DEVELOPMENT PERMIT

No. **DP- 2022-11**

TO: **Jessica Gagne,**
Frontera Geotechnical Inc.

ADDRESS: [redacted]
(Permittee)

1) This Development Permit is issued subject to compliance with all of the Bylaws of the Town of Gibsons applicable thereto, except those specifically varied or supplemented by this Permit.

2) The Development Permit applies to land within the Town of Gibsons described below:

Parcel Identifier: **003-394-123**

Legal Description: **LOT B, EXCEPT: PART ON PLAN BCP24580 BLOCK 1 DISTRICT LOT 683 PLAN 9351**

Civic Address: **1057-1065 Gibsons Way**

(the "Lands")

3) The Lands are within a Development Permit Area of the Town of Gibsons Official Community Plan (Bylaw 985, 2005). This permit applies to:

- Development Permit Area No. 9 (Gibsons Aquifer) for the purpose of protection of the Gibsons Aquifer.

4) The Lands shall be developed only in strict accordance with the terms and conditions and provisions of this Permit, including as outlined in the following report, which is attached to and forms part of this Permit:

- *DPA 9 Application for Geotechnical Investigation 1057 Gibsons Way*, by Jessica Gagne and Steven Fofonoff of Frontera Geotechnical Inc., dated 05/18/22.

5) Minor changes to the aforesaid drawings that do not affect the intent of this Development Permit are permitted only with the approval of the Director of Planning.

6) This Permit is issued pursuant to the requirements of the Environmental Management Act, whereby the applicant has completed a "Site Disclosure Statement" for the property.

7) If the Permittee does not commence the development permitted by this Permit within twenty-four months of the date of this Permit, this Permit shall lapse.

8) This Permit is NOT a Building Permit.

ISSUED THIS 6TH DAY OF JUNE 2022.

Lesley-Anne Staats, MCIP, RPP
Director of Planning

Emanuel Machado
Acting Director of Infrastructure Services

Copy of permit to:

Daniel Lopez, PCRE Gibsons Limited Partnership

FRONTERA GEOTECHNICAL

1 – 38920 Queens Way
Squamish, BC V8B 0K8
604-898-1093

Town of Gibsons
Via Email

May 18, 2022
File: 1358

Attention: Kirsten Dafoe

RE: DPA 9 Permit Application for Geotechnical Investigation
1057 Gibsons Way, Gibsons, BC

Frontera Geotechnical Inc. (previously SFA) has been engaged to complete a geotechnical investigation for the proposed two new retail and residential buildings at 1057 Gibsons Way in Gibsons, BC. The Gibsons Aquifer underlays the site as shown in the Development Permit Area 9 guidelines, Schedule F. Concerns related to the risks associated with drilling, as described in the Town of Gibsons Official Community Plan section 16.10 are addressed below. The Gibsons Aquifer is estimated to be 70 m below site grades as per the 2010 Waterline Resources geological cross-section.

Frontera previously investigated the site on March 26, 2020 in order to characterize the geotechnical properties of the near surface soils which will support the new structures. Variable fill materials were noted in the southeast corner of the site. An additional investigation is proposed for June 21, 2022, to help characterize the extent of poor quality fill in the area.

It is proposed to utilize a solid stem auger which would be advanced to depths up to 6.0 m below present grades. The soils would be logged in the field and samples collected for further review and laboratory testing. The auger test holes may be supplemented with dynamic cone penetration test (DCPT) soundings which would be advanced to depths up to 6.0 m to help in characterizing the in-situ density of the soils. It is intended to terminate the holes once native soils are encountered. The soils and groundwater will be thoroughly monitored throughout the investigation to ensure that the Gibsons Aquifer is not impacted by drilling related activities.

In considerations of the mapped depth to the Gibsons Aquifer and our previous investigation at the site, it is not expected that drilling activities will influence the aquifer. Our drilling contractor is prepared to abandon all boreholes as per provincial regulations.

This permit application package includes:

- Figures Including:
  - Site plans with existing and proposed buildings on parcel (1358-01)
  - Proposed test hole locations (1358-02)
  - Topographic site map from the Sunshine Coast Regional District GIS (1358-03)
  - Geological cross-section of the aquifers as presented in the Aquifer Mapping Report (Waterline Resources, 2013) (1358-04)
  - Site location with respect to the Schedule F – Gibsons Aquifer Development Permit Area No. 9 (1358-05)
  - iMapBC figure depicting well locations within approximately 300 m of the site (1358-06)
  - Proposed Site Plan prepared by PCRE dated April 19, 2022
  - Site Survey Plan

- Appendix A- DPA 9 Application Form
- Appendix B – Schedule E Drilling Program
- Appendix C – Drill Certification and Drill Safety Manual
- Appendix D – Worksafe Clearance Letter and Confirmation of Insurance
- Appendix E – Schedule F Subsurface Exploration Data

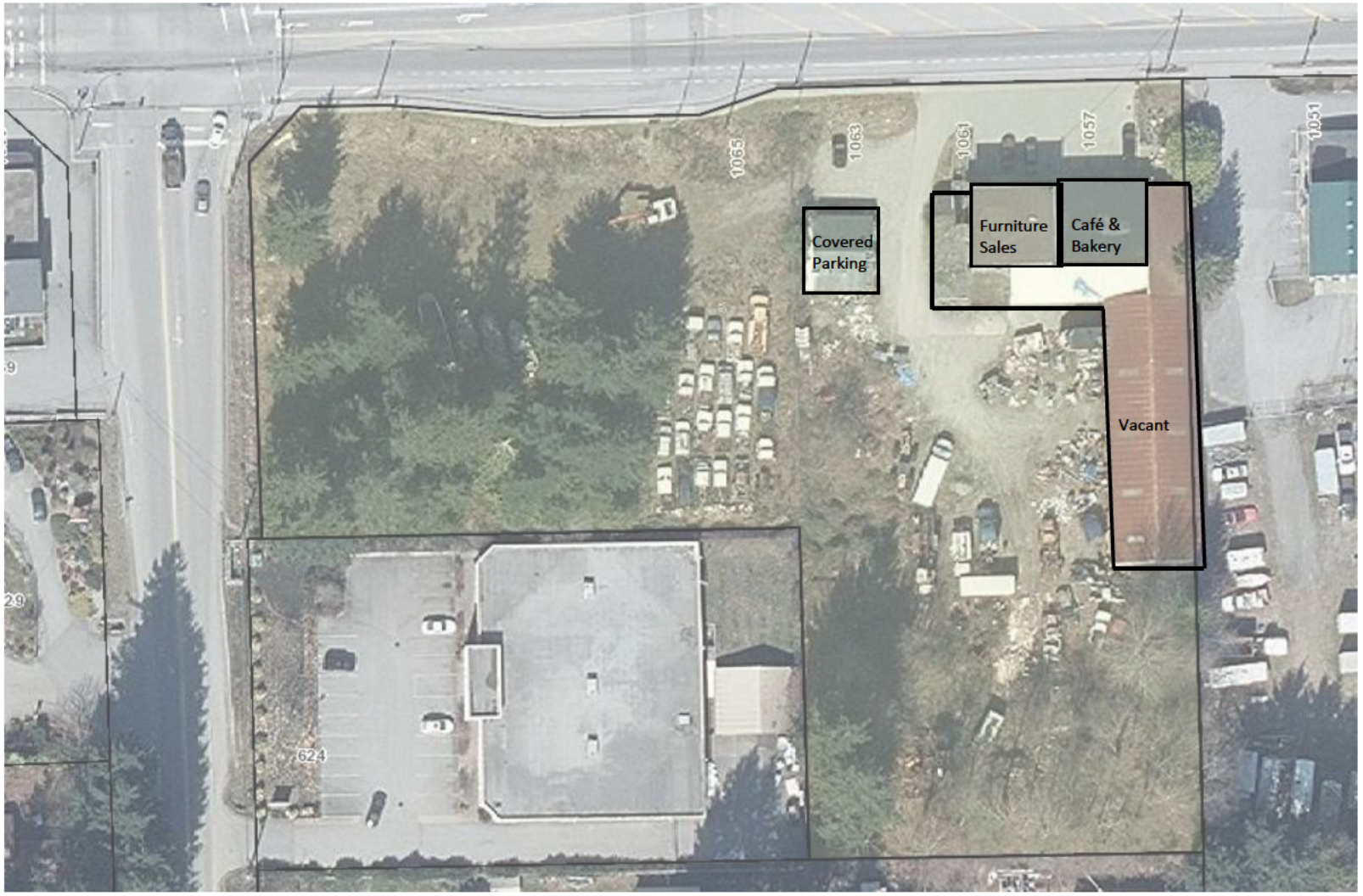
We trust this information is helpful and sufficient for your purposes at this time. However, please do not hesitate to call the undersigned if you should require any clarification or additional details.

For:
Frontera Geotechnical Inc.

Jessica Gagne, P.Eng.
Geotechnical Engineer

Reviewed by:

Steven Fofonoff, M.Eng., P.Eng.
Principal



Geotechnical Investigation Current Site Operations 1057 Gibsons Way, Gibsons, BC DPA 9 Permit Application	FILE NO. 1358 DWG NO. 1358 - 01	LEGEND	Date: May 12, 2022 Drawn By: JB / Approved By: / Reviewed By: Scale: NTS	FRONTERA GEOTECHNICAL

Geotechnical Investigation

Proposed Hole Location Plan
Proposed Four-Storey Rental Buildings
1057 Gibsons Way, Gibsons, BC

FILE NO. 1358

DWG NO. 1358 - 02

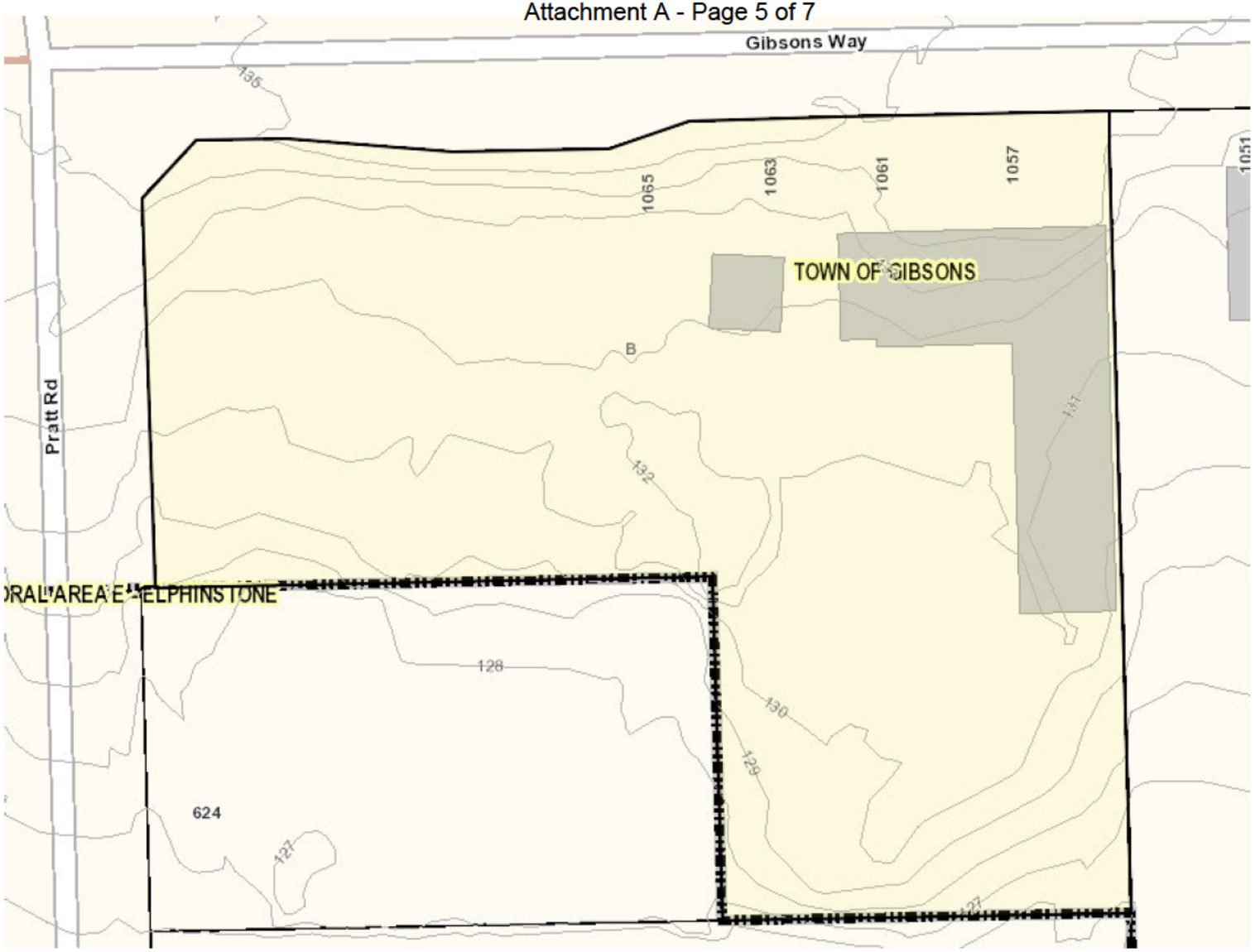
LEGEND
Approx. Test Hole Locations

Date: May 12, 2022

Drawn By:	Approved By:	Reviewed By:
JG		

Scale: NTS

FRONTERA GEOTECHNICAL



Geotechnical Investigation

Topographic Site Map

1057 Gibsons Way, Gibsons, BC

DPA 9 Permit Application

FILE NO. 1358

DWG NO. 1358 - 03

Notes:

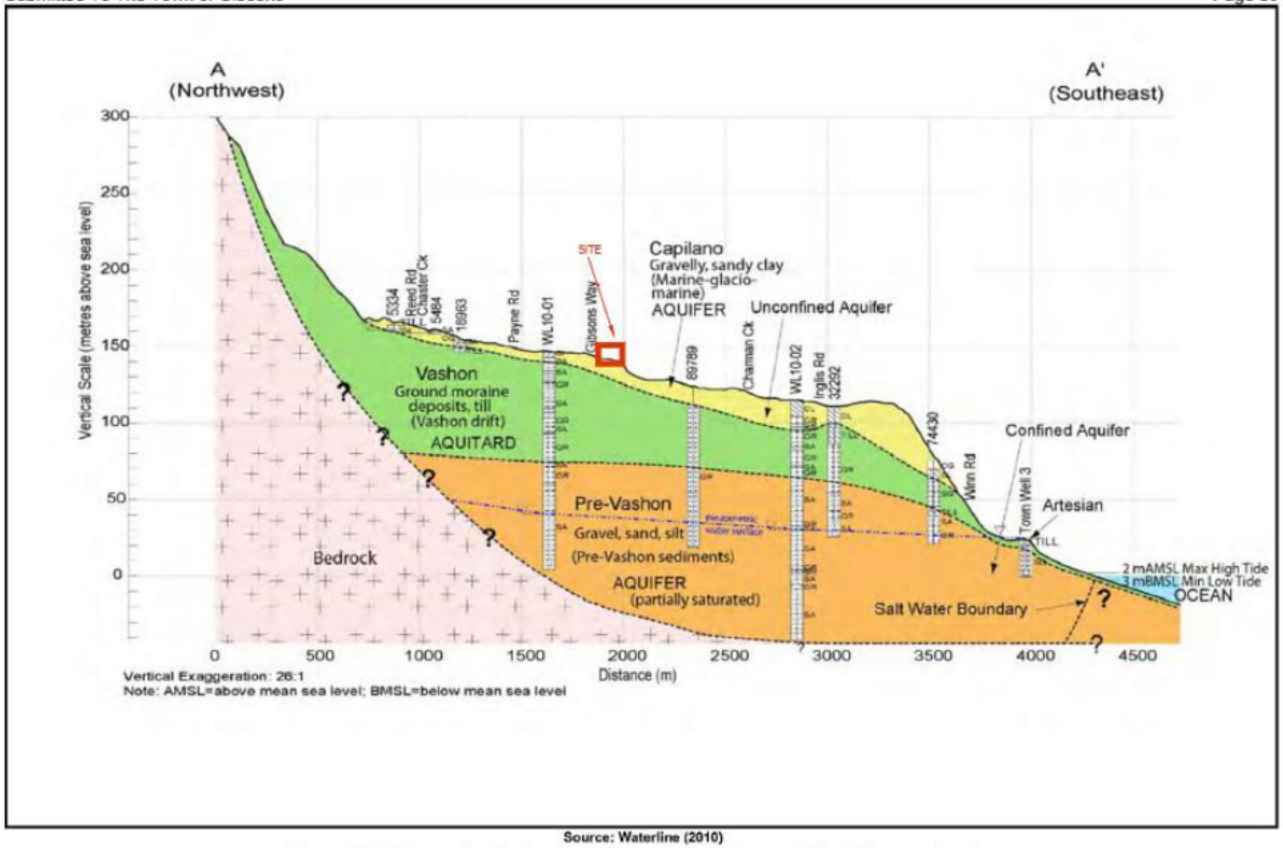
Retrieved from Sunshine Coast Regional District WebMap

Date: 2022-05-12

Drawn By:	Approved By:	Reviewed By:
JB		

Scale: NTS

FRONTERA GEOTECHNICAL



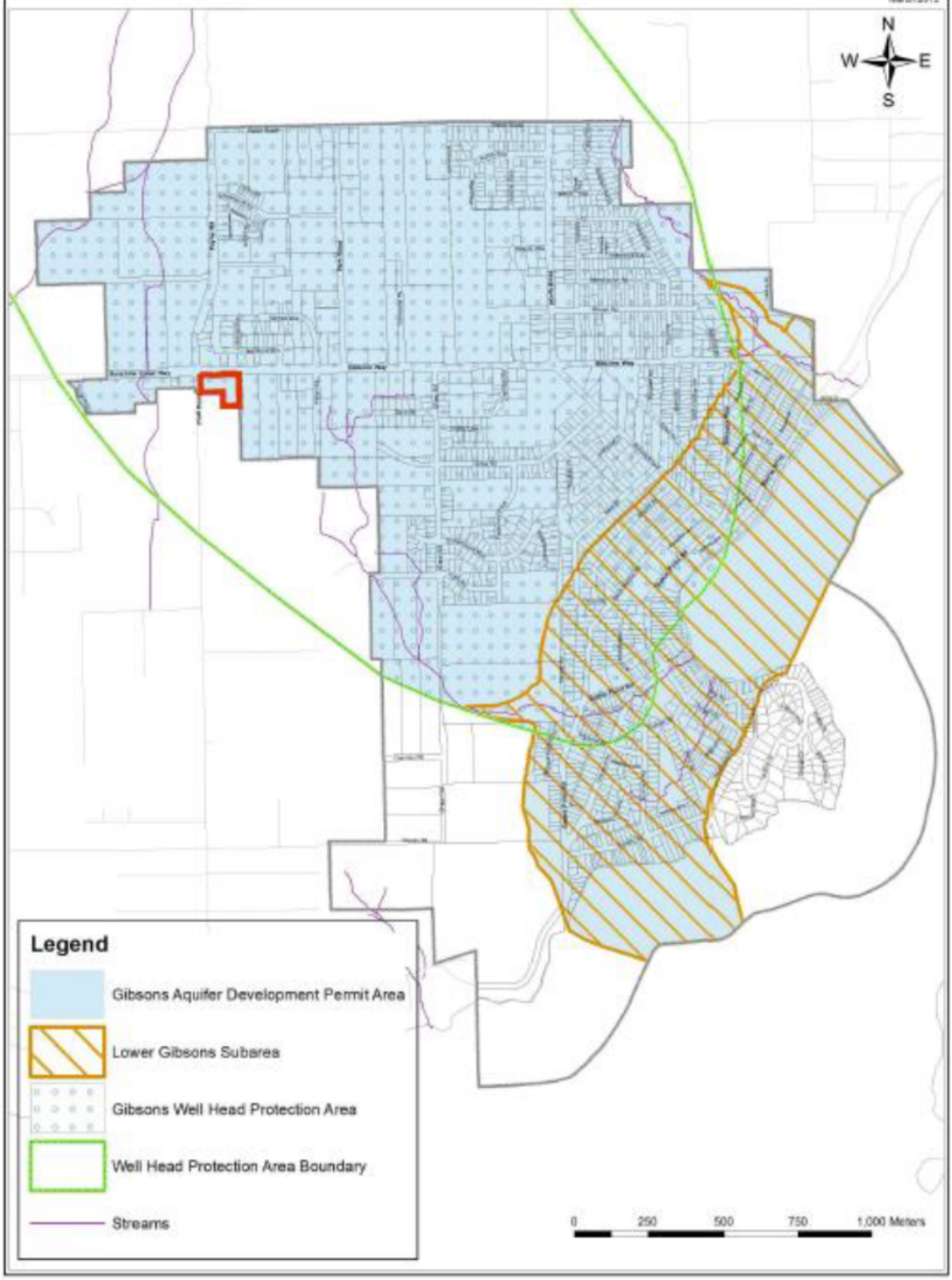
Source: Waterline (2010)

Figure 26: Schematic Geological Cross-Section through the Gibsons Aquifer

Waterline Resources Inc.

Geotechnical Investigation Aquifer Cross Section 1057 Gibsons Way, Gibsons, BC DPA 9 Permit Application	FILE NO. 1358 DWG NO. 1358 - 04	**Notes:** Retrieved from Aquifer Mapping Study Report (Waterline Resource Inc, 2013)	Date: 2022-05-12 Drawn By: JB / Approved By: / Reviewed By: Scale: NTS	FRONTERA GEOTECHNICAL

Schedule F - Gibsons Aquifer Development Permit Area No.9



Geotechnical Investigation Site Location on Schedule F 1057 Gibsons Way, Gibsons, BC DPA 9 Permit Application	FILE NO. 1358 DWG NO. 1358 - 05	LEGEND Site Boundary	Date: 2022-05-12 Drawn By: JB / Approved By: / Reviewed By: Scale: NTS	FRONTERA GEOTECHNICAL

~SCHEDULE E~

Proposed Drilling Program for Geotechnical Investigation

Submitted to: The Town of Gibsons

Date Issued:_____

PREPARED BY: Jessica Gagne, P.Eng. SFA Geotechnical Inc.

CC: Town of Gibsons representative _____
Town's hydrogeology consultant _____
Drilling contractor Southland Drilling Co. Ltd
Barge Contractor (if applicable) N/A
Other personnel on site (if applicable) _____

CONTACT LIST

EMERGENCY NUMBERS

Town of Gibsons Representative:
Drilling Contractor Owner/Principal: Emily Guttridge [redacted]
Ambulance/Hospital **911**

Prime Consultant in Charge

Principal Consultant: Frontera Geotechnical - Jessica Gagne, [redacted]
Field Consultant: Frontera Geotechnical - Tatumn Paige, [redacted]

Town Hydrogeology Consultant

Principal Hydrogeologist:
Field Hydrogeologist:

SERVICE COMPANIES

Drilling Contractors:	*Southland Drill Co. Ltd,* [redacted]
Grouting/Cement Contractor:	N/A
Vacuum Truck:	N/A
Waste Removal Contractor:	N/A
Barge Operator:	N/A
Other:	FJM Utility Location Ltd.

TO BE POSTED ON SITE

~SCHEDULE E~

1 OVERVIEW

1.1 The purpose of subject the drilling program is to:

- *Complete a second geotechnical investigation at the site to determine extent of fill on the property for future site development. Drilling in upper 6 m of the soil profile. Terminating drill holes once native soils encountered.*

1.2 As outlined in the Town of Gibsons Development Permit Area Guidelines, the proposed drilling area is underlain by a known artesian aquifer (the Gibson Aquifer) and therefore an increased standard of care is needed to protect the aquifer.

- *The Site is located on the northwestern portion of the Gibsons Well Head Protection Area.*
- *According to the BC Water Resources Atlas, water well #5489 is closest to the Site.*

1.3 *Frontera Geotechnical Inc.* envisage that the following risks would be involved in the proposed drilling program:

- *Uncontrolled artesian flow if aquitard is breached.*
- *Development of a sink hole if artesian flow is left unattended or site workers are unprepared to mitigate the flow.*
- *Impact on the Town of Gibsons' water wells if the aquifer is breached and left unsealed.*
- *Potential loss of aquifer pressure if the aquifer is breached and not sealed properly.*
- *Migration of potential contamination from perched aquifers to the deeper aquifer.*

1.4 Table 1 summarizes the proposed drilling program with anticipated depth, location, and decommissioning plan. The proposed borehole locations are shown on drawings 1358-02.

Table 1: Proposed Borehole Details

Borehole Name	***Location***	***Planned Depth(m)***	***Decommission Plan***
TH22-01 to TH22-10	*See dwg. 1358-02*	*<6.0*	*See below*

~SCHEDULE E~

2 PRE-DRILLING REQUIREMENTS

2.1 The following must be established prior to drilling commencement:

- Knowledge and understanding of British Columbia's Groundwater Protection Regulation
- *(http://www.bclaws.ca/Recon/document/ID/freeside/11_299_2004)*
  Frontera will adhere to the BC Groundwater Protection Regulations.
- WorkSafe BC program
  - *CSA Boots, Hard Hats, High Visibility Clothing, Hearing Protection.*
- Permit Requirements:
  - *Town of Gibsons DPA9 Permit*
- Driller certification (included in appendix):
  - *Drilling License: WD 06100604*
  - *Post Training*
  - *Shell Training*
  - *Construction Safety Training System (CSTS-09) including WHMIS*
- All rig lifting equipment, and overhead equipment must be certified to the Original Equipment Manufacturers Specifications (OEM).
  - *N/A*
- Casing handling and running procedures:
  - *No casing proposed due to shallow holes*
- Certificate of Insurance and WorkSafe BC letter are attached
  - *Included in appendix*
- Drill rig specifications are attached
  - *Included in appendix.*
- Additional pre-drilling requirements:
  - *Refer to BC MoE Flowing Artesian Wells document. http://www.env.gov.bc.ca/wsd/plan_protect_sustain/groundwater/flowing_artesian_wells.pdf*

~SCHEDULE E~

3 RIG MOVE, RIG UP AND SITE SAFETY

3.1 The following procedures site safety provisions must be followed in mobilizing, set up and operation of the drilling rig:

- *Drilling contractor to contact Frontera the day before mobilization to site to confirm site and drill is ready.*
- *Move in and rig up drilling rig and auxiliary equipment on site prior to initiating drilling, carry out detailed rig inspection and report any unsafe conditions to Frontera.*
- *Hold a pre-drilling safety meeting with the rig crew and all consultants on site to discuss the Hazardous Operations and drilling program.*

4 GENERAL DRILLING PROCEDURES

4.1 Roles and responsibilities:

- *Frontera: Oversee all activities as the prime contractor during locating and drilling,*
- *Utility Locator: Identify potential; utilities associated with the Site including but not limited to: gas, electrical, communication, sewer and storm lines, as well as potential in-ground structures including tanks, septic systems, sumps, etc.*
- *Driller: Complete all drilling activities as directed by Frontera, including operating equipment, clearing soil cuttings, moving equipment around the site.*

4.2 Methodology of data and sample collection:

- *Frontera to log soil profile and collect samples to depths of up to 6.0 m.*
- *Additional data collection during drilling may include dynamic cone penetration testing(DCPT) to 6.0 m depth to characterize the in-situ density of the soils.*

4.3 Drilling Details

4.3.1 Borehole TH22-01 through TH22-10

- *Boreholes will be drilled vertically to a maximum depth of 6.0 m and logged by Frontera. The intention of this investigation is to determine the type and extent of overlying fill material. It is not intended to drill into the underlying native soils.*
- *Drilling rate should be sufficiently slow to allow for the collection of and review of auger samples by Frontera.*
- *If the aquifer soil (which is understood to comprise coarse grained sand and/or gravel) and/or artesian pressures or fresh water are encountered, borehole to be abandoned immediately.*

4.3.2 Monitoring Well / Piezometer Installation Details (If Required)

- *No well to be installed.*

~SCHEDULE E~

4.3.3 Borehole Abandonment Program (Artesian Flowing Well Bore)

- *Determine type of artesian (high volume low pressure/ high pressure low volume)*
- *Calculate the gravity of the artesian pressure*
- *Place casing in the borehole*
- *Prepare a cement/bentonite mixture with barite for weighting*
- *Pressure pump mixture down borehole to counteract the artesian flow*
- *Mechanically close borehole if needed and monitor for 24 hours as grout sets, or as needed*

4.3.4 Borehole Abandonment Program (Non-artesian Flowing Well Bore)

- *Dropping cuttings into the borehole from surface for shallow <5 m boreholes;*
- *Feeding cuttings into the borehole by reverse-rotating auger cuttings down the borehole;*
- *Partially filling the borehole with cuttings and surface sealing with bentonite chips >5 m*
- *Partially filling the borehole with cuttings while sealing between granular zones to reconstruct naturally less permeable zone;*

5 FIELD PACKAGE

- The following documents are attached:
  - *Proposed borehole location plan (1358-02)*
  - *Letter from Southland Drilling Co. Ltd and associated documents*
  - *Utility clearances, to be obtained on the date of drilling*

~SCHEDULE F~

SUBSURFACE EXPLORATION

Table 1

Subsurface Investigation Summary

Completed by: Jessica Gagne **Project:** 1057 Gibsons Way **DATE:** February 26, 2020

A	Number (Test Pit, Well, borehole, etc...)	TH22-01 to TH22-08
B	Subsurface Disturbance Type (from Table 2)	Borehole
C	Method of exploration (from Table 3)	Solid Stem Auger
D	Northing (m)	49.406273
E	Easting (m)	-123.528266
F	Ground Elevation (m amsl)	127 to 135 m
G	Proposed testing depth below ground (m)	<6
H	Previously Encountered Depth to top of Gibsons Aquitard (ie: Till-Like Soil (m))	12
I	Previously Encountered Depth to top of Gibsons Aquifer (ie: Sand and gravel with Artesian flow (m))	98
J	Distance of existing subsurface information to proposed new intrusive work (m)	450 m
K	Report Reference for previous work to support new proposed work (Copies of original logs/records should be attached)	Well 89789 (information taken from BC Well Information)
L	Estimated depth offset to top of Gibson Aquitard Row H minus Row I (m, + if above and - if below)	-86
M	Estimated depth offset to top of Gibson Aquifer Row L minus Row G (m, + if above and - if below)	-92
N	Comment on uncertainty and potential risk to aquifer	Existing well log data, review of the aquifer mapping cross section prepared by Town of Gibsons, and our past drill investigation at the site (drilling to similar depths), risk is judged to be very low
O	Describe Aquifer Protection measures to be implemented	Drill investigation will be kept shallow.