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GROUNDWATER IMPACT ASSESSMENT

**1160 Stonecrest Way
Shawnigan Lake, BC**

PREPARED FOR

Dolby & Harding Developments Ltd.

PREPARED BY

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AE PROJECT NUMBER: 2053
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1 INTRODUCTION

Active Earth Engineering Ltd. was retained by Dolby & Harding Developments Ltd. (Client) to prepare a groundwater impact assessment report in support of a Type C Soil Deposit Permit from the Cowichan Valley Regional District (CVRD) for the property located at 1160 Stonecrest Way in Shawnigan Lake, BC.

The CVRD Bylaw No. 4236 Section 12.2 (c) states the following requirement:

- *“for lands within 100 metres of a provincially designated vulnerable aquifer, a Ground Water Impact Assessment, prepared by a Registered Professional, analyzing the potential impact of proposed soil deposit activity on ground water and recommended ground water protection measures”*

This report presents a summary of the available hydrogeological information and an assessment of the proposed site filling plan with respect to the aquifer underlying the Site, including recommendations as appropriate for groundwater protection measures.

2 SITE DESCRIPTION

The Site is located at 1160 Stonecrest Way in the South Shawnigan Lake Area within the Cowichan Valley Regional District (CVRD) on Vancouver Island, British Columbia (Figure 1). The Site is approximately 6.2 km south of Shawnigan Lake and 1.9 km west of Finlayson Arm. Devereaux Lake is approximately 3.7 km southwest of the Site and Sooke Lake is approximately 8 km to the west (Figure 1).

The Site is located in the upper reaches of the Finlayson Arm catchment, and near the height of land adjoining the south Shawnigan Lake catchment. The area is underlain by shallow bedrock as expressed through steep slopes and significant rises in elevation. The peak elevation at the Site is approximately 450 m-geod. and the ground surface generally slopes downward to the east.

The Site consists of one property approximately 11.465 acres in size. There is a newly constructed single-family dwelling on the property with the landscaping work in early progress. The following table presents a summary of the property descriptions:

TABLE A – LOCATION AND PHYSICAL DESCRIPTION

Site Description	Current Civic Address	1160 Stonecrest Way, Shawnigan Lake, BC
	PID	027-675-190
	Cartographic Coordinates	48° 32' 45" North 123° 34' 57" West
	Area	11.645 Acres

3 SCOPE OF WORK

The scope of work for this study included the following:

1. Conduct a site visit to assess the property and proposed filling plan;
2. Review of Geological Survey Map 1553A;
3. Search of the IMAPBC interface and Water Resources Atlas;
4. Review of Ryzuk Geotechnical report dated November 19, 2019;
5. Develop a Conceptual Site Model to assess potential impacts to groundwater from fill placement; and,
6. Prepare this report including recommendations for groundwater protection.

4 DESCRIPTION OF PROPOSED FILLING

It is proposed to fill an area on the Site to the immediate east of the newly constructed residence where the ground surface currently slopes steeply downward largely controlled by bedrock outcrops. We understand that the purpose of the filling is to create a flat useable area that will ultimately be a tree orchard and no structures will be built on the fill. It is further understood that the area to be filled may eventually cover up to 10,000 m² and will require significantly greater than 1,000 m³ of fill soil.

The lot has previously been logged and only a few small trees remain and minimal soil cover on the slopes. Where present, the native soil cover is comprised of dense glacial till often underlying colluvium deposits.

Some soil fill has already been placed on the Site to the east of the residence. These soils appear to be comprised of poorly sorted fill including mixed silt, clay and blast rock. According to the Ryzuk Geotechnical report, these soils were originally sourced from a site on North Dairy Road.

Geotechnical, erosion and sediment control aspects of the fill placement are being addressed by Ryzuk, who have recommended that all organics within the fill area be stripped prior to fill placement. It is also recommended that the fill be placed and compacted in lifts, with the final surfaces revegetated as soon as possible.

5 HYDROGEOLOGY AND WATER RESOURCES

5.1 Geology

A review of the Geological Survey Map 1553A indicates that the Site lies within the Warwick Range between Saanich inlet to the east, and Shawnigan and Sooke Lakes to the north and west. The underlying bedrock is known as Wark Gneiss, a mafic unit of an early Paleozoic metamorphic

complex. The formation is composed of massive and gneissic metadiorite along with metagabbro and amphibolites. The unit is generally vertically foliated dipping 25 degrees to the northwest.

Colquitz Gneiss is found to the east and west of the Wark Gneiss unit. This silicic unit of a similar Paleozoic period is also vertically foliated striking to the northwest. The unit is composed mainly of quartz and feldspar with lenses of marble up to several meters thick.

Both units are largely cataclastic and exhibit retrograde metamorphism with severe alteration of the main constituents. Contacts between the Wark Gneiss and Colquitz Gneiss are poorly defined and external contacts are generally faulted and obscure. Together the units underlie a 10 km wide belt which extends from Victoria and the coast to Shawnigan Lake to the north, the units terminate against the San Juan and Survey Mountain Faults.

5.2 Aquifer Description

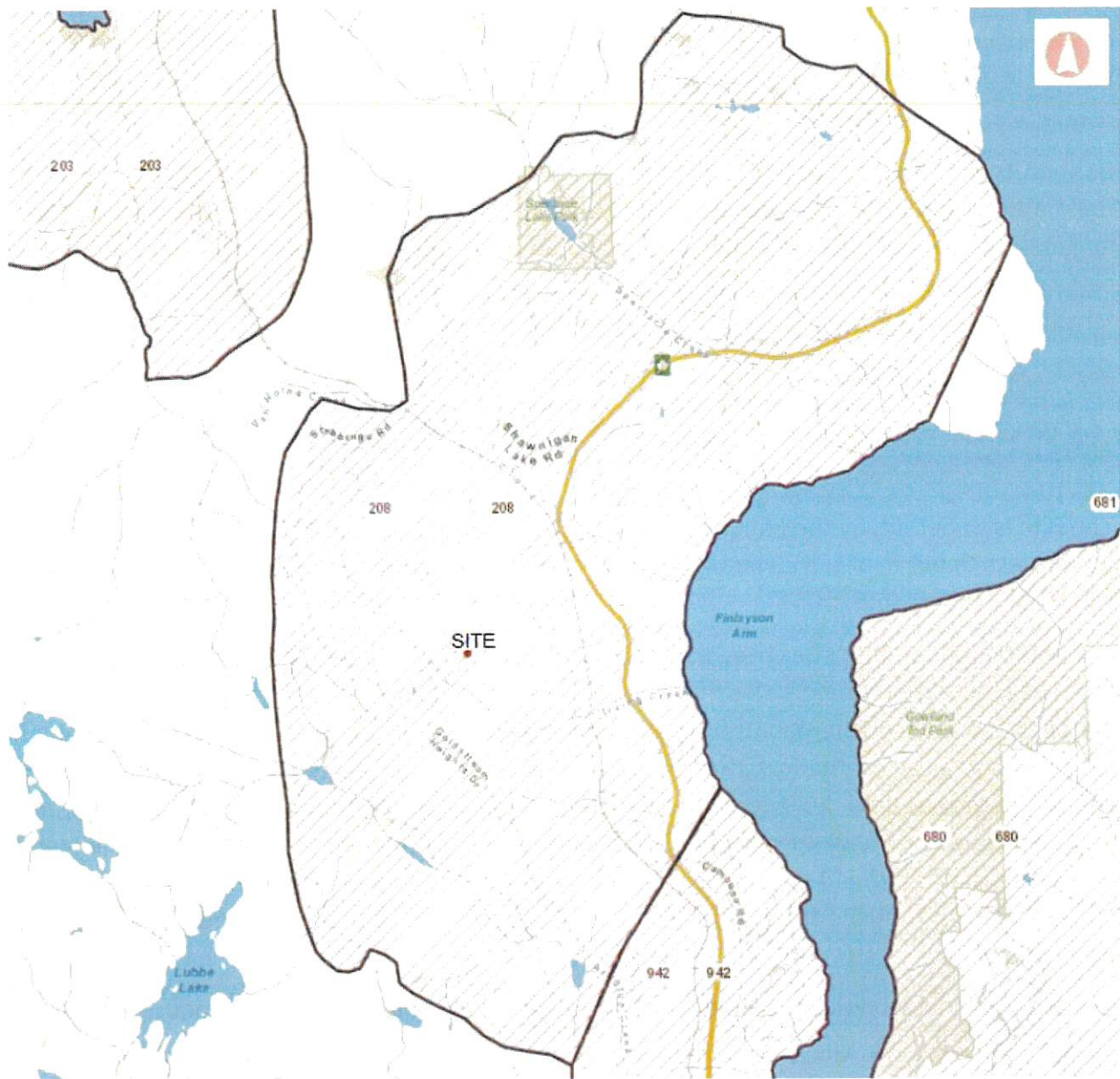
The BC Water Resources Atlas and IMAPBC were searched to obtain nearby well records and aquifer mapping information.

The Site is underlain by the Malahat Ridge bedrock aquifer (Aquifer 208) and has been mapped as having less than 1 m of soil cover being present over the majority of the aquifer. The aquifer report is included in Appendix A.

The aquifer vulnerability has been assessed using the DRASTIC method as being low to moderate. In areas where there are greater thicknesses of low permeability soil overlying the bedrock, the classification is low vulnerability. In addition, the bedrock in the area can be described as low-permeability based on the low production rates of the surrounding wells. At the subject Site, the aquifer vulnerability is considered to be moderate based on the minimal soil cover and areas of exposed bedrock. This vulnerability assessment for the aquifer incorporated the median depth to water-bearing fractures being approximately 90 m below ground surface. This assumption is consistent with the logs for the water supply wells servicing the Site and nearby residences as described below.

The aquifer is located along the east and southeast slopes of Malahat Ridge and is bound to the east by Saanich Inlet. The extent of the aquifer is shown on Figure A below.

FIGURE A – AQUIFER MAP



5.3 Water Wells

Ten existing water supply wells were identified within a 250 m radius of the Site according to the Ministry of Environment's WELLS database. The map is provided in Appendix A.

The following presents a summary of the wells details and the logs are included in Appendix A.

TABLE B – WELL SUMMARY

Address	Well Tag Number	Yield* (USgpm)	Well Depth (ft)	Depth to Water (ft)
Stebbings Rd	83529	12	307	Unknown
Stebbings Rd	85098	2	860	Unknown
Stonecrest Way	95445	5	500	7
Goldstream Heights	95446	2	1005	Unknown
Goldstream Heights	95447	1	747	20
Goldstream Heights	95448	8	685	Unknown
Stonecrest Way	96972	30	181	39
Stonecrest Estates	102344	3	785	Unknown
Stonecrest Way	111397	3	560	Unknown
Stonecrest Way	113961	2	480	40

*Driller's Estimate

GREY SHADING – Site Well

The property and surrounding lots are serviced by individual drilled water supply wells. The Site well is inferred to be Well Tag Number 102344. This well is 785 ft deep and encountered the shallowest water bearing fracture at 85 ft below ground. The estimated well yield is relatively low at 3 USgpm, similar to most of the nearby wells indicating that the aquifer has low productivity in the vicinity of the Site.

5.4 Surface Water Licenses

A search of IMAPBC was carried out for licensed Points of Diversion near the Site. Two existing surface water licenses were identified on Colpman Creek downslope from the proposed fill area. The nearest license is located approximately 625 m east of the Site. The following table summarizes the licenses:

TABLE C – NEARBY SURFACE WATER LICENSES

Licence No.	Quantity (m ³ /day)	Licensee
C036106	2.273	Montgomery Neil G
C131604	4.54	Malahat Meadows Holdings Ltd.

5.5 Water Quality

No water quality concerns are reported for the aquifer with the exception of some well records indicating a potential sulphur odour. No laboratory analytical results for the Site well water quality were available for review.

5.6 Wellhead Protection

According to the well record for WTN 102344, constructed in September 2010, the Site well is completed with a 10-inch diameter surface seal to 19 ft into competent bedrock, comprised of poured bentonite around the 6-inch diameter well casing. The well encountered bedrock at 3 ft below ground and the 10-inch diameter surface casing was removed during grouting of the surface seal. This meets the requirements of the BC Groundwater Protection Regulation (GPR).

The 6-inch diameter casing stick up is reported as 0.3 m above the ground surface, and the well was drilled by a driller licensed in British Columbia, in accordance with the GPR.

The well was not observed during the Site visit, but according to the property owner, the well is not located in the immediate vicinity of the fill area on the Site. Fill soil should not be placed around and/or over top of the well, and surface water should be directed away from the well.

6 CONCEPTUAL SITE MODEL

The provincial aquifer mapping and nearby well logs indicate that the Site overlies a moderately vulnerable bedrock aquifer with relatively low productivity and low demand.

The Site is located in an uplands area (elevation 450 m-geod.) of the aquifer catchment and is within the recharge zone for the aquifer. Recharge to the aquifer occurs via infiltration of precipitation through bedrock fractures that daylight at or near ground surface. Surface water bodies such as lakes and streams may also be constant sources of groundwater recharge via leakage reporting to fracture networks.

Infiltrating precipitation will flow along fracture networks via gravity until it reaches saturated conditions within the fracture network. Saturated flow also occurs predominantly within the fracture network and is driven by hydraulic pressure differences within the interconnected fractures. The potentiometric pressure driving the groundwater flow decreases to the east with the downward sloping topography. The regional groundwater flow direction in the bedrock aquifer beneath the Site is therefore to the east towards Saanich Inlet.

The median estimated yield for the 10 closest domestic water supply wells is 3 USgpm and the median depth is 622 ft. This represents a low permeability aquifer and suggests there are limited major water-bearing fracture networks.

Overall, precipitation and leakage from surface water bodies infiltrates into the ground and into the bedrock via fractures. The groundwater flow is inferred to occur through interconnected fracture networks in an easterly direction and discharge predominantly into Saanich Inlet. The overall ground surface slopes approximately 24% from the Site down to Saanich Inlet 1.9 km to the east. Some groundwater discharge is also expected occur along the lower portions of the slope above sea level.

7 CONCLUSIONS

A Type C Soil Deposit Permit is required for the proposed filling of the Site, and the CVRD Bylaw No. 4236 Section 12.2 (c) states the following requirement:

- *"for lands within 100 metres of a provincially designated vulnerable aquifer, a Ground Water Impact Assessment, prepared by a Registered Professional, analyzing the potential impact of proposed soil deposit activity on ground water and recommended ground water protection measures"*

The above hydrogeological assessment indicates that the Site area overlies the Malahat Ridge Aquifer, which is classified as being moderately vulnerable. This overall classification was determined by others using the DRASTIC method. The moderate vulnerability classification for the aquifer is based on the median depth to water-bearing fracture zones of approximately 90 m below ground, and the hydraulic conductivity of the bedrock aquifer being relatively low. In areas where the native till soil cover is greater than 5 m in thickness, the aquifer vulnerability to surface contamination is considered to be low. Since the Site currently has minimal soil cover, the aquifer is considered to be moderately vulnerable as the fracture dominated flow may include some preferential flow pathways or conduits for flow extending to surface.

The proposed fill placement is assumed to consist of chemically suitable soils as required by the BC Contaminated Sites Regulation (CSR). It is also understood that the fill will be placed and compacted according to the geotechnical recommendations which is expected to result in a low permeability for the fill. As such, the placement of clean and compacted fill soil cover over the exposed or shallow bedrock surface will enhance the degree of aquifer protection versus the current conditions. The added fill material will likely decrease the amount of recharge to the aquifer over the filled area, but it will also decrease the aquifer vulnerability over that area. Both of these impacts are considered to be negligible however because the size of the fill area is insignificant to that of the aquifer.

The on-Site domestic water supply well is completed in accordance with the Groundwater Protection Regulation including a 0.3 m stick up, secured lid and a 19 ft surface seal completed in competent bedrock.

8 RECOMMENDATIONS

The following recommendations are provided with respect to the placement of fill at the Site as it pertains to the protection of groundwater quality:

- The chemical quality of imported fill should meet the site-specific standards of the BC Contaminated Sites Regulation. A Qualified Professional should review and approve the chemical quality of the fill to be imported before it is transported to the Site.
- Fill placement should not promote surface water drainage towards the well head, and surface drainage should be maintained away from the well.
- Fill placement should not occur within 10 m of the well.
- The geotechnical and erosion control recommendations provided by Ryzuk Geotechnical should be followed.
- Site grading should be uniform as not to concentrate surface runoff down the slope.
- A buffer zone of 10 m from the base of the fill to the property lines should be left undisturbed to allow infiltration of surface runoff

9 LIMITATIONS

The use of this report by anyone is subject to the following conditions and limitations:

1. This report has been prepared at the request of the client and for the specific use referred to herein. The client, CVRD and BC Ministry of Environment and Climate Change Strategy may rely on this report. It is not reasonable for any other party to rely on the contents of this report without first obtaining written authorization from the client and Active Earth Engineering Ltd.
2. Liability is expressly denied to any person other than the parties indicated above and those who obtain written consent. Accordingly, Active Earth Engineering Ltd. does not accept responsibility for any damage suffered by any such person as a result of decisions made or actions based on this report. Diligence by all intended users is assumed.
3. This report is believed to provide a reasonable representation of the general environmental condition at the Site. The conclusions made in this report reflect Active Earth's best judgment in light of the information available at the time of reporting. Should additional information become available or Site conditions change, the conclusions and recommendations of this report may be subject to change.
4. Active Earth Engineering Ltd. has agreed to conduct an assessment of the Site hydrogeology to assess potential impacts to groundwater quality and prepare this report as requested by the client named in the report for the use specified by the client, which is stated in the report. The client has agreed that the performance of this work and the report format are appropriate for the intended use.
5. Written consent from Active Earth Engineering Ltd. must be obtained before any part of the report can be used for any purpose by anyone other than the client and other intended users identified in the report. Liability to any other party or for any other use is expressly denied regardless of who pays Active Earth Engineering Ltd.'s fee. Written consent and approval of Active Earth Engineering Ltd. must also be obtained before the report (or any part of it) can be altered or conveyed to other parties or the public through prospectus, offering memoranda, advertising, public relations, news, sales or other media.



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LIST OF ACRONYMS

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AEC	Area of Environmental Concern
AiP	Approval in Principle
AL	Agricultural Land Use Standards (AL)
APEC	Area of Potential Environmental Concern
AST	Above Ground Storage Tank
AWfw/m	Aquatic Life Standards (CSR) (fw – freshwater, m – marine)
BTEXS	Benzene, Toluene, Ethylbenzene, Xylenes, and Styrene
CL	Commercial Land Use Standards (CSR)
CoC	Certificate of Compliance
COC	Contaminant of Concern
CSM	Conceptual Site Model
CSR	Contaminated Sites Regulation
DSI	Detailed Site Investigation
DW	Drinking Water Standards (CSR)
ENV	BC Ministry of Environment & Climate Change Strategy
EPHw	Extractable Petroleum Hydrocarbons (w – water)
ESA	Environmental Site Assessment
HDPE	High-Density Polyethylene
HEPHs	Heavy Extractable Petroleum Hydrocarbons (s – soil)
HWR	BC Hazardous Waste Regulation
IL	Industrial Land Use Standards (CSR)
IW	Irrigation Water Standards (CSR)
LEPHs/w	Light Extractable Petroleum Hydrocarbons (s – soil, w – water)
LW	Livestock Watering Standards (CSR)
MDL	Method Detection Limit
MTBE	Methyl Tertiary Butyl Ether (also referred to as Methyl Tert-Butyl Ether)
NIR	Notification of Independent Remediation
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyl
PCOC	Potential Contaminant of Concern
PERC	Tetrachloroethylene
Phase I	Phase I Environmental Site Assessment
Phase II	Phase II Environmental Site Assessment
PSI	Preliminary Site Investigation
RLld	Residential Low-Density Land Use Standards (CSR)
RLhd	Residential High-Density Land Use Standards (CSR)
Stage 1	Stage 1 Preliminary Site Investigation
Stage 2	Stage 2 Preliminary Site Investigation
TCE	Trichloroethylene
VOC	Volatile Organic Compounds
VHw	Volatile Hydrocarbons (w – water)
VPHs/w/v	Volatile Petroleum Hydrocarbons (s – soil, w – water, v – vapour)
PL	Urban Park Land Use Standards (CSR)
UST	Underground Storage Tank
WLn	Wildlands Natural Land Use Standards (CSR)
WLr	Wildlands Reverted Land Use Standards (CSR)



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FIGURES



LOCATION PLAN

REFERENCE: GOOGLE MAPS

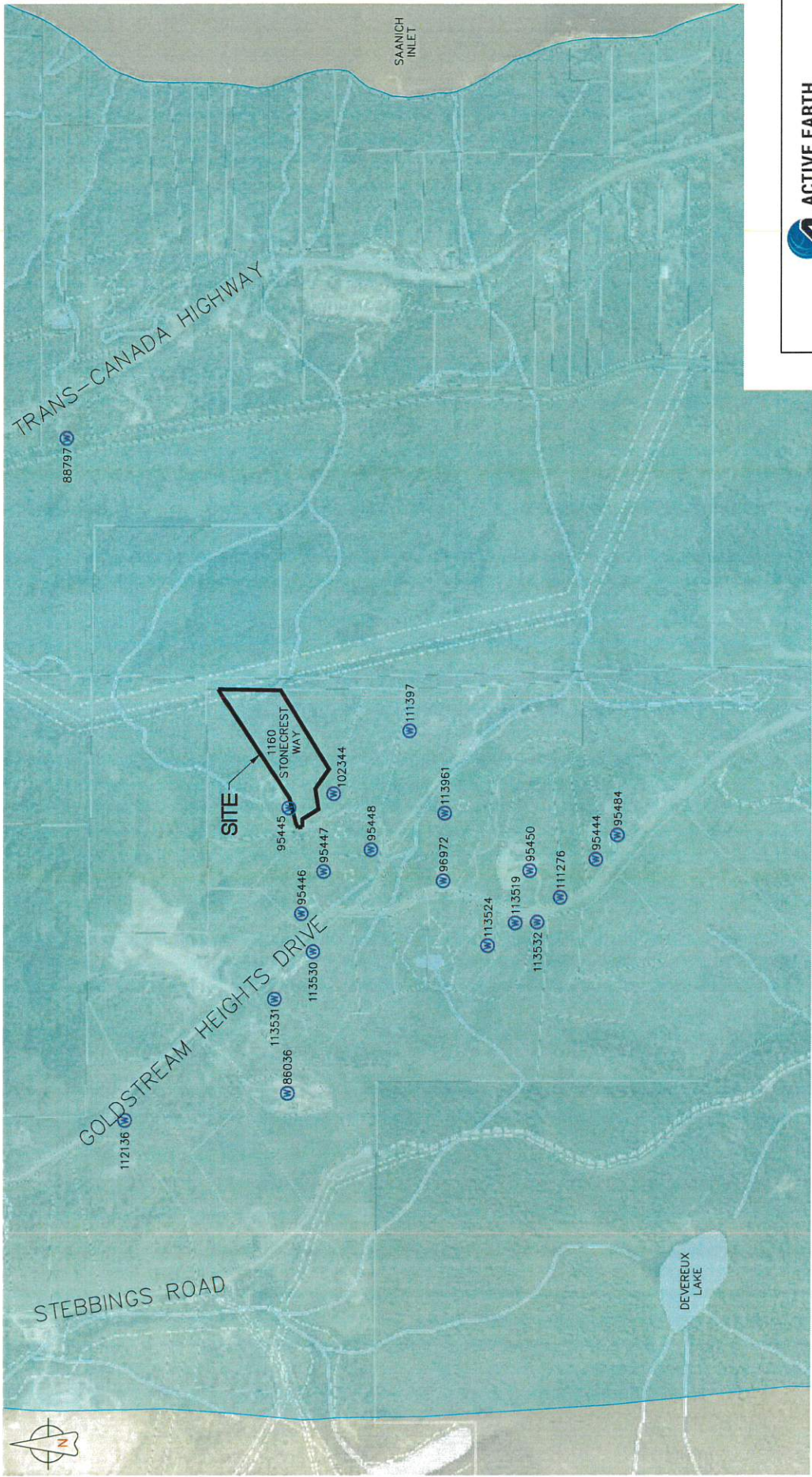
SCALE: N.T.S.

DOLBY & HARDING DEVELOPMENTS LTD



LOCATION PLAN
1160 STONECREST WAY
SHAWNIGAN LAKE, BC

date:	JAN 20	scale:	N.T.S.
		drawn:	CM
		checked:	MP
		file:	2053-1
drawing no:	FIGURE 1	issue:	A



CLIENT NAME: DOLBY & HARDING DEVELOPMENTS LTD.		PROJECT LOCATION: SHAWNIGAN LAKE, BC	
DWN BY: GM		DATE: 2020-01-22	
CHKD: MP		COURSE: 2053	
PROJECT NAME: SITE & SURROUNDING PLAN 1160 STONECREST WAY		FIGURE 2	

LEGEND

- APPROXIMATE SITE BOUNDARY
- AQUIFIER EXTENT
- ⊙ WATER WELL



REFERENCE: COWICHAN VALLEY REGIONAL DISTRICT - WEBMAP, INCLUDING AERIAL PHOTOGRAPH DATED 2014



LEGEND

— APPROXIMATE SITE BOUNDARY



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CLIENT NAME: JOLLY & HARDING
DEVELOPMENTS LTD.

PROJECT LOCATION:
SHAWNIGAN LAKE, BC

SITE PLAN
1160 STONECREST WAY

DWN BY: GM
CHK'D: MP

DWG NAME: -3
DATE: 2020-01-22
CADDLE: 2053

FIGURE 3

REFERENCE: COWICHAN VALLEY REGIONAL DISTRICT - WEBMAP, INCLUDING AERIAL PHOTOGRAPH DATED 2014

PAGE:



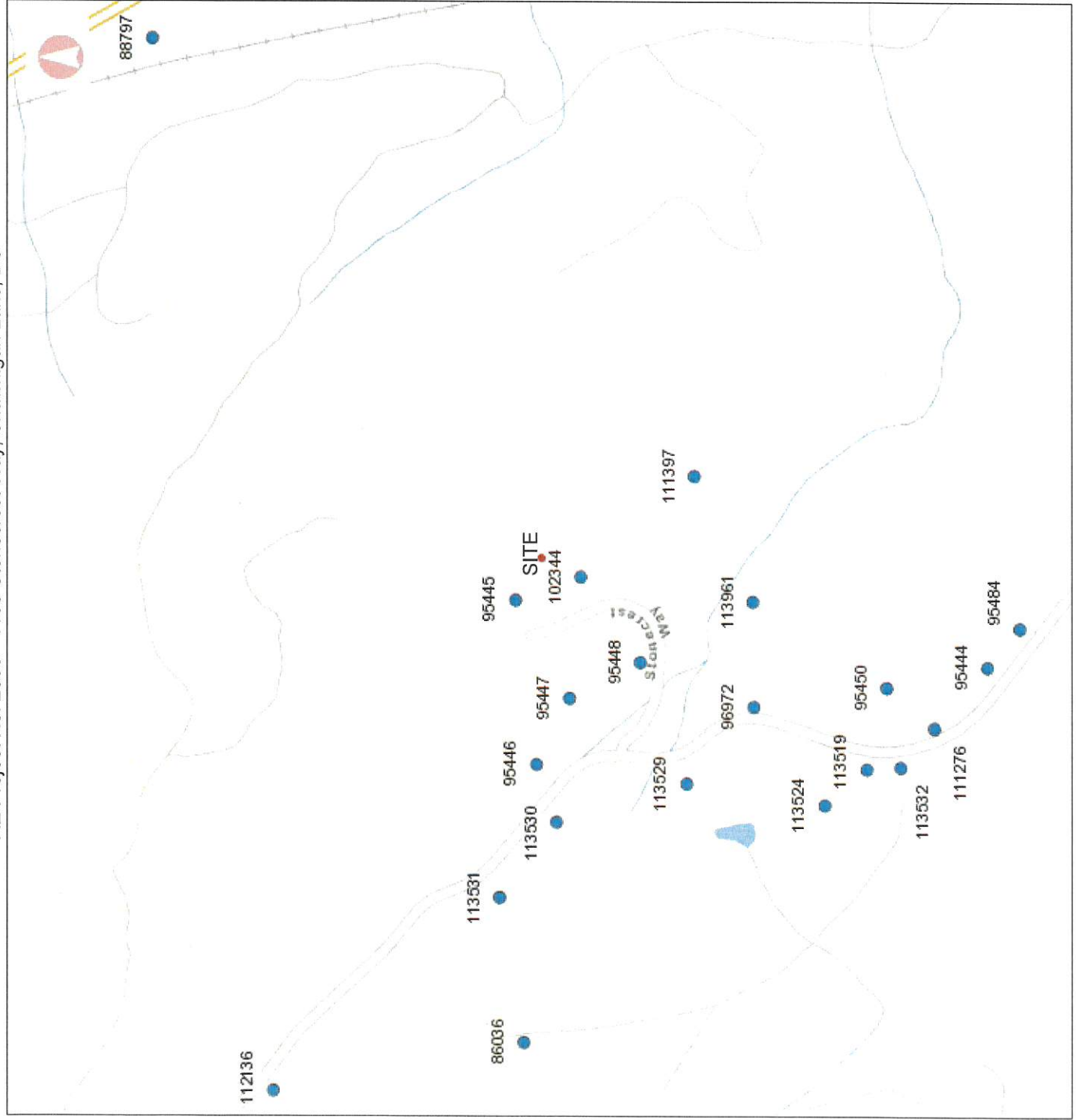
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APPENDIX A

BC Water Resources Atlas Results



iMapBC Mapping

Legend

Groundwater Supply Wells -

INTENDED_WATER_USE

- Private Domestic
- Water Supply System
- Irrigation
- Commercial and Industrial
- Observation
- Test
- Open Loop Geoeexchange
- Other
- Unknown
- Not Specified

TileCache



1: 10,000

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Datum: NAD83

Projection: NAD_1983_BC_Environment_Albers

Key Map of British Columbia



Well Summary

Well Tag Number: 83529
Well Identification Plate Number:
Owner Name: VAN MAREN
Intended Water Use: Unknown Well Use

Well Status: New
Well Class: Unknown
Well Subclass:
Aquifer Number:

Observation Well Number:
Observation Well Status:
Environmental Monitoring System (EMS) ID:
Alternative specs submitted: No

Licensing Information

Licensed Status: Unlicensed

Licence Number:

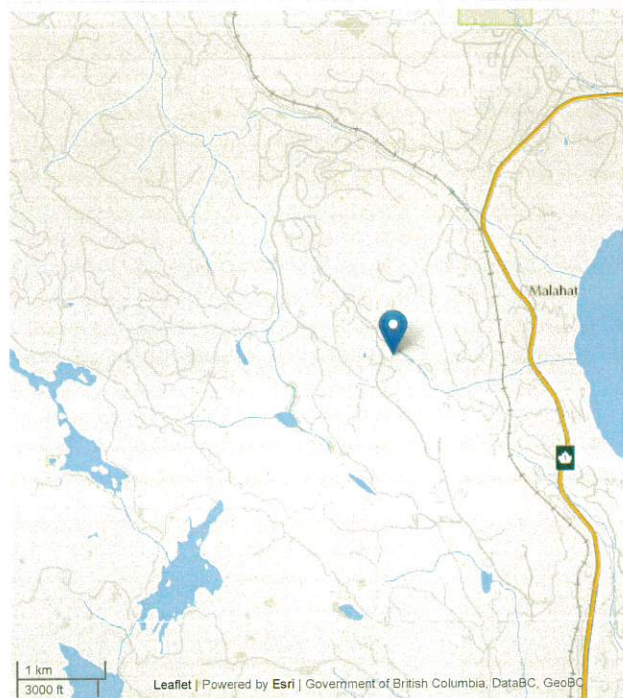
Location Information

Street Address: STEBBINGS RD
Town/City: HOLE #3

Legal Description:

Lot	
Plan	
District Lot	
Block	361
Section	
Township	
Range	
Land District	30
Property Identification Description (PID)	

Description of Well Location: HOLE #3; PROPOSED LOT 11



Geographic Coordinates - North American Datum of 1983 (NAD 83)

Latitude: 48.542614
Longitude: -123.585803
UTM Easting: 456762
UTM Northing: 5376778
Zone: 10
Coordinate Acquisition Code: (unknown, accuracy based on parcel size) No ICF cadastre, poor or no location sketch; site located in center of primary parcel

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
There has been no activity related to this well.				

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2003-10-30	2003-10-30				

Well Completion Data

Total Depth Drilled: 307.00 feet
Finished Well Depth: 307.00 feet
Final Casing Stick Up:
Depth to Bedrock: 4.00 feet
Ground elevation:

Static Water Level (BTOC):
Estimated Well Yield: 12,000 USGPM
Artesian Flow:
Artesian Pressure:
Method of determining elevation: Unknown

Well Cap: TACK LID
Well Disinfected Status: Not Disinfected
Drilling Method: Air Rotary
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0.00	4.00	TOPSOIL						
4.00	14.00	WEATHERED ROCK						
14.00	307.00	BEDROCK GREEN					180' 2 GPM, 227' 3 GPM, 280' 12 GPM	

Casing Details

From (ft)	To (ft)	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe

Surface Seal and Backfill Details

Surface Seal Material: Bentonite clay

Surface Seal Installation Method:

Surface Seal Thickness:

Surface Seal Depth:

Backfill Material Above Surface Seal:

Backfill Depth:

Liner Details

Liner Material:

Liner Diameter:

Liner from:

Liner Thickness:

Liner to:

Liner perforations

From

To

There are no records to show

Screen Details

Intake Method:

Type:

Material:

Opening:

Bottom:

Installed Screens

From

To

Diameter

Assembly Type

Slot Size

There are no records to show

Well Development

Developed by:

Development Total Duration:

Well Yield

No well yield data available.

Well Decommission Information

Reason for Decommission:

Sealant Material:

Decommission Details:

Method of Decommission:

Backfill Material:

Comments

CHLORINATE MEASUREMENTS TAKEN AT GROUND LEVEL

Alternative Specs Submitted: No

Documents

- WTN 83529_Well Record.pdf

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

Well Summary

Well Tag Number: 85098
Well Identification Plate Number:
Owner Name: VAN MAREN GOLDSTREAM HEIGHTS
Intended Water Use: Private Domestic

Well Status: New
Well Class: Unknown
Well Subclass:
Aquifer Number: 208

Observation Well Number:
Observation Well Status:
Environmental Monitoring System (EMS) ID:
Alternative specs submitted: No

Licensing Information

Licensed Status: Unlicensed

Licence Number:

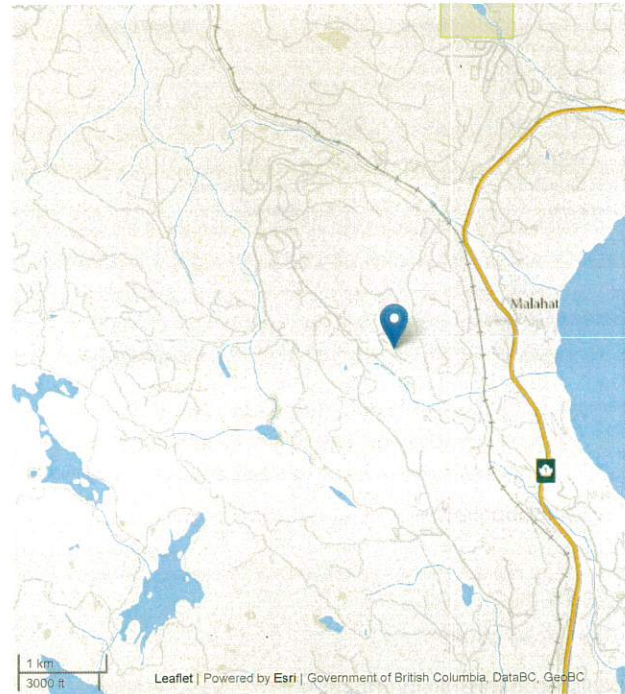
Location Information

Street Address: STEBBINGS ROAD
Town/City:

Legal Description:

Lot	5
Plan	
District Lot	
Block	361
Section	
Township	
Range	
Land District	30
Property Identification Description (PID)	

Description of Well Location: 1484 ELEV



Geographic Coordinates - North American Datum of 1983 (NAD 83)

Latitude: 48.544464 **Longitude:** -123.582763
UTM Easting: 456988 **UTM Northing:** 5376982
Zone: 10 **Coordinate Acquisition Code:** (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
There has been no activity related to this well.				

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2005-01-25	2005-01-25				

Well Completion Data

Total Depth Drilled: 860.00 feet
Finished Well Depth: 860.00 feet
Final Casing Stick Up:
Depth to Bedrock: 4.00 feet
Ground elevation:

Static Water Level (BTOC):
Estimated Well Yield: 2.000 USGPM
Artesian Flow:
Artesian Pressure:
Method of determining elevation: Unknown

Well Cap: WELDED LID
Well Disinfected Status: Not Disinfected
Drilling Method: Air Rotary
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0.00	4.00	OVERBURDEN						
4.00	860.00	BEDROCK (GREEN)						
		.5 GPM @ 280', 420', 540', 1 GPM @ 580', 600', 700', 740', 2 GPM @ 800' & 860'						

Casing Details

From (ft)	To (ft)	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0.00	20.00		Steel	6.000		

Surface Seal and Backfill Details

Surface Seal Material: Bentonite clay

Surface Seal Installation Method:

Surface Seal Thickness:

Surface Seal Depth:

Backfill Material Above Surface Seal:

Backfill Depth:

Liner Details

Liner Material:

Liner Diameter:

Liner from:

Liner Thickness:

Liner to:

Liner perforations

From

To

There are no records to show

Screen Details

Intake Method:

Type:

Material:

Opening:

Bottom:

Installed Screens

From

To

Diameter

Assembly Type

Slot Size

There are no records to show

Well Development

Developed by:

Development Total Duration:

Well Yield

No well yield data available.

Well Decommission Information

Reason for Decommission:

Sealant Material:

Decommission Details:

Method of Decommission:

Backfill Material:

Comments

CHLORINE. DRILLED 8 3/4 0-19', CASED 6 20'. MEASUREMENTS TAKEN AT GROUND LEVEL

Alternative Specs Submitted: No

Documents

- WTN 85098_Well Record.pdf

Disclaimer

The information provided should not be used as a basis for making financial or any other commitments. The Government of British Columbia accepts no liability for the accuracy, availability, suitability, reliability, usability, completeness or timeliness of the data or graphical depictions rendered from the data.

Well Summary

Well Tag Number: 95445
Well Identification Plate Number: 21759
Owner Name: ISIS LAND CORPORATION
Intended Water Use: Private Domestic

Well Status: New
Well Class: Water Supply
Well Subclass: Domestic
Aquifer Number: 208

Observation Well Number:
Observation Well Status:
Environmental Monitoring System (EMS) ID:
Alternative specs submitted: No

Licensing Information

Licensed Status: Unlicensed

Licence Number:

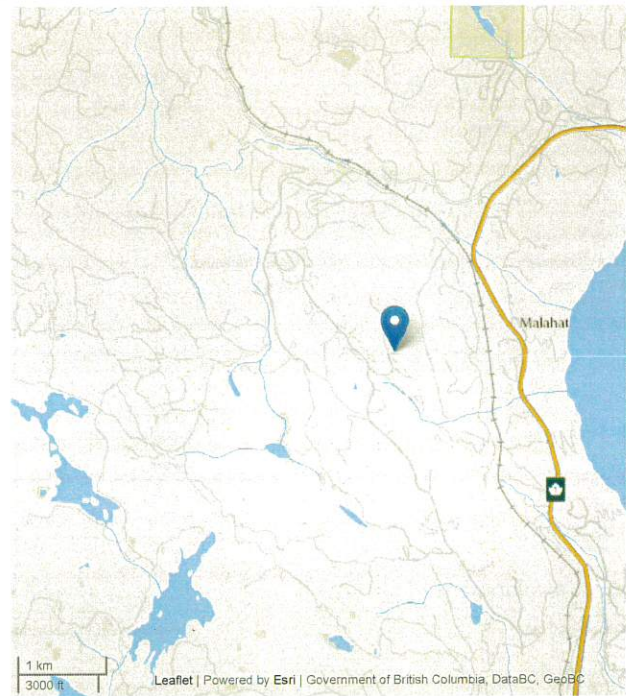
Location Information

Street Address: STONE CREST WAY
Town/City: MALAHAT

Legal Description:

Lot	SL5
Plan	VIP 78459
District Lot	
Block	361
Section	
Township	
Range	
Land District	29
Property Identification Description (PID)	

Description of Well Location: PROPOSED STRATA SUBDIVISION OF LOT 4, PLAN VIP 78459 & LOT H.



Geographic Coordinates - North American Datum of 1983 (NAD 83)

Latitude: 48.546175
Longitude: -123.584219
UTM Easting: 456882
UTM Northing: 5377173
Zone: 10
Coordinate Acquisition Code: (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
There has been no activity related to this well.				

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2007-11-14	2007-11-19				

Well Completion Data

Total Depth Drilled: 500.00 feet
Finished Well Depth: 500.00 feet
Final Casing Stick Up: 12.000 inches
Depth to Bedrock: 2.00 feet
Ground elevation: 1446.00

Static Water Level (BTOC): 7.00 feet
Estimated Well Yield: 5.000 USGPM
Artesian Flow:
Artesian Pressure:
Method of determining elevation: GPS

Well Cap: WELDED LID
Well Disinfected Status: Not Disinfected
Drilling Method: Dual Rotary
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0.00	2.00							
2.00	500.00						FRACTURE AT 35' - 30 GPM, FLOW AT 40' - 3 GPM, 60' - 4 GPM, 80' - 4 GPM, 160' - 4 GPM, 240' - 4 GPM, 290' - 15 GPM, 300' - 6 GPM, 320' - 6 GPM, 360' - 5 GPM, 420' - 5 GPM, 500' - 5 GPM.	

Casing Details

From (ft)	To (ft)	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0.00	18.00	Steel Removed		10.000		Not Installed
0.00	18.00		Steel	6.000	0.219	Installed
18.00	500.00		Open hole	6.000		Not Installed

Surface Seal and Backfill Details

Surface Seal Material: Bentonite clay
Surface Seal Installation Method: Poured
Surface Seal Thickness: 2.00
Surface Seal Depth:

Backfill Material Above Surface Seal:
Backfill Depth:

Liner Details

Liner Material:	Liner Thickness:	Liner perforations
Liner Diameter:	Liner to:	From To
Liner from:		There are no records to show

Screen Details

Intake Method:	Installed Screens
Hole	From To Diameter Assembly Type Slot Size
Type:	There are no records to show
Material:	
Opening:	
Bottom:	

Well Development

Developed by: **Development Total Duration:**

Well Yield

No well yield data available.

Well Decommission Information

Reason for Decommission: **Method of Decommission:**
Sealant Material: **Backfill Material:**
Decommission Details:

Comments

No comments submitted

Alternative Specs Submitted: No

Documents

- WTN 95445_Well Construction.pdf

Disclaimer

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Well Summary

Well Tag Number: 95446
Well Identification Plate Number: 25653
Owner Name: ISIS LAND CORPORATION
Intended Water Use: Private Domestic

Well Status: New
Well Class: Water Supply
Well Subclass: Domestic
Aquifer Number:

Observation Well Number:
Observation Well Status:
Environmental Monitoring System (EMS) ID:
Alternative specs submitted: No

Licensing Information

Licensed Status: Unlicensed

Licence Number:

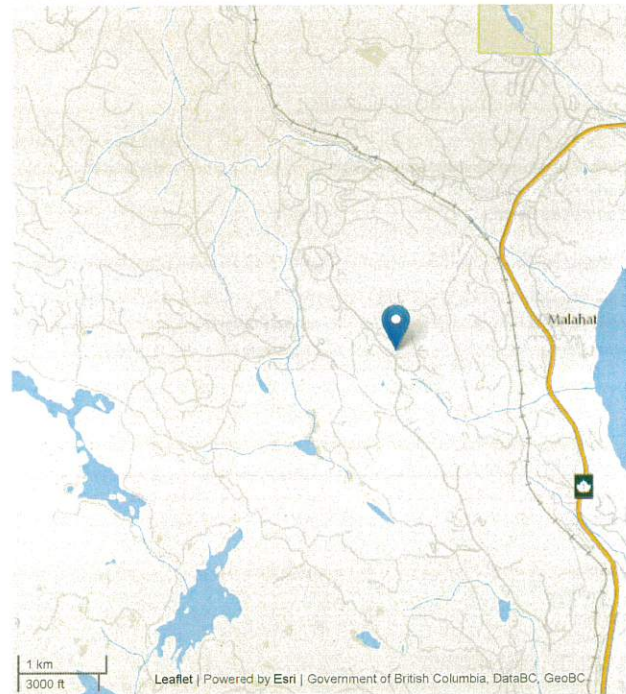
Location Information

Street Address: GOLDSTREAM HEIGHTS
Town/City: MALAHAT

Legal Description:

Lot	SL3
Plan	VIP 78459
District Lot	361
Block	
Section	
Township	
Range	
Land District	29
Property Identification Description (PID)	

Description of Well Location: PROPOSED STRATA SUBDIVISION OF LOT 4, PLAN VIP 78459 & LOT H.



Geographic Coordinates - North American Datum of 1983 (NAD 83)

Latitude: 48.54593	Longitude: -123.588131
UTM Easting: 456593	UTM Northing: 5377148
Zone: 10	Coordinate Acquisition Code: (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
There has been no activity related to this well.				

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2007-11-28	2007-12-05				

Well Completion Data

Total Depth Drilled: 1005.00 feet
Finished Well Depth: 1005.00 feet
Final Casing Stick Up: 24.000 inches
Depth to Bedrock: 3.00 feet
Ground elevation: 1528.00

Static Water Level (BTOC):
Estimated Well Yield: 2.000 USGPM
Artesian Flow:
Artesian Pressure:
Method of determining elevation: Unknown

Well Cap: WELDED
Well Disinfected Status: Disinfected
Drilling Method: Air Rotary
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0.00	3.00					Loose		
3.00	1005.00				green	Hard	SOFTER SPOTS 385'-386'; 557'-558'; 750'-751'; 830'-831'; 928'-930'. BEFORE FRAC .25 GPM; AFTER FRAC 2 GPM.	

Casing Details

From (ft)	To (ft)	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0.00	3.00	Steel Removed		9.000		Not Installed
0.00	18.00		Steel	6.000	0.219	Not Installed
18.00	1005.00		Open hole			Not Installed

Surface Seal and Backfill Details

Surface Seal Material: Bentonite clay
Surface Seal Installation Method: Poured
Surface Seal Thickness: 1.50
Surface Seal Depth:

Backfill Material Above Surface Seal:
Backfill Depth:

Liner Details

Liner Material:
Liner Diameter:
Liner from:

Liner Thickness:
Liner to:

Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method: Uncased
Hole
Type:
Material:
Opening:
Bottom:

Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by:

Development Total Duration: 3.00 hours

Well Yield

No well yield data available.

Well Decommission Information

Reason for Decommission:
Sealant Material:
Decommission Details:

Method of Decommission:
Backfill Material:

Comments

No comments submitted

Alternative Specs Submitted: No

Documents

- WTN 95446_Well Construction.pdf

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Well Summary

Well Tag Number: 95447
Well Identification Plate Number: 25656
Owner Name: ISIS LAND CORPORATION
Intended Water Use: Private Domestic

Well Status: New
Well Class: Water Supply
Well Subclass: Domestic
Aquifer Number: 208

Observation Well Number:
Observation Well Status:
Environmental Monitoring System (EMS) ID:
Alternative specs submitted: No

Licensing Information

Licensed Status: Unlicensed

Licence Number:

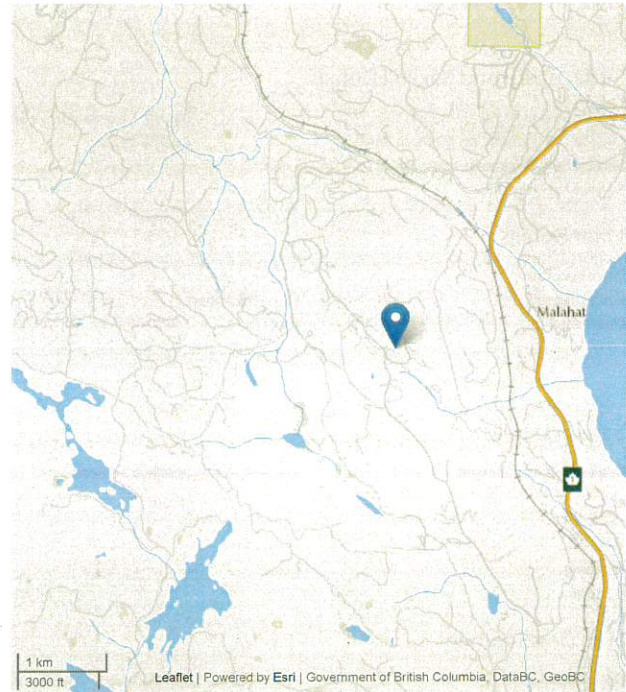
Location Information

Street Address: GOLDSTREAM HEIGHTS
Town/City: MALAHAT

Legal Description:

Lot	SL2
Plan	VIP 78459
District Lot	361
Block	
Section	
Township	
Range	
Land District	29
Property Identification Description (PID)	

Description of Well Location: PROPOSED STRATA SUBDIVISION OF LOT 4
 PLAN VIP 78459 & LOT H.



Geographic Coordinates - North American Datum of 1983 (NAD 83)

Latitude: 48.545372 **Longitude:** -123.586594
UTM Easting: 456706 **UTM Northing:** 5377085
Zone: 10 **Coordinate Acquisition Code:** (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
There has been no activity related to this well.				

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2007-11-05	2007-11-13				

Well Completion Data

Total Depth Drilled: 747.00 feet
Finished Well Depth: 747.00 feet
Final Casing Stick Up: 24.000 inches
Depth to Bedrock: 2.00 feet
Ground elevation: 1535.00

Static Water Level (BTOC): 20.00 feet
Estimated Well Yield: 1.000 USGPM
Artesian Flow:
Artesian Pressure:
Method of determining elevation: GPS

Well Cap: STEEL
Well Disinfected Status: Disinfected
Drilling Method: Air Rotary
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0.00	2.00				brown	Loose		
2.00	747.00				green	Hard		1.0000

Casing Details

From (ft)	To (ft)	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0.00	2.00	Steel Removed		9.000		Not Installed
0.00	18.00		Steel	6.000	0.219	Not Installed
18.00	747.00		Open hole	6.000		Not Installed

Surface Seal and Backfill Details

Surface Seal Material: Bentonite clay	Backfill Material Above Surface Seal:
Surface Seal Installation Method: Poured	Backfill Depth:
Surface Seal Thickness: 1.50	
Surface Seal Depth:	

Liner Details

Liner Material:	Liner perforations
Liner Diameter:	From To
Liner from:	Liner Thickness:
	Liner to:
	There are no records to show

Screen Details

Intake Method: Uncased	Installed Screens
Hole	From To Diameter Assembly Type Slot Size
Type:	
Material:	There are no records to show
Opening:	
Bottom:	

Well Development

Developed by:	Development Total Duration: 1.00 hours
----------------------	---

Well Yield

No well yield data available.

Well Decommission Information

Reason for Decommission:	Method of Decommission:
Sealant Material:	Backfill Material:
Decommission Details:	

Comments

No comments submitted

Alternative Specs Submitted: No
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Documents

- WTN 95447_Well Construction.pdf

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Well Summary

Well Tag Number: 95448
Well Identification Plate Number: 25654
Owner Name: ISIS LAND CORPORATION
Intended Water Use: Private Domestic

Well Status: New
Well Class: Water Supply
Well Subclass: Domestic
Aquifer Number: 208

Observation Well Number:
Observation Well Status:
Environmental Monitoring System (EMS) ID:
Alternative specs submitted: No

Licensing Information

Licensed Status: Unlicensed

Licence Number:

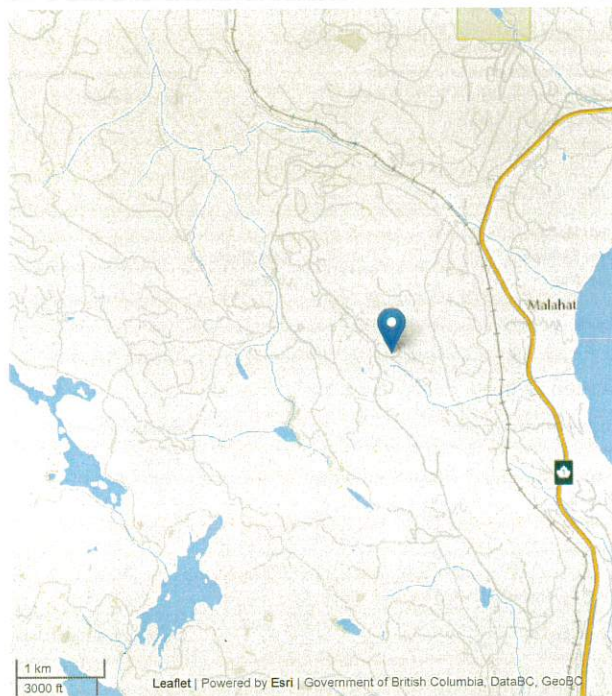
Location Information

Street Address: GOLDSTREAM HEIGHTS
Town/City: MALAHAT

Legal Description:

Lot	SL1
Plan	VIP 78459
District Lot	361
Block	
Section	
Township	
Range	
Land District	29
Property Identification Description (PID)	

Description of Well Location: PROPOSED SUBDIVISION (STRATA) OF LOT 4 PLAN VIP 78459 & LOT H.



Geographic Coordinates - North American Datum of 1983 (NAD 83)
Latitude: 48.544224 **Longitude:** -123.585795
UTM Easting: 456764 **UTM Northing:** 5376957
Zone: 10 **Coordinate Acquisition Code:** (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
There has been no activity related to this well.				

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2007-11-16	2007-11-21				

Well Completion Data

Total Depth Drilled: 685.00 feet
Finished Well Depth: 685.00 feet
Final Casing Stick Up: 24.000 inches
Depth to Bedrock: 3.00 feet
Ground elevation: 1473.00

Static Water Level (BTOC):
Estimated Well Yield: 8.000 USGPM
Artesian Flow:
Artesian Pressure:
Method of determining elevation: GPS

Well Cap: STEEL
Well Disinfected Status: Disinfected
Drilling Method: Air Rotary
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0.00	3.00				brown	Loose		
3.00	685.00				green	Very Hard	FRACTURE AT 660' - 8 GPM	8.0000

Casing Details

From (ft)	To (ft)	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0.00	3.00	Steel Removed		9.000		Not Installed
0.00	18.00		Steel	6.000	0.219	Not Installed
18.00	685.00		Open hole	6.000		Not Installed

Surface Seal and Backfill Details

Surface Seal Material: Bentonite clay
Surface Seal Installation Method: Poured
Surface Seal Thickness: 1.50
Surface Seal Depth:

Backfill Material Above Surface Seal:
Backfill Depth:

Liner Details

Liner Material:
Liner Diameter:
Liner from:

Liner Thickness:
Liner to:

Liner perforations

From
To

There are no records to show

Screen Details

Intake Method: Uncased
Hole
Type:
Material:
Opening:
Bottom:

Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by:

Development Total Duration: 1.00 hours

Well Yield

No well yield data available.

Well Decommission Information

Reason for Decommission:
Sealant Material:
Decommission Details:

Method of Decommission:
Backfill Material:

Comments

No comments submitted

Alternative Specs Submitted: No

Documents

- WTN 95448_Well Construction.pdf

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Well Summary

Well Tag Number: 96972
Well Identification Plate Number:
Owner Name: MIKE & CINDY BEAM
Intended Water Use: Private Domestic

Well Status: New
Well Class: Water Supply
Well Subclass: Domestic
Aquifer Number: 208

Observation Well Number:
Observation Well Status:
Environmental Monitoring System (EMS) ID:
Alternative specs submitted: No

Licensing Information

Licensed Status: Unlicensed

Licence Number:

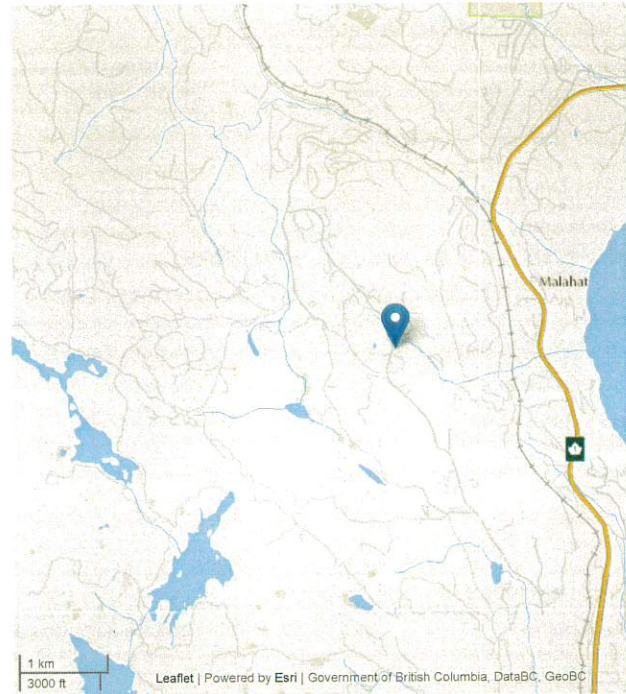
Location Information

Street Address: STONECREST WAY
Town/City: GOLDSTREAM HEIGHTS

Legal Description:

Lot	12
Plan	
District Lot	
Block	361
Section	
Township	
Range	
Land District	29
Property Identification Description (PID)	

Description of Well Location: STRATA LOT 12, STRATA PLAN EPS 21, ON RIGHT SIDE OF DRIVEWAY NEAR GOLDSTREAM HEIGHTS RD



Geographic Coordinates - North American Datum of 1983 (NAD 83)

Latitude: 48.542446
Longitude: -123.586939
UTM Easting: 456678
UTM Northing: 5376760
Zone: 10
Coordinate Acquisition Code: (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
There has been no activity related to this well.				

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2009-11-30	2009-12-01				

Well Completion Data

Total Depth Drilled: 181.00 feet
Finished Well Depth: 181.00 feet
Final Casing Stick Up: 12.000 inches
Depth to Bedrock: 4.50 feet
Ground elevation: 1525.00

Static Water Level (BTOC): 39.00 feet
Estimated Well Yield: 30.00 USGPM
Artesian Flow:
Artesian Pressure:
Method of determining elevation: Unknown

Well Cap: WELDED LID
Well Disinfected Status: Disinfected
Drilling Method: Dual Rotary
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0.00	4.50	SILT & BROKEN ROCK			brown	Soft		
4.50	32.00	HARD ROCK VOLCANIC			vari-coloured	Hard	GREEN & GREY	
32.00	40.00	BEDROCK WITH BROWN COLOR			green		MEDIUM HARD	1.5000
40.00	139.00				green	Hard	WITH WHITE PARTICULAR	
139.00	140.00				green	Medium	SMALL FRACTURE	0.2500
140.00	154.00	BEDROCK VOLCANIC			green	Hard		
154.00	159.00		fractured		green	Medium		
159.00	181.00				green	Hard		

Casing Details

From (ft)	To (ft)	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0.00	19.00		Steel	6.000	0.219	Not Installed
0.00	19.00	Steel Removed		10.000		Not Installed

Surface Seal and Backfill Details

Surface Seal Material: Bentonite clay
Surface Seal Installation Method: Poured
Surface Seal Thickness: 2.00
Surface Seal Depth:

Backfill Material Above Surface Seal:
Backfill Depth:

Liner Details

Liner Material:		Liner Thickness:		Liner perforations	
Liner Diameter:		Liner to:		From	To
Liner from:				There are no records to show	

Screen Details

Intake Method: Uncased
Hole
Type:
Material:
Opening:
Bottom:

Installed Screens				
From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by: **Development Total Duration:** 1.00 hours

Well Yield

No well yield data available.

Well Decommission Information

Reason for Decommission: **Method of Decommission:**
Sealant Material: **Backfill Material:**
Decommission Details:

Comments

No comments submitted

Alternative Specs Submitted: No

Documents

No additional documentation available for this well.

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Well Summary

Well Tag Number: 102344
Well Identification Plate Number: 34847
Owner Name: ISIS Land Corp.
Intended Water Use: Private Domestic

Well Status: New
Well Class: Water Supply
Well Subclass: Domestic
Aquifer Number: 208

Observation Well Number:
Observation Well Status:
Environmental Monitoring System (EMS) ID:
Alternative specs submitted: No

Licensing Information

Licensed Status: Unlicensed

Licence Number:

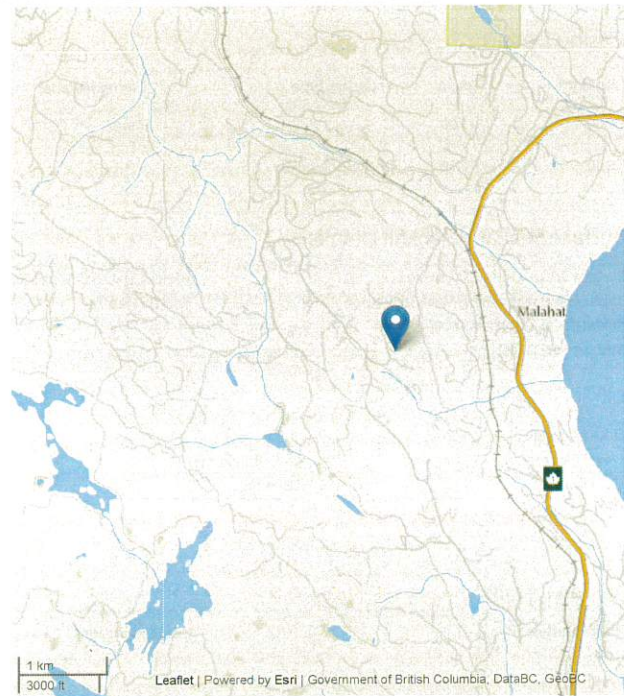
Location Information

Street Address: Stonecrest Estates
Town/City: Malahat

Legal Description:

Lot	7
Plan	EPS21
District Lot	
Block	361
Section	
Township	
Range	
Land District	29
Property Identification Description (PID)	027675203

Description of Well Location: Description not provided. Oh well.



Geographic Coordinates - North American Datum of 1983 (NAD 83)

Latitude: 48.545125
UTM Easting: 456918
Zone: 10
Longitude: -123.583719
UTM Northing: 5377056
Coordinate Acquisition Code: (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
There has been no activity related to this well.				

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2010-09-14	2010-09-17				

Well Completion Data

Total Depth Drilled: 785.00 feet
Finished Well Depth: 785.00 feet
Final Casing Stick Up: 12,000 inches
Depth to Bedrock: 3.00 feet
Ground elevation: 1505.00

Static Water Level (BTOC):
Estimated Well Yield: 3.000 USGPM
Artesian Flow:
Artesian Pressure:
Method of determining elevation: GPS

Well Cap: welded steel lid
Well Disinfected Status: Disinfected
Drilling Method: Air Rotary
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0.00	3.00	roots, sand, & gravel			brown	Soft		
3.00	107.00				green	Hard	at 85ft	0.3300
107.00	111.00				green	Medium	wet	
111.00	286.00				green	Hard	at 165ft	0.5000
286.00	311.00				green	Hard		
311.00	486.00				green	Hard		0.5000
486.00	497.00				green	Hard		0.5000
497.00	642.00				green	Hard		0.5000
642.00	766.00				green	Hard	at 785ft	3.0000
766.00	785.00				green	Medium		

Casing Details

From (ft)	To (ft)	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0.00	19.00		Steel	6.000	0.219	Not Installed
0.00	19.00	Steel Removed		10.000		Not Installed
19.00	785.00		Open hole	6.000		Not Installed

Surface Seal and Backfill Details

Surface Seal Material: Bentonite clay
Surface Seal Installation Method: Poured
Surface Seal Thickness: 2.00
Surface Seal Depth:

Backfill Material Above Surface Seal:
Backfill Depth:

Liner Details

Liner Material:
Liner Diameter:
Liner from:

Liner Thickness:
Liner to:

Liner perforations

From

To

There are no records to show

Screen Details

Intake Method:
Type:
Material:
Opening:
Bottom:

Installed Screens

From

To

Diameter

Assembly Type

Slot Size

There are no records to show

Well Development

Developed by:

Development Total Duration: 2.00 hours

Well Yield

No well yield data available.

Well Decommission Information

Reason for Decommission:
Sealant Material:
Decommission Details:

Method of Decommission:
Backfill Material:

Comments

Do NOT put pump below 760ft. Or else. WELL RECORD SUBMITTED THROUGH EWELLS.

Alternative Specs Submitted: No

Documents

No additional documentation available for this well.

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Well Summary

Well Tag Number: 111397
 Well Identification Plate Number: 42500
 Owner Name: 624765 BC LTD
 Intended Water Use: Private Domestic

Well Status: New
 Well Class: Water Supply
 Well Subclass: Domestic
 Aquifer Number:

Observation Well Number:
 Observation Well Status:
 Environmental Monitoring System (EMS) ID:
 Alternative specs submitted: No

Licensing Information

Licensed Status: Unlicensed

Licence Number:

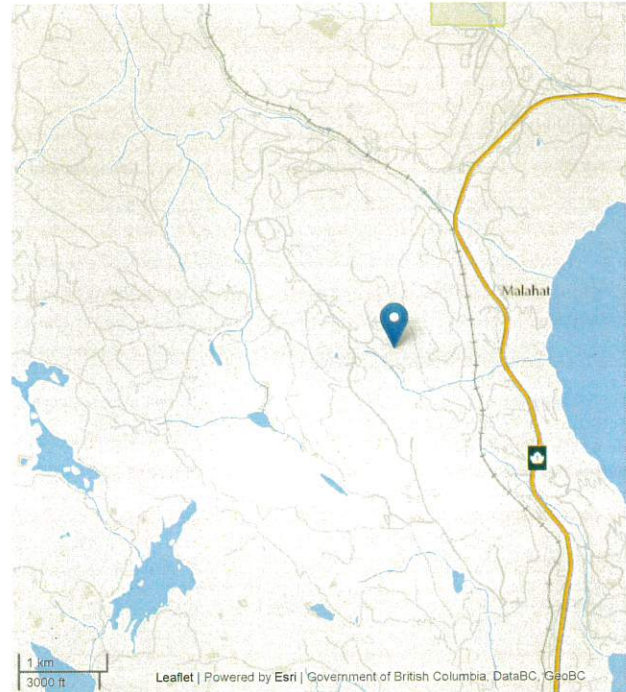
Location Information

Street Address: STONECREST
 Town/City:

Legal Description:

Lot	9
Plan	EPS 21
District Lot	
Block	361
Section	
Township	
Range	
Land District	29
Property Identification Description (PID)	027675220

Description of Well Location: NOTHING ENTERED.



Geographic Coordinates - North American Datum of 1983 (NAD 83)

Latitude: 48.543266 Longitude: -123.581421
 UTM Easting: 457086 UTM Northing: 5376848
 Zone: 10 Coordinate Acquisition Code: (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
There has been no activity related to this well.				

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2016-03-03	2016-03-08				

Well Completion Data

Total Depth Drilled: 560.00 feet
 Finished Well Depth: 560.00 feet
 Final Casing Stick Up: 16.000 inches
 Depth to Bedrock: 10.00 feet
 Ground elevation: 1426.00

Static Water Level (BTOC):
 Estimated Well Yield: 3.000 USGPM
 Artesian Flow:
 Artesian Pressure:
 Method of determining elevation: GPS

Well Cap: STEEL, WELDED
 Well Disinfected Status: Disinfected
 Drilling Method: Dual Rotary
 Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Moisture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0.00	10.00	TOPSOIL, FILL			brown	Loose		
10.00	438.00	BEDROCK, GRANITE			grey	Hard	0.5 GPM @ 90'	
438.00	525.00	GREEN AND LIGHT GREEN BEDROCK			green	Hard	1 GPM @ 200'	
525.00	540.00	WHITE BEDROCK, FRACTURE @ 540'			green	Hard	1.5 GPM @ 280'	
540.00	560.00	WHITE BEDROCK			green	Very Hard	3 GPM @ 545'	

Casing Details

From (ft)	To (ft)	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0.00	10.00	Steel Removed		10.000		Not Installed
0.00	18.00		Steel	6.000	0.219	Not Installed

Surface Seal and Backfill Details

Surface Seal Material: Bentonite clay
Surface Seal Installation Method: Poured
Surface Seal Thickness: 2.00
Surface Seal Depth:

Backfill Material Above Surface Seal:
Backfill Depth:

Liner Details

Liner Material:
Liner Diameter:
Liner from:

Liner Thickness:
Liner to:

Liner perforations

From	To
There are no records to show	

Screen Details

Intake Method:
Type:
Material:
Opening:
Bottom:

Installed Screens

From	To	Diameter	Assembly Type	Slot Size
There are no records to show				

Well Development

Developed by:

Development Total Duration: 1.00 hours

Well Yield

No well yield data available.

Well Decommission Information

Reason for Decommission:
Sealant Material:
Decommission Details:

Method of Decommission:
Backfill Material:

Comments

No comments submitted

Alternative Specs Submitted: No

Documents

No additional documentation available for this well.

Disclaimer

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Well Summary

Well Tag Number: 113961
Well Identification Plate Number: 52104
Owner Name: EARTH CORPORATION
Intended Water Use: Private Domestic

Well Status: New
Well Class: Water Supply
Well Subclass: Domestic
Aquifer Number:

Observation Well Number:
Observation Well Status:
Environmental Monitoring System (EMS) ID:
Alternative specs submitted: No

Licensing Information

Licensed Status: Unlicensed

Licence Number:

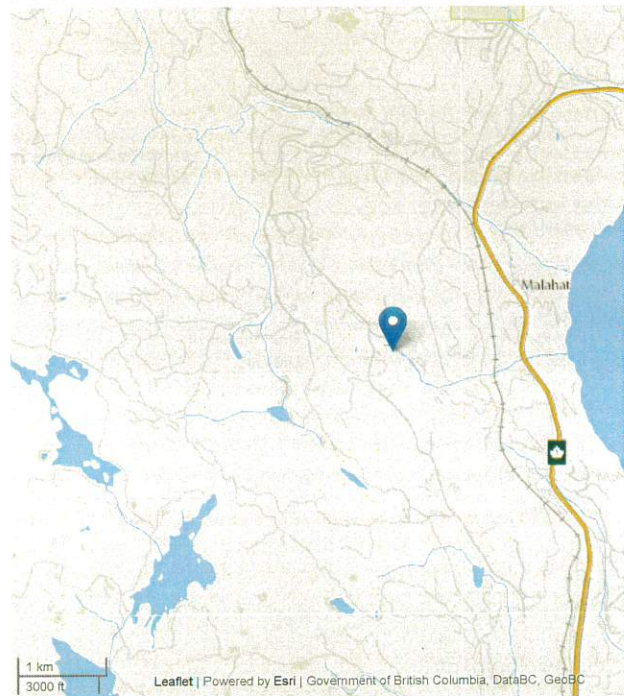
Location Information

Street Address: STONECREST WAY
Town/City: MALAHAT

Legal Description:

Lot	11
Plan	
District Lot	
Block	
Section	361
Township	
Range	
Land District	29
Property Identification Description (PID)	027675246

Description of Well Location: GOLDSTREAM HEIGHTS



Geographic Coordinates - North American Datum of 1983 (NAD 83)

Latitude: 48.542405
UTM Easting: 456862
Zone: 10
Longitude: -123.584446
UTM Northing: 5376754
Coordinate Acquisition Code: (10 m accuracy) Handheld GPS with accuracy of +/- 10 metres

Well Activity

Activity	Work Start Date	Work End Date	Drilling Company	Date Entered
There has been no activity related to this well.				

Well Work Dates

Start Date of Construction	End Date of Construction	Start Date of Alteration	End Date of Alteration	Start Date of Decommission	End Date of Decommission
2017-12-05	2017-12-07				

Well Completion Data

Total Depth Drilled: 480.00 feet
Finished Well Depth: 480.00 feet
Final Casing Stick Up: 18.000 inches
Depth to Bedrock: 9.00 feet
Ground elevation: 1444.00

Static Water Level (BTOC): 40.00 feet
Estimated Well Yield: 2.000 USGPM
Artesian Flow:
Artesian Pressure:
Method of determining elevation: GPS

Well Cap: WELDED LID
Well Disinfected Status: Disinfected
Drilling Method: Dual Rotary
Orientation of Well: VERTICAL

Lithology

From (ft bgl)	To (ft bgl)	Raw Data	Description	Molsture	Colour	Hardness	Observations	Water Bearing Flow Estimate (USGPM)
0.00	4.00	broken rock	silty		brown	Medium		0.5000
4.00	9.00	till			brown	Medium		
9.00	108.00	rock			green	Hard		
108.00	190.00	bedrock			grey	Hard		
190.00	267.00	bedrock			grey	Medium		
267.00	375.00				green	Hard		
375.00	480.00				green	Very Hard	FRACTURE AT 445'	2.0000

Casing Details

From (ft)	To (ft)	Casing Type	Casing Material	Diameter	Wall Thickness	Drive Shoe
0.00	18.50	Steel Removed	Steel	6.000	0.219	Not Installed
0.00	18.50			10.000		Not Installed

Surface Seal and Backfill Details

Surface Seal Material: Bentonite clay	Backfill Material Above Surface Seal:
Surface Seal Installation Method: Poured	Backfill Depth:
Surface Seal Thickness: 2.00	
Surface Seal Depth:	

Liner Details

Liner Material:	Liner Thickness:		Liner perforations
Liner Diameter:	Liner to:		From To
Liner from:			There are no records to show

Screen Details

Intake Method: Uncased		Installed Screens				
Hole		From	To	Diameter	Assembly Type	Slot Size
Type: Pipe size						
Material:		There are no records to show				
Opening:						
Bottom:						

Well Development

Developed by:	Development Total Duration: 2.00 hours
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Well Yield

No well yield data available.

Well Decommission Information

Reason for Decommission:	Method of Decommission:
Sealant Material:	Backfill Material:
Decommission Details:	

Comments

DO NOT SET PUMP BELOW 440'

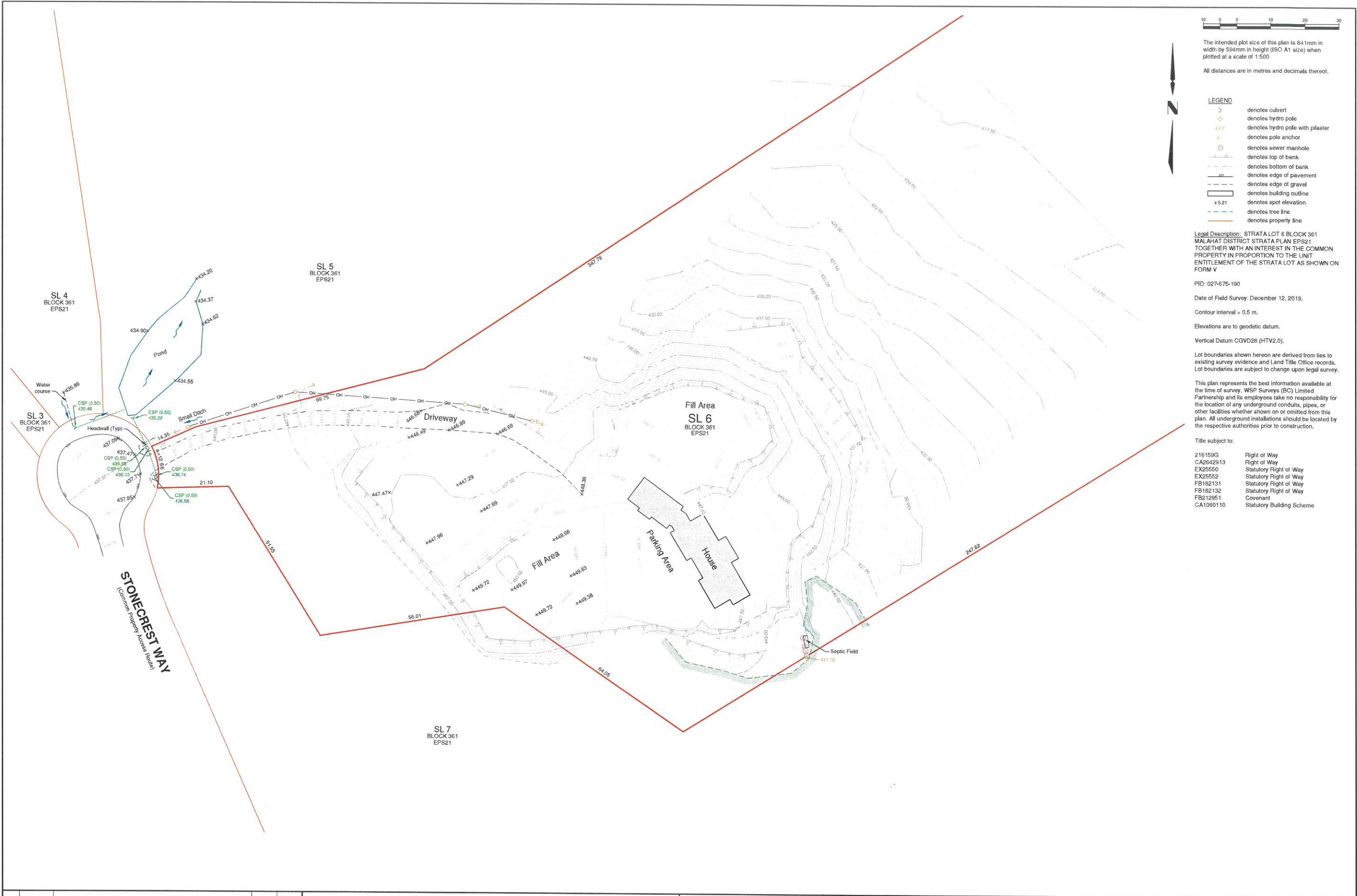
Alternative Specs Submitted: No

Documents


No additional documentation available for this well.

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0				2020-01-08				ISSUED TO CLIENT				MLR				MLE			
ISS/REV				YYYY-MM-DD				DESCRIPTION				DRN				CHK			
0				2020-01-08				ISSUED TO CLIENT				MLR				MLE			
ISS/REV				YYYY-MM-DD				DESCRIPTION				DRN				CHK			

CLIENT:	D&H Excavating	 WSP Canada Inc. 301-3600 Uptown Boulevard, Victoria, BC V8Z 0B9 t: 250-384-5510 www.wsp.com	PROJECT:	1160 Stonecrest Way	TITLE:	Type 'C' Soil Deposit Permit Topographic Survey
CLIENT REF. NO:			PROJECT NO:	191-14479-00	DRAWING NO:	191-14479-00-BSSSI001-R0
			SCALE:	As-Noted	SHEET NO:	1 OF 1
			DISCIPLINE:	GEOMATICS		

All distances are in metres and decimals thereof.

All distances are in metres and decimals thereof.

	denotes culvert
	denotes hydro pole
	denotes hydro pole with pilaster
	denotes pole anchor
	denotes sewer manhole
	denotes top of bank
	denotes bottom of bank
	denotes edge of pavement
	denotes edge of gravel
	denotes building outline
	denotes spot elevation
	denotes tree line
	denotes property line
	denotes existing major contour
	denotes existing minor contour
	denotes proposed major contour
	denotes proposed minor contour

Legal Description: STRATA LOT 6 BLOCK 361
MALAHAT DISTRICT STRATA PLAN EPS21
TOGETHER WITH AN INTEREST IN THE COMMON
PROPERTY IN PROPORTION TO THE UNIT
ENTITLEMENT OF THE STRATA LOT AS SHOWN ON
FORM V

PID: 027-675-190

Date of Field Survey: December 12, 2019

Contours shown are existing and proposed final contours

Contour interval = 1m

Elevations are to geodetic datum.

Vertical Datum CGVD28 (HTV2.0).

Lot boundaries shown hereon are derived from ties to existing survey evidence and Land Title Office records. Lot boundaries are subject to change upon legal survey.

This plan represents the best information available at the time of survey. WSP Surveys (BC) Limited Partnership and its employees take no responsibility for the location of any underground conduits, pipes, or other facilities whether shown on or omitted from this plan. All underground installations should be located by the respective authorities prior to construction.

Title subject to:

216159G	Right of Way
CA2642913	Right of Way
EX25550	Statutory Right of Way
EX25552	Statutory Right of Way
FB182131	Statutory Right of Way
FB182132	Statutory Right of Way
FB212951	Covenant
CA1060110	Statutory Building Scheme

Approximate Existing Fill 24,000m³

Approximate Future Proposed Fill (NET) 54.750m³

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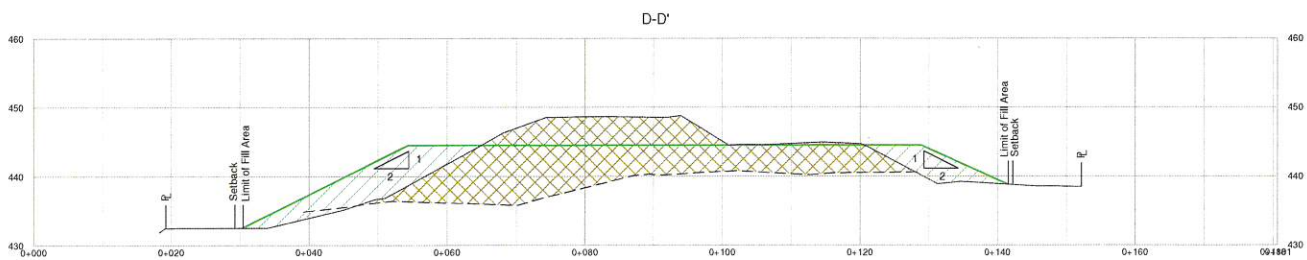
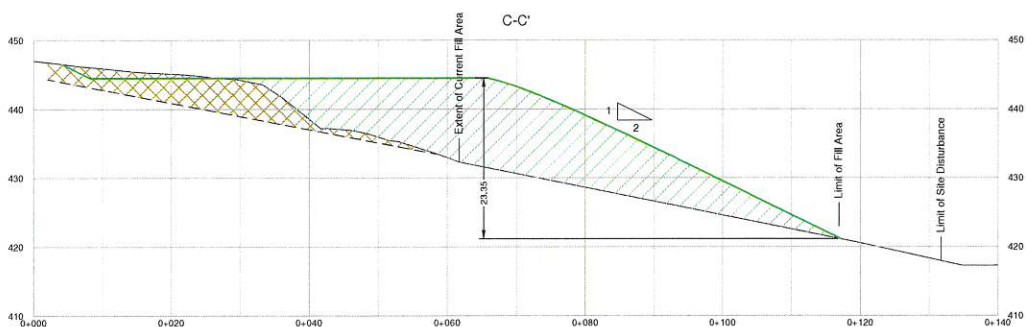
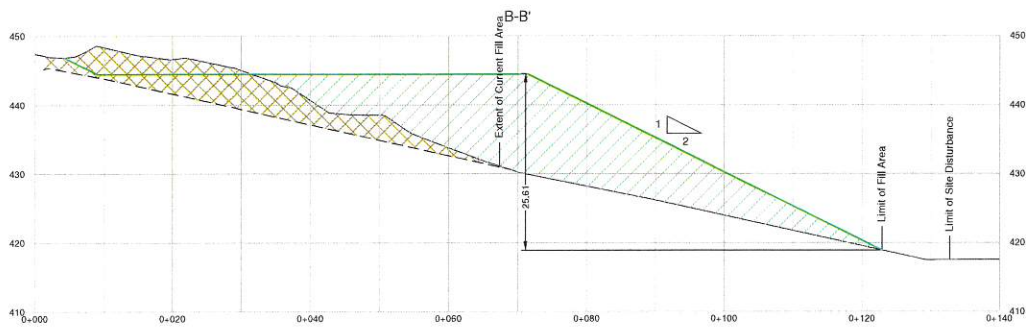
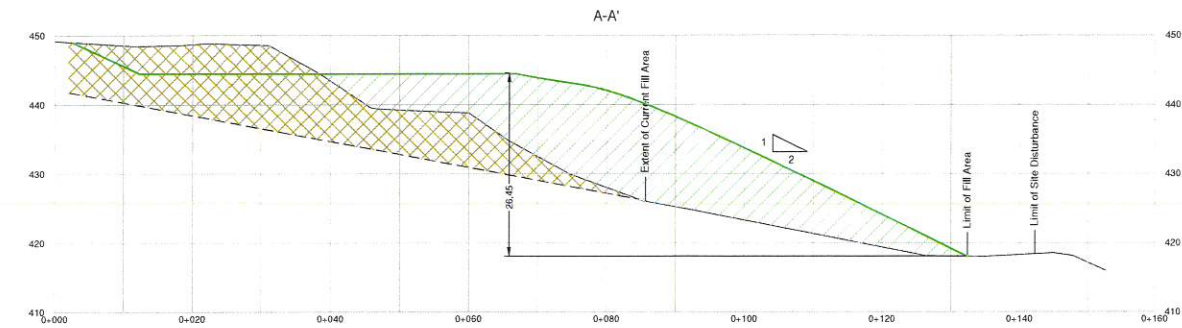


The intended plot size of this plan is 841mm in width by 594mm in height (ISO A1 size) when plotted at a scale of 1:500

All distances are in metres and decimals thereof.

LEGEND

- Existing Ground (Date of Field Survey: December 12, 2019)
- Proposed Final Surface
- Approximate Existing Ground Before Fill



						CLIENT:		<div><div><div></div></div><div><div>WSP</div><div>WSP Canada Inc. 301-3600 Uptown Boulevard, Victoria, BC V8Z 0B9 t. 250-384-5510 www.wsp.com</div></div></div>		PROJECT: 1160 Stonecrest Way		TITLE: Cross Sections			
1		2020-02-25		ADDED LIMIT OF SITE DISTURBANCE, CROSS SECTION FILL HATCHING		BKS				HC		PROJECT NO: 191-14479-G0		DRAWING NO:	
0		2020-02-13		ISSUED TO CLIENT		BKS				MLE		SCALE: As-Noted		191-14479-G0-SSDSI001-R1	
ISS/REV		YYYYMMDD		DESCRIPTION		DRN		CHK		CLIENT REF. NO:		DISCIPLINE: GEOMATICS		SHEET NO: 2 OF 2	