

Talbot Mackenzie & Associates

Consulting Arborists

July 10, 2013

Mike Hodson 322 Plaskett Place Victoria, BC V9A 6G4



Re: Tree Retention and Construction damage mitigation plan.

Assignment: Review the plans provided and prepare a tree retention report to be used during the proposal to create a new panhandle lot off of the existing lot at 322 Plaskett Place.

Methodology: All bylaw-protected trees on the subject property were identified using a numeric metal tag attached to the lower trunk. Information such as tree species, size (dbh), crown spread, health and structural condition, relative tolerance to construction impacts and general remarks and recommendations was recorded in the attached tree resource spreadsheet.

Tree Resource: (see attached spreadsheet)

Potential impacts: We anticipate that the highest onsite impacts will occur during blasting and rock removal to accommodate the proposed servicing, building and driveway footprint. Depending on the extent of necessary blasting and excavation, the proposal has the potential to impact trees on the neighbouring property for the proposed driveway and servicing and trees on the subject property for the proposed new house location. The Grand fir trees located close to the proposed building location have some structural concerns and are a species that we generally do not recommend retaining in high target areas. Grand fir trees are known to have a poor tolerance to construction impacts and changes to the water table or drainage patterns. Grand fir trees are prone to top failure as they mature and will often develop multiple tops as a result. The new multiple tops that are formed can often be poorly attached and can be more susceptible to failure in high wind and heavy snow load conditions. Given the existing health and form of Grand fir trees numbered 288, 289 and 290, the anticipated loss of critical root zone due to excavation and possible blasting and the new targets that are going to be introduced, it is unlikely that these trees will be suitable trees to retain.

Mitigation of impacts:

Barrier Fencing: Areas, surrounding the trees to be retained, should be isolated from the construction activity by erecting protective barrier fencing. Where possible, the fencing should be erected at the perimeter of the critical root zones. The barrier fencing to be erected must be a minimum of 4 feet in height and constructed of solid material or flexible safety fencing that is attached to wooden or metal posts. If a flexible fencing material is used, the top and bottom of the fencing must be secured to the posts by a wire or board that runs between these posts. The fencing must be erected prior to the start of any construction activity on site (i.e. demolition, excavation, construction), and remain in place through completion of the project. Signs should be posted around the protection zone to declare it off limits to all construction related activity. The project arborist must be consulted before this fencing is removed or moved for any purpose. Solid hording material may also be required to protect the trunks of trees from mechanical injury if vehicles or machinery are permitted close to tree trunks and where blasting is required.

Building footprint: The proposed building footprint and associated excavation has the potential to encroach into the critical root zones of bylaw-protected trees #286, 287, 288, 289, 290, 291 and 292. In our opinion, it is unlikely that it will be possible to retain trees #288, 289 and 290, given the proximity of the proposed building footprint, and additional impacts from underground servicing. Grand fir is a species that has a poor tolerance to construction impacts, and quite often will decline and die following construction, making them poor candidates for retention in a high target area.

Servicing: There are no services shown on the plans provided; however, it is our understanding that underground service corridors will be located within the proposed driveway footprint. Excavation and blasting to create the proposed underground service corridors will be required within the critical root zones of untagged trees #1 – 6 located on the neighbouring strata property at 14 and 15 Plaskett Place and trees #285, 286, 287, 288, 289 and 290 located on the subject property. The project arborist must be onsite to direct blasting and excavation within the critical root zones of the above-mentioned bylaw-protected trees. We recommend that underground service corridors be located as far from the trunks of bylaw-protected trees as possible. If significant structural roots are encountered during excavation, the project arborist will determine if it is possible to tunnel the services underneath the tree. If it is not possible to tunnel services, and structural roots are damaged or require pruning, we may recommend that trees be removed.

Driveway footprint: The proposed driveway footprint encroaches into the critical root zone of the 100 cm dbh Douglas-fir (no tag 1) located on the neighbouring property at #15 Plaskett Place. We anticipate large structural roots from this tree within the proposed driveway footprint, given the tree's proximity to the rock outcrop. Floating driveway specifications must be used in the portion of the proposed driveway that encroaches into the critical root zone of this tree (see attached floating driveway specifications). It is our understanding that a footpath constructed of permeable material will connect the garage to the proposed residence.

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Blasting and rock removal: A large rock outcrop is located on the southeast corner of the property, which will require blasting to accommodate the servicing and driveway for the proposed new lot. Blasting could potentially impact untagged trees #1-6 located on the neighbouring strata properties at 14 and 15 Plaskett Place. Some blasting may also be required to level an area for the proposed building footprint, within the critical root zone of 285, 286, 287, 288, 289, 290, 291 and 292. The blasting to level any of these rock areas should be sensitive to the root zones located at the edge of the rock. Care must be taken to assure that the area of blasting does not extend into the critical root zones beyond the building and road footprints. The use of small low-concussion charges, and multiple small charges designed to pre-shear the rock face, will reduce fracturing, ground vibration, and reduce the impact on the surrounding environment. Only explosives of low phytotoxicity, and techniques that minimize tree damage, are to be used. Provisions must be made to store blast rock, and other construction materials and debris, away from critical tree root zones. There may be some areas where rock where it will be better to remove rock using a hoe ram or similar equipment if possible to avoid blasting near trees to be retained.

Pruning: We anticipate that clearance pruning may be required to attain adequate clearance from the proposed garage, depending on the final design and location. All pruning of bylaw-protected trees must be performed by an ISA certified arborist, and we recommend that it first be reviewed with the project arborist.

Work Area and Material Storage: It is important that the issue of storage of excavated soil, material storage, and site parking be reviewed prior to the start of construction; where possible, these activities should be kept outside of the critical root zone. If there is insufficient room for onsite storage and working room, the arborist must determine a suitable working area within the critical root zone, and outline methods of mitigating the associated impacts (i.e. mulch layer, bridging etc).

Arborists Role: It is the responsibility of the client or his/her representative to contact the project arborist for the purpose of:

- Locating the barrier fencing
- Reviewing the report with the project foreman or site supervisor
- Locating work zones, where required
- Supervising excavation for the building footprint, driveway footprint, and service corridor.

Review and site meeting: Once the development receives approval, it is important that the project arborist meet with the principals involved in the project to review the information contained herein. It is also important that the arborist meet with the site foreman or supervisor before any demolition, site clearing or other construction activity occurs.

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Please do not hesitate to call us at 250-479-8733 should you have any further questions. Thank you.

Yours truly,

Tom Talbot & Graham Mackenzie ISA Certified, & Consulting Arborists

Encl. - Tree Resource Spreadsheet, Barrier Fencing Specifications, Floating Driveway Specifications

Disclosure Statement

Arborists are professionals who examine trees and use their training, knowledge and experience to recommend techniques and procedures that will improve the health and structure of individual trees or group of trees, or to mitigate associated risks.

Trees are living organisms, whose health and structure change, and are influenced by age, continued growth, climate, weather conditions, and insect and disease pathogens. Indicators of structural weakness and disease are often hidden within the tree structure or beneath the ground. It is not possible for an arborist to identify every flaw or condition that could result in failure nor can he/she guarantee that the tree will remain healthy and free of risk.

Remedial care and mitigation measures recommended are based on the visible and detectable indicators present at the time of the examination and cannot be guaranteed to alleviate all symptoms or to mitigate all risk posed.



Key to Headings in Resource Table

d.b.h. – *diameter at breast height* - diameter of trunk, measured in centimetres at 1.4 metres above ground level

CRZ – *critical root zone* - estimated optimal size of tree protection zone based on tree species, condition and age of specimen and the species tolerance to root disturbance. Indicates the radial distance from the trunk, measured in metres.

Crown spread – indicates the diameter of the crown spread measured in metres to the dripline of the longest limbs.

Condition health/structure -

- Good no visible or minor health or structural flaw
- Fair health or structural flaw present that can be corrected through normal arboricultural or horticultural care.
- Poor significant health or structural defects that compromise the longterm survival or retention of the specimen.

Relative Tolerance – relative tolerance of the selected species to development impacts.

Tree #	d.b.h. (cm)	CRZ	Species	Crown Spread(m)	Condition Health	Condition Structure	Relative Tolerance	Remarks / Recommendations
								remains / recommendations
			and the same of th					
281	70	8.5	Shore pine	10.0	Fair	Fair	Moderate	Pruning wounds, corrected lean, end-weighted.
		-						
282	84	10.0	Western Red cedar	12.0	Fair	Fair	Moderate	2
	0.	10.0	red ocuar	12.0	I all	rall	Moderate	2 secondary stems, some health stress.
283	11, 21	4.0	Yew	11, 21	Fair	Fair	Poor	Suppressed.
001			Western					May be partially municipal, services within critical root zone, health stress, dead top,
284	98	12.0	Red cedar	10.0	Fair	Fair	Moderate	secondary stems.
no ton				<u>1</u>				
no tag 1	100	15.0	Douglas-fir	14.0	Fair	Fair	Poor	Located on neighbouring property within 3 meters of the property boundary, ivy covered,
			_ v v g rese m	1 1.0	i un	T CII	1 001	stunted, tearout injuries. Will likely be impacted by proposed blasting/servicing.
no tag						2		Located on neighbouring proporty within 2 modern of the
2	40	4.0	Garry oak	16.0	Fair	Fair	Good	Located on neighbouring property within 3 meters of the property boundary, ivy covered, co-dominant. Will likely be impacted by proposed blasting/servicing.
no tag	50	7.5	D	10.0				
3	50	7.5	Douglas-fir	12.0	Fair	Fair	Poor	Low live crown ratio, stunted.
no tag		1						
	cluster	4.0	Garry oak	10.0	Fair	Fair (Good	Ocated on neighbouring proporty within 2 maters of the
						-	0000	Located on neighbouring property within 3 meters of the property line. Ivy covered.
no tag								Located on neighbouring property within 3 meters of the property line. Ivy covered. May
5	70	10.5	Douglas-fir	8.0	Fair I	Fair F	⊃oor	be impacted by blasting.
	-							
no tag	70	10 5	Douglas-fir	0.0	-oir			Located on neighbouring property within 3 meters of the property line. Ivy covered. May
	70	10.5	Jougias-III	8.0 F	-aii	air F	Poor	be impacted by blasting.
								PECCO
85 ired by:	55	8.0	Grand fir	8.0 F	air F	air F	oor	Topped, one-sided form.

285 Prepared by:

Talbot Mackenzie & Associates

ISA Certified, and Consulting Arborists Phone: (250) 479-8733 Fax: (250) 479-7050

email: Treehelp@telus.net

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Tree #	d.b.h. (cm)	CRZ	Species	Crown Spread(m)	Condition Health	Condition Structure		Remarks / Recommendations
281	70	8.5	Shore pine	10.0	Fair	Fair	Moderate	Description
		0.0	eviere pine	10.0	T dil	i aii	Moderate	Pruning wounds, corrected lean, end-weighted.
286	74	11.0	arbutus	8.0	Fair	Fair	Poor	History of large stem removal, canker, dieback, large pruning wounds with decay.
287	96	14.5	Douglas-fir	12.0	Fair	Fair	Poor	Co-dominant, pitching, surface rooted, included bark.
288	70	10.5	Grand fir	10.0	Fair	Fair		Surface rooted, proposed building footprint within crz.
289	55	8.0	Grand fir	10.0	Fair	Fair	_	Topped, health stress, suppressed, cavity with decay, proposed building footprint within crz.
290	70	10.5	Grand fir	8.0	Fair	Fair	Poor	Ivy covered, stunted, proposed building footprint within crz, possible birds nest in canopy. May have been impacted by development on neighbouring property.
291	100	15.0	Douglas-fir	10.0	Fair	Fair	Poor	lvy covered, one-sided, sparse, deadwood, proposed building footprint within crz.
292	85	12.8	Douglas-fir	10.0	-air	Fair	Poor	End-weighted, surface rooted, deadwood, proposed building footprint within crz.
no tag	multiple stems		Big Leaf	10.0	-air F	-air/poor		Large historic tearout with decay, deadwood.

Prepared by: Talbot Mackenzie & Associates ISA Certified, and Consulting Arborists Phone: (250) 479-8733 Fax: (250) 479-7050 email: Treehelp@telus.net





Talbot Mackenzie & Associates

Consulting Arborists

March 31, 2014

Mike Hodson 322 Plaskett Place Victoria, BC V9A 6G4



Re: 322 Plaskett Place – Proposed Lot A

Assignment: to review the most recent servicing details for the proposed new Lot A to be subdivided off of the property at 322 Plaskett Place. Comment on how the proposed servicing may impact the trees designated for retention.

Methodology: Further to our report regarding this project dated July 10, 2013, we have reviewed several different servicing scenarios in recent months and, in our opinion, the most recent servicing plan that is attached will have the least impact on the trees to be retained. It is proposed to be above the existing grades, when it passes over the critical root zones of the trees and will use floating, permeable construction. We have attached a sketch of a profile that we have used in the past, and in discussions with Jan Hoel of Hoel engineering he feels he can incorporate our ideas and likely improve on them with his final drawings.

Findings and Recommendations: In our opinion, the impacts to the existing trees can be successfully mitigated by using the following course of action:

- Excavation for driveway area must remove only the sod layer, where the driveway bisects the critical root zones of the protected trees.
- A layer of geotextile installed over the existing soils with enough extra material extending from the sides of the driveway to wrap around and retain the next aeration fill layer.
- An aeration layer of 10 cms of torpedo rock, or 20-mm clean crushed drain rock, or larger material in bigger fill situations. The services will likely be incorporated into this layer.
- Wrap the geotextile around the sides of the fill layer, with material ends overlapping at the top of the aeration fill layer.
- A layer of felted filter fabric can then be installed over the aeration layer to prevent fine particles of sand and soil from infiltrating this layer if necessary.
- The permeable paver base layer can be installed directly on top of this aeration layer and the pavers installed over top.
- Suitable edging material such as a loose-stacked rock wall is required to retain the fill away from the trunks of the trees.
- It should be noted that if installed correctly the geotextile will help to displace weight and reduce driveway settling over the organic layer, but in some situations settling may still occur over time. If any driveway settling cannot be tolerated you may wish to consult with a geotechnical engineer.

Please do not hesitate to call us at 250-479-8733 should you have any further questions. Thank you.

Yours truly,

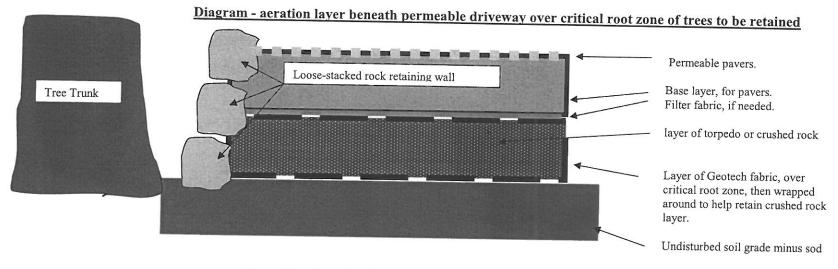
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Remedial care and mitigation measures recommended are based on the visible and detectable indicators present at the time of the examination and cannot be guaranteed to alleviate all symptoms or to mitigate all risk posed.



Specifications for boulder retained floating driveway.

- 1. Excavation for driveway area must remove only the sod layer, where the driveway bisects the critical root zones of the protected trees.
- 2. A layer of geotech fabric installed over the existing soils with enough extra material extending from the sides of the driveway to wrap around and retain the next aeration fill layer.
- 3. An aeration layer of 10cms of torpedo rock, or 20-mm clean crushed drain rock, or larger material in bigger fill situations.
- 4. Wrap the geotch fabric around the sides of the fill layer, with material ends overlapping at the top of the aeration fill layer.
- 5. A layer of felted filter fabric can then be installed over the aeration layer to prevent fine particles of sand and soil from infiltrating this layer if necessary.
- 6. The permeable paver base layer can be installed directly on top of this aeration layer and the pavers installed over top.
- 7. Suitable edging material such as a loose-stacked rock wall is required to retain the fill away from the trunks of the trees.
- 8. It should be noted that if installed correctly the geotech fabric will help to displace weight and reduce driveway settling over the organic layer, but in some situations settling may still occur over time. If any driveway settling cannot be tolerated you may wish to consult with a geotechnical engineer.

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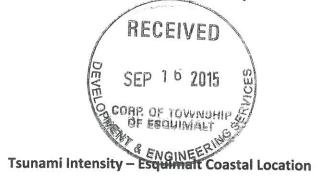


INTERNATIONAL TSUNAMI RESEARCH INC.

11321 Chalet Road, Sidney BC V8L 5M1

December 2, 2014

Mr. Michael Hodson 322 Plaskett Place Victoria BC V9A 6G4



Dear Mr. Hodson:

As we have discussed, this letter is an attempt by International Tsunami Research Inc. (ITR) to address your requirement to provide expert opinions for development regarding the expected heights of tsunami at the 322 Plaskett Place property located on the coast in a small bay in Esquimalt, BC.

In addition to simply providing a professional judgment regarding the amplitude of a tsunami wave itself, as we discussed, it is important to also indicate the absolute elevation of such an event (related to the <u>present</u> geodetic position) during: (a) an expected rise in sea level due to natural effects, such as those that occur during El-Niño years; (b) significant increases in elevation for several days due to storm surges; and (c) background trends in regional sea level during the reasonable long-term presence of the proposed structure.

Tsunami Maximum Elevations

Bays have the ability to intensify the tsunami wave heights from those which occur in adjacent open waters. Unfortunately it very difficult to determine the expected increase in amplitude without undertaking a full numerical tsunami modeling exercise, which is not only extremely costly but impossible if there are insufficient, very detailed bathymetric data available, as in this situation. Thus, our approach has been to use existing estimates of tsunami amplitude for the offshore areas increased for small bay structures based on the extensive professional experience of three tsunami researchers associated with ITR: Dr. Isaac Fine, Dr. Alexander Rabinovich and myself. As well, the opinion of a Fisheries and Oceans Canada tsunami expert, Dr. Richard Thomson was sought. Dr. Thomson also provided additional information on durations of storm surge elevation changes, El-Niño elevation changes and anticipated changes in long-term sea level change in local water levels.

The tsunami which has been assessed is comparable to the historical tsunami (January 26, 1700) related to a very large (magnitude ~9.0 or greater) Cascadia earthquake off Vancouver Island. There have been several tsunami models developed for Juan de Fuca Strait by both Canadian and U.S. researchers; in 2009 the Canadian Department of Fisheries and Oceans (DFO), through Dr. Josef Cherniavsky, made an early model publicly available for Esquimalt Harbour as one of the sites (http://www.pac.dfo-mpo.gc.ca/science/oceans/tsunamis/tsunami-esquimault-eng.htm.). Two additional models by the U.S. National Oceanographic and Atmospheric Agency (NOAA), along with Dr. Cherniavsky and others, have shown similar and higher estimates of tsunami amplitudes in the region. A recent project similar to this was undertaken by myself for a more western site for the Department of National Defence; with other expert opinions we concluded that the wave height nearer the bay entrance than in the present study would be approximately 4.0 m.

The opinion of all of the tsunami experts used here, based on available Juan de Fuca Strait, Esquimalt and Victoria Harbour modeling, is that the **tsunami wave maximum amplitude** would be 4.5 m in the bay adjacent to this project, and possibly increasing to as much as 5 m.

Tidal Extremes

The maximum recorded tidal level near Victoria is 3.14 m above lowest low water. Geodetic elevation is extremely close to being at mid-tide, meaning that at maximum tide levels, sea level will stand 1.57 m above geodetic.

Storm Surge Elevations

Storm surges occur most commonly during the winter season and can last for periods of up to several days. "The historical maximum observed water level at Victoria of 3.71 m above chart datum (3.14 m tide + 0.57 m surge) occurred on January 2, 2003. This coincided with the time of highest seasonal tide." (2014-2015 Storm Surge Almanac, BC Storm Surge Forecasting System. Sept. 30 2014. www.stormsurgebc.ca). While this value, 0.57 m, is an extraordinary occurrence, values up to 0.40 m higher than normal occur sufficiently frequently that they should be considered as possibly occurring at the time of a tsunami.

El Niño Sea Level Changes

"A persistent SSH [Sea Surface Height] anomaly of **5-10 cm** may increase surges if it remains through the storm season." (2014-2015 Storm Surge Almanac, BC Storm Surge Forecasting System. Sept. 30 2014. www.stormsurgebc.ca). For the purpose of this study a value of 10 cm should be applied.

Long-term Sea Level Change

Global sea level change has been the subject of many research activities over the past decade and is a major concern of the Intergovernmental Panel on Climate Change (IPCC). Dr. Richard

Thomson and I have been involved in two major studies in 2008 and 2012 on sea level change at various communities on the BC coast; the work was undertaken for both the federal and BC governments. A trend in such estimates is that as research continues, sea level rise also increases. The current estimate for sea level rise at Victoria by 2100 is: Mean = 0.97 to 0.99 m; Low = 0.57 to 0.59 m; High = 1.27 to 1.29 m (Bornhold, B.D. and Thomson, R.E., 2012, Report on Sea Level Trends in the Northeast Pacific. Aquatic Climate Change Adaptation Services. Risk Analysis Process. Fisheries and Oceans Canada. 22 pp).

Ongoing research shows a trend toward progressively increasing sea level rise. As a consequence, I recommend using the "High" sea level elevation of **1.29 m** for Victoria. After our discussions, I would place the year 2100 within the expected lifetime of the structure being contemplated.

Total Expected Sea Surface Height and Tsunami Height for Planning

The result of this analysis for the property concerned, yields the following sum of increased sea surface elevation above geodetic as well as a planned tsunami wave height: **7.86 m**

In our phone discussion, you indicated that a possible elevation for a home being planned at this site would include an elevation of **8.8 m** at the open, seaward facing edge. If this style of home is pursued it would lie above the anticipated maximum tsunami height in 2100 under severe but common other sea surface elevation conditions.

I hope that these facts and summaries will assist you in planning purposes.

Sincerely

Brian D. Bornhold, PhD, PGeo

President

CIMC: #322

EASEMENT AND U.S WALL

PLANT STOULDER

ABOVE GRAVEL DRIVE

SL 14

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PLAN

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Talbot Mackenzie & Associates

March 31, 2014

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SL 15

Re: 322 Flankett Place - Proposed Lot A

Methodology: Further to our report regarding this project dated buly 10, 2013, we have reviewed several different servicing scenarios. In recent mentils and, in our options, the most recent sentencing plan that is attached will have the losts imposed on the troot to be retained. It is proposed to be above the conting grades, when it presess over the critical root among of the trees and will use floating, permeable conservation. We have attached a schedule of a profite that we have used in the past, and in decassions with in Blood of Received and the profite that we have used in the past, and in decassions with in Blood of Received as the fields that we have used in the past, and in decassions with in Blood of Received Rece

Findings and Recommendations: In our opinion, the impacts to the existing trees can be successfully mitigated by using the following course of action

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 A layer of geometric mittalled over the existing soils with enough extra mercral extending from the sides of the driveway to wrap amount and retain the next sention fill layer.

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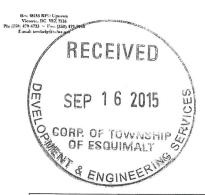
322 Plaskett Place March 31, 2014

Please do not hesitate to call us at 250-479-8733 should you have any further questions. Thank you.

Graham Mackenzie & Tom Talhot ISA Certified, & Consulting Arborist

Albertals are professionals who encourse treas and use their heaving, line-sladge and experience to recovered techniques and protestions dust will superve the health and attitude of infloredual tensor around stans, or to prove the

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OVERVIEW

PROJECT

PLASKETT

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2B-40 Cadillac Avenue, Victoria, BC Canada V8Z 1T2

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Town of Esquimalt

CONCEPTUAL CIVIL PLAN - PROJECT OVERVIEW LOT 8, PLAN 195A, SECTION 11, ESQUIMALT DISTRICT

322 PLASKETT PLACE

C1.1 | of 2

KEY PLAN - NTS

INTENT OF THESE GRAWINGS ARE TO INNICATE THE GENERAL ARRANGEMENT OF THE WORK PROJECTS FOR THE CONT. ASSPCTS THE INFORMATION ON THESE PLANS MAY REQUIRE ADDITIONS DELETIONS OR CHARGES TO SLAT SITE CONDITIONS OF OTHER SUCH ADDITIONS DELETIONS OF CHARGES IN CONTROL SITE OF THESE SUCH ADDITIONS OF CHARGES IN CONTROL SITE OF THESE SUCH ADDITIONS OF CHARGES IN CONTROL SITE OF THESE SUCH ADDITIONS OF CHARGES IN CONTROL SITE OF THE SITE OF THE

PLAN VIP54665

PROPOSED

SL 13 STRATA

LOTA

SL 12



PERMEABLE DRIVEWAY with overground utilities ———NO TRENCHING

Predrill on 600mm grid Remove sod Remove Blocks by mechanical breaker No power blasting

Remaining -- Remove sod

Install Geogrid on existing sub grade
Install 25mm water,50mm sewer forcemain
and 2x 100 electrical/telecom ducts at grade
bed piping with 300mm of clear crush
Bulk fill new driveway with 75mm
minus gravel
to provide 700mm cover on the services
and top-dress with 25mm of 19mm clear

gravel