

NEW MUNICIPAL WELL AND RELATED INFRASTRUCTURE EIA REGISTRATION DOCUMENT

Village of Doaktown

No. 1900703



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REGISTRATION FORM

PURSUANT TO SECTION 5 (2) OF

THE ENVIRONMENTAL IMPACT ASSESSMENT REGULATION 87-83

CLEAN ENVIRONMENT ACT

1 The Proponent

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Property Ownership

As noted in the Water Supply Source Assessment (WSSA) Initial Application prepared by Englobe Corp. and included in Appendix A, two preliminary drill targets have been located on PID 40043044 in Doaktown, New Brunswick. At this stage, drilling targets were chosen after a preliminary site visit, field survey (geophysics), desktop studies, and a review of the 2009/2010 work completed by Crandall Engineering Limited (now Englobe Corp.)/TerrAtlantic, for the Village for the development of the existing municipal water supply well. The targets are shown in the enclosed Figure 1 in Appendix A (WSSA Initial Application).

Table 1: Preliminary Drilling Targets

Proposed Drill Locations	PID's Impacted
Test Drill 21-01 & 21-02	40043044

The Village does not presently own this property. However, the existing north side water supply well is located on the same PID and the Village has a Water Treatment Plant License Agreement with the landowner.

The Village is in the process of obtaining the landowner's permission to complete the exploration program, including temporary access roads, preliminary test well drilling, etc. Depending on the outcome of the test holes, an updated land agreement will be acquired as appropriate; or if the test holes are unsuccessful, the holes will be decommissioned as per NBDELG requirements. However, the NBDELG's approval of test well drilling is also requested for this site.

2 The Undertaking

2.1 Name of the Undertaking

New Municipal Well and Related Infrastructure - Village of Doaktown

2.2 Project Overview

The Village of Doaktown's municipal water supply is currently fed by a single municipal well on the north side and a spring source on the south side of the river. The system was originally configured so that each side could supply the opposite side if needed. The north side municipal well is treated (manganese treatment & chlorination), then pumped into a reservoir and then distributed to the system by gravity. The water for the south side system flows from the spring through a 100+-year-old water line to a raw water reservoir and is then pumped for treatment (chlorination) before entering the south side water distribution system.

The existing south side spring and its infrastructure require major upgrades and have surpassed their useful lifespan. Due to the risk of failing infrastructure, the south spring will not be capable of providing redundancy to the system in the long-term. To ensure a proper reliable system, it would be necessary for the Village of Doaktown to improve its water supply source. However, the current south side spring has been in use for 100+ years and upgrades to the current infrastructure would be difficult to accomplish without impacting the source itself. In addition, a groundwater source would be preferred for water quality protection reasons.

For these reasons, a new groundwater source is considered the most cost-effective long-term solution for the Village of Doaktown to ensure a reliable municipal water system with full redundancy. Therefore, the proposed upgrades will consist of improving the north side supply to eliminate the need for the south side supply. These improvements will include a new well, and related infrastructure, and may include decommissioning of the existing springs. Concurrently to the well exploration project, a new water treatment unit and water reservoir will be added to the existing well's site, as these are required in order to use the existing well to its full rated capacity. The water treatment unit and the reservoir are not considered to be part of the EIA for this reason.

In 2008, a complete design was developed which included provisions for a second groundwater source to be developed in the area, including an additional WTP unit and reservoir. Therefore, the existing piping systems and buildings are already configured to accept the new proposed infrastructure.

- Construction of a preliminary access road to the drilling targets, including clearing and grubbing operations where required, and access road construction (use of imported sandstone or pit run material).
- Drilling of two (2) tests holes to determine the yield and water quality of the proposed site.
- If the test holes are found to be acceptable, the following work will be required:
 - Development of one (1) of the test holes, and related works as required under the WSSA Guidelines, including use of the other test hole and existing well/observation well for observation.
 - Construction of well controls building.
 - Final well construction in accordance with WSSA guidelines.
 - Construction of permanent access road and water transmission main to the existing system.
- If the test holes are not successful, it may be decided to drill additional test holes (with the approval of the NBDELG).

Construction of new water reservoir and treatment unit is part of a separate contract that does not require to be registered with the EIA branch. Therefore, the construction of the water reservoir and the treatment unit will be implemented despite the results of the EIA, since they are required to allow the full use of the existing well.

2.3 Purpose / Rationale / Need for the Undertaking

The work proposed herein is required to evaluate the potential for a reliable new water source in the Village of Doaktown and to ensure access to potable water throughout the community. A reliable municipal water system is a primary need, and failure of the municipal distribution system could result in deteriorated water quality and ultimately in the loss of this imperative service. If the new well is deemed sufficient, it will act as an additional water source for the Village and provide redundancy to the existing well system.

A “do-nothing” approach is not acceptable in this case since the existing spring water infrastructure has reached its useful lifespan and the Village does not have a reliable backup water source due to the risk of failing infrastructure.

Therefore, the proposed addition of a second groundwater production well and related infrastructure is required to provide access to a reliable water system that meets the current standards.

2.4 Project Location

As identified in Section 1, the proposed site is located on the property defined as PID 40043044. Two (2) potential drilling targets have been identified based on preliminary desktop analyses and site surveys (geophysics). The exact location will be as directed on-site by a Hydrogeologist.

The proposed drill locations are shown in Figure 1 of the Water Supply Source Assessment Initial Application prepared by Englobe Corp., (Appendix A of this document). The figure shows the preliminary location of the proposed test well drilling targets (21-01 and 21-02) over an existing aerial photograph. The figure also shows the existing groundwater well (09-01), the current observations well (09-02). Figure 1 also indicates the location of past proposed test drill locations (09-03, 09-04, and 09-05) that were part of work completed for the development of the existing north side municipal water supply well (by Crandall Engineering Limited (now Englobe Corp.)/TerrAtlantic).

The 2009 targets were recorded in the field using pace & compass, rather than a hand-held GPS, and would therefore be difficult to re-locate at this time. In addition, the 2009 geophysics survey can not be repeated now due to the presence of power lines which would impact the survey equipment. Therefore, based on the new desktop analyses it was determined that the 2009 drilling targets would have a low success rate and it was inadvisable to use the past data for new drilling targets. Further discussion regarding the 2009 drilling targets can be found in Section 2.5 – Siting Considerations. It is to be noted that the exact location of the new municipal well and related infrastructure will be determined depending on the outcome of the exploration program.

The Village of Doaktown is located in central NB, approximately 90 km southwest of Miramichi and roughly 95 km northeast of Fredericton. It is located in the county of Northumberland and is part of the parish of Blissfield.

The latitude and longitude of the center of each of the identified test well targets are as follows (approximately, to be confirmed on-site):

PID 40043044:

- Test Hole 21-01 - Latitude: 7508268.4738, Longitude: 252886.8133
- Test Hole 21-02 – Latitude: 7508266.3027, Longitude: 2528884.5378

A 1:25,000 scale map showing the proposed site in reference to the existing features is also included in Appendix B.

2.5 Siting Considerations

GENERAL SITE CONSIDERATIONS

A desktop analysis and geophysics survey has been completed, which has identified two (2) potential drilling zones as previously indicated. This review has been based on previous geology, hydrogeology studies and investigations, existing aerial imagery, lidar data, geological mapping, as well as the proximity of each site to existing water system components and vehicle access points. These proposed drill targets are located approximately 100 m north-northwest of the present operating well.

The Village currently has a license agreement with the landowner of the existing north side well that is located on the same PID as the proposed test drill location. The Village is currently working towards obtaining the landowners' permission to carry out this second round of exploration programs on their land including the related infrastructure.

A preliminary site visit and geophysical work were carried out, and no signs of pollution or contamination hazards were noted nearby the proposed drill target. It is to be noted that the subject property PID 40043044 was cleared approximately 10-15 years ago.

As shown on the attached drawings and indicated in the attached WSSA Initial Application (Appendix A), the proposed drilling targets are not within 30 m of any Wetland and Watercourse according to the NBDELG delineation. In addition, a desktop assessment of unmapped wetlands and watercourses was conducted based on the findings of a Wetland Delineation Report prepared for the subject parcel by AMEC in 2010 and supplemented with a review of publicly available information. The 2010 wetland assessment suggests a low likelihood of wetlands or watercourses within the project footprint. An additional field survey could be conducted during the appropriate growing season to confirm the findings of the desktop assessment if required.

For additional information on the geology and hydrogeology of the area, please refer to the WSSA Initial Application in Appendix A of this document.

It shall be noted that the exact route for future piping and other related infrastructure to the existing system will be determined once the final well location has been established.

OTHER LOCATION CONSIDERED

The locations proposed for the well exploration program were derived from the results of the desktop analyses, field survey and review of the past studies conducted as part of the development of the existing north side municipal water supply well (by Crandall Engineering Limited (now Englobe Corp./TerrAtlantic).

A fieldwork investigation (EM16 survey) of the area conducted in 2009 had revealed a potential bedrock fault system. From this, a total of five (5) potential test drill locations had been identified (ID 09-01, 09-02, 09-03, 09-04, and 09-05 shown in Figure 1 of the WSSA Application, Appendix A of this document). Reportedly, wells drilled within a bedrock fault system in the Doaktown area result in higher well yields. It was determined that the final test drill location of the existing north side well would be 09-01 and 09-02, one as a pumping well (existing north well) and the second one as an observation well.

In December 2020, a non-intrusive site investigation (geophysics field survey) was conducted in the area of the existing north well. This investigation suggested a presence of a fault zone, approximately 100 meters north of Tom Boyd Road. In addition to the reasons noted previously all three remaining 2009 targets (09-03, 09-04, and 09-05) are located farther east of this fault zone, thus, less likely to intersect fault(s), therefore, considered less promising. With this new round of exploration for a suitable new well location, it was determined that they were not the priorities for test well drilling.

Another option that could be considered is the rehabilitation of the existing spring system. However, this option is not recommended since a spring system is considered surface water and therefore more susceptible to contamination. A well source would be the preferred option as this is considered to be a more secure source in terms of both quality and quantity.

ZONING

There are no concerns with the zoning for this project. The proposed test holes are located outside the Village's limits, adjacent to Rural Residential zoning (Figure 3, in Appendix A) and are on the same PID as the existing well, therefore land use will be similar.

PROXIMITY TO WETLANDS AND WATERCOURSES

As mentioned prior, and as shown on the attached figures in Appendix A, the proposed drilling targets are not within 30 m of any wetlands according to GeoNB's delineation. As mentioned earlier, a desktop analysis for unmapped wetlands in the area was conducted based primarily on the findings of a Wetland Delineation Report prepared for the subject parcel by AMEC in 2010, and review of available information including GeoNB Wetland Mapping, Surficial Geology Mapping (Rampton, V.N. 1984, Generalized Surficial Geology Map of New Brunswick, reproduced and edited 2002.), Google Earth and aerial imagery (1985-2019), and Lidar imagery of the project area.

The 2010 Wetland Delineation Report was completed by AMEC as part of the north side well development. The 2010 wetland delineation identified a small isolated wetland located centrally on the parcel, approximately 250m from the proposed drilling sites. Based on the current project scope, the wetland is unlikely to be impacted by the project. No other wetlands were identified on the subject parcel. With respect to wetlands, it will not be possible to complete a formal delineation until the summer although the previous studies suggest that these are unlikely. An updated wetland evaluation could be completed in the summer of 2021 if required to confirm the findings of the desktop assessment. However, preliminary exploratory activities are necessary prior to that time to allow the project to move forward.

According to GeoNB, a mapped watercourse is also present on the central portion of the property. In 2010, the AMEC assessment revealed no evidence of the watercourse being present at the site. If present, the watercourse would be greater than 200m from the proposed drilling sites and unlikely to be impacted by the project. No other watercourses were identified on the subject parcel.

For the exploratory well drilling phase of the project, it is anticipated that the disturbance will be limited to tree clearing, stripping, and construction of new temporary access roads and well pad area(s) and construction of up to two (2) test wells in the approximate locations shown on the attached Figure 1. The intent is to maintain construction activities a minimum of 30m away from any watercourses identified in the field.

2.6 Physical Components and Dimensions of the Project

LAND REQUIREMENTS

A map showing the location of each proposed test hole (2) relative to the environmental features of the region and a color aerial photograph is attached as part of the WSSA Initial Application Submittal (Figure 2 - Appendix A).

It shall be noted that the total area required on the property will only be known once the final test hole locations have been established on-site and the hydraulic test results are available. If the test hole does not provide sufficient yield, it will be decommissioned in accordance with the NBDELG guidelines.

The total area of the subject property on which this work may take place is as follows:

PID 40043044: Test Hole 21-01, 21-0 – 37 hectares

However, only a portion of the total area of the successful site is to be developed. The total area on the property will be determined following the results of the preliminary drilling and pump testing.

PHYSICAL COMPONENTS AND INFRASTRUCTURE

If a successful yield is found, the construction of the well will be completed in accordance with the NBDELG guidelines. In addition to the well, the following components and infrastructure will be required:

- a) **Water transmission main and access road:** The installation of a new water transmission main and access road will be required from the newly drilled well to the existing water system (exact location to be determined depending on final well location, however, it is anticipated that the new well will be directed to the existing water treatment plant). This will be done by conventional open trench excavation.
- b) **Well controls building:** A new controls building is anticipated in the vicinity of the new well, to house the well's electrical/mechanical systems.

A new reservoir is anticipated, to provide additional water storage in the Village, to manage the peak flow water demands, and to handle the full capacity of the existing north well. A new treatment unit will also be added to the existing WTP for similar reasons. These upgrades are outside of the scope of work that requires an EIA and will be constructed as part of a separate contract even if a new source is not required. Therefore, it was not included in this EIA Application.

ADDITIONAL DETAILS

In addition to the new major physical features, construction is expected to include the following:

- a) **Lighting and impervious surfaces:** There will be no lighting on the site, except for exterior building lights (1 light per building). Full cut-off lighting will be used to reduce the attraction to birds. New impervious surfaces will be limited to the rooftops of the new structures (treatment plant, pumphouse, and reservoir).
- b) **Off-site facilities:** Off-site facilities will not be required under this water study.
- c) **Construction activities:** Various activities will be required as part of the project. During the construction of the access roads, imported material will be hauled to the site. As a result, an increase in vehicular traffic will be experienced during this period. In addition, various materials and equipment will be delivered to the site from time to time.

2.7 Construction Details

As soon as the EIA Registration Document and WSSA Initial Application are approved, the drilling of the test holes will be immediately undertaken.

It is estimated that, from the start of the tender period to full commissioning of the upgraded facility, it will require roughly 33 working weeks, pending receipt of approval to proceed under the EIA Registration. In order to achieve this, the following schedule is proposed (assuming that the comprehensive EIA Study is not required):

Table 2: Preliminary Project Schedule

COMPONENT	APPROX. DURATION	ANTICIPATED COMPLETION
1. EIA Registration, WSSA Initial Application, and Review	8 weeks	May 3, 2021
3. Construction of Access Road	2 weeks	May 17, 2021
4. Preliminary Drilling. Preliminary Well Construction and Pump Testing	5 weeks	June 21, 2021
5. WSSA Hydrogeological Study and NBDELG Reviewing Process	4 weeks	July 19, 2021
6. Engineering Design (Tender Ready Package, Control Building & Transmission Main)	6 weeks	August 30, 2021
7. Design Reviews and Approvals	3 weeks	September 20, 2021
8. Final Well Construction	2 weeks	October 4, 2021
9. Tender Period	3 weeks	October 25, 2021
10. Construction of Access Road and Piping	6 weeks	December 6, 2021
11. Construction of Well Controls Building	12 weeks	March 7, 2022
12. Commissioning of New Well and Infrastructure	1 week	March 14, 2022

The estimated hours of construction will be from Monday to Friday from 7:00 AM to 7:00 PM except during the constant rate pumping where the work is 24 hrs/day.

The following equipment is anticipated to be used for the construction procedures:

- Earthwork and construction of structures: Excavators, dozers, dump trucks, concrete trucks, compaction equipment.
- Well Drilling: Well Drilling Equipment, pumps, and generators.

Potential sources of pollutants during the construction period are anticipated to include:

- Exhaust and other emissions from construction equipment.

- Noise from construction equipment.
- Water for drilling. The run-off water from the drilling operation will be controlled by the installation of erosion control structures. Typical installation for a drilling site includes the excavation of a drilling ditch, installation of the erosion control structure (silt fencing and hay bales), and utilization of the existing wooded land where possible to minimize the effect on nearby streams.
- Silt from disturbed surface areas. This will be minimized by requiring the contractor to install silt fences and other erosion protection devices around the work area and to reinstate disturbed areas as soon as is practical.
- Petroleum hydrocarbons from possible leaks, spills, or accidents from construction equipment and vehicles. This will be minimized by requiring the Contractor to have spill kits on-site and to conduct daily inspections of his equipment. Contractors will be required to follow the Environmental Management Plan (EMP), which will be developed if a successful well is found and will be included in the specifications. No refueling or maintenance of vehicles will occur within 30 m of watercourses.

All waste generated during construction will be stored in containers and removed off-site by the Contractor.

The following sequence and procedures are recommended during the construction process:

1. Mobilization and installation of environmental protection devices.
2. Clearing and grubbing.
3. Construction of access road (imported sandstone/pit run material).
4. Mobilization of drilling equipment and installation of environmental protection devices for the drilling work.
5. Drilling of test holes and step pumping test.
6. If unsuccessful:
 - Abandonment of test holes as per NBDELG guidelines and removal of the casing.
 - Clean-up, property restoration, and demobilization.
7. If successful:
 - Enlargement of one (1) test hole (remaining test hole to be used as an observation well, along with existing wells).
 - Step pumping test and constant rate pumping test including installation of environmental protection devices as required for selected pumping rate.
 - Clean-up, property restoration, and demobilization.

As noted above, some clearing and grubbing activities will be required for the construction of the temporary access road. The grubbing material will be disposed of off-site by the Contractor. The topsoil and organic material will be re-used for the restoration following the completion of the work where possible or disposed of off-site by the Contractor. Trees will be returned to the Owners or may be disposed of by the Contractor.

It is expected that clearing and grubbing work within the breeding season will be limited to the work required to access drilling sites for preliminary drilling. A non-intrusive search for evidence of nesting will be performed prior to clearing trees and the recommended buffers will be used.

In the event that the well is successful and the hydrogeological assessment reveals a sufficient yield, the new well will be connected to the Village's water system and the associated

infrastructure will be constructed (refer to Section 2.6). This work will be done by a qualified contractor to be selected through a public tendering process in accordance with the requirements of the Crown Construction Contracts Act. The specific contractors who will be involved, sources of materials, etc., cannot be confirmed until the tendering and contract award process has been carried out. Imported materials will include, where “imported” is interpreted to mean “brought in from off the construction site”:

- Imported common fill and topsoil;
- Imported bedding for pipes;
- Imported granular material for structure foundations, permanent access road and roadway restoration within the pipe trench;
- Imported construction materials for water transmission main installation (pipes, hydrants, valves, etc.);
- Imported construction materials for buildings: steel, concrete, etc.; and,
- Imported equipment for pumping and monitoring the water system.

It is noted that it will be a requirement that components that will come into contact with drinking water be certified to NSF Standard 61. Furthermore, AWWA standards will be followed as appropriate.

2.8 Operation and Maintenance Details

The water pumped from this future well will be directed to the existing water treatment plant. Based on the water quality of the existing well, it is anticipated that the water will then be treated for the removal of manganese with a bacteria media filter. Following the treatment system, chlorine will be injected into the water before it flows to the reservoir and distribution system. The stop and start signal for this well pump will be controlled based on the water elevation in the reservoir. The daily water production of this new well(s), motor size, and other components are unknown at this time and will be determined following the completion of the Hydrogeological Study and detailed design. The goal is to obtain a well that has the same capacity as the existing north well (~200 USgpm) to provide full redundancy.

Normal operation and maintenance will include:

- Overall water system maintenance.
- Maintenance of reservoirs and treatment plant as current practices.
- Continued operation and maintenance of existing chlorine equipment.
- Mechanical and electrical maintenance.
- Generator maintenance at the water treatment plant and well pumphouse.
- Water sampling in accordance with the NBDELG and NBDOH.

The power will be brought on-site by the existing and/or new hydro transmission lines, depending on the final well location. Power costs for the well controls building/pump house are estimated to be approximately \$5,000.00 per year based on the initial use and present NB Power rates.

The well controls building/pump house and related infrastructure will be operated and maintained by the Village maintenance personnel (water system operator).

2.9 Future Modification, Extensions, or Abandonment

It is anticipated that the existing south side springs may be decommissioned once the new system has been in operation for a sufficient timeframe to adequately test the system under all operations. A decommissioning plan would be developed at that time. In regard to the new well and infrastructures, it is not anticipated that the water system would be abandoned. However, all regulations would be followed in the event that this would happen.

2.10 Project-Related Documents

The following project-related documents are appended:

The Water Supply Source Assessment Initial Application prepared by Englobe Corp. (Appendix A).

3 Description of the Existing Environment

3.1 Physical and Natural Features

As noted in the previous sections, the proposed drilling areas are not within 30 m of a Wetland or Watercourse according to GeoNB's delineation. In addition, the 2010 Wetland Delineation Study by AMEC suggested that unmapped wetlands/watercourses are unlikely to be present.

The complete description of the geology and hydrogeology of the area is available in the WSSA Initial Application in Appendix A of this document. Additional soil information will be obtained following the preliminary investigations during the drilling of test holes.

Site Topography and General Surface Drainage Regime:

The approximate elevations at the proposed locations are 126 meters for Test Hole 21-01 and 123 meters for Test Hole 21-02 based on Provincial LiDAR mapping. The average gradient is approximately 1.0%.

The majority of the property drains toward the south. From the aerial photographs and topographical mapping, the site drains towards existing small drainage ditches and eventually to Miramichi River.

As shown in Figure 2 in Appendix A, there are no private wells located within 500 meters of each proposed test hole. However, the new targets are approximately 100m north of the existing municipal well. In the event that the test holes are developed as municipal production wells, the wellfield protection plan would then be updated in accordance with the NBDELG guidelines.

3.2 Cultural Features

There are no known major recreational or tourism activities in the immediate vicinity of the proposed drilling site, nor any known heritage features. The site is located in a remote area.

3.3 Existing and Historic Land Uses

The two drill targets are located outside the Village's limits with no adjacent developed land and are presently wooded. Figure 1 in Appendix A shows the subject property with a 500 meters radius from the proposed test hole zones.

As noted in the WSSA Initial Application (see Appendix A), from the preliminary desktop analyses completed to date, we do not anticipate any water quality concerns due to the surrounding land use, but this will be confirmed during the preliminary drilling investigations.

There is no indication that there were previous developments on this site that may have been of cultural or historic interest.

4 Summary of Environmental Impacts and Mitigation

At this time, the construction work will be limited to clearing and grubbing activities to access the identified drilling target(s), the construction of access roads using imported sandstone, drilling of test holes, enlargement of successful test holes, and property restoration. If a successful well would be found, the project's scope of work would be expanded to include the final well construction, connection to the system, and related infrastructure, which will depend on the final well location (refer also to Section 2.6).

The attached map from GeoNB (Appendix C) shows the mapped floodplain for the Village of Doaktown. Based on GeoNB mapping, the predicted return period flood elevation for the Southwest Miramichi River is from + 26.8 to + 36.0 meters. The historic flood elevations are from + 28.4 m to + 38.0 metres.

The proposed test holes are well above the flood level of Doaktown. As noted in section 3.1 of this document, the elevation of the sites is from 126 meters to 123 meters, which are well above the approximate flood levels.

It is anticipated that the proposed work will have little effect on the surrounding environmental features. As noted in the previous section, the proposed drilling targets are not within 30 m of any mapped wetland according to GeoNB's delineation, however, the existing well is located near the test drilling targets. The main disturbance to existing environmental features will be during the construction of access roads and during drilling operations which will be protected with environmental protection structures as noted in Section 2.7 of this document.

5 Summary of Proposed Mitigation

Different mitigation measures will be used throughout the project to minimize environmental impacts as follows:

- Disturbed areas will be reinstated as soon as is practical, silt fences and other erosion protection devices around excavations and stockpiles will also be used until the fully grown.

- Clearing and grubbing activities and access road construction will be limited to the requirements of the drilling equipment.
- A setback of 30 meters from wetlands and watercourses will be respected. A WAWA permit application will be submitted if construction is required within the 30m buffer zone of a wetland or watercourse.
- The construction will be inspected by the Village's engineering consultant.
- The Contractor will be responsible to have on-site the proper leak and spill prevention equipment prior to commencement of any work. In the event of a spill, the contaminated soils will be removed from the site and disposed of at an approved decontamination site. Any spills will be reported to the DELG Fredericton Regional Office during business hours or to the Canadian Coast Guard's 24-hour reporting system after-hours.
- The Contractor will be responsible to provide machinery in good working condition and greenhouse gas mitigation measures such as anti-idling policies will be described in the project specifications.
- If the preliminary investigations and Hydrogeological Assessment are successful, an Environmental Management Plan (EMP) will be developed and submitted prior to major construction work (watermain installation, construction of permanent access road, etc.). The EMP will be included in the project specifications, and it will be required that the Contractor follow the EMP requirements.

FAUNA AND FLORA DESKTOP STUDY

The project is located in the Eastern Lowlands Ecoregion where it abuts the Valley Lowlands Ecoregion. It is within the Bantalor Ecodistrict and characterized by a flat to gently rolling area. (New Brunswick Department of Natural Resources (NBDNR), 2007). Most of the property appears to be a temperate mixed forest that is currently regenerating from forestry activities. Tree species include dominance of red maple (*Acer rubrum*), large-toothed aspen (*Populus grandidentata*), trembling aspen (*Populus tremuloides*), white birch (*Betula papyrifera*), balsam fir (*Abies balsamea*), and red spruce (*Picea rubens*). (AMEC, 2010).

A Species at Risk (SAR) assessment will be conducted at the project site and will include a review of Atlantic Canada Conservation Data Centre (ACDC) reports prepared for the project area and a field survey to identify SAR (and their critical habitats) protected under federal and provincial Species at Risk Acts.

Preliminary exploratory activities are not anticipated to generate significant disturbance to site flora or fauna. Some disturbance of vegetation is expected at the well site but will be limited to tree clearing, stripping, and construction of new temporary access roads and well pad area(s). As such, the SAR survey will be conducted following the initial exploratory project stage during the appropriate field season. However, the following mitigation measures will be taken by Englobe and their subcontractors during the course of the project to ensure native flora and fauna are protected:

- If encountered, wildlife is not to be handled, touched, or harassed. Wildlife will be provided ample space to vacate the worksite on their own accord. Encounters with wildlife will be documented and reported to the client.
- Machinery will be operated on existing access roads and trails, where possible, to prevent unnecessary disturbance of vegetation, tree root zones and soils;
- Only trees and vegetation necessary for construction will be removed.
- Signs, notices, posters, etc. will not be affixed to trees or other vegetation; and
- Exhaust fumes from all equipment will be directed away from tree canopies;

Following the completion of the exploratory phase of the work, it is proposed that a field survey be conducted during the summer of 2021 to confirm that no wetlands or watercourses were impacted by the preliminary work. If the exploratory drilling is successful and a municipal water source is found, the temporary access roads will remain in place and a wetland compensation plan will be developed at that time if impacts are suspected. In the event that the test well drilling program is unsuccessful, an evaluation will be carried out following the field survey to determine if any land restoration or compensation is required.

6 Public and First Nation Involvement

As noted in Section 1, the Village is in discussion with the landowner. The Village will proceed with a formal land agreement as appropriate, depending on the results of the preliminary drilling.

Following the preliminary drilling investigations and constant rate pump testing, any landowners affected outside the identified properties will be contacted. At that time, the Village will prepare an overall public notice to inform the general public and any stakeholders of the details of the project.

A Public Consultation will be held and a report summarizing the discussions and related topics will be done per the EIA Guidelines. The summary-report will be provided to the NBDELG for review and approval.

7 Approval of Undertaking

The following technical approvals are anticipated as being required for this project:


- Approval under the EIA Legislation from the NBDELG.
- Approval of the Initial Application and Hydrogeological Study under the NBDELG Water Supply Source Assessment.
- For the construction of the well, the contractor will be required to obtain the drilling permit from the NBDELG before undertaking the drilling operations.
- WAWA Permit if required.
- Certificate of Approval to Construct from the NBDELG for the work involved with connecting the new well to the system, and construction of the new well control building.
- Approval to Operate as provided by the NBDELG once the facility has been completed and is being operated by the Village.

8 Funding

The Village has secured funding for the project under the Integrated Bilateral Agreement for the Investing in Canada Infrastructure Program.

9 Signature

March 10, 2021
Date


Ms. Karen Petitpas
Assistant Clerk
Village of Doaktown

**Appendix A Water Supply Source Assessment Initial
Application, incl. Englobe Corp. Figures 1 to 3**

Water Supply Source Assessment Initial Application

Please provide the following information:

1. **Name of proponent:** Village of Doaktown, New Brunswick.
2. **Location of drill targets (including property PID) and purpose of the proposed water supply:**

The Village of Doaktown has an existing water supply well located on the north side of the Miramichi River, approximately 1.4 km north of the river. The property (PID 40043044) is located just north of the Hazleton Road, approximately one kilometre northwest of the Hazleton Road's intersection with Route 8.

The Village requires that a second well be drilled to serve as a backup water supply. Based on preliminary work completed to date, a preliminary drill target has been located on PID 40043044 in Doaktown, New Brunswick. This is the same PID where the Village has their existing water supply well (License Agreement with the landowner). This drilling target was chosen after review of the 2009/2010 work completed by Crandall Engineering Limited/TerrAtlantic, for the development of the existing municipal water supply well. A preliminary non-intrusive site visit was completed by Englobe and Mr. John Hart, B.Sc. on December 29, 2020, in order to confirm this new drill target.

The Village of Doaktown's municipal water system is currently supplied by a single municipal well on the north side and a two-spring source on the south side of the river. Currently, the 100+ year old water line from the spring and the spring building require major upgrades. In addition, a groundwater source is preferred over a spring-fed source, both for water quality reasons and for long-term reliability, as springs are considered to be "surface water". Springs are known to be more susceptible to water quality and quantity concerns. For these reasons, a second groundwater source is considered the preferred long-term solution for the Village and will eliminate the need for the south side springs supply.

3. **Required water quantity (in m³/day) and/or required pumping rate.**

The desired water quantity of the new well is roughly 1090 m³/day (200 USgpm). If this quantity is found, it will provide the necessary backup capacity in the water supply system to completely replace the south side spring source.

4. **List alternate water supply sources in area (including municipal systems).**

The Village of Doaktown has one (1) municipal production well on the north side and a spring source on the south side of the river.

5. **Discuss area hydrogeology as it relates to the project requirements.**

Zone # 1:

This proposed drill target is located some 100 m north-northwest of the present operating well along a north-northeasterly lineament that parallels a fault zone (basically very near to, or under the Tom Boyd Road (Hazelton Road). The existing water supply well was drilled on this EM16 target (potential fault) back in 2009. It was successful in targeting a suitable amount of water (~300 USgpm). Zone 1 is underlain by Late Carboniferous to Permian-age sediments belonging to the Pictou Group. Smith, and Fyffe (2006) describe these rocks as medium- to fine-grained, terrestrial, clastic rocks (Pictou Group - Mountain View and Minto formations).

An examination of the topography through LiDAR data reveals a number of linear depressions, most likely bedrock-controlled (since rock is at, or close to the surface). Some of these features are aligned to the east-northeast (typically trending between 050 and 070 degrees), paralleling the neighbouring Miramichi River to the south. The second most prominent group of lineations are aligned north-south, or a little to the northeast (actually trending between 005 and 030 degrees). This proposed drill site parallels a suspected/known fault zone (trending about 005 degrees); drilling along the lineaments with potential higher fracture permeabilities typically results in higher well yields. The orientation of the linear, north northeast structure was confirmed with a field survey with an EM-16 Geonics geophysical instrument on December 29, 2020. Two traverses were run with the EM16 instrument and using a hand-held GPS unit on December 29, 2020.

The northernmost traverse (see figure) indicated two positive “values” (conductors), aligned north-south, or a little to the northeast, following use of the Fraser Filtering method for EM16 data. A Fraser Filter is typically used in geophysics when displaying VLF data (EM16). These two positive zones are marked on the figure. The geophysical data suggests the conductor is in the immediate area of the road. This does not correspond to the “obvious depression”, immediately to the east of the road. The recommended targets are one (1) along the eastern side of the Tom Boyd road and two (2) near the base of the depression. The test hole most successful would be reconstructed to production well status while the other would be used as one of the observation wells.

The site is remote with limited potential for contamination.

6. Outline the proposed hydrogeological testing and work schedule.

It is the intent of the Village of Doaktown to start drilling as soon as possible at the proposed test site(s) to determine the preliminary yield and quality (see attached Figure 1 for the preliminary proposed drilling location). It is anticipated that one (1) test well and one (1) observation well will be drilled and the existing production/observation well will also be used for observation in accordance with the WSSA Requirements.

It is understood that the exploratory drilling may not be started until after approval of the EIA Registration Document and Initial Application has been received from the NBDELG.

The complete schedule of the work is presented in the EIA Registration Document in Section 2 (vii). The following is the proposed schedule for the preliminary drilling investigation to establish the ground water profile (in accordance with the Water Supply Source Assessment Guidelines (April 2017)):

- 🔗 Submittal of EIA Registration Document and WSSA Initial Application (including submittal and review process by NBDELG);
- 🔗 Landowner agreements/land acquisition;
- 🔗 Construction of Access Road;
- 🔗 Preliminary drilling investigations and water sampling;
- 🔗 Preliminary Well Construction, Step Pumping Test and 72-hour Constant Rate Pumping Test;
- 🔗 WSSA Hydrogeological Assessment Report (including submittal and review process by NBDELG); and
- 🔗 Final Well Construction (based on results and approval of Hydrogeological Report).

Based on the existing well construction and available hydrogeology, the proposed target depth below ground surface for the test wells (150 and/or 200 mm diameter) is 30 to 160 m, depending on the final test well location, to determine preliminary yield and quality.

If the newly constructed test well is found to be successful, step drawdown testing and a constant rate pumping test will be undertaken, in accordance with the Water Supply Source Assessment Guidelines (April 2017), including required sampling. This is proposed to be completed by the end of June 2021. Plans will have to be made in order to test the new well with the existing water supply well functioning as water source for the Village at the same time.

The results of the 72-hour constant rate pumping test will be used to calculate the safe yield of the test well in order to determine the construction method of the final production well configuration. During the constant rate test, water level fluctuations will be monitored in the new well and observation wells (2) using Solinst Levelloggers (plus Barologger), and electric water level tapes as a backup and way of calibrating the Levellogger data. Upon completion of the aquifer testing, a report will be prepared in accordance with the Water Supply Source Assessment Guidelines (April 2017), outlining the methods used, field data, final design drawings of the well, and relevant information used to provide conclusions and recommendations. The drawdown and recovery data will be analyzed using commercially available software (AquiferTest, Version 8.0, by Waterloo Hydrogeologic). The report will also include a discussion of long-term sustainable yields of the well and impacts on surrounding water supplies, if any.

7. Identify any existing pollution or contamination hazards within a minimum radius of 500 m from the proposed drill targets. Historical land use that might pose a contamination hazard (i.e. tannery, industrial, waste disposal, etc.) should also be discussed.

To the best of our knowledge, there are no visible indications of existing pollution or contamination hazards within a 500 m radius of the proposed drill targets. A request was made to DELG on January 15, 2021, File No. 100-05-R2. Based on this request, there is no record of Ministerial Orders or Remediation Orders related to these PID numbers. NBDELG records indicate that there are no petroleum storage tanks registered with the Department, under the Petroleum Product Storage and Handling Regulation, for these PID numbers. DELG have no records in their database of any remedial activity or contamination for these PID numbers. These PID numbers are not registered with the Department as a PCB Storage site. There are no records of landfill sites or former dumpsites located near these PID numbers.

8. Identify any groundwater use problems (quantity or quality) that have occurred in the area.

There are no known groundwater problems in the immediate area, with the exception of elevated manganese which is treated at the water treatment plant.

Preliminary indications of the geology and hydrogeology in the proposed test well area, suggest the potential of a successful second water supply well in this area.

9. Identify any watercourse(s) (stream, brook, river, wetland, etc.) within 60 m of the proposed drill targets.

Zone #1:

Figure 2 shows watercourses within 500 m of the immediate vicinity of the proposed well.

10. Identify site supervisory personnel involved in the source development (municipal officials, consultants and drillers).

Village of Doaktown:

Assistant Treasurer – Karen Petitpas

Englobe Corp.:

Project Engineer – Laura Leger, P. Eng.

Project Manager – Bob Oakley, P.Tech.

Senior Hydrogeologist – John Hart, B. Sc.

Senior Hydrogeologist – Jeff Meadows M.Eng., P.Geo.

Well Drillers:

To be determined.

11. Attach a 1:10 000 map and/or recent air photo clearly identifying the following:

- 📍 proposed location of drill targets and property PID
- 📍 domestic or production wells within a 500 m radius from the drill target(s)
- 📍 any potential hazards identified in question 7.

The attached Figure 2 includes a recent aerial surface overlain with available property information. The proposed drill target areas are clearly identified; The 500 m buffer zone around the drill target, adjacent brooks and existing wells within a 500 m radius of the drill targets (location of domestic wells are approximate, but collected from the DELG database) are shown on the drawing.

Existing well sites recorded on the NB Online Well Log System have been shown for reference. There were six wells located in the area of the proposed drilling location.

12. Attach a land use/zoning map of the area (if any). Superimpose drill targets on this map.

Reviewing the Village of Doaktown Rural Plan By-Law 2017-1 (<https://gmrsc.maps.arcgis.com/apps/webappviewer/index.html?id=7b340569b03f4533b34a0125943232f0>), indicated that the site is not included in the Village's zoning areas. The attached Figure 3 includes the current zones in the immediate area.

In all cases, public utilities are a permitted land use in accordance with the 2017 Village of Doaktown Rural Plan By-Law.

13. Contingency plan for open loop earth energy systems (see Section 2.3).

N/A.

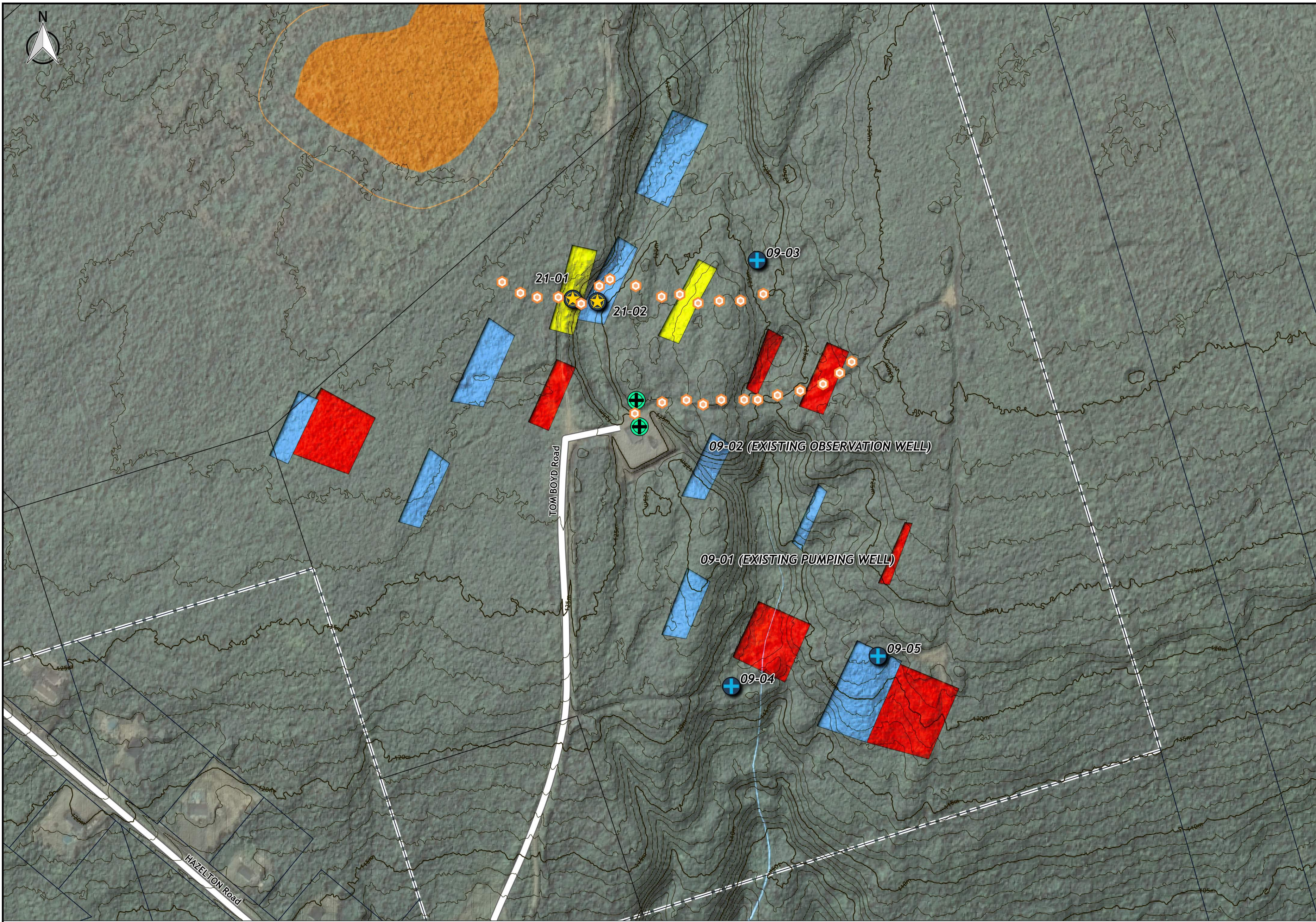
Submit WSSA Initial Application:
c/o Manager
Department of Environment and Local Government
Environmental Assessment Section
Tel: (506) 444-5382
Fax: (506) 453-2627

Mailing Address:
P.O. Box 6000
Fredericton, New Brunswick
E3B 5H1

Physical Address:
20 McGloin Street, Marysville Place
Fredericton, New Brunswick
E3A 5T8

References:

SMITH, E.A. and FYFFE, L.R., 2006. Bedrock geology of central New Brunswick (NTS 21 J). New Brunswick Department of Natural Resources, Minerals, Policy and Planning Division. Plate NR-4 (Second Edition).



Legend / Notes: **LEGEND**

- Hydrology**
- Watercourses
— Watercourses
- Wetlands
 - Regulated wetland (RWM)
 - 30m Wetland buffer
- Municipality**
 - Doaktown limits
- Topography**
 - Contours (1m)
- 2009 TerrAtlantic EM16 Target areas**
 - Target Areas (-)
 - Target Areas (+)
- EM16 Traverse Points (Dec. 29, 2020)**
 - Waypoints
 - Positive target areas. Potential fault
- Wells**
 - Proposed drill locations
 - Proposed well locations (2010)
 - Existing proposed observation / pumping well locations

Project Location:
DOAKTOWN, NB

Project Title:
NEW MUNICIPAL WELL AND RELATED INFRASTRUCTURE

Map Title:
PROPOSED DRILLING SITES FOR NEW WATER SUPPLY WELL

Map ID:
**MAP No: FIG-1
PAGE No: 1 of 1
SCALE: 1:1500**

Revision:
DATE: 2021/03/08 BY: MA
PROJ No: 1900703 APPR: LEL





Legend / Notes: **LEGEND**

Hydrology

Watercourses
 — Watercourses

Wetlands
 ■ Provincially significant wetland (PSW)
 ■ Regulated wetland (RWM)
 — 30m Wetland buffer

Municipality
 □ Doaktown limits

Topography
 — Contours (10m)

Wells
 ● Existing observation / pumping well locations
 ★ Area water wells
 ● Proposed drill locations
 ● Proposed well locations (500m buffer)

Project Location:
DOAKTOWN, NB

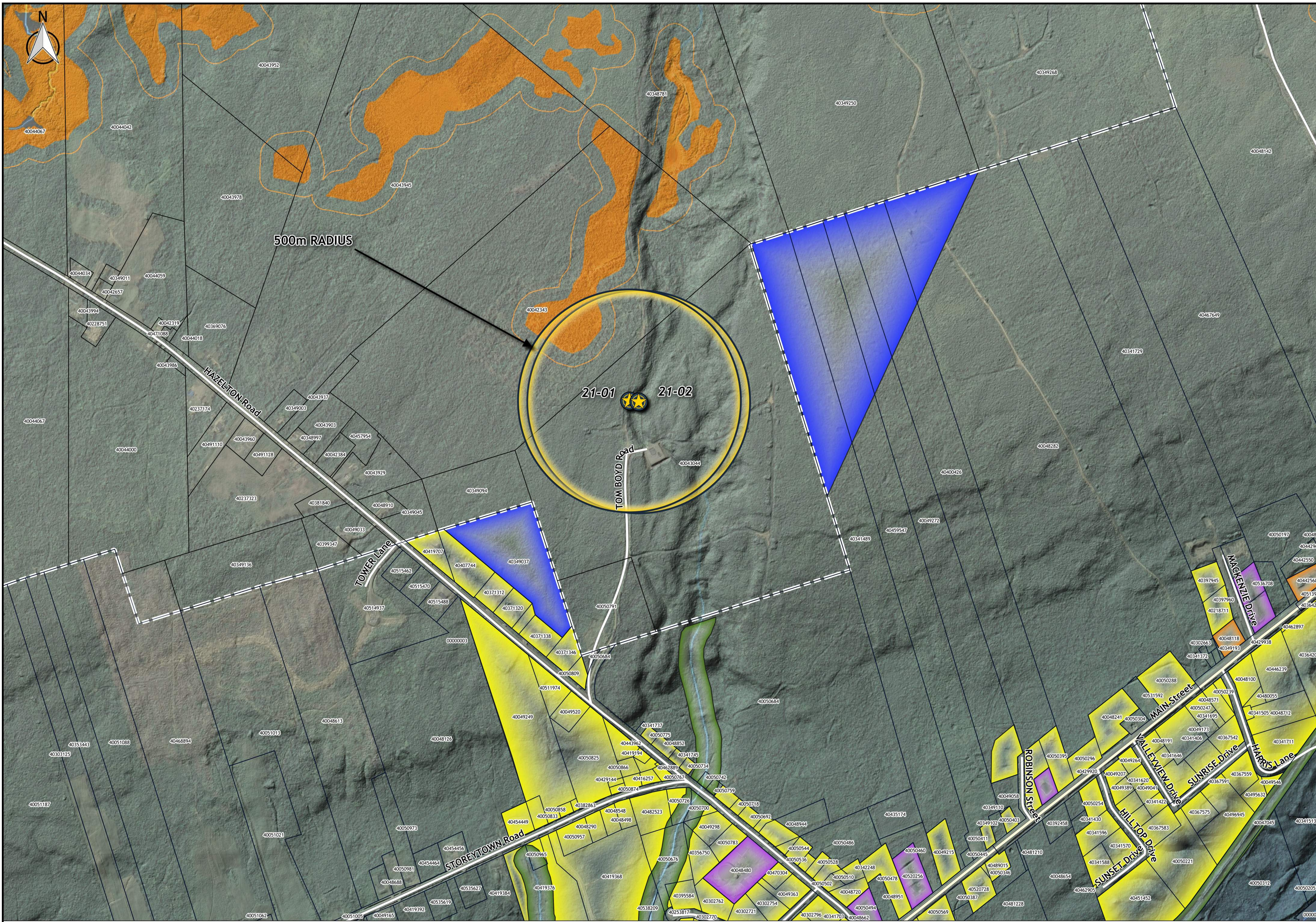
Project Title:
NEW MUNICIPAL WELL AND RELATED INFRASTRUCTURE

Map Title:
LOCATION OF PROPOSED WELLS, EXISTING WELLS, WATERCOURSES AND WETLANDS

Map ID:
MAP No: FIG-2
PAGE No: 1 of 1
SCALE: 1:10000

Revision:
DATE: 2021/03/08 BY: MA
PROJ No: 1900703 APPR: LEL





Legend / Notes: LEGEND

Hydrology

- Watercourses
- Wetlands
 - Regulated wetland (RWM)
 - 30m Wetland buffer

Municipality

- Doaktown limits

Proposed

- Proposed drill locations
- Proposed well locations (500m buffer)

Doaktown zoning

- Protected water supply
- Residential
- Industrial
- Conservation
- Commercial

Project Location:
DOAKTOWN, NB

Project Title:
NEW MUNICIPAL WELL AND RELATED INFRASTRUCTURE

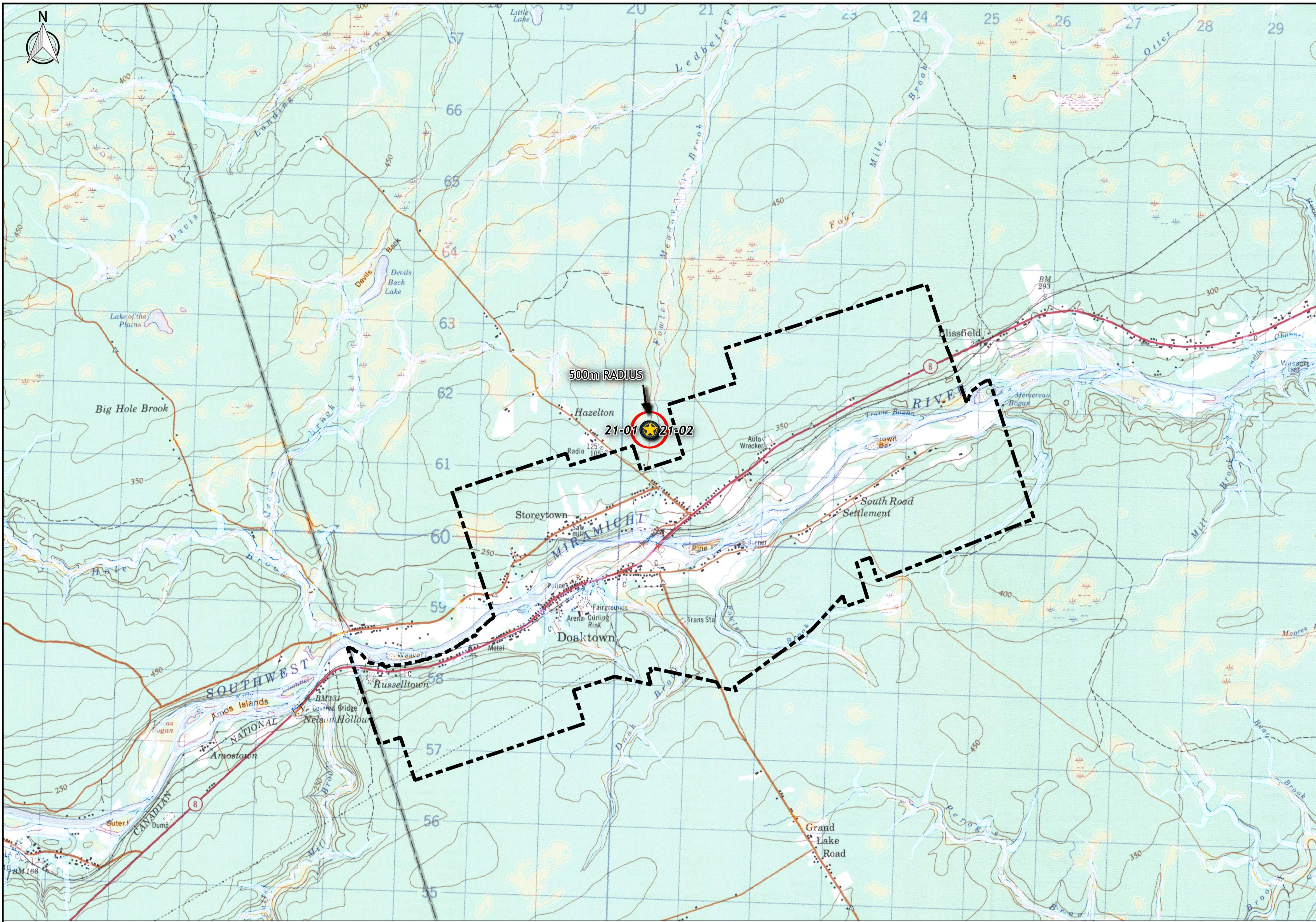
Map Title:
ZONING MAP FROM DOAKTOWN RURAL PLAN BY-LAW 2017-1

Map ID:
**MAP No: FIG-3
PAGE No: 1 of 1
SCALE: 1:4000**

Revision:
DATE: 2021/03/08 BY: MA
PROJ No: 1900703 APPR: LEL



Appendix B Figure 4 - 1:25,000 Scale Map & Location Plan



Legend / Notes: **LEGEND**

Municipality
 Doaktown village limits

Wells
 Proposed drill locations
 500m buffer

Project Location:
DOAKTOWN, NB

Project Title:
NEW MUNICIPAL WELL AND RELATED INFRASTRUCTURE

Map Title:
OVERALL LOCATION PLAN

Map ID:
MAP No: FIG-4
PAGE No: 1 of 1
SCALE: 1:25000

Revision:
DATE: 2021/03/08 BY: MA
PROJ No: 1900703 APPR: LEL



Appendix C GeoNB Floodplain Map

GeoNB Floodplain Map



2021-02-18, 11 h 57 min 50 s

- Override 1
- parcels
- Property Assessment
- 2018 Flood Extents – Lower Saint John River
- 2008 Flood Extents – Lower Saint John River
- Flood Hazard Areas
- 1 in 20 Year Flood
- 1 in 100 Year Flood
- Flood Envelope
- 1976 Ice Jam Flood Extents – Perth-Andover
- 1987 Ice Jam Flood Extents – Perth-Andover
- 2008 and 2018 Flood Limits
- Data Limits
- Large Scale / Grande échelle

