

DEVELOPMENT PERMIT

NO. DP- 2018-18 (Aquifer)

TO: Bayside Studios Inc.

ADDRESS: **#524 – 2288 West Broadway** Vancouver, B.C. V6K 0V3 (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 those "lands" within the Town of Gibsons described below:

Parcel Identifier: 004-236-939

Legal Description: Lot A, Block 16, District Lot 685, Plan 7109

Civic Address: 505 Gower Point Road

- 3) These lands are within Development Permit Areas of the Town of Gibsons Official Community Plan (Bylaw 985, 2005). This permit applies to the following Development Permit Area:
 - Development Permit Area No. 9 (Gibsons Aquifer) for the purpose of the protection of the Gibsons Aquifer.
- 4) The "land" described herein shall be developed strictly in accordance with the terms and conditions and provisions of this Permit, and any plans and specifications attached to this Permit which shall form a part thereof; specifically:
 - Geotechnical Memorandum, dated September 18, 2018, by Arya Engineering Inc. stamped by Ben Tomasz, B.Eng. P.Eng.
- 5) All requirements of the plan(s) are to be followed. On site monitoring by the Geotechnical Engineer during construction as outlined in the plan(s) is required.
- 6) Minor changes to the aforesaid drawings that do not affect the intent of this Development Permit are permitted only with the approval of the Town of Gibsons and Geotechnical Engineer.
- 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 1ST DAY OF OCTOBER, 2018.

Lesley-Ann Staats, RPP Director of Planning

Copy of permit to the Geotechnical Engineer



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Memorandum			
File No.:	18-166-SC	Date:	September 18, 2018
To:	Spani Developments c/o Larry Hunt		
Email:	spanidev@gmail.com	Phone:	
From:	Elvis Lu, EIT; Ben Tomasz, P.Eng.	CC:	Lhunt.spanidev@gmail.com
Subject:	Development Permit Area 9 Review 505 Gower Point Road, Gibsons, BC		

Arya Engineering Inc. (Arya) presents the following memorandum to provide a summary of the professional services completed for the above listed site. The intent of this memorandum is to assess the impact of a recently constructed elevator shaft at the above listed site, with respect to the potential presence of the underlying Gibsons' Aquifer. This memorandum was completed to satisfy the Development Permit Area (DPA) 9 requirements for the Lower Gibsons Subarea, well head protection area, and contamination potential guidelines outlined in the Town of Gibsons' Official Community Plan (adopted on March 17, 2015), in support of the development proceedings required at this time.

Based on information reviewed as part of this assessment, and based on Arya's work experience in the area, the property is likely located within the boundary of Capilano Sediments (McCammon, 1977). Capilano Sediments deposited in the vicinity of the proposed development area are expected to consist of marine and glacio-marine deposits, comprised of gravel and sand with a trace fines fraction of silt and clay, and trace cobble sized rock fragments.

It is expected that these unconsolidated deposits vary in thickness (less than a meter to several meters in thickness) across the lot. Lodgment till, deposited during the Vashon Stade, consisting of silty sand with trace clay, gravel, cobbles, and boulders is expected below the Capilano Sediments. This till material is typically cemented, indurated and overconsolidated, and in this area of Gibsons, commonly ranges in thickness from a veneer to several meters. Due to the compactness of the TILL deposit and it's fines fraction, the glacial till material has low permeability characteristics and serves as an aquitard, confining the Gibsons Aquifer throughout portions of Lower Gibsons, and restricting the aquifers upward mobility.

As part of this assessment, provincially published well log data for several water wells nearest to the subject site were evaluated to develop a more comprehensive understanding of the potential location of an underlying, confined aquifer (Gibsons Aquifer) with respect to the subject site and the development area. Using iMapBC, five wells, owned both by the Town of Gibsons and privately, were estimated to range from 50 m and 170 m to the subject site. Water well ID's for these five wells are: 11667, 76155,

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33950, 53237, and 70506. The well log data indicated a minimum overburden (Capilano Sediments) thickness of 4.5 m overlaying the glacial till layer (aquitard), with the glacial till layer present at approximately 14.5 mASL for water wells 53237 and 33950.

In addition, review of an aquifer study conducted for the Town of Gibsons (Waterline, 2013) was completed to evaluate aquifer characteristics, including aquifer boundaries, hydraulic properties, geological schematics of the Town of Gibsons, recharge/discharge properties, and the contamination potential for the aquifer. The results of this assessment generally indicate that a layer of Capilano Sediments is present across Lower Gibsons, which overlays the glacial till aquitard, which itself overlays pre-Vashon deposits that constitute the Gibsons Aquifer. Based on this study, aquitard thickness ranges from a veneer, near the contact of the oceanic waters of Howe Sound, increasing to as much as 35 m in thickness towards Upper Gibsons. Based on a geological cross-section schematic from the aquifer study, a layer of till material, roughly 13 m in thickness, is present at water well 53237 and 33950 locations. These water wells, approximately 150 m and 170 m to the subject site, were both involved in the aquifer study that indicated their respective water supply was sourced from an aquifer comprised of Pre-Vashon Stade (Gibsons Aquifer) deposits. In addition, the aquifer study indicated that the top of the aquifer (underside of the glacial till deposit), for both public water wells, was 12.8 m and 16.5 m in depth respectively.

Based on previous project work conducted by representatives of this office, including a comprehensive subsurface investigation conducted near the subject site for the development of the recently completed Gibsons Public Market, the upper boundary of the glacial till aquitard is expected to be uncovered between 1.0 m and 3.0 m below existing ground surface in the vicinity of the subject site. A minimum aquitard thickness of at least 3.5 m is expected in this area.

Based on conversations with the client's representative, the proposed works, now requiring screening for DPA 9, have consisted of the development of an elevator shaft for the subject site. It is our understanding that no change in the usage of the existing facility is planned as part of the development described herein, and no new usage or storage of hazardous material or potential contaminants will result from the proposed works. As such, a net neutral change in contaminant potential is posed from usage type of the news works, from those of the preexisting structure.

Based on conversations with the client's representative, an excavation of approximately 1.0 m was commenced for underside of footing elevation (subgrade) for the elevator shaft foundation. At this 1.0 m depth, dense glacial till (grey, silty sand) was encountered, at which depth footings were placed. It is our understanding that the excavated materials were predominantly granular, possibly of either the Salish or Capilano Sediments (as mapped by McCammon) in origin. We understand that no groundwater was encountered during excavation, and excavation was halted at the glacial till contact.

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Based on aforesaid conversations, and a site reconnaissance conducted by an Arya representative on September 18, 2018, footings for the elevator shaft consist of strip footings, approximately 0.6 m in width and ranging in length from 2.1 m to 2.7 m. The backfill used was observed to be compact via manual hand probing methods, and was described as sand and gravel with trace fines.

Based on the conditions detailed herein, and the assumed working stresses induced at the footing locations of the recently constructed elevator shaft, the elevator shaft construction is not expected to adversely affect the glacial till/aquitard or Gibsons Aquifer at the depths anticipated and detailed in this memo.

We trust that the observations and recommendations presented herein meet the current development requirements. Should any questions or concerns arise, please do not hesitate to contact our office.

Sincerely, Arya Engineering Inc.

Elvis Ľu, B.ESc, EIT Geotechnical Engineer-in-Training



Ben Tomasz, B.Eng., P.Eng. 2018-09-18 Principal | Senior Geotechnical Engineer

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Bibliography

McCammon, J. (1977). Surficial Geology and Sand and Gravel Deposits of Sunshine Coast, Powell River, and Campbell River Areas. Bulletin 65. Province of British Columbia: Ministry of Mines and Petroleum Resources.

Waterline Resources Inc. (2013). Aquifer Mapping Study Town of Gibsons British Columbia.

Governments Communications. (2017, September 19). iMapBC. Retrieved September 18, 2018 from https://www2.gov.bc.ca/gov/content/data/geographic-data-services/web-based-mapping/imapbc

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Photograph 1 – Elevator Shaft Structure

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Photograph 2 - Backfill around Footings



Photograph 3 – Strip Footings inside of the Elevator Shaft

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