ECOLOGICAL ASSESSMENT REPORT FOR PROPOSED AFFORDABLE HOUSING PROPERTY

Lot 1 of proposed subdivision of:
Lot B, Section 7, Mayne Island, Plan 27091
Civic Address: 375 Village Bay Road
September 21st, 2020

Prepared For
Mayne Island Housing Society
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Executive Summary

This report has been prepared for Lot 1 of the Proposed Subdivision of Lot B, Section 7, Mayne Island, Plan 27091 (Map 1) to provide an assessment of the ecological values present on the site, an overview of the proposed property's surrounding land-use and ecological context, and, site specific recommendations for incorporating ecological values into development design (planning for a proposed ten housing unit development is in conceptual and exploratory stages).

Ecological Values:

- Contextually, the proposed property lies on the margin of a tract of contiguous forest that extends from the protected areas on Mt. Parke through residentially zoned properties on its north facing slope through Indian Reserve No. 8 to Helen Pt.
- The Islands Trust Conservancy Regional Conservation Plan 2018-2027 shows the proposed property as having a "high" relative ecological ranking.
- The proposed property includes 5 old-growth Douglas-fir trees and 3 large diameter wildlife trees (rare on Mayne Island) positioned within a matrix of regenerating forest that was logged in the early 2000's and a narrow band of mature forest that parallels Village Bay Road.
- A large area of the proposed property (56%) is characterized by moist and wet regenerating forest ecosystems. These areas are sensitive to disturbance. Intact examples of these ecosystems are rare on Mayne Island due to historic forest clearing for agricultural use.
- The property includes a small portion characterized by the Provincially red-listed Douglas-fir / dull Oregon-grape Ecological Community (*Pseudotsuga menziesii / Berberis nervosa*).
- No Provincially red or blue listed species-at-risk were observed or are known to occur on the proposed property (targeted inventories were not completed).

Disturbance:

- The property has been heavily disturbed and altered through logging, road building and ditching and is located directly adjacent to a small lot subdivision to the north, a developed residence to the east, a recently cleared and developed residential lot to the west, Village Bay Road to the immediate south, and, a recently logged (patch cut) residential property south of the road.
- The surface hydrology of the property has been heavily impacted through past land-use and development including:
    - Construction of ditches, logging roads and compacted landing areas along with removal of forest cover on the property.
    - Logging, ditching and residential development on surrounding properties.
    - Construction of Village Bay Road.

Recommendations:

- Minimize forest fragmentation.
- Protect remnant old forest structures.
- Minimize impacts to wetter forest ecosystems and ecosystems-at-risk.
- Conduct further consultation on hydrological impacts and mitigation requirements.
- Implement ecological and hydrological restoration in areas outside of the development footprint.

Introduction

This report has been prepared for the Mayne Island Housing Society to provide an ecological assessment of the current condition of Lot 1 of the proposed subdivision of Lot B, Section 7, Mayne Island, Plan 27091 (Map 1). This report provides an assessment of the ecological values present on the site, an overview of the proposed property's surrounding land-use and ecological context, and site-specific recommendations for incorporating ecological values into development design.

At the time the assessment was completed, plans for the development were in a conceptual design stage, waiting to be informed by recommendations from this report.

Site characteristics were mapped, inventoried, and described during 3 site visits on August 24th, September 5th, and September 14th.

Ecological context for the proposed property was determined through observation of 2017 aerial photography, direct observation of neighbouring lands from the property boundaries, and examination of available mapping and reports from the Islands Trust including zoning maps, Islands Trust Conservancy Regional Conservation Plan 2018-2027[1] and the Contiguous Forest Mapping in the Islands Trust Area Report (2020)[2].

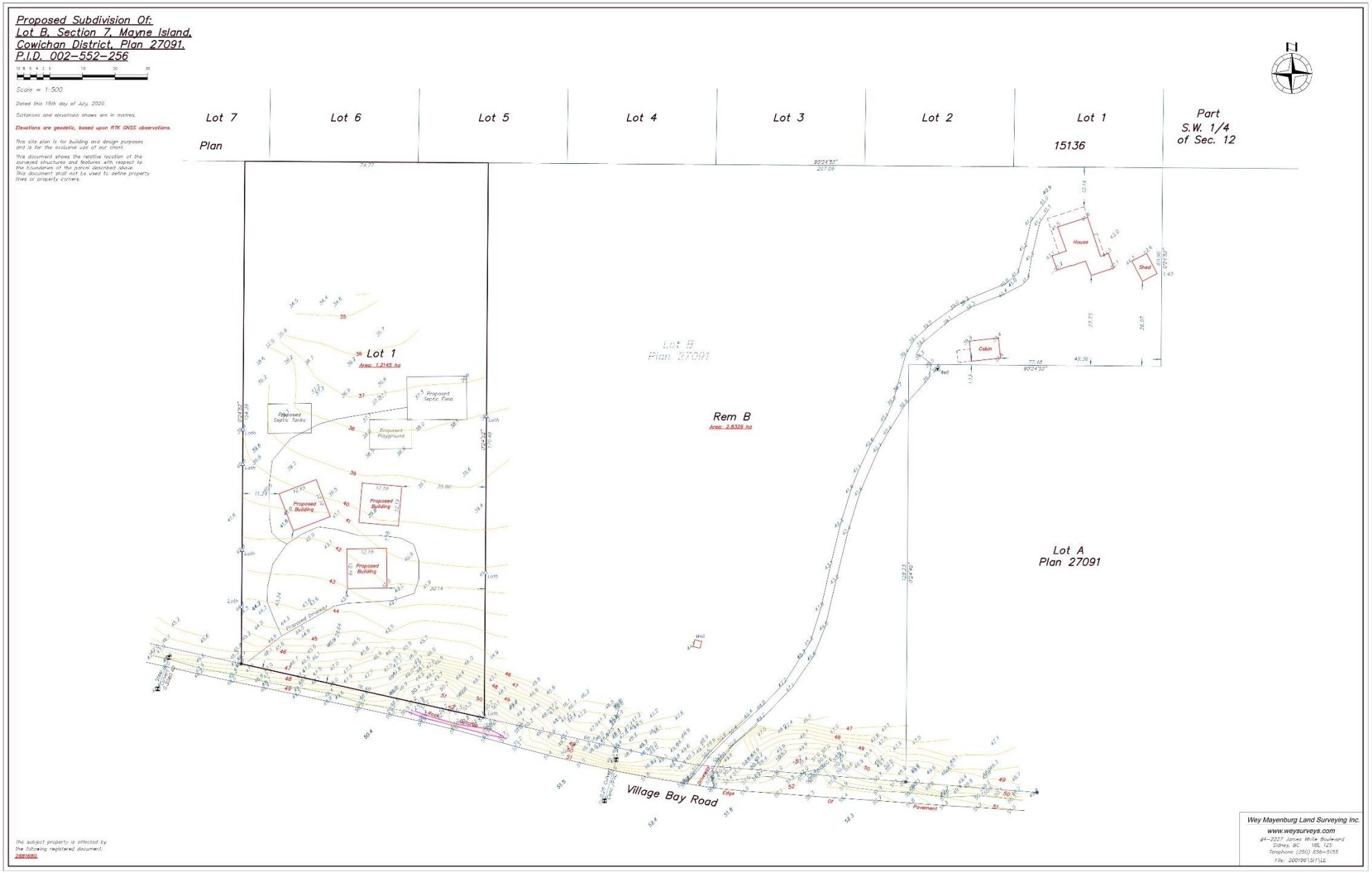
Report Limitations

1) This report does not provide a comparative analysis of the suitability of the site for the proposed use in relation to other properties or areas of Mayne Island. This report describes the current conditions of the site and provides recommendations for how best to design the proposed development in a manner that protects or minimizes impacts to ecological values present on the site.
2) The scope of this report did not allow for any targeted species-at-risk surveys of the site.
3) The scope of this report did not allow for any targeted wildlife surveys of the site.
4) Vegetation inventory of the site was not comprehensive and is limited to species that are identifiable in late summer.
5) Features of the site were mapped using a Trimble GeoXH 6000, with horizontal accuracy generally within 1m.

[1] Available at http://www.islandstrustconservancy.ca/media/84821/itc_2018-11_rcp-2018-2027-web_final.pdf
[2] Contiguous Forest Mapping in the Islands Trust Area. May 4, 2020. Prepared for the Islands Trust by Cabin Resource Management.

Map 1: Site Plan

Proposed building, service and driveway siting is incorrect and NOT CURRENT



Map 2: Ecological Communities

LOT 1 of:
Proposed Subdivision of
Lot B, Section 7, Mayne Island
PID 002-552-256

Scale 1 : 4700

Map Date: September 17, 2020
UTM Zone 10 NAD83
Keith Erickson (R.P. Bio.)

0 5 10 20 30 40 Meters

Legend

Ecological Communities

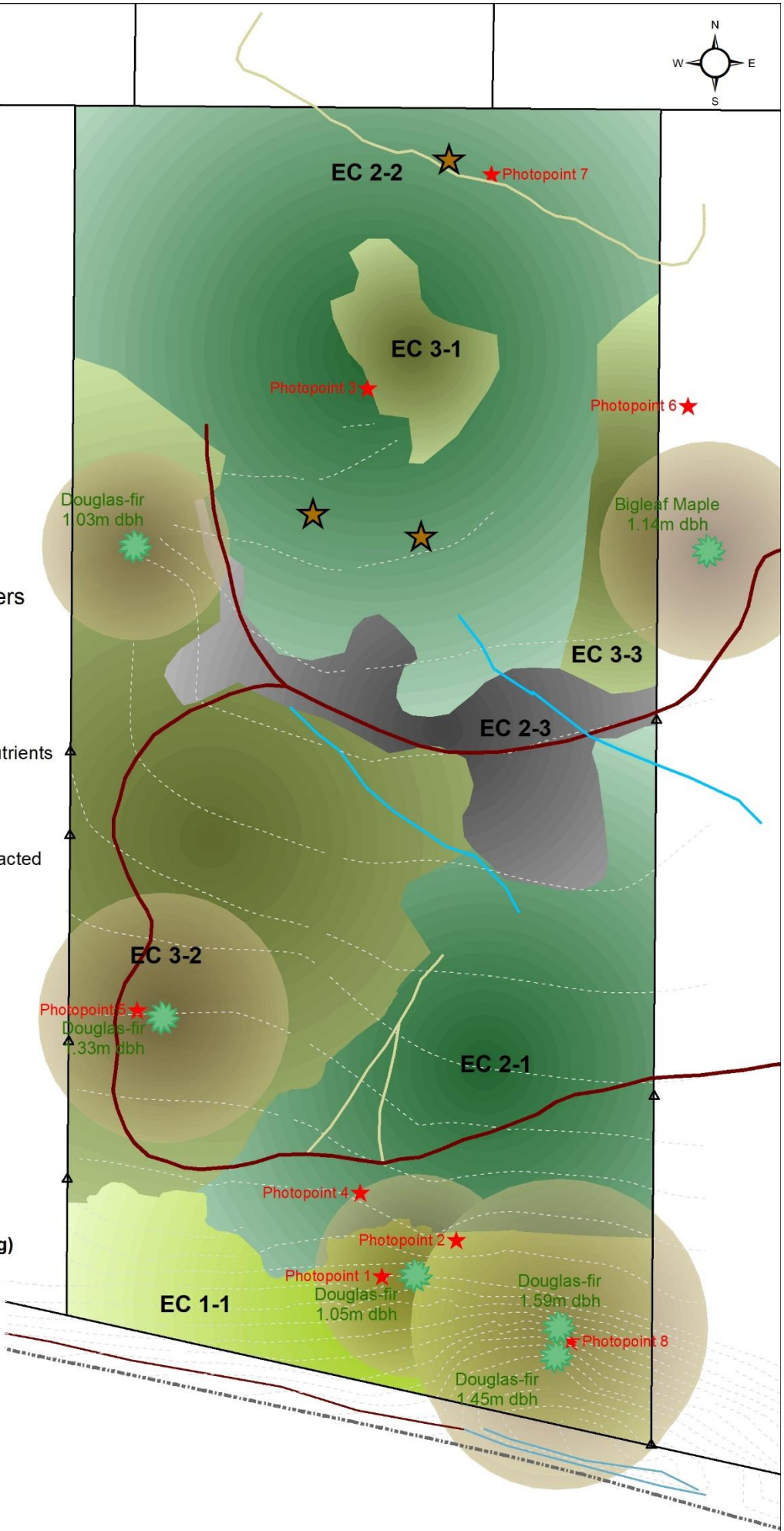
- Soils well drained, poor to medium nutrients
- Soils well drained, rich nutrients
- Soils moist to wet, rich nutrients
- Soils moist, very disturbed and compacted
- Tree Protection Zone

Features From GPS Survey

- Old Veteran Tree
- Large Wildlife Tree
- Photopoint
- Ditch
- Driveway
- Old Road
- Skid

From Surveyed Site Plan (Wey Meyenburg)

- Edge of Road Bank
- Contours (1m)
- Roadside Ditch
- Edge of Pavement
- Legal; PL
- culvert
- rockoutcrop



Ecological Assessment

Ecosystems-At-Risk

Douglas-fir / dull Oregon-grape Ecological Community (*Pseudotsuga menziesii / Berberis nervosa*). CDC Element Occurrence: 61556: Ranked "Critically imperilled" in BC and "imperilled" globally.

This occurrence has an estimated ecological integrity of "Fair" due to fragmentation from roads, converted lands and residential development (BC Conservation Data Centre: Ecosystem Occurrence Report, Shape ID: 65116)

The occurrence of this ecosystem-at-risk was confirmed on the proposed property and is found within Ecological Community 1-1.

Species-At-Risk

No red or blue listed species-at-risk were directly observed, and no occurrences were identified for the proposed property through the Conservation Data Centre and anecdotally through the Mayne Island Conservancy Society. (No targeted species-at-risk surveys were completed as part of this assessment.)

The following species have habitat requirements that could be supported by the ecology of the property and have been identified to occur on Mayne Island generally (Islands Trust Conservancy Regional Conservation Plan 2018-2027):

Conservation Data Centre:

- Peregrine Falcon (*Falco peregrinus anatum*), species of concern (SARA), red listed
- Grand fir (*Abies grandis*), yellow listed

Mayne Island Conservancy Society:

- Western Screech-owl (*Megascops kennicottii kennicottii*), threatened (SARA), blue listed
- Olive-sided Flycatcher (*Contopus cooperi*), threatened (SARA), blue listed
- Great Blue Heron (*Ardea herodias fannini*), special concern (SARA), blue listed
- Red legged frog (*Rana aurora*), special concern (SARA), blue listed

Adjacent Land Uses

Lot B, Section 7 is currently zoned 'Rural' by the Mayne Island Official Community Plan (Bylaw 144) Schedule B: Land Use Designations. Zoning of lands surrounding the property are 'Settlement Residential' to the north and 'Rural' to the west, south, and east. Zoning for all surrounding lots allows for residential use and related clearing.

Residential use has been established on all lots immediately surrounding the subject property. Most of the adjacent property to the east has been cleared for a mixture of residential and agricultural uses. The adjacent property to the south (across Village Bay Road) is currently undergoing logging and

development. Adjacent properties to the north and to the east include typical residential development and related clearing.

Hydrology

The property is located on a moisture receiving bench on the generally north facing moderately sloped side of Mount Parke. Water from the uplands of Mount Parke moves down through the mid-slope position (south of Village Bay Road) and begins to slow as it transitions through the property to a lower, more gently sloped toe position, and then out through the northwest corner onto adjacent properties, ultimately discharging into Miner's Bay. Generally, water moves diagonally through the proposed property from the southeast to the northwest.

The transition to the toe slope that occurs on the property results in an accumulation of moisture on the site and a relatively high, and somewhat fluctuating water table, with some areas becoming saturated for portions of the year. This is evidenced through deposition of fine clays and silts along with signs of gleying and mottling observed in soil pits. Areas of the property, mostly in the lower portion, are subject to surface flow during winter months and heavy precipitation events, seen by the presence of clear braided channels winding through vegetation (often salmonberry). Areas with high water table and surface flow are generally found within Ecological Community 02 described below.

Surface and subsurface flow has been altered by compacted logging roads and landings as well as by ditching. Ditches, roads, and compacted areas are shown on Map 2.

Ecosystem Description Method

For the purposes of this report, the assessment area was divided into 3 primary ecological communities according to slope position, soils, and observed vegetation. The descriptions and inventories for each of the communities were completed by Rob Underhill (R.P.Bio.), based on field observations from a site visit conducted on September 5th, 2020. The locations of the ecological communities are shown in relation to other mapped features and proposed property boundaries on Map 2. The inventory was limited to the area contained within Lot 1 of the proposed subdivision of Lot B, Section 7, Mayne Island.

The format for the description of ecosystem types has been adapted from the Field Manual for Describing Terrestrial Ecosystems - Site and Vegetation forms (Land Management Handbook #25 2nd Edition, BC Ministry of Environment, Lands, and Parks / BC Ministry of Forests, 2008. Percent cover estimates for vegetation provide a general sense of the relative abundance of species. Site series were determined from an examination of soils and vegetation and are based on the Field Guide to Site Identification and Interpretation for the Vancouver Forest Region (Land Management Handbook #28, BC Ministry of Forests Research Branch, 1994).

GPS was used to accurately identify boundaries and other features such as roads and stream channels. Plots were established within each Ecological Community where detailed inventories were conducted, Plots were generally located to provide a representative 'snap-shot' of the ecological community. Additional plots were located to capture ecological variation.

Ecological Community 1

Description: Ecological Community 1 occurs in Polygon 1-1, and in patches along the east side of Polygon 3-2. It is the driest of the ecosystem types in the area of interest and is characterized by thin, humous rich soils 0-50cm deep over fractured sandstone. Within the Biogeoclimatic Ecosystem Classification system this vegetation community would be designated CDFmm01. The canopy is dominated by Douglas-fir and western red cedar, with larger trees rooting in pockets of deeper soils. The shrub layer typically contains a mix of salal, sword fern, and dull Oregon grape whose distribution and abundance are also determined by soil depth. The herb layer is typically not well developed, and Oregon beaked moss is most common.

Polygon 1-1: This is the least recently disturbed area of the property, because it appears no trees were cut in this area in the 2004 logging. The canopy contains three larger diameter veteran Douglas-fir trees and is made up of a mixture of Douglas-fir and western red cedar. There are a few individual big-leaf maples and two western yew. Naturally regenerating Douglas-fir, grand fir, and cedar are growing along the north and south edges where there is more light. The shrub layer contains sparse salal with occasional large patches of dull Oregon grape. Sword fern is the most common species in the shrub layer and is scattered throughout. The herb layer is not well developed and lacks vanilla leaf, which is common in the wetter ecosystems on the property. The dominant moss is Oregon beaked moss other than along the north edge where medium sized patches of step moss and electrified cats tail moss are present.

Photograph of Vegetation Community 1, Polygon 1-1. September 5th, 2020. Photopoint 1 Bearing 100°.

Table 1. Vegetation plot 1-1 surveyed September 5th, 2020.

Plot ID:	1-1	**Slope:**	15-22°	**Aspect:**	355°
Structural Stage:	Mature	**Meso-slope Position:**	mid	**Site Series:**	CDFmm/01
Soil Nutrients	C	**Soil Moisture**	2	**Canopy Closure:**	50%

Vegetation Species	**A1**	**A2**	**A3**	**B1**	**B2**	**C**	**D**	**Notes**
Pseudotsuga menziesii (Douglas-fir)	3	20	1					3 large veterans
Thuja Plicata (western red cedar)		2	30					
Acer macrophyllum (big-leaf maple)		5						one tree
Taxus brevifolia (western yew)			<1					two trees
Abies grandis (grand fir)			1					
Gaultheria shallon (salal)					<1			
Mahonia nervosa (dull Oregon grape)					5			
Mahonia aquifolium (tall Oregon grape)					<1			
Polystichum munitum (sword fern)					1			
Vaccinium parvifolium (red huckleberry)				<1	<1			
Lonicera hispidula (hairy honeysuckle)				<1	<1			
Rosa gymnocarpa (baldhip rose)					<1			
Bromus vulgaris (Columbia brome)						<1		
Trientalis latifolia (western star flower)						<1		
Lactuca muralis (wall lettuce)						<1		
Galium aparine (cleavers)						<1		
Festuca occidentalis (western fescue)						<1		
Eurhynchium oreganum (Oregon beaked-moss)							15	dominant moss
Rhytidiadelphus triquetrus (electrified cat's-tail moss)							3	north edge
Hylocomium splendens (step moss)							2	north edge

Cover by Layer (%)	Tree:	50	Shrub:	5	Herb:	<1	Moss:	20

Soils: Rapid to moderately well-draining. Variable depth of gravely sandy loam over fractured sandstone bedrock. Microtopography at the site determines the depth, with deeper pockets also containing deeper O and A horizons.

Recommendations/notes: Avoid disturbance to veteran trees and root zones. Minimize disturbance to maintain road buffer.

Ecological Community 2

Description: Ecological Community 2 is the wettest ecosystem type within the area of interest, and is located in Polygons 2-1, 2-2, and 2-3. This ecosystem type is characterized by poorly draining, organic-rich soils that are seasonally flooded or saturated. Within the Biogeoclimatic Ecosystem Classification system this ecological community would be considered primarily CDFmm06 with small wetter patches of CDFmm11. These areas were heavily logged around 2004 and presently contain regenerating tree and shrub vegetation characteristic of an early successional stage. The flow of water in the wetter sites has been impacted by a couple of ditches, and by compaction along skid roads during past logging.

Polygon 2-1: This polygon contains a variable canopy with occasional second growth dead standing grand fir and cedar. Scattered live cedar trees not cut in the recent logging make up the remainder of the main canopy. There is a regenerating lower canopy made up of red alder and grand fir. The regenerating trees are mostly 14-16 years old. The shrub layer is variable, and well established other than where soils have been compacted along skid roads or dug up for ditching. Salmon berry, salal, and sword fern grow dense and large in patches, while in the wettest sites small-flowered bulrush and lady fern are common. Along the skid roads creeping bentgrass and common rush are dominant. Vegetation in this polygon is indicative of seasonally flooded soils.

Photograph of Vegetation Community 2, Polygon 2-1. September 5th, 2020. Photopoint 4 Bearing 80°.

Table 2. Vegetation plot 2-1 surveyed September 5th, 2020.

Plot ID:	2-1	**Slope:**	7°	**Aspect:**	12°
Structural Stage:	Young	**Meso-slope Position:**	bench	**Site Series:**	CDFmm/06/11
Soil Nutrients	E	**Soil Moisture**	6-7	**Canopy Closure:**	30%

Vegetation Species	**A1**	**A2**	**A3**	**B1**	**B2**	**C**	**D**	**Notes**
Thuja plicata (western red cedar)		3	1					
Acer macrophyllum (big-leaf maple)		<1	<1					
*Alnus rubra (*Red alder)		T	30				T	Variable cover
Abies grandis (grand fir)			3					
Ilex aquifolium (English holly)			T					
Rubus spectabilis (salmon berry)				5	2			
Gaultheria shallon (salal)				5	5			
Rubus ursinus (trailing blackberry)					<1			
Rubus armeniacus (Himalayan blackberry)				2	2			
Polystichum munitum (sword fern)					10			
Vaccinium parvifolium (red huckleberry)				<1	<1			
Agrostis stolonifera (creeping bentgrass)						20		compacted areas
Scirpus microcarpus (small-flowered bulrush)						8		wettest sites
Athyrium filix-femina (lady fern)						5		wettest sites
Juncus effusus (common rush)						5		compacted areas
Geranium robertianum (Robert's geranium)						<1		
Urtica dioica (stinging nettle)						<1		
Lactuca muralis (wall lettuce)						<1		
Galium aparine (cleavers)						<1		

Cover by Layer (%)	Tree:	30	Shrub:	30	Herb:	50	Moss:	5

Polygon 2-2: Recently logged in 2004, few mature trees are present in this polygon. One large dead cedar and a few larger second growth Douglas-fir are present in the canopy. There is a patchy regeneration of red alder. The shrub layer is well defined with sword fern dominant. Salmonberry and salal are common, as is the exotic Himalayan blackberry. Compacted skid roads are dominated by creeping bent grass and other exotic grasses, as well as common rush. Vanilla leaf is more common in this site than in Polygon 2-1. Soil are sandier and slightly more free draining than in Polygon 2-1, though soils in this polygon are still likely saturated for most of the year due to a combination of high volume surface flow from upslope and an underlying impermeable layer of fine marine sediments.

Photograph of Vegetation Community 2, Polygon 2-2. September 5th, 2020. Photopoint 7 Bearing 290°.

Table 3. Vegetation plot 2-1 surveyed September 5th, 2020.

Plot ID:	2-2	**Slope:**	4°	**Aspect:**	12°
Structural Stage:	Young	**Meso-slope Position:**	bench	**Site Series:**	CDFmm/06/11
Soil Nutrients	D	**Soil Moisture**	6	**Canopy Closure:**	2%

Vegetation Species	**A1**	**A2**	**A3**	**B1**	**B2**	**C**	**D**	**Notes**
Thuja Plicata (western red cedar)	T	T	T					large snag in A1
Pseudotsuga menziesii (Douglas fir)	T							
*Alnus rubra (*Red alder)			5					variable cover
Abies grandis (grand fir)			<1					
Prunus domestica (plum)				T	T			one exotic plum
Rosa eglanteria (sweetbriar rose)				T	<1			
Rubus spectabilis (salmon berry)				8	2			
Gaultheria shallon (salal)					5			
Rubus ursinus (trailing blackberry)					1			
Rubus armeniacus (Himalayan blackberry)				8	3			

Polystichum munitum (sword fern)						40				
Pteridium aquilinum (bracken fern)						<1				
Daphne laureola (daphne)						T				
Achlys triphylla (vanilla leaf)							<1			
Juncus effusus (common rush)							<1			
Dactylus glomerata (orchard grass)							<1			
Anthoxanthum odoratum (sweet vernal grass)							<1			
Agrostis stolonifera (creeping bentgrass)							5		compacted areas	
Digitalis purpurea (foxglove)							<1		wettest sites	
Cover by Layer (%)	Tree:	15	Shrub:	70	Herb:	20			Moss:	<1

Polygon 2-3: This polygon is the most heavily disturbed polygon within the area of interest. Possibly this was a loading zone during the timber harvest in 2004. The site is characterized by compacted soils dominated by exotic grasses. Some tree regeneration is occurring, primarily grand fir and Douglas fir. At the time of survey, the water table was approximately 1m below grade, as observed from a soil pit. This polygon is a transition between the slightly more free-draining soils in Polygon 3-2 to the southwest and the more poorly draining soils to the southeast and north. One ditch runs Southeast to northwest along the southwest border of the polygon. A second ditch runs parallel to the first but further to the northeast. No vegetation plot was completed for Polygon 2-3.

Photograph of Vegetation Community 2, Polygon 2-3. June 29th, 2020.

Soils: Poorly draining, nutrient rich sandy loam soils 50-100cm deep over silty clay marine deposits. Becoming sandier in Polygon 2-2, most poorly draining in Polygon 2-1.

Recommendations/notes:

- Despite recent logging, vegetation is regenerating nicely outside of compacted areas.
- Some issues with exotic species, specifically English holly and daphne. Other sun loving exotics (Himalayan blackberry etc.) will decline as a canopy re-establishes.
- Consider decompaction of skid roads.
- The CDFmm06 ecosystem type on Mayne Island is 58% converted to other land uses, making remaining natural areas a priority for conservation.
- Seasonal flooding and surface flow of water will have significant impact on any infrastructure built in Polygons 2-1, 2-2, and 2-3.

Ecological Community 3

Description: This Ecological Community is characterized by well-draining soils on mild slopes. In the Biogeoclimatic Ecosystem Classification system this Ecological Community would be considered primarily CDFmm04 with small pockets of CDFmm01 in the drier sites. Prior to selective logging in 2004 +/- 2yrs, the canopy was dominated by Douglas-fir with a lesser component of western redcedar, and a sub canopy of cedar. Currently the canopy contains a few large diameter veteran Douglas fir and scattered standing dead Douglas fir, with a variable cover of western red cedar that would have made up the subcanopy prior to the 2004 timber harvest. There is abundant regeneration of Douglas fir and grand fir with occasional cedar and western hemlock. The understory is characterized by a high percent cover of western sword fern with scattered clumps of salal in deeper soiled sites and dull Oregon grape in shallower soils. The herb layer is not well developed, though vanilla leaf occurs in wetter microsites, and herb diversity is occasionally higher in more open areas along skid roads.

Polygon 3-1: This is a small, raised knoll of well drained soils surrounded by the wetter poor draining soils of Ecological Community 2. The soils contain a higher proportion of coarse fragments than surrounding soils, 50cm deep sandy gravelly loam over silty clay. The canopy contains occasional standing dead second growth Douglas fir and grand fir. Western redcedar is dominant in the remnant canopy post logging. Sword fern is the dominant shrub, with salmon berry and salal growing along the edges where wetter soils begin. Vanilla leaf is occasional but otherwise the herbaceous layer is not well developed.

Photograph of Vegetation Community 3, Polygon 3-1. September 5th, 2020. Photopoint 3 Bearing 50°.

Table 4. Vegetation plot 3-1 surveyed September 5th, 2020.

Plot ID:	3-1	**Slope:**	<5°	**Aspect:**	360°
Structural Stage:	Mixed	**Meso-slope Position:**	Knoll	**Site Series:**	CDFmm/04
Soil Nutrients	D	**Soil Moisture**	3	**Canopy Closure:**	25%

Vegetation Species	**A1**	**A2**	**A3**	**B1**	**B2**	**C**	**D**	**Notes**
Pseudotsuga menziesii (Douglas-fir)	<1	4			T			snag in A1
Thuja Plicata (western red cedar)		25	2		T			
Acer macrophyllum (big-leaf maple)			3					
Rubus spectabilis (salmon berry)				T	T			
Gaultheria shallon (salal)					T			
Mahonia nervosa (dull Oregon grape)					1			
Rubus armeniacus (Himalayan blackberry)				T	T			
Polystichum munitum (sword fern)					80			
Rosa gymnocarpa (baldhip rose)					T			
Achlys triphylla (vanilla leaf)						2		

Trientalis latifolia (broad-leaf starflower)								<1			
Eurhynchium oreganum (Oregon beaked moss)									2	dominant moss	
Cover by Layer (%)	Tree:	25	Shrub:	85	Herb:	5				Moss:	2

Polygon 3-2: Polygon 3-2 was selectively logged in 2004 +/- 2 years. The site contains a variable cover canopy with the occasional veteran Douglas fir and some standing dead Douglas fir. The main canopy if made up of Western red cedar with an occasional Douglas fir. Abundant regeneration of Douglas fir and grand fir is present along the west side of the polygon. Sword fern is the most common shrub though there are dense patches of dense salal and occasional salmonberry as the soils transition to the east. Exotic species diversity and abundance is higher in this Polygon, likely because of recent soil disturbance in combination with sun exposure and proximity to the more heavily logged property to the west, which is a source of seeds. Oregon beaked moss is common and is the dominant moss within this Polygon.

Photograph of Vegetation Community 3, Polygon 3-2. September 5th, 2020. Photopoint 5 Bearing 140°.

Table 5. Vegetation plot 3-2 surveyed September 5th, 2020.

Plot ID:	3-2	**Slope:**	5°	**Aspect:**	30°
Structural Stage:	Mixed/Young	**Meso-slope Position:**	Mid	**Site Series:**	CDFmm/04/01

Soil Nutrients	D	Soil Moisture	3	Canopy Closure:	10%

Vegetation Species	A1	A2	A3	B1	B2	C	D	Notes
Thuja Plicata (western red cedar)		5	<1					
Pseudotsuga menziesii (Douglas-fir)	T	2	5					
Acer macrophyllum (big-leaf maple)		1	1					
Abies grandis (grand fir)			3					
Tsuga heterophylla (western hemlock)			T					
Rubus spectabilis (salmon berry)				T	T			
Cytisus scoparius (Scotch broom)				T	T			
Gaultheria shallon (salal)				T	<1			
Ilex aquifolium (English holly)					T			
Polystichum munitum (sword fern)					10			
Mahonia nervosa (dull Oregon grape)					<1			
Lonicera hispidula (hairy honeysuckle)					<1			
Rubus armeniacus (Himalayan blackberry)					T			
Rubus ursinus (trailing blackberry)					<1			
Pteridium aquilinum (bracken fern)					<1			
Daphne laureola (daphne)					<1			
Holodiscus discolor (oceanspray)					<1			heavily browsed
Vaccinium parvifolium (western red huckleberry)					<1			heavily browsed
Achlys triphylla (vanilla leaf)						<1		
Digitalis purpureum (foxglove)						<1		
Dactylus glomerata (orchard grass)						<1		
Trientalis latifolia (broad-leaf starflower)						<1		
Senecio jacobaea (tansy ragwort)						<1		
Hypochaeris radicata (hairy cats-ear)						<1		
Melica subulata (Alaskan onion grass)						<1		
Cirsium arvense (Canada thistle)						<1		
Cirsium vulgare (bull thistle)						<1		
Eurhynchium oreganum							30	Dominant moss
Cover by Layer (%) Tree: 10	Shrub: 50			Herb: <1				Moss: 40

Polygon 3-3: This Polygon contains one larger diameter (0.7m) grand fir in a patchy canopy otherwise dominated by western red cedar and the occasional Douglas fir. The understory contains a high percent cover of sword fern with occasional patches of baldhip rose, salal, and dull Oregon grape. Vanilla leaf occurs occasionally but the herb layer is not well developed. Oregon beaked moss is the most common moss but not abundant.

Photograph of Vegetation Community 3, Polygon 3-3. September 5th, 2020. Photopoint 6, bearing 140°.

Table 6. Vegetation plot 3-3 surveyed September 5th, 2020.

Plot ID:	3-3	**Slope:**	12°	**Aspect:**	12°
Structural Stage:	Mixed/Young	**Meso-slope Position:**	Mid	**Site Series:**	CDFmm/04
Soil Nutrients	D	**Soil Moisture**	3	**Canopy Closure:**	10%

Vegetation Species	**A1**	**A2**	**A3**	**B1**	**B2**	**C**	**D**	**Notes**
Thuja Plicata (western redcedar)		10	10					
Pseudotsuga menziesii (Douglas-fir)	T	5						
Abies grandis (grand fir)	T							
Gaultheria shallon (salal)					5			
Polystichum munitum (sword fern)					70			
Mahonia nervosa (dull Oregon grape)					<1			
Rosa gymnocarpa (sweetbriar rose)					1			
Achlys triphylla (vanilla leaf)						<1		
Eurhynchium oreganum							5	Dominant moss
Cover by Layer (%)	Tree:	10	Shrub:	70	Herb:	<1	Moss:	5

Soils: Soils are variable across Polygons 3-1, 3-2, and 3-3. Along the west edge of Polygon 3-1 soils are well draining 0-50cm deep sandy loam over fractured sandstone bedrock, transitioning into deeper soils to the west towards Ecological Community 2 where a water impermeable layer of fine marine sediments results in poor drainage. Polygon 3-2 is a raised knoll of well drained soils situated within the wetter soils of Ecological Community 2. Polygon 3-3 is well draining because of coarse fragments of conglomerate and steeper slope. Soils in Community 3 are richer and slightly wetter than in Community 1.

Recommendations/notes:

- Avoid disturbance to veteran trees and root zones.
- Natural regeneration is abundant other than in compacted skid roads.

Ecological Context and Significance

Landscape Level Ecological Context

Islands Trust Contiguous Forest Ecosystem Mapping ranks the forest cover on the proposed property as "Established Forest – Class 3". It is mapped on the margin of a tract of contiguous forest that extends from the protected areas on Mt. Parke through residentially zoned properties on its north facing slope through Indian Reserve No. 8 to Helen Pt.

- 'Established Forest' is defined as a forested area with greater than 50% characterized by a Structural Stage of young (30 to 80 years), mature (80 to 250yrs) or old (>250 yrs).
- 'Class 3' is defined as undisturbed or minor disturbance, where road coverage and density of structures is low.

The Islands Trust Conservancy Regional Conservation Plan shows the proposed property as having a "high" relative ecological value in their landscape level analysis. Surrounding cleared and developed lands were categorized as "low" and "medium" relative value.

It is important to note that the base data used to produce the referenced Islands Trust documents was last updated in 2017 and that additional fragmentation through land clearing on surrounding lands (specifically properties to the south) has occurred since that time.

It is also important to note that one of the limitations of these studies is that they are completed at a scale (1:10,000 for Mayne) that is not able to identify or incorporate site level conditions or impacts to the land that are evident in the detailed inventory completed for this report.

Ecologically Significant Features

Intact forest communities occurring on wet soiled sites are considered locally underrepresented on Mayne Island. These ecosystems have been disproportionately converted to other land uses (primarily agriculture) compared to drier forest ecosystem types[3]. Further, these wet areas are more sensitive than drier areas to soil disturbance such as compaction, that occurs during logging and other land-use practices.

A significant portion of the property (56%) is characterized by moist and wet soils, described under Ecological Community 02. This community is regenerating after recent logging activity and includes significant alterations to its hydrology through ditching and soil compaction (roads and landings). Despite this disturbance, these areas remain valuable as they have not yet been converted to another more permanent use such as agriculture.

[3] *source: "Follow-up notes from a site visit at the west side of 375 Village Bay Rd with the Mayne Island Housing Society on June 22nd 2020", Rob Underhill RPBio, Mayne Island Conservancy*

While the entire property has been logged at different times, there remains several old-growth Douglas-fir trees and large diameter snags (standing dead trees) that are considered as rare and highly valued remnant forest structures on Mayne Island. On the proposed property, these features generally occur in a narrow band along Village Bay Road within Ecological Community 01 and are contiguous with similarly positioned veteran features on the remainder of Lot B, and Lot A to the east. These veteran trees also spatially coincide with areas characteristic of the Douglas-fir / dull Oregon-grape (*Pseudotsuga menziesii / Berberis nervosa*) Provincially red-listed plant community.

Description of Proposed Land Alteration / Development

A specific development design was not available at the time of this report. Planning for the site was in conceptual and exploratory stages. However, for the purpose of this report, the general scale and character of the development is described by the Mayne Island Housing Society in an information document available on their website https://www.mayneislandhousingsociety.com/ titled qna_aug_4.docx:

> We're proposing ten housing units ranging from one to three bedrooms (complying with the Mayne Island Official Community Plan). The units will be set in a few cluster-style buildings, tastefully designed and set well back from the road at several small, cleared sites with thoughtful landscaping and privacy distancing. There will be a small garden, play area, woodland trails and wetland. The landscaping will preserve the existing healthy mix of older trees and young forest.

The development described above will also require driveway access, power, and communications infrastructure along with water supply and waste-water treatment services.

Recommended Guidelines for Development Planning

1) Reduce fragmentation of the forest by keeping the development compact and minimizing the footprint of structures and services. For example, bury power and communications lines under access driveway.

2) Retain, and establish a Tree Protection Zone around remaining old veteran trees on the property.

    a) **Recommend consulting with a certified arborist** to determine the health the veteran trees, assess the impacts from the proposed development and provide recommendations for tree protection and establishing a critical rooting zone.

    b) To give a sense of a standard calculation of the Critical Rooting Zone or Tree Protection Zone, this report has created a Tree Protection Zone based on the trunk diameter method with every 1cm of tree diameter (at breast height) equaling 12cm of Protection Zone radius.

3) Retain large diameter wildlife trees (dead standing trees).

    a) **Recommend consulting with a certified arborist** to determine safety considerations and setback requirements around these trees. If necessary, top wildlife tree to reduce setback rather than remove completely.

4) Minimize the encroachment of the development footprint into moist/wet ecosystems.

5) Minimize disturbance to Douglas-fir / dull Oregon-grape Provincially red-listed ecological community within mapped Ecological Community 1-1. A large portion of this overlaps with recommended Tree Protection / Critical Rooting Zone in 2b).

6) Focus development in and around areas where soils are already heavily disturbed and compacted as much as possible.

7) Minimize area of impervious surfaces and area of soil compaction including during the construction phase and post-construction ongoing use.

8) **Recommend consultation with professional hydrologist** to determine direct impacts to hydrology from development and to prescribe measures required to mitigate on-site and downslope impacts. Potential measures might include:

    a) Installation of bioswales, creation of rainwater gardens, constructed wetlands or retention ponds to promote infiltration of surface water and any diverted water into the ground.

    b) Installation of rainwater catchment and storage systems to reduce roof runoff and reduce pressure on groundwater resources.

9) Retain as much forest structure and natural vegetation cover as possible.

    a) Minimize impacts to vegetation during the construction process, and immediately revegetate/restore any areas where temporary damage is necessary for construction purposes.

    b) Retain large diameter coarse woody debris within undeveloped areas of the property to provide critical wildlife habitat.

10) Restore areas outside of the development footprint where soils have been previously compacted (skid roads, logging landing sites) through 'rough and loose' treatment.

11) Incorporate 'wildlife zones' into the design where no ongoing use occurs. Restoration and wildlife enhancement measures should be focused in these areas.

12) Monitor, evaluate and if necessary employ further mitigation measures during all phases of the development and construction process.