REGIONAL DISTRICT OF CENTRAL OKANAGAN

DEVELOPMENT PERMIT
DP-22-08

TO: Maloney Construction Ltd. BC0463734 (owner)
2223 Westside Rd N.
Kelowna, BC V1Z 3T5

Urban Options Planning Corp. (Agent)
202-1470 St. Paul St
Kelowna BC, V1Y 2E6

1. This permit is issued subject to compliance with all bylaws of the Regional District applicable thereto, except as specifically varied or supplemented by permits issued by the Regional District.

2. This Permit applies to and only to those lands within the Regional District described below, and any and all buildings, structures and other developments thereon:

   Lot 2, Plan KAP14249, District Lot 3745, ODYD, Except Plan KAP47451 (PID: 009-053-794)

3. This Development Permit is issued exclusively for works associated with the demolition of existing retaining walls, wooden patio/sundeck, and wooden shed; and construction of a single-family dwelling, and septic system, as well as associated environmental habitat restoration and monitoring works.

4. All works, inclusive of planning and site preparation, construction, mitigation, restoration, monitoring and reporting, shall be completed strictly in compliance with and according to the conditions of the Development Permit set out in the following Schedules, attached hereto:

   a. Schedule A: Permit Conditions (2 pages);
   b. Schedule B: Environmental Assessment by Ecoscape Environmental Consultants Ltd., including appendices (September 29, 2022, 87 pages).

5. As a condition of the issuance of this permit, the Board is holding the security set out below to ensure that development is carried out in accordance with the terms and conditions of this Permit. Should any interest be earned upon the security, it shall accrue to the Permittee and be paid to the Permittee if the security is returned. The condition of the posting of the security is that should the Permittee fail to carry out the development hereby authorized, according to the terms and conditions of the Permit within the time provided, the Regional District may use the security to carry out the work by its servants, agents or contractors, and any surplus shall be paid over to the Permittee, or should the Permittee carry out the development

permitted by this permit within the time set out above, the security shall be returned to the Permittee. There is filed accordingly:

An unconditional Irrevocable Letter of Credit, Bank Draft, or Cash drawn on a chartered bank in Canada valid for a period of one year and automatically renews thereafter, in the amount of $14,588.

6. The land described herein shall be developed strictly in accordance with the terms and conditions of this Permit and any plans and specifications attached to this Permit, which shall form a part hereof.

7. This Permit is not a Building Permit.

8. Subject to the terms of the permit, where the holder of a permit issued under the Local Government Act does not substantially commence any construction with respect to which the permit was issued within one year after the date it is issued, the permit lapses.

9. If development commences and the landscaping and restoration works are not completed within twenty-four (24) months of commencement, the Regional District may use the security to carry out the work by its servants, agents or contractors.

AUTHORIZING RESOLUTION PASSED BY THE DIRECTOR OF COMMUNITY SERVICES ON THIS _____ DAY OF _____, _____.

DATED _____ _____

Director of Community Services

Schedule A

The Regional Board Designee hereby approves Development Permit DP-22-08 subject to the following conditions:

Adherence to Development Plans:

- No further variance in construction of, addition to or alteration of a building or structure; or alteration or clearing of land; is to occur within any Development Permit Areas without prior notification and approval by RDCO.
- No further buildings, structures or improvements of any kind shall be constructed nor located within the Streamside Protection and Enhancement Area (SPEA) of any nearby watercourse. Any works proposed within the SPEA may require approvals from the Province in accordance with the *Riparian Areas Protection Regulation*. And further, there shall be no removal and/or alteration of any soil, vegetation, or trees (except for noxious weeds) from within the setback area without first obtaining the written consent of the RDCO.
- Other than works permitted by this Development Permit, further modifications including changes in and about a stream, construction/alteration of culverts, retaining walls, and substrate modification must not occur at any time without further environmental assessment being conducted and appropriate approvals received from the RDCO ***and*** Province in accordance with the BC *Water Sustainability Act* (Section 11).

Professional Reports:

- All construction, land clearing, mitigation, and restoration activities must be completed as per;
  - The November, 2022 Environmental Assessment conducted by Ecoscape Environmental Consultants Ltd.
  - The September 29, 2022 Design Documents prepared by Mullins Design Group.
  - The October 27, 2022 Geotechnical Report prepared by Geopacific Consultants.
  - The September 20, 2022 Site Survey and Foundation Plan prepared by Chiu Hippman Engineering Inc.
  - The October 19, 2022 Septic System Designs prepared by Franklin Engineering Ltd.

Monitoring:

- The property owner(s) shall obtain the services of an Environmental Monitor (EM) to ensure the recommendations of the Development Permit are implemented and are in accordance with permit conditions including but not limited to:
  - Pre-construction meetings between work crews (including but not limited to the contractor, Wastewater Practitioner, and Engineers) and EM to establish work limits and protection measures required prior to, during and post construction;
  - A substantial completion report is prepared and submit to the RDCO upon completion of construction and restoration works, indicating substantial completion of the conditions and the requirements of the Development Permit have been carried out;
  - A final site visit two years post restoration works is required to document survival of restoration plantings; and
  - In the event that greater disturbance occurs due to unforeseen circumstances, the EM will recommend further measures to protect/restore the natural integrity of the site and report on these measures to the RDCO.

Security:

- The applicant shall post a letter of credit or bank draft in the amount of $14,588 in order to ensure completion of works and associated restoration plan within 2 years of the issuance of the Development Permit. Ninety per cent (90%) of this amount is refundable upon completion

of said works and receipt of a substantial completion report signed by a registered professional, and to the satisfaction of Regional District Community Services staff.

- The remainder of the bond shall be held for a minimum of two (2) years (growing seasons) to ensure that the required mitigation has been fully implemented and demonstrated to function (ecologically or as designed). The maintenance bond may be held for longer periods if, throughout the initial 2-year period the persistent failure of the works is documented.

Further Conditions or Restrictions:

- The landowner must receive a building permit for the proposed works, and receive approval for demolition permit for the existing wooden patio to enable the removal of the Notice of Bylaw Contravention (KJ89410) registered on the property title.
- The landowner must register a Land Title Act, Section 219 restrictive covenant upon a portion of the ESA2 lands west of Westside Road, as directed by a QEP, to ensure area of high ecological value shall remain largely undisturbed and protected in perpetuity.
- A Registered Professional Engineer must be retained at time of site preparation and subsurface investigation, excavation, and subgrade works to ensure that the structural considerations of soil, including slope stability, site drainage, and erosion and sediment control will be supervised and approved by the Engineer.
- The building footprint and riparian setback area must be surveyed, staked, and clearly delineated to prevent encroachment.
- All erosion and sediment control measures (e.g. silt fencing), as necessary, must be in place and functioning as required prior to the initiation of and during any construction activities.
- Construction debris and materials must not be stored or deposited within the riparian setback and must be removed from the property on a regular basis.
- Avian nesting periods should be considered to protect birds within and adjacent to the proposed work area. Should clearing activities be required during avian nesting period, pre-clearing nesting surveys must be conducted by the EM to identify active nests and other critical habitat features. Clearing and other construction activities must be conducted within 72 hours following the completion of the pre-clearing nest surveys. Additional buffers and no-disturbance zones may be required at this time.
- In accordance with the RDCO Noxious Weed Control Bylaw No. 179, the owner or occupier of the land shall prevent the infestation of noxious weeds and cut down or otherwise destroy and mulch or remove all noxious weeds and plant with native grasses or other native vegetation.

ENVIRONMENTAL ASSESSMENT
2223 WESTSIDE ROAD, RDCO

Lot 2, Plan KAP14249
PID: 009-053-794

Regional District of Central Okanagan (RDCO)

Prepared For:

Maloney Construction Ltd.
2223 Westside Road North
Kelowna, BC, V1Z 3T5

Prepared By:

Ecoscape Environmental Consultants Ltd.
#102 – 450 Neave Court
Kelowna, B.C.
V1V 2M2

November 2022

File No. 19-3064.01

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APPENDIX

1.0 INTRODUCTION

Ecoscape Environmental Consultants Ltd. (Ecoscape) has been retained by Maloney Construction Ltd. (Maloney) (client) to complete an environmental assessment report for a proposed construction of a single-family dwelling at 2223 Westside Road, RDCO, BC (subject property) (**Appendix A**) **(Photos 1-3)**. The subject property is legally described as Lot 2, Plan KAP14249, District Lot 3745, within the Regional District of Central Okanagan (RDCO) (**Figure 1**). The subject property is bounded by rural properties to the west, north and south, and Okanagan Lake to the east. Westside Road bisects the subject property, running north/south (**Figure 1**). The subject property is approximately 1.34 ha in size and is zoned as Rural Residential 3 (RU3) under the RDCO Official Community Plan (OCP) which is designated as Residential – Low Density / Rural Residential by RDCO. The subject property is located within a RDCO Sensitive Terrestrial Ecosystem and Aquatic Ecosystem Development Permit Areas (DPAs) and is within Hillside and Wildfire Interface DPAs. This report has been written to meet the requirements set out in the RDCO Terms of Reference (TOR) for Professional Reports for Planning Services (RDCO 2006) for a development permit within the Sensitive Terrestrial Ecosystem and Aquatic Ecosystem DPAs.

This report has been prepared for an application for a development permit (DP) within the Sensitive Terrestrial Ecosystem and Aquatic Ecosystem DPAs. On April 27, 2021, the RDCO Regional Board (the Board) did not extend support to the client for a previously submitted Floodplain Exemption Request (File No. FEX-20-01), Variance Request (File No. VP-20-03), and Development Permit application (DP-20-08) related to a previously proposed single-family dwelling within the property. The client has now redesigned the proposed dwelling to comply with the 15 m Streamside Protection and Enhancement Areas (SPEA) setback.

On February 25, 2021, a Riparian Areas Protection Regulation (RAPR) Hardship application was approved for the previously proposed dwelling. If a DP for the revised single family-dwelling is approved, then an updated copy of this report, and the approved development permit, will be uploaded to the Riparian Areas Regulation Notification System (RARNS). A Geotechnical Report from Geopacific Consultants Ltd. (Geopacific) (previously Beach Geotechnical Ltd.) has been attached to this report summarizing the geotechnical challenges within the subject property (**Appendix B**). A previous Geotechnical Assessment was completed by Beacon Geotechnical Ltd. in 2021 for the previous DP application. As per request from the Ministry of Transport and Infrastructure (MOTI), a copy of this EA report will be submitted to MOTI to ensure it complies with all regulations and previously approved MOTI permits for the previously dwelling.

On May 25 and 26, 2021, a Basic Tree Assessment was completed by Lumberjack Clearing at the request of the property owner. Three coniferous trees were removed by the contractor; however, only one rooted tree was removed from within the SPEA. *Ecoscape and the RDCO were not notified of the planned removal, nor was any specific permitting sought by the property owner with the RDCO.* Based on the Provincial Tree

Replacement Criteria, an additional 6 trees were added to the revised restoration plan to account for this removal. A copy of the Basic Tree Assessment has been attached to **Appendix E** of this report.

2.0 PROPOSED WORKS

The proposed works are limited to construction of a single-family dwelling, garage, and septic system within the subject property (**Appendix A**). The septic system is the only portion of the proposed works to occur within the western side of the subject property. Previous plans included a protective covenant on the west side of the property. This area of high value should remain largely undisturbed and protected. However, the area of developable land on the lakefront has been reduced. At this time, the property owner has not figured out important details such as potential storage needs for example. A specified covenant area has not been identified in this report - but it is still recommended that large portions of the western side of the property be protected in perpetuity through mechanisms such as a covenant when appropriate. The septic system has been designed to meet the requirements of Interior Health for onsite sewerage. The septic field for the subject property has been designed for a two-bedroom home with an average daily volume of effluent of 1,000 liters. Construction of the system will not require a significant amount of site grading and cuts into the existing topography within the western side of the subject property (**Appendix A**) (**Appendix D**). The designs for the dwelling have been developed to ensure the proposed building footprint will be constructed as drawn.

The subject property has many different constraints. West of Westside Road is very steep and provides high value terrestrial and wildlife habitat. East of the property, there is minimal developable area due to environmental constraints. While development is proposed adjacent to Okanagan Lake, it is generally contained within previously disturbed areas, and is outside of the 15 m SPEA setback.

As outlined within **Figure 4**, the proposed disturbance footprint for the single-family dwelling, septic tank and field, and driveway is approximately **165 m²** (**Figure 4**). The total potential disturbance is approximately **394 m²** and takes into account the additional disturbance that may occur during construction. (**Figure 5**). The footprint for the proposed dwelling has been reduced from what was proposed previously, and no longer needs the previous floodplain variance or encroaches within the 15 m SPEA setback.

3.0 ENVIRONMENTAL ASSESSMENT

A site assessment of the subject property was completed by Scott Layher, M.Sc., R.P.Bio and Carly Simpson, B.Sc, A.Ag, Natural Resource Biologists with Ecoscape, on October 30, 2019. Data collection and reporting standards are pursuant to the RDCO TOR. This report has been developed to address terrestrial environmental and riparian values present within the subject property. The following section describes the conditions of the subject property.

3.1 Terrestrial Resource Values

The subject property occurs within a low-density residential area along Westside Road in the RDCO. Private properties are present to the north and south, and rural properties are present to the west. The subject property meets Okanagan Lake to the east. The subject property is bisected by Westside Road, which runs north/south through the subject property. The portion of the subject property adjacent to Okanagan Lake has been developed, with foreshore modifications including an existing dock structure, rock retaining wall, and wooden staircase **(Photo 3).** Modifications within the subject property include a wooden retaining wall, cement block retaining wall, wooden patio area, campfire pit, and wooden shed **(Photos 4-5)**. As per conversation between Jason Schleppe (Ecoscape) and Patrick Tobin (MOFLNRORD), the present natural boundary line - and possible Crown Land encroachments within the foreshore of the subject property, are currently being investigated. Neil Denby (Runnalls Denby) has been retained and will note any encroachment issues within the subject property if identified.

The southeastern portion of the subject property, adjacent to Okanagan Lake is relatively undisturbed, with a pebble beach present below rock outcrops and steep slopes leading to Westside Road. The western portion of the subject property is relatively undisturbed with steep slopes and a gully, with some minor disturbance from storage of large retaining wall blocks at the base of the slope **(Photo 6)**. The proposed work area is located within the existing disturbance in the eastern side of the subject property adjacent to Okanagan Lake, and within a small section of the western side of the subject property for the septic system.

The eastern portion of the subject property was primarily a developed yard. Native vegetation observed included black cottonwood (*Populus trichocarpa*), trembling aspen (*Populus tremuloides*), ponderosa pine (*Pinus ponderosa*), juniper (*Juniperus* spp.), spruce (*Picea* spp.), tall-Oregon grape (*Mahonia aquifolium*), and varied grass species. Invasive vegetation observed included tree of heaven (*Ailanthus altissima*), knapweed (*Centaurea* spp.), white clover (*Trifolium repens*), and lambs' quarter (*Chenopodium album*).

Vegetation along the beach on the south end of the subject property, and along the embankment on Westside Road included rose (*Rosa* spp.), willow (*Salix* spp.), ponderosa pine, alder (*Betulaceae* spp.), tall-Oregon grape, common rabbitbrush (*Ericameria nauseosa* spp), common snowberry (*Symphoricarpos albus*), hawksbeard (*Crepis tectorum*), red osier dogwood (*Cornus sericea*), scouring rush (*Equisetum hyemale*), black cottonwood, interior Douglas-fir, and yarrow (*Achillea millefolium*). Invasive vegetation observed included mustard (*Brassica* spp.), knapweed, alfalfa (*Medicago sativa*), and dalmation toadflax (*Linaria dalmatica*), white clover, great mullein (*Verbascum thapsus*).

A detailed wildlife assessment was not conducted, and there were no incidental observations of wildlife during the site visit. Trees within the subject property potentially provide perching, foraging, and nesting habitat for a diversity of birds. No dense shrub cover was observed that could provide high value cover, forage, and nesting habitat for avian species and small mammals.

The subject property occurs within Ungulate Winter Range u-8-001, which has been established for the protection of mule deer (*Odocoileus hemionus*) winter habitat. Private properties are exempt from wildlife measures required within Ungulate Winter Ranges, but the site is considered important winter range habitat. This area of high and very high value should remain largely undisturbed and protected. However, the area of developable land on the lakefront has been reduced. At this time, owner has not figured out important details such as potential storage needs for example. A specified covenant area has not been identified in this report, but it is still recommended that large portions of the western side of the property are protected in perpetuity through mechanisms such as a covenant when appropriate.

3.2 Aquatic Resource Values

The shoreline of the subject property occurs along Okanagan Lake Foreshore Inventory and Mapping (FIM) segments 219 and 220. Segment 219 is described as being of Single-Family use with a high level of impact (>40%), with approximately 95% of the 385 m segment is disturbed (Schleppe, 2016). The shoreline is classified as sand, and substrates observed to be 40% gravels and 60% sand. The current and potential Aquatic Habitat Index ratings are moderate, with juvenile rearing rated as moderate.

Segment 220 is described as being rural use, with a high level of impact (>40%), with approximately 85% of the 360 m segment disturbed. The shoreline is classified as rocky shore, and substrates observed were 100% gravels. The current and potential Aquatic Habitat Index ratings are rated as High, with juvenile rearing rated as moderate.

Historical and recent Kokanee (*Oncorhynchus nerka*) shore spawning data, Rocky Mountain Ridged Mussel (*Gonidea angulata*) (RMRM) occurrence data, and foreshore plant species-at-risk data from the BC Ministry of Forests, Lands, Natural Resource Operations, and Rural Development (BC MoFLNRORD 2018) were reviewed for the subject property. The subject property is located within a No Colour Zone Kokanee shore spawning and is adjacent to a Yellow Zone to the north and south of the subject property. A No Colour Zone for Kokanee shore spawning is an area where no recent or historic shore spawning is known to occur (BC MoFLNRORD 2018). A Yellow Zone for Kokanee shore spawning is an area where aggregations of ≤50 spawning fish were observed and historical (pre-2001) data were aggregations of <1000 spawning fish were observed.

The subject property is located within a No Colour Zone for freshwater mussels and foreshore plants. No Colour Zones for freshwater mussels and foreshore plant species-

at-risk are defined as habitats that have not been assessed for RMRM or foreshore plant SAR presence as of 2017 (BC MoFLNRORD 2018).

There were no shore spawning Kokanee, RMRM or other mollusks, or rare foreshore plants observed within the subject property during the site visit; however, lack of observation does not preclude presence as detailed surveys were not conducted during the site visit.

A *Water Sustainability Act* Notification (R8005520) was approved on July 9, 2020 for four new steel piles for a boat lift adjacent to the existing dock within the subject property.

A comprehensive list of fish and mussel species found in Okanagan Lake which have the potential to occur adjacent the subject property is noted in **Table 1** listed below

Table 1. Fish Species found in Okanagan Lake (BC MoE, accessed online on January 27, 2022)

Common Name	Scientific Name
Eastern Brook Trout	*Salvelinus fontinalis*
Bull Trout	*Salvelinus confluentus*
Burbot	*Lota lota*
Carp	*Cyprinus carpio*
Chiselmouth	*Acrocheilus alutaceus*
Cutthroat Trout	*Oncorhynchus clarkii*
Floater Mussel (General)	*Anodonta spp.*
Kokanee	*Oncorhynchus nerka*
Lake Trout	*Salvelinus namaycush*
Lake Whitefish	*Coregonus clupeaformis*
Largescale Sucker	*Catostomus macrocheilus*
Leopard Dace	*Rhinichthys falcatus*
Longnose Dace	*Rhinichthys cataractae*
Longnose Sucker	*Catostomus catostomus*
Mountain Whitefish	*Prosopium williamsoni*
Northern Pikeminnow	*Ptychocheilus oregonensis*
Peamouth Chub	*Mylocheilus caurinus*
Prickly Sculpin	*Cottus asper*
Pumpkinseed	*Lepomis gibbosus*
Pygmy Whitefish	*Prosopium coulterii*
Rainbow Trout	*Oncorhynchus mykiss*
Redside Shiner	*Richardsonius balteatus*
Slimy Sculpin	*Cottus cognatus*
Smallmouth Bass	*Micropterus dolomieu*
Yellow Perch	*Perca flavescens*
Rocky Mountain (Western) Ridged Mussel	*Gonidea angulata*
Western Floater Mussel	*Anodonta kennerlyi*
Winged Floater Mussel	*Anodonta nuttalliana*

The proposed building footprint is within 30 m of Okanagan Lake and required a Riparian Area Protection Regulation (RAPR) Assessment, as outlined in the *Riparian Area Protection Regulations*. Setbacks had been determined based on the methodology outlined in the Riparian Areas Protection Technical Assessment Manual (MoFLNRORD,

2019). No encroachments within the 15 m SPEA setback have been proposed based on the proposed works.

3.3 Species at Risk

The BC Conservation Data Centre (BC CDC) was queried for species-at-risk observed within close proximity (1km) to the subject property. The data that was queried included Critical Habitat for Federally-Listed Species-at-Risk, Species and Ecosystems at Risk (Publicly Available Occurrences), and Wildlife Species Inventory Survey and Incidental Observation Points.

- Incidental Observation ID 51962, Object ID 666666 representing a 2007 observation of a provincially Yellow-listed Common Poorwill (*Phalaenoptilus nuttallii*), approximately 890 m northwest of the subject property.
- Incidental Observation ID 52006, Object ID 32904258 representing a 2007 observation of a provincially Yellow-listed Great Horned Owl (*Bubo virginianus*), approximately 695 m northwest of the subject property.
- Incidental Observation ID 52005, Object ID 32904257 representing a 2007 observation of a Great Horned Owl, approximately 695 m northwest of the subject property.
- Incidental Observation ID 51956 Object ID 32903313 representing a 2007 observation of a Common Poorwill, approximately 725m north of the subject property.
- Incidental Observation ID 52004, Object ID 32904256 representing a 2007 observation of a Great Horned Owl, approximately 400m north of the subject property.
- Incidental Observation ID 51955, Object ID 32903297 representing a 2007 observation of a Common Poorwill, approximately 280 m north of the subject property.
- Incidental Observation ID 51954, Object ID 32903311 representing a 2007 observation of a Common Poorwill, approximately 700 m south of the subject property.
- Incidental Observation ID 52003, Object ID 32904255 representing a 2007 observation of a Great Horned Owl, approximately 850 m south of the subject property.
- Incidental Observation ID 150783, Object ID 3309520 representing a 2015 observation of a provincially Blue-listed Gopher Snake (*Pituophis catenifer deserticola*), approximately 435 m south of the subject property.
- Incidental Observation ID 151443, Object ID 33008324 representing a 2015 observation of a provincially Red-listed Desert Night Snake (*Hypsiglena chlorophaea*), approximately 880 m west of the subject property.

- Incidental Observation ID 166092, Object ID 33004435 representing a 2016 observation of a provincially Yellow-listed Northern Rubber Boa (*Charina bottae*), approximately 600 m north of the subject property.

The subject property occurs within a 10 km x 10 km grid square identified as critical habitat for Great Basin Gophersnake by the recovery strategy recently developed from Environment and Climate Change Canada (ECCC 2019). The presence of rock outcrops, mammal burrows, and shrub and grassy cover within the western portion of the subject property provide value as potential snake habitat.

The BC Ministry of Environment's Species and Ecosystem Explorer was queried to identify wildlife species potentially present in the region; search terms used to query this database are provided in the footnotes of **Table 2**, below.

Table 2. Species at risk with the potential to occur within the subject property

Class	Common Name	Scientific Name	Provincial Status	COSEWIC Listing	Likelihood of Occurrence
Birds	Great Blue Heron	*Ardea herodias herodias*	Blue	-	Moderate
	Short-eared Owl	*Asio flammeus*	Blue	Special Concern	Low
	Burrowing Owl	*Athene cunicularia*	Blue	Endangered	Low
	American Bittern	*Botaurus lentiginosus*	Blue	-	Low
	Swainson's Hawk	*Buteo swainsoni*	Red	-	Moderate
	Canyon Wren	*Catherpes mexicanus*	Blue	Not at Risk	Low
	Common Nighthawk	*Chordeiles minor*	Yellow	Special Concern	Moderate
	Evening Grosbeak	*Coccothaustes vespertinus*	Yellow	Special Concern	Low
	Olive-sided Flycatcher	*Contopus cooperi*	Blue	Special Concern	Low
	Horned Lark, merrilli subspecies	*Eremophila alpestris merrilli*	Blue	-	Low
	Rusty Blackbird	*Euphagus carolinus*	Blue	Special Concern	Low
	Barn Swallow	*Hirundo rustica*	Blue	Threatened	Low
	California Gull	*Larus californicus*	Blue	-	Moderate
	Western Screech-Owl, *macfarlanei* subspecies	*Megascops kennicottii macfarlanei*	Blue	Threatened	Low
	Lewis's Woodpecker	*Melanerpes lewis*	Blue	Threatened	Moderate
	Flammulated Owl	*Psiloscops flammeolus*	Blue	Special Concern	Low
Insects	Monarch	*Danaus plexippus*	Blue	Endangered	Low
	Pale Jumping-slug	*Hemphillia camelus*	Blue	-	Moderate
	Nevada Skipper	*Hesperia Nevada*	Blue	-	Low
	Lilac-bordered Copper	*Lycaena nivalis*	Blue	-	Low
	Common Sootywing	*Pholisora Catullus*	Blue	-	Moderate

Table 2. Species at risk with the potential to occur within the subject property

Class	Common Name	Scientific Name	Provincial Status	COSEWIC Listing	Likelihood of Occurrence
Mammals	Townsend's Big-eared Bat	*Corynorhinus thownsendii*	Blue	-	Low
	Spotted Bat	*Euderma maculatum*	Blue	Special concern	Moderate
	White-tailed Jackrabbit	*Lepus townsendii*	Red	-	Low
	Western Small-footed Myotis	*Myotis ciliolabrum*	Blue	-	Moderate
	Little Brown Myotis	*Myotis luciugus*	Yellow	Endangered	Moderate
	Fringed Myotis	*Myotis thysanodes*	Blue	Data Deficient	Moderate
	Bighorn Sheep	*Ovis canadensis*	Blue	-	Low
	Fisher	*Pekania pennanti*	Blue	-	Low
	Western Harvest Mouse	*Reithrodontomys megalotis*	Blue	Special Concern	Low
	Merriam's Shrew	*Sorex merriami*	Red	-	Low
	Nuttall's Cottontail	*Sylvilagus nuttallii*	Blue	Special Concern	Low
	American Badger	*Taxidea taxus*	Red	Endangered	Low
Amphibians and Reptiles	Western Toad	*Bufo boreas*	Yellow	Special Concern	Moderate
	Northern Rubber Boa	*Charina bottae*	Yellow	Special Concern	Moderate
	Painted Turtle – Intermountain-Rocky Mountain Population	*Chrysemys picta*	Blue	Special Concern	Low
	North American Racer	*Coluber constrictor*	Blue	-	Low
	Western Rattlesnake	*Crotalus oreganus*	Blue	Threatened	Moderate
	Gopher Snake, *deserticola* subspecies	*Pituophis catenifer deserticola*	Blue	Threatened	Moderate
	Western Skink	*Plestiodon skiltonianus*	Blue	Special Concern	Moderate
	Great Basin Spadefoot	*Spea intermontana*	Blue	Threatened	Low
Plants	Slender hawksbeard	*Crepis atribarba atribarba*	Blue	-	Low

3.4 Ecosystem Communities

The subject property occurs within the Okanagan Very Dry Hot Ponderosa Pine (PPxh1) biogeoclimatic zone that is described by the Biogeoclimatic Ecosystem Classification (BEC) program (Lloyd et al. 1990). Areas of the PP zone are the driest forested ecosystems in B.C., with low snowfall and hot, dry, summers.

Terrestrial Ecosystem Mapping (TEM) was reviewed for the subject property; however, a formal categorization based on the site assessment was not complete for the subject property, and only the existing TEM completed for the central Okanagan (Iverson

2009) was referenced. **Table 3** below presents the ecosystem codes, their associated site modifiers, and provincial status.

Table 3. Ecosystem communities occurring within the subject property

Ecosystem Code	Site Modifier	Ecosystem Name	Site Modifier Definition	Provincial Status [1]
PF	k6C	Idaho fescue – Bluebunch wheatgrass	Cool aspect, mature coniferous forest structural stage	Red
PW	s5C	Ponderosa pine/Douglas fir – Bluebunch wheatgrass - Pinegrass	Shallow soils, young forest coniferous forest structural stage	Blue
SP	k	Douglas-fir/Ponderosa Pine – Snowberry – Pinegrass	Cool aspect, mature forest structural stage	N/A
RW	N/A	Rural	N/A	N/A
ES	k1	Exposed soil	Cool aspect, sparse/bryoid structural stage	N/A
RZ	N/A	Road Surface	N/A	N/A

[1] **Source:** http://www.env.gov.bc.ca/cdc/
N/A: Non-listed **Blue:** Of special concern. **Red:** Endangered or threatened.

The provincially Red-listed PF ecosystem community is the dominating community throughout the primarily undisturbed west side of the subject property. PF ecosystems are categorized as cool aspect ponderosa pine forests with some interior Douglas-fir with mixed bluebunch wheatgrass (*Pseudoroegneria spicata*) and fescue (*Festuca* spp.) understory (at climax). Understory vegetation is primarily composed of bluebunch wheatgrass, arrow-leaved balsam root (*Balsamorhiza sagittate*), rough fescue (*Festuca scabrella*), Idaho fescue, hawksbeard, junegrass (*Koeleria macrantha*), and timber milk-vetch (*Astragalus canadensis*).

The provincially Blue-listed PW ecosystem community is present throughout the westside of the subject property. PW ecosystems are categorized as mesic and near-mesic ponderosa pine forests on medium-textured soils, on level or gently sloping sites. Understory vegetation is primarily composed of bluebunch wheatgrass, arrow-leaved balsam root (*Balsamorhiza sagittate*), Idaho fescue (*Festuca idahoensis*), timber milk-vetch (*Astragalus canadensis*) and yarrow.

The yet to be classified SP ecosystem community is present throughout the westside of the subject property. SP ecosystems are categorized as moist or sheltered sites with mixed interior Douglas-fir and ponderosa pine overstories and an understory with pinegrass and various shrubs. Understory vegetation is primarily composed of trembling aspen, saskatoon (*Amelanchier alnifolia*), common snowberry, nootka rose (*Rosa nutkana*), tall-Oregon grape, Douglas maple (*Acer glabrum*), and pinegrass (*Calamagrostis rubescens*).

An assortment of anthropogenic subzones had been designated adjacent to Westside Road and within the eastern side of the subject property, and includes RW (Rural), ES

(Exposed Soil), and RZ (Road Surface). These subzones account for the rural development within the area of the exist within the eastern side of the subject property.

3.5 Environmentally Sensitive Areas (ESAs)

An Environmental Sensitivity Analysis was undertaken to categorize the defined ecosystem/habitat polygons in the project area based on the degree of environmental sensitivity. Evaluation criteria considered in the analysis include: provincial CDC status (i.e., Red or Blue listed), rare and endangered species occurrence potential, landscape condition (i.e., connectivity, fragmentation), successional stage, regional rarity, relative biodiversity, and level of disturbance.

The four categories of environmental sensitivity are described below based on ESA categories used in the Regional District of Central Okanagan (RDCO) Terms of Reference for Professional Reports for Planning Services (2006), along with relative retention expectations.

- **Very High (ESA-1):** These areas represent rare and/or significant physical features, plants and animals or include ecologically functioning natural systems. ESA-1 areas include vegetation and wildlife characteristics representing a diverse range of sensitive habitat. These features contribute significantly to the overall connectivity of the habitat and ecosystems. Various types of habitats will qualify as ESA-1 on the basis of sensitivity, vulnerability, connectivity and biodiversity. All wetlands, high value foreshore, locally/regionally rare plant communities, animals and habitats will be considered as Very High.
    - **80 – 100% retention:** Areas given an ESA-1 rating are considered the highest priority for protection of ecosystem function and values and therefore avoidance and conservation of ESA-1 designations should be the primary objective. If development is required and justified within these areas mitigation to reduce or eliminate environmental impacts shall be required as well as compensation to promote no net loss to the habitat (typically with a 3:1 replacement of equivalent functioning habitat). Only when residual, permanent loss of habitat is unavoidable and after it proves impossible or impractical to maintain the same level of ecological function, will compensation be considered.
- **High (ESA-2):** Polygons delineated as ESA-2 contain physical features, plants, animals and habitat characteristics which contribute to the overall diversity and contiguous nature of the surrounding natural features. ESA-2 may also include areas used to buffer ecological functions of ESA-1 areas.
    - **40 – 80% retention:** Some degree of development may be considered in ESA-2 areas as long as the development does not have any potential negative impact on ESA-1 areas. If development is pursued in ESA-2 areas, portions of the habitat should be retained (40-80%) and integrated to maintain the contiguous nature of the landscape. Any loss to the ESA-2 areas shall be offset by habitat improvements to the remaining natural areas found on the property

and must ensure habitat function is maintained or improved in the retention areas.

- **Moderate (ESA-3):** Polygons delineated as ESA-3 represent disturbed habitats or fragmented features that are not locally or regionally rare. However, these areas still contribute to the diversity and connectivity of the landscape and may contain natural habitats, and some features of interest (i.e. tree patches, rock outcroppings, drainages and corridors), although based on the condition and adjacency of each habitat the significant function within the landscape is limited. If development is pursued in these areas, the impacts should be offset by habitat improvements in other more sensitive natural areas found on the property. There may also be portions of the area that have significant ecological functions within the landscape (i.e. buffers to ESA 1 and/or ESA 2, or corridors) that should be retained.
    - **20 – 40% retention:** Important features or remnant stands/sites with intrinsic ecological value. Maintain important features within (e.g., tree patches, rock outcroppings, drainages and corridors). If development is pursued in these areas the impacts should be offset by habitat improvements in other more sensitive natural areas found on property.
- **Low (ESA-4):** Polygons delineated as ESA - 4 contribute little or no value to the overall diversity of vegetation, soils, terrain and wildlife characteristics of the area. These areas have generally experienced anthropogenic disturbances (i.e. a driveway or other approved land clearing but does not include land cleared for agriculture) with little or no possibility for recovery or rehabilitation. Development is therefore encouraged to be focused to these sites before consideration of using higher-rated sites within the planning area. These areas shall not be considered as areas for restoration and enhancement or as recruitment as higher value ESA to offset development in other areas.
    - **0 – 20% retention**: Development is encouraged to be focused in these areas.

The ESA composition of the subject property is summarized in **Table 4** and depicted on **Figure 3**.

Table 4. Area and percent composition of ESAs and disturbance within the study area.

ESA Value	ESA Area (m^2)	Percentage of Study Area (%)	ESA Area Disturbed within study area (m^2)	Percentage of ESA Disturbed (%)
Very High (ESA 1)	0	0	0	0
High (ESA 2)	11,777	90	47	1
Moderate (ESA 3)	1,281	10	347	27
Low (ESA 4)	0	0	0	0
Total	**13,057**	**100%**	**394**	**3%**

*total value is based on disturbance within each ESA area polygon

Based on the existing level of disturbance within the eastern side of the subject property, the proposed works would be built within predominantly ESA 3 (Moderate),

and a small portion of the ESA 2 (High) valued areas (**Table 4**). Focusing the proposed dwelling within the existing disturbed area mitigates the expected disturbance resulting from slope stabilization structures or grades (i.e., retaining walls) that would be needed for development if the proposed works were to occur within western side of the property. The extent of earthworks needed to stabilize the western slope would require "chasing" a stable grade up the hill until it "daylights" using a combination of retaining walls and/or grading.

4.0 IMPACT ASSESSMENT

The proposed development includes the construction of a single-family dwelling, garage, and septic system. Ecoscape anticipates that, provided mitigation measures are adhered to, impacts on terrestrial and aquatic resource values as a result of construction will be negligible. However, without appropriate mitigation measures, proposed works could result in the following impacts:

- Potential for release of fine sediments into Okanagan Lake. The release of fine sediments could result in temporary increases in turbidity and deterioration of water quality. *Due to the location of the proposed works in proximity to Okanagan Lake, silt fencing must be installed between the development footprint and Okanagan Lake.*
- Potential for the release of deleterious substances (e.g., fuel, oil, hydraulic fluid) to the environment as a result of improper storage, equipment re-fueling, and/or poorly maintained equipment. *It is recommended that a spill kit be kept on site at all times during the proposed works and refueling will not take place within 30 m of Okanagan Lake.*
- Potential for encroachment into the wetted area below the HWL could cause impacts to Okanagan Lake and the potential spawning habitat adjacent to the project area. *All works must occur above the high-water mark (343 m above sea level).*
- Disturbance beyond the proposed clearing limits may create conditions favorable for colonization of invasive plant species.
- Potential to directly or indirectly impact wildlife during earthworks, roadworks and tree clearing, including disruption of migration, breeding, or other behavior as a result of noise, impacts to air quality, and alterations to existing wildlife habitat and cover.

Section 5.0 below provides specific recommendations to mitigate these potential impacts. As already indicated, adverse effects associated with construction activities will be negligible if the mitigation measures proposed are implemented.

5.0 MITIGATION MEASURES

Ecoscape provides the following mitigation measures to minimize the risks of impacts during proposed works to fish, wildlife and associated habitats. Best Management Practices (BMPs) have been adapted from BC Ministry of Environment Standards and Best Practices for Instream Works. This document will be made available to the contractor prior to initiating the works and it should be kept onsite during proposed works to demonstrate that the contractor is aware of the recommendations and that they are being followed. The most relevant best management practices that should be adhered to during the proposed works include:

- Standards and Best Management Practices for Instream Works (BC MoWLAP 2004a)
- Develop with Care Environmental Guidelines for Urban and Rural Land Development (BC MoE 2014).

The appropriate Development Permits and approvals must be obtained from the RDCO prior to construction activities within the subject property. The Development Permit must be kept onsite at all times.

5.1 General Recommendations for Construction

- No work can occur below the high-water mark / Present Natural Boundary of Okanagan Lake without having a Provincial *Water Sustainability Act* Section 11 Notification or Approval application submitted, approved and in the possession of the property owner and contractor prior to any instream work.
- The operation or parking of equipment below the driplines of the trees must be avoided.
- The release of fine sediments, construction debris or other substances deleterious to the environment or aquatic habitat must be prevented at all times.
- Wherever possible, trees with high wildlife value, such as veteran trees and large snags, must be conserved. Hazardous trees with wildlife value within the vicinity of the construction works should be assessed by a certified wildlife/danger trees assessor to determine levels of risk.
- No equipment refueling or servicing is to be undertaken within 30 m of Okanagan Lake whenever possible.
- All road surfaces (i.e., Westside Road) must be kept clean and free of fine materials (i.e., swept or scraped) regularly to prevent the increase of airborne particulate matter.

5.3 Nesting Bird Work Window

Avian nesting timing windows should be considered to protect nesting birds within and adjacent to the proposed work area.

The following methods should be implemented in relation to nesting bird work windows.

- Section 6 of the Federal *Migratory Birds Convention Regulation* protects both the nests and eggs of migratory birds. The project area falls within the **Canadian Avian Nesting Zone A1** (MECCS 2020). The general avian nesting period for migratory birds within this zone is **March 26th to August 9th**. Section 34 of the Provincial *Wildlife Act* protects all birds and their eggs, and Section 34(c) protects their nests while they are occupied by a bird or egg. The project area falls within the Northern Okanagan Basin ecodistrict. The avian nesting period for all birds within this ecodistrict is **February 1st to September 14th** (Birds Canada 2020).
- If active nests are found within the construction limits, a buffer will be established around the nest until such time that the environmental monitor (EM) can determine that nest has become inactive. The size of the buffer will depend on the species and nature of the surrounding habitat. Buffer sizes will generally follow provincial BMP guidelines or other accepted protocol (e.g., Environment Canada). In general, a minimum 20 m buffer will be established around songbird nests or other non-sensitive (i.e., not at risk) species.
- **Clearing and other construction activities must be conducted within 72 hours following the completion of any pre-clearing nest surveys.** If works are not conducted in that time, the nest surveys are considered to have expired, and a follow-up survey will be completed to ensure that no new nests have been constructed.
- Wherever possible, trees with high wildlife value, such as veteran trees and large snags, must be conserved. Hazardous trees with wildlife value within the vicinity of the construction works should be assessed by a certified wildlife/danger trees assessor to determine levels of risk.

5.4 Clearing and Grubbing

Clearing, stripping, and grubbing limits must be clearly marked in the field prior to construction and minimized wherever possible. Unnecessary impacts to native vegetation and soils must always be avoided. No important wildlife habitat, including veteran trees, snags, or other important features, were identified within the development footprint during the site visit, however, should additional workspace be required, the EM should confirm whether sensitive features are present in the amended footprint. Native vegetation, including trees, shrubs, and groundcover, should be retained to the extent possible to mitigate the establishment of invasive plants and to maintain the existing ecological value sustained within the project area.

- Prevention of the spread of non-native and invasive species can be achieved by limiting disturbance to soils and native vegetation where possible. Areas that have previously been disturbed should be restored with native plantings or grass seeding. Infestation areas must be controlled with regular manual removal of weeds (e.g., mowing, pulling).
- Flagging or snow fencing must be used to clearly delineate the construction disturbance limits prior to the commencement of works and must remain in place for the duration of works. Flagging or snow fencing will also be used to clearly identify setbacks and buffers associated with other identified environmentally sensitive areas (e.g., wildlife trees, nests).
- In the event that land and/or natural vegetation is disturbed or damaged beyond the development footprint area, these areas will be restored and/or replanted with plant material indigenous to the area under the direction of the EM.
- Exposed soils must be seeded immediately following any activities that result in disturbance to native vegetation and soils. Grass seed mixes must be comprised of native species, appropriate for the environmental conditions and certified as Canada #1 Grade by Agriculture Canada to minimize the weed seed count. **Ecoscape can provide the client recommendations regarding local suppliers who can provide appropriate upland/riparian seed mixes based on the ecological communities within the site.**

5.5 Erosion and Sediment Control

The mitigation strategies described below should be followed as required to provide erosion and sediment control associated with the environmentally sensitive habitats identified in the assessment.

- Stockpile locations, staging and equipment storage areas, concrete washouts, washroom locations and environmentally sensitive areas should be delineated at the start of construction.
- Works involving ground disturbance should not be conducted during heavy rains wherever feasible to reduce the potential for sediment and erosion issues. Exposed soils along slopes must be stabilized and covered where appropriate using erosion control blankets (ECB), poly sheeting, tarps, or other suitable materials to reduce the potential for erosion resulting from rainfall, seepage, or other unexpected causes.
- **Silt fencing should be installed as directed by the EM in a field-fit manner. Silt fence must be staked into the ground and trenched a minimum of 15 cm to prevent erosion underneath the fence.** Silt fencing will be monitored on a regular basis and any damages or areas where the integrity and function of the fencing has been compromised should be repaired or replaced promptly. Silt fence must remain in place where required until the completion of the project.

- If erosion becomes a problem during construction and there is a risk of siltation to the adjacent naturally vegetated areas and watercourses (i.e., during heavy rain events), silt fence must be installed immediately adjacent to the development footprint to mitigate for potential sediment transport and erosion downslope of the works. Silt fence must be staked into the ground and trenched to prevent flow underneath the fence.
- ESC recommendations by the EM or Engineer on Record must be implemented within 24 hours.
- It is the contractor's responsibility to inspect all mitigation measures daily and additional measures will be installed, maintained, and repaired or replaced as required using a field-fit, adaptive approach.
- The release of silt, sediment, sediment-laden water, or any other deleterious substance into any ditch, watercourse (creek, river, lake), ravine, or other drainage feature must be prevented at all times. Similarly, there is to be no sediment release into areas of vegetation growth or sensitive areas in levels that would adversely alter growing or hydraulic conditions.
- It is the contractor's responsibility to regularly monitor weather forecasts and adjust ESC measures or proposed construction activities as required based upon the existing conditions of the site.
- Adjacent roadways should be kept clean and free of fine materials. Sediment accumulation upon the road surfaces should be removed and disposed of appropriately.

5.6 Dirty Water Management

If water is encountered during excavations dewatering may be required. Options for dirty water management include the following;

  - Discharging water in small quantities to well-vegetated areas of the site to allow for infiltration and reduction of runoff potential.
  - Discharging to local stormwater will only be an option if prior approval is obtained from the RDCO.
  - Discharge to Okanagan Lake may be an option provided that water discharged is within the allowable limits for turbidity under the ambient water quality guidelines for turbidity, suspended and benthic sediments; see below (BC MoE 2001). Any water discharged to Okanagan Lake must be approved by the EM prior to discharge and the EM would need to be onsite full time.

- Turbidity levels under the Ministry of Environment guidelines for fish and aquatic habitats (BC MoE 2001) are as follows;

- During clear flow periods, induced turbidity should not exceed 8 NTU above background levels at any given time and no more than an average of 2 NTU above background levels over a 30-day period.
- During turbid flow periods, induced turbidity should not exceed background levels by more than 5 NTU at any time when background turbidity is between 8 and 50 NTU. When background exceeds 50 NTU, turbidity should not be increased by more than 10% of the measured background level at any one time.

5.7 Emergency Spill Response Plan

Spills of deleterious substances can be prevented through awareness of the potential for negative impacts and with responsible housekeeping practices onsite. Maintenance of a clean site and the proper use, storage and disposal of deleterious liquids and their containers are important to mitigate the potentially harmful effects of spills and/or leaks. The following BMP are adapted from Chilibeck *et al*. (1992) to provide guidance in the control of deleterious substances.

- Ensure that onsite machinery is in good operating condition, clean, and free of leaks, excess oil or grease.
- Equipment and tools used for concrete works must be washed offsite away from any watercourses. Concrete wastewater must not be washed into any watercourse or the storm water system (i.e., must not be poured in a location that drains into municipal catch basins and subsequently into watercourses).
- Spills occurring on dry land will be contained, scraped and disposed of appropriately. Contaminated material will be stored on tarps and covered to prevent mobilization and will be disposed of in accordance with the *Environmental Management Act*.
- Copies of contact phone numbers for notification of all of the required authorities in the event of a spill/emergency response will be kept posted and clearly visible onsite.
- Spill containment kits should be kept readily available on-site during construction in case of the accidental release of a deleterious substance to the environment. Any spills of a reportable amount of a toxic substance must be immediately reported to Ecoscape at **250-491-7337**, as well as Emergency Management BC's 24-hour hotline at **1-800-663-3456**.

5.8 Invasive Species Management

- Ongoing invasive species control will be required within any areas with exposed/disturbed soils and restoration areas in the first few years until vegetation becomes established. Species that are aggressive have the potential to outcompete native species.

- Invasive plant species should be hand pulled or brushed/mowed using mechanical means. Mowing or brushing of invasive plant species should only occur before they have flowered or gone to seed. The use of chemical treatments is not recommended, particularly since herbicides can kill native species and due to plantings associated with stormwater runoff which enters watercourses (i.e., Okanagan Lake) untreated.
- The contractor will ensure that all equipment and vehicles are washed and free of weed seeds prior to mobilization and de-mobilization. Vehicles and equipment should not be stored, parked, or staged within weed infested areas if possible. Contractor clothing should also be inspected daily for signs of weed seeds. If found, weed seeds should be disposed of in a contained refuse bin for offsite disposal.
- Care must be taken to ensure that invasive species removal does not impact existing or planted native tree and shrub species.
- Invasive plant species must be disposed of in a landfill; however, invasive species material must not be composted in the yard waste section of the landfill. Invasive plant species must not be transported to or deposited in other natural areas.
- Woody debris/wood fiber mulch spread around the base of plantings may help to deter establishment of and competition from invasive plant species.

5.9 Site Cleanup and Restoration

At this time, a formal landscape plan has not been prepared. Ecoscape has prepared a riparian restoration plan that outlines substantial plantings within the 15 m SPEA setback (**Figure 6**).

The total area proposed for restoration within the SPEA – taking into account the proposed works footprint and space availability within the subject property, is **600 m^2.** Due to the opportunity for enhancing the native species regime within the SPEA, a substantial planting list has been included below. If a formal landscape plan is prepared for the subject property (that encompasses the SPEA), it must be reviewed and approved by Ecoscape and reviewed by the RDCO, prior to implementation.

The following recommendations are to be adhered to with completion of riparian restoration activities:

Table 5. Riparian Restoration Plantings			
Common Name	**Scientific Name**	**Size**	**Quantity**
TREES			
Trembling aspen	*Populus tremuloides*	1-2 gal	
Interior Douglas-fir	*Pseudotsuga menziesii var. glauca*	1-2 gal	
Ponderosa pine	*Pinus Ponderosa*	1-2 gal	
		Subtotal	26
SHRUBS			
Red-osier dogwood	*Cornus sericea*	1 gal	
Prickly rose	*Rosa acicularis*	1 gal	
Common snowberry	*Symphoricarpos albus*	1 gal	
Tall Oregon-grape	*Mahonia aquifolium*	1 gal	
Nootka rose	*Rosa nutkana*	1 gal	
Mock orange	*Philadelphus lewisii*	1 gal	
		Subtotal	200
		Total	**226**

- With a density of 1 shrub per 2 m^2, and 1 tree per 7m^2, a total of **200 shrubs**, and **26 trees** are recommended for planting within the SPEA.
- Changes to the species list is permissible, but must be approved by the EM prior to substitution and plants must be native to the Okanagan. The proposed planting list and layout should be reviewed by the EM prior to planting and all plants should be flagged for review. Only native vegetation from local stock should be planted within the SPEA, unless approved by the EM.
- Upon the completion of the proposed works and installation of the restoration plantings, invasive plant species should be removed from any disturbed areas and the SPEA on a monthly basis, at minimum. Ongoing invasive weed management may continue to be required as necessary within the subject property. Chemical pesticides/herbicides and fertilizers must not be used within the enhancement area due to the close proximity to Okanagan Lake. Furthermore, it is recommended that invasive species are pulled by hand or by mechanical means.
- Watering should occur for the first two growing seasons, until plants are established. Spring and fall watering, if necessary, should be timed to water every 3 or 4 days. In summer, watering should be deep, but infrequent – occurring once per week. Irrigation should be timed to augment rainfall and a rainfall sensor would help to reduce water consumption. Hand watering and drip irrigation are both acceptable methods. Care should be taken during watering to ensure that overland flows do not result in sedimentation to surrounding watercourses.
- A target of 80% plant survival is recommended after two years. If the total number of plants drops below 80% of the original number planted, fill/replacement planting will be required. Replacement trees and shrubs can be

1-gallon size, although the property owners are welcome to use larger plant stock.

- Shrubs should be spaced at about 1.5 m on center and trees should be spaced about 3 m on center.
- Native plantings may need to be protected from beaver and/or deer with wire mesh or suitable fencing.
- While wood fiber or rock mulch may be used around plants, bark mulch in close proximity to Okanagan Lake should be avoided due to the potential for toxic leachates.
- Weed management and erosion control must occur in all areas disturbed during development.
- If additional disturbance occurs outside the development footprint, these areas will need to be addressed by the EM and restored with native plantings.

The following recommendations are to be adhered to with completion of site cleanup:

- Silt fencing and other temporary mitigation features must be removed upon substantial completion of construction works. All equipment, supplies, and non-biodegradable materials must be removed from the site.

- Weed management and erosion control must occur in all areas disturbed during development. At a minimum, hydro-seed or loose grass seed must be applied to re-vegetate areas that have been disturbed.

- Retention of some coarse woody debris within the project area is recommended for the wildlife habitat value and it provides.

- Ongoing weed control through hand removal is recommended to reduce the abundance of weeds already established within the subject property as well as mitigate the future spread of weeds as a result of construction activities as a result of the project. A QEP must follow up with site visits twice per year over 3 years post construction to ensure that weed control measures are effective and recommend adapted weed management measures if required.

6.0 ENVIRONMENTAL MONITORING

Ecoscape has be retained for environmental monitoring during construction activities. The EM will document compliance with BMPs, mitigation measures, and other recommendations and provide guidance for implementation of best practices (e.g., erosion and sediment control, restoration) during construction. In the event that greater disturbance occurs due to unforeseen circumstances, the EM will recommend measures to protect/restore the natural integrity of the site. If RDCO requires monitoring, the following schedule is recommended;

- A pre-construction meeting should be held between the EM and the contractor(s) undertaking the work onsite to ensure a common understanding of the mitigation measures and best practices required for the project. A copy of the development permit and this report must be kept readily available at the site for reference while the work is being conducted. Site delineation must be in place prior to project startup.
- The contractor will provide the EM with an up-to-date schedule of construction activities, and notify the EM is the schedule changes, or potentially high-risk work (e.g., site clearing) is planned that is not identified on the schedule.
- The EM will be an appropriately qualified environmental professional (QEP) authorized to halt construction activities should an incident arise that is causing undue harm (unforeseen or from lack of due care) to terrestrial resource values.
- Construction activities should be monitored on a monthly basis and more regularly during high-risk activities (e.g. clearing and grubbing, concrete pours, large material excavations) until the completion of the project. At a minimum, environmental monitoring of restoration is recommended to provide substantial completion for the project.
- Regular monitoring reports will be submitted to the primary contractor, client, and RDCO. Once construction and restoration are complete, a substantial completion site visit and report will be undertaken by the EM.

7.0 PERFORMANCE AND MAINTENANCE BONDING

Performance bonding is typically required by the RDCO to ensure that the recommended mitigation measures are adhered to and any restoration is completed as required. Bonding in the amount of 125% of the estimated value of the prescribed works (i.e. monitoring) and is generally required to ensure faithful performance and that all mitigation measures are completed and function as intended. Security deposits shall remain in effect until the RDCO has been notified, in writing by the EM that the objectives have been met and substantial completion of the restoration works has been achieved.

A cost estimate has been prepared to address the RDCO performance bonding requirements. Ecoscape estimates that the total cost for planting, associated

environmental monitoring of compensation works and subsequent preparation of a substantial completion report will be approximately **$11,670**, not including GST (**Table 6**). The 125% bond amount is therefore estimated to be **$14,588.**

Table 6. Cost estimate for restoration planting and bonding.

Item	Location	Quantity	Unit	Material Cost	Installed Cost*
Trees and shrubs	Within SPEA (refer to Figure 4)	226	1 gallon, but larger stock is acceptable	$3,390 (based on $15/plant)	$10,170
Environmental monitoring of enhancement plantings (including substantial completion report)**					$1,500
				Grand Total	**$11,670**
				125% Bond	**$14,588**

*Installed costs are assumed to be based upon 3 x the purchase price of materials. A landscaping company and distributor of native plant stock may be able to provide a more accurate estimate to complete the prescribed works.
**The estimate for environmental monitoring does not include monitoring of proposed works.

8.0 CONCLUSION

This environmental assessment report has been prepared to address the Development Permit requirements as outlined within the RDCO Rural Westside Official Community Plan (RWOCP) and meet the Terms of Reference (TOR) for Professional Reports for Planning Services.

The proposed development will meet the objectives as outlined within the Appendices of the RWOCP for the RDCO Sensitive Terrestrial Ecosystem, Aquatic Ecosystem, Hillside, and Wildfire DPAs, with key points addressing the objectives of each DP, and is summarized below:

1.) Aquatic Ecosystems Development Permit Objectives:

a) To protect the ecological attributes and socio-economic values that is common to all Aquatic Ecosystems.

b) To protect, restore, and enhance Aquatic Ecosystems (water, wetland, riparian and broadleaf woodland).

c) To protect Aquatic Ecosystems through use of buffers.

d) To protect water quality and quantity.

e) To protect vital wildlife functions such as (but not limited to) a travel corridor, a place of refuge, water source, fish habitat, and a breeding habitat to ensure future generations.

The objectives for the Aquatic Ecosystems Development Permit area will be met through compliance with the Provincial Riparian Areas Protection Regulation (RAPR) and the substantial restoration plan proposed for the development. The existing riparian vegetation is limited to a thin band of assorted trees and shrub species, with a

high amount of disturbance to the understory. The proposed restoration plan will enhance the existing riparian area, increase bank stability through root regimes of plantings, and increase the ecological attributes within the riparian area by providing increased habitat values for various avian, terrestrial, and aquatic species. No instream works are proposed as part of the development within the subject property.

2.) Terrestrial Ecosystems Development Permit Objectives:

a) To ensure that sensitive environments are identified and protected in areas that may be subject to future rural subdivision.

b) To encourage and support the current rural and resort use of land in a way that best conserves important and vanishing environments. The Development Permit Area established to include coniferous woodland, broadleaf woodland, grassland, sparsely vegetated, and mature forest ecosystems identified in the sensitive ecosystem inventory of Central Okanagan.

The objectives for the Terrestrial Ecosystems Development Permit area should be met through establishment of a covenant (or other suitable mechanism determined by RDCO) for protection of the mostly undisturbed western area of the subject property. The only exception to this would-be placement of a septic field in the previously disturbed areas on the western portion. The western portion of the property contains high habitat value. Conservation of this area will ensure feasible wildlife corridors are maintained including high value habitat for various avian and wildlife species, conservation of snags and standing dead trees (i.e., wildlife trees). Protection of this area will also reduce the potential for introduction of invasive plant species, maintain slope stability, and provide continued successional growth of the existing vegetation regime within the western side of the property.

Previous plans included a protective covenant on the west side of the property. This area of high and very high value should remain largely undisturbed and protected. However, the area of developable land on the lakefront has been reduced. At this time, the property owner has not figured out important details such as potential storage needs for example. A specified covenant area has not been identified in this report, but it is still recommended that large portions of the western side of the property are protected in perpetuity through mechanisms such as a covenant when appropriate.

The eastern side of the subject property will further be enhanced through restoration proposed as a part of this development and is further outlined within the previous section (i.e., 1. Aquatic Ecosystems Development Permit Objectives) of this report.

3.) Hillside Development Permit Area Objectives:

a) To support rural subdivision, road building and construction on hillsides that protects and enhances the natural characteristics of the hillside which are a significant component of the OCP area.

b) To support rural subdivision, road building and construction on hillsides in a manner that minimizes damage to property (both the property under application and neighboring property) from erosion, soil instability, rock fall, or other identified hazards.

c) To support rural subdivision, road building and construction on hillsides in a manner that is sensitive to the natural topography and maximizes the retention of existing landscape vegetation and soils.

d) To support rural subdivision, road building, and construction on hillsides in a manner that is responsive to the natural environment and drainage patterns.

The objectives for the Hillside Development Permit area will be met through retention of the high gradient sloped hillside within the western area of the property. Prevention of erosion, soil instability, rock fall, mass movements, and retention of natural drainage patterns through conservation will mitigate these types of hazards, while protecting the high-valued ecosystems within this area of the property.

4.) Wildfire Interface Construction Development Permit Objectives:

a) The objective is to reduce the susceptibility to wildlife of new construction or large addition near the provincial forest interface, or the interface with large, forested parks.

As per correspondence between Ecoscape and Brittany Lange of the RDCO during the pre-application meeting completed for the proposed development, a wildfire assessment report was not needed for the Wildfire Interface Construction Development Permit (WICDP) application. At this time, only submission of the designs of the proposed home were required to meet the permit guidelines.

Previous plans included a protective covenant on the west side of the property. This area of high value should remain largely undisturbed and protected. However, the area of developable land on the lakefront has been reduced. At this time, the property owner has not figured out important details such as potential storage needs for example. A specified covenant area has not been identified in this report - but it is still recommended that large portions of the western side of the property are protected in perpetuity through mechanisms such as a covenant when appropriate.

The proposed development is not anticipated to have any long-term effects within the subject property, as long as the recommended restoration plan, mitigation measures, and best management practices are followed throughout the course of the construction period within the subject property.

9.0 CLOSURE

This report has been prepared for the exclusive use of Maloney Construction Ltd. Ecoscape has prepared this report with the understanding that all available information on the present and proposed use of the subject property has been disclosed. Maloney Construction Ltd. has acknowledged that in order for Ecoscape to properly provide the professional service, Ecoscape is relying upon full disclosure and accuracy of this information. This report should not be interpreted as an endorsement of the proposed works, but as a municipal tool for decision making.

If you have any questions or comments, please contact the undersigned at your convenience.

Respectfully Submitted
ECOSCAPE ENVIRONMENTAL
CONSULTANTS LTD.

Prepared By:

Kris Mohoruk, B.Sc.
Natural Resource Biologist
Direct Line: (778) 940-1937

Reviewed by:

COLLEGE OF APPLIED BIOLOGY Jason L. Schleppe #1795 CAB

Jason Schleppe, M.Sc., R.P.Bio.
Senior Natural Resource Biologist
Direct Line: (778) 940-3479

Attachments:
Photographs
Figures
Appendix A: Design Documents Provided by Mullins Design Group
Appendix B: Geotechnical Report from Geopacific Consultants
Appendix C: Site Survey & Foundation Plan
Appendix D: Septic System Designs from Franklin Engineering Ltd.
Appendix E: Danger Tree Assessment by Lumberjack Clearing

10.0 REFERENCES

British Columbia Ministry of Environment (BC MoE). 2020. Fish Inventories Data Queries (FIDQ). Accessed on July 14, 2020. Available: https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/fish/fish-and-fish-habitat-data-information/search-fish-fish-habitat-data-information/fisheries-inventory-data-queries

British Columbia Ministry of Environment (BC MoE). 2018. Okanagan Region Large Lakes Foreshore Protocol (Update). Accessed on July 14, 2020. Available: https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/best-management-practices/okanagan/okanagan_large_lakes_foreshore_protocol.pdf

British Columbia Ministry of Environment (BC MoE). 2014. Develop with Care Environmental Guidelines for Urban and Rural Land Development. Accessed on July 14, 2020. Available: https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/best-managementpractices/develop-with-care/dwc-section-4.pdf.

British Columbia Ministry of Environment. 2001. Ambient Water Quality Guidelines (Criteria) for Turbidity, Suspended and Benthic Sediments. Accessed on July 14, 2020. Available: https://www.for.gov.bc.ca/hfd/library/ffip/BCMoE1998_b.pdf

British Columbia Ministry of Forests, Lands and Natural Resource Operations (MFLNRORD). 2018. Lake Fisheries Work Windows: Okanagan, Similkameen & Upper Shuswap Fisheries Timing Windows. Accessed on July 14, 2020. Available: https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/working-around-water/2018_fish_timing_windows_okanaganregion_final.pdf

British Columbia Ministry of Forests, Lands and Natural Resource Operations and Rural Development (MFLNRORD). 2019. Okanagan Timing Windows: Nesting Birds. Accessed on July 14, 2020. Available: https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-licensing-rights/working-around-water/regional-terms-conditions-timing-windows/okanagan-timing-windows.

British Columbia Ministry of Water, Land and Air Protection (MoWLAP). 2004a. Standards and Best Management Practices for Instream Works. Ecosystems Standards and Planning. Biodiversity Branch. Accessed on July 14, 2020. Available: https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/best-management-practices/iswstdsbpsmarch2004.pdf.

Chilibeck, B., C. Chislett, and G. Norris. 1992. Land Development Guidelines for the Protection of Aquatic Habitat. Habitat Management Division of the Department of Fisheries and Oceans and the Integrated Management Branch of the Ministry of Environment, Lands and Parks. 129 pp.

Environment and Climate Change Canada. 2019. Western Rattlesnake, Great Basin Gophersnake, Desert Nightsnake: Recovery strategy 2019. Accessed on July 14, 2020. Available: https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/recovery-strategies/western-rattlesnake-great-basin-gophersnake-desert-nightsnake-2019.html

Haney, A. and Iverson, K. 2009. Conservation Analysis and Updated Ecosystem Mapping for the Central Okanagan Valley: Central Okanagan, South Slopes, Kelowna, Ellison and Joe Rich Project Areas. Prepared for: Okanagan Collaborative Conservation Program. Prepared by: Ophiuchus Consulting and Iverson & MacKenzie Biological Consulting Ltd. March 2009.

Regional District of Central Okanagan. 2006. Terms of Reference: Professional Reports for Planning Services. Available at : https://www.regionaldistrict.com/media/20329/Handout%20TofR.pdf. Accessed July 14, 2020.

Photo 1. View looking northwest of the proposed build area and existing modifications within the subject property (All photos taken on October 30, 2019).

Photo 2. View looking northwest of the existing deck proposed for removal within the subject property.

Photo 3. View looking north of the riparian area within the subject property.

Photo 4. View looking southwest of foreshore modifications (retaining wall and stairs to foreshore) within the subject property.

Photo 5. View looking southwest of the wooden retaining wall within the subject property.

Photo 6. View looking west of cement blocks and gully within the west slope adjacent to Westside Road.

Photo 7. View looking east and downslope within the western slope of the subject property.

Photo 8. View looking west and upslope within the western slope of the subject property.

Photo 9. View looking northeast of the neighboring properties from the western slope.

FIGURES

FIGURE 1

Site Location and Fisheries Information

Project:	Environmental Assessment
Location:	Regional District of Central Okanagan
Project No.:	19-3064.01
Prepared for:	Maloney Construction Ltd.
Prepared by:	Ecoscape Environmental Consultants Ltd.
	Josh Castanier, GIS Technician
Coordinate System:	NAD83-UTM Zone 11
Imagery:	ESRI World Imagery
Map Date:	July 21, 2020

LEGEND

- Regional Location of Subject Property
- Places
- Subject Property
- Cadastre
- Municipal Boundary
- Lakes
- Parks and Protected Lands
- Critical Habitat for Species-at-Risk
- Okanagan Wetlands
- BC Conservation Data Centre Polygons
- Highway
- Major Roads
- Streams
- WSI Survey Observations
- WSI Incidental Observations
- Segment Break
- Foreshore Inventory and Mapping (FIM)

Okanagan Large Lakes Foreshore Protocol

- Historical Kokanee Spawning Records
- Kokanee Spawning Black Zone
- Kokanee Spawning Red Zone
- Kokanee Spawning Yellow Zone
- Mussel Red Zone
- Mussel Yellow Zone
- Foreshore Plants Black Zone
- Foreshore Plants Red Zone
- Foreshore Plants Yellow Zone

Regional Location of Subject Properties

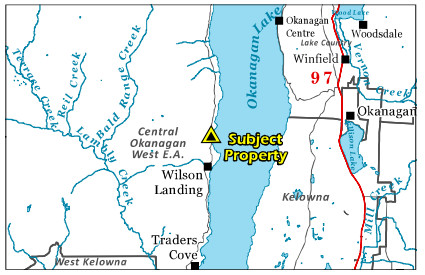

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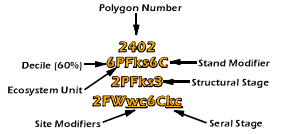
FIGURE 2
Ecosystem Polygons

Project:	Environmental Assessment
Location:	Regional District of Central Okanagan
Project No.:	19-3064.01
Prepared for:	Maloney Construction Ltd.
Prepared by:	Ecoscape Environmental Consultants Ltd.
	Dan Austin, GIS Specialist
Coordinate System:	NAD83-UTM Zone 11
Imagery:	ESRI World Imagery
Map Date:	January 27, 2022

LEGEND

- Subject Property
- Cadastre
- Ecosystem Polygons
- Streams and Rivers

Ecosystem Polygon Key



Ecosystem Units

RW	Rural
RZ	Road
PF	Ponderosa pine - Bluebunch wheatgrass - Rough fescue
PW	Ponderosa pine - Bluebunch wheatgrass - Idaho fescue
SP	Snowbrush - Pinegrass

Site Modifiers

c	coarse textured soils
k	cool aspect (slope >25%)
s	shallow soils (20-100 cm to bedrock)
v	very shallow (< 20 cm to bedrock)
w	warm aspect (slope > 25%)

Structural Stage

1	Sparce/bryoid
2b	Herb - Graminoid-dominated
3a	Shrub/Herb - Low Shrub
3b	Shrub/Herb - Tall Shrub
4	Pole Sapling
5	Young Forest
6	Mature Forest
7	Old Forest

Seral Stage/Weed Modifiers

kc	knapweed - cheatgrass
wk	bluebunch wheatgrass - knapweed

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FIGURE 3

Environmental Sensitivity Analysis

Project:	Environmental Assessment
Location:	Regional District of Central Okanagan
Project No.:	19-3064.01
Prepared for:	Maloney Construction Ltd.
Prepared by:	Ecoscape Environmental Consultants Ltd. Dan Austin, GIS Specialist
Coordinate System:	NAD83-UTM Zone 11
Imagery:	RDCO 2021
Map Date:	November 24, 2022

LEGEND

- "99" Ecosystem Polygon Number
- Subject Property
- Cadastre
- Streams and Rivers

Environmental Sensitivity Rating

- Very High (ESA 1)
- High (ESA 2)
- Moderate (ESA 3)
- Low (ESA 4)

Environmental Sensitivity Gradient

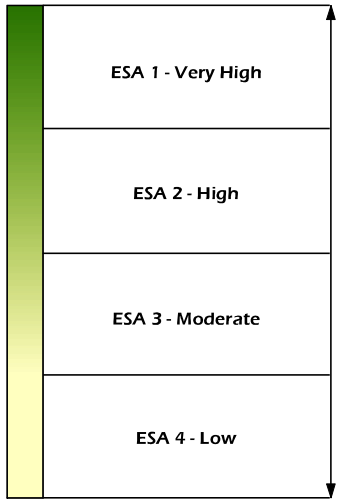

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FIGURE 4

Riparian Areas Regulation Assesment

Project:	Environmental Assessment
Location:	Regional District of Central Okanagan
Project No.:	19-3064.01
Prepared for:	Maloney Construction Ltd.
Prepared by:	Dan Austin, GIS Specialist Ecoscape Environmental Consultants Ltd.
Coordinate System:	NAD83-UTM Zone 11
Imagery:	ESRI World Imagery
Map Date:	November 17, 2022

LEGEND

- Surveyed High Water Mark (343 masl)
- 30 m Riparian Areas Regulation Assessment Area
- Zone of Sensitivity - Large Woody Debris (15 m)
- Zone of Sensitivity - Litterfall (15 m)
- Zone of Sensitivity - Shade (30 m due south)
- Proposed Front Yard Setback (2.29m)
- Proposed Building
- Proposed Parking
- Proposed Retainintg wall
- Proposed Septic
- Subject Property
- Streamside Protection and Enhancement Area (SPEA)
- Cadastre

ECOSCAPE

FIGURE 5

Impact Assessment

Project:	Environmental Assessment
Location:	Regional District of Central Okanagan
Project No.:	19-3064.01
Prepared for:	Maloney Construction Ltd.
Prepared by:	Dan Austin, GIS Specialist Ecoscape Environmental Consultants Ltd.
Coordinate System:	NAD83-UTM Zone 11
Imagery:	ESRI World Imagery
Map Date:	November 24, 2022

LEGEND

- Surveyed High Water Level (343. m.a.s.l.)
- Foreshore Inventory and Mapping (FIM)
- Proposed Building
- Proposed Parking
- Proposed Retainintg wall
- Proposed Septic
- Subject Property
- Cadastre
- Streamside Protection and Enhancement Area (SPEA)
- Proposed Limit of Disturbance

Environmental Sensitivity Rating

- Very High (ESA 1)
- High (ESA 2)
- Moderate (ESA 3)
- Low (ESA 4)

Area (m^2)	Outside Disturbance	Within Disturbance	Total
Very High (ESA 1)	0	0	0
High (ESA 2)	11,730	47	11,777
Moderate (ESA 3)	933	347	1,281
Low (ESA 4)	0	0	0
Total	12,664	394	13,057

ECOSCAPE

FIGURE 6
Restoration Plan

Project:	Environmental Assessment
Location:	Regional District of Central Okanagan
Project No.:	19-3064.01
Prepared for:	Maloney Construction Ltd.
Prepared by:	Dan Austin, GIS Specialist Ecoscape Environmental Consultants Ltd.
Coordinate System:	NAD83-UTM Zone 11
Imagery:	ESRI World Imagery
Map Date:	November 30, 2022

LEGEND

- *Stream Boundary i.e. Surveyed High Water Level (343 m.a.s.l.)*
- Subject Property
- Cadastre
- Streamside Protection and Enhancement Area (SPEA)
- Restoration Area
- Proposed Building
- Proposed Parking
- Proposed Retainintg wall
- Proposed Septic

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APPENDIX A:
DESIGN DOCUMENTS PROVIDED BY MULLINS DESIGN GROUP

FRONT ELEVATION

SPECIFICATIONS

ROOF
TORCH ON ROOFING
METAL ROOFING (PITCHED)
7/16" ROOF SHEATHING
ENGINEERED ROOF TRUSSES
R-50 INSULATION
6 MIL UV POLY
5/8" DRYWALL

SOFFIT & FASCIA
5" FASCIA GUTTER
SUB FASCIA VARIES
STUCCO FASCIA
VENTED SOFFIT

EXT. WALL
STUCCO
CULTURED STONE
7/16" WALL SHEATHING
2x6 STUDS 24" o/c
R-22 BATT INSULATION
6 MIL UV POLY
1/2" DRYWALL

INT. WALL
2x4 STUDS 16" o/c
1/2" DRYWALL BOTH SIDES

FLOOR SYSTEM
3/4" T&G SHEETING
ENGINEERED I JOIST

DECK CONSTRUCTION
8" CONC. PERS
2X10 JOISTS @16" o/c
VINYL DECKING
POSTS & BEAMS AS REQ.

STAIR CONSTRUCTION
PRE MANUFACTURED
STAIR SYSTEM
2X6 @ 16"o/c LANDINGS

FOUNDATION
8" CONC. FOUNDATION
10MM REBAR
R12 STYROFOAM INSULATION
8"x16" CONC. FOOTING

CONC. SLAB
4" CONC. SLAB
6 MIL UV POLY
6" DRAINAGE ROCK

DRAINAGE TILE
4" DRAIN TILE
MINIMUM 6" DRAIN ROCK
DRY SHEETING PAPER

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE CURRENT EDITION OF THE B.C. BUILDING CODE AND ALL LOCAL LAWS AND BYLAWS.
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3. IT IS THE RESPONSIBILITY OF THE CONTRACTOR FOR THE CORRECT SITING OF THE BUILDING TO CONFORM WITH NECESSARY SETBACKS.
4. ALTHOUGH EVERY EFFORT HAS BEEN MADE TO PROVIDE COMPLETE AND ACCURATE DRAWINGS WE CANNOT ELIMINATE THE POSSIBILITY OF HUMAN ERROR, THEREFORE MULLINS DRAFTING & DESIGN WILL NOT BE LIABLE FOR ANY ERRORS OR OMISSIONS.

****NOTE****
WINDOW SPEC'S TO BE CONFIRMED BY OWNER/ CONTRACTOR PRIOR TO ORDERING TO ENSURE PROPER VENTING AND EGRESS.

****NOTE****
PROVIDE PROPER SLOPE TO ALLOW DRAINAGE AWAY FROM RESIDENCE.

****NOTE****
CONTRACTOR TO CONFIRM DIM PRIOR TO CONST.

SHEET NUMBER 1/10

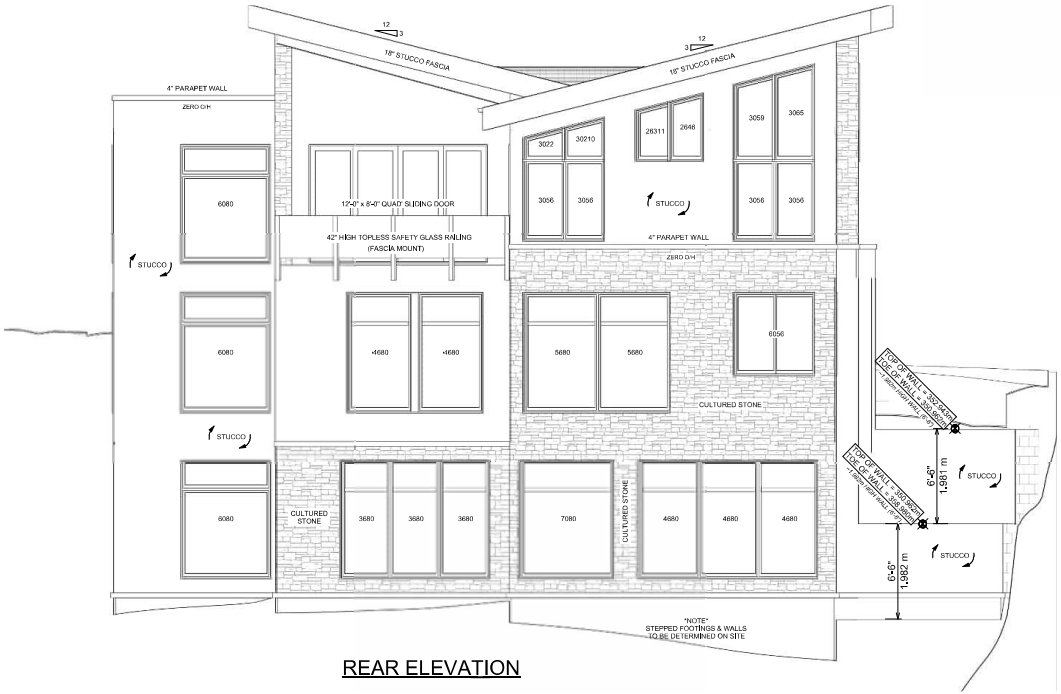
SCALE: 1/4" = 1'

DATE : SEPT-29-2022

MALONEY CONSTRUCTION

PROPOSED PROJECT FOR
2223 WESTSIDE RD

UNIT 203 - 1889 SPALL RD.
Kelowna BC V1Y 4R2
Bus: (250) 717-3415
Cell: (250) 258-7819
E-mail: mullinsdrafting@shaw.ca
MULLINS DESIGN GROUP



REAR ELEVATION

SPECIFICATIONS

ROOF
TORCH ON ROOFING
METAL ROOFING (PITCHED)
7/16" ROOF SHEATHING
ENGINEERED ROOF TRUSSES
R-50 INSULATION
6 MIL UV POLY
5/8" DRYWALL

SOFFIT & FASCIA
5" FASCIA GUTTER
SUB FASCIA VARIES
STUCCO FASCIA
VENTED SOFFIT

EXT. WALL
STUCCO
CULTURED STONE
7/16" WALL SHEATHING
2x6 STUDS 24" o/c
R-22 BATT INSULATION
6 MIL UV POLY
1/2" DRYWALL

INT. WALL
2x4 STUDS 16" o/c
1/2" DRYWALL BOTH SIDES

FLOOR SYSTEM
3/4" T&G SHEETING
ENGINEERED I JOIST

DECK CONSTRUCTION
8" CONC. PIERS
2X10 JOISTS @16" o/c
VINYL DECKING
POSTS & BEAMS AS REQ.

STAIR CONSTRUCTION
PRE MANUFACTURED
STAIR SYSTEM
2X6 @ 16"o/c LANDINGS

FOUNDATION
8" CONC. FOUNDATION
10MM REBAR
R12 STYROFOAM INSULATION
8"x16" CONC. FOOTING

CONC. SLAB
4" CONC. SLAB
6 MIL UV POLY
6" DRAINAGE ROCK

DRAINAGE TILE
4" DRAIN TILE
MINIMUM 6" DRAIN ROCK
DRY SHEETING PAPER

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3. IT IS THE RESPONSIBILITY OF THE CONTRACTOR FOR THE CORRECT SETING OF THE BUILDING TO CONFORM WITH NECESSARY SETBACKS.
4. ALTHOUGH EVERY EFFORT HAS BEEN MADE TO PROVIDE COMPLETE AND ACCURATE DRAWINGS WE CANNOT ELIMINATE THE POSSIBILITY OF HUMAN ERROR, THEREFORE MULLINS DRAFTING & DESIGN WILL NOT BE LIABLE FOR ANY ERRORS OR OMISSIONS.

"NOTE"
WINDOW SPEC'S TO BE CONFIRMED BY OWNER/ CONTRACTOR PRIOR TO ORDERING TO ENSURE PROPER VENTING AND EGRESS.

"NOTE"
PROVIDE PROPER SLOPE TO ALLOW DRAINAGE AWAY FROM RESIDENCE.

"NOTE"
CONTRACTOR TO CONFIRM DIM PRIOR TO CONST.

SHEET NUMBER 2/10

SCALE: 1/4" = 1'

DATE : SEPT-29-2022

MALONEY CONSTRUCTION

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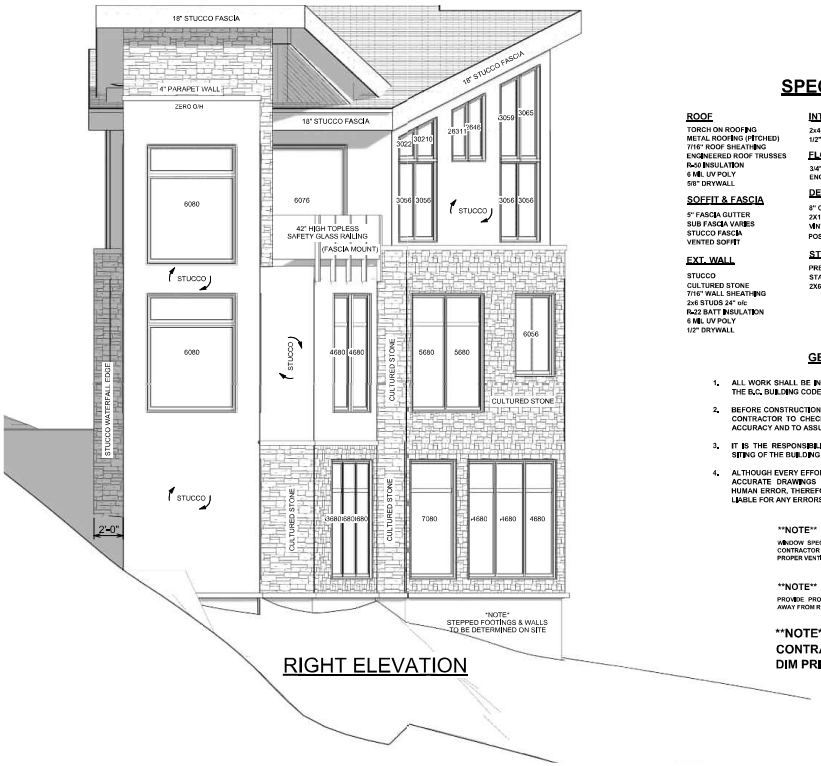

RIGHT ELEVATION

SPECIFICATIONS

ROOF
TORCH ON ROOFING
METAL ROOFING (PITCHED)
7/16" ROOF SHEATHING
ENGINEERED ROOF TRUSSES
R-50 INSULATION
6 MIL UV POLY
5/8" DRYWALL

SOFFIT & FASCIA
5" FASCIA GUTTER
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VENTED SOFFIT

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MINIMUM 6" DRAIN ROCK
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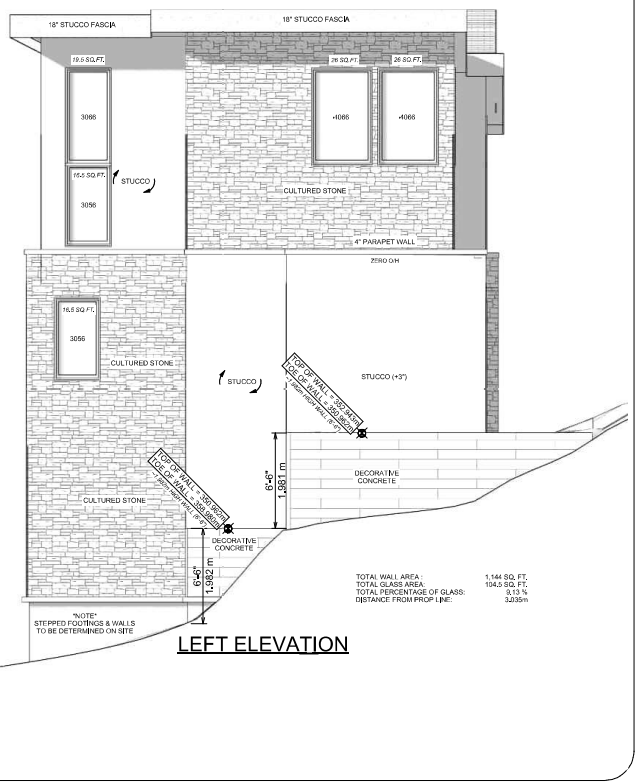
NOTE
PROVIDE PROPER SLOPE TO ALLOW DRAINAGE AWAY FROM RESIDENCE.

****NOTE****
CONTRACTOR TO CONFIRM DIM PRIOR TO CONST.



LEFT ELEVATION

TOTAL WALL AREA :	1,144 SQ. FT.
TOTAL GLASS AREA :	104.5 SQ. FT.
TOTAL PERCENTAGE OF GLASS:	9.13 %
DISTANCE FROM PROP LINE:	3.035m

SHEET NUMBER 3/10

SCALE: 1/4" = 1'

DATE : SEPT-29-2022

MALONEY CONSTRUCTION

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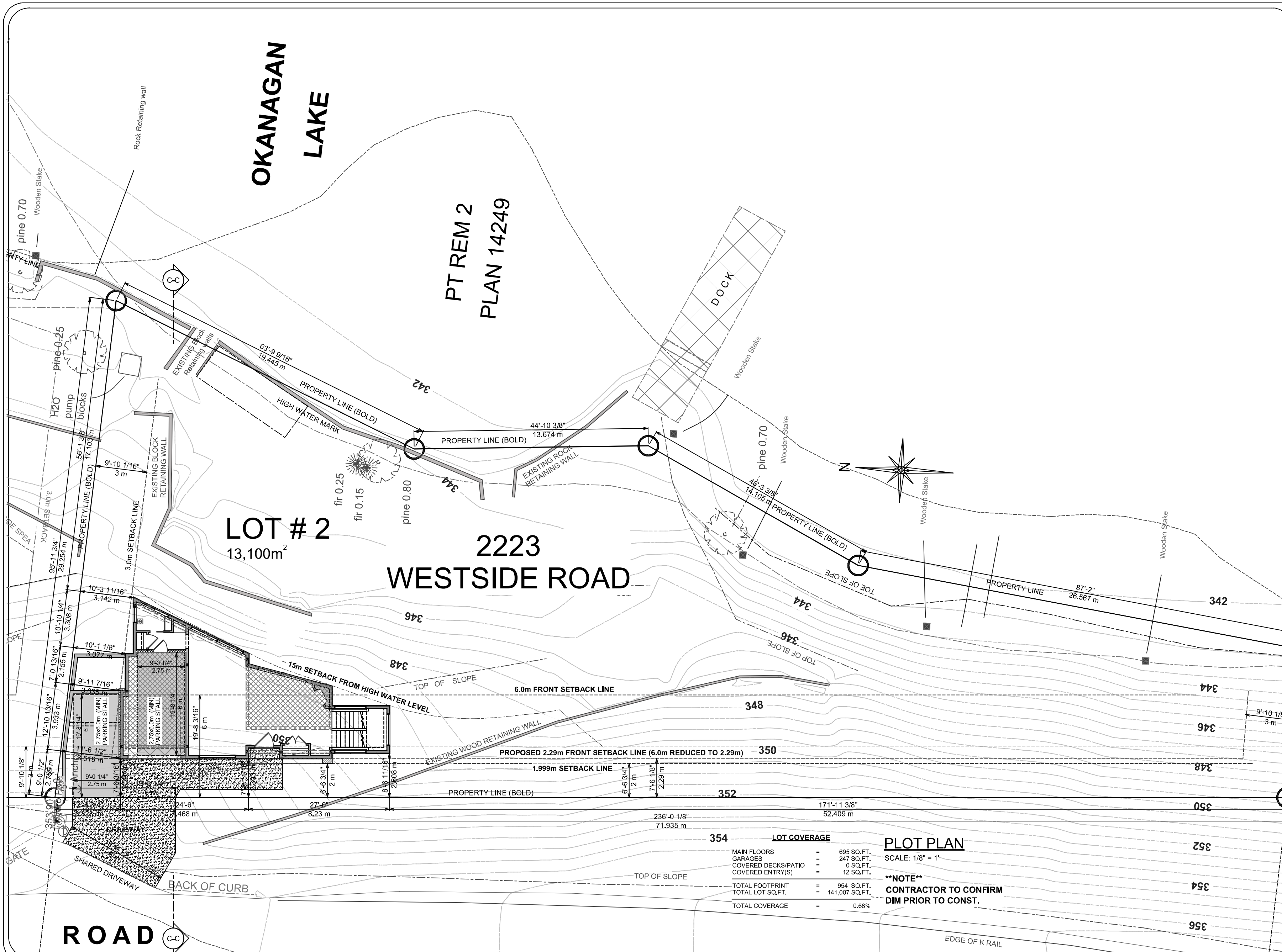

PLOT PLAN

SCALE: 1/8" = 1'

LOT COVERAGE

MAIN FLOORS	=	695 SQ.FT.
GARAGES	=	247 SQ.FT.
COVERED DECKS/PATIO	=	0 SQ.FT.
COVERED ENTRY(S)	=	12 SQ.FT.
TOTAL FOOTPRINT	=	954 SQ.FT.
TOTAL LOT SQ.FT.	=	141,007 SQ.FT.
TOTAL COVERAGE	=	0.68%

****NOTE****
CONTRACTOR TO CONFIRM DIM PRIOR TO CONST.

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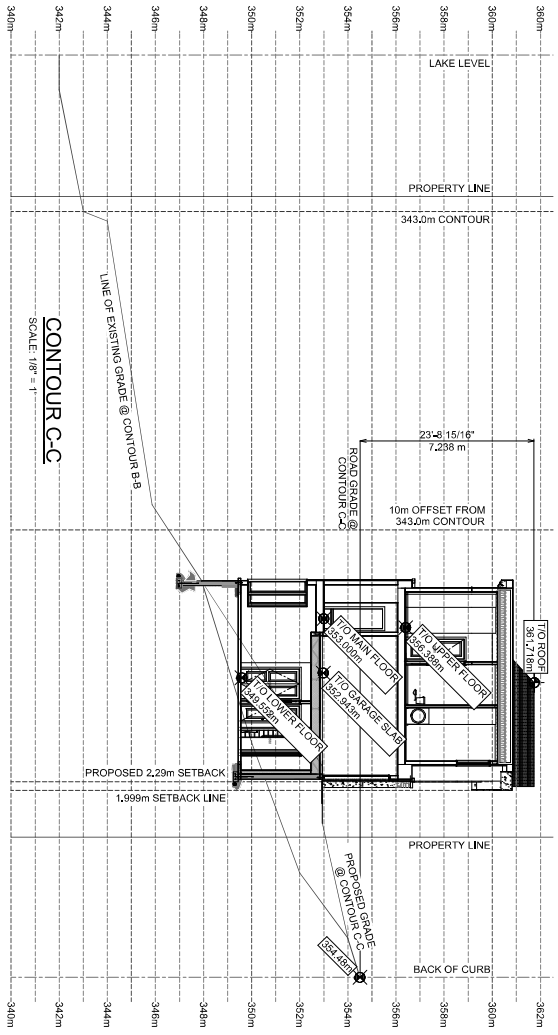
PROPOSED PROJECT FOR
2223 WESTSIDE RD

MALONEY CONSTRUCTION

SCALE: 1/4" = 1'
DATE : SEPT-29-2022

SHEET NUMBER
4/10



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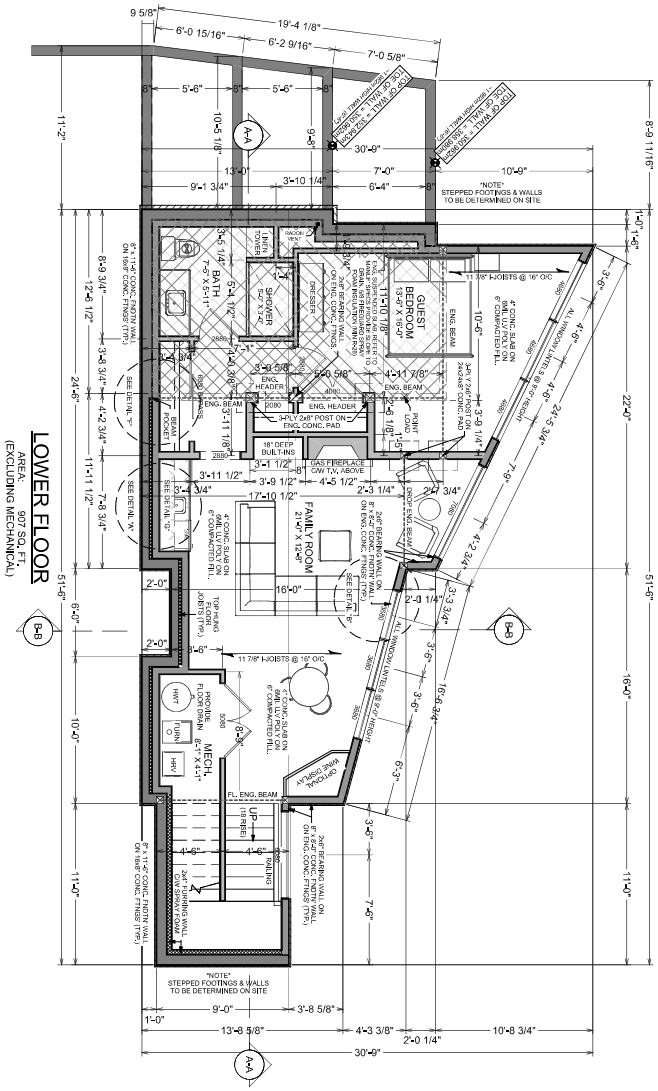
PROPOSED PROJECT FOR		SCALE: 1/4" = 1'	SHEET NUMBER
2223 WESTSIDE RD	**MALONEY CONSTRUCTION**	DATE : SEPT-29-2022	5/10



"NOTE"
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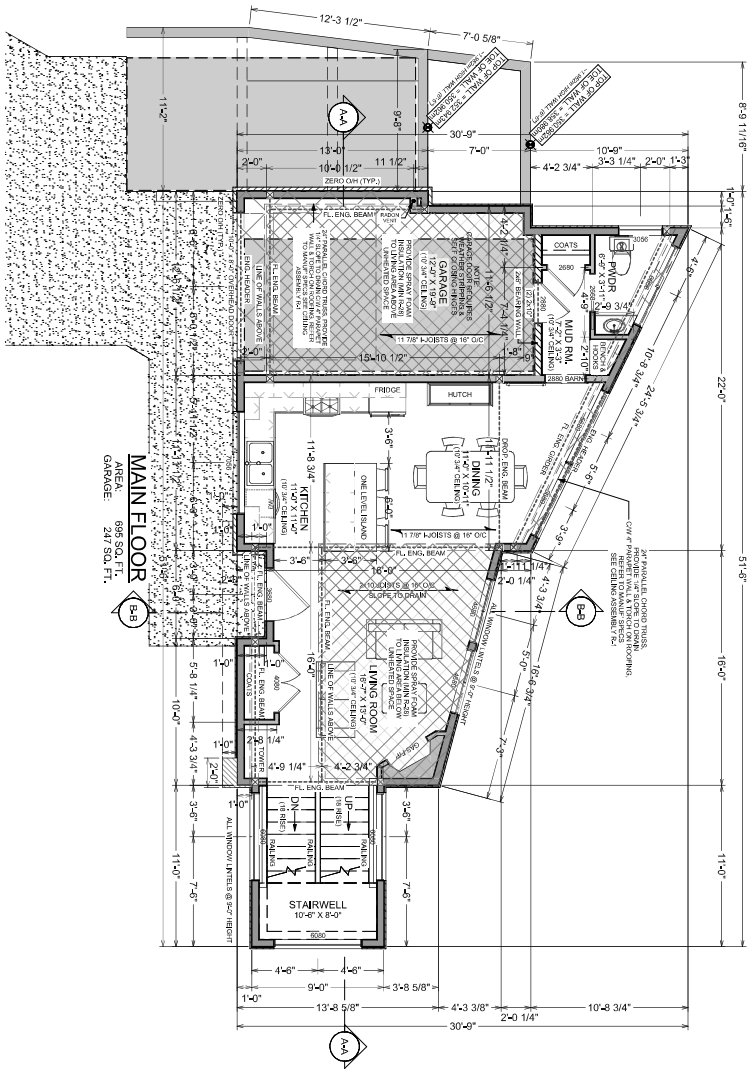
PROPOSED PROJECT FOR		SCALE: 1/4" = 1'	SHEET NUMBER
2223 WESTSIDE RD	**MALONEY CONSTRUCTION**	DATE : SEPT-29-2022	6/10



NOTE
CONTRACTOR TO CONFIRM
DIM PRIOR TO CONST.

MULLINS DESIGN GROUP
UNIT 203 - 1889 SPALL RD.
Kelowna BC V1Y 4R2
Bus: (250) 717-3415
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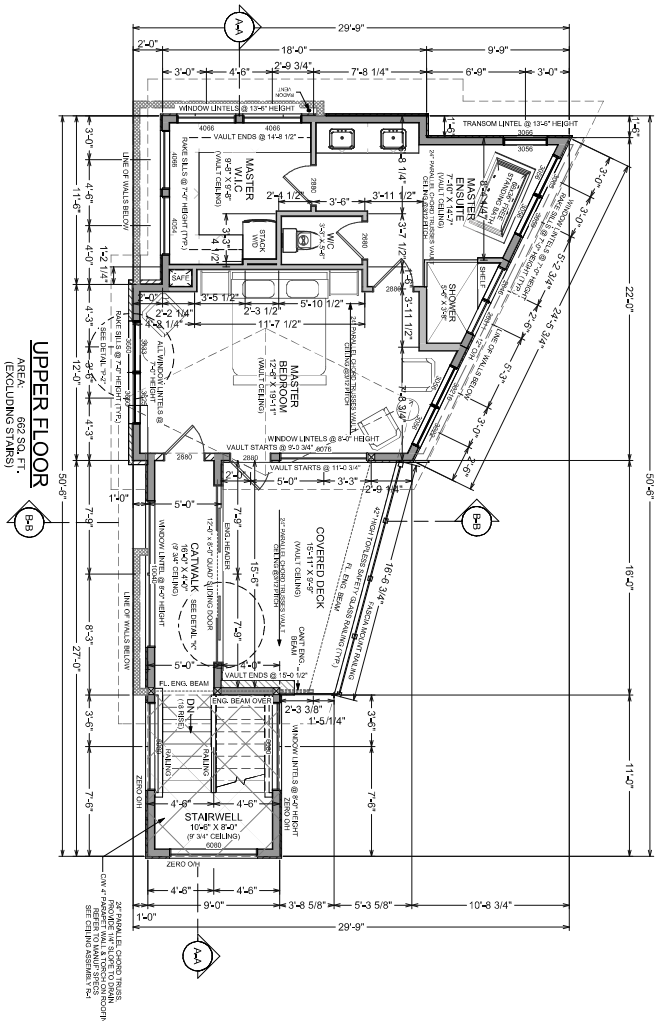
PROPOSED PROJECT FOR
2223 WESTSIDE RD

MALONEY CONSTRUCTION

SCALE: 1/4" = 1'

DATE : SEPT-29-2022

SHEET NUMBER
7/10



NOTE
CONTRACTOR TO CONFIRM
DIM PRIOR TO CONST.

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PROPOSED PROJECT FOR		SCALE: 1/4" = 1'	SHEET NUMBER
2223 WESTSIDE RD	**MALONEY CONSTRUCTION**	DATE : SEPT-29-2022	8/10

CODES AND STANDARDS

All workmanship is to be of a standard equal in all respects to good building practice.

At the time of preparation, this plan was drawn in accordance with the current edition of the B.C. Building Code. It is the responsibility of the owner/builder to insure that changes made to the code are complied with and all amendments are incorporated in the construction of this plan. All work shall conform to local building codes and bylaws which may take precedence.

Prior to proceeding with construction, the owner/builder must verify all information, dimensions and specifications of this plan. Written dimensions always take precedence over scale measurements.

Any variance from structural drawings and specifications or from conditions encountered at the job site, shall be resolved by the owner/builder and such solutions shall be their sole responsibility.

CONCRETE & FOOTINGS

All concrete to have a minimum compressive strength of 2,900 PSI (20 mPa) at 28 days.

Concrete footings must be placed on undisturbed or compacted soil to an elevation below frost penetration. Footings shown on these drawings have been designed for soil bearing capacity of 2,500 PSF. If a lesser bearing capacity is encountered, it is the responsibility of the owner/builder to have the footings redesigned by qualified persons to suit existing conditions.

All foundation walls 24" (600 mm) and higher should have one horizontal 10 mm reinforcing bar 3" (75 mm) from the top. Corner reinforcing to be lapped minimum 24" (600 mm).

All footings are to have two ½" reinforcing bars. The reinforcing bars are to be situated such that one bar is 3" (75 mm) clear of the side and bottom of the footing on both sides of the footing.

Grades shown on elevations are estimated. Adjust on site as required. Retaining walls other than the foundation walls of the residence are beyond the scope of these drawings unless otherwise noted.

ABOVE GRADE MASONRY

All above grade masonry is to conform to the BC Building Code.

If brick veneer is to be installed, counter flashing shall be installed up to 8" (200 mm) behind the building felt and below the bottom course with vertical joints raked clean. Weep holes 24" (600 mm) o/c.

CARPENTRY

Framing lumber shall be number two (2) or better Spruce unless otherwise specified on the plans. All beam and lintel sizes shown on the drawings to be reviewed & confirmed by truss manufacturer and contractor. Any beam or lintel sizes provided by truss/floor manufacturer take precedence.

Joists are to be doubled under parallel partitions.

Joists shall be placed to accommodate plumbing, in the event of a discrepancy please contact floor supplier before any alterations or cuts are made.

Wood in contact with concrete shall be damp proofed with 45 lb. felt or a sill plate gasket and pressure treated with a waterborne preservative or other approved method on exterior walls.

Interior framing to be 4" (100 mm) clear of back and sides of fireboxe and 2" (50 mm) clear of brick chimneys. Frame exterior walls 1" (25 mm) clear from exterior fireplaces.

Plates are to be anchored to concrete with ½" anchor bolts, maximum 6 ft. o/c, or other approved method.

Flush framed wood members shall be anchored with 200 lb. joist hangers unless otherwise specified.

INSULATION / VENTILATION

Minimum insulation requirements:

Roof/Ceiling – R 50
Walls – 2 x 6 – R 22
Garage Ceiling – R 22

Ceiling insulation may be loose fill type or batt type. Wall and floor insulation must be batt type.

Walls and ceilings between residence and attached garage shall be insulated.

Insulation requirements may vary with heating systems and with local conditions.

All roof spaces shall be ventilated with soffit, roof or gable vents or a combination of these, equally distributed between the top of the roof space and soffits.

MISCELLANEOUS

Caulk over and around all exterior openings using non-hardening caulking compound.

Flash all changes of materials on exterior walls.

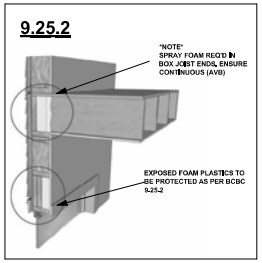
Flash over all exterior openings.

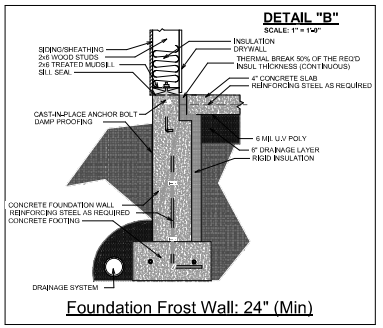
All siding or stucco to be a minimum of 8" (200 mm) above finished grade.

All balcony railings to be 3'6" (1070 mm) in height. Maximum spacing between vertical members is 4" (100 mm). Minimum distance between horizontal rails to be 32" (800 mm). Top rail to sustain outward load of 40 lbs. per lineal foot.

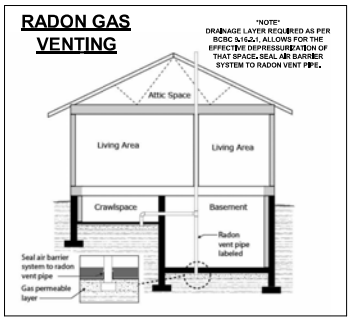
Coat and clothes closets shall have at least one rod and shelf with minimum depth of 24" unless otherwise stated. Linen closet shall have 5 adjustable shelves wherever possible. Broom closets shall have one shelf.

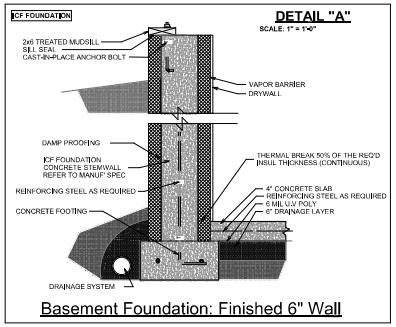
SECTION A-A



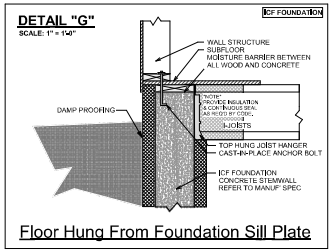


Foundation Frost Wall: 24" (Min)

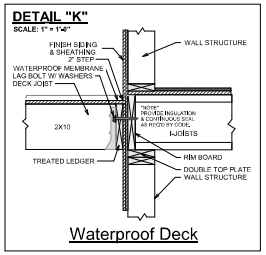




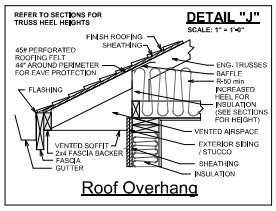
Basement Foundation: Finished 6" Wall



Floor Hung From Foundation Sill Plate



Waterproof Deck



Roof Overhang

SPECIFICATIONS

ROOF
TORCH ON ROOFING (FLAT)
LAMINATE SHINGLES (PITCHED)
7/16" ROOF SHEATHING
ENGINEERED ROOF TRUSSES
R-50 INSULATION
6 MIL U/V POLY
5/8" DRYWALL

SOFFIT & FASCIA
5" FASCIA GUTTER
SUB FASCIA VARIES
STUCCO FASCIA
VENTED SOFFIT

EXT. WALL
STUCCO
CULTURED STONE
7/16" WALL SHEATHING
2x6 STUDS 24" o/c
R-22 BATT INSULATION
6 MIL U/V POLY
1/2" DRYWALL

INT. WALL
2x4 STUDS 16" o/c
1/2" DRYWALL BOTH SIDES

FLOOR SYSTEM
3/4" T&G SHEETING
ENGINEERED I JOIST

DECK CONSTRUCTION
8" CONC. PIERS
2X10 JOISTS @16" o/c
VINYL DECKING
POSTS & BEAMS AS REQ.

STAIR CONSTRUCTION
PRE MANUFACTURED
STAIR SYSTEM
2X6 @ 16"o/c LANDINGS

FOUNDATION
8" CONC. FOUNDATION
10MM REBAR
R12 STYROFOAM INSULATION
8"x16" CONC. FOOTING

CONC. SLAB
4" CONC. SLAB
6 MIL UV POLY
6" DRAINAGE ROCK

DRAINAGE TILE
4" DRAIN TILE
MINIMUM 6" DRAIN ROCK
DRY SHEETING PAPER

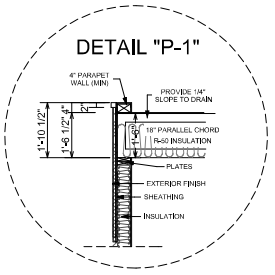
GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE CURRENT EDITION OF THE B.C. BUILDING CODE AND ALL LOCAL LAWS AND BYLAWS.
2. BEFORE CONSTRUCTION COMMENCES IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO CHECK ALL DETAILS AND DIMENSIONS TO CONFIRM ACCURACY AND TO ASSURE THERE ARE NO DISCREPANCIES.
3. IT IS THE RESPONSIBILITY OF THE CONTRACTOR FOR THE CORRECT SITING OF THE BUILDING TO CONFORM WITH NECESSARY SETBACKS.
4. ALTHOUGH EVERY EFFORT HAS BEEN MADE TO PROVIDE COMPLETE AND ACCURATE DRAWINGS WE CANNOT ELIMINATE THE POSSIBILITY OF HUMAN ERROR. THEREFORE MULLINS DRAFTING & DESIGN WILL NOT BE LIABLE FOR ANY ERRORS OR OMISSIONS.

****NOTE****
WINDOW SPEC'S TO BE CONFIRMED BY OWNER/ CONTRACTOR PRIOR TO ORDERING TO ENSURE PROPER VENTING AND EGRESS.

****NOTE****
PROVIDE PROPER SLOPE TO ALLOW DRAINAGE AWAY FROM RESIDENCE.

****NOTE****
CONTRACTOR TO CONFIRM DIM PRIOR TO CONST.



SHEET NUMBER 9/10

SCALE: 1/4" = 1'

DATE : SEPT-29-2022

PROPOSED PROJECT FOR
MALONEY CONSTRUCTION
2223 WESTSIDE RD

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MULLINS DESIGN GROUP

9.36.2.6
THERMAL CHARACTERISTICS OF ABOVE GROUND OPAQUE ASSEMBLIES

EFFECTIVE RSI-VALUES (WITH HRV)

ASSEMBLY	CLIMATE ZONE (HEATING DEGREE DAYS DEGREES CELSIUS) (4)	(5)	(6)	(7)A	(7)B
CEILINGS	6.91 (39.23)	6.91 (39.23)	8.67 (49.2)	8.67 (49.2)	10.43 (59.2)
CATHEDRAL CEILINGS	4.67 (26.5)	4.67 (26.5)	4.67 (26.5)	5.02 (28.5)	5.02 (28.5)
WALLS (2x6 @ 16")	2.78 (15.75)	2.97 (16.86)	2.97 (16.86)	2.97 (16.86)	3.08 (17.48)
FLOORS OVER UNHEATED SPACE	4.67 (26.5)	4.67 (26.5)	4.67(26.5)	5.02 (28.5)	5.02 (28.5)

NOTE
MINIMUM REQUIREMENTS.

SPECIFICATIONS

ROOF
TORCH ON ROOFING (FLAT)
LAMINATE SHINGLES (PITCHED)
7/16" ROOF SHEATHING
ENGINEERED ROOF TRUSSES
R-50 INSULATION
6 MIL UV POLY
5/8" DRYWALL

SOFFIT & FASCIA
5" FASCIA GUTTER
SUB FASCIA VARIES
STUCCO FASCIA
VENTED SOFFIT

EXT. WALL
STUCCO
CULTURED STONE
7/16" WALL SHEATHING
2x6 STUDS 24" o/c
R-22 BATT INSULATION
6 MIL UV POLY
1/2" DRYWALL

INT. WALL
2x4 STUDS 16" o/c
1/2" DRYWALL BOTH SIDES

FLOOR SYSTEM
3/4" T&G SHEETING
ENGINEERED I JOIST

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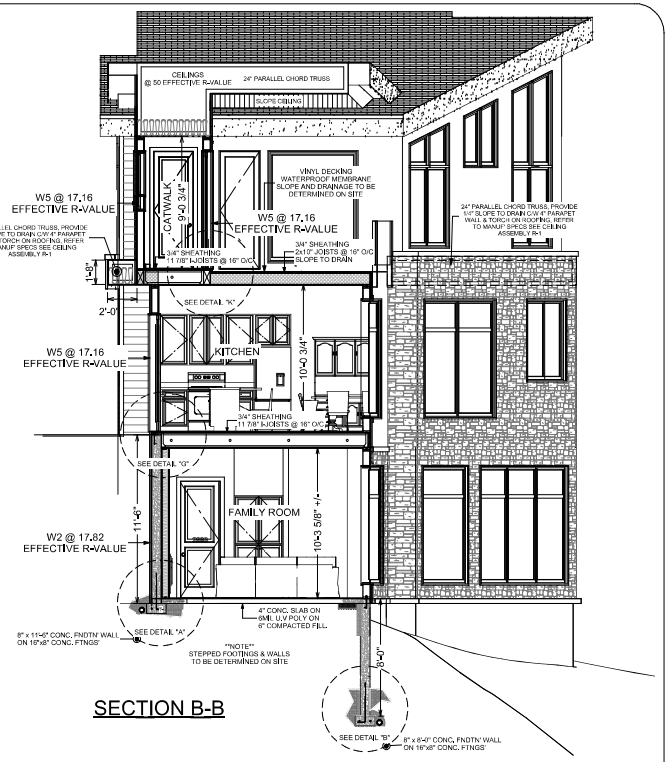
VINYL DECKING
POSTS & BEAMS AS REQ.

STAIR CONSTRUCTION
PRE MANUFACTURED
STAIR SYSTEM
2X6 @ 16"o/c LANDINGS

FOUNDATION
8" CONC. FOUNDATION
10MM REBAR
R12 STYROFOAM INSULATION
8"x16" CONC. FOOTING

CONC. SLAB
4" CONC. SLAB
6 MIL UV POLY
6" DRAINAGE ROCK

DRAINAGE TILE
4" DRAIN TILE
MINIMUM 6" DRAIN ROCK
DRY SHEETING PAPER



SECTION B-B

GENERAL NOTES

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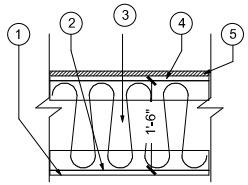
****NOTE****
PROVIDE PROPER SLOPE TO ALLOW DRAINAGE AWAY FROM RESIDENCE.

****NOTE****
CONTRACTOR TO CONFIRM DIM PRIOR TO CONST.

ROOF ASSEMBLY — R1

ENG. FLAT ROOF SYSTEM
(PARALLEL CHORD TRUSS)

COMPONENTS	RSI	R
1. INTERIOR AIR FILM	0.12	0.68
2. 1/2" (12.7mm) GYPSUM BOARD	0.08	0.45
3. ENG. TRUSS SYSTEM WITH R-50 BATT INSULATION	8.81	50.0
4. 7/16" (11.1 mm) OSB SHEATHING	0.11	0.62
5. ROOF FINISH	0.00	0.00

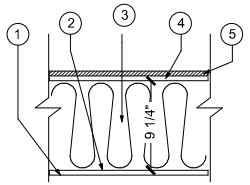


EFFECTIVE RSI / R VALUE OF ENTIRE ASSEMBLY 9.12 51.75

FLOOR ASSEMBLY — F3

2x10" JOIST R-28
(DECK OVER LIVING)

COMPONENTS	RSI	R
1. INTERIOR AIR FILM	0.12	0.68
2. 1/2" (12.7mm) GYPSUM BOARD	0.08	0.45
3. 2x10" FLOOR JOISTS WITH R28 SPRAY FOAM	4.93	26.0
4. 3/4" T&G SHEETING	0.16	0.91
5. FLOOR FINISH	0.00	0.00

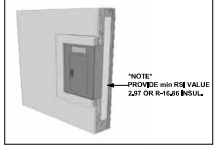


EFFECTIVE RSI / R VALUE OF ENTIRE ASSEMBLY 5.29 30.04

ROOF INSULATION

9.36

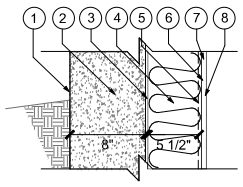
MECHANICAL, ELECTRICAL, AND PLUMBING COMPONENTS PLACED WITHIN AN EXTERIOR WALL MUST BE INSULATED BEHIND TO THE EFFECTIVE THERMAL RESISTANCE REQUIRED FOR THE ABOVE OR BELOW GRADE WALL ASSEMBLY.



WALL ASSEMBLY — W2

BELOW GRADE

COMPONENTS	RSI	R
1. DAMP PROOFING	0.03	0.17
2. 8" REINFORCED CONCRETE WALL	0.08	0.45
3. 1/2" AIR GAP	0.16	0.91
4. 2x6 FRAMING FILLED WITH R22 BATT @ 24" O/C	2.67	15.16
5. POLYETHYLENE	0.00	0.00
6. 1/2" (12.7mm) GYPSUM BOARD	0.08	0.45
7. FINISH: 1 COAT LATEX PRIMER AND LATEX PAINT	0.00	0.00
8. INTERIOR AIR FILM	0.12	0.68



ENERGY EFFICIENCY REQUIREMENTS AS PER BCBC 9.36

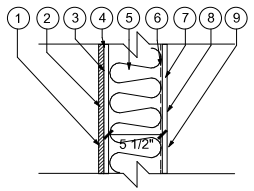
TO MEET THE MINIMUM (EFFECTIVE) RSI VALUE FOR THE WALL ASSEMBLY OF 2.98 OR R-VALUE OF 16.9 AN HRV MUST BE INCORPORATED INTO THIS DESIGN.

EFFECTIVE RSI / R VALUE OF ENTIRE ASSEMBLY 3.14 17.82

WALL ASSEMBLY — W3

2x6 EXTERIOR
(GARAGE TO HOUSE)

COMPONENTS	RSI	R
1. EXTERIOR AIR FILM	0.03	0.17
2. 1/2" (12.7mm) GYPSUM BOARD	0.08	0.45
3. ASPHALT IMPREGNATED PAPER	0.00	0.00
4. 7/16" (11.1 mm) OSB SHEATHING	0.11	0.62
5. 2x6 FRAMING FILLED WITH R22 BATT @ 24" O/C	2.67	15.16
6. POLYETHYLENE	0.00	0.00
7. 1/2" (12.7mm) GYPSUM BOARD	0.08	0.45
8. FINISH: 1 COAT LATEX PRIMER AND LATEX PAINT	0.00	0.00
9. INTERIOR AIR FILM	0.12	0.68



ENERGY EFFICIENCY REQUIREMENTS AS PER BCBC 9.36

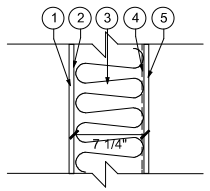
TO MEET THE MINIMUM (EFFECTIVE) RSI VALUE FOR THE WALL ASSEMBLY OF 2.97 OR R-VALUE OF 16.86 AN HRV MUST BE INCORPORATED INTO THIS DESIGN.

EFFECTIVE RSI / R VALUE OF ENTIRE ASSEMBLY 3.09 17.53

WALL ASSEMBLY - 2x8 — W4

2x8 WALL
(SUSPENDED SLAB)

COMPONENTS	RSI	R
1. INTERIOR AIR FILM	0.12	0.68
2. 1/2" (12.7mm) GYPSUM BOARD	0.08	0.45
3. 2x8 FRAMING FILLED WITH R28 BATT @ 16" O/C	3.73	21.18
4. 1/2" (12.7mm) GYPSUM BOARD	0.08	0.45
5. INTERIOR AIR FILM	0.12	0.68



ENERGY EFFICIENCY REQUIREMENTS AS PER BCBC 9.36

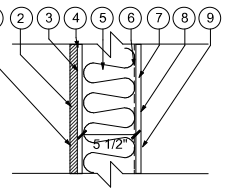
TO MEET THE MINIMUM (EFFECTIVE) RSI VALUE FOR THE WALL ASSEMBLY OF 2.97 OR R-VALUE OF 16.86 AN HRV MUST BE INCORPORATED INTO THIS DESIGN.

EFFECTIVE RSI / R VALUE OF ENTIRE ASSEMBLY 4.13 23.44

WALL ASSEMBLY — W5

STUCCO CLADDING

COMPONENTS	RSI	R
1. EXTERIOR AIR FILM	0.03	0.17
2. STUCCO CLADDING (15mm)	.0135	0.08
3. ASPHALT IMPREGNATED PAPER	0.00	0.00
4. 7/16" (11.1 mm) OSB SHEATHING	0.11	0.62
5. 2x6 FRAMING FILLED WITH R22 BATT @ 24" O/C	2.67	15.16
6. POLYETHYLENE	0.00	0.00
7. 1/2" (12.7mm) GYPSUM BOARD	0.08	0.45
8. FINISH: 1 COAT LATEX PRIMER AND LATEX PAINT	0.00	0.00
9. INTERIOR AIR FILM	0.12	0.68



ENERGY EFFICIENCY REQUIREMENTS AS PER BCBC 9.36

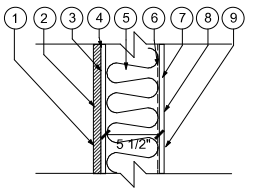
TO MEET THE MINIMUM (EFFECTIVE) RSI VALUE FOR THE WALL ASSEMBLY OF 2.97 OR R-VALUE OF 16.86 AN HRV MUST BE INCORPORATED INTO THIS DESIGN.

EFFECTIVE RSI / R VALUE OF ENTIRE ASSEMBLY 3.0235 17.16

WALL ASSEMBLY — W6

ALUMINUM SIDING

COMPONENTS	RSI	R
1. EXTERIOR AIR FILM	0.03	0.17
2. ALUMINUM SIDING	0.11	0.61
3. ASPHALT IMPREGNATED PAPER	0.00	0.00
4. 7/16" (11.1 mm) OSB SHEATHING	0.11	0.62
5. 2x6 FRAMING FILLED WITH R22 BATT @ 24" O/C	2.67	15.16
6. POLYETHYLENE	0.00	0.00
7. 1/2" (12.7mm) GYPSUM BOARD	0.08	0.45
8. FINISH: 1 COAT LATEX PRIMER AND LATEX PAINT	0.00	0.00
9. INTERIOR AIR FILM	0.12	0.68



ENERGY EFFICIENCY REQUIREMENTS AS PER BCBC 9.36

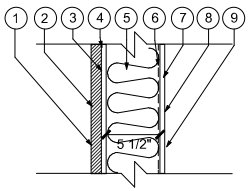
TO MEET THE MINIMUM (EFFECTIVE) RSI VALUE FOR THE WALL ASSEMBLY OF 2.97 OR R-VALUE OF 16.86 AN HRV MUST BE INCORPORATED INTO THIS DESIGN.

EFFECTIVE RSI / R VALUE OF ENTIRE ASSEMBLY 3.12 17.69

WALL ASSEMBLY — W8

CULTURED STONE VENEER

COMPONENTS	RSI	R
1. EXTERIOR AIR FILM	0.03	0.17
2. 3/8" MORTAR & 2" ROCK FACING	0.04	0.23
3. ASPHALT IMPREGNATED PAPER	0.00	0.00
4. 7/16" (11.1 mm) OSB SHEATHING	0.11	0.62
5. 2x6 FRAMING FILLED WITH R22 BATT @ 24" O/C	2.82	16.00
6. POLYETHYLENE	0.00	0.00
7. 1/2" (12.7mm) GYPSUM BOARD	0.08	0.45
8. FINISH: 1 COAT LATEX PRIMER AND LATEX PAINT	0.00	0.00
9. INTERIOR AIR FILM	0.12	0.68



ENERGY EFFICIENCY REQUIREMENTS AS PER BCBC 9.36

TO MEET THE MINIMUM (EFFECTIVE) RSI VALUE FOR THE WALL ASSEMBLY OF 2.97 OR R-VALUE OF 16.86 AN HRV MUST BE INCORPORATED INTO THIS DESIGN.

EFFECTIVE RSI / R VALUE OF ENTIRE ASSEMBLY 3.25 18.42

SHEET NUMBER 10/10

SCALE: 1/4" = 1'

DATE : SEPT-29-2022

PROPOSED PROJECT FOR
MALONEY CONSTRUCTION
2223 WESTSIDE RD

UNIT 203 - 1889 SPALL RD.
Kelowna BC V1Y 4R2
Bus: (250) 717-3415
Cell: (250) 258-7819
E-mail: mullinsdrafting@shaw.ca
MULLINS DESIGN GROUP

APPENDIX B:
GEOTECHNICAL REPORT FROM GEOPACIFIC CONSULTANTS

GEOPACIFIC CONSULTANTS

P (250) 762 8073
geopacific.ca
1340 St. Paul Street
Kelowna, B.C. V1S 1A7

Maloney Construction Ltd.
2223 Westside Road North
Kelowna, B.C.
V1Z 3T5

October 27, 2022
File: 20599
Rev. 1

Attention: Kathy Maloney-Johnson

Re: Geotechnical Report – Proposed Single Family Home
2223 Westside Road, RDCO, BC

1.0 INTRODUCTION

GeoPacific (previously Beacon Geotechnical Ltd.) understands that Maloney Construction Ltd. (Maloney) proposes to construct a single-family home on the property located at 2223 Westside Road, in the Regional District of Central Okanagan (RDCO). As part of the permitting process, GeoPacific has been retained by Maloney to carry out a geotechnical hazard assessment of the property. The purpose of the assessment was to identify geotechnical hazards that may exist on the site which would impact the proposed development and to provide recommendations for construction of the project. This report summarizes our observations and presents our geotechnical comments based on the development plans provided, Mullins Design Group Drawing Nos. 1/10 through 10/10, dated September 29th, 2022.

We understand that the proposed scope of development has changed and that the new proposed development will include a single family home set into the on site slopes, on the eastern portion of the property between Westside Road and Okanagan Lake. The proposed home is located west of the 15 m high water mark setback and about 2.3 m east of the property line bordering Westside Road.

The property is identified in Map 5b (South) of the Bylaw as being within the Hillside Development Permit Area as a portion of the property exceeds a gradient of 30%. As such, a geotechnical hazard report is to form part of the development permit application. The purpose of the report is to ensure sensitive development on affected areas and to minimize risk to the development and to any adjacent properties.

2.0 SITE DESCRIPTION

The property is legally described as Lot 2, Plan KAP14249. It is roughly rectangular in shape and encompasses approximately 1.3 hectares. It is bounded to the north, south and west by similar residential lots and to the east by Okanagan Lake.

Westside Road bisects the property in a north-south direction and approximately 85% of the property lies to the west of the road. The topography on the west side of Westside Road slopes up to the west at approximately 50% and continues to rise beyond the property line at a similar slope for a distance of approximately 1.5 kilometres. The total vertical grade difference on the western side of the lot is approximately 72 metres. A ravine traverses this side of the property in an east-west direction, through the middle of the lot. The ravine is approximately 15 to 20 metres across and up to 5 metres deep. No evidence of recent flow was noted in the ravine and it is likely that it was created as a drainage relic from the retreat of the last glacial event in the valley. However, it is likely that the area is a preferential drainage path for groundwater in the area.

The property on the west side of the road is vegetated with sparse, mature, coniferous trees and indigenous grasses and shrubs. Bedrock outcrops were noted at several locations on the slope at the time of our reconnaissance, particularly near the ravine area. Isolated, shallow soil exposures were noted on the slope and indicated that the site is underlain by a thin veneer of forest litter overlying granular soils.

The remaining 15% of the property, east of Westside Road the area of proposed improvements, encompasses approximately 0.12 hectares. The area is roughly triangular-in-shape and is bounded to the east by Okanagan Lake, the west by Westside Road and to the north by 2235 Westside Road. From Westside Road, the property grades down towards Okanagan Lake a vertical distance of 14 metres. The area is benched, with three retaining walls used to maintain the horizontal spaces between the benched areas. The upper wall is constructed of mortared masonry blocks and is approximately 2 metres in height. The lower wall is constructed of mortared cobble sized rock and is approximately 1.5 metres in height. A third wall is constructed of railway ties and appears to be in the process of failing by decay of the wood. A narrow driveway provides access to the benched sites from Westside Road. A small deck and out-building are located on the benched area.

The property in the area is sparsely vegetated with both coniferous and deciduous trees, lawn and shrubs. Steep bedrock outcrops were observed immediately below the road on the southern end of the triangular area. In other areas, soil exposures were noted to consist of silty sand and gravel. It appears that the granular soils have been disturbed as part of the construction of the retaining walls and benched areas. Beach deposits of sand and gravel were noted to the east of the cobble retaining wall.

3.0 PROJECT DESCRIPTION

We understand that it is proposed to construct a new, single-family residence on the lot. Based on the provided development drawings by Mullins Design Group, dated September 29th, 2022, The home will be a three-storey residence with the lower level anticipated to be constructed of reinforced concrete, partially set into the existing slope/new final grades. The proposed home is situated on the benched topography of the lot immediately east of Westside Road. The building location has been designed to accommodate a 15 m riparian setback, according to the provided development drawings. Preliminary designs indicate that the home will be founded on conventional, shallow strip and pad spread footings. No storm service is provided for the property based on the information obtained and provided to us previously.

It appears the proposed building footprint and a two tiered reinforced concrete cast-in-place wall to the immediate north of the residence is situated over the disturbed soils and that some site grading work, including rock removal may be required to achieve a suitable bearing surface for the foundations. Where required, un-suitable fills placed previously will be removed and replaced with compacted granular structural fill for house and proposed wall footings. It is likely that the existing masonry wall and the timber crib wall will need to be demolished as part of the site grading and foundation works for the new home. Additionally, up to about 2.5 m of backfilling adjacent Westside Road will be required to achieve final driveway grades. We envision that all walls within the area of the proposed new improvements would be removed during construction.

4.0 DESKTOP AND FIELD REVIEWS

A site reconnaissance of the property on March 11, 2020 and February 7th, 2022. Photographs were taken, and observations and measurements of the soil, bedrock, general topography and vegetation were recorded. Review of available aerial photographs of the general area were also reviewed as part of our original assessment. The purpose of the review was to identify geological hazards that may adversely affect development of the property or adjacent properties. GeoPacific has considered the proposed changes to the site required for the construction of the home as part of our review based on the probability of occurrence of less than 2% in 50 years or 1:2,475.

The following provides a description of the geotechnical hazards associated with the development and of the effect that the hazards may have on the development and recommendations to provide a safe buildable area for the proposed home.

From the shoulder of Westside Road to the west, the topography of the lot rises to the west to a plateau at a height of approximately 700 metres above Okanagan Lake at a relatively consistent grade of approximately 2(H):1(V). Based on existing exposures, the soil profile consists of sand and gravel. The material is likely outwash deposits from the retreat of the last glacial period, 12,000 years ago. Based on published correlations, we estimate the natural sand and gravel to have the following strength parameters:

Angle of Internal Friction:	36°
Unit Weight:	21 kN/m3
Cohesion:	0 kPa

The extent of the bedrock surface has not been investigated in this area of the site, however, bedrock outcrops were noted on the upper reaches of the property, near the ravine and bedrock is exposed on the east side of Westside Road, immediately south of the site near the southern end of the existing rail-tie wall. No evidence of recent slope instability was noted either during our reconnaissance or from on aerial photos of the lot. No evidence of rockfall, such as isolated boulders or talus slopes were noted and the bedrock exposures creating the source of a rockfall were limited in extent. Observed existing retaining structures are in a general state of decay with exception of the lowest cobble wall adjacent the beachfront. Observed rail-tie walls were observed to be leaning to the downslope and evidence of raveling from below portions of the walls was evident. The existing masonary wall was observed to contain deleterious debris and waste behind the wall, no known foundation was observed for the wall and supports a slope leading up to at grade pad footings on the slope for an existing structure proposed to be removed during the construction of the new home.

Based on the results of our desktop and field review, subsequent analysis and our understanding of the project, we are of the opinion that the proposed house location is acceptable with respect to hazards from landslip, rock fall or debris torrents on the east side of Westside Road. However, the uncontrolled fill within the proposed building footprint has the potential to cause excessive total and differential settlement and will require removal.

5.0 SLOPE STABILTY ANALYSIS

We have analyzed both the upslope (western site) and down slope areas of the property in regards to Westside Road. Slope stability was was assessed in accordance with the requirements of the “Guidelines for Landslide Assessment for Proposed Residential Developments in BC” (Revised May 2010) and taking into account the 2018 British Columbia Building Code (BCBC) design earthquake. A total of 2 cross sections were analyzed, on for the western slopes west of Westside Road and on the eastern slopes about the proposed development.

It is difficult to equate probabilistic analysis of the mass to a factor of safety, however a published report by the Pipeline Research Council, (C-Core, D.G. Honegger Consulting, SSD Inc., 2009) states that a factor of safety of 1.3 has a probabilistic equivalent of landslide occurrence of less than 1 in 1,000 years, and a factor of safety of 1.4 has a probabilistic equivalent of landslide occurrence of less than 1 in 10,000 years. An annual probability of occurrence of 1 in 2,475 years (2% in 50 years required) would therefore be between a factor of safety of 1.3 and 1.4. For the purposes of our analysis, a factor of safety of 1.4 has been adopted as a minimum factor of safety for our analysis.

Existing grades and proposed cuts about the development were obtained via provided topographic plan by Runnalls Denby, Drawing No. 15567 SITE, dated October 8th, 2019 and development plans by Mullins Design Group, dated September 29th, 2022. The global stability of the cross-sections were analyzed utilizing the software programs ReSSA 3.0 and Slope/W (2018), which employ the Morgenstern-Price limit equilibrium method. The on site slopes where modeled utilizing an average contact stress under the proposed house of 15 kPa.

The results of our stability analyses indicate that the static and seismic factors of safety for the western natural slopes are greater than 1.5 and 1.4, respectively. Our analysis additionally shows that the eastern grades and proposed development has a factor of safety against deep seated failure of 1.8 and 1.6, respectively indicating that the on site probability of deep seated failure is low. Therefore, the factor of safety for both static and seismic conditions are sufficient in accordance with the "Guidelines for Landslide Assessment for Proposed Residential Developments in BC" (Revised May 2010).

GeoPacific has completed cursory visual review of the adjacent properties and confirm the proposed development will have no slope stability related impacts on the adjoining properties based on the current topography beyond the property. GeoPacific accepts no responsibility for slope stability related impacts on the development property as a result of activities conducted on adjoining lands by other parties.

Should proposed grading differ from those documents outlined above as part of our analysis, copies of proposed new grading must be provided to GeoPacific to review and update our analysis to confirm suitability well in advance of construction.

6.0 RECOMMENDATIONS

As outlined in Section 1.0 we understand that development will consist of a single-family residential home located on the eastern property, associated driveway, tiered reinforced concrete cast-in-place retaining and servicing. The cast-in-place walls must be designed by a professional engineer prior to construction. Superstructures are expected to primarily consist of wood-frame construction overlying reinforced concrete foundations and basement. No structural information was provided at the time of this report, however, structural loading for the building is expected to be light. We understand that the existing retaining structures within the proposed new structure would be removed as part of the re-development, excluding the grouted cobble wall about the lake. We understand that all existing retaining walls outside of the proposed new improvement will remain in place. It is recommended that the wooden railway tie wall extending south of the proposed improvement be remediated in the future under the supervision of a geotechnical engineer.

Based upon our review the improvements can be supported by conventional pad and strip footings placed on the natural compact sand and gravels or bedrock.

The existing onsite soils are not considered liquefiable or other forms of ground softening when subject to the British Columbia Building Code 2018 design earthquake.

Following our review, we are of the opinion that the proposed residential development is feasible from a geotechnical perspective provided that our recommendations outlined herein are incorporated into the overall design.

6.1 Site Preparation and Engineered Fills

Prior to construction of foundations or floor slabs any organic material, fills, debris, and loose or otherwise disturbed soils must be removed from the construction areas to expose a subgrade compact to dense sand and gravel or bedrock. It is anticipated that stripping depths will be governed by minimum footing burial depth for frost protection except where uncontrolled fills exist and require removal and grade reinstatement prior to footing construction. The subgrade for new structures must be reviewed by GeoPacific prior to footing construction to ensure all fills and deleterious materials have been removed from the excavation.

Any grade reinstatement beneath floor slabs or footings must be completed using engineered fill. In the context of this report "engineered fill" is defined as clean sand and gravel fill, compacted in 300 mm loose lifts to a minimum standard of 95% of its Modified Proctor Maximum Dry Density (ASTM D1557) while at a moisture content that is within 2% of its optimum for compaction.

The geotechnical engineer shall be contacted for the review of stripping and engineered fill placement and compaction.

6.2 Foundations

Foundations constructed on the native compact to dense sand and gravel or compacted engineered fill as described above may be designed for a Serviceability Limit State (SLS) bearing pressure of 120 kPa and factored Ultimate Limit State (ULS) bearing pressure of 180 kPa.

Dependent on encountered bedrock within the proposed development area, and provided all footings are constructed on competent and sound bedrock, reviewed by GeoPacific, the footings may be designed for an SLS and factored ULS bearing pressure of 300 kPa and 450 kPa, respectively. This would require in field review and confirmation by GeoPacific.

Irrespective of bearing pressures strip and pad footings should not be less than 450 mm in width and 600 mm by 600 mm, respectively. The exterior foundations should be buried at least 900 mm below finish grades for frost protection. Frost protection is not required for footings bearing directly on sound bedrock.

All foundation subgrades must be reviewed by the geotechnical engineer prior to any placement of engineered fills or footing construction.

6.3 Foundation Settlements

Provided the structural loading is light to moderate, post construction settlement should be less than 25 mm and differential settlements should be less than 1:500 at the recommended bearing pressures. Final structural loading scheme should be reviewed by GeoPacific to confirm the noted settlement extents.

6.4 Slab-On-Grade Floors

In order to provide suitable support for slab-on-grade floors we recommend that any fill placed under the slab should be compacted to the minimum requirements outlined in section 6.1. All grade supported concrete slabs should be underlain directly by a polyethylene moisture barrier and a minimum of 150 mm of 19 mm clear crushed gravel to prevent moisture from accumulating below the slab.

Compaction of the slab-on-grade fill must be reviewed by the geotechnical engineer.

6.5 Foundation Drainage Systems

Provided that the finished surface grades are sloped away from the buildings at a minimum of 2% and the ground floor elevation is a minimum of 200 mm above finish exterior grades, a perimeter drainage system would not be required from a geotechnical standpoint. Any below grade construction such as basements, crawlspaces, etc. should include a perimeter drain.

6.6 Seismic Design of Foundations

The native soils are not considered prone to ground liquefaction or other forms of ground softening caused by earthquake induced ground motions based on the 2018 BCBC design earthquake. Based on our review of the property, the site is classified as "Site Class D" according to the 2018 BCBC Table 4.1.8.4.A. Should bedrock be encountered within 3 m of the footing grades, the site may be taken to be "Site Class C". Peak ground accelerations on firm ground for the approximate site location is 0.07g (National Resource Canada, Site Coordinates: 49.996°N, 119.495°W).

6.7 Temporary Excavations

Based on the current understanding of the project scope, it is anticipated that below grade excavation up to about 3 m below existing grades may be required. Provided the site layout allows it these cuts can be achieved by cut slopes made into the existing site soils.

Temporary cut slopes made into the natural soils should not exceed 1H:1V and at no greater than 3H:4V for bedrock unless otherwise reviewed and approved by GeoPacific. All temporary cut slopes should be covered in poly sheeting to prevent erosion and disturbance from wind and precipitation. For service trenching, alternative excavation methods such as shored excavation in accordance with Work Safe BC guidelines may be used or a detailed shoring design using lock blocks or anchor tie backs can be provided on a separate cover.

It is expected that any water that accumulates in the excavations can be removed by conventional sump and pump.

Any excavations exceeding 1.2 m in depth must be reviewed by a geotechnical engineer prior to worker entry.

6.8 Lateral Pressure on Foundation Walls

Earth pressures on buried walls depends upon a number of factors including the backfill material, surcharge loads, backfill slope, drainage, rigidity of the basement or retaining wall, and method of construction including sequence and degree of compaction.

For a yielding basement wall designed for static pressure a pressure distribution should be employed of 5.5H (kPa) triangular, where 'H' is the buried depth of the wall, in metres, below grade.

Dynamic loading induced by the 2018 BCBC design earthquake should be added to the static loads and should be taken as 0.5H (kPa) inverted triangular, where 'H' is the buried depth of the wall, in metres, below grade.

We have assumed that a free draining granular backfill will be used behind the walls and that a perimeter drainage system will also be employed to collect any water and prevent the buildup of hydrostatic forces. Therefore, our wall loading scenarios presented above assume that no water pressure will be generated behind the walls.

For tiered, cast-in-place exterior walls for grading purposes (not foundation walls) global stability must be accounted for by the wall designer.

6.9 New Onsite Roads and Parking

Following the recommended site preparation outlined in Section 6.1, it is our opinion that the minimum asphalt pavement structure should be based on a subgrade CBR value of between 5 and 10. Therefore, the recommended minimum pavement structure should be as outline in Table 1 below. Dependent on the provided fills utilized for grade reinstatement between basement walls and temporary cuts, we envision that the subbase structure may be considered to be a part of the placed fills and no additional subbase structure is required. This must be confirmed by GeoPacific during construction.

The driveway area subgrades should be proof rolled prior to placement of pavement structure to detect any soft spots in the native subgrade below. The proof roll should consist of a fully loaded single axel water or gravel truck advancing across the entire pavement area while under supervision of GeoPacific. Any detected soft spots should be over excavated and replaced with engineered fill or with the specified sub-base course material.

Table 1. Recommended Minimum Pavement Structure for On-Site Parking and Roads

Material	Thickness (mm)	CBR
Asphaltic Concrete	75	N/A
Crushed gravel base course - 19 mm minus	100	80
Clean sand and gravel sub-base course well graded - 75 mm minus	200	20

The asphalt thickness can be reduced to 65 mm where the road structure will be supporting light vehicle traffic only.

All base and sub-base fills should be compacted to a minimum of 95% Modified Proctor dry density with moisture content within 2% of optimum for compaction. The base and sub-base materials should meet municipal requirements for gradation and density. Density testing should be conducted on the base and sub-base materials to confirm that they have been compacted to the required standard. The density testing results should be forwarded to the geotechnical engineer for review or performed by GeoPacific.

Pavement structure fill materials and compaction must be reviewed by the geotechnical engineer.

7.0 FIELD REVIEWS

As required by the 2018 BC Building Code "Letters of Assurance", GeoPacific Consultants Ltd. will carry out sufficient field reviews during construction to ensure that the geotechnical design recommendations contained within this report have been adequately communicated to the design team and to the contractors implementing the design. These field reviews are not carried out for the benefit of the contractors and therefore do not in any way effect the contractor's obligations to perform under the terms of his/her contract.

It is the contractors' responsibility to advise GeoPacific Consultants Ltd. (a minimum of 48 hours in advance) that a field review is required. Field reviews are normally required at the time of the following activities:

1.	Stripping	-Review of stripping depth and subgrade, confirmation of fill removal
2.	Subgrade	-Review of subgrade soils prior to footing construction
3.	Excavation	-Review of excavations greater than 1.2 m requiring worker entry
4.	Slab-on-Grade	-Review of slab-on-grade subgrade and fill materials
5.	Engineered Fill	-Review of compaction of engineered fills

It is critical that these reviews are carried out to ensure that our intentions have been adequately communicated. It is also critical that contractors working on the site view this report in advance of any work being carried out so that they become familiarized with the sensitive aspects of the works proposed. It is the responsibility of the developer and/or contractor to notify GeoPacific when conditions that differ from those described in this report are encountered.

8.0 CLOSURE

This report has been prepared exclusively for Maloney Construction Ltd. for the purpose of providing preliminary geotechnical recommendations for the design and construction of the proposed development. We expect that this report will be updated once a finalized development plan is available and building ground loadings are known. The report remains the property of GeoPacific Consultants Ltd. and unauthorized use of, or duplication of, this report is prohibited.

We are pleased to be of assistance to you on this project and we trust that our recommendations are both helpful and sufficient for your current purposes. If you would like further details or require clarification of the above, please do not hesitate to contact the undersigned.

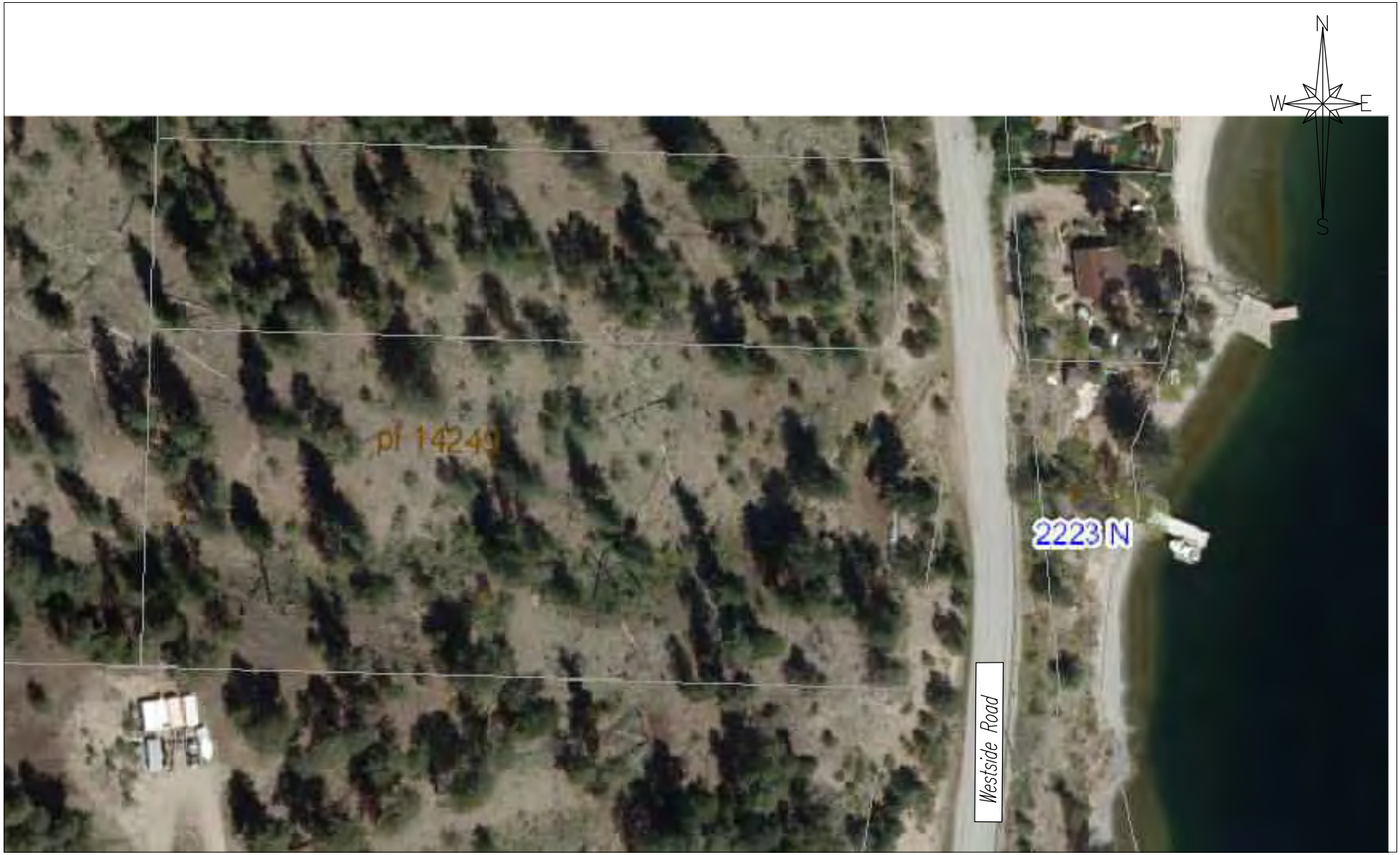
Sincerely,

GeoPacific Consultants Ltd.

Reviewed by:

Mitchell Lange, B.A.Sc., EIT
Geotechnical Engineer-in-Training

Kevin Bodnar, M.Eng., P.Eng., P.E.
Principal



LEGEND:

SITE PLAN

REFERENCE:
RDCO GIS IMAGERY – 2021

GEOPACIFIC CONSULTANTS
1779 West 75th Ave.
Vancouver, B.C. V6P 6P2
P 604.439.0922
F 604.439.9189

DATE:	1-FEBRUARY-2022	
DRAWN BY: ML	APPROVED BY: KB	REVIEWED BY: ML
SCALE:	NTS	

PROPOSED RESIDENTIAL DEVELOPMENT
2223 WESTSIDE ROAD, RDCO, B.C.
PROPOSED RESIDENTIAL DEVELOPMENT

FILE NO.: 20599
DWG. NO.: 20599-01

REVISIONS:
A.
B.
C.

ORIGINAL PAPER SIZE 8.5"x11"

APPENDIX C:
SITE SURVEY & FOUNDATION PLAN

STRUCTURAL NOTES

GENERAL:

ALL CONSTRUCTION AND DESIGN TO CONFORM TO THE STRUCTURAL REQUIREMENTS OF PART 9 OF THE B.C.B.C. 2018.

CONTRACTOR PERFORMING ANY OF THE WORK MUST BE REGISTERED WITH THE HOME OWNERS PROTECTION OFFICE. WORK TO COMPLY WITH THE HOMEOWNER PROTECTION ACT 1998.

ENGINEER TO BE NOTIFIED FOR INSPECTION PRIOR TO CONSTRUCTION.

THESE DRAWINGS TO BE READ IN CONJUNCTION WITH ARCHITECTURAL AND ALL OTHER APPLICABLE DRAWINGS. ELEVATIONS, SLOPES AND DIMENSIONS SHOWN ON STRUCTURAL DRAWINGS MUST BE CROSS-REFERENCED WITH ARCHITECTURAL DRAWINGS.

DRAWINGS ARE ONLY TO BE USED FOR PURPOSES INDICATED; USE ONLY "FOR CONSTRUCTION" DRAWINGS FOR ACTUAL CONSTRUCTION.

THE CONTRACTOR IS TO VERIFY ALL DIMENSIONS AND DETAILS IN FIELD AND NOTIFY THE ARCHITECT AND ENGINEER OF ANY DISCREPANCIES AND INCOMPATIBILITIES.

THE CONTRACTOR IS RESPONSIBLE FOR DESIGN OF ALL TEMPORARY SUPPORTS, FORMWORK AND ALL SAFETY ASPECTS OF THE CONSTRUCTION.

DO NOT CUT OR DRILL INTO ANY STRUCTURAL MEMBERS OR CUT REBAR PROJECTIONS WITHOUT THE ENGINEER'S APPROVAL.

THE CONTRACTOR IS RESPONSIBLE FOR LABOUR, MATERIALS AND EQUIPMENT FOR THE EXECUTION AND QUALITY CONTROL OF THE WORK SHOWN IN THE CONTRACT DOCUMENTS, INCLUDING ALL WORK OF SUB-CONTRACTORS. FIELD REVIEWS SHALL NOT RELIEVE THE CONTRACTOR FROM THE RESPONSIBILITY FOR THE PROPER PERFORMANCE OF HIS WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. ANY ERRORS OR OMISSIONS IN THE WORK SHALL BE REPORTED TO THE ENGINEER FOR REVIEW.

ADDITIONAL CHARGES FOR REQUIRED STRUCTURAL WORK NOT SHOWN ON STRUCTURAL DRAWINGS OR OTHER CONTRACT DOCUMENTS MUST BE BROUGHT TO THE ENGINEER'S ATTENTION PRIOR TO PERFORMING THE WORK. CLAIMS FOR EXTRAS WILL BE DISALLOWED UNLESS APPROVAL IS OBTAINED PRIOR TO PROCEEDING WITH THE WORK.

CONTRACTOR SHALL MARKUP A SET OF STRUCTURAL DRAWINGS WITH AS-BUILT DIMENSIONS AND DETAILS MODIFIED DURING THE COURSE OF CONSTRUCTION AND PROVIDE COPIES TO ARCHITECT AND ENGINEER IF REQUESTED.

CONTRACTOR SHALL PROVIDE A COMPLETE BREAKDOWN OF STRUCTURAL COSTS INCLUDING UNIT PRICES FOR EXTRAS AND CREDITS UPON REQUEST.

SPECIFIED DESIGN LOADS:

DESIGN SERVICE LOADS:

SNOW LOAD	Ss = 1.7 kPa Sr = 0.1 kPa
ROOF DEAD LOAD FLOOR LIVE LOAD (RESIDENTIAL) FLOOR DEAD LOAD	0.94 kPa (INCLUDES 0.24 kPa FOR FUTURE SOLAR COLLECTOR) 1.9 kPa 1.63 kPa (INCLUDES ½" CONCRETE TOPPING)
WIND LOAD (Q 1/50)	0.40 kPa
SEISMIC PARAMETERS	Rd=3.0, Ro=1.7 Sa(0.2)=0.143, Sa(0.5)=0.122, Sa(1.0)=0.091, Sa(2.0)=0.063 PGA=0.066

CONSTRUCTION LOADS SHALL NOT EXCEED THE SPECIFIED DESIGN LIVE LOADS.

OTHER LOADING AS REQUIRED FOR TEMPORARY CONDITIONS OF CONSTRUCTION MUST BE DESIGNED UNDER THE SUPERVISION OF A PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF BRITISH COLUMBIA.

SITE INSPECTIONS & REVIEW OF CONSTRUCTION:

IT IS CONTRACTOR'S RESPONSIBILITY TO GIVE ENGINEER MINIMUM OF 48 HOURS NOTICE FOR SITE INSPECTIONS. CONTRACTORS SHOULD BE AWARE THAT FAILURE TO OBTAIN ALL SITE INSPECTIONS REQUIRED WILL RESULT IN SUSPENSION OF BUILDING PERMIT BY BUILDING INSPECTOR.

STRUCTURAL WORK BEING INSPECTED MUST BE 100 % COMPLETE AT THE TIME OF INSPECTION. COST OF ADDITIONAL INSPECTION REQUIRED BY WORK BEING INCOMPLETE SHALL BE BORNE BY THE CONTRACTOR.

INSPECTIONS ARE REQUIRED PRIOR TO:
- POURING CONCRETE
- COVERING STRUCTURAL FRAMING

REQUIRED SHOP DRAWING SUBMITTALS:

SUBMIT 5 COPIES OF ALL SHOP DRAWINGS TO THE ARCHITECT FOR REVIEW SHOP DRAWINGS ARE REQUIRED FOR THE FOLLOWING ITEMS:

1. PRE-FABRICATED WOOD TRUSSES
2. ENGINEERED WOOD PRODUCTS (WOOD I-JOIST)
3. STRUCTURAL STEEL
4. HANDRAILS/ GUARDRAILS

ADDITIONAL SECONDARY STRUCTURAL COMPONENTS MAY REQUIRE SHOP DRAWING SUBMITTALS IN ADDITION TO THE ABOVE. REFER TO ARCHITECTURAL SPECIFICATIONS AND "SECONDARY STRUCTURAL COMPONENTS" SECTION OF STRUCTURAL NOTES.

SHOP DRAWINGS MUST BE COMPLETE AND BEAR SEAL OF SPECIALITY ENGINEER REGISTERED IN BRITISH COLUMBIA IN ORDER TO BE REVIEWED.

SHOP DRAWINGS SUBMITTED ARE REVIEWED ONLY FOR GENERAL CONFORMITY WITH THE STRUCTURAL DESIGN, CORRECTNESS OF DETAIL, DESIGN, AND DIMENSIONS, ETC. ARE THE RESPONSIBILITY OF THE PARTY SUBMITTING THE DRAWINGS.

FOUNDATIONS AND SOIL WORK:

FOUNDATION DESIGN BEARING PRESSURE CAPACITY AS FOLLOWS:
- SPREAD FOOTING 100 kPa
- STRIP FOOTING 100 kPa

TO BE CONFIRMED AFTER EXCAVATION IS COMPLETE.

FOR MORE INFORMATION CONTACT PETER HANENBURG, P.ENG, FROM INTERIOR SERVICES LTD. @ 250-860-6540

THE CONTRACTOR TO NOTIFY THE SOILS ENGINEER FOR SITE INSPECTIONS AS REQUIRED. AFTER COMPLETION OF WORK THE SOILS ENGINEER WILL CERTIFY THE SOIL CONDITIONS AND PREPARATION FOR ITS CAPACITY TO SUPPORT THE FOUNDATIONS.

ALL SURFACE TOP SOIL UNDER FOOTINGS AND SLAB ON GRADE TO BE REMOVED AND FOOTINGS TO BEAR ON FIRM UNDISTURBED SOIL.

WHERE REQUIRED, STRIP FOOTINGS TO BE STEPPED-UP WITH VERTICAL STEP AS SHOWN ON DETAILS. MAINTAIN MAXIMUM SLOPE OF 2.0 HORIZONTAL TO 1.0 VERTICAL BETWEEN UNDERSIDE OF ADJACENT FOOTINGS OR AS INDICATED BY THE SOILS ENGINEER.

NO CONCRETE TO BE PLACED UNTIL BEARING STRATA, FORMS AND REINFORCEMENT INSPECTED BY ENGINEER.

PROTECT EXISTING FOUNDATIONS FROM LOSS OF SUPPORT DURING CONSTRUCTION OF NEW FOOTINGS. UNDERPINNING AND PROTECTION OF ADJACENT PROPERTY ARE THE RESPONSIBILITY OF THE CONTRACTOR AND IS TO BE CARRIED OUT UNDER THE SUPERVISION OF A GEOTECHNICAL ENGINEER.

IF SOIL CONDITIONS ON SITE OR SPECIAL JOB CONDITIONS REQUIRE LOWERING OF FOOTINGS, ADVISE SOILS CONSULTANT BEFORE PROCEEDING.

SOILS SUPPORTING FOOTINGS AND SLABS SHALL BE PROTECTED FROM FREEZING BEFORE AND AFTER CONCRETE IS POURED.

CONCRETE:

ALL CONCRETE MATERIALS AND METHODS OF CONSTRUCTION SHALL BE IN ACCORDANCE WITH CSA A23.1-09, "CONCRETE MATERIALS AND METHODS OF CONCRETE CONSTRUCTION" AND DESIGN TO CONFORM TO CSA A23.3-04, "DESIGN OF CONCRETE STRUCTURES."

CONCRETE MIX DESIGN TO BE SUBMITTED TO THE ENGINEER FOR REVIEW PRIOR TO COMMENCEMENT OF WORK.

CONCRETE PROPERTIES TO BE AS FOLLOWS: (STRENGTH LEVELS ARE AT 28 DAYS)

	f'c (MPa)	MAX. W/C RATIO	AIR CONTENT %	SLUMP (mm)	MAX. AGGR. (mm)	EXPOSURE CLASS
FOOTINGS SLAB ON GRADE (INTERIOR)	25 25	.55 –	4-7 –	80±20 80±20	20 20	F2 –
SLAB ON GRADE (INTERIOR PARKING)	32	.55	4-7	80±20	20	C4
SLAB ON GRADE (EXTERIOR/DRIVEWAYS)	32	.45	5-8	80±20	20	C2
INTERIOR SUSPENDED SLABS, BEAMS, WALLS AND COLUMNS	25	–	–	80±20	20	–
NON-STRUCTURAL CONCRETE TOPPING	25	–	–	40±20	10	–
EXTERIOR WALLS & COLUMNS BEAMS AND SUSPENDED SLABS EXPOSED TO FREEZING	25	.55	4-7	80±20	20	F2

ALL TOPPINGS, SLAB ON GRADE, CONCRETE FILL TO BE FIBRE-REINFORCED CONCRETE.

NO CALCIUM CHLORIDE ADDITIVES OR OTHER ADMIXTURES ARE PERMITTED IN CONCRETE MIXES WITHOUT THE WRITTEN PERMISSION OF THE ENGINEER.

ALL CONCRETE TO BE NORMAL DENSITY 24.3 kN/m³; TYPE 10 PORTLAND CEMENT UNLESS NOTED OTHERWISE.

SPECIAL CONSTRUCTION PROCEDURE FOR CONCRETE WORK CAST DURING WEATHER BELOW 5 DEGREES CELSIUS OR ABOVE 25 DEGREES CELSIUS TO BE SUBMITTED TO THE ENGINEER FOR REVIEW PRIOR TO COMMENCEMENT OF WORK. WORK TO CONFORM TO CAN/CSA-A23.1-04, "CONCRETE MATERIALS AND METHODS OF CONCRETE CONSTRUCTION."

NO BACKFILLING OF BASEMENT WALLS TO BE COMMENCED UNTIL WALLS ARE LATERALLY SUPPORTED AND CONCRETE HAS BEEN CURED FOR MINIMUM OF 28 DAYS.

EXPANSION JOINTS IN SLAB ON GRADE TO CONSIST OF ZIP STRIP OR 38 mm DEEP SAW CUTS AND TO BE LOCATED @ 4500 mm MAXIMUM SPACING EACH WAY.

STYROFOAM INSULATION UNDER CONCRETE TOPPING TO BE EPS TYPE 1 (55 kPa MINIMUM COMPRESSIVE STRENGTH) OR BETTER AS MANUFACTURED BY BASF CANADA INC. OR APPROVED EQUAL.

PROVIDE CONTROL JOINTS AT 12000 mm MAXIMUM SPACING IN ALL EXTERIOR WALLS.

ALL OPENINGS FOR MECHANICAL AND ELECTRICAL TRADES SHALL BE APPROVED BY THE ENGINEER FOR SIZE AND LOCATION PRIOR TO PLACEMENT OF CONCRETE.

PROVIDE DOVETAIL ANCHOR SLOTS FOR MASONRY ANCHORS IN ALL CONCRETE WALLS AND COLUMNS FACED WITH BLOCK OR BRICK. MASONRY ANCHORS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION.

LOCATION OF ALL CONSTRUCTION JOINTS MUST BE APPROVED BY ENGINEER PRIOR TO CONSTRUCTION.

CONCRETE REINFORCING:

ALL REINFORCING SHALL BE DEFORMED BILLET STEEL CONFORMING TO CSA G30.18-09 "BILLET-STEEL BARS FOR CONCRETE REINFORCEMENT" GRADE 400 MPA.

WELDED WIRE MESH SHALL CONFORM TO CSAG 30.5-1983 (R1998) / CSAG 30.15-1983 (R1998) GRADE 300 MPA

WHERE USE OF WELDABLE REBAR IS NOTED ON STRUCTURAL DRAWINGS, REBAR SHALL CONFORM TO CSA G30.18-09 "BILLET-STEEL BARS FOR CONCRETE REINFORCEMENT" WELDABLE GRADE 400 MPA.

EPOXY-COATED REBAR SHALL CONFORM TO ASTM-A775M-07b "STANDARD SPECIFICATION FOR EPOXY-COATED REINFORCING STEEL BARS."

REINFORCEMENT SHALL HAVE CLEAR CONCRETE COVER (MM) TO MAIN FLEXURAL REINFORCING AS FOLLOWS:
CONCRETE COVER:

LOCATION	COVER
CONCRETE CAST AGAINST EARTH	75
CONCRETE EXPOSED TO EARTH OR WEATHER	50
BEAMS (TO TIES, STIRRUPS)	30
WALLS	25

SPLICING OR EMBEDMENT OF REINFORCEMENT TO BE AS FOLLOWS UNLESS NOTED OTHERWISE:
(FOR EPOXY COATED BARS MULTIPLY GIVEN VALUES BY 1.5)
(FOR CLASS B SPLICE, MULTIPLY GIVEN VALUES BY 1.3)
BAR SPLICES

BAR SIZE	SPLICE LENGTH (mm) CLASS A SPLICE, BOTTOM BAR	SPLICE LENGTH (mm) CLASS A SPLICE, TOP BAR
10M	365	475
15M	515	670

REINFORCEMENT TO BE CONTINUOUS AROUND CORNERS.

ADD TWO 15M EACH FACE OF OPENINGS IN CONCRETE WALLS AND EXTEND 600 mm PAST OPENING EACH SIDE.

ADD TWO 15M PARALLEL TO EACH EDGE OF OPENINGS AND EXTEND 600 mm PAST OPENING EACH SIDE.

ALL DOWELS INTO HARDENED CONCRETE TO BE FASTENED USING THE HILTI HIT HY-150 SYSTEM:
10M DOWELS: PREDRILL 15 mm DIAMETER HOLE X 100 mm DEEP
15M DOWELS: PREDRILL 20 mm DIAMETER HOLE X 200 mm DEEP

WOOD FRAMING:

ALL WOOD MATERIALS AND DESIGN SHALL BE IN ACCORDANCE WITH CAN/CSA 086.1-01 "ENGINEERING DESIGN IN WOOD."

ALL FRAMING, BRIDGING, BLOCKING, NAILING AND OTHER DETAILS NOT SPECIFIED ON DRAWINGS TO BE IN ACCORDANCE WITH PART 9 OF THE B.C.B.C. 2018.

ALL JOIST HANGERS TO BE HUS AND FRAMING ANCHORS TO BE A35 BY SIMPSON STRONG TIE OR APPROVED EQUAL.

ALL STRUCTURAL LUMBER TO BE STAMPED BY MANUFACTURER INDICATING GRADE:
- DOUGLAS FIR NO. 2 OR BETTER
- HEM-FIR OR SPRUCE NO. 2 OR BETTER
- S-P-F NO. 2 OR BETTER

ALL ORIENTED STRAND BOARD (OSB) TO CONFORM TO CAN 3-0437.0-93 "OSB AND WAFERBOARD" AND CSA 0452.0-94 "DESIGN RATED OSB: SPECIFICATIONS."

GLULAM TO BE FABRICATED IN ACCORDANCE WITH CAN/CSA-O122-M89 "STRUCTURAL GLUED-LAMINATED TIMBER" AND SHALL BE MANUFACTURED IN PLANTS CERTIFIED BY CAN/CSA-O177-M89, "QUALIFICATION CODE FOR MANUFACTURERS OF STRUCTURAL GLUED-LAMINATED TIMBER. DESIGN TO CONFORM TO CAN/CSA-086-01, (INCL. 08651-05) "ENGINEERING DESIGN IN WOOD".

GLULAM BEAMS TO BE D-FIR 24F-EX BENDING GRADE, INTERIOR SERVICE, INDUSTRIAL APPEARANCE. MEMBERS TO BE STAMPED WITH MANUFACTURER'S IDENTIFICATION MARK.

GLULAMS OVER 3 METRES (10 FEET) TO HAVE A DEAD LOAD CAMBER OF R=1600 FT RADIUS.

LAMINATE STUDS SOLID UNDER ALL LINTELS AND BEAMS TO WIDTH OF BEAM. (NO. OF STUDS TO EQUAL NO. OF BEAM LAMINATIONS). ENSURE THAT POSTS AND COLUMNS ARE CONTINUOUS TO FOUNDATIONS.

PROVIDE DOUBLE JOIST UNDER ALL PARTITION WALLS.

PROVIDE TWO 2X TOP PLATES LAPPED 1500 mm MINIMUM AND NAILED WITH 3" COMMON NAILS AT 150 mm O.C. STAGGERED ALONG LAP.

FINGER JOINTED WALL STUDS MAY BE USED WHEN MARKED AS FOLLOWS:

.SPS1 AND SPS2 IN ALL LOCATIONS
.SPS3 INTERIOR WALLS ONLY, EXCEPT SHEAR WALLS

WINDOW HEADERS OVER 2400 mm SPAN TO HAVE MIN. 2 CRIPPLES AT END UNLESS NOTED OTHERWISE IN PLAN.

SAWN TIMBER TO BE D. FIR NO. 1 OR BETTER. (SIZES SHOWN ON DRAWINGS INDICATE ACTUAL SIZES OF TIMBER U.N.O.).
SHEATHING:

ROOFS (FLAT)	15.5 mm T&G PLYWOOD
ROOFS (PITCHED)	12.5 mm T&G PLYWOOD OR WITH H CLIPS @ 24" O.C.
FLOORS	15.5 mm T&G PLYWOOD GLUED AND NAILED
EXTERIOR WALL SHEATHING	12.5 mm EXTERIOR TYPE PLYWOOD

PARALLAM BEAMS TO BE 2.0E WS PARALLAM PSL BEAMS AS MANUFACTURED BY TRUS JOIST MACMILLAN LIMITED. STRUCTURAL PROPERTIES AS SUPPLIED AND WARRANTED BY THE MANUFACTURER.

MICROLAM BEAMS TO BE 1.9E MICROLAM LVL BEAMS AS MANUFACTURED BY TRUS JOIST MACMILLAN LIMITED. STRUCTURAL PROPERTIES AS SUPPLIED AND WARRANTED BY THE MANUFACTURER.

ALL BUILT-UP PARALLAM BEAMS OVER 2 LAMINATIONS TO BE BOLTED WITH 12 mm DIA. BOLTS @ 800 mm TOP & 800 mm BOTTOM, STAGGERED.

NON-STANDARD SIZES OF LAG BOLTS AS MANUFACTURED BY PACIFIC BOLT MFG (1988) LTD., NEW WESTMINSTER, B.C. OR APPROVED EQUAL.

BOLTS AND THREADED RODS TO BE A307 OR 300W GRADE.

STAPLES ARE NOT PERMITTED FOR SHEAR WALL OR ROOF/ FLOOR SHEATHING APPLICATION.

PROVIDE SIMPSON STRONG-TIE (OR APPROVED EQUAL) POST CAP AND POST SHOE FOR ISOLATED POSTS OR BUILT-UP COLUMNS.

ALL JOIST TO BEAM FLUSH CONNECTIONS TO BE WITH JOIST HANGERS OR FRAMING ANCHORS. NO PRESSURE BLOCKING IS PERMITTED.

ALL EXTERIOR WOOD OR WOOD IN CONTACT WITH CONCRETE TO BE PRESSURE TREATED MATERIAL AS PER CAN/CSA-O80 SERIES-97 "WOOD PRESERVATION."

WHERE METAL HANGERS ARE IN CONTACT WITH PRESSURE TREATED MATERIAL, USE STAINLESS STEEL (TYPES 304 OR 316) OR HOT-DIPPED GALVANIZED ACCORDING TO ASTM A653-G185 IN AREAS NOT SUBJECT TO REGULAR WETTING. METAL FASTENER MATERIAL TO MATCH HANGER MATERIAL.

PREFABRICATED WOOD TRUSSES:

PREFABRICATED WOOD TRUSSES TO BE DESIGNED AND FABRICATED IN ACCORDANCE WITH PART 4 (PART 9) OF B.C.B.C. 2018, CAN/CSA-086.1-01 "ENGINEERING DESIGN IN WOOD," AND TPIC PROCEDURES.
DESIGN SERVICE LOADS:

LOAD	COMMENTS
TOP CHORD ULS LOAD TOP CHORD SNOW LOAD SLS	1.46 kPa SEE ROOF PLAN FOR SNOW DRIFT & MECHANICAL UNITS 1.31 kPa
CONCENTRATED LIVE LOAD APPLIED ANYWHERE ON TOP CHORD OVER 750mm x750mm	1.3 kN
BOTTOM CHORD LIVE LOAD TOP CHORD DEAD LOAD BOTTOM CHORD DEAD LOAD	0.5 kPa 0.54 kPa (INCLUDES 0.24 kPa FOR FUTURE SOLAR COLLECTOR) 0.4 kPa
NET WIND UPLIFT * DRAG STRUT LOAD	0.4 kPa APPLIED TO TRUSS TOP CHORD. AS NOTED ON PLAN
TRUSSES TO BE DESIGNED FOR UNBALANCED SNOW CONDITIONS AS PER B.C.B.C. 2018 AND NBCC STRUCTURAL COMMENTARIES. MAXIMUM ROOF TRUSS LIVE LOAD DEFLECTION TO BE BASED ON L/360. MAXIMUM ROOF TRUSS TOTAL DEFLECTION TO BE BASED ON L/240. ULS: ULTIMATE LIMIT STATES SLS: SERVICE LIMIT STATES	

WOOD TRUSS SHOP DRAWINGS:
DESIGN IS TO BE CERTIFIED BY A SPECIALITY PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF B.C. THE SPECIALITY ENGINEER RESPONSIBLE FOR THE PREPARATION OF THE SHOP DRAWINGS IS TO SUPPLY A LETTER WITH THE SHOP DRAWING SUBMISSION STATING THAT HE HAS REVIEWED THE TRUSS DESIGN REQUIREMENTS AND SPECIFICATIONS AS SHOWN ON THE STRUCTURAL DRAWINGS AND THAT THE SHOP DRAWINGS ARE IN CONFORMANCE WITH THE STRUCTURAL REQUIREMENTS. SUBMIT SHOP DRAWINGS INCLUDING A SEALED LAYOUT DRAWING FOR REVIEW TO CH ENGINEERING PRIOR TO FABRICATION.

TRUSS SHOP DRAWINGS ARE DEFINED AS THE INDIVIDUAL TRUSS DESIGN DRAWINGS AND A TRUSS LAYOUT DRAWING. THE TRUSS SHOP DRAWINGS ARE TO PROVIDE SUFFICIENT DETAIL TO PERMIT THE TRUSSES TO BE ERECTED WITHOUT REFERENCE TO FURTHER DRAWINGS OR INSTRUCTIONS. THE TRUSS DESIGNER IS RESPONSIBLE FOR PREPARING THE SHOP DRAWINGS AS A COMPLETE THREE DIMENSIONAL ROOF SYSTEM AND NOT JUST AS A SERIES OF TWO DIMENSIONAL STRUCTURAL COMPONENTS; DETAILS OF LONGITUDINAL COMPRESSION BRACING ARE TO BE PROVIDED BY THE TRUSS DESIGNER.

SHOP DRAWINGS ARE TO INCLUDE THE FOLLOWING INFORMATION:

-PROJECT NAME, LOCATION AND SHOP DRAWING REVISION DATES.
-TRUSS LAYOUT, INDICATION ALL TRUSSES WITH A CLEAR REFERENCE BETWEEN THE LAYOUT AND INDIVIDUAL TRUSS DESIGN DRAWINGS.
-ALL LOADS USED IN THE DESIGN INCLUDING MECHANICAL UNITS AND SNOW BUILD-UP AS SHOWN ON THE STRUCTURAL OR MECHANICAL DRAWINGS. SNOW BUILD UP AND MECHANICAL LOADS ARE TO BE CLEARLY INDICATED ON THE TRUSS LAYOUT DRAWING.
-ALL NON-UNIFORM LOADS ARE TO BE GRAPHICALLY SHOWN ON THE INDIVIDUAL TRUSS DESIGN DRAWINGS.
-MATERIAL SIZE, GRADE AND SPECIES, CONNECTOR PLATE SIZE, GAUGE AND LOCATION.
-ALL LATERAL BRACING REQUIREMENTS, INCLUDING DETAILS TO PROVIDE RESTRAINT FOR LONGITUDINAL WEB BRACING AT ENDS AND INTERVALS ALONG LENGTH OF BUILDING.
-LAMINATING INSTRUCTIONS FOR MULTIPLE -PLY TRUSSES.
-LIVE LOAD AND TOTAL LOAD DEFLECTION LIMITS.
-HANGER SCHEDULE ON TRUSS LAYOUT DRAWING SHOWING ALL HARDWARE FOR TRUSS TO TRUSS CONNECTIONS.
CERTIFICATION FOR HANGERS AND HARDWARE TO BE SUPPLIED UPON REQUEST. -INSTRUCTIONS FOR TEMPORARY BRACING OF TRUSSES IN ACCORDANCE WITH WCB REGULATIONS.

WHERE BOTTOM CHORD BRACING IS REQUIRED AT SPACING OTHER THAN 3000 mm CENTRES, SUCH AS CANTILEVERS, INTERIOR BEARINGS OR WIND UPLIFT CONDITIONS, SUCH BRACING IS TO BE SHOWN GRAPHICALLY ON TRUSS SHOP DRAWINGS.

ALL MARK NUMBERS TO BE CLEARLY DISPLAYED ON THE UNDERSIDE OF TRUSS BOTTOM CHORD.

CHANGES TO THE ROOF TRUSS LAYOUT ON THE STRUCTURAL DRAWINGS ARE NOT PERMITTED WITHOUT THE APPROVAL OF THE PROJECT ENGINEER. ANY COSTS INCURRED BY THE PROJECT ENGINEER ASSOCIATED WITH REVIEWING ALTERNATE FRAMING SCHEMES ARE TO BE PAID FOR BY THE CONTRACTOR.

FIELD DRILLING, CUTTING, NOTCHING OR ANY OTHER MODIFICATION TO TRUSSES IS NOT PERMITTED WITHOUT PRIOR WRITTEN APPROVAL OF THE TRUSS FABRICATOR'S SPECIALITY ENGINEER. COPIES OF ANY MODIFICATION APPROVALS TO BE SUBMITTED TO THE PROJECT ENGINEER.

PROVIDE HURRICANE CLIPS H10 BY SIMPSON STRONG TIE OR APPROVED EQUAL AT SUPPORTS

TRUSS SUPPLIER MUST ENGAGE A QUALIFIED PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF B.C. TO INSPECT INSTALLED TRUSSES AND CERTIFY:
- . TRUSS FABRICATION CONFORMS TO SUBMITTED DESIGN
- . TRUSS CAPACITY TO CARRY REQUIRED LOADS
- . ALL PERMANENT BRACING IS IN PLACE AND IS CORRECTLY INSTALLED
- . TRUSS COMPLIANCE WITH B.C. BUILDING CODE 2012

A COPY OF CERTIFICATE IS TO BE SUBMITTED TO CH ENGINEERING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY TRUSS SUPPLIER FOR INSPECTION.

STRUCTURAL STEEL:

STRUCTURAL STEEL TO CONFORM TO CSA S16.1-14 "LIMIT STATES DESIGN FOR STEEL STRUCTURES."

FABRICATORS SHALL CERTIFIED BY CWB UNDER THE REQUIREMENTS OF W47.1 AS DIVISION 1 OR 2.1. ALL WELDING TO CONFORM TO CSA W59.1 "WELDED STEEL CONSTRUCTION" (METAL-ARC WELDING).

STRUCTURAL SECTIONS TO CONFORM TO CSA G40.20/G40.21-13 GRADE 300W (FY = 44,000 PSI) EXCEPT HOLLOW SECTIONS SHALL CONFORM TO CSA G40.20/G40.21-13 GRADE 350W, CLASS C (FY = 50,000 PSI). MISCELLANEOUS STEEL PLATES, BASE PLATES, BEARING PLATES AND RODS TO BE 300W. ANCHOR BOLTS TO BE MINIMUM A307 GRADE UNLESS NOTED OTHERWISE. STEEL PIPE SECTIONS TO CONFORM TO ASTM A53 (MINIMUM FY=241 MPA).

ALL STEEL SHALL RECEIVE ONE SHOP COAT OF PRIMER. TOUCH UP IN FIELD AS REQUIRED.

ALL BOLTS TO BE MINIMUM TO ASTM A325-89.

STRUCTURAL STEEL CONTRACTOR SHALL EXAMINE THE SITE AND VERIFY THE LOCATION OF ALL FOUNDATIONS OR OTHER RELEVANT WORK PREPARED BY OTHER TRADES PRIOR TO COMMENCING FABRICATION. NOTIFY THE ENGINEER OF ANY REQUIRED CHANGES IN STRUCTURAL STEEL LAYOUT AS A RESULT OF THIS FIELD EXAMINATION.

STEEL FABRICATOR SHALL PREPARE SHOP DRAWINGS AND SUBMIT FOR REVIEW TO CH ENGINEERING PRIOR TO FABRICATION. ALL STEEL CONNECTIONS AND DETAILS SHALL BE DESIGNED BY THE STEEL FABRICATOR FOR FORCES(FACTORED) AS INDICATED ON DRAWINGS. UNLESS NOTED OTHERWISE, STEEL BEAM TO COLUMN SHEAR CONNECTIONS 75 OF THE TOTAL FACTORED UDL LOAD THAT THE BEAM CAN SAFELY SUPPORT IN MAY BE DESIGNED FOR 100 FLEXURE. SHOP DRAWINGS, CONNECTIONS AND DETAIL DESIGN WILL BE CERTIFIED BY A QUALIFIED PROFESSIONAL ENGINEER REGISTERED IN BRITISH COLUMBIA.

CONNECTION DESIGN TO BE SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN BRITISH COLUMBIA. CONNECTION ENGINEER TO UNDERTAKE ADEQUATE FIELD REVIEWS TO CERTIFY THAT THE CONSTRUCTION CONFORMS TO THE SUBMITTED DESIGN. LETTERS OF ASSURANCE OF FIELD REVIEW AND DESIGN TO BE SUBMITTED TO CH ENGINEERING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE CONNECTION ENGINEER FOR INSPECTION.

THE FABRICATOR SHALL NOTE THE SIZE AND TYPE OF BOLTS AND WELDS USED IN STRUCTURAL CONNECTIONS ON THE SHOP DRAWINGS.

ALL STRUCTURAL STEEL SHALL BE THOROUGHLY CLEANED OF LOOSE MILL SCALE, DIRT, OIL OR OTHER FOREIGN MATTER BEFORE SHOP PAINTING. SHOP PAINT SHALL CONFORM TO CAN/CGSB-1.40-M89 "PRIMER, STRUCTURAL STEEL, OIL ALKYD TYPE."

STEEL DIRECTLY EXPOSED TO WEATHER OR AS NOTED ON STRUCTURAL DRAWINGS SHALL BE HOT DIPPED GALVANIZED (HDG) OR SHALL HAVE ONE COAT OF INORGANIC ZINC-RICH PRIMER CONFORMING TO CGSB SPECIFICATION 1-GP-171M FOR A TOTAL PAINT THICKNESS OF 0.08 MM. WHERE HDG IS SPECIFIED, IT SHALL BE IN ACCORDANCE WITH CAN/CSA G164-M92 "HOT DIP GALVANIZING OF IRREGULARLY SHAPED ARTICLES" (MINIMUM ZINC COATING 600 GSM).

STRUCTURAL STEEL TO BE ENCASED IN CONCRETE, FAYING SURFACES OF SLIP-RESISTANT CONNECTIONS AND ADJACENT TO AREAS TO BE FIELD-WELDED SHALL NOT BE PAINTED.

ALL VISUAL INSPECTION AND NON DESTRUCTIVE TESTING OF STEEL WORK TO BE DONE BY A MATERIAL CONSULTANT ENGAGED BY THE CONTRACTOR IF REQUIRED BY THE ENGINEER. SUPPLY ALL MILL TEST CERTIFICATE AND CHEMICAL ANALYSIS FOR THE SUPPLIED STEEL WORK IF EQUIRED BY THE ENGINEER.

WHERE IT IS NECESSARY TO PROVIDE HOLES IN BEAM WEBS FOR CONDUIT, ETC. REINFORCING SHALL BE PROVIDED BY THE CONTRACTOR SUBJECT TO THE APPROVAL OF THE ENGINEER. COST OF REQUIRED ANALYSIS OR DETAILING TO BE PAID FOR BY THE CONTRACTOR. FLANGES OF BEAMS OR COLUMNS SHALL NOT BE CUT OR DRILLED UNLESS APPROVED BY THE ENGINEER.

WHERE THE EDGES OF SUSPENDED CONCRETE SLABS BEAR ON STEEL BEAMS, ANCHORS SHALL BE WELDED TO BEAMS AT 600 mm MAX. INTERVALS AND EMBEDDED IN CONCRETE. ANCHORS MAY BE HOOKED FLAT BAR MIN. 6 mm THICK X 38 mm WIDE OR WELDABLE 15M REBARS.

WHERE BLOCK OR BRICK MASONRY ABUTS STEEL COLUMNS OR PASSES OVER STEEL BEAMS, PROVIDE HOT DIPPED GALVANIZED MASONRY BAR ANCHORS TO THE STRUCTURAL STEEL ELEMENTS.

ALL OPENINGS THROUGH METAL DECK LARGER THAN 300 mm SHALL BE FRAMED BY THE STRUCTURAL STEEL FABRICATOR USING MINIMUM L90X90X6 mm OR AS NOTED ON THE FRAMING PLANS OR DETAILS.

REV:	DATE:	ISSUED FOR:
3	SEP. 20/22	REVISED B.P.
2	JAN. 25/22	BUILDING PERMIT
1	JAN. 20/22	REVIEW

PERMIT TO PRACTICE
CHIU HIPPMANN ENGINEERING INC.
PERMIT NUMBER: 1000083
Association of Engineers and Geoscientists B.C.

Chiu Hippmann Engineering Inc.
Consulting Structural Engineers
653 East 15th Ave Vancouver, B.C. V5T 2R6 T 604 737 9830
mail@chiuhippmann.ca

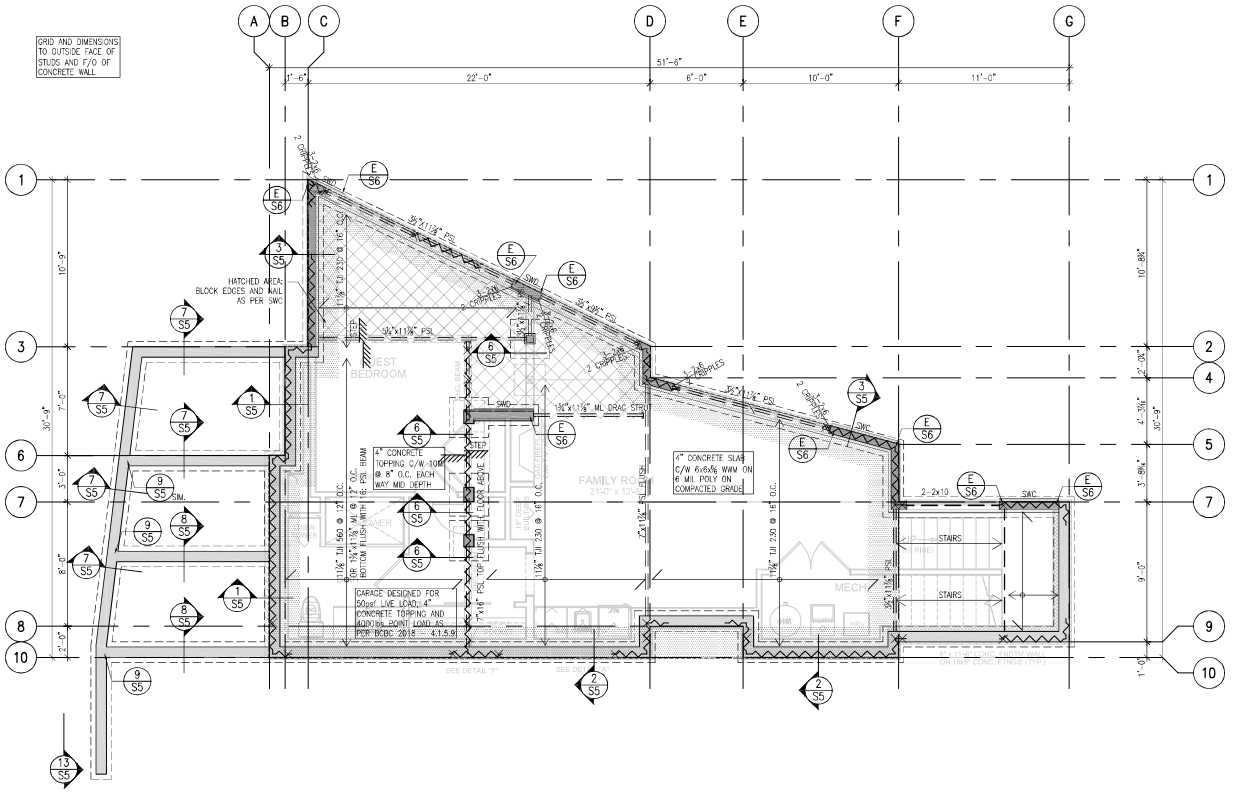
project:

MALONEY CONSTRUCTION
2223 WESTSIDE RD
KELOWNA, BC

drawing title:

STRUCTURAL NOTES

SCALE: N/A	PROJECT NO. 21142
DESIGN: C.C.	
DRAWN: M.P.	S1
CHECKED BY: CHE	
DATE: JAN.11/22	OF 6



LOWER FLOOR PLAN–MAIN FLOOR FRAMING PLAN

SCALE 1/4" = 1'-0"

SHEAR WALL SCHEDULE SEE DETAIL 1/S6

SHEAR WALL TYPE AS NOTED IN PLAN ..... –SW–

NAIL INTERMEDIATE SUPPORTS @ 12", BLOCK ALL PANEL EDGES FOR NAIL GUNS DECREASE NAIL SPACING BY 1/3

SHEARWALL	1/2" PLY OR OSB	PANEL EDGE NAILING ANCHORS TO FOUNDATION
SWB	ONE FACE	3" COMMON NAILS @ 4" ⅝"ø ANCHOR BOLTS @ 2'-6"
SWC	ONE FACE	3" COMMON NAILS @ 2½" ⅝"ø ANCHOR BOLTS @ 2'-0"
SWD	BOTH FACES	3" COMMON NAILS @ 4" ⅝"ø ANCHOR BOLTS @ 1'-6"

TYPICAL HATCH PATTERNS:

- FLOOR HATCH
  - -> OUTLINES EXTENT OF FLOOR SPACE ABOVE.....
- DECK HATCH
  - -> HATCHES DECK AREAS IN FLOOR ABOVE.....
- BLOCKED FLOOR SHEATHING
  - -> FLOOR SHEATHING BLOCKED AND PANEL EDGES NAILED AS PER SWC.....
- LOAD BEARING WALL/ EXTERIOR WALL ABOVE
  - -> CONTINUOUS LINE OF BLOCKING BETWEEN JOIST UNDER IF APPLICABLE...
- POINT LOAD
  - -> LOCATION OF POINT LOAD ABOVE.....

TYPICAL FRAMING (UNLESS NOTED OTHERWISE IN PLAN):

- FLOOR JOISTS..... 11⅞" TJI 230 @ 16"
- BUILT-UP BEAMS AND LINTELS..... 2 - 2x10
- PREFABRICATED ROOF TRUSSES..... @ 24" MAX.
- ROOF GIRDER TRUSS.....
- INTERIOR LOAD BEARING WALLS..... 2x4 @ 16"
- EXTERIOR WALLS..... 2x6 @ 24"
- PSL DENOTES PARALLAM.....
- DRAG STRUT CONNECTOR..... MSTC40

2ND LAYER ROOF FRAMING TO BE PREFABRICATED TRUSSES OR 2"x4" @ 24" RAFTERS SUPPORTED ON 2"x4" @ 24" PONY WALLS LOCATED OVER PANEL POINTS OF TRUSSES BELOW AT 4' MAX. SPACING.
ROOF SHEATHING TO BE CONTINUOUS UNDER FRAMING.

REV:	DATE:	ISSUED FOR:
3	SEP. 20/22	REVISED B.P.
2	JAN. 25/22	BUILDING PERMIT
1	JAN. 20/22	REVIEW

PERMIT TO PRACTICE
CHIU HIPPMANN ENGINEERING INC.
PERMIT NUMBER: 1000083
Association of Engineers and Geoscientists B.C.

Chiu Hippmann Engineering Inc.
Consulting Structural Engineers
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mail@chiuhippmann.ca

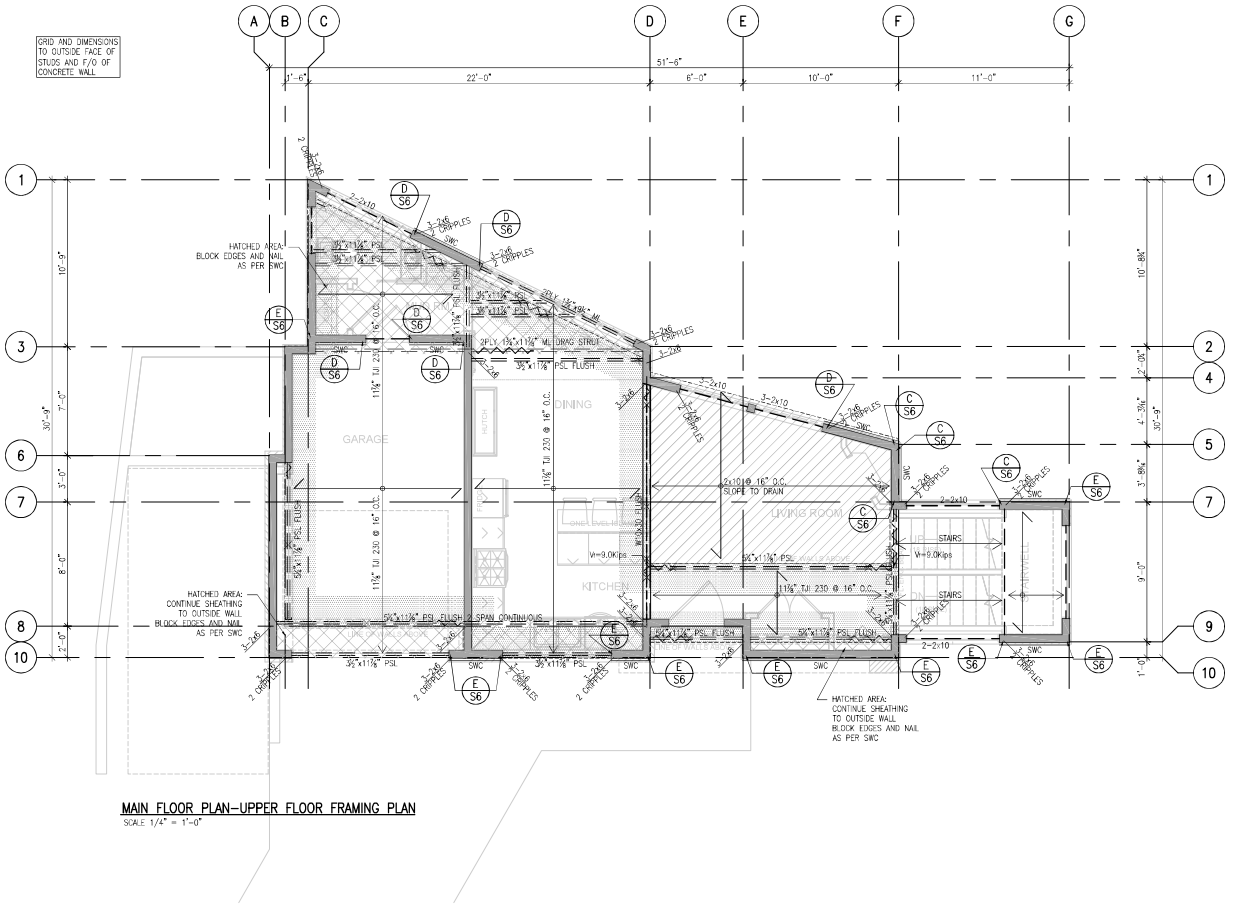
project:

MALONEY CONSTRUCTION
2223 WESTSIDE RD
KELOWNA, BC

drawing title:

FOUNDATION PLAN
LOWER FLOOR PLAN/MAIN FLOOR FRAMING PLAN

SCALE:	PROJECT NO.
1/4"=1'-0"	21142
DESIGN: C.C.	
DRAWN: M.P.	
CHECKED BY: CHE	S2
DATE: JAN.11/22	OF 6



MAIN FLOOR PLAN–UPPER FLOOR FRAMING PLAN

SCALE 1/4" = 1'-0"

SHEAR WALL SCHEDULE SEE DETAIL 1/S6

SHEAR WALL TYPE AS NOTED IN PLAN ..... –SW–

NAIL INTERMEDIATE SUPPORTS @ 12", BLOCK ALL PANEL EDGES FOR NAIL GUNS DECREASE NAIL SPACING BY 1/3

SHEARWALL	1/2" PLY OR OSB	PANEL EDGE NAILING ANCHORS TO FOUNDATION
SWB	ONE FACE	3" COMMON NAILS @ 4" ⅝"ø ANCHOR BOLTS @ 2'-6"
SWC	ONE FACE	3" COMMON NAILS @ 2½" ⅝"ø ANCHOR BOLTS @ 2'-0"
SWD	BOTH FACES	3" COMMON NAILS @ 4" ⅝"ø ANCHOR BOLTS @ 1'-6"

TYPICAL HATCH PATTERNS:

FLOOR HATCH
–> OUTLINES EXTENT OF FLOOR SPACE ABOVE.....
DECK HATCH
–> HATCHES DECK AREAS IN FLOOR ABOVE.....
BLOCKED FLOOR SHEATHING
–> FLOOR SHEATHING BLOCKED AND PANEL EDGES NAILED AS PER SWC.....
LOAD BEARING WALL/ EXTERIOR WALL ABOVE
–> CONTINUOUS LINE OF BLOCKING BETWEEN JOIST UNDER IF APPLICABLE...
POINT LOAD
–> LOCATION OF POINT LOAD ABOVE.....

TYPICAL FRAMING (UNLESS NOTED OTHERWISE IN PLAN):

FLOOR JOISTS..... 11⅞" TJI 230 @ 16"
BUILT-UP BEAMS AND LINTELS..... 2 – 2x10
PREFABRICATED ROOF TRUSSES..... @ 24" MAX.
ROOF GIRDER TRUSS.....
INTERIOR LOAD BEARING WALLS..... 2x4 @ 16"
EXTERIOR WALLS..... 2x6 @ 24"
PSL DENOTES PARALLAM.....
DRAG STRUT CONNECTOR..... MSTC40

2ND LAYER ROOF FRAMING TO BE PREFABRICATED TRUSSES OR 2"x4" @ 24" RAFTERS SUPPORTED ON 2"x4" @ 24" PONY WALLS LOCATED OVER PANEL POINTS OF TRUSSES BELOW AT 4' MAX. SPACING.
ROOF SHEATHING TO BE CONTINUOUS UNDER FRAMING.

REV:	DATE:	ISSUED FOR:
3	SEP. 20/22	REVISED B.P.
2	JAN. 25/22	BUILDING PERMIT
1	JAN. 20/22	REVIEW

PERMIT TO PRACTICE
CHIU HIPPMANN ENGINEERING INC.
PERMIT NUMBER: 1000083
Association of Engineers and Geoscientists B.C.

Chiu Hippmann Engineering Inc.
Consulting Structural Engineers
659 East 15th Ave Vancouver, B.C. V5T 2R6 T 604 737 9830
mail@chiuhippmann.ca

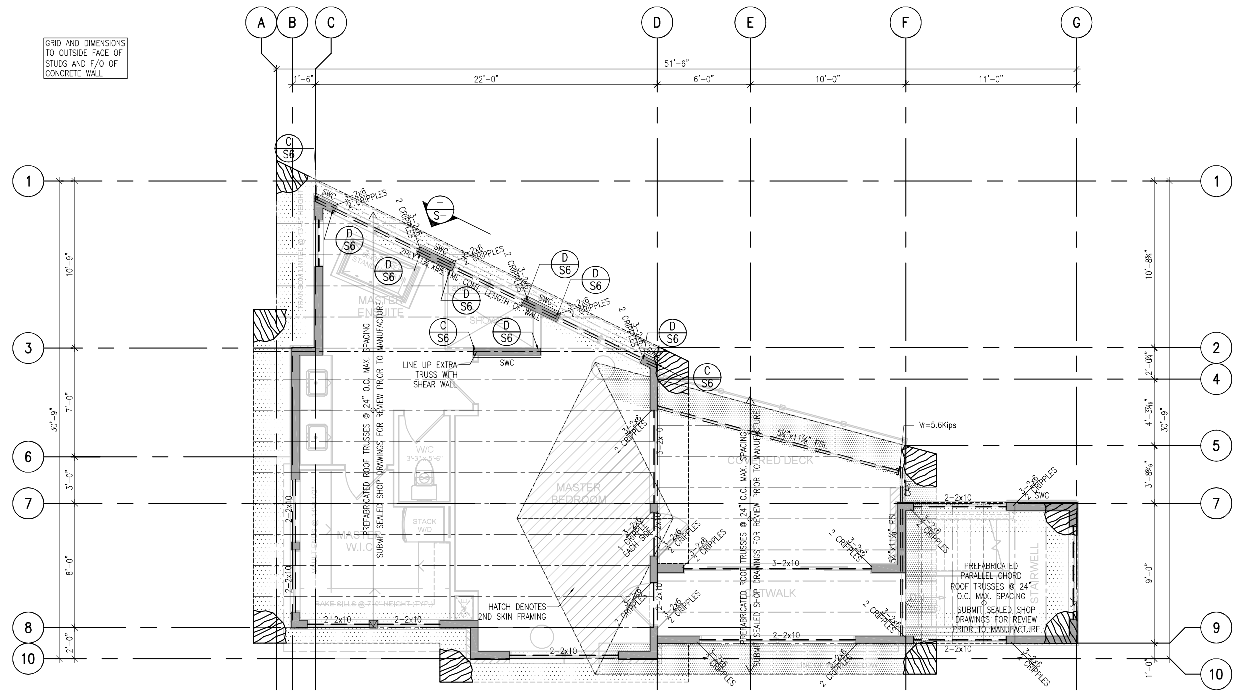
project:

MALONEY CONSTRUCTION
2223 WESTSIDE RD
KELOWNA, BC

drawing title:

MAIN FLOOR PLAN/UPPER FLOOR FRAMING PLAN

SCALE:	PROJECT NO.
1/4"=1'-0"	21142
DESIGN: C.C.	
DRAWN: M.P.	S3
CHECKED BY: CHE	OF 6
DATE: JAN.11/22	



UPPER FLOOR PLAN–ROOF FRAMING PLAN
SCALE 1/4" = 1'-0"

SHEAR WALL SCHEDULE SEE DETAIL 1/S6

SHEAR WALL TYPE AS NOTED IN PLAN .... SW–

NAIL INTERMEDIATE SUPPORTS @ 12", BLOCK ALL PANEL EDGES FOR NAIL GUNS DECREASE NAIL SPACING BY 1/3

SHEARWALL	1/2" PLY OR OSB	PANEL EDGE NAILING ANCHORS TO FOUNDATION
SWB	ONE FACE	3" COMMON NAILS @ 4" ⅝"ø ANCHOR BOLTS @ 2'-6"
SWC	ONE FACE	3" COMMON NAILS @ 2½" ⅝"ø ANCHOR BOLTS @ 2'-0"
SWD	BOTH FACES	3" COMMON NAILS @ 4" ⅝"ø ANCHOR BOLTS @ 1'-6"

TYPICAL HATCH PATTERNS:

FLOOR HATCH
-> OUTLINES EXTENT OF FLOOR SPACE ABOVE.
DECK HATCH
-> HATCHES DECK AREAS IN FLOOR ABOVE.
BLOCKED FLOOR SHEATHING
-> FLOOR SHEATHING BLOCKED AND PANEL EDGES NAILED AS PER SWC.
LOAD BEARING WALL/ EXTERIOR WALL ABOVE
-> CONTINUOUS LINE OF BLOCKING BETWEEN JOIST UNDER IF APPLICABLE.
POINT LOAD
-> LOCATION OF POINT LOAD ABOVE.

TYPICAL FRAMING (UNLESS NOTED OTHERWISE IN PLAN):

FLOOR JOISTS .... 11⅞" TJI 230 @ 16"
BUILT-UP BEAMS AND LINTELS .... 2 – 2x10
PREFABRICATED ROOF TRUSSES .... @ 24" MAX.
ROOF GIRDER TRUSS
INTERIOR LOAD BEARING WALLS .... 2x4 @ 16"
EXTERIOR WALLS .... 2x6 @ 24"
PSL DENOTES PARALLAM
DRAG STRUT CONNECTOR MSTC40
2ND LAYER ROOF FRAMING TO BE PREFABRICATED TRUSSES OR 2"x4" @ 24" RAFTERS SUPPORTED ON 2"x4" @ 24" PONY WALLS LOCATED OVER PANEL POINTS OF TRUSSES BELOW AT 4' MAX. SPACING.
ROOF SHEATHING TO BE CONTINUOUS UNDER FRAMING.

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CHIU HIPPMANN ENGINEERING INC.
PERMIT NUMBER: 1000083
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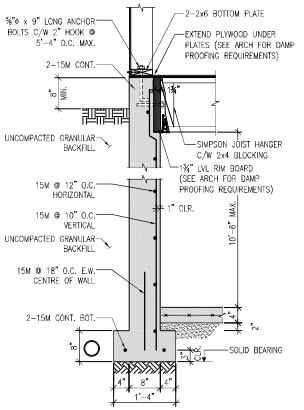
project:
MALONEY CONSTRUCTION
2223 WESTSIDE RD
KELOWNA, BC

drawing title:
UPPER FLOOR PLAN/ROOF FRAMING PLAN

SCALE: 1/4"=1'-0"
PROJECT NO. 21142
DESIGN: C.C.
DRAWN: M.P.
CHECKED BY: CHE
DATE: JAN.11/22

S4
OF 6



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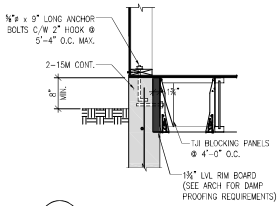

2 JOISTS PARALLEL TO WALL
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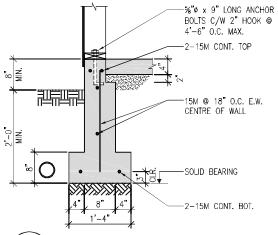

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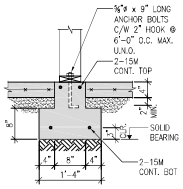

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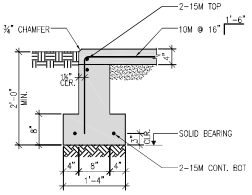

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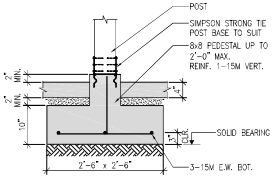

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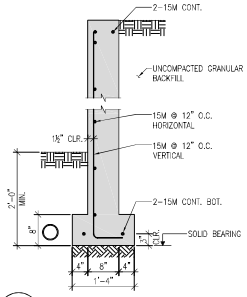

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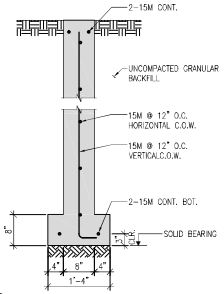

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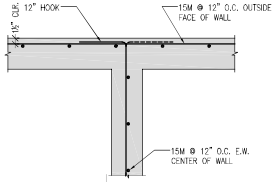
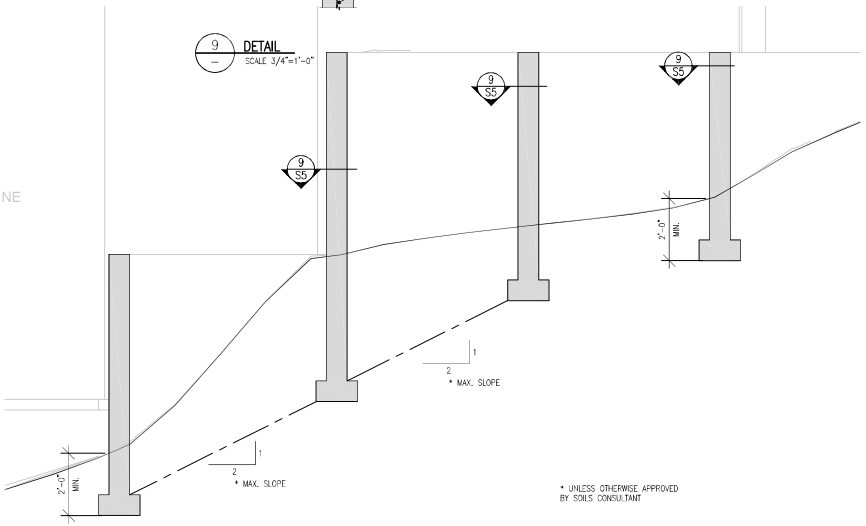


9 DETAIL
SCALE 3/4"=1'-0"



13 SECTION
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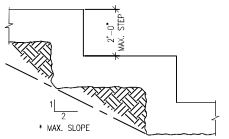
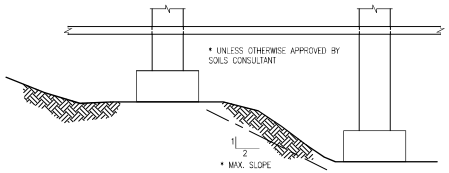


11 TYP. STEP FOOTING (WALLS)
SCALE 3/4" = 1'-0"



12 TYP. ADJ. SPREAD FOOTING (COLUMNS)
SCALE 3/4" = 1'-0"

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1	JAN. 20/22	REVIEW

PERMIT TO PRACTICE
CHIU HIPPMANN ENGINEERING INC.
PERMIT NUMBER: 1000985
Association of Engineers and Geoscientists B.C.

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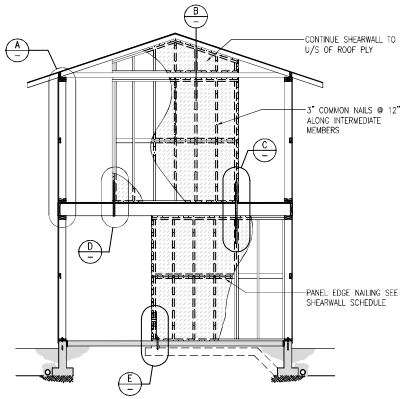
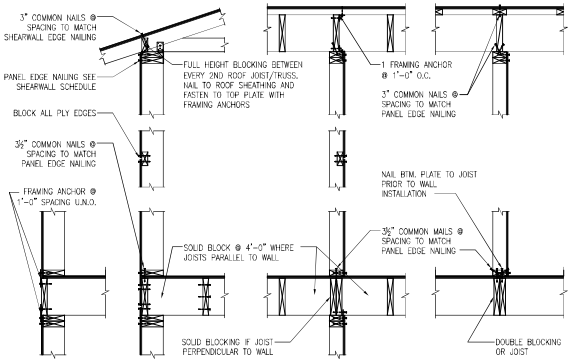
project:
MALONEY CONSTRUCTION
2223 WESTSIDE RD
KELOWNA, BC

drawing title:
SECTIONS/DETAILS

SCALE: 3/4"=1'-0"	PROJECT NO. 21142
DESIGN: C.C.	
DRAWN: M.P.	S5
CHECKED BY: CHE	OF 6
DATE: JAN.11/22	

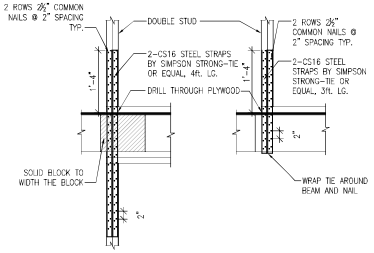


1 CONCEPTUAL SHEARWALL
SCALE 1/4"=1'-0"



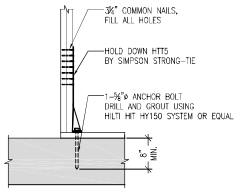
A EXT. SHEARWALL
SCALE 3/4"=1'-0"

B INT. SHEARWALL
SCALE 3/4"=1'-0"

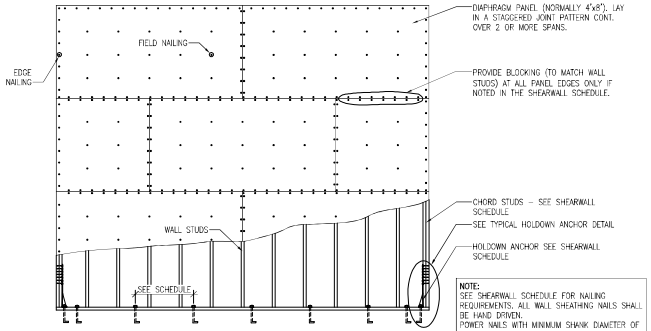


C OVER WALL
SCALE 3/4"=1'-0"

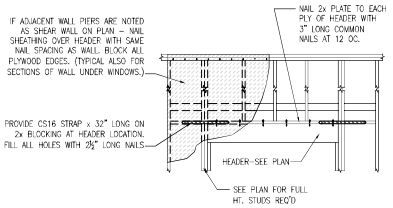
D OVER BEAM
SCALE 3/4"=1'-0"



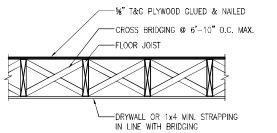
E HOLD DOWN TO CONCRETE
SCALE 3/4"=1'-0"



2 TYP. SHEARWALL ELEVATION DETAIL
SCALE 3/8"=1'-0"



3 TYPICAL HEADER/SILL AT SHEAR WALLS
SCALE: NTS



4 BRIDGING
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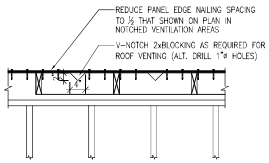
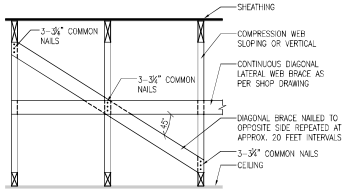


5 ROOF VENTING @ BLOCKING
SCALE 3/4"=1'-0"



6 LATERAL WEB BRACING
SCALE 3/4"=1'-0"

REV:	DATE:	ISSUED FOR:
3	SEP. 20/22	REVISED B.P.
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1	JAN. 20/22	REVIEW

PERMIT TO PRACTICE
CHIU HIPPMANN ENGINEERING INC.
PERMIT NUMBER: 1000883
Association of Engineers and Geoscientists B.C.

Chiu Hippmann Engineering Inc.
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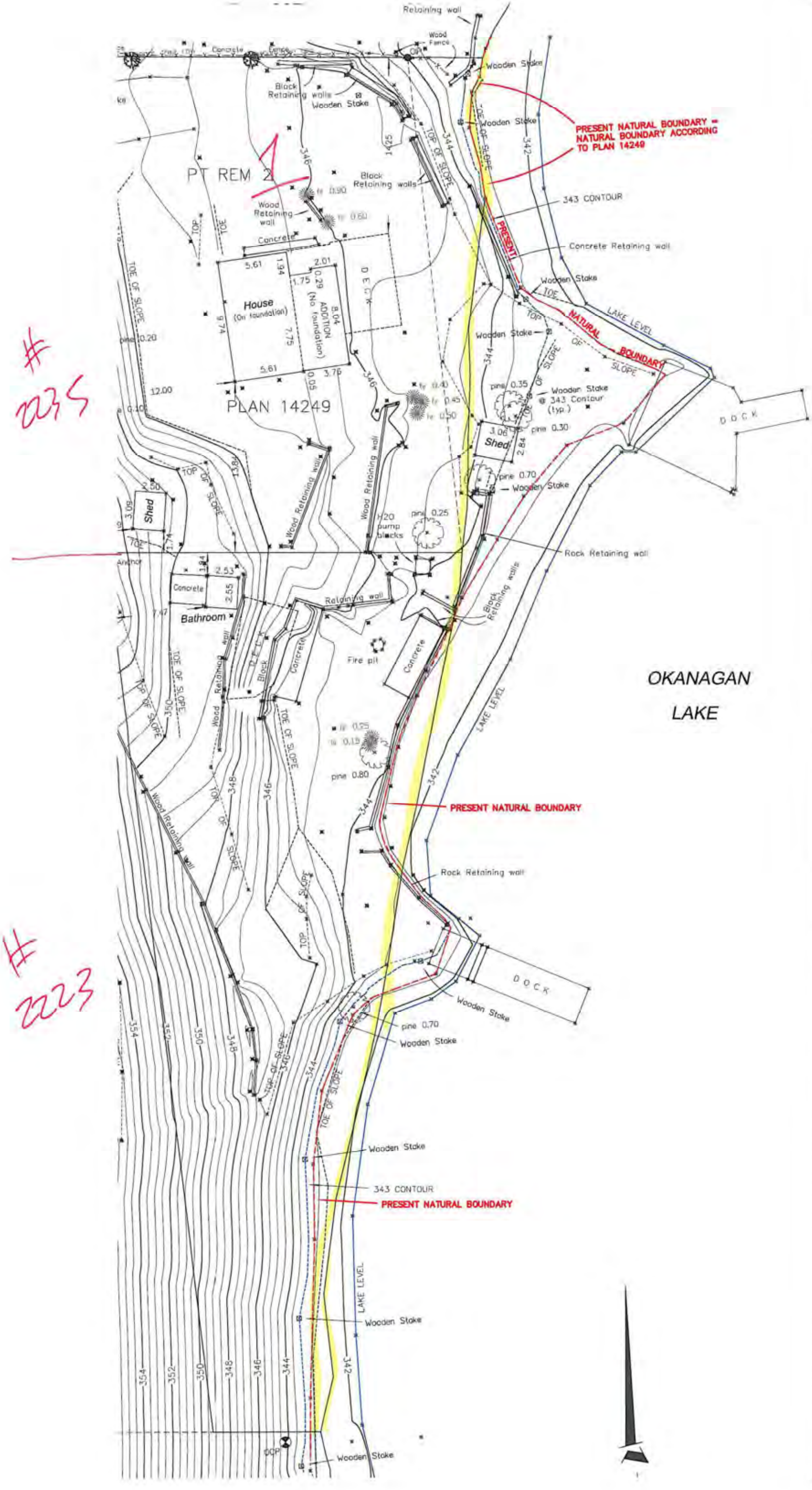
project:

MALONEY CONSTRUCTION
2223 WESTSIDE RD
KELOWNA, BC

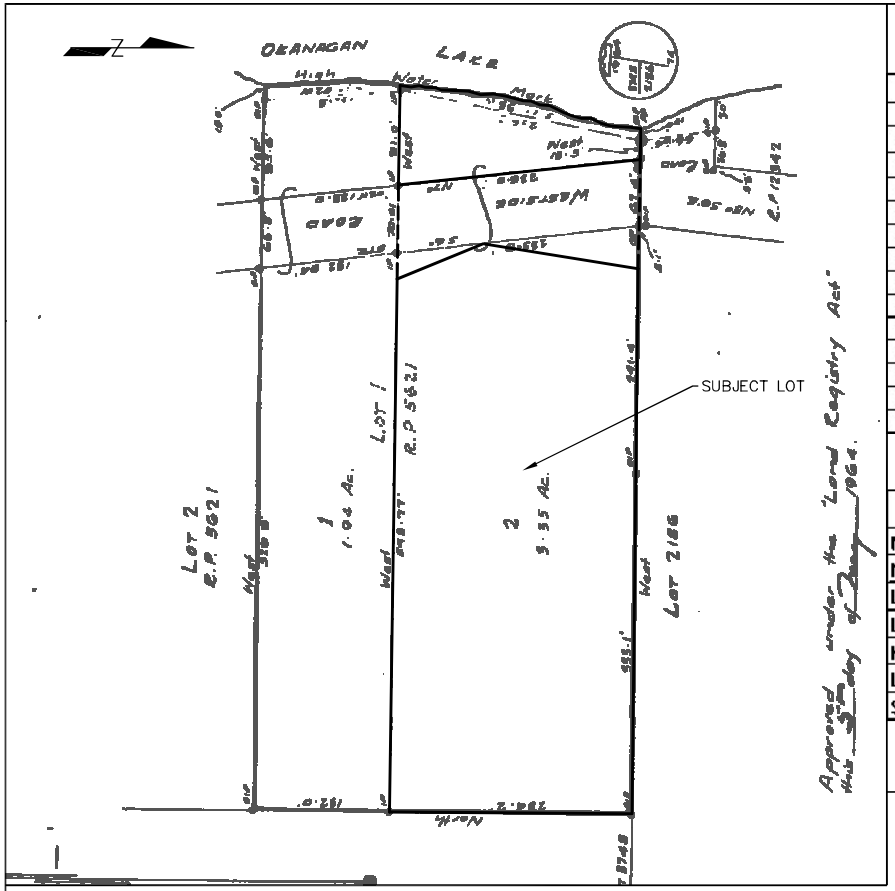
drawing title:

SECTIONS/DETAILS

SCALE:	PROJECT NO.
3/4"=1'-0"	21142
DESIGN: C.C.	
DRAWN: M.P.	S6
CHECKED BY: CHE	OF 6
DATE: JAN.11/22	


PRESENT NATURAL BOUNDARY = NATURAL BOUNDARY ACCORDING TO PLAN 14249
343 CONTOUR
Concrete Retaining wall
Rock Retaining wall
PRESENT NATURAL BOUNDARY
OKANAGAN
LAKE
LAKE LEVEL
DOCK
PT REM 2
PLAN 14249
House
(On foundation)
ADDITION
(No foundation)
DECK
Shed
Bathroom
Concrete
Fire pit
Block Retaining walls
Wood Retaining wall
Retaining wall
Wooden Stake
TOE OF SLOPE
TOP OF SLOPE
H20 pump blocks
Wood Fence
#2235
#2223

APPENDIX D
SEPTIC SYSTEM DESIGNS FROM FRANKLIN ENGINEERING LTD.



LEGAL PLAN
1:1500

NOTE:
THIS DRAWING IS PRELIMINARY AND NOT FOR CONSTRUCTION UNLESS SO SEALED AND NOTATED BELOW.

BILL OF MATERIALS*

	DESCRIPTION	MODEL	QTY
1	Leko Precast concrete dual chamber septic tank	1000 IGAL	1
2	Leko Precast concrete pump chamber assembly	48"	1
3	Eljen GSF Module	A42	36
4	Tuf-Tite Distribution Box, Plastic 7-Hole	7HD2	1
5	100mmØ (4") PVC Pipe	CSA Sewer Grade	12m (40')
6	50mmØ (2") PVC Pipe	CSA Sewer Grade	73m (240')
7	100mmØ (4") Perforated PVC Pipe	CSA Sewer Grade	20m (64')
8	Effluent-Filter Assembly 1/26" -Tuf-Tite	EF-6	1
9	Valve Boxes (Optional)	6"	2
10	Aquaworx Control Panel	Simplex IPC	1
11	**Effluent pump	**	1
12	Transducer	TRN-HX	1
*	Materials List is a guide only. Actual material amounts may differ.		

**PUMP TO BE CONFIRMED - ELEVATION FROM PUMP CHAMBER TO INDEX VALVE TO BE DETERMINED PRIOR TO PUMP SELECTION

Dose Pump Panel Settings*

Norm ON	=	1	minutes	0	seconds	
Norm OFF	=	60	minutes	0	seconds	
Lag ON	=	1	minutes	0	seconds	
Lag OFF	=	30	minutes	0	seconds	
High Alarm ON	=	36	inches from bottom of bell			
Lag Override ON	=	24	inches from bottom of bell			
Start ON	=	6	inches from bottom of bell			

NOTES:
PLEASE RECORD Z-BIAS NUMBER FROM TRANSDUCER ON INSIDE OF CONTROL PANEL DOOR

SEWAGE DISPOSAL SYSTEM FOR:
L 2, PLAN KAP14249, DISTRICT LOT 3745, ODYD, EXCEPT PLAN KAP47451
ASSESSMENT ROLL NUMBER:
20-723-14883.000
PID:
009-053-794

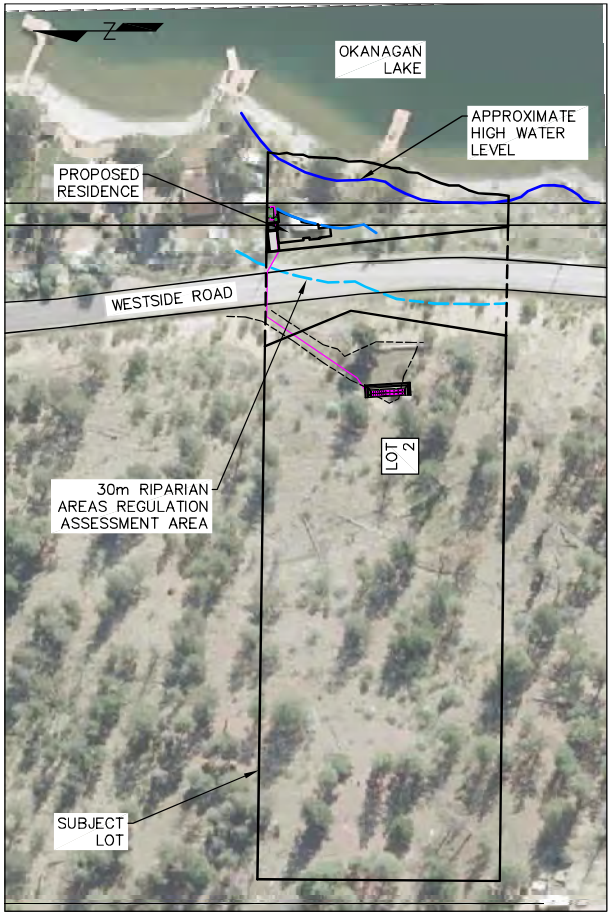
GENERAL NOTES:
1. THE TANK SHALL BE LOCATED TO PROVIDE A MIN. OF 2 % FALL FOR ALL GRAVITY SEWER DRAINS.
2. ROOF DRAINAGE SHALL BE DIVERTED AWAY FROM TREATMENT SYSTEM AND THE DISPOSAL AREA.
3. THE DISPOSAL AREA SHALL BE COVERED TO PROVIDE SURFACE DRAINAGE AND BE PROPERLY SEEDED OR SODDED TO PREVENT EROSION, AND PROPERLY MAINTAINED. HERBACEOUS PLANTS SUCH AS WILDFLOWERS AND GRASSES ARE GOOD CHOICES FOR PLANTING. GRASSES ARE ESPECIALLY DESIRABLE DUE TO THEIR FIBROUS ROOT SYSTEMS WHICH HOLD THE SOIL IN PLACE.
4. SHALLOW ROOTED SHRUBS SUCH AS CEDARS MAY BE PLANTED ON THE SIDE SLOPE OR AT THE TOE OF THE DISPOSAL AREA.
5. EFFLUENT FILTER TO BE CLEANED EVERY SIX MONTHS OF USE.
6. TANKS TO BE PUMPED OUT EVERY 3-5 YEARS OR AS DEEMED NECESSARY BY SERVICE PROVIDER.
7. DISTRIBUTION BOX TO BE INSPECTED ANNUALLY.
8. WATER CONDITIONER, WATER SOFTENER, HOT TUB, OR SWIMMING POOL DISCHARGE CANNOT BE FLUSHED INTO THE SEWAGE TREATMENT SYSTEM.

DESIGN CALCULATIONS:
A. PEAK DAILY DESIGN FLOW = 1000 L/D (220 IGPD) BASED ON A 2-BEDROOM RESIDENCE.
B. DISPOSAL AREA CONSISTS OF 2 LATERALS SPACED 3' APART ON A SAND MOUND. EACH LATERAL CONSISTS OF 8 A42 ELJEN GSF MODULES = 32' (10M) TOTALING 64' (20M) FOR THE ENTIRE FIELD.
C. BASAL AREA PEAK HYDRAULIC LOADING RATE = 65 L/M^2

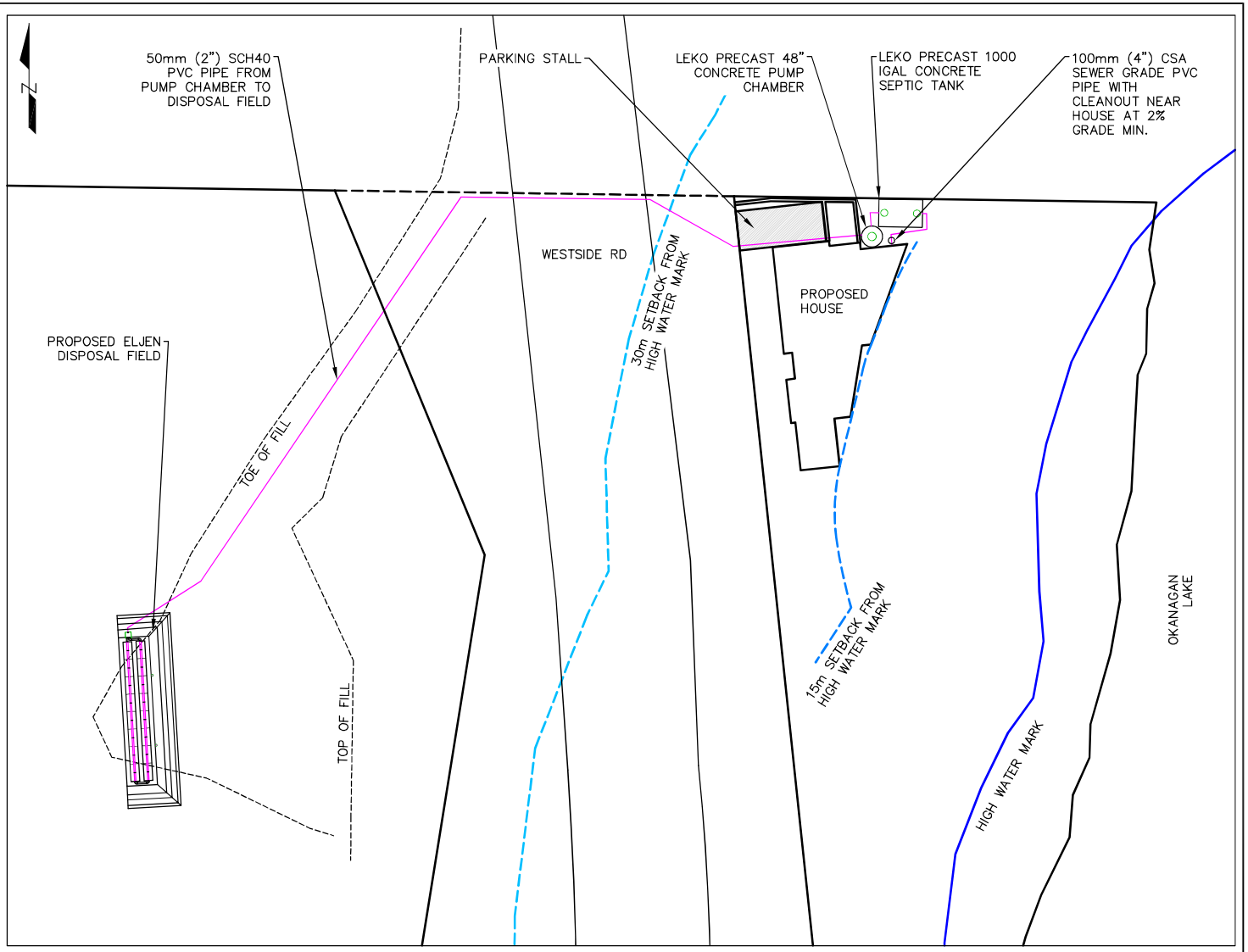
INSPECTION SCHEDULE:
1. PRE-CONSTRUCTION MEETING.
2. AFTER EXCAVATION OF DISPOSAL FIELD AREA- PRIOR TO PLACEMENT OF SAND.
3. UPON PLACEMENT OF TANKS, PRIOR TO BACKFILLING.
4. FIELD INSTALLATION COMPLETE - PIPE INSTALLED (PRIOR TO BACKFILL/LATERAL COVERAGE)

CLIENT:	PROJECT:	TITLE:				
MALONEY LOT 2 2223 WESTSIDE RD	20-102-S SEWERAGE SYSTEM	PLOT PLAN & GENERAL NOTES	THIS DRAWING IS NOT FOR CONSTRUCTION UNLESS SO SEALED. © FRANKLIN ENGINEERING LTD.	0	19/OCT/2022	ISSUED FOR UPDATE

FRANKLIN ENGINEERING LTD
Jayme Franklin, P.Eng.
250.832.8380
DRAWING NO. 20-102-01



SITE PLAN
SCALE: 1:1500



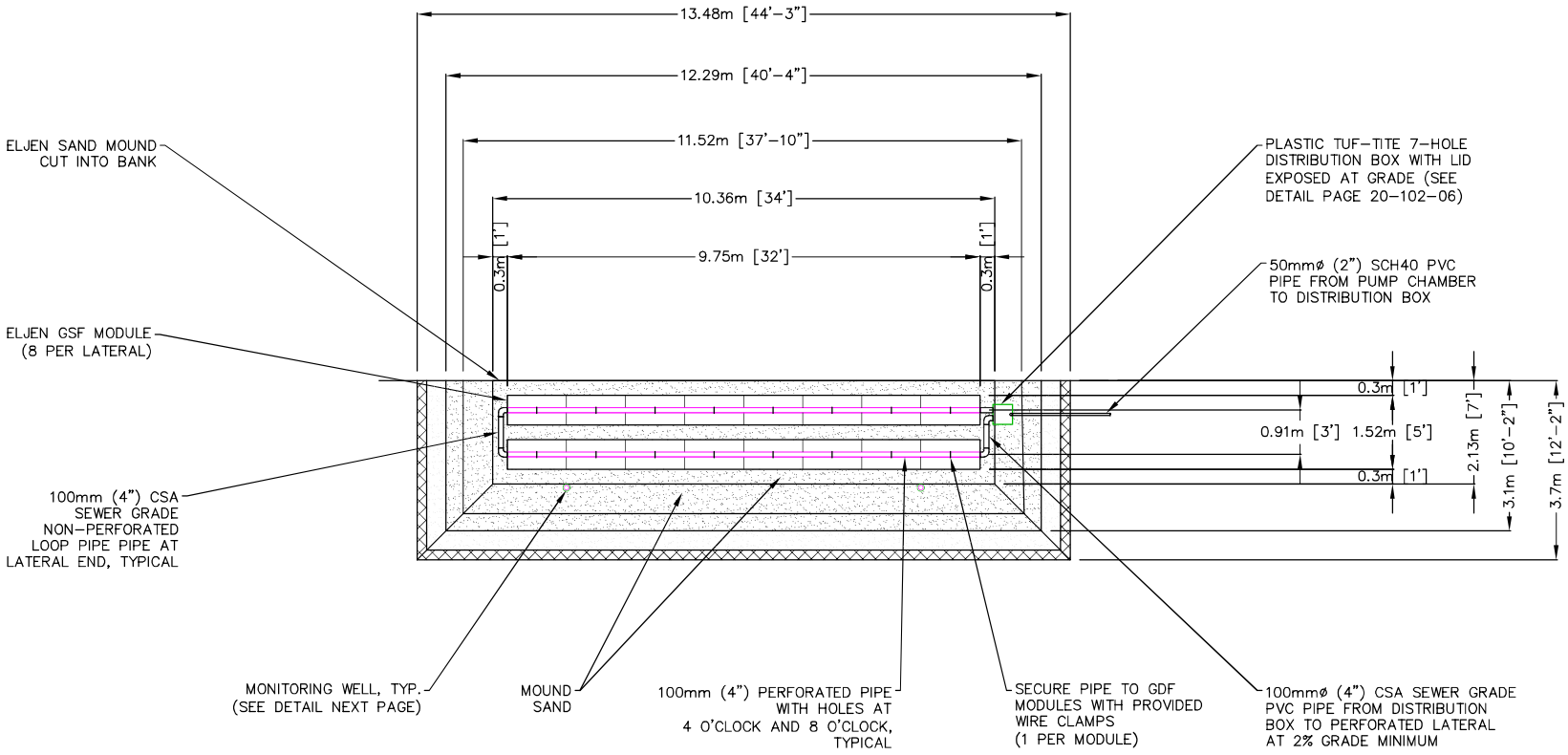
SYSTEM LOCATION
SCALE: 1:300

CLIENT:	PROJECT:	TITLE:					
MALONEY LOT 2 2223 WESTSIDE RD	20-102-S SEWERAGE SYSTEM	SITE PLAN AND SYSTEM LOCATION	THIS DRAWING IS NOT FOR CONSTRUCTION UNLESS SO SEALED. © FRANKLIN ENGINEERING LTD.				
				0	19/OCT/2022	ISSUED FOR UPDATE	

FRANKLIN ENGINEERING LTD.
Jayme Franklin, P.Eng.
250.832.8380

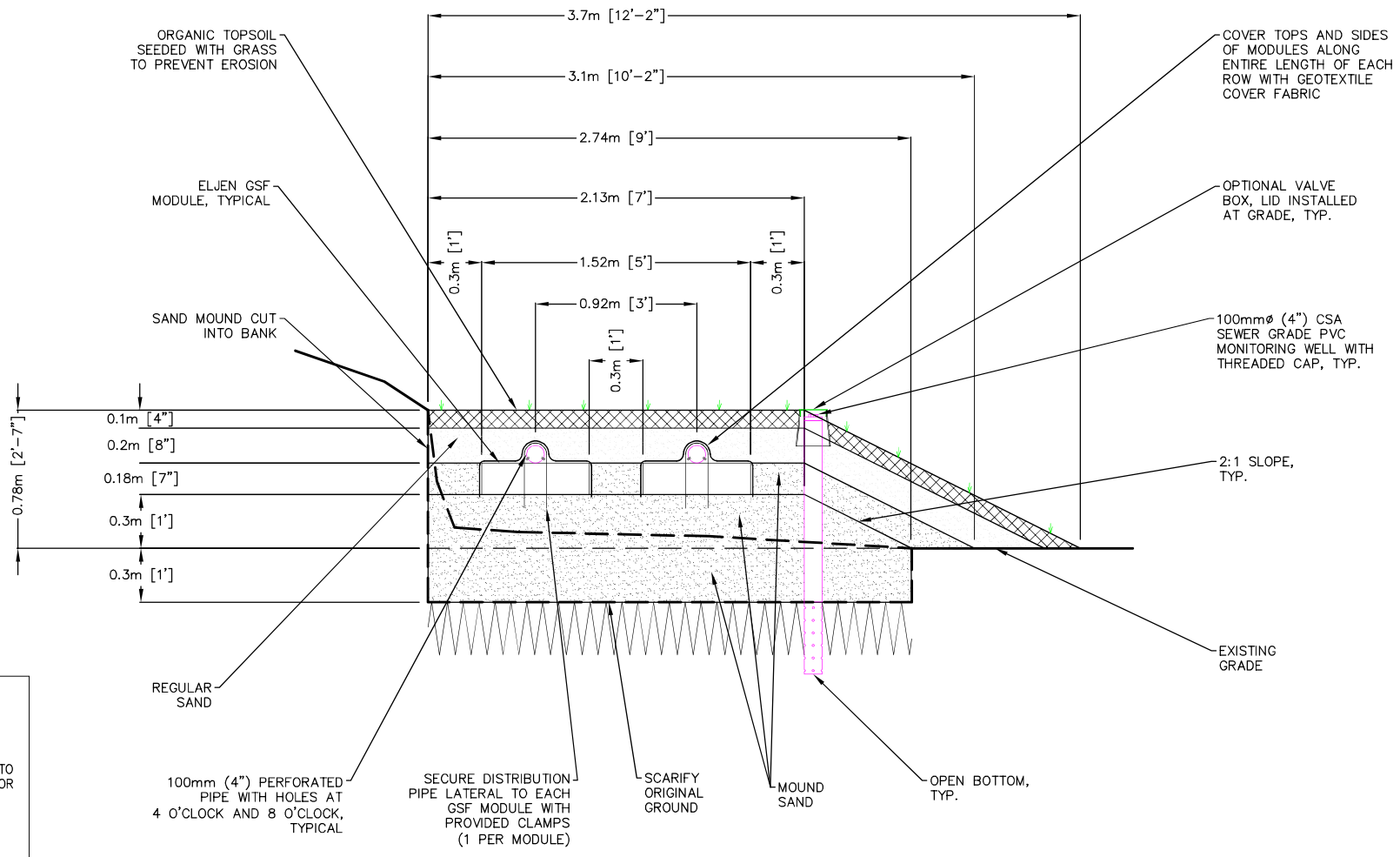
DRAWING NO. 20-102

NOTES:
1. PLACE GSF MODULES WITH PAINTED STRIPE FACING UP



MOUND PLAN
SCALE 1:100

CLIENT: MALONEY LOT 2 2223 WESTSIDE RD	PROJECT: 20-102-S SEWERAGE SYSTEM	TITLE: DISPOSAL FIELD DETAILS	THIS DRAWING IS NOT FOR CONSTRUCTION UNLESS SO SEALED. © FRANKLIN ENGINEERING LTD.				FRANKLIN ENGINEERING LTD. Jayme Franklin, P.Eng. 250.832.8380 DRAWING NO. 20-102-03
				0	19/Oct/2022	ISSUED FOR UPDATE	



NOTES:
1. SAND BED BASE TO BE SCARIFIED TO A MINIMUM DEPTH OF 0.3m (1') BELOW BASE OF EXCAVATION.

2. CONSTRUCTION TRAFFIC MUST BE KEPT TO A MINIMUM WITHIN THE DISPOSAL AREA PRIOR AND DURING CONSTRUCTION.

3. SAND BED TO BE CONSTRUCTED WITH BASE LEVEL ALONG LENGTH AND WIDTH BELOW INFILTRATORS.

MOUND SECTION
SCALE 1:50

CLIENT:	PROJECT:	TITLE:				
MALONEY LOT 2 2223 WESTSIDE RD	20-102-S SEWERAGE SYSTEM	DISPOSAL FIELD DETAILS	THIS DRAWING IS NOT FOR CONSTRUCTION UNLESS SO SEALED. © FRANKLIN ENGINEERING LTD.	0	19/OCT/2022	ISSUED FOR UPDATE

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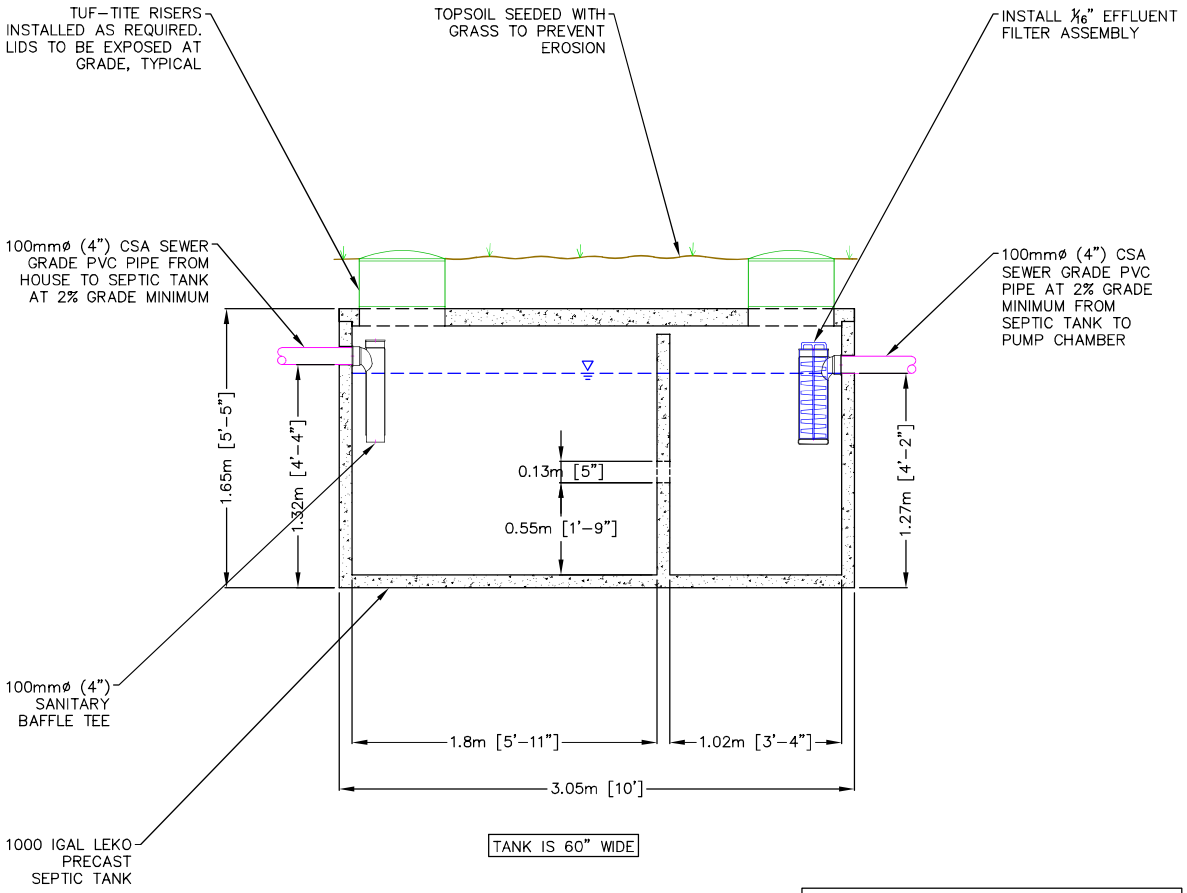
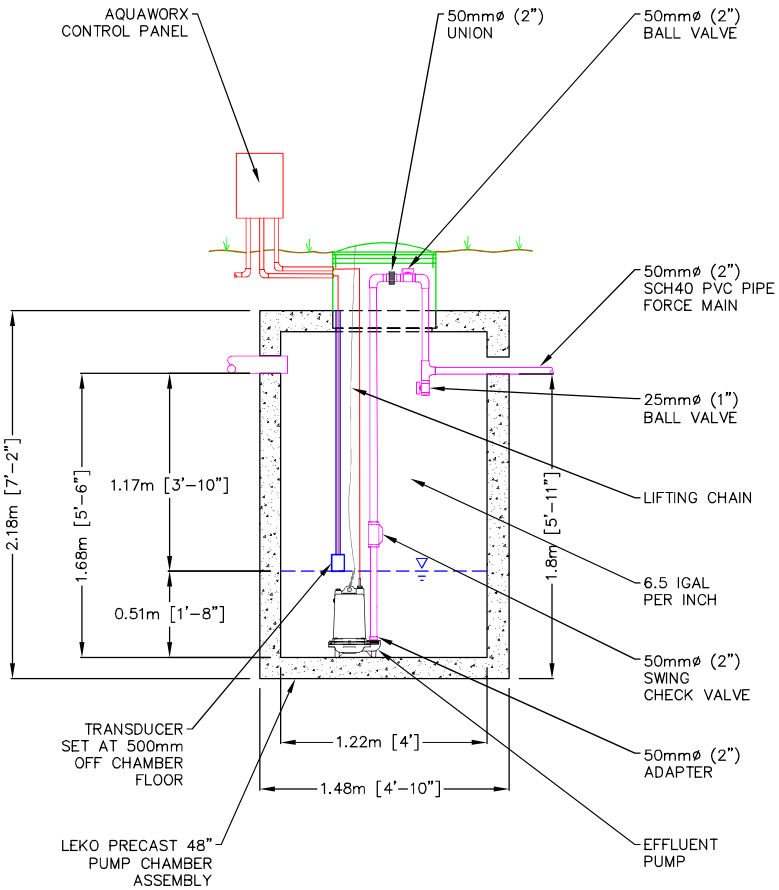
Jayme Franklin, P.Eng.
250.832.8380
DRAWING NO. 20-102-04





NOTES:
1. TANK TO BE INSTALLED ON STABLE AND LEVEL FOUNDATION SUBGRADE.
2. MANUFACTURERS BACKFILL SPECIFICATION MUST BE FOLLOWED.
3. EFFLUENT FILTER TO BE INSTALLED.

SEPTIC TANK AND PUMP CHAMBER DETAILS

SCALE: 1:25

CLIENT: MALONEY LOT 2 2223 WESTSIDE RD	PROJECT: 20-102-S SEWERAGE SYSTEM	TITLE: DISPOSAL SYSTEM DETAILS	THIS DRAWING IS NOT FOR CONSTRUCTION UNLESS SO SEALED. © FRANKLIN ENGINEERING LTD.	0	19/OCT/2022	ISSUED FOR UPDATE

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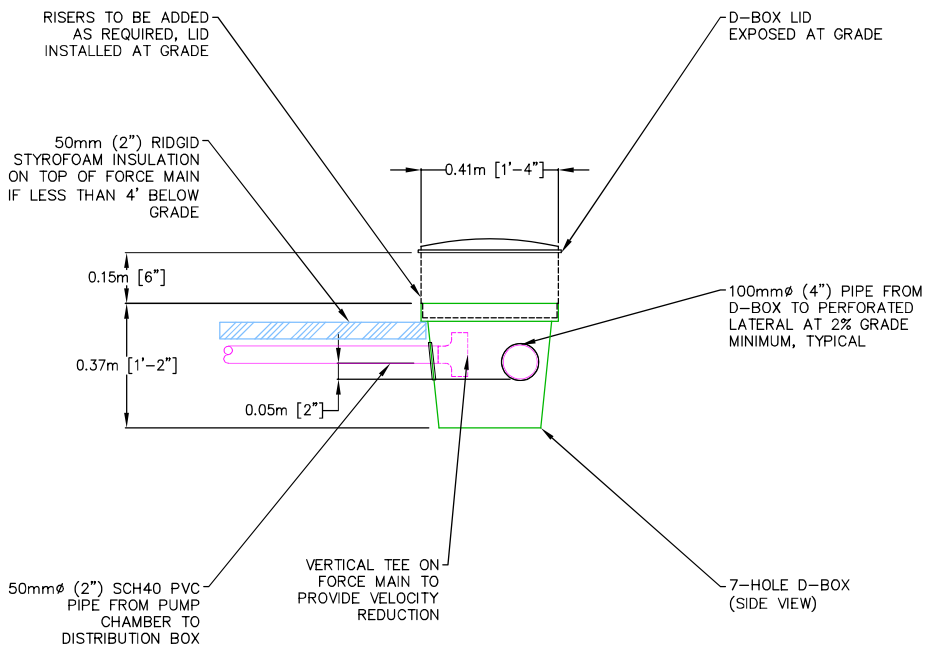
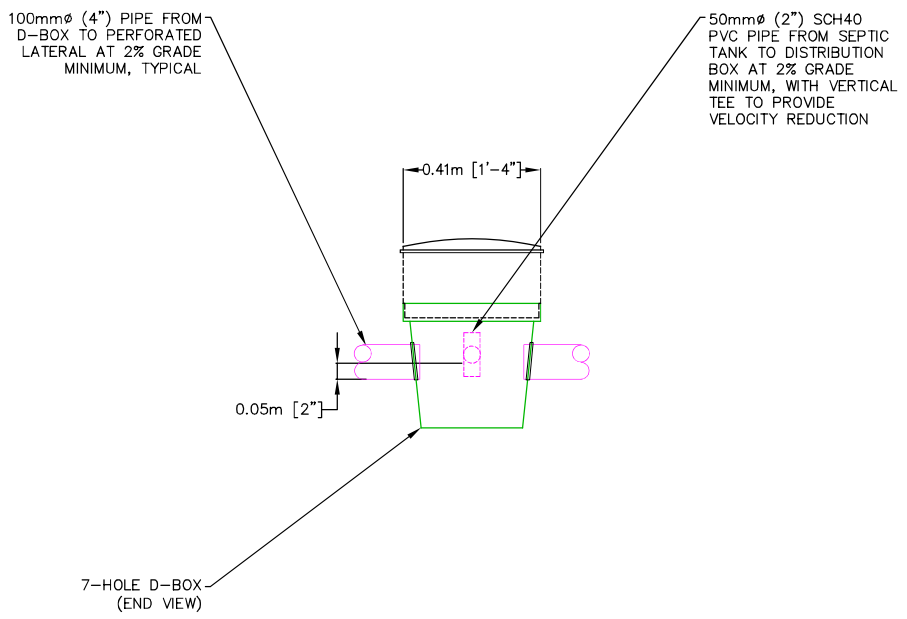
Jayme Franklin, P.Eng.
250.832.8380

DRAWING NO. 20-102-05





LATERAL END DETAILS
SCALE: 1:15

CLIENT: MALONEY LOT 2 2223 WESTSIDE RD	PROJECT: 20-102-S SEWERAGE SYSTEM	TITLE: DISPOSAL SYSTEM DETAILS	THIS DRAWING IS NOT FOR CONSTRUCTION UNLESS SO SEALED. © FRANKLIN ENGINEERING LTD.			
				0	19/Oct/2022	ISSUED FOR UPDATE

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Jayme Franklin, P.Eng.
250.832.8380
DRAWING NO. 20-102-06

APPENDIX E
DANGER TREE ASSESSMENT BY LUMBERJACK CLEARING

Basic Tree Risk Assessment Form

Client: Maloney Construction Ltd. Date: May 24, 2021 Time: 11:00AM

Address/Tree location: 2223 Westside Road North, Kelowna, BC V1Z 3T5 Tree no.: 1 Sheet: 1 of 3

Tree species: Douglas Fir dbh: 19 inches Height: 45 feet Crown spread dia.: 16 feet approx.

Assessor(s): Brandon Andres - Lumberjack Clearing Time frame: 1-2 years Tools used: None

Target Assessment

Target number	Target description	Target zone: Target within drip line	Target zone: Target within 1 x Ht.	Target zone: Target within 1.5 x Ht.	Occupancy rate (1–rare, 2 – occasional, 3 – frequent, 4 – constant)	Practical to move target?	Restriction practical?
1	Danger Tree - High traffic road with power lines			✓	3	No	No
2							
3							
4							

Site Factors

History of failures Another tree fell during the wind storm - page 2 of 3 in report **Topography** Flat ☐ Slope ▣ _____% **Aspect** West

Site changes None ☐ Grade change ☐ Site clearing ■ Changed soil hydrology ■ Root cuts ☐ Describe Salt from road, tree has been topped

Soil conditions Limited volume ☐ Saturated ☐ Shallow ■ Compacted ☐ Pavement over roots ☐ _____% Describe Sandy, rock, on steep grade

Prevailing wind direction NE-S **Common weather** Strong winds ■ Ice ■ Snow ■ Heavy rain ■ Describe Site is near lake

Tree Health and Species Profile

Vigor Low ■ Normal ☐ High ☐ **Foliage** None (seasonal) ☐ None (dead) ☐ Normal _____% Chlorotic _____% Necrotic 40 %

Pests None **Abiotic** Road salt, road enbankment and being topped

Species failure profile Branches ■ Trunk ☐ Roots ☐ Describe _____

Load Factors

Wind exposure Protected ☐ Partial ☐ Full ■ Wind funneling ☐ _____ **Relative crown size** Small ☐ Medium ▣ Large ☐

Crown density Sparse ■ Normal ☐ Dense ☐ **Interior branches** Few ■ Normal ☐ Dense ☐ **Vines/Mistletoe/Moss** ☐ None

Recent or planned change in load factors Wind storm and construction

Tree Defects and Conditions Affecting the Likelihood of Failure

— Crown and Branches —

Unbalanced crown ■ LCR 44.4 %

Dead twigs/branches ■ 30 % overall Max. dia. 6 in

Broken/Hangers Number _____ Max. dia. _____

Over-extended branches ■

Pruning history

Crown cleaned ☐ Thinned ☐ Raised ☐

Reduced ☐ Topped ■ Lion-tailed ☐

Flush cuts ☐ Other _____

Cracks ☐ _____ Lightning damage ☐

Codominant ☐ _____ Included bark ■

Weak attachments ■ Regrwth frm topping Cavity/Nest hole ____% circ.

Previous branch failures ■ _____ Similar branches present ■

Dead/Missing bark ☐ Cankers/Galls/Burls ☐ Sapwood damage/decay ☐

Conks ☐ Heartwood decay ☐ _____

Response growth _____

Main concern(s) Previously topped causong regrowth - unstable with decay

Load on defect N/A ■ Minor ☐ Moderate ☐ Significant ☐

Likelihood of failure Improbable ☐ Possible ☐ Probable ■ Imminent ☐

— Trunk —

Dead/Missing bark ☐ Abnormal bark texture/color ■

Codominant stems ☐ Included bark ■ Cracks ☐

Sapwood damage/decay ☐ Cankers/Galls/Burls ☐ Sap ooze ■

Lightning damage ☐ Heartwood decay ☐ Conks/Mushrooms ☐

Cavity/Nest hole _____ % circ. Depth _____ Poor taper ■

Lean 15 ° Corrected? New top grew corrected

Response growth No

Main concern(s) None

Load on defect N/A ☐ Minor ☐ Moderate ■ Significant ☐

Likelihood of failure

Improbable ☐ Possible ☐ Probable ■ Imminent ☐

— Roots and Root Collar —

Collar buried/Not visible ■ Depth 6 in Stem girdling ☐

Dead ☐ Decay ☐ Conks/Mushrooms ☐

Ooze ☐ Cavity ☐ _____% circ.

Cracks ☐ Cut/Damaged roots ☐ Distance from trunk _____

Root plate lifting ☐ Soil weakness ■

Response growth _____

Main concern(s) None

Load on defect N/A ■ Minor ☐ Moderate ☐ Significant ☐

Likelihood of failure

Improbable ☐ Possible ■ Probable ☐ Imminent ☐

Risk Categorization

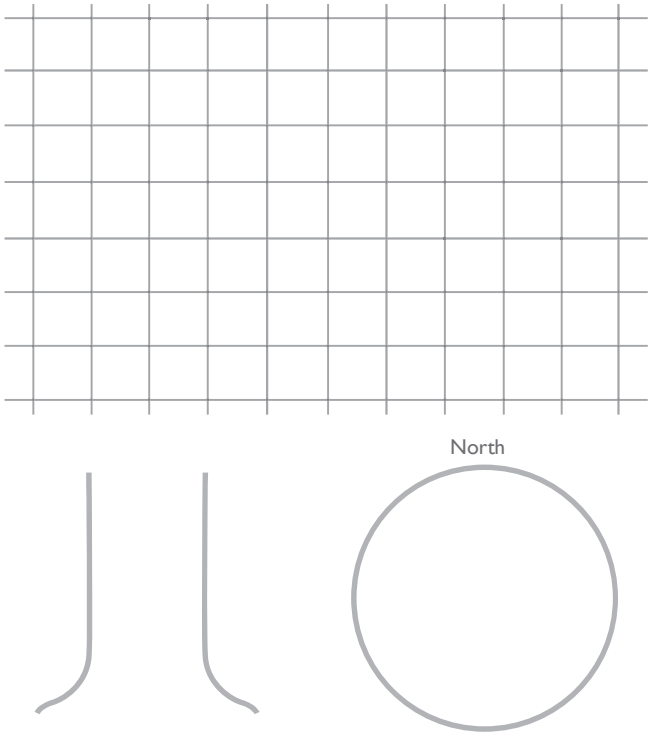
Condition number	Tree part	Conditions of concern	Part size	Fall distance	Target number	Target protection	Likelihood: Failure: Improbable	Likelihood: Failure: Possible	Likelihood: Failure: Probable	Likelihood: Failure: Imminent	Likelihood: Impact: Very low	Likelihood: Impact: Low	Likelihood: Impact: Medium	Likelihood: Impact: High	Likelihood: Failure & Impact (from Matrix 1): Unlikely	Likelihood: Failure & Impact (from Matrix 1): Somewhat	Likelihood: Failure & Impact (from Matrix 1): Likely	Likelihood: Failure & Impact (from Matrix 1): Very likely	Consequences: Negligible	Consequences: Minor	Consequences: Significant	Consequences: Severe	Risk rating of part (from Matrix 2)
1	Top	Top would hit road	6 in	20ft	1	None	○	○	●	○	○	○	●	○	○	●	○	○	○	○		○	Mod.
							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
2							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
3							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
4							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	

Matrix 1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impacting Target			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk rating matrix.

Likelihood of Failure & Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low



Notes, explanations, descriptions _____

Mitigation options Tree should be removed before further construction _____ **Residual risk** Low

_____ **Residual risk** _____

_____ **Residual risk** _____

_____ **Residual risk** _____

Overall tree risk rating Low ☐ Moderate ■ High ☐ Extreme ☐ **Work priority** 1 ☐ 2 ☐ 3 ■ 4 ☐

Overall residual risk Low ■ Moderate ☐ High ☐ Extreme ☐ **Recommended inspection interval** Quarterly

Data ☐ Final ■ Preliminary **Advanced assessment needed** ☐ No ☐ Yes-Type/Reason _____

Inspection limitations ■ None ☐ Visibility ☐ Access ☐ Vines ☐ Root collar buried Describe _____

TREE No. 1

Power Line

Basic Tree Risk Assessment Form

Client Maloney Construction Ltd. Date May 24, 2021 Time 11:15AM

Address/Tree location 2223 Westside Road North, Kelowna, BC V1Z 3T5 Tree no. 2 Sheet 2 of 3

Tree species Ponderosa Pine dbh 24 inches Height 70 ft Crown spread dia. 30 ft

Assessor(s) Brandon Andres - Lumberjack Clearing Time frame 1-5 years Tools used None

Target Assessment

Target number	Target description	Target zone: Target within drip line	Target zone: Target within 1 x Ht.	Target zone: Target within 1.5 x Ht.	Occupancy rate (1–rare 2 – occasional 3 – frequent 4 – constant)	Practical to move target?	Restriction practical?
1	Danger Tree - Moderate traffic beach area near boat dock and fire pit	✓		✓	3	No	No
2	Roots weaken due to growing into protective retaining wall on the shore of Lake Okanagan						
3	Potential danger to future house location - Tree should have never						
4	been planted in this location - Sister tree 20ft from location blew down in wind storm						

Site Factors

History of failures Tree on other side of dock blown down in wind storm **Topography** Flat ■ Slope ☐ _____% **Aspect** _____

Site changes None ☐ Grade change ☐ Site clearing ☐ Changed soil hydrology ■ Root cuts ☐ Describe Truck is back filled

Soil conditions Limited volume ☐ Saturated ■ Shallow ☐ Compacted ☐ Pavement over roots ☐ _____% Describe Overfilled / Dry

Prevailing wind direction NE-S **Common weather** Strong winds ■ Ice ■ Snow ■ Heavy rain ■ Describe _____

Tree Health and Species Profile

Vigor Low ☐ Normal ■ High ☐ **Foliage** None (seasonal) ☐ None (dead) ☐ Normal 95 % Chlorotic _____% Necrotic _____%

Pests None **Abiotic** _____

Species failure profile Branches ☐ Trunk ☐ Roots ☐ Describe _____

Load Factors

Wind exposure Protected ☐ Partial ☐ Full ☐ Wind funneling ☐ _____ **Relative crown size** Small ☐ Medium ☐ Large ■

Crown density Sparse ☐ Normal ☐ Dense ■ **Interior branches** Few ☐ Normal ☐ Dense ■ **Vines/Mistletoe/Moss** ☐ _____

Recent or planned change in load factors Fututre construction

Tree Defects and Conditions Affecting the Likelihood of Failure

— Crown and Branches —

Unbalanced crown ■ LCR 95 %

Dead twigs/branches ☐ 5 % overall Max. dia. _____

Broken/Hangers Number 1 Max. dia. 4in

Over-extended branches ☐

Pruning history

Crown cleaned ☐ Thinned ☐ Raised ☐

Reduced ☐ Topped ☐ Lion-tailed ☐

Flush cuts ☐ Other _____

Cracks ☐ _____ Lightning damage ☐

Codominant ☐ _____ Included bark ☐

Weak attachments ☐ _____ Cavity/Nest hole ____% circ.

Previous branch failures ■ _____ Similar branches present ☐

Dead/Missing bark ☐ Cankers/Galls/Burls ☐ Sapwood damage/decay ☐

Conks ☐ Heartwood decay ☐ _____

Response growth _____

Main concern(s) 1 fir and 1 pine growing into canopy. pine has broken dead top

Load on defect N/A ☐ Minor ☐ Moderate ■ Significant ☐ _____

Likelihood of failure Improbable ☐ Possible ☐ Probable ■ Imminent ■ _____

— Trunk —

Dead/Missing bark ☐ Abnormal bark texture/color ☐

Codominant stems ☐ Included bark ☐ Cracks ☐

Sapwood damage/decay ☐ Cankers/Galls/Burls ☐ Sap ooze ☐

Lightning damage ☐ Heartwood decay ☐ Conks/Mushrooms ☐

Cavity/Nest hole _____ % circ. Depth _____ Poor taper ☐

Lean 5 ° Corrected? _____

Response growth _____

Main concern(s) pine next to trunk grows around trunk girdling stem

Load on defect N/A ☐ Minor ☐ Moderate ■ Significant ☐

Likelihood of failure

Improbable ☐ Possible ■ Probable ☐ Imminent ☐

— Roots and Root Collar —

Collar buried/Not visible ■ Depth over 12ir Stem girdling ■

Dead ☐ Decay ☐ Conks/Mushrooms ☐

Ooze ☐ Cavity ☐ _____% circ.

Cracks ☐ Cut/Damaged roots ☐ Distance from trunk _____

Root plate lifting ☐ Soil weakness ☐

Response growth _____

Main concern(s) root collar buried

Load on defect N/A ☐ Minor ☐ Moderate ☐ Significant ■

Likelihood of failure

Improbable ☐ Possible ☐ Probable ■ Imminent ☐

Risk Categorization

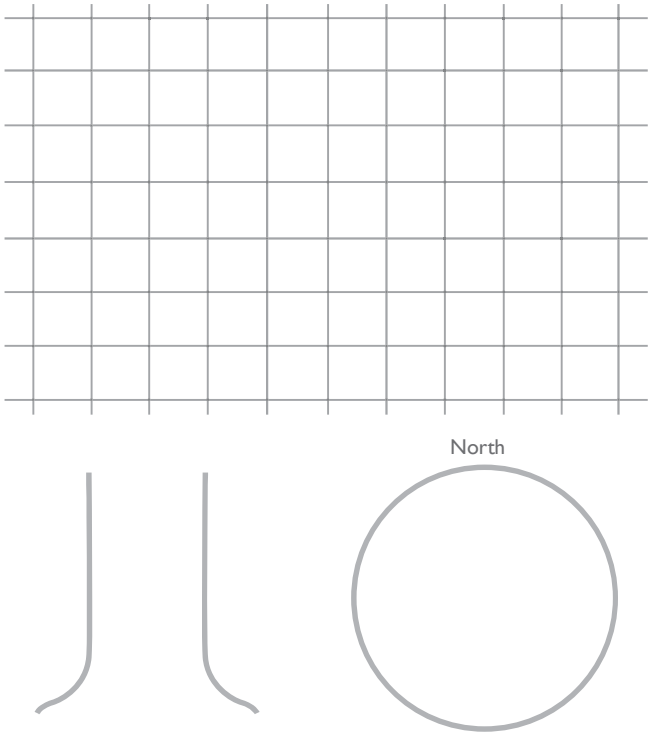
Condition number	Tree part	Conditions of concern	Part size	Fall distance	Target number	Target protection	Likelihood: Failure: Improbable	Failure: Possible	Failure: Probable	Failure: Imminent	Likelihood: Impact: Very low	Impact: Low	Impact: Medium	Impact: High	Failure & Impact (from Matrix 1): Unlikely	Somewhat	Likely	Very likely	Consequences: Negligible	Minor	Significant	Severe	Risk rating of part (from Matrix 2)
1	trunk	girdling trunk from nearby pine	24in	75	x		○	●	○	○	○	○	○	●	○	●	○	○	○	○	○		Mod.
							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
2	root system						○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
			4ft	75	x		○	○	●	○	○	○	○	●	○	○		○	○	○	○		High
							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
3							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
4							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	

Matrix 1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impacting Target			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk rating matrix.

Likelihood of Failure & Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low



Notes, explanations, descriptions smaller pine growing beside has grown around tree of concern causeing a wound and girdling threwout t the tree. this along with the stump/root system being over filled

Mitigation options removal recommended with stem girdling and recent tree similar tree blown down on property **Residual risk** low

Residual risk _____

Residual risk _____

Residual risk _____

Overall tree risk rating Low ☐ Moderate ☐ High ■ Extreme ☐ **Work priority** 1 ■ 2 ☐ 3 ☐ 4 ☐

Overall residual risk Low ■ Moderate ☐ High ☐ Extreme ☐ **Recommended inspection interval** Monthly

Data ☐Final ■Preliminary **Advanced assessment needed** ☐No ☐Yes-Type/Reason _____

Inspection limitations ■None ☐Visibility ☐Access ☐Vines ☐Root collar buried Describe _____

TREE No. 2

Basic Tree Risk Assessment Form

Client Maloney Construction Ltd. Date May 24, 2021 Time 11:30 AM

Address/Tree location 2223 Westside Road North, Kelowna, BC V1Z 3T5 Tree no. 3 Sheet 3 of 3

Tree species Ponderosa Pine dbh 22 in Height 60 ft Crown spread dia. 30 ft

Assessor(s) Brandon Andres - Lumberjack Clearing Time frame 0 Years Tools used None

Target Assessment

Target number	Target description	Target zone: Target within drip line	Target zone: Target within 1 x Ht.	Target zone: Target within 1.5 x Ht.	Occupancy rate (1–rare 2 – occasional 3 – frequent 4 – constant)	Practical to move target?	Restriction practical?
1	Danger Tree - Low traffic driveway - hit retaining wall of driveway		✓		2	No	No
2							
3							
4							

Site Factors

History of failures Tree is on ground - blown over in wind storm **Topography** Flat ☐ Slope ■ 15 % **Aspect** East

Site changes None ☐ Grade change ☐ Site clearing ☐ Changed soil hydrology ■ Root cuts ☐ Describe Recent Flooding

Soil conditions Limited volume ☐ Saturated ■ Shallow ■ Compacted ☐ Pavement over roots ☐ _____% Describe _____

Prevailing wind direction NE-S **Common weather** Strong winds ■ Ice ■ Snow ■ Heavy rain ■ Describe _____

Tree Health and Species Profile

Vigor Low ☐ Normal ■ High ☐ **Foliage** None (seasonal) ☐ None (dead) ☐ Normal 100 % Chlorotic _____% Necrotic _____%

Pests _____ **Abiotic** _____

Species failure profile Branches ☐ Trunk ☐ Roots ☐ Describe _____

Load Factors

Wind exposure Protected ☐ Partial ☐ Full ■ Wind funneling ☐ _____ **Relative crown size** Small ☐ Medium ☐ Large ■

Crown density Sparse ☐ Normal ☐ Dense ■ **Interior branches** Few ☐ Normal ■ Dense ☐ **Vines/Mistletoe/Moss** ☐ _____

Recent or planned change in load factors _____

Tree Defects and Conditions Affecting the Likelihood of Failure

— Crown and Branches —

Unbalanced crown ☐ LCR _____%

Dead twigs/branches ☐ ____% overall Max. dia. _____

Broken/Hangers Number _____ Max. dia. _____

Over-extended branches ☐

Pruning history

Crown cleaned ☐ Thinned ☐ Raised ☐

Reduced ☐ Topped ☐ Lion-tailed ☐

Flush cuts ☐ Other _____

Cracks ☐ _____ Lightning damage ☐

Codominant ☐ _____ Included bark ☐

Weak attachments ☐ _____ Cavity/Nest hole ____% circ.

Previous branch failures ☐ _____ Similar branches present ☐

Dead/Missing bark ☐ Cankers/Galls/Burls ☐ Sapwood damage/decay ☐

Conks ☐ Heartwood decay ☐ _____

Response growth _____

Main concern(s) _____

Load on defect N/A ☐ Minor ☐ Moderate ☐ Significant ☐ _____

Likelihood of failure Improbable ☐ Possible ☐ Probable ☐ Imminent ☐ _____

— Trunk —

Dead/Missing bark ☐ Abnormal bark texture/color ☐

Codominant stems ☐ Included bark ☐ Cracks ☐

Sapwood damage/decay ☐ Cankers/Galls/Burls ☐ Sap ooze ☐

Lightning damage ☐ Heartwood decay ☐ Conks/Mushrooms ☐

Cavity/Nest hole _____ % circ. Depth _____ Poor taper ☐

Lean _____° Corrected? _____

Response growth _____

Main concern(s) _____

Load on defect N/A ☐ Minor ☐ Moderate ☐ Significant ☐

Likelihood of failure

Improbable ☐ Possible ☐ Probable ☐ Imminent ☐

— Roots and Root Collar —

Collar buried/Not visible ☐ Depth _____ Stem girdling ☐

Dead ☐ Decay ☐ Conks/Mushrooms ☐

Ooze ☐ Cavity ☐ _____% circ.

Cracks ☐ Cut/Damaged roots ☐ Distance from trunk _____

Root plate lifting ■ Soil weakness ☐

Response growth _____

Main concern(s) tree has uprooted and blown over

Load on defect N/A ☐ Minor ☐ Moderate ☐ Significant ☐

Likelihood of failure

Improbable ☐ Possible ☐ Probable ☐ Imminent ■

Risk Categorization

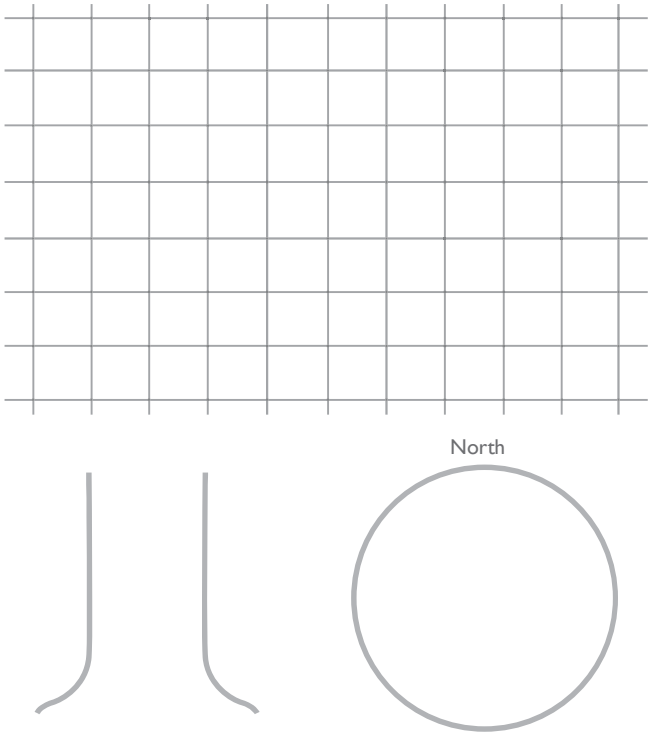
Condition number	Tree part	Conditions of concern	Part size	Fall distance	Target number	Target protection	Likelihood: Failure: Improbable	Failure: Possible	Failure: Probable	Failure: Imminent	Likelihood: Impact: Very low	Impact: Low	Impact: Medium	Impact: High	Failure & Impact (from Matrix 1): Unlikely	Somewhat	Likely	Very likely	Consequences: Negligible	Minor	Significant	Severe	Risk rating of part (from Matrix 2)
1	root system		4ft	60in	1		○	○	○	●	○	○	●	○	○	○	●	○	○		○	○	Mod.
							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
2							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
3							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
4							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	
							○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	

Matrix 1. Likelihood matrix.

Likelihood of Failure	Likelihood of Impacting Target			
	Very low	Low	Medium	High
Imminent	Unlikely	Somewhat likely	Likely	Very likely
Probable	Unlikely	Unlikely	Somewhat likely	Likely
Possible	Unlikely	Unlikely	Unlikely	Somewhat likely
Improbable	Unlikely	Unlikely	Unlikely	Unlikely

Matrix 2. Risk rating matrix.

Likelihood of Failure & Impact	Consequences of Failure			
	Negligible	Minor	Significant	Severe
Very likely	Low	Moderate	High	Extreme
Likely	Low	Moderate	High	High
Somewhat likely	Low	Low	Moderate	Moderate
Unlikely	Low	Low	Low	Low



Notes, explanations, descriptions _____

Mitigation options Tree is already on ground - remove branches and trunk, leave root system on shore **Residual risk** low

Residual risk _____

Residual risk _____

Residual risk _____

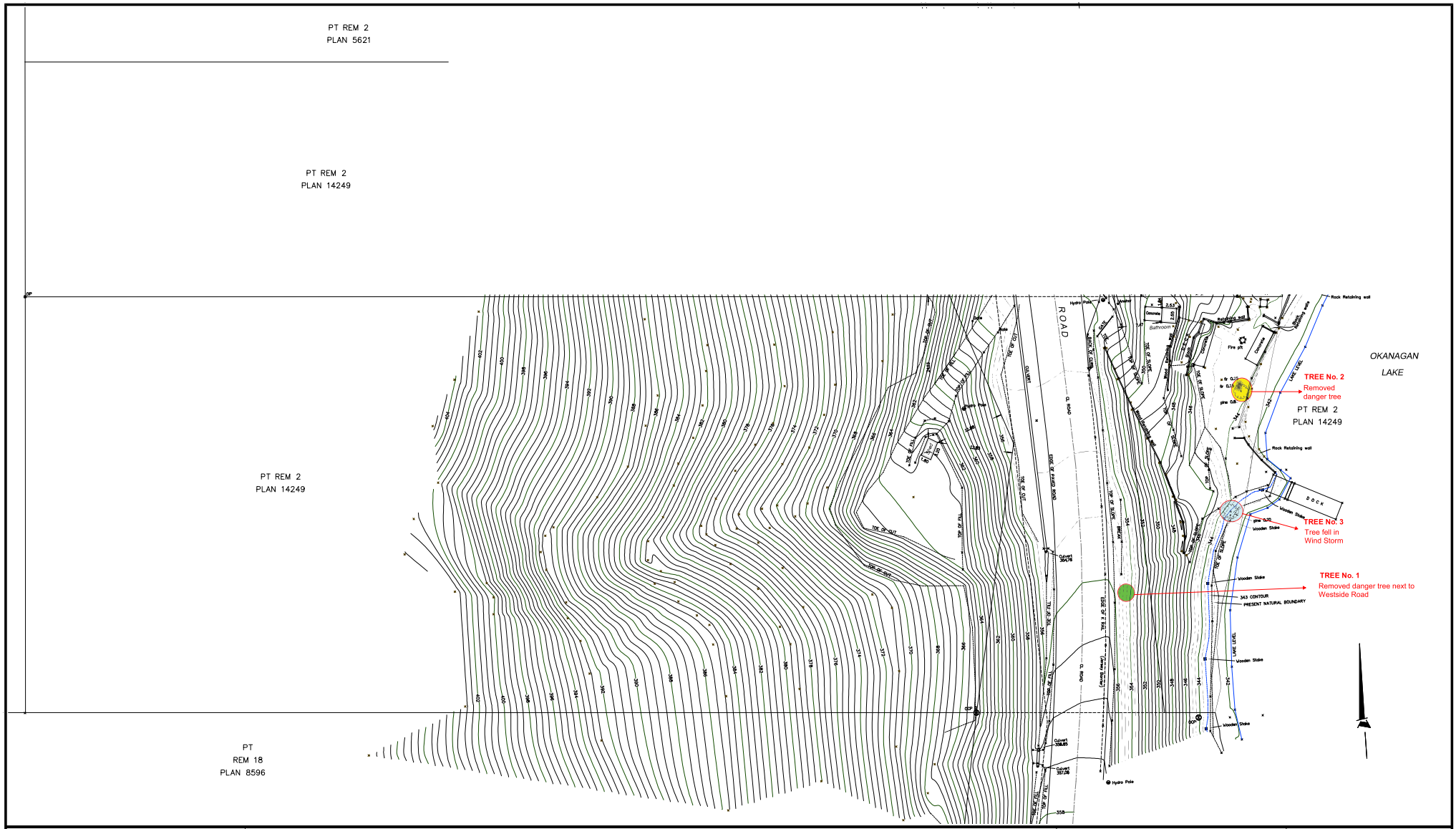
Overall tree risk rating Low ☐ Moderate ☐ High ☐ Extreme ☐ **Work priority** 1 ☐ 2 ☐ 3 ■ 4 ☐

Overall residual risk Low ☐ Moderate ☐ High ☐ Extreme ☐ **Recommended inspection interval** None - must mitigate

Data ☐Final ■Preliminary **Advanced assessment needed** ■No ☐Yes-Type/Reason _____

Inspection limitations ■None ☐Visibility ☐Access ☐Vines ☐Root collar buried Describe _____

TREE No. 3



LEGEND:

Elevations are in metres are based on GNSS Observations.

Contour interval – 0.5m

TITLE:

SITE PLAN OF LOT 2, DISTRICT LOT 3745, OSOYOOS DIVISION YALE DISTRICT, PLAN 14249, EXCEPT PLAN KAP47451

DRAWN BY:

RUNNALLS DENBY
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Phone: (250)763-7322
Fax: (250)763-4413

CLIENT: *KATAWA CONSTRUCTION LTD.*

SCALE:	1:300 (22"x34")
DATE:	OCT. 8, 2019
DWG:	15567 SITE
FILE No:	15567
REV.	0