Greenforest Incorporated

Consulting Arborist

TO: Robert Londo
Orcas Moon, LLC
PO Box 2710
Redmond WA 98073

REFERENCE: Arborist Report

SITE ADDRESS: Forbes Creek, TPN 3890100050 & 3890100055.

DATE: November 20, 2017

PREPARED BY: Favero Greenforest, ISA Certified Arborist # PN -0143A
ISA Tree Risk Assessment Qualified
ASCA Registered Consulting Arborist® #379

This *arborist report* establishes the condition of the significant trees at the referenced site, and is to be used to satisfy City of Kirkland permit submittal requirements (Kirkland Zoning Code §95.30.4.c).

Last year you contracted my services to prepare a *significant tree inventory* of the regulated trees on the site as per KZC §95.30.4.a, which is incorporated into this report.

You provided me a topographic survey from Axis Survey & Mapping dated 5/10/16. I visited the site 7/19/16 and visually inspected the trees indicated on the survey, which are the subject of this report.

The site has a northern aspect with variable topography. With the exception of 2 weeping willows, the subject trees are all native species, dominated by Bigleaf maple and Red alder. I inventoried 192 surveyed significant trees, plus (I annotated the survey with) an additional 5 significant trees (numbered A-E) not included initially. Three duplicate trees are identified at the end of the inventory.

LIMITATIONS AND USE OF THIS REPORT

This tree report establishes, via the most practical means available, the existing conditions of the trees on the subject property. Ratings for health and structure, as well as any recommendations are valid only through the development and construction process. This report is based solely on what is readily visible and observable, without any invasive means.

There are several conditions that can affect a tree's condition that may be pre-existing and unable to be ascertained with a visual-only analysis. No attempt was made to determine the presence of hidden or concealed conditions which may contribute to the risk or failure potential of trees on the site. These conditions include root and stem (trunk) rot, internal cracks, structural defects or construction damage to roots, which may be hidden beneath the soil. Additionally, construction and post-construction circumstances can cause a relatively rapid deterioration of a tree's condition.

TREE INSPECTION – Tree Health, Condition and Viability

Each tree was marked with a 1" x 3.5" aluminum tag indicating tree number prior to my inspection. I visually inspected each tree from the ground and rated both tree health and structure.

A tree's structure is distinct from its health. This inspection identifies what is visible with both. Structure is the way the tree is put together or constructed, and identifying obvious defects can be helpful in determining if a tree is predisposed to failure. Tree health assesses disease, insect infestation and old age.

No invasive procedures were performed on any trees. The results of this inspection are based on what is visible at the time of the inspection.

The attached inventory summarizes my inspection results and provides the following information for each tree:

Parcel indicated general location of tree.

Proposed action identifies trees to be removed, saved, impacted and those that are non-viable.

Tree Density Credit (TDC) is assigned for each tree from table KZC 95.33.1 The TDC for multiple-stemmed trees is calculated using quadratic mean diameter.

Retained TDC tallies credits for retained trees. Native conifers are assigned 1.5 times credit.

Tree number as shown on tag in the field.

DBH Stem diameter in inches measured 4.5 feet from the ground.

Tree Species Common name.

Dripline Average branch extension from the trunk as radius in feet.

Health and Structure rating '1' indicates no visible health-related problems or structural defects, '2' indicates minor visible problems or defects that may require attention if the tree is retained, and '3' indicates significant visible problems or defects and tree removal is recommended.

Visible defects Obvious structural defects or diseases visible at time of inspection, which includes:

Asymmetric canopy– the tree has an asymmetric canopy from space and light competition from adjacent trees.
Branch dieback - mature branches in canopy are dying/dead.
Crack – separation of wood fibers and predisposed to failure.
Dead – tree is dead.
Deadwood – large and/or multiple dead branches throughout canopy.
Decay – process of wood degradation by microorganisms resulting in weak and defective structure.
Diseased – foliage and trunk/stems are diseased.
Dogleg in trunk – trunk with a bow or defective bend (90°) in trunk often half way of further up the trunk.
Double leader – the tree has multiple stem attachments, which may require maintenance or monitoring over time.
Included bark - bark inclusion at attachment of multiple leaders and is preventing a wood-to-wood attachment
Insect Injury – active insect injury affecting tree health.
Ivy - dense ivy prevents a thorough inspection, and other defects may be present.
Kretzschmaria fungus indicated internal wood decay.
Multiple leaders - the tree has multiple stem attachments, which may lead to tree failure and require maintenance or monitoring over time.
Previous failure – tree trunk previously broken and defective.
Sweep in trunk – characterized by a leaning lower trunk and a more upright top.
Thinning Canopy – low foliage density may indicate stress, or early infection/declining health.

Stumpsprout- tree previously cut at grade with multiple stems and potentially weak attachments.
Suppressed – tree crowded by larger adjacent trees; with defective structure and/or low vigor. Retain tree only as a grove tree, not stand-alone.
Sweep – tree leans away from adjacent trees. Characterized by a leaning lower trunk and a top that is more upright.
Topped – the tree is previously topped and has poor structure and/or stem decay.
Tree leans – trunk has significant lean from vertical.
Tree suppressed -tree is suppressed by adjacent tree canopies.
Trunk decay - wood decay is visible in the trunk.
Wound/decay base of trunk - open wound with visible decay in trunk.

Viable Tree a determination by the arborist whether the tree is viable for retention.

Non-viable trees are indicated.

REQUIRED TREE DENSITY & AVAILABLE TREE DENSITY CREDIT

Required tree density is calculated by multiplying the acreage of the lot by 30, which equals 194. (6.44 X 30 = 193.2 or 194 rounded) The required minimum tree density credit for this site = 194. The total tree density credits for retained trees is 222.5. (See attachment 3). The calculated (retained) tree density is above the required minimum and no supplemental trees are needed.

LIMITS OF DISTURBANCE

Limits of Disturbance (LOD) are calculated for all the retained *significant* and *impacted* trees. They are listed below as radii in feet from the trunk. They are determined using rootplate [1] and trunk diameter,[2,3] and ISA Best Management Practices.[4] These are the minimum distances from the trees for any soil disturbance, and represent the area to be protected during construction.

<u>These LOD also assume disturbance on multiple sides of a tree, and they are malleable, particularly where disturbance is proposed on only a single side of the tree, and may be adjusted during the construction process.</u>

[1] Coder, Kim D. 2005. *Tree Biomechanics Series*. University of Georgia School of Forest Resources.
[2] Smiley, E. Thomas, Ph. D. *Assessing the Failure Potential of Tree Roots, Shade Tree Technical Report*. Bartlett Tree Research Laboratories.
[3] Fite, Kelby and E. Thomas Smiley. 2009. *Managing Trees During construction; Part Two*. Arborist News. ISA.
[4] Companion publication to the ANSI A300 Series, Part 5: Managing Trees During Construction. 2008. ISA.

The following table establishes the limits of disturbance of each tree.

Proposed Action	TREE NO.	DBH	Species	DL	LOD
SAVE	20235	12”	Red alder	16’	6’
SAVE	20240	8”	Red alder	0’	6’
SAVE	20241	10”	Red alder	14’	6’
SAVE	20243	8”	Red alder	12’	5.5’
SAVE	20244	6”	Red alder	0’	6’
SAVE	20247	10”	Red alder	14’	6’
SAVE	20249	6”	Red alder	6’	5’
SAVE	20251	8”	Red alder	14’	5.5’
SAVE	20254	6”	Red alder	10’	5’
SAVE	20256	8”	Red alder	10’	5.5’
SAVE	20259	8”	Red alder	12’	5.5’
SAVE	20260	10”	Red alder	16’	6’
SAVE	20261	6”	Red alder	12’	5’
SAVE	20262	6”	Red alder	8’	5’
SAVE	20263	10”	Red alder	16’	6’
SAVE	20264	8”	Red alder	12’	5.5’
SAVE	20265	8”	Red alder	14’	5.5’
SAVE	20266	6”	Red alder	6’	5’
SAVE	20267	6”	Red alder	8’	5’
SAVE	20268	8”	Red alder	14’	5.5’
SAVE	20269	6”	Red alder	8’	5’
SAVE	20270	8”	Red alder	10’	5.5’
SAVE	20271	10”	Red alder	14’	6’
SAVE	20272	8”	Western red-cedar	10’	5.5’
SAVE	20273	8”	Red alder	14’	5.5’
SAVE	20274	8”	Red alder	12’	5.5’
SAVE	20275	8”	Red alder	12’	5.5’
SAVE	20276	8”	Red alder	14’	5.5’
SAVE	20277	8”	Red alder	14’	5.5’
SAVE	20279	8”	Red alder	10’	5.5’
IMPACTED	20280	6”	Red alder	10’	6’
IMPACTED	20281	8”	Red alder	12’	6’
SAVE	20286	6”	Red alder	8’	5’
SAVE	20288	6”	Red alder	8’	5’

Proposed Action	TREE NO.	DBH	Species	DL	LOD
SAVE	20349	22,20”	Bigleaf maple	30’	13’
SAVE	20361	24",22",18",10”	Bigleaf maple	30’	17’
SAVE	20363	24,24”	Bigleaf maple	25’	15’
SAVE	20364	24”	Bigleaf maple	30	12’
SAVE	20366	38,40”	Black cottonwood	25’	18’
SAVE	20412	12”	Red alder	16’	6’
SAVE	20413	8”	Red alder	14’	5.5’
SAVE	20414	8”	Red alder	14’	5.5’
SAVE	20415	10”	Red alder	14’	6’
SAVE	20416	6,8”	Red alder	14’	6’
SAVE	20417	7”	Red alder	4’	5’
SAVE	20418	10”	Red alder	14’	6’
SAVE	20419	8”	Red alder	10’	5.5'
SAVE	20420	8”	Red alder	10’	5.5’
SAVE	20421	8”	Red alder	10’	5.5’
SAVE	20427	16”	Red alder	14’	8’
SAVE	20429	18”	Bigleaf maple	20’	8’
SAVE	20460	6,24,30,34”	Bigleaf maple	25’	20’
SAVE	20470	16”	Bigleaf maple	14’	8’
IMPACTED	20495	16”	Bigleaf maple	16’	8’
SAVE	20562	42”	Douglas-fir	20’	19’
IMPACTED	20674	32,22,10”	Bigleaf maple	30’	15’
IMPACTED	20675	24,18”	Bigleaf maple	25’	11’
SAVE	20688	14”	Douglas-fir	16’	7’
IMPACTED	20702	16”	Bigleaf maple	14’	8’
SAVE	20709	24”	Bigleaf maple	16’	12’
SAVE	20730	10”	Western red-cedar	12’	6’
IMPACTED	20731	20”	Western red-cedar	16’	8’
SAVE	20732	28,30,30,24”	Bigleaf maple	35’	21’
SAVE	20733	8,12”	Bigleaf maple	16’	8’
SAVE	20735	22”	Bigleaf maple	18’	11’
SAVE	20793	6”	Pacific dogwood	8’	5’
SAVE	20807	14”	Western red-cedar	10’	7’
SAVE	20989	14,16”	Bigleaf maple	14’	11’

No work is proposed within the critical root zone of a retained tree.

LOCATION AND TYPE OF PROTECTION MEASURES FOR TREES.
Minimum six (6) foot temporary chain-link fence shall be installed at the driplines of all retained trees, or at the limits of disturbance when construction or access is required or proposed within the dripline. Fence shall completely encircle the retained trees and shall be installed prior to site clearing. Install fence posts using pier block only. A City planner must approve any modifications to the fencing material and location.

No stockpiling of materials, vehicular or pedestrian traffic, material storage or use of equipment or machinery shall be allowed within the protective fencing. Fencing shall not be moved or removed unless approved by a City planner. Any work, activity or soil disturbance within the protection fencing, or critical root zone, shall be reviewed, approved and monitored by the project arborist.

Instructions and specifications for pruning roots or branches shall be addressed individually for specific trees based on the proposed encroachment.

Fencing signage as detailed (see attached) must be posted every fifteen (15) feet along the fencing.

Attachments

1. Assumptions and Limiting Conditions
2. Certification of Performance
3. Regulated Tree Inventory
4. Tree Retention Plan
5. Tree Protection Detail

Attachment No. 1 - Assumptions & Limiting Conditions

1. A field examination of the site was made 7/19/2016. My observations and conclusions are as of that date.

2. Care has been taken to obtain all information from reliable sources. All data has been verified insofar as possible; however, the consultant/arborist can neither guarantee nor be responsible for the accuracy of information provided by others.

3. I am not a qualified land surveyor. Reasonable care was used to match the trees indicated on the sheets with those growing in the field.

4. Construction activities can significantly affect the condition of retained trees. All retained trees should be inspected after construction is completed, and then inspected regularly as part of routine maintenance.

5. Unless stated other wise: 1) information contained in this report covers only those trees that were examined and reflects the condition of those trees at the time of inspection; and 2) the inspection is limited to visual examination of the subject trees without dissection, excavation, probing, or coring. There is no warranty or guarantee, expressed or implied that problems or deficiencies of the subject tree may not arise in the future.

6. All trees possess the risk of failure. Trees can fail at any time, with or without obvious defects, and with or without applied stress. A complete evaluation of the potential for this (a) tree to fail requires excavation and examination of the base of the subject tree. Permission of the current property owner must be obtained before this work can be undertaken and the hazard evaluation completed.

7. The consultant/appraiser shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made.

Attachment No. 2 – Certification of Performance

I, Favero Greenforest, certify that:

- I have personally inspected the trees and the property referred to in this report and have stated my findings accurately.
- I have no current or prospective interest in the vegetation or the property that is the subject of this report and have no personal interest or bias with respect to the parties involved.
- The analysis, opinion, and conclusions stated herein are my own and are based on current scientific procedures and facts.
- My analysis, opinion, and conclusions were developed and this report has been prepared according to commonly accepted arboricultural practices.
- No one provided significant professional assistance to me, except as indicated within the report.
- My compensation is not contingent upon the reporting of a predetermined conclusion that favors the cause of the client of any other party nor upon the results of the assessment, the attainment of stipulated results, or the occurrence of any subsequent events.

I further certify that I am a member in good standing of International Society of Arboriculture (ISA), and the ISA PNW Chapter, I am an ISA Certified Arborist (#PN-0143A) and am Tree Risk Assessment Qualified, and am a Registered Consulting Arborist® (#379) with American Society of Consulting Arborists. I have worked as an independent consulting arborist since 1989.

Signed:

Favero Greenforest

GREENFOREST, Inc.
By Favero Greenforest, M. S.

Date: November 20, 2017

Attachment No. 3 – Regulated Tree Inventory

Parcel	Proposed Action	Density Credits	Retained TDC	TREE NO.	DBH	Species	Dripline	Health	Structure	Visible Defects	Viable Tree?
B	SAVE	2	2	20235	12	Red alder	16	1	2	Decline	
A	OFFSITE	0	0	20236	36	Weeping willow	35	2	2	Diseased, ivy	
A	NON-VIABLE	0	0	20237	12	Red alder	18	1	3	Upper trunk decay	NO
A	NON-VIABLE	0	0	20238	10	Red alder	12	1	3	Trunk failure	NO
A	OFFSITE	0	0	20239	10	Red alder	14	1	2	Asymmetric canopy	
B	SAVE	0	0	20240	8	Red alder	0	3	3	Covered in vines	NO
B	SAVE	1	1	20241	10	Red alder	14	1	2	Asymmetric, vines	
B	SAVE	1	1	20243	8	Red alder	12	1	2	Asymmetric	
B	SAVE	0	0	20244	6	Red alder	0	3	3	Covered in vines	NO
B	NON-VIABLE	0	0	20246	8	Red alder	6	1	3	Adjacent tree fell into it	NO
B	SAVE	1	1	20247	10	Red alder	14	1	2	Asymmetric	
B	SAVE	1	1	20249	6	Red alder	6	1	2	Suppressed	
A	NON-VIABLE	0	0	20250	16	Weeping willow	12	1	3	Previous trunk failure	NO
B	SAVE	1	1	20251	8	Red alder	14	1	2	Asymmetric	
B	SAVE	1	1	20254	6	Red alder	10	1	2	Suppressed	
B	SAVE	1	1	20256	8	Red alder	10	1	2	Asymmetric	
B	NON-VIABLE	0	0	20257	8	Red alder	14	1	3	Asymmetric, trunk injury	NO
B	NON-VIABLE	0	0	20258	8	Red alder	14	1	2	Lean, asymmetric	
B	SAVE	1	1	20259	8	Red alder	12	1	2	Asymmetric, lean	
B	SAVE	1	1	20260	10	Red alder	16	1	2	Asymmetric	
B	SAVE	1	1	20261	6	Red alder	12	1	2	Suppressed	
B	SAVE	1	1	20262	6	Red alder	8	1	2	Asymmetric	

Parcel	Proposed Action	Density Credits	Retained TDC	TREE NO.	DBH	Species	Dripline	Health	Structure	Visible Defects	Viable Tree?
B	SAVE	1	1	20263	10	Red alder	16	1	2	Asymmetric	
B	SAVE	1	1	20264	8	Red alder	12	1	1		
B	SAVE	1	1	20265	8	Red alder	14	1	2	Asymmetric	
B	SAVE	1	1	20266	6	Red alder	6	1	2	Suppressed	
B	SAVE	1	1	20267	6	Red alder	8	1	2	Asymmetric	
B	SAVE	1	1	20268	8	Red alder	14	1	2	Lean	
B	SAVE	1	1	20269	6	Red alder	8	1	2	Suppressed	
B	SAVE	1	1	20270	8	Red alder	10	1	1		
B	SAVE	1	1	20271	10	Red alder	14	1	1		
B	SAVE	1	1.5	20272	8	Western red-cedar	10	1	1		
B	SAVE	1	1	20273	8	Red alder	14	1	2	Asymmetric	
B	SAVE	1	1	20274	8	Red alder	12	1	2	Asymmetric	
B	SAVE	1	1	20275	8	Red alder	12	1	2	Lean	
B	SAVE	1	1	20276	8	Red alder	14	1	2	Suppressed	
B	SAVE	1	1	20277	8	Red alder	14	1	2	Sweep	
A	NON-VIABLE	0	0	20278	28	Red alder	12	2	3	Decline, decay	NO
B	SAVE	1	1	20279	8	Red alder	10	1	1		
B	IMPACTED	0	0	20280	6	Red alder	10	1	2	Lean	
B	IMPACTED	0	0	20281	8	Red alder	12	1	1		
B	REMOVE	0	0	20283	12	Red alder	12	1	2	Asymmetric	
B	SAVE	1	1	20286	6	Red alder	8	1	1		
B	SAVE	1	1	20288	6	Red alder	8	2	1	Stem canker	

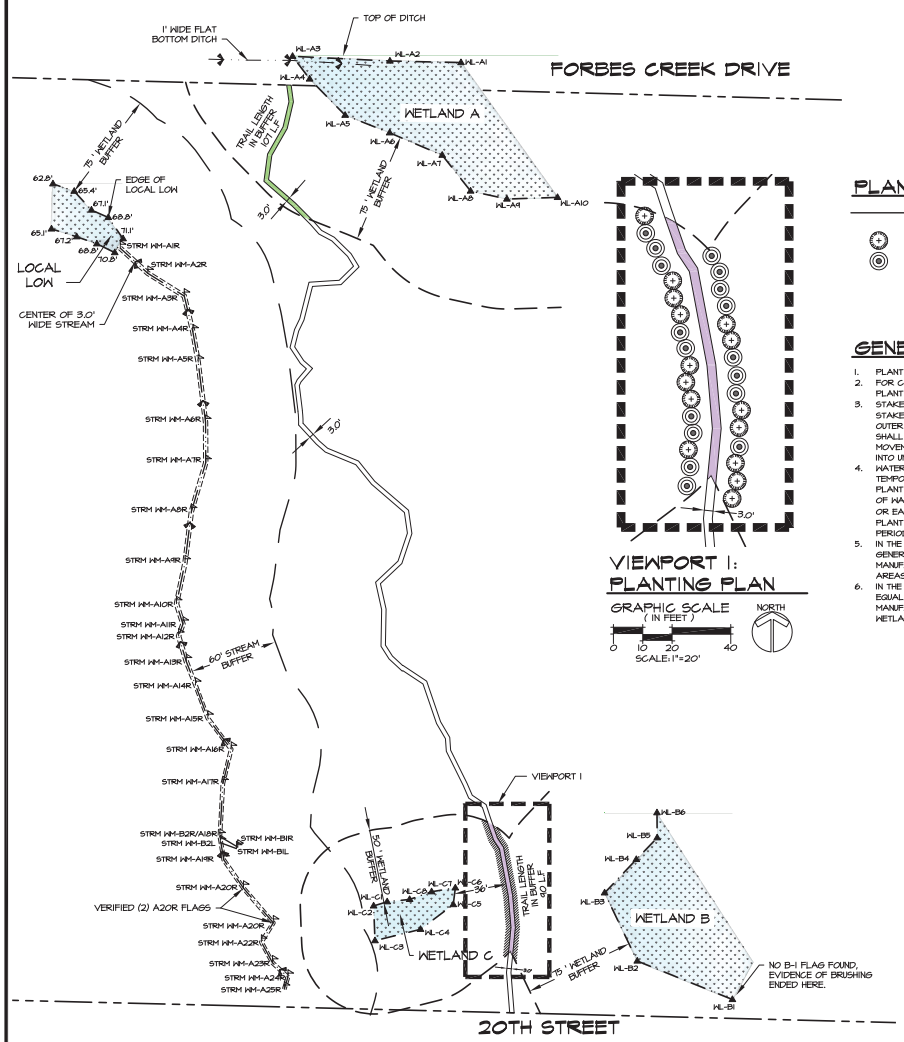
Parcel	Proposed Action	Density Credits	Retained TDC	TREE NO.	DBH	Species	Dripline	Health	Structure	Visible Defects	Viable Tree?
B	REMOVE	0	0	20292	18	Bitter cherry	16	1	2	Asymmetric	
B	NON-VIABLE	0	0	20293	6	Red alder	8	1	3	Root failure	NO
B	NON-VIABLE	0	0	20294	12	Red alder	10	3	3	Decline, vine, dying-nearly dead	NO
B	REMOVE	0	0	20296	22,40	Bigleaf maple	35	1	2	Soil heave	
A	NON-VIABLE	0	0	20297	18	Douglas-fir	16	1	1		
A	OFFSITE	0	0	20307	6	Douglas-fir	8	1	2	Suppressed	
A	NON-VIABLE	0	0	20309	38	Bigleaf maple	30	1	3	Decay, Kretzschmaria	NO
A	OFFSITE	0	0	20319	6	Douglas-fir	6	1	2	Suppressed	
A	OFFSITE	0	0	20321	6	Red alder	8	1	1		
A	OFFSITE	0	0	20324	12	Douglas-fir	14	1	1		
B	SAVE	11	11	20349	22,20	Bigleaf maple	30	1	2	Double leader	
A	NON-VIABLE	0	0	20350	10",18", 18",16	Bigleaf maple	20	2	3	Decline, stumpsprout, Kretzschmaria	NO
A	OFFSITE	0	0	20351	20	Bigleaf maple	20	1	1		
A	OFFSITE	0	0	20352	14,12,22	Bigleaf maple	18	1	2	Multiple leaders	
A	OFFSITE	0	0	20353	14",16", 18",18	Bigleaf maple	25	2	2	Decay, multiple leaders, chain embedded in trunk	
B	NON-VIABLE	0	0	20354	18	Bigleaf maple	16	2	3	Decline, trunk decay, Kretzschmaria	NO
B	NON-VIABLE	0	0	20355	10,14,14"	Bigleaf maple	16	2	3	Decline, trunk decay, Kretzschmaria	NO
B	NON-VIABLE	0	0	20356	24	Bigleaf maple	18	2	3	Decline, Kretzschmaria	NO
B	REMOVE	0	0	20357	14	Douglas-fir	12	1	2	Ivy	

Parcel	Proposed Action	Density Credits	Retained TDC	TREE NO.	DBH	Species	Dripline	Health	Structure	Visible Defects	Viable Tree?
B	NON-VIABLE	0	0	20358	18	Bitter cherry	12	2	3	Decline, stem failure	NO
B	REMOVE	0	0	20359	6	Douglas-fir	6	1	2	Suppressed	
A	REMOVE	0	0	20360	22	Red alder	16	2	2	Decline, double leader	
B	SAVE	15	15	20361	24",22", 18",10	Bigleaf maple	30	1	2	Multiple leaders	
A	REMOVE	0	0	20362	10,14,14"	Western red-cedar	12	1	1		
B	SAVE	13	13	20363	24,24	Bigleaf maple	25	1	2	Double leader	
B	SAVE	8	8	20364	24	Bigleaf maple	30	1	1		
B	SAVE	21	21	20366	38,40	Black cottonwood	25	1	2	Double leader	
B	NON-VIABLE	0	0	20367	14	Red alder	10	1	3	Lean, ivy	NO
B	REMOVE	0	0	20368	10	Red alder	12	2	2	Decline, nearly dead	
B	SAVE	2	2	20412	12	Red alder	16	1	1		
B	SAVE	1	1	20413	8	Red alder	14	1	2	Asymmetric	
B	SAVE	1	1	20414	8	Red alder	14	1	2	asymmetric	
B	SAVE	1	1	20415	10	Red alder	14	1	1		
B	SAVE	1	1	20416	6,8	Red alder	14	1	2	Asymmetric, double leader, included bark	
B	SAVE	1	1	20417	7	Red alder	4	1	1		
B	SAVE	1	1	20418	10	Red alder	14	1	1		
B	SAVE	1	1	20419	8	Red alder	10	1	2	Asymmetric	
B	SAVE	1	1	20420	8	Red alder	10	1	2	Asymmetric	
B	SAVE	1	1	20421	8	Red alder	10	1	2	Asymmetric	
B	SAVE	0	0	20427	16	Red alder	14	2	3	Decline, deadwood	NO

Parcel	Proposed Action	Density Credits	Retained TDC	TREE NO.	DBH	Species	Dripline	Health	Structure	Visible Defects	Viable Tree?
B	NON-VIABLE	0	0	20428	12	Bigleaf maple	16	1	2	Asymmetric	
B	SAVE	5	5	20429	18	Bigleaf maple	20	2	1	Stunted upper foliage	
B	REMOVE	0	0	20447	18,20,24,28	Bigleaf maple	25	1	2	Multiple leaders	
B	REMOVE	0	0	20448	36,38	Bigleaf maple	20	1	2	Double leader	
B	REMOVE	0	0	20449	16	Bigleaf maple	18	1	1		
B	REMOVE	0	0	20450	52	Black cottonwood	25	1	2	Asymmetric, sweep	
B	REMOVE	0	0	20451	65	Black cottonwood	25	1	2	Asymmetric, sweep	
B	REMOVE	0	0	20452	44	Black cottonwood	25	1	2	Asymmetric, sweep	
B	NON-VIABLE	0	0	20453	10,18,20, 20,26,30	Bigleaf maple	30	1	3	Previous failure, multiple leaders, stumpsprout	NO
B	REMOVE	0	0	20454	30	Black cottonwood	25	1	2	Asymmetric, sweet	
B	REMOVE	0	0	20456	26	Black cottonwood	25	1	2	Asymmetric, sweet	
B	SAVE	21	21	20460	6,24,30,34	Bigleaf maple	25	1	2	Multiple leaders	
B	SAVE	4	4	20470	16	Bigleaf maple	14	1	2	Trunk wound, deadwood	
B	IMPACTED	0	0	20495	16	Bigleaf maple	16	1	1		
B	REMOVE	0	0	20528	16	Bigleaf maple	18	1	2	Asymmetric	
B	REMOVE	0	0	20530	8	Douglas-fir	6	1	2	Suppressed	
B	REMOVE	0	0	20532	18	Bigleaf maple	18	1	2	Deadwood, asymmetric	
B	REMOVE	0	0	20536	50	Black cottonwood	30	1	1		
B	REMOVE	0	0	20540	30	Bigleaf maple	20	1	2	Asymmetric	
B	REMOVE	0	0	20543	20	Western red-cedar	14	1	1		
B	REMOVE	0	0	20544	54	Black cottonwood	20	1	2	Sweep in trunk	
B	NON-VIABLE	0	0	20545	18,16,16	Bigleaf maple	20	2	3	Stunted, trunk failure,	NO

Parcel	Proposed Action	Density Credits	Retained TDC	TREE NO.	DBH	Species	Dripline	Health	Structure	Visible Defects	Viable Tree?
										stumpsprout	
B	REMOVE	0	0	20546	6	Western red-cedar	8	1	2	Suppressed	
B	REMOVE	0	0	20547	28	Bigleaf maple	25	1	2	Branch failure, asymmetric	
B	REMOVE	0	0	20548	14	Western red-cedar	12	1	2	Suppressed	
B	REMOVE	0	0	20549	12	Western red-cedar	14	1	2	Suppressed	
B	REMOVE	0	0	20550	24	Bigleaf maple	18	1	2	Asymmetric	
B	REMOVE	0	0	20551	18	Bigleaf maple	16	1	2	Seam in trunk	
B	SAVE	17	25.5	20562	42	Douglas-fir	20	1	1		
B	REMOVE	0	0	20666	40	Bigleaf maple	25	1	2	Spiral cracks in trunk	
B	REMOVE	0	0	20667	16	Western hemlock	16	1	1		
B	NON-VIABLE	0	0	20668	8	Bigleaf maple	14	1	3	Asymmetric, suppressed	NO
B	IMPACTED	0	0	20674	32,22,10	Bigleaf maple	30	1	2	Multiple leaders	
B	IMPACTED	0	0	20675	24,18	Bigleaf maple	25	2	2	Stunted foliage, stump sprout	
B	REMOVE	0	0	20678	2-20",18", 2-12",10", 26",34",16	Bigleaf maple	25	2	2	Stunted foliage, multiple leader, deadwood	
B	REMOVE	0	0	20679	10	Douglas-fir	12	1	2	Suppressed	
B	REMOVE	0	0	20682	24	Douglas-fir	18	1	1		
B	REMOVE	0	0	20683	22	Bigleaf maple	18	1	2	Asymmetric	
B	REMOVE	0	0	20684	24	Western red-cedar	18	1	2	Double leader	
B	SAVE	3	4.5	20688	14	Douglas-fir	16	1	2	Dogleg, double leader	
B	REMOVE	0	0	20689	26	Western red-cedar	16	1	1		

SW ¼, SECT. 32, TWP. 26N, RNG. 5E, W.M.



VIEWPORT 1: PLANTING PLAN

GRAPHIC SCALE (IN FEET) 0 10 20 40
SCALE: 1"=20'
NORTH

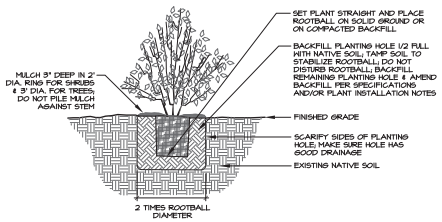
PLANT SCHEDULE

TREES

	SCIENTIFIC NAME	COMMON NAME	QTY.	WL STATUS	AVERAGE SPACING	SIZE (MIN)	NOTES
	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	15	FACU	6' O.C.	2-3' HT.	2 GAL., FULL & BUSHY
	THUJA PLICATA	WESTERN RED CEDAR	17	FAC	6' O.C.	2-3' HT.	2 GAL., FULL & BUSHY

GENERAL PLANT INSTALLATION NOTES

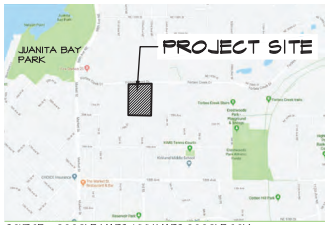
1. PLANT TREES AND/OR SHRUBS 1" HIGHER THAN DEPTH GROWN AT NURSERY.
2. FOR CONTAINER TREES AND/OR SHRUBS, SCORE FOUR SIDES OF ROOTBALL PRIOR TO PLANTING. BUTTERFLY ROOTBALL IF ROOT CIRCLING IS EVIDENT.
3. STAKE DECIDUOUS AND EVERGREEN TREES 4 FEET AND OVER IN HEIGHT WITH ONE (1) STAKE PER TREE. STAKE TREES IMMEDIATELY AFTER PLANTING. PLACE STAKE AT THE OUTER EDGE OF THE ROOTS OR ROOTBALL, IN LINE WITH THE PREVAILING WIND. STAKES SHALL BE LOOSELY ATTACHED USING CHAIN-LOCK TREE TIES TO ALLOW FOR SOME TRUNK MOVEMENT. STAKES TO BE VERTICAL, PARALLEL, EVEN-TOPPED, UNSCARRED AND DRIVEN INTO UNDISTURBED SUBGRADE. REMOVE AFTER ONE YEAR.
4. WATER PLANTS IMMEDIATELY UPON PLANTING, THEN PROVIDE MANUAL WATERING OR A TEMPORARY IRRIGATION SYSTEM TO PREVENT PLANT MORTALITY AND ENSURE PROPER PLANT ESTABLISHMENT. PLANTS SHALL RECEIVE A MINIMUM OF APPROXIMATELY ONE INCH OF WATER EVERY WEEK DURING THE DRY SEASON (GENERALLY JUNE 15TH - OCTOBER 15TH, OR EARLIER OR LATER IF CONDITIONS WARRANT) FOR THE FIRST SEASON AFTER PLANTING. IRRIGATION AMOUNTS MAY NEED TO BE INCREASED DURING PROLONGED PERIODS OF HOT, DRY WEATHER.
5. IN THE BUFFER AREAS ONLY, FERTILIZE ALL TREES AND SHRUBS WITH A SLOW-RELEASE GENERAL PURPOSE GRANULAR FERTILIZER OR SLOW-RELEASE TABLETS AT MANUFACTURER'S SPECIFIED RATE. NO FERTILIZER SHALL BE APPLIED WITHIN WETLAND AREAS.
6. IN THE BUFFER AREAS ONLY, A SOIL MOISTURE RETENTION AGENT, SUCH AS "SOILMOIST" OR EQUAL, SHALL BE INCORPORATED INTO THE BACKFILL OF EACH PLANTING PIT, PER MANUFACTURER'S INSTRUCTIONS. NO MOISTURE RETENTION AGENT SHALL BE APPLIED WITHIN WETLAND AREAS.



1 CONTAINER STOCK PLANTING DETAIL
N.T.S.

VICINITY MAP

NTS



SOURCE: GOOGLE MAPS; WWW.MAPS.GOOGLE.COM (ACCESSED 03/19/2019)
NORTH

CONTACTS

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NAME: ORCAS MOON, LLC
ADDRESS: P.O. BOX 2710 REDMOND, WA 98073
PHONE: (206) 550-5560
CONTACT: ROBERT LONDO

SURVEYOR
NAME: AXIS SURVEY & MAPPING
ADDRESS: 15241 NE 90TH ST REDMOND, WA 98052
PHONE: (425) 823-5700
CONTACT: STEVE PHILIPS, PLS

ENVIRONMENTAL CONSULTANT
NAME: TALASAEA CONSULTANTS, INC.
ADDRESS: 15020 BEAR CREEK RD. NE WOODINVILLE, WA 98077
PHONE: (425) 861-7550
CONTACT: ANN OLSEN, SENIOR PROJECT MANAGAER

SHEET INDEX

SHEET NUMBER	SHEET TITLE
T1.0	PROPOSED OFF-SITE TRAIL PLAN

NOTES

1. SURVEY PROVIDED BY AXIS SURVEY AND MAPPING, 15241 NE 90TH ST REDMOND, WA 98052, (425) 216-4051.
2. WETLAND & STREAM DELINEATIONS PERFORMED BY OTHERS.
3. SOURCE DRAWING WAS MODIFIED BY TALASAEA CONSULTANTS FOR VISUAL ENHANCEMENT.

Know what's below. Call before you dig.

EXISTING CONDITIONS & PROPOSED TRAIL ROUTE

GRAPHIC SCALE (IN FEET) 0 20 40 80
SCALE: 1"=40'
NORTH

PLAN LEGEND

- PROPERTY LINE
- EXISTING WETLAND
- ▲WL-# WETLAND FLAG LOCATION, BY OTHERS
- WETLAND BUFFER
- STREAM CENTERLINE
- STRM WM-# STREAM CENTERLINE FLAG LOCATION, BY OTHERS
- 3' WIDE STREAM BED
- STREAM BUFFER
- DITCH CENTERLINE

IMPACTS LEGEND

BUFFER IMPACTS

WETLAND A	322 SF
WETLAND C	372 SF
TOTAL:	594 SF

MITIGATION LEGEND

BUFFER ENHANCEMENT 1:1	594 SF

TALASAEA CONSULTANTS, INC.
Resource & Environmental Planning
15020 Bear Creek Road Northeast • Woodinville, Washington 98077
Bus (425) 861-7550 • Fax (425) 861-7560

PROPOSED OFF-SITE TRAIL PLAN
EXISTING CONDITIONS, PROPOSED TRAIL ROUTE & PLANTING PLAN
CITY OF KIRKLAND PARKLAND 20TH AVE NE
TO FORBES CREEK DRIVE TRAIL
KIRKLAND, WASHINGTON

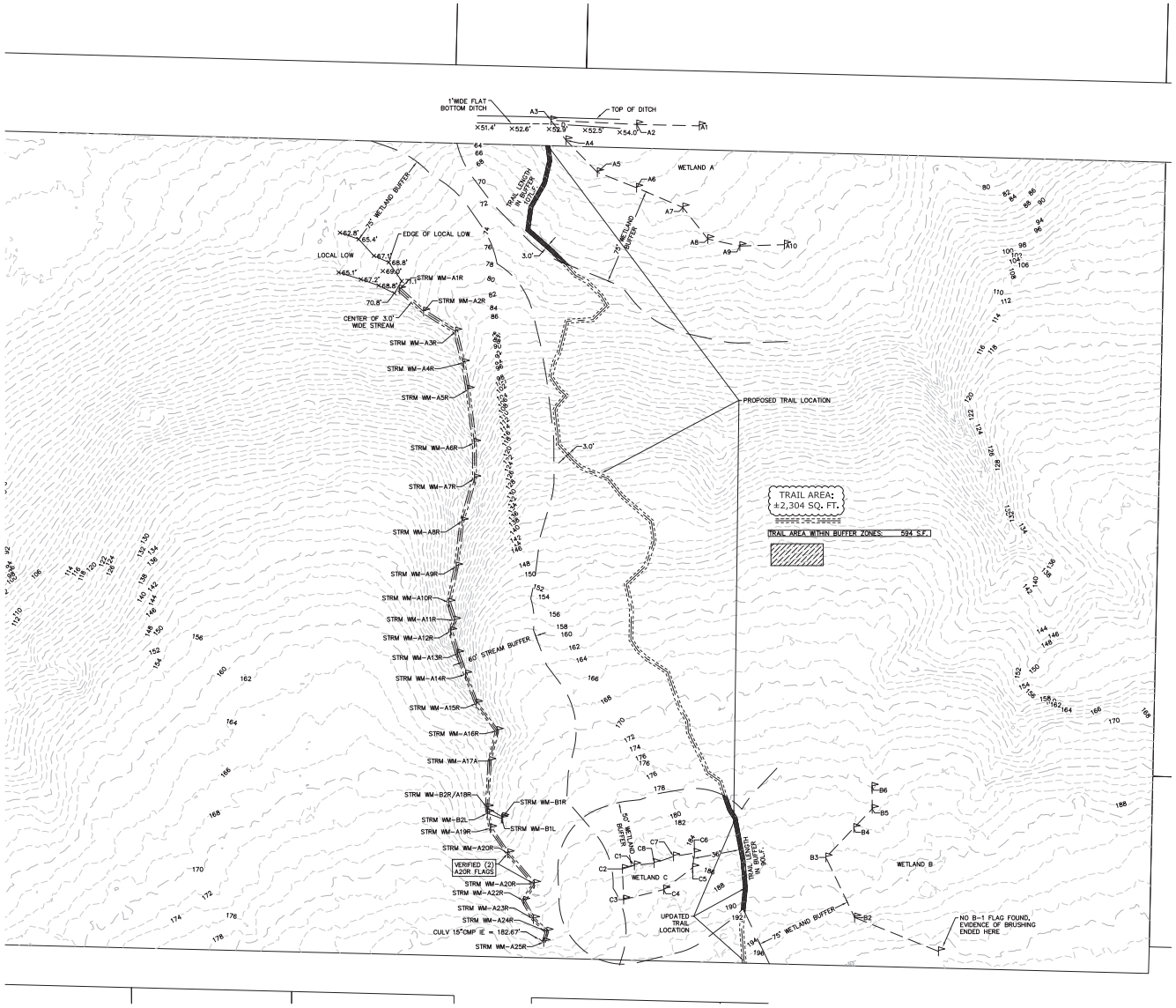
Revisions	Date	By

Date 03-20-2019
Scale AS NOTED
Designed AO
Drawn FH
Checked AO
Approved BS

Project # 5128

Sheet # T1.0

EXHIBIT



GRAPHIC SCALE

40 20 0 40 80

1" = 40'

LIDAR NOTE

THESE CONTOURS WERE INTERPOLATED FROM PUBLIC DOMAIN AIRBORNE LIDAR DATA ACQUIRED IN 2003 BY THE PUGET SOUND LIDAR CONSORTIUM (PSLC). LIDAR HAS DEMONSTRATED ADVANTAGES IN DEFINING GROUND SURFACES IN SHADOWED AREAS BUT MAY NOT ADEQUATELY DEFINE THE GROUND IN OBSCURED AREAS. THE ACCURACY OF THE CONTOURS AND DIGITAL TERRAIN MODEL IS CONTINGENT ON THE ACCURACY OF THE PSLC DATA. IT IS NOT EXPECTED THAT THESE CONTOURS CONFORM TO NATIONAL STANDARDS FOR SPATIAL DATA ACCURACY. THIS DATA IS INTENDED FOR PRELIMINARY SITE EVALUATION ONLY.

NE 1/4, SW 1/4, SEC. 32, TWP. 26N., RGE. 5E., W.M.
CITY OF KIRKLAND, KING COUNTY, WASHINGTON

REV#	DESCRIPTION OF REVISION	DATE	BY
#1			
#2			
#3			
#4			
#5			
#6			
#7			

EXHIBIT
FOR
OFFSITE TRAIL

ROBERT P LONDO
ORCAS MOON, LLC

KIRKLAND, WA 98034

Axis Survey & Mapping
15241 NE 90TH ST
REDMOND, WA 98052
TEL: 425.823-5700
FAX 425.823-6700
www.axlsmap.com

JOB NO.	DATE
16-067	3/14/19
DRAWN BY	CHECKED BY
DB/TO/JM/EM	MTSE
SCALE	SHEET
1" = 40'	1 OF 1

CRITICAL AREAS REPORT

ORCAS MOON PROPERTY
KIRKLAND, WASHINGTON

Prepared For:
ORCAS MOON, LLC

Prepared By:
TALASAEA CONSULTANTS, INC.

21 July 2016

Critical Areas Report

Orcas Moon Property
Kirkland, Washington

Prepared For:
Orcas Moon, LLC
13809 209th Avenue NE
Woodinville, Washington 98072

Prepared By:
Talasaea Consultants, Inc.
15020 Bear Creek Road NE
Woodinville, Washington 98077
(425) 861-7550

21 July 2016

EXECUTIVE SUMMARY

PROJECT NAME: Orcas Moon Project

CLIENT: Orcas Moon, LLC

SITE LOCATION: Property is northwest of the intersection of 28th Avenue and 5th Street and south of Forbes Creek Drive in Kirkland, Washington. The Public Land Survey System location of the property is the southwest ¼ of Section 32, T26N, R5E, Willamette Meridian.

PROJECT STAFF: Bill Shiels, Principal; Ann Olsen, Senior Project Manager; David R. Teesdale, Senior Wetlands Ecologist

FIELD SURVEY: Site was evaluated and critical areas delineated on 8 and 19 April 2016.

DETERMINATION: The Orcas Moon property is located within a City of Kirkland Primary Basin (Forbes Creek). Two wetlands and five streams were identified on the Orcas Moon Property. One wetland was identified offsite to the west of the property. The onsite wetlands were all rated as City of Kirkand Type 3 wetlands. The offsite wetland was rated as a City of Kirkland Type 2 wetland. Type 2 wetlands within a Primary Basin have a 75-foot standard buffer. Type 3 wetlands within a Primary Basin have a 50-foot standard buffer. The streams were rated as City of Kirkland Class B waters. Class B waters within a Primary Basin have a 60-foot standard buffer.

HYDROLOGY: Hydrology for Wetlands A and C is provided by shallow groundwater seepage on a slope. Hydrology for Wetland B is supported entirely by stream flow from Stream 4, which is supported by Wetland C.

SOILS: Three soil types are mapped on the property. These are Kitsap silt loam (2 to 8 percent slope), Kitsap silt loam (15 to 30 percent slope), and Indianola loamy fine sand (4 to 15 percent). These soils are not listed as hydric by the National Technical Committee on Hydric Soils.

VEGETATION: Vegetation within Wetland A is a mixture of sparse herbaceous and scrub-shrub species with a significant portion of bare soil present. Species include skunk cabbage (*Lysichiton americanum*), piggyback plant (*Tolmea menziesii*), slough sedge (*Carex obnupta*), field and tall horsetail (*Equisetum arvense* and *E. telmateia*), lady fern (*Athyrium filix-femina*), salmonberry (*Rubus spectabilis*), and young red alder (*Alnus rubra*). Vegetation within Wetland B includes American brooklime (*Veronica americana*), lady fern, piggyback plant, and slough sedge. Vegetation within Wetland C is mostly scrub-shrub species, comprised predominantly of salmonberry, lady fern, skunk cabbage, slough sedge, and red alder.

PROPOSED DEVELOPMENT: The Client proposes to develop the Orcas Moon Project as a cottage unit development. Sixteen (16) units of cottages will be constructed in three separate clusters on the property. Spreading the development out into two different areas allows the project to maximize the buildable area outside of steep slope zones. The two cottage unit clusters will be arranged around rain gardens, which will handle all stormwater runoff from paved parking and foot trail systems as well as rooftop runoff.

The proposed development will not directly impact wetlands or streams on the subject property. However, it will be necessary to reduce the critical areas buffers in nine (9) locations. This is permitted under KMC §90.60(2)(a) and §90.100(1)(a) for buffer averaging. Sufficient area is available onsite to provide additional buffer area that is equal in functions and services to the buffer areas being reduced. Further enhancement of buffer vegetation will not be required.

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LIST OF FIGURES

APPENDICES

Chapter 1. INTRODUCTION

1.1 Report Purpose

This report is the result of a critical areas study of the Orcas Moon Project property (referred to hereinafter as "Project Site" or "Site). The Site is located within the Forbes Creek basin of Kirkland (**Figure 1**). The purpose of this report is to identify, categorize, and describe existing site conditions, such as wetlands, streams, or other critical habitats, and their respective buffers. The report has been prepared to comply with the requirements of Kirkland Municipal Code Chapter 90 – Drainage Basins.

This report will provide and describe the following information:

- General property description;
- Methodology for critical areas investigation;
- Results of critical areas background review and field investigation; and
- Regulatory review.

1.2 Statement of Accuracy

Critical areas characterizations and ratings were conducted by trained professionals at Talasaea Consultants, Inc., and adhered to the protocols, guidelines, and generally accepted industry standards available at the time the work was performed. The conclusions in this report are based on the results of analyses performed by Talasaea Consultants and represent our best professional judgment. To that extent and within the limitation of project scope and budget, we believe the information provided herein is accurate and true to the best of our knowledge. Talasaea does not warrant any assumptions or conclusions not expressly made in this report, or based on information or analyses other than what is included herein.

Chapter 2. GENERAL PROPERTY DESCRIPTION AND LAND USE

2.1 Project Location

The Project Site is located northwest of the intersection of 20th Avenue and 5th Street in the City of Kirkland, Washington (**Figure 2**). The Site extends northward from 20th Avenue to Forbes Creek Drive. The Site includes two tax parcels: Parcel A (3890100055), and Parcel B (3890100050). The Site encompasses approximately 7.1 acres. The Public Land Survey System location of the Site is southwest ¼ of Section 32, T26N, R5E, Willamette Meridian.

2.2 General Property Description

The Site is currently undeveloped and forested with second-growth mixed coniferous and deciduous trees. The topography of the Site is moderately sloped with five ravines extending generally in a north-south orientation. The Site generally slopes downward from 20th Avenue to Forbes Creek Drive.

2.3 Land Use and Zoning

The Site is zoned RS-12.5 or Single Family Residential. The Site is currently undeveloped. However, a single-family residence and an associated outbuilding did exist on Parcel A prior to 1936 (date of earliest aerial photo available). This residence

was still visible as of 1952. This residence was removed from Parcel A, although its driveway is still present. Properties to the northeast and south are developed as single-family residential. Properties to the west and southeast are currently undeveloped.

Chapter 3. METHODOLOGY

The critical areas analysis of the Site involved a two-part effort. The first part consisted of a preliminary assessment of the Site and the immediate surrounding area using existing published environmental information. This information includes:

1. Wetland and soils information from resource agencies;
2. Critical areas information from the City of Kirkland and King County;
3. Orthophotography and LIDAR imagery; and,
4. Relevant studies completed or ongoing in the vicinity of the Site.

The second part consisted of site investigations where direct observations and measurements of existing environmental conditions were made. Observations included plant communities, soils, hydrology, and stream conditions. This information was used to help characterize the site and define the limits of critical areas onsite and offsite for regulatory purposes (see **Section 3.2 – Field Investigation** below).

3.1 Background Information Reviewed

Background information from the following sources was reviewed prior to field investigations:

- US Fish and Wildlife Service (USFWS) Wetlands Online Mapper (National Wetlands Inventory)(U.S. Fish and Wildlife Service) (www.wetlandsfws.er.usgs.gov/wtlnds/launch.html);
- Natural Resources Conservation Service, Web Soil Survey (Natural Resources Conservation Service)(www.websoilsurvey.nrcs.usda.gov/app);
- Natural Resources Conservation Service National Hydric Soils List by State (Natural Resources Conservation Service)(www.soils.usda.gov/use/hydric/lists/state.html);
- City of Kirkland GIS database (City of Kirkland, 2015);
- King County GIS database (King County 2015);
- King County iMap online mapping program (King County);
- LIDAR data from King County GIS (2006);
- Orthophotography from Earth Explorer (2016);
- WDFW Priority Habitats and Species (PHS) Database on the Web (Washington State Department of Fish and Wildlife)(wdfw.wa.gov/mapping/phs); and
- Washington Department of Natural Resources Natural Heritage GIS database, 2015.
- Fish usage data from SalmonScape (http://apps.wdfw.wa.gov/salmonscape/map.html) and StreamNet

(http://www.streamnet.org/data/interactive-maps-and-gis-data/)

3.2 Field Investigation

The Site was evaluated and critical areas delineated on 8 and 19 April 2016. The boundaries of wetlands and the ordinary high water mark (OHWM) of streams were flagged in the field for later professional surveying.

The wetland delineation utilized the routine approach described in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (U.S. Army Corps of Engineers, 2010). The ordinary high water mark (OWHM) for any streams found on the Site was determined and delineated using the methodology described by Washington State Department of Ecology's "*Determining the Ordinary High Water Mark on Streams in Washington State".* (Olson and Stockdale 2008). Wetlands and streams were classified according to City of Kirkland Municipal Code, Chapter 90 – Drainage Basins.

Plant species were identified according to the taxonomy of Hitchcock and Cronquist (Hitchcock, *et al*. 1969). Taxonomic names were updated and plant wetland status was assigned according to *North American Digital Flora: National Wetland Plant List, Version 2.4.0* (Lichvar, *et al*. 2012). Wetland classes were determined using the U.S. Fish and Wildlife Service's system of wetland classification (Cowardin, *et al*. 1979). Vegetation was considered hydrophytic within a suspected wetland area if greater than 50% of the dominant plant species had a wetland indicator status of facultative or wetter (i.e., facultative, facultative wetland, or obligate wetland).

Wetland hydrology was determined based on the presence of hydrologic indicators listed in the Corps regional supplement. These indicators are separated into Primary Indicators and Secondary Indicators. To confirm the presence of wetland hydrology, one Primary Indicator or two Secondary Indicators must be demonstrated. Indicators of wetland hydrology may include, but are not necessarily limited to; drainage patterns, drift lines, sediment deposition, watermarks, stream gauge data and flood predictions, historic records, visual observation of saturated soils, and visual observation of inundation.

Soils on the Site were considered hydric if one or more of the hydric soil indicators listed in the Corps' Regional Supplement were present. Indicators include: presence of organic soils; reduced, depleted or gleyed soils, or redoximorphic features in association with reduced soils.

Wetlands were rated using the City of Kirkland's wetland rating system. The wetland datasheets are contained in **Appendix A**.

Chapter 4. RESULTS

4.1 Analysis of Existing Information

The following sources provided information on site conditions based on data compiled from resource agencies and local government. For the purposes of this report, the term "vicinity" will mean an area within ¼ mile of the Project Site.

4.1.1 USFWS Wetlands Online Mapper (National Wetlands Inventory)

The USFWS Wetlands Online Mapper maps six wetland units within the vicinity of the Site (**Figure 3**). No wetlands are indicated on or extending onto the site. Three of the wetlands are palustrine forested (one is indicated as palustrine forested/scrub-shrub), two are palustrine unconsolidated bottom, and one is a palustrine scrub-shrub wetland.

4.1.2 Natural Resources Conservation Service Web Soil Survey

Three soil types are mapped on the property (**Figure 4**). These are Kitsap silt loam (KpB, 2 to 8 percent slope), Kitsap silt loam (KpC, 15 to 30 percent slope), and Indianola loamy fine sand (InC, 4 to 15 percent).

The Kitsap series is made up of moderately well drained soils that formed in glacial lake deposits, under a cover of conifers and shrubs. These soils are on terraces and strongly dissected terrace fronts. The surface layer and subsoil are very dark brown and dark yellowish brown silt loam.

The Indianola series is made up of somewhat excessively drained soils that formed under conifers in sandy, recessional, stratified glacial drift. These undulating, rolling, and hummocky soils are on terraces. These soils are generally brown, dark yellowish-brown, and light olive-brown loamy fine sand.

The Kitsap and Indianola soil series are not listed as hydric by the National Technical Committee on Hydric Soils.

4.1.3 StreamNet and SalmonScape GIS Databases

StreamNet and SalmonScape maintain data concerning the usage or potential usage of streams in the Pacific Northwest. StreamNet maps Coho (*Oncorhynchus kisutch*) as utilizing Forbes Creek for rearing and migration. No other salmonid species are mapped within the vicinity of the Site. SalmonScape maps four species utilizing or having the potential to utilize Forbes Creek. These are fall chinook (*O. tshawytscha*), coho, winter steelhead (*O. mykiss*), and sockeye (*O. nerka*). Coho are indicated as documented rearing. Sockeye are indicated as documented presence. Both fall chinook and winter steelhead are indicated as modeled presence[1].

4.1.4 King County GIS Database

King County GIS does not map any features on the Site. However, it does map some features within the vicinity of the Site (**Figure 5**). These features include two water bodies, two streams, a floodway, and a flood plain. One of the streams is associated with the floodway and floodplain, and is identified as Forbes Creek. The second stream is unnamed on the King County GIS database.

4.1.5 City of Kirkland Critical Areas Map

The City of Kirkland does not map any wetlands on the Site (**Figure 6**). However, it does map two wetlands in the vicinity of the Site. One wetland is located near the

[1] "Modeled presence" indicates that physical parameters of a particular stream may support the presence of a salmonid species, but no actual documentation of their presence exists.

southwest property corner on an adjacent parcel. The other wetland is associated with Forbes Creek to the north of the Site.

The City of Kirkland also maps five streams on the Site, including Forbes Creek to the north of the property. At least four more streams are mapped on properties to the east and west of the Site.

Finally, the City of Kirkland maps a floodplain and floodway in the general vicinity of Forbes Creek.

4.2 Analysis of Existing Site Conditions

Two wetlands and five streams were identified during our evaluation of the Site (**Figure 7**). An additional wetland was identified off site to the west, but was not delineated. It was, however, rated using the City of Kirkland's wetland rating system (Plate 26).

4.2.1 Wetlands

4.2.1.1 Wetland A

Wetland A is an approximately 5,900 sf wetland located near the southwestern corner of the Site (Parcel A). It appears to have been created by a slump in the recent past, based on the age of the alders growing within Wetland A. The wetland is a slope wetland that provides hydrology for one of the five onsite streams.

Vegetation within Wetland A consists primarily of skunk cabbage (*Lysichiton americanum*), piggyback plant (*Tolmea menziesii*), slough sedge (*Carex obnupta*), field and tall horsetail (*Equisetum arvense* and *E. telmateia*), lady fern (*Athyrium filix-femina*), salmonberry (*Rubus spectabilis*), and young red alder (*Alnus rubra*).

Wetland A was rated using the City of Kirkland's wetland rating system. The wetland scored 21 points, which satisfies the criteria for characterization as a Type 3 wetland. Type 3 wetlands located within a Primary Basin (Forbes Creek) have a 50-foot standard buffer. Wetland buffers may be modified through buffer averaging, provided that the minimum buffer width at any one point is not less than 33 feet and that the total area of the averaged buffer is not less than the area of the standard buffer.

4.2.1.2 Wetland B

Wetland B is a very small (approximately 170 sf) wetland that formed within an old concrete cistern. The cistern is constructed within the ravine for one of the onsite streams (Stream 4) and may have provided water for the residence that existed on Parcel A. Over time, this cistern has silted in and wetland vegetation has become established. Vegetation in Wetland B consists of American brooklime (*Veronica americana*), lady fern, piggyback plant, and slough sedge.

Wetland B scored 17 points using the City of Kirkland wetland rating system. This satisfies the criteria for characterization as a Type 3 wetland. Type 3 wetlands located within a Primary Basin have a 50-foot standard buffer. Wetland buffers may be modified through buffer averaging, provided that the minimum buffer width at any one point is not less than 33 feet and that the total area of the averaged buffer is not less than the area of the standard buffer.

4.2.1.3 Wetland C (Off Site)

Wetland C is a slope wetland that is located to the west of the southwest property corner. This wetland was not delineated since it resides off property. However, we estimate its size to be approximately 6,200 sf. Vegetation consists predominantly of salmonberry, lady fern, skunk cabbage, slough sedge, and red alder. Wetland C is the headwaters of one of the onsite streams (Stream 4).

Wetland C scored 25 points using the City of Kirkland wetland rating system. This satisfies the criteria for characterization as a Type 2 wetland. Type 2 wetlands located within a Primary Basin have a 75-foot standard buffer. Due to the location of this wetland, buffer averaging will likely not be possible.

4.2.2 Streams

4.2.2.1 Stream 1

Stream 1 starts at the outfall of a stormwater pipe located on the north side of 20th Avenue. The stream flows onto the Site at the southeast property corner and flows in a northerly direction for approximately 70 feet. Then, the stream flows off property to the east. The stream channel is in a deeply incised ravine that extends from the stormwater outfall.

Stream 1 satisfies the criteria for categorization as a City of Kirkland Class B stream. Class B streams within a Primary Basin have a 60-foot standard buffer. This buffer may be reduced to 39.6 feet through buffer averaging, provided that the total area of the reduced buffer is not less than the area of the standard buffer.

4.2.2.2 Stream 2

Stream 2 starts at the outfall of two stormwater pipes located on the north side of 20th Avenue, approximately 170 feet west of the stormwater outfall for Stream 1. As with Stream 1, Stream 2 flows within a deeply incised ravine. The stream flows aboveground for approximately 390 feet where it flows into a buried pipe. The pipe extends to the northeast for approximately 160 feet. The outfall of this pipe is within the channel for Stream 5.

Stream 2 satisfies the criteria for categorization as a City of Kirkland Class B stream. Class B streams within a Primary Basin have a 60-foot standard buffer. This buffer may be reduced to 39.6 feet through buffer averaging, provided that the total area of the reduced buffer is not less than the area of the standard buffer. There is no buffer requirement for the piped portion of Stream 2.

4.2.2.3 Stream 3

Stream 3 starts near the northwest corner of the Site in an area of a previous soil slump (the same slump that likely created Wetland A). There are at least three pipe outfalls mapped near the headwaters of Stream 3. As with Stream 1 and 2, the pipes carry stormwater from the development to the south of 20th Avenue. Stream 3 begins as three separate seeps that coalesce towards the northern tip of Wetland A. At this point, it flows in a deeply incised ravine for approximately 220 feet. The stream then enters a

buried pipe that extends to the northeast for approximately 280 feet. The pipe then discharges into a roadside ditch along Forbes Creek Road.

Stream 3 satisfies the criteria for categorization as a City of Kirkland Class B stream. Class B streams within a Primary Basin have a 60-foot standard buffer. This buffer may be reduced to 39.6 feet through buffer averaging, provided that the area of the reduced buffer is not less than the area of the standard buffer. There is no buffer requirement for the piped portion of Stream 3.

4.2.2.4 Stream 4

The headwaters for Stream 4 are within Wetland C off property to the west. Stream 4 flows onto the Site approximately 130 feet north of the northwest property corner and flows within a deeply incised ravine for approximately 100 feet (this aboveground portion of Stream 4 includes Wetland B). At this point, the stream enters a buried pipe. The pipe extends to the northeast for approximately 140 feet and discharges into a roadside ditch along Forbes Creek Road.

Stream 4 satisfies the criteria for categorization as a City of Kirkland Class B stream. Class B streams within a Primary Basin have a 60-foot standard buffer. This buffer may be reduced to 39.6 feet through buffer averaging, provided that the area of the reduced buffer is not less than the area of the standard buffer. There is no buffer requirement for the piped portion of Stream 4.

4.2.2.5 Stream 5

Stream 5 starts off property to the east. Prior to the subdivision along Forbes Creek Road adjacent to the east of the Site, Stream 5 did not flow onto the subject property. Stream 5 is collected offsite in a pipe and shunted along the south side of the aforementioned subdivision. This pipe discharges into a deeply incised ravine that flows in a westerly direction on to the Site, then in a northwesterly direction towards Forbes Creek Road. As previously mentioned, the piped portion of Stream 2 discharges into the ravine for Stream 5.

Stream 5 satisfies the criteria for categorization as a City of Kirkland Class B stream. Class B streams in a Primary Basin have a 60-foot standard buffer. This buffer may be reduced to 39.6 feet through buffer averaging, provided that the area of the reduced buffer is not less than the area of the standard buffer.

Chapter 5. REGULATORY REVIEW

5.1 City of Kirkland Critical Areas Regulations

Wetlands and streams on the Site are subject to City of Kirkland critical areas regulations under Chapter 90 – Drainage Basins. City of Kirkland currently uses its own wetland rating and water typing systems. The wetland rating system seems to be based on the Washington Department of Ecology's (WDOE) Washington State Wetland Rating System for Western Washington (1993), which is not comparable with the current WDOE Washington State Wetland Rating System for Western Washington (2014). Similarly, their method of water typing for streams is not comparable with the

current Washington Department of Natural Resources (WDNR) water typing system, which is promulgated in WAC 222-16-030.

Wetland buffers are determined based on the wetland's rating and whether it is located within a Primary Basin. Primary Basins are defined as the basin that supports one of Kirkland's major stream systems. Similarly, stream buffers are based on the stream's class and whether it is located within a Primary Basin.

5.2 State and Federal Regulations

Wetlands and streams on the Site are subject to applicable State and Federal regulations. Wetland impacts are regulated at the Federal level by Sections 404 and 401 of the Clean Water Act. The U.S. Army Corps of Engineers (Corps) is responsible for administering compliance with Section 404 via the issuance of Nationwide or Individual Permits for any fill or dredging activities within wetlands under Corps jurisdiction. Any project that is subject to Section 404 permitting is also required to comply with Section 401 Water Quality Certification, which is administered by the Washington State Department of Ecology (WDOE). No dredging or filling of onsite wetlands is proposed for the current site development plan. Therefore, the project will not need to apply for any Section 404 Nationwide or Individual Permits or Section 401 Water Quality Certification.

Any work within, over, or under the Ordinary High Water Mark of a stream requires a Hydraulic Project Approval (HPA) from the Washington Department of Fish and Wildlife (WDFW), pursuant to the State Hydraulic Code (Chapter 77.55 RCW).

Chapter 6. PROPOSED PROJECT

6.1 Project Description

Orcas Moon, LLC is proposing to develop the Orcas Moon property with 16 units of cottage housing (**Figure 8**). The site development will be divided into two separate groups based on available land that is not constrained by steep slopes. For the purposes of this report, the groups will be called Group 1 and Group 2. Group 1 is located in the southwestern portion of the Site adjacent to 20th Avenue. Group 2 is located in the southeastern portion of the Site, also adjacent to 20th Avenue. Group 1 will include 10 cottage units, and Group 2 will provide 6 cottage units. Parking for Groups 1 and 2 will be provided off of the north side of 20th Avenue in two separate locations. Access to the Group 1 and 2 cottage units will be provided by loop walkways. The loop walkway for the Group 1 units will have an approximately 5,200 sf rain garden open space and the loop walkway for Group 2 will have an approximately 3,960 sf rain garden open space as defined by their respective loops. Both Group 2 and 3 walkways will incorporate switchbacks across steeper sloped areas to ensure ADA compliance.

6.2 Project impacts

The project has been designed to avoid all direct impacts to wetlands and streams on the Site. However, it will be necessary to impact wetland and stream buffers in order to provide the required yard setbacks for the cottage units, construction of some of the parking areas, and walkways (**Figure 9**). Buffers will be reduced in these areas of

impact using buffer averaging. In all, there will be nine areas of buffer reduction for a total reduction area of 12,047 sf.

6.3 Proposed Mitigation

The proposed mitigation for the buffer reduction will be through buffer averaging. Sufficient area is available on the Site to provide meaningful buffer averaging. We have identified 6 areas on the Site that will provide additional buffer area. The total area of buffer addition is approximately 12,490 sf for a net increase of approximately 246 sf.

The areas proposed for buffer addition are well vegetated and similar to the areas of buffer reduction. The functions and services provided by the lost buffer area will be compensated by the functions and services provided by the additional buffer areas. Enhancement will not be provided since the buffer increase areas are of equal value to the areas proposed for buffer reduction.

Chapter 7. SUMMARY

The Orcas Moon property is an approximately 7.1 acre assemblage of two tax lots, located in Kirkland, Washington. The property is currently undeveloped and forested. Two wetlands and five streams were identified and delineated on the property. One wetland was identified off property to the west. Orcas Moon, LLC proposes to development of 16 units of cottage housing on the property. The units will be constructed in two groups across the property to take advantage of limited relatively level areas. Approximately 2 acres of the 7-acre Site will be developed. The remaining portion (approximately 70 percent of the total Site size) will remain in its natural state.

Chapter 8. REFERENCES

City of Kirkland, 2016. Chapter 90 – Drainage Basins. Retrieved from http://www.codepublishing.com/wa/kirkland.html.

Cowardin, Lewis M., Virginia Carter, Francis C. Golet, and Edward T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States.* Washington, DC: U.S. Department of the Interior, Fish and Wildlife Service.

Google Earth. 2016. *Google Earth.* https://www.google.com/earth/.

Hitchcock, C. Leo, Arthur Cronquist, Marion Owensby, and J. W. Thompson. 1969. *Vascular Plants of the Pacific Northwest.* Seattle: University of Washington Press.

Iowa State University. 1995. *Hydric Soils of Washington State.* U.S. Department of Agriculture, Natural Resources Conservation Service.

King County. 2010. *GIS Database.* Accessed mo da, year. <http://www.kingcounty.gov/operations/GIS/GISData.aspx>.

Lichvar, R.W. 2012. *The National Wetland Plant List.* ERDC/CRREL TR-12-11, Hanover, NH: U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory. http://acwc.sdp.sirsi.net/client/search/asset:asset?t:ac=$N/1012381.

Munsell Color. 1988. *Munsell Soil Color Charts.* Grand Rapids, Michigan: X-RiteCorp.

Natural Resources Conservation Service. 2012. *National Technical Committee for Hydric Soils - Hydric Soils List.* http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/.

Olson, P, and E Stockdale. 2008. *Determining the Ordinary High Water Mark on Streams in Washington State.* Olympia: Washington Department of Ecology.

Reed, P. B. 1988. *National List of Plant Species that Occur in Wetlands: Northwest (Region 9).* Report 88, USF & WS Biol.Update.

Reed, P. B. 1996. *Supplement to National List of Plant Spcies that Occur in Wetlands (Region 9). National Wetlands Inventory.* US Fish and Wildlife Service.

Soil Survey Staff. 2013. *Web Soil Survey.* December. Accessed September 2014. http://websoilsurvey.nrcs.usda.gov/.

StreamNet. 2016. "StreamNet Mapper." *StreamNet.* Accessed July 2016. http://map.streamnet.org/website/bluesnetmapper/viewer.htm.

U.S. Army Corps of Engineers. 2010. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region*

(Version 2.0). U. S. Army Corps of Engineers, Vicksburg, MS: U.S. Army Engineer Research and Development Center.

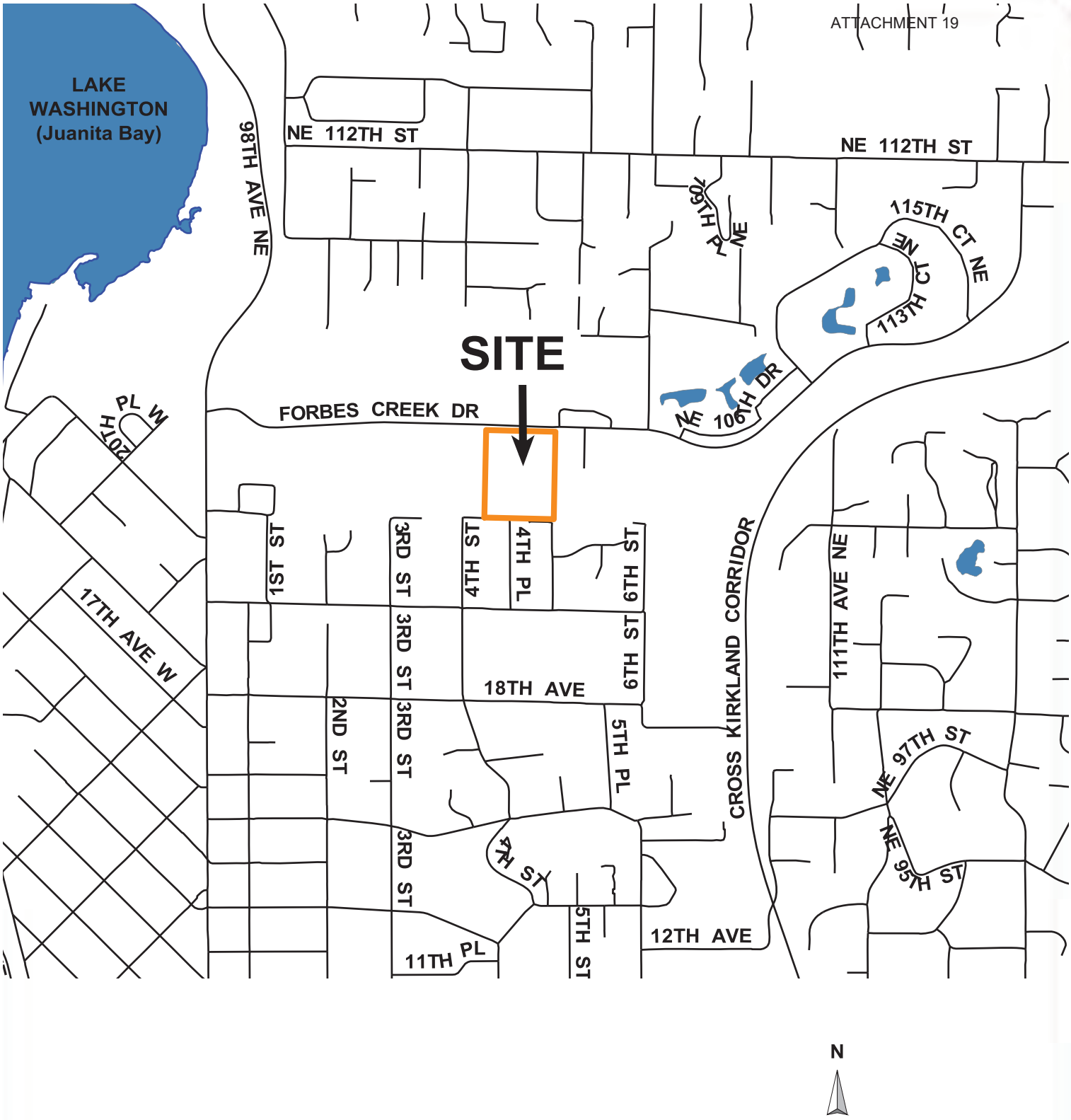
U.S. Department of Agriculture. 1991. *Hydric Soils of The United States.* Washington, DC: Soil Conservation Service.

U.S. Department of the Interior, Fish and Wildlife Service. year. *National Wetlands Inventory Map.* Washington D.C., month day.

United States Geological Service. 2014. *EarthExplorer.* http://earthexplorer.usgs.gov/.

Washington State Department of Fish and Wildlife. 2016. *Salmonscape.* Accessed July 2016. wdfw.wa.gov/mapping/salmonscape/index.html.

Figures



Reference: GIS parcel, road, and water body data from City of Kirkland, 2015.

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FIGURE 1

VICINITY MAP
ORCAS MOON PROJECT
KIRKLAND, WASHINGTON

DESIGN	DRAWN	PROJECT
	DRT	518B

SCALE: 1 in : 1000 ft

DATE: 8 JULY 2016

REVISED: 384

1

N

Reference: GIS parcel and road data from City of Kirkland, 2015.
Aerial image 2012 from Earth Explorer, downloaded 2016).

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FIGURE 2

SITE MAP
ORCAS MOON PROJECT
KIRKLAND, WASHINGTON

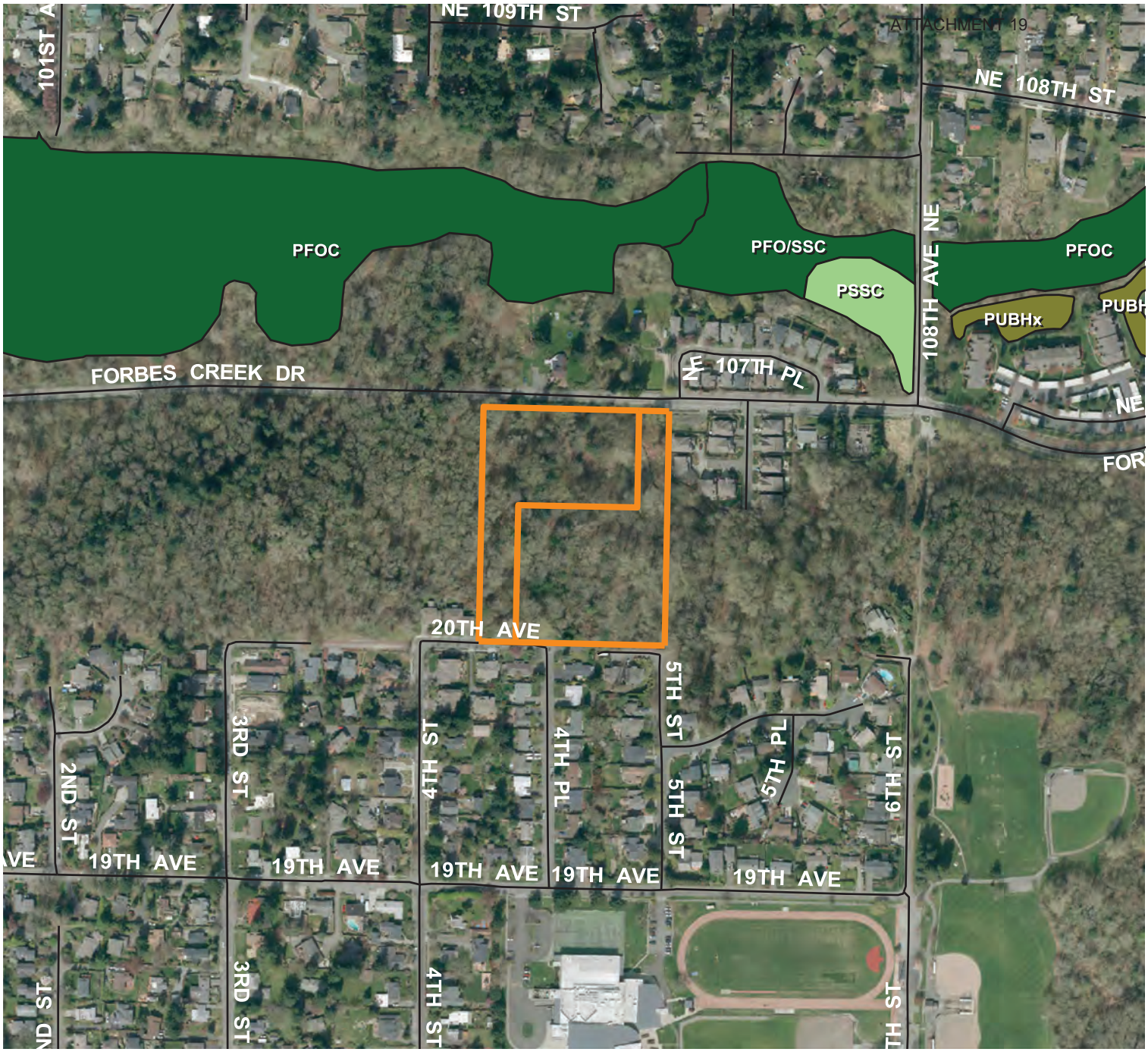
DESIGN	DRAWN	PROJECT
	DRT	518B

SCALE 1 in : 200 ft

DATE 8 JULY 2016

REVISED

2



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Reference: GIS parcel and road data from City of Kirkland, 2015. National Wetlands Inventory GIS data from USFWS, 2012. Aerial image 2012 from Earth Explorer, downloaded 2016.

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FIGURE 3

NWI MAP - KIRKLAND QUADRANGLE
ORCAS MOON PROJECT
KIRKLAND, WASHINGTON

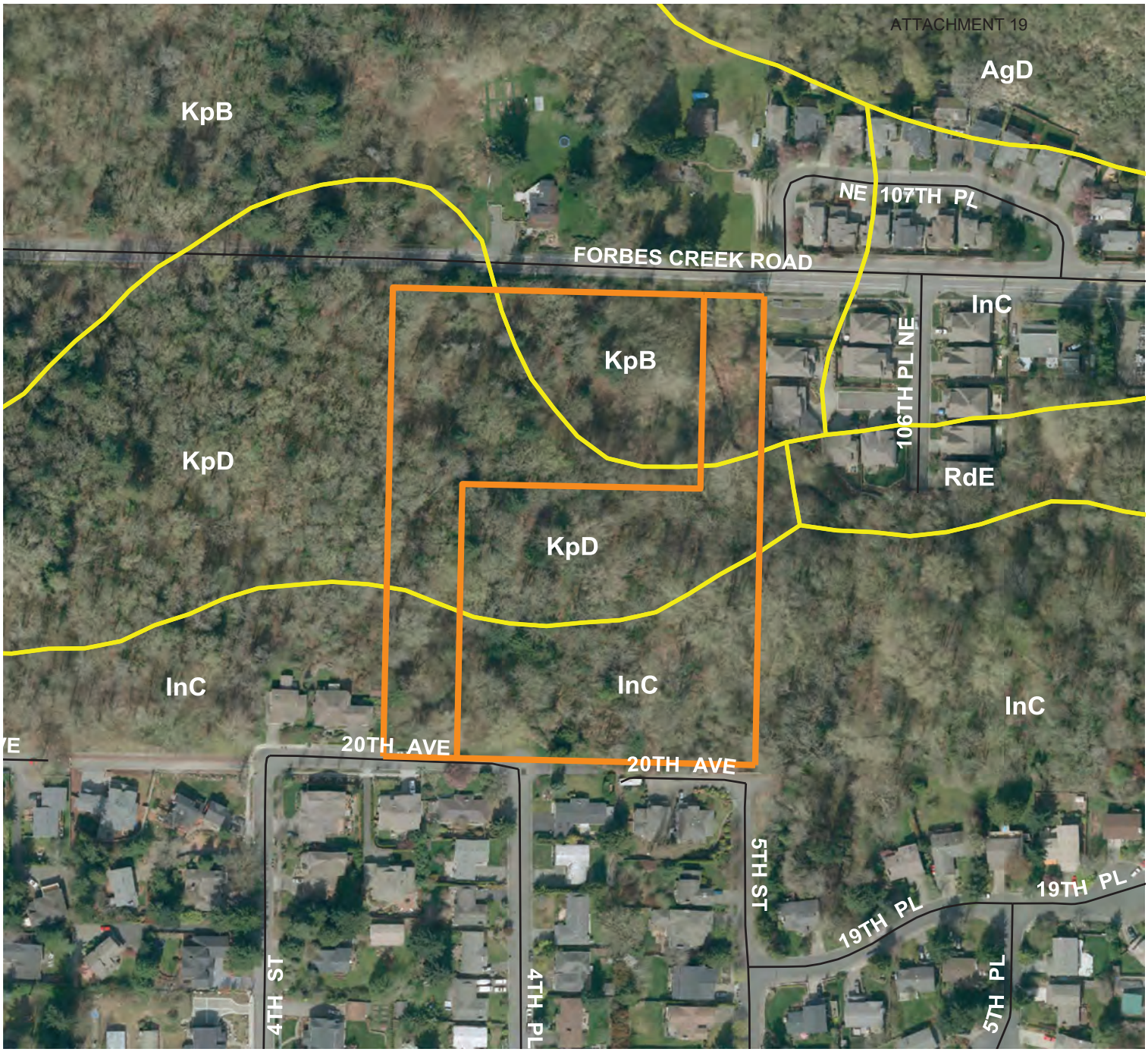
DESIGN	DRAWN	PROJECT
	DRT	518B

SCALE 1 in : 400 ft

DATE 8 JULY 2016

REVISED

3



SOIL KEY

AgD - Alderwood gravelly sandy loam, 15 to 30 percent slope
InC - Indianola lomay sand, 5 to 15 percent slope
KpB - Kitsap silt loam, 2 to 8 percent slope
KpD - Kitsap silt loam, 15 to 30 percent slope

N

Reference: GIS parcel, road, and soil GIS data from City of Kirkland, 2015. Aerial image 2012 from Earth Explorer, downloaded 2016.

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FIGURE 4

NRCS SOILS DATA
(from City of Kirkland)
ORCAS MOON PROJECT
KIRKLAND, WASHINGTON

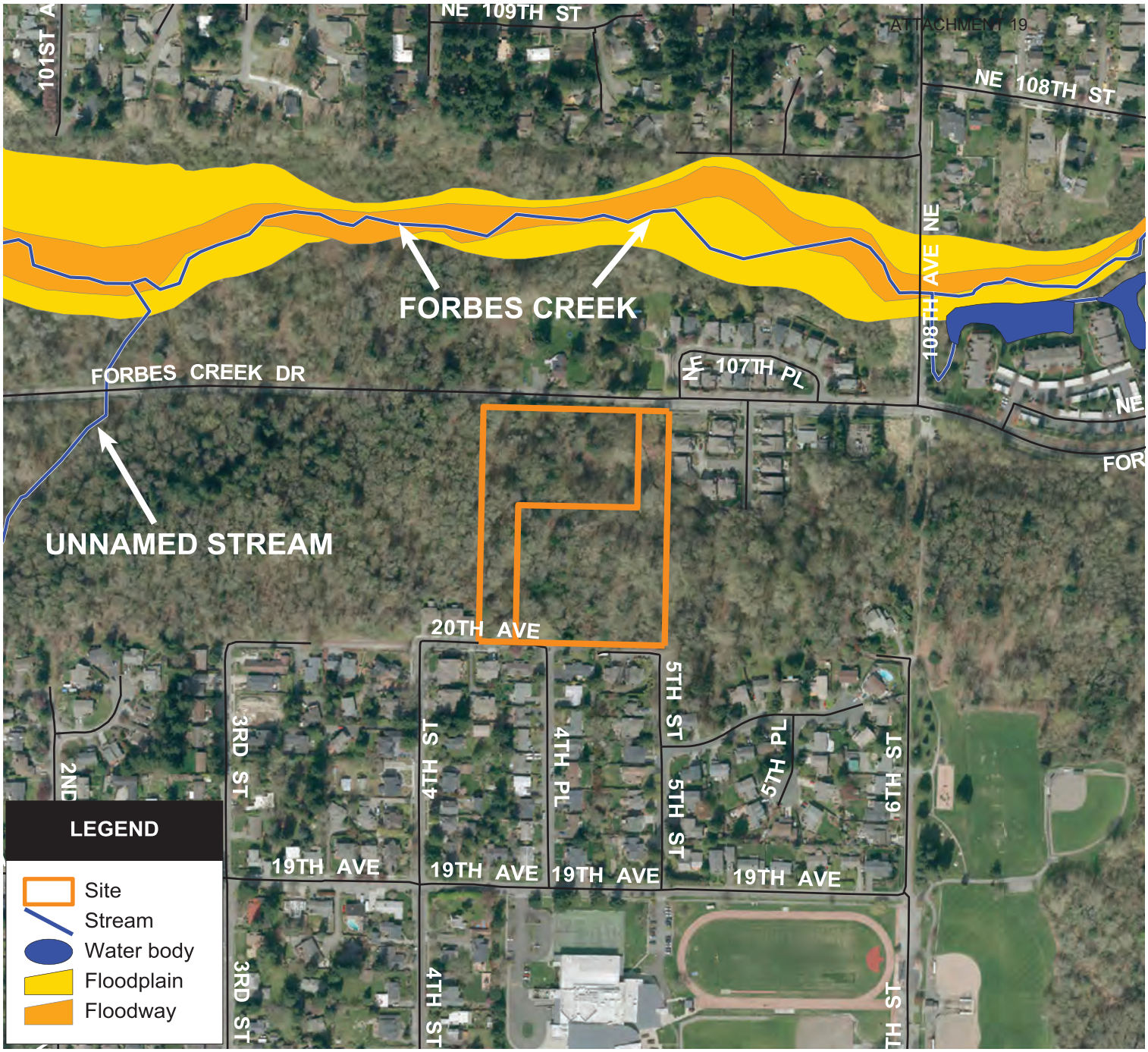
DESIGN	DRAWN	PROJECT
	DRT	518B

SCALE 1 in : 200 ft

DATE 8 JULY 2016

REVISED

4



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Reference: GIS parcel and road data from City of Kirkland, 2015. Stream, water body, floodway, and floodplain data from King County GIS, 2015. Aerial image 2012 from Earth Explorer, downloaded 2016.

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FIGURE 5

KING COUNTY CRITICAL AREAS GIS DATA
ORCAS MOON PROJECT
KIRKLAND, WASHINGTON

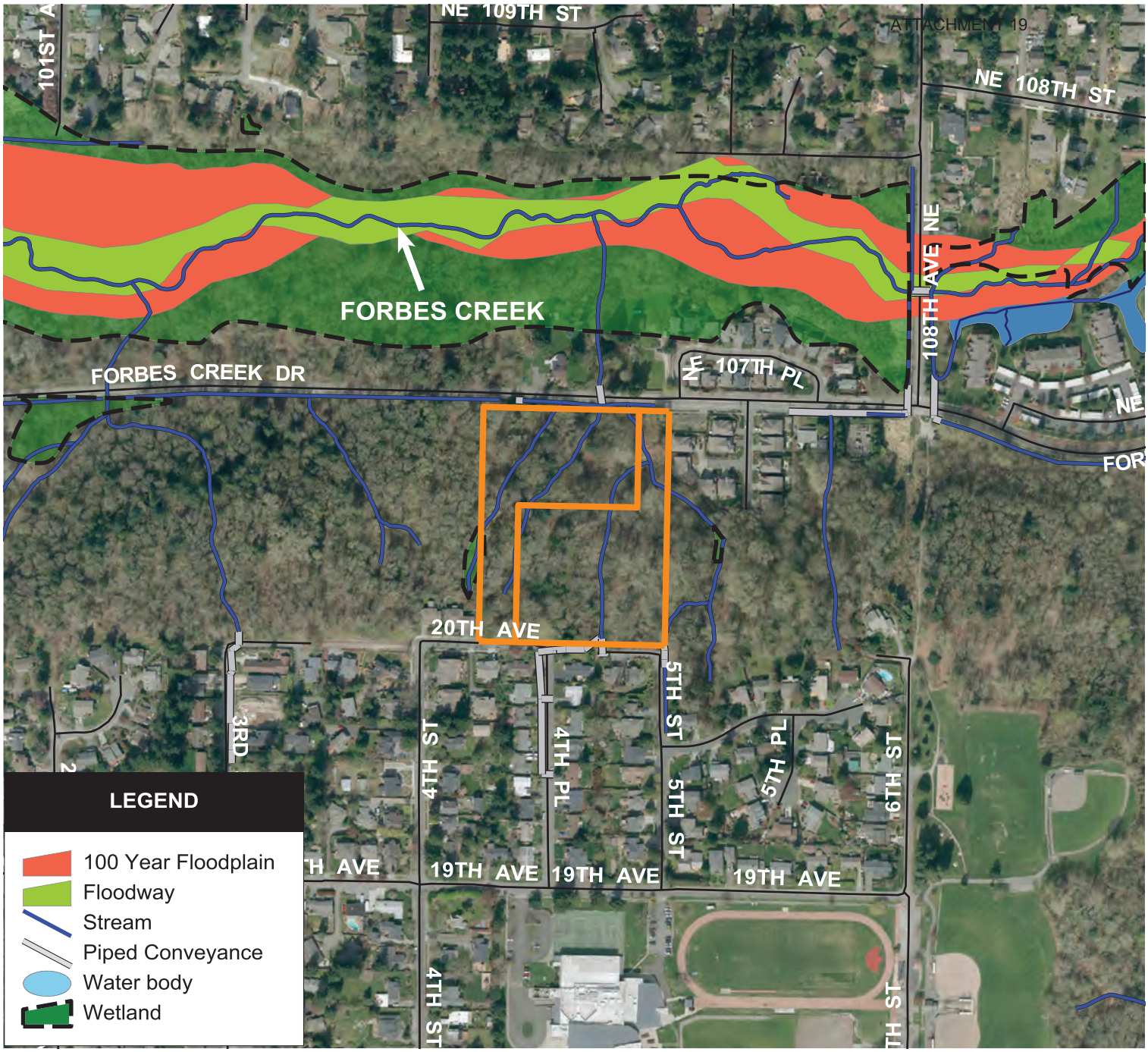
DESIGN	DRAWN	PROJECT
	DRT	518B

SCALE 1 in : 400 ft

DATE 8 JULY 2016

REVISED

5



N

Reference: GIS parcel, road, stream, wetland, water body, floodplain, and floodway data from City of Kirkland, 2015. Aerial image 2012 from Earth Explorer, 2016.

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FIGURE 6

CITY OF KIRKLAND CRITICAL AREAS
GIS DATABASE
ORCAS MOON PROJECT
KIRKLAND, WASHINGTON

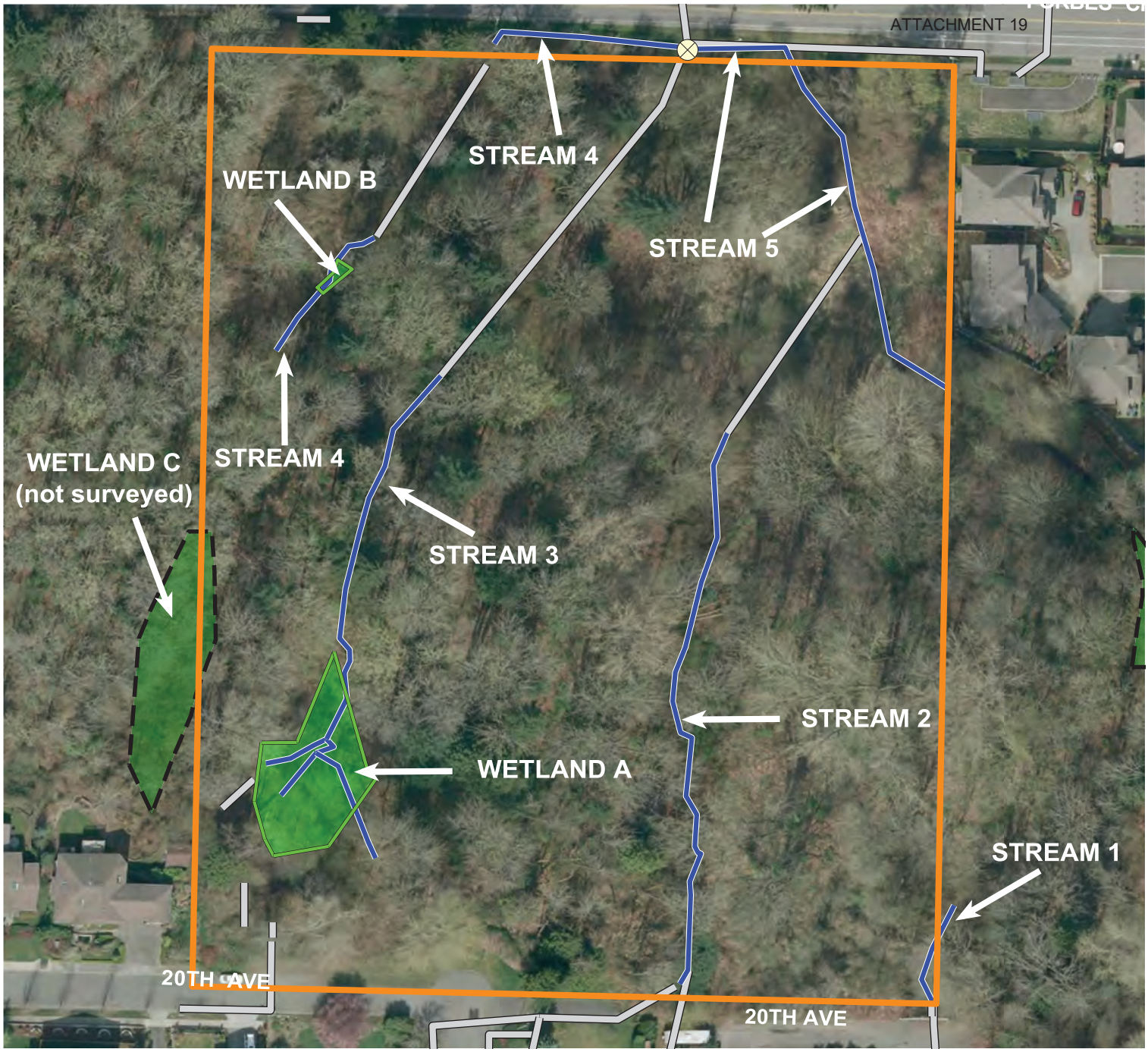
DESIGN	DRAWN	PROJECT
	DRT	518B

SCALE 1 in : 400 ft

DATE 8 JULY 2016

REVISED

6



N

Reference: GIS parcel and wetland data from City of Kirkland, 2015.
Surveyed stream and wetland data provided by Blueline Group, 2016.
Aerial image 2012 from Earth Explorer, downloaded 2016.

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FIGURE 7

WETLAND AND STREAM MAP
ORCAS MOON PROJECT
KIRKLAND, WASHINGTON

DESIGN	DRAWN	PROJECT
	DRT	518B

SCALE 1 in : 100 ft

DATE 8 JULY 2016

REVISED 390

7

N

Reference: GIS parcel, road ... data from City of Kirkland, 2015.

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FIGURE 8

COTTAGE UNIT LAYOUT MAP
ORCAS MOON PROJECT
KIRKLAND, WASHINGTON

DESIGN	DRAWN	PROJECT
	DRT	518B

SCALE 1 in : 100 ft

DATE 8 JULY 2016

REVISED

8

LEGEND

- Site
- Proposed Cottage Unit
- Walkway
- Rain Garden
- Surveyed Stream
- Piped Conveyance
- Standard Critical Area Buffer
- Minimum Critical Area Buffer Width
- Buffer Impact Area
- Buffer Replacement Area

N

Reference: GIS parcel and wetland data from City of Kirkland, 2015. Site design from Blueline Group, 2016. Aerial image 2012 from Earth Explorer, 2016.

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FIGURE 9

SITE DEVELOPMENT CONCEPT
ORCAS MOON PROJECT
KIRKLAND, WASHINGTON

DESIGN	DRAWN	PROJECT
	DRT	518B

SCALE 1 in : 100 ft

DATE 8 JULY 2016

REVISED

9

Appendix A

City of Kirkland Wetland Rating Forms (Plate 26)

TAL-518B
wetland A

Chapter 1. **Plate 26**

WETLAND FIELD DATA FORM

(Note: Applicable to Chapter 90 KZC, but not Chapter 83 KZC)

Type 3

WETLAND FIELD DATA FORM

BEGIN BY CHECKING ANY OF THE FOLLOWING (a. – e.) THAT APPLY:

a. The wetland is contiguous to Lake Washington; NO

b. The wetland contains at least 1/4 acre of organic soils, such as peat bogs or mucky soils; NO

c. The wetland is equal to or greater than 10 acres in size and having three or more wetland classes, as defined by the U.S. Fish & Wildlife Service (Cowardin et al., 1979), one of which is open water; NO

d. The wetland has significant habitat value to state or federally listed threatened or endangered wildlife species; or NO

e. The wetland contains state or federally listed threatened or endangered plant species. NO

IF ANY OF THE CRITERIA LISTED ABOVE ARE MET, THEN THE WETLAND IS CONSIDERED TO BE TYPE 1. IF THAT IS THE CASE, PLEASE CONTINUE TO COMPLETE THE ENTIRE FORM, BUT DO NOT ASSIGN POINTS.

IF THE WETLAND DOES NOT MEET THE CRITERIA LISTED ABOVE FOR TYPE 1, COMPLETE THE ENTIRE FORM, USING THE ASSIGNED POINTS TO DETERMINE IF IT IS A TYPE 2 OR TYPE 3 WETLAND.

Type 2 wetlands typically have at least two wetland vegetation classes, are at least partially surrounded by buffers of native vegetation, connected by surface water flow (perennial or intermittent) to other wetlands or streams, and contain or are associated with forested habitat.

1. Total wetland area

Estimate wetland area and score from	Acres	Point Value	Points

choices

>20.00	=	6
10-19.99	=	5
5-9.99	=	4
1-4.99	=	3
0.1-0.99	=	2
<0.1	=	1

2. Wetland classes: Determine the number of wetland classes that qualify, and score according to the table.

		# of Classes		Points
Open Water: if the area of open water is >1/3 acre or >10% of the total wetland area		1	=	1
Aquatic Beds: if the area of aquatic beds is >10% of the open water area or >1/2 acre		2	=	3
Emergent: if the area of emergent class is >1/2 acre or >10% of the total wetland area	X	3	=	5
Scrub-Shrub: if the area of scrub-shrub class is >1/2 acre or >10% of the total wetland area	X	4	=	7
Forested: if the area of forested class is >1/2 acre or >10% of the total wetland area		5	=	10

3. Plant species diversity.

For all wetland classes which qualified in 2 above, count the number of different plant species and score according to the table below. You do not have to name them.

e.g., if a wetland has an aquatic bed class with 3 species, and emergent class with 4 species and a scrub-shrub class with 2 species, you would circle 2, 2, and 1 in the second column (below).

Class	# of Species		Point Value	Class	# of Species		Point Value
Aquatic Bed	1-2	=	1	Scrub-Shrub	1-2	=	1
	3	=	2		3-4	=	2
	>3	=	3		>4	=	3

NONE

Emergent	1-2	=	1
	3-4	=	2
	>4	=	3

Forested	1-2	=	1
	3-4	=	2
	>4	=	3

None

4. Structural diversity.

If the wetland has a forested class, add 1 point for each of the following attributes present:

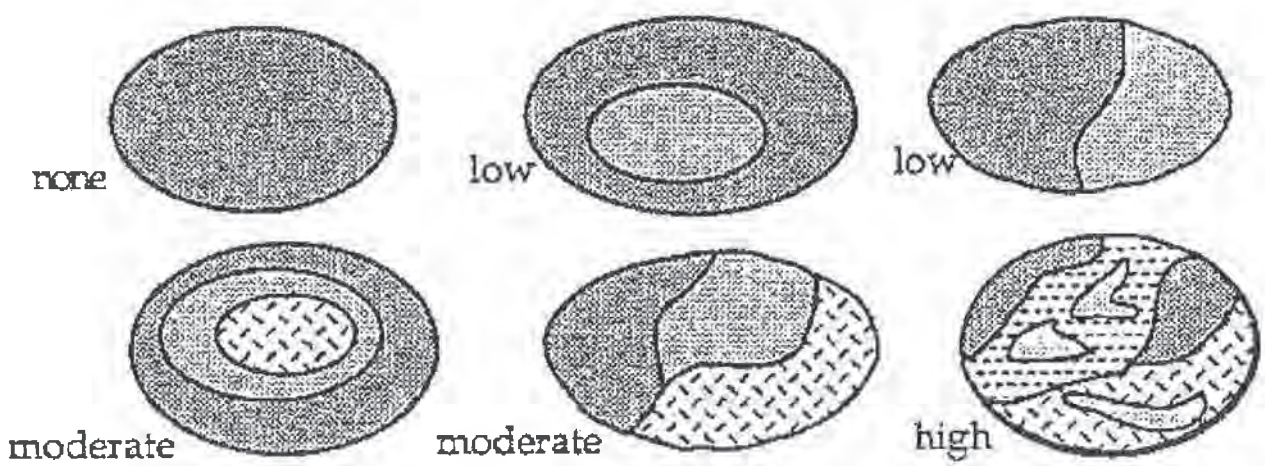
Trees >50′ tall	=	1
Trees 20′ to 49′ tall	=	1
shrubs	=	1
Herbaceous ground cover	=	1

None

5. Interspection between wetland classes.

Decide from the diagrams below whether interspection between wetland classes is high, moderate, low or none

3	=	High
2	=	Moderate
1	=	Low
0	=	None



6. Habitat features

Add points associated with each habitat feature listed:	= 3
Is there evidence of current use by beavers?	= 2
Is a heron rookery located within 300′?	= 1
Are raptor nest(s) located within 300′?	= 1
Are there at least 2 standing dead trees (snags) per acre?2	= 1
Are there any other perches (wires, poles, or posts)?	= 1
Are there at least 3 downed logs per acre?	= 1

7. Connection to streams

Is the wetland connected at any time of the year via surface water? (score one answer only)

Is the wetland connected at any time of the year via surface water?

To a perennial stream or a seasonal stream with fish	= 5
To a seasonal stream without fish	= 3
Is not connected to any stream	= 0

8. Buffers

Step 1: Estimate (to the nearest 5%) the percentage of each buffer or land-use type (below) that adjoins the wetland boundary. Then multiply these percentages by the factor(s) below and enter result in the column to the right.

	% of Buffer	Step 1	Width Factor	Step 2
Roads, buildings or parking lots	% X 0 =		=	
Lawn, grazed pasture, vineyards or annual crops	% X 1 =		=	
Ungrazed grassland or orchards	% X 2 =		=	
Open water or native grasslands	% X 3 =		=	
Forest or shrub	100 % X 4 =	400 x 2	=	800
			Add buffer total	

Step 2: Multiply result(s) of step 1:

By 1 if buffer width is 25-50′

By 2 if buffer width is 50-100′

By 3 if buffer width is >100′

Enter results and add subscores

Step 3: Score points according to the following table:

Buffer Total

900-1200 = 4

600-899 = 3 800

300-599 = 2

100-299 = 1

9. Connection to other habitat areas:

Is there a riparian corridor to other wetlands within 0.25 of a mile, or a corridor >100′ wide with good forest or shrub cover to any other habitat area? = 5

Is there a narrow corridor <100′ wide with good cover or a wide corridor >100′ wide with low cover to any other habitat area? = 3

Is there a narrow corridor <100′ wide with low cover or a significant habitat area within 0.25 mile but no corridor? = 1

Is the wetland and buffer completely isolated by development and/or cultivated agricultural land? = 0

10. Scoring

Add the scores to get a total: 21

Question: Is the total greater than or equal to 22 points?

Answer:

Yes = Type 2

No = Type 3

 TAL-518B
wetland B

Chapter 1. **Plate 26**

WETLAND FIELD DATA FORM

(Note: Applicable to Chapter 90 KZC, but not Chapter 83 KZC)

Type 3

WETLAND FIELD DATA FORM

BEGIN BY CHECKING ANY OF THE FOLLOWING (a. – e.) THAT APPLY:

a. The wetland is contiguous to Lake Washington; NO

b. The wetland contains at least 1/4 acre of organic soils, such as peat bogs or mucky soils; NO

c. The wetland is equal to or greater than 10 acres in size and having three or more wetland classes, as defined by the U.S. Fish & Wildlife Service (Cowardin et al., 1979), one of which is open water; NO

d. The wetland has significant habitat value to state or federally listed threatened or endangered wildlife species; or NO

e. The wetland contains state or federally listed threatened or endangered plant species. NO

IF ANY OF THE CRITERIA LISTED ABOVE ARE MET, THEN THE WETLAND IS CONSIDERED TO BE TYPE 1. IF THAT IS THE CASE, PLEASE CONTINUE TO COMPLETE THE ENTIRE FORM, BUT DO NOT ASSIGN POINTS.

IF THE WETLAND DOES NOT MEET THE CRITERIA LISTED ABOVE FOR TYPE 1, COMPLETE THE ENTIRE FORM, USING THE ASSIGNED POINTS TO DETERMINE IF IT IS A TYPE 2 OR TYPE 3 WETLAND.

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choices

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5-9.99	=	4
1-4.99	=	3
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	# of Classes		Points
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Scrub-Shrub: if the area of scrub-shrub class is >1/2 acre or >10% of the total wetland area	4	=	7
Forested: if the area of forested class is >1/2 acre or >10% of the total wetland area X	5	=	10

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For all wetland classes which qualified in 2 above, count the number of different plant species and score according to the table below. You do not have to name them.

e.g., if a wetland has an aquatic bed class with 3 species, and emergent class with 4 species and a scrub-shrub class with 2 species, you would circle 2, 2, and 1 in the second column (below).

Class	# of Species		Point Value
Aquatic Bed	1-2	=	1
	3	=	2
	>3	=	3

none

Class	# of Species		Point Value
Scrub-Shrub	1-2	=	1
	3-4	=	2
	>4	=	3

none

Emergent	1-2	=	1	Forested	1-2	=	1
	3-4	=	2		3-4	=	2
	>4	=	3		>4	=	3

none

4. Structural diversity.

If the wetland has a forested class, add 1 point for each of the following attributes present:

Trees >50′ tall	=	1
Trees 20′ to 49′ tall	=	1
shrubs	=	1
Herbaceous ground cover	=	1

none

5. Interspection between wetland classes.

Decide from the diagrams below whether interspection between wetland classes is high, moderate, low or none

3	=	High
2	=	Moderate
1	=	Low
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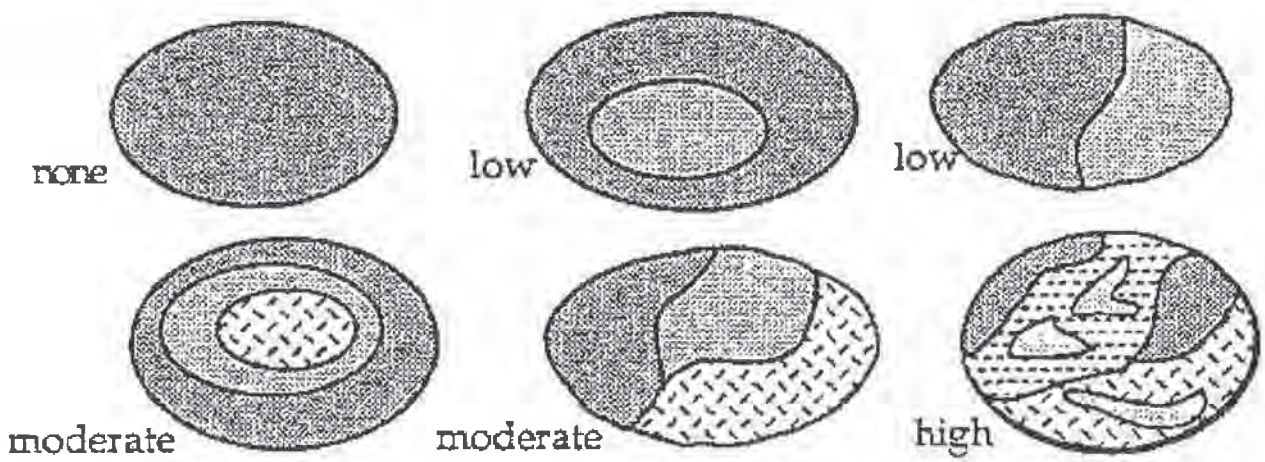

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Add points associated with each habitat feature listed:	= 3
Is there evidence of current use by beavers?	= 2
Is a heron rookery located within 300′?	= 1
Are raptor nest(s) located within 300′?	= 1
Are there at least 2 standing dead trees (snags) per acre?2	= 1
Are there any other perches (wires, poles, or posts)?	= 1
Are there at least 3 downed logs per acre?	= 1

7. Connection to streams

Is the wetland connected at any time of the year via surface water? (score one answer only)

Is the wetland connected at any time of the year via surface water?

To a perennial stream or a seasonal stream with fish	= 5
To a seasonal stream without fish	= 3
Is not connected to any stream	= 0

8. Buffers

Step 1: Estimate (to the nearest 5%) the percentage of each buffer or land-use type (below) that adjoins the wetland boundary. Then multiply these percentages by the factor(s) below and enter result in the column to the right.

	% of Buffer	Step 1	Width Factor	Step 2
Roads, buildings or parking lots	% X 0 =		=	
Lawn, grazed pasture, vineyards or annual crops	% X 1 =		=	
Ungrazed grassland or orchards	% X 2 =		=	
Open water or native grasslands	% X 3 =		=	
Forest or shrub	100 % X 4 =	400 x 3	=	1200
			Add buffer total	

Step 2: Multiply result(s) of step 1:

By 1 if buffer width is 25-50′

By 2 if buffer width is 50-100′

By 3 if buffer width is >100′

Enter results and add subscores

Step 3: Score points according to the following table:

Buffer Total

900-1200 = 4 1200

600-899 = 3

300-599 = 2

100-299 = 1

9. Connection to other habitat areas:

Is there a riparian corridor to other wetlands within 0.25 of a mile, or a corridor >100′ wide with good forest or shrub cover to any other habitat area?	= 5
Is there a narrow corridor <100′ wide with good cover or a wide corridor >100′ wide with low cover to any other habitat area?	= 3
Is there a narrow corridor <100′ wide with low cover or a significant habitat area within 0.25 mile but no corridor?	= 1
Is the wetland and buffer completely isolated by development and/or cultivated agricultural land?	= 0

10. Scoring

Add the scores to get a total: 17

Question: Is the total greater than or equal to 22 points?

Answer:

Yes = Type 2

No = Type 3

TAL-518B
wetland C

Chapter 1. **Plate 26**

WETLAND FIELD DATA FORM

(Note: Applicable to Chapter 90 KZC, but not Chapter 83 KZC)

Type 2

WETLAND FIELD DATA FORM

BEGIN BY CHECKING ANY OF THE FOLLOWING (a. – e.) THAT APPLY:

a. The wetland is contiguous to Lake Washington; NO

b. The wetland contains at least 1/4 acre of organic soils, such as peat bogs or mucky soils; NO

c. The wetland is equal to or greater than 10 acres in size and having three or more wetland classes, as defined by the U.S. Fish & Wildlife Service (Cowardin et al., 1979), one of which is open water; NO

d. The wetland has significant habitat value to state or federally listed threatened or endangered wildlife species; or NO

e. The wetland contains state or federally listed threatened or endangered plant species. NO

IF ANY OF THE CRITERIA LISTED ABOVE ARE MET, THEN THE WETLAND IS CONSIDERED TO BE TYPE 1. IF THAT IS THE CASE, PLEASE CONTINUE TO COMPLETE THE ENTIRE FORM, BUT DO NOT ASSIGN POINTS.

IF THE WETLAND DOES NOT MEET THE CRITERIA LISTED ABOVE FOR TYPE 1, COMPLETE THE ENTIRE FORM, USING THE ASSIGNED POINTS TO DETERMINE IF IT IS A TYPE 2 OR TYPE 3 WETLAND.

Type 2 wetlands typically have at least two wetland vegetation classes, are at least partially surrounded by buffers of native vegetation, connected by surface water flow (perennial or intermittent) to other wetlands or streams, and contain or are associated with forested habitat.

1. Total wetland area

Estimate wetland area and score from	Acres	Point Value	Points

choices

>20.00	=	6
10-19.99	=	5
5-9.99	=	4
1-4.99	=	3
0.1-0.99	=	2
<0.1	=	1

2. Wetland classes: Determine the number of wetland classes that qualify, and score according to the table.

		# of Classes		Points
Open Water: if the area of open water is >1/3 acre or >10% of the total wetland area		1	=	1
Aquatic Beds: if the area of aquatic beds is >10% of the open water area or >1/2 acre		2	=	3
Emergent: if the area of emergent class is >1/2 acre or >10% of the total wetland area	X	3	=	5
Scrub-Shrub: if the area of scrub-shrub class is >1/2 acre or >10% of the total wetland area		4	=	7
Forested: if the area of forested class is >1/2 acre or >10% of the total wetland area	X	5	=	10

3. Plant species diversity.

For all wetland classes which qualified in 2 above, count the number of different plant species and score according to the table below. You do not have to name them.

e.g., if a wetland has an aquatic bed class with 3 species, and emergent class with 4 species and a scrub-shrub class with 2 species, you would circle 2, 2, and 1 in the second column (below).

Class	# of Species		Point Value
Aquatic Bed	1-2	=	1
	3	=	2
	>3	=	3

Class	# of Species		Point Value
Scrub-Shrub	1-2	=	1
	3-4	=	2
	>4	=	3

none

Emergent	1-2	=	1
	3-4	=	2
	>4	=	3

Forested	1-2	=	1
	3-4	=	2
	>4	=	3

4. Structural diversity

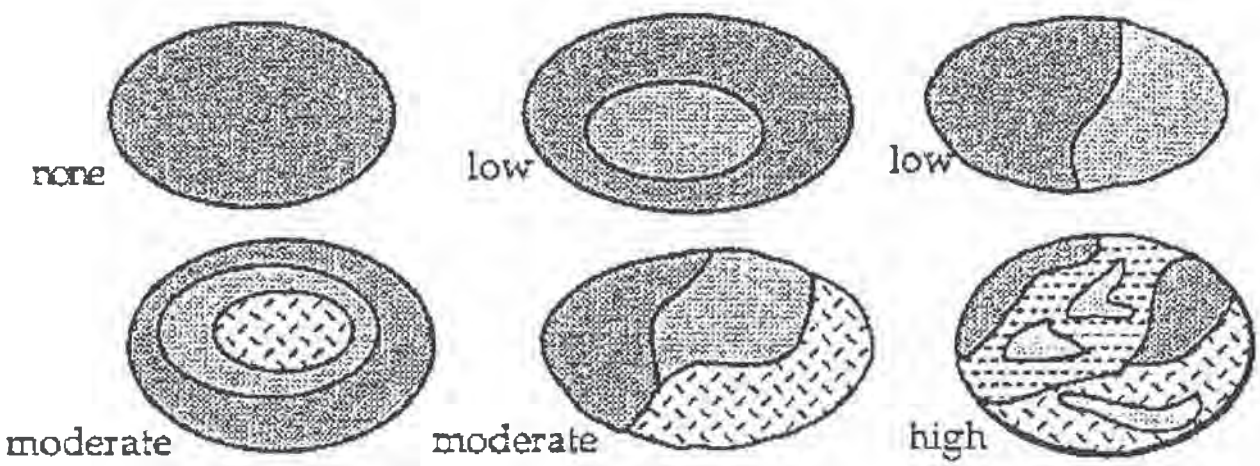
If the wetland has a forested class, add 1 point for each of the following attributes present

Trees >50′ tall	=	1
Trees 20′ to 49′ tall	=	1
shrubs	=	1
Herbaceous ground cover	=	1

5. Interspection between wetland classes.

Decide from the diagrams below whether interspection between wetland classes is high, moderate, low or none

3	=	High
2	=	Moderate
1	=	Low
0	=	None



6. Habitat features

Add points associated with each habitat feature listed:	= 3
Is there evidence of current use by beavers?	= 2
Is a heron rookery located within 300′?	= 1
Are raptor nest(s) located within 300′?	= 1
Are there at least 2 standing dead trees (snags) per acre?2	= 1
Are there any other perches (wires, poles, or posts)?	= 1
Are there at least 3 downed logs per acre?	= 1

7. Connection to streams

Is the wetland connected at any time of the year via surface water? (score one answer only)

Is the wetland connected at any time of the year via surface water?

To a perennial stream or a seasonal stream with fish	= 5
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8. Buffers

Step 1: Estimate (to the nearest 5%) the percentage of each buffer or land-use type (below) that adjoins the wetland boundary. Then multiply these percentages by the factor(s) below and enter result in the column to the right.

	% of Buffer	Step 1	Width Factor	Step 2
Roads, buildings or parking lots	% X 0 =		=	
Lawn, grazed pasture, vineyards or annual crops	% X 1 =		=	
Ungrazed grassland or orchards	% X 2 =		=	
Open water or native grasslands	% X 3 =		=	
Forest or shrub	100 % X 4 =	400 X	2 =	800
			Add buffer total	

Step 2: Multiply result(s) of step 1:

By 1 if buffer width is 25-50′

By 2 if buffer width is 50-100′

By 3 if buffer width is >100′

Enter results and add subscores

Step 3: Score points according to the following table:

Buffer Total

900-1200 = 4

600-899 = 3 800

300-599 = 2

100-299 = 1

9. Connection to other habitat areas:

Is there a riparian corridor to other wetlands within 0.25 of a mile, or a corridor >100′ wide with good forest or shrub cover to any other habitat area?	= 5
Is there a narrow corridor <100′ wide with good cover or a wide corridor >100′ wide with low cover to any other habitat area?	= 3
Is there a narrow corridor <100′ wide with low cover or a significant habitat area within 0.25 mile but no corridor?	= 1
Is the wetland and buffer completely isolated by development and/or cultivated agricultural land?	= 0

10. Scoring

Add the scores to get a total: 25

Question: Is the total greater than or equal to 22 points?

Answer:

Yes = Type 2 75' primary basin buffer

No = Type 3