EIA Registration Document

Riverside Resort and Conference Centre

Development of Potable Groundwater Source
French Village, NB

Prepared by NAM Freelance Environmental, Inc.

3/23/2022

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1.0 The Proponent

(i) Name of Proponent:

643562 NB Inc. operating as Riverside Resort and Conference Centre

(ii) Address of Proponent:

35 Mactaquac Road,
French Village, NB
E3E 1L2

(iii) Chief Executive Officer:

Feroze Virani
(416) 822-9410

(iv) Principal Contact Person for purposes of Environmental Impact Assessment:

Naveed A. Majid, P.Eng.
5 Mannington Lane
Fredericton, NB
E3A 5S6
(506) 476-7292

(v) Property Ownership:

New Brunswick Power Corporation (PID# 75279125)

The Property Owner on September 17th, 2010 entered into an ***Assignment of Lease and Licence*** agreement with the Proponent (*Document # 29327310*), wherein the lessee is granted permission in respect of the construction, operation and maintenance of a water supply system upon the leased lands for the purposes of benefiting the lessee's operation of a commercial tourism enterprise.

2.0 The Undertaking

(i) Name of the Undertaking

Development of Potable Groundwater Source

(ii) Project Overview

The Proponent had three (3) exploratory wells drilled onsite in September 2018; developed two (2) of them successfully in October 2018; installed a new water supply pipe from the production wells in December 2018 to

intercept the existing intake pipe coming from the Mactaquac Dam head pond and installed valving on the two pipes.

The valve on the existing surface water source (Mactaquac Dam head pond) intake pipe was shut off and the valve on the new water supply pipe from the production wells was opened in March 2019, thereby switching the Riverside Resort and Conference Centre's water supply from a surface water to a groundwater source.

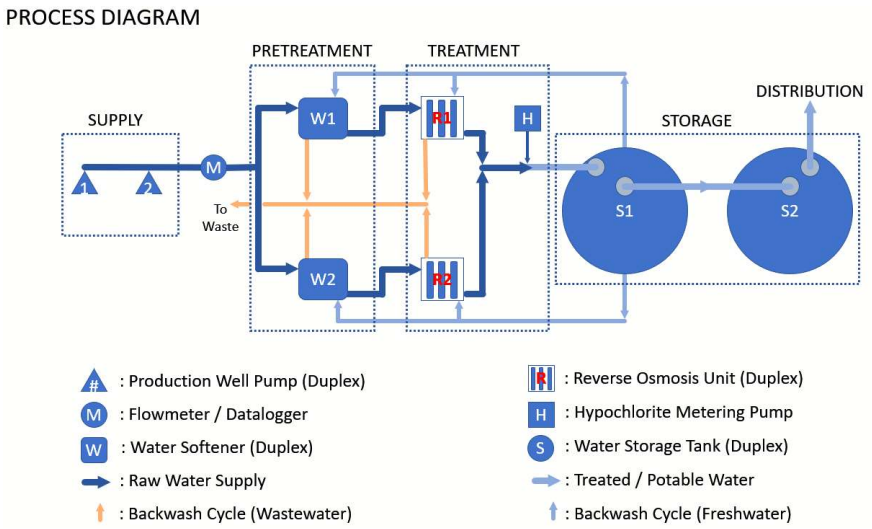


Figure 1. Proposed Process Diagram

Two (2) existing onsite settling tanks that formed part of the surface water source treatment system with a total combined volume of 60 m^3, will remain to be used as a storage reservoir for the groundwater source.

Water chemistry of the groundwater source indicates elevated hardness, chloride and arsenic content. The proposed process diagram, Figure 1. above, shows how these parameters will be addressed.

The Proponent intends to install a flowmeter on the water supply pipe with data logging capability. The device will be an ultrasonic clamp-on type, which does not require cutting the existing water supply pipe to install it.

The Proponent intends to install a duplex alternating water softener system to reduce source water hardness. A duplex system permits the backwash cycle of an offline unit while an online unit will continue to pre-treat incoming raw water.

The Proponent intends to install a duplex parallel reverse osmosis system to reduce total dissolved solids, arsenic, chlorides and sodium from the source water. A duplex system permits the backwash cycle of an offline

unit while an online unit will continue to treat water from the water softener.

The Proponent intends to disconnect the previous treatment system and dismantle all unnecessary process components.

(iii) Purpose/Rationale/Need for the Undertaking

All predecessor establishments at this location including the Riverside Resort and Conference Centre, prior to December 2018 had known only one water supply source, that being drawn from the Saint John River at the Mactaquac Dam head pond.

Unfortunately, that surface water source intake was situated downstream from the Resort's wastewater discharge point. This fact motivated the Proponent since September 2010 to find an alternative groundwater source to provide a safer, better quality water supply for the Resort.

The Mactaquac Dam head pond water required a high level of treatment to render the supply potable for human consumption and for the Resort's other purposes.

For effective water treatment, the poor water quality required complex processing / filtration components, summarized in Figure 2. Simple operation and regular maintenance of the water treatment system was time consuming and labour intensive because of the critical nature / complexity of some of these processes.

The system was not only costly financially but also with respect to the large amount of water wasted as a requirement to maintain it.

(Previous) PROCESS DIAGRAM

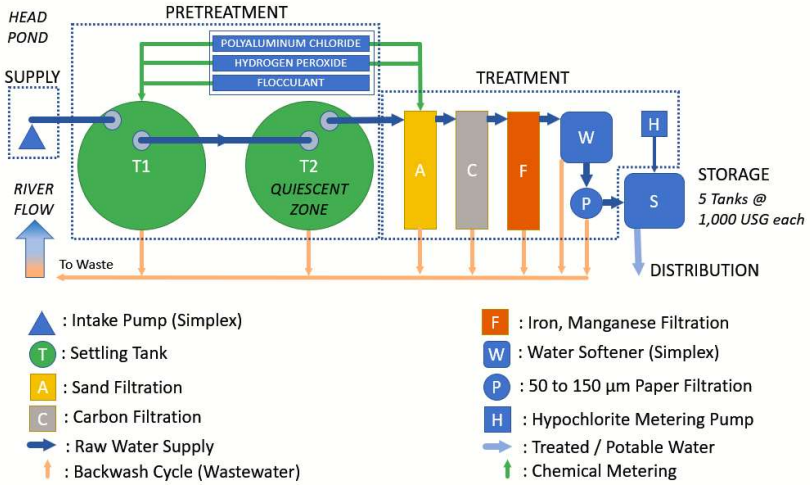


Figure 2. Process Diagram summarizing previous treatment stream and components.

Given the complexity and the possibility that any one of the many process / filtration components could malfunction even with 24-hour monitoring, the risk of supplying improperly treated water was always high.

(iv) Project Location

The project site is on the property identified as PID# 75279125, located in French Village, New Brunswick which is served by the Kingsclear Local Service District in York County (Figure 3).

Figure 3 - Location Map; courtesy NB GeoViewer.

(v) Siting Considerations

Riverside Resort and Conference Centre is bound on the west by the Saint John River, on the east by Mactaquac Road and westbound on-ramp to NB Route 102, on the south by PID #75390237 and on the north by PID # 75258699.

The property is dissected approximately in half by an unnamed stream running east to west, that empties into the Saint John River and is buffered by a treed area south of the Resort's buildings and roadways, (Figure 4).

A geophysical survey had been performed in Fall 2010 by TerrAtlantic, as it was then known. A site plan developed from the survey and its accompanying letter report are included in *Appendix A*.

Exploratory test wells and subsequent wells development were contained entirely within the boundaries of the proponent's leased property.

Figure 4 - Site Map showing property boundary; courtesy NB GeoViewer.

(vi) Physical Components and Dimensions of the Project

Project Area

Exploratory drilling was limited to the area north of the unnamed stream that dissects the property from east to west (Figure 5).

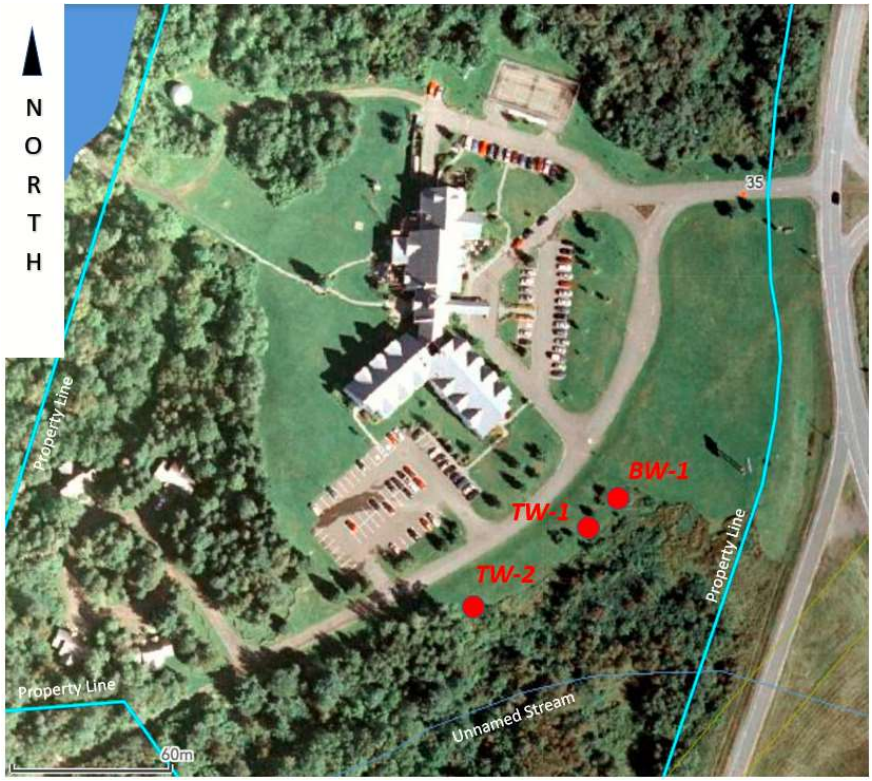


Figure 5. Project Area showing location of test wells (TW) and backup well (BW).

Drilling sites were identified in the Geophysical Survey Site Plan by TerrAtlantic (*Appendix A*), as TW-1 through TW-4. These drill sites are located at the edge and outside of the 30-metre setback of the unnamed stream.

Well development and the infrastructure required to convey the water were limited to trenching, water pipe and controls cable installation from the production wells to the Resort's service building (Figure 6).

No development activity occurred within the 30-metre coastal setback of the Saint John River.

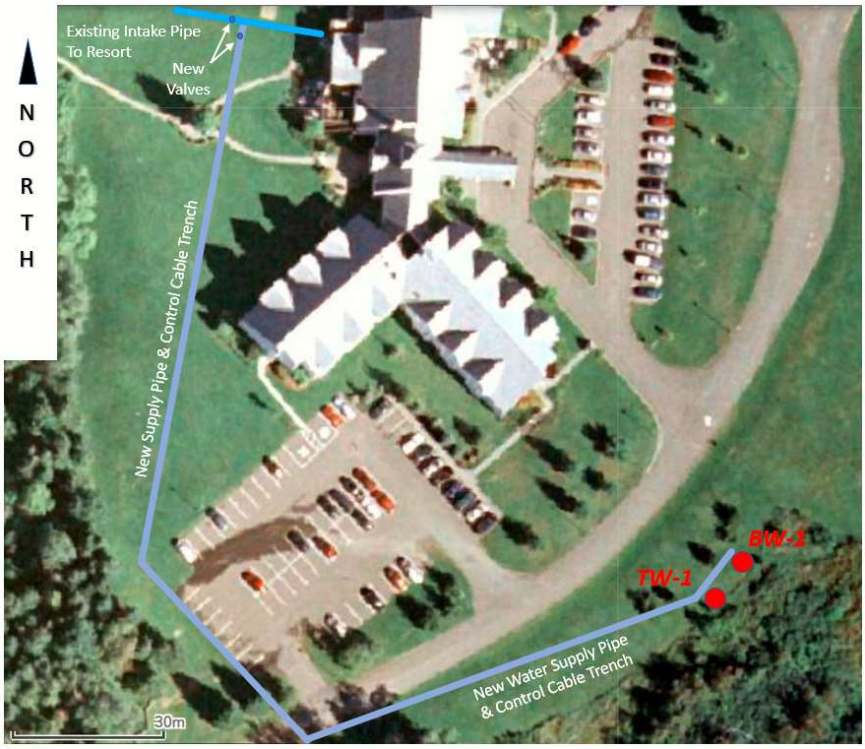


Figure 6. Route of trenching for new water supply pipe and controls cable from new production wells to existing intake pipe into Resort building. Valving was also installed on the existing intake pipe as well as the new supply pipe.

Site Access

Test Well Sites TW-1 and TW-2 are located at the tree line of the buffer zone and are easily accessible from the Resort's asphalted roadways.

Test wells TW-3 and TW-4 were proposed; however, drilling those wells became unnecessary following the safe yields determined at TW-1.

Access Roadways

Drilling equipment and accompanying vehicles were provided temporary access to the drill locations. Access roadways consisted of a crushed stone

surface at 150mm (6") on top of 150mm (6") thick sub-base granular material.

Stream Crossing
No in-stream work was conducted as part of this project. Equipment was not operated in the wetted portion of any watercourse.

Water Supply
Craig Hydrogeologic completed a Water Supply Source Assessment (WSSA) in November 2021. A copy of the final hydrogeological assessment is provided in *Appendix B*.

Based on 2017 daily water consumption records, the average water quantity rate required is 34.2 m^3/d.

Water Storage
The Resort's previous water treatment system required two (2) large settling tanks, each with a capacity of 30 m^3 as part of the treatment process. Now used for storage, the 60 m^3 volume is almost twice that of the projected daily average water consumption (34.2 m^3).

Utilizing the existing tanks for onsite water storage will, at times of peak water demand, attenuate the supply wells' daily pumping rate. The combined flow rates from the two supply wells may be limited to a maximum of 35 m^3/day to 40 m^3/day.

Test Wells
Search for a viable groundwater source on the proponent's leased lands was historically largely unsuccessful. At least 7 exploratory wells had been drilled on the property in the previous 20 years.

Test wells TW-1 and TW-2 were selected to be explored first because both locations are on the same side of the unnamed stream as the Resort buildings.

Test wells TW-3 and TW-4 would be considered as a last resort to explore if TW-1 and TW-2 were dry; because of the prospect of having to cross the unnamed stream.

(vii) Construction Details

Well Development Activities
Exploratory drilling activities were conducted September 10, 11 and 13, 2018.

TW-2 was drilled first; slant-drilled about 15˚ NW towards the unnamed creek; 350 feet deep; approx. safe yield 0.5 IGPM (3.3 m^3/d).

TW-1 was drilled next; a total vertical depth of 400 feet; approx. safe yield 18 IGPM (118 m^3/d).

MW-1, monitoring well drilled approx. 17 feet north of TW-1; 400 feet depth; approx. safe yield 5.5 IGPM (36 m^3/d).

Pump tests logs, above, may be found in *Appendix C*. Well Driller's Report logs may be found in *Appendix D*.

Water level readings suggest TW-1 and MW-1 are hydraulically connected.

Green's Well Drilling utilized plunging type alternative to hydro-fracturing rock between the two wells. MW-1 used as a Backup Well, BW-1; to produce similar yields from both wells TW-1 and BW-1.

On September 19th, Sullivan's Well Drilling began 24-hour pump test at TW-1; at a rate of approx. 9 IGPM (59 m^3/d); pump located at 200 feet below casing.

Water samples from TW-1 were collected at 9:00 am Thursday September 20th and brought to lab for general chemistry + trace metals analyses.

Green's Well Drilling began 72-Hour Pump Test at 9:00 am Tuesday October 9th; at a rate of approx. 10 IGPM (65 m^3/d); pump located at 300 feet below casing.

Water samples from TW-1 were collected at 9:00 am Friday Oct 12th and brought to lab for EC + TC + general chemistry + trace metals analyses.

NOTE: TW-1 was NOT shock chlorinated prior to starting 72-h pump test. Lab results show 1.0 CFU in this sample.

Lab results for samples collected during this time, may be found in *Appendix E*.

Pump Selection

The Proponent had two (2) Model L10P4DMGS-06 Berkeley submersible pumps with two (2) Model 2345049203S Franklin submersible motors installed in both the TW-1 and BW-1 wells.

Cutsheets and details of these components may be found in *Appendix G*.

Located at a depth of 200' below the top of each well casing, each ¾ HP pump, according to its pump performance curve is anticipated to produce between 7.3 USGPM (39.8 m^3/d) at 50 PSI and 8.6 USGPM (46.9 m^3/d) at 40 PSI.

Pipe and Controls Cabling Installation

Construction activities began in December 2018 to trench the route for the new water supply pipe and controls cables; from the production well and backup well, TW-1 and BW-1 (see Figure 5).

The new 2" diameter PEX water service lateral pipe was installed in along a 6' deep trench approximately 12" below and 12" laterally away from a 2" diameter PVC conduit (Figure 7). Following burial of the conduit, electrical control cables were pulled through the conduit to provide a watertight encasement.

A water curb-stop valve was installed on the new PEX pipe and a 4" gate valve was installed on the existing 4" intake pipe coming from the Mactaquac Dam head pond and into the Resort building.

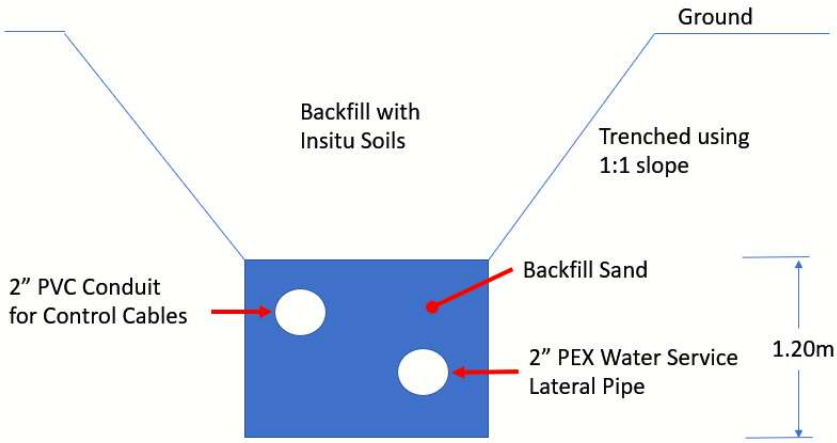


Figure 7. Profile of services trenching from production wells to existing intake pipe into Resort building.

Throughout December 2018 and until March 2019 the Resort's water supply continued to come from the Mactaquac Dam head pond.

On or about March 6th, 2019, the gate valve on the intake pipe was shut off and the water curb-stop valve was opened allowing groundwater from the production wells to enter the Resort building's settling tanks.

The quality and clarity of the groundwater entering the settling tank was notably much better than the "chocolate slurry" that had been coming from the Mactaquac Dam head pond.

(viii) Operation and Maintenance Details

Water Supply

The daily average water quantity requirement for the Resort is estimated to be about 34.2 m^3/day (6.3 USGPM), refer to *Appendix B - Water Supply Source Assessment (WSSA): Final Hydrogeological Assessment.*

Although wells TW-1 and BW-1, now hydraulically connected and having a safe yield determined to be 18 IGPM (118 m^3/d), the Proponent selected a submersible pump that limits the production capacity of the wells to about 30% more than the daily average water quantity required by the Resort or about 45 m^3/d.

Limiting the production capacity of wells TW-1 and BW-1 to below 50 m^3/d serves the dual purpose of reducing costs for an unnecessarily large capacity submersible pump and to trigger a review of the Proponent's Approval to Operate document.

The WSSA identifies a peak consumption rate recorded in September 2017, found to be 74.7 m^3/d. Anecdotally, this anomalous peak was because of the necessity to flush and pressure wash the 60 m^3 settling tanks twice that month.

Moving forward, the Proponent will have an automated datalogger to record the volume of water entering the storage tanks, as well as recording daily water consumption.

Testing and sampling of raw and treated water will be conducted routinely in accordance with the current Approval to Operate.

Water Treatment & Distribution

Two (2) existing onsite settling tanks that formed part of the surface water source treatment system with a total combined volume of 60 m^3, will remain to be used as a storage reservoir for the groundwater source.

Water chemistry of the groundwater source indicates elevated hardness, chloride and arsenic content. Lab results may be found in *Appendix F*. The proposed process diagram, Figure 1. shows how these parameters will be addressed.

The Proponent intends to install a flowmeter on the water supply pipe with data logging capability. The device will be an ultrasonic clamp-on type, which does not require cutting the existing water supply pipe to install it.

The Proponent intends to install a duplex alternating water softener system to reduce source water hardness. A duplex system permits the backwash cycle of an offline unit while an online unit will continue to pre-treat incoming raw water.

The Proponent intends to install a duplex parallel reverse osmosis system to reduce total dissolved solids, arsenic, chlorides and sodium from the source water. A duplex system permits the backwash cycle of an offline

unit while an online unit will continue to treat water from the water softener.

Testing and sampling of drinking water will be conducted routinely in accordance with the current Approval to Operate.

(ix) Future Modifications, Extensions or Abandonment

Modifications

The existing 60 m^3 settlings tanks have been repurposed as storage tanks as part of the new water treatment system.

Each tank has approx. 30 m^3 capacity. Tank No. 1 (see proposed process diagram, Figure 1.) will not be chlorinated / disinfected. Chlorine will only be injected as water from Tank 1 enters Tank No. 2.

Essentially, water in Tank No. 2 is the potable water reservoir that will be distributed throughout the hotel and resort facilities.

The treated water stored in Tank No. 1 will remain unchlorinated. The purpose is to maintain an unchlorinated water source for backwash cycles in both the water softener units and the reverse osmosis units.

The Proponent intends to automate the controls of all newly installed duplex pumps. The purpose is to operate all duplex pumps by alternating automatically from lead to lag.

Abandonment

The existing sand, carbon, iron, manganese, paper filtration systems are not necessary for treatment of the new groundwater source. These filtration systems will be disconnected from the water treatment system.

The existing water softener (ath Model Duo-2910) is a European imported unit not readily available in North America. The water softening system proposed for the new pre-treatment process requires a duplex system.

While functional, the ath water softener may be difficult to duplicate; matching a new model with the existing one may be unnecessarily costly given the wide selection of good quality water softeners readily available in the Canadian market.

Therefore, the existing water softener will be disconnected from the water treatment system.

Five (5) existing tanks, each having a capacity of 1,000 US Gallon, presently function as final treated water storage prior to distribution to the hotel and resort facilities.

These five small storage tanks are not necessary as part of the proposed groundwater source treatment system. The existing 60 m^3 settling tanks will serve as water storage / reservoirs.

The five smaller storage tanks will be disconnected from the distribution system.

(x) Project-Related Documents

A. Geophysical Survey– Riverside Resort, Mactaquac, NB
File: 230.07, Letter Report and Survey Map
(Prepared by TerrAtlantic Engineering Limited – September 17, 2010)

B. Water Supply Source Assessment - Step One Application
(Initially prepared by Craig Hydrogeological – August 14, 2018)

3.0 Description of the Existing Environment

The Riverside Resort and Conference Centre is bound on the west by the Saint John River, on the east by Mactaquac Road and westbound on-ramp to NB Route 102, on the south by PID #75390237 and on the north by PID # 75258699.

The property is dissected approximately in half by an unnamed tributary to the Saint John River; varies in width from 1 to 5 metres; running east to west and buffered by a treed area immediately south of the Resort's buildings and roadways (Figure 4).

To the south of the tributary is an undeveloped forested area that extends to the neighbouring property line. The forested area appears to contain mature stands of pine, spruce, birch, some elm and cedar trees; alders appear closer to the tributary.

Publicly available wetland mapping (http://geonb.snb.ca/geonb/), shows no provincially significant regulated wetlands nor any regulated wetlands in the project area.

No project related activities were proposed within a 30-metre buffer of the tributary or within the forested areas. For that reason, no vegetation, wildlife, fish habitat, migratory bird nor other species at risk field studies were conducted.

4.0 Summary of Environmental Impacts

Potential environmental impacts within the project location resulting from construction and operation of the project were equipment refueling and lubrication during the well drilling and trench excavation phases.

Excavation of the trench was restricted to within already developed lands, routed along the treeline immediately south of the access roadway, near the parking lot, between the hotel and cabins and not deeper than 1.8-metres.

5.0 Summary of Proposed Mitigation

The Proponent implemented the following mitigation measures:

- Equipment refuelling and lubrication was performed on spill containment sites.
- No in-stream work was conducted at the unnamed stream.
- No activities, construction or otherwise, occurred within the 30-metre coastal setback or watercourse buffers.

Ground disturbance resulting from project related activities was limited to well drilling and trench excavation to install the water service lateral, valving and electrical control cabling / conduit.

6.0 Public Involvement

The proponent intends to inform stakeholders of the undertaking via information flyers distributed door-to-door and via email. A copy of the information flyer and distribution map is in Appendix I.

Neighbours identified within a 500-metre radius of the groundwater wells shall have the information flyer delivered to their door. The Kingsclear First Nation shall be notified via personal delivery of the information flyer to the band council office. NB Power, the present landowner of the subject property and the MLA for Fredericton West-Hanwell, Electoral District 43 shall be notified via email.

The Proponent will not be conducting a public meeting to disclose and discuss details of the proposed project. However, the Proponent will address questions and concerns from stakeholders received in written form received 25 days after the information flyer has been distributed or by April 22nd, 2022, whichever is later.

7.0 Approval of the Undertaking

A Water Supply Source Assessment (WSSA) Initial Application was submitted to DELG August 14, 2018. The final Hydrogeological Assessment reporting on results of the 72-hour pump test conducted on TW-1 and BW-1 was prepared November 3rd, 2021. The hydrogeological report is found in Appendix B.

8.0 Funding

The proposed project is funded entirely by private personal finances.

9.0 Signature

March 27, 2022
Date

Shane Hashemi, General Manager for
Feroze Virani, Chief Executive Officer

APPENDIX A

GEOPHYSICAL SURVEY REPORT

prepared by TerrAtlantic Engineering Ltd.

TerrAtlantic
Engineering Limited

515 Beaverbrook Court
Fredericton, New Brunswick, E3B 1X6
tel: (506) 460-8660 fax: (506) 460-8679

September 17, 2010

File: 230.07

Mr. Stephen Pyke, P. Eng.
Opus International Consultants (Canada) Limited
80 Bishop Drive, Fredericton, New Brunswick,
E3C 1B2

Dear Mr. Pyke:

RE: GEOPHYSICAL SURVEY, RIVERSIDE RESORT, MACTAQUAC, NB

Introduction

As requested, following examination of the geologic and topographic mapping and air photos, we carried out field reconnaissance and a geophysical survey on the subject property to help identify a potential groundwater supply source in the area. From this investigation we have identified some target drilling sites for further consideration.

Hydrogeologic setting

Based on a review of the geological mapping for the area, the bedrock beneath the subject property consists of Late Silurian aged greywacke and slate of the Kingsclear Group. On a regional setting the domestic wells in this area are likely intercepting water from southwesterly trending vertical joint sets. This groundwater likely ultimately discharges into the St. John River.

A small stream is situated in the wooded area approximately 200 metres south of the resort, and occupies a significant topographical low. Based on the prior examination of pre-headpond topographic maps, it is thought that this topographic feature is bedrock-controlled. If this is the case, the bedrock may be more fractured in that area. A geophysical survey was recommended for this area so as to gain further insight into this possibility, and help refine the location of possible drilling sites.

Field Methodology

A total of eight geophysical survey lines were traversed on the subject property at a distance of between 50 metres and 200 metres south of the existing resort building (refer to the survey lines in Figure 1). As planned, all geophysical lines were oriented nearly perpendicular to 193 degrees southwest.

Bedrock outcrops were also investigated along the highway to the southeast of the subject property. Southwesterly and southeasterly trending vertical joint sets were observed to be present. The shear faces and associated joint sets in the area were found to be either open, slickensided, or infilled with quartz.

Geophysical Survey Observations

From the geophysical work undertaken, two linear bedrock features were found to exist within the study area, trending on approximately 7 degrees to the northeast (refer to the shaded target areas in Figure 1). These features appear to be oriented sub-parallel with the joint sets that were found further south in outcrops along the highway.

Given the apparent correlation between the geophysical features and the geologic structure noted in outcrop, it is considered more probable that real fractures exist at depth. Test-drilling should help to confirm this, but there is no guarantee that high yielding fractures would indeed be intercepted.

Drilling Target Locations

Although the stream location is considered to be most attractive for further exploration, current environmental regulations disapprove of any drilling and construction activity within thirty metres of a stream. Future exploration efforts should therefore remain outside the indicated buffer zone, otherwise the requirement for watercourse alteration permits, and additional regulatory scrutiny would be triggered.

Based on the field observations, and the above constraints, four possible drill targets have been shown on the attached Figure 1.

(I) TW-1 - This test well location is situated just north of the 30 metre stream buffer and outlined target area. This drilling option should probably be considered first, with the anticipation of avoiding the expense of constructing an access road, if drilling results prove to be favourable here.

(II) TW-2 - If the yield from drilling at the TW-1 target proves to be inadequate, drilling at the TW-2 location should probably be pursued next.

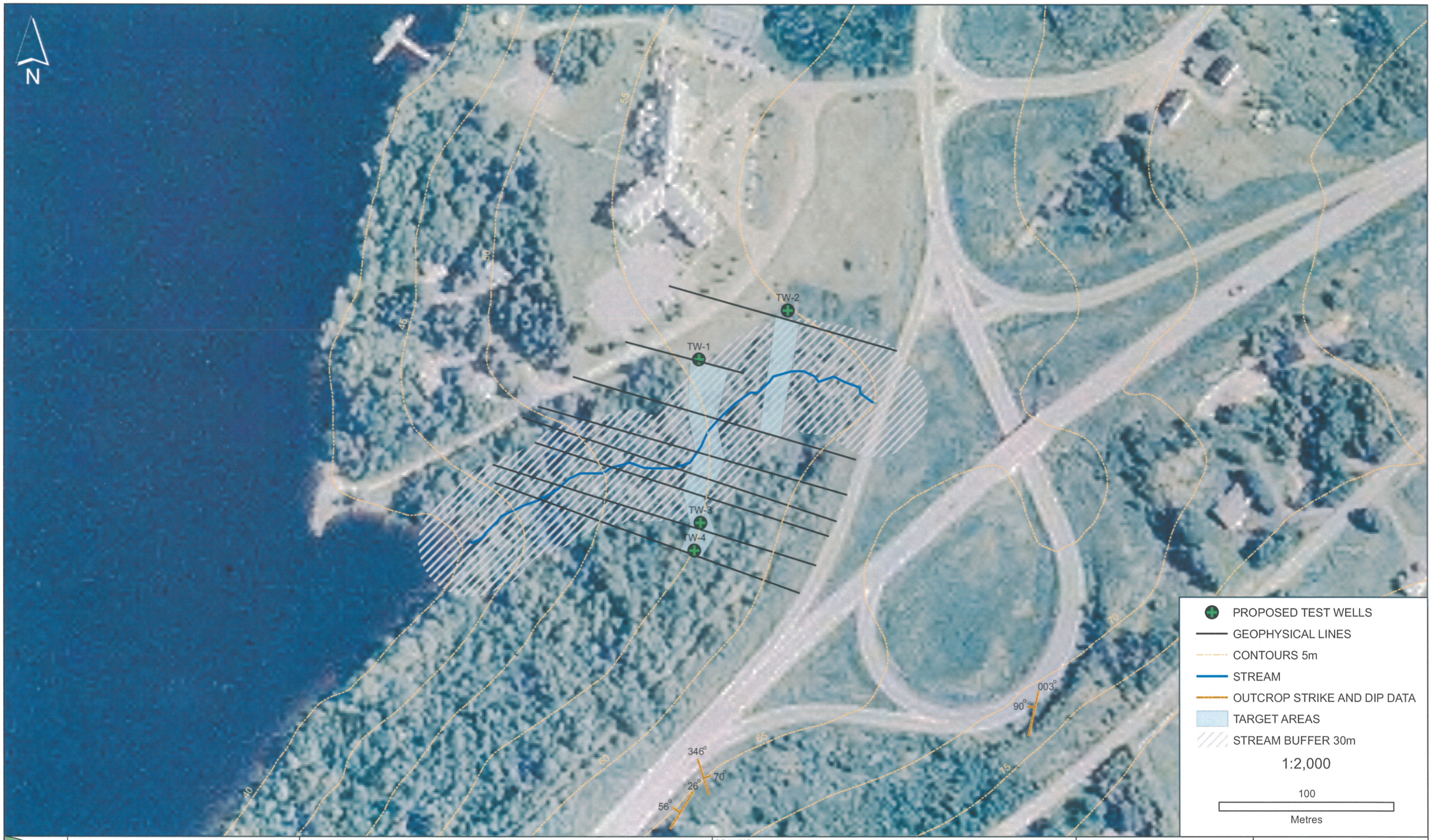
(III) TW-3 and TW-4 - These potential drilling target locations would ideally be situated further north, closer to the stream. However, so as to respect the minimum 30 metre buffer, these targets were moved further south, as shown. Drilling of these test wells should be pursued if the results from TW-1 and TW-2 prove to be unsuccessful. Some clearing of trees and brush, and construction of an access road would likely be necessary to drill at these locations. NBDOT may also need to be notified if an access road is constructed from the nearby on-ramp.

Closure

We trust that the above investigation will help to optimize future groundwater exploration efforts for the Riverside Resort.

Sincerely,

MARC W. HODDER, P. GEO., P. ENG.
HYDROGEOLOGIST / GEOLOGICAL ENGINEER



TerrAtlantic Engineering Limited	PROJECT: RIVERSIDE HOTEL, MACTAQUAC	DRAWING: GEOPHYSICAL SURVEY SITE PLAN	DATE: SEPTEMBER, 2010	FIGURE: FIGURE 1
			PROJECT NO.: 230.07	DRAWING NO.: 2300701

APPENDIX B

WSSA - FINAL REPORT
HYDROGEOLOGICAL ASSESSMENT

CRAIG HYDROGEOLOGIC INC.

Groundwater and Soil Contamination
Groundwater Protection
Resource Development
Site Remediation
Site Professional

RIVERSIDE RESORT AND CONFERENCE CENTER

WSSA REPORT
72 HOUR PUMP TEST

PRODUCTION WELL TW-1 AND BW-1

French Village, NB

2021

Prepared for:

NAM Freelance Environmental Inc.
Naveed A. Majid, P.Eng.
5 Mannington Lane
Fredericton, NB
E3A 5S6
(506)-476-7292

Prepared by:

Craig HydroGeoLogic Inc.
140 Meadow Cove Road
Dipper Harbour, N.B.
E5J 2S9
Phone: 506-659-3064

Date: November 3, 2021

RIVERSIDE RESORT AND CONFERENCE CENTER

WSSA REPORT
72 HOUR PUMP TEST

PRODUCTION WELL TW-1 AND BW-1

French Village, NB

INTRODUCTION

Craig HydroGeoLogic Inc. was retained by NAM Freelance Environmental Inc. to prepare a Water Supply Source Assessment Report for groundwater supply wells (Well TH-1 and BW-1 in this report) as specified in the EIA Water Supply Source Assessment Guidelines (April 2017) prescribed by the New Brunswick Department of Environment and Local Government (NBDELG). The pump test is part of the NB Environment EIA approval process which is required in order for the Riverside Resort and Conference Center to obtain an Approval to Operate the groundwater supply wells.

This report presents the results of the pump test and conclusions and recommendations based on the results of the pump test. This report was prepared by Craig HydroGeoLogic Inc. for the clients, Riverside Resort and Conference Center and NAM Freelance Environmental Inc., the report presents the results of a pump test on a groundwater supply sourced from two production wells (Wells TH-1 and BW-1) as described in this report. The groundwater produced from the two wells is intended to supply potable water to the Riverside Resort and Conference Center.

The report is based on the application of scientific principles and professional judgment to certain facts with resultant subjective interpretations. For example, but not limited to, interpolation between boreholes is an accepted industry practice, however, actual subsurface conditions may vary from that interpolated and such variation could impact observations, discussions, conclusions and recommendations in the report. Professional

judgments expressed herein are based on the facts currently available within the existing data, scope of work, budget and schedule. The material and information in the report reflects Craig HydroGeoLogic Inc.'s best judgment in light of the information available at the time of report preparation. Any use which a third party makes of this report, or any reliance on or decision(s) to be made based on this report are the responsibility of the third party(ies). Craig HydroGeoLogic Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this report.

SCOPE

The scope of the assessment is as follows:

1. To assess the results of a 72-hour pump test on the proposed water supply Wells TH-1 and BW-1 as specified in the EIA Water Supply Source Assessment guidelines prescribed by the New Brunswick Department of Environment and Local Government, and;
2. To produce a report with the findings of the pump test and recommendations with regard to the development/operation of the proposed groundwater supply.

SITE DESCRIPTION

LOCATION

The Riverside Resort and Conference Center is located on PID 75279125 in French Village, NB as shown in Figure 1.

EXISTING DEVELOPMENT/OPERATION

The site is an existing hotel and conference center. Prior to December 2018, the hotel operations at this location, including the current Riverside Resort and Conference Centre, operated using a water supply which was drawn from the Saint John River at the Mactaquac Dam head pond. Unfortunately, the surface water source intake was situated downstream from the Resort's wastewater discharge point. This fact motivated the Proponent to find an alternative groundwater source to provide a safer, better quality water supply for the Resort, a process that has been going on since September 2010.

The water from the Mactaquac Dam head pond required extensive water quality treatment to render the supply potable for human consumption and for the Resort's other purposes. The water required complex processing/filtration to achieve potable water quality. Operation and regular maintenance of the water treatment system was time consuming and labour intensive because of the critical nature and complexity of some of the treatment system processes. The treatment system was not only costly financially but also with respect to the large amount of water wasted as a requirement to maintain it.

REQUIRED WATER QUANTITY

The water supply is required for an existing hotel and conference center which had used the Mactaquac head pond for its water supply in the past. The groundwater supply is considered safer and more economical. The current water supply is equipped with a flow meter and in 2017 the hotel used a total of 12,478 m^3, or a daily average of 34.2 m^3/d. A peak consumption rate was recorded in September 2017 which was 74.7 m^3/d. It was anecdotally reported that this anomalous peak was a result of flushing and pressure washing of the two 30 m^3 storage tanks twice that month. The normal daily consumption rate of 34.2 m^3/d converts to an average pumping rate of 5.2 igpm. As mentioned, the hotel and conference center currently has two storage tanks each of which has 30 m^3 capacity (each tank has a capacity of 6,600 igal). It is anticipated that, based on the drilling results, it will

be possible to utilize the storage system to supply peak demand rates and pump the wells at a maximum rate of approximately 5 – 6 igpm over 24 hours.

SITE DESCRIPTION

General

The locations of the three exploration wells are shown in Figure 1. The local area is referred to as French Village The existing land use in the general area is agricultural, rural residential and/or woodland. The existing development in the area relies on private wells and has onsite sewage systems.

Based on site visits and the existing land use in the area, the potential contamination of ground water resources by previous land uses does not appear to be an issue for the new well development. The land on which the exploration wells are located is part of the Hotel and Conference Center property as shown in Figures 1 and 2. TW-1 is located approximately 150 meters downslope from the Mactaquac Road interchange with NB Highway 102.

Geology and Hydrogeology

The geologic setting is that of a large bedrock valley (the Saint John River Valley) which has been infilled with alluvial sand and gravel in its lower portions. A thin layer of stony till overlying bedrock characterizes the valley walls at topographic elevations above the sand and gravel deposits. The hotel is located at the top of the valley wall in an area of thin stony till overlying bedrock.

The bedrock in the area is mapped as Late Silurian age greywacke and slate of the Kingsclear Group. The bedrock is characterized by vertical or near vertical joints. Local wells source groundwater from the vertical or near vertical joints.

A review of the NBELG well log database for private well logs constructed with in a 500-meter radius of the site (PID 75279125) provided the following information relating to the bedrock aquifer (Table 1). This search was carried out on July 31, 2018.

Table 1: Summary of hydrogeologic information derived from 500-meter radius around PID 75279125 search of NBDELG well log database which yielded 10 well logs.

Well Depth (feet)	Estimated Yield (igpm)	Depth to Bedrock (feet)	Casing Length (feet)
Average: 231.5	Average: 9.0	Average: 7.9	Average: 22.7
Median: 202.5	Median: 7	Median: 6	Median: 20
Minimum: 65	Minimum: 1.0	Minimum: 3	Minimum: 20
Maximum: 405	Maximum: 30	Maximum: 21	Maximum: 31

All the well logs summarized in Table 1 above appear to be private wells and are developed in the bedrock aquifer. The estimated safe yields are variable and two out of the ten well logs had significant yields of 20 and 30 igpm. The average well yield of 9.0 igpm and the median well yield of 7.0 igpm indicates that well yields in the 4 – 6 igpm range as needed for the hotel groundwater supply should be achievable.

NBDELG Well Water Chemistry Data: A search of the NBDELG well chemistry database for locations in a 500-meter radius around the target property was carried out July 30, 2021 and the search yielded seven inorganic chemistry records. The precise locations of the wells from which the ground water chemistry was obtained are not available due to right to privacy considerations for the property owners. These well chemistry analytical results are provided in Table 2, which follows. The average value of the measured result and the New Brunswick Drinking Water Quality Guideline (NBDWQG) are included in the table for the purpose of comparison. Any parameter which exceeds the New Brunswick

Riverside Resort and Convention Center PID 75279125

NBDWQG = New Brunswick Drinking Water Quality Guideline

Table 2

NBDELG Groundwater Chemistry Database

Parameter	ALK_T (mg/L)	Al (mg/L)	As (µg/L)	B (mg/L)	Ba (mg/L)	Br (mg/L)	COND (µSIE/cm)	Ca (mg/L)	Cd (µg/L)
	179	0.193	5.5	0.01	0.204	0.1	840	112	0.5
	173	0.117	11	0.01	0.228	0.1	784	108	0.5
	139	0.025	1.6	0.018	0.131	0.1	497	51.1	0.5
	123	0.025	**14.5**	0.2	0.162	0.1	420	41.1	0.5
	162	0.025	1.5	0.2	0.204	0.1	694	90.8	0.5
	135	0.025	1.5	0.2	0.219	0.1	383	59.7	0.5
	199	0.03	5.43	0.01	0.353	0.21	708	109	0.5
Mean	**158.6**	**0.063**	**5.9**	**0.093**	**0.214**	**0.1**	**618**	**81.7**	**0.5**
NBDWQG			**<10**	**<5.0**	**<1.0**				**<5.0**

Parameter	Cl (mg/L)	Cr (µg/L)	Cu (µg/L)	E_coli P/A (P/A)	F (mg/L)	Fe (mg/L)	HARD (mg/L)	K (mg/L)	Mg (mg/L)
	144	13	10	Ab	0.1	**0.633**	346	1.11	16.1
	129	12	10	Ab	0.1	**0.437**	341	1.2	17.4
	65	10	11	Ab	0.105	0.153	211	1	20.3
	40.2	12	10	Ab	0.1	0.08	171	1.28	16.7
	103	10	10	Ab	0.1	0.05	278	1.08	12.5
	20.4	15	10	Ab	0.1	0.29	194	0.926	11
	115	20	10		0.1	0.209	363	1.46	22.1
Mean	**88.1**	**13**	**10**		**0.10**	**0.265**	**272.0**	**1.15**	**16.59**
NBDWQG	**<250**	**<50**	**<1000**		**<1.5**	**<0.3**		.	

Riverside Resort and Convention Center PID 75279125

NBDWQG = New Brunswick Drinking Water Quality Guideline

Table 2

NBDELG Groundwater Chemistry Database

Parameter	Mn (mg/L)	NO2 (mg/L)	NO3 (mg/L)	NOX (mg/L)	Na (mg/L)	PH (pH)	Pb (µg/L)	SO4 (mg/L)	Sb (µg/L)
	0.141	0.05	0.05	0.05	32.1	7.62	1.9	27.7	1.9
	0.03	0.05	0.16	0.21	21	7.74	1.3	22	7.4
	0.032	0.05	0.05	0.05	17.1	8.03	2.5	26.4	1.8
	0.024	0.05	0.05	0.05	13.8	8.1	1	20.7	1
	0.005	0.05	2.88	2.9	34	7.76	1	28.5	1.89
	0.058	0.05	1.29	1.29	5.98	7.88	1	24.1	1
	0.272	0.05	0.05	0.05	19.8	8.13	2.27	16.6	2.34
Mean	**0.080**	**0.05**	**0.65**	**0.66**	**20.54**	**7.89**	**1.6**	**23.71**	**2.48**
NBDWQG	**<0.05**	**<10**	**<10**	**<10**	**<200**	**7.0-10.5**	**<10**	**<500**	**6**

Parameter	Se (µg/L)	TC-P/A (P/A)	TURB (NTU)	Tl (µg/L)	U (µg/L)	Zn (µg/L)	TDS (mg/L)
	1.5	**Pr**	14.3	1	1.5	11	442
	1.5	**Pr**	7.43	1	1.9	11	404
	1.5	Ab	1.63	1	0.6	10	265
	1.5	**Pr**	0.3	1		5	208
	1.5	Ab	0	1	1.09	11	380
	1.5	**Pr**	1.4	1		6.7	209
	1.5		1.7	1	2.84	18	404
Mean	**1.5**		**3.8**	**1**	**1.6**	**10**	**330**
NBDWQG	**<10**		**<1.0**		**<20**		

Drinking Water Quality Guideline concentration is bolded and shaded for ease of recognition in the data table.

Out of the seven well chemistry records available, one well exceeded the NBDWQG for arsenic of 10 µg/L with measured concentrations of 14.5 µg/L. Arsenic is known to occur naturally in groundwater in New Brunswick and other areas of Canada and the United States. Arsenic in drinking water is absorbed by the body when you swallow it and distributed by the bloodstream. It does not enter the body through the skin or by inhalation during bathing or showering. Waters containing elevated concentrations of arsenic should not be consumed or used for cooking; however, they can be used for bathing. Waters containing elevated concentrations of arsenic should be treated using reverse osmosis systems or whole house ion exchange systems prior to consumption. The cost of such systems range from approximately $500.00 to $4,000.00 and they are readily available from local suppliers and installers. Alternatively water with elevated concentrations of arsenic can be replaced with bottled water for drinking and cooking.

Out of the seven chemistry records available, two wells had an exceedance of the CDWQG for iron of 0.3 mg/L and three wells exceeded the CDWQG concentration for manganese of 0.05 mg/L. The guidelines for iron and/or manganese are based on esthetic considerations, not health. Iron and/or manganese can cause staining of plumbing fixtures and laundry. The presence of Iron and/or manganese in the groundwater from this aquifer is not uncommon and is commonly the result of natural conditions.

A single well chemistry record out of the seven records available showed an elevation of antimony (Sb) with a measured concentration of 7.4 µg/L compared to the NBDELG of 6 µg/L. The NBDELG is based on health risk; however, the human health risk is a result of ingestion only. Well water with antimony concentrations greater than the guideline can be used for bathing, handwashing and dishwashing. Treatment is similar to that for arsenic, outlined above, and local water treatment system suppliers can supply such systems. Alternately, water with elevated concentrations of antimony can be replaced with bottled water for consumption and cooking.

A total of five out of the seven chemistry records available had elevated turbidity present in the samples. The elevated levels of turbidity may be related to the relative newness of the wells, and they may not have had sufficient time, or use, to clear naturally. Most new wells clear naturally with time and use. At levels in excess of 5 NTUs turbidity may become noticeable to consumers and therefore, objectionable. The turbidity may be the result of elevated concentrations of iron and or manganese or the presence of particulate in the water

Microbiological Results: There were six sample results for microbiology. Out of the six results there were no detections of E. coli and four detections of total coliforms. Total coliforms are natural soil bacteria and are commonly present in well water systems, particularly associated with elevated turbidities. Such detections are usually easily treated by shock chlorination of the wells and associated plumbing systems.

SURFACE WATER

Surface Streams: The Mactaquac Head Pond of the Saint John River system is located within 60 m of the test property. The Head Pond shoreline is located approximately 225 meters east of TW-1 and 240 meters east of BW-1. An unnamed stream is located south of the wells, TW-1 is approximately 55 meters distant, and BW-1 is approximately 65 meters distant from the stream.

GWUDI Assessment:

Step 1: GWUDI Screening (NB Protocol)

1. **In a sensitive setting**: Wells TW-1 and BW-1 are cased and grouted to 12.2 meters (40 feet). Both well logs indicate limited thicknesses of overburden (3.4 and 3.0 meters) and the well log does not indicate any significant accumulations of sand and/or gravel in the surficial deposits. The overburden in the area is mapped as till. The wells are not in a sensitive setting.
2. **In proximity to surface water:** Ground water wells are considered to be in proximity to surface water if they are within 60 meters. TW-1 is approximately 55 meters distant, and BW-1 is approximately 65 meters distant from the unnamed stream.
3. **Improper well construction:** Both wells are new and cased to 12.2 meters (40 feet) depth.
4. **Water quality indicative of surface water:** the water quality sample collected during the 24-hour pump test did not indicate surface water. The microbiology sample had a detection of total coliforms which is not unusual in new wells.

Based on the above GWUDI screening TW-1 screens out under the New Brunswick protocol.

FIELD TESTING PROGRAM

A total of three test wells (TW-1, TW-2, and BW-1) were drilled at the locations shown in Figure 2, and the well logs are provided in Appendix 1, at the back of this report. Out of the three test wells, TW-1 was identified as having the best potential for yield development.

TW-1 was completed September 13, 2018 to a depth of 121.9 meters (400 feet) and the well driller estimated a safe yield of 18 igpm. The tag number is 0056672 and the well is 6 inches in diameter and cased to 40 feet. TW-2 was completed September 10, 2018 to a depth of 106.7 meters (350 feet) and has an estimate safe yield of 0.5 igpm. The tag number is 0056671, the well is 6 inches in diameter and cased to 40 feet in depth. The backup production well, (BW-1 in this report) was completed September 14, 2018 to a depth of 121.9 meters (400 feet). The tag number is 0056673, the well is 6 inches in diameter and the well is cased to 40 feet. The well driller initially estimated the safe yield at 5.5 igpm, however: the well was reportedly subsequently developed to produce similar yields to TW-1. As discussed later in this report, wells TW-1 and BW-1 are so close together that they are hydraulically connected, which is clearly demonstrated in the pump test results.

Field Testing

Two pump tests were conducted. TW-1, located as shown in Figure 2, is the production well that was used for the pump tests. Wells TW-1 and BW-1 were used as observation wells. A 24-hour pump test was conducted on well TW-1 starting on September 19, 2018 at a pumping rate of approximately 59 m^3/day (9 igpm). Subsequently a 72-hour pump test was started October 9, 2018 at a pumping rate of approximately 65 m^3/day (10 igpm). Both pump tests will be analyzed below.

It is the Top of Casing that is used as the reference point for all groundwater level measurements during the pump test and recovery period. The top of casing of each well was surveyed in order to get the elevation of the reference point above mean sea level. The casing elevations are as follows:

TW-1	+61.541 meters AMSL Top of Casing
	+60.868 meters AMSL Ground Level
TW-2	+61.898 meters AMSL Top of Casing
	+61.237 meters AMSL Ground Level

The well coordinates are as follows:

			PID
TW-1	+45° 56.577’ N	-66° 52.090’ W	75279125
TW-2	+45° 56.579’ N	-66° 52.087’ W	75279125

Antecedent and Pump Test Period Weather

The temperatures and precipitation amount for the weather immediately before and during the two pump tests are provided below in Table 3. The data source is Environment Canada, the closest operating station is Fredericton, NB. In Table 3 the time period of the pump test and recovery is shaded.

Table 3: Antecedent and Test Period Weather

Date	Max. Temp. C	Min. Temp. C	Avg. Temp. C	Total Precip. mm
11 September, 2018	18.3	9.7	14.0	5.2
12 September, 2018	22.2	11.0	16.6	0.0
13 September, 2018	26.7	11.6	19.1	0.0
14 September, 2018	28.6	13.5	21.0	0.0
15 September, 2018	28.6	11.7	20.2	0.0
16 September, 2018	22.6	13.0	17.8	0.2
17 September, 2018	29.6	11.4	20.5	0.2
18 September, 2018	34.5	10.4	17.5	0.6
19 September, 2018	15.5	7.8	11.7	0.0
20 September, 2018	16.4	7.1	11.8	0.0
1 October, 2018	15.0	3.8	9.4	0.0
2 October, 2018	10.4	4.1	7.3	16.6
3 October, 2018	14.4	9.1	11.7	5.4
4 October, 2018	15.0	11.2	13.1	0.2
5 October, 2018	13.6	3.9	8.7	0.0
6 October, 2018	14.7	2.8	8.7	0.0
7 October, 2018	12.7	6.9	9.8	0.0
8 October, 2018	12.9	5.6	9.3	1.2
9 October, 2018	20.8	7.5	14.1	1.0
10 October, 2018	19.5	6.2	12.8	5.4
11 October, 2018	6.5	4.1	5.3	30.8
12 October, 2018	10.5	6.3	8.4	5.2

As can be seen in the above Table 3 some precipitation occurred in the eight days leading up to the start of the first pump test which started September 19, 2018 with a maximum of 0.6 mm occurring on September 18. This precipitation is regarded as minimal. During the second pump test which started on October 9, 2018, precipitation did occur with 16.6 mm falling on October 2

and 5.4 mm falling on October 3. During the actual pump test 1.0 mm fell on October 9, 5.4 mm fell on October 10, 30.8 mm fell on October 11 and 5.2 mm fell on October 12.

Water Quality Testing

The 24-hour pump test was started September 19, 2018 and conducted until September 20, 2018. Subsequently a 72-hour pump test was started October 9, 2018 through October 12, 2018 at a pumping rate of approximately 65 m3/day (10 igpm)A water samples were collected from TW-1 near the end of the pump test, microbiological and inorganic chemistry samples being collected. The water samples collected where analyzed at RPC in Fredericton, NB. It is the analytical results of these samples that are provided below. The laboratory certificates are provided in Appendix 2 at the back of this report.

Inorganic Results

The general inorganic chemistry, trace metal, and microbiological analytical results for the groundwater samples collected during the pump test are provided in Tables 4 and 5 which follow. In Tables 4 and 5 any parameter that exceeds the New Brunswick Drinking Water Quality Guidelines (NBDWQG) is shaded for ease of recognition.

As can be seen in Table 4 the measured concentration of chloride and arsenic in the first sample exceeded the New Brunswick Drinking Water Quality Guidelines. In the second sample collected November 12, 2018, only the concentration of chloride was elevated. A single count of total coliform was detected as is shown in Table 5 in the microbiological sample as shown in Table 5.

Table 4: Major inorganic ion chemistry for groundwater samples from TW-1 during 24-hour pump test, Riverside Resort and Convention Center.

				Guidelines
Sample ID	TW-1 Well#1	TW-1 Well#1		New Brunswick Drinking Water Quality Guidelines
Sample Date	20-09-18	12-10-18		
Sodium (mg/L)	19.1	20.9		≤200
Potassium (mg/L)	1.44	1.21		
Calcium (mg/L)	96.5	92.4		
Magnesium (mg/L)	49.8	46.9		
Alkalinity (as $CaCO_3$) (mg/L)	93	100		
Chloride (mg/L)	**260**	**272**		≤250
Sulphate (mg/L)	25	28		≤500
Nitrate + Nitrite (as N) (mg/L)	<0.05	<0.05		10.0
Iron (mg/L)	<0.02	<0.02		≤0.3
Manganese (mg/L)	0.016	0.014		≤0.05
Aluminum (mg/L)	0.001	0.002		
Antimony (mg/L)	0.0124	0.0029		
Arsenic (mg/L)	**0.020**	0.009		0.01
Barium (mg/L)	0.169	0.158		
Boron (mg/L)	0.011	0.011		
Cadmium (mg/L)	<0.00001	<0.00001		
Chromium (mg/L)	<0.001	<0.001		
Copper (mg/L)	<0.001	<0.001		≤1.0
Fluoride (mg/L)	0.12	0.16		1.5
Lead mg/L)	<0.0001	<0.0001		0.01
Selenium (mg/L)	<0.001	<0.001		
Uranium (mg/L)	0.0008	0.0006		
Zinc (mg/L)	0.001	<0.001		≤5
pH	7.9	8.0		
Turbidity (NTU)	0.2	0.1		
Conductivity (µS/cm)	1140	1080		
Colour TCU	<5	<5		
Hardness (calc) mg/l as $CaCO_3$	446	424		

Microbiology Results

A microbiological sample was collected from TW-1 on October 12, 2018. The analytical results of this sample are provided below.

Table 5: Microbiology Results

Well	Date (d-m-y)	E. Coli	Total Coliform
Pump Test Results			
TW-1	12-10-18	0	**1**

Field Pump Testing: 24 Hour Pump Test

A 24-hour pump test was started on September 19, 2018 and conducted until September 20, 2018 when the pump was turned off and the well allowed to recover. The pump test was conducted at 9 igpm (40.9 L/min or 58.9 m^3/day) and this rate was held constant for the next 24 hours, the pumped volume being measured using a flow meter. Well TW-2 and BW-1 were used as observation wells.

Aquifer Parameters

The arithmetic plot of the drawdown and recovery curve for TW-1 is shown in Figure 3. The log plot of the drawdown and recovery curve for TW-1 is provided in Figure 4 which also shows the trend line for the analysis carried out below. The analytical method reference is C.W. Fetter, 1994: Applied Hydrogeology, Macmillan College Publishing Company Inc. Pages 214 – 241. It is the Jacob straight line method that was used.

Transmissivity

$T=2.3Q / 4\pi\Delta s = 0.183Q / \Delta s$

where Q = 9 igpm = 40.9 L/min = 58.9 m^3/day

and Δs = 2.5 from the slope of the trend line shown in Figure 4

Then $T = (0.183*58.9) / 2.5 = 4.3$ m^2/day

Based on the Jacob straight line method (on the lower portion of the curve) the aquifer transmissivity is estimated at 4.3 m^2/day, indicating a hydraulic conductivity of approximately 0.039 m/day (b = 109.7 meters). The results can be considered within the normal range for the bedrock aquifer as is found in the local area. The specific capacity is estimated at approximately 0.61 igal (2.77 liters) per meter of drawdown. Upon shutdown

of the pump test, the wells recovery was monitored. Well TW-2 recovered to 52% of the total drawdown after 0.5 hours or 30 minutes) of recovery.

Figure 5 shows the residual drawdown plotted against the ratio of t/t'. The plot indicates an approach to zero drawdown near the intersect of the two axis which would indicate normal recovery without major recharge.

The observed water level fluctuations in TW-2 and BW-1 are also shown in Figures 3 and 4. It is clear from the drawdown data that the water levels in wells TW-1 and BW-1 are closely linked with significant hydraulic connections existing between the two wells. After 24 hours of pumping at 9 igpm well TW-1 had 14.18 meters of drawdown compared to BW-1 which had 13.68 meters of drawdown.

The distance drawdown relationship for the 24-hour pump test at 9 igpm was not analyzed as it was felt that the results of the 72 hour pump test would give a more representative answer.

Field Pump Testing: 72 Hour Pump Test

A 72-hour pump test in TW-1 was started at approximately 9:00 am on October 9, 2018 and conducted until 9:00 am October 12, 2018 when the pump was turned off and the well allowed to recover. The pump test was conducted at 10 igpm (45.5 L/min or 65.5 m^3/day) and this rate was held constant for the next 72 hours. TW-2 and BW-1 were used as observation wells. During the pump test the flow had to be adjusted upwards back to 10 igpm at 600 minutes into the test, resulting in a downward deflection of the drawdown curve between 600 and 660 minutes.

Aquifer Parameters

The arithmetic plot of the drawdown and recovery curve for TW-1 is shown in Figure 6. The log plot of the drawdown and recovery curve for TW-1 is provided in Figure 7 which also shows the trend line for the analysis carried out below. The analytical method reference is C.W. Fetter, 1994: Applied Hydrogeology, Macmillan College Publishing Company Inc. Pages 214 – 241. It is the Jacob straight line method that was used.

Transmissivity

$T=2.3Q / 4\pi\Delta s = 0.183Q / \Delta s$
where Q = 10 igpm = 45.5 L/min = 65.5 m^3/day
and Δs = 2.2 from the slope of the trend line shown in Figure 3

Then $T = (0.183*65.5) / 2.2 = 5.4$ m^2/day

Based on the Jacob straight line method (on the lower portion of the curve) the aquifer transmissivity is estimated at 5.4 m^2/day, indicating a hydraulic conductivity of approximately 0.049 m/day (b = 109.7 meters). The results can be considered within the normal range for the bedrock aquifer as is found in the local area. The specific capacity is estimated at approximately 0.65 igal (2.96 liters) per meter of drawdown. Upon shutdown of the pump test, the wells recovery was monitored. TW-1 recovered to 86% of the total drawdown after 6 hours and 40 minutes of recovery.

Figure 8 shows the residual drawdown plotted against the ratio of t/t'. The plot indicates an approach to zero drawdown at a positive intercept of approximately 3.5, indicating that recharge has impacted the recovery.

The water level fluctuations in the observation wells (TW-1 and BW-1) are shown in Figures 3 and 4 for the 24-hour pump test and in Figures 6 and 7 for the 72-hour pump test. In both cases, the close response of BW-1 to the pumping in TW-1 indicates that the two wells are hydraulically linked or connected. The water level in TW-2 shows a drawdown

of 8.86 meters after 72 hours of pumping. TW-1 has 15.38 meters of drawdown and BW-1 has 14.86 meters of drawdown after 72 hours of pumping.

The distance drawdown relationship shown by the observation wells for Q = 45.5 L/min (10 igpm) is shown in Figure 9. For Q = 45.5 L/min the drawdown is about 1.0 meters at 450 meters distance from TW-1.

Predicted Drawdown at Q = 7.6 igpm

Well TW-1 was pump tested at 10 igpm in order to estimate the capacity of the well and associated drawdowns in the observation wells, TW-2 and BW-1. In actual use, as discussed later in the discussion section, the well would be pumped at a maximum rate of 7.6 igpm (34.6 L/min or 49.8 m^3/day) to provide water to the storage and treatment system. We can derive a trend line for a pumping rate (Q) of 1.56 L/minute using the following.

For PW1

$T=2.3Q / 4\pi\Delta s = 0.183Q / \Delta s$
rearranging we get

$\Delta s = 0.183Q / T$

where Q = 34.6 L/minute = 49.8 m^3/day
and using the mean of the two pump tests, T = 4.85 m^2/day
Therefore Δs = 1.88 meters

We can construct a trend line of this slope as is shown in Figure 10. Based on this trend line, with well TW-1 pumping at 7.6 igpm for 24 hours a day constantly, at the 100-day (144,000 min) mark with negligible recharge, well TW-1 would have approximately just slightly less than 10 meters of drawdown.

DISCUSSION

Water Chemistry: The ground water sample from TW-1 had exceedances of the measured concentrations of chloride and arsenic. A single total coliform was detected in the microbiological sample. The water from this well will require treatment and the proposed treatment process is described in the EIA Registration Document, Riverside Resort and Conference Centre, Development of Potable Groundwater Source, NAM Freelance Environmental Inc. 7-13-21.

Water Quantity: Well TW-1 was pumped at an average of 9 igpm (58.9 m^3/day or 40.9 L/min) for 24 hours starting on September 19, 2018. Subsequently TW-1 was pumped at an average of 10 igpm (65.5 m^3/day or 45.5 L/min) for 72 hours starting on October 9. 2018. TW-1 had a measured drawdown of approximately 15.38 meters after 72 hours of pumping at an average of 10 igpm. During the period of the pump test the observed drawdown in BW-1 was 14.86 meters and in TW-2 the drawdown was 8.86 meters as a result of pumping in TW-1.

TW-1 was pump tested for 72 hours at 10 igpm with a drawdown of 15.38 meters. The drawdown curve flattened during the latter part of the pump test and that rate appears sustainable. If we ignore the flatting of the drawdown curve towards the end of the pump test shown in Figure 7 and project the drawdown from pumping at 10 igpm over approximately 19 years (shown as the straight line in Figure 2) a drawdown of approximately 22 meters is predicted. This approach is considered to represent a worst-case scenario. With normal recharge over the time period, the total projected drawdown would be less.

The daily water usage for the Resort was measured at approximately 5.2 igpm (23.75 L/min or 34.2 m^3/day) during previous operation. The Resort has existing water storage capacity of 60 cubic meters, which exceeds the daily usage. It is anticipated that the storage tanks

can be filled by a constant pumping from TW-1 (or alternately BW-1) and the stored water used to make up peak flows. Therefore the minimum pumping rate from TW-1 (or alternately BW-1) is 5.2 igpm to provide that amount of water. At a pumping rate of 7.6 igpm well TW-1 would provide the required daily water demand in approximately 16.5 hours, leaving the remaining time (7.5 hours) for well recovery.

The proponent has limited the pump capacity in TW-1 and BW-1 to an upper limit of 7.6 igpm (46.9 m^3). If well TW-1 (or alternately BW-1) was pumped at 7.6 igpm for 24 hours a day a drawdown of 13 meters would be predicted over approximately 19 years, based on the measured transmissivity. This represents a worst-case scenario as the proposed pumping rate of 7.6 igpm would allow for a period of daily recovery.

Potential for Saltwater Intrusion:

TW-1 is located a great distance from the seacoast which should rule out the potential for saltwater intrusion. Localized recharge would rule out any ocean derived saltwater intrusion occurring over such distances. The observed elevated concentration of chloride in the groundwater from TW-1 is probably related to a local source. TW-1 is located approximately 150 meters downslope from the Mactaquac Road interchange with NB Highway 102.

CONCLUSIONS AND RECOMENDATIONS

Based on the above information relating to water quantity it is concluded that Well TW-1:

1. Has sufficient potential ground water resources for the intended use, and;
2. Will not aggravate any existing or create new water supply problems.

The hydrogeologic conditions on the site are considered to be typical for the bedrock aquifer in this area.

The ground water sample from TW-1 had exceedances of the measured concentrations of chloride and arsenic. A single total coliform was detected in the microbiological sample. The water from this well will require treatment and the proposed treatment process is described in the EIA Registration Document, Riverside Resort and Conference Centre, Development of Potable Groundwater Source, NAM Freelance Environmental Inc. 7-13-21.

Based on the above, it is recommended that TW-1 and BW-1 be approved for a maximum pumping rate of 7.6 igpm (49.8 m^3/day or 34.6 L/min).

Report Prepared by:
Craig HydroGeoLogic Inc.

Douglas Craig, M.Sc., P. Geo.
Hydrogeologist

Figure 1: General location map and property boundaries.

Figure 2: Location of test wells (TW-1 and TW-2) and backup well (BW-1)

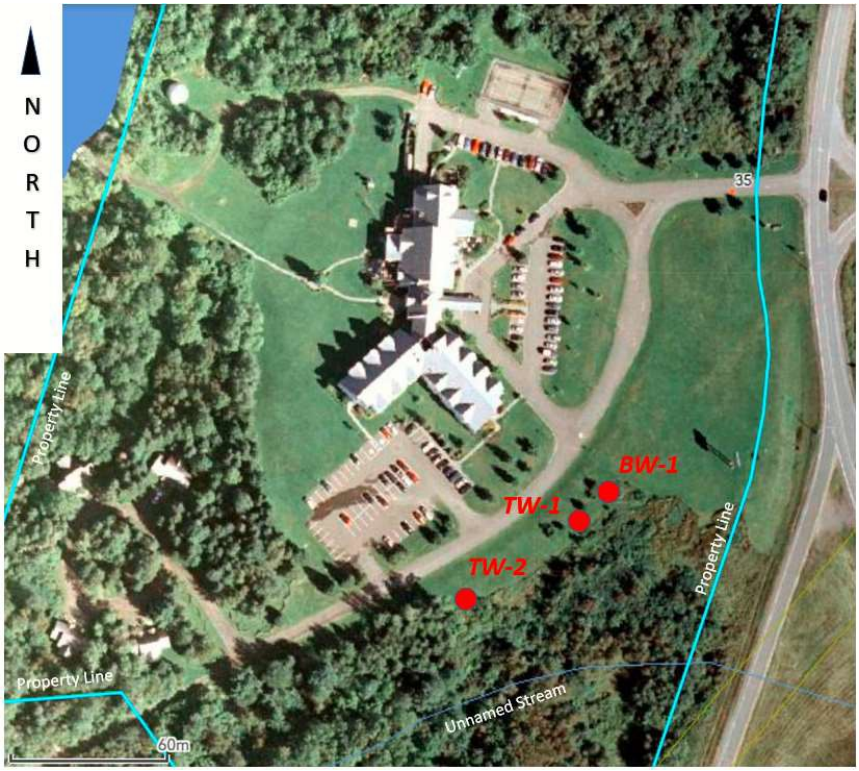


Figure 3: 24 Hour Pump Test, Arithmetic Scale

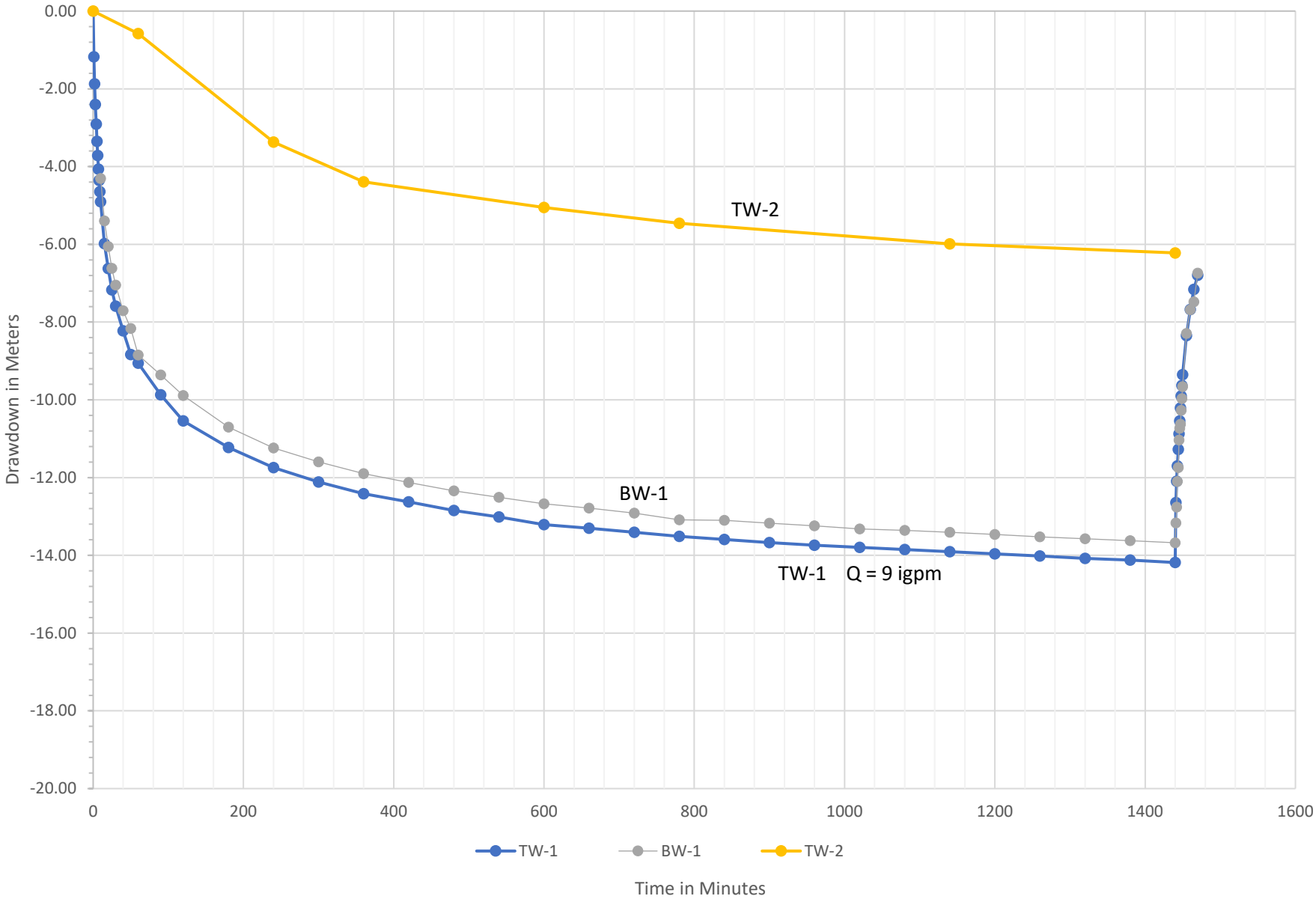


Figure 4: 24 Hour Pump Test, Log Scale

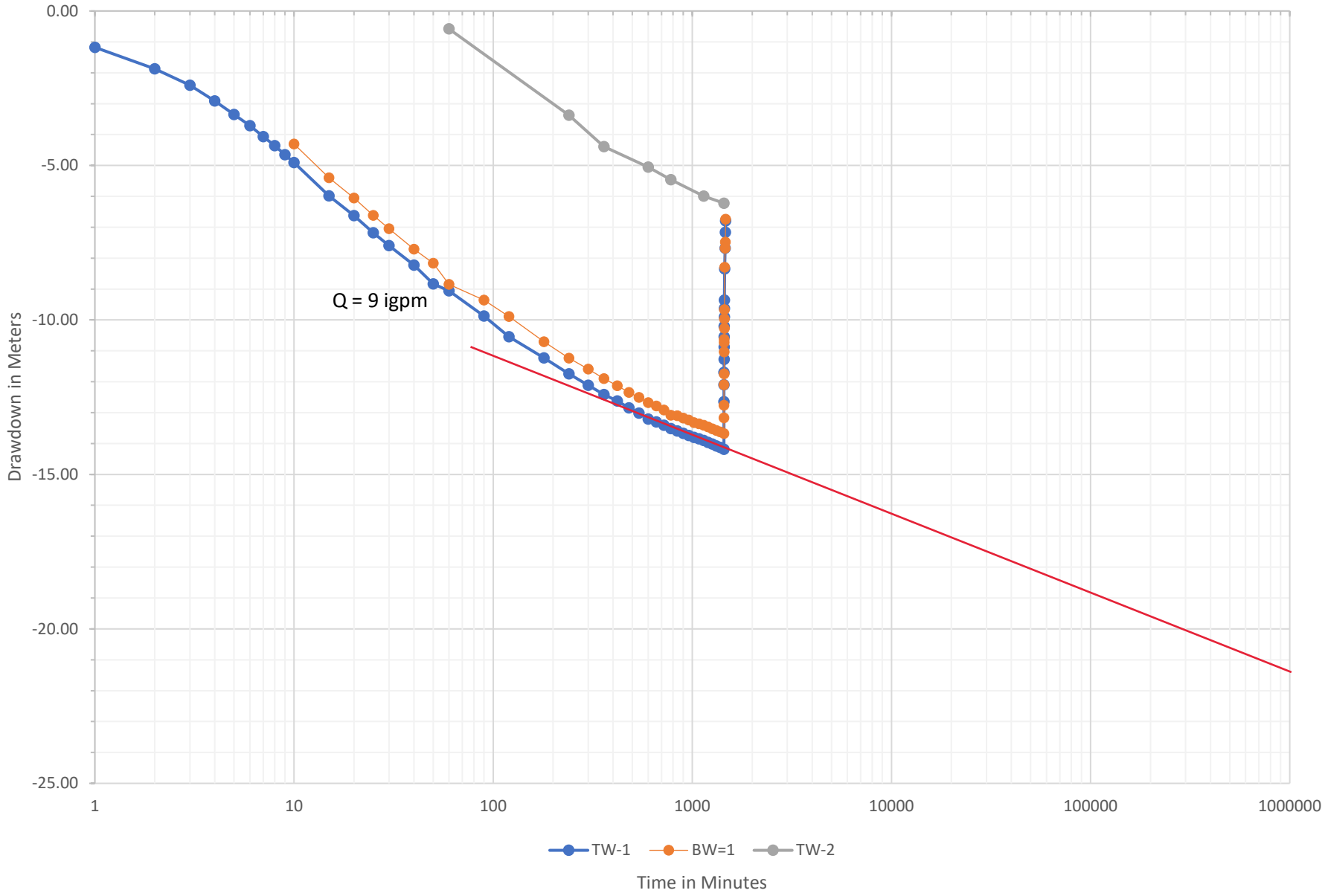


Figure 5: Residual Drawdown 24 hour Pump Test

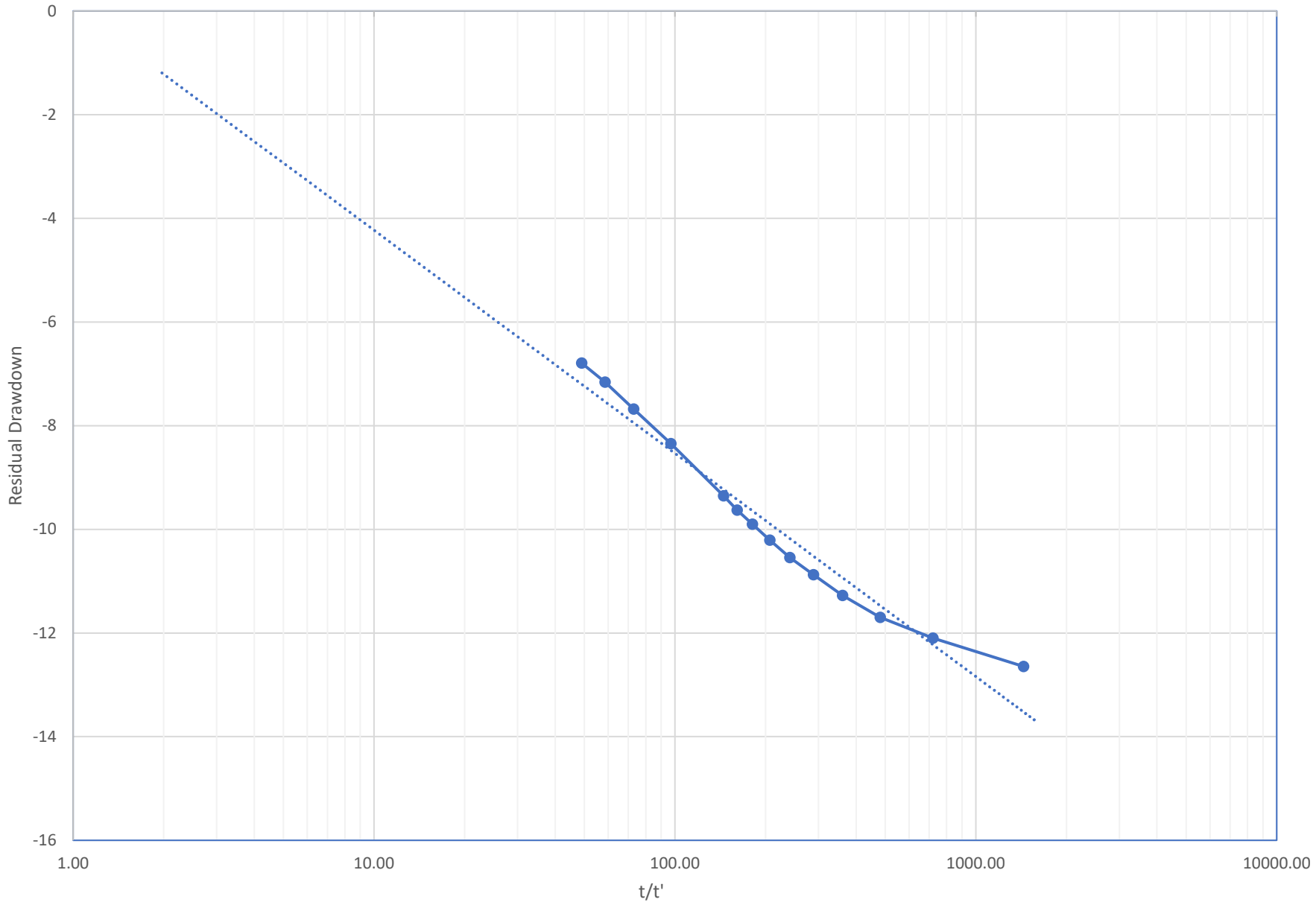


Figure 6: 72 Hour Pump Test at 10 igpm, Arithmetic Scale

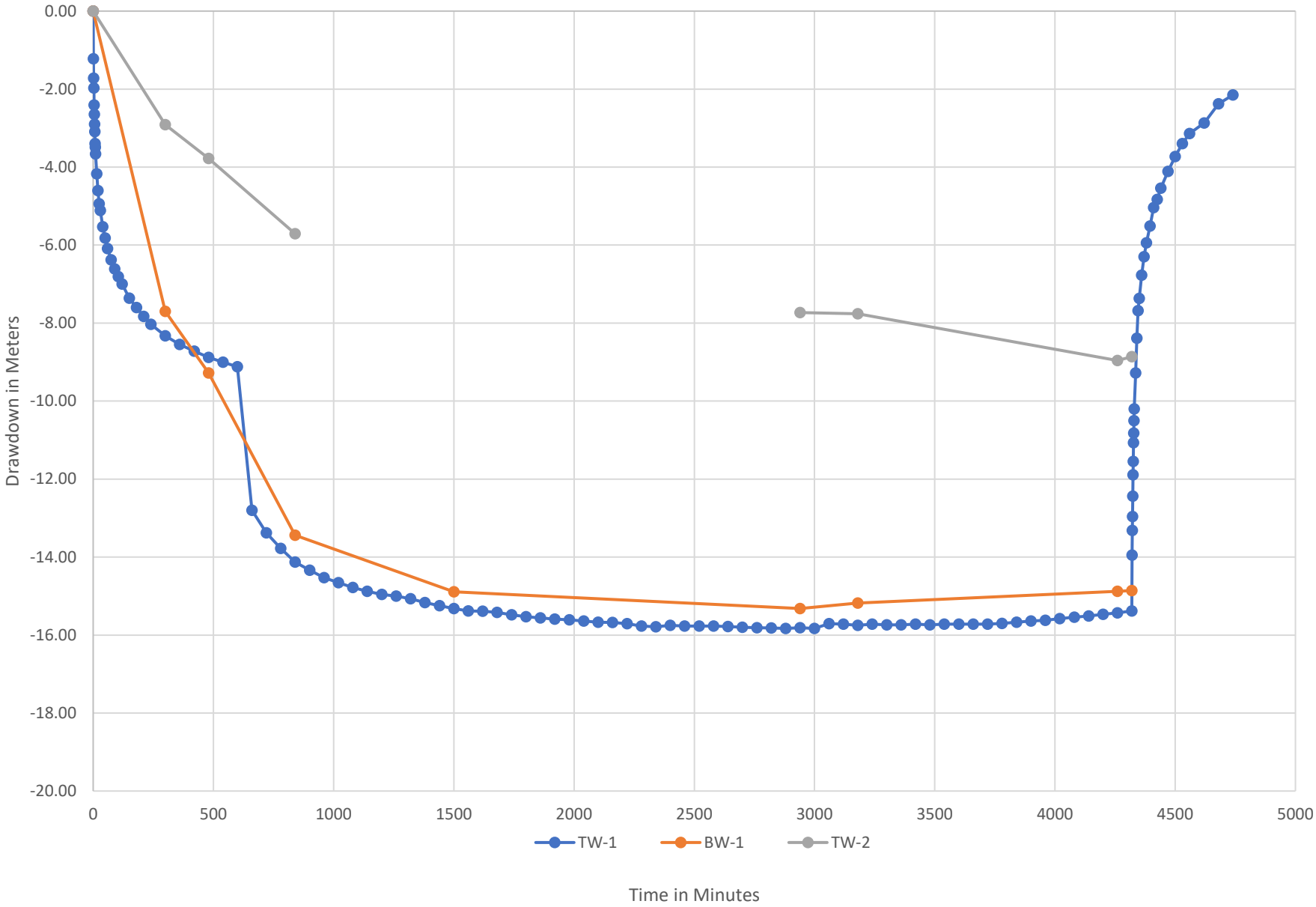


Figure 7: 72 Hour Pump Test at 10 igpm, Log Scale

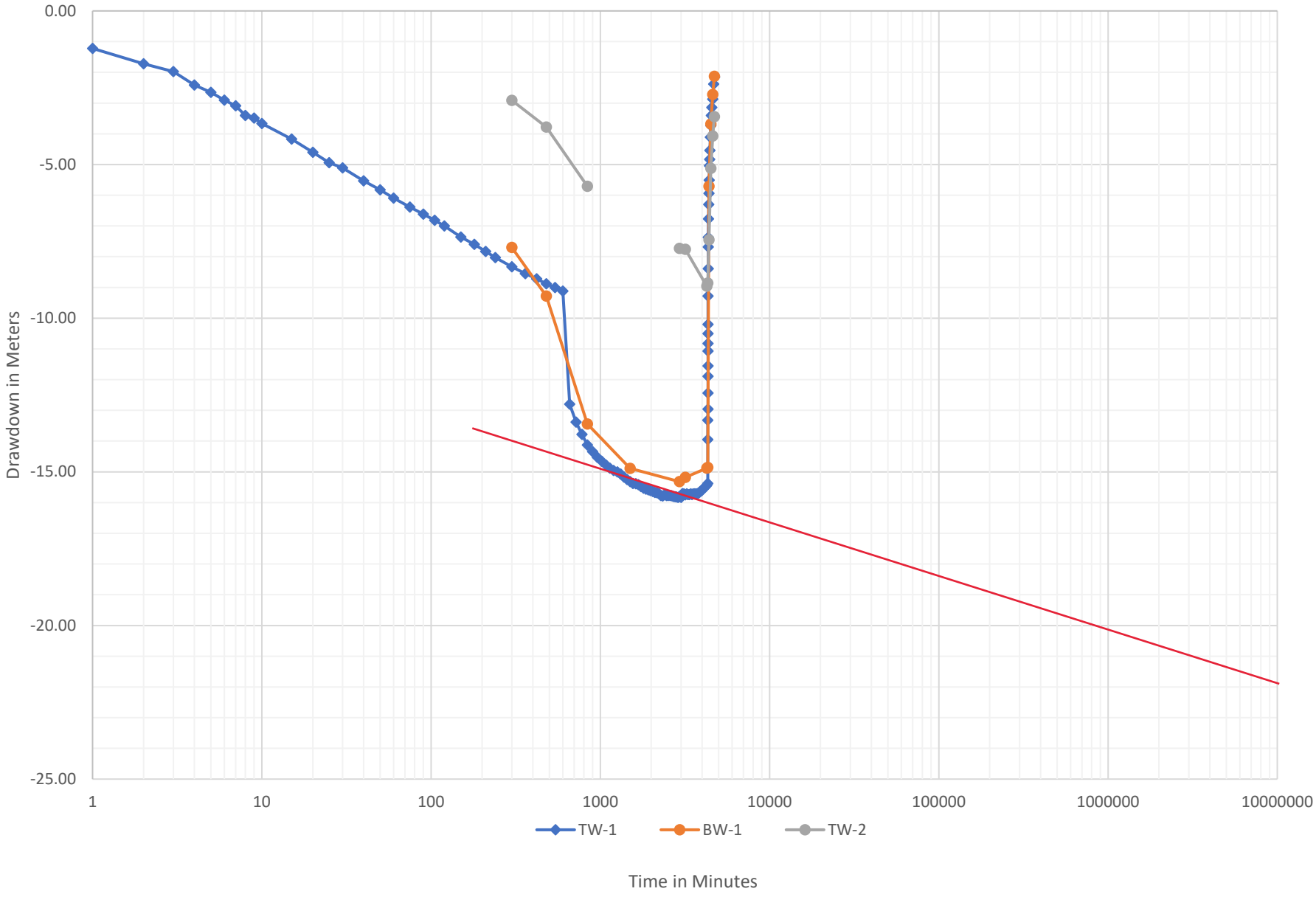


Figure 8: TW-1 Residual Drawdown vs t/t'

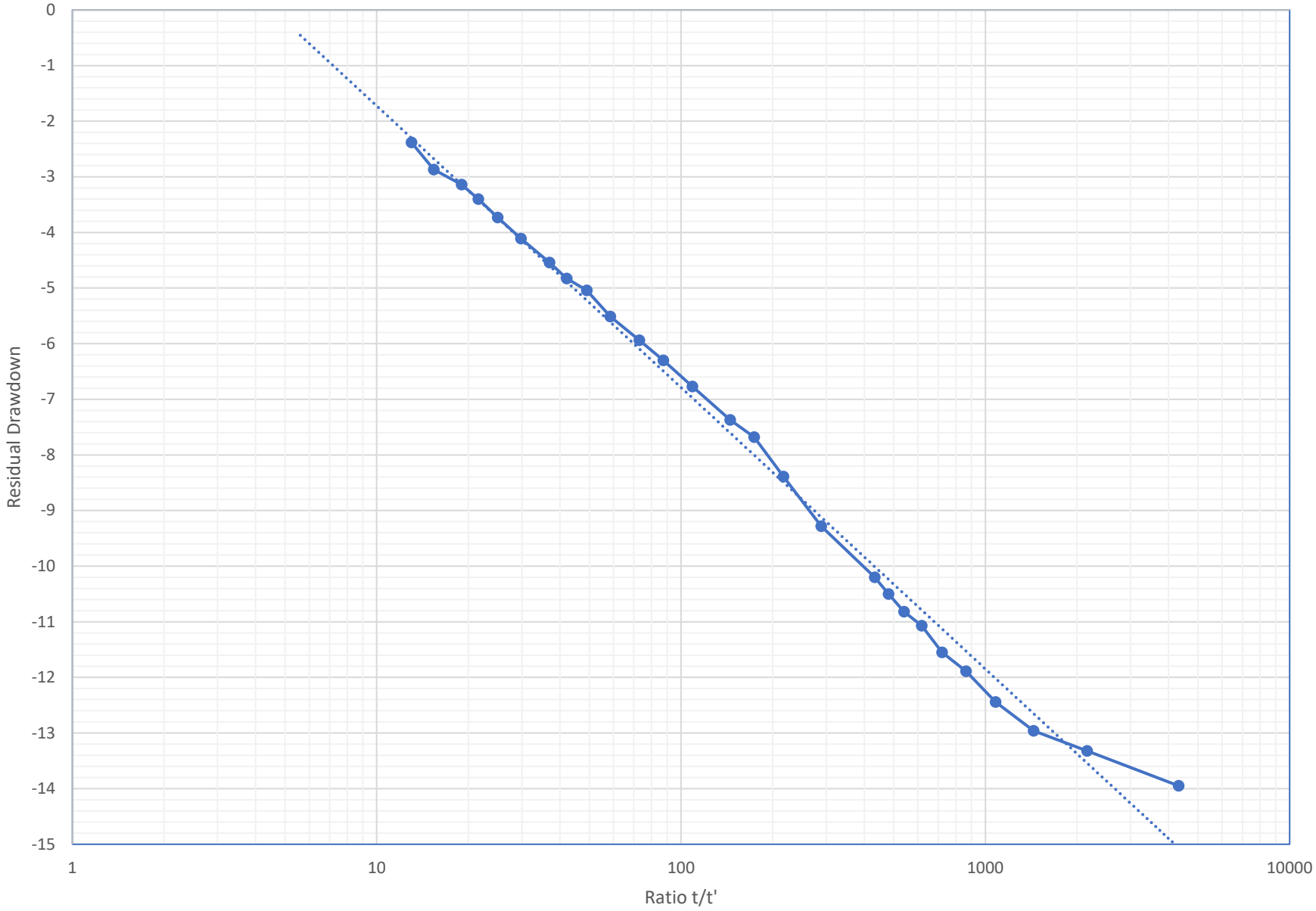


Figure 9: Distance Drawdown, 72 Hour Pump Test

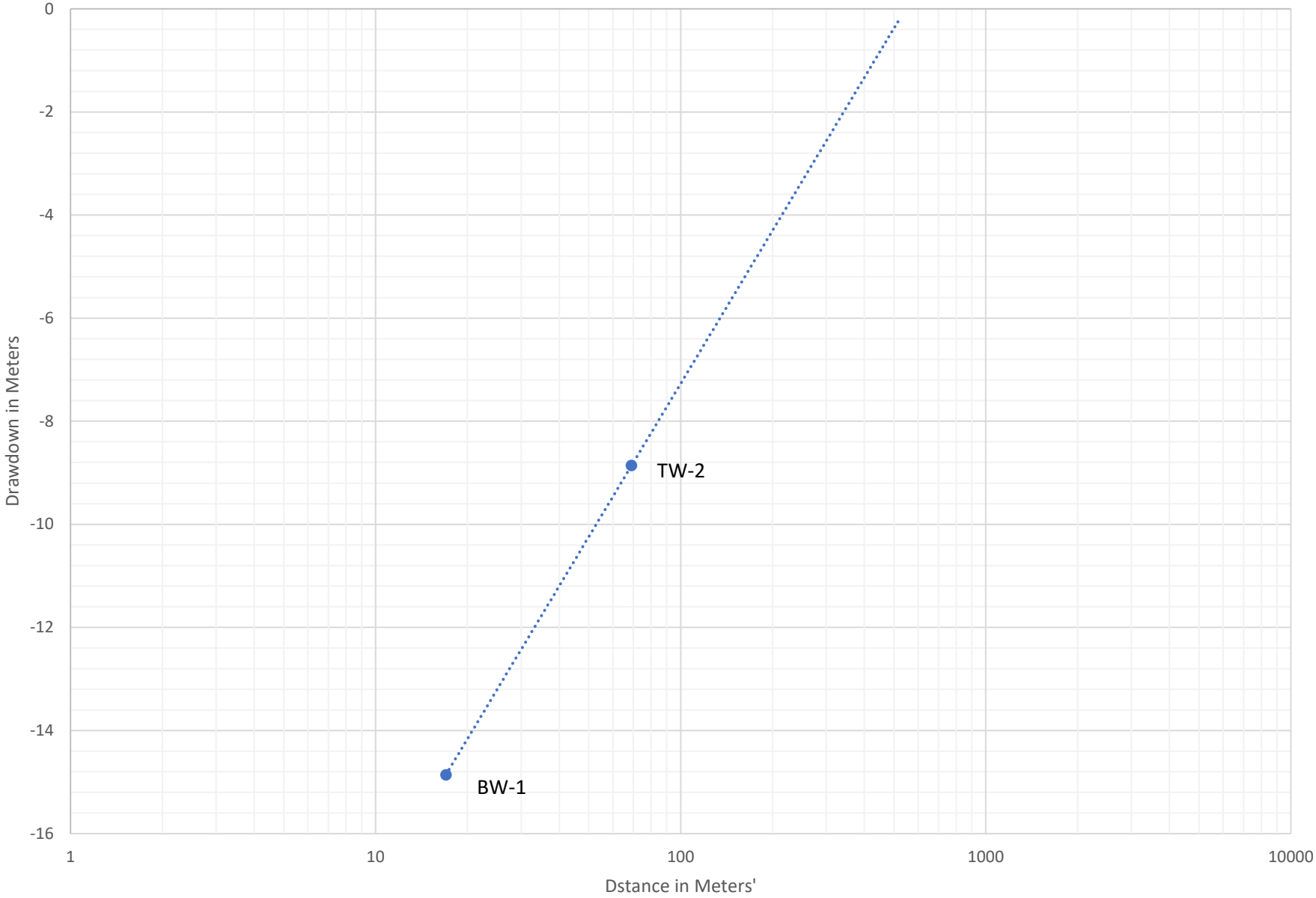
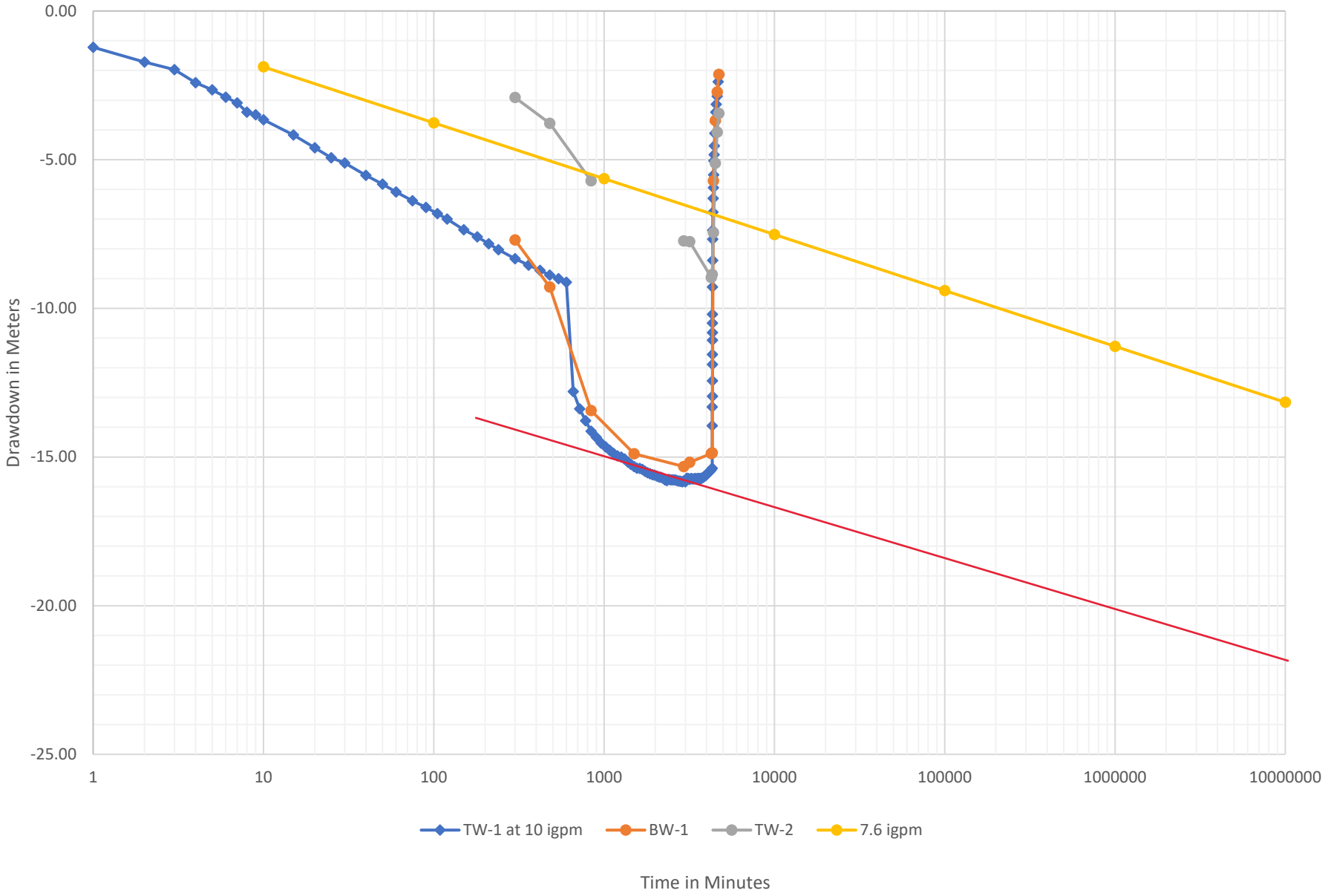


Figure 10: Predicted Drawdown at 7.6 igpm (49.8 m^3/day)



Appendix 1

Well Logs

New Brunswick / Nouveau Brunswick

ENVIRONMENT & LOCAL GOVERNMENT

WATER WELL DRILLER'S REPORT

00041845

OFFICE USE ONLY	HEALTH CODE	LAB NO.	SAMPLE RECEIVED DATE
FIELD NO.	HEALTH OFFICE	EVENT NO.	YR MO DAY

SAMPLE RECEIVED BY:

TESTING VOUCHER INFORMATION — MANDATORY FOR WATER TEST

SEE BACK FOR DETAILS **PLEASE PRINT**

INFORMATION INCLUDED HEREIN SHOULD BE THE WELL OWNER AT TIME OF SAMPLING

FIRST NAME LAST NAME

ADDRESS (MAIL RESULTS TO:)

CITY/TOWN/VILLAGE PROV. POSTAL CODE

DAYTIME PHONE FAX NO.

TEL. NO. SAMPLE COLLECTED YR MO DAY HR MIN AM PM

DO YOU NEED A SAMPLE FOR YOUR MORTGAGE?

IF YOU WISH THE RESULTS TO BE RELEASED TO A MORTGAGE INSTITUTION PLEASE INCLUDE THE FOLLOWING CONTACT INFORMATION: SEE BACK FOR DETAILS

ATTENTION OF:

TEL NO. FAX NO.

SIGNATURE OF WELL OWNER

WAS THE COST OF THIS WELL FINANCED BY NB HOUSING?

YES ☐ NO ☐

WELL / WATER USE:

INDUSTRIAL	☐	ABANDONED	☐	DOMESTIC	☐
EXPLORATORY	☑	MUNICIPAL	☐	MONITORING	☐
HEAT PUMP	☐	OBSERVATION	☐	OTHER	☐

TYPE OF WORK COMPLETED: NEW WELL ☑ DEEPENED ☐

OTHER:

METHOD:

CABLE TOOL ☐ ROTARY ☑ OTHER

CASING INSTALLED:

LENGTH OF CASING ABOVE GROUND: 1 FT. — IN.

STEEL: 6 IN DIAM. FROM 0 FT. TO 29 FT.

PVC: IN DIAM. FROM FT. TO FT.

SLOTTED IN DIAM. FROM FT. TO FT.

SCREENS: TYPE: SLOT SIZE

IN DIAM. FROM FT. TO FT.

DRIVE SHOE: ☑ YES ☐ NO

SETBACKS: SEE BACK FOR DETAILS

SEPTIC TANK (1) 250 FT.

SEPTIC TANK (2) FT. FIELD (2) FT. FIELD (1) 260 FT.

*RIGHT OF WAY OF ANY PUBLIC ROAD ☐ (1) ROAD (2)

CENTER OF ROAD ☐ (1) 210' (2)

SETBACKS MEASURED (NEW CONSTRUCTION)

APPROXIMATE SETBACKS AS INDICATED BY HOMEOWNER (EXISTING CONST.)

FLOWING WELL? YES ☐ NO ☑ IF YES - RATE: igpm (approx.)

AQUIFER TEST: METHOD: AIR ☑ BAILER ☐ PUMP ☐

INITIAL WATER LEVEL: 13 FT BELOW TOP OF CASING

PUMPING RATE 1/2 igpm DURATION: 1 hrs. min.

FINAL WATER LEVEL: 350 FT. BELOW TOP OF CASING

ESTIMATED SAFE YIELD: 1/2 igpm

WELL GROUTED? YES ☐ NO ☑

FROM FT. TO FT. GROUT TYPE:

DRILLING FLUIDS USED: YES ☐ NO ☑

TYPE:

P.I.D. NO.	WELL I.D. NO.
7527915	56671

WELL OWNER INFORMATION

INFORMATION INCLUDED HEREIN SHOULD BE THE WELL OWNER AT TIME OF DRILLING

FIRST NAME LAST NAME

RIVERSIDE RESORT

ADDRESS

35 MACTAQUAC RD.

CITY/TOWN/VILLAGE PROVINCE POSTAL CODE

FRENCH VILLAGE NB E3E 1L2

WELL LOCATION: SAME AS ABOVE . . . . . OR

CIVIC NUMBER STREET NAME

SAME

CITY/TOWN/VILLAGE

WELL PAID FOR BY PROVINCIAL DEPT. OF

WELL ON RESERVE? YES ☐ NO ☑

WELL ALREADY TAGGED? YES ☐ NO ☑

OLD WELL I.D.

DRILLER'S LOG *

FROM (FT.)	TO (FT.)	COLOUR	ROCK TYPE
Ground Level	24	BROWN	OVERBURDEN
24	350	GREY	WACKE

IF INSUFFICIENT SPACE PLEASE USE ADDITIONAL SHEETS

TOTAL WELL DEPTH: 350 FT. DEPTH TO BEDROCK: 24 FT.

WATER BEARING 1 1/4 igpm AT 164 FT. 2 1/4 igpm AT 350 FT.

FRACTURE ZONES: 3 igpm AT FT. 4 igpm AT FT.

PUMP INSTALLATION: INSTALLED ☐ NOT INSTALLED ☑

PUMP INTAKE SETTING: FT. BELOW TOP OF CASING (Recommended)

PUMP TYPE: SUBMERSIBLE ☐ JET ☐ TURBINE ☐

OTHER

WELL DISINFECTED? YES ☐ NO ☑

TYPE

DRILLER'S COMMENTS Angle Well

DRILLING COMPANY: SULLIVAN'S WELL DRILLING

COMPLETION DATE: 18 09 10 (YR. MO. DAY) LICENSE NO. 77

G.P.S. (OPTIONAL)

I CERTIFY THAT THE WELL HEREIN DESCRIBED HAS BEEN CONSTRUCTED IN ACCORDANCE WITH THE WATER WELL REGULATION UNDER THE NEW BRUNSWICK CLEAN WATER ACT.

Signature of Driller

Signature of Helper

WHITE - NBELG
BLUE - Homeowner / Voucher
YELLOW - Homeowner
PINK - Drilling Company

KEEP THIS REPORT WITH YOUR IMPORTANT DOCUMENTS

New Nouveau Brunswick

ENVIRONMENT & LOCAL GOVERNMENT

WATER WELL DRILLER'S REPORT

00041846

OFFICE USE ONLY	HEALTH CODE	LAB NO.	SAMPLE RECEIVED DATE	SAMPLE RECEIVED BY:
FIELD NO.	HEALTH OFFICE	EVENT NO.	YR MO DAY	

TESTING VOUCHER INFORMATION — MANDATORY FOR WATER TEST

SEE BACK FOR DETAILS **PLEASE PRINT**

INFORMATION INCLUDED HEREIN SHOULD BE THE WELL OWNER AT TIME OF SAMPLING

FIRST NAME LAST NAME

ADDRESS (MAIL RESULTS TO:)

CITY/TOWN/VILLAGE PROV. POSTAL CODE

DAYTIME PHONE FAX NO.

TEL. NO. SAMPLE COLLECTED YR MO DAY HR MIN AM PM

DO YOU NEED A SAMPLE FOR YOUR MORTGAGE?

IF YOU WISH THE RESULTS TO BE RELEASED TO A MORTGAGE INSTITUTION PLEASE INCLUDE THE FOLLOWING CONTACT INFORMATION: SEE BACK FOR DETAILS

ATTENTION OF:

TEL NO. FAX NO.

SIGNATURE OF WELL OWNER

WAS THE COST OF THIS WELL FINANCED BY NB HOUSING?

YES ☐ NO ☑

WELL / WATER USE:

INDUSTRIAL	☐	ABANDONED	☐	DOMESTIC	☑
EXPLORATORY	☐	MUNICIPAL	☐	MONITORING	☐
HEAT PUMP	☐	OBSERVATION	☐	OTHER	☐

TYPE OF WORK COMPLETED: NEW WELL ☑ DEEPENED ☐

OTHER: _____

METHOD:

CABLE TOOL ☐ ROTARY ☑ OTHER _____

CASING INSTALLED:

LENGTH OF CASING ABOVE GROUND: 1 FT. 6 IN.

STEEL: 6 IN DIAM. FROM 0 FT. TO 40 FT.

PVC: _____ IN DIAM. FROM _____ FT. TO _____ FT.

SLOTTED _____ IN DIAM. FROM _____ FT. TO _____ FT.

SCREENS: TYPE: _____ SLOT SIZE _____

_____ IN DIAM. FROM _____ FT. TO _____ FT.

DRIVE SHOE: YES ☑ NO ☐

SETBACKS: SEE BACK FOR DETAILS

SEPTIC TANK (1) 270 FT.

SEPTIC TANK (2) _____ FT. FIELD (2) _____ FT. FIELD (1) 280 FT.

*RIGHT OF WAY OF ANY PUBLIC ROAD ☐ (1) _____ ROAD (2) _____

CENTER OF ROAD ☐ (1) 200' (2) _____

SETBACKS MEASURED _____ (NEW CONSTRUCTION)

APPROXIMATE SETBACKS AS INDICATED BY HOMEOWNER ✓ (EXISTING CONST.)

FLOWING WELL? YES ☐ NO ☑ IF YES - RATE: _____ igpm (approx.)

AQUIFER TEST: METHOD: AIR ☑ BAILER ☐ PUMP ☐

INITIAL WATER LEVEL: 13 FT BELOW TOP OF CASING

PUMPING RATE 9 igpm DURATION: 24 hrs. _____ min.

FINAL WATER LEVEL: 60 FT. BELOW TOP OF CASING

ESTIMATED SAFE YIELD: 18 igpm

WELL GROUTED? YES ☐ NO ☑

FROM _____ FT. TO _____ FT. GROUT TYPE: _____

DRILLING FLUIDS USED: YES ☐ NO ☑

TYPE: _____

P.I.D. NO.	WELL I.D. NO.
75279 15	56672

WELL OWNER INFORMATION

INFORMATION INCLUDED HEREIN SHOULD BE THE WELL OWNER AT TIME OF DRILLING

FIRST NAME LAST NAME: RIVER SIDE RESORT

ADDRESS: 35 MACTAQUAC RD

CITY/TOWN/VILLAGE: FRENCH VILLAGE PROVINCE: NB POSTAL CODE: E3E 1L2

WELL LOCATION: SAME AS ABOVE ..... OR

CIVIC NUMBER STREET NAME: SAME

CITY/TOWN/VILLAGE

WELL PAID FOR BY PROVINCIAL DEPT. OF _____

WELL ON RESERVE?	WELL ALREADY TAGGED?	OLD WELL I.D.
YES ☐ NO ☑	YES ☐ NO ☑	

DRILLER'S LOG *

FROM (FT.)	TO (FT.)	COLOUR	ROCK TYPE
Ground Level	11	BROWN	OVERBURDEN
11	400	GREY	WACKE

IF INSUFFICIENT SPACE PLEASE USE ADDITIONAL SHEETS

TOTAL WELL DEPTH: 400 FT. DEPTH TO BEDROCK: 11 FT.

WATER BEARING 1 1.5 igpm AT 72 FT. 2 1.5 igpm AT 110 FT.

FRACTURE ZONES: 3 6 igpm AT 193 FT. 4 3 igpm AT 283 FT.

PUMP INSTALLATION: INSTALLED ☑ NOT INSTALLED ☐

PUMP INTAKE SETTING: 300 FT. BELOW TOP OF CASING (Recommended)

PUMP TYPE: SUBMERSIBLE ☑ JET ☐ TURBINE ☐

OTHER _____

WELL DISINFECTED? YES ☑ NO ☐

TYPE CHLORINE

DRILLER'S COMMENTS 330' 4 gpm 380' 2 gpm

DRILLING COMPANY: SULLIVAN'S WELL DRILLING LTD

COMPLETION DATE: 18 09 13 (YR. MO. DAY) LICENSE NO. 77

G.P.S. (OPTIONAL)

I CERTIFY THAT THE WELL HEREIN DESCRIBED HAS BEEN CONSTRUCTED IN ACCORDANCE WITH THE WATER WELL REGULATION UNDER THE NEW BRUNSWICK CLEAN WATER ACT.

Signature of Driller _____ Signature of Helper _____

WHITE - NBELG
BLUE - Homeowner / Voucher
YELLOW - Homeowner
PINK - Drilling Company

KEEP THIS REPORT WITH YOUR IMPORTANT DOCUMENTS

New Nouveau Brunswick

ENVIRONMENT & LOCAL GOVERNMENT

WATER WELL DRILLER'S REPORT 00041847

OFFICE USE ONLY
FIELD NO.

HEALTH CODE | LAB NO. | SAMPLE RECEIVED DATE (YR MO DAY)
HEALTH OFFICE | EVENT NO.

SAMPLE RECEIVED BY:

TESTING VOUCHER INFORMATION — MANDATORY FOR WATER TEST
SEE BACK FOR DETAILS — PLEASE PRINT
INFORMATION INCLUDED HEREIN SHOULD BE THE WELL OWNER AT TIME OF SAMPLING

FIRST NAME | LAST NAME

ADDRESS (MAIL RESULTS TO:)

CITY/TOWN/VILLAGE | PROV. | POSTAL CODE

DAYTIME PHONE | FAX NO.

TEL. NO. | SAMPLE COLLECTED (YR MO DAY HR MIN AM PM)

DO YOU NEED A SAMPLE FOR YOUR MORTGAGE?
IF YOU WISH THE RESULTS TO BE RELEASED TO A MORTGAGE INSTITUTION PLEASE INCLUDE THE FOLLOWING CONTACT INFORMATION: — SEE BACK FOR DETAILS

ATTENTION OF:

TEL NO. | FAX NO.

SIGNATURE OF WELL OWNER

WAS THE COST OF THIS WELL FINANCED BY NB HOUSING?
YES ☐ NO ☑

WELL / WATER USE:

INDUSTRIAL	☐	ABANDONED	☐	DOMESTIC	☐
EXPLORATORY	☑	MUNICIPAL	☐	MONITORING	☐
HEAT PUMP	☐	OBSERVATION	☐	OTHER	☐

TYPE OF WORK COMPLETED: NEW WELL ☑ DEEPENED ☐
OTHER: _____

METHOD:
CABLE TOOL ☐ ROTARY ☑ OTHER _____

CASING INSTALLED:
LENGTH OF CASING ABOVE GROUND: 1 FT. 8 IN.
STEEL: 6 IN DIAM. FROM 0 FT. TO 40 FT.
PVC: _____ IN DIAM. FROM _____ FT. TO _____ FT.
SLOTTED _____ IN DIAM. FROM _____ FT. TO _____ FT.

SCREENS: TYPE: ____ SLOT SIZE _____
_____ IN DIAM. FROM _____ FT. TO _____ FT.

DRIVE SHOE: YES ☑ NO ☐

SETBACKS: SEE BACK FOR DETAILS
SEPTIC TANK (1) 270 FT.
SEPTIC TANK (2) _____ FT. FIELD (2) _____ FT. FIELD (1) 280 FT.
*RIGHT OF WAY OF ANY PUBLIC ROAD ☐ (1) _____ ROAD (2) _____
CENTER OF ROAD ☐ (1) 200 (2) _____
SETBACKS MEASURED _____ (NEW CONSTRUCTION)
APPROXIMATE SETBACKS AS INDICATED BY HOMEOWNER ☑ (EXISTING CONST.)

FLOWING WELL? YES ☐ NO ☑ IF YES - RATE: _____ igpm (approx.)

AQUIFER TEST: METHOD: AIR ☑ BAILER ☐ PUMP ☐
INITIAL WATER LEVEL: 14 FT BELOW TOP OF CASING
PUMPING RATE 5 1/2 igpm DURATION: _____ hrs. _____ min.
FINAL WATER LEVEL: 400 FT. BELOW TOP OF CASING
ESTIMATED SAFE YIELD: 5.5 igpm

WELL GROUTED? YES ☐ NO ☑
FROM _____ FT. TO _____ FT. GROUT TYPE: _____
DRILLING FLUIDS USED: YES ☐ NO ☑
TYPE: _____

P.I.D. NO. 7527915 | **WELL I.D. NO.** 56673

WELL OWNER INFORMATION
INFORMATION INCLUDED HEREIN SHOULD BE THE WELL OWNER AT TIME OF DRILLING

FIRST NAME | LAST NAME
RIVERSTONE RESORT

ADDRESS
35 MACTAQUAC RD.

CITY/TOWN/VILLAGE | PROVINCE | POSTAL CODE
FRENCH VILLAGE NB E3E 1L2

WELL LOCATION: SAME AS ABOVE ..... OR
CIVIC NUMBER STREET NAME
SAME

CITY/TOWN/VILLAGE | WELL PAID FOR BY PROVINCIAL DEPT. OF _____

WELL ON RESERVE? YES ☐ NO ☑ | WELL ALREADY TAGGED? YES ☐ NO ☑ | OLD WELL I.D.

DRILLER'S LOG *

FROM (FT.)	TO (FT.)	COLOUR	ROCK TYPE
Ground Level	10	BROWN	OVERBURDEN
10	400	GREY	WACKE

IF INSUFFICIENT SPACE PLEASE USE ADDITIONAL SHEETS

TOTAL WELL DEPTH: 400 FT. DEPTH TO BEDROCK: 10 FT.
WATER BEARING 1 1/2 igpm AT 90 FT. 2 1/2 igpm AT 167 FT.
FRACTURE ZONES: 3 1 igpm AT 200 FT. 4 3 igpm AT 274 FT.

PUMP INSTALLATION: INSTALLED ☐ NOT INSTALLED ☑
PUMP INTAKE SETTING: 300 FT. BELOW TOP OF CASING (Recommended)
PUMP TYPE: SUBMERSIBLE ☐ JET ☐ TURBINE ☐
OTHER _____
WELL DISINFECTED? YES ☐ NO ☑
TYPE _____

DRILLER'S COMMENTS 1/2 gpm @ 290'

DRILLING COMPANY: SULLIVAN'S WELL DRILLING LTD
COMPLETION DATE: 18 09 14 (YR. MO. DAY) LICENSE NO. 77

G.P.S. (OPTIONAL)

I CERTIFY THAT THE WELL HEREIN DESCRIBED HAS BEEN CONSTRUCTED IN ACCORDANCE WITH THE WATER WELL REGULATION UNDER THE NEW BRUNSWICK CLEAN WATER ACT.

Signature of Driller | Signature of Helper

WHITE - NBELG
BLUE - Homeowner / Voucher
YELLOW - Homeowner
PINK - Drilling Company

KEEP THIS REPORT WITH YOUR IMPORTANT DOCUMENTS

Riverside Resort

500 meter radius around PID 75279125

Well Depth (Feet)	**Estimated Yield** (igpm)	**Depth to Bedrock** (Feet)	**Casing Length** (Feet)
205	1.5	6	30
65	5	3	20
120	7	6	20
405	1	18	26
200	30	6	20
200	2	6	20
270	7	3	20
120	8	21	31
385	8	5	20
345	20	5	20
Well Depth (Feet)	**Estimated Yield** (igpm)	**Depth to Bedrock** (Feet)	**Casing Length** (Feet)

Median	202.5	7	6	20	Median
average	231.5	9.0	7.9	22.7	AVERAG
max	405	30	21	31	max
min	65	1	3	20	min
count	10				

New Nouveau Brunswick

Environment

Report Number **1791**

Well Driller's Report

Date printed 2018/07/31

Drilled by

Well Use	Work Type	Drill Method	Work Completed
Drinking Water, Domestic	New Well	Rotary	07/17/2002

Casing Information

Casing above ground 2ft 6in — Drive Shoe Used? Yes

Well Log	Casing Type	Diameter	From	End	Slotted?
1791	**Steel**	**6 inch**	**0ft**	**20ft**	

Aquifer Test/Yield

Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	0ft	25 igpm	1hr 15min	15ft	20 igpm	No	0 igpm

(BTC - Below top of casing)

Well Grouting

There is no Grout information.

Drilling Fluids Used
None

Disinfectant
N/A

Qty 0 ig

Pump Installed
N/A

Intake Setting (BTC)
0ft

Driller's Log

Well Log	From	End	Colour	Rock Type
1791	**0ft**	**5ft**	**Brown**	**Overburden**
1791	**5ft**	**345ft**	**Grey**	**Shale**

Overall Well Depth
345ft

Bedrock Level
0ft

Water Bearing Fracture Zone

Well Log	Depth	Rate
1791	**40ft**	**2 igpm**
1791	**320ft**	**23 igpm**

Setbacks

Well Log	Distance	Setback From
1791	**120ft**	**Right of any Public Way Road**

New Nouveau Brunswick

Environment

Report Number **1792**

Well Driller's Report

Date printed 2018/07/31

Drilled by

Well Use	Work Type	Drill Method	Work Completed
Drinking Water, Domestic	New Well	Rotary	07/18/2002

Casing Information

Casing above ground 2ft 6in — Drive Shoe Used? Yes

Well Log	Casing Type	Diameter	From	End	Slotted?
1792	**Steel**	**6 inch**	**0ft**	**20ft**	

Aquifer Test/Yield

Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	0ft	12 igpm	1hr 15min	0ft	8 igpm	No	0 igpm

(BTC - Below top of casing)

Well Grouting

There is no Grout information.

Drilling Fluids Used
None

Disinfectant
N/A

Qty 0 ig

Pump Installed
N/A

Intake Setting (BTC)
0ft

Driller's Log

Well Log	From	End	Colour	Rock Type
1792	**0ft**	**5ft**	**Brown**	**Overburden**
1792	**5ft**	**385ft**	**Grey**	**Shale**

Overall Well Depth
385ft

Bedrock Level
0ft

Water Bearing Fracture Zone

Well Log	Depth	Rate
1792	**160ft**	**2 igpm**
1792	**300ft**	**10 igpm**

Setbacks

Well Log	Distance	Setback From
1792	**120ft**	**Right of any Public Way Road**

New Nouveau Brunswick

Environment

Report Number **7795**

Well Driller's Report

Date printed 2018/07/31

Drilled by

Well Use	Work Type	Drill Method	Work Completed
Drinking Water, Domestic	New Well	Cable Tool	08/19/2003

Casing Information

Casing above ground 1ft 3in — Drive Shoe Used? Yes

Well Log	Casing Type	Diameter	From	End	Slotted?
7795	**Steel**	**6 inch**	**0ft**	**31ft**	

Aquifer Test/Yield

Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	0ft	8 igpm	1hr	15ft	8 igpm	No	0 igpm
	(BTC - Below top of casing)						

Well Grouting

There is no Grout information.

Drilling Fluids Used
None

Disinfectant
Bleach (Javex)
Qty 0 ig

Pump Installed
Submersible
Intake Setting (BTC)
110ft

Driller's Log

Well Log	From	End	Colour	Rock Type
7795	**0ft**	**4ft**	**Brown**	**Gravel**
7795	**4ft**	**21ft**	**Brown**	**Clay**
7795	**21ft**	**62ft**	**Grey**	**Granite**
7795	**62ft**	**67ft**	**Grey**	**Slate**
7795	**67ft**	**82ft**	**Grey**	**Granite**
7795	**82ft**	**84ft**	**Grey**	**Slate**
7795	**84ft**	**120ft**	**Grey**	**Granite**

Overall Well Depth
120ft

Bedrock Level
0ft

Water Bearing Fracture Zone

Well Log	Depth	Rate
7795	**83ft**	**8 igpm**

Setbacks

Well Log	Distance	Setback From
7795	**66ft**	**Septic Tank**
7795	**77ft**	**Leach Field**
7795	**271ft**	**Right of any Public Way Road**

New Nouveau Brunswick

Environment

Report Number **10819**

Well Driller's Report

Date printed 2018/07/31

Drilled by

Well Use	Work Type	Drill Method	Work Completed
Drinking Water, Domestic	New Well	Rotary	09/30/2004

Casing Information

Casing above ground 2ft — Drive Shoe Used? Yes

Well Log	Casing Type	Diameter	From	End	Slotted?
10819	**Steel**	**6 inch**	**0ft**	**20ft**	

Aquifer Test/Yield

Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	20ft	7 igpm	1hr 20min	20ft	7 igpm	No	0 igpm

(BTC - Below top of casing)

Well Grouting

There is no Grout information.

Drilling Fluids Used
None

Disinfectant
Bleach (Javex)
Qty 0 ig

Pump Installed
N/A
Intake Setting (BTC)
220ft

Driller's Log

Well Log	From	End	Colour	Rock Type
10819	**0ft**	**3ft**	**Brown**	**Till**
10819	**3ft**	**270ft**	**Grey**	**Slate**

Overall Well Depth
270ft

Bedrock Level
0ft

Water Bearing Fracture Zone

Well Log	Depth	Rate
10819	**260ft**	**1 igpm**
10819	**45ft**	**1 igpm**
10819	**160ft**	**3 igpm**
10819	**220ft**	**2 igpm**

Setbacks

Well Log	Distance	Setback From
10819	**55ft**	**Septic Tank**
10819	**75ft**	**Leach Field**

New Nouveau Brunswick

Environment

Report Number **38072**

Well Driller's Report

Date printed 2018/07/31

Drilled by

Well Use	Work Type	Drill Method	Work Completed
Drinking Water, Domestic	New Well	Rotary	10/11/2016

Casing Information

Casing above ground 1ft 6in — Drive Shoe Used? Yes

Well Log	Casing Type	Diameter	From	End	Slotted?
38072	**Steel**	**6 inch**	**0ft**	**18ft**	

Aquifer Test/Yield

Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	10ft	4 igpm	1hr 30min	100ft	2 igpm	No	0 igpm

(BTC - Below top of casing)

Well Grouting

There is no Grout information.

Drilling Fluids Used
None

Disinfectant
Bleach (Javex)
Qty 0 ig

Pump Installed
Submersible
Intake Setting (BTC)
180ft

Driller's Log

Well Log	From	End	Colour	Rock Type
38072	**0ft**	**6ft**	**Brown**	**Till**
38072	**6ft**	**200ft**	**Grey**	**Shale**

Overall Well Depth
200ft

Bedrock Level
0ft

Water Bearing Fracture Zone

Well Log	Depth	Rate
38072	**100ft**	**2 igpm**

Setbacks

Well Log	Distance	Setback From
38072	**75ft**	**Septic Tank**
38072	**90ft**	**Leach Field**
38072	**150ft**	**Right of any Public Way Road**

New Nouveau Brunswick

Environment

Report Number **38724**

Well Driller's Report

Date printed 2018/07/31

Drilled by

Well Use	Work Type	Drill Method	Work Completed
Drinking Water, Domestic	New Well	Rotary	06/17/2016

Casing Information

Casing above ground 2ft — Drive Shoe Used? Yes

Well Log	Casing Type	Diameter	From	End	Slotted?
38724	**Steel**	**6 inch**	**0ft**	**18ft**	

Aquifer Test/Yield

Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	20ft	4 igpm	1hr 30min	20ft	30 igpm	No	0 igpm

(BTC - Below top of casing)

Well Grouting

There is no Grout information.

Drilling Fluids Used
None

Disinfectant
Chlorine pellets
Qty 0 ig

Pump Installed
Submersible
Intake Setting (BTC)
180ft

Driller's Log

Well Log	From	End	Colour	Rock Type
38724	**0ft**	**6ft**	**Brown**	**Till**
38724	**6ft**	**200ft**	**Grey**	**Shale**

Overall Well Depth
200ft

Bedrock Level
6ft

Water Bearing Fracture Zone

Well Log	Depth	Rate
38724	**35ft**	**1 igpm**
38724	**190ft**	**29 igpm**

Setbacks

Well Log	Distance	Setback From
38724	**300ft**	**Right of any Public Way Road**
38724	**75ft**	**Septic Tank**
38724	**80ft**	**Leach Field**

New Nouveau Brunswick

Environment

Report Number **90649900**

Well Driller's Report

Date printed 2018/07/31

Drilled by

Well Use	Work Type	Drill Method	Work Completed
Drinking Water, Domestic	New Well (NEW WELL)	Rotary (ROTARY)	05/22/1998

Casing Information

Casing above ground 2ft — Drive Shoe Used? Yes

Well Log	Casing Type	Diameter	From	End	Slotted?
90649900	**Steel**	**6 inch**	**0ft**	**26ft**	

Aquifer Test/Yield

Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	0ft	1 igpm	0hr	0ft	1 igpm	No	0 igpm

(BTC - Below top of casing)

Well Grouting

There is no Grout information.

Drilling Fluids Used
None

Disinfectant
Chlorine Pucks

Qty 0 ig

Pump Installed
N/A

Intake Setting (BTC)
300ft

Driller's Log

Well Log	From	End	Colour	Rock Type
90649900	**0ft**	**18ft**	**Yellow**	**Clay**
90649900	**18ft**	**22ft**	**Grey**	**Wackie**
90649900	**22ft**	**405ft**	**Grey**	**Wackie**

Overall Well Depth
405ft

Bedrock Level
18ft

Water Bearing Fracture Zone

Well Log	Depth	Rate
90649900	**380ft**	**1 igpm**

Setbacks

There is no Setback information.

New Nouveau Brunswick

Environment

Report Number **91403600**

Well Driller's Report

Date printed 2018/07/31

Drilled by

Well Use	Work Type	Drill Method	Work Completed
Drinking Water, Domestic	New Well (NEW WELL)	Rotary (ROTARY)	05/26/1999

Casing Information

Casing above ground 1ft 6in Drive Shoe Used? Yes

Well Log	Casing Type	Diameter	From	End	Slotted?
91403600	**Steel**	**6 inch**	**0ft**	**20ft**	

Aquifer Test/Yield

Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	0ft	7 igpm	1hr	14ft	7 igpm	No	0 igpm

(BTC - Below top of casing)

Well Grouting

There is no Grout information.

Drilling Fluids Used
Water

Disinfectant
Bleach (Javex)
Qty 1.0 ig

Pump Installed
N/A
Intake Setting (BTC)
110ft

Driller's Log

Well Log	From	End	Colour	Rock Type
91403600	**28ft**	**56ft**	**Grey**	**Granite**
91403600	**0ft**	**6ft**	**Brown**	**Clay**
91403600	**6ft**	**28ft**	**Grey**	**Slate**
91403600	**56ft**	**110ft**	**Grey**	**Slate**
91403600	**110ft**	**112ft**	**Brown**	**Slate**
91403600	**112ft**	**120ft**	**Grey**	**Granite**

Overall Well Depth
120ft

Bedrock Level
6ft

Water Bearing Fracture Zone

Well Log	Depth	Rate
91403600	**60ft**	**1 igpm**
91403600	**110ft**	**6 igpm**

Setbacks

There is no Setback information.

New Nouveau Brunswick

Environment

Report Number **91456200**

Well Driller's Report

Date printed 2018/07/31

Drilled by

Well Use	Work Type	Drill Method	Work Completed
Drinking Water, Domestic	New Well (NEW WELL)	Rotary (ROTARY)	05/21/1999

Casing Information

Casing above ground 2ft — Drive Shoe Used? Yes

Well Log	Casing Type	Diameter	From	End	Slotted?
91456200	**Steel**	**6 inch**	**0ft**	**18ft**	

Aquifer Test/Yield

Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	0ft	0 igpm	0hr	0ft	5 igpm	No	0 igpm

(BTC - Below top of casing)

Well Grouting

There is no Grout information.

Drilling Fluids Used
None

Disinfectant
Chlorine Pucks
Qty 65.0 ig

Pump Installed
N/A
Intake Setting (BTC)
45ft

Driller's Log

Well Log	From	End	Colour	Rock Type
91456200	**3ft**	**65ft**	**Grey**	**Shale**
91456200	**0ft**	**3ft**	**Brown**	**Till**

Overall Well Depth
65ft

Bedrock Level
0ft

Water Bearing Fracture Zone

Well Log	Depth	Rate
91456200	**55ft**	**5 igpm**

Setbacks

There is no Setback information.

New Nouveau Brunswick

Environment

Report Number **91764200**

Well Driller's Report

Date printed 2018/07/31

Drilled by

Well Use	Work Type	Drill Method	Work Completed
Drinking Water, Domestic	New Well (NEW WELL)	Rotary (ROTARY)	06/19/2000

Casing Information

Casing above ground 1ft 6in — Drive Shoe Used? Yes

Well Log	Casing Type	Diameter	From	End	Slotted?
91764200	**Steel**	**6 inch**	**0ft**	**30ft**	

Aquifer Test/Yield

Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	0ft	4 igpm	1hr 30min	6ft	1.5 igpm	No	0 igpm

(BTC - Below top of casing)

Well Grouting

There is no Grout information.

Drilling Fluids Used
None

Disinfectant
N/A

Qty 0 ig

Pump Installed
N/A

Intake Setting (BTC)
185ft

Driller's Log

Well Log	From	End	Colour	Rock Type
91764200	**0ft**	**6ft**	**Brown**	**Till**
91764200	**6ft**	**205ft**	**Grey**	**Shale**

Overall Well Depth
205ft

Bedrock Level
0ft

Water Bearing Fracture Zone

Well Log	Depth	Rate
91764200	**140ft**	**1 igpm**
91764200	**190ft**	**0.5 igpm**

Setbacks

There is no Setback information.

Appendix 2

Ground Water Chemistries

Report ID: 290006-IAS
Report Date: 02-Oct-18
Date Received: 20-Sep-18

CERTIFICATE OF ANALYSIS

for
Freelance Environmental Inc
5 Mannington Lane
Fredericton, NB E3A 5S6

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Naveed Majid
Project #: RRC-1809
Location: Riverside Resort

Analysis of Potable Water

RPC Sample ID:					290006-1
Client Sample ID:					TW-1: TEST WELL #1
Date Sampled:					20-Sep-18
Analytes	**Units**	**RL**	MAC	AO	
Alkalinity (as $CaCO_3$)	mg/L	2	-	-	93
Chloride	mg/L	0.5	-	250	260
Colour	TCU	5	-	15	< 5
Conductivity	µS/cm	1	-	-	1140
Fluoride	mg/L	0.05	1.5	-	0.12
Nitrate + Nitrite (as N)	mg/L	0.05	10	-	< 0.05
pH	units	-	-	-	7.9
Phosphorus	mg/L	0.02	-	-	< 0.02
r-Silica (as SiO_2)	mg/L	0.1	-	-	12.9
Sulfate	mg/L	1	-	500	25
Total Organic Carbon	mg/L	0.5	-	-	< 0.5
Turbidity	NTU	0.1	-	-	0.2
Calculated Parameters					
Hardness (as $CaCO_3$)	mg/L	0.2	-	-	446
TDS (calc)	mg/L	-	-	500	522
Saturation pH (5°C)	units	-	-	-	7.8
Langelier Index (5°C)	-	-	-	-	0.14

This report relates only to the sample(s) and information provided to the laboratory.

RL = Reporting Limit; MAC = Maximum Acceptable Concentration; AO = Aesthetic Objective

Guidelines are from Guidelines for Canadian Drinking Water Quality (February 2017).

Ross Kean
Department Head
Inorganic Analytical Chemistry

Peter Crowhurst
Analytical Chemist
Inorganic Analytical Chemistry

Report ID: 290006-IAS
Report Date: 02-Oct-18
Date Received: 20-Sep-18

CERTIFICATE OF ANALYSIS
for
Freelance Environmental Inc
5 Mannington Lane
Fredericton, NB E3A 5S6

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Naveed Majid
Project #: RRC-1809
Location: Riverside Resort

Analysis of Metals in Potable Water

RPC Sample ID:					290006-1
Client Sample ID:					TW-1: TEST WELL #1
Date Sampled:					20-Sep-18
Analytes	**Units**	**RL**	MAC	AO	
Aluminum	mg/L	0.001	-	-	0.001
Antimony	mg/L	0.0001	0.006	-	0.0124
Arsenic	mg/L	0.001	0.01	-	0.020
Barium	mg/L	0.001	1	-	0.169
Boron	mg/L	0.001	5	-	0.011
Cadmium	mg/L	0.00001	0.005	-	< 0.00001
Calcium	mg/L	0.05	-	-	96.5
Chromium	mg/L	0.001	0.05	-	< 0.001
Copper	mg/L	0.001	-	1	< 0.001
Iron	mg/L	0.02	-	0.3	< 0.02
Lead	mg/L	0.0001	0.01	-	< 0.0001
Lithium	mg/L	0.0001	-	-	0.0178
Magnesium	mg/L	0.01	-	-	49.8
Manganese	mg/L	0.001	-	0.05	0.016
Molybdenum	mg/L	0.0001	-	-	0.0014
Nickel	mg/L	0.001	-	-	0.002
Potassium	mg/L	0.02	-	-	1.44
Selenium	mg/L	0.001	0.05	-	< 0.001
Sodium	mg/L	0.05	-	200	19.1
Strontium	mg/L	0.001	-	-	2.09
Thallium	mg/L	0.0001	-	-	< 0.0001
Uranium	mg/L	0.0001	0.02	-	0.0008
Vanadium	mg/L	0.001	-	-	< 0.001
Zinc	mg/L	0.001	-	5	0.001

Report ID: 290006-IAS
Report Date: 02-Oct-18
Date Received: 20-Sep-18

CERTIFICATE OF ANALYSIS
for
Freelance Environmental Inc
5 Mannington Lane
Fredericton, NB E3A 5S6

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Methods

Analyte	RPC SOP #	Method Reference	Method Principle
pH	4.M03	APHA 4500-H^+ B	pH Electrode - Electrometric
Alkalinity (as $CaCO_3$)	4.M43	EPA 310.2	Methyl Orange Colourimetry
Chloride	4.M44	APHA 4500-CL E	Ferricyanide Colourimetry
Fluoride	4.M30	APHA 4500-F- D	SPADNS Colourimetry
Sulfate	4.M45	APHA 4500-SO_4 E	Turbidimetry
Nitrate + Nitrite (as N)	4.M48	APHA 4500-NO_3 H	Hydrazine Red., Derivitization, Colourimetry
r-Silica (as SiO_2)	4.M46	APHA 4500-SI F	Heteropoly Blue Colourimetry
Carbon - Total Organic	4.M38	APHA 5310 C	UV-Persulfate Digestion, NDIR Detection
Turbidity	4.M06	APHA 2130 B	Nephelometry
Colour	4.M55	APHA 2020 Color (A,C)	Single Wavelength Spectrophotometry
Conductivity	4.M04	APHA 2510 B	Conductivity Meter, Pt Electrode
Trace Metals	4.M01/4.M29	EPA 200.8/EPA 200.7	ICP-MS/ICP-ES

Report ID: 292673-IAS
Report Date: 25-Oct-18
Date Received: 12-Oct-18

CERTIFICATE OF ANALYSIS

for
Freelance Environmental Inc
5 Mannington Lane
Fredericton, NB E3A 5S6

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Naveed Majid
Project #: RRC-1809
Location: Riverside Resort

Analysis of Potable Water

RPC Sample ID:					292673-1
Client Sample ID:					TW-1: Test Well #1
Date Sampled:					12-Oct-18
Analytes	**Units**	**RL**	MAC	AO	
Alkalinity (as $CaCO_3$)	mg/L	2	-	-	100
Chloride	mg/L	0.5	-	250	272
Colour	TCU	5	-	15	< 5
Conductivity	µS/cm	1	-	-	1080
Fluoride	mg/L	0.05	1.5	-	0.16
Nitrate + Nitrite (as N)	mg/L	0.05	10	-	< 0.05
pH	units	-	-	-	8.0
Phosphorus	mg/L	0.02	-	-	< 0.02
r-Silica (as SiO_2)	mg/L	0.1	-	-	13.5
Sulfate	mg/L	1	-	500	28
Total Organic Carbon	mg/L	0.5	-	-	< 0.5
Turbidity	NTU	0.1	-	-	0.1
Calculated Parameters					
Hardness (as $CaCO_3$)	mg/L	0.2	-	-	424
TDS (calc)	mg/L	-	-	500	536
Saturation pH (5°C)	units	-	-	-	7.7
Langelier Index (5°C)	-	-	-	-	0.26

This report relates only to the sample(s) and information provided to the laboratory.

RL = Reporting Limit; MAC = Maximum Acceptable Concentration; AO = Aesthetic Objective

Guidelines are from Guidelines for Canadian Drinking Water Quality (February 2017).

Ross Kean
Department Head
Inorganic Analytical Chemistry

Peter Crowhurst
Analytical Chemist
Inorganic Analytical Chemistry

Report ID: 292673-IAS
Report Date: 25-Oct-18
Date Received: 12-Oct-18

CERTIFICATE OF ANALYSIS

for
Freelance Environmental Inc
5 Mannington Lane
Fredericton, NB E3A 5S6

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Naveed Majid
Project #: RRC-1809
Location: Riverside Resort

Analysis of Metals in Potable Water

RPC Sample ID:					292673-1
Client Sample ID:					TW-1: Test Well #1
Date Sampled:					12-Oct-18
Analytes	**Units**	**RL**	MAC	AO	
Aluminum	mg/L	0.001	-	-	0.002
Antimony	mg/L	0.0001	0.006	-	0.0029
Arsenic	mg/L	0.001	0.01	-	0.009
Barium	mg/L	0.001	1	-	0.158
Boron	mg/L	0.001	5	-	0.011
Cadmium	mg/L	0.00001	0.005	-	< 0.00001
Calcium	mg/L	0.05	-	-	92.4
Chromium	mg/L	0.001	0.05	-	< 0.001
Copper	mg/L	0.001	-	1	< 0.001
Iron	mg/L	0.02	-	0.3	< 0.02
Lead	mg/L	0.0001	0.01	-	< 0.0001
Lithium	mg/L	0.0001	-	-	0.0179
Magnesium	mg/L	0.01	-	-	46.9
Manganese	mg/L	0.001	-	0.05	0.014
Molybdenum	mg/L	0.0001	-	-	0.0010
Nickel	mg/L	0.001	-	-	< 0.001
Potassium	mg/L	0.02	-	-	1.21
Selenium	mg/L	0.001	0.05	-	< 0.001
Sodium	mg/L	0.05	-	200	20.9
Strontium	mg/L	0.001	-	-	1.88
Thallium	mg/L	0.0001	-	-	< 0.0001
Uranium	mg/L	0.0001	0.02	-	0.0006
Vanadium	mg/L	0.001	-	-	< 0.001
Zinc	mg/L	0.001	-	5	< 0.001

Report ID: 292673-IAS
Report Date: 25-Oct-18
Date Received: 12-Oct-18

CERTIFICATE OF ANALYSIS
for
Freelance Environmental Inc
5 Mannington Lane
Fredericton, NB E3A 5S6

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Methods

Analyte	RPC SOP #	Method Reference	Method Principle
pH	4.M03	APHA 4500-H^+ B	pH Electrode - Electrometric
Alkalinity (as $CaCO_3$)	4.M43	EPA 310.2	Methyl Orange Colourimetry
Chloride	4.M44	APHA 4500-CL E	Ferricyanide Colourimetry
Fluoride	4.M30	APHA 4500-F- D	SPADNS Colourimetry
Sulfate	4.M45	APHA 4500-SO_4 E	Turbidimetry
Nitrate + Nitrite (as N)	4.M48	APHA 4500-NO_3 H	Hydrazine Red., Derivitization, Colourimetry
r-Silica (as SiO_2)	4.M46	APHA 4500-SI F	Heteropoly Blue Colourimetry
Carbon - Total Organic	4.M38	APHA 5310 C	UV-Persulfate Digestion, NDIR Detection
Turbidity	4.M06	APHA 2130 B	Nephelometry
Colour	4.M55	APHA 2020 Color (A,C)	Single Wavelength Spectrophotometry
Conductivity	4.M04	APHA 2510 B	Conductivity Meter, Pt Electrode
Trace Metals	4.M01/4.M29	EPA 200.8/EPA 200.7	ICP-MS/ICP-ES

Report/Rapport: 292673-ML-W1
Date: 15-Oct-18
Date Received/Reçu: 12-Oct-18

CERTIFICATE OF ANALYSIS / CERTIFICAT D'ANALYSE

for/pour
Freelance Environmental Inc
5 Mannington Lane
Fredericton, NB E3A 5S6

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1368
Fax: 506.452.1395
www.rpc.ca

Attention: Naveed Majid / Shane Hashemi

Project/Job #: RRC-1809

Client Location: Riverside Resort

Microbiological Examination of Water/Qualité microbiologique de l'eau potable

RPC Sample ID/No. d'échantillon de RPC:				292673-1
Client Sample ID/ID d'échantillon du client:				TW-1: Test Well #1
Date collected/Date du prélèvement				12-Oct-18
Time sampled/Heure du prélèvement				9:15:00 AM
Analytes/Paramètre(s)	**Method/Méthode**	**Date Analyzed Date Analysé**	**Units Unités**	
Total Coliforms/Coliformes totaux	FFA10	12-Oct-18	MPN/100mL	1.0
E. coli	FFA10	12-Oct-18	MPN/100mL	0

This report relates only to the sample(s) and information provided to the laboratory.

Le présent rapport ne s'applique qu'aux échantillons et à l'information transmis au laboratoire.

Cathy Hay
Microbiology Supervisor
Food, Fisheries & Aquaculture

Gillian Travis
Microbiology Technician
Food, Fisheries & Aquaculture

Appendix 3

Field Results

SUBDIVISION/SITE CONDOMINIUM
WELL PUMP TEST DATA SHEET

PROJECT NAME: RIVERSIDE RESORT	
WELL NAME/NO. TN 18-02	DATE OF TEST: SEPT. 19/2018
STATIC WATER LEVEL 13.8 FT.	PUMPING RATE 9 GPM IMP.
WATER LEVEL MEASURED BY: ___ AIR GUAGE __ ELECTRIC METER OTHER: FLOW METER	
PUMP TEST CONDUCTED BY: SULLIVAN'S WELL DRILLING LTD.	
WATER SAMPLES COLLECTED: ___ PARTIAL CHEM. ___ COLIFORM OTHER:	

DRAWDOWN DATA

ELAPSED TIME (MIN.)	DEPTH TO WATER (FT.)*	DRAWDOWN (FT.)	REMARKS
0	13.8'		OBS. WELL 14'9 3/4"
1	17.67'		
2	19.95'		
3	21.7'		
4	23.36'		
5	24.8'		
6	26.0		
7	27.15'		
8	28.11'		
9	29.06'		
10	29.9'		OBS WELL 28'11"
15	33.44'		" " 32' 6"
20	35.55'		" " 34'8"
25	37.35'		" " 36'6"
30	38.72'		" " 37'11"
40	40.8'		" " 40'1"
50	42.8'		" " 41'7"
60	43.53'		" " 43.10"
90	46.2'		" " 45'6"
120	48.4'		" " 47'3"
180	50.64'		" " 49'11"
240	52.34'		" " 51'8"

ANGLE HOLE 9'8"

11'7"

20'9"

* - RECORD DEPTH TO WATER FROM GROUND SURFACE

RECOVERY DATA				
ELAPSED TIME (MIN.)	DEPTH TO WATER (FT.)*	DRAWDOWN (FT.)	REMARKS	
300	53.55'		OBS WELL 52'10"	ANGLE HOLE
360	54.55'		" " 53'10"	24'1"
420	55.23'		" " 54'7"	
480	55.95'		" " 55'3½"	
540	56.51'		" " 55'10"	
600	57.15'		" " 56'4½"	26'3"
660	57.45'		" " 56'9"	
720	57.80'		" " 57'2"	
780	58.15'		" " 57'8¾"	27'7"
840	58.41'		" " 57'9¼"	
900	58.67'		" " 58'¼"	
960	58.9'		" " 58'2¾"	
1020	59.08'		" " 58'6"	
1080	59.25'		" " 58'7½"	
1140	59.43'		" " 58'9½"	
1200	59.61'		" " 58'11½"	29'4"
1260	59.8'		" " 59'2"	
1320	60.0'		" " 59'4"	
1380	60.15'		" " 59'6"	
1440	60.35'		" " 59'8"	30'1"

* - RECORD DEPTH TO WATER FROM GROUND SURFACE

RECOVERY DATA				
ELAPSED TIME (MIN.)	DEPTH TO WATER (FT.)*	DRAWDOWN (FT.)	REMARKS	
0	60.35'		OBS WELL 59' 8"	ANGLE HOLE 30' 1"
1	55.3'		" " 58' 0"	
2	53.5'		" " 56' 8"	
3	52.2'		" " 54' 6"	
4	50.8'		" " 53' 4"	
5	49.5'		" " 51' 0"	
6	48.4'		" " 50' 0"	
7	47.3'		" " 49' 8"	
8	46.3'		" " 48' 6"	
9	45.4'		" " 47' 6"	
10	44.5"		" " 46' 6"	
15	41.2'		" " 42' 0"	
20	39.0'		" " 40' 0"	
25	37.3'		" " 39' 4"	
30	36.1'		" " 36' 11"	28' 9"

* - RECORD DEPTH TO WATER FROM GROUND SURFACE

Green's Welldrilling Company Ltd.
5281 Route 8, Astle N.B.
(506) 369-2603

Well ID: **0056672**

Location: 35 Mactaquac Rd
Fredericton NB E3E-1L2

Client: Riverside Resort &
Conference Center

Well Diameter 6"

Reference Point for measurement:
70mm above grade

Static Level: 4.27 M

Pump Test – **DRAWDOWN P-1**

Date: 2018-10-09 to 2018-10-12

Time	Elapsed Time (Min/hrs)	Water Depth		Pumping Rate	Notes Monitoring M1 & M2
9:00 AM	0	4.27M		10 gpm imp	M1 - 4.52m M2 – 2.38m
9:01	1	5.49			
9:02	2	5.99			
9:03	3	6.24			
9:04	4	6.68			
9:05	5	6.92			
9:06	6	7.14			
9:07	7	7.36			
9:08	8	7.67			
9:09	9	7.76			
9:10	10	7.93			
9:15	15	8.44			
9:20	20	8.87			
9:25	25	9.21			
9:30	30	9.38			
9:40	40	9.80			
9:50	50	10.09			
10:00	(1 hr) 60	10.36			
10:15	75	10.65			
10:30	90	10.88			
10:45	105	11.08			
11:00	(2 hrs) 120	11.27			
11:30	150	11.63			
12:00PM	(3 hrs) 180	11.87			
12:30	210	12.10			
1:00	(4 hrs) 240	12.30			
2:00	(5 hrs) 300	12.60			M1 – 12.22m M2 – 5.29m

Green's Welldrilling Company Ltd. 5281 Route 8, Astle N.B.
(506) 369-2603

Pump Test – **DRAWDOWN P-2**
Field Sheet

Time	Elapsed Time		Water Depth		Notes
3 pm	6 Hrs		12.82m		
4 pm	7 Hrs		12.99		
5 pm	8 Hrs		13.15		M1 – 13.80 M2 – 6.16
6 pm	9 Hrs		13.27		
7 pm	10 Hrs		13.39		Adjust Flow – 10 GPM IMP
8 pm	11 Hrs		17.07		
9 pm	12 Hrs		17.65		
10 pm	13 Hrs		18.05		
11 pm	14 Hrs		18.40		M1 – 17.96 M2 – 8.09
12:00	15 Hrs		18.61		
1 am	16 Hrs		18.80		
2 am	17 Hrs		18.93		
3 am	18 Hrs		19.05		
4 am	19 Hrs		19.15		
5 am	20 Hrs		19.23		
6 am	21 Hrs		19.27		
7 am	22 Hrs		19.34		
8 am	23 Hrs		19.44		
9 am	24 Hrs		19.52		
10 am	25 Hrs		19.59		M1 – 19.41
11 am	26 Hrs		19.65		
12:00	27 Hrs		19.66		
1 pm	28 Hrs		19.69		
2pm	29 Hrs		19.75		
3 pm	30 Hrs		19.80		
4 pm	31 Hrs		19.83		
5 pm	32 Hrs		19.86		
6 pm	33 Hrs		19.88		
7 pm	34 Hrs		19.91		
8 pm	35 Hrs		19.94		
9 pm	36 Hrs		19.95		
10 pm	37 Hrs		19.98		
11 pm	38 Hrs		20.04		
12:00	39 Hrs		20.06		
1 am	40 Hrs		20.02		
2 am	41 Hrs		20.04		
3 am	42 Hrs		20.04		
4 am	43 Hrs		20.04		

Green's Welldrilling Company Ltd. 5281 Route 8, Astle N.B.
(506) 369-2603

Pump Test – **DRAWDOWN P-3**
Field Sheet

Time	Elapsed Time		Water Depth		Notes	
5 am	44 Hrs		20.05			
6 am	45 Hrs		20.07			
7 am	46 Hrs		20.08			
8 am	47 Hrs		20.09			
9 am	48 Hrs		20.10			
10 am	49 Hrs		20.08		M1 – 19.84	M2 – 10.11
11 am	50 Hrs		20.01			
12:00	51 Hrs		19.98			
1 pm	52 Hrs		19.99			
2pm	53 Hrs		20.02		M1 – 19.70	M2 – 10.14
3 pm	54 Hrs		19.99			
4 pm	55 Hrs		20.01			
5 pm	56 Hrs		20.01			
6 pm	57 Hrs		19.99			
7 pm	58 Hrs		20.01			
8 pm	59 Hrs		19.99			
9 pm	60 Hrs		19.99			
10 pm	61 Hrs		19.99			
11 pm	62 Hrs		19.99			
12:00	63 Hrs		19.97			
1 am	64 Hrs		19.94			
2 am	65 Hrs		19.91			
3 am	66 Hrs		19.89			
4 am	67 Hrs		19.85			
5 am	68 Hrs		19.81			
6 am	69 Hrs		19.78			
7 am	70 Hrs		19.74			
8 am	71 Hrs		19.70		M1 – 19.40	M2 – 11.34
9 am	72 Hrs		19.65		M1 – 19.38	M2 – 11.20

Green's Welldrilling Company Ltd.
5281 Route 8, Astle N.B.
(506) 369-2603

Well ID: **056672**

Location: 35 Mactaquac Rd
Fredericton NB E3E-1L2

Client: Riverside Resort & Conference Center

Well Diameter 6"

Reference Point for measurement: 70mm above grade

Static Level:

Pump Test – **RECOVERY**

Date: 2018-10-12

Time	Elapsed Time (Min)	Water Depth	M1	M2	Notes
9:00 AM	0	19.65m	19.38m	11.20m	
9:01	1	18.22			
9:02	2	17.59			
9:03	3	17.23			
9:04	4	16.71			
9:05	5	16.16			
9:06	6	15.82			
9:07	7	15.34			
9:08	8	15.09			
9:09	9	14.77			
9:10	10	14.47			
9:15	15	13.55			
9:20	20	12.66			
9:25	25	11.95			
9:30	30	11.64			
9:40	40	11.04			
9:50	50	10.57			
10:00	(1 hr) 60	10.21	10.23	9.83	
10:15	75	9.78			
10:30	90	9.31			
10:45	105	9.10			
11:00	(2 hrs) 120	8.81			
11:30	150	8.38			
12:00PM	(3 hrs) 180	8.00	8.20	7.50	
12:30	210	7.67			
1:00	(4 hrs) 240	7.41			
2:00	5:00 hrs	7.14	7.24	6.45	
3:00	6:00 hrs	6.65			
3:40	6:40	6.42	6.65	5.82	

APPENDIX C

WELL DRILLER'S REPORTS - 500 METRE RADIUS

New Nouveau Brunswick

Environment

Report Number **1791**

Well Driller's Report

Date printed 2018/07/31

Drilled by

Well Use	Work Type	Drill Method	Work Completed
Drinking Water, Domestic	New Well	Rotary	07/17/2002

Casing Information

Casing above ground 2ft 6in — Drive Shoe Used? Yes

Well Log	Casing Type	Diameter	From	End	Slotted?
1791	**Steel**	**6 inch**	**0ft**	**20ft**	

Aquifer Test/Yield

Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	0ft (BTC - Below top of casing)	25 igpm	1hr 15min	15ft	20 igpm	No	0 igpm

Well Grouting

There is no Grout information.

Drilling Fluids Used
None

Disinfectant
N/A

Qty 0 ig

Pump Installed
N/A

Intake Setting (BTC)
0ft

Driller's Log

Well Log	From	End	Colour	Rock Type
1791	**0ft**	**5ft**	**Brown**	**Overburden**
1791	**5ft**	**345ft**	**Grey**	**Shale**

Overall Well Depth
345ft

Bedrock Level
0ft

Water Bearing Fracture Zone

Well Log	Depth	Rate
1791	**40ft**	**2 igpm**
1791	**320ft**	**23 igpm**

Setbacks

Well Log	Distance	Setback From
1791	**120ft**	**Right of any Public Way Road**

New Nouveau Brunswick

Environment

Report Number **1792**

Well Driller's Report

Date printed 2018/07/31

Drilled by

Well Use	Work Type	Drill Method	Work Completed
Drinking Water, Domestic	New Well	Rotary	07/18/2002

Casing Information

Casing above ground 2ft 6in — Drive Shoe Used? Yes

Well Log	Casing Type	Diameter	From	End	Slotted?
1792	**Steel**	**6 inch**	**0ft**	**20ft**	

Aquifer Test/Yield

Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	0ft (BTC - Below top of casing)	12 igpm	1hr 15min	0ft	8 igpm	No	0 igpm

Well Grouting

There is no Grout information.

Drilling Fluids Used
None

Disinfectant
N/A

Qty 0 ig

Pump Installed
N/A

Intake Setting (BTC)
0ft

Driller's Log

Well Log	From	End	Colour	Rock Type
1792	**0ft**	**5ft**	**Brown**	**Overburden**
1792	**5ft**	**385ft**	**Grey**	**Shale**

Overall Well Depth
385ft

Bedrock Level
0ft

Water Bearing Fracture Zone

Well Log	Depth	Rate
1792	**160ft**	**2 igpm**
1792	**300ft**	**10 igpm**

Setbacks

Well Log	Distance	Setback From
1792	**120ft**	**Right of any Public Way Road**

New Nouveau Brunswick

Environment

Report Number **7795**

Well Driller's Report

Date printed 2018/07/31

Drilled by

Well Use	Work Type	Drill Method	Work Completed
Drinking Water, Domestic	New Well	Cable Tool	08/19/2003

Casing Information

Casing above ground 1ft 3in — Drive Shoe Used? Yes

Well Log	Casing Type	Diameter	From	End	Slotted?
7795	**Steel**	**6 inch**	**0ft**	**31ft**	

Aquifer Test/Yield

Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	0ft	8 igpm	1hr	15ft	8 igpm	No	0 igpm

(BTC - Below top of casing)

Well Grouting

There is no Grout information.

Drilling Fluids Used
None

Disinfectant
Bleach (Javex)
Qty 0 ig

Pump Installed
Submersible
Intake Setting (BTC)
110ft

Driller's Log

Well Log	From	End	Colour	Rock Type
7795	**0ft**	**4ft**	**Brown**	**Gravel**
7795	**4ft**	**21ft**	**Brown**	**Clay**
7795	**21ft**	**62ft**	**Grey**	**Granite**
7795	**62ft**	**67ft**	**Grey**	**Slate**
7795	**67ft**	**82ft**	**Grey**	**Granite**
7795	**82ft**	**84ft**	**Grey**	**Slate**
7795	**84ft**	**120ft**	**Grey**	**Granite**

Overall Well Depth
120ft

Bedrock Level
0ft

Water Bearing Fracture Zone

Well Log	Depth	Rate
7795	**83ft**	**8 igpm**

Setbacks

Well Log	Distance	Setback From
7795	**66ft**	**Septic Tank**
7795	**77ft**	**Leach Field**
7795	**271ft**	**Right of any Public Way Road**

New Nouveau Brunswick

Environment

Report Number **10819**

Well Driller's Report

Date printed 2018/07/31

Drilled by

Well Use	Work Type	Drill Method	Work Completed
Drinking Water, Domestic	New Well	Rotary	09/30/2004

Casing Information

Casing above ground 2ft — Drive Shoe Used? Yes

Well Log	Casing Type	Diameter	From	End	Slotted?
10819	**Steel**	**6 inch**	**0ft**	**20ft**	

Aquifer Test/Yield

Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	20ft (BTC - Below top of casing)	7 igpm	1hr 20min	20ft	7 igpm	No	0 igpm

Well Grouting

There is no Grout information.

Drilling Fluids Used
None

Disinfectant
Bleach (Javex)
Qty 0 ig

Pump Installed
N/A
Intake Setting (BTC)
220ft

Driller's Log

Well Log	From	End	Colour	Rock Type
10819	**0ft**	**3ft**	**Brown**	**Till**
10819	**3ft**	**270ft**	**Grey**	**Slate**

Overall Well Depth
270ft

Bedrock Level
0ft

Water Bearing Fracture Zone

Well Log	Depth	Rate
10819	**260ft**	**1 igpm**
10819	**45ft**	**1 igpm**
10819	**160ft**	**3 igpm**
10819	**220ft**	**2 igpm**

Setbacks

Well Log	Distance	Setback From
10819	**55ft**	**Septic Tank**
10819	**75ft**	**Leach Field**

New Nouveau Brunswick

Environment

Report Number **38072**

Well Driller's Report

Date printed 2018/07/31

Drilled by

Well Use	Work Type	Drill Method	Work Completed
Drinking Water, Domestic	New Well	Rotary	10/11/2016

Casing Information

Casing above ground 1ft 6in — Drive Shoe Used? Yes

Well Log	Casing Type	Diameter	From	End	Slotted?
38072	**Steel**	**6 inch**	**0ft**	**18ft**	

Aquifer Test/Yield

Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	10ft (BTC - Below top of casing)	4 igpm	1hr 30min	100ft	2 igpm	No	0 igpm

Well Grouting

There is no Grout information.

Drilling Fluids Used
None

Disinfectant
Bleach (Javex)
Qty 0 ig

Pump Installed
Submersible
Intake Setting (BTC)
180ft

Driller's Log

Well Log	From	End	Colour	Rock Type
38072	**0ft**	**6ft**	**Brown**	**Till**
38072	**6ft**	**200ft**	**Grey**	**Shale**

Overall Well Depth
200ft

Bedrock Level
0ft

Water Bearing Fracture Zone

Well Log	Depth	Rate
38072	**100ft**	**2 igpm**

Setbacks

Well Log	Distance	Setback From
38072	**75ft**	**Septic Tank**
38072	**90ft**	**Leach Field**
38072	**150ft**	**Right of any Public Way Road**

New Nouveau Brunswick

Environment

Report Number **38724**

Well Driller's Report

Date printed 2018/07/31

Drilled by

Well Use	Work Type	Drill Method	Work Completed
Drinking Water, Domestic	New Well	Rotary	06/17/2016

Casing Information

Casing above ground 2ft — Drive Shoe Used? Yes

Well Log	Casing Type	Diameter	From	End	Slotted?
38724	**Steel**	**6 inch**	**0ft**	**18ft**	

Aquifer Test/Yield

Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	20ft (BTC - Below top of casing)	4 igpm	1hr 30min	20ft	30 igpm	No	0 igpm

Well Grouting

There is no Grout information.

Drilling Fluids Used
None

Disinfectant
Chlorine pellets
Qty 0 ig

Pump Installed
Submersible
Intake Setting (BTC)
180ft

Driller's Log

Well Log	From	End	Colour	Rock Type
38724	**0ft**	**6ft**	**Brown**	**Till**
38724	**6ft**	**200ft**	**Grey**	**Shale**

Overall Well Depth
200ft

Bedrock Level
6ft

Water Bearing Fracture Zone

Well Log	Depth	Rate
38724	**35ft**	**1 igpm**
38724	**190ft**	**29 igpm**

Setbacks

Well Log	Distance	Setback From
38724	**300ft**	**Right of any Public Way Road**
38724	**75ft**	**Septic Tank**
38724	**80ft**	**Leach Field**

New Nouveau Brunswick

Environment

Report Number **90649900**

Well Driller's Report

Date printed 2018/07/31

Drilled by

Well Use	Work Type	Drill Method	Work Completed
Drinking Water, Domestic	New Well (NEW WELL)	Rotary (ROTARY)	05/22/1998

Casing Information

Casing above ground 2ft — Drive Shoe Used? Yes

Well Log	Casing Type	Diameter	From	End	Slotted?
90649900	**Steel**	**6 inch**	**0ft**	**26ft**	

Aquifer Test/Yield

Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	0ft	1 igpm	0hr	0ft	1 igpm	No	0 igpm

(BTC - Below top of casing)

Well Grouting

There is no Grout information.

Drilling Fluids Used
None

Disinfectant
Chlorine Pucks

Qty 0 ig

Pump Installed
N/A

Intake Setting (BTC)
300ft

Driller's Log

Well Log	From	End	Colour	Rock Type
90649900	**0ft**	**18ft**	**Yellow**	**Clay**
90649900	**18ft**	**22ft**	**Grey**	**Wackie**
90649900	**22ft**	**405ft**	**Grey**	**Wackie**

Overall Well Depth
405ft

Bedrock Level
18ft

Water Bearing Fracture Zone

Well Log	Depth	Rate
90649900	**380ft**	**1 igpm**

Setbacks

There is no Setback information.

New Nouveau Brunswick

Environment

Report Number **91403600**

Well Driller's Report

Date printed 2018/07/31

Drilled by

Well Use	Work Type	Drill Method	Work Completed
Drinking Water, Domestic	New Well (NEW WELL)	Rotary (ROTARY)	05/26/1999

Casing Information

Casing above ground 1ft 6in Drive Shoe Used? Yes

Well Log	Casing Type	Diameter	From	End	Slotted?
91403600	**Steel**	**6 inch**	**0ft**	**20ft**	

Aquifer Test/Yield

Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	0ft	7 igpm	1hr	14ft	7 igpm	No	0 igpm

(BTC - Below top of casing)

Well Grouting

There is no Grout information.

Drilling Fluids Used
Water

Disinfectant
Bleach (Javex)
Qty 1.0 ig

Pump Installed
N/A
Intake Setting (BTC)
110ft

Driller's Log

Well Log	From	End	Colour	Rock Type
91403600	**28ft**	**56ft**	**Grey**	**Granite**
91403600	**0ft**	**6ft**	**Brown**	**Clay**
91403600	**6ft**	**28ft**	**Grey**	**Slate**
91403600	**56ft**	**110ft**	**Grey**	**Slate**
91403600	**110ft**	**112ft**	**Brown**	**Slate**
91403600	**112ft**	**120ft**	**Grey**	**Granite**

Overall Well Depth
120ft

Bedrock Level
6ft

Water Bearing Fracture Zone

Well Log	Depth	Rate
91403600	**60ft**	**1 igpm**
91403600	**110ft**	**6 igpm**

Setbacks

There is no Setback information.

New Nouveau Brunswick

Environment

Report Number **91456200**

Well Driller's Report

Date printed 2018/07/31

Drilled by

Well Use	Work Type	Drill Method	Work Completed
Drinking Water, Domestic	New Well (NEW WELL)	Rotary (ROTARY)	05/21/1999

Casing Information

Casing above ground 2ft — Drive Shoe Used? Yes

Well Log	Casing Type	Diameter	From	End	Slotted?
91456200	**Steel**	**6 inch**	**0ft**	**18ft**	

Aquifer Test/Yield

Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	0ft	0 igpm	0hr	0ft	5 igpm	No	0 igpm

(BTC - Below top of casing)

Well Grouting

There is no Grout information.

Drilling Fluids Used
None

Disinfectant
Chlorine Pucks
Qty 65.0 ig

Pump Installed
N/A
Intake Setting (BTC)
45ft

Driller's Log

Well Log	From	End	Colour	Rock Type
91456200	**3ft**	**65ft**	**Grey**	**Shale**
91456200	**0ft**	**3ft**	**Brown**	**Till**

Overall Well Depth
65ft

Bedrock Level
0ft

Water Bearing Fracture Zone

Well Log	Depth	Rate
91456200	**55ft**	**5 igpm**

Setbacks

There is no Setback information.

New Nouveau Brunswick

Environment

Report Number **91764200**

Well Driller's Report

Date printed 2018/07/31

Drilled by

Well Use	Work Type	Drill Method	Work Completed
Drinking Water, Domestic	New Well (NEW WELL)	Rotary (ROTARY)	06/19/2000

Casing Information

Casing above ground 1ft 6in — Drive Shoe Used? Yes

Well Log	Casing Type	Diameter	From	End	Slotted?
91764200	**Steel**	**6 inch**	**0ft**	**30ft**	

Aquifer Test/Yield

Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	0ft	4 igpm	1hr 30min	6ft	1.5 igpm	No	0 igpm

(BTC - Below top of casing)

Well Grouting

There is no Grout information.

Drilling Fluids Used
None

Disinfectant
N/A

Qty 0 ig

Pump Installed
N/A

Intake Setting (BTC)
185ft

Driller's Log

Well Log	From	End	Colour	Rock Type
91764200	**0ft**	**6ft**	**Brown**	**Till**
91764200	**6ft**	**205ft**	**Grey**	**Shale**

Overall Well Depth
205ft

Bedrock Level
0ft

Water Bearing Fracture Zone

Well Log	Depth	Rate
91764200	**140ft**	**1 igpm**
91764200	**190ft**	**0.5 igpm**

Setbacks

There is no Setback information.

APPENDIX D

PUMP TEST LOGS

24-HOUR: Sullivan's Well Drilling
72-HOUR: Green's Well Drilling

SUBDIVISION/SITE CONDOMINIUM
WELL PUMP TEST DATA SHEET

PROJECT NAME: RIVERSIDE RESORT	
WELL NAME/NO. TN 18-02	DATE OF TEST: SEPT. 19/2018
STATIC WATER LEVEL 13.8 FT.	PUMPING RATE 9 GPM IMP.
WATER LEVEL MEASURED BY: ___ AIR GUAGE __ ELECTRIC METER OTHER: FLOW METER	
PUMP TEST CONDUCTED BY: SULLIVAN'S WELL DRILLING LTD.	
WATER SAMPLES COLLECTED: ___ PARTIAL CHEM. ___ COLIFORM OTHER:	

DRAWDOWN DATA

ELAPSED TIME (MIN.)	DEPTH TO WATER (FT.)*	DRAWDOWN (FT.)	REMARKS
0	13.8'		OBS. WELL 14'9 3/4"
1	17.67'		
2	19.95'		
3	21.7'		
4	23.36'		
5	24.8'		
6	26.0		
7	27.15'		
8	28.11'		
9	29.06'		
10	29.9'		OBS WELL 28'11"
15	33.44'		" " 32' 6"
20	35.55'		" " 34'8"
25	37.35'		" " 36'6"
30	38.72'		" " 37'11"
40	40.8'		" " 40'1"
50	42.8'		" " 41'7"
60	43.53'		" " 43.10"
90	46.2'		" " 45'6"
120	48.4'		" " 47'3"
180	50.64'		" " 49'11"
240	52.34'		" " 51'8"

ANGLE HOLE 9'8"

11'7"

20'9"

* - RECORD DEPTH TO WATER FROM GROUND SURFACE

RECOVERY DATA				
ELAPSED TIME (MIN.)	DEPTH TO WATER (FT.)*	DRAWDOWN (FT.)	REMARKS	
300	53.55'		OBS WELL 52'10"	ANGLE HOLE
360	54.55'		" " 53'10"	24'1"
420	55.23'		" " 54'7"	
480	55.95'		" " 55'3½"	
540	56.51'		" " 55'10"	
600	57.15'		" " 56'4½"	26'3"
660	57.45'		" " 56'9"	
720	57.80'		" " 57'2"	
780	58.15'		" " 57'8¾"	27'7"
840	58.41'		" " 57'9¼"	
900	58.67'		" " 58'¼"	
960	58.9'		" " 58'2¾"	
1020	59.08'		" " 58'6"	
1080	59.25'		" " 58'7½"	
1140	59.43'		" " 58'9½"	
1200	59.61'		" " 58'11½"	29'4"
1260	59.8'		" " 59'2"	
1320	60.0'		" " 59'4"	
1380	60.15'		" " 59'6"	
1440	60.35'		" " 59'8"	30'1"

* - RECORD DEPTH TO WATER FROM GROUND SURFACE

RECOVERY DATA				
ELAPSED TIME (MIN.)	DEPTH TO WATER (FT.)*	DRAWDOWN (FT.)	REMARKS	
0	60.35'		OBS WELL 59' 8"	ANGLE HOLE 30' 1"
1	55.3'		" " 58' 0"	
2	53.5'		" " 56' 8"	
3	52.2'		" " 54' 6"	
4	50.8'		" " 53' 4"	
5	49.5'		" " 51' 0"	
6	48.4'		" " 50' 0"	
7	47.3'		" " 49' 8"	
8	46.3'		" " 48' 6"	
9	45.4'		" " 47' 6"	
10	44.5"		" " 46' 6"	
15	41.2'		" " 42' 0"	
20	39.0'		" " 40' 0"	
25	37.3'		" " 39' 4"	
30	36.1'		" " 36' 11"	28' 9"

* - RECORD DEPTH TO WATER FROM GROUND SURFACE

Green's Welldrilling Company Ltd.
5281 Route 8, Astle N.B.
(506) 369-2603

Well ID: **0056672**

Location: 35 Mactaquac Rd
Fredericton NB E3E-1L2

Client: Riverside Resort &
Conference Center

Well Diameter 6"

Reference Point for measurement:
70mm above grade

Static Level: 4.27 M

Pump Test – **DRAWDOWN P-1**

Date: 2018-10-09 to 2018-10-12

Time	Elapsed Time (Min/hrs)	Water Depth		Pumping Rate	Notes Monitoring M1 & M2
9:00 AM	0	4.27M		10 gpm imp	M1 - 4.52m M2 – 2.38m
9:01	1	5.49			
9:02	2	5.99			
9:03	3	6.24			
9:04	4	6.68			
9:05	5	6.92			
9:06	6	7.14			
9:07	7	7.36			
9:08	8	7.67			
9:09	9	7.76			
9:10	10	7.93			
9:15	15	8.44			
9:20	20	8.87			
9:25	25	9.21			
9:30	30	9.38			
9:40	40	9.80			
9:50	50	10.09			
10:00	(1 hr) 60	10.36			
10:15	75	10.65			
10:30	90	10.88			
10:45	105	11.08			
11:00	(2 hrs) 120	11.27			
11:30	150	11.63			
12:00PM	(3 hrs) 180	11.87			
12:30	210	12.10			
1:00	(4 hrs) 240	12.30			
2:00	(5 hrs) 300	12.60			M1 – 12.22m M2 – 5.29m

Green's Welldrilling Company Ltd. 5281 Route 8, Astle N.B.
(506) 369-2603

Pump Test – **DRAWDOWN P-2**
Field Sheet

Time	Elapsed Time		Water Depth		Notes
3 pm	6 Hrs		12.82m		
4 pm	7 Hrs		12.99		
5 pm	8 Hrs		13.15		M1 – 13.80 M2 – 6.16
6 pm	9 Hrs		13.27		
7 pm	10 Hrs		13.39		Adjust Flow – 10 GPM IMP
8 pm	11 Hrs		17.07		
9 pm	12 Hrs		17.65		
10 pm	13 Hrs		18.05		
11 pm	14 Hrs		18.40		M1 – 17.96 M2 – 8.09
12:00	15 Hrs		18.61		
1 am	16 Hrs		18.80		
2 am	17 Hrs		18.93		
3 am	18 Hrs		19.05		
4 am	19 Hrs		19.15		
5 am	20 Hrs		19.23		
6 am	21 Hrs		19.27		
7 am	22 Hrs		19.34		
8 am	23 Hrs		19.44		
9 am	24 Hrs		19.52		
10 am	25 Hrs		19.59		M1 – 19.41
11 am	26 Hrs		19.65		
12:00	27 Hrs		19.66		
1 pm	28 Hrs		19.69		
2pm	29 Hrs		19.75		
3 pm	30 Hrs		19.80		
4 pm	31 Hrs		19.83		
5 pm	32 Hrs		19.86		
6 pm	33 Hrs		19.88		
7 pm	34 Hrs		19.91		
8 pm	35 Hrs		19.94		
9 pm	36 Hrs		19.95		
10 pm	37 Hrs		19.98		
11 pm	38 Hrs		20.04		
12:00	39 Hrs		20.06		
1 am	40 Hrs		20.02		
2 am	41 Hrs		20.04		
3 am	42 Hrs		20.04		
4 am	43 Hrs		20.04		

Green's Welldrilling Company Ltd. 5281 Route 8, Astle N.B.
(506) 369-2603

Pump Test – **DRAWDOWN P-3**
Field Sheet

Time	Elapsed Time		Water Depth		Notes	
5 am	44 Hrs		20.05			
6 am	45 Hrs		20.07			
7 am	46 Hrs		20.08			
8 am	47 Hrs		20.09			
9 am	48 Hrs		20.10			
10 am	49 Hrs		20.08		M1 – 19.84	M2 – 10.11
11 am	50 Hrs		20.01			
12:00	51 Hrs		19.98			
1 pm	52 Hrs		19.99			
2pm	53 Hrs		20.02		M1 – 19.70	M2 – 10.14
3 pm	54 Hrs		19.99			
4 pm	55 Hrs		20.01			
5 pm	56 Hrs		20.01			
6 pm	57 Hrs		19.99			
7 pm	58 Hrs		20.01			
8 pm	59 Hrs		19.99			
9 pm	60 Hrs		19.99			
10 pm	61 Hrs		19.99			
11 pm	62 Hrs		19.99			
12:00	63 Hrs		19.97			
1 am	64 Hrs		19.94			
2 am	65 Hrs		19.91			
3 am	66 Hrs		19.89			
4 am	67 Hrs		19.85			
5 am	68 Hrs		19.81			
6 am	69 Hrs		19.78			
7 am	70 Hrs		19.74			
8 am	71 Hrs		19.70		M1 – 19.40	M2 – 11.34
9 am	72 Hrs		19.65		M1 – 19.38	M2 – 11.20

Green's Welldrilling Company Ltd.
5281 Route 8, Astle N.B.
(506) 369-2603

Well ID: **056672**

Location: 35 Mactaquac Rd
Fredericton NB E3E-1L2

Client: Riverside Resort & Conference Center

Well Diameter 6"

Reference Point for measurement: 70mm above grade

Static Level:

Pump Test – **RECOVERY**

Date: 2018-10-12

Time	Elapsed Time (Min)	Water Depth	M1	M2	Notes
9:00 AM	0	19.65m	19.38m	11.20m	
9:01	1	18.22			
9:02	2	17.59			
9:03	3	17.23			
9:04	4	16.71			
9:05	5	16.16			
9:06	6	15.82			
9:07	7	15.34			
9:08	8	15.09			
9:09	9	14.77			
9:10	10	14.47			
9:15	15	13.55			
9:20	20	12.66			
9:25	25	11.95			
9:30	30	11.64			
9:40	40	11.04			
9:50	50	10.57			
10:00	(1 hr) 60	10.21	10.23	9.83	
10:15	75	9.78			
10:30	90	9.31			
10:45	105	9.10			
11:00	(2 hrs) 120	8.81			
11:30	150	8.38			
12:00PM	(3 hrs) 180	8.00	8.20	7.50	
12:30	210	7.67			
1:00	(4 hrs) 240	7.41			
2:00	5:00 hrs	7.14	7.24	6.45	
3:00	6:00 hrs	6.65			
3:40	6:40	6.42	6.65	5.82	

APPENDIX E

WELL DRILLER'S LOGS

New Brunswick / Nouveau Brunswick

ENVIRONMENT & LOCAL GOVERNMENT

WATER WELL DRILLER'S REPORT

00041845

OFFICE USE ONLY	HEALTH CODE	LAB NO.	SAMPLE RECEIVED DATE
FIELD NO.	HEALTH OFFICE	EVENT NO.	YR MO DAY

SAMPLE RECEIVED BY:

TESTING VOUCHER INFORMATION — MANDATORY FOR WATER TEST

SEE BACK FOR DETAILS **PLEASE PRINT**

INFORMATION INCLUDED HEREIN SHOULD BE THE WELL OWNER AT TIME OF SAMPLING

FIRST NAME LAST NAME

ADDRESS (MAIL RESULTS TO:)

CITY/TOWN/VILLAGE PROV. POSTAL CODE

DAYTIME PHONE FAX NO.

TEL. NO. SAMPLE COLLECTED YR MO DAY HR MIN AM PM

DO YOU NEED A SAMPLE FOR YOUR MORTGAGE?

IF YOU WISH THE RESULTS TO BE RELEASED TO A MORTGAGE INSTITUTION PLEASE INCLUDE THE FOLLOWING CONTACT INFORMATION: SEE BACK FOR DETAILS

ATTENTION OF:

TEL NO. FAX NO.

SIGNATURE OF WELL OWNER

WAS THE COST OF THIS WELL FINANCED BY NB HOUSING?

YES ☐ NO ☐

WELL / WATER USE:

INDUSTRIAL	☐	ABANDONED	☐	DOMESTIC	☐
EXPLORATORY	☑	MUNICIPAL	☐	MONITORING	☐
HEAT PUMP	☐	OBSERVATION	☐	OTHER	☐

TYPE OF WORK COMPLETED: NEW WELL ☑ DEEPENED ☐

OTHER:

METHOD:

CABLE TOOL ☐ ROTARY ☑ OTHER

CASING INSTALLED:

LENGTH OF CASING ABOVE GROUND: 1 FT. — IN.

STEEL: 6 IN DIAM. FROM 0 FT. TO 29 FT.

PVC: IN DIAM. FROM FT. TO FT.

SLOTTED IN DIAM. FROM FT. TO FT.

SCREENS: TYPE: SLOT SIZE

IN DIAM. FROM FT. TO FT.

DRIVE SHOE: ☑ YES ☐ NO

SETBACKS: SEE BACK FOR DETAILS

SEPTIC TANK (1) 250 FT.

SEPTIC TANK (2) FT. FIELD (2) FT. FIELD (1) 260 FT.

*RIGHT OF WAY OF ANY PUBLIC ROAD ☐ (1) ROAD (2)

CENTER OF ROAD ☐ (1) 210' (2)

SETBACKS MEASURED (NEW CONSTRUCTION)

APPROXIMATE SETBACKS AS INDICATED BY HOMEOWNER (EXISTING CONST.)

FLOWING WELL? YES ☐ NO ☑ IF YES - RATE: igpm (approx.)

AQUIFER TEST: METHOD: AIR ☑ BAILER ☐ PUMP ☐

INITIAL WATER LEVEL: 13 FT BELOW TOP OF CASING

PUMPING RATE 1/2 igpm DURATION: 1 hrs. min.

FINAL WATER LEVEL: 350 FT. BELOW TOP OF CASING

ESTIMATED SAFE YIELD: 1/2 igpm

WELL GROUTED? YES ☐ NO ☑

FROM FT. TO FT. GROUT TYPE:

DRILLING FLUIDS USED: YES ☐ NO ☑

TYPE:

P.I.D. NO.	WELL I.D. NO.
7527915	56671

WELL OWNER INFORMATION

INFORMATION INCLUDED HEREIN SHOULD BE THE WELL OWNER AT TIME OF DRILLING

FIRST NAME LAST NAME

RIVERSIDE RESORT

ADDRESS

35 MACTAQUAC RD.

CITY/TOWN/VILLAGE PROVINCE POSTAL CODE

FRENCH VILLAGE NB E3E 1L2

WELL LOCATION: SAME AS ABOVE . . . . . OR

CIVIC NUMBER STREET NAME

SAME

CITY/TOWN/VILLAGE

WELL PAID FOR BY PROVINCIAL DEPT. OF

WELL ON RESERVE? YES ☐ NO ☑

WELL ALREADY TAGGED? YES ☐ NO ☑

OLD WELL I.D.

DRILLER'S LOG *

FROM (FT.)	TO (FT.)	COLOUR	ROCK TYPE
Ground Level	24	BROWN	OVERBURDEN
24	350	GREY	WACKE

IF INSUFFICIENT SPACE PLEASE USE ADDITIONAL SHEETS

TOTAL WELL DEPTH: 350 FT. DEPTH TO BEDROCK: 24 FT.

WATER BEARING 1 1/4 igpm AT 164 FT. 2 1/4 igpm AT 350 FT.

FRACTURE ZONES: 3 igpm AT FT. 4 igpm AT FT.

PUMP INSTALLATION: INSTALLED ☐ NOT INSTALLED ☑

PUMP INTAKE SETTING: FT. BELOW TOP OF CASING (Recommended)

PUMP TYPE: SUBMERSIBLE ☐ JET ☐ TURBINE ☐

OTHER

WELL DISINFECTED? YES ☐ NO ☑

TYPE

DRILLER'S COMMENTS Angle Well

DRILLING COMPANY: SULLIVAN'S WELL DRILLING

COMPLETION DATE: 18 09 10 (YR. MO. DAY) LICENSE NO. 77

G.P.S. (OPTIONAL)

I CERTIFY THAT THE WELL HEREIN DESCRIBED HAS BEEN CONSTRUCTED IN ACCORDANCE WITH THE WATER WELL REGULATION UNDER THE NEW BRUNSWICK CLEAN WATER ACT.

Signature of Driller

Signature of Helper

WHITE - NBELG
BLUE - Homeowner / Voucher
YELLOW - Homeowner
PINK - Drilling Company

KEEP THIS REPORT WITH YOUR IMPORTANT DOCUMENTS

New Nouveau Brunswick

ENVIRONMENT & LOCAL GOVERNMENT

WATER WELL DRILLER'S REPORT

00041846

OFFICE USE ONLY	HEALTH CODE	LAB NO.	SAMPLE RECEIVED DATE	SAMPLE RECEIVED BY:
FIELD NO.	HEALTH OFFICE	EVENT NO.	YR MO DAY	

TESTING VOUCHER INFORMATION — MANDATORY FOR WATER TEST

SEE BACK FOR DETAILS **PLEASE PRINT**

INFORMATION INCLUDED HEREIN SHOULD BE THE WELL OWNER AT TIME OF SAMPLING

FIRST NAME LAST NAME

ADDRESS (MAIL RESULTS TO:)

CITY/TOWN/VILLAGE PROV. POSTAL CODE

DAYTIME PHONE FAX NO.

TEL. NO. SAMPLE COLLECTED YR MO DAY HR MIN AM PM

DO YOU NEED A SAMPLE FOR YOUR MORTGAGE?

IF YOU WISH THE RESULTS TO BE RELEASED TO A MORTGAGE INSTITUTION PLEASE INCLUDE THE FOLLOWING CONTACT INFORMATION: SEE BACK FOR DETAILS

ATTENTION OF:

TEL NO. FAX NO.

SIGNATURE OF WELL OWNER

WAS THE COST OF THIS WELL FINANCED BY NB HOUSING?

YES ☐ NO ☑

WELL / WATER USE:

INDUSTRIAL	☐	ABANDONED	☐	DOMESTIC	☑
EXPLORATORY	☐	MUNICIPAL	☐	MONITORING	☐
HEAT PUMP	☐	OBSERVATION	☐	OTHER	☐

TYPE OF WORK COMPLETED: NEW WELL ☑ DEEPENED ☐

OTHER: _____

METHOD:

CABLE TOOL ☐ ROTARY ☑ OTHER _____

CASING INSTALLED:

LENGTH OF CASING ABOVE GROUND: 1 FT. 6 IN.

STEEL: 6 IN DIAM. FROM 0 FT. TO 40 FT.

PVC: _____ IN DIAM. FROM _____ FT. TO _____ FT.

SLOTTED _____ IN DIAM. FROM _____ FT. TO _____ FT.

SCREENS: TYPE: _____ SLOT SIZE _____

_____ IN DIAM. FROM _____ FT. TO _____ FT.

DRIVE SHOE: YES ☑ NO ☐

SETBACKS: SEE BACK FOR DETAILS

SEPTIC TANK (1) 270 FT.

SEPTIC TANK (2) _____ FT. FIELD (2) _____ FT. FIELD (1) 280 FT.

*RIGHT OF WAY OF ANY PUBLIC ROAD ☐ (1) _____ ROAD (2) _____

CENTER OF ROAD ☐ (1) 200' (2) _____

SETBACKS MEASURED _____ (NEW CONSTRUCTION)

APPROXIMATE SETBACKS AS INDICATED BY HOMEOWNER ✓ (EXISTING CONST.)

FLOWING WELL? YES ☐ NO ☑ IF YES - RATE: _____ igpm (approx.)

AQUIFER TEST: METHOD: AIR ☑ BAILER ☐ PUMP ☐

INITIAL WATER LEVEL: 13 FT BELOW TOP OF CASING

PUMPING RATE 9 igpm DURATION: 24 hrs. _____ min.

FINAL WATER LEVEL: 60 FT. BELOW TOP OF CASING

ESTIMATED SAFE YIELD: 18 igpm

WELL GROUTED? YES ☐ NO ☑

FROM _____ FT. TO _____ FT. GROUT TYPE: _____

DRILLING FLUIDS USED: YES ☐ NO ☑

TYPE: _____

P.I.D. NO.	WELL I.D. NO.
75279 15	56672

WELL OWNER INFORMATION

INFORMATION INCLUDED HEREIN SHOULD BE THE WELL OWNER AT TIME OF DRILLING

FIRST NAME LAST NAME: RIVER SIDE RESORT

ADDRESS: 35 MACTAQUAC RD

CITY/TOWN/VILLAGE: FRENCH VILLAGE PROVINCE: NB POSTAL CODE: E3E 1L2

WELL LOCATION: SAME AS ABOVE ..... OR

CIVIC NUMBER STREET NAME: SAME

CITY/TOWN/VILLAGE

WELL PAID FOR BY PROVINCIAL DEPT. OF _____

WELL ON RESERVE?	WELL ALREADY TAGGED?	OLD WELL I.D.
YES ☐ NO ☑	YES ☐ NO ☑	

DRILLER'S LOG *

FROM (FT.)	TO (FT.)	COLOUR	ROCK TYPE
Ground Level	11	BROWN	OVERBURDEN
11	400	GREY	WACKE

IF INSUFFICIENT SPACE PLEASE USE ADDITIONAL SHEETS

TOTAL WELL DEPTH: 400 FT. DEPTH TO BEDROCK: 11 FT.

WATER BEARING 1 1.5 igpm AT 72 FT. 2 1.5 igpm AT 110 FT.

FRACTURE ZONES: 3 6 igpm AT 193 FT. 4 3 igpm AT 283 FT.

PUMP INSTALLATION: INSTALLED ☑ NOT INSTALLED ☐

PUMP INTAKE SETTING: 300 FT. BELOW TOP OF CASING (Recommended)

PUMP TYPE: SUBMERSIBLE ☑ JET ☐ TURBINE ☐

OTHER _____

WELL DISINFECTED? YES ☑ NO ☐

TYPE CHLORINE

DRILLER'S COMMENTS 330' 4 gpm 380' 2 gpm

DRILLING COMPANY: SULLIVAN'S WELL DRILLING LTD

COMPLETION DATE: 18 09 13 (YR. MO. DAY) LICENSE NO. 77

G.P.S. (OPTIONAL)

I CERTIFY THAT THE WELL HEREIN DESCRIBED HAS BEEN CONSTRUCTED IN ACCORDANCE WITH THE WATER WELL REGULATION UNDER THE NEW BRUNSWICK CLEAN WATER ACT.

Signature of Driller _____ Signature of Helper _____

WHITE - NBELG
BLUE - Homeowner / Voucher
YELLOW - Homeowner
PINK - Drilling Company

KEEP THIS REPORT WITH YOUR IMPORTANT DOCUMENTS

New Nouveau Brunswick

ENVIRONMENT & LOCAL GOVERNMENT

WATER WELL DRILLER'S REPORT 00041847

OFFICE USE ONLY
FIELD NO.

HEALTH CODE | LAB NO. | SAMPLE RECEIVED DATE (YR MO DAY)
HEALTH OFFICE | EVENT NO.

SAMPLE RECEIVED BY:

TESTING VOUCHER INFORMATION — MANDATORY FOR WATER TEST
SEE BACK FOR DETAILS — PLEASE PRINT
INFORMATION INCLUDED HEREIN SHOULD BE THE WELL OWNER AT TIME OF SAMPLING

FIRST NAME | LAST NAME

ADDRESS (MAIL RESULTS TO:)

CITY/TOWN/VILLAGE | PROV. | POSTAL CODE

DAYTIME PHONE | FAX NO.

TEL. NO. | SAMPLE COLLECTED (YR MO DAY HR MIN AM PM)

DO YOU NEED A SAMPLE FOR YOUR MORTGAGE?
IF YOU WISH THE RESULTS TO BE RELEASED TO A MORTGAGE INSTITUTION PLEASE INCLUDE THE FOLLOWING CONTACT INFORMATION: — SEE BACK FOR DETAILS

ATTENTION OF:

TEL NO. | FAX NO.

SIGNATURE OF WELL OWNER

WAS THE COST OF THIS WELL FINANCED BY NB HOUSING?
YES ☐ NO ☑

WELL / WATER USE:

INDUSTRIAL	☐	ABANDONED	☐	DOMESTIC	☐
EXPLORATORY	☑	MUNICIPAL	☐	MONITORING	☐
HEAT PUMP	☐	OBSERVATION	☐	OTHER	☐

TYPE OF WORK COMPLETED: NEW WELL ☑ DEEPENED ☐
OTHER: _____

METHOD:
CABLE TOOL ☐ ROTARY ☑ OTHER _____

CASING INSTALLED:
LENGTH OF CASING ABOVE GROUND: 1 FT. 8 IN.
STEEL: 6 IN DIAM. FROM 0 FT. TO 40 FT.
PVC: _____ IN DIAM. FROM _____ FT. TO _____ FT.
SLOTTED _____ IN DIAM. FROM _____ FT. TO _____ FT.

SCREENS: TYPE: ____ SLOT SIZE _____
_____ IN DIAM. FROM _____ FT. TO _____ FT.

DRIVE SHOE: YES ☑ NO ☐

SETBACKS: SEE BACK FOR DETAILS
SEPTIC TANK (1) 270 FT.
SEPTIC TANK (2) _____ FT. FIELD (2) _____ FT. FIELD (1) 280 FT.
*RIGHT OF WAY OF ANY PUBLIC ROAD ☐ (1) _____ ROAD (2) _____
CENTER OF ROAD ☐ (1) 200 (2) _____
SETBACKS MEASURED _____ (NEW CONSTRUCTION)
APPROXIMATE SETBACKS AS INDICATED BY HOMEOWNER ☑ (EXISTING CONST.)

FLOWING WELL? YES ☐ NO ☑ IF YES - RATE: _____ igpm (approx.)

AQUIFER TEST: METHOD: AIR ☑ BAILER ☐ PUMP ☐
INITIAL WATER LEVEL: 14 FT BELOW TOP OF CASING
PUMPING RATE 5 1/2 igpm DURATION: _____ hrs. _____ min.
FINAL WATER LEVEL: 400 FT. BELOW TOP OF CASING
ESTIMATED SAFE YIELD: 5.5 igpm

WELL GROUTED? YES ☐ NO ☑
FROM _____ FT. TO _____ FT. GROUT TYPE: _____
DRILLING FLUIDS USED: YES ☐ NO ☑
TYPE: _____

P.I.D. NO. 7527915 | **WELL I.D. NO.** 56673

WELL OWNER INFORMATION
INFORMATION INCLUDED HEREIN SHOULD BE THE WELL OWNER AT TIME OF DRILLING

FIRST NAME | LAST NAME
RIVERSTONE RESORT

ADDRESS
35 MACTAQUAC RD.

CITY/TOWN/VILLAGE | PROVINCE | POSTAL CODE
FRENCH VILLAGE NB E3E 1L2

WELL LOCATION: SAME AS ABOVE ..... OR
CIVIC NUMBER STREET NAME
SAME

CITY/TOWN/VILLAGE | WELL PAID FOR BY PROVINCIAL DEPT. OF _____

WELL ON RESERVE? YES ☐ NO ☑ | WELL ALREADY TAGGED? YES ☐ NO ☑ | OLD WELL I.D.

DRILLER'S LOG *

FROM (FT.)	TO (FT.)	COLOUR	ROCK TYPE
Ground Level	10	BROWN	OVERBURDEN
10	400	GREY	WACKE

IF INSUFFICIENT SPACE PLEASE USE ADDITIONAL SHEETS

TOTAL WELL DEPTH: 400 FT. DEPTH TO BEDROCK: 10 FT.
WATER BEARING 1 1/2 igpm AT 90 FT. 2 1/2 igpm AT 167 FT.
FRACTURE ZONES: 3 1 igpm AT 200 FT. 4 3 igpm AT 274 FT.

PUMP INSTALLATION: INSTALLED ☐ NOT INSTALLED ☑
PUMP INTAKE SETTING: 300 FT. BELOW TOP OF CASING (Recommended)
PUMP TYPE: SUBMERSIBLE ☐ JET ☐ TURBINE ☐
OTHER _____
WELL DISINFECTED? YES ☐ NO ☑
TYPE _____

DRILLER'S COMMENTS 1/2 gpm @ 290'

DRILLING COMPANY: SULLIVAN'S WELL DRILLING LTD
COMPLETION DATE: 18 09 14 (YR. MO. DAY) LICENSE NO. 77

G.P.S. (OPTIONAL)

I CERTIFY THAT THE WELL HEREIN DESCRIBED HAS BEEN CONSTRUCTED IN ACCORDANCE WITH THE WATER WELL REGULATION UNDER THE NEW BRUNSWICK CLEAN WATER ACT.

Signature of Driller | Signature of Helper

WHITE - NBELG
BLUE - Homeowner / Voucher
YELLOW - Homeowner
PINK - Drilling Company

KEEP THIS REPORT WITH YOUR IMPORTANT DOCUMENTS

APPENDIX F

LAB RESULTS

RPC Certificates of Analysis

Report ID: 290006-IAS
Report Date: 02-Oct-18
Date Received: 20-Sep-18

CERTIFICATE OF ANALYSIS

for
Freelance Environmental Inc
5 Mannington Lane
Fredericton, NB E3A 5S6

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Naveed Majid
Project #: RRC-1809
Location: Riverside Resort

Analysis of Potable Water

RPC Sample ID:					290006-1
Client Sample ID:					TW-1: TEST WELL #1
Date Sampled:					20-Sep-18
Analytes	**Units**	**RL**	MAC	AO	
Alkalinity (as $CaCO_3$)	mg/L	2	-	-	93
Chloride	mg/L	0.5	-	250	260
Colour	TCU	5	-	15	< 5
Conductivity	µS/cm	1	-	-	1140
Fluoride	mg/L	0.05	1.5	-	0.12
Nitrate + Nitrite (as N)	mg/L	0.05	10	-	< 0.05
pH	units	-	-	-	7.9
Phosphorus	mg/L	0.02	-	-	< 0.02
r-Silica (as SiO_2)	mg/L	0.1	-	-	12.9
Sulfate	mg/L	1	-	500	25
Total Organic Carbon	mg/L	0.5	-	-	< 0.5
Turbidity	NTU	0.1	-	-	0.2
Calculated Parameters					
Hardness (as $CaCO_3$)	mg/L	0.2	-	-	446
TDS (calc)	mg/L	-	-	500	522
Saturation pH (5°C)	units	-	-	-	7.8
Langelier Index (5°C)	-	-	-	-	0.14

This report relates only to the sample(s) and information provided to the laboratory.

RL = Reporting Limit; MAC = Maximum Acceptable Concentration; AO = Aesthetic Objective

Guidelines are from Guidelines for Canadian Drinking Water Quality (February 2017).

Ross Kean
Department Head
Inorganic Analytical Chemistry

Peter Crowhurst
Analytical Chemist
Inorganic Analytical Chemistry

Report ID: 290006-IAS
Report Date: 02-Oct-18
Date Received: 20-Sep-18

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www.rpc.ca

Attention: Naveed Majid
Project #: RRC-1809
Location: Riverside Resort

Analysis of Metals in Potable Water

RPC Sample ID:					290006-1
Client Sample ID:					TW-1: TEST WELL #1
Date Sampled:					20-Sep-18
Analytes	**Units**	**RL**	MAC	AO	
Aluminum	mg/L	0.001	-	-	0.001
Antimony	mg/L	0.0001	0.006	-	0.0124
Arsenic	mg/L	0.001	0.01	-	0.020
Barium	mg/L	0.001	1	-	0.169
Boron	mg/L	0.001	5	-	0.011
Cadmium	mg/L	0.00001	0.005	-	< 0.00001
Calcium	mg/L	0.05	-	-	96.5
Chromium	mg/L	0.001	0.05	-	< 0.001
Copper	mg/L	0.001	-	1	< 0.001
Iron	mg/L	0.02	-	0.3	< 0.02
Lead	mg/L	0.0001	0.01	-	< 0.0001
Lithium	mg/L	0.0001	-	-	0.0178
Magnesium	mg/L	0.01	-	-	49.8
Manganese	mg/L	0.001	-	0.05	0.016
Molybdenum	mg/L	0.0001	-	-	0.0014
Nickel	mg/L	0.001	-	-	0.002
Potassium	mg/L	0.02	-	-	1.44
Selenium	mg/L	0.001	0.05	-	< 0.001
Sodium	mg/L	0.05	-	200	19.1
Strontium	mg/L	0.001	-	-	2.09
Thallium	mg/L	0.0001	-	-	< 0.0001
Uranium	mg/L	0.0001	0.02	-	0.0008
Vanadium	mg/L	0.001	-	-	< 0.001
Zinc	mg/L	0.001	-	5	0.001

Report ID: 290006-IAS
Report Date: 02-Oct-18
Date Received: 20-Sep-18

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Fredericton, NB E3A 5S6

rpc
921 College Hill Rd
Fredericton NB
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Methods

Analyte	RPC SOP #	Method Reference	Method Principle
pH	4.M03	APHA 4500-H^+ B	pH Electrode - Electrometric
Alkalinity (as $CaCO_3$)	4.M43	EPA 310.2	Methyl Orange Colourimetry
Chloride	4.M44	APHA 4500-CL E	Ferricyanide Colourimetry
Fluoride	4.M30	APHA 4500-F- D	SPADNS Colourimetry
Sulfate	4.M45	APHA 4500-SO_4 E	Turbidimetry
Nitrate + Nitrite (as N)	4.M48	APHA 4500-NO_3 H	Hydrazine Red., Derivitization, Colourimetry
r-Silica (as SiO_2)	4.M46	APHA 4500-SI F	Heteropoly Blue Colourimetry
Carbon - Total Organic	4.M38	APHA 5310 C	UV-Persulfate Digestion, NDIR Detection
Turbidity	4.M06	APHA 2130 B	Nephelometry
Colour	4.M55	APHA 2020 Color (A,C)	Single Wavelength Spectrophotometry
Conductivity	4.M04	APHA 2510 B	Conductivity Meter, Pt Electrode
Trace Metals	4.M01/4.M29	EPA 200.8/EPA 200.7	ICP-MS/ICP-ES

Report/Rapport: 292673-ML-W1
Date: 15-Oct-18
Date Received/Reçu: 12-Oct-18

CERTIFICATE OF ANALYSIS / CERTIFICAT D'ANALYSE

for/pour
Freelance Environmental Inc
5 Mannington Lane
Fredericton, NB E3A 5S6

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1368
Fax: 506.452.1395
www.rpc.ca

Attention: Naveed Majid / Shane Hashemi

Project/Job #: RRC-1809

Client Location: Riverside Resort

Microbiological Examination of Water/Qualité microbiologique de l'eau potable

RPC Sample ID/No. d'échantillon de RPC:				292673-1
Client Sample ID/ID d'échantillon du client:				TW-1: Test Well #1
Date collected/Date du prélèvement				12-Oct-18
Time sampled/Heure du prélèvement				9:15:00 AM
Analytes/Paramètre(s)	**Method/Méthode**	**Date Analyzed Date Analysé**	**Units Unités**	
Total Coliforms/Coliformes totaux	FFA10	12-Oct-18	MPN/100mL	1.0
E. coli	FFA10	12-Oct-18	MPN/100mL	0

This report relates only to the sample(s) and information provided to the laboratory.

Le présent rapport ne s'applique qu'aux échantillons et à l'information transmis au laboratoire.

Cathy Hay
Microbiology Supervisor
Food, Fisheries & Aquaculture

Gillian Travis
Microbiology Technician
Food, Fisheries & Aquaculture

Report ID: 306827-IAS
Report Date: 27-Mar-19
Date Received: 15-Mar-19

CERTIFICATE OF ANALYSIS

for
Freelance Environmental Inc
5 Mannington Lane
Fredericton, NB E3A 5S6

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Naveed Majid
Project #: RRC-1809
Location: Riverside Resort

Analysis of Water

RPC Sample ID:			306827-1
Client Sample ID:			Potable Water Influent
Date Sampled:			15-Mar-19
Analytes	**Units**	**RL**	
Sodium	mg/L	0.05	29.7
Potassium	mg/L	0.02	1.47
Calcium	mg/L	0.05	84.2
Magnesium	mg/L	0.01	40.0
Iron	mg/L	0.02	0.11
Manganese	mg/L	0.001	0.017
Copper	mg/L	0.001	0.001
Zinc	mg/L	0.001	< 0.001
Ammonia (as N)	mg/L	0.05	< 0.05
pH	units	-	7.4
Alkalinity (as $CaCO_3$)	mg/L	2	120
Chloride	mg/L	0.5	235
Sulfate	mg/L	1	32
Nitrate + Nitrite (as N)	mg/L	0.05	< 0.05
o-Phosphate (as P)	mg/L	0.01	< 0.01
r-Silica (as SiO_2)	mg/L	0.1	13.3
Carbon - Total Organic	mg/L	0.5	< 0.5
Turbidity	NTU	0.1	1.2
Conductivity	µS/cm	1	1070
Calculated Parameters			
Bicarbonate (as $CaCO_3$)	mg/L	-	120.
Carbonate (as $CaCO_3$)	mg/L	-	0.283
Hydroxide (as $CaCO_3$)	mg/L	-	0.013
Cation Sum	meq/L	-	8.83
Anion Sum	meq/L	-	9.69
Percent Difference	%	-	-4.66
Theoretical Conductivity	µS/cm	-	922
Hardness (as $CaCO_3$)	mg/L	0.2	375
Ion Sum	mg/L	-	509
Saturation pH (5°C)	units	-	7.7
Langelier Index (5°C)	-	-	-0.29

This report relates only to the sample(s) and information provided to the laboratory.

RL = Reporting Limit; Organic Carbon and ion chemistries for turbid samples are determined on filtered aliquots.

Ross Kean
Department Head
Inorganic Analytical Chemistry

Peter Crowhurst
Analytical Chemist
Inorganic Analytical Chemistry

Report ID: 306827-IAS
Report Date: 27-Mar-19
Date Received: 15-Mar-19

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Freelance Environmental Inc
5 Mannington Lane
Fredericton, NB E3A 5S6

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Naveed Majid
Project #: RRC-1809
Location: Riverside Resort

Analysis of Metals in Water

RPC Sample ID:			306827-1
Client Sample ID:			Potable Water Influent
Date Sampled:			15-Mar-19
Analytes	**Units**	**RL**	
Aluminum	µg/L	1	4
Antimony	µg/L	0.1	6.8
Arsenic	µg/L	1	11
Barium	µg/L	1	154
Beryllium	µg/L	0.1	< 0.1
Bismuth	µg/L	1	< 1
Boron	µg/L	1	12
Cadmium	µg/L	0.01	< 0.01
Calcium	µg/L	50	84200
Chromium	µg/L	1	< 1
Cobalt	µg/L	0.1	0.2
Copper	µg/L	1	1
Iron	µg/L	20	110
Lead	µg/L	0.1	< 0.1
Lithium	µg/L	0.1	18.7
Magnesium	µg/L	10	40000
Manganese	µg/L	1	17
Molybdenum	µg/L	0.1	1.0
Nickel	µg/L	1	1
Potassium	µg/L	20	1470
Rubidium	µg/L	0.1	1.3
Selenium	µg/L	1	< 1
Silver	µg/L	0.1	< 0.1
Sodium	µg/L	50	29700
Strontium	µg/L	1	1860
Tellurium	µg/L	0.1	< 0.1
Thallium	µg/L	0.1	< 0.1
Tin	µg/L	0.1	< 0.1
Uranium	µg/L	0.1	1.0
Vanadium	µg/L	1	< 1
Zinc	µg/L	1	< 1

Report ID: 306827-IAS
Report Date: 27-Mar-19
Date Received: 15-Mar-19

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921 College Hill Rd
Fredericton NB
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Methods

Analyte	RPC SOP #	Method Reference	Method Principle
Ammonia	4.M47	APHA 4500-NH_3 G	Phenate Colourimetry
pH	4.M03	APHA 4500-H^+ B	pH Electrode - Electrometric
Alkalinity (as $CaCO_3$)	4.M43	EPA 310.2	Methyl Orange Colourimetry
Chloride	4.M44	APHA 4500-CL E	Ferricyanide Colourimetry
Sulfate	4.M45	APHA 4500-SO_4 E	Turbidimetry
Nitrate + Nitrite (as N)	4.M48	APHA 4500-NO_3 H	Hydrazine Red., Derivitization, Colourimetry
o-Phosphate (as P)	4.M50	APHA 4500-P F	Molybdate/Ascorbic Acid Colourimetry
r-Silica (as SiO_2)	4.M46	APHA 4500-SI F	Heteropoly Blue Colourimetry
Carbon - Total Organic	4.M38	APHA 5310 C	UV-Persulfate Digestion, NDIR Detection
Turbidity	4.M06	APHA 2130 B	Nephelometry
Conductivity	4.M04	APHA 2510 B	Conductivity Meter, Pt Electrode
Trace Metals	4.M01/4.M29	EPA 200.8/EPA 200.7	ICP-MS/ICP-ES

Report ID: 306827-OAS
Report Date: 29-Mar-19
Date Received: 15-Mar-19

CERTIFICATE OF ANALYSIS

for
Freelance Environmental Inc
5 Mannington Lane
Fredericton, NB E3A 5S6

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Naveed Majid
Project #: RRC-1809
Location: Riverside Resort

Semi-Volatile Organic Compounds in Water

RPC Sample ID:				306827-2	306827-2 Dup
Client Sample ID:				Treated Water at Source	Treated Water at Source
Date Sampled:				15-Mar-19	15-Mar-19
Matrix:				water	water
Analytes	Units	RL	MAC(AO)		
Benzo(a)pyrene	mg/L	0.00001	0.00004	< 0.00001	< 0.00001
Pentachlorophenol	mg/L	0.0002	0.06	< 0.0002	< 0.0002
P_terphenyl_d14	%			89	86
2,4,6-tribromophenol	%			84	83

This report relates only to the sample(s) and information provided to the laboratory.
RL = Reporting Limit

Angela Colford
Lab Supervisor
Organic Analytical Services

Steven Davenport
Senior Technician
Organic Analytical Services

Report ID: 306827-OAS
Report Date: 29-Mar-19
Date Received: 15-Mar-19

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for
Freelance Environmental Inc
5 Mannington Lane
Fredericton, NB E3A 5S6

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Naveed Majid
Project #: RRC-1809
Location: Riverside Resort

Volatile Organic Compounds in Water

RPC Sample ID:				306827-2
Client Sample ID:				Treated Water at Source
Date Sampled:				15-Mar-19
Matrix:				water
Analytes	Units	RL	MAC(AO)	
Benzene	mg/L	0.0005	0.005	< 0.0005
Bromodichloromethane	mg/L	0.0005	Note	0.0053
Bromoform	mg/L	0.0005	Note	0.0007
Carbon Tetrachloride	mg/L	0.0005	0.002	< 0.0005
Chloroform	mg/L	0.0005	Note	0.029
Dibromochloromethane	mg/L	0.0005	Note	0.0023
1,2-dichlorobenzene	mg/L	0.0005	0.20	< 0.0005
1,4-dichlorobenzene	mg/L	0.0005	0.005	< 0.0005
1,2-dichloroethane	mg/L	0.0005	0.005	< 0.0005
Dichloromethane	mg/L	0.0010	0.05	< 0.0010
Ethylbenzene	mg/L	0.0005	0.14	< 0.0005
Tetrachloroethylene	mg/L	0.0005	0.01	< 0.0005
Toluene	mg/L	0.0005	0.06	0.0005
Trichloroethylene	mg/L	0.0005	0.005	< 0.0005
Vinyl Chloride	mg/L	0.0020	0.002	< 0.0020
Xylenes	mg/L	0.0005	0.09	< 0.0005
Total THM	mg/L	0.001	0.10	0.037
1,2-Dichloroethane-d4	%			101
Toluene-d8	%			101
4-Bromofluorobenzene	%			107

This report relates only to the sample(s) and information provided to the laboratory.
RL = Reporting Limit

Troy Smith
Lab Supervisor
Organic Analytical Services

Steven Davenport
Senior Technician
Organic Analytical Services

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for
Freelance Environmental Inc
5 Mannington Lane
Fredericton, NB E3A 5S6

rpc
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Canada E3B 6Z9
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Method Summary

OAS-HC08: The Determination of Benzo (a) Pyrene and Pentachlorophenol in Water.
OAS-HC02: Determination of Volatile Organic Compounds in Water.

General Report Comments

MAC = maximum acceptable concentration; AO = aesthetic objective (CDWQG 2017)
Note = one of the trihalomethanes (THM); MAC for total THM is expressed as a locational running annual average of quarterly samples.

Report ID: 306827-OAS
Report Date: 29-Mar-19
Date Received: 15-Mar-19

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Project #: RRC-1809
Location: Riverside Resort
QA/QC Report

RPC Sample ID:			BLANKC4955	SPIKEC4955
Matrix:			water	water
Analytes	Units	RL		% Recovery
Benzo(a)pyrene	mg/L	0.00001	< 0.00001	93%
Pentachlorophenol	mg/L	0.0002	< 0.0002	95%

RL = Reporting Limit

Report ID: 306827-OAS
Report Date: 29-Mar-19
Date Received: 15-Mar-19

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rpc
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Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Project #: RRC-1809
Location: Riverside Resort
QA/QC Report

RPC Sample ID:			BLANKC4927	SPIKEC4927
Matrix:			water	water
Analytes	Units	RL		% Recovery
Benzene	mg/L	0.0005	< 0.0005	104%
Bromodichloromethane	mg/L	0.0005	< 0.0005	91%
Bromoform	mg/L	0.0005	< 0.0005	83%
Carbon Tetrachloride	mg/L	0.0005	< 0.0005	87%
Chloroform	mg/L	0.0005	< 0.0005	101%
Dibromochloromethane	mg/L	0.0005	< 0.0005	88%
1,2-dichlorobenzene	mg/L	0.0005	< 0.0005	95%
1,4-dichlorobenzene	mg/L	0.0005	< 0.0005	94%
1,2-dichloroethane	mg/L	0.0005	< 0.0005	108%
Dichloromethane	mg/L	0.0010	< 0.0010	106%
Ethylbenzene	mg/L	0.0005	< 0.0005	103%
Tetrachloroethylene	mg/L	0.0005	< 0.0005	101%
Toluene	mg/L	0.0005	< 0.0005	105%
Trichloroethylene	mg/L	0.0005	< 0.0005	97%
Vinyl Chloride	mg/L	0.0020	< 0.0020	117%
Xylenes	mg/L	0.0005	< 0.0005	100%

RL = Reporting Limit

Report ID: 306827-OAS
Report Date: 29-Mar-19
Date Received: 15-Mar-19

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rpc
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Fredericton NB
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www.rpc.ca

Project #: RRC-1809

Summary of Date Analyzed

	SVOC		VOC	
RPC Sample ID	**Extracted**	**Analyzed**	**Extracted**	**Analyzed**
306827-2	22-Mar-19	27-Mar-19	20-Mar-19	20-Mar-19
306827-2 Dup	22-Mar-19	27-Mar-19	-	-

Report ID: 308462-IAS
Report Date: 12-Apr-19
Date Received: 02-Apr-19

CERTIFICATE OF ANALYSIS

for
Freelance Environmental Inc
5 Mannington Lane
Fredericton, NB E3A 5S6

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Naveed Majid
Project #: RRC-1809
Location: Riverside Resort

Analysis of Water

RPC Sample ID:			308462-1
Client Sample ID:			Treated Water at Source
Date Sampled:			1-Apr-19
Analytes	**Units**	**RL**	
Sodium	mg/L	0.05	33.8
Potassium	mg/L	0.02	1.44
Calcium	mg/L	0.05	87.2
Magnesium	mg/L	0.01	44.8
Iron	mg/L	0.02	< 0.02
Manganese	mg/L	0.001	0.012
Copper	mg/L	0.001	0.010
Zinc	mg/L	0.001	0.006
Ammonia (as N)	mg/L	0.05	< 0.05
pH	units	-	7.6
Alkalinity (as $CaCO_3$)	mg/L	2	130
Chloride	mg/L	0.5	259
Sulfate	mg/L	1	28
Nitrate + Nitrite (as N)	mg/L	0.05	< 0.05
o-Phosphate (as P)	mg/L	0.01	< 0.01
r-Silica (as SiO_2)	mg/L	0.1	9.3
Carbon - Total Organic	mg/L	0.5	< 0.5
Turbidity	NTU	0.1	0.3
Conductivity	µS/cm	1	1060
Calculated Parameters			
Bicarbonate (as $CaCO_3$)	mg/L	-	129.
Carbonate (as $CaCO_3$)	mg/L	-	0.485
Hydroxide (as $CaCO_3$)	mg/L	-	0.020
Cation Sum	meq/L	-	9.55
Anion Sum	meq/L	-	10.5
Percent Difference	%	-	-4.70
Theoretical Conductivity	µS/cm	-	989
Hardness (as $CaCO_3$)	mg/L	0.2	402
Ion Sum	mg/L	-	543
Saturation pH (5°C)	units	-	7.7
Langelier Index (5°C)	-	-	-0.05

This report relates only to the sample(s) and information provided to the laboratory.

RL = Reporting Limit; Organic Carbon and ion chemistries for turbid samples are determined on filtered aliquots.

Ross Kean
Department Head
Inorganic Analytical Chemistry

Peter Crowhurst
Analytical Chemist
Inorganic Analytical Chemistry

Report ID: 308462-IAS
Report Date: 12-Apr-19
Date Received: 02-Apr-19

CERTIFICATE OF ANALYSIS

for
Freelance Environmental Inc
5 Mannington Lane
Fredericton, NB E3A 5S6

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Naveed Majid
Project #: RRC-1809
Location: Riverside Resort

Analysis of Metals in Water

RPC Sample ID:			308462-1
Client Sample ID:			Treated Water at Source
Date Sampled:			1-Apr-19
Analytes	**Units**	**RL**	
Aluminum	µg/L	1	82
Antimony	µg/L	0.1	3.7
Arsenic	µg/L	1	1
Barium	µg/L	1	56
Beryllium	µg/L	0.1	< 0.1
Bismuth	µg/L	1	< 1
Boron	µg/L	1	13
Cadmium	µg/L	0.01	< 0.01
Calcium	µg/L	50	87200
Chromium	µg/L	1	< 1
Cobalt	µg/L	0.1	< 0.1
Copper	µg/L	1	10
Iron	µg/L	20	< 20
Lead	µg/L	0.1	0.1
Lithium	µg/L	0.1	12.0
Magnesium	µg/L	10	44800
Manganese	µg/L	1	12
Molybdenum	µg/L	0.1	0.9
Nickel	µg/L	1	< 1
Potassium	µg/L	20	1440
Rubidium	µg/L	0.1	2.5
Selenium	µg/L	1	< 1
Silver	µg/L	0.1	< 0.1
Sodium	µg/L	50	33800
Strontium	µg/L	1	1710
Tellurium	µg/L	0.1	< 0.1
Thallium	µg/L	0.1	< 0.1
Tin	µg/L	0.1	< 0.1
Uranium	µg/L	0.1	0.2
Vanadium	µg/L	1	< 1
Zinc	µg/L	1	6

Report ID: 308462-IAS
Report Date: 12-Apr-19
Date Received: 02-Apr-19

CERTIFICATE OF ANALYSIS

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5 Mannington Lane
Fredericton, NB E3A 5S6

921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
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Methods

Analyte	RPC SOP #	Method Reference	Method Principle
Ammonia	4.M47	APHA 4500-NH_3 G	Phenate Colourimetry
pH	4.M03	APHA 4500-H^+ B	pH Electrode - Electrometric
Alkalinity (as $CaCO_3$)	4.M43	EPA 310.2	Methyl Orange Colourimetry
Chloride	4.M44	APHA 4500-CL E	Ferricyanide Colourimetry
Sulfate	4.M45	APHA 4500-SO_4 E	Turbidimetry
Nitrate + Nitrite (as N)	4.M48	APHA 4500-NO_3 H	Hydrazine Red., Derivitization, Colourimetry
o-Phosphate (as P)	4.M50	APHA 4500-P F	Molybdate/Ascorbic Acid Colourimetry
r-Silica (as SiO_2)	4.M46	APHA 4500-SI F	Heteropoly Blue Colourimetry
Carbon - Total Organic	4.M38	APHA 5310 C	UV-Persulfate Digestion, NDIR Detection
Turbidity	4.M06	APHA 2130 B	Nephelometry
Conductivity	4.M04	APHA 2510 B	Conductivity Meter, Pt Electrode
Trace Metals	4.M01/4.M29	EPA 200.8/EPA 200.7	ICP-MS/ICP-ES

Report ID: 340125-IAS
Report Date: 03-Jan-20
Date Received: 17-Dec-19

CERTIFICATE OF ANALYSIS

for
Riverside Resort & Conference Centre
35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Shane Hashemi
Project #: Not Available

Analysis of Water

RPC Sample ID:			340125-1	340125-2
Client Sample ID:			Raw Water	RM #332
Date Sampled:			17-Dec-19	17-Dec-19
Analytes	**Units**	**RL**		
Sodium	mg/L	0.05	33.7	36.2
Potassium	mg/L	0.02	1.43	1.48
Calcium	mg/L	0.05	83.7	81.5
Magnesium	mg/L	0.01	42.6	40.7
Iron	mg/L	0.02	< 0.02	< 0.02
Manganese	mg/L	0.001	0.009	< 0.001
Copper	mg/L	0.001	0.005	0.011
Zinc	mg/L	0.001	< 0.001	0.006
Ammonia (as N)	mg/L	0.05	< 0.05	< 0.05
pH	units	-	8.1	8.1
Alkalinity (as $CaCO_3$)	mg/L	2	140	140
Chloride	mg/L	0.5	190	190
Bromide	mg/L	0.1	< 0.1	< 0.1
Sulfate	mg/L	1	38	38
Nitrate + Nitrite (as N)	mg/L	0.05	< 0.05	< 0.05
o-Phosphate (as P)	mg/L	0.01	< 0.01	< 0.01
r-Silica (as SiO_2)	mg/L	0.1	13.5	12.5
Carbon - Total Organic	mg/L	0.5	< 0.5	< 0.5
Turbidity	NTU	0.1	0.1	< 0.1
Conductivity	µS/cm	1	985	1010
Calculated Parameters				
Bicarbonate (as $CaCO_3$)	mg/L	-	138.	138.
Carbonate (as $CaCO_3$)	mg/L	-	1.64	1.64
Hydroxide (as $CaCO_3$)	mg/L	-	0.063	0.063
Cation Sum	meq/L	-	9.19	9.03
Anion Sum	meq/L	-	8.95	8.95
Percent Difference	%	-	1.30	0.44
Theoretical Conductivity	µS/cm	-	882	876
Hardness (as $CaCO_3$)	mg/L	0.2	384	371
Ion Sum	mg/L	-	488	486
Saturation pH (5°C)	units	-	7.6	7.6
Langelier Index (5°C)	-	-	0.47	0.46

This report relates only to the sample(s) and information provided to the laboratory.

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Ross Kean
Department Head
Inorganic Analytical Chemistry

Peter Crowhurst
Analytical Chemist
Inorganic Analytical Chemistry

Report ID: 340125-IAS
Report Date: 03-Jan-20
Date Received: 17-Dec-19

CERTIFICATE OF ANALYSIS

for
Riverside Resort & Conference Centre
35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Shane Hashemi
Project #: Not Available

Analysis of Metals in Water

RPC Sample ID:			340125-1	340125-2
Client Sample ID:			Raw Water	RM #332
Date Sampled:			17-Dec-19	17-Dec-19
Analytes	**Units**	**RL**		
Aluminum	µg/L	1	3	19
Antimony	µg/L	0.1	2.6	3.1
Arsenic	µg/L	1	5	4
Barium	µg/L	1	148	49
Beryllium	µg/L	0.1	< 0.1	< 0.1
Bismuth	µg/L	1	< 1	< 1
Boron	µg/L	1	11	12
Cadmium	µg/L	0.01	< 0.01	< 0.01
Calcium	µg/L	50	83700	81500
Chromium	µg/L	1	< 1	< 1
Cobalt	µg/L	0.1	< 0.1	< 0.1
Copper	µg/L	1	5	11
Iron	µg/L	20	< 20	< 20
Lead	µg/L	0.1	< 0.1	< 0.1
Lithium	µg/L	0.1	19.4	18.6
Magnesium	µg/L	10	42600	40700
Manganese	µg/L	1	9	< 1
Mercury	µg/L	0.025	< 0.025	< 0.025
Molybdenum	µg/L	0.1	1.2	1.2
Nickel	µg/L	1	< 1	< 1
Potassium	µg/L	20	1430	1480
Rubidium	µg/L	0.1	1.4	2.2
Selenium	µg/L	1	< 1	< 1
Silver	µg/L	0.1	< 0.1	< 0.1
Sodium	µg/L	50	33700	36200
Strontium	µg/L	1	1790	1600
Tellurium	µg/L	0.1	< 0.1	< 0.1
Thallium	µg/L	0.1	< 0.1	< 0.1
Tin	µg/L	0.1	< 0.1	< 0.1
Uranium	µg/L	0.1	0.9	1.0
Vanadium	µg/L	1	1	1
Zinc	µg/L	1	< 1	6

Report ID: 340125-IAS
Report Date: 03-Jan-20
Date Received: 17-Dec-19

CERTIFICATE OF ANALYSIS
for
Riverside Resort & Conference Centre
35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
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Fax: 506.452.0594
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Methods

Analyte	RPC SOP #	Method Reference	Method Principle
Ammonia	4.M47	APHA 4500-NH_3 G	Phenate Colourimetry
pH	4.M03	APHA 4500-H^+ B	pH Electrode - Electrometric
Alkalinity (as $CaCO_3$)	4.M43	EPA 310.2	Methyl Orange Colourimetry
Bromide	4.M39	EPA 300.1	Ion Chromatography
Chloride	4.M44	APHA 4500-CL E	Ferricyanide Colourimetry
Sulfate	4.M45	APHA 4500-SO_4 E	Turbidimetry
Nitrate + Nitrite (as N)	4.M48	APHA 4500-NO_3 H	Hydrazine Red., Derivitization, Colourimetry
o-Phosphate (as P)	4.M50	APHA 4500-P F	Molybdate/Ascorbic Acid Colourimetry
r-Silica (as SiO_2)	4.M46	APHA 4500-SI F	Heteropoly Blue Colourimetry
Carbon - Total Organic	4.M38	APHA 5310 C	UV-Persulfate Digestion, NDIR Detection
Turbidity	4.M06	APHA 2130 B	Nephelometry
Conductivity	4.M04	APHA 2510 B	Conductivity Meter - Electrode
Trace Metals	4.M01/4.M29	EPA 200.8/EPA 200.7	ICP-MS/ICP-ES
Mercury	4.M52	EPA 245.1	Cold Vapor AAS

Report/Rapport: 340125-ML-W1
Date: 19-Dec-19
Date Received/Reçu: 17-Dec-19

CERTIFICATE OF ANALYSIS / CERTIFICAT D'ANALYSE

for/pour
Riverside Resort & Conference
Centre
35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1368
Fax: 506.452.1395
www.rpc.ca

Attention: Shane Hashemi / Mike Spurvey

Microbiological Examination of Water/Qualité microbiologique de l'eau potable

RPC Sample ID/No. d'échantillon de RPC:				340125-1	340125-2
Client Sample ID/ID d'échantillon du client:				Raw Water	RM #332
Date collected/Date du prélèvement				17-Dec-19	17-Dec-19
Analytes/Paramètre(s)	**Method/Méthode**	**Date Analyzed Date Analysé**	**Units Unités**		
Total Coliforms/Coliformes totaux	FFA01	17-Dec-19	MPN/100mL	0	0
E. coli	FFA01	17-Dec-19	MPN/100mL	0	0
HPC	FFA11	17-Dec-19	cfu/mL	5	19

This report relates only to the sample(s) and information provided to the laboratory.

Le présent rapport ne s'applique qu'aux échantillons et à l'information transmis au laboratoire.

Cathy Hay
Microbiology Supervisor
Food, Fisheries & Aquaculture

Julie Hanscomb
Micro Technician
Food, Fisheries & Aquaculture

Report ID: 340125-OAS
Report Date: 27-Dec-19
Date Received: 17-Dec-19

CERTIFICATE OF ANALYSIS

for
Riverside Resort & Conference Centre
35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Shane Hashemi
Project #: Not Available

Hydrocarbon Analysis in Water (Atlantic MUST)

RPC Sample ID:			340125-1
Client Sample ID:			Raw Water
Date Sampled:			17-Dec-19
Matrix:			water
Analytes	Units	RL	
Benzene	mg/L	0.001	< 0.001
Toluene	mg/L	0.001	< 0.001
Ethylbenzene	mg/L	0.001	< 0.001
Xylenes	mg/L	0.001	< 0.001
VPH C6-C10 (Less BTEX)	mg/L	0.01	< 0.01
EPH >C10 - C16	mg/L	0.01	< 0.01
EPH >C16 - C21	mg/L	0.01	< 0.01
EPH >C21-C32	mg/L	0.01	< 0.01
Modified TPH Tier 1	mg/L	0.02	< 0.02
VPH Surrogate (IBB)	%		100
EPH Surrogate (IBB)	%		80
EPH Surrogate (C32)	%		94
Resemblance			ND
Return to Baseline at C32			Yes

This report relates only to the sample(s) and information provided to the laboratory.
RL = Reporting Limit

Bruce Phillips
Department Head
Organic Analytical Services

Angela Colford
Lab Supervisor
Organic Analytical Services

Report ID: 340125-OAS
Report Date: 27-Dec-19
Date Received: 17-Dec-19

CERTIFICATE OF ANALYSIS

for
Riverside Resort & Conference Centre
35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Shane Hashemi
Project #: Not Available

Semi-Volatile Organic Compounds in Water

RPC Sample ID:				340125-2
Client Sample ID:				RM #332
Date Sampled:				17-Dec-19
Matrix:				water
Analytes	Units	RL	MAC(AO)	
Benzo(a)pyrene	mg/L	0.00001	0.00004	< 0.00001
Pentachlorophenol	mg/L	0.0002	0.06	< 0.0002
P_terphenyl_d14	%			100
2,4,6-tribromophenol	%			80

This report relates only to the sample(s) and information provided to the laboratory.
RL = Reporting Limit

Bruce Phillips
Department Head
Organic Analytical Services

Angela Colford
Lab Supervisor
Organic Analytical Services

Report ID: 340125-OAS
Report Date: 27-Dec-19
Date Received: 17-Dec-19

CERTIFICATE OF ANALYSIS

for
Riverside Resort & Conference Centre
35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Shane Hashemi
Project #: Not Available

Volatile Organic Compounds in Water

RPC Sample ID:				340125-2
Client Sample ID:				RM #332
Date Sampled:				17-Dec-19
Matrix:				water
Analytes	Units	RL	MAC(AO)	
Benzene	mg/L	0.0005	0.005	< 0.0005
Bromodichloromethane	mg/L	0.0005	Note	0.0020
Bromoform	mg/L	0.0005	Note	0.0006
Carbon Tetrachloride	mg/L	0.0005	0.002	< 0.0005
Chloroform	mg/L	0.0005	Note	0.0025
Dibromochloromethane	mg/L	0.0005	Note	0.0020
1,2-dichlorobenzene	mg/L	0.0005	0.20	< 0.0005
1,4-dichlorobenzene	mg/L	0.0005	0.005	< 0.0005
1,2-dichloroethane	mg/L	0.0005	0.005	< 0.0005
Dichloromethane	mg/L	0.0010	0.05	< 0.0010
Ethylbenzene	mg/L	0.0005	0.14	< 0.0005
Tetrachloroethylene	mg/L	0.0005	0.01	< 0.0005
Toluene	mg/L	0.0005	0.06	< 0.0005
Trichloroethylene	mg/L	0.0005	0.005	< 0.0005
Vinyl Chloride	mg/L	0.0020	0.002	< 0.0020
Xylenes	mg/L	0.0005	0.09	< 0.0005
Total THM	mg/L	0.001	0.10	0.007
1,2-Dichloroethane-d4	%			106
Toluene-d8	%			96
4-Bromofluorobenzene	%			105

This report relates only to the sample(s) and information provided to the laboratory.
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Bruce Phillips
Department Head
Organic Analytical Services

Angela Colford
Lab Supervisor
Organic Analytical Services

CERTIFICATE OF ANALYSIS

for
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35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Method Summary

OAS-HC04: The Determination of Petroleum Hydrocarbons (Atlantic MUST) in Water(VPH)
OAS-HC04: Determination of Petroleum Hydrocarbons (Atlantic MUST) in Water (EPH)
OAS-HC08: The Determination of Benzo (a) Pyrene and Pentachlorophenol in Water.
OAS-HC02: Determination of Volatile Organic Compounds in Water.

Resemblance Legend

Resemblance Code	Resemblance
COMMENT	See General Report Comments
FO	Fuel Oil Fraction
FO.LO	Fuel Oil and Lube Oil Fraction
G	Gasoline Fraction
LO	Lube Oil Fraction
ND	Not Detected
NR	No Resemblance (not-petrogenic in origin)
NRLR	No Resemblance in the lube oil range (>C21-C32).
OP	One Product (unidentified)

Resemblance Code	Resemblance
PAH	Possible PAHs Detected
PG	Possible Gasoline Fraction
PLO	Possible Lube Oil Fraction
PWFO	Possible Weathered Fuel Oil Fraction
PWG	Possible Weathered Gasoline Fraction
TO	Tranformer Oil
UP	Unknown Peaks
WFO	Weathered Fuel Oil Fraction
WG	Weathered Gasoline Fraction

General Report Comments

MAC = maximum acceptable concentration; AO = aesthetic objective (CDWQG 2017)
Note = one of the trihalomethanes (THM); MAC for total THM is expressed as a locational running annual average of quarterly samples.
Return to Baseline: Samples are considered to have returned to baseline if the area from C32-C36 is less than 10% of the area from C10-C32.

Report ID: 340125-OAS
Report Date: 27-Dec-19
Date Received: 17-Dec-19

CERTIFICATE OF ANALYSIS

for
Riverside Resort & Conference Centre
35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Project #: Not Available

QA/QC Report

RPC Sample ID:			BLANKC6972	BLANKC7010	SPIKEC6971	SPIKEC7010
Type:			VPH	EPH	VPH	EPH
Matrix:			water	water	water	water
Analytes	Units	RL			% Recovery	% Recovery
Benzene	mg/L	0.001	< 0.001	-	102%	-
Toluene	mg/L	0.001	< 0.001	-	105%	-
Ethylbenzene	mg/L	0.001	< 0.001	-	102%	-
Xylenes	mg/L	0.001	< 0.001	-	100%	-
VPH C6-C10 (Less BTEX)	mg/L	0.01	< 0.01	-	100%	-
EPH >C10 - C16	mg/L	0.01	-	< 0.01	-	-
EPH >C16 - C21	mg/L	0.01	-	< 0.01	-	-
EPH >C21-C32	mg/L	0.01	-	< 0.01	-	-
EPH >C10-C32	mg/L		-	-	-	106%

RL = Reporting Limit

Report ID: 340125-OAS
Report Date: 27-Dec-19
Date Received: 17-Dec-19

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French Village, NB E3E 1L2

rpc
921 College Hill Rd
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Canada E3B 6Z9
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www.rpc.ca

Project #: Not Available

QA/QC Report

RPC Sample ID:			BLANKC7030	SPIKEC7030
Matrix:			water	water
Analytes	Units	RL		% Recovery
Benzo(a)pyrene	mg/L	0.00001	< 0.00001	100%
Pentachlorophenol	mg/L	0.0002	< 0.0002	84%

RL = Reporting Limit

Report ID: 340125-OAS
Report Date: 27-Dec-19
Date Received: 17-Dec-19

CERTIFICATE OF ANALYSIS

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French Village, NB E3E 1L2

rpc
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www.rpc.ca

Project #: Not Available

QA/QC Report

RPC Sample ID:			BLANKC6952	SPIKEC6951
Matrix:			water	water
Analytes	Units	RL		% Recovery
Benzene	mg/L	0.0005	< 0.0005	115%
Bromodichloromethane	mg/L	0.0005	< 0.0005	101%
Bromoform	mg/L	0.0005	< 0.0005	86%
Carbon Tetrachloride	mg/L	0.0005	< 0.0005	110%
Chloroform	mg/L	0.0005	< 0.0005	113%
Dibromochloromethane	mg/L	0.0005	< 0.0005	91%
1,2-dichlorobenzene	mg/L	0.0005	< 0.0005	103%
1,4-dichlorobenzene	mg/L	0.0005	< 0.0005	106%
1,2-dichloroethane	mg/L	0.0005	< 0.0005	114%
Dichloromethane	mg/L	0.0010	< 0.0010	112%
Ethylbenzene	mg/L	0.0005	< 0.0005	108%
Tetrachloroethylene	mg/L	0.0005	< 0.0005	103%
Toluene	mg/L	0.0005	< 0.0005	108%
Trichloroethylene	mg/L	0.0005	< 0.0005	107%
Vinyl Chloride	mg/L	0.0020	< 0.0020	128%
Xylenes	mg/L	0.0005	< 0.0005	112%

RL = Reporting Limit

CERTIFICATE OF ANALYSIS

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Project #: Not Available

Summary of Date Analyzed

	VPH		EPH		SVOC	
RPC Sample ID	**Extracted**	**Analyzed**	**Extracted**	**Analyzed**	**Extracted**	**Analyzed**
340125-1	18-Dec-19	18-Dec-19	19-Dec-19	23-Dec-19	-	-
340125-2	-	-	-	-	18-Dec-19	23-Dec-19

Report ID: 340125-OAS
Report Date: 27-Dec-19
Date Received: 17-Dec-19

CERTIFICATE OF ANALYSIS

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rpc
921 College Hill Rd
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Project #: Not Available

Summary of Date Analyzed

	VOC	
RPC Sample ID	**Extracted**	**Analyzed**
340125-1	-	-
340125-2	18-Dec-19	18-Dec-19

Report ID: 341249-IAS
Report Date: 16-Jan-20
Date Received: 06-Jan-20

CERTIFICATE OF ANALYSIS

for
Riverside Resort & Conference Centre
35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Shane Hashemi
Project #: Not Available

Analysis of Water

RPC Sample ID:			341249-1
Client Sample ID:			Raw water
Date Sampled:			6-Jan-20
Analytes	**Units**	**RL**	
Sodium	mg/L	0.05	31.0
Potassium	mg/L	0.02	1.44
Calcium	mg/L	0.05	73.4
Magnesium	mg/L	0.01	37.9
Iron	mg/L	0.02	< 0.04
Manganese	mg/L	0.001	0.008
Copper	mg/L	0.001	< 0.002
Zinc	mg/L	0.001	< 0.002
Ammonia (as N)	mg/L	0.05	< 0.05
pH	units	-	7.7
Alkalinity (as $CaCO_3$)	mg/L	2	150
Chloride	mg/L	0.5	183
Bromide	mg/L	0.05	< 0.05
Sulfate	mg/L	1	31
Nitrate + Nitrite (as N)	mg/L	0.05	0.11
o-Phosphate (as P)	mg/L	0.01	< 0.01
r-Silica (as SiO_2)	mg/L	0.1	12.3
Carbon - Total Organic	mg/L	0.5	< 0.5
Turbidity	NTU	0.1	0.2
Conductivity	µS/cm	1	895
Calculated Parameters			
Bicarbonate (as $CaCO_3$)	mg/L	-	149.
Carbonate (as $CaCO_3$)	mg/L	-	0.703
Hydroxide (as $CaCO_3$)	mg/L	-	0.025
Cation Sum	meq/L	-	8.17
Anion Sum	meq/L	-	8.81
Percent Difference	%	-	-3.80
Theoretical Conductivity	µS/cm	-	829
Hardness (as $CaCO_3$)	mg/L	0.2	339
Ion Sum	mg/L	-	462
Saturation pH (5°C)	units	-	7.6
Langelier Index (5°C)	-	-	0.05

This report relates only to the sample(s) and information provided to the laboratory.

RL = Reporting Limit; Organic Carbon and ion chemistries for turbid samples are determined on filtered aliquots.

Ross Kean
Department Head
Inorganic Analytical Chemistry

Peter Crowhurst
Analytical Chemist
Inorganic Analytical Chemistry

Report ID: 341249-IAS
Report Date: 16-Jan-20
Date Received: 06-Jan-20

CERTIFICATE OF ANALYSIS

for
Riverside Resort & Conference Centre
35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Shane Hashemi
Project #: Not Available

Analysis of Metals in Water

RPC Sample ID:			341249-1
Client Sample ID:			Raw water
Date Sampled:			6-Jan-20
Analytes	**Units**	**RL**	
Aluminum	µg/L	1	2
Antimony	µg/L	0.1	2.1
Arsenic	µg/L	1	5
Barium	µg/L	1	145
Beryllium	µg/L	0.1	< 0.2
Bismuth	µg/L	1	< 2
Boron	µg/L	1	14
Cadmium	µg/L	0.01	< 0.02
Calcium	µg/L	50	73400
Chromium	µg/L	1	< 2
Cobalt	µg/L	0.1	< 0.2
Copper	µg/L	1	< 2
Iron	µg/L	20	< 40
Lead	µg/L	0.1	< 0.2
Lithium	µg/L	0.1	16.3
Magnesium	µg/L	10	37900
Manganese	µg/L	1	8
Mercury	µg/L	0.025	< 0.025
Molybdenum	µg/L	0.1	1.7
Nickel	µg/L	1	< 2
Potassium	µg/L	20	1440
Rubidium	µg/L	0.1	1.4
Selenium	µg/L	1	< 2
Silver	µg/L	0.1	< 0.2
Sodium	µg/L	50	31000
Strontium	µg/L	1	1510
Tellurium	µg/L	0.1	< 0.2
Thallium	µg/L	0.1	< 0.2
Tin	µg/L	0.1	< 0.2
Uranium	µg/L	0.1	0.9
Vanadium	µg/L	1	< 2
Zinc	µg/L	1	< 2

Report ID: 341249-IAS
Report Date: 16-Jan-20
Date Received: 06-Jan-20

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French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
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Methods

Analyte	RPC SOP #	Method Reference	Method Principle
Ammonia	4.M47	APHA 4500-NH_3 G	Phenate Colourimetry
pH	4.M03	APHA 4500-H^+ B	pH Electrode - Electrometric
Alkalinity (as $CaCO_3$)	4.M43	EPA 310.2	Methyl Orange Colourimetry
Bromide	4.M39	EPA 300.1	Ion Chromatography
Chloride	4.M44	APHA 4500-CL E	Ferricyanide Colourimetry
Sulfate	4.M45	APHA 4500-SO_4 E	Turbidimetry
Nitrate + Nitrite (as N)	4.M48	APHA 4500-NO_3 H	Hydrazine Red., Derivitization, Colourimetry
o-Phosphate (as P)	4.M50	APHA 4500-P F	Molybdate/Ascorbic Acid Colourimetry
r-Silica (as SiO_2)	4.M46	APHA 4500-SI F	Heteropoly Blue Colourimetry
Carbon - Total Organic	4.M38	APHA 5310 C	UV-Persulfate Digestion, NDIR Detection
Turbidity	4.M06	APHA 2130 B	Nephelometry
Conductivity	4.M04	APHA 2510 B	Conductivity Meter - Electrode
Trace Metals	4.M01/4.M29	EPA 200.8/EPA 200.7	ICP-MS/ICP-ES
Mercury	4.M52	EPA 245.1	Cold Vapor AAS

Report/Rapport: 341249-ML-W1
Date: 08-Jan-20
Date Received/Reçu: 06-Jan-20

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for/pour
Riverside Resort & Conference
Centre
35 Mactaquac Road
French Village, NB E3E 1L2

Attention: Shane Hashemi / Mike Spurvey

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1368
Fax: 506.452.1395
www.rpc.ca

Microbiological Examination of Water/Qualité microbiologique de l'eau potable

RPC Sample ID/No. d'échantillon de RPC:				341249-1
Client Sample ID/ID d'échantillon du client:				Raw water
Date collected/Date du prélèvement				6-Jan-20
Analytes/Paramètre(s)	**Method/Méthode**	**Date Analyzed Date Analysé**	**Units Unités**	
Total Coliforms/Coliformes totaux	FFA01	6-Jan-20	MPN/100mL	0
E. coli	FFA01	6-Jan-20	MPN/100mL	0
HPC	FFA11	6-Jan-20	cfu/mL	3

This report relates only to the sample(s) and information provided to the laboratory.

Le présent rapport ne s'applique qu'aux échantillons et à l'information transmis au laboratoire.

Cathy Hay
Microbiology Supervisor
Food, Fisheries & Aquaculture

GILLIAN TRAVIS
Microbiology Technician
Food, Fisheries & Aquaculture

Report ID: 341249-OAS
Report Date: 13-Jan-20
Date Received: 06-Jan-20

CERTIFICATE OF ANALYSIS

for
Riverside Resort & Conference Centre
35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Shane Hashemi
Project #: Not Available

Hydrocarbon Analysis in Water (Atlantic MUST)

RPC Sample ID:			341249-1	341249-1 Dup
Client Sample ID:			Raw water	Raw water
Date Sampled:			6-Jan-20	6-Jan-20
Matrix:			water	water
Analytes	Units	RL		
Benzene	mg/L	0.001	< 0.001	< 0.001
Toluene	mg/L	0.001	< 0.001	< 0.001
Ethylbenzene	mg/L	0.001	< 0.001	< 0.001
Xylenes	mg/L	0.001	< 0.001	< 0.001
VPH C6-C10 (Less BTEX)	mg/L	0.01	< 0.01	< 0.01
EPH >C10 - C16	mg/L	0.01	< 0.01	< 0.01
EPH >C16 - C21	mg/L	0.01	< 0.01	< 0.01
EPH >C21-C32	mg/L	0.01	< 0.01	< 0.01
Modified TPH Tier 1	mg/L	0.02	< 0.02	< 0.02
VPH Surrogate (IBB)	%		101	104
EPH Surrogate (IBB)	%		113	99
EPH Surrogate (C32)	%		120	110
Resemblance			ND	ND
Return to Baseline at C32			Yes	Yes

This report relates only to the sample(s) and information provided to the laboratory.
RL = Reporting Limit

Angela Colford
Lab Supervisor
Organic Analytical Services

Steven Davenport
Senior Technician
Organic Analytical Services

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for

Riverside Resort & Conference Centre
35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Method Summary

OAS-HC04: The Determination of Petroleum Hydrocarbons (Atlantic MUST) in Water(VPH)
OAS-HC04: Determination of Petroleum Hydrocarbons (Atlantic MUST) in Water (EPH)

Resemblance Legend

Resemblance Code	Resemblance
COMMENT	See General Report Comments
FO	Fuel Oil Fraction
FO.LO	Fuel Oil and Lube Oil Fraction
G	Gasoline Fraction
LO	Lube Oil Fraction
ND	Not Detected
NR	No Resemblance (not-petrogenic in origin)
NRLR	No Resemblance in the lube oil range (>C21-C32).
OP	One Product (unidentified)

Resemblance Code	Resemblance
PAH	Possible PAHs Detected
PG	Possible Gasoline Fraction
PLO	Possible Lube Oil Fraction
PWFO	Possible Weathered Fuel Oil Fraction
PWG	Possible Weathered Gasoline Fraction
TO	Tranformer Oil
UP	Unknown Peaks
WFO	Weathered Fuel Oil Fraction
WG	Weathered Gasoline Fraction

General Report Comments

Return to Baseline: Samples are considered to have returned to baseline if the area from C32-C36 is less than 10% of the area from C10-C32.

Report ID: 341249-OAS
Report Date: 13-Jan-20
Date Received: 06-Jan-20

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French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Project #: Not Available

QA/QC Report

RPC Sample ID:			BLANKC7072	BLANKC7078	SPIKEC7072	SPIKEC7078
Type: Matrix:			VPH water	EPH water	VPH water	EPH water
Analytes	Units	RL			% Recovery	% Recovery
Benzene	mg/L	0.001	< 0.001	-	102%	-
Toluene	mg/L	0.001	< 0.001	-	100%	-
Ethylbenzene	mg/L	0.001	< 0.001	-	97%	-
Xylenes	mg/L	0.001	< 0.001	-	96%	-
VPH C6-C10 (Less BTEX)	mg/L	0.01	< 0.01	-	90%	-
EPH >C10 - C16	mg/L	0.01	-	< 0.01	-	-
EPH >C16 - C21	mg/L	0.01	-	< 0.01	-	-
EPH >C21-C32	mg/L	0.01	-	< 0.01	-	-
EPH >C10-C32	mg/L		-	-	-	96%

RL = Reporting Limit

Report ID: 341249-OAS
Report Date: 13-Jan-20
Date Received: 06-Jan-20

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35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Project #: Not Available

Summary of Date Analyzed

	VPH		EPH	
RPC Sample ID	**Extracted**	**Analyzed**	**Extracted**	**Analyzed**
341249-1	6-Jan-20	6-Jan-20	6-Jan-20	6-Jan-20
341249-1 Dup	7-Jan-20	7-Jan-20	6-Jan-20	6-Jan-20

Report ID: 341251-IAS
Report Date: 16-Jan-20
Date Received: 06-Jan-20

CERTIFICATE OF ANALYSIS

for
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35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Shane Hashemi
Project #: Not Available

Analysis of Water

RPC Sample ID:			341251-1
Client Sample ID:			Room #332
Date Sampled:			6-Jan-20
Analytes	**Units**	**RL**	
Sodium	mg/L	0.05	27.8
Potassium	mg/L	0.02	1.48
Calcium	mg/L	0.05	69.2
Magnesium	mg/L	0.01	35.2
Iron	mg/L	0.02	< 0.04
Manganese	mg/L	0.001	< 0.002
Copper	mg/L	0.001	0.014
Zinc	mg/L	0.001	0.012
Ammonia (as N)	mg/L	0.05	< 0.05
pH	units	-	7.8
Alkalinity (as $CaCO_3$)	mg/L	2	160
Chloride	mg/L	0.5	136
Bromide	mg/L	0.05	< 0.05
Sulfate	mg/L	1	33
Nitrate + Nitrite (as N)	mg/L	0.05	0.20
o-Phosphate (as P)	mg/L	0.01	< 0.01
r-Silica (as SiO_2)	mg/L	0.1	11.0
Carbon - Total Organic	mg/L	0.5	0.6
Turbidity	NTU	0.1	< 0.1
Conductivity	µS/cm	1	824
Calculated Parameters			
Bicarbonate (as $CaCO_3$)	mg/L	-	159.
Carbonate (as $CaCO_3$)	mg/L	-	0.943
Hydroxide (as $CaCO_3$)	mg/L	-	0.032
Cation Sum	meq/L	-	7.60
Anion Sum	meq/L	-	7.73
Percent Difference	%	-	-0.89
Theoretical Conductivity	µS/cm	-	739
Hardness (as $CaCO_3$)	mg/L	0.2	318
Ion Sum	mg/L	-	412
Saturation pH (5°C)	units	-	7.6
Langelier Index (5°C)	-	-	0.16

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Ross Kean
Department Head
Inorganic Analytical Chemistry

Peter Crowhurst
Analytical Chemist
Inorganic Analytical Chemistry

Report ID: 341251-IAS
Report Date: 16-Jan-20
Date Received: 06-Jan-20

CERTIFICATE OF ANALYSIS

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Riverside Resort & Conference Centre
35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Shane Hashemi
Project #: Not Available

Analysis of Metals in Water

RPC Sample ID:			341251-1
Client Sample ID:			Room #332
Date Sampled:			6-Jan-20
Analytes	**Units**	**RL**	
Aluminum	µg/L	1	33
Antimony	µg/L	0.1	1.9
Arsenic	µg/L	1	3
Barium	µg/L	1	79
Beryllium	µg/L	0.1	< 0.2
Bismuth	µg/L	1	< 2
Boron	µg/L	1	16
Cadmium	µg/L	0.01	< 0.02
Calcium	µg/L	50	69200
Chromium	µg/L	1	< 2
Cobalt	µg/L	0.1	< 0.2
Copper	µg/L	1	14
Iron	µg/L	20	< 40
Lead	µg/L	0.1	< 0.2
Lithium	µg/L	0.1	13.1
Magnesium	µg/L	10	35200
Manganese	µg/L	1	< 2
Mercury	µg/L	0.025	< 0.025
Molybdenum	µg/L	0.1	2.2
Nickel	µg/L	1	< 2
Potassium	µg/L	20	1480
Rubidium	µg/L	0.1	1.9
Selenium	µg/L	1	< 2
Silver	µg/L	0.1	< 0.2
Sodium	µg/L	50	27800
Strontium	µg/L	1	1150
Tellurium	µg/L	0.1	< 0.2
Thallium	µg/L	0.1	< 0.2
Tin	µg/L	0.1	< 0.2
Uranium	µg/L	0.1	1.0
Vanadium	µg/L	1	< 2
Zinc	µg/L	1	12

Report ID: 341251-IAS
Report Date: 16-Jan-20
Date Received: 06-Jan-20

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rpc
921 College Hill Rd
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Methods

Analyte	RPC SOP #	Method Reference	Method Principle
Ammonia	4.M47	APHA 4500-NH_3 G	Phenate Colourimetry
pH	4.M03	APHA 4500-H^+ B	pH Electrode - Electrometric
Alkalinity (as $CaCO_3$)	4.M43	EPA 310.2	Methyl Orange Colourimetry
Bromide	4.M39	EPA 300.1	Ion Chromatography
Chloride	4.M44	APHA 4500-CL E	Ferricyanide Colourimetry
Sulfate	4.M45	APHA 4500-SO_4 E	Turbidimetry
Nitrate + Nitrite (as N)	4.M48	APHA 4500-NO_3 H	Hydrazine Red., Derivitization, Colourimetry
o-Phosphate (as P)	4.M50	APHA 4500-P F	Molybdate/Ascorbic Acid Colourimetry
r-Silica (as SiO_2)	4.M46	APHA 4500-SI F	Heteropoly Blue Colourimetry
Carbon - Total Organic	4.M38	APHA 5310 C	UV-Persulfate Digestion, NDIR Detection
Turbidity	4.M06	APHA 2130 B	Nephelometry
Conductivity	4.M04	APHA 2510 B	Conductivity Meter - Electrode
Trace Metals	4.M01/4.M29	EPA 200.8/EPA 200.7	ICP-MS/ICP-ES
Mercury	4.M52	EPA 245.1	Cold Vapor AAS

Report/Rapport: 341251-ML-W1
Date: 08-Jan-20
Date Received/Reçu: 06-Jan-20

CERTIFICATE OF ANALYSIS / CERTIFICAT D'ANALYSE

for/pour
Riverside Resort & Conference
Centre
35 Mactaquac Road
French Village, NB E3E 1L2

Attention: Shane Hashemi / Mike Spurvey

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1368
Fax: 506.452.1395
www.rpc.ca

Microbiological Examination of Water/Qualité microbiologique de l'eau potable

RPC Sample ID/No. d'échantillon de RPC:				341251-1
Client Sample ID/ID d'échantillon du client:				Room #332
Date collected/Date du prélèvement				6-Jan-20
Analytes/Paramètre(s)	**Method/Méthode**	**Date Analyzed Date Analysé**	**Units Unités**	
Total Coliforms/Coliformes totaux	FFA01	6-Jan-20	MPN/100mL	0
E. coli	FFA01	6-Jan-20	MPN/100mL	0
HPC	FFA11	6-Jan-20	cfu/mL	18

This report relates only to the sample(s) and information provided to the laboratory.

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Cathy Hay
Microbiology Supervisor
Food, Fisheries & Aquaculture

GILLIAN TRAVIS
Microbiology Technician
Food, Fisheries & Aquaculture

Report ID: 342342-IAS
Report Date: 29-Jan-20
Date Received: 15-Jan-20

CERTIFICATE OF ANALYSIS

for
Riverside Resort & Conference Centre
35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Shane Hashemi
Project #: Not Available

Analysis of Water

RPC Sample ID:			342342-1
Client Sample ID:			Room #332 Treated Water
Date Sampled:			15-Jan-20
Analytes	**Units**	**RL**	
Sodium	mg/L	0.05	35.2
Potassium	mg/L	0.02	1.42
Calcium	mg/L	0.05	81.9
Magnesium	mg/L	0.01	40.6
Iron	mg/L	0.02	< 0.02
Manganese	mg/L	0.001	< 0.001
Copper	mg/L	0.001	0.012
Zinc	mg/L	0.001	0.007
Ammonia (as N)	mg/L	0.05	< 0.05
pH	units	-	7.9
Alkalinity (as $CaCO_3$)	mg/L	2	170
Chloride	mg/L	0.5	194
Bromide	mg/L	0.05	< 0.05
Sulfate	mg/L	1	36
Nitrate + Nitrite (as N)	mg/L	0.05	0.10
o-Phosphate (as P)	mg/L	0.01	< 0.01
r-Silica (as SiO_2)	mg/L	0.1	12.4
Carbon - Total Organic	mg/L	0.5	< 0.5
Turbidity	NTU	0.1	< 0.1
Conductivity	µS/cm	1	945
Calculated Parameters			
Bicarbonate (as $CaCO_3$)	mg/L	-	169.
Carbonate (as $CaCO_3$)	mg/L	-	1.26
Hydroxide (as $CaCO_3$)	mg/L	-	0.040
Cation Sum	meq/L	-	9.00
Anion Sum	meq/L	-	9.63
Percent Difference	%	-	-3.38
Theoretical Conductivity	µS/cm	-	898
Hardness (as $CaCO_3$)	mg/L	0.2	372
Ion Sum	mg/L	-	506
Saturation pH (5°C)	units	-	7.6
Langelier Index (5°C)	-	-	0.34

This report relates only to the sample(s) and information provided to the laboratory.

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Ross Kean
Department Head
Inorganic Analytical Chemistry

Brannen Burhoe
Chemical Technician
Inorganic Analytical Services

Report ID: 342342-IAS
Report Date: 29-Jan-20
Date Received: 15-Jan-20

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for
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35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
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Fax: 506.452.0594
www.rpc.ca

Attention: Shane Hashemi
Project #: Not Available

Analysis of Metals in Water

RPC Sample ID:			342342-1
Client Sample ID:			Room #332 Treated Water
Date Sampled:			15-Jan-20
Analytes	**Units**	**RL**	
Aluminum	µg/L	1	17
Antimony	µg/L	0.1	2.2
Arsenic	µg/L	1	4
Barium	µg/L	1	59
Beryllium	µg/L	0.1	< 0.1
Bismuth	µg/L	1	< 1
Boron	µg/L	1	13
Cadmium	µg/L	0.01	0.02
Calcium	µg/L	50	81900
Chromium	µg/L	1	< 1
Cobalt	µg/L	0.1	< 0.1
Copper	µg/L	1	12
Iron	µg/L	20	< 20
Lead	µg/L	0.1	< 0.1
Lithium	µg/L	0.1	16.3
Magnesium	µg/L	10	40600
Manganese	µg/L	1	< 1
Mercury	µg/L	0.025	< 0.025
Molybdenum	µg/L	0.1	1.5
Nickel	µg/L	1	< 1
Potassium	µg/L	20	1420
Rubidium	µg/L	0.1	1.9
Selenium	µg/L	1	< 1
Silver	µg/L	0.1	< 0.1
Sodium	µg/L	50	35200
Strontium	µg/L	1	1400
Tellurium	µg/L	0.1	< 0.1
Thallium	µg/L	0.1	< 0.1
Tin	µg/L	0.1	< 0.1
Uranium	µg/L	0.1	1.0
Vanadium	µg/L	1	< 1
Zinc	µg/L	1	7

Report ID: 342342-IAS
Report Date: 29-Jan-20
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www.rpc.ca

Methods

Analyte	RPC SOP #	Method Reference	Method Principle
Ammonia	4.M47	APHA 4500-NH_3 G	Phenate Colourimetry
pH	4.M03	APHA 4500-H^+ B	pH Electrode - Electrometric
Alkalinity (as $CaCO_3$)	4.M43	EPA 310.2	Methyl Orange Colourimetry
Bromide	4.M39	EPA 300.1	Ion Chromatography
Chloride	4.M44	APHA 4500-CL E	Ferricyanide Colourimetry
Sulfate	4.M45	APHA 4500-SO_4 E	Turbidimetry
Nitrate + Nitrite (as N)	4.M48	APHA 4500-NO_3 H	Hydrazine Red., Derivitization, Colourimetry
o-Phosphate (as P)	4.M50	APHA 4500-P F	Molybdate/Ascorbic Acid Colourimetry
r-Silica (as SiO_2)	4.M46	APHA 4500-SI F	Heteropoly Blue Colourimetry
Carbon - Total Organic	4.M38	APHA 5310 C	UV-Persulfate Digestion, NDIR Detection
Turbidity	4.M06	APHA 2130 B	Nephelometry
Conductivity	4.M04	APHA 2510 B	Conductivity Meter - Electrode
Trace Metals	4.M01/4.M29	EPA 200.8/EPA 200.7	ICP-MS/ICP-ES
Mercury	4.M52	EPA 245.1	Cold Vapor AAS

Report/Rapport: 342342-ML-W1
Date: 17-Jan-20
Date Received/Reçu: 15-Jan-20

CERTIFICATE OF ANALYSIS / CERTIFICAT D'ANALYSE

for/pour
Riverside Resort & Conference
Centre
35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1368
Fax: 506.452.1395
www.rpc.ca

Attention: Shane Hashemi / Mike Spurvey

Microbiological Examination of Water/Qualité microbiologique de l'eau potable

RPC Sample ID/No. d'échantillon de RPC:				342342-1
Client Sample ID/ID d'échantillon du client:				Room #332 Treated Water
Date collected/Date du prélèvement				15-Jan-20
Time sampled/Heure du prélèvement				11:30:00 AM
Analytes/Paramètre(s)	**Method/Méthode**	**Date Analyzed Date Analysé**	**Units Unités**	
Total Coliforms/Coliformes totaux	FFA01	15-Jan-20	MPN/100mL	0
E. coli	FFA01	15-Jan-20	MPN/100mL	0
HPC	FFA11	15-Jan-20	cfu/mL	0

This report relates only to the sample(s) and information provided to the laboratory.

Le présent rapport ne s'applique qu'aux échantillons et à l'information transmis au laboratoire.

Cathy Hay
Microbiology Supervisor
Food, Fisheries & Aquaculture

Breannah Collins
Micro Technician
Food, Fisheries & Aquaculture

Report ID: 342342-OAS
Report Date: 29-Jan-20
Date Received: 15-Jan-20

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for
Riverside Resort & Conference Centre
35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Shane Hashemi
Project #: Not Available

Semi-Volatile Organic Compounds in Water

RPC Sample ID:				342342-1
Client Sample ID:				Room #332 Treated Water
Date Sampled:				15-Jan-20
Matrix:				water
Analytes	Units	RL	MAC(AO)	
Benzo(a)pyrene	mg/L	0.00001	0.00004	< 0.00001
Pentachlorophenol	mg/L	0.0002	0.06	< 0.0002
P_terphenyl_d14	%			102
2,4,6-tribromophenol	%			90

This report relates only to the sample(s) and information provided to the laboratory.
RL = Reporting Limit

Angela Colford
Lab Supervisor
Organic Analytical Services

Steven Davenport
Senior Technician
Organic Analytical Services

Report ID: 342342-OAS
Report Date: 29-Jan-20
Date Received: 15-Jan-20

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for
Riverside Resort & Conference Centre
35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Shane Hashemi
Project #: Not Available

Volatile Organic Compounds in Water

RPC Sample ID:				342342-1
Client Sample ID:				Room #332 Treated Water
Date Sampled:				15-Jan-20
Matrix:				water
Analytes	Units	RL	MAC(AO)	
Benzene	mg/L	0.0005	0.005	< 0.0005
Bromodichloromethane	mg/L	0.0005	Note	0.0015
Bromoform	mg/L	0.0005	Note	0.0011
Carbon Tetrachloride	mg/L	0.0005	0.002	< 0.0005
Chloroform	mg/L	0.0005	Note	0.0021
Dibromochloromethane	mg/L	0.0005	Note	0.0017
1,2-dichlorobenzene	mg/L	0.0005	0.20	< 0.0005
1,4-dichlorobenzene	mg/L	0.0005	0.005	< 0.0005
1,2-dichloroethane	mg/L	0.0005	0.005	< 0.0005
Dichloromethane	mg/L	0.0010	0.05	< 0.0010
Ethylbenzene	mg/L	0.0005	0.14	< 0.0005
Tetrachloroethylene	mg/L	0.0005	0.01	< 0.0005
Toluene	mg/L	0.0005	0.06	< 0.0005
Trichloroethylene	mg/L	0.0005	0.005	< 0.0005
Vinyl Chloride	mg/L	0.0020	0.002	< 0.0020
Xylenes	mg/L	0.0005	0.09	< 0.0005
Total THM	mg/L	0.001	0.10	0.006
1,2-Dichloroethane-d4	%			106
Toluene-d8	%			94
4-Bromofluorobenzene	%			103

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Angela Colford
Lab Supervisor
Organic Analytical Services

Steven Davenport
Senior Technician
Organic Analytical Services

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French Village, NB E3E 1L2

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Method Summary

OAS-HC08: The Determination of Benzo (a) Pyrene and Pentachlorophenol in Water.
OAS-HC02: Determination of Volatile Organic Compounds in Water.

General Report Comments

MAC = maximum acceptable concentration; AO = aesthetic objective (CDWQG 2017)
Note = one of the trihalomethanes (THM); MAC for total THM is expressed as a locational running annual average of quarterly samples.

Report ID: 342342-OAS
Report Date: 29-Jan-20
Date Received: 15-Jan-20

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35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
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Project #: Not Available

QA/QC Report

RPC Sample ID:			BLANKC7222	SPIKEC7222
Matrix:			water	water
Analytes	Units	RL		% Recovery
Benzo(a)pyrene	mg/L	0.00001	< 0.00001	96%
Pentachlorophenol	mg/L	0.0002	< 0.0002	90%

RL = Reporting Limit

Report ID: 342342-OAS
Report Date: 29-Jan-20
Date Received: 15-Jan-20

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35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
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Project #: Not Available

QA/QC Report

RPC Sample ID:			BLANKC7139	SPIKEC7139
Matrix:			water	water
Analytes	Units	RL		% Recovery
Benzene	mg/L	0.0005	< 0.0005	112%
Bromodichloromethane	mg/L	0.0005	< 0.0005	96%
Bromoform	mg/L	0.0005	< 0.0005	88%
Carbon Tetrachloride	mg/L	0.0005	< 0.0005	105%
Chloroform	mg/L	0.0005	< 0.0005	108%
Dibromochloromethane	mg/L	0.0005	< 0.0005	88%
1,2-dichlorobenzene	mg/L	0.0005	< 0.0005	97%
1,4-dichlorobenzene	mg/L	0.0005	< 0.0005	102%
1,2-dichloroethane	mg/L	0.0005	< 0.0005	104%
Dichloromethane	mg/L	0.0010	< 0.0010	120%
Ethylbenzene	mg/L	0.0005	< 0.0005	115%
Tetrachloroethylene	mg/L	0.0005	< 0.0005	106%
Toluene	mg/L	0.0005	< 0.0005	104%
Trichloroethylene	mg/L	0.0005	< 0.0005	107%
Vinyl Chloride	mg/L	0.0020	< 0.0020	127%
Xylenes	mg/L	0.0005	< 0.0005	110%

RL = Reporting Limit

Report ID: 342342-OAS
Report Date: 29-Jan-20
Date Received: 15-Jan-20

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35 Mactaquac Road
French Village, NB E3E 1L2

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921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Project #: Not Available

Summary of Date Analyzed

	SVOC		VOC	
RPC Sample ID	**Extracted**	**Analyzed**	**Extracted**	**Analyzed**
342342-1	17-Jan-20	28-Jan-20	15-Jan-19	15-Jan-20

Report ID: 342345-IAS
Report Date: 30-Jan-20
Date Received: 15-Jan-20

CERTIFICATE OF ANALYSIS

for
Riverside Resort & Conference Centre
35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Shane Hashemi
Project #: Not Available

Analysis of Water

RPC Sample ID:			342345-1
Client Sample ID:			Raw water
Date Sampled:			15-Jan-20
Analytes	**Units**	**RL**	
Sodium	mg/L	0.05	33.1
Potassium	mg/L	0.02	1.42
Calcium	mg/L	0.05	77.2
Magnesium	mg/L	0.01	38.9
Iron	mg/L	0.02	0.02
Manganese	mg/L	0.001	0.008
Copper	mg/L	0.001	0.001
Zinc	mg/L	0.001	< 0.001
Ammonia (as N)	mg/L	0.05	< 0.05
pH	units	-	8.0
Alkalinity (as $CaCO_3$)	mg/L	2	160
Chloride	mg/L	0.5	182
Bromide	mg/L	0.05	< 0.05
Sulfate	mg/L	1	35
Nitrate + Nitrite (as N)	mg/L	0.05	0.08
o-Phosphate (as P)	mg/L	0.01	< 0.01
r-Silica (as SiO_2)	mg/L	0.1	13.3
Carbon - Total Organic	mg/L	0.5	< 0.5
Turbidity	NTU	0.1	0.1
Conductivity	µS/cm	1	934
Calculated Parameters			
Bicarbonate (as $CaCO_3$)	mg/L	-	158.
Carbonate (as $CaCO_3$)	mg/L	-	1.49
Hydroxide (as $CaCO_3$)	mg/L	-	0.050
Cation Sum	meq/L	-	8.53
Anion Sum	meq/L	-	9.07
Percent Difference	%	-	-3.04
Theoretical Conductivity	µS/cm	-	853
Hardness (as $CaCO_3$)	mg/L	0.2	353
Ion Sum	mg/L	-	479
Saturation pH (5°C)	units	-	7.6
Langelier Index (5°C)	-	-	0.39

This report relates only to the sample(s) and information provided to the laboratory.

RL = Reporting Limit; Organic Carbon and ion chemistries for turbid samples are determined on filtered aliquots.

Ross Kean
Department Head
Inorganic Analytical Chemistry

Peter Crowhurst
Analytical Chemist
Inorganic Analytical Chemistry

Report ID: 342345-IAS
Report Date: 30-Jan-20
Date Received: 15-Jan-20

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for
Riverside Resort & Conference Centre
35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Shane Hashemi
Project #: Not Available

Analysis of Metals in Water

RPC Sample ID:			342345-1
Client Sample ID:			Raw water
Date Sampled:			15-Jan-20
Analytes	**Units**	**RL**	
Aluminum	µg/L	1	3
Antimony	µg/L	0.1	2.3
Arsenic	µg/L	1	5
Barium	µg/L	1	150
Beryllium	µg/L	0.1	< 0.1
Bismuth	µg/L	1	< 1
Boron	µg/L	1	12
Cadmium	µg/L	0.01	< 0.01
Calcium	µg/L	50	77200
Chromium	µg/L	1	< 1
Cobalt	µg/L	0.1	< 0.1
Copper	µg/L	1	1
Iron	µg/L	20	20
Lead	µg/L	0.1	< 0.1
Lithium	µg/L	0.1	18.3
Magnesium	µg/L	10	38900
Manganese	µg/L	1	8
Mercury	µg/L	0.025	< 0.025
Molybdenum	µg/L	0.1	1.4
Nickel	µg/L	1	< 1
Potassium	µg/L	20	1420
Rubidium	µg/L	0.1	1.4
Selenium	µg/L	1	< 1
Silver	µg/L	0.1	< 0.1
Sodium	µg/L	50	33100
Strontium	µg/L	1	1600
Tellurium	µg/L	0.1	< 0.1
Thallium	µg/L	0.1	< 0.1
Tin	µg/L	0.1	< 0.1
Uranium	µg/L	0.1	0.9
Vanadium	µg/L	1	< 1
Zinc	µg/L	1	< 1

Report ID: 342345-IAS
Report Date: 30-Jan-20
Date Received: 15-Jan-20

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for
Riverside Resort & Conference Centre
35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Methods

Analyte	RPC SOP #	Method Reference	Method Principle
Ammonia	4.M47	APHA 4500-NH_3 G	Phenate Colourimetry
pH	4.M03	APHA 4500-H^+ B	pH Electrode - Electrometric
Alkalinity (as $CaCO_3$)	4.M43	EPA 310.2	Methyl Orange Colourimetry
Bromide	4.M39	EPA 300.1	Ion Chromatography
Chloride	4.M44	APHA 4500-CL E	Ferricyanide Colourimetry
Sulfate	4.M45	APHA 4500-SO_4 E	Turbidimetry
Nitrate + Nitrite (as N)	4.M48	APHA 4500-NO_3 H	Hydrazine Red., Derivitization, Colourimetry
o-Phosphate (as P)	4.M50	APHA 4500-P F	Molybdate/Ascorbic Acid Colourimetry
r-Silica (as SiO_2)	4.M46	APHA 4500-SI F	Heteropoly Blue Colourimetry
Carbon - Total Organic	4.M38	APHA 5310 C	UV-Persulfate Digestion, NDIR Detection
Turbidity	4.M06	APHA 2130 B	Nephelometry
Conductivity	4.M04	APHA 2510 B	Conductivity Meter - Electrode
Trace Metals	4.M01/4.M29	EPA 200.8/EPA 200.7	ICP-MS/ICP-ES
Mercury	4.M52	EPA 245.1	Cold Vapor AAS

Report/Rapport: 342345-ML-W1
Date: 17-Jan-20
Date Received/Reçu: 15-Jan-20

CERTIFICATE OF ANALYSIS / CERTIFICAT D'ANALYSE

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Riverside Resort & Conference
Centre
35 Mactaquac Road
French Village, NB E3E 1L2

Attention: Shane Hashemi / Mike Spurvey

rpc
921 College Hill Rd
Fredericton NB
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Fax: 506.452.1395
www.rpc.ca

Microbiological Examination of Water/Qualité microbiologique de l'eau potable

RPC Sample ID/No. d'échantillon de RPC:				342345-1
Client Sample ID/ID d'échantillon du client:				Raw water
Date collected/Date du prélèvement				15-Jan-20
Time sampled/Heure du prélèvement				10:30:00 AM
Analytes/Paramètre(s)	**Method/Méthode**	**Date Analyzed Date Analysé**	**Units Unités**	
Total Coliforms/Coliformes totaux	FFA01	15-Jan-20	MPN/100mL	0
E. coli	FFA01	15-Jan-20	MPN/100mL	0
HPC	FFA11	15-Jan-20	cfu/mL	15

This report relates only to the sample(s) and information provided to the laboratory.

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Cathy Hay
Microbiology Supervisor
Food, Fisheries & Aquaculture

Breannah Collins
Micro Technician
Food, Fisheries & Aquaculture

Report ID: 342345-OAS
Report Date: 21-Jan-20
Date Received: 15-Jan-20

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for
Riverside Resort & Conference Centre
35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Shane Hashemi
Project #: Not Available

Hydrocarbon Analysis in Water (Atlantic MUST)

RPC Sample ID:			342345-1
Client Sample ID:			Raw water
Date Sampled:			15-Jan-20
Matrix:			water
Analytes	Units	RL	
Benzene	mg/L	0.001	< 0.001
Toluene	mg/L	0.001	< 0.001
Ethylbenzene	mg/L	0.001	< 0.001
Xylenes	mg/L	0.001	< 0.001
VPH C6-C10 (Less BTEX)	mg/L	0.01	< 0.01
EPH >C10 - C16	mg/L	0.01	< 0.01
EPH >C16 - C21	mg/L	0.01	< 0.01
EPH >C21-C32	mg/L	0.01	< 0.01
Modified TPH Tier 1	mg/L	0.02	< 0.02
VPH Surrogate (IBB)	%		98
EPH Surrogate (IBB)	%		99
EPH Surrogate (C32)	%		109
Resemblance			ND
Return to Baseline at C32			Yes

This report relates only to the sample(s) and information provided to the laboratory.
RL = Reporting Limit

Angela Colford
Lab Supervisor
Organic Analytical Services

Steven Davenport
Senior Technician
Organic Analytical Services

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for

Riverside Resort & Conference Centre
35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Method Summary

OAS-HC04: The Determination of Petroleum Hydrocarbons (Atlantic MUST) in Water(VPH)
OAS-HC04: Determination of Petroleum Hydrocarbons (Atlantic MUST) in Water (EPH)

Resemblance Legend

Resemblance Code	Resemblance
COMMENT	See General Report Comments
FO	Fuel Oil Fraction
FO.LO	Fuel Oil and Lube Oil Fraction
G	Gasoline Fraction
LO	Lube Oil Fraction
ND	Not Detected
NR	No Resemblance (not-petrogenic in origin)
NRLR	No Resemblance in the lube oil range (>C21-C32).
OP	One Product (unidentified)

Resemblance Code	Resemblance
PAH	Possible PAHs Detected
PG	Possible Gasoline Fraction
PLO	Possible Lube Oil Fraction
PWFO	Possible Weathered Fuel Oil Fraction
PWG	Possible Weathered Gasoline Fraction
TO	Tranformer Oil
UP	Unknown Peaks
WFO	Weathered Fuel Oil Fraction
WG	Weathered Gasoline Fraction

General Report Comments

Return to Baseline: Samples are considered to have returned to baseline if the area from C32-C36 is less than 10% of the area from C10-C32.

Report ID: 342345-OAS
Report Date: 21-Jan-20
Date Received: 15-Jan-20

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French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
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Project #: Not Available

QA/QC Report

RPC Sample ID:			BLANKC7143	BLANKC7147	SPIKEC7143	SPIKEC7147
Type:			VPH	EPH	VPH	EPH
Matrix:			water	water	water	water
Analytes	Units	RL			% Recovery	% Recovery
Benzene	mg/L	0.001	< 0.001	-	105%	-
Toluene	mg/L	0.001	< 0.001	-	106%	-
Ethylbenzene	mg/L	0.001	< 0.001	-	106%	-
Xylenes	mg/L	0.001	< 0.001	-	104%	-
VPH C6-C10 (Less BTEX)	mg/L	0.01	< 0.01	-	93%	-
EPH >C10 - C16	mg/L	0.01	-	< 0.01	-	-
EPH >C16 - C21	mg/L	0.01	-	< 0.01	-	-
EPH >C21-C32	mg/L	0.01	-	< 0.01	-	-
EPH >C10-C32	mg/L		-	-	-	113%

RL = Reporting Limit

Report ID: 342345-OAS
Report Date: 21-Jan-20
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rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Project #: Not Available

Summary of Date Analyzed

	VPH		EPH	
RPC Sample ID	**Extracted**	**Analyzed**	**Extracted**	**Analyzed**
342345-1	15-Jan-20	15-Jan-20	16-Jan-20	16-Jan-20

Report ID: 343155-IAS
Report Date: 07-Feb-20
Date Received: 23-Jan-20

CERTIFICATE OF ANALYSIS

for
Riverside Resort & Conference Centre
35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Shane Hashemi
Project #: Not Available

Analysis of Water

RPC Sample ID:			343155-1
Client Sample ID:			Room #332 Treated Water
Date Sampled:			23-Jan-20
Analytes	**Units**	**RL**	
Sodium	mg/L	0.05	35.5
Potassium	mg/L	0.02	1.48
Calcium	mg/L	0.05	78.9
Magnesium	mg/L	0.01	38.4
Iron	mg/L	0.02	< 0.02
Manganese	mg/L	0.001	< 0.001
Copper	mg/L	0.001	0.009
Zinc	mg/L	0.001	0.005
Ammonia (as N)	mg/L	0.05	< 0.05
pH	units	-	8.0
Alkalinity (as $CaCO_3$)	mg/L	2	160
Chloride	mg/L	0.5	181
Bromine	mg/L	0.01	0.06
Sulfate	mg/L	1	29
Nitrate + Nitrite (as N)	mg/L	0.05	0.09
o-Phosphate (as P)	mg/L	0.01	< 0.01
r-Silica (as SiO_2)	mg/L	0.1	12.0
Carbon - Total Organic	mg/L	0.5	0.6
Turbidity	NTU	0.1	< 0.1
Conductivity	µS/cm	1	915
Calculated Parameters			
Bicarbonate (as $CaCO_3$)	mg/L	-	158.
Carbonate (as $CaCO_3$)	mg/L	-	1.49
Hydroxide (as $CaCO_3$)	mg/L	-	0.050
Cation Sum	meq/L	-	8.68
Anion Sum	meq/L	-	8.91
Percent Difference	%	-	-1.32
Theoretical Conductivity	µS/cm	-	850
Hardness (as $CaCO_3$)	mg/L	0.2	355
Ion Sum	mg/L	-	474
Saturation pH (5°C)	units	-	7.6
Langelier Index (5°C)	-	-	0.40

This report relates only to the sample(s) and information provided to the laboratory.

RL = Reporting Limit; Organic Carbon and ion chemistries for turbid samples are determined on filtered aliquots.

Ross Kean
Department Head
Inorganic Analytical Chemistry

Peter Crowhurst
Analytical Chemist
Inorganic Analytical Chemistry

Report ID: 343155-IAS
Report Date: 07-Feb-20
Date Received: 23-Jan-20

CERTIFICATE OF ANALYSIS

for
Riverside Resort & Conference Centre
35 Mactaquac Road
French Village, NB E3E 1L2

rpc
921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Shane Hashemi
Project #: Not Available

Analysis of Metals in Water

RPC Sample ID:			343155-1
Client Sample ID:			Room #332 Treated Water
Date Sampled:			23-Jan-20
Analytes	**Units**	**RL**	
Aluminum	µg/L	1	164
Antimony	µg/L	0.1	2.1
Arsenic	µg/L	1	3
Barium	µg/L	1	64
Beryllium	µg/L	0.1	< 0.1
Bismuth	µg/L	1	< 1
Boron	µg/L	1	13
Cadmium	µg/L	0.01	< 0.01
Calcium	µg/L	50	78900
Chromium	µg/L	1	< 1
Cobalt	µg/L	0.1	< 0.1
Copper	µg/L	1	9
Iron	µg/L	20	< 20
Lead	µg/L	0.1	< 0.1
Lithium	µg/L	0.1	14.7
Magnesium	µg/L	10	38400
Manganese	µg/L	1	< 1
Mercury	µg/L	0.025	< 0.025
Molybdenum	µg/L	0.1	1.6
Nickel	µg/L	1	< 1
Potassium	µg/L	20	1480
Rubidium	µg/L	0.1	1.8
Selenium	µg/L	1	< 1
Silver	µg/L	0.1	< 0.1
Sodium	µg/L	50	35500
Strontium	µg/L	1	1350
Tellurium	µg/L	0.1	< 0.1
Thallium	µg/L	0.1	< 0.1
Tin	µg/L	0.1	< 0.1
Uranium	µg/L	0.1	0.9
Vanadium	µg/L	1	< 1
Zinc	µg/L	1	5

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Methods

Analyte	RPC SOP #	Method Reference	Method Principle
Ammonia	4.M47	APHA 4500-NH_3 G	Phenate Colourimetry
pH	4.M03	APHA 4500-H^+ B	pH Electrode - Electrometric
Alkalinity (as $CaCO_3$)	4.M43	EPA 310.2	Methyl Orange Colourimetry
Chloride	4.M44	APHA 4500-CL E	Ferricyanide Colourimetry
Sulfate	4.M45	APHA 4500-SO_4 E	Turbidimetry
Nitrate + Nitrite (as N)	4.M48	APHA 4500-NO_3 H	Hydrazine Red., Derivitization, Colourimetry
o-Phosphate (as P)	4.M50	APHA 4500-P F	Molybdate/Ascorbic Acid Colourimetry
r-Silica (as SiO_2)	4.M46	APHA 4500-SI F	Heteropoly Blue Colourimetry
Carbon - Total Organic	4.M38	APHA 5310 C	UV-Persulfate Digestion, NDIR Detection
Turbidity	4.M06	APHA 2130 B	Nephelometry
Conductivity	4.M04	APHA 2510 B	Conductivity Meter - Electrode
Trace Metals	4.M01/4.M29	EPA 200.8/EPA 200.7	ICP-MS/ICP-ES
Mercury	4.M52	EPA 245.1	Cold Vapor AAS

Report/Rapport: 343155-ML-W1
Date: 27-Jan-20
Date Received/Reçu: 23-Jan-20

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Fredericton NB
Canada E3B 6Z9
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Fax: 506.452.1395
www.rpc.ca

Attention: Shane Hashemi / Mike Spurvey

Microbiological Examination of Water/Qualité microbiologique de l'eau potable

RPC Sample ID/No. d'échantillon de RPC:				343155-1
Client Sample ID/ID d'échantillon du client:				Room #332 Treated Water
Date collected/Date du prélèvement				23-Jan-20
Time sampled/Heure du prélèvement				9:00:00 AM
Analytes/Paramètre(s)	**Method/Méthode**	**Date Analyzed Date Analysé**	**Units Unités**	
Total Coliforms/Coliformes totaux	FFA01	23-Jan-20	MPN/100mL	0
E. coli	FFA01	23-Jan-20	MPN/100mL	0
HPC	FFA11	23-Jan-20	cfu/mL	0

This report relates only to the sample(s) and information provided to the laboratory.

Le présent rapport ne s'applique qu'aux échantillons et à l'information transmis au laboratoire.

Cathy Hay
Microbiology Supervisor
Food, Fisheries & Aquaculture

Lindsey Boone
Micro Technician
Food, Fisheries & Aquaculture

Report ID: 343155-OAS
Report Date: 30-Jan-20
Date Received: 23-Jan-20

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Attention: Shane Hashemi
Project #: Not Available

Semi-Volatile Organic Compounds in Water

RPC Sample ID:				343155-1
Client Sample ID:				Room #332 Treated Water
Date Sampled:				23-Jan-20
Matrix:				water
Analytes	Units	RL	MAC(AO)	
Benzo(a)pyrene	mg/L	0.00001	0.00004	< 0.00001
Pentachlorophenol	mg/L	0.0002	0.06	< 0.0002
P_terphenyl_d14	%			96
2,4,6-tribromophenol	%			86

This report relates only to the sample(s) and information provided to the laboratory.
RL = Reporting Limit

Angela Colford
Lab Supervisor
Organic Analytical Services

Steven Davenport
Senior Technician
Organic Analytical Services

Report ID: 343155-OAS
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Attention: Shane Hashemi
Project #: Not Available

Volatile Organic Compounds in Water

RPC Sample ID:				343155-1
Client Sample ID:				Room #332 Treated Water
Date Sampled:				23-Jan-20
Matrix:				water
Analytes	Units	RL	MAC(AO)	
Benzene	mg/L	0.0005	0.005	< 0.0005
Bromodichloromethane	mg/L	0.0005	Note	0.0010
Bromoform	mg/L	0.0005	Note	0.0008
Carbon Tetrachloride	mg/L	0.0005	0.002	< 0.0005
Chloroform	mg/L	0.0005	Note	0.0010
Dibromochloromethane	mg/L	0.0005	Note	0.0016
1,2-dichlorobenzene	mg/L	0.0005	0.20	< 0.0005
1,4-dichlorobenzene	mg/L	0.0005	0.005	< 0.0005
1,2-dichloroethane	mg/L	0.0005	0.005	< 0.0005
Dichloromethane	mg/L	0.0010	0.05	< 0.0010
Ethylbenzene	mg/L	0.0005	0.14	< 0.0005
Tetrachloroethylene	mg/L	0.0005	0.01	< 0.0005
Toluene	mg/L	0.0005	0.06	< 0.0005
Trichloroethylene	mg/L	0.0005	0.005	< 0.0005
Vinyl Chloride	mg/L	0.0020	0.002	< 0.0020
Xylenes	mg/L	0.0005	0.09	< 0.0005
Total THM	mg/L	0.001	0.10	0.004
1,2-Dichloroethane-d4	%			107
Toluene-d8	%			98
4-Bromofluorobenzene	%			103

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Method Summary

OAS-HC08: The Determination of Benzo (a) Pyrene and Pentachlorophenol in Water.
OAS-HC02: Determination of Volatile Organic Compounds in Water.

General Report Comments

MAC = maximum acceptable concentration; AO = aesthetic objective (CDWQG 2017)
Note = one of the trihalomethanes (THM); MAC for total THM is expressed as a locational running annual average of quarterly samples.

Report ID: 343155-OAS
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www.rpc.ca

Project #: Not Available

QA/QC Report

RPC Sample ID:			BLANKC7223	SPIKEC7223
Matrix:			water	water
Analytes	Units	RL		% Recovery
Benzo(a)pyrene	mg/L	0.00001	< 0.00001	98%
Pentachlorophenol	mg/L	0.0002	< 0.0002	94%

RL = Reporting Limit

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Project #: Not Available

QA/QC Report

RPC Sample ID:			BLANKC7215	SPIKEC7215
Matrix:			water	water
Analytes	Units	RL		% Recovery
Benzene	mg/L	0.0005	< 0.0005	123%
Bromodichloromethane	mg/L	0.0005	< 0.0005	101%
Bromoform	mg/L	0.0005	< 0.0005	88%
Carbon Tetrachloride	mg/L	0.0005	< 0.0005	105%
Chloroform	mg/L	0.0005	< 0.0005	112%
Dibromochloromethane	mg/L	0.0005	< 0.0005	90%
1,2-dichlorobenzene	mg/L	0.0005	< 0.0005	102%
1,4-dichlorobenzene	mg/L	0.0005	< 0.0005	105%
1,2-dichloroethane	mg/L	0.0005	< 0.0005	111%
Dichloromethane	mg/L	0.0010	< 0.0010	110%
Ethylbenzene	mg/L	0.0005	< 0.0005	121%
Tetrachloroethylene	mg/L	0.0005	< 0.0005	107%
Toluene	mg/L	0.0005	< 0.0005	118%
Trichloroethylene	mg/L	0.0005	< 0.0005	103%
Vinyl Chloride	mg/L	0.0020	< 0.0020	112%
Xylenes	mg/L	0.0005	< 0.0005	116%

RL = Reporting Limit

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Project #: Not Available

Summary of Date Analyzed

	SVOC		VOC	
RPC Sample ID	**Extracted**	**Analyzed**	**Extracted**	**Analyzed**
343155-1	24-Jan-20	28-Jan-20	24-Jan-20	24-Jan-20

Report ID: 343165-IAS
Report Date: 05-Feb-20
Date Received: 23-Jan-20

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rpc
921 College Hill Rd
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Attention: Shane Hashemi
Project #: Not Available

Analysis of Water

RPC Sample ID:			343165-1
Client Sample ID:			Raw water
Date Sampled:			23-Jan-20
Analytes	**Units**	**RL**	
Sodium	mg/L	0.05	31.2
Potassium	mg/L	0.02	1.44
Calcium	mg/L	0.05	76.3
Magnesium	mg/L	0.01	38.5
Iron	mg/L	0.02	< 0.02
Manganese	mg/L	0.001	0.006
Copper	mg/L	0.001	0.001
Zinc	mg/L	0.001	< 0.001
Ammonia (as N)	mg/L	0.05	< 0.05
pH	units	-	7.9
Alkalinity (as $CaCO_3$)	mg/L	2	150
Chloride	mg/L	0.5	183
Bromine	mg/L	0.01	0.04
Sulfate	mg/L	1	31
Nitrate + Nitrite (as N)	mg/L	0.05	0.06
o-Phosphate (as P)	mg/L	0.01	< 0.01
r-Silica (as SiO_2)	mg/L	0.1	13.1
Carbon - Total Organic	mg/L	0.5	0.6
Turbidity	NTU	0.1	< 0.1
Conductivity	µS/cm	1	260
Calculated Parameters			
Bicarbonate (as $CaCO_3$)	mg/L	-	149.
Carbonate (as $CaCO_3$)	mg/L	-	1.11
Hydroxide (as $CaCO_3$)	mg/L	-	0.040
Cation Sum	meq/L	-	8.37
Anion Sum	meq/L	-	8.81
Percent Difference	%	-	-2.56
Theoretical Conductivity	µS/cm	-	838
Hardness (as $CaCO_3$)	mg/L	0.2	349
Ion Sum	mg/L	-	466
Saturation pH (5°C)	units	-	7.6
Langelier Index (5°C)	-	-	0.26

This report relates only to the sample(s) and information provided to the laboratory.

RL = Reporting Limit; Organic Carbon and ion chemistries for turbid samples are determined on filtered aliquots.

Ross Kean
Department Head
Inorganic Analytical Chemistry

Peter Crowhurst
Analytical Chemist
Inorganic Analytical Chemistry

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Attention: Shane Hashemi
Project #: Not Available

Analysis of Metals in Water

RPC Sample ID:			343165-1
Client Sample ID:			Raw water
Date Sampled:			23-Jan-20
Analytes	**Units**	**RL**	
Aluminum	µg/L	1	3
Antimony	µg/L	0.1	1.9
Arsenic	µg/L	1	5
Barium	µg/L	1	139
Beryllium	µg/L	0.1	< 0.1
Bismuth	µg/L	1	< 1
Boron	µg/L	1	13
Cadmium	µg/L	0.01	< 0.01
Calcium	µg/L	50	76300
Chromium	µg/L	1	< 1
Cobalt	µg/L	0.1	< 0.1
Copper	µg/L	1	1
Iron	µg/L	20	< 20
Lead	µg/L	0.1	< 0.1
Lithium	µg/L	0.1	15.8
Magnesium	µg/L	10	38500
Manganese	µg/L	1	6
Mercury	µg/L	0.025	< 0.025
Molybdenum	µg/L	0.1	1.4
Nickel	µg/L	1	< 1
Potassium	µg/L	20	1440
Rubidium	µg/L	0.1	1.3
Selenium	µg/L	1	< 1
Silver	µg/L	0.1	< 0.1
Sodium	µg/L	50	31200
Strontium	µg/L	1	1430
Tellurium	µg/L	0.1	< 0.1
Thallium	µg/L	0.1	< 0.1
Tin	µg/L	0.1	< 0.1
Uranium	µg/L	0.1	0.8
Vanadium	µg/L	1	< 1
Zinc	µg/L	1	< 1

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Methods

Analyte	RPC SOP #	Method Reference	Method Principle
Ammonia	4.M47	APHA 4500-NH_3 G	Phenate Colourimetry
pH	4.M03	APHA 4500-H^+ B	pH Electrode - Electrometric
Alkalinity (as $CaCO_3$)	4.M43	EPA 310.2	Methyl Orange Colourimetry
Chloride	4.M44	APHA 4500-CL E	Ferricyanide Colourimetry
Sulfate	4.M45	APHA 4500-SO_4 E	Turbidimetry
Nitrate + Nitrite (as N)	4.M48	APHA 4500-NO_3 H	Hydrazine Red., Derivitization, Colourimetry
o-Phosphate (as P)	4.M50	APHA 4500-P F	Molybdate/Ascorbic Acid Colourimetry
r-Silica (as SiO_2)	4.M46	APHA 4500-SI F	Heteropoly Blue Colourimetry
Carbon - Total Organic	4.M38	APHA 5310 C	UV-Persulfate Digestion, NDIR Detection
Turbidity	4.M06	APHA 2130 B	Nephelometry
Conductivity	4.M04	APHA 2510 B	Conductivity Meter - Electrode
Trace Metals	4.M01/4.M29	EPA 200.8/EPA 200.7	ICP-MS/ICP-ES
Mercury	4.M52	EPA 245.1	Cold Vapor AAS

Report/Rapport: 343165-ML-W1
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Attention: Shane Hashemi / Mike Spurvey

Microbiological Examination of Water/Qualité microbiologique de l'eau potable

RPC Sample ID/No. d'échantillon de RPC:				343165-1
Client Sample ID/ID d'échantillon du client:				Raw water
Date collected/Date du prélèvement				23-Jan-20
Time sampled/Heure du prélèvement				9:00:00 AM
Analytes/Paramètre(s)	**Method/Méthode**	**Date Analyzed Date Analysé**	**Units Unités**	
Total Coliforms/Coliformes totaux	FFA01	23-Jan-20	MPN/100mL	9
E. coli	FFA01	23-Jan-20	MPN/100mL	0
HPC	FFA11	23-Jan-20	cfu/mL	7

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Cathy Hay
Microbiology Supervisor
Food, Fisheries & Aquaculture

Lindsey Boone
Micro Technician
Food, Fisheries & Aquaculture

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rpc
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Attention: Shane Hashemi
Project #: Not Available

Hydrocarbon Analysis in Water (Atlantic MUST)

RPC Sample ID:			343165-1	343165-1 Dup
Client Sample ID:			Raw water	Raw water
Date Sampled:			23-Jan-20	23-Jan-20
Matrix:			water	water
Analytes	Units	RL		
Benzene	mg/L	0.001	< 0.001	< 0.001
Toluene	mg/L	0.001	< 0.001	< 0.001
Ethylbenzene	mg/L	0.001	< 0.001	< 0.001
Xylenes	mg/L	0.001	< 0.001	< 0.001
VPH C6-C10 (Less BTEX)	mg/L	0.01	< 0.01	< 0.01
EPH >C10 - C16	mg/L	0.01	< 0.01	< 0.01
EPH >C16 - C21	mg/L	0.01	< 0.01	< 0.01
EPH >C21-C32	mg/L	0.01	< 0.01	< 0.01
Modified TPH Tier 1	mg/L	0.02	< 0.02	< 0.02
VPH Surrogate (IBB)	%		95	104
EPH Surrogate (IBB)	%		90	97
EPH Surrogate (C32)	%		97	101
Resemblance			ND	ND
Return to Baseline at C32			Yes	Yes

This report relates only to the sample(s) and information provided to the laboratory.
RL = Reporting Limit

Angela Colford
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Method Summary

OAS-HC04: The Determination of Petroleum Hydrocarbons (Atlantic MUST) in Water(VPH)
OAS-HC04: Determination of Petroleum Hydrocarbons (Atlantic MUST) in Water (EPH)

Resemblance Legend

Resemblance Code	Resemblance
COMMENT	See General Report Comments
FO	Fuel Oil Fraction
FO.LO	Fuel Oil and Lube Oil Fraction
G	Gasoline Fraction
LO	Lube Oil Fraction
ND	Not Detected
NR	No Resemblance (not-petrogenic in origin)
NRLR	No Resemblance in the lube oil range (>C21-C32).
OP	One Product (unidentified)

Resemblance Code	Resemblance
PAH	Possible PAHs Detected
PG	Possible Gasoline Fraction
PLO	Possible Lube Oil Fraction
PWFO	Possible Weathered Fuel Oil Fraction
PWG	Possible Weathered Gasoline Fraction
TO	Tranformer Oil
UP	Unknown Peaks
WFO	Weathered Fuel Oil Fraction
WG	Weathered Gasoline Fraction

General Report Comments

Return to Baseline: Samples are considered to have returned to baseline if the area from C32-C36 is less than 10% of the area from C10-C32.

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Project #: Not Available

QA/QC Report

RPC Sample ID:			BLANKC7206	BLANKC7226	SPIKEC7206	SPIKEC7226
Type: Matrix:			VPH water	EPH water	VPH water	EPH water
Analytes	Units	RL			% Recovery	% Recovery
Benzene	mg/L	0.001	< 0.001	-	106%	-
Toluene	mg/L	0.001	< 0.001	-	104%	-
Ethylbenzene	mg/L	0.001	< 0.001	-	108%	-
Xylenes	mg/L	0.001	< 0.001	-	103%	-
VPH C6-C10 (Less BTEX)	mg/L	0.01	< 0.01	-	92%	-
EPH >C10 - C16	mg/L	0.01	-	< 0.01	-	-
EPH >C16 - C21	mg/L	0.01	-	< 0.01	-	-
EPH >C21-C32	mg/L	0.01	-	< 0.01	-	-
EPH >C10-C32	mg/L		-	-	-	97%

RL = Reporting Limit

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Project #: Not Available

Summary of Date Analyzed

	VPH		EPH	
RPC Sample ID	**Extracted**	**Analyzed**	**Extracted**	**Analyzed**
343165-1	25-Jan-20	25-Jan-20	24-Jan-20	28-Jan-20
343165-1 Dup	27-Jan-20	27-Jan-20	24-Jan-20	28-Jan-20

APPENDIX G

PUMP INFORMATION AND CURVE DATA

Don't get caught with
CURVE ENVY
See what's
NEW
inside

BERKELEY®
4" SUBMERSIBLE PUMPS

1/2 HP to 1-1/2 HP

PENTAIR

www.BerkeleyPumps.com

BERKELEY® 4" SUBMERSIBLE PUMPS

The Signature 2000® pump design has been delivering dependable performance since 1990. Our floating stage design continues to handle even the most aggressive water with our SignaSeal™ system that breaks down debris and reduces locking. Now we're going further by upstaging and adding additional features to the pumps you've grown to trust and rely on every day!

So what does this mean for you?

Better performance

With increased staging across much of our 1/2-1 1/2HP pumps, you'll enjoy even greater performance receiving more depth and/or more flow than before with heads to 800 feet and flows up to 27 gallons.

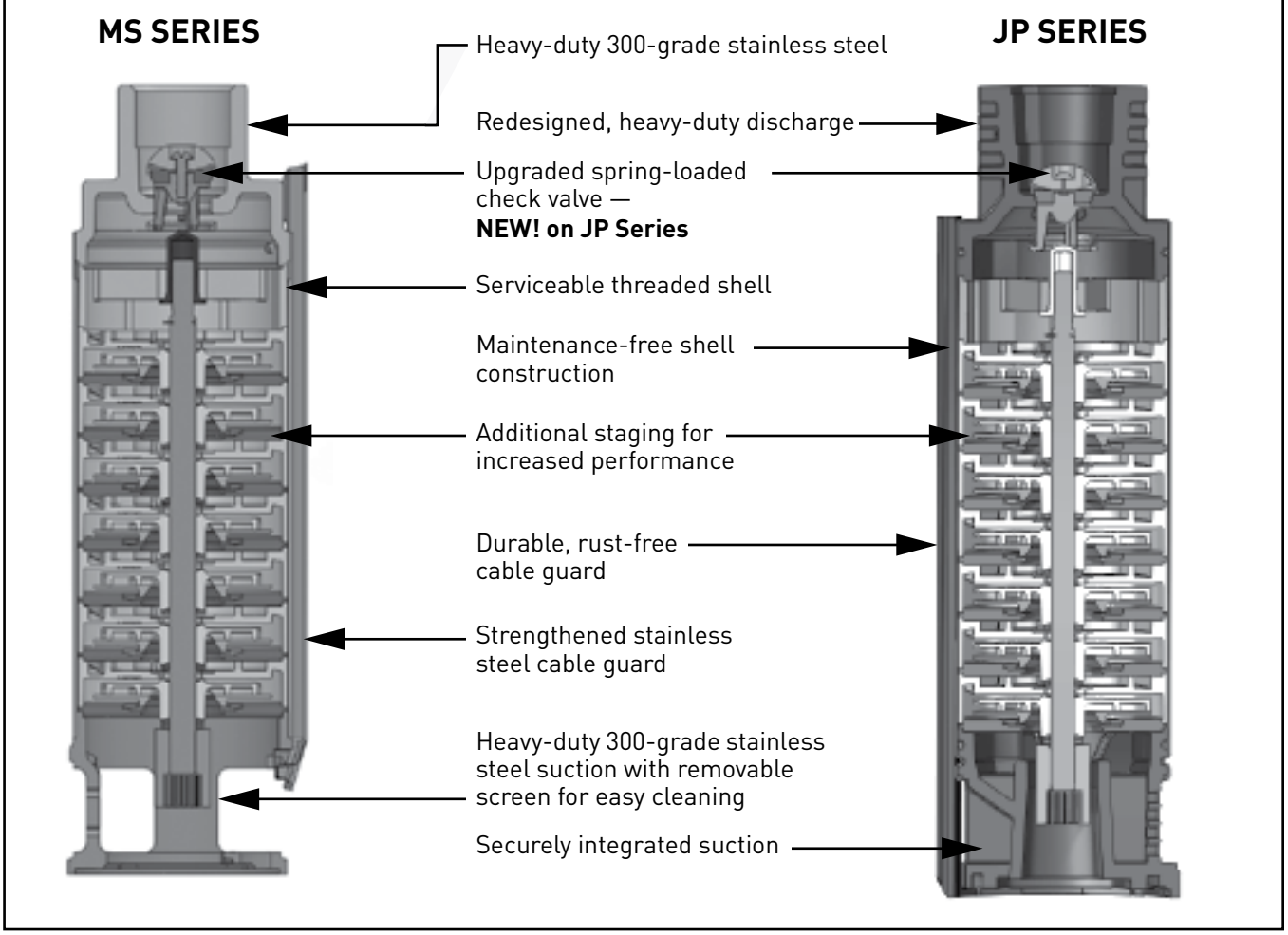
Avoid Curve Envy

Our increased staging also gives you more than competitive pumps at like horsepower and rated flow. We've even developed a tool to show you how our pumps compare to the top competitors. Visit www.pumps.com/curveenvy.html to compare your pump!

Reliability

We continue to strive towards perfecting our pumps and we've taken the next step with our JP series by redesigning the discharge to make it even stronger as well as adding a NEW spring-loaded check valve. All in an effort to provide you with the most reliable pump in the market.

PRODUCT IMPROVEMENTS



APPLICATIONS

Water Supply: for residential, industrial, commercial, multiple housing and farm use.

FEATURES (MS & JP)

Proven Staging System: Our proven SignaSeal staging system incorporates a harder-than-sand ceramic wear surface that when incorporated with our floating impeller design, greatly reduces problems with abrasives, sand lock-up and running dry.

Discharge Bearing: Self-lubricating Nylatron bearing resists wear from sand.

Shaft: Positive drive from 7/16" hexagonal heavy-duty 300 grade stainless steel.

Coupling: Stainless steel press fit to pump shaft, which couples to all standard NEMA motors.

Shell: 300-grade, heavy-walled corrosion-resistant stainless steel.

Hardware: All screws, washers and nuts are corrosion-resistant 300 grade stainless steel.

Check Valve: Durable internal spring-loaded check valve — **NEW! on JP Series**

Pentek® XE Series Motor: Our powerful, encapsulated submersible 2 and 3 wire motors drive all of our pumps. These powerful motors have been proven over the years with over a million motors installed across the world!

POWERED BY PENTEK®

C US

NSF/ANSI 61 Drinking Water

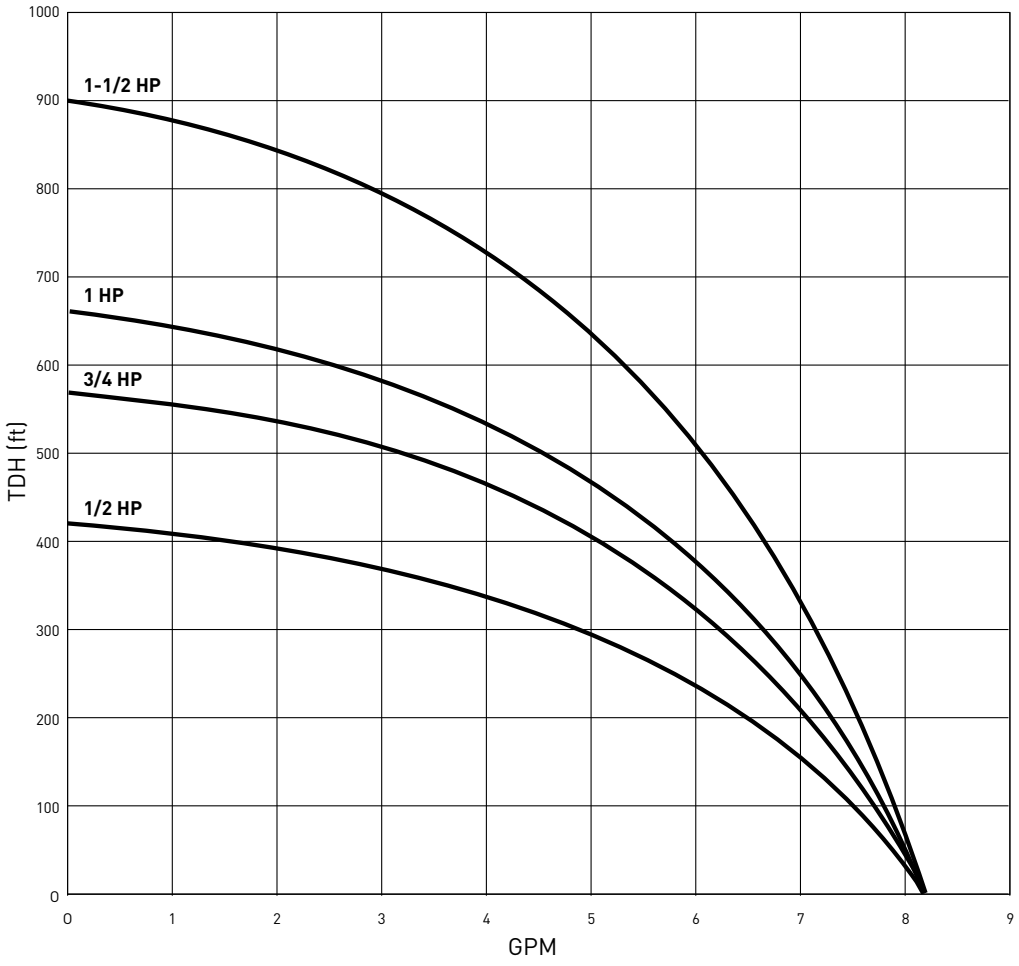
SPECIFICATIONS

	MS Series	JP Series
SUCTION/DISCHARGE		
Material	300-Grade Stainless Steel	Nylon 610 (Composite)
SCREEN		
Type	Serviceable	Integrated
Material	300-Grade Stainless Steel	Nylon 610
CABLE GUARD		
Material	300-Grade Stainless Steel	PVC
Attachment Method	2 screws – 300-Grade Stainless Steel and 2 hooks	2 screws – 300-Grade Stainless Steel and bottom inserts into suction slots
Screw Placement	Discharge/Shell area	Discharge/Shell area
SHELL		
Material	300-Grade Stainless Steel	300-Grade Stainless Steel
Construction Method	Threaded, left-handed threads	Sealed
Thickness	.065"	.032"
Serviceable	Yes	No

ORDERING INFORMATION

GPM	Motor Type	HP	Stages	PH	Volt	Assembled Pump			Pump End			Motor		Drive		Control Box	
						Catalog Number	Length (in.)	Weight (lbs.)	Catalog Number	Length (in.)	Weight (lbs.)	Catalog Number	Weight (lbs.)	Catalog Number	Weight (lbs.)	Catalog Number	Weight (lbs.)
MS SERIES																	
5	2	1/2	14	1	115	**B5P4MS05121**	28	28	**L5P4CMGS**	18	12	**P42B0005A1-C**	19	**PID10**	22		
		1/2	14	1	230	**B5P4MS05221**	28	28	**L5P4CMGS**	18	12	**P42B0005A2-C**	19				
		3/4	19	1	230	**B5P4MS07221**	33	34	**L5P4DMGS**	22	15	**P42B0007A2-C**	23				
		1	22	1	230	**B5P4MS10221**	37	39	**L5P4EMGS**	26	17	**P42B0010A2-C**	25				
		1 1/2	30	1	230	**B5P4MS15221**	47	51	**L5P4FMGS**	32	21	**P42B0015A2-C**	29	**PID20**			
	3	1/2	14	1	230	**B5P4MS05231**	28	28	**L5P4CMGS**	18	12	**P43B0005A2-C**	18	**PID10**		**SMC-CR0521**	4
		3/4	19	1	230	**B5P4MS07231**	33	34	**L5P4CMGS**	22	15	**P43B0007A2-C**	21			**SMC-CR0721**	4
		1	22	1	230	**B5P4MS10231**	38	39	**L5P4DMGS**	26	17	**P43B0010A2-C**	23			**SMC-CR1021**	4
		1 1/2	30	1	230	**B5P4MS15231**	46	48	**L5P4EMGS**	32	21	**P43B0015A2-C**	27	**PID20**		**SMC-CR1521**	7
JP SERIES																	
5	2	1/2	14	1	115	**B5P4JP05121**	28	28	**SL5P4CJ**	18	12	**P42B0005A1-C**	19	**PID10**	22		
		1/2	14	1	230	**B5P4JP05221**	28	28	**SL5P4CJ**	18	12	**P42B0005A2-C**	19				
		3/4	19	1	230	**B5P4JP07221**	33	34	**SL5P4DJ**	22	15	**P42B0007A2-C**	23				
		1	22	1	230	**B5P4JP10221**	37	39	**SL5P4EJ**	26	17	**P42B0010A2-C**	25				
	3	1/2	14	1	230	**B5P4JP05231**	28	28	**SL5P4CJ**	18	12	**P43B0005A2-C**	18	**PID10**		**SMC-CR0521**	4
		3/4	19	1	230	**B5P4JP07231**	33	34	**SL5P4CJ**	22	15	**P43B0007A2-C**	21			**SMC-CR0721**	4
		1	22	1	230	**B5P4JP10231**	38	39	**SL5P4DJ**	26	17	**P43B0010A2-C**	23			**SMC-CR1021**	4

PUMP PERFORMANCE



PUMP PERFORMANCE (CAPACITY IN GALLONS PER MINUTE)

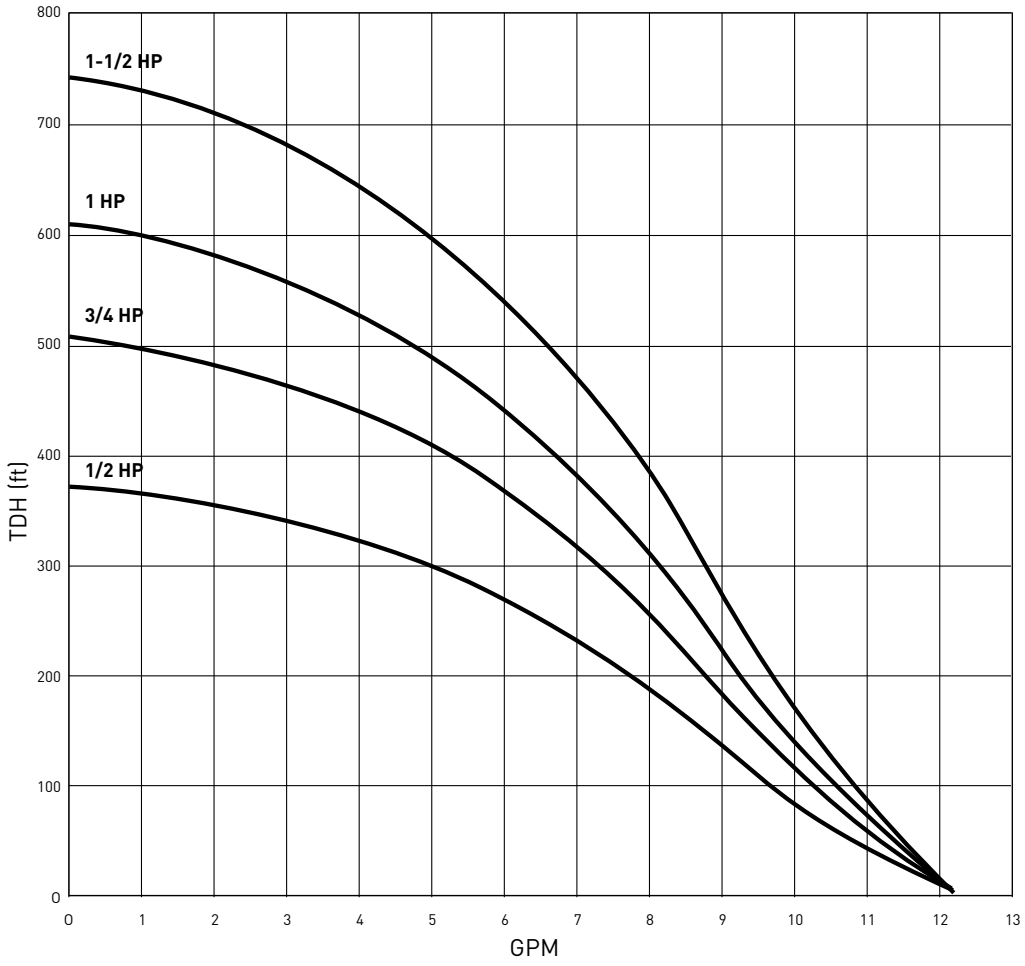
5 GALLONS PER MINUTE

HP	PSI	Pumping Depth in Feet																													Shut-Off Head	
		0	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	450	500	550	600	650	700	750	800	850	Feet	PSI
1/2	0	-	-	-	-	-	-	-	7.3	7.0	6.8	6.5	6.2	5.9	5.6	5.2	4.9	4.4	4.0	3.5	2.9	2.1	-	-	-	-	-	-	-	-	-	421	182
	20	-	-	-	-	7.5	7.2	7.0	6.7	6.4	6.1	5.8	5.5	5.1	4.7	4.3	3.9	3.3	2.7	1.7	-	-	-	-	-	-	-	-	-	-	-		
	30	-	-	-	7.4	7.2	6.9	6.6	6.4	6.1	5.7	5.4	5.1	4.7	4.2	3.8	3.2	2.5	1.5	-	-	-	-	-	-	-	-	-	-	-	-		
	40	-	-	7.4	7.1	6.9	6.6	6.3	6.0	5.7	5.4	5.0	4.6	4.2	3.7	3.1	2.4	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-		
	50	-	7.4	7.1	6.8	6.6	6.3	6.0	5.6	5.3	4.9	4.5	4.1	3.6	3.0	2.3	1.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	60	7.3	7.1	6.8	6.5	6.2	5.9	5.6	5.3	4.9	4.5	4.0	3.5	2.9	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	70	7.0	6.8	6.5	6.2	5.9	5.5	5.2	4.8	4.4	4.0	3.4	2.8	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	80	6.7	6.4	6.1	5.8	5.5	5.1	4.8	4.3	3.9	3.4	2.7	1.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
3/4	0	-	-	-	-	-	-	-	-	-	7.4	7.2	7.0	6.8	6.6	6.4	6.2	6.0	5.7	5.5	5.2	5.0	4.2	3.2	1.8	-	-	-	-	-	-	571	247
	20	-	-	-	-	-	-	-	7.3	7.1	7.0	6.8	6.6	6.3	6.1	5.9	5.7	5.4	5.1	4.9	4.6	4.3	3.3	2.0	-	-	-	-	-	-	-		
	30	-	-	-	-	-	7.5	7.3	7.1	6.9	6.7	6.5	6.3	6.1	5.9	5.6	5.4	5.1	4.8	4.5	4.2	3.9	2.8	-	-	-	-	-	-	-	-		
	40	-	-	-	-	7.5	7.3	7.1	6.9	6.7	6.5	6.3	6.1	5.8	5.6	5.3	5.1	4.8	4.5	4.2	3.8	3.4	2.1	-	-	-	-	-	-	-	-		
	50	-	-	-	7.4	7.3	7.1	6.9	6.7	6.5	6.2	6.0	5.8	5.5	5.3	5.0	4.7	4.4	4.1	3.7	3.3	2.9	-	-	-	-	-	-	-	-	-		
	60	-	-	7.4	7.2	7.0	6.8	6.6	6.4	6.2	6.0	5.7	5.5	5.2	5.0	4.7	4.4	4.1	3.7	3.3	2.8	2.2	-	-	-	-	-	-	-	-	-		
	70	-	7.4	7.2	7.0	6.8	6.6	6.4	6.2	5.9	5.7	5.5	5.2	4.9	4.6	4.3	4.0	3.6	3.2	2.7	2.1	1.2	-	-	-	-	-	-	-	-	-		
	80	7.4	7.2	7.0	6.8	6.6	6.4	6.1	5.9	5.7	5.4	5.2	4.9	4.6	4.3	3.9	3.6	3.1	2.6	2.0	-	-	-	-	-	-	-	-	-	-	-		
1	0	-	-	-	-	-	-	-	-	-	-	7.5	7.3	7.1	7.0	6.8	6.6	6.4	6.3	6.1	5.9	5.7	5.1	4.5	3.8	2.8	1.2	-	-	-	-	661	286
	20	-	-	-	-	-	-	-	-	7.4	7.3	7.1	6.9	6.7	6.6	6.4	6.2	6.0	5.8	5.6	5.4	5.2	4.5	3.8	2.9	1.4	-	-	-	-	-		
	30	-	-	-	-	-	-	7.5	7.4	7.2	7.1	6.9	6.7	6.5	6.4	6.2	6.0	5.8	5.6	5.3	5.1	4.9	4.2	3.4	2.3	-	-	-	-	-	-		
	40	-	-	-	-	-	7.5	7.4	7.2	7.0	6.9	6.7	6.5	6.3	6.1	5.9	5.7	5.5	5.3	5.1	4.8	4.6	3.9	3.0	1.6	-	-	-	-	-	-		
	50	-	-	-	-	7.5	7.3	7.2	7.0	6.8	6.7	6.5	6.3	6.1	5.9	5.7	5.5	5.3	5.0	4.8	4.5	4.3	3.5	2.4	-	-	-	-	-	-	-		
	60	-	-	-	7.5	7.3	7.2	7.0	6.8	6.6	6.5	6.3	6.1	5.9	5.7	5.5	5.2	5.0	4.8	4.5	4.2	3.9	3.1	1.7	-	-	-	-	-	-	-		
	70	-	-	7.4	7.3	7.1	7.0	6.8	6.6	6.4	6.2	6.1	5.9	5.6	5.4	5.2	5.0	4.7	4.5	4.2	3.9	3.6	2.5	-	-	-	-	-	-	-	-		
	80	-	7.4	7.3	7.1	6.9	6.8	6.6	6.4	6.2	6.0	5.8	5.6	5.4	5.2	4.9	4.7	4.4	4.1	3.8	3.5	3.1	1.9	-	-	-	-	-	-	-	-		
1 1/2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	7.5	7.4	7.3	7.2	7.1	6.9	6.8	6.7	6.4	6.0	5.6	5.2	4.8	4.3	3.8	3.1	2.2	901	390
	20	-	-	-	-	-	-	-	-	-	-	-	7.5	7.4	7.3	7.1	7.0	6.9	6.8	6.6	6.5	6.4	6.0	5.7	5.3	4.8	4.3	3.8	3.2	2.3	-		
	30	-	-	-	-	-	-	-	-	-	-	7.5	7.4	7.2	7.1	7.0	6.9	6.8	6.6	6.5	6.4	6.2	5.9	5.5	5.1	4.6	4.1	3.5	2.8	1.8	-		
	40	-	-	-	-	-	-	-	-	-	7.5	7.3	7.2	7.1	7.0	6.9	6.7	6.6	6.5	6.3	6.2	6.1	5.7	5.3	4.9	4.4	3.8	3.2	2.4	-	-		
	50	-	-	-	-	-	-	7.7	7.6	7.4	7.3	7.2	7.1	7.0	6.8	6.7	6.6	6.5	6.3	6.2	6.0	5.9	5.5	5.1	4.6	4.1	3.6	2.9	1.9	-	-		
	60	-	-	-	-	-	-	7.5	7.4	7.3	7.2	7.1	6.9	6.8	6.7	6.6	6.4	6.3	6.2	6.0	5.9	5.7	5.3	4.9	4.4	3.9	3.3	2.5	-	-	-		
	70	-	-	-	-	-	7.5	7.4	7.3	7.2	7.1	6.9	6.8	6.7	6.5	6.4	6.3	6.1	6.0	5.8	5.7	5.5	5.1	4.7	4.2	3.6	2.9	2.0	-	-	-		
	80	-	-	-	-	7.5	7.4	7.3	7.2	7.0	6.9	6.8	6.7	6.5	6.4	6.3	6.1	6.0	5.8	5.7	5.5	5.4	4.9	4.5	3.9	3.3	2.5	1.3	-	-	-		

ORDERING INFORMATION

GPM	Motor Type	HP	Stages	PH	Volt	Assembled Pump			Pump End			Motor		Drive		Control Box	
						Catalog Number	Length (in.)	Weight (lbs.)	Catalog Number	Length (in.)	Weight (lbs.)	Catalog Number	Weight (lbs.)	Catalog Number	Weight (lbs.)	Catalog Number	Weight (lbs.)
MS SERIES																	
7	2	1/2	11	1	115	**B7P4MS05121**	26	27	**L7P4CMGS**	16	11	**P42B0005A1-C**	19	**PID10**	22		
		1/2	11	1	230	**B7P4MS05221**	26	27	**L7P4CMGS**	16	11	**P42B0005A2-C**	19				
		3/4	15	1	230	**B7P4MS07221**	30	32	**L7P4DMGS**	19	13	**P42B0007A2-C**	23				
		1	18	1	230	**B7P4MS10221**	34	37	**L7P4EMGS**	22	15	**P42B0010A2-C**	25				
		1 1/2	22	1	230	**B7P4MS15221**	43	47	**L7P4FMGS**	28	17	**P42B0015A2-C**	29	**PID20**			
	3	1/2	11	1	230	**B7P4MS05231**	26	27	**L7P4CMGS**	16	11	**P43B0005A2-C**	19	**PID10**		**SMC-CR0521**	4
		3/4	15	1	230	**B7P4MS07231**	30	32	**L7P4DMGS**	19	13	**P43B0007A2-C**	21			**SMC-CR0721**	4
		1	18	1	230	**B7P4MS10231**	34	37	**L7P4EMGS**	22	15	**P43B0010A2-C**	23			**SMC-CR1021**	4
		1 1/2	22	1	230	**B7P4MS15231**	42	47	**L7P4FMGS**	28	17	**P43B0015A2-C**	27	**PID20**		**SMC-CR1521**	7
JP SERIES																	
7	2	1/2	11	1	115	**B7P4JP05121**	26	27	**SL7P4CJL**	16	11	**P42B0005A1-C**	19	**PID10**	22		
		1/2	11	1	230	**B7P4JP05221**	26	27	**SL7P4CJL**	16	11	**P42B0005A2-C**	19				
		3/4	15	1	230	**B7P4JP07221**	30	32	**SL7P4DJL**	19	13	**P42B0007A2-C**	23				
		1	18	1	230	**B7P4JP10221**	34	37	**SL7P4EJL**	22	15	**P42B0010A2-C**	25				
		1 1/2	22	1	230	**B7P4JP15221**	43	47	**SL7P4FJL**	28	17	**P42B0015A2-C**	29	**PID20**			
	3	1/2	11	1	230	**B7P4JP05231**	26	27	**SL7P4CJL**	16	11	**P43B0005A2-C**	19	**PID10**		**SMC-CR0521**	4
		3/4	15	1	230	**B7P4JP07231**	30	32	**SL7P4DJL**	19	13	**P43B0007A2-C**	21			**SMC-CR0721**	4
		1	18	1	230	**B7P4JP10231**	34	37	SL7P4EJL	22	15	**P43B0010A2-C**	23			**SMC-CR1021**	4
		1 1/2	22	1	230	**B7P4JP15231**	42	47	SL7P4FJL	28	17	**P43B0015A2-C**	27	**PID20**		**SMC-CR1521**	7

PUMP PERFORMANCE



PUMP PERFORMANCE (CAPACITY IN GALLONS PER MINUTE)

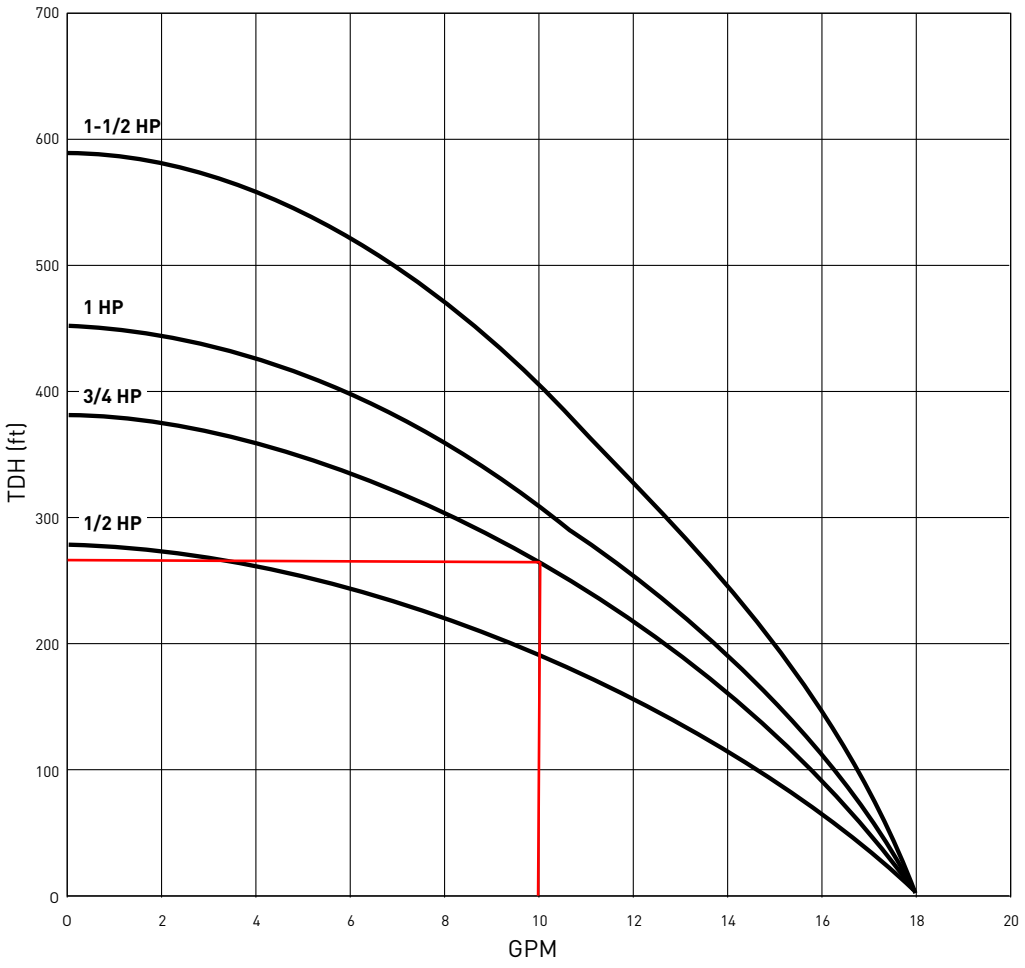
7 GALLONS PER MINUTE

HP	PSI	Pumping Depth in Feet																										Shut-Off Head	
		0	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	450	500	550	600	650	700	Feet	PSI
1/2	0	-	11.0	10.7	10.4	10.0	9.7	9.3	8.9	8.6	8.1	7.7	7.2	6.7	6.2	5.6	5.0	4.2	3.3	-	-	-	-	-	-	-	-	-	372	161
	20	10.6	10.3	9.9	9.6	9.2	8.8	8.4	8.0	7.6	7.1	6.6	6.0	5.4	4.7	3.9	2.9	-	-	-	-	-	-	-	-	-	-	-		
	30	10.2	9.9	9.5	9.2	8.8	8.4	7.9	7.5	7.0	6.5	5.9	5.3	4.6	3.8	2.7	-	-	-	-	-	-	-	-	-	-	-	-		
	40	9.8	9.5	9.1	8.7	8.3	7.9	7.4	6.9	6.4	5.9	5.2	4.5	3.7	2.5	-	-	-	-	-	-	-	-	-	-	-	-	-		
	50	9.4	9.0	8.6	8.2	7.8	7.3	6.9	6.3	5.8	5.1	4.4	3.5	2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	60	9.0	8.6	8.2	7.7	7.3	6.8	6.2	5.7	5.0	4.3	3.3	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	70	8.5	8.1	7.7	7.2	6.7	6.2	5.6	4.9	4.1	3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	80	8.0	7.6	7.1	6.6	6.1	5.5	4.8	4.0	3.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
3/4	0	-	-	10.9	10.6	10.4	10.2	9.9	9.6	9.4	9.1	8.8	8.5	8.2	7.9	7.6	7.2	6.9	6.5	6.1	5.7	5.2	3.8	-	-	-	-	-	507	220
	20	10.8	10.6	10.3	10.1	9.8	9.6	9.3	9.0	8.7	8.4	8.1	7.8	7.5	7.1	6.8	6.4	6.0	5.5	5.0	4.5	3.9	-	-	-	-	-	-		
	30	10.5	10.3	10.0	9.8	9.5	9.2	9.0	8.7	8.4	8.1	7.8	7.4	7.1	6.7	6.3	5.9	5.5	5.0	4.4	3.8	3.0	-	-	-	-	-	-		
	40	10.2	10.0	9.7	9.5	9.2	8.9	8.6	8.3	8.0	7.7	7.4	7.0	6.6	6.3	5.8	5.4	4.9	4.3	3.7	2.9	-	-	-	-	-	-	-		
	50	10.0	9.7	9.4	9.2	8.9	8.6	8.3	8.0	7.7	7.3	7.0	6.6	6.2	5.8	5.3	4.8	4.2	3.6	2.8	-	-	-	-	-	-	-	-		
	60	9.7	9.4	9.1	8.8	8.5	8.2	7.9	7.6	7.3	6.9	6.5	6.1	5.7	5.2	4.7	4.1	3.5	2.6	-	-	-	-	-	-	-	-	-		
	70	9.4	9.1	8.8	8.5	8.2	7.9	7.6	7.2	6.8	6.5	6.1	5.6	5.2	4.6	4.0	3.3	2.5	-	-	-	-	-	-	-	-	-	-		
	80	9.0	8.8	8.5	8.2	7.8	7.5	7.2	6.8	6.4	6.0	5.6	5.1	4.5	3.9	3.2	2.3	-	-	-	-	-	-	-	-	-	-	-		
1	0	-	-	11.0	10.8	10.6	10.4	10.2	9.9	9.7	9.5	9.3	9.1	8.8	8.6	8.3	8.1	7.8	7.5	7.2	6.9	6.6	5.8	4.8	3.5	-	-	-	608	263
	20	10.9	10.7	10.5	10.3	10.1	9.9	9.7	9.4	9.2	9.0	8.7	8.5	8.2	8.0	7.7	7.4	7.1	6.8	6.5	6.2	5.8	4.9	3.6	-	-	-	-		
	30	10.7	10.5	10.3	10.1	9.8	9.6	9.4	9.2	8.9	8.7	8.5	8.2	7.9	7.7	7.4	7.1	6.8	6.5	6.1	5.8	5.4	4.3	2.8	-	-	-	-		
	40	10.4	10.2	10.0	9.8	9.6	9.4	9.1	8.9	8.7	8.4	8.2	7.9	7.6	7.4	7.1	6.8	6.4	6.1	5.7	5.3	4.9	3.7	-	-	-	-	-		
	50	10.2	10.0	9.8	9.6	9.3	9.1	8.9	8.6	8.4	8.1	7.9	7.6	7.3	7.0	6.7	6.4	6.0	5.7	5.3	4.9	4.4	3.0	-	-	-	-	-		
	60	10.0	9.7	9.5	9.3	9.1	8.8	8.6	8.3	8.1	7.8	7.5	7.3	7.0	6.7	6.3	6.0	5.6	5.2	4.8	4.3	3.8	-	-	-	-	-	-		
	70	9.7	9.5	9.3	9.0	8.8	8.6	8.3	8.0	7.8	7.5	7.2	6.9	6.6	6.3	5.9	5.6	5.2	4.7	4.3	3.7	3.1	-	-	-	-	-	-		
	80	9.5	9.2	9.0	8.8	8.5	8.3	8.0	7.7	7.5	7.2	6.9	6.6	6.2	5.9	5.5	5.1	4.7	4.2	3.6	3.0	2.1	-	-	-	-	-	-		
1 1/2	0	-	-	11.0	10.9	10.7	10.5	10.4	10.2	10.0	9.9	9.7	9.5	9.3	9.1	8.9	8.8	8.6	8.3	8.1	7.9	7.7	7.1	6.5	5.8	5.0	4.0	2.7	744	322
	20	11.0	10.8	10.7	10.5	10.3	10.2	10.0	9.8	9.6	9.5	9.3	9.1	8.9	8.7	8.5	8.3	8.1	7.9	7.6	7.4	7.2	6.5	5.8	5.0	4.1	2.8	-		
	30	10.8	10.6	10.5	10.3	10.1	10.0	9.8	9.6	9.4	9.2	9.1	8.9	8.7	8.5	8.3	8.0	7.8	7.6	7.4	7.1	6.9	6.2	5.5	4.6	3.5	-	-		
	40	10.6	10.4	10.3	10.1	9.9	9.8	9.6	9.4	9.2	9.0	8.8	8.6	8.4	8.2	8.0	7.8	7.6	7.3	7.1	6.8	6.6	5.9	5.1	4.2	2.9	-	-		
	50	10.4	10.2	10.1	9.9	9.7	9.6	9.4	9.2	9.0	8.8	8.6	8.4	8.2	8.0	7.8	7.5	7.3	7.1	6.8	6.5	6.3	5.5	4.7	3.6	2.1	-	-		
	60	10.2	10.1	9.9	9.7	9.5	9.3	9.2	9.0	8.8	8.6	8.4	8.2	7.9	7.7	7.5	7.3	7.0	6.8	6.5	6.2	5.9	5.2	4.2	3.0	-	-	-		
	70	10.0	9.9	9.7	9.5	9.3	9.1	8.9	8.7	8.5	8.3	8.1	7.9	7.7	7.5	7.2	7.0	6.7	6.5	6.2	5.9	5.6	4.8	3.7	2.3	-	-	-		
	80	9.8	9.6	9.5	9.3	9.1	8.9	8.7	8.5	8.3	8.1	7.9	7.6	7.4	7.2	6.9	6.7	6.4	6.1	5.9	5.5	5.2	4.3	3.1	-	-	-	-		

ORDERING INFORMATION

GPM	Motor Type	HP	Stages	PH	Volt	Assembled Pump			Pump End			Motor		Drive		Control Box	
						Catalog Number	Length (in.)	Weight (lbs.)	Catalog Number	Length (in.)	Weight (lbs.)	Catalog Number	Weight (lbs.)	Catalog Number	Weight (lbs.)	Catalog Number	Weight (lbs.)
MS SERIES																	
10	2	1/2	8	1	115	B10P4MS05121	23	28	L10P4CMGS	13	9	P42B0005A1-C	19	PID10	22		
		1/2	8	1	230	B10P4MS05221	23	28	L10P4CMGS	13	9	P42B0005A2-C	19				
		3/4	11	1	230	B10P4MS07221	26	31	L10P4DMGS	15	10	P42B0007A2-C	23				
		1	13	1	230	B10P4MS10221	29	35	L10P4EMGS	17	11	P42B0010A2-C	25				
		1 1/2	17	1	230	B10P4MS15221	35	42	L10P4FMGS	20	12	P42B0015A2-C	29	PID20			
	3	1/2	8	1	230	B10P4MS05231	23	28	L10P4CMGS	13	9	P43B0005A2-C	19	PID10		SMC-CR0521	4
		3/4	11	1	230	B10P4MS07231	26	31	L10P4DMGS	15	10	P43B0007A2-C	21			SMC-CR0721	4
		1	13	1	230	B10P4MS10231	29	35	L10P4EMGS	17	11	P43B0010A2-C	23			SMC-CR1021	4
		1 1/2	17	1	230	B10P4MS15231	34	42	L10P4FMGS	20	12	P43B0015A2-C	27	PID20		SMC-CR1521	7
JP SERIES																	
10	2	1/2	8	1	115	B10P4JP05121	23	28	SL10P4CJ	13	9	P42B0005A1-C	19	PID10	22		
		1/2	8	1	230	B10P4JP05221	23	28	SL10P4CJ	13	9	P42B0005A2-C	19				
		3/4	11	1	230	B10P4JP07221	26	31	SL10P4DJ	15	10	P42B0007A2-C	23				
		1	13	1	230	B10P4JP10221	29	35	SL10P4EJ	17	11	P42B0010A2-C	25				
		1 1/2	17	1	230	B10P4JP15221	35	42	SL10P4FJ	20	12	P42B0015A2-C	29	PID20			
	3	1/2	8	1	230	B10P4JP05231	23	28	SL10P4CJ	13	9	P43B0005A2-C	19	PID10		SMC-CR0521	4
		3/4	11	1	230	B10P4JP07231	26	31	SL10P4DJ	15	10	P43B0007A2-C	21			SMC-CR0721	4
		1	13	1	230	B10P4JP10231	29	35	SL10P4EJ	17	11	P43B0010A2-C	23			SMC-CR1021	4
		1 1/2	17	1	230	B10P4JP15231	34	42	SL10P4FJ	20	12	P43B0015A2-C	27	PID20		SMC-CR1521	7

PUMP PERFORMANCE



PUMP PERFORMANCE (CAPACITY IN GALLONS PER MINUTE)

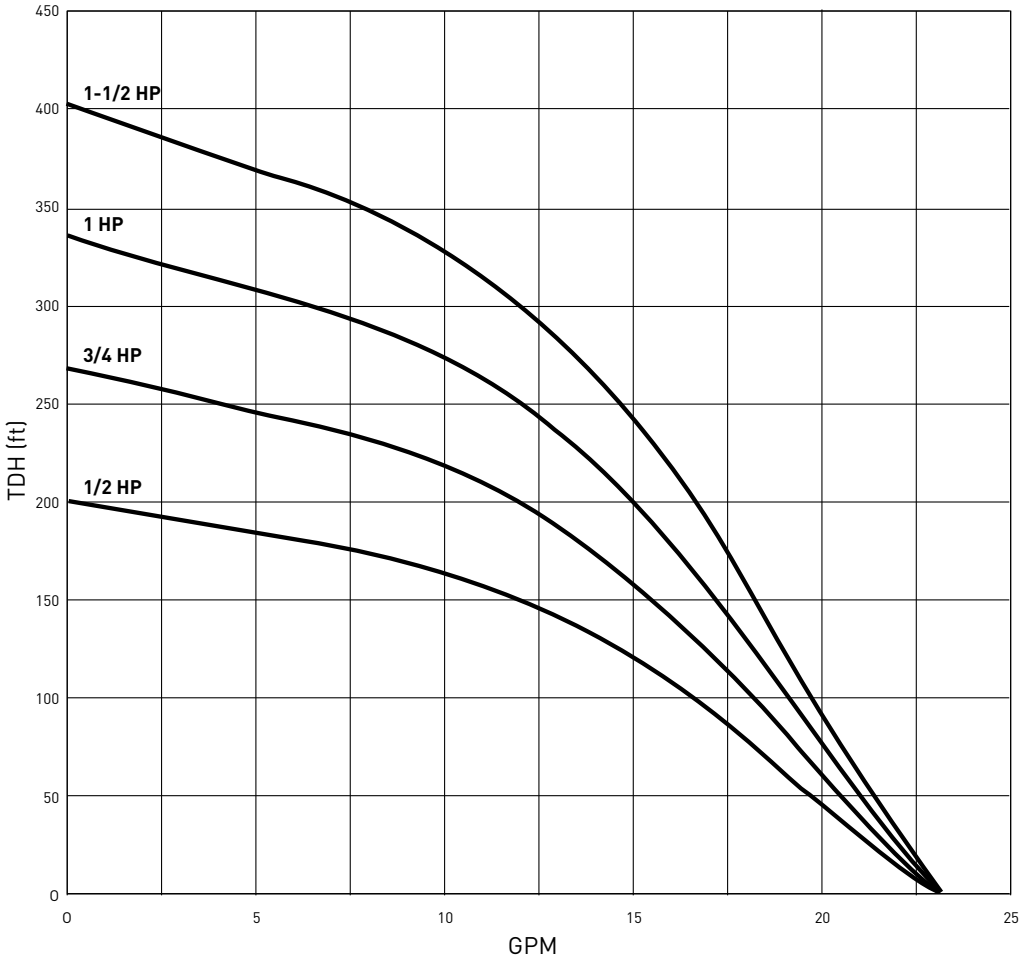
10 GALLONS PER MINUTE

HP	PSI	Pumping Depth in Feet																							Shut-off Head	
		0	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	450	500	550	Feet	PSI
1/2	0	-	-	-	-	-	14.7	13.8	12.9	11.8	10.7	9.4	8.0	6.3	4.1	-	-	-	-	-	-	-	-	-	-	278	120
	20	-	-	-	14.4	13.5	12.5	11.5	10.3	9.0	7.5	5.7	3.2	-	-	-	-	-	-	-	-	-	-	-	-		
	30	-	-	14.3	13.4	12.4	11.3	10.1	8.8	7.3	5.4	2.7	-	-	-	-	-	-	-	-	-	-	-	-	-		
	40	-	14.2	13.2	12.2	11.1	9.9	8.6	7.0	5.1	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	50	14.0	13.1	12.1	11.0	9.7	8.4	6.8	4.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	60	12.9	11.9	10.8	9.5	8.1	6.5	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	70	11.7	10.6	9.3	7.9	6.2	3.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	80	10.4	9.1	7.7	5.9	3.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
3/4	0	-	-	-	-	-	-	-	14.6	14.0	13.3	12.6	11.8	11.0	10.1	9.2	8.2	7.0	5.6	3.9	-	-	-	-	-	382	165
	20	-	-	-	-	-	14.4	13.8	13.1	12.3	11.6	10.7	9.9	8.9	7.8	6.6	5.1	3.2	-	-	-	-	-	-	-		
	30	-	-	-	15.0	14.3	13.7	13.0	12.2	11.5	10.6	9.7	8.7	7.6	6.4	4.9	2.8	-	-	-	-	-	-	-	-		
	40	-	-	14.9	14.2	13.6	12.9	12.1	11.3	10.5	9.6	8.6	7.5	6.2	4.6	2.4	-	-	-	-	-	-	-	-	-		
	50	15.4	14.8	14.1	13.5	12.7	12.0	11.2	10.3	9.4	8.4	7.3	6.0	4.3	-	-	-	-	-	-	-	-	-	-	-		
	60	14.7	14.0	13.3	12.6	11.9	11.1	10.2	9.3	8.2	7.1	5.7	4.0	-	-	-	-	-	-	-	-	-	-	-	-		
	70	13.9	13.2	12.5	11.8	10.9	10.1	9.1	8.1	6.9	5.5	3.7	-	-	-	-	-	-	-	-	-	-	-	-	-		
	80	13.1	12.4	11.6	10.8	9.9	9.0	7.9	6.7	5.3	3.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1	0	-	-	-	-	-	-	-	-	14.8	14.2	13.7	13.1	12.5	11.8	11.1	10.4	9.6	8.8	7.9	6.9	5.7	-	-	-	452	195
	20	-	-	-	-	-	-	14.6	14.1	13.5	12.9	12.3	11.6	10.9	10.2	9.4	8.5	7.6	6.6	5.3	3.8	-	-	-	-		
	30	-	-	-	-	-	14.5	14.0	13.4	12.8	12.2	11.5	10.8	10.1	9.3	8.4	7.5	6.4	5.1	3.5	-	-	-	-	-		
	40	-	-	-	15.0	14.5	13.9	13.3	12.7	12.1	11.4	10.7	9.9	9.1	8.3	7.3	6.2	4.9	3.2	-	-	-	-	-	-		
	50	-	-	14.9	14.4	13.8	13.2	12.6	12.0	11.3	10.6	9.8	9.0	8.1	7.1	6.0	4.7	2.9	-	-	-	-	-	-	-		
	60	-	14.8	14.3	13.7	13.1	12.5	11.9	11.2	10.5	9.7	8.9	8.0	7.0	5.8	4.4	2.6	-	-	-	-	-	-	-	-		
	70	14.7	14.2	13.6	13.0	12.4	11.8	11.1	10.4	9.6	8.7	7.8	6.8	5.6	4.2	2.2	-	-	-	-	-	-	-	-	-		
	80	14.1	13.5	12.9	12.3	11.7	11.0	10.2	9.5	8.6	7.7	6.6	5.4	3.9	-	-	-	-	-	-	-	-	-	-	-		
1 1/2	0	-	-	-	-	-	-	-	-	-	-	15.0	14.6	14.1	13.7	13.3	12.8	12.3	11.8	11.3	10.8	10.2	8.6	6.8	4.3	590	256
	20	-	-	-	-	-	-	-	-	14.9	14.4	14.0	13.6	13.1	12.6	12.2	11.7	11.1	10.6	10.0	9.4	8.8	6.9	4.5	-		
	30	-	-	-	-	-	-	-	14.8	14.4	13.9	13.5	13.0	12.6	12.1	11.6	11.1	10.5	9.9	9.3	8.7	8.0	5.9	2.9	-		
	40	-	-	-	-	-	-	14.7	14.3	13.9	13.4	13.0	12.5	12.0	11.5	11.0	10.4	9.8	9.2	8.6	7.9	7.1	4.7	-	-		
	50	-	-	-	-	-	14.7	14.2	13.8	13.4	12.9	12.4	11.9	11.4	10.9	10.3	9.7	9.1	8.5	7.7	7.0	6.1	3.2	-	-		
	60	-	-	-	15.0	14.6	14.2	13.7	13.3	12.8	12.4	11.9	11.3	10.8	10.2	9.6	9.0	8.3	7.6	6.8	6.0	4.9	-	-	-		
	70	-	-	14.9	14.5	14.1	13.7	13.2	12.8	12.3	11.8	11.3	10.7	10.1	9.5	8.9	8.2	7.5	6.7	5.8	4.8	3.5	-	-	-		
	80	-	14.9	14.5	14.0	13.6	13.2	12.7	12.2	11.7	11.2	10.6	10.1	9.5	8.8	8.1	7.4	6.6	5.7	4.6	3.3	-	-	-	-		

ORDERING INFORMATION

GPM	Motor Type	HP	Stages	PH	Volt	Assembled Pump			Pump End			Motor		Drive		Control Box	
						Catalog Number	Length (in.)	Weight (lbs.)	Catalog Number	Length (in.)	Weight (lbs.)	Catalog Number	Weight (lbs.)	Catalog Number	Weight (lbs.)	Catalog Number	Weight (lbs.)
MS SERIES																	
15	2	1/2	6	1	115	**B15P4MS05121**	23	27	**L15P4CMGS**	13	9	**P42B0005A1-C**	19	**PID10**	22		
		1/2	6	1	230	**B15P4MS05221**	23	27	**L15P4CMGS**	13	9	**P42B0005A2-C**	19				
		3/4	8	1	230	**B15P4MS07221**	26	31	**L15P4DMGS**	15	10	**P42B0007A2-C**	23				
		1	10	1	230	**B15P4MS10221**	30	35	**L15P4EMGS**	17	11	**P42B0010A2-C**	25				
		1 1/2	12	1	230	**B15P4MS15221**	36	43	**L15P4FMGS**	21	13	**P42B0015A2-C**	29	**PID20**			
	3	1/2	6	1	230	**B15P4MS05231**	23	27	**L15P4CMGS**	13	9	**P43B0005A2-C**	19	**PID10**		**SMC-CR0521**	4
		3/4	8	1	230	**B15P4MS07231**	26	31	**L15P4DMGS**	15	10	**P43B0007A2-C**	21			**SMC-CR0721**	4
		1	10	1	230	**B15P4MS10231**	30	35	**L15P4EMGS**	17	11	**P43B0010A2-C**	23			**SMC-CR1021**	4
		1 1/2	12	1	230	**B15P4MS15231**	34	41	**L15P4FMGS**	21	13	**P43B0015A2-C**	27	**PID20**		**SMC-CR1521**	7
JP SERIES																	
15	2	1/2	6	1	115	**B15P4JP05121**	23	27	**SL15P4CJ**	13	9	**P42B0005A1-C**	19	**PID10**	22		
		1/2	6	1	230	**B15P4JP05221**	23	27	**SL15P4CJ**	13	9	**P42B0005A2-C**	19				
		3/4	8	1	230	**B15P4JP07221**	26	31	**SL15P4DJ**	15	10	**P42B0007A2-C**	23				
		1	10	1	230	**B15P4JP10221**	30	35	**SL15P4EJ**	17	11	**P42B0010A2-C**	25				
		1 1/2	12	1	230	**B15P4JP15221**	36	43	**SL15P4FJ**	21	13	**P42B0015A2-C**	29	**PID20**			
	3	1/2	6	1	230	**B15P4JP05231**	23	27	**SL15P4CJ**	13	9	**P43B0005A2-C**	19	**PID10**		**SMC-CR0521**	4
		3/4	8	1	230	**B15P4JP07231**	26	31	**SL15P4DJ**	15	10	**P43B0007A2-C**	21			**SMC-CR0721**	4
		1	10	1	230	**B15P4JP10231**	30	35	**SL15P4EJ**	17	11	**P43B0010A2-C**	23			**SMC-CR1021**	4
		1 1/2	12	1	230	**B15P4JP15231**	34	41	**SL15P4FJ**	21	13	**P43B0015A2-C**	27	**PID20**		**SMC-CR1521**	7

PUMP PERFORMANCE



PUMP PERFORMANCE (CAPACITY IN GALLONS PER MINUTE)

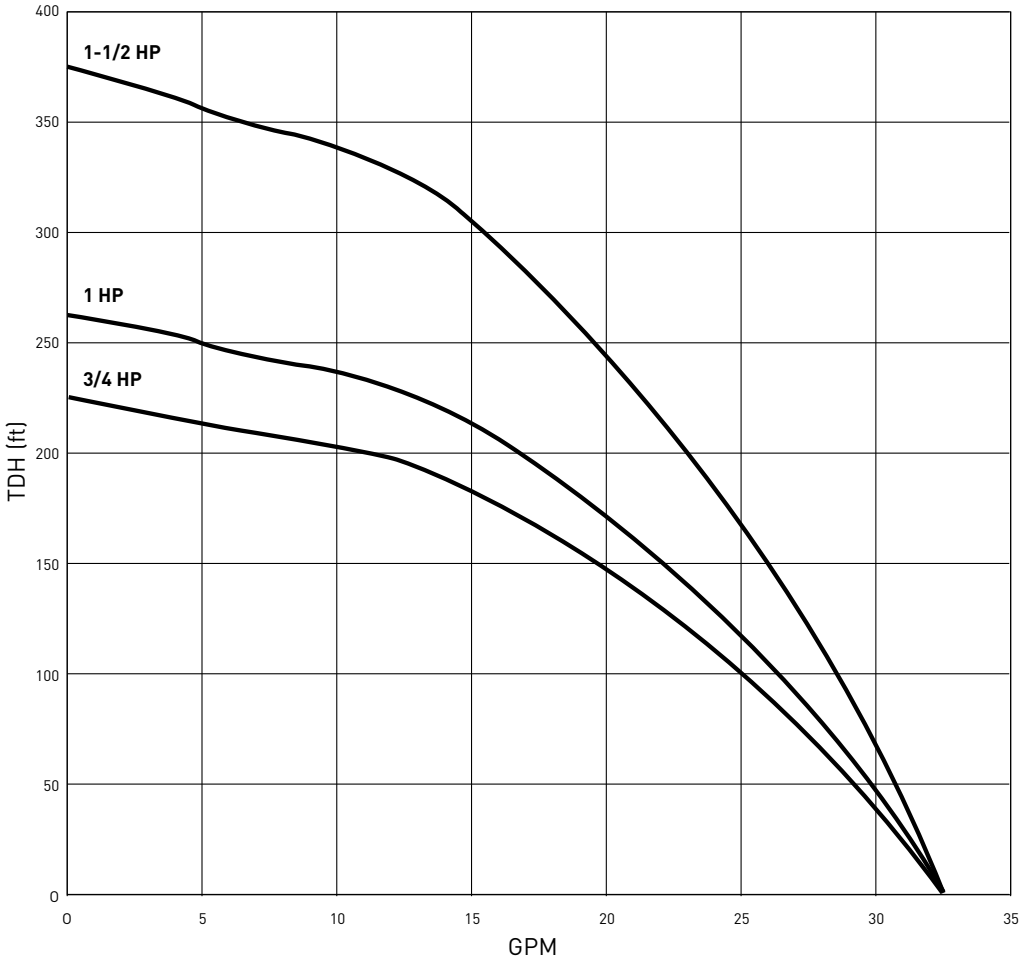
15 GALLONS PER MINUTE

HP	PSI	Pumping Depth in Feet																					Shut-off Head	
		0	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	Feet	PSI
1/2	0	-	-	20.5	19.2	17.8	16.3	14.7	12.8	10.5	7.5	-	-	-	-	-	-	-	-	-	-	-	201	87
	20	20.1	18.8	17.4	15.8	14.1	12.1	9.7	6.2	-	-	-	-	-	-	-	-	-	-	-	-	-		
	30	18.6	17.1	15.6	13.8	11.8	9.2	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	40	16.9	15.3	13.5	11.4	8.8	4.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	50	15.1	13.2	11.0	8.3	3.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	60	12.9	10.7	7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	70	10.3	7.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	80	6.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
3/4	0	-	-	-	20.2	19.2	18.2	17.1	15.9	14.7	13.3	11.7	9.8	7.5	3.6	-	-	-	-	-	-	-	269	116
	20	20.8	19.9	18.9	17.9	16.7	15.5	14.2	12.8	11.2	9.2	6.6	-	-	-	-	-	-	-	-	-	-		
	30	19.7	18.7	17.7	16.6	15.4	14.0	12.6	10.9	8.8	6.1	-	-	-	-	-	-	-	-	-	-	-		
	40	18.6	17.5	16.4	15.2	13.8	12.3	10.6	8.5	5.5	-	-	-	-	-	-	-	-	-	-	-	-		
	50	17.3	16.2	15.0	13.6	12.1	10.3	8.1	4.8	-	-	-	-	-	-	-	-	-	-	-	-	-		
	60	16.0	14.8	13.4	11.8	10.0	7.7	4.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	70	14.5	13.1	11.5	9.7	7.3	3.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	80	12.9	11.3	9.3	6.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1	0	-	-	-	-	20.4	19.6	18.7	17.8	16.9	15.9	14.8	13.6	12.3	10.9	9.3	7.3	4.5	-	-	-	-	336	145
	20	-	21.0	20.2	19.3	18.5	17.5	16.6	15.5	14.4	13.2	11.9	10.4	8.7	6.6	3.2	-	-	-	-	-	-		
	30	20.9	20.1	19.2	18.3	17.4	16.4	15.4	14.3	13.0	11.7	10.2	8.4	6.2	2.4	-	-	-	-	-	-	-		
	40	19.9	19.1	18.2	17.3	16.3	15.2	14.1	12.8	11.5	9.9	8.1	5.7	-	-	-	-	-	-	-	-	-		
	50	18.9	18.0	17.1	16.1	15.0	13.9	12.6	11.3	9.7	7.8	5.3	-	-	-	-	-	-	-	-	-	-		
	60	17.9	17.0	15.9	14.9	13.7	12.4	11.0	9.4	7.5	4.8	-	-	-	-	-	-	-	-	-	-	-		
	70	16.8	15.8	14.7	13.5	12.2	10.8	9.1	7.1	4.2	-	-	-	-	-	-	-	-	-	-	-	-		
	80	15.6	14.5	13.3	12.0	10.6	8.8	6.7	3.6	-	-	-	-	-	-	-	-	-	-	-	-	-		
1 1/2	0	-	-	-	-	20.5	19.9	19.2	18.5	17.8	17.1	16.3	15.5	14.7	13.7	12.8	11.7	10.5	9.1	7.5	5.3	-	403	174
	20	-	20.9	20.3	19.7	19.0	18.3	17.6	16.9	16.1	15.3	14.4	13.4	12.4	11.3	10.1	8.7	6.9	4.3	-	-	-		
	30	20.8	20.2	19.6	18.9	18.2	17.5	16.7	16.0	15.1	14.2	13.3	12.3	11.2	9.9	8.4	6.6	3.8	-	-	-	-		
	40	20.1	19.5	18.8	18.1	17.4	16.6	15.8	15.0	14.1	13.1	12.1	11.0	9.7	8.2	6.2	3.0	-	-	-	-	-		
	50	19.4	18.7	18.0	17.3	16.5	15.7	14.9	14.0	13.0	11.9	10.8	9.5	7.9	5.9	1.8	-	-	-	-	-	-		
	60	18.6	17.9	17.1	16.4	15.6	14.7	13.8	12.8	11.8	10.6	9.2	7.6	5.5	-	-	-	-	-	-	-	-		
	70	17.8	17.0	16.3	15.4	14.6	13.7	12.7	11.6	10.4	9.0	7.3	5.1	-	-	-	-	-	-	-	-	-		
	80	16.9	16.1	15.3	14.4	13.5	12.5	11.4	10.2	8.8	7.0	4.6	-	-	-	-	-	-	-	-	-	-		

ORDERING INFORMATION

GPM	Motor Type	HP	Stages	PH	Volt	Assembled Pump			Pump End			Motor		Drive		Control Box	
						Catalog Number	Length (in.)	Weight (lbs.)	Catalog Number	Length (in.)	Weight (lbs.)	Catalog Number	Weight (lbs.)	Catalog Number	Weight (lbs.)	Catalog Number	Weight (lbs.)
MS SERIES																	
20	2	3/4	6	1	230	B20P4MS07221	24	30	L20P4DMGS	13	9	P42B0007A2-C	23	PID10	22		
		1	7	1	230	B20P4MS10221	28	34	L20P4EMGS	15	10	P42B0010A2-C	25				
		1 1/2	9	1	230	B20P4MS15221	32	39	L20P4FMGS	17	11	P42B0015A2-C	29	PID20			
	3	3/4	6	1	230	B20P4MS07231	24	30	L20P4DMGS	13	9	P43B0007A2-C	23	PID10		SMC-CR0721	4
		1	7	1	230	B20P4MS10231	28	34	L20P4EMGS	15	10	P43B0010A2-C	25			SMC-CR1021	4
		1 1/2	9	1	230	B20P4MS15231	31	39	L20P4FMGS	17	11	P43B0015A2-C	29	PID20		SMC-CR1521	7
JP SERIES																	
20	2	3/4	6	1	230	B20P4JP07221	24	30	SL20P4DJ	13	9	P42B0007A2-C	23	PID10	22		
		1	7	1	230	B20P4JP10221	28	34	SL20P4EJ	15	10	P42B0010A2-C	25				
		1 1/2	10	1	230	B20P4JP15221	32	39	SL20P4FJ	17	11	P42B0015A2-C	29	PID20			
	3	3/4	6	1	230	B20P4JP07231	24	30	SL20P4DJ	13	9	P43B0007A2-C	23	PID10		SMC-CR0721	4
		1	7	1	230	B20P4JP10231	28	34	SL20P4EJ	15	10	P43B0010A2-C	25			SMC-CR1021	4
		1 1/2	10	1	230	B20P4JP15231	31	39	SL20P4FJ	17	11	P43B0015A2-C	29	PID20		SMC-CR1521	7

PUMP PERFORMANCE



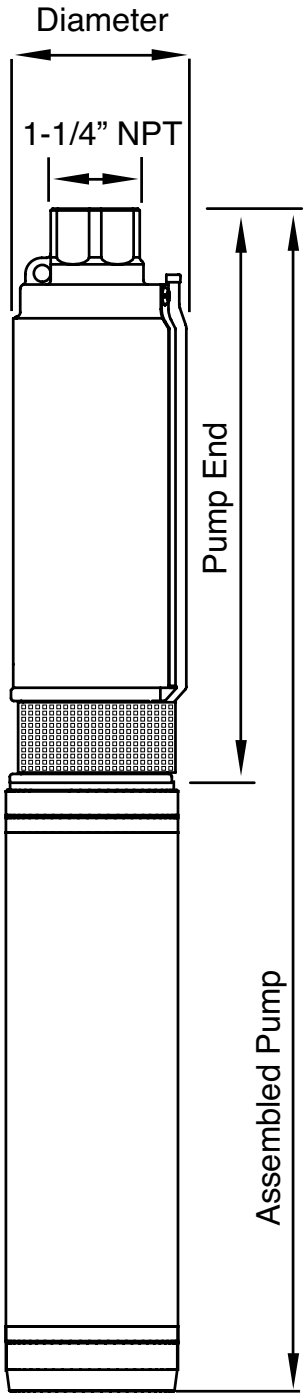
PUMP PERFORMANCE (CAPACITY IN GALLONS PER MINUTE)

20 GALLONS PER MINUTE

HP	PSI	Pumping Depth in Feet																					Shut-Off Head	
		0	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	Feet	PSI
3/4	0	-	-	-	-	26.9	25.0	23.0	20.7	18.1	15.1	11.3	4.9	-	-	-	-	-	-	-	-	-	225	97
	20	-	-	26.3	24.4	22.3	19.9	17.3	14.1	9.8	-	-	-	-	-	-	-	-	-	-	-	-		
	30	27.9	26.1	24.1	21.9	19.6	16.8	13.5	9.0	-	-	-	-	-	-	-	-	-	-	-	-	-		
	40	25.8	23.8	21.6	19.2	16.4	12.9	8.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	50	23.4	21.2	18.8	15.9	12.3	7.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	60	20.9	18.3	15.4	11.6	5.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	70	17.9	14.9	10.9	3.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	80	14.3	10.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1	0	-	-	-	-	27.9	26.4	24.7	23.0	21.0	18.9	16.5	13.6	10.0	2.8	-	-	-	-	-	-	-	262	114
	20	-	-	27.5	25.9	24.2	22.4	20.4	18.2	15.7	12.6	8.5	-	-	-	-	-	-	-	-	-	-		
	30	-	27.2	25.6	23.9	22.1	20.1	17.8	15.2	12.1	7.6	-	-	-	-	-	-	-	-	-	-	-		
	40	27.0	25.4	23.7	21.8	19.7	17.5	14.8	11.5	6.6	-	-	-	-	-	-	-	-	-	-	-	-		
	50	25.1	23.4	21.5	19.4	17.1	14.3	10.9	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-		
	60	23.1	21.2	19.1	16.7	13.9	10.3	3.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	70	20.9	18.7	16.3	13.4	9.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
	80	18.4	15.9	12.9	8.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
1 1/2	0	-	-	-	-	-	-	27.9	26.8	25.6	24.4	23.1	21.7	20.2	18.6	16.9	15.0	12.7	10.0	6.1	-	-	375	162
	20	-	-	-	-	27.5	26.4	25.2	24.0	22.6	21.3	19.8	18.1	16.3	14.3	12.0	9.0	4.1	-	-	-	-		
	30	-	-	-	27.4	26.2	25.0	23.8	22.4	21.0	19.5	17.9	16.0	14.0	11.6	8.4	2.6	-	-	-	-	-		
	40	-	-	27.2	26.0	24.8	23.6	22.2	20.8	19.3	17.6	15.7	13.6	11.1	7.8	-	-	-	-	-	-	-		
	50	-	27.0	25.8	24.6	23.4	22.0	20.6	19.0	17.3	15.4	13.3	10.7	7.2	-	-	-	-	-	-	-	-		
	60	26.8	25.7	24.4	23.2	21.8	20.3	18.8	17.0	15.1	12.9	10.2	6.5	-	-	-	-	-	-	-	-	-		
	70	25.5	24.2	23.0	21.6	20.1	18.5	16.8	14.8	12.5	9.7	5.6	-	-	-	-	-	-	-	-	-	-		
	80	24.1	22.7	21.4	19.9	18.2	16.5	14.5	12.2	9.2	4.7	-	-	-	-	-	-	-	-	-	-	-		

OUTLINE DIMENSIONS: 10, 15 AND 20 GPM

DIAMETER (in inches)	
5, 7 GPM	3-3/4
10, 15, 20 GPM	3-7/8



For lengths, refer to Ordering Information tables.
Dimensions (in inches) are for estimating purposes only.

NOTES

293 WRIGHT STREET, DELAVAN, WI 53115 www.BerkeleyPumps.com
PH: 888-782-7483 ORDERS FAX: 800-426-9446

B11575WS (06/26/15)

4" Submersible Motors Super Stainless

Applications

These motors are built for dependable operation in 4" diameter or larger water wells.

Basic Features

- Corrosion-resistant stainless steel exterior
- Stainless steel splined shaft
- Hermetically-sealed windings
- StatorShield™ resin system
- Filter check valve
- Water lubrication
- Kingsbury-type thrust bearing
- Pressure-equalizing diaphragm
- Built-in lightning arrestors (All single-phase; 200 & 300 V three-phase)
- Removable water bloc lead
- Franklin-manufactured control boxes available for single-phase motors
- UL 778 recognized (North American voltages)
- CSA certified
- ANSI/NSF 61 certified
- Industry standard NEMA mounting dimensions

Special Features

- Flow inducer sleeve not required in water up to 86 °F (30 °C) for motors through 2 hp.
- Two-wire motors are split-phase designs with integral starting components and do not require a control box. They feature Franklin's patented 2-wire BIAC starting switch which provides Reverse Impact Torque to aid starting in adverse environments and prevents extreme fast cycling (e.g. water logged tank).
- Three-wire motors through 1 hp use Franklin's exclusive three-wire QD (Quick Disconnect) Control Box with the patented QD Relay. This relay provides the ultimate in operational life.
- Single-phase motors can be used with Pumptec products to protect against dry-run and other installation conditions that can damage motors and/or pumps. See Single-phase Protection Devices for details.

Constant Pressure Options

- Use Franklin's MonoDrive controller with 1½ hp three-wire single-phase motors to provide constant water pressure.
- Three-phase motors can be used with SubDrive controllers to provide constant water pressure.

Pollution Recovery Option

- Pollution Recovery motors are equipped for use in monitoring and recovery wells in which hydrocarbons and other chemicals may be present.
- Special Viton® rubber parts and other chemical resistant materials as listed in Construction Materials chart.

4" Submersible Motors Super Stainless

4-Inch Super Stainless Motor Specifications

Hz	Ph	Hp Range	kW Range	Poles	RPM	Max. Ambient Temp.	Duty Rating
60	2-Wire	0.3 - 1.5	0.25 - 1.1	2	3450	86 °F / 30 °C	Continuous
50	2-Wire	0.5 - 1.5	0.37 - 1.1	2	2875	86 °F / 30 °C	Continuous
60	3-Wire	0.3 - 3	0.25 - 2.2	2	3450	86 °F / 30 °C	Continuous*
50	3-Wire	0.3 - 3	0.25 - 2.2	2	2875	86 °F / 30 °C	Continuous*
60	Three-Phase	0.5 - 3	0.37 - 2.2	2	3450	86 °F / 30 °C	Continuous*
50	Three-Phase	0.5 - 3	0.37 - 2.2	2	2875	86 °F / 30 °C	Continuous*

4-Inch Pollution Recovery Motor Specifications

Hz	Ph	Hp Range	kW Range	Poles	RPM	Max. Ambient Temp.	Duty Rating
60	2-Wire	0.3 - 1.5	0.25 - 1.1	2	3450	86 °F / 30 °C	Continuous
50	2-Wire	0.5 - 1.5	0.37 - 1.1	2	2875	86 °F / 30 °C	Continuous
60	3-Wire	0.3 - 2	0.25 - 1.5	2	3450	86 °F / 30 °C	Continuous*
50	3-Wire	0.3 - 2	0.25 - 1.5	2	2875	86 °F / 30 °C	Continuous*
60	Three-Phase	0.5 - 2	0.37 - 1.5	2	3450	86 °F / 30 °C	Continuous*
50	Three-Phase	0.5 - 2	0.37 - 1.5	2	2875	86 °F / 30 °C	Continuous*

* 3 hp motors require 0.25 ft/sec flow past motor.

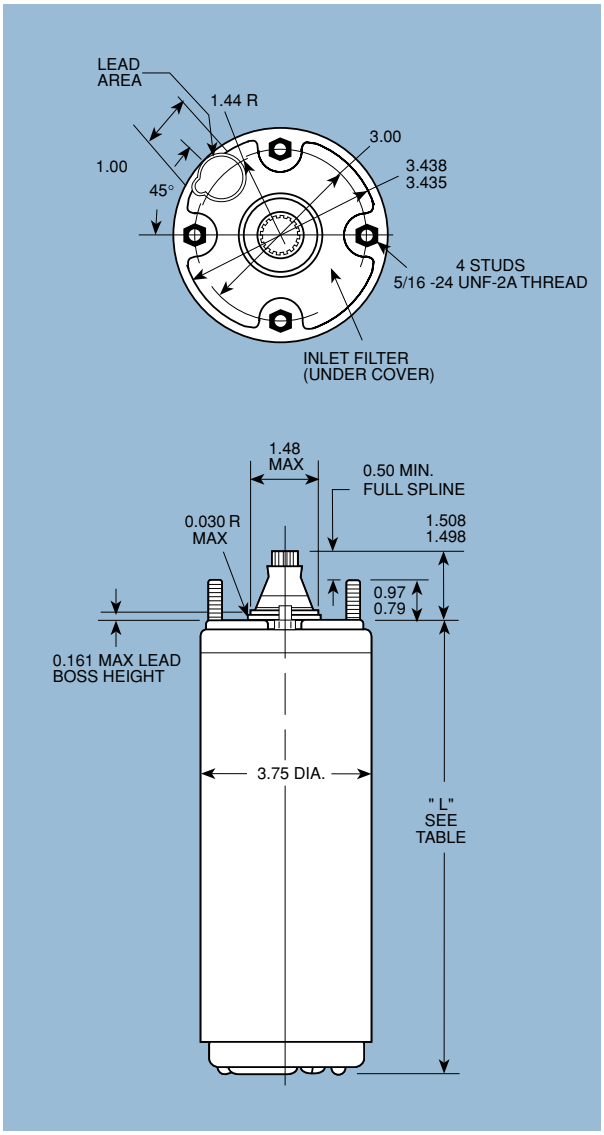
4-Inch Construction Materials

	Construction Type	
Component	Standard Water Well	Pollution Recovery
Castings	304 SS over Iron	304 SS over Iron
Stator Shell	301 SS	301 SS
Shaft Extension	17-4 SS or 303 SS	303 SS
Fasteners	305 SS or 302 SS	316 SS
Seal Cover	Acetal	Tefzel®
Seal	Nitrile Rubber Lip	Viton®
Diaphragm	Nitrile Rubber	Viton®
Slinger	Nitrile Rubber	Viton®
Lead Wire (or Cable)	XLPE	Lead not furnished with motor
Lead Potting	Epoxy	Lead not furnished with motor
Lead Jam Nut	303 SS	Lead not furnished with motor

Specifications subject to change without notice. Contact Franklin Electric if current material types are required for bid specifications.

Viton® is a registered trademark of DuPont Dow Elastomers.
Tefzel® is a registered trademark of E.I. du Pont Nemours and Company.

4-Inch Dimensions and Weights



Single-Phase Motors - 2-wire

HP	KW	"L" (inches)	SHIPPING WEIGHT LBS	SHIPPING WEIGHT KG	MOTOR CARTON SIZE (in inches)
1/3	0.25	8.78	16	7.3	4 x 4.375 x 16
0.5	0.37	9.53	18	8.2	4 x 4.375 x 16
0.75	0.55	10.66	21	9.5	4 x 4.375 x 19
1	0.75	11.75	24	10.9	4 x 4.375 x 19
1.5	1.1	15.12	31	14.1	4 x 4.375 x 21

Single-Phase Motors - 3-wire

HP	KW	"L" (inches)	SHIPPING WEIGHT LBS	SHIPPING WEIGHT KG	MOTOR CARTON SIZE (in inches)
1/3	0.25	8.78	17	7.7	4 x 4.375 x 16
0.5	0.37	9.53	19	8.6	4 x 4.375 x 16
0.75	0.55	10.66	21	9.5	4 x 4.375 x 19
1	0.75	11.75	24	10.9	4 x 4.375 x 19
1.5	1.1	13.62	28	12.7	4 x 4.375 x 21
2	1.5	15.12	33	15.0	5 x 4.375 x 21
3	2.2	19.06	41	18.6	6 x 4.375 x 21

Three-Phase Motors

HP	KW	"L" (inches)	SHIPPING WEIGHT LBS	SHIPPING WEIGHT KG	MOTOR CARTON SIZE (in inches)
0.5	0.37	9.53	18	8.2	4 x 4.375 x 16
0.75	0.55	10.66	21	9.5	4 x 4.375 x 16
1	0.75	11.75	24	10.9	4 x 4.375 x 19
1.5	1.1	11.75	24	10.9	4 x 4.375 x 19
2	1.5	13.62	28	12.7	4 x 4.375 x 21
3	2.2	16.06	35	15.9	4 x 4.375 x 21

All dimensions listed above are for models supplied with lead. Consult factory for other models.

4" Submersible Motors Super Stainless

4-Inch 2-wire Models

HP (kW)	DESCRIPTION						MODEL	STOCK STATUS	DOWNWARD THRUST RATING
	W/PH	CONSTRUCTION	VOLTS	HZ	S.F.	LEAD IN MTR			
⅓ hp 0.25 kW	2-WIRE	WATER WELL	115	60	1.75		244 502 01--S		300 LBS (1500 N)
			115	60	1.75	YES	244 502 90--S	YES	
			230	60	1.75		244 503 01--S		
			230	60	1.75	YES	244 503 90--S	YES	
		POLLUTION RECOVERY	115	60	1.75		244 502 09--S		
			230	60	1.75		244 503 09--S		
½ hp 0.37 kW	2-WIRE	WATER WELL	115	60	1.60		244 504 01--S		300 LBS (1500 N)
			115	60	1.60	YES	244 504 90--S	YES	
			220	50	1.00		244 555 01--S		
			230	60	1.60		244 505 01--S		
			230	60	1.60	YES	244 505 90--S	YES	
		POLLUTION RECOVERY	115	60	1.60		244 504 09--S		
			230	60	1.60		244 505 09--S		
¾ hp 0.55 kW	2-WIRE	WATER WELL	220	50	1.00		244 557 01--S		300 LBS (1500 N)
			230	60	1.50		244 507 01--S		
			230	60	1.50	YES	244 507 90--S	YES	
		POLLUTION RECOVERY	230	60	1.50		244 507 09--S		
1 hp 0.75 kW	2-WIRE	WATER WELL	220	50	1.00		244 558 12--S		650 LBS (3000 N)
			230	60	1.40		244 508 12--S		
			230	60	1.40	YES	244 508 90--S	YES	
		POLLUTION RECOVERY	230	60	1.40		244 508 23--S		
1.5 hp 1.1 kW	2-WIRE	WATER WELL	220	50	1.00		244 359 12--S		650 LBS (3000 N)
			230	60	1.30		244 309 12--S		
			230	60	1.30	YES	244 309 90--S	YES	
		POLLUTION RECOVERY	230	60	1.30		244 309 23--S		

NOTES:

1. Pack Designation: --S = Single Pack, available in any quantity. All 3 hp motors are single-packed.
2. Contact factory for lead time for non-stocked items.
3. Pallet packs available but not shown. Please contact customer service for availability.

4" Submersible Motors Super Stainless

4-Inch 3-wire Models

HP (KW)	DESCRIPTION						MOTOR MODEL	CONTROL BOX MODEL	STOCK STATUS	DOWNWARD THRUST RATING
	W/PH	CONSTRUCTION	VOLTS	HZ	S.F.	LEAD IN MTR				
⅓ hp 0.25 kW	3-WIRE	WATER WELL	115	60	1.75		214 502 44--S	280 102 49		300 LBS (1500 N)
			115	60	1.75	YES	214 502 90--S	280 102 49	YES	
			220	50	1.00		214 553 41--S	280 353 01		
			230	60	1.75		214 503 44--S	280 103 49		
			230	60	1.75	YES	214 503 90--S	280 103 49	YES	
		POLLUTION RECOVERY	115	60	1.75		214 502 49--S	280 102 49		
			230	60	1.75		214 503 49--S	280 103 49		
½ hp 0.37 kW	3-WIRE	WATER WELL	115	60	1.60		214 504 44--S	280 104 49		300 LBS (1500 N)
			115	60	1.60	YES	214 504 90--S	280 104 49	YES	
			220	50	1.00		214 555 41--S	280 355 01	YES	
			230	60	1.60		214 505 44--S	280 105 49		
			230	60	1.60	YES	214 505 90--S	280 105 49	YES	
		POLLUTION RECOVERY	115	60	1.60		214 504 49--S	280 104 49		
			230	60	1.60		214 505 49--S	280 105 49		
¾ hp 0.55 kW	3-WIRE	WATER WELL	220	50	1.00		214 557 41--S	280 357 01	YES	300 LBS (1500 N)
			230	60	1.50		214 507 44--S	280 107 49		
			230	60	1.50	YES	214 507 90--S	280 107 49	YES	
		POLLUTION RECOVERY	230	60	1.50		214 507 49--S	280 107 49		
		FOUNTAIN DUTY	230	60	1.50	YES	214 507 0600		YES	
1 hp 0.75 kW	3-WIRE	WATER WELL	220	50	1.00		214 558 19--S	280 358 01	YES	650 LBS (3000 N)
			230	60	1.40		214 508 12--S	280 108 49		
			230	60	1.40	YES	214 508 90--S	280 108 49	YES	
		POLLUTION RECOVERY	230	60	1.40		214 508 23--S	280 108 49		
		FOUNTAIN DUTY	230	60	1.40	YES	214 508 0610		YES	
1.5 hp 1.1 kW	3-WIRE	WATER WELL	220	50	1.00		224 350 19--S	282 350 81	YES	650 LBS (3000 N)
			230	60	1.30		224 300 19--S	282 300 81	YES	
			230	60	1.30	YES	224 300 92--S	282 300 81	YES	
		POLLUTION RECOVERY	230	60	1.30		224 300 23--S	282 300 81		
		FOUNTAIN DUTY	230	60	1.30	YES	224 300 0610		YES	
2 hp 1.5 kW	3-WIRE	WATER WELL	220	50	1.00		224 351 19--S	282 351 81	YES	650 LBS (3000 N)
			230	60	1.25		224 301 19--S	282 301 81	YES	
			230	60	1.25	YES	224 301 92--S	282 301 81	YES	
		POLLUTION RECOVERY	230	60	1.25		224 301 23--S	282 301 81		
		FOUNTAIN DUTY	230	60	1.25	YES	224 301 0610		YES	
3 hp 2.2 kW	3-WIRE	WATER WELL	220	50	1.00		224 352 25	282 352 81	YES	900 LBS (4000 N)
			230	60	1.15		224 302 25	282 302 81		
			230	60	1.15	YES	224 302 26	282 302 81	YES	
		FOUNTAIN DUTY	230	60	1.15	YES	224 302 0620		YES	

NOTES:

1. Pack Designation: --S = Single Pack, available in any quantity. All 3 hp motors are single-packed.
2. Contact factory for lead time for non-stocked items.
3. Pallet packs available but not shown. Please contact customer service for availability.

4" Submersible Motors Super Stainless

4-Inch Three-Phase Models

HP (KW)	DESCRIPTION						MODEL	STOCK STATUS	DOWNWARD THRUST RATING
	W/PH	CONSTRUCTION	VOLTS	HZ	S.F.	LEAD IN MTR			
½ hp 0.37 kW	3-PHASE	WATER WELL	200	60	1.60		234 501 41--S		300 LBS (1500 N)
			200	60	1.60	YES	234 501 92--S		
			220	50	1.00		234 551 41--S		
			230	60	1.60		234 511 41--S		
			230	60	1.60	YES	234 511 92--S		
			380/415	50	1.00		234 561 31--S	YES	
			460	60	1.60		234 521 31--S		
			460	60	1.60	YES	234 521 94--S		
		POLLUTION RECOVERY	200	60	1.60		234 501 49--S		
			230	60	1.60		234 511 49--S		
			460	60	1.60		234 521 49--S		
¾ hp 0.55 kW	3-PHASE	WATER WELL	200	60	1.50		234 502 41--S		300 LBS (1500 N)
			200	60	1.50	YES	234 502 92--S		
			220	50	1.00		234 552 41--S		
			230	60	1.50		234 512 41--S		
			230	60	1.50	YES	234 512 92--S		
			380/415	50	1.00		234 562 31--S	YES	
			460	60	1.50		234 522 31--S		
			460	60	1.50	YES	234 522 94--S		
		POLLUTION RECOVERY	200	60	1.50		234 502 49--S		
			230	60	1.50		234 512 49--S		
			460	60	1.50		234 522 49--S		
		FOUNTAIN DUTY	230	60	1.50	YES	234 512 0600	YES	
			460	60	1.50	YES	234 522 0600		
1 hp 0.75 kW	3-PHASE	WATER WELL	200	60	1.40		234 503 19--S		650 LBS (3000 N)
			200	60	1.40	YES	234 503 92--S		
			220	50	1.00		234 553 41--S		
			230	60	1.40		234 513 19--S		
			230	60	1.40	YES	234 513 92--S	YES	
			380/415	50	1.00		234 563 31--S	YES	
			460	60	1.40		234 523 16--S		
			460	60	1.40	YES	234 523 94--S	YES	
		POLLUTION RECOVERY	200	60	1.40		234 503 23--S		
			230	60	1.40		234 513 23--S		
			460	60	1.40		234 523 23--S		
		FOUNTAIN DUTY	230	60	1.40	YES	234 513 0610	YES	
			460	60	1.40	YES	234 523 0610		

4-Inch Three-Phase Models

HP (KW)	DESCRIPTION						MODEL	STOCK STATUS	DOWNWARD THRUST RATING
	W/PH	CONSTRUCTION	VOLTS	HZ	S.F.	LEAD IN MTR			
1.5 hp 1.1 kW	3-PHASE	WATER WELL	200	60	1.30		234 504 19--S		650 LBS (3000 N)
			200	60	1.30	YES	234 504 92--S	YES	
			220	50	1.00		234 554 19--S		
			230	60	1.30		234 514 19--S		
			230	60	1.30	YES	234 514 92--S	YES	
			460/380	60/50	1.30/1.00		234 524 16--S		
			460/380	60/50	1.30/1.00	YES	234 524 94--S	YES	
			575	60	1.30		234 534 16--S		
			575	60	1.30	YES	234 534 94--S	YES	
		POLLUTION RECOVERY	200	60	1.30		234 504 23--S		
			230	60	1.30		234 514 23--S		
			460/380	60/50	1.30/1.00		234 524 23--S		
		FOUNTAIN DUTY	230	60	1.30	YES	234 514 0610	YES	
			460/380	60	1.30/1.00	YES	234 524 0610		
2 hp 1.5 kW	3-PHASE	WATER WELL	200	60	1.25		234 305 16--S		650 LBS (3000 N)
			200	60	1.25	YES	234 305 92--S	YES	
			220	50	1.00		234 355 19--S		
			230	60	1.25		234 315 16--S	YES	
			230	60	1.25	YES	234 315 92--S	YES	
			460/380	60/50	1.25/1.00		234 325 16--S	YES	
			460/380	60/50	1.25/1.00	YES	234 325 94--S	YES	
			575	60	1.25		234 335 16--S		
			575	60	1.25	YES	234 335 94--S	YES	
		POLLUTION RECOVERY	200	60	1.25		234 305 23--S		
			230	60	1.25		234 315 23--S		
			460/380	60/50	1.25/1.00		234 325 23--S		
		FOUNTAIN DUTY	230	60	1.25	YES	234 315 0610	YES	
			460/380	60	1.25/1.00	YES	234 325 0610		
3 hp 2.2 kW	3-PHASE	WATER WELL	200	60	1.15		234 306 25--S		900 LBS (4000 N)
			200	60	1.15	YES	234 306 26--S	YES	
			220	50	1.00		234 356 25--S		
			230	60	1.15		234 316 25--S		
			230	60	1.15	YES	234 316 26--S	YES	
			380	60	1.15		234 346 25--S		
			380	60	1.15	YES	234 346 26--S	YES	
			460/380	60/50	1.15/1.00		234 326 25--S		
			460/380	60/50	1.15/1.00	YES	234 326 26--S	YES	
			575	60	1.15		234 336 25--S		
			575	60	1.15	YES	234 336 26--S	YES	
		FOUNTAIN DUTY	230	60	1.15	YES	234 316 0620		
			460/380	60	1.15/1.00	YES	234 326 0620		

NOTES:

1. Pack Designation: --S = Single Pack, available in any quantity. All 3 hp motors are single-packed.
2. Contact factory for lead time for non-stocked items.
3. Pallet packs available but not shown. Please contact customer service for availability.

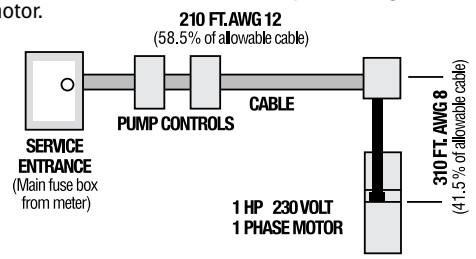
Cable Selection

4" submersible motors

Two different cable sizes can be used.
The example below is for reference and uses the CSIR chart below. Depending on the installation, any number of combinations may be used, as long as the total percentage length of the two cables used does not exceed 100%. This is to ensure that adequate voltage will be supplied to the motor.

EXAMPLE:
1 HP,
230 Volt, 3W,
1 PH Motor

using CSIR chart



In a replacement installation, the well already has 210 feet of buried #12 cable between the service entrance and the well head. The question is: *What size cable is required in the well with a 1 HP, 230 Volt, 1 PH, 3W motor setting at 310 feet?*

1. According to the table, #12 cable is large enough for the 1 HP motor so the percent of the maximum allowable cable used by the 210-foot run is 210 ÷ 359 = 58.5%, since 359 feet is the total allowable.
2. With 58.5% of the total allowable cable already used between the service entrance and the well head, only 41.5% is left for the well. Therefore, the 310 feet needed in the well can only utilize 41.5% of the total feet allowed in the table.
3. From the table, 41.5% of the 573 feet for #10 cable equals only 238 feet, so a larger size is needed. For #8, 41.5% of 908 feet = 377 feet. As a result, #8 can be used for the 310 feet in the well.

CAUTION **Use of wire size smaller than listed will void warranty.**

MOTOR LEAD LENGTHS – PENTEK® 2-WIRE MOTORS

60 Hz Motor Rating		60C and 75C Insulation – AWG Copper Wire Size												
Volts	**HP**	**14**	**12**	**10**	**8**	**6**	**4**	**3**	**2**	**1**	**1/0**	**2/0**	**3/0**	**4/0**
115	1/2	115	183	293	463	721	1150	1445	1825	2299	2902	3662	4623	5824
230	1/2	466	742	1183	1874	2915	4648	5843	7379	9295	11733			
	3/4	342	545	869	1376	2141	3413	4291	5419	6826	8617	10871		
	1	241	383	611	968	1506	2400	3018	3811	4801	6060	7646	9652	
	1-1/2	199	317	505	801	1246	1986	2496	3153	3972	5013	6325	7985	

MOTOR LEAD LENGTHS – PENTEK 3-WIRE MOTORS

CSIR Control Boxes

60 Hz Motor Rating		60C and 75C Insulation – AWG Copper Wire Size												
Volts	**HP**	**14**	**12**	**10**	**8**	**6**	**4**	**3**	**2**	**1**	**1/0**	**2/0**	**3/0**	**4/0**
115	1/2	87	138	221	349	544	867	1090	1376	1734	2188	2761	3485	4391
230	1/2	348	553	883	1398	2175	3467	4359	5505	6935	8753			
	3/4	264	420	670	1061	1651	2632	3309	4178	5264	6644	8383		
	1	226	359	573	908	1413	2252	2831	3575	4504	5685	7173		

CSCR Control Boxes

60 Hz Motor Rating		60C and 75C Insulation – AWG Copper Wire Size												
Volts	**HP**	**14**	**12**	**10**	**8**	**6**	**4**	**3**	**2**	**1**	**1/0**	**2/0**	**3/0**	**4/0**
230	1/2	447	711	1135	1797	2796	4458	5604	7078	8916	11254			
	3/4	348	553	883	1398	2175	3467	4359	5505	6935	8753	11044		
	1	304	484	772	1223	1903	3034	3814	4817	6068	7659	9663		
	1-1/2	197	314	501	793	1234	1968	2474	3124	3936	4968	6268		
	2	180	286	456	722	1123	1790	2251	2843	3581	4520	5703		
	3	133	211	337	534	830	1324	1664	2102	2648	3342	4217	5323	
	5			206	326	507	809	1017	1284	1618	2042	2577	3253	

All lengths in feet.

NOTE: Based on service factor amps, 30C ambient and 5% voltage drop.

(1) This table is based on copper wire. If aluminum wire is used it must be two sizes larger. *Example:* When the table calls for #12 copper wire you would use #10 aluminum wire.

(2) Cables #14 to #0000 are AWG sizes.

Cable Selection

4" submersible motors

MOTOR LEAD LENGTHS – PENTEK® 3-PHASE MOTORS

60 Hz Motor Rating		60C AND 75C Insulation – AWG Copper Wire Size												
Volts	**HP**	**14**	**12**	**10**	**8**	**6**	**4**	**3**	**2**	**1**	**1/0**	**2/0**	**3/0**	**4/0**
200	0.5	657	1045	1667	2641	4109								
	3/4	423	674	1074	1702	2648								
	1	346	551	879	1392	2166	3454	4342						
	1.5	265	421	672	1064	1655	2638	3317						
	2	217	344	549	870	1354	2158	2714	3427	4317	5449			
	3	159	253	403	638	993	1583	1990	2513	3166	3996			
	5	94	150	239	379	590	940	1182	1493	1881	2374	2995	3781	4764
	7.5	64	101	161	255	397	633	796	1005	1266	1598	2017	2546	3207
230	0.5	756	1202	1917	3037	4725	7532	9469						
	0.75	562	894	1426	2258	3513	5601	7041	8892					
	1	466	742	1183	1874	2915	4648	5843	7379					
	1.5	359	571	912	1444	2246	3581	4502	5685	7162	9040			
	2	288	459	732	1159	1803	2874	3613	4563	5748	7256	9155		
	3	217	345	551	872	1357	2163	2719	3434	4326	5460	6889	8696	10956
	5			318	503	783	1248	1569	1982	2496	3151	3976	5019	6323
	7.5				334	519	827	1040	1314	1655	2089	2635	3327	4192
460	0.5	2922	4648	7414										
	0.75	2191	3486	5560	8806									
	1	1753	2789	4448	7045									
	1.5	1370	2179	3475	5504									
	2	1153	1835	2926	4635	7212								
	3	827	1315	2098	3323	5171								
	5	516	820	1308	2072	3224	5140							
	7.5	325	516	824	1305	2030	3236	4068	5138	6472				
	10	255	405	647	1024	1593	2540	3193	4033	5080				
575	1.5	2283	3631	5792										
	2	1660	2641	4212	6671									
	3	1336	2126	3390	5370									
	5	721	1147	1829	2897	4507								
	7.5	548	871	1390	2202	3426								

All lengths in feet.

NOTE: Based on service factor amps, 30C ambient and 5% voltage drop.

(1) This table is based on copper wire. If aluminum wire is used it must be two sizes larger. *Example:* When the table calls for #12 copper wire you would use #10 aluminum wire.

(2) The portion of the total cable that is between the service entrance and a 3-phase motor starter should not exceed 25% of the total maximum length to assure reliable starter operation.

(3) Cables #14 to #0000 are AWG sizes.

APPENDIX H

ASSIGNMENT OF LEASE & LICENCE

PID 75279125

29327310 Oct. 08, 2010 @ 11:36

~~293237~~

ASSIGNMENT OF LEASE & LICENCE

THIS ASSIGNMENT made as of the 5 day of October, 2010

BETWEEN:

I certify this instrument is registered or filed in the York County Registry office, New Brunswick
Oct. 08, 2010 11:36
Date time-heure
29327310
number - numéro
Evelyn Reddy
Deputy Registrar - Conservateur Adjoint

J'atteste que cet instrument est enregistré ou depose au bureau d'enregistrement du comté de York, Nouveau-Brunswick

SILVERBIRCH No. 36 HOLDINGS LTD., in its capacity as trustee for **bcIMC REALTY CORPORATION**, a Canadian corporation having its registered office at 1600-925 West Georgia Street, Vancouver, British Columbia, V6C 3L2 (the "Assignor")

OF THE FIRST PART

- and -

643562 NEW BRUNSWICK INC., a body corporate having its registered office at 35 Mactaquac Road, French Village, New Brunswick, E3E 1L2 (the "Assignee"),

OF THE SECOND PART

- and -

NEW BRUNSWICK POWER GENERATION CORPORATION (a subsidiary of the New Brunswick Power Holding Corporation) a body corporate, with its Head Office at the City of Fredericton in the County of York and Province of New Brunswick, Canada (the "Consenting Party"),

OF THE THIRD PART

RECITALS

WHEREAS:

1. The Assignor is now the duly assigned lessee under the holder of a certain Lease, dated April 3, 1989, (hereinafter referred to as the **"Lease"**) from The New Brunswick Electric Power Commission which Lease was originally granted in favour of Kingsclear Development Corporation in respect of certain leasehold premises situated upon the shore of the Mactaquac Headpond at or near the Community of French Village in the Parish of Kingsclear, County of York and Province of New Brunswick, Canada, and described in the aforesaid Lease as Lot 88-1 as shown on the NBPEC Subdivision Plan (PDI-197-0), dated June 15, 1988,

prepared by A.C. Fletcher, NBLS, approved for registration by Donald Coles, For Development Officer – Province of New Brunswick, on March 14, 1989, and registered in the York County Registry Office on March 14, 1989, as Official Number 9535 and containing approximately 14.34 hectares, more or less, (hereinafter referred to as the **"Leased Premises"**) for a term of 20 years with the option to renew as provided therein, which instrument was approved for registration by Wayne Moore, For Development Officer – Province of New Brunswick on December 13, 1990, and registered in the York County Registry Office in Book 1406 at Page 223 as Number 338343 on December 13, 1990.

2. The Assignor is now the duly assigned licencee under and holder of a certain Licence, dated November 26, 1991, (hereinafter referred to as the **"Licence"**) from The New Brunswick Power Corporation which Licence was originally granted in favour of the Kingsclear Hotel and Resort Ltd. (formerly 040413 N.B. Ltd.) in respect of the construction, operation and maintenance of a water supply system upon the lands of The New Brunswick Power Corporation (as described in the Schedule "A" attached to the Licence and referred to hereinafter as the **"Licenced Premises"**) for the purposes of facilitating and benefiting the lessee's operation of a commercial tourism enterprise upon the Leased Premises, which instrument was exempted by Donald Coles, For Development Officer – Province of New Brunswick, and registered in the York County Registry Office in Book 1601 at Page 334 as Number 360798 on January 28, 1993.

3. The Assignor is the duly assigned lessee and/or licencee under the aforesaid Lease and/or Licence pursuant to (and further recited therein) an assignment of the same dated the 14th day of August 1998, made by Vista Mactaquac Holding Company to and in favour of the Assignee, Chip Reit No. 36 Holdings Ltd. The aforesaid assignment to the Assignor was duly consented to by The New Brunswick Power Corporation which instruments were registered in the York County Registry Office in Book 2070 at Page 28 as Number 415671 on August 14, 1998.

4. The New Brunswick Electric Power Commission was continued as the New Brunswick Power Corporation pursuant to Section 3(1) of the *Electric Power Act*, R.S.N.B. 1973, c.E-5. The New Brunswick Power Corporation was continued under the name New Brunswick Power Holding Corporation pursuant to a certificate of continuance registered in the York County Registry Office on November 1, 2004 as Number 19382507 and issued under the *Business Corporations Act*, S.N.B. 1981, c. B-9.1 effective as of October 1, 2004.

5. New Brunswick Power Holding Corporation's interest in the Leased Premises was transferred to the New Brunswick Power Generation Corporation by way of Transfer Order Number OIC 2004-382 made pursuant to the *Electricity Act*,

S.N.B. 2003, c.E-4.6, registered in the York County Registry Office as Number 19445825; New Brunswick Power Generation Corporation is a subsidiary corporation of New Brunswick Power Holding Corporation, incorporated under the *Business Corporations Act*, S.N.B. 1981, c. B-9.1.

6. By Change of Name registered in the York County Registry Office on August 1, 2008 as Number 25944506, the Assignor herein, changed its name from Chip Reit No. 36 Holdings Ltd. to SilverBirch No. 36 Holdings Ltd.

7. The Assignor, SilverBirch No. 36 Holdings Ltd., a federal corporation, holds the leasehold interest in the Leased Premises and the Licenced Premises in trust for bcIMC Realty Corporation.

8. The Assignor has previously entered into an Agreement with 643562 New Brunswick Inc., dated September 13th, 2010 (as amended and hereinafter referred to as the **"Agreement"**) for the purchase by 643562 New Brunswick Inc. from the Assignor of all of the assets of the Assignor used or held in connection with the business and at the Riverside Resort and Conference Centre, 35 Mactaquac Road, French Village, Parish of Kingsclear, York County, New Brunswick.

NOW THEREFORE WITNESSETH THAT:

ASSIGNMENT AND AGREEMENT

9. In consideration of the sum of One Dollar ($1.00) and other good and valuable consideration, the receipt and sufficiency of which is acknowledged, the Assignor does hereby absolutely grant, bargain, sell, assign, transfer, convey and set over unto the Assignee all its right, title and interest (as it may appear) in and to the aforesaid:

   (a) Lease, dated April 3, 1989, which is registered in the York County Registry Office in Book 1406 at page 223 as Number 338343 on December 13, 1990, and the Leased Premises; and

   (b) Licence, dated November 26, 1991, which is registered in the York County Registry Office in Book 1601 at Page 334 as Number 360798 on January 28, 1993, and the Licenced Premises;

   including any improvements made and/or fixtures attached to the Leased Premises and/or the Licenced Premises, together with the unexpired residue of the Term of Years and any renewals of the Lease and/or Licence, and all the benefits or advantages to the derived therefrom.

10. To have and to hold the aforesaid Lease and Licence unto the Assignee, its permitted successors and assigns, as the lessee under the Lease and the licencee under the Licence and, subject to the payment by the Assignee of all rents and other payments due under the Lease and/or Licence and to the observance and performance by the Assignee of the lessee's and/or licencee's covenants and conditions in the Lease and/or Licence, the Assignee may enter into and upon and

peaceably possess and quietly enjoy the Leased Premises and the Licenced Premises together with the leasehold improvements and fixtures for the unexpired residue of the term granted by the Lease and/or Licence and any renewals thereof for the use and benefit of the Assignee, without any interruption, disturbance or hindrance by or from the Assignor or any other person whomsoever, claiming by, through or under the Assignor or any of their respective successors or assigns.

11. The Assignee covenants with the Assignor that the Assignee shall hereafter, during the residue of the term granted by the Lease and Licence and every renewal thereof, pay the rent and perform the lessee's covenants, conditions and agreements therein respectively reserved and contained. The Assignee shall indemnify and hold harmless the Assignor from and against any and all liabilities, whether absolute, contingent or otherwise, the Assignor may incur arising from the failure of the Assignee to pay the rent and perform the lessee's covenants, conditions and agreements during the residue of the term and every renewal thereof and any and all costs and expenses incurred by the Assignor incidental to any of the foregoing including legal fees incurred by the Assignor determined on a solicitor and own client basis.

12. The Assignee acknowledges and agrees with the Assignor that:

(a) it is accepting possession of the Leased Premises and Licenced Premises (including any improvements made and/or fixtures attached to the Leased Premises and/or the Licenced Premises) in an "as is" condition;

(b) it shall and does hereby attorn as lessee to the New Brunswick Power Generation Corporation, as the landlord under the Lease and Licence;

(c) it has received a copy of the Lease and Licence and is familiar with the terms covenants and conditions contained therein;

(d) the New Brunswick Power Generation Corporation's consent to this Assignment of Lease and Licence shall not in any way derogate from the rights of the landlord under the Lease and Licence or constitute a waiver of the necessity for consent to any further assignment of the Lease and/or Licence, which must be completed in accordance with the terms of the Lease and Licence; and

(e) if 643562 New Brunswick Inc. proposes to effect a further assignment of the Lease and/or Licence, the terms of the Lease and Licence with respect to an assignment shall apply to any such further assignment.

The Parties hereto mutually covenant and agree that they shall (at the requesting party's expense) execute any and all documents and/or further assurance reasonably required by any of them to give effect to this Assignment of Lease and Licence.

This Assignment of Lease and Licence shall enure to the benefit of and be binding upon the parties hereto and their permitted successors and assigns, respectively.

The Parties hereto mutually covenant and agree that they shall (at the requesting party's expense) execute any and all documents and/or further assurance reasonably required by any of them to give effect to this Assignment of Lease and Licence.

This Assignment of Lease and Licence shall enure to the benefit of and be binding upon the parties hereto and their permitted successors and assigns, respectively.

13. The New Brunswick Power Generation Corporation has considered the request by the Assignor for its written consent to the aforesaid Assignment of Lease and Licence and determined to grant such consent.

NOW THEREFORE WITNESSETH THAT:

CONSENT TO ASSIGNMENT

14. In consideration of the sum of One Dollar ($1.00) and other good and valuable consideration, the receipt and sufficiency of which is acknowledged, the New Brunswick Power Generation Corporation does hereby consent to the forgoing Assignment of Lease and Licence between SilverBirch No. 36 Holdings Ltd. with respect to the aforesaid Lease and aforesaid Licence (including any improvement made and/or fixtures attached to the Leased Premises and/or the Licenced Premises) together with the unexpired residue of the term of the Lease and/or Licence and all the benefits or advantages to be derived therefrom as assigned by Vista Mactaquac Holding Company (as assignor) to Chip Reit No. 36 Holdings Ltd. (now SilverBirch No. 36 Holdings Ltd. as assignee).

15. This instrument shall be binding upon the New Brunswick Power Generation Corporation and enure for the benefit of the parties to the within Assignment of Lease and Licence and their permitted successors and assigns, respectively.

IN WITNESS WHEREOF the Assignor and Assignee have duly executed this Assignment on the day and year first above written.

SIGNED, SEALED AND DELIVERED
this 17th day of September, 2010,
before me:

SilverBirch No. 36 Holdings Ltd.

By : Robert des Trois Maisons
Title : Director

SIGNED, SEALED AND DELIVERED
this _____ day of _____, 2010,
before me:

643562 New Brunswick Inc.

_____

13. The New Brunswick Power Generation Corporation has considered the request by the Assignor for its written consent to the aforesaid Assignment of Lease and Licence and determined to grant such consent.

NOW THEREFORE WITNESSETH THAT:

CONSENT TO ASSIGNMENT

14. In consideration of the sum of One Dollar ($1.00) and other good and valuable consideration, the receipt and sufficiency of which is acknowledged, the New Brunswick Power Generation Corporation does hereby consent to the forgoing Assignment of Lease ad Licence between SilverBirch No. 36 Holdings Ltd. with respect to the aforesaid Lease and aforesaid Licence (including any improvement made and/or fixtures attached to the Leased Premises and/or the Licenced Premises) together with the unexpired residue of the term of the Lease and/or Licence and all the benefits or advantages to be derived therefrom as assigned by Vista Mactaquac Holding Company (as assignor) to Chip Reit No. 36 Holdings Ltd. (now SilverBirch No. 36 Holdings Ltd. as assignee).

15. This instrument shall be binding upon the New Brunswick Power Generation Corporation and enure for the benefit of the parties to the within Assignment of Lease and Licence and their permitted successors and assigns, respectively.

IN WITNESS WHEREOF the Assignor and Assignee have duly executed this Assignment on the day and year first above written.

SIGNED, SEALED AND DELIVERED this _____ day of _____, 2010, before me:

SilverBirch No. 36 Holdings Ltd.

By :
Title :

SIGNED, SEALED AND DELIVERED this 15th day of September 2010, before me:

643562 New Brunswick Inc.

By : Feroze Virani
Title : President

Sridhar Chandra
LSUC # 412065

IN WITNESS WHEREOF the New Brunswick Power Generation Corporation has hereunder caused its Corporate Seal to be affixed and this Instrument to be signed by its duly Authorized Signing Officers in such behalf on this 5 day of October 2010.

SIGNED, SEALED AND DELIVERED this 5 day of October, 2010, before me:

New Brunswick Power Generation Corporation

By : Michael D. Gorman
Title : Michael D. Gorman
V.P. Legal & Shared Services

By : Wanda J Harrison
Title : Corporate Secretary & General Counsel

SERVICES JURIDIQUES
LEGAL

CANADA

PROVINCE OF BRITISH COLUMBIA

I, Robert des Trois Maisons of Victoria, in the Province of British Columbia, MAKE OATH AND SAY as follows:-

1. THAT I am the Director of SilverBirch No. 36 Holdings Ltd., a corporation incorporated under the laws of Canada (the "Corporation").

2. THAT the Director of the Corporation is authorized to execute documents in the name and on behalf of the Corporation.

3. THAT SilverBirch No. 36 Holdings Ltd. acknowledges that it holds the leasehold interest in the "Leased Premises" and the "Licenced Premises" herein, in trust for bcIMC Realty Corporation and as such has the necessary consent and authority to execute the documents herein in the name of and on behalf of bcIMC Realty Corporation.

4. THAT the corporation has no seal.

5. THAT the signature "Robert des Trois Maisons" set and subscribed to the attached instrument is in the proper handwriting of me, this deponent.

6. THAT the said signature was subscribed to the attached instrument for the purpose of execution on behalf of the Corporation.

7. THAT the ownership of a share of the Corporation does not entitle the owner thereof to occupy the parcel described in the attached instrument as a marital home.

SWORN TO at the City of VICTORIA)
in the Province of British Columbia, this)
17TH day of SEPT, 2010.)
BEFORE ME:)
)
)
)
Notary Public)
Province of British Columbia)
[Affix Notarial Seal]

ALEXANDER CHUI
Barrister and Solicitor
#301 - 2940 Jutland Road
Victoria, BC V8T 5K6
(250) 356-0263

[Print Name of Deponent]

CANADA

PROVINCE OF ONTARIO

I, Feroze Virani, of 67 Lagani Avenue, Richmond Hill, in the Province of Ontario, MAKE OATH AND SAY as follows:

1. That I am the President of 643562 New Brunswick Inc., a corporation incorporated under the laws of the Province of New Brunswick, (the "Corporation").

2. That the President of the Corporation is authorized to execute documents in the name and on behalf of the Corporation.

3. That the seal affixed to the attached instrument is the corporate seal of the Corporation and was so affixed by authority of the directors thereof.

4. That the signature "Feroze Virani" set and subscribed to the attached instrument is in the proper handwriting of me, this deponent.

5. That the said signature was subscribed to the attached instrument and the corporate seal affixed thereto for the purpose of execution on behalf of the Corporation.

6. That the ownership of a share of the Corporation does not entitle the owner thereof to occupy the parcel described in the attached instrument as a marital home.

SWORN TO at the City of Toronto,)
in the Province of Ontario, this 18th day of)
September, 2010, before me:)
)
)
)
)
)
)
)
)

Feroze Virani

A Notary Public in and for the
Province of Ontario
(Affix Notarial Seal)

LSUC# 41206S

PROVINCE OF NEW BRUNSWICK
COUNTY OF YORK

I, **WANDA J. HARRISON** of the Parish of New Maryland, in the County of York, Province of New Brunswick, Barrister and Solicitor, make oath and say that:

1. I am the Secretary of New Brunswick Power Generation Corporation and as such, have personal knowledge of matters and things herein deposed to.

2. The seal affixed to the within instrument purporting to be the common seal of New Brunswick Power Generation Corporation is the corporate seal of New Brunswick Power Generation Corporation and was affixed to the said instrument by authority of the said New Brunswick Power Generation Corporation.

3. The signature ***"Michael D. Gorman"*** subscribed to the said instrument and purporting to be the signature of the Vice President of Legal is the signature of Michael D. Gorman, who is the Vice President of Legal for the said New Brunswick Power Generation Corporation and the signature ***"Wanda J. Harrison"*** subscribed thereto purporting to be the signature of me, the said Wanda J. Harrison, is my signature.

4. The said Michael D. Gorman, Vice President of Legal for New Brunswick Power Generation Corporation and I, the said Wanda J. Harrison, the Secretary of the said New Brunswick Power Generation Corporation, are duly authorized officers having authority to execute the within instrument.

5. The said instrument was duly signed, sealed, executed and delivered by New Brunswick Power Generation Corporation at the City of Fredericton, in the County of York, on the 5th day of October, 2010 to and for the uses and purposes therein expressed and contained.

6. The ownership of a share of the corporation does not entitle the owner thereof to occupy the parcel described in the attached instrument as a marital home.

SWORN TO at the City of Fredericton, in the County of York and Province of New Brunswick, this 5th day of October, 2010, before me:

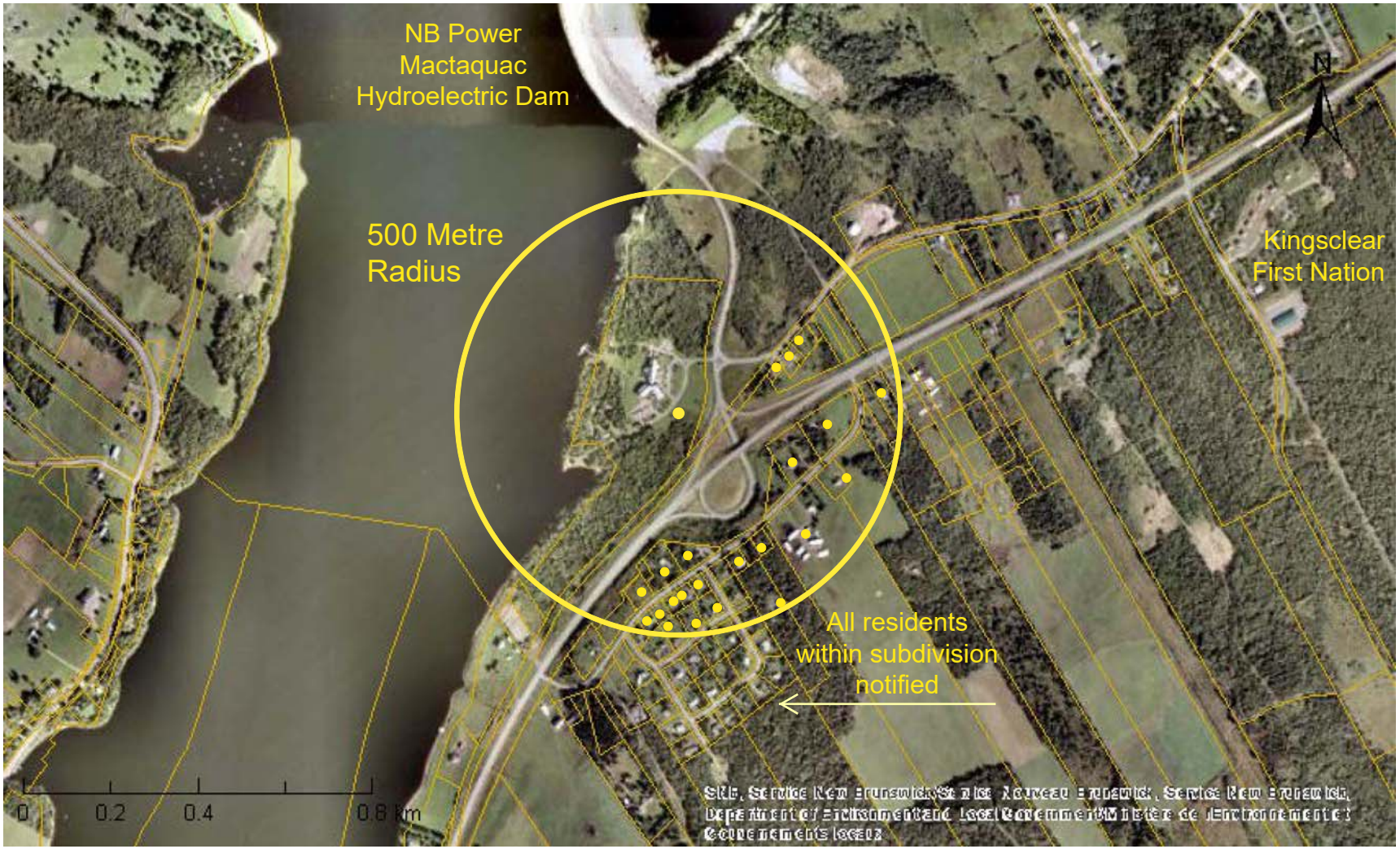
A Commissioner of Oaths,
Being a Solicitor

Melinda J. Maguire-Porter
A Commissioner of Oaths
Being a Solicitor

Wanda J. Harrison

APPENDIX I

PUBLIC INVOLVEMENT OPPORTUNITY INFORMATION FLYER and NOTIFICATION



Project: Riverside Resort and Conference Centre - Development of Groundwater Source	Public Involvement - Notification of Stakeholders		500 Metre radius centred near location of Test Well # 1 and Backup Well #1.
	Scale: As Shown	Figure: 8	
	Date: 2022 March 23		

Riverside Resort and Conference Centre wants to change its water supply.

In December 2018, the Riverside Resort and Conference Centre located in French Village on the Saint John River near the Kingsclear First Nation was fortunate enough to find a good groundwater source after years of searching.

Prior to that, the Resort and every establishment before it at this location, had to rely on getting their water from the Mactaquac Dam head pond.

The Resort is embarking on developing the two groundwater wells drilled on their property. The quality of the groundwater is remarkably cleaner and more reliable than what they had been pumping from the Saint John River.

The two wells will serve to supply the basic water needs of the Resort. The Resort also expects the annual operation costs and maintenance efforts of a smaller water treatment system to be lower than their present system.

Treating groundwater is much less complicated and requires far fewer components to make the water fit to drink as compared to treating Saint John River water.

For these reasons, the Resort wants to change the source of its water supply.

In changing its water supply, the Resort is obliged to notify **potential stakeholders** of these intentions. You've been identified as a neighbour and potential stakeholder.

As the Proponent, the Resort will respond to stakeholders' questions and address any concerns, if any regarding this undertaking.

The undertaking is currently registered for review with the NB Department of Environment and Local Government (DELG) under the Environmental Impact Assessment (EIA) Regulation, Clean Environment Act.

An electronic copy of the Registration Document for this undertaking may be found online in the Projects Under Review registry with the EIA branch of the DELG - website (URL) is below maps *(over):*

Project Name:
Riverside Resort & Conference Centre - Development of a Groundwater Source

The Proponent's document may also be reviewed at the DELG offices located at 20 McGloin Street, Fredericton, NB.

Questions, concerns and comments MUST be

- received before **12:00 pm on April 22th, 2022.**
- in writing and should be submitted directly to the Proponent's Technical Representative via the following contacts:

EMAIL:

nam@namfreelance.com
or **freelance@bellaliant.net**

CANADA POST:

NAM Freelance Environmental
Suite #218 – 281 Restigouche Road,
OROMOCTO, NB E2V 2H2

NOTICE

OPPORTUNITY FOR COMMENT

PROJECT NAME:
Riverside Resort and Conference Centre -
Development of a Groundwater Source

You've been identified as a neighbour and potential stakeholder. As such and in accordance with Section 5.1 and Schedule "A" of the New Brunswick Environmental Impact Assessment (EIA) Regulation, the Proponent in this undertaking, the Riverside Resort and Conference Centre welcomes your comments and is providing you the opportunity to ask any questions you may have about the environmental impacts of this undertaking.

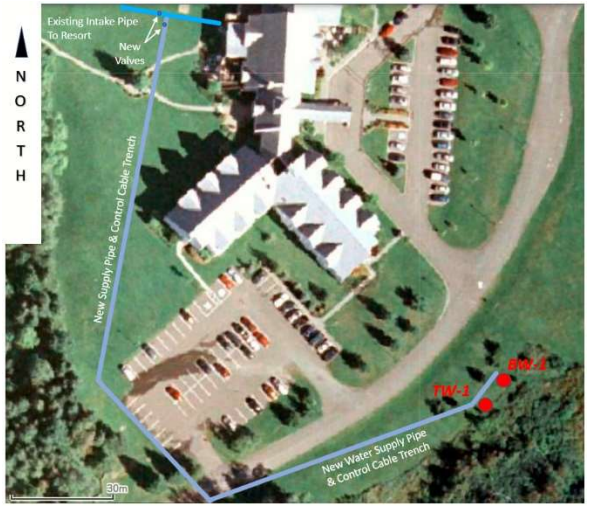
Please note: DEADLINE to submit questions, concerns and comments is **12:00 pm on April 22th, 2022.**

SEE BACK PAGE FOR CONTACT INFORMATION

The Riverside Resort and Conference Centre is situated in French Village on the Saint John River near the Kingsclear First Nation.

After many years of searching, the Resort found two good groundwater supply wells on its property in 2018.

Below are the locations of Test Well (TW-1) and the Backup Well (BW-1).



FREELANCE
ENVIRONMENTAL MONITORING AND ENGINEERING SERVICES

The Proponent's registration document may be examined at the following GNB WEBSITE (URL):

New Brunswick Nouveau Brunswick CANADA

http://www2.gnb.ca/content/gnb/en/departmnts/elg/environment/content/environmental _impactassessment/registrations.html