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CONSULTING

CITY OF SAINT JOHN

Environmental Impact Assessment (FINAL)

Greenwood Subdivision Wastewater Treatment Facility Upgrades



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References

1.0 The Proponent

1.1 Project Title

Greenwood Subdivision Wastewater Treatment Facility Upgrades - Environmental Impact Assessment

1.2 Proponent Contact

The proponent for the proposed project is:

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The subject site is located at 173 Karen Street (Property Identification Number 00425660) in Saint John and is owned by the City of Saint John (Contact: Mr. Kevin O'Brien).

2.0 The Undertaking

2.1 Project Overview and Purpose

The City of Saint John intends to replace the existing Greenwood Subdivision Wastewater Treatment Facility (WWTF), located at 173 Karen Street in Saint John, NB.

The existing WWTF was constructed and commissioned in the 1960's and consists of trickling filters with rock media. The facility treats wastewater from approximately 37 residences from the Greenwood Subdivision. City of Saint John personnel operate the current WWTF under an Approval to Operate (Permit No. S2690) from the New Brunswick Department of Environment and Local Government (NBDELG). The facility has experienced problems with the mechanical systems in recent years and, despite upgrades, is unable to consistently meet the requirements for Carbonaceous Biological Oxygen Demand (CBOD₅) and Suspended Solids in the effluent that discharges to an unnamed watercourse.

The City of Saint John proposes to replace the existing WWTF with a new Moving Bed Biofilm Reactor (MBBR) treatment system. The new facility will modernize treatment, include ultra violet disinfection of the effluent, allow for better effluent sampling, and have a submerged discharge that will allow for immediate dilution of the effluent. To be able to continue to service the Greenwood Subdivision area and minimize disturbance of greenfield space, the new facility will be constructed on the same land parcel next to the existing facility.

Dillon Consulting Limited (Dillon) completed an engineering review of the Greenwood facility in 2007 and outlined multiple options for improving the facility that included; a 'do nothing' approach, upgrades and modernization of the treatment process, and replacement of the WWTF. The City of Saint John selected to replace the WWTF, after considering the possible treatment options, forecasted service requirements, existing and potential environmental impacts, and financial implications.

The City of Saint John is required to complete an Environmental Impact Assessment for the proposed project in accordance with the NB *Environmental Impact Assessment Regulation 87-83*, under item (n) "construction, or demolition, of all sewage disposal or sewage treatment facilities, other than domestic, on-site facilities".

2.2 Project Location

The City of Saint John proposes to construct the new WWTF on the same land parcel on which the current WWTF currently operates (**Figures 1 and 2**). The property is owned by the City of Saint John and identified by civic number 173 Karen Street, in the Greenwood subdivision area of Saint John, NB (PID No. 00425660; latitude N45° 19' 25.9" and longitude W65° 57' 14.9"). The property has an approximate area of 2,500 m², a maximum length of approximately 55 m and a maximum width of 50 m.

The proposed project location is bound to the north and west by public right-of-ways for Karen Street and Secord Street, respectively (**Figure 2**). Residential properties are located north (beyond Karen

Street), east and west (beyond Second Street). South of the proposed project location is an undeveloped forested property. An unnamed watercourse, controlled by ditching, runs parallel to the proposed project location along Second Street.

Physical components of the project will be contained within the land parcel with the exception of the submerged effluent discharge pipe which will extend into the unnamed watercourse (**Figure 2**).

2.3 Siting Considerations

As the intent of the project is to continue to be able to service the Greenwood area, the new WWTF will need to be in close proximity to the community it serves, be accessible by road, have an adequate power supply, and have access to an appropriate discharge location. Because the current WWTF property (PID No. 00425660) is already owned by the City of Saint John, is appropriately zoned, has been operating as a WWTF, it satisfies these minimum needs (see the attached letter in Appendix A). The City of Saint John also considered the following prior to selecting the current WWTF property as the preferred property for the proposed development:

- A location that would require minimal ground disturbance for development and to connect the proposed system to the existing collection system;
- A property that could supply approximately 30m by 30m for the project footprint;
- Construction on developed lands to reduce, or minimizes, clearing/grubbing requirements;
- Construction on previously disturbed lands to minimize potential for environmental and cultural impacts;
- Requirement to reclassify the land use zoning if another property is selected;
- Minimize impacts to viewscape;
- Potential for flooding;
- Land use restrictions such as a protected wellfield or watershed;
- Location in proximity to watercourses and/or wetlands;
- Location in proximity to other environmentally sensitive features or unique habitats;
- Appropriate setbacks from adjacent residential properties; and,
- Foreseeable future development in the area.

Where possible, the WWTF was located and/or adjusted to minimize impacts to the natural environment. The following considerations were incorporated into the design concept to minimize the overall impact of the project:

- Infrastructure locations were selected such that minimal ground disturbance would be required to connect to the existing collection system;
- Viewscales will be minimally impacted;
- Infrastructure locations were selected such that noise levels would be mitigated;

- Infrastructure locations were selected such that appropriate setback distances from adjacent properties could be maintained; and,
- Construction activities will occur as far back from the watercourse as feasible, with the exception of the submerged discharge pipe.

2.4 Physical Components and Dimensions of the Project

The City of Saint John has selected the moving bed biofilm reactor (MBBR) as the preferred treatment system. The facility is anticipated to include the following components (**Figure 3**):

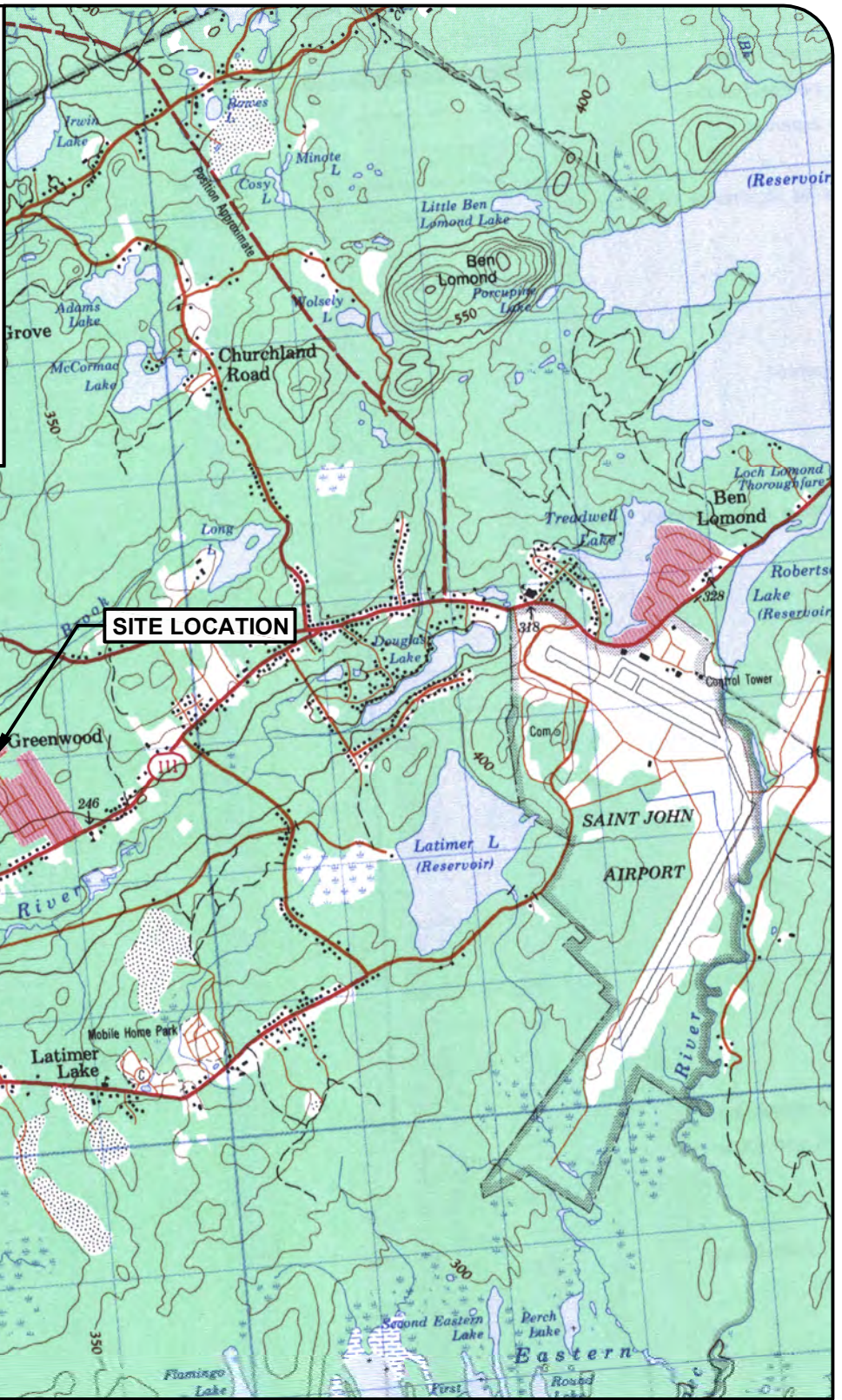
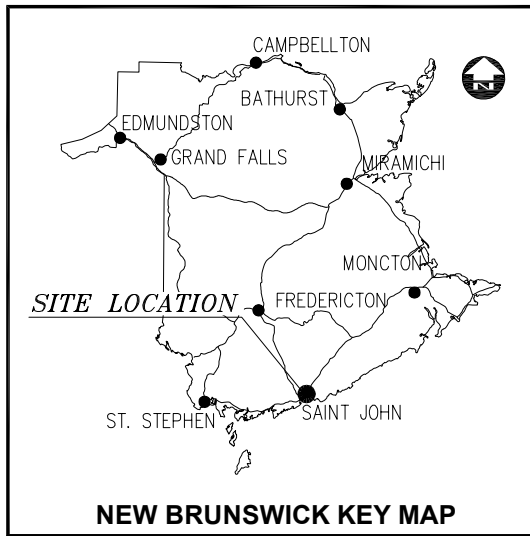
- a small WWTF building (approximately 36 m²);
- four underground tanks that will house the MBBR system;
- buried/submerged effluent outfall in the adjacent unnamed watercourse;
- piping for connection to the existing wastewater collection system;
- drilled groundwater well for non-potable use;
- driveway, fencing and gate; and,
- removal of existing infrastructure.

WWTF Building

The WWTF control building will be constructed of masonry or pre-engineered steel supported on a poured concrete foundation. The exterior of the building will be designed to blend into local architecture. Civil work to prepare the area for the building foundation will be carried out by an excavator. Construction activities will occur as far back from the watercourse as feasible. Appropriate setbacks from adjacent residential properties will be applied in accordance with the City of Saint John bylaws.

Although the system is currently under design, it is anticipated that the WWTF building will house blowers, electrical equipment, future chemical feed systems, a UV disinfection system in an open channel and an effluent sampling station. A space will be provided for chemical feed storage.

Because pumping and Ultra Violet (UV) disinfection will be required at the site the WWTF building will house a SCADA system that will be connected to the City's current monitoring system. Power will be supplied to the facility from overhead power lines that supply single phase 240 VAC. The building will also be fitted for a backup power connection for a temporary mobile generator; however, no generators will be stored onsite.



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 ENVIRONMENTAL IMPACT ASSESSMENT
 173 KAREN STREET
 SAINT JOHN, NB
 WASTEWATER TREATMENT FACILITY
 UPGRADES
 GREENWOOD SUBDIVISION

SITE LOCATION MAP
 FIGURE 1



CITY OF SAINT JOHN

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MAP/DRAWING INFORMATION
 National Topographic System Mapsheet 21H/05.

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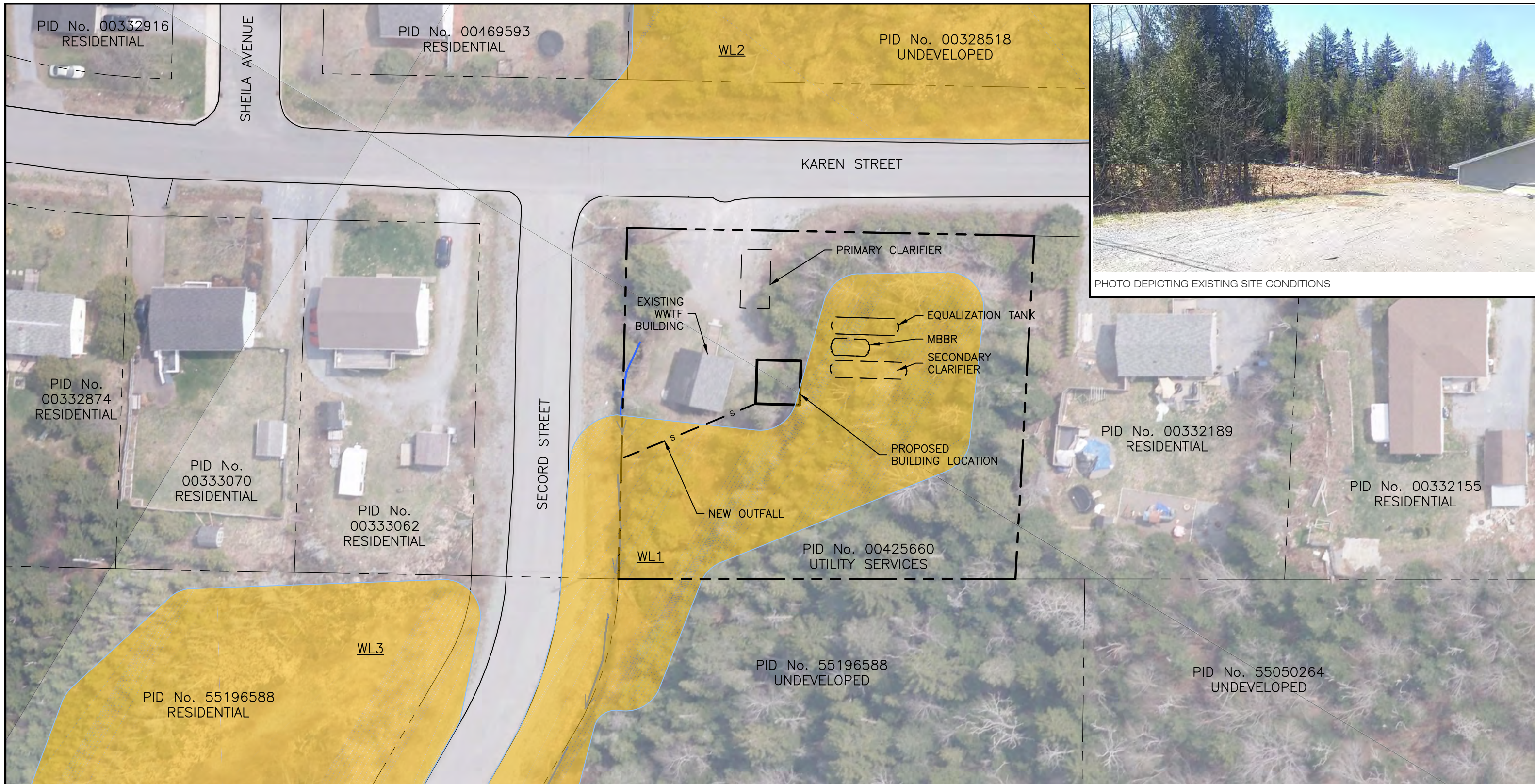


PHOTO DEPICTING EXISTING SITE CONDITIONS

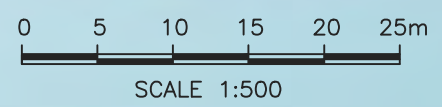
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 SAINT JOHN, NB
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SITE PLAN
 FIGURE 2

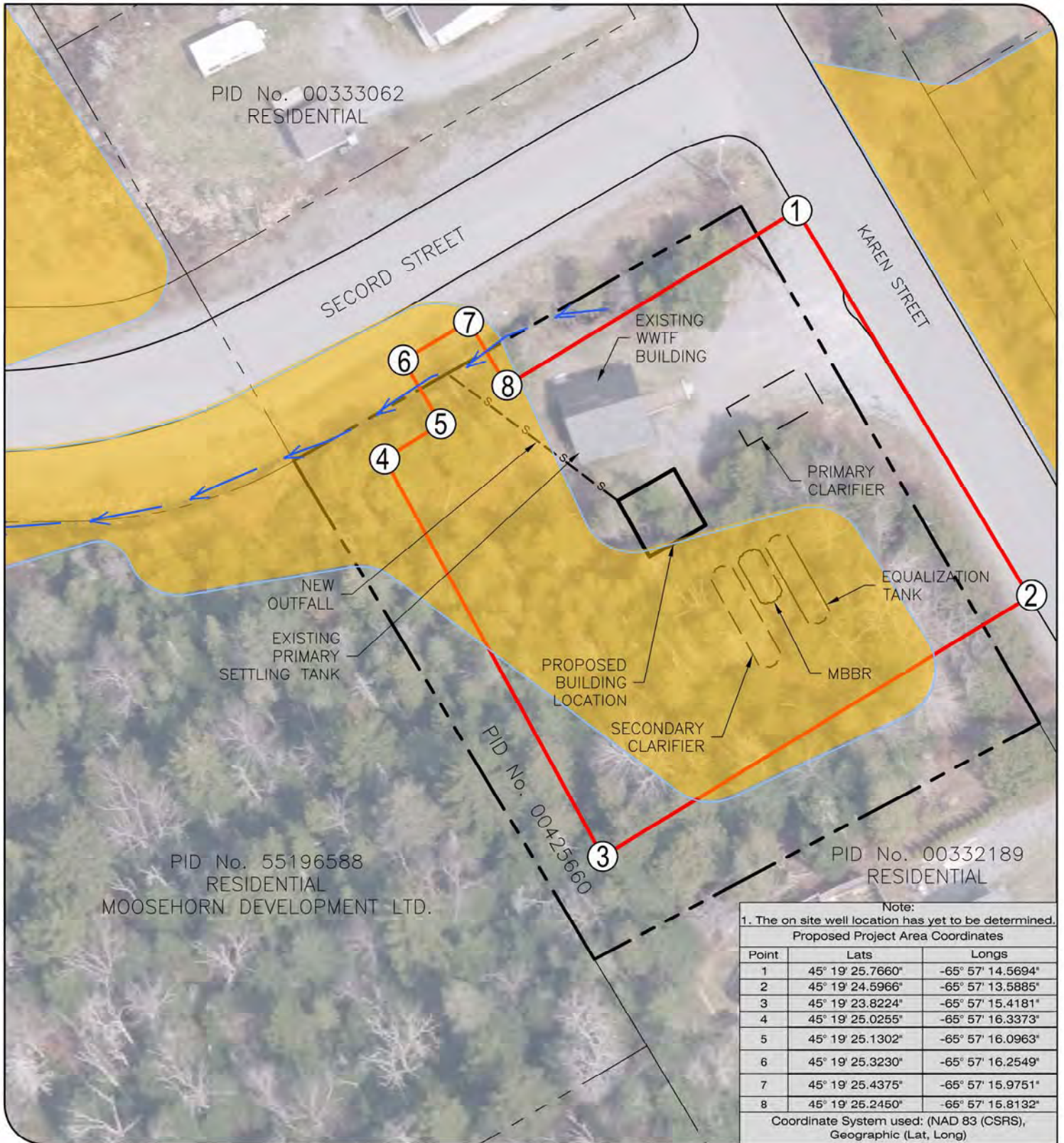


	SUBJECT PROPERTY LINE		EXISTING SANITARY MANHOLE		WATERCOURSE		WL2 - WETLAND IDENTIFIED
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	EXISTING SANITARY SEWER		EXISTING STRUCTURE U/G		UNMAPPED WETLAND		

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

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**INFRASTRUCTURE LOCATION
MAP**
FIGURE 3



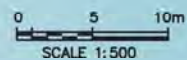
-  PROPOSED PROJECT AREA
-  UNMAPPED WETLAND



MAP/DRAWING INFORMATION
Property boundaries are based on Service New Brunswick records and may not be exact. This is not a legal survey.

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Underground Tanks

The MBBR system will include four underground tanks as part of the treatment process:

- Primary clarifier tank to reduce gross solids, fats, oils and greases (FOG). Based on conceptual design the tank will be located east of the current WWTF building. This tank will be periodically pumped to remove solid waste material. The waste will be transported to larger WWTF owned by the City of Saint John;
- Equalization tank, proposed to be located south of the proposed WWTF building, to accommodate variances between average day and peak flows;
- MBBR treatment process tank, which will contain the treatment process, is proposed to be located north of the new WWTF building; and,
- Secondary clarifier which based on the conceptual design will be located south of the MBBR tank.

Submerged Outfall

Treated effluent will be conveyed from the UV disinfection to the watercourse via a buried HDPE pipe. The pipe will be trenched via excavator into the bank of the unnamed watercourse.

The new WWTF is being designed to meet the effluent discharge objectives recommended in the 2017 Environmental Risk Assessment report by Natech. The proposed effluent discharge objectives for CBOD₅ and Total Suspended Solids (TSS) remain the same as required in the Approval to Operate for the City while several new objectives are proposed as indicated in **Table 2-1**.

Table 2-1: Effluent Discharge Objectives

Parameter	Current Discharge Requirements	Proposed Discharge Requirements
Carbonaceous Biological Oxygen Demand	<25 mg/L	<25 mg/L
Dissolved Oxygen	-	>4 (May-Oct)
Total Suspended Solids	<25 mg/L	<25 mg/L
Un-ionized ammonia-nitrogen	-	<1.25 mg/L
Total ammonia-nitrogen	-	<0.4 mg/L (June –Sept) <3.9 (Oct – May)
Total Kjeldahl nitrogen	-	<0.7 mg/L (May-Oct)
Total phosphorous	-	<0.046 mg/L (May-Oct)
PH	-	6.4 – 9.1
E. Coli	-	<1000 mg/L

Collection System Collection

The new WWTF will be connected to the existing wastewater collection system at the onsite sanitary connection point. The collection pipe will be laid in an excavated trench and buried.

Groundwater Well

It is estimated that the MBBR WWTF will require an average of less than 1m³/day of non-potable groundwater to aid the maintenance of the treatment equipment. The well will be installed by a licenced well driller and will be cased into bedrock.

It is anticipated that drawdowns of the local groundwater table associated with water usage from the WWTF operations (0.18gal/min) may be deemed negligible when compared to aquifer recharge. However, appropriate setbacks from adjacent residential properties, and onsite infrastructure, will be applied as outlined in the 2016 Saint John Community Plan.

Site Access

The new facility will make use of the existing parking and access area, off Karen Street, along the south boundary of the subject property.

Existing WWTF Removal

The existing WWTF will continue to operate throughout the construction of the new facility. Once the new facility has been commissioned, the existing system will be decommissioned and salvageable equipment and materials will be removed from the building. The existing WWTF building will be

demolished using an excavator and bulldozer. Demolition debris will be removed via dump truck and disposed of at an offsite NBDELG approved facility.

2.5 Schedule

The replacement of the existing WWTF will be completed by March 31, 2018 and can be divided into three phases. A description and anticipated timeline for each project phase is presented in the table below (**Table 2-2**).

Table 2-2: Project Schedule

Phase	Timeline
Phase I - Project Planning and Preparation System Design Regulatory Approvals	Ongoing – July 15, 2016
Phase II – Construction and Commissioning Site Preparation (grubbing) Construction of the new WWTF Installation of the submerged discharge line Connection to the current WWTF collection system Commissioning of the new WWTF Decommissioning of the current WWTF Landscaping	July 15, 2017 – March 31, 2018 (some landscaping in spring 2018)
Phase III – Operation and Maintenance Operation of the new WWTF	March 31, 2018 - onward

A proposed date for the first physical construction-related activity on site has yet to be determined and is dependent on the Ministers decision on this registration. The estimated hours of construction will be 7am to 7pm. Longer hours may be required to meet the project schedule but will not go beyond the hours of 7am to 9pm in accordance with the City of Saint John's bylaws. The schedule presented in **Table 2-2** assumes construction starting no later than July 15, 2017.

2.5.1 Phase I – Project Planning and Preparation

The first phase of the project involves desktop design, project planning, environmental studies, and regulatory permitting and approvals. Preliminary environmental site visits were completed in spring 2017.

The proposed site has been previously cleared and additional vegetation clearing is not anticipated. If any additional shrub, grass or tree clearing activities are required they will adhere to applicable regulatory requirements and will only be done on an as required basis.

2.5.2 Phase II – Construction and Commissioning

Phase II of the project will include site preparation activities, construction and commissioning of the new WWTF, decommissioning of the existing WWTF and landscaping. Construction of the new facility is anticipated to occur from July 2017 until early 2018, while decommissioning and landscaping activities are anticipated to occur in February and March of 2018. It is recognized that some landscaping (seeding and planting) will be deferred until spring of 2018. Appropriate erosion control measures shall remain in place until vegetation is established.

Site Preparation

Site preparation work, including grubbing, grading, and excavation, will be ongoing throughout the construction phase of the proposed project. Prior to grubbing activities sedimentation/siltation fencing will be installed along the bank of the watercourse. Grubbing will involve the removal of organic material and unsuitable soil including stumps, roots, felled timber, embedded logs, and root mat from the proposed construction area. Where possible, existing vegetation will be left in place.

Grading or rock breaking may be required to prepare and level the site in some areas and if fill material is required, it will be imported from an offsite source. Once the site has been cleared and graded, if needed, the area will be stabilized with gravel to a required thickness capable of supporting heavy equipment traffic.

The existing gravel access and parking area on the property may be topped with pit run gravel or crushed rock, crowned, and compacted to minimize erosion. Sedimentation structures including hay bales and silt fencing will be installed on the down gradient side of exposed erodible soils, including access and parking areas on an as needed basis to control run-off.

New WWTF

The new WWTF will be constructed adjacent the existing facility to allow continuity of wastewater treatment during the construction period (**Figure 2**). Although detailed design has yet to be completed, the new facility is anticipated to include:

- New WWTF Building - the new WWTF building is anticipated to be an industrial building with an approximate foot print of 36m² and façade that will resemble the local community. The building will have a reinforced concrete slab foundation with masonry block or pre-engineered steel construction and soundproofing. Mechanical and electrical systems will be detailed in the final design. Single phase power will be supplied to the site by overhead lines currently in place along Karen Street.
- Four Underground Tanks – the installation of four underground tanks (primary clarifier tank, equalization tank, MBBR tank and secondary clarifier tank to contain the treatment process. Tank construction and installation details will be included in the final design.
- Submerged outfall - a new submerged outfall will be installed in the same approximate location as the existing outfall in the unnamed watercourse (**Figure 3**). The HDPE pipe will be installed in an excavated trench that will extend to the south eastern bank of the watercourse.

- Connection to the existing system – the proposed system is being designed such that minimal trenching and piping will be required to connect the new facility to the existing system. It is anticipated that PVC pipe will be buried in an excavated trench to the existing onsite connection point.
- Groundwater Well – a non-potable groundwater well will be installed by a licenced well driller and will be cased into bedrock. Connection lines will be run in an excavated trench from the well to the new WWTF building. The trench will be buried using appropriate fill material.

Heavy equipment expected to be onsite during construction activities includes; excavator(s), backhoe, bulldozer, roller compactor, dump trucks, concrete trucks, well drilling rig and/or crane.

During construction, access to the site will be from Karen Street. Equipment and heavy machinery will typically be offloaded onsite adjacent to Karen Street. However, should the offloading be required to occur in the roadway appropriate signage and flagging will be in place. Detours are not expected and impacts on traffic are expected to be minimal and temporary.

Construction activities may generate waste. Solid waste and recyclable materials generated will be collected in a centralized location and will be regularly disposed offsite at appropriate facilities. Construction will also introduce construction noise during working hours to the surrounding area, which is primarily residential in nature.

2.5.2.1 Existing WWTF Decommissioning and Removal

The existing facility is located on the northwestern third of the property (**Figure 3**) on a gentle slope to the west. There is currently no potable water used on site.

The facility consists of buried connection lines to the current waste water collection system; a buried concrete primary settling tank; the existing WWTF building (wood frame construction with concrete foundation) housing a trickling filter with small stone media and a secondary clarifier; and, a PVC outfall pipe. All facility components will be decommissioned and removed. If fill material is required it will be either surplus material from onsite excavations or imported.

Heavy equipment required to decommission and remove the existing facility is expected to be limited to an excavator, bulldozer and dump trucks. The equipment will loaded/offloaded onsite adjacent to Karen Street.

2.6 Phase III – Operation and Maintenance

The proposed WWTF is being designed to be able to service an average flow of 60m³ per day with peak flows of up to 350m³ per day. The estimated lifespan of the new WWTF is 50 years.

Routine maintenance and process monitoring will be completed on a daily to weekly basis, based on communications from the SCADA system, to ensure that the facility is meeting the service demand and requirements outlined in the approval to operate. Routine process specific maintenance may also be required depending on the final design. Based on the maintenance requirements, it is estimated that an

employee will be onsite once a week for up to an hour. Additional municipal staff involved in the operation may be onsite periodically.

Non-potable water will be supplied to the facility by the onsite well to aid in the treatment process. If necessary, flocculent may be used in the treatment process. The quantity of flocculants is not known at this time. Other disinfectants and chemicals are not anticipated to be required for the treatment process.

Waste products of the facility are anticipated to be minimal and be limited to include small amounts of solid waste (recyclables and garbage) on an infrequent basis. Waste products of the process also include waste sludge which will be transported offsite for disposal as needed at a NBDELG approved facility.

The WWTF is being designed to upgrade the current treatment process with modern equipment and onsite effects should be reduced or remain similar to the current system (i.e. air emissions are expected to be reduced following the commissioning of the new WWTF). The proposed effluent discharge objectives for the new system will surpass the requirements for the current system.

The new WWTF will obtain power from the existing single phase hydro transmission infrastructure nearby. The facility is being designed to utilize equipment that is powered by a single phase 240 VAC.

2.7 Future Modifications or Extensions

The WWTF is being designed to meet the foreseeable needs of the Greenwood Subdivision residential area. Future modifications or extensions to the new WWTF are outside the scope of this assessment.

2.8 Accidents and Unplanned Events

An assessment of potential environmental impacts associated with accidents, malfunctions and unplanned events during the construction, operations and maintenance of the new WWTF have been included as part of this EIA. Potential impacts to both the socio-economic and bio-physical effects which could result from the project.

2.9 Project-Related Documents

The following reports have been included in Appendix A;

City of Saint John Property Zoning Inquiry Letter. Katelyn Davis. March 27, 2017.

NATECH Environmental Services Inc. 2017. Environmental Risk Assessment – Greenwood Wastewater Treatment Plant – Interim Report. For the City of Saint John. Hanwell, NB.

New Brunswick Department of Environment and Local Government, 2014. Approval to Operate (S-2690) Wastewater Works – Greenwood Trickling Filter.

New Brunswick Department of Environment and Local Government Clean Water and Wastewater Fund Agreement. January 2017.

3.0 Description of Existing Environment

The proposed project location is a 2500 m² lot within a residential subdivision area. The existing WWTF building is located on the northwestern third of the property while the remaining 2/3 of the property has not been developed. A gravel driveway and parking area is located between the building and WWTF building and Karen Street. The property gently slopes from the southeastern boundary toward an unnamed watercourse along the northwestern property boundary where the treated effluent from the WWTF is discharged. The perimeter of the property is generally lined with coniferous trees and shrubs providing a buffer for neighbouring residences. Photographs of the subject site taken during site visits are presented in Appendix B.

A description of the existing environment in the area of the proposed project is presented in the following sections. The information has been gathered through a desktop review and field investigation.

3.1 Methodology

3.1.1 Desktop Review

The desktop review consisted of an analysis of the biophysical and socio-economic setting based on background information available within the proposed WWTF project footprint. Information sources included digital mapping and online databases through provincial and federal government resources along with discussions with government representatives.

Prior to conducting field investigations, the Atlantic Conservation Data Centre (ACDC) and New Brunswick Department of Natural Resources (NBDNR) were consulted to identify potential for occurrences of rare and endangered flora and fauna, and unique or sensitive habitats that have been known to occur within a 1km radius of the study area. The following lists were reviewed for species and habitats of concern:

- Listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC);
- Listed under the Species at Risk Act (SARA);
- Listed under the New Brunswick Species at Risk Act (NBSARA);
- Ranked by New Brunswick Department of Natural Resources (NBDNR); and,
- Listed by the Atlantic Canada Conservation Data Center (ACDC) as extremely rare (S1), rare (S2) and uncommon (S3).

Available background information from the following websites and databases was also reviewed:

- Nature NB;
- Important Bird Areas (IBA), the Ramsar Convention on Wetlands and Federally recognized Migratory Bird Sanctuaries;
- Provincially identified deer wintering areas;

- Protected Wellfields and Watersheds; and,
- Protected Natural Areas.

Existing ambient air quality was evaluated through the closest NBDELG ambient air monitoring stations to the proposed project that are located in Forest Hills and Prince William Street (Customs Building) in Saint John, approximately 4.5 km and 10 km, respectively from the project location. Although the Forest Hills station is closer to the subject site, and in a rural or residential area and considered to be representative of the project area, it does not provide reporting on all parameters. Therefore, the Prince William Street monitoring station was also consulted. The Prince William station reports on carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO₂), and ground level ozone (O₃). The Forest Hills location reports on fine particulate matter (PM_{2.5}), nitrogen oxides (NO_x), ground level ozone (O₃), sulfur dioxide (SO₂), and total reduced sulfur (TRS). The most recent available monitoring results from NBDELG are for monitoring years 2012 and 2013.

3.1.2 Biophysical Site Investigations

Preliminary site investigations were carried out in March and May 2017. The site investigations consisted of a topographical and environmental aspect survey that focused on identifying the existing environment and potential environmental constraints. During the site visits, general wildlife habitat conditions, and evidence of wildlife, were observed to identify the type of wildlife and habitat that may be present in the study area (i.e. within 1km of the subject site).

3.2 Results

3.2.1 Atmospheric Environment

The subject site is located within a residential neighbourhood. Commercial or industrial properties have not been identified within 1 km of the subject site.

For the purpose of this environmental assessment, the atmospheric environment is characterized by; air quality, emissions, climate, and ambient noise quality.

3.2.1.1 Ambient Air Quality

Monitoring results for CO, NO₂, PM_{2.5} and O₃ for the Saint John area in 2012 and 2013 did not exceed applicable guidelines. The concentrations of SO₂ in two samples collected from the Forest Hills station exceeded applicable guidelines. The exceedances were attributed to malfunctions at the Irving Oil Refinery, located approximately 6km south of the subject property, that were detected immediately and corrected.

The existing WWTF has operated on the subject site since the 1960's and odours typical to normal operations of a very small WWTF have been discharged at the property since that time. Modernization of the system will improve on odours and treated effluent will be submerged when discharged.

3.2.1.2 Climate

Data obtained from the Canadian Climate Normals - Saint John climate station (Government of Canada, 2017) was selected as the most appropriate as it was located closest to the subject site (approximately 5 km to the east of the proposed project location at 45°19'N and 65°53'W). Data indicates an annual daily mean temperature of 5.2°C, with extremes ranging from -36.7°C to 34.4°C. The historical precipitation data from the Saint John climate station recorded an average of 1295.5 mm of precipitation per year with 1076 mm falling as rain and 239.6 cm as snowfall. According to the Climate Normals, the average annual wind speed at the climate station is 15.2 km/h from the southwest with a maximum wind speed in March at an average of 17.5 km/h. The prevailing winds are generally from the south in the summer and the northwest in the winter.

3.2.1.3 Ambient Noise Quality

Existing sound quality conditions in the vicinity of the project location were not measured for this assessment. Land uses within 1 km of the project location are limited to residential, other than the existing WWTF. Given the setting of the project, existing sound pressure levels in vicinity of the project are expected to be typical of sound pressure levels in a suburban residential area.

3.2.2 Terrestrial Environment

The subject site is located in a mature residential neighbourhood and has historically operated as a small municipal service site. Due to recent clearing activities minimal vegetation remains onsite. The adjacent property is occupied by young to mature softwood (cedar and balsam fir dominant) forest consisting primarily of a sphagnum moss, other mosses and grass understory (see photos in Appendix B).

For the purposes of this environmental assessment, the description of the terrestrial environment considers the site topography, geology, and flora and fauna (including species at risk) habitat/populations. The description has been prepared from available information and field reconnaissance conducted in spring 2017.

3.2.2.1 Site Topography and Physiography

The proposed WWTF upgrade will be constructed on a small property that is predominantly undeveloped. Surface topography gradually slopes west towards Graham Brook located approximately 1 km downgradient of the subject property. The property is bound by Secord Street to the north, Karen Street to the east, residential land to the south and undeveloped properties containing softwood trees southwest to west.

The proposed project area is located within the Fundy Coast Ecoregion (Ecoregion 4), specifically within the Fundy Coastal Ecodistrict which encompasses low-lying areas along the Bay of Fundy. The area ranges from seaside salt marshes and estuaries to the gently rolling hills and valleys of inland areas.

3.2.2.2 Geology

Based on the Generalized Surficial Geology Map of New Brunswick (Rampton et al. 1984, 2002 Ed.), the surficial geology in the vicinity of the proposed location of the new WWTF is Late Wisconsinian aged glaciofluvial sediments deposited from ice contacts. The soil is comprised of thick (>2m) eskers and kame/kettle complexes made up of sand and gravel with minor silt or till. Soil in the area of the proposed project has been previously disturbed and may not be representative of undisturbed soil horizons.

Based on the New Brunswick Department of Natural Resources bedrock geological map of New Brunswick (revised version of map plate NR-1; 2005), the regional bedrock geology in the project area is identified as the Saddleback Brook Formation of the Coldbrook Group deposited during the late Neoproterozoic period. The formation is characterized by dark grey to black crystal lithic volcanic tuff, but also contains black to grey amygdaloidal dacite, basalt flows and rhyolitic flows or domes.

3.2.2.3 Hydrology and Hydrogeology

The subject site is boarded to the northwest by an unnamed tributary to Grahams Brook and is encompassed within the Little River watershed. During the site visits pooled surface water, and unmapped wetlands were observed both northeast and west of the subject property.

Surface water flow is expected to be controlled by topography and be directed northwest toward the unnamed watercourse and into Graham Brook. A mapped wetland is located approximately 1km downgradient of the site. The proposed project area is not located within a watershed protected area as outlined in the New Brunswick Watershed Protection Program.

Shallow groundwater in the area of the subject site is expected to flow west toward Graham Brook. Potable water is supplied to the adjacent residences by private wells and communal wells shared by two to three residences. The proposed project area is not located in a designated wellfield protected area under the New Brunswick Wellfield Protection Program.

3.2.2.4 Environmentally Sensitive Areas

No environmentally sensitive areas (ESA) or protected natural areas have been identified within 1 km of the proposed project area. The closest ESAs are located at Dolan Lake (approximately 4 km to the north) and Renforth Bog (approximately 5 km to the northwest). Both areas are significant for rare or unique plant communities.

The proposed project location would not provide unique or limited habitat and is not located within an ESA.

3.2.2.5 Forest Cover and Vegetation (Flora)

Coniferous forests in the Fundy Coastal Ecodistrict are dominated by red spruce, balsam spruce, black spruce, white spruce and tamarack. Cedar is also a predominant species on the limestone-derived soils around Saint John. In the Saint John area, the most common hardwoods are white birch, mountain ash, red maple, and yellow birch.

Forest cover has largely been removed on the property. Tree cover immediately west and adjacent the property boundary was identified as a cedar forest dominated by eastern white cedar (*Thuja occidentalis*), balsam fir (*Abies balsamea*), and white birch (*Betula papyrifera*). An unnamed watercourse along the northern boundary of the subject property was dominated by willow (*Salix* sp.), speckled alder (*Alnus incana*), fireweed (*Chamerion angustifolium*), cattails (*Typha* sp.), and watercress (*Nasturtium* sp.).

The understory was dominated by moss (sphagnum) with limited vegetation diversity consisting of grass, cinnamon fern (*Osmundastrum cinnamomeum*) and other mosses which reflects the soil moisture and nutrient regimes of this type of habitat. Some grass and regenerating balsam fir (*Abies balsamea*) was the secondary species noted within the understory or herbaceous cover.

A review of ACCDC data did not identify vegetation (flora) species of conservation concern within a 1 km radius of the project footprint (see Appendix B). Based on the habitat identified during the site visit, there is limited potential habitat to support vegetation of conservation concern. Species identified during the field investigations were species considered to be common and widespread within this region of the province.

3.2.2.6 Wildlife (Fauna) and Wildlife Habitat

The current conditions at the subject property consist of minimal tree cover along property boundaries with limited vegetation allowing for limited habitat for wildlife. However, the area surrounding the subject property is predominantly forested or undeveloped, with the exception of residential properties to the north and south, and provides suitable habitat for small and large mammals.

During the 2017 site visits, wildlife habitat conditions, and evidence of wildlife, were observed to identify the type of wildlife that the study area (i.e. within 1 km of the subject property) has the potential to support. Evidence of white tailed deer (*Odocoileus virginianus*) browse and droppings was observed during the site visit. No other animal signs (actual sightings, auditory detections, tracks, scat, and/or dens/nests) were observed during either site visit.

Based on field observations, the study area would provide suitable habitat for white-tailed deer as well as small mammals and urbanized wildlife such as; skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*) meadow voles (*Microtus pennsylvanicus*), fox (*Vulpes vulpes*), squirrels (*Sciurus vulgaris*) and chipmunk (*Tamias striatus*). Mammals may use the property for foraging and/or migration, but are unlikely to inhabit the proposed project area due to the limited availability of suitable habitat. More suitable habitat exists west and southwest of the property.

The proposed project location would not provide unique or limited habitat for any of these species.

3.2.2.7 Wildlife (Fauna) of Conservation Concern

A review of the ACCDC database indicated that no wildlife species of conservation concern (excluding birds, and “location sensitive” species) had historically been observed within a 1 km or 5 km radius. Refer to Appendix C for the ACCDC report.

3.2.2.8 Birds and Bird Habitat

Important Bird Areas (IBA)

The proposed project area is not within an Important Bird Area (IBA). The nearest IBA is the Saint's Rest Marsh & Beach (NB022), located approximately 10 km southwest of the proposed project area.

Maritime Breeding Bird Atlas

The Maritime Breeding Bird Atlas (MBBA) database provides information on the presence of breeding bird species counts conducted between 2006 -2010. It was determined through the on-line search tool that the proposed project lies within the "Renforth #2" Atlas square (20KR62) with the closest roadside point count (PC) to the project location occurring at PC# 39. During the atlas period 2006-2010, a total of 62 species of birds were recorded within this square. Of these species, 32 were confirmed as breeding, 17 were probable breeders, and 9 were possible breeders. There were no species of conservation concern noted during the MBBA surveys at PC #39.

Atlantic Canada Conservation Data Center (ACCDC)

The ACCDC database indicates that there are no species of conservation concern potentially occurring within 1 km area of the proposed project area (Appendix B). However, the New Brunswick Department of Energy and Resource Development (DERD) and the ACCDC consider a number of species as "location sensitive". The ACCDC database indicated that Bald Eagles are known to occur within 5 km of the project footprint (**Table 3-1**).

Table 3-1: Summary of Bird Species of Conservation Concern Identified by ACCDC Database Within 5 km of the Project Location

Common Name	Scientific Name	ACCDC Status	COSEWIC/ SARA Status	NBSARA Status	Typical Habitat	Habitat Suitability within Project Footprint
Bald Eagle	<i>Haliaeetus leucocephalus</i>	S4	-	Endangered	Found throughout New Brunswick, but more common in the southwestern portion of the province where there is more open water. Nests are typically built near open water where there is an abundance of fish, often on very large white pines. Coastal islands also provide suitable habitat for nesting.	No nesting or roosting due to absence of tall, mature pine or hardwood trees suitable for nesting or roosting. Additionally no observed suitable nesting/roosting or large bodies of water within 500m of the project.

The proposed project location would not provide unique or limited habitat for Bald Eagles.

3.2.3 Aquatic Environment

The proposed project area is situated within the Graham Brook subwatershed, which is in turn located within the Little River Watershed.

For the purposes of this environmental assessment, the description of the aquatic environment considers wetlands and watercourses located on, or adjacent to, the proposed project area. The description has been prepared from available information and field reconnaissance conducted in spring 2017. It is recognized that any project proposed within 30m of a watercourse or wetland that is identified on the GeoNB map must apply for a permit under the Wetland and Watercourse Alteration Regulation (WAWA) under the Clean Water Act.

3.2.3.1 Wetlands

According to the GeoNB wetland mapping database, there are no regulated wetlands or provincially significant wetlands within 30m of the proposed project area. The nearest GeoNB mapped wetland is located approximately 250 m north and upgradient of the subject property.

During field observations in May, 2017, unmapped wetlands were identified in the area of the subject property including; a forest wetland (WL1) located on the subject property and extending to the southwest; a shrub wetland bound by Karen Street (WL2) located to the northeast; and a shrub wetland bound by Secord Street (WL3) located to the northwest (**Figure 2**). The unnamed watercourse located along the northern boundary of the subject property serves as a stormwater drainage as well as connection for WL1 and WL2 to Graham Brook. WL3 was not observed to be connected to WL1 and WL2 by means of a culvert but was considered to potentially maintain some connection under Secord Street through the groundwater table.

WL1 is connected to the GeoNB mapped wetland (shrub wetland) located approximately 250 m west of the project site. These wetlands (WL1, WL2 and the mapped wetland) form a complex of forest wetland and shrub wetland that is more than 8.0 hectares in size. The subject property occupies approximately 0.12 ha of this wetland. **Table 3.2** provides a summary of the field identified wetlands.

Due to the location and size of the project footprint (0.12 ha) in relation to the size of the unmapped wetland complex (WL1/2) (>8ha), it is not anticipated that the proposed project activities would have a significant impact on the surrounding wetland habitat.

Table 3-2: Field identified wetlands within 30 m of the Project Area

Wetland ID	Project Component Interaction	Fish Bearing (Y/N) ¹	Description				
			Wetland Type	Wetland Size (ha)	Area within Project Footprint (ha)	Dominant Vegetation	Hydrologic Characteristics
WL1 – project footprint extends west-southwest	Construction: Within 30 m	N	Forest Wetland	>8	0.12 (~1.5%)	Eastern White Cedar, Balsam Fir, Sphagnum Moss	Located in Graham Brook subwatershed. Contribution from stormwater, precipitation and shallow groundwater
WL2 – East of Karen Street		N	Shrub Wetland	>2.7	n/a	Speckled alder, eastern white cedar, black spruce, red maple, willow, sedges, grasses	
WL3 – North of Secord Street		N	Forest Wetland	0.4	n/a	Speckled alder, cattails, willow, sedges, grasses	

3.2.3.2 Watercourses

According to the GeoNB watercourse mapping (1:10,000) database, a watercourse is present along the northern property boundary shared with Secord Street. Observations made during site visits confirmed the presence of the unnamed tributary to Graham Brook. This watercourse is also contiguous with the unmapped wetland east of Karen Street as described previously in Section 3.2.3.1.

The watercourse channel, with a width ranging between 0.5 to 1.0 m, has a substrate that is dominated by silt, organics, sand, and rock. During the site visit the watercourse was also observed to facilitate stormwater drainage for the subject property and immediate residential area (**Figure 3**). The drained surface water discharges to Graham Brook approximately 1 km downgradient, eventually connecting to the Little River and subsequently to the Little River Reservoir. This watercourse would not be considered fish habitat. Refer to Appendix B for site photographs. **Table 3-3** provides a summary of the watercourse habitat conditions.

Table 3-3: Watercourse Habitat Conditions within 30 m of the Project Area

Watercourse ID	Project Component Interaction	Fish Bearing (Y/N)	Habitat Description				
			Substrate	Watercourse Width (m)	Dominant Habitat	Depth (m)	% Cover
WC1 – Unnamed Tributary to Graham Brook	Construction: Within 30 m Operations: New Outfall (effluent),	N	Silt, organics, sand, rock	1.0	Run	20-25 cm	20%

3.2.4 Archaeological and Cultural Environment

There are no known cultural heritage or archaeological resources located within the proposed project area or on adjacent properties.

According to the New Brunswick Register of Historic Places, there were 365 listings of historic buildings within the City of Saint John. The closest registered sites to the study area are located approximately 10 km west of the subject property on Mount Pleasant Avenue.

Due to the location of the proposed project area, it has limited potential to preserve cultural heritage resources either Native (both pre-contact and historic) or Euro-Canadian resources. In addition, the proposed project area was cleared and grubbed during the construction of the existing WWTF, and it is expected cultural resources (if any) were likely destroyed or found at that time.

3.2.5 Socio-Economic Environment

3.2.5.1 Population and Local Economy

Based on the 2011 census the population of Saint John metropolitan area was approximately 130 000, showing an increase of approximately 4.4% from 2006 (Statistics Canada, 2016). The core of the City serves as the commercial, industrial and employment centre for the region.

The Greenwood Subdivision community consists of 150 residences and is located approximately 15 km northeast of the City core. Residents predominantly commute for employment purposes and government services. The surrounding community is situated off Loch Lommond Road, a main highway within the City of Saint John, and is a predominantly urban setting. The surrounding community includes schools, several churches, the Saint John Airport and the Little River Reservoir Park.

Land Use

The subject property, owned by the City of Saint John, is zoned for utility services and has operated as a WWTP since the 1960's. Prior to which the property was undeveloped and forested. The surrounding properties are occupied by privately owned residences.

There are no commercial land uses immediately adjacent to the proposed site. The nearest major commercial establishments are the Saint John Airport (located approximately 5 km southeast of the property) and the Irving Oil refinery (located approximately 6 km southwest of the property). There are no industrial uses immediately adjacent to the proposed project site.

Recreational and Tourism

The City of Saint John services a regional population of over 150,000, which provides a sufficient population base for ample recreational facilities. Natural features in the area, including the Bay of Fundy and many lakes and waterways, provide many areas of interest to tourists as well.

The Little River Reservoir Park area, located approximately 5 km southwest of the subject property, is an important recreational area for local users and tourists. The year-round park is widely used for

recreational fishing, hiking, swimming in the spring to fall months and skiing, snowshoeing and hiking during the winter months.

3.2.5.2 Transportation and Transportation Infrastructure

Karen Street is accessed via Greenwood Street located north of Loch Lommond Road. Loch Lommond Road is the main commuter roadway for the Greenwood Subdivision area and provides access to other New Brunswick Highways. The majority of the communities are along the Loch Lommond Road.

The proposed project is located 5 km northwest of the Saint John Airport (YSJ), serving domestic and international commercial passenger and cargo flights.

The proposed project is not anticipated to significantly influence transportation or transportation infrastructure.

3.2.5.3 Utilities

The Greenwood Subdivision area, including the subject property, is supplied single phase power by Saint John Energy. There are no generating facilities within the proposed project area.

The Greenwood residential properties are supplied potable water by individually drilled wells or by communal wells servicing two or three residences. The existing central wastewater treatment facility on the subject property currently provides sanitary services to 37 residents of the Greenwood subdivision residents, the remainder are serviced by private septic systems.

Bell Aliant, Telus and Rogers have lines and communication towers within the region and provide communication services to the Greenwood area.

3.2.5.4 Aboriginal Communities

The nearest First Nation community to the proposed project area is the Oromocto First Nation, a Maliseet community of 654 persons (304 on-reserve) (AANDC, 2014). Oromocto First Nation is located within Oromocto town limits and occupies approximately 20 hectares of land located 120 km north of the project site. Established in 1895, it currently governed by an elected council, Chief and five councillors serving a two-year term. The current council governs until Fall 2017 (Oromocto First Nation, 2017).

There no identified traditional use areas located within the project footprint.

4.0 Assessment of Environmental Impacts

There is potential for the local environment in the area of the subject site to be impacted by the project. An assessment of potential impacts during each phase of the project, as well as potential accidental events/malfunctions, has been undertaken below.

4.1 Methodology

Environmental features deemed to have specific value to the ecosystem, heritage and culture or are afforded protection by legislation are identified as Valued Ecosystem Components (VEC) or Valued Socio-economic Components (VSC's). The following environmental features have been identified as a VEC/VSC in relation to the proposed project:

- Atmospheric Environment;
- Aquatic Environment;
- Terrestrial Environment;
- Species at Risk;
- Archaeological and Cultural Resources; and,
- Socio-Economic Environment.

The impact assessment involves identifying the potential for the project to interact with the VEC/VSCs.

Because each phase of the project involves different activities, and potentially different interactions with the VEC/VSCs, the impact assessment was completed in consideration of each of the project phases identified in Section 2.5 (Project Planning and Preparation; Construction; and Operation and Maintenance) as well as unplanned events and accidents.

The initial screening to identify if interactions between the project and the environmental component are anticipated is presented in **Table 4-1**.

Table 4-1: Anticipated Project Interaction with VECs/VSCs

Environmental Components		Project Components			
		Planning and Preparation	Construction Phase	Operations and Maintenance	Unplanned Events and Accidents
Atmospheric	Ambient Air Quality		✓	✓	✓
	Climate				
	Ambient Noise Quality		✓		
Terrestrial	Vegetation (Flora)				
	Wildlife (Fauna)		✓		✓
	Migratory Birds		✓		✓
	Designated Habitat and other Protected Areas				
Species at Risk	Flora/Fauna and Associated Habitat				
Aquatic	Groundwater			✓	✓
	Surface Water		✓		✓
	Wetlands		✓		
Cultural and Heritage Resources	Archaeological / Cultural Heritage Resources				✓
Socio-Economic	First Nations / Aboriginal Interests				✓
	Health and Safety				✓
	Labour and Economy				
	Land Use				✓

5.0 Environmental Effects Assessment and Mitigation

An analysis of the potential environmental effects for each of the interactions identified in Section 4.1 is undertaken in the following sections. For each of these interactions the potential impact and boundaries are identified, the effect prior to mitigation is evaluated, mitigation is proposed, and significance and residual effects were predicted. The predicted residual effect assumes that each of the recommended mitigation measures has been implemented.

5.1 Methodology

5.1.1 Potential Impact from Interaction

Potential interactions between the project phases and VEC/VSCs were considered. If the interaction was expected to result in a net negative impact to the VEC/VSC it was carried forward for mitigation and a residual effect was predicted.

Impacts that were not expected to pose a net change to the project area (i.e. noise levels for the new WWTF and effluent quality and quantity discharge are expected to be similar or improved compared to the existing WWTF) were not considered carried forward for further consideration.

5.1.2 Impact Effects Boundaries

The spatial and ecological boundaries for the environmental impact assessment encompass the physical or geographical limit for which impacts related to a proposed project will be considered and assessed. The spatial boundary for the assessment of the potential environmental effects of the project on the following VECs are presented in **Table 5-1**.

Table 5-1: Spatial Boundaries for Potential Environmental Effects

Environmental Components		Spatial Boundary (km)
Atmospheric	<i>Ambient Air Quality</i>	0.25
	<i>Climate</i>	1
	<i>Ambient Noise Quality</i>	0.25
Terrestrial	<i>Vegetation (Flora)</i>	0.5
	<i>Wildlife (Fauna)</i>	1
	<i>Migratory Birds</i>	1
	<i>Designated Habitat and other Protected Areas</i>	1
Species at Risk	<i>Flora/Fauna and Associated Habitat</i>	1
Aquatic	<i>Groundwater</i>	0.03
	<i>Surface Water</i>	0.03
	<i>Wetlands</i>	0.03
Cultural and Heritage Resources	Archaeological / Cultural Heritage Resources	0.5
Socio-Economic	First Nations / Aboriginal Interests	0.5
	Health and Safety	5
	Labour and Economy	50
	<i>Land Use</i>	n/a

5.1.3 Mitigation

Mitigation is identified for each interaction and/or effect in an attempt to reduce the severity, magnitude or duration of the interaction. Best management practices (based on industry guidelines and regulatory guidance documents) have been identified as appropriate mitigative measures. In addition, several acts, codes, regulations and guidelines may require appropriate actions be conducted as mitigative measures prior to or during the interaction. The following Acts, codes, regulations and guidelines have been consulted in the development of the mitigative measures:

- Environment Canada's Migratory Birds Convention Act,1994 (MBCA);
- The Migratory Birds Regulations (MBR);
- The Fisheries Act;
- Watercourse and Wetland Alteration Regulation;



- The Clean Air Act (New Brunswick);
- New Brunswick Health and Safety Act;
- Fire Code of Canada;
- Canadian Council of Ministers of the Environment – Canadian Environmental Quality Guidelines; and,
- The Atlantic Risk Based Corrective Action Guideline for the Management of Contaminated Sites.

5.1.4 Significance and Residual Effect

The significance of the resultant effect of the interaction after mitigative measures were applied was evaluated using the following questions as a guide:

1. What is the magnitude of the effect?
2. What is the geographic extent of the effect?
3. What is the duration (short or long term) and frequency of the effect?
4. How does the net effect compare to the existing environment? Does it represent a substantive or order of magnitude negative change in baseline conditions?
5. Is there a substantive public, government or agency concern?
6. What is the ecological and/or social context for the effect?
7. Is the effect reversible?

The significance of the resultant effects are ranked on the following scale (**Table 5-2**);

Table 5-2: Significance of Environmental Effects

Significance of Effects	Definition
Negligible	Impacts contained to the immediate area (<5m) and are short term (days to weeks)
Low	Impacts contained to the project area and/or are short term in duration (>1 year)
Moderate	Impacts may extend to the area surrounding the project and/or are moderate term in duration (1-5 years)
High	Impacts extend to the area surrounding the project and/or are moderate term in duration (>5 years)

The residual effect of the interaction after mitigative measures were applied was then predicted.

5.2 Results

The results of the environmental effects evaluation, including post mitigation, are presented on **Table 5-3**.



Table 5-3 - Environmental Effects Evaluation Results

Project Phase	Potential Impact	Mitigation	Significance of Effects	Residual
Atmospheric Environment - Ambient Air Quality, Ambient Noise Quality				
Construction	<ul style="list-style-type: none"> Fugitive dust emissions; Generation of particulate matter from construction activities Emissions of NOX, CO, VOCs and SO₂ from construction equipment; and Elevated noise levels at adjacent and nearby receptors from construction equipment and activities. 	<ul style="list-style-type: none"> As part of the Environmental Management Plan (EMP), a noise reduction plan will be established and communicated to the contractors prior to construction During construction nearby residents will be notified of the schedule for construction activities and the likely duration Contractors are to ensure that equipment and tools are well maintained Vehicles and equipment will be properly muffled and maintained according to emission and noise suppression standards All construction equipment will be turned off when not in active use to minimize excess idling A plan for handling soil and construction materials for the site will be developed (i.e. excavated soil and rock will be stockpiled away from any watercourse or wetland in predefined areas or removed from site to a predetermined location) with an intent to minimize soil stockpiled, and duration soil is stockpiled, at the site Monitoring of weather (wind conditions) and stabilization of stockpiles, bare slopes to minimize increase in fine particulate matter Water will be used to reduce dust, where necessary Exposed soils will be stabilized as soon as practical Complaints related to noise from the construction will be addressed by the contractor. 	Low	None
Operational	<ul style="list-style-type: none"> Elevated noise levels at adjacent residences from onsite equipment. 	<ul style="list-style-type: none"> The WWTF building will be constructed such that the soundproofing measures are included Blowers and fans will be pointed away from residential properties Sound levels and odors will be similar to, or improved, than the current operations of the existing WWTF 	Low	None
Unplanned Events and Accidents	<ul style="list-style-type: none"> Fire may result in decreased air quality for the subject site and surrounding area; and, Treatment operations failure may increase odors noticeable to residents in the surrounding area. 	<ul style="list-style-type: none"> Rubbish and waste materials will be kept at minimum quantities and burning of this material will be prohibited Waste materials will be collected on a regular basis and disposed of at an appropriate facility Oily rags will be stored in approved receptacles and disposed of at approved waste facilities Operation requirements will be completed in accordance with the DELG Approval to Operate Certificate 	Low	None
Terrestrial Environment - Wildlife and Wildlife Habitat, Migratory Birds				
Construction	<ul style="list-style-type: none"> Alteration of, disruption to, or removal of, foraging areas for wildlife; Disturbance of adjacent nesting/breeding habitats from construction noise; Disturbance from the visual impacts vehicles and construction equipment may cause disruption of sensitive wildlife activity such as breeding and/or feeding; and, Heavy equipment use during the construction activities may cause direct injury or death of wildlife through collisions or destruction of dens and food sources. 	<ul style="list-style-type: none"> Vegetation will be retained where possible to provide wildlife habitat Construction crews and machinery are to use designated roadways and access-points to limit disturbance off the project footprint and minimize the interactions with wildlife and wildlife habitat To minimize wildlife encounters, site and working areas shall be kept clean of food scraps and garbage and will be removed from the site daily In the case of wildlife encounters the following shall be implemented: <ul style="list-style-type: none"> No attempt will be made by any worker at the project site to chase, catch, divert, follow or otherwise harass wildlife by vehicle or on foot Equipment and vehicles will yield the right-of-way to wildlife Any wildlife sightings or encounters shall be reported to the site supervisor If the nest of any bird is encountered during construction activities, work around the nest shall cease until the City of Saint John dispatches a biologist to assesses the situation and appropriate mitigations are applied All workers will adhere to the Environment and Climate Change Canada (ECCC) <i>Migratory Birds Convention Act</i>, 1994 (MBCA) and the Migratory Birds Regulations (MBR) Tree clearing shall not be undertaken Grubbing will be initiated as early as possible, and will be completed in 30 days of initiation To minimize disruptions with bird/bat activity at night, the project construction activities will be limited to daylight hours. 	Low	None
Unplanned Events and Accidents	<ul style="list-style-type: none"> Chemical and fuel spills have the potential to kill vegetation, resulting in a loss of habitat or food sources; and, Fires may result in a loss of vegetation in adjacent areas which has the potential to impact wildlife food sources. 	<ul style="list-style-type: none"> A spill response plan will be completed and detailed in the EMP and the contractor will be required to provide spill response training to construction personnel Prior to commencing construction the contractor will be required to ensure that spill response equipment is readily available onsite Any spills or leaks that occur will be reported to the appropriate regulatory bodies (1-800-565-1633), if applicable, as soon as possible Remedial action, or engineered controls, for any spills or leaks that occur will be completed Refueling, oiling, and maintenance of equipment will be completed in specifically designated areas to minimize the potential for terrestrial impacts Servicing of equipment fluids will be completed offsite by a licensed mechanic; however if required to be completed onsite the work will be completed over an impervious surface Rubbish and waste materials will be kept at minimum quantities and burning of this material will be prohibited Waste materials will be collected on a regular basis and disposed of at an appropriate waste facility Oily rags will be stored in approved receptacles and disposed of at approved waste facilities Construction equipment and vehicles will be stored away from surface water bodies to minimize potential for accidents or vandalism, petroleum hydrocarbons will not reach a watercourse or wetland habitat. Appropriate erosion and sediment control structures will be installed to minimize impacts to adjacent watercourse/wetland habitat areas 	Low	None

Project Phase	Potential Impact	Mitigation	Significance of Effects	Residual
Aquatic Environment - Groundwater, Surface Water (Watercourses and Wetlands)				
Construction	<ul style="list-style-type: none"> A change in local surface water quality in an aquatic receptor (wetland or watercourse) due to deleterious substances discharging downgradient of the project footprint. 	<ul style="list-style-type: none"> Ground disturbance shall be minimized to reduce the potential for erosion and sedimentation to the aquatic environment Natural vegetation (especially adjacent to the wetland) will be preserved as much as possible A watercourse and wetland alteration (WAWA) permit under the Clean Water Act will be obtained prior to any work within 30 m of a watercourse or wetland Stock piled materials will be kept as far as feasible away from a watercourse or wetland and as defined by the DELG WAWA permit conditions of approval If practical, work will be scheduled so as to avoid outdoor work during periods of significant precipitation, defined as rainfall in excess of 25 mm in 12 hours, or an intensity of greater than 5 mm/hour for 2 or more hours. This shall be considered a minimum; conditions may require more stringent criteria to adequately control erosion and sedimentation Prior to heavy rainfall events sediment control measures will be checked to ensure they are continuing to operate properly Proper sediment control measures will be installed Additional mitigate measures as outlined in the conditions of approval of the WAWA will be followed 	Low	None
Operational	<ul style="list-style-type: none"> Possibility for drawdown of the groundwater table associated with use of the new well. 	<ul style="list-style-type: none"> The proposed WWTF will source non-potable groundwater for its operations from only the onsite well The onsite well will not provide potable water to any residential, industrial, or communal water supply Water volume requirements for the WWTF operations will remain less than 25 cubic meters per day The onsite well will adhere to applicable NBDELG Water Well Regulations 	Low	None
Unplanned Events and Accidents	<ul style="list-style-type: none"> Chemical and fuel spills have the potential to impact groundwater or migration to the Saint John River; and, Erosion and sediment control measures failure. 	<ul style="list-style-type: none"> A spill response plan will be completed and detailed in the environmental protection plan and the contractor will be required to provide spill response training to construction personnel Prior to commencing construction, the contractor will be required to ensure that spill response equipment is readily available onsite and each piece of machinery is equipped with a spill response kit Any spills or leaks that occur will be reported to the appropriate regulatory bodies, if applicable, as soon as possible Remedial action, or engineered controls, for any spills or leaks that occur will be completed Refueling, oiling, and maintenance of equipment will be completed in specifically designated areas to minimize the potential for surface water impacts Servicing of equipment fluids will be completed offsite by a licensed mechanic; however, if required to be completed onsite, the work will be completed over an impervious surface Oily rags will be stored in approved receptacles and disposed of at approved waste facilities Construction equipment and vehicles will be stored away from any surface water to ensure that in the event of an accident or vandalism, petroleum hydrocarbons will not reach the watercourse or wetland The performance of erosion and sediment control measures will be inspected daily and prior to storm events. Issues or concerns will be addressed proactively 	Low	None
Cultural and Heritage Resources				
Unplanned Events and Accidents	<ul style="list-style-type: none"> Potential discovery and destruction or alteration of all or part of an archaeological resource; and, Potential discovery of human remains. 	<ul style="list-style-type: none"> Construction crews and machinery are to use the designated roadways and access points to limit disturbance off the project footprint Construction crews will be made aware of the potential for archaeological resources within the construction area The contractor will be educated on the proper mitigative activities if an archaeological resource or human remains is unearthed Should an archaeological resource be unearthed, work in the area will cease immediately and Archaeological Services New Brunswick (ASNB) will be contacted at (506) 453-3014 for further mitigation. Until a qualified archaeologist arrives at the scene, no one shall disturb, move or rebury any uncovered artifact. Construction at the proposed project area will only resume when authorized by ASNB and once mitigative measures have been completed Should human remains be unearthed, work in the area will cease and the Saint John Police will be notified immediately. No one will disturb, move or rebury any uncovered human remains. If it is a suspected First Nations burial site, the Oromocto First Nation will be contacted 	Low	None

Project Phase	Potential Impact	Mitigation	Significance of Effects	Residual
Socio-Economic - First Nation / Aboriginal Interests, Health and Safety, Land Use				
Unplanned Events and Accidents	<ul style="list-style-type: none"> • During construction accidents connected to construction activities may pose a physical hazard to the contract workers or the public residing or working in close proximity to the construction activities; and, • Fire may result in damage to adjacent residential properties. 	<ul style="list-style-type: none"> • Rubbish and waste materials will be kept at minimum quantities and burning of this material will be prohibited • Waste materials will be collected on a regular basis and disposed of at an appropriate facility • Oily rags will be stored in approved receptacles and disposed of at approved waste facilities • Contractors will be required to comply with requirements of the New Brunswick Department of Transportation and Infrastructure's (NB DTI) Work Area Traffic Control Manual (WATCM) as well as all applicable Acts, Regulations and By Laws in force for regulation of traffic or use of roadways • The contractor will be required to post appropriate signage prior to entering the construction areas and to facilitate passage of traffic around restricted construction area (use of flaggers on Bay Crescent Drive, as necessary) • Workers and operators of heavy equipment will be properly trained in order to help avoid hazardous situations • A site specific / project specific health and safety plan will be developed for all stages of construction of the Project • Tender documents for the construction of the Project will include a clause that the contractor will adhere to the H&S standard, procedures, policies, safe work practices, etc, as outlined in the NB H&S Act • An emergency response plan and procedures will be developed to ensure an injured person will receive aid as quickly and safely as possible • During construction nearby residents will be notified of the schedule for construction activities and the likely duration 	Low	None

6.0 Public Involvement

INTRODUCTION

In accordance with the New Brunswick EIA Regulation (87-83), public notification of the proposed project is required. Evidence of notification presented in Appendix D. Consultation has primarily focused on those individuals residing in the Greenwood Subdivision, as well as provincial regulatory authorities providing guidance on the regulatory requirements. The following individuals have been consulted:

Consultation with Other Departments

Provincial Departments that have been contacted through email communication and/or telephone:

1. Christie Ward – Project Manager, NBDELG Environmental Assessment Section.
2. Pierre Doucet - Project Manager, NBDELG Environmental Assessment Section.
3. Sheryl Johnstone –Engineer, NBDELG Industrial Processes Section.
4. Kim Allen – Director, Engagement and Consultation, Aboriginal Affairs Secretariat.

COMMUNICATIONS OBJECTIVES

The following objectives have been established by the City of Saint John to ensure effective communications with the stakeholders and public:

1. Keep the public informed about the proposed project through timely and meaningful information release(s) in both official languages.
2. Consult with affected stakeholders in a timely manner in an effort to mitigate impacts.
3. Provide the public and interested stakeholder groups with opportunities to be involved and learn more about the proposed project.

DIRECT WRITTEN COMMUNICATIONS TO AREA RESIDENTS

Residents of Greenwood Subdivision were made aware of the proposed project, and its location, through direct written communications on March 17, 2017. Each resident along Karen Street, Shelia Avenue, Abigail Place, Secord Street, Sharon Avenue, Maureen Avenue, Greenwood Street and Asied Street was provided with an invitation to an open house on March 23, 2017 and a project information sheet detailing the following information:

- Brief description of the proposed project;
- Description of the location for the proposed project;
- Map showing the location of the proposed project;
- Status of the Provincial Regulatory Approval process;

- Statement indicating that members of the general public can ask questions and/or raise concerns with the Proponent regarding any and all environmental impacts; and,
- Date that the public comment period expires.

The project information sheet is attached in Appendix D.

An open house style information session was held at the Silver Falls United Church on March 23, 2017 from 2:00 to 4:00 p.m. and again from 6:00 to 8:00 pm. An advertisement inviting stakeholders to the session was published in the Telegraph Journal on March 17, 2017 (Appendix D). The open house was attended by three residents and the sign-in sheet is attached in Appendix D. Questions were primarily related to traffic impacts during construction, expansion of services and the proposed treatment process. Requests for modifications or concerns with the proposed project were not raised by the local residents during the information session. A summary of the questions and comments received and our responses are presented in **Table 6-1**.

Table 6-1: Environmental Effects Evaluation Results

Questions and Comments from the Public	Response to Questions and Comments
A resident asked how the project was being funded and if local taxation rates would be increased as a result of the project.	Residents were informed that the project is partially funded by the Clean Water Wastewater Fund Program. Taxation rates are dictated by the City of Saint John by-laws and will not be impacted by this project.
A resident posed a question regarding the duration and timing of work that would be completed in the Karen Street area.	Initial information on the duration and timing of work was verbally provided to residents at the information session. An overview of the schedule was also provided on the information sheet available at the information session.
A resident inquired about the final viewscape of the project and the amount of landscaping that would be required. Two residents inquired if the serviced area would be expanded as a result if the upgrades.	Renderings of the project were on display at the information session. Residents were also informed of the level of landscaping anticipated to be. Residents were informed that expansion of the service area is outside of scope of the project.
Several general questions regarding the proposed treatment process and frequency of storage tank pumping were posed.	Information on the current and proposed treatment processes was verbally provided at the information session. Residents were also informed that a project description will be included in the Environmental Impact Assessment and will be made available to the public.

Written comments from the public were not received by the public consultation closing date, nor have any questions or comments been received since.

FIRST NATIONS COMMUNITIES

The Oromocto First Nation, located approximately 75 km north of the proposed project area is the closest First Nation community to the subject site.

The Aboriginal Affairs Secretariat (AAS) was contacted in writing on March 23, 2017 with inquiries as to the duty to consult with relation to this project. On April 18, 2017 the City was advised that the

conclusion of the initial assessment of the project was complete and that AAS determined that there would be no obligation regarding the Crown's Duty to Consult as there is no apparent adverse impact to Aboriginal or Treaty Rights as a result of the project. Documentation of the initial assessment from AAS is presented in Appendix D.

REGISTRATION DOCUMENT AVAILABILITY

The City of Saint John will provide a copy of the Registration document to the NBDELG Sustainable Development, Planning and Impact Evaluation Branch and the regional Saint John NBDELG office. Requests for copies from the public, stakeholders and First Nation communities will be honoured by providing a copy of the Registration document directly. Subsequent submissions in response to issues raised by the Technical Review Committee will be made available upon request.

7.0 Permits and Approvals

The following permits and approvals will be obtained once the Certificate of Determination is received and prior to proceeding with the physical components of the project:

Table 7-1: List of Permits and Approvals

Permit or Approval	Authority Responsible
Watercourse and Wetland Alteration Permit	NBDELG (Watercourse and Wetland Alteration Regulation - Clean Water Act)
Approval to Construct	NBDELG (Water Quality Regulation - Clean Environment Act)
Approval to Operate	NBDELG (Water Quality Regulation - Clean Environment Act)
Building Permit	City of Saint John (Community Plan)

8.0 Funding

The proposed project is being funded under the Clean Water and Wastewater Fund through a partnership between the municipality, the Province of New Brunswick and the Government of Canada. Contact information for the departments involved in the partnership are presented below:

Government of Canada

Infrastructure Canada
180 Kent Street, Suite 1100
Ottawa, Ontario K1P 0B6

Province of New Brunswick

Department of Environment and Local Government
20 McGloin Street
Fredericton, NB E3A 5T8

City of Saint John

P.O. Box 1971
15 Market Square
Saint John, NB E2L 4L1

The Funding Contribution Agreement (Reference No. 6990-1070; Appendix A) requires that the project be completed prior to March 31, 2018.

9.0 Summary

This EIA registration has been prepared for the construction and operation of a new wastewater treatment facility and the decommissioning of the existing wastewater treatment facility in Greenwood subdivision in the City of Saint John. The proposed project will allow the City to modernize the treatment processes, improve the treated effluent quality, and reduce impacts on the local environment.

The information provided in this document is based on the current available design/planning information and existing environment information obtained in 2017.

The applicable environmental components and potential project effects were assessed and presented with meaningful mitigation measures to minimize, and in some cases eliminate, the potential effects. Based on these interactions, it can be concluded that, with the proper mitigation and standard operating procedures as outlined in this document, the residual effects of the project would be considered not significant for project components. The project would be considered to provide a net positive effect.

10.0

Closure

This report was prepared by Dillon on behalf of the City of Saint John. Dillon has used the degree of care and skill ordinarily exercised under similar circumstances at the time the work was performed by reputable members of the environmental consulting profession practicing in Canada. Dillon assumes no responsibility for conditions which were beyond its scope of work. There is no warranty expressed or implied by Dillon.

The material in the report reflects Dillon's best judgment in light of the information available to Dillon at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Dillon accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Yours truly,

DILLON CONSULTING LIMITED

Jeff Trail
City Manager
City of Saint John

Kristin Banks, P.Eng.
EIA Lead for Project
Dillon Consulting

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