



**DILLON**  
CONSULTING

TOWN OF WOODSTOCK  
**Environmental Impact Assessment  
(Draft)**

Town of Woodstock Water Supply





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- B Project Site - Photos
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## References

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## 1.0 The Proponent

### 1.1 Project Title

Town of Woodstock Water Supply

### 1.2 Proponent Contact

The proponent for the proposed project is the Town of Woodstock. The project manager, and principle contact, for the project is:

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## 2.0 Introduction

The Town of Woodstock (the Town) is proposing to complete a new municipal water system in Grafton, Carlton County, NB in order to supply the Town with a viable source of potable water that would not be at risk to annual flooding. Following a groundwater exploration program conducted in 2015, a potential viable water source was identified on a property located near Grafton, Carleton County, New Brunswick (Property Identification (PID) No. 10165819). Following the groundwater exploration program, a new production well was installed on the property, and subsequent well development and hydraulic testing confirmed the viability of the water supply.

In order to complete the new municipal water system and connect it to the Town's existing municipal water supply infrastructure, transmission piping must be installed via Horizontal Directional Drilling (HDD).

This document is provided as the EIA registration document and is submitted to the New Brunswick Department of Environment and Local Government (NBDELG) as part of requirements under the New Brunswick Environmental Impact Assessment (EIA) Regulation – *Clean Environment Act* (NB Reg. 87-83) "...waterworks with a capacity greater than fifty cubic metres of water daily". This document follows the Dillon Consulting (Dillon) 2015 submission "*Environmental Impact Assessment Registration (Final) Groundwater Exploration Program, September 2015 – 15-2119, EIA Registration No. 4516-03-21422*".

An electronic version of the document is available for download on the NBDELG's website:

<http://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/EIA-EIE/Registrations-Enregistremets/documents/EIARegistration1422.pdf>

## 3.0 The Undertaking

### 3.1 Project Background

The Town is currently supplied potable water from two municipal water supply wells that are located on a causeway in the Saint John River adjacent to the Town limits (**Figure 1**). The existing wells predate the installation of the Mactaquac hydroelectric dam, and the resulting Mactaquac head pond. Both wells are constructed to an approximate depth of 45 meters below ground surface (mbgs) and completed above grade. Potable water is transferred from the wells to the community via a transmission water main pipeline that extends under the causeway. During periods of snow melt and flooding in the spring, ice and flood water pose a significant risk to the potable water supply for the Town. The Town recognized the significant risk to the municipal water supply and therefore underwent an exploration program in 2015 to identify potential sources for potable water that would not be at risk to flooding.

Since 2015, Dillon Consulting Limited (Dillon) has been assisting the Town with the exploration of a new potable water source. Three (3) locations were previously identified as potential drill targets based

upon initial screening and desktop review studies conducted in 2015 and 2016. Upon New Brunswick Department of Environment and Local Government (NBDELG) approval, Dillon completed field investigations and water supply source assessments (WSSA) at those locations (refer to **Appendix A**).

These field investigations included the installation of three (3), 100 mm diameter geotechnical boreholes to observe subsurface soil conditions. At each of the three (3) initial locations, shallow bedrock with low yielding water bearing capacities were encountered; therefore, no further assessment was completed at these locations.

During initial project planning in 2015, a fourth potential drill target was identified along the Grafton Shore Road in Grafton, NB and ultimately selected as the most feasible option. This site demonstrated the potable water quality criteria and an appropriate yield required to supply the Town. This location was originally omitted from the initial WSSA application (**Appendix A**) based upon anticipated costs associated with installation of water distribution infrastructure across the Saint John River. The updated WSSA application was submitted to the NBDELG on April 12, 2016. Permission to continue with the assessment at this location was received from the NBDELG on June 3, 2016. Between June, 2016 and March, 2017 the assessment activities (including installation of three (3) observation wells and one (1) proposed production well) were completed at the Grafton site (i.e. the production well area).

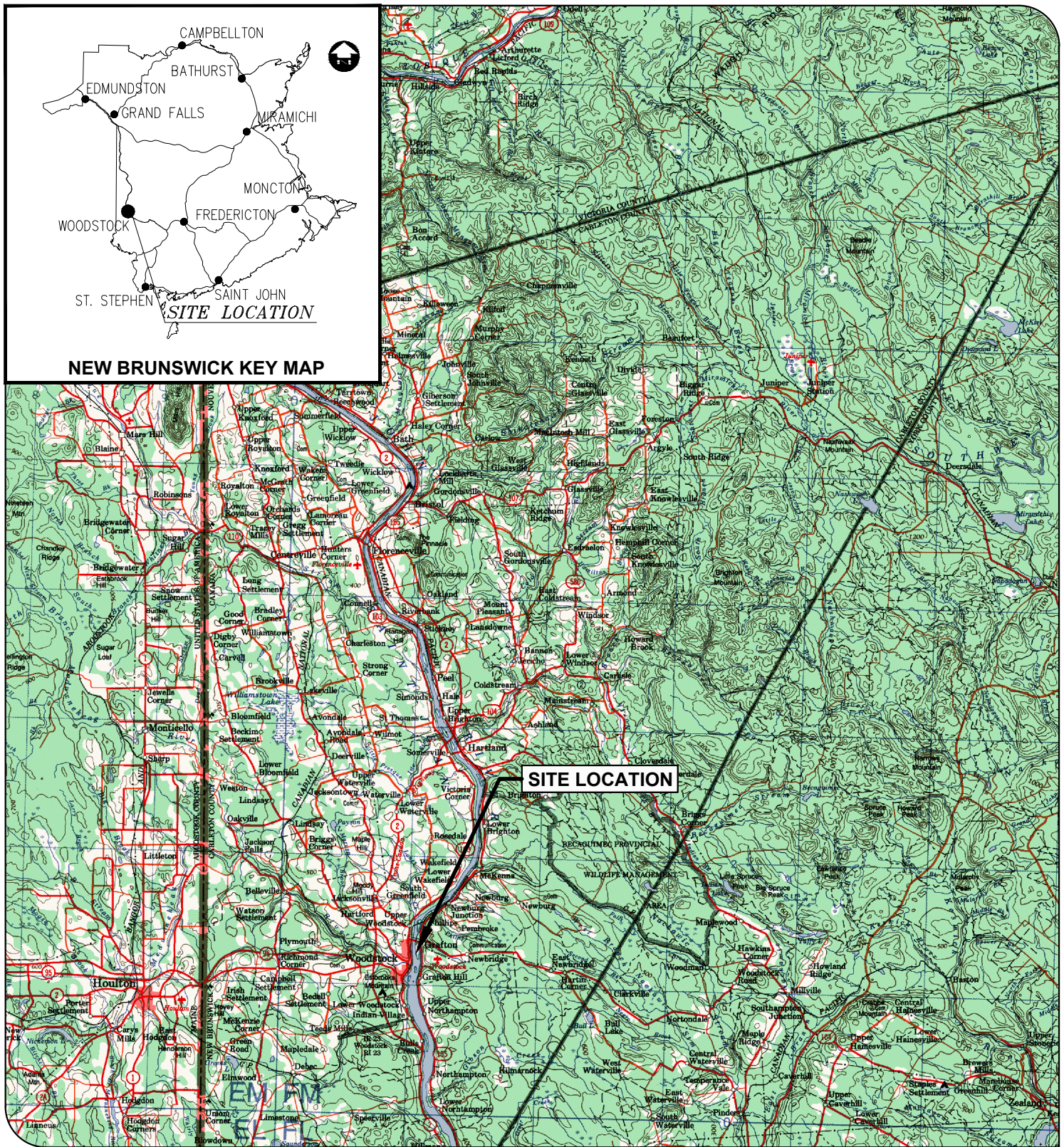
### 3.2 Project Overview and Purpose

The proposed project consists of completing the construction of a new municipal water supply located on a vacant property in Grafton, NB (i.e. the production well area) and connecting it to the existing municipal infrastructure (i.e. the water main connection area in the Town) for distribution to the Woodstock area. During the planning and exploration stages of the project, it was identified that the most effective and least impactful method of connecting the new water supply to the existing infrastructure was by HDD. The new horizontally drilled transmission water main piping will extend across the Saint John River (approximately 380 m), 5m beneath the river bottom, from the west bank of the river in Woodstock to the east bank in Grafton. Refer to the detailed engineering drawings provided in **Appendix A**. The project components required to complete the construction of the new municipal water supply include the following:

1. Construction of a treatment building and associated septic;
2. Installation of a transmission water main pipeline via HDD methods; and,
3. Connection of the transmission water main pipeline to the existing municipal infrastructure.

Refer to *Section 3.6 Construction Details* for further breakdown of project components. The commissioning of this project will provide the Town with a viable source of potable water that will be less susceptible to annual flooding.





**TOWN OF WOODSTOCK**  
 WATER SUPPLY ENVIRONMENTAL  
 IMPACT ASSESSMENT

**SITE LOCATION MAP**  
 FIGURE 1



MAP/DRAWING INFORMATION  
 National Topographic System Mapsheet 22B/02.

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PROJECT: 16-4843 STATUS: DRAFT DATE: 18/12/2017



## 3.3

## Project Location

The proposed project spans over several properties located near Grafton and Woodstock, Carleton County, New Brunswick (refer to **Figures 2 and 3**). The subject site is located in a vacant residential area of Grafton, NB between the Grafton Shore Road and Route 105. The project areas are described as follows:

### 1. The Production Well Area

The new production well is situated on a 4500 m<sup>2</sup> vacant area which spans over two (2) properties (PID Nos 10165819 and 10022051) and is located in a former residential/agricultural area adjacent to the southern end of Grafton Shore Road in Grafton, Carleton County, NB. The property is currently owned by New Brunswick Power Corporation (NB Power); however, the properties are in the process of being purchased by the Town.



Undeveloped woodland borders the property to the north, east and south. New Brunswick Department of Transportation and Infrastructure (NB DTI) Route 105 is located approximately 260m further east. Grafton Shore Road borders the property to the west and the Saint John River is located approximately 20 m further west. Permission was granted by NB Power to access the aforementioned properties and a bill of sale is currently being finalized. The production well area lies outside of mapped flood zones as depicted on **Figure 3**.

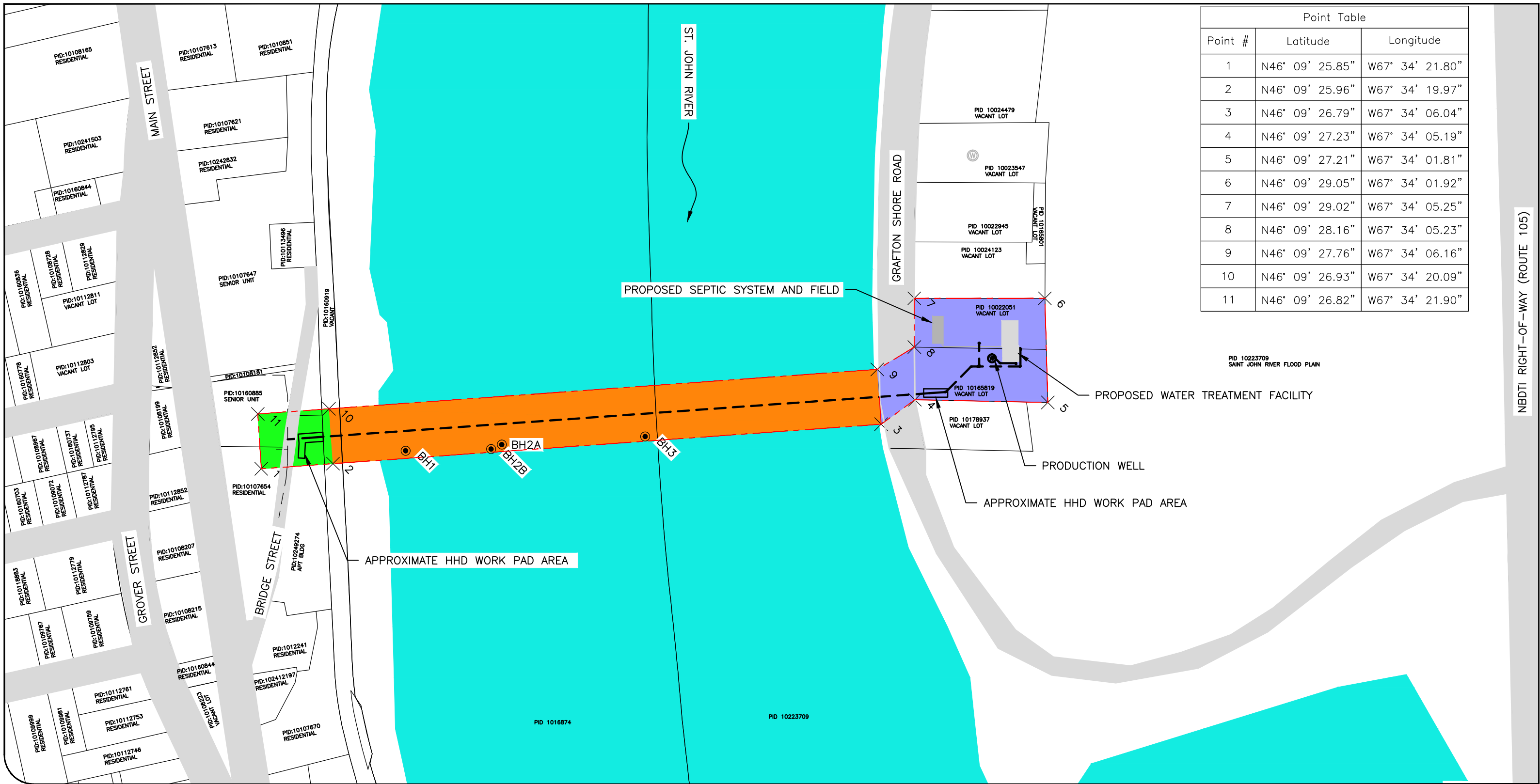
### 2. The Water Main Connection Area

The water main connection area is located on an easement on the properties identified by PID Nos. 10160885, 10107654 and 10249274 located along Bridge Street in Woodstock, Carleton County, New



Brunswick. Residential properties border the water main connection area to the north and south. Bridge Street borders the property to the west, followed by a residential property and Main Street further west. The NB trail is located adjacent and to the east of the property. The Saint John River is located approximately 35 m east from the water main connection area.





Point Table		
Point #	Latitude	Longitude
1	N46° 09' 25.85"	W67° 34' 21.80"
2	N46° 09' 25.96"	W67° 34' 19.97"
3	N46° 09' 26.79"	W67° 34' 06.04"
4	N46° 09' 27.23"	W67° 34' 05.19"
5	N46° 09' 27.21"	W67° 34' 01.81"
6	N46° 09' 29.05"	W67° 34' 01.92"
7	N46° 09' 29.02"	W67° 34' 05.25"
8	N46° 09' 28.16"	W67° 34' 05.23"
9	N46° 09' 27.76"	W67° 34' 06.16"
10	N46° 09' 26.93"	W67° 34' 20.09"
11	N46° 09' 26.82"	W67° 34' 21.90"

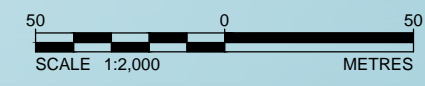
**TOWN OF WOODSTOCK**  
 WATER SUPPLY ENVIRONMENTAL  
 IMPACT ASSESSMENT

**PROJECT MAP**  
 FIGURE 2

- PRODUCTION WELL
- MONITORING WELL
- BOREHOLE LOCATION
- PROPERTY LINE
- PROJECT AREA
- ROAD NETWORK
- ST. JOHN RIVER
- TRANSMISSION PIPING AREA
- WATER MAIN CONNECTION AREA
- PRODUCTION WELL AREA
- PROPOSED WATER MAIN

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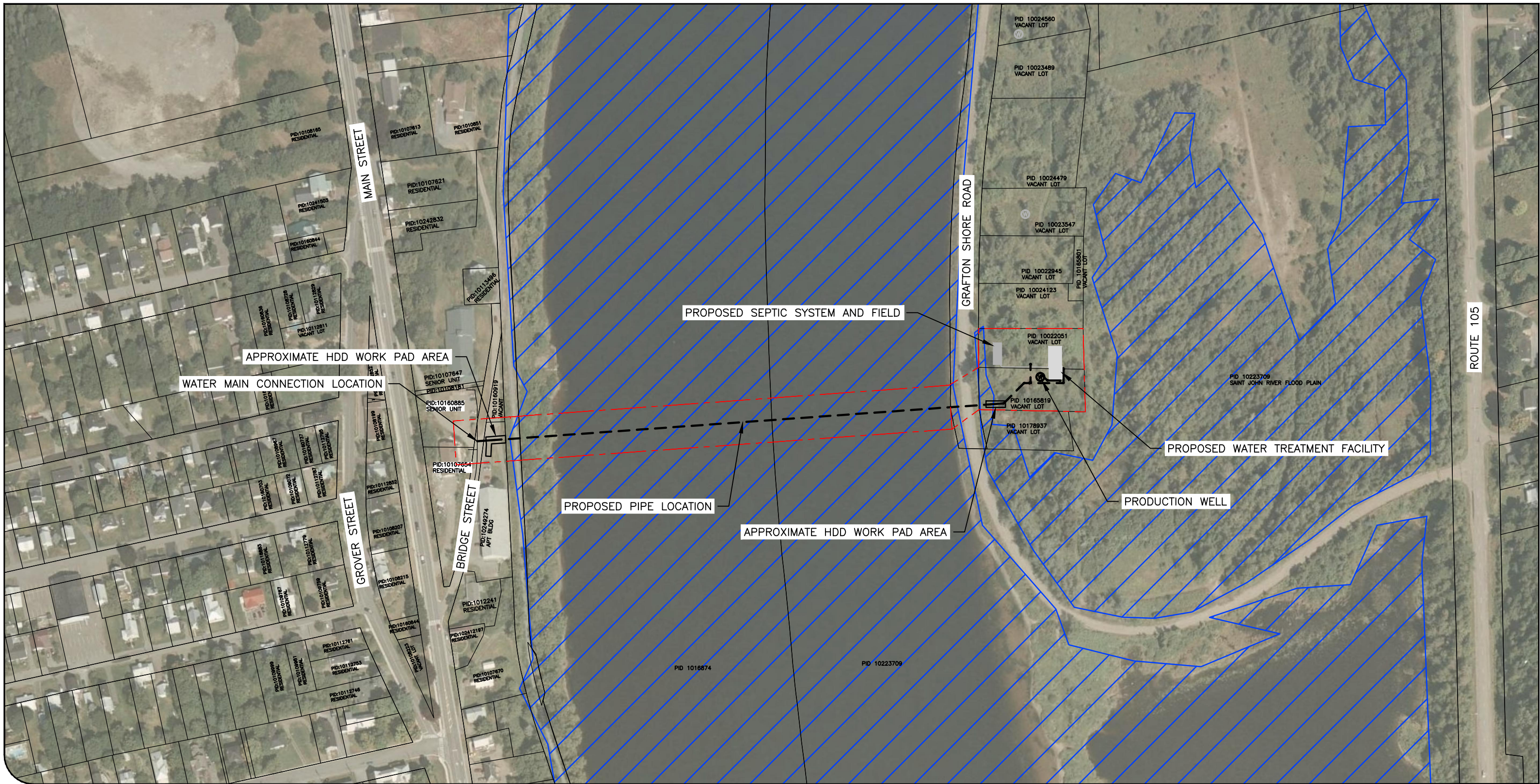
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 STATUS: DRAFT  
 DATE: DECEMBER 2017

NBDTI RIGHT-OF-WAY (ROUTE 105)





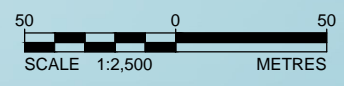
**TOWN OF WOODSTOCK**  
 WATER SUPPLY ENVIRONMENTAL  
 IMPACT ASSESSMENT

**INFORMATION MAP**  
 FIGURE 3

- PRODUCTION WELL
- MONITORING WELL
- PROPERTY LINE
- FLOOD AREA OBTAINED FROM GeoNB

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PROJECT: 16-4843  
 STATUS: DRAFT  
 DATE: DECEMBER 2017



### 3. Transmission Water Main Pipeline



The pipeline transmission main will extend from the production well area to the water main connection area (PID Nos. 10223709 and 10167814). The proposed pipeline transmission main is designed to be installed at a minimum depth of 5 meters below the Saint John River bottom.

Refer to additional site photos and descriptions in **Appendix B**.

## 3.4 Siting Considerations

Where possible, the associated production well infrastructure will be 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:

- Creating a design that would minimize ground disturbance for development as well as allow for a suitable and feasible area that can connect the proposed water main system to the existing water main system with minimal disturbance;
- Constructing on previously disturbed land to eliminate or minimize the potential for environmental (eg., watercourses, wetlands, and sensitive features and habitats) and socio-economic (eg., aesthetics, cultural resources, and residential concerns) impacts; and,
- Establishing an area that meets the requirement for proper classification of land use zoning and future development in the area.

As previously mentioned in Section 3.1, four (4) drill targets were investigated. The fourth target, in Grafton Shore Road, was identified as the only location capable of meeting the production requirements of the Town. The environmental impacts associated with the proposed development at this site is considered to be low, as it is relatively remote and is previously disturbed from historical residential development (prior to the Mactaquac Dam). Currently, the area is dominated by early successional terrestrial floodplain habitat and young to immature regenerating hardwood forest with older forest growth dominating the previously undeveloped portions of the lots. The production well area is also well suited to connection to the existing distribution system as it is directly across the river from a large diameter section of the “St. Andrews” zone of the distribution system.



In addition to the subject site (PID Nos 10165819 and 10022051), the Town is currently in the process of purchasing eight (8) individual parcels of land along Grafton Shore Road (PID Nos. 10023547, 10024479, 10023489, 10024560, 10026003, 10024123, 10022945 and 10025864). Once these parcels are acquired, Grafton Shore Road the parcels will be closed and absorbed into the Town owned land. This process has been discussed with NBDTI (pers. comm. Mr. Kevin Richard, District Engineer; November 1, 2017).

The production well and area for associated infrastructure is located on PID Nos. 10165819 and 10022051 of the vacant residential land along Grafton Shore Road. The east (back) side of these properties has been selected for the location of the production well house and treatment building to accommodate anticipated flood level elevations. The existing ground in the immediate vicinity of the production well and building will be finished to an elevation of approximately 45.5 m, approximately 600 mm above the calculated 200 year flood event. Access to the well site will be via the closed section of Grafton Shore Road. An NB power transmission line to the production well area will be installed along a proposed easement on Town property; if required, alternate access to the well site will be available in this location.

The transmission water main pipeline will be installed 5m beneath and extend 380m across the Saint John River. Geotechnical data was gathered in the summer of 2017 and used to design the drill path and specify pipe class and resin properties (refer to Conquest Engineering Ltd. Factual Geotechnical Report - Grafton Water Transmission Line, Woodstock-Grafton, NB in **Appendix A**). Detailed water transmission main drawings (**Appendix A**) show the proposed alignment and construction details in addition to property constraints. It is anticipated that the drilling equipment will be positioned on the west side of the Saint John River on Bridge Street (Woodstock). The limits of the easement are shown on sheet C1 of the Transmission Main drawings (**Appendix A**).

The Town has a municipal utility easement on PID No. 10113728 (DNR – Sentier NB Trails) for existing infrastructure which will accommodate the construction of the transmission main across the trail property. Construction activities will not extend onto the NB Trail. The transmission main terminates on Bridge Street.

### 3.5 Physical Components and Dimensions of the Project

The project will consist of a well house, treatment building (including washroom facilities) and septic system and field located on vacant property along Grafton Shore Road as well as a water main connection area along Bridge Street.

Detailed engineering drawings specifying the full extent of the construction and building elevations are provided in **Appendix A**.



### 3.5.1 Dimensions and Area:

#### **Production Well Area (Grafton Shore Road):**

The project footprint in the production well area (including excavations for associated infrastructure and building) spans over two properties (PID Nos 10165819 and 10022051) and consists of an area of approximately 4500m<sup>2</sup>.

In the production well area, the workpad footprint for the HDD component has been defined as an area of approximately 4m x 10m and is located within the larger project footprint described above. Refer to **Figure 2** as well as detailed engineering drawings provided in **Appendix A**.

#### **Water Main Connection Area (Bridge Street, Woodstock):**

The water main connection area is located on an easement comprising a portion of three properties (PID Nos. 10160885, 10107654 and 10249274). The project footprint consists of an area of approximately 1200m<sup>2</sup>.

In the water main connection area, the workpad footprint for the HDD component has been defined as an “L-shaped” area of approximately 4m x 10m and 4m x 8m and is included within the larger project footprint. The topography in this area is sloped towards the River, and the HDD workpad will require site preparation including excavation and/or infilling to accommodate the drill equipment. Refer to **Figure 2** as well as detailed engineering drawings provided in **Appendix A**.

#### **Transmission Water Main Pipeline:**

The pipeline transmission main will consist of 250mm High-density Polyethylene (HDPE) piping. Connections points to both the new production well and the existing water main will consist of 250mm diameter PVC piping installed via open trench. Refer to **Figure 2** as well as detailed engineering drawings provided in **Appendix A**.

### 3.5.2 Setbacks

Clearing of vegetation will be conducted to meet the requirement of the construction of the production well infrastructure, treatment building and both HDD workpads. Refer to **Figure 2** and detailed engineering drawings provided in **Appendix A**.

### 3.5.3 Additional Considerations:

All work, construction activity and temporary storage will be within the project footprint (refer to **Figure 2**).

Areas for parking equipment, laydown areas, etc., will have to be secured by the contractor and be acceptable to the Town. Parking and laydown areas at the production well area are expected to be along the closed portion of Grafton Shore Road.

During the construction of the transmission water main pipeline, it is anticipated that increased construction related traffic will occur on Bridge Street for a period of approximately four (4) weeks.

During construction of the well house and treatment building, increased traffic will be noticed along Grafton Shore Road for an anticipated period of three (3) months. Heavier construction equipment will be more noticeable in the first few weeks during site development, followed by lighter traffic during construction of the new treatment building.

### 3.6 Anticipated Project Schedule

The overall construction period is expected to last approximately 6 months depending on the timing of tendering the work. In general, it is expected that the transmission main (HDD phase) will be a stand-alone tender and take approximately one (1) month to fully complete. This may overlap with the well site development if possible. The well site development is expected to take approximately three (3) months to complete.

**Table 1: Anticipated Project Schedule**

Construction Phase	Tentative Schedule
Clearing and Grubbing	March 1 to 30, 2018
Construction of Building and Access Roads	April 30 to September 28, 2018
Water Main Installation (HDD program)	April 30 to June 1, 2018
Site Restoration	By September 30, 2018
Ongoing Operations and Maintenance	50+ years*

\*Note: Ongoing operations and maintenance will include maintenance as required and standard operational activities, see Section 3.6.5.

It is estimated that typical construction hours will be from 7am to 7pm, Monday to Friday, with extended work hours being subject to Town approval. Site access for the well house site will be via Grafton Shore Road and access to the Bridge Street site will be via Bridge Street. No detours are anticipated. Upon approval of this project, the Town would prefer to undertake any clearing prior to April 15, 2018.

### 3.7 Construction Details

The proposed project will consist of several concurrent construction components including site preparation and civil works, facilities construction, and water line drilling and connection. A description of the major components of the development is provided below.

Although the specific details of scheduling will be up to the successful contractor, it is expected that the general construction workflow for the project will consist of the following sequence:

- Setting up environmental protection measures;
- Clearing/grubbing;
- Earthwork and construction of access;
- Preparation of workpads on each end of the drill path;

- Drilling Pilot hole;
- Fusing HDPE pipe;
- Pulling HDPE pipe from the Grafton site toward Bridge Street;
- Make connection by open trench between HDPE (drilled) pipe and existing main on Bridge Street;
- Construction of treatment building;
- Installation of septic system; and,
- Site restoration (i.e. hydroseeding).

The following sub-sections detail the construction and project works.

### 3.7.1 Site Preparation and Civil Works

The project will be accessed using existing access roads (Grafton Shore Road and Bridge Street). Site development is expected to consist of equipment typically used for clearing and earthworks such as bull dozers, excavators, roller compactors, front end loaders, tandem dump trucks and dump trailers.

Site preparation activities will be conducted to accommodate the project footprint areas and is expected to consist of:

- Minor vegetation clearing – the majority of the project footprint exists within a formerly developed area and requires minimal vegetation and tree clearing;
- Excavation and grading; and,
- Surface preparation of workpads and site access where necessary.

Site access may be topped with pit run gravel or crushed rock, crowned, and compacted to minimize erosion and road dust emissions. Additional details regarding civil works are provided herein.

#### 3.7.1.1 Clearing and Grubbing

Low lying scrub vegetation and early successional tree species sparsely cover the area. Any clearing is likely to be completed using an excavator with a hydraulic mulching attachment. Clearing activities will adhere to applicable regulatory requirements and will only be done on an as required basis. Unnecessary tree removal will not occur. As outlined in **Table 1**, it is proposed that clearing activities will take place during the winter months, prior to the arrival of breeding birds, to minimize the potential interaction with migratory birds.

Prior to grubbing activities sedimentation/siltation fencing will be set up around the perimeter of the project site. Grubbing will involve the removal of all organic material and unsuitable soil including all stumps, roots, felled timber, embedded logs, and root mat from the area. Bulldozers may be used to scrape the organic material off the underlying soil. If the grubbed material (spoils) cannot be used on site and requires removal, grubblings will be transported to a pre-approved disposal location. This

material will not be piled into standing timber and will not be located within 30 m of a watercourse or wetland.

### 3.7.1.2 Excavation and Grading

Earthworks including grading, infilling and/or excavation will be required to prepare and level the site. Suitable soil material and overburden will be segregated and stockpiled so that it can be reused onsite where possible. Additional material, if required, will be pit run gravel and/or crushed gravel sourced locally from an approved facility. Exposed soils will be covered and appropriate erosion and sediment control measures will be implemented if left on site for a period of time.

### 3.7.2 Facilities Construction

The well head is located approximately 60 m from the edge of the Saint John River and will be adjacent to a permanent structure (treatment building) containing the associated pressure tank, chlorination equipment/treatment system and electrical supply. Access hatches are located above the well head to enable access to the infrastructure.

The proposed treatment building will have an approximate footprint of 60m<sup>2</sup> (refer to **Figure 2** and detailed engineering drawings provided in **Appendix A**). Wastewater effluent from a single washroom and two sinks in the building will be handled by an onsite septic system.

Lighting will consist of a “dusk to dawn” light mounted to the treatment building. The production well, associated infrastructure and treatment building will be fenced with chain link fence (within the project footprint).

### 3.7.3 Transmission Water Main Pipeline

The workpads on each end of the drill path will be prepared with an excavator or backhoe to suit the requirements of the drill equipment. The directionally drilled water main will be installed using HDD drill equipment suitable to the application.

Typical HDD methods are described as a construction technique, where a tunnel is drilled under a specified area and a pipeline is installed by being pulled through the tunnel (Enbridge, 2017). Advanced technology and trained drilling technicians guide a drill head and pipe electronically to ensure the angle, depth and exit point accurately adhere to detailed engineering plans and specifications.

### 3.7.4 Operation and Maintenance

Based on current water demands for the Town, the proposed well house and well pump is expected to pump approximately 9650 cubic metres per day (m<sup>3</sup>/day) from the aquifer into the municipal system. Routine maintenance and monitoring of the equipment will typically occur during standard business hours. Process specific maintenance will also be required depending on the final design.

### 3.8 Future Modifications, Extensions, or Abandonment

The proposed well is being designed to meet the foreseeable needs of the Town and its customers. Decommissioning of the new well is not anticipated in the foreseeable future. Repair and maintenance is intended to support the operation of the well indefinitely. Incremental replacement, upgrades of the infrastructure may be required in future years for continued effective operation or to conform to current standards and maintain regulatory compliance.

## 4.0 Description of the Existing Environment

Descriptions of the existing environment in the areas of the proposed project are presented in the following sections. The information has been gathered through a desktop review of the area.

The desktop review consisted of an analysis of the biophysical and socio-economic setting based on background information available within and surrounding the proposed project footprint. Information sources included background documents, digital mapping and online databases through provincial and federal government resources as well as observations gathered during dedicated field studies.

### 4.1.1 Atmospheric Environment

Existing ambient air quality was evaluated through the closest NBDELG ambient air monitoring stations to the proposed project that are located in Fredericton NB, approximately 100 km east of the project location and an industry-operated monitoring station located at AV Nackawic, approximately 50 km east of the project location. The Fredericton monitoring station reports on fine particulate matter (PM<sub>2.5</sub>), relative humidity, barometric pressure, wind speed and wind direction, ambient temperature, carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), total reduced sulfur (TRS) and ground level ozone (O<sub>3</sub>) (NBDELG, 2017<sup>a</sup>). The AV Nackawic monitoring station reports on fine particulate matter (PM<sub>2.5</sub>), Sulphur Dioxide (SO<sub>2</sub>), and total reduced sulphur (TRS) (NBDELG, 2017<sup>b</sup>).

The proposed project areas are located within or near the residential neighbourhoods of Woodstock (water main connection area; Bridge Street) and Grafton (production well area; Grafton Shore Road). Commercial or industrial properties have not been identified within 500 m of the project areas. The production well area is located in a rural area consisting of former residential/agricultural area of Grafton and currently, there are no residences within 300 m of the project site.

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

#### 4.1.1.1 Ambient Air Quality

Monitoring results for CO, NO<sub>2</sub>, PM<sub>2.5</sub> and O<sub>3</sub> for the Fredericton area (100 km east of the proposed project area) in 2017 did not exceed applicable guidelines. Monitoring results for PM<sub>2.5</sub>, SO<sub>2</sub>, and TRS for the AV Nackawic monitoring site in 2015 did not exceed applicable guidelines (NBDELG, 2017b).

## 4.1.1.2

## Climate

The nearest Environment and Climate Change Canada (ECCC) weather station to the proposed project site is the Woodstock (Climate ID: 8105600) station located approximately 2 km northwest. A summary of the average daily temperatures by month between 1980 and 2010 is found in **Table 2**, while monthly precipitation total averages between 1981 and 2010 are found in **Table 3**. Monthly averages of days with precipitation are displayed in **Table 4**.

**Table 2: Average Daily Temperature per Month (1981-2010)**

Temperature (°C)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Daily Average	<b>-11.5</b>	-9.5	-3.4	3.7	10.9	16.3	<b>19.0</b>	18.4	13.2	6.6	0.3	-7.0	<b>4.8</b>

(Source: Environment Canada and Climate Change Canada, Climate Normals 1981-2010)

The warmest months are generally from June to August, while July being the warmest month with an average daily temperature of 19.0 °C. The coldest months are typically between December and February, with January being the coldest with an average daily temperature of -11.5 °C.

**Table 3: Average Monthly Precipitation (1980-2010)**

Precipitation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Rainfall (mm)	27.5	<b>24.2</b>	36.9	61.6	93.6	91	100.2	<b>100.6</b>	95.6	92.1	81.9	53.2	<b>858.2</b>
Snowfall (cm)	<b>76.6</b>	47.4	54.3	18.8	0.7	<b>0</b>	<b>0</b>	<b>0</b>	0.1	3.2	21.3	50	<b>272.3</b>
Precipitation (mm)	104	<b>71.6</b>	91.2	80.4	94.2	91	100.2	100.6	95.7	95.3	<b>103.2</b>	<b>103.2</b>	<b>1130.6</b>

(Source: Environment Canada and Climate Change Canada, Climate Normals 1981-2010)

**Table 4: Average Number of Days with Precipitation per Month (1980-2010)**

Amount of Precipitation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
>= 0.2 mm	11.5	<b>10</b>	11.1	11.3	<b>12.4</b>	11.7	11.8	10.9	10.4	10.5	11.4	12	<b>135</b>
>= 5 mm	<b>6.8</b>	<b>4.9</b>	5.8	5.7	5.8	5.4	5.9	5.2	5.3	5.5	5.9	6	<b>68.1</b>
>= 10 mm	<b>4.1</b>	<b>2.6</b>	3.4	2.7	3.3	2.9	3.5	3.1	3.3	3.2	3.7	3.8	<b>39.4</b>
>= 25 mm	0.67	<b>0.38</b>	0.82	<b>0.38</b>	0.64	0.83	0.79	0.88	<b>0.96</b>	0.92	0.78	0.71	<b>8.8</b>

(Source: Environment and Climate Change Canada, Climate Normals 1981-2010)

Over the dataset, monthly averages yielded an annual average of 1130.6 mm of precipitation, with 858.2 mm of rain and 272.3 cm of snow falling per year. Generally, there were 135 days of precipitation annually between 1980 and 2010. The highest monthly average of precipitation was observed in November and December, each with 103.2 mm, while the lowest monthly average was observed in February with 71.6 mm.



Based on the climate data, the most surficial recharge to the source aquifer in the Woodstock/Grafton area is expected to occur between November and December, while the least amount of recharge would be expected to occur in February. However, the surficial recharge would be deemed negligible when compared to the recharge from the constant head boundary represented by the adjacent Saint John River.

#### 4.1.1.3 Ambient Noise Quality

Existing sound quality conditions in the vicinity of the project location were not measured for this assessment. Land uses within 250 m of the project location are primarily residential. An elementary school is located approximately 370 m to the northwest, a middle school is located approximately 400 m to the southwest and Woodstock High School is located approximately 1.5 km northwest of the water main connection area. Given the setting of this project component, existing sound pressure levels in vicinity of the project are expected to be typical of sound pressure levels in a suburban residential area.

The Woodstock Airport is located approximately 1.1 km southeast of the production well area, in the community of Grafton. Given the setting of this project component, existing sound pressure levels in vicinity of the project are expected to be typical of sound pressure levels in a suburban mixed development area near city outskirts. Based on ambient sound level predictions of typical background community noise, existing sound pressure levels in the area are likely in the range of 40 to 50 dBA(A) as a 24-hour arithmetic average (EUB, 2007).

#### 4.1.2 Geology, Hydrogeology and Hydrology

##### 4.1.2.1 Geology



Based on the Generalize Surficial Geology Map of New Brunswick (Rampton 1984; 2002 Ed.), the native surficial geology in the general area consists of a blanket of loamy lodgement till, ablation till, silt, sand and gravel.

Based upon the Granular Aggregate Resources of Woodstock Map (Plate 81-38, 21 J/4, P. Finamore 1979), the subject area consists of glaciofluvial outwash of mainly sand and gravel.

Based on the Department of Natural Resources (DNR) map of the Bedrock Geology of the Woodstock Area (NTS 21 J/04), the bedrock geology of the subject site is identified as Cambrian to Ordovician aged rocks of the Woodstock Group (Baskahegan Lake formation), which typically consists of light grey to green, medium to thick bedded quartzite; and grey to greenish grey, thin to medium-bedded quartz wacke; olive green silty shale; and, minor red sandstone and shale.

## 4.1.2.2

**Hydrology and Hydrogeology****Production Well and Water Main Connection Areas:**

During hydrogeological assessment activities conducted by Dillon in 2016, the observed stratigraphy of the area generally consisted of the following:

- Sand and Gravel (at depths ranging from 0-13.7 mbgs)
- Silty Sand/Silty Clay (at depths ranging from 13.7-32.0 mbgs)
- Sand, Gravel, and Boulders (at depths ranging from 32.0-43.3 mbgs)
- Quartzite Bedrock (at depths ranging from 43.3-46.0 mbgs)

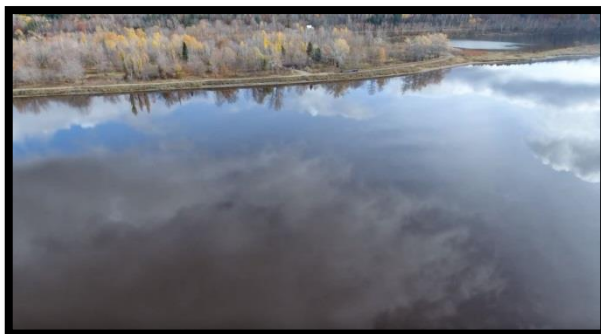
The general topography and regional groundwater flow direction is assumed to be to the west-southwest (production well area) and east-southeast (water main connection area) towards the Saint John River. Based upon the observed stratigraphy, geological mapping and geomorphology the production well is located within buried glacio-fluvial gravel within the Saint John River Valley.

The proposed project areas are situated between 30-50 metres away from the Saint John River and approximately greater than 3.5 m above the elevation of the river. This elevation is above the recorded flood level in 1973. Further, based on proposed construction specifications the well head for the production well was raised to approximately 46 metres above sea level (masl), which is 2 m higher than the highest recorded water level (43.9 masl) in this area (Dillon, 2017).

The nearest potable wells in proximity to the subject site are located approximately 300m to the east. According to the WSSA (Dillon, 2017) significant well interference is not expected at the proposed pumping rate.

**Transmission Water Main Pipeline:**

The proposed pipeline transmission main is designed to be installed at a minimum depth of 5 m below the river bottom. On the west side of the river, bedrock is exposed along the shoreline. Borehole information from the geotechnical investigation (see attached Conquest Engineering Ltd. Factual Geotechnical Report - Grafton Water Transmission Line, Woodstock-Grafton, NB; **Appendix A**) indicate



approximately 1 m of sand, gravel or highly fractured bedrock transitioning to a more consolidated quartz wacke at a distance of approximately 20 m off the west shore along the sloped bank. Near the center of the river (approximately 150 m from shore) borehole information indicate some gravel (<0.5 m) overlying >4 m of firm to stiff silt/clay over 1-2 m of sand and gravel transitioning to grey quartz wacke.

Based upon the results of the geotechnical investigations and water exploration drilling conducted by Conquest Engineering (2017; **Appendix A**), the geology identified is consistent with river valley sediment

deposits where the production well on the east side of the river is close to the center of the river valley basin center.

#### 4.1.2.3 Current Groundwater Usage

Residential properties in the Grafton area source water from individual private wells. Residences located within 500 m of the proposed production well are located along the Route 105 (nearest residences located between 325 m to 500 m away) and along Second Street (nearest residences located between 475 m to 500 m away).

The current municipal water system for the Town undergoes treatment due to the presence of manganese within their water source. The presence of manganese within a water supply in close proximity to a river basin (i.e., the Saint John River) is not uncommon within New Brunswick (Dillon, 2017). Details regarding manganese treatment for the proposed water source are found in Section 3.3.4.2.

No other registered water wells (predating the current assessment activities) were located on the subject site. The Town currently has two municipal water supply wells located on a causeway in the Saint John River adjacent to the Town limits. The subject site is not located within a wellfield protection area under the New Brunswick Wellfield Protection Program or a designated watershed under the New Brunswick Watershed Protected Area Designation Order. Further, based on GeoNB mapping, no wetland areas were located within 500 m of the subject site.



#### 4.1.3 Terrestrial Environment

For the purposes of this EIA, 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 background information.

The Atlantic Conservation Data Centre (ACDC) was 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 Federal *Species at Risk Act* (SARA);
- Listed under the New Brunswick *Species at Risk Act* (NBSARA); and,
- Listed by the Atlantic Canada Conservation Data Center (ACDC) as extremely rare (S1), rare (S2), uncommon (S3) or location sensitive.

Both the water main connection and production well area terrestrial environments are described as follows:

#### Production Well Area

The production well area is located in a former rural residential neighbourhood on the banks of the Saint John River, predating the installation of the Mactaquac hydroelectric dam (late 1960s). The area has been vacant since the construction of the Mactaquac dam, and is dominated by early successional terrestrial floodplain habitat. Dominant tree species within the overstory include white birch (*Betula papyrifera*), red maple (*Acer rubrum*), and speckled alder (*Alnus incana*). The understory consists of shrubs, weedy forbs and grasses. The adjacent properties are composed of similar habitat characterized by early successional habitat and formerly disturbed land.



#### Water Main Connection Area



The water main connection area is located in a predominantly residential area of Woodstock, NB. The property is covered in gravel and landscaped lawn. The surrounding residential properties are generally occupied by landscaped lawns and urban shrubs with sparsely distributed trees.

#### 4.1.3.1

#### Site Topography and Physiography

The production well area is characterized by flat forested floodplain within the valley of the Saint John River. The water main connection area is gently sloping to the east towards the Saint John River.

The proposed project area is located within the Valley Lowlands Ecoregion (Ecoregion 5), and specifically within the Meductic Ecodistrict. The landscape's dominant geographic feature is the expansive Saint John River and its broad river valley. Relief of the gently rolling landscape rarely exceeds 100 m, and is punctuated by small intrusions of resistant bedrock, which underlie several local hills and mountains (NBDNR, 2007).



#### 4.1.3.2 Environmentally Significant Areas

Based on information provided by the Atlantic Canada Conservation Data Center (2017), there are no environmentally significant areas (ESAs) or protected natural areas identified within 1 km of the proposed project area.

The ACCDC request for the proposed project area identified 2 managed areas within 5km of the proposed project site: Kindness Club Wildlife Refuge (old growth forest) and the Northampton managed area. Additionally, 4 biologically significant areas were identified within 5 km of the proposed project site:

- **Woodstock-Meduxnekeag Bridge ESA:** Calcareous site harbouring several uncommon plant species.
- **Upper Woodstock Hardwood Slope ESA:** Hardwood and Hemlock forest harbouring 2 species of rare plants.
- **Newbridge Barite Occurrence ESA:** Area of geological importance for Barite.
- **Highway 95 Hardwoods ESA:** Hardwood forest harbouring colonies of uncommon plant species.

The project footprint is not located within a managed area or biologically significant area.

#### 4.1.3.3 Wildlife (Fauna) and Wildlife Habitat



The production well area may provide suitable habitat for small mammals and urbanized wildlife such as; skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*) meadow voles (*Microtus pennsylvanicus*), squirrels (*Sciurus vulgaris*), chipmunk (*Tamias striatus*), white tailed deer (*Odocoileus virginianus*), red fox (*Vulpes vulpes*) and coyote (*Canis latrans*). Mammals may use the property for foraging, migration or denning. Undeveloped forested land used for forestry

operations is located approximately 400m further east of the proposed project site. This area of mostly contiguous forest may support larger mammals requiring larger home ranges such as moose (*Alces alces*) and American Black Bear (*Ursus americanus*). The site may provide foraging opportunities or a migration route for these larger mammals residing in the adjacent forested habitats.

The water main connection area and surrounding properties includes mainly landscaped residences with some tree coverage allowing for limited habitat for wildlife.

The Saint John River, in the area of the proposed project, provides potential suitable habitat for species such as river otter (*Lontra canadensis*), American mink (*Neovison vison*), beaver (*Castor Canadensis*) and muskrat (*Ondatra zibethicus*).

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

## 4.1.3.4

**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 area surrounding the proposed project area. However, the New Brunswick Department of Energy and Resource Development (DERD) and the ACCDC consider a number of species as “location sensitive”. Concern about exploitation of location-sensitive species precludes inclusion of precise geographical coordinates in ACCDC reports. The ACCDC database indicated that there were two location sensitive wildlife species or habitats of conservation concern known to occur within 5 km of the proposed project area which have been outlined in **Table 5**.

**Table 5: Summary of Wildlife (Excluding Birds) of Conservation Concern and/or Location Sensitive Species Identified by the ACCDC Within a 1 KM Radius of the Project Footprint**

Common Name	Scientific Name	ACCDC Status <sup>2</sup>	COSEWIC/SARA Status	NBSARA Status	Typical Habitat <sup>3</sup>	Habitat Suitability within Project Footprint
Wood Turtle	<i>Glyptemys insculpta</i>	S3	Threatened	Threatened	Requires rivers and streams with sandy or gravely-sandy bottoms and prefers clear meandering watercourses with a moderate current. The Wood Turtle's natural nesting sites are found on sand or gravel-sand beaches and banks. Other habitats used less frequently by the Wood Turtle include bogs, marshy pastures, beaver ponds, shrubby cover, meadows, coniferous forests, mixed forests, hay, and agricultural fields.	Minimal habitat for overwintering or nesting and turtle migration and foraging. The shoreline along the subject property does not provide preferred habitat for turtle species (i.e. general absence of basking logs, cover, soft substrates, shallow pools, etc.). However, habitat with such features may be present within the adjacent floodplain.
Bat Hibernaculum	N/A	S3	Endangered <sup>1</sup>	Endangered <sup>1</sup>	Bats favour larger hibernacula where large groups may roost together, including natural caves, mines, cellars, and other kinds of underground sites and man-made structures.	Potential for bat hibernacula at the property, and potential habitat was not observed on adjacent properties. Trees along the shoreline of the subject and neighbouring properties do not provide suitable habitat for bat roosting.

1. *Myotis lucifugus* (Little Brown Myotis), *Myotis septentrionalis* (Long-eared Myotis), and *Perimyotis subflavus* (Tri-colored Bat or Eastern Pipistrelle) are all Endangered under the *Federal Species at Risk Act* and the *NB Species at Risk Act*.

2. Listed by the Atlantic Canada Conservation Data Center (ACCDC) as extremely rare (S1), rare (S2), uncommon (S3) or location sensitive.

3. Sourced from [http://www.registrelep-sararegistry.gc.ca/sar/index/default\\_e.cfm](http://www.registrelep-sararegistry.gc.ca/sar/index/default_e.cfm)



There were no other wildlife species of conservation concern and/or location sensitive species identified as potentially occurring within the boundaries of the proposed project. The proposed project location would not provide unique or limited habitat for any of these species.

4.1.3.5 **Birds and Bird Habitat**

**Important Bird Areas (IBA)**

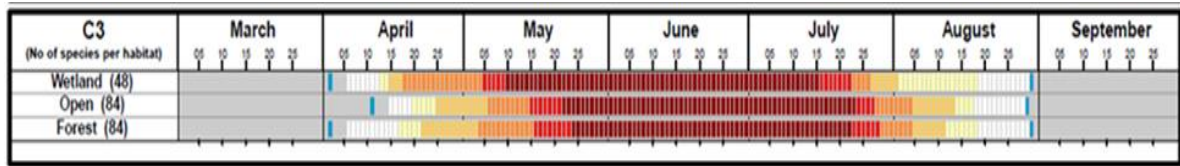
The proposed project area is not within an Important Bird Area (IBA) and there are no IBAs located within 10 km of the proposed project location.

**Migratory Birds**

Migratory bird species such as waterfowl and passerines protected under the *Migratory Bird Act*, including species of conservation concern may occur within the project area for foraging purposes; however, there is no critical or well suited habitat identified within the proposed project area. According to ACCDC records, migratory species that have occurred within 5km of the proposed project area include (but is not limited to); Purple Martin (*Progne subis*), Northern Mockingbird (*Mimus polyglottos*), Red Crossbill (*Loxia curvirostra*), Lesser Scaup (*Aythya affinis*), Carolina Wren (*Thryothorus ludovicianus*), Horned Grebe (*Podiceps auritus*), Bufflehead (*Bucephala albeola*), Eastern Kingbird (*Tyrannus tyrannus*), Solitary Sandpiper (*Tringa solitaria*), Barn Sallow (*Hirundo rustica*; *Threatened*, NBSARA, SARA and COSEWIC), and Bank Swallow (*Riparia riparia*; *Threatened*, SARA and COSEWIC).

**Environment Canada Nesting Zones**

Based on ECCC’s calendar for specific “nesting zones” across Canada, the proposed project area is located within “Nesting Zone C3” which identifies the April 1 to August 31 period as a sensitive nesting period for the area (see the table below).



Environment Canada Nesting Calendar ([https://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=4F39A78F-1#\\_05](https://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=4F39A78F-1#_05))

4.1.3.6 **Birds of Conservation Concern**

**Atlantic Canada Conservation Data Center (ACCDC)**

The ACCDC database indicates that one bird species of conservation, the Chimney Swift (*Chaetura pelagica*) has occurred within 1 km of the proposed project area. The Chimney Swift is provincially (NB SARA) and federally (COSEWIC and SARA) listed as “Threatened”.

The DERD and ACCDC consider Bald Eagle as “location sensitive”, thus removing inclusion of precise coordinates in ACCDC reports. The ACCDC database indicated that Bald Eagles are known to occur within

5 km of the project footprint. **Table 6** summarizes the bird species of conservation concern that have occurred near the proposed project areas. Refer to **Appendix C** for the full ACCDC report.

**Table 6: Summary of Bird Species of Conservation Concern Identified by ACCDC Database within 1 km of the Project Location**

Common Name	Scientific Name	ACCDC Status <sup>1</sup>	COSEWIC/SARA Status	NBSARA Status	Typical Habitat <sup>2</sup>	Habitat Suitability within Project Footprint
Chimney Swift	<i>Chaetura pelagica</i>	S2	Threatened	Threatened	Found throughout New Brunswick. The Chimney Swift spends the majority of the day in flight, often near water, feeding on insects. Chimney swifts nest within chimneys, or other hollow structures that simulate hollows trees (their preferred nesting habitat).	No nesting or roosting due to absence of hollow structures or trees. Foraging would occur in the Saint John River in the vicinity of the project.
Bald Eagle	<i>Haliaeetus leucocephalus</i>	S4	Not at Risk	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. Nests will often be built 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. Additionally no observed suitable nesting/roosting at the adjacent shoreline properties east and west of the subject property (up to 200 m distance from boundary). Foraging would occur in the Saint John River in the vicinity of the project.

1. Listed by the Atlantic Canada Conservation Data Center (ACCDC) as extremely rare (S1), rare (S2), uncommon (S3) or location sensitive.

2. Sourced from [http://www.registrelep-sararegistry.gc.ca/sar/index/default\\_e.cfm](http://www.registrelep-sararegistry.gc.ca/sar/index/default_e.cfm)

The proposed project location would not provide unique or limited habitat for the species listed above.

#### 4.1.4 Aquatic Environment

The proposed project area is situated within the Saint John River basin. For the purposes of this EIA, 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 must apply for a permit under the Wetland and Watercourse Alteration Regulation (WAWA) under the *Clean Water Act*.

## 4.1.4.1

**Wetlands**

According to the GeoNB wetland mapping database, there are no regulated wetlands or provincially significant wetlands within 30m of the proposed project area.

Two unmapped intermediate wetlands were identified within 30m of the production well area during review of available Draft Beta Wetland Mapping (2017) and interpreted through aerial photography (refer to adjacent photo).



According to the Draft Beta Wetland Mapping, one unmapped intermediate wetland is located on PID No. 10022051 within the area of the proposed treatment buildings.

## 4.1.4.2

**Watercourses**

Based on a review of GeoNB watercourse (1:10,000) mapping, watercourses within 30m of the proposed project area are limited to the Saint John River. The Saint John River is the longest river in northeastern North America at approximately 700 km long, and with a basin area of over 55,000 km<sup>2</sup> (CRI, 2011). A description of the river's characteristics is presented in **Table 7**.

**Table 7: Watercourses within the Project Area**

Watercourse	Project Component Interaction	Fish Bearing (Y/N)	Habitat Description				
			Substrate	Watercourse Width (m)	Dominant Habitat	Depth (m)	% Cover
Saint John River	Pipeline Crossing	Y	Boulders, cobble, gravel, sand	380	Run	5 m	0

The Saint John River is located approximately 20 m from the production well area and 35 m from the water main connection area. The pipeline crossing component of the proposed project will interact with the east and west banks of the River.

The pipeline transition main will be installed 5m beneath the Riverbed and with exception of the riverbanks, is not expected to interact with the River, fish or fish habitat.

## 4.1.4.3

## Freshwater Fish



There are 53 fish species identified within the Saint John River Basin, the greatest natural diversity of freshwater fish in Maine and Atlantic Canada (CRI, 2011). The Canadian Rivers Institute (CRI, 2011) indicates that many stable and healthy populations and communities exist throughout the River. Some populations in other areas of the River demonstrate signs of stress. Key stressors to the fish populations within the Saint John River include poor management of wastewater, river flow and fish passage.

The pipeline crossing will be installed 5m beneath the Riverbed and with exception of the riverbanks, is not expected to interact with the River, fish or fish habitat.

## 4.1.4.4

## Fish Species of Conservation Concern

The ACCDC database indicates that there is one fish species of conservation concern historically observed within a 5 km area of the proposed project: shortnose sturgeon (*Acipenser brevirostrum*). The shortnose sturgeon is a species of Special Concern under SARA and NBSAR, as summarized in **Table 8**. The ACCDC database did not report occurrences of Atlantic salmon (*Salmo salar*) within 5km of the project area; however, the Atlantic salmon is known to travel the Saint John River during migration to inland freshwater streams for spawning (DFO, 2017). The addition of hydroelectric dams on the river system impedes their movement to upriver tributaries and the number of wild individuals is known to be reduced within the upper reaches of the River.

**Table 8: Summary of Fish Species of Conservation Concern Identified by ACCDC Database within 1 km of the Project Location**

Common Name	Scientific Name	ACCDC Status <sup>1</sup>	COSEWIC/SARA Status	NBSARA Status	Typical Habitat <sup>2</sup>	Habitat Suitability within Project Footprint
Atlantic Salmon	<i>Salmo Salar</i>	-	Endangered	Endangered	Inland, this fish favours natural stream channels with rapids, pools and gravelly bottoms in which hatchlings can hide from predators. The fish prefer cool water that is free from chemical and organic pollution, and that maintains temperatures between 15°C and 25°C in summer.	The project components are not expected to directly interact with Fish and Fish Habitat
Shortnose Sturgeon	<i>Acipenser brevirostrum</i>	S3	Special Concern	Special Concern	The Shortnose Sturgeon an anadromous fish inhabiting nearshore marine, estuarine and riverine habitats of large	The project components are not expected to directly interact with Fish and Fish Habitat

Common Name	Scientific Name	ACCDC Status <sup>1</sup>	COSEWIC/ SARA Status	NBSARA Status	Typical Habitat <sup>2</sup>	Habitat Suitability within Project Footprint
					river systems. It is known to occur and spawn in the Saint John River, the only river system it inhabits in Canada. It spawns in fast flowing water over a boulder and gravel bottom. They generally over winter in the lower reaches of the Saint John River and in the spring migrate upstream to spawn.	

1. Listed by the Atlantic Canada Conservation Data Center (ACCDC) as extremely rare (S1), rare (S2), uncommon (S3) or location sensitive.  
 2. Sourced from [http://www.registrelep-sararegistry.gc.ca/sar/index/default\\_e.cfm](http://www.registrelep-sararegistry.gc.ca/sar/index/default_e.cfm)

The proposed project location would not provide unique or limited habitat for fish species of conservation concern.

**4.1.4.5 Benthic Macroinvertebrates**

The biodiversity of the Saint John River’s benthic macroinvertebrate community has not been well studied and as a result limited data is available (CRI, 2011). Based on the results of benthic macroinvertebrate sampling conducted in the 1970s, tubificid worms and chironomid midges were the most common species found within the river. It was also noted that chironomid midges and blackflies were common throughout the entire length of the River (CRI, 2011).



The project components are not expected to interact with benthic macroinvertebrates.

**4.1.5 Socio-Economic Environment**

**4.1.5.1 Archaeological and Cultural Resources**

Based on the proximity to the Saint John River, there is potential for Indigenous cultural heritage resources (both pre-contact and historic) or Euro-Canadian resources to exist within the project footprint. Areas with high potential for archaeological and cultural resources are typically found along the shoreline of waterbodies, and the Saint John River has a particularly rich cultural history for both Indigenous and Euro-Canadian settlement.

Preliminary discussions with Archaeological Services New Brunswick indicated that there are no known archaeological resources within the project footprint. However, as the project area is located in a high to moderate potential area (i.e., between 50 m and 80 m, respectively) of a major waterbody (i.e., Saint



John River), it was recommended that a licensed archaeologist be on site to monitor any excavation or drilling activities within these areas. (Pers.Comm. T. Jarrett, December, 2017).

#### 4.1.5.2 **Aboriginal Communities**

The proposed project is located within the traditional territory of the Maliseet (Wolastoqey Nation). Based on the Government of Canada's Indigenous and Northern Affairs webpage, the Maliseet Nation's population in New Brunswick is approximately 7500 people as of December 2017. The Nation is comprised of six communities; Oromocto, St. Mary's, Kingsclear, Woodstock, Tobique and Madawaska.

The nearest First Nation community to the proposed project area is the Woodstock First Nation, a community of approximately 1,069 persons (293 on-reserve) (WFN, 2017). Woodstock First Nation is located near Lower Woodstock and occupies approximately 426 acres of land located 5 km south of the project site along the Saint John River. The Community provides several services to community members including; child and family services, social development, education, housing and healthcare. The community is also involved in several business ventures including two petroleum retail outlets, gaming facility, fisheries and forest harvesting.

The Maliseet refer to their people as Wolastoqiyik (People of the Saint John River) and as such have deep rooted cultures and traditions tied to both the present day river, as well as the historical path of the river. It is assumed that the banks of the Saint John River within the proposed project area would have been traditionally used for hunting and gathering with the potential for village or agricultural sites. Based on the Woodstock First Nation webpage primarily English is the predominant language however, the Maliseet language is still used by many community elders.

At this time, the Woodstock First Nation has not provided any information on traditional land use within the project footprint.



#### 4.1.5.3 **Population and Local Economy**

Based on the 2016 census, the population of the Town is comprised of 5,288 residents; a decrease of 0.5% since 2011 (Statistics Canada, 2016). The Town is a transportation hub, based on its proximity to the United States Border. It is a service centre for the potato industry in New Brunswick and serves the nearby communities of Hartland, Florenceville-Bristol, Centreville, Bath, Meductic and Canterbury for shopping, entertainment and employment. A campus of the New Brunswick Community College is also located in the Town.

#### 4.1.5.4 **Land Use**

The proposed project areas are currently zoned for residential purposes. The property where the production well is situated is owned by NB Power and the property where the water main connection area is situated is also privately owned. The water main connection area is located in a developed area

of Woodstock. The area has been developed since at least the 1800s. The community of Grafton is located across the Saint John River, approximately 600 m east of the Town. The community is made up of rural residential and subdivision lots.

There are no commercial or industrial land uses immediately adjacent to the proposed project areas.

#### 4.1.5.5 Transportation and Transportation Infrastructure

Grafton Shore road is located adjacent and to the west of the production well area. NBDTI Highway No. 105 is located approximately 300m to the east. Bridge Street borders the water main connection area to the west. NBDTI Highway No. 103 (Main Street) is located further west. The nearest major highway is NBDTI Highway No. 2, located approximately 3.2 km west of the project area.

The nearest airport to the project site is the Woodstock Airport, located approximately 1.1 km southeast of the production well area, in the community of Grafton.

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

#### 4.1.5.6 Utilities

The Woodstock and Grafton areas, including the proposed project areas, are supplied single phase power by NB Power. There are no generating facilities within the proposed project area. The Woodstock area is supplied potable water by municipal services and the Grafton area is supplied water by individual potable wells.

Bell Aliant and Rogers have lines and communication towers within the region and provide communication services to the Woodstock and Grafton areas.

## 5.0 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.

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 features have been identified as a VEC/VSC in relation to the proposed project:

- Atmospheric Environment (Air Quality, Climate, Noise Quality);
- Aquatic Environment (Watercourses, Wetlands, Fish and Fish Habitat);
- Terrestrial Environment (Vegetation, Wildlife, Migratory Birds);

- Species at Risk; and,
- Socio- Economic Environment (Aboriginal Interest, Archaeological and Cultural Resources, Land Use, Economy, and Public Interest).

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 (Construction (site preparation and civil works, facilities construction, HDD); and Operation and Maintenance) as well as Accidents, Malfunctions and Unplanned Events.

The potential interactions between the project and the environmental components (VECs/VSCs) anticipated for the project is presented in **Table 9**.

**Table 9: Anticipated Project Interaction with VECs/VSCs**

Environmental Components		Project Components				Operations and Maintenance	Unplanned Events, Accidents and Malfunctions
		Construction Phase					
		Site Preparation and Civil Works	Facilities Construction	Horizontal Directional Drilling			
Atmospheric	Ambient Air Quality	✓	✓	✓		✓	
	Climate						
	Ambient Sound Quality	✓	✓	✓	✓	✓	
Geology/ Hydrogeology	Geology						
	Hydrology/ Hydrogeology (Groundwater)				✓	✓	
Terrestrial	Environmentally Significant Areas						
	Vegetation (Flora)	✓				✓	
	Wildlife (Fauna)	✓				✓	
	Migratory Birds	✓				✓	
Aquatic Environment (Water and Water Resources)	Watercourses	✓	✓	✓		✓	
	Wetlands*	✓	✓			✓	
	Fish					✓	
Species at Risk	Flora/Fauna and Associated Habitat					✓	
Socio-Economic	Archaeological / Cultural Heritage Resources	✓	✓	✓		✓	
	First Nations / Aboriginal Interests					✓	
	People (local residents)	✓	✓	✓		✓	
	Land Use						

\*Based upon NBDELG draft Beta Wetland Mapping (non-regulated wetlands)



# 6.0 Environmental Effects Assessment and Mitigation

An analysis of the potential environmental effects for each of the interactions identified in Section 5.1 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.

## 6.1 Environmental Effects Assessment Methodology

### 6.1.1 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 were not carried forward for further consideration.

### 6.1.2 Impact Effects Boundaries

#### 6.1.2.1 Spatial and Ecological 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 10**.

**Table 10: Spatial Boundaries for Potential Environmental Effects**

Environmental Components		Spatial Boundary (m)
Atmospheric	Ambient Air Quality	250
	Climate	1000
	Ambient Noise Quality	100
Terrestrial	Vegetation (Flora)	500
	Wildlife (Fauna)	500
	Migratory Birds	1000
	Designated Habitat and other Protected Areas	1000

Environmental Components		Spatial Boundary (m)
Species at Risk	<i>Flora/Fauna and Associated Habitat</i>	1000
Aquatic	<i>Groundwater</i>	500
	<i>Surface Water</i>	100
	<i>Wetlands</i>	50
Cultural and Heritage Resources	<i>Archaeological / Cultural Heritage Resources</i>	150
Socio-Economic	<i>First Nations / Aboriginal Interests</i>	500
	<i>Health and Safety</i>	500
	<i>Labour and Economy</i>	500
	<i>Land Use</i>	500

**6.1.2.2 Temporal Boundaries**

The temporal boundaries for the EIA define the time periods for which likely environmental effects of the project are considered, such as, the duration of the construction phase or the operation and maintenance of the project. In the construction phase, specific construction-related effects are short-term while potential effects associated with the operational period are long term.

**6.1.3 Mitigation**

Mitigation is identified for each interaction and/or effect in an attempt to; prevent the interaction from occurring if possible, or 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. A variety of provincial and federal Acts, codes, regulations and guidelines have been consulted in the development of the mitigative measures.

**6.1.4 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 “Spatial” (geographic) extent of the effect?
2. What is the “Duration” (short or long term) and frequency of the effect?
3. How does the net effect compare to the existing environment? Does it represent a substantive or order of magnitude negative change in baseline conditions?

4. Is there a substantive public, government or agency concern?
5. What is the ecological and/or social context for the effect?
6. Is the effect reversible?

The significance of effects are ranked on the following scale (**Table 11**);

**Table 11: Significance of Environmental Effects**

Residual Effect Criteria	Significance of Effects Criteria <sup>1</sup>
<b>Magnitude</b>	Low/ Moderate/ Large
<b>Spatial Extent</b>	Immediate/ Local/ Regional
<b>Duration of Impacts</b>	Short-Term/ Medium-Term/ Long-Term
<b>Reversibility</b>	Reversible/Irreversible
<sup>1</sup> <b>Low/Immediate/Short-Term</b> - Impacts contained to the immediate area (<5m) and are short term (days to weeks). Impacts contained to the project area and/or are short term in duration (<1 year) <b>Moderate/Local/Medium-Term</b> - Impacts may extend to the area surrounding the project and/or are moderate term in duration (1-5 years) <b>Large/Regional/Long-Term</b> - 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.

## 6.2 Environmental Effects Evaluation Results

The results of the environmental effects evaluation are discussed for each VEC/VSC where potential impacts of the project were identified in **Table 10** above. Mitigation measures are presented for potential impacts of the project below in **Table 12**.

Table 12 - Potential effects of the project on each VEC/VSC with mitigation measures

Project Phase	Potential Impact	Mitigation	Significance of Effects	Residual
<b>Atmospheric Environment - Ambient Air Quality, Ambient Noise Quality</b>				
Construction (All Phases)	<ul style="list-style-type: none"> <li>Elevated noise levels at adjacent and nearby receptors from construction equipment and HDD activities</li> <li>Fugitive dust emissions.</li> <li>Generation of particulate matter from construction activities.</li> <li>Emissions of NOX, CO, VOCs and SO2 from construction/drilling equipment.</li> </ul>	<p>In addition to the standard mitigation measures provided in Section 6.3, the following mitigative measures will be employed to reduce the impact to air quality and noise quality in the area of the subject site prior to and during the construction phase of the project:</p> <ul style="list-style-type: none"> <li>As part of the Environmental Management Plan (EMP), a noise reduction plan will be established and communicated to the contractors prior to construction.</li> <li>Where practical, construction activities will be planned during daylight hours so as to reduce noise disturbance to nearby residence.</li> <li>During construction, nearby residents will be notified of the schedule for construction activities and the likely duration.</li> <li>Contractors are to ensure that vehicles, tools, and equipment will be properly maintained according to emission and noise suppression standards.</li> <li>All construction equipment will be turned off when not in active use to minimize idling.</li> <li>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.</li> <li>Monitoring of weather (wind conditions) and stabilization of stockpiles, bare slopes to minimize increase in fine particulate matter.</li> <li>Water will be used to reduce dust, where necessary.</li> <li>Exposed soils will be stabilized as soon as practical.</li> <li>Complaints related to noise from the construction will be addressed by the contractor.</li> </ul>	<p>Magnitude: Low                      Spatial Extent: Local                      Duration of Impacts: Short term - Seasonal                      Reversibility: Reversible</p>	<p>None</p>
Operations and Maintenance	<ul style="list-style-type: none"> <li>Elevated noise levels at adjacent residences from onsite equipment.</li> </ul>	<ul style="list-style-type: none"> <li>The well house building will be constructed such that the soundproofing measures are included.</li> <li>Operation requirements will be completed in accordance with the NBDELG Approval to Operate Certificate.</li> </ul>		
<b>Terrestrial Environment - Flora, Fauna, Habitat, and Migratory Birds (Wildlife and Wildlife Habitat)</b>				
Construction (All Phases)	<ul style="list-style-type: none"> <li>Disturbance from vehicles and construction equipment may cause disruption of wildlife (including birds) activity such as breeding and/or feeding.</li> <li>Heavy equipment use during the construction activities may cause direct injury or death of wildlife through collisions or destruction of dens and food sources.</li> <li>A change in vegetation (flora) quality and/or quantity due to the activities associated with the construction of the Production Well and Water Main Connection areas.</li> </ul>	<p>In addition to the standard mitigation measures provided in Section 6.3, the following mitigative measures will be employed to reduce the impact to terrestrial environment quality in the area of the subject site prior to and during the construction phase of the project:</p> <ul style="list-style-type: none"> <li>Vegetation will be retained where possible to maintain wildlife habitat.</li> <li>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.</li> <li>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.</li> <li>In the case of wildlife encounters the following shall be implemented:                             <ul style="list-style-type: none"> <li>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.</li> <li>Equipment and vehicles will yield the right-of-way to wildlife.</li> <li>If the nest of any bird is encountered during construction activities, work around the nest shall cease until the Town of Woodstock dispatches a biologist to assesses the situation and appropriate mitigations are applied.</li> </ul> </li> <li>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).</li> <li>Tree clearing and grubbing shall be kept to a minimum and will only be permitted inside the project footprint as needed.</li> <li>Tree clearing and grubbing will be conducted during winter months before the migratory bird breeding season (April 1 – August 30), to limit potential impacts to Migratory birds.</li> <li>Prior to any clearing activities during the winter months, a professional biologist with experience in recognizing bald eagle and bald eagle nest will assess the footprint area to determine the presence and/or activity within the area. If nests or bald eagles are encountered, the biologist will contact DERD and/or ECCC for appropriate mitigation measures for the clearing activities to move forward.</li> <li>To minimize disruptions with bird/bat activity at night, the project construction activities will be limited to daylight hours. If night work is required, approval from the Town will be required. Lighting requirements will meet ECCC standards to minimize the potential impacts to migratory birds and bats.</li> <li>Any nuisance wildlife as identified under the Nuisance Wildlife Regulation (97-141) of the <i>Fish and Wildlife Act</i> identified as disrupting production operation may only be removed by a licensed Nuisance Wildlife Control Officer or a licensed trapper</li> </ul>	<p>Magnitude: Low                      Spatial Extent: Immediate                      Duration of Impacts: Short term - Seasonal                      Reversibility: Reversible</p>	<p>None</p>



Project Phase	Potential Impact	Mitigation	Significance of Effects	Residual
<b>Aquatic Environment (Water and Water Resources) - Groundwater, Surface Water (Watercourses and Wetlands)</b>				
Construction (All Phases)	<ul style="list-style-type: none"> <li>• Increased sediment loading in the watercourse resulting from construction and ground breaking activities.</li> <li>• Inadvertent releases of drilling fluids or sediment loaded groundwater during HDD activities could cause a temporary increase in turbidity that can negatively impact water quality and aquatic life.</li> <li>• Increased sediment loading in the watercourse resulting from construction and ground breaking activities.</li> </ul>	<p>In addition to the standard mitigation measures provided in Section 6.3, the following mitigative measures will be employed to reduce the impact aquatic environment quality in the area of the subject site prior to and during the construction phase of the project:</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• Additional mitigation measures as outlined in the conditions of approval of the WAWA will be followed.</li> <li>• A minimum distance of 5 m between the borehole trajectory and the river bottom will be maintained during drilling activity.</li> <li>• Entry and exit points with similar elevations will be selected to reduce pressure head differences which can cause upland leakages of drilling muds.</li> <li>• Drilling mud will be recycled when possible to reduce the amount of waste mud generated.</li> <li>• The HDD contractor will be required to have the necessary containment and clean-up equipment on-site and/or readily available for use.</li> <li>• A minimum distance of 5 m between the hole path and the river bottom will be maintained during drilling activity.</li> <li>• Entry and exit points with similar elevations will be selected to reduce pressure head differences which can cause upland leakages of drilling muds.</li> </ul>	<p style="text-align: center;">Magnitude: Low Spatial Extent: Local Duration of Impacts: Short term - Seasonal Reversibility: Reversible</p>	None
Operations and Maintenance	<ul style="list-style-type: none"> <li>• Possibility for drawdown of the groundwater table associated with use of the new well.</li> </ul>	<ul style="list-style-type: none"> <li>• The onsite well will adhere to applicable NBDELG Water Well Regulations.</li> <li>• Operation requirements will be completed in accordance with the NBDELG Approval to Operate Certificate.</li> </ul>		
<b>Cultural and Heritage Resources and First Nation / Aboriginal Interests</b>				
Construction	<ul style="list-style-type: none"> <li>• Potential discovery of all or part of an archaeological or cultural resource; and,</li> <li>• Potential discovery of human remains.</li> </ul>	<ul style="list-style-type: none"> <li>• An archaeologist will be on site during all construction activities involving soil disturbance including the initial 30 m of HDD operations to monitor for the possible discovery of archaeological artifacts.</li> </ul>	<p style="text-align: center;">Magnitude: Low Spatial Extent: Local Duration of Impacts: Short term - Seasonal Reversibility: Reversible</p>	None
<b>Socio-Economic - People (local residences)</b>				
Construction	<ul style="list-style-type: none"> <li>• Potential disturbance to the public use of the NB Nature Trail during construction</li> <li>• Potential disruption to local residences due to excessive construction activity include transporting materials and drilling</li> </ul>	<ul style="list-style-type: none"> <li>• Detour signs will be posted during construction to minimize traffic within the construction site.</li> <li>• Residences will be informed of the project schedule prior to commencement.</li> <li>• Construction crews will be limited to working between the hours of 7 am and 7 pm unless extended hours are approved by the Town.</li> </ul>	<p style="text-align: center;">Magnitude: Low Spatial Extent: Local Duration of Impacts: Short term - Seasonal Reversibility: Reversible</p>	None

Project Phase	Potential Impact	Mitigation	Significance of Effects	Residual
<b>Unplanned Events and Accidents (All Phases)</b>				
Unplanned Events and Accidents (Air)	<ul style="list-style-type: none"> <li>• Fire may result in decreased air quality for the subject site and surrounding area; and,</li> <li>• Chemical and fuel spills may adversely impact the ambient air quality</li> </ul>	<ul style="list-style-type: none"> <li>• Rubbish and waste materials will be kept at minimum quantities and burning of this material will be prohibited.</li> <li>• Waste materials will be collected on a regular basis and disposed of at an appropriate approved facility.</li> <li>• The Contractor will ensure that there is basic fire-fighting equipment available on site and all personnel will be familiar with the emergency response plan in the event of a spill or accidental fire.</li> </ul>		
Unplanned Events and Accidents, Malfunctions (Terrestrial/Aquatic/Species At Risk)	<ul style="list-style-type: none"> <li>• Accidental collision with wildlife or destruction of food sources could impact species of conservation concern or their habitat.</li> <li>• Chemical and fuel spills have the potential to kill vegetation, resulting in a loss of habitat or food sources; and,</li> <li>• Fires may result in a loss of vegetation in adjacent areas which has the potential to impact wildlife food sources.</li> <li>• Potential frac outs or escape of drilling muds to the environment</li> <li>• Potential collapse of the borehole created by the HDD approach.</li> <li>• Risk of potential flooding of well head, treatment system and infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>• An environmental monitor will be on site during the HDD to assist in mitigation of an environmental incident such as incidental drilling fluid release.</li> <li>• If a spill occurs, then it must be reported to the DELG Fredericton Regional Office at 506-444-5149 during regular business hours or if the spill occurs after regular business hours, then the Canadian Coast Guard's 24-hour environmental emergencies reporting system must be contacted at 1-800-565-1633; 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.</li> <li>• 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.</li> <li>• If a spill occurs, then it must be reported to the DELG Fredericton Regional Office at 506-444-5149 during regular business hours or if the spill occurs after regular business hours, then the Canadian Coast Guard's 24-hour environmental emergencies reporting system must be contacted at 1-800-565-1633.</li> <li>• The well head has been sited to an elevation 46 metres above sea level (masl), which is 2 metres higher than the highest recorded water level (43.9 masl) in this area.</li> <li>• Remedial action, or engineered controls, for any spills or leaks that occur will be completed.</li> <li>• Refueling, oiling, and maintenance of equipment will be completed in specifically designated areas to minimize the potential for terrestrial or surface water impacts.</li> <li>• 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.</li> <li>• Construction equipment and vehicles will be stored away and secured from any surface water to ensure that in the event of an accident or vandalism, petroleum hydrocarbons will not reach the watercourse or wetland.</li> <li>• The performance of erosion and sediment control measures will be inspected daily and prior to storm events. Issues or concerns will be addressed proactively.</li> <li>• An experienced contractor will be hired to construct the pipe using the horizontally directionally drilled methodology.</li> <li>• The HDD contractor will be required to have the necessary containment and clean-up equipment on-site and/or readily available for use.</li> <li>• Contractor(s) are to be provided guidance on proper species identification and the potential occurrence of SAR and their habitat requirements.</li> <li>• Contractors will be notified of potential environmental constraints (i.e. potential habitat areas) in the project area prior to the commencement of work.</li> <li>• 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.</li> <li>• Tree clearing shall not be undertaken between April 1 and August 31, to minimize potential impacts to Migratory Birds.</li> <li>• If a SAR is encountered, the Contractor will immediately stop work and notify Environment Canada or a professional biologist for further mitigation measures.</li> <li>• The Contractor will ensure that there is basic fire-fighting equipment available on site and all personnel will be familiar with the emergency response plan in the event of a spill or accidental fire.</li> </ul>	<p>Magnitude: Low to Moderate            Spatial Extent: Local            Duration of Impacts: Short term - Seasonal            Reversibility: Reversible</p>	None
Unplanned Events and Accidents (Archaeological and Cultural Heritage)	<ul style="list-style-type: none"> <li>• Potential discovery and destruction or alteration of all or part of an archaeological resource; and,</li> <li>• Potential discovery of human remains.</li> </ul>	<ul style="list-style-type: none"> <li>• Construction crews and machinery are to use the designated roadways and access points to limit disturbance off the project footprint</li> <li>• Construction crews will be made aware of the potential for archaeological resources within the construction area</li> <li>• The contractor will be educated on the proper mitigative activities if an archaeological resource or human remains is unearthed</li> <li>• Should an archaeological resource be unearthed, work in the area will cease immediately and Archaeological Services New Brunswick (ASNB) will be contacted at (506) 238-3512 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</li> <li>• Should human remains be unearthed, work in the area will cease and the Woodstock Police will be notified immediately. No one will disturb, move or rebury any uncovered human remains. If the remains are suspected to be Indigenous in origin or it is a suspected First Nations burial site, the Woodstock First Nation will be contacted in addition to ASNB</li> </ul>		



### Standard Mitigation of Potential Environmental Effects

The following mitigation measures have been identified to reduce the likelihood of occurrence, or minimize potential impacts of effects of the project on the VECs identified during the Environmental Effects Evaluation. A list of standard mitigation measures applicable to more than one VEC is provided with mitigation measures specific to each VEC discussed below.

- An Environmental Management Plan (EMP) will be established and communicated to the contractors prior to construction;
- A fire safety plan and spill response plan will be completed and detailed in the EMP and as part of the contractor Emergency Response Plan (ERP) to ensure that all site personnel understand how to prevent accidents from happening and how to respond quickly and safely in the event of a fire or spill on the site;
- The Contractor will ensure that there is basic fire-fighting equipment available on site and all personnel will be familiar with the ERP in the event of a spill or accidental fire;
- The contractor will be required to provide spill response training to construction personnel and will ensure that spill response equipment is readily available onsite and each piece of machinery is equipped with a spill response kit;
- Remedial action, or engineered controls, for any spills or leaks that occur will be completed and outlined in the EMP;
- During construction nearby residents will be notified of the schedule for construction activities and the likely duration;
- Proper labeling of chemical storage containers will be completed and appropriate MSDS for stored chemicals and drill mud additives will be stored onsite to reduce likelihood of accidents or spills and to ensure the safety of workers onsite;
- Proper sediment control measures will be installed and checked regularly and prior to storm events to ensure they are continuing to operate properly to minimize potential impacts to adjacent habitat;
- 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; and,
- Exposed soils will be stabilized as soon as practical to minimize increase in fine particulate matter.



# 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 Woodstock area, 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. Lee Swanson – Project Manager, NBDELG Environmental Assessment Section
2. Sherry McCoy – Wellfield Protection Officer
3. Ken Harding – CAO Town of Woodstock (Retired)
4. John Pinsent – CAO Town of Woodstock (Current)
5. Mallory Gillis – Hydrogeologist NBDELG
6. Kim Allen – Director, Engagement and Consultation, Aboriginal Affairs Secretariat.
7. Ed Stone – Local Service District Chair, Upper and Lower Northampton, NB

## COMMUNICATIONS OBJECTIVES

The following objectives have been established by the Town 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 the Town were made aware of the proposed project, and its location, through direct written communications on May 26, 2017. Each resident was given the option to review the EIA document at either the NBDELG Grand Falls office located at 65 Broadway Boulevard in Grand Falls or via an electronic version of the document, available to download on the NBDELG's website. The residents were told that if they wished to further discuss the project, they could submit written communication by June 20, 2017, to Parrish Arnott, at Dillon Consulting Limited.

The residents were provided with a letter 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**.

No questions were received from the residents or public by the consultation closing date, nor have any questions or comments been received since. The Technical Review Committee (TRC) posed questions concerning the initial 2015 submission document: “*Environmental Impact Assessment Registration (Final) Groundwater Exploration Program, September 2015 – 15-2119, EIA Registration No. 4516-03-21422*”.

#### **FIRST NATIONS COMMUNITIES**

The Woodstock First Nation, located approximately 5 km south 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 May 17, 2017 with the project description and inquiries as to the duty to consult with relation to this project. On August 9, 2017, the Chief of Woodstock First Nation’s, Timothy Paul, was contacted in writing regarding the project. The letter included a brief description of the proposed project, location (with map included) and status of the Provincial Regulatory Approval process. The Chief was also given the option to submit written communications by September 1, 2017, to discuss the project further, and/or maintain contact throughout the project.

No questions were put forward by the AAS or Chief Timothy Paul.

Documentation of these letters is presented in **Appendix D**.

#### **2015 REGISTRATION DOCUMENT AVAILABILITY**

The Town has provided a copy of the initial submission to an NBDELG office. An electronic version of the document is also available for download on the NBDELG's website:

<http://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/EIA-EIE/Registrations-Engestremets/documents/EIARegistration1422.pdf>

## 8.0 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 13: 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	Town of Woodstock (Community Plan)
Crown Land – Licence of Occupation (potential)	New Brunswick Department of Energy and Resource Development (Crown Land and Forests Act)

According to the Navigable Protection Act (NPA), navigable water includes a canal and any other body of water created or altered as a result of the construction of any work and are those waterways where the public has a right to navigate the water as a highway. Only navigable waters included on the List of Scheduled Waters under the NPA are those navigable waters for which regulatory approval is required for works that risk a substantial interference with navigation.

According to the NPA list of scheduled waters, the Saint John River is considered to be “designated” navigable water; however the proposed water transmission line installation is considered a designated work in the “Minor Works Order”. Designated works are works that may proceed without Notice under the NPA, as long as they comply with the requirements of the Minor Works

Based on the above requirements of the Minor Works Order, it has been determined that the proposed project complies with the Minor Works Order and a notice to the Minister is not required for the water transmission line installation.

## 9.0

## Funding

The proposed project is being funded by the Town of Woodstock, the Province of New Brunswick's Gas Tax Fund. Contact information for the departments involved in the partnership are presented below:

**Town of Woodstock**

824 Main Street  
Woodstock, New Brunswick  
E7M 2E8

**Province of New Brunswick**

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

## 10.0

## Summary

This EIA registration has been prepared for the construction and operation of a new potable water supply for the Town of Woodstock. The proposed project will allow the Town to access potable water that is at lower risk during flood events.

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.



## Closure

This report was prepared by Dillon on behalf of the Town. 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**

**John Pinsent**

Chief Administration Officer  
Town of Woodstock

**Parrish Arnott, P. Geo.**

Project Manager  
Dillon Consulting