPAs).

The study is consistent with the Ontario's *Environmental Assessment Act (1990, amended 2010)* and the MOECC Design Guidelines for Drinking-Water Systems (2008) related to "Firm Capacity".

RELEVANT CONSULTATION

The affected Ward Councillor has been advised about the completion of the study and the recommendations of this report.

Public and Review Agency consultation is an integral and legislated component of any Municipal Class Environmental Assessment study. Therefore the following Public Consultation events were undertaken:

- A Notice of Study Commencement was published in local newspapers in October 2007. The notice outlined the purpose of the study and gave a brief background on the proposed project.
- Public Information Centre no. 1 (PIC1) was held at the Copetown and District Community Centre on October 23, 2007. The PIC was advertised in local newspapers. The purpose of this PIC was to familiarize the public with the Study, present the alternatives and the recommended alternative, as well as provide a summary of the evaluation completed in the assessment and the selection of the recommended alternative. There was also the opportunity to receive comments on the alternatives and the evaluation.
- A total of 20 different comments were received. Eight (8) individual response letters were mailed after the PIC to further clarify questions and comments received. The questions and concerns were generally associated with the location of the proposed well; the impact the new well will have on private wells in the area, the need for

improved sewage services over water services in Lynden and the ability and cost to connect to the new Lynden water system.

- Public Information Centre no. 2 (PIC2) was held at the Royal Canadian Legion Hall in Lynden on October 18, 2016. The PIC was advertised in both the Hamilton Spectator and selected Hamilton Community News. The purpose of this PIC was to (re)familiarize the public with the Study by presenting the recommended alternative, as well as provide a summary of the evaluation completed in the assessment and the selection of the recommended design solution.
- A total of 45 attendees recorded their names on the sign in sheet and 11 different comments were received. Four (4) individual responses were e-mailed after the PIC to further clarify questions and comments received. The questions and concerns were generally associated with the location of the pumping station and the ability and cost to connect to the new Lynden water system.
- Through mailings undertaken at the points of the Notice of Commencement and the PICs, relevant agencies and City departments were solicited for input and kept informed of the study and its findings. Any information, comments or concerns provided by agencies through these contacts were integrated into the study and the assessment of alternatives.

The Agency and Stakeholder Contact Lists include the following groups:

- Provincial Ministries and Agencies
- Federal Agencies
- First Nations
- Others (e.g. Municipal, Utilities, School Boards, etc.)

Project Stakeholder and Review Agency lists were developed at the onset of the study and maintained throughout the process to ensure all interested and relevant parties are kept informed. All Stakeholders are invited and encouraged to comment on the project at any time during the study.

The project team will receive and attempt to mitigate any Stakeholder concerns or request for a Part II Order that is initiated within the mandatory 30-day review period.

ANALYSIS AND RATIONALE FOR RECOMMENDATION

Municipal Class Environmental Assessment:

A Municipal Class EA planning process has been undertaken to arrive at a solution for the problem statement. The Schedule C planning process was followed for the Class EA, which includes the three phase EA planning process:

- Phase 1: Problem Definition
- Phase 2: Identification and Evaluation of Alternative Solutions to determine a preferred solution

- Phase 3: Examination of Alternative Methods of Implementation of preferred solution

The final step in the analysis rationale before proceeding to implementation of the preferred alternative is to undertake the mandatory 30-day review. A Notice of Completion of the Class EA as recommended herein will be issued in the first quarter 2017. Notices will be issued via newspaper advertising and direct mail out to all members of the Stakeholder and Agency Contact lists. The Project File will be placed on public record along with contact information to receive concerns. All attempts will be made to mitigate all expressed concerns. Should resolution of a concern be unattainable the conflict may be escalated by the opponent to the Minister of the Environment and Climate Change for a decision.

The above analysis rationale is a prescribed process under that Municipal Class Environmental Assessment. The project was completed under full compliance.

Water Demands:

Historical water demand for the years 2011-2015 was considered in order to estimate the Ultimate Buildout Maximum Day Demand (MDD) and was determined using a Max Day Peak Factor (MDF) of 1.88. The current and projected Average Day Demand (ADD) and Maximum Day Demand (MDD) for Lynden are summarized below in Table 1.

Table 1 – Current and Ultimate Demand Average and Maximum Day Demands

	ADD (L/s)	MDD (L/s)
Current	1.01	1.9
Ultimate Buildout	1.7	3.2

The long-term projected demand was calculated to evaluate the ability of the current and any new water source to provide service to Lynden in the future. For this purpose the current connections (141), potential future connection for properties within the RSA (85) or outside the RSA fronting the watermain (9) were considered for a total of 235 ultimate service connections.

Per Capita Consumption:

Based on the recorded values for water demand and number of users (451 capita), the calculated average per capita demand is just under 200 litres per capital per day (LCD) which is exceptionally low. The MOE states that generally, average water demands range from 270-450 LCD. The small lots within the RSA and the absence of new urban style development may partly contribute to the low water use.

Assessment of Existing and Possible Water Sources:

Any new or existing water source must be assessed on its ability to produce raw water of adequate quality and quantity. The projected Maximum Day Demand of 3.2 L/s is the

minimum production quantity required for any new water source or primary production well provided that the current water consumption behaviour is maintained. Also any new Industrial Commercial Institutional (ICI) development will need to have the water demand assessed on a case by case basis.

The current water source FDL01 is capable of supplying raw water at a rate of 3.8 L/S and it is technically adequate to supply the current and projected water demand but there is no redundancy of supply in the system. Therefore, the objective of the hydrogeological investigation was to secure a new source of water adequate in both quality and quantity.

Design Alternatives:

The Municipal Class Environmental Assessment study identified three design alternatives that include using the new well FDL03 and up-grading the treatment system:

- Alternative 1 - Expansion of the Existing Pumping Station and Utilizing the Existing Reservoir. This option will utilize some of the existing assets while a new treatment system will improve the treated water quality by reducing the turbidity of the treated water caused by elemental sulphur formation. Repurposing the existing reservoirs aeration cell into treated water storage will allow the facility to meet MOECC storage capacity requirements. Repurposing the existing reservoir is also expected to reduce or eliminate the number of Lead exceedances in the system which may be related to the presence of Lead sediments inside the existing reservoir. The benefits of this alternative are tempered by the fact that space limitations within the existing Pumping Station would require a costly building expansion. As well, there are inherent constructability risks considering the age of the existing structure. Concerns with regards to resuspension of the sediments at the bottom of the existing reservoir persist under this alternative and finally, this alternative presents operational risks associated with operating the existing water system while concurrently attempting to construct a new pumping station and treatment system under the same roof. The operational risk being the loss of water supply to the community during the period of construction.
- Alternative 2 - Expansion of the Existing Pumping Station and New Reservoir. Similar to Alternative 1, the new treatment system will improve the treated water quality. The construction of a new reservoir would eliminate the concerns of repurposing the existing reservoir and more specifically, inheriting into the new system the lead concerns that are connected with the sediments in the old reservoir. This alternative partially addresses the risks associated with operating an existing water treatment system while concurrently building a new treatment system on the same site. In this alternative, the re-purposing of the existing reservoir is eliminated but the expansion and repurposing of the existing building

still exists and therefore still presents an operational risk of loss of water supply to the community during construction.

- Alternative 3 – a separate new Pumping Station with Reservoir and Treatment System located on the same property will improve the treated water quality by reducing the turbidity of the treated water caused by elemental sulphur formation. This alternative excludes the expansion of the old building and the repurposing of the existing reservoir and thereby eliminates the problems associated with operational and constructability risks associated with aged infrastructure. This alternative provides flexibility during the construction period and provides for a continuous supply of water to the residents through the existing pumping station and reservoir until the new pumping station, treatment system and reservoir are in full operation.

The recommended option is Alternative 3 - Construction of a New Pumping Station and New Reservoir.

ALTERNATIVES FOR CONSIDERATION

Alternative: Reject the Municipal Class EA Study

Should Council not wish to approve the filing of the Communal Well System in the Community of Lynden, Schedule 'C' Municipal Class Environmental Assessment, the Municipal Class EA process would be considered incomplete by the provincial government. The City will not have approval under provincial environmental legislation to have the option to pursue the capital project for the New Pumping Station and New Reservoir in the Lynden RSA.

ALIGNMENT TO THE 2016 – 2025 STRATEGIC PLAN

Community Engagement & Participation

Hamilton has an open, transparent and accessible approach to City government that engages with and empowers all citizens to be involved in their community.

Economic Prosperity and Growth

Hamilton has a prosperous and diverse local economy where people have opportunities to grow and develop.

Healthy and Safe Communities

Hamilton is a safe and supportive city where people are active, healthy, and have a high quality of life.

Clean and Green

Hamilton is environmentally sustainable with a healthy balance of natural and urban spaces.

Built Environment and Infrastructure

Hamilton is supported by state of the art infrastructure, transportation options, buildings and public spaces that create a dynamic City.

Our People and Performance

Hamiltonians have a high level of trust and confidence in their City government.

APPENDICES AND SCHEDULES ATTACHED

Appendix "A" Study Area Map
Appendix "B" Table of design alternatives