STORMWATER MANAGEMENT AND EROSION CONTROL PLAN FOR UNIVERSITY PARK

Prepared for:

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INTRODUCTION

The purpose of this report is to assess the proposed improvements to the University Park development for the management of stormwater runoff and erosion control on the project site. The 70-acre site is located in Sandpoint, Idaho in Township 57N, Range 02W, Section 15 and is located on the east side of N. Boyer Ave.

The report is based on and limited to the soil types identified by site inspection, a Soil Resource Report from the USDA NRCS Web Soil Survey, the preliminary site plan layout and general topography of the site.

EXISTING SITE CONDITIONS

The existing site is relatively flat and is surfaced with native grasses, various trees, weeds, dirt and natural drainage areas. The northeast edge of the property slopes towards a wooded area next to Sand Creek. The south and southeast sides of the property border existing railroad right-of-way.

The main existing drainage receives runoff from catch basins on N. Boyer Ave and an upstream drainage along Culver's Drive. The upstream drainage enters the property on the west side through a 36" culvert under N. Boyer Ave. The seasonal runoff in this drainage appear to be minimal and flows through open ditches, swales, and retention ponds upstream before entering this property. The runoff from the N. Boyer Ave catch basins is directed to the property through a 24" culvert under N. Boyer Ave. These culverts discharge near the public right-of-way and into a 15' wide wetland swale which leads to a large existing detention pond in the center of the property.

The surface area of the existing detention pond is estimated at 0.75 acres and can hold approximately 150,000 cubic feet of water. The deepest area in the pond is near the outlet and is over 12 feet deep. The overflow elevation is 2109.7' and is maintained in the summer by pumping water out of Sand Creek. The existing outlet structure of the pond is a vertical 12" culvert which functions as an overflow. The overflow discharges below a man-made berm into a seasonal drainage channel that ultimately flows back into Sand Creek.

A smaller existing drainage is located on the north side of the property near E. Mountain View Road. This drainage appears to collect runoff from the public right-of-way and from the surrounding flat lands. This drainage slowly deepens as it heads toward the east property line making its way down the hill to Sand Creek. There is also a culvert under the railroad near the Southeast corner of the property which collects runoff from a large portion of the existing fields.

The existing drainage plan is included on Sheet 1 of Appendix C.

PROPOSED IMPROVEMENTS

The proposed on-site improvements include the construction of a paved roadway, sidewalks along the right-of-way, grassed infiltration swales, storm water collection and discharge system, extension of the City's 8" water main, gravity sewer piping, sewer manholes, sewer liftstation, overhead lighting, and dry utilities to individual lot lines.

The proposed paved roadway width is 34 feet with curb and gutter on each side. Both sides of the proposed roadway will have approximately 7.5-foot wide swales along the length of the road placed directly behind the curb with a 5-foot wide sidewalk between the swales and lot lines. See construction plans for cross-sectional views.

The proposed swales will capture runoff from impervious surfaces within the proposed right-of-way by sheet flow off of the sidewalks, and curb cuts along the roadway gutters. The roadway rock cap will be extended beyond the curb and gutter to improve the permeability of the roadside swales. Catch basins will be placed at low points to collect overflow from the swales. Underground piping will convey the runoff from catch basins to proposed discharge locations. See Appendix C for proposed drainage basins and discharge locations. Drainage Basin #1 will discharge to the existing natural drainage in the northeast area of the property. Basin's #2, #3, #4, and #5 will all discharge to the existing detention pond. Basin #6 will discharge to the existing natural drainage near the Southeast corner of the property.

The proposed drainage basin plan is included on Sheet 2 of Appendix C.

SOILS

The USDA NRCS Web Soil Survey identifies the subject soils as primarily "Mission Silt Loam, 0 to 2 percent slopes" with "Haploxeralfs and Xerochrepts, 30 to 55 percent slopes" on the slopes near Sand Creek.

The proposed improvements within the right-of-ways will be constructed within the area identified as Mission Silt Loam.

According to the survey, "Mission Silt Loam" is somewhat poorly drained and is shallow to a hardpan and is on terraces. It formed in silty glacial lake-laid sediment derived from mixed sources and has a mantle of volcanic ash and loess. The average annual precipitation is about 32 inches and the average annual air temperature is about 44 degrees F, and the average frost-free period is about 115 days.

Permeability of this Mission soil is very slow. Effective rooting depth is limited to a depth of 10 to 20 inches by the hardpan. Available water capacity is moderate. Runoff is slow, and the hazard of water erosion is slight. Water is perched above the hardpan late in winter and in spring.

Soil Permeability:

Depth (inches)	Permeability (in/hr)
0-11	0.6-2.0
11-20	<0.06
20-32	0.2-0.6
32-47	<0.06
47-60	0.06-0.2

The "Haploxeralfs" are very deep and well drained to moderately well drained. They formed in silty, glacial lake-laid sediment derived from mixed sources and have a mantle of volcanic ash and loess. Typically, the surface is covered with a mat of needles, leaves, and twigs about 1 inch thick. The surface layer is brown, neutral silt loam about 3 inches thick. The upper 5 inches of the subsoil is pale brown, neutral silt loam, and the lower 28 inches is pale yellow, slightly acid silty clay loam, silty clay, or silt foam. The substratum to a depth of 60 inches or more is while and pale yellow, slightly acid, stratified fine sand to silty clay.

Permeability of the Haploxeralfs is slow. Effective rooting depth is 60 inches or more. Available water capacity is high. Runoff is very rapid, and the hazard of water erosion is very high.

The "Xerochrepts" are very deep and well drained. They formed in sanded glacial lake-laid sediment, glacial till, or glacial outcast derived from mixed sources. In some areas these soils have a mantle of volcanic ash and loess. Typically, the surface is covered with a mat of needles leaves, and twigs about 0.25 inch thick. The surface layer is brown, neutral fine sandy loam, gravelly silt loam, or sandy loam about 4 inches thick. The subsoil is light yellowish brown, slightly acid fine sandy loam, gravelly sandy loam, or sandy loam about 21 inches thick. The substratum to a depth of 60 inches or more is light yellowish brown, slightly acid very gravelly loamy sand or fine sand.

Permeability of the Xerochrepts is moderately rapid.
Effective rooting depth is 60 inches or more. Available water capacity is low, Runoff is very rapid, and the hazard of water erosion is very high. This unit is used for timber production, limited livestock grazing, and wildlife habitat.

Permanent and temporary stormwater BMP's that occur within the Haploxeralfs/Xerochrepts soils shall be carefully installed and inspected. Discharge locations in these soils shall be stabilized with heavy rocks and fabric to prevent soil erosion.

The Soil Resource Report from the USDA NRCS Web Soil Survey has been included in Appendix B.

STORMWATER MANAGEMENT

Stormwater runoff within the public right-of-way (from impervious surfaces such as paved roadways, concrete sidewalks, driveway approaches and curbs) will be collected and treated in grassed roadside swales. Swales will capture runoff from impervious surfaces by sheet flow off of the sidewalks, and through curb cuts along the roadway gutters. Runoff will be retained and treated in the roadside swales and overflow into catch basins. The catch basins will convey runoff to the proposed discharge locations as shown on the stormwater plan sheets in Appendix C.

The swale volumes are designed to capture, at a minimum, the first ½" of run-off from the impervious surfaces within the public right-of-way. Discharge locations are designed to release runoff at the pre-development rate for a 25-year storm event. Stormwater pipes, outlet structures, and overflows are sized to convey peak run-off rates from the developed site for a 25-year storm frequency and storm duration of 5 minutes. All drainage basin's shown in Appendix C have sufficient storage capacity in the proposed swales to maintain the pre-development runoff rates.

All design elements and details for the stormwater collection system will be included in the final design drawings for each phase of construction. Design plans will include pipe sizes, catch basin locations, invert elevations, conveyance slopes and lengths, and BMP details and locations.

CALCULATIONS

Included in this report are the calculations that demonstrate the ability of the stormwater system's capability to retain and treat the first ½" of run-off from impervious surfaces, the capacity of the swales and retention pond and the design storm yield expected at the site. See Appendix A.

The results of the calculations are as follows:

1. The minimum swale volume required to retain and treat the first ½ inch of run-off is 15,101 cubic feet.
2. The design swale volume shown on plans is 23,974 cubic feet.
3. The proposed drainage basin's each have sufficient storage volume in the roadside swales to maintain pre-development discharge rates.

Calculation summary for each drainage basin:

Basin	Impervious Surfaces (sf)	1st Half Inch From Impervious (cf)	Required Storage (cf)	Swale Storage Provided (cf)	Additional Storage Required (cf)
#1	37,737	1,572	1,572	2,197	0
#2	125,675	5,236	5,236	7,197	0
#3	19,416	809	809	1,125	0
#4	57,327	2,389	2,389	3,584	0
#5	74,245	3,094	3,094	5,197	0
#6	48,028	2,001	2,001	4,674	0
Total	362,428	15,101	15,101	23,974	0

TEMPORARY EROSION CONTROL

Maintaining all temporary erosion control measures will be the responsibility of the contractor(s) until project completion and until final stabilization of exposed soils occurs as defined by the EPA Construction General Permit.

All temporary erosion control measures will be installed prior to ground disturbing activities. Soil disturbance activities will be performed during periods of dry weather when practical. Existing drainages will be protected and exposed soils will be stabilized in accordance with this stormwater plan, the SWPPP, and IDEQ's Catalog of Storm Water BMPs For Idaho Cities and Counties.

The Owner's and General Contractor's involved with this project will be required to file as "Federal Operators" under the EPA's Construction General Permit 2017. They will need to file an NOI at least 14 days prior to ground disturbing activities. At least one SWPPP plan will need to be on-site with the inspection requirements followed in order to protect the seasonal drainages and Sand Creek which leads to Lake Pend Oreille.

The west side of the property drains towards an existing wetland swale and detention pond. The detention pond overflow through a vertical culvert into an

existing drainage which leads to a culvert under the railroad. The drainage ultimately discharges to Sand Creek. The contractor shall confirm that downstream culverts are clean and operating properly prior to construction. Silt fencing will be installed along the edges of all wetlands, ponds and drainages in this area which are located downhill of ground disturbing activities. Straw wattles will be installed in addition to silt fencing at the perimeters of placed fill materials and exposed soil stock pile locations. Small soil piles will be covered with plastic tarps and secured to withstand local wind conditions. Storm pipe discharges in this location shall be stabilized with rock as shown on the construction plan details to eliminate bank erosion and prevent transportation of sediment to the pond.

The south end of the site currently drains across a grassed field towards an existing culvert under the railroad. The contractor shall confirm that downstream culverts are clean and operating properly prior to construction. Installation of the proposed swale in this location prior to ground disturbing activities will serve as a temporary settling pond for sedimentary runoff during construction. Straw wattles will be placed in swale near any obvious inlets to capture heavy sediment. Silt fencing will be installed along the edges of all wetlands, ponds and drainages in this area which are located downhill of ground disturbing activities. Straw wattles will be installed in addition to silt fencing at the perimeters of placed fill materials and exposed soil stock pile locations. Small soil piles will be covered with plastic tarps and secured to withstand local wind conditions. Storm pipe discharges in this location shall be stabilized with rock as shown on the construction plan details to eliminate erosion potential and prevent transportation of sediment to Sand Creek.

The Northeast side of the development slopes towards a wooded area next to Sand Creek. Installation of the proposed swale in this location prior to ground disturbing activities will serve as a temporary settling pond for sedimentary runoff during construction. Straw wattles will be placed in swale near any obvious inlets to capture heavy sediment. Silt fencing will be installed along the edges of all wetlands, ponds and drainages in this area which are located downhill of ground disturbing activities. Straw wattles will be installed in addition to silt fencing at the perimeters of placed fill materials and exposed soil stock pile locations. Small soil piles will be covered with plastic tarps and secured to withstand local wind conditions. Storm pipe discharges in this location shall be stabilized with rock as shown on the construction plan details to eliminate erosion potential and prevent transportation of sediment to Sand Creek.

Dust control will be managed with a water truck (or equivalent) to apply water to the construction site in an appropriate manner to mitigate dust during grading and construction activities for compliance with the City’s dust control regulations.

Construction access shall be limited to designated locations that are stabilized with rock entrances meeting BMP requirements. If mud and/or dirt is tracked off

the site onto adjacent roadways, the contractor will be responsible to remove all mud, dirt and debris within 24 hours.

Concrete washouts will be provided where needed. Wasted concrete shall be disposed of in proposed pavement areas or in an approved concrete washout structure. See construction plans for details.

Catch Basins will be protected upon installation with BMP sediment traps. Inlet protections will remain in place until final stabilization of roadway swales. Traps will be inspected after each storm event and sediment will be removed as needed to prevent the traps from breaking. Once roadway swales have stabilized with grass, the traps will be removed and the storm pipes will be flushed with a minimal amount of clean water. Outlet locations will be cleaned after flushing.

PERMANENT EROSION CONTROL

All disturbed areas associated with the project that do not receive pavement or concrete shall be seeded by the contractor within 7 days of final grading. The revegetation of the site will serve as permanent erosion and sediment control for the site. Alternate seed mixture recommendations may be obtained from the U.S.D.A Natural Resource Conservation Service, the project Landscape Architect or a commercially marketed grass mixture. All revegetation work should be accomplished between the dates of April 15 and October 15 of a given year.

Maintaining permanent erosion control and permanent stormwater BMPs will be the responsibility of the owner after project completion and after final stabilization of exposed soils occurs as defined by the EPA Construction General Permit.

CONSTRUCTION SCHEDULE

The proposed schedule for site activities should occur in the following order:

Time Sequence	Construction Task
1	Rough-in swales to serve as sedimentation ponds during construction and install silt fencing and straw wattles. Confirm that all downstream culverts are clean and functioning properly.
2	Remove vegetation and topsoil for construction of hard surface area and stockpile within designated area.
3	Protect topsoil stockpile as necessary during construction by covering piles when not in use
4	Construct hard surface areas and protect inlets and outlets with appropriate BMPs.
5	Hydroseed and revegetate all remaining disturbed areas

BMP INSPECTION SCHEDULE

Inspections shall take place once every 7 days, within 24 hours of an anticipated storm event of 0.5 inches or greater, and within 24 hours of the end of a storm event of 0.5 inches or greater. Inspections which are required by the EPA can take the place of these standard inspections provided that they meet the same requirements.

OPERATION AND MAINTENANCE PLAN

Permanent operation and maintenance after construction shall be the responsibility of the current landowner. During construction, the Temporary and Permanent Erosion and Stormwater control measures will be the responsibility of the general contractors.

Operation and maintenance shall include and not be limited to the following items:

1. Install temporary erosion control measures as show on plans and as needed.
2. The newly seeded areas shall be inspected weekly until it is certain that adequate root depth has formed and shall be inspected every three months and after every large storm event for erosion. If erosion has occurred, the eroded soils and vegetation shall be replaced.
3. The grassy swales shall be inspected every three months and after every large storm event. Any sediments and other debris deposited in the swales, catch basins, culverts or stabilized discharge locations shall be

removed and disposed off-site. Notify the railroad if culvert maintenance is required within the railroad right-of-way. In the summer months, the swales shall be watered and mowed as needed.

SUMMARY

The proposed site is adequately suited for the proposed improvements. The site is capable of withstanding any disturbances created by the proposed development without risk of additional site run-off and/or sedimentation of ground water and/or surface water. The Stormwater Management plan is adequate to retain the first ½" of rainfall from created impervious surfaces within the public right-of-way while maintaining pre-development off-site discharge rates.

APPENDIX A.

Stormwater Calculations

STORMWATER CALCULATIONS

PROJECT: University of Idaho Property

PREPARED BY: RYAN J. LUTTMANN, P.E.

DATE: June 19, 2020

BASIN #1

I. 1/2" RUN-OFF CALCULATIONS (PROPOSED ADDITION)

A. IMPERVIOUS SURFACES (square feet) — 37,737 Ft^2

LOTS	17	
DRIVEWAYS	2,040	SF
SIDEWALK	7,273	SF
PAVEMENT	28,424	SF
TOTAL	37,737	

B. VOLUME REQUIRED FOR 1ST 1/2" STORAGE (cubic feet) — 1,572 Ft^3

IMPERVIOUS AREA X (0.5in/12ft) =

II. PRE-DEVELOPMENT 25 YR STORM CALCULATIONS (24 HR STORM)

A. TIME INCREMENT FOR BOWSTRING CALC'S (min.) — 5 Minutes

B. CALCULATED TIME OF CONCENTRATION (min.) — 2.65 Minutes
TIME OF CONCENTRATION USED (5 minute minimum) — 5.00 Minutes

L = 600 n = 0.02
s = 0.01 C_t = 0.15
where: $T_c = C_t (Ln/s^{0.5})^{0.6}$

C. TOTAL AREA — 175,009 SF — 4.02 Acres

D. INTENSITY (inches/hour) — 0.11 in/hr

E. IMPERVIOUS AREA — 0 Ft^2

F. DEVELOPED "C" FACTOR		0.20
G. PEAK FLOW (cubic feet per second)		0.088 cfs

Q=C*I*A

III. POST DEVELOPMENT 25 YR STORM CALCULATIONS (24 HR STORM)

A. TIME INCREMENT FOR BOWSTRING CALC'S (min.)		5 Minutes
B. CALCULATED TIME OF CONCENTRATION (min.)	2.65 Minutes	
TIME OF CONCENTRATION USED (5 minute minimum)		5.00 Minutes

L = 600 n = 0.02
s = 0.01 C_t = 0.15
where: $T_c = C_t (Ln/s^{0.5})^{0.6}$

C. TOTAL AREA	175,009 SF		4.02 Acres
D. INTENSITY (inches/hour)			0.11 in/hr
E. IMPERVIOUS AREA			37,737 Ft^2
F. DEVELOPED "C" FACTOR			0.35
IMPERVIOUS C = 0.9	22%	C:	0.194
PRE-DEVELOPMENT C = 0.20	78%	C:	0.157
G. PEAK FLOW (cubic feet per second)			0.155 cfs

Q=C*I*A

IV. PRE- VS. POST DEVELOPMENT RUN-OFF CALCULATIONS

A. PRE-DEVELOPMENT PEAK FLOW (cubic feet per second)	0.088	cfs
B. POST DEVELOPMENT PEAK FLOW (cubic feet per second)	0.155	cfs
C. DIFFERENCE OF PRE- VS. POST PEAK FLOW	0.067	cfs
D. INCREASED VOLUME OF STORMWATER FOR 24 HR STORM	5,763	Ft^3

$V = Q_{post\text{-}pre} * 24hr * 3600\ sec/hr$

E. SWALE INFILTRATION FLOW (cubic feet per second)		0.076	cfs
TOTAL SWALE AREA =	8,238	SF	(7.5' WIDTH)
EFFECTIVE SWALE AREA =	5,492	SF	(5' WIDTH)
SWALE VOLUME =	2,197	Ft^3	(8" AVG. DEPTH)
SOIL PERMEABILITY (in/hr) =	0.60		
F. VOLUME LOSS THROUGH SWALE INFILTRATION		6,590	Ft^3
G. ADDITIONAL STORAGE TO MAINTAIN PRE-DEV. DISCHARGE RATE		0	Ft^3

V. ROUTING CALCULATIONS

A. PROPOSED SWALE VOLUME + ADDITIONAL STORAGE 2,197 Ft^3

B. SWALE INFILTRATION FLOW (cubic feet per second) 0.076 cfs

C. "BOWSTRING" METHOD

#1 Time Inc. (min)	#2 Time Inc. (sec)	#3 Intensity (in/hr)	#4 Q Dev. (cfs)	#5 V in (cf)	#6 V out (cf)	#7 Storage V (cf)	#8 Overflow V (cf)	#9 PreDev V (cf)
5	300	2.88	4.06	1632.39	22.88	1609.51	-587.29	930.30
10	600	2.06	2.90	2038.97	45.77	1993.20	-203.60	1162.00
15	900	1.69	2.38	2387.59	68.65	2318.94	122.14	1360.68
20	1200	1.54	2.17	2827.08	91.53	2735.54	538.74	1611.14
25	1500	1.34	1.89	3026.73	114.42	2912.31	715.51	1724.92
30	1800	1.20	1.69	3218.08	137.30	3080.78	883.98	1833.98
35	2100	1.09	1.54	3384.15	160.18	3223.97	1027.17	1928.62
40	2400	1.00	1.41	3527.71	183.07	3344.64	1147.84	2010.43
45	2700	0.93	1.31	3674.15	205.95	3468.20	1271.40	2093.89
50	3000	0.87	1.23	3805.11	228.83	3576.27	1379.47	2168.52
55	3300	0.82	1.16	3933.27	251.72	3681.55	1484.75	2241.56
60	3600	0.78	1.10	4071.33	274.60	3796.73	1599.93	2320.24
65	3900	0.74	1.04	4175.56	297.48	3878.07	1681.27	2379.64
70	4200	0.70	0.99	4245.94	320.37	3925.58	1728.78	2419.75
75	4500	0.67	0.94	4347.37	343.25	4004.12	1807.32	2477.56
80	4800	0.65	0.92	4492.54	366.13	4126.41	1929.61	2560.29
85	5100	0.63	0.89	4620.79	389.02	4231.78	2034.98	2633.38
90	5400	0.61	0.86	4732.12	411.90	4320.22	2123.42	2696.83
95	5700	0.59	0.83	4826.53	434.78	4391.75	2194.95	2750.63
100	6000	0.57	0.80	4904.03	457.67	4446.36	2249.56	2794.79
1440	86400	0.11	0.16	13416.05	6590.40	6825.65	4628.85	7645.77

VI. RESULTS

A. VOLUME REQUIRED FOR 1ST 1/2" STORAGE 1,572 Ft^3

B. PROPOSED SWALE VOLUME 2,197 Ft^3

C. ADDITIONAL STORAGE TO MAINTAIN PRE-DEV. DISCHARGE RATE 0 Ft^3

VII. OUTLET PIPE SIZING

Post Development flow for 25-year, 5-minute storm (2.88 in/hr) = 4.06 cfs

Manning's Equation:

Q= (1.49/n)*A*(R^2/3)*(S^1/2)

Q=	4.439	Flow (cfs)
n=	0.015	Roughness Coefficient
A=	0.628	Cross Sectional Area (sq. ft.)
R=	0.3019231	Hydraulic Radius (ft.)
S=	0.025	Slope (ft/ft)

Pipe Diameter =	8	10	12	15	18	24	
Sectional Area =	0.349	0.545	0.785	1.227	1.767	3.141	SF
80% Water Section =	0.279	0.436	0.628	0.981	1.414	2.514	SF
80% Wet Perimeter =	1.39	1.74	2.08	2.61	3.13	4.17	FT
R =	0.200719424	0.250575	0.3019231	0.375862	0.4517572	0.602878	
R^2/3	0.013429429	0.020929	0.0303858	0.047091	0.0680282	0.121154	

gpm = 1992.24

PIPE SIZE TO TRANSMIT POST-DEVELOPMENT PEAK FLOW: 12 inch

BASIN #2

I. 1/2" RUN-OFF CALCULATIONS (PROPOSED ADDITION)

A. IMPERVIOUS SURFACES (square feet) — 125,675 Ft^2

LOTS	58	
DRIVEWAYS	6,960	SF
SIDEWALK	24,045	SF
PAVEMENT	94,670	SF
TOTAL	125,675	

B. VOLUME REQUIRED FOR 1ST 1/2" STORAGE (cubic feet) — 5,236 Ft^3

IMPERVIOUS AREA X (0.5in/12ft) =

II. PRE-DEVELOPMENT 25 YR STORM CALCULATIONS (24 HR STORM)

A. TIME INCREMENT FOR BOWSTRING CALC'S (min.) — 5 Minutes

B. CALCULATED TIME OF CONCENTRATION (min.) — 3.60 Minutes
TIME OF CONCENTRATION USED (5 minute minimum) — 5.00 Minutes

L = 1000 n = 0.02
s = 0.01 C_t = 0.15
where: $T_c = C_t (Ln/s^{0.5})^{0.6}$

C. TOTAL AREA — 605,534 SF — 13.90 Acres

D. INTENSITY (inches/hour) — 0.11 in/hr

E. IMPERVIOUS AREA — 0 Ft^2

F. DEVELOPED "C" FACTOR — 0.20

G. PEAK FLOW (cubic feet per second) — 0.306 cfs

Q=C*I*A

III. POST DEVELOPMENT 25 YR STORM CALCULATIONS (24 HR STORM)

A. TIME INCREMENT FOR BOWSTRING CALC'S (min.)		5 Minutes
B. CALCULATED TIME OF CONCENTRATION (min.)	3.60 Minutes	
TIME OF CONCENTRATION USED (5 minute minimum)		5.00 Minutes

L = 1000 n = 0.02
s = 0.01 C_t = 0.15
where: $T_c = C_t (Ln/s^{0.5})^{0.6}$

C. TOTAL AREA	605,534 SF	13.90 Acres
D. INTENSITY (inches/hour)		0.11 in/hr
E. IMPERVIOUS AREA		125,675 Ft^2
F. DEVELOPED "C" FACTOR		0.35

IMPERVIOUS C = 0.9	21%	C:	0.187
PRE-DEVELOPMENT C = 0.20	79%	C:	0.158

G. PEAK FLOW (cubic feet per second)	0.528 cfs

Q=C*I*A

IV. PRE- VS. POST DEVELOPMENT RUN-OFF CALCULATIONS

A. PRE-DEVELOPMENT PEAK FLOW (cubic feet per second)	0.306 cfs
B. POST DEVELOPMENT PEAK FLOW (cubic feet per second)	0.528 cfs
C. DIFFERENCE OF PRE- VS. POST PEAK FLOW	0.222 cfs
D. INCREASED VOLUME OF STORMWATER FOR 24 HR STORM	19,194 Ft^3

$V = Q_{post\text{-}pre} * 24hr * 3600 sec/hr$

E. SWALE INFILTRATION FLOW (cubic feet per second)	0.250 cfs

TOTAL SWALE AREA =	26,988 SF	(7.5' WIDTH)
EFFECTIVE SWALE AREA =	17,992 SF	(5' WIDTH)
SWALE VOLUME =	7,197 Ft^3	(8" AVG. DEPTH)
SOIL PERMEABILITY (in/hr) =	0.60	

F. VOLUME LOSS THROUGH SWALE INFILTRATION	21,590 Ft^3
G. ADDITIONAL STORAGE TO MAINTAIN PRE-DEV. DISCHARGE RATE	0 Ft^3

V. ROUTING CALCULATIONS

A. PROPOSED SWALE VOLUME + ADDITIONAL STORAGE 7,197 Ft^3

B. SWALE INFILTRATION FLOW (cubic feet per second) 0.250 cfs

C. "BOWSTRING" METHOD

#1 Time Inc. (min)	#2 Time Inc. (sec)	#3 Intensity (in/hr)	#4 Q Dev. (cfs)	#5 V in (cf)	#6 V out (cf)	#7 Storage V (cf)	#8 Overflow V (cf)	#9 PreDev V (cf)
5	300	2.88	13.82	5557.02	74.97	5482.05	-1714.75	3218.84
10	600	2.06	9.89	6941.09	149.93	6791.15	-405.65	4020.55
15	900	1.69	8.11	8127.89	224.90	7902.99	706.19	4707.99
20	1200	1.54	7.39	9623.98	299.87	9324.12	2127.32	5574.58
25	1500	1.34	6.43	10303.64	374.83	9928.80	2732.00	5968.26
30	1800	1.20	5.76	10955.06	449.80	10505.26	3308.46	6345.60
35	2100	1.09	5.23	11520.38	524.77	10995.62	3798.82	6673.05
40	2400	1.00	4.80	12009.10	599.73	11409.37	4212.57	6956.13
45	2700	0.93	4.46	12507.61	674.70	11832.91	4636.11	7244.89
50	3000	0.87	4.18	12953.41	749.67	12203.75	5006.95	7503.12
55	3300	0.82	3.94	13389.71	824.63	12565.08	5368.28	7755.84
60	3600	0.78	3.74	13859.71	899.60	12960.11	5763.31	8028.08
65	3900	0.74	3.55	14214.51	974.57	13239.95	6043.15	8233.59
70	4200	0.70	3.36	14454.12	1049.53	13404.59	6207.79	8372.38
75	4500	0.67	3.22	14799.42	1124.50	13674.92	6478.12	8572.39
80	4800	0.65	3.12	15293.60	1199.47	14094.14	6897.34	8858.65
85	5100	0.63	3.02	15730.19	1274.43	14455.76	7258.96	9111.54
90	5400	0.61	2.93	16109.19	1349.40	14759.79	7562.99	9331.06
95	5700	0.59	2.83	16430.58	1424.37	15006.21	7809.41	9517.23
100	6000	0.57	2.74	16694.38	1499.33	15195.04	7998.24	9670.03
1440	86400	0.11	0.53	45671.16	21590.40	24080.76	16883.96	26454.50

VI. RESULTS

A. VOLUME REQUIRED FOR 1ST 1/2" STORAGE 5,236 Ft^3

B. PROPOSED SWALE VOLUME 7,197 Ft^3

C. ADDITIONAL STORAGE TO MAINTAIN PRE-DEV. DISCHARGE RATE 0 Ft^3

VII. OUTLET PIPE SIZING

Post Development peak flow for 25-year, 5-minute storm (2.88 in/hr) = 13.82 cfs

Manning's Equation:

Q= (1.49/n)*A*(R^2/3)*(S^1/2)

Q=	14.323	Flow (cfs)
n=	0.015	Roughness Coefficient
A=	1.414	Cross Sectional Area (sq. ft.)
R=	0.4517572	Hydraulic Radius (ft.)
S=	0.03	Slope (ft/ft)

Pipe Diameter =	8	10	12	15	18	24	
Sectional Area =	0.349	0.545	0.785	1.227	1.767	3.141	SF
80% Water Section =	0.279	0.436	0.628	0.981	1.414	2.514	SF
80% Wet Perimeter =	1.39	1.74	2.08	2.61	3.13	4.17	FT
R =	0.200719424	0.250575	0.3019231	0.375862	0.4517572	0.602878	
R^2/3	0.013429429	0.020929	0.0303858	0.047091	0.0680282	0.121154	

gpm = 6428.28

PIPE SIZE TO TRANSMIT POST-DEVELOPMENT PEAK FLOW: 18 inch

BASIN #3

I. 1/2" RUN-OFF CALCULATIONS (PROPOSED ADDITION)

A. IMPERVIOUS SURFACES (square feet) — 19,416 Ft^2

LOTS	6	
DRIVEWAYS	720	SF
SIDEWALK	3,610	SF
PAVEMENT	15,086	SF
TOTAL	19,416	

B. VOLUME REQUIRED FOR 1ST 1/2" STORAGE (cubic feet) — 809 Ft^3

IMPERVIOUS AREA X (0.5in/12ft) =

II. PRE-DEVELOPMENT 25 YR STORM CALCULATIONS (24 HR STORM)

A. TIME INCREMENT FOR BOWSTRING CALC'S (min.) — 5 Minutes

B. CALCULATED TIME OF CONCENTRATION (min.) — 1.37 Minutes
TIME OF CONCENTRATION USED (5 minute minimum) — 5.00 Minutes

L = 200 n = 0.02
s = 0.01 C_t = 0.15
where: $T_c = C_t (Ln/s^{0.5})^{0.6}$

C. TOTAL AREA — 80,970 SF — 1.86 Acres

D. INTENSITY (inches/hour) — 0.11 in/hr

E. IMPERVIOUS AREA — 0 Ft^2

F. DEVELOPED "C" FACTOR — 0.20

G. PEAK FLOW (cubic feet per second) — 0.041 cfs

Q=C*I*A

III. POST DEVELOPMENT 25 YR STORM CALCULATIONS (24 HR STORM)

A. TIME INCREMENT FOR BOWSTRING CALC'S (min.)		5 Minutes
B. CALCULATED TIME OF CONCENTRATION (min.)	1.37 Minutes	
TIME OF CONCENTRATION USED (5 minute minimum)		5.00 Minutes

L = 200 n = 0.02
s = 0.01 C_t = 0.15
where: $T_c = C_t (Ln/s^{0.5})^{0.6}$

C. TOTAL AREA	80,970 SF	1.86 Acres
D. INTENSITY (inches/hour)		0.11 in/hr
E. IMPERVIOUS AREA		19,416 Ft^2
F. DEVELOPED "C" FACTOR		0.37

IMPERVIOUS C = 0.9	24%	C:	0.216
PRE-DEVELOPMENT C = 0.20	76%	C:	0.152

G. PEAK FLOW (cubic feet per second)	0.075 cfs

Q=C*I*A

IV. PRE- VS. POST DEVELOPMENT RUN-OFF CALCULATIONS

A. PRE-DEVELOPMENT PEAK FLOW (cubic feet per second)	0.041 cfs
B. POST DEVELOPMENT PEAK FLOW (cubic feet per second)	0.075 cfs
C. DIFFERENCE OF PRE- VS. POST PEAK FLOW	0.034 cfs
D. INCREASED VOLUME OF STORMWATER FOR 24 HR STORM	2,965 Ft^3

$V = Q_{post\text{-}pre} * 24hr * 3600 sec/hr$

E. SWALE INFILTRATION FLOW (cubic feet per second)	0.039 cfs

TOTAL SWALE AREA =	4,219 SF	(7.5' WIDTH)
EFFECTIVE SWALE AREA =	2,813 SF	(5' WIDTH)
SWALE VOLUME =	1,125 Ft^3	(8" AVG. DEPTH)
SOIL PERMEABILITY (in/hr) =	0.60	

F. VOLUME LOSS THROUGH SWALE INFILTRATION	3,375 Ft^3
G. ADDITIONAL STORAGE TO MAINTAIN PRE-DEV. DISCHARGE RATE	0 Ft^3

V. ROUTING CALCULATIONS

A. PROPOSED SWALE VOLUME + ADDITIONAL STORAGE 1,125 Ft^3

B. SWALE INFILTRATION FLOW (cubic feet per second) 0.039 cfs

C. "BOWSTRING" METHOD

#1 Time Inc. (min)	#2 Time Inc. (sec)	#3 Intensity (in/hr)	#4 Q Dev. (cfs)	#5 V in (cf)	#6 V out (cf)	#7 Storage V (cf)	#8 Overflow V (cf)	#9 PreDev V (cf)
5	300	2.88	1.97	791.65	11.72	779.93	-345.14	430.41
10	600	2.06	1.41	988.82	23.44	965.38	-159.69	537.61
15	900	1.69	1.16	1157.89	35.16	1122.73	-2.34	629.54
20	1200	1.54	1.05	1371.02	46.88	1324.14	199.08	745.41
25	1500	1.34	0.92	1467.84	58.60	1409.25	284.18	798.06
30	1800	1.20	0.82	1560.65	70.32	1490.33	365.26	848.51
35	2100	1.09	0.75	1641.18	82.04	1559.14	434.08	892.30
40	2400	1.00	0.68	1710.80	93.76	1617.05	491.98	930.15
45	2700	0.93	0.64	1781.82	105.48	1676.34	551.28	968.76
50	3000	0.87	0.59	1845.33	117.19	1728.13	603.07	1003.29
55	3300	0.82	0.56	1907.48	128.91	1778.57	653.50	1037.09
60	3600	0.78	0.53	1974.44	140.63	1833.81	708.74	1073.49
65	3900	0.74	0.51	2024.98	152.35	1872.63	747.56	1100.97
70	4200	0.70	0.48	2059.12	164.07	1895.05	769.98	1119.53
75	4500	0.67	0.46	2108.31	175.79	1932.52	807.45	1146.27
80	4800	0.65	0.44	2178.71	187.51	1991.20	866.13	1184.55
85	5100	0.63	0.43	2240.91	199.23	2041.67	916.61	1218.36
90	5400	0.61	0.42	2294.90	210.95	2083.95	958.88	1247.72
95	5700	0.59	0.40	2340.68	222.67	2118.01	992.95	1272.61
100	6000	0.57	0.39	2378.26	234.39	2143.87	1018.81	1293.04
1440	86400	0.11	0.08	6506.26	3375.20	3131.06	2005.99	3537.41

VI. RESULTS

A. VOLUME REQUIRED FOR 1ST 1/2" STORAGE 809 Ft^3

B. PROPOSED SWALE VOLUME 1,125 Ft^3

C. ADDITIONAL STORAGE TO MAINTAIN PRE-DEV. DISCHARGE RATE 0 Ft^3

VII. OUTLET PIPE SIZING

Post Development flow for 25-year, 5-minute storm (2.88 in/hr) = 1.97 cfs

Manning's Equation:

Q= (1.49/n)*A*(R^2/3)*(S^1/2)

Q=	1.985	Flow (cfs)
n=	0.015	Roughness Coefficient
A=	0.628	Cross Sectional Area (sq. ft.)
R=	0.3019231	Hydraulic Radius (ft.)
S=	0.005	Slope (ft/ft)

Pipe Diameter =	8	10	12	15	18	24	
Sectional Area =	0.349	0.545	0.785	1.227	1.767	3.141	SF
80% Water Section =	0.279	0.436	0.628	0.981	1.414	2.514	SF
80% Wet Perimeter =	1.39	1.74	2.08	2.61	3.13	4.17	FT
R =	0.200719424	0.250575	0.3019231	0.375862	0.4517572	0.602878	
R^2/3	0.013429429	0.020929	0.0303858	0.047091	0.0680282	0.121154	

gpm = 890.96

PIPE SIZE TO TRANSMIT POST-DEVELOPMENT PEAK FLOW: 12 inch

BASIN #4

I. 1/2" RUN-OFF CALCULATIONS (PROPOSED ADDITION)

A. IMPERVIOUS SURFACES (square feet) — 57,327 Ft^2

LOTS	22	
DRIVEWAYS	2,640	SF
SIDEWALK	11,174	SF
PAVEMENT	43,513	SF
TOTAL	57,327	

B. VOLUME REQUIRED FOR 1ST 1/2" STORAGE (cubic feet) — 2,389 Ft^3

IMPERVIOUS AREA X (0.5in/12ft) =

II. PRE-DEVELOPMENT 25 YR STORM CALCULATIONS (24 HR STORM)

A. TIME INCREMENT FOR BOWSTRING CALC'S (min.) — 5 Minutes

B. CALCULATED TIME OF CONCENTRATION (min.) — 1.75 Minutes
TIME OF CONCENTRATION USED (5 minute minimum) — 5.00 Minutes

L = 300 n = 0.02
s = 0.01 C_t = 0.15
where: $T_c = C_t (Ln/s^{0.5})^{0.6}$

C. TOTAL AREA — 234,103 SF — 5.37 Acres

D. INTENSITY (inches/hour) — 0.11 in/hr

E. IMPERVIOUS AREA — 0 Ft^2

F. DEVELOPED "C" FACTOR — 0.20

G. PEAK FLOW (cubic feet per second) — 0.118 cfs

Q=C*I*A

III. POST DEVELOPMENT 25 YR STORM CALCULATIONS (24 HR STORM)

A. TIME INCREMENT FOR BOWSTRING CALC'S (min.)			5 Minutes
B. CALCULATED TIME OF CONCENTRATION (min.)		1.75 Minutes	
TIME OF CONCENTRATION USED (5 minute minimum)			5.00 Minutes

L = 300 n = 0.02
s = 0.01 C_t = 0.15
where: $T_c = C_t (Ln/s^{0.5})^{0.6}$

C. TOTAL AREA	234,103 SF		5.37 Acres
D. INTENSITY (inches/hour)			0.11 in/hr
E. IMPERVIOUS AREA			57,327 Ft^2
F. DEVELOPED "C" FACTOR			0.37

IMPERVIOUS C = 0.9	24%	C:	0.220
PRE-DEVELOPMENT C = 0.20	76%	C:	0.151

G. PEAK FLOW (cubic feet per second)	0.220 cfs

Q=C*I*A

IV. PRE- VS. POST DEVELOPMENT RUN-OFF CALCULATIONS

A. PRE-DEVELOPMENT PEAK FLOW (cubic feet per second)	0.118 cfs
B. POST DEVELOPMENT PEAK FLOW (cubic feet per second)	0.220 cfs
C. DIFFERENCE OF PRE- VS. POST PEAK FLOW	0.101 cfs
D. INCREASED VOLUME OF STORMWATER FOR 24 HR STORM	8,755 Ft^3

$V = Q_{post\text{-}pre} * 24hr * 3600 sec/hr$

E. SWALE INFILTRATION FLOW (cubic feet per second)	0.124 cfs

TOTAL SWALE AREA =	13,439 SF	(7.5' WIDTH)
EFFECTIVE SWALE AREA =	8,959 SF	(5' WIDTH)
SWALE VOLUME =	3,584 Ft^3	(8" AVG. DEPTH)
SOIL PERMEABILITY (in/hr) =	0.60	

F. VOLUME LOSS THROUGH SWALE INFILTRATION	10,751 Ft^3
G. ADDITIONAL STORAGE TO MAINTAIN PRE-DEV. DISCHARGE RATE	0 Ft^3

V. ROUTING CALCULATIONS

A. PROPOSED SWALE VOLUME + ADDITIONAL STORAGE 3,584 Ft^3

B. SWALE INFILTRATION FLOW (cubic feet per second) 0.124 cfs

C. "BOWSTRING" METHOD

#1 Time Inc. (min)	#2 Time Inc. (sec)	#3 Intensity (in/hr)	#4 Q Dev. (cfs)	#5 V in (cf)	#6 V out (cf)	#7 Storage V (cf)	#8 Overflow V (cf)	#9 PreDev V (cf)
5	300	2.88	5.75	2310.99	37.33	2273.66	-1310.08	1244.42
10	600	2.06	4.11	2886.58	74.66	2811.92	-771.81	1554.37
15	900	1.69	3.37	3380.13	111.99	3268.14	-315.59	1820.13
20	1200	1.54	3.07	4002.31	149.32	3852.99	269.26	2155.17
25	1500	1.34	2.67	4284.96	186.65	4098.30	514.57	2307.37
30	1800	1.20	2.40	4555.87	223.98	4331.88	748.15	2453.24
35	2100	1.09	2.18	4790.97	261.31	4529.65	945.92	2579.84
40	2400	1.00	2.00	4994.21	298.64	4695.56	1111.83	2689.28
45	2700	0.93	1.86	5201.52	335.98	4865.55	1281.81	2800.92
50	3000	0.87	1.74	5386.92	373.31	5013.61	1429.88	2900.75
55	3300	0.82	1.64	5568.36	410.64	5157.72	1573.99	2998.45
60	3600	0.78	1.56	5763.82	447.97	5315.85	1732.12	3103.70
65	3900	0.74	1.48	5911.37	485.30	5426.07	1842.34	3183.16
70	4200	0.70	1.40	6011.01	522.63	5488.39	1904.65	3236.81
75	4500	0.67	1.34	6154.61	559.96	5594.65	2010.92	3314.14
80	4800	0.65	1.30	6360.13	597.29	5762.84	2179.11	3424.80
85	5100	0.63	1.26	6541.69	634.62	5907.07	2323.34	3522.57
90	5400	0.61	1.22	6699.30	671.95	6027.35	2443.62	3607.44
95	5700	0.59	1.18	6832.96	709.28	6123.68	2539.95	3679.42
100	6000	0.57	1.14	6942.67	746.61	6196.05	2612.32	3738.49
1440	86400	0.11	0.22	18993.20	10751.20	8242.00	4658.26	10227.46

VI. RESULTS

A. VOLUME REQUIRED FOR 1ST 1/2" STORAGE 2,389 Ft^3

B. PROPOSED SWALE VOLUME 3,584 Ft^3

C. ADDITIONAL STORAGE TO MAINTAIN PRE-DEV. DISCHARGE RATE 0 Ft^3

VII. OUTLET PIPE SIZING

Post Development flow for 25-year, 5-minute storm (2.88 in/hr) = 5.75 cfs

Manning's Equation:

Q= (1.49/n)*A*(R^2/3)*(S^1/2)

Q=	5.956	Flow (cfs)
n=	0.015	Roughness Coefficient
A=	0.628	Cross Sectional Area (sq. ft.)
R=	0.3019231	Hydraulic Radius (ft.)
S=	0.045	Slope (ft/ft)

Pipe Diameter =	8	10	12	15	18	24	
Sectional Area =	0.349	0.545	0.785	1.227	1.767	3.141	SF
80% Water Section =	0.279	0.436	0.628	0.981	1.414	2.514	SF
80% Wet Perimeter =	1.39	1.74	2.08	2.61	3.13	4.17	FT
R =	0.200719424	0.250575	0.3019231	0.375862	0.4517572	0.602878	
R^2/3	0.013429429	0.020929	0.0303858	0.047091	0.0680282	0.121154	

gpm = 2672.87

PIPE SIZE TO TRANSMIT POST-DEVELOPMENT PEAK FLOW: 12 inch

BASIN #5

I. 1/2" RUN-OFF CALCULATIONS (PROPOSED ADDITION)

A. IMPERVIOUS SURFACES (square feet) — 74,245 Ft^2

LOTS	42	
DRIVEWAYS	5,040	SF
SIDEWALK	13,922	SF
PAVEMENT	55,283	SF
TOTAL	74,245	

B. VOLUME REQUIRED FOR 1ST 1/2" STORAGE (cubic feet) — 3,094 Ft^3

IMPERVIOUS AREA X (0.5in/12ft) =

II. PRE-DEVELOPMENT 25 YR STORM CALCULATIONS (24 HR STORM)

A. TIME INCREMENT FOR BOWSTRING CALC'S (min.) — 5 Minutes

B. CALCULATED TIME OF CONCENTRATION (min.) — 2.65 Minutes
TIME OF CONCENTRATION USED (5 minute minimum) — 5.00 Minutes

L = 600 n = 0.02
s = 0.01 C_t = 0.15
where: $T_c = C_t (Ln/s^{0.5})^{0.6}$

C. TOTAL AREA — 373,160 SF — 8.57 Acres

D. INTENSITY (inches/hour) — 0.11 in/hr

E. IMPERVIOUS AREA — 0 Ft^2

F. DEVELOPED "C" FACTOR — 0.20

G. PEAK FLOW (cubic feet per second) — 0.188 cfs

Q=C*I*A

III. POST DEVELOPMENT 25 YR STORM CALCULATIONS (24 HR STORM)

A. TIME INCREMENT FOR BOWSTRING CALC'S (min.)			5 Minutes
B. CALCULATED TIME OF CONCENTRATION (min.)			2.65 Minutes
TIME OF CONCENTRATION USED (5 minute minimum)			5.00 Minutes

L = 600 n = 0.02
s = 0.01 C_t = 0.15
where: $T_c = C_t (Ln/s^{0.5})^{0.6}$

C. TOTAL AREA	373,160 SF		8.57 Acres
D. INTENSITY (inches/hour)			0.11 in/hr
E. IMPERVIOUS AREA			74,245 Ft^2
F. DEVELOPED "C" FACTOR			0.34

IMPERVIOUS C = 0.9	20%	C:	0.179
PRE-DEVELOPMENT C = 0.20	80%	C:	0.160

G. PEAK FLOW (cubic feet per second)	0.320 cfs

Q=C*I*A

IV. PRE- VS. POST DEVELOPMENT RUN-OFF CALCULATIONS

A. PRE-DEVELOPMENT PEAK FLOW (cubic feet per second)	0.188 cfs
B. POST DEVELOPMENT PEAK FLOW (cubic feet per second)	0.320 cfs
C. DIFFERENCE OF PRE- VS. POST PEAK FLOW	0.131 cfs
D. INCREASED VOLUME OF STORMWATER FOR 24 HR STORM	11,339 Ft^3

$V = Q_{post\text{-}pre} * 24hr * 3600 sec/hr$

E. SWALE INFILTRATION FLOW (cubic feet per second)		0.180 cfs
TOTAL SWALE AREA =	19,489 SF	(7.5' WIDTH)
EFFECTIVE SWALE AREA =	12,993 SF	(5' WIDTH)
SWALE VOLUME =	5,197 Ft^3	(8" AVG. DEPTH)
SOIL PERMEABILITY (in/hr) =	0.60	
F. VOLUME LOSS THROUGH SWALE INFILTRATION		15,591 Ft^3
G. ADDITIONAL STORAGE TO MAINTAIN PRE-DEV. DISCHARGE RATE		0 Ft^3

V. ROUTING CALCULATIONS

A. PROPOSED SWALE VOLUME + ADDITIONAL STORAGE 5,197 Ft^3

B. SWALE INFILTRATION FLOW (cubic feet per second) 0.180 cfs

C. "BOWSTRING" METHOD

#1 Time Inc. (min)	#2 Time Inc. (sec)	#3 Intensity (in/hr)	#4 Q Dev. (cfs)	#5 V in (cf)	#6 V out (cf)	#7 Storage V (cf)	#8 Overflow V (cf)	#9 PreDev V (cf)
5	300	2.88	8.37	3364.93	54.14	3310.80	-1886.27	1983.61
10	600	2.06	5.99	4203.03	108.27	4094.75	-1102.31	2477.66
15	900	1.69	4.91	4921.67	162.41	4759.26	-437.81	2901.29
20	1200	1.54	4.48	5827.60	216.54	5611.05	413.99	3435.33
25	1500	1.34	3.89	6239.15	270.68	5968.47	771.40	3677.94
30	1800	1.20	3.49	6633.60	324.82	6308.79	1111.72	3910.47
35	2100	1.09	3.17	6975.92	378.95	6596.97	1399.90	4112.26
40	2400	1.00	2.91	7271.85	433.09	6838.77	1641.70	4286.71
45	2700	0.93	2.70	7573.71	487.23	7086.49	1889.42	4464.66
50	3000	0.87	2.53	7843.66	541.36	7302.30	2105.23	4623.79
55	3300	0.82	2.38	8107.86	595.50	7512.36	2315.29	4779.53
60	3600	0.78	2.27	8392.45	649.63	7742.82	2545.75	4947.30
65	3900	0.74	2.15	8607.29	703.77	7903.52	2706.46	5073.95
70	4200	0.70	2.03	8752.38	757.91	7994.48	2797.41	5159.48
75	4500	0.67	1.95	8961.47	812.04	8149.43	2952.36	5282.73
80	4800	0.65	1.89	9260.71	866.18	8394.54	3197.47	5459.14
85	5100	0.63	1.83	9525.08	920.31	8604.77	3407.70	5614.98
90	5400	0.61	1.77	9754.57	974.45	8780.12	3583.06	5750.26
95	5700	0.59	1.71	9949.19	1028.59	8920.60	3723.53	5864.99
100	6000	0.57	1.66	10108.92	1082.72	9026.20	3829.13	5959.15
1440	86400	0.11	0.32	27655.19	15591.20	12063.99	6866.93	16302.57

VI. RESULTS

A. VOLUME REQUIRED FOR 1ST 1/2" STORAGE 3,094 Ft^3

B. PROPOSED SWALE VOLUME 5,197 Ft^3

C. ADDITIONAL STORAGE TO MAINTAIN PRE-DEV. DISCHARGE RATE 0 Ft^3

VII. OUTLET PIPE SIZING

Post Development flow for 25-year, 5-minute storm (2.88 in/hr) = 8.37 cfs

Manning's Equation:

Q= (1.49/n)*A*(R^2/3)*(S^1/2)

Q=	8.270	Flow (cfs)
n=	0.015	Roughness Coefficient
A=	1.414	Cross Sectional Area (sq. ft.)
R=	0.4517572	Hydraulic Radius (ft.)
S=	0.01	Slope (ft/ft)

Pipe Diameter =	8	10	12	15	18	24	
Sectional Area =	0.349	0.545	0.785	1.227	1.767	3.141	SF
80% Water Section =	0.279	0.436	0.628	0.981	1.414	2.514	SF
80% Wet Perimeter =	1.39	1.74	2.08	2.61	3.13	4.17	FT
R =	0.200719424	0.250575	0.3019231	0.375862	0.4517572	0.602878	
R^2/3	0.013429429	0.020929	0.0303858	0.047091	0.0680282	0.121154	

gpm = 3711.37

PIPE SIZE TO TRANSMIT POST-DEVELOPMENT PEAK FLOW: 18 inch

BASIN #6

I. 1/2" RUN-OFF CALCULATIONS (PROPOSED ADDITION)

A. IMPERVIOUS SURFACES (square feet) — 48,028 Ft^2

LOTS	4	
DRIVEWAYS	0	SF
SIDEWALK	10,529	SF
PAVEMENT	37,499	SF
TOTAL	48,028	

B. VOLUME REQUIRED FOR 1ST 1/2" STORAGE (cubic feet) — 2,001 Ft^3

IMPERVIOUS AREA X (0.5in/12ft) =

II. PRE-DEVELOPMENT 25 YR STORM CALCULATIONS (24 HR STORM)

A. TIME INCREMENT FOR BOWSTRING CALC'S (min.) — 5 Minutes

B. CALCULATED TIME OF CONCENTRATION (min.) — 4.02 Minutes
TIME OF CONCENTRATION USED (5 minute minimum) — 5.00 Minutes

L = 1200 n = 0.02
s = 0.01 C_t = 0.15
where: $T_c = C_t (Ln/s^{0.5})^{0.6}$

C. TOTAL AREA — 634,432 SF — 14.56 Acres

D. INTENSITY (inches/hour) — 0.11 in/hr

E. IMPERVIOUS AREA — 0 Ft^2

F. DEVELOPED "C" FACTOR — 0.20

G. PEAK FLOW (cubic feet per second) — 0.320 cfs

Q=C*I*A

III. POST DEVELOPMENT 25 YR STORM CALCULATIONS (24 HR STORM)

A. TIME INCREMENT FOR BOWSTRING CALC'S (min.)		5 Minutes
B. CALCULATED TIME OF CONCENTRATION (min.)		4.02 Minutes
TIME OF CONCENTRATION USED (5 minute minimum)		5.00 Minutes

L = 1200 n = 0.02
s = 0.01 C_t = 0.15
where: $T_c = C_t (Ln/s^{0.5})^{0.6}$

C. TOTAL AREA	634,432 SF	14.56 Acres
D. INTENSITY (inches/hour)		0.11 in/hr
E. IMPERVIOUS AREA		48,028 Ft^2
F. DEVELOPED "C" FACTOR		0.25

IMPERVIOUS C = 0.9	8%	C:	0.068
PRE-DEVELOPMENT C = 0.20	92%	C:	0.185

G. PEAK FLOW (cubic feet per second)	0.405 cfs

Q=C*I*A

IV. PRE- VS. POST DEVELOPMENT RUN-OFF CALCULATIONS

A. PRE-DEVELOPMENT PEAK FLOW (cubic feet per second)	0.320 cfs
B. POST DEVELOPMENT PEAK FLOW (cubic feet per second)	0.405 cfs
C. DIFFERENCE OF PRE- VS. POST PEAK FLOW	0.085 cfs
D. INCREASED VOLUME OF STORMWATER FOR 24 HR STORM	7,335 Ft^3

$V = Q_{post\text{-}pre} * 24hr * 3600 sec/hr$

E. SWALE INFILTRATION FLOW (cubic feet per second)	0.162 cfs

TOTAL SWALE AREA =	17,529 SF	(7.5' WIDTH)
EFFECTIVE SWALE AREA =	11,686 SF	(5' WIDTH)
PROPOSED SWALE VOLUME =	4,674 Ft^3	(8" AVG. DEPTH)
SOIL PERMEABILITY (in/hr) =	0.60	

F. VOLUME LOSS THROUGH SWALE INFILTRATION	14,023 Ft^3
G. ADDITIONAL STORAGE TO MAINTAIN PRE-DEV. DISCHARGE RATE	0 Ft^3

*Swale areas within the ROW minus the driveways and the areas impacted by driveways.

V. ROUTING CALCULATIONS

A. PROPOSED SWALE VOLUME + ADDITIONAL STORAGE 4,674 Ft^3

B. SWALE INFILTRATION FLOW (cubic feet per second) 0.162 cfs

C. "BOWSTRING" METHOD

#1 Time Inc. (min)	#2 Time Inc. (sec)	#3 Intensity (in/hr)	#4 Q Dev. (cfs)	#5 V in (cf)	#6 V out (cf)	#7 Storage V (cf)	#8 Overflow V (cf)	#9 PreDev V (cf)
5	300	2.88	10.61	4266.01	48.69	4217.32	-457.08	3372.45
10	600	2.06	7.59	5328.53	97.38	5231.15	556.75	4212.42
15	900	1.69	6.23	6239.62	146.08	6093.54	1419.14	4932.67
20	1200	1.54	5.67	7388.14	194.77	7193.37	2518.97	5840.62
25	1500	1.34	4.94	7909.89	243.46	7666.44	2992.04	6253.09
30	1800	1.20	4.42	8409.98	292.15	8117.83	3443.43	6648.43
35	2100	1.09	4.02	8843.97	340.84	8503.13	3828.73	6991.51
40	2400	1.00	3.68	9219.15	389.53	8829.61	4155.21	7288.10
45	2700	0.93	3.43	9601.84	438.23	9163.62	4489.22	7590.64
50	3000	0.87	3.21	9944.08	486.92	9457.16	4782.76	7861.19
55	3300	0.82	3.02	10279.02	535.61	9743.41	5069.01	8125.97
60	3600	0.78	2.87	10639.82	584.30	10055.52	5381.12	8411.21
65	3900	0.74	2.73	10912.20	632.99	10279.21	5604.81	8626.53
70	4200	0.70	2.58	11096.14	681.68	10414.45	5740.05	8771.94
75	4500	0.67	2.47	11361.22	730.38	10630.84	5956.44	8981.49
80	4800	0.65	2.40	11740.59	779.07	10961.53	6287.13	9281.41
85	5100	0.63	2.32	12075.76	827.76	11248.00	6573.60	9546.37
90	5400	0.61	2.25	12366.70	876.45	11490.25	6815.85	9776.37
95	5700	0.59	2.17	12613.43	925.14	11688.29	7013.89	9971.42
100	6000	0.57	2.10	12815.94	973.83	11842.11	7167.71	10131.51
1440	86400	0.11	0.41	35060.83	14023.20	21037.63	16363.23	27716.99

VI. RESULTS

A. VOLUME REQUIRED FOR 1ST 1/2" STORAGE 2,001 Ft^3

B. PROPOSED SWALE VOLUME 4,674 Ft^3

C. ADDITIONAL STORAGE TO MAINTAIN PRE-DEV. DISCHARGE RATE 0 Ft^3

VII. OUTLET PIPE SIZING

Post Development flow for 25-year, 5-minute storm (2.88 in/hr) = 10.61 cfs

Manning's Equation:

Q= (1.49/n)*A*(R^2/3)*(S^1/2)

Q=	10.128	Flow (cfs)
n=	0.015	Roughness Coefficient
A=	1.414	Cross Sectional Area (sq. ft.)
R=	0.4517572	Hydraulic Radius (ft.)
S=	0.015	Slope (ft/ft)

Pipe Diameter =	8	10	12	15	18	24	
Sectional Area =	0.349	0.545	0.785	1.227	1.767	3.141	SF
80% Water Section =	0.279	0.436	0.628	0.981	1.414	2.514	SF
80% Wet Perimeter =	1.39	1.74	2.08	2.61	3.13	4.17	FT
R =	0.200719424	0.250575	0.3019231	0.375862	0.4517572	0.602878	
R^2/3	0.013429429	0.020929	0.0303858	0.047091	0.0680282	0.121154	

gpm = 4545.48

PIPE SIZE TO TRANSMIT POST-DEVELOPMENT PEAK FLOW: 18 inch

APPENDIX B.

NRCS Soil Report

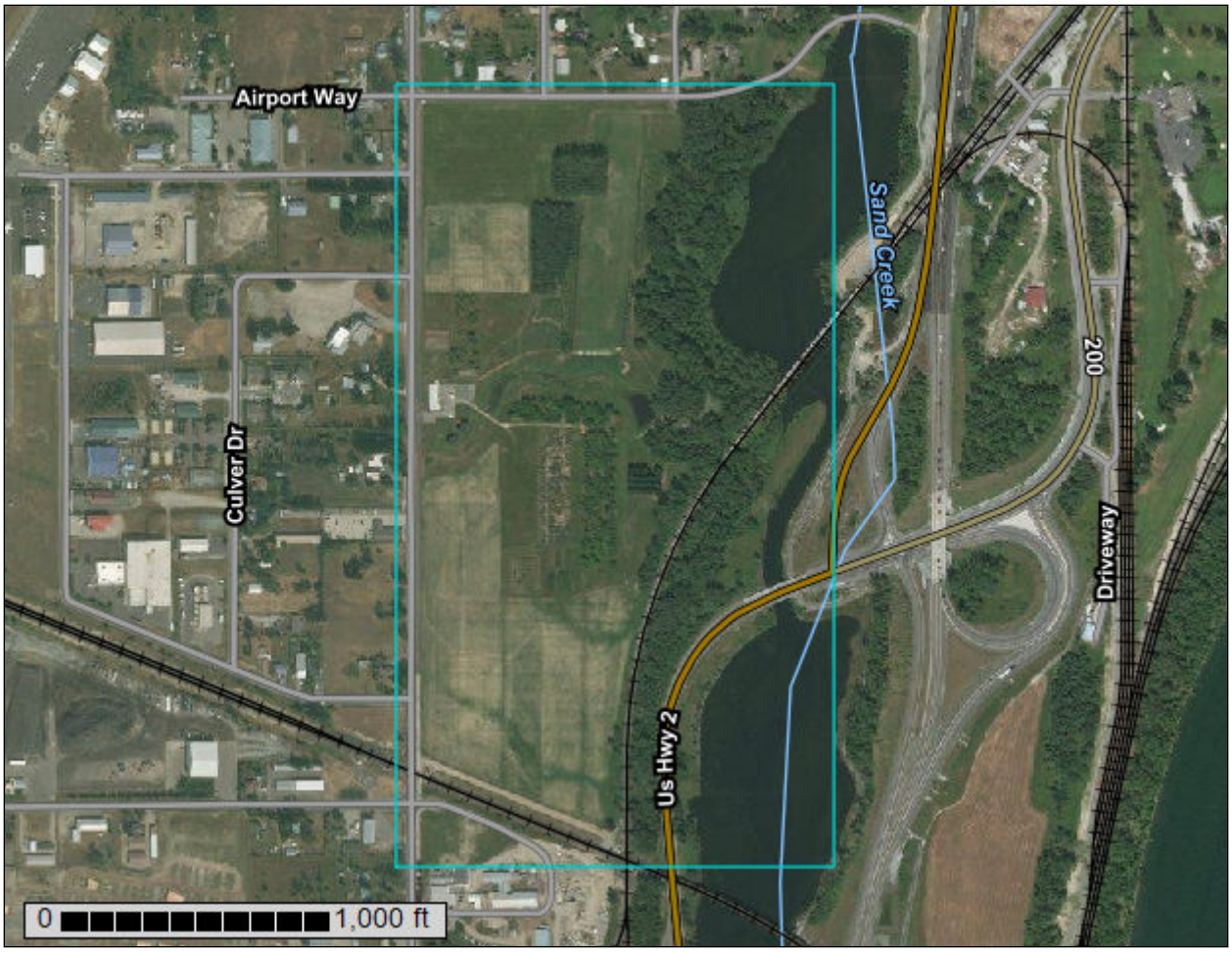
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Bonner County Area, Idaho, Parts of Bonner and Boundary Counties



April 7, 2020

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

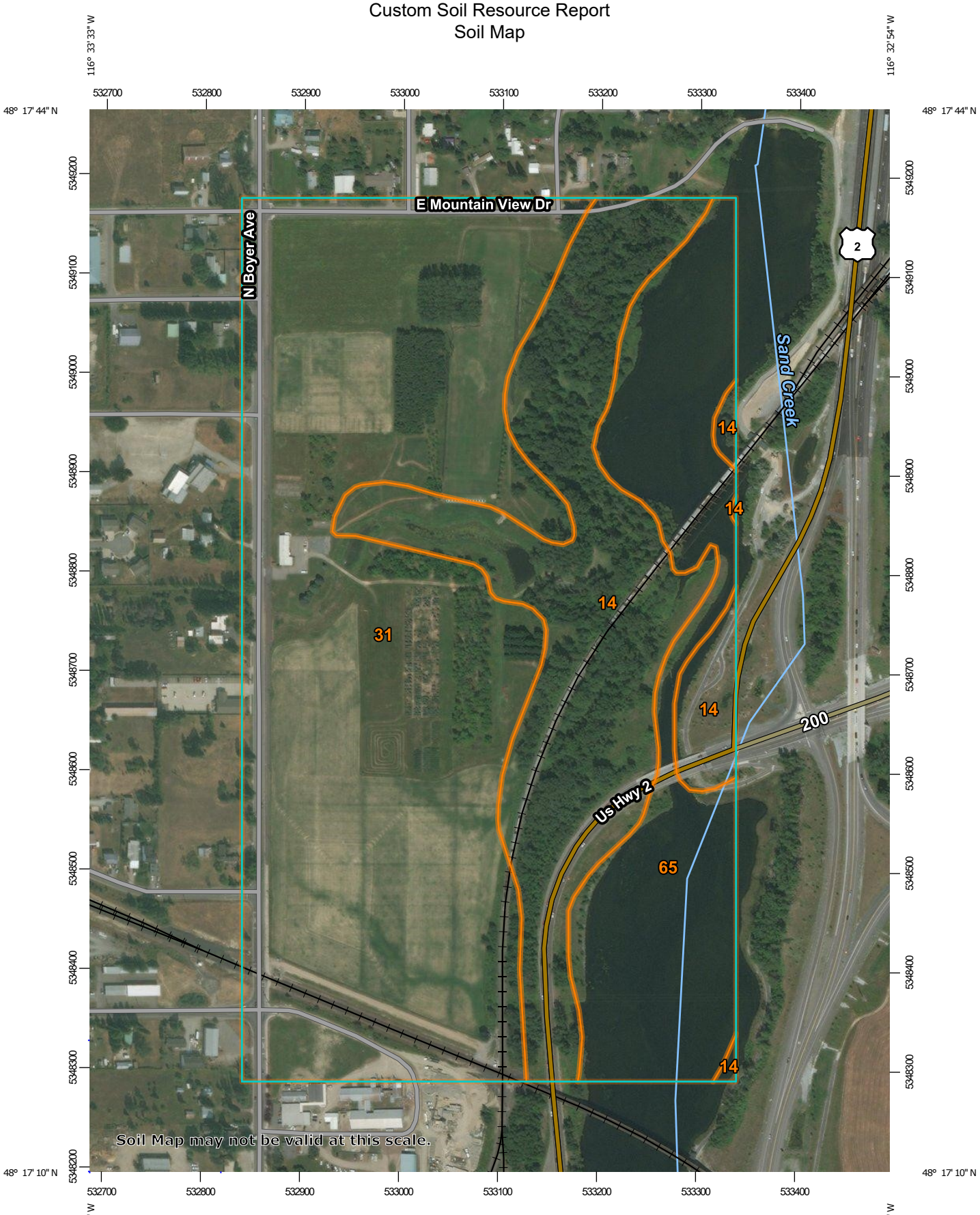
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:5,210 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Bonner County Area, Idaho, Parts of Bonner and Boundary Counties
Survey Area Data: Version 15, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 15, 2010—Aug 23, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
14	Haploxeralfs and Xerochrepts, 30 to 55 percent slopes	28.6	26.0%
31	Mission silt loam, 0 to 2 percent slopes	60.9	55.3%
65	Water	20.6	18.7%
Totals for Area of Interest		**110.1**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The

delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Bonner County Area, Idaho, Parts of Bonner and Boundary Counties

14—Haploxeralfs and Xerochrepts, 30 to 55 percent slopes

Map Unit Setting

National map unit symbol: 545g
Elevation: 2,050 to 2,500 feet
Mean annual precipitation: 30 to 35 inches
Mean annual air temperature: 41 to 45 degrees F
Frost-free period: 90 to 110 days
Farmland classification: Not prime farmland

Map Unit Composition

Haploxeralfs and similar soils: 40 percent
Xerochrepts and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Haploxeralfs

Setting

Landform: Escarpments
Landform position (two-dimensional): Backslope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Volcanic ash and loess over silty glaciolacustrine deposits

Typical profile

A - 0 to 8 inches: silt loam
Bt - 8 to 36 inches: silty clay loam
C - 36 to 60 inches: stratified fine sand to silty clay

Properties and qualities

Slope: 30 to 55 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to high (0.06 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 11.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Other vegetative classification: western redcedar/queencup beadlily (CN530)
Hydric soil rating: No

Description of Xerochrepts

Setting

Landform: Escarpments
Down-slope shape: Convex
Across-slope shape: Linear

Parent material: Volcanic ash and/or loess over sandy glaciolacustrine deposits and/or outwash and/or till

Typical profile

A - 0 to 4 inches: gravelly sandy loam
Bw - 4 to 25 inches: gravelly sandy loam
2C - 25 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 30 to 55 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Other vegetative classification: grand fir/twinflower (CN590)
Hydric soil rating: No

31—Mission silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 5462
Elevation: 2,000 to 2,800 feet
Mean annual precipitation: 25 to 38 inches
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 90 to 120 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Mission and similar soils: 75 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mission

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Volcanic ash and loess over silty glaciolacustrine deposits

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 3 inches: silt loam
Bw - 3 to 12 inches: silt loam
2Btx - 12 to 21 inches: silt loam
2E - 21 to 33 inches: silt
2Bt - 33 to 48 inches: silt loam
3C - 48 to 67 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 10 to 20 inches to fragipan
Natural drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Other vegetative classification: western redcedar/queencup beadlily (CN530)
Hydric soil rating: No

Minor Components

Hoodoo

Percent of map unit: 3 percent
Landform: Flood plains, drainageways
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: Yes

Odenson

Percent of map unit: 2 percent
Landform: Depressions
Hydric soil rating: Yes

65—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

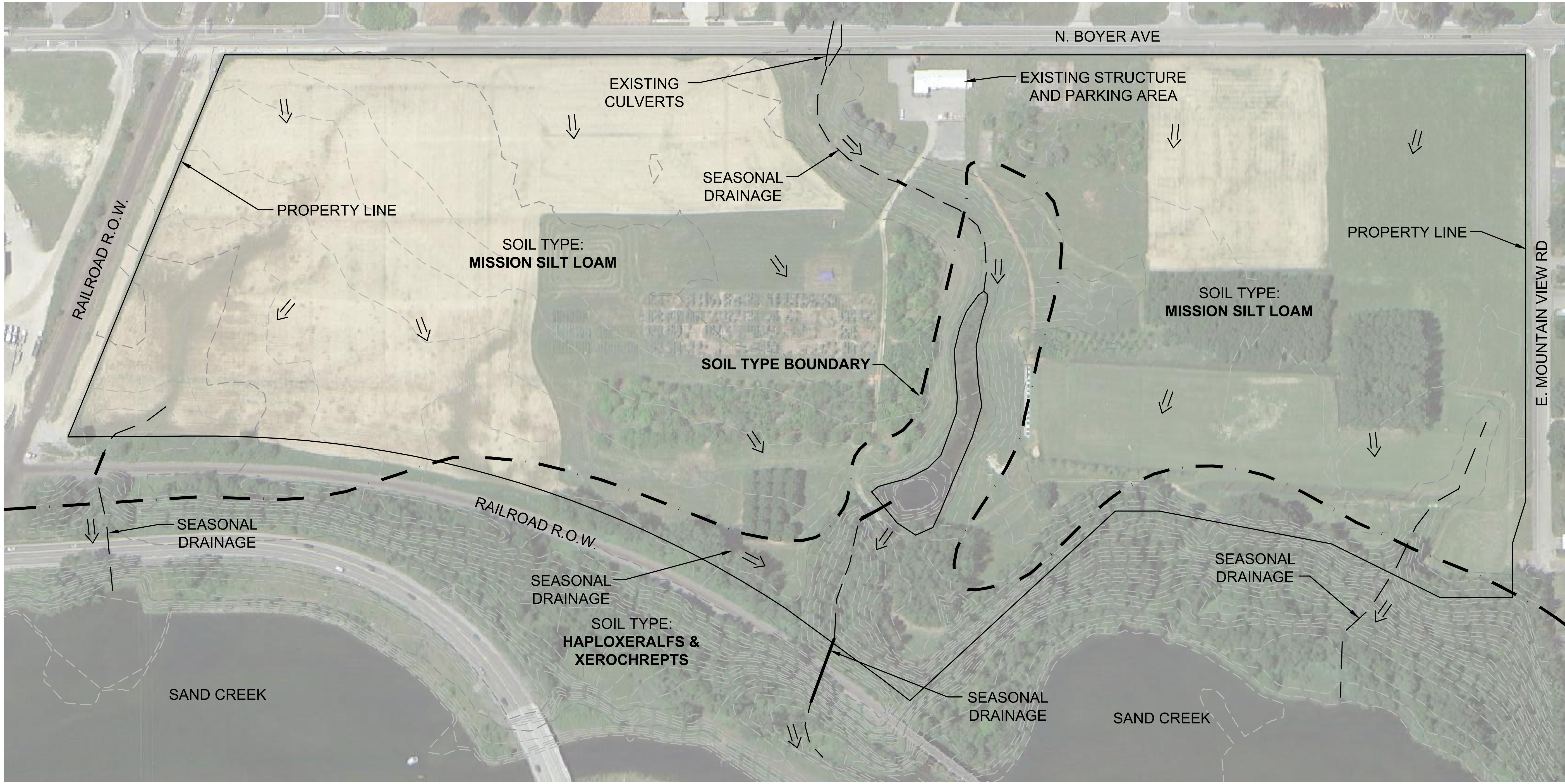
United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

APPENDIX C.

Stormwater Site Plans

STORMWATER MANAGEMENT PLAN

OVERALL EXISTING DRAINAGE PLAN



N

0 100 200

SCALE IN FEET

NOT FOR CONSTRUCTION

PRELIMINARY NOT FOR CONSTRUCTION

VERIFY SCALES

BAR IS ONE INCH ON ORIGINAL DRAWING.
0" 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

NO.	DATE	BY	APPR	REVISIONS

CENTURY WEST ENGINEERING

SPOKANE OFFICE
11707 E. MONTGOMERY DRIVE
SPOKANE VALLEY, WA 99206
509.838.3810
509.624.0355 FAX

DESIGNED BY: AHB
DRAWN BY: AHB
CHECKED BY: RL
DATE: 6-22-20
PROJECT NO: 51012.001.01
SCALE: AS SHOWN

UNIVERSITY OF IDAHO PROPERTY
K-M ENTERPRISES/M&W HOLDINGS
STORMWATER MANAGEMENT PLAN

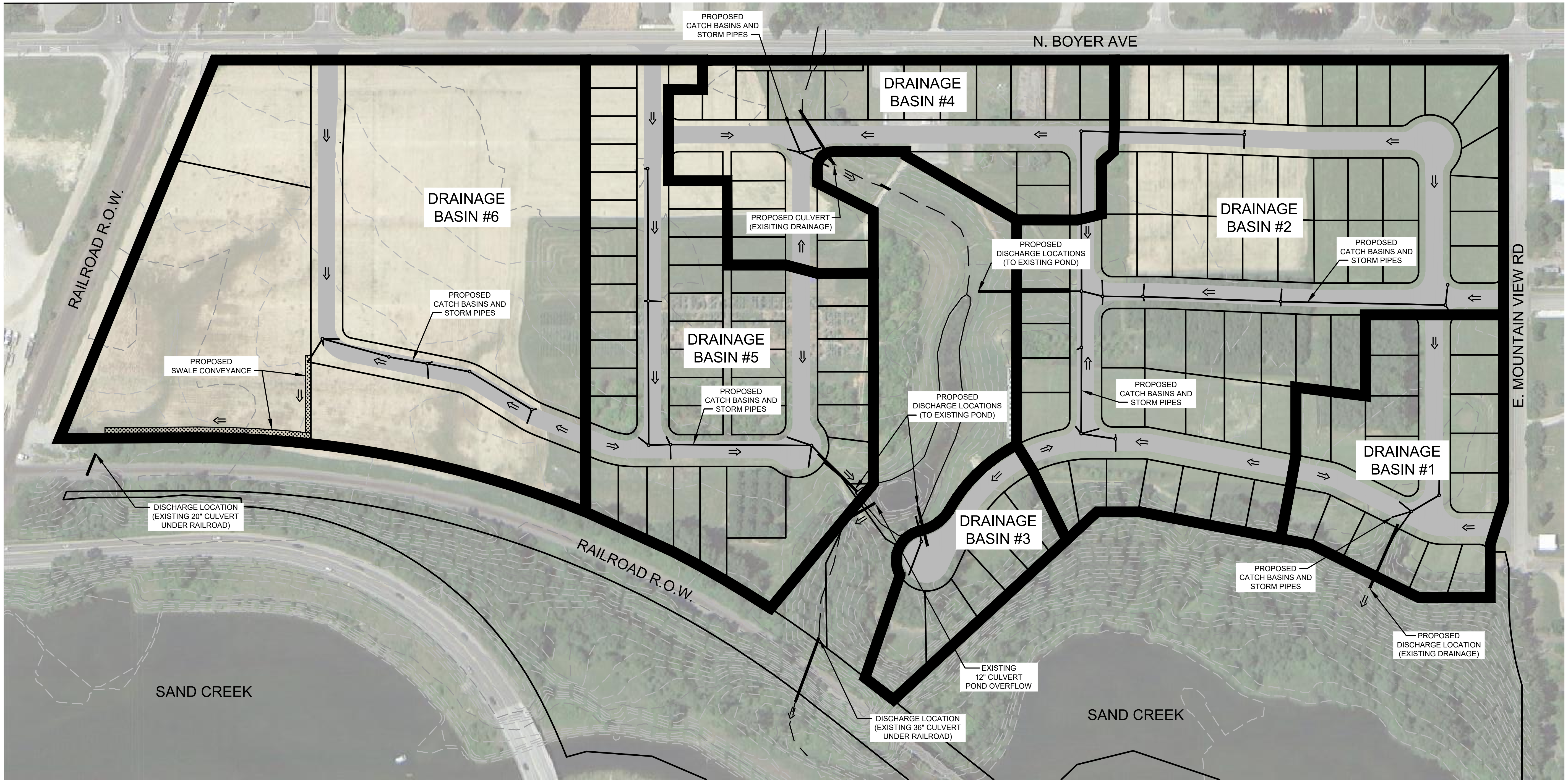
STORMWATER MANAGEMENT PLAN
OVERALL EXITING DRAINAGE PLAN

DRAWING NO.

SHEET NO. 1 OF 4

STORMWATER MANAGEMENT PLAN

PROPOSED DRAINAGE BASINS



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SCALE IN FEET

DRAINAGE BASIN AREAS

BASIN	TOTAL AREA (ACRES)	IMPERVIOUS AREA (SF)	SWALE SIZE (CF)
#1	4.02	37,737	2,197
#2	13.90	125,675	7,197
#3	1.86	19,416	1,125
#4	5.37	57,327	3,584
#5	8.57	74,245	5,197
#6	14.56	48,028	4,674

NOTE:
SEE ROAD CONSTRUCTION PLANS FOR STORMWATER STRUCTURE LOCATIONS AND PIPE SIZING. ROAD PLANS INCLUDE STORM PIPE INVERTS, CATCH BASIN LOCATIONS, BMP DETAILS AND SWALE LOCATIONS. STORMWATER REPORT INCLUDES CALCULATIONS FOR RETENTION AND TREATMENT OF RUNOFF AND CONTROLLED RELEASE OF PEAK FLOW DISCHARGES. SEE TEMPORARY EROSION CONTROL SECTION OF STORMWATER REPORT FOR EPA PERMITTING REQUIREMENTS.

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CENTURY WEST ENGINEERING

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UNIVERSITY OF IDAHO PROPERTY
K-M ENTERPRISES/M&W HOLDINGS
STORMWATER MANAGEMENT PLAN

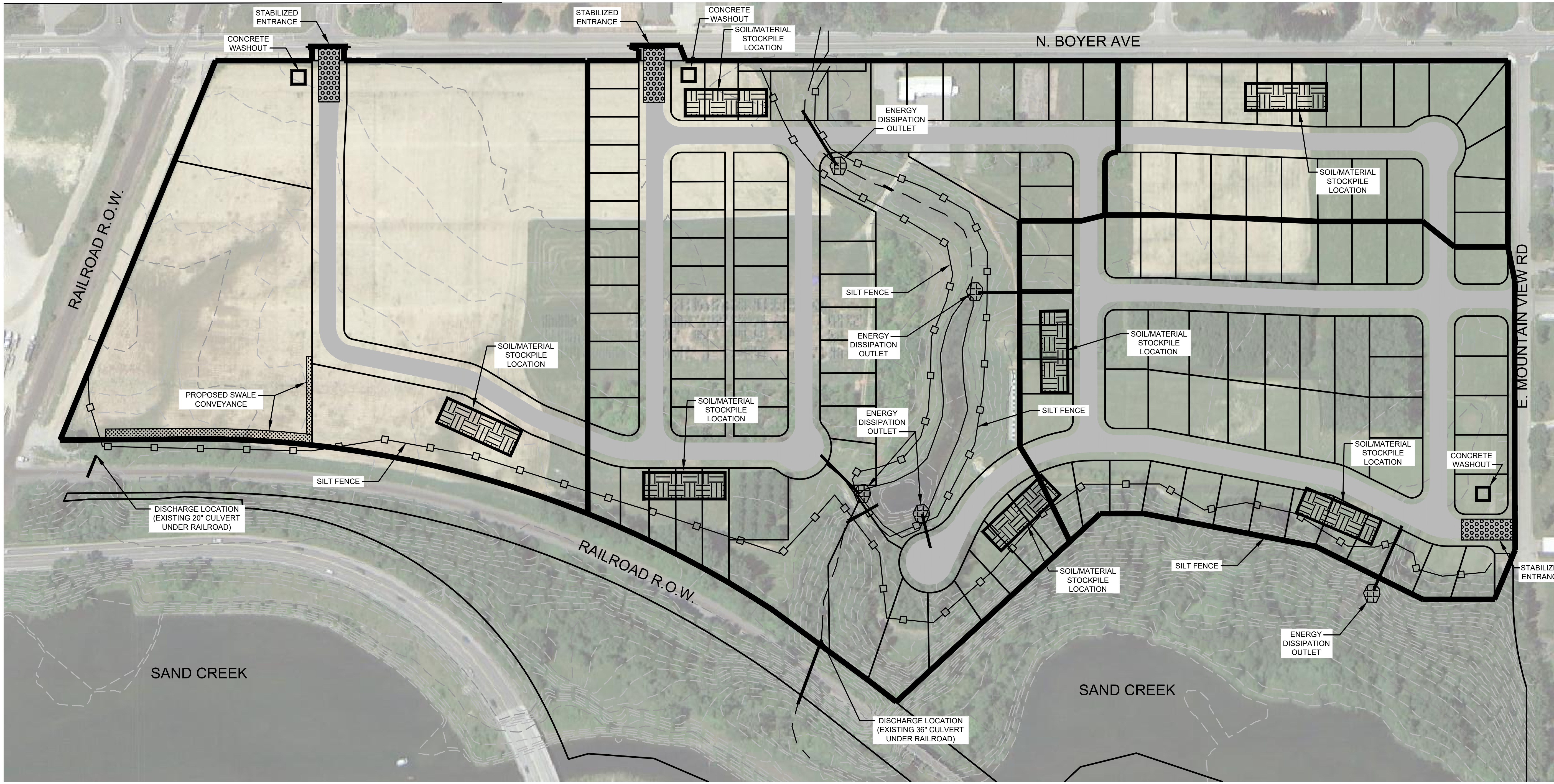
STORMWATER MANAGEMENT PLAN
PROPOSED DRAINAGE BASINS

DRAWING NO.

SHEET NO.

STORMWATER MANAGEMENT PLAN

PROPOSED BMP LOCATIONS



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SCALE IN FEET

SILT FENCING:
SILT FENCING SHALL BE PLACED BETWEEN ALL AREAS OF DISTURBED SOIL AND EXISTING DRAINAGES. SEE DETAIL SHEETS ON ROAD CONSTRUCTION PLANS.

STABILIZED CONSTRUCTION ENTRANCES:
ALL CONSTRUCTION ENTRANCES SHALL BE STABILIZED IF OFFSITE TRACKING WILL OCCUR. SEE DETAIL SHEETS ON ROAD CONSTRUCTION PLANS.

ENERGY DISSIPATION OUTLET:
STORMWATER DISCHARGE LOCATIONS SHALL BE PROTECTED TO ELIMINATE EROSION POTENTIAL. SEE DETAIL SHEETS ON ROAD CONSTRUCTION PLANS.

STOCK PILE SEDIMENT CONTROL:
ALL SOIL STOCK PILES SHALL BE PROTECTED FROM PRECIPITATION TO ENSURE THAT NO SEDIMENT TRANSFER OCCURS. SEE DETAIL SHEETS ON ROAD CONSTRUCTION PLANS.

SEEDING:
ALL DISTURBED SOILS SHALL BE SEEDED WITHIN 7 DAYS OF FINAL GRADING AND SHALL CONFORM TO THE STORMWATER REPORT.

CONCRETE WASH OUT:
WASTED CONCRETE SHALL BE DISPOSED OF IN PROPOSED PAVEMENT AREAS Or IN AN APPROVED CONCRETE WASH OUT STRUCTURE. SEE DETAIL SHEETS ON ROAD CONSTRUCTION PLANS.

STORM DRAIN INLET PROTECTION:
SEDIMENT TRAPS SHALL BE PLACED AT ALL INLETS FOR CATCH BASINS AND STORM MANHOLES. SEE DETAIL SHEETS ON ROAD CONSTRUCTION PLANS.

BMP INSPECTIONS:
BMP'S SHALL BE INSPECTED AS PER THE STORMWATER REPORT, CITY OF SANDPOINT REQUIREMENTS AND EPA GUIDELINES.

NOTE:

ALL TEMPORARY AND PERMANENT STORM WATER BMP's SHALL CONFORM TO THE FOLLOWING STANDARDS:

1. CITY OF SANDPOINT STORMWATER ORDINANCE
2. CITY OF SANDPOINT GRADING ORDINANCE
3. IDEQ - CATALOG OF STORM WATER BMPs FOR IDAHO CITIES AND COUNTIES

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PRELIMINARY NOT FOR CONSTRUCTION — J. LUTTMANN

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NO.	DATE	BY	APPR	REVISIONS

CENTURY WEST ENGINEERING

SPOKANE OFFICE
11707 E. MONTGOMERY DRIVE
SPOKANE VALLEY, WA 99206
509.838.3810
509.624.0355 FAX

DESIGNED BY: AHB
DRAWN BY: AHB
CHECKED BY: RL
DATE: 6-22-20
PROJECT NO: 51012.001.01
SCALE: AS SHOWN

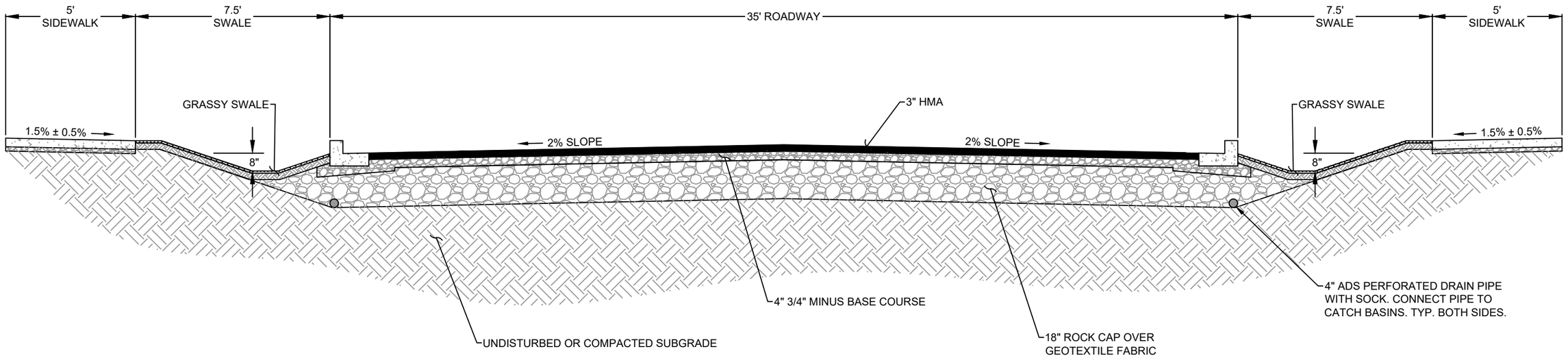
UNIVERSITY OF IDAHO PROPERTY
K-M ENTERPRISES/M&W HOLDINGS
STORMWATER MANAGEMENT PLAN

STORMWATER MANAGEMENT PLAN
PROPOSED BMP LOCATIONS

DRAWING NO.

STORMWATER MANAGEMENT PLAN

TYPICAL ROADSIDE SWALE SECTION



NOT FOR CONSTRUCTION

PROFESSIONAL ENGINEER REGISTERED STATE OF IDAHO R. J. LUTTMANN PRELIMINARY NOT FOR CONSTRUCTION

VERIFY SCALES

BAR IS ONE INCH ON ORIGINAL DRAWING. 0" 1"

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NO.	DATE	BY	APPR	REVISIONS

CENTURY WEST ENGINEERING

SPOKANE OFFICE
11707 E. MONTGOMERY DRIVE
SPOKANE VALLEY, WA 99206
509.893.2610
509.924.0565 FAX

DESIGNED BY: AHB

DRAWN BY: AHB

CHECKED BY: RL

DATE: 6-22-20

PROJECT NO: 51012.001.01

SCALE: AS SHOWN

UNIVERSITY OF IDAHO PROPERTY
K-M ENTERPRISES/M&W HOLDINGS
STORMWATER MANAGEMENT PLAN

STORMWATER MANAGEMENT PLAN
TYPICAL ROADSIDE SWALE SECTION

DRAWING NO.

SHEET NO. 4 OF 4

C:\Users\rlutt\Desktop\51012.001\STORMWATER\SP-ROAD_SECTION.dwg

Tom Duebendorfer - Professional Wetland Scientist, Biologist

April 29, 2020

Scott Toldness, P.E.
Glahe & Associates, Inc.
303 Church St.
Sandpoint, Idaho 83864
(208) 265-4474
stoldness@glaheinc.com

RE: University of Idaho Property: along N Boyer Ave, Sandpoint, ID: (T 57N, R 2W, portion of Sec 15); (portion of RPS00000150750A): Wetland Delineation Letter Report

Dear Scott:

Per your request, here is the letter report documenting the Wetland Delineation on the 57-acre parcel identified above (generally 48°17'29.26"N; 116°33'17.25"W). The property is east of North Boyer Ave, north of the BNSF Railroad, and south of E Mountain View Rd, in the City of Sandpoint, ID (Figure 1).

Methods

Using the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region U.S. Army Corps of Engineers 2010 (Appendix A), I visited the site on April 3, 8, and 24, 2020, completed 13 Data Plots (appended), flagged, and located the wetland boundaries (using a submeter GPS). Glahe, Inc. formally land surveyed four of the identified wetland areas — those boundaries and areal calculations are shown on Figures 3, 4, and 5. Wetland D was surveyed using a sub-meter GPS.

Existing Conditions

Established in 1912, the Sandpoint Research and Extension Center was gifted to the University of Idaho for agricultural education and research purposes by the Humbird Lumber Company. Over the years, the site has been used by the University's extension work in Bonner County. The center has served the community as a source of agricultural research and learning. The public has frequented the site year-round for sporting activities.

The property is presently marginally developed (a structure and "tree" farms) and consists of planted native and non-native trees, native shrubs, and open pasture areas. There is a swale running through the center of the property from west to east, charged by culverts under N Boyer Ave and ultimately discharging into Sand Creek. It has been "dammed" to produce a ponded area, which overflows into a steep narrow channel in the eastern portion of the property.

The National Wetland Inventory has mapped the central swale as a linear feature; PEM1C (palustrine, emergent, persistent, seasonally flooded). The majority of the soils are mapped as the somewhat poorly drained Mission silt loam (0-1% slopes) which potentially has a hydric inclusion (Hoodoo series). It is a classified as an ochreptic fragixeralf (this means the soil has a surface layer that is low in organic matter, often mottled at depth, slowly or moderately slowly permeable to water, formed in a Mediterranean climate of wet winters and dry summers, and has a subsurface layer that is high in crystalline clays). In spite of the occasional hardpan, this series is not considered hydric (but see discussion under "Soils"). A portion of the central swale and eastern slope toward Sand Creek is mapped as Haploxeralfs-Xerochrepts (30-55% slopes). Haploxeralfs are intermediately weathered soils having thin topsoils with little soil organic matter, but are more developed, displaying an illuvial clay increase in the subsoil. Xeralfs are Alfisols that have a xeric moisture regime and are not considered hydric.

Findings

Vegetation:

The property contains various vegetation associations; these do not include the planted trees in rows:

(1) grassy swale consisting mostly of canarygrass (*Phalaris arundinacea* [FACW*]) and cattail (*Typha latifolia* [OBL]), with some open water. This association is hydrophytic and occurs in the central portion of the property as a swale, discharging into a steep narrow creek canyon prior to exiting through a culvert under the Union Pacific Railroad (UPRR) embankment. A small wetland within the southern pasture area consists primarily of pasture grasses: orchardgrass (*Dactylis glomerata* [FACU]), bentgrass (*Agrostis stolonifera* [FAC]), and quackgrass (*Elmyus repens* [FAC]). Other grasses may be present there, but were not identifiable during the early spring site investigation. Most pasture grasses are considered hydrophytes (FAC).

(2) upland pasture covers much of the open "non-planted" areas on the site. The vegetation appears to be similar to that of the small wetland area in the southern portion of the property. Due to pasture grasses being largely FAC species, this association would be considered hydrophytic.

(3) deciduous forest occupies the eastern side of the property as the topography dips steeply toward Sand Creek. The eastern portion of the central swale is included in this association. The association is dominated by birch (*Betula papyrifera* [FAC]), snowberry (*Symphoricarpos albus* [FACU]), dogwood (*Cornus alba* [FACW]), Oregon grape (*Mahonia aquifolium* [UPL]), cedar (*Thuja plicata* [FAC]), and grandfir (*Abies grandis* [FACU]). Areas near and east of the property down to Sand Creek have considerable cover of cottonwood (*Populus balsmaifera* [FAC]), quaking aspen (*Populus tremuloides* [FACU]), and in some seepy areas, skunk cabbage (*Lysichiton americanus* [OBL]), scouring rush (*Equisetum hyemale* [FACW]), horsetail (*Equisetum arvense* [FAC]), and Star Solomon's seal (*Maianthemum stellatum* [FAC]). While there are FACU species within this association, most areas show some hydrophytic species in patches.

*Wetland Indicator Status is described in Appendix B.

Soils:

The majority of the underlying soil is Mission silt loam (Figure 2). Essentially all Data Plots showed high chroma, reddish brown silt loams (7.5YR 3/3) - not displaying hydric indicators. I found no soil horizons showing redoximorphic features. Some soils (no Data Plots taken) along the eastern slope were in seepy areas showing black, saturated to shallowly ponded surface soils. Since the majority of the soil pits examined in the pasture areas did not show any hydric indicators within the soil horizons they would not be considered hydric, unless they were ponded — under the National Technical Criteria for Hydric Soils (NTCHS Criteria 3). NTCHS Criterion 2a requires a water table at the surface (for somewhat poorly drained soils) during the growing season. Ponding renders all soils hydric — under the NTCHS, ponding "trumps" any lack of soil hydric indicators. Note: NTCHS Criterion 2 is ONLY used to gather soils into the database list, and Criteria 1, 3, and 4 require proof of anaerobic conditions. Data Plot forms are appended.

Hydrology:

The National Wetland Inventory (NWI) mapped only the central swale (in an incorrect location) as a single line feature (PEM1C - palustrine, emergent, persistent, seasonally flooded) (Figure 2). Hydrologic input to the site includes two metal culverts under N Boyer Ave which discharge water from the west through the swale eastward. There is a vertical overflow culvert in the eastern end of the swale which discharges water into the extreme eastern end of the swale as it trends steeply down to Sand Creek. At the terminus of this swale wetland, there is a concrete culvert under the UPRR embankment. In the extreme southeast portion of the property, there is a smaller culvert which discharges water from under the BNSF Railroad a short distance along a ditch adjacent the UPRR. Another culvert is located under the UPRR embankment.

I visited the site in early April 3rd, 2020 after a spring snowfall following a dry spell and observed shallow ponding and surface saturation in various areas on the site (observation points shown as "p" or "s"; Figures 3, 4). The points shown as "p" indicated observed ponding; those as "s" indicated surface saturation. Notably, in the southern portion of the site, the aerial photography shows darker areas in a swale-like configuration (Figures 2, 3). Some of these areas had shallow ponding ("p") or saturation ("s") (see Data Plots 0, 1, 1a, 2, 3, 4, 5, and 7, 8, and 9). I re-visited the site on April 8th to assess whether or not these areas still showed ponding (as that would render the soils hydric). Some areas had dried by that time. I re-visited the site on April 24th, 2020, and noted that only Data Plot 3 maintained surface water — hence that area would be considered having wetland hydrology and by default, hydric soils. The remaining Data Plots did not show any ponding, rendering those plots as lacking wetland hydrology, and hence were considered upland plots.

The same scenario and method of determining wetland hydrology and hydric soils was undertaken in the northern section of the property (Figure 4). I believe hydrology in these areas is extremely short-duration and the duration may vary from year to year, but given the lack of hydric indicators in the soils, I expect these areas do not undergo anaerobic conditions for a period sufficient to render the soils hydric.

Hydrology was also observed near the toe of the steep slope in the eastern wooded section of the property (and off property). There, seeps provided hydrology to wetland areas containing skunk cabbage and horsetail under cedar. Some areas within this slope have smaller upland mounds and benches that did not appear to have ponding or surface water.

Results

Based on the site survey and the Data Plots, I mapped and located wetland boundaries in areas where all three wetland parameters (or indicators thereof) were positive (Figures 3, 4, and 5). Five areas were identified as wetland. Glahe, Inc. land surveyed Wetlands A, B, C, and E. Wetland D (primarily off-site) was located using a submeter GPS unit.

Wetland A, B, and C are essentially the same feature, only separated by the access roads. Wetland A (18,384 sf [0.42 ac]) and B (58,486 sf [1.34 ac]) would be classified as palustrine, emergent, persistent, seasonally flooded (PEM1C), dominated by canarygrass and/or cattail. Wetland C (7,482 sf [0.17 ac]) would be classified as palustrine, forested, deciduous, seasonally flooded (PFO1C), and is essentially a very narrow, steeply banked riparian area (creek).

Wetland D encompasses much of the northeastern portion of the property and continues off-property (outside the Project Area bounds as shown on the figures). Since it extended off-site to Sand Creek, I did not calculate its areal extent. It is a mosaic of seeps, rivulets, wet benches, drier mounded areas, and terminates at Sand Creek. It would be classified as palustrine, forested, deciduous, seasonally flooded (PFO1C). The area of Wetland D within the property bounds as shown (calculated by ArcGIS) is 1,707 sf (0.04 ac).

Wetland E is a very small wetland depression in the southern pasture area, showing very short-lived wetland hydrology under pasture grasses. It encompasses 3,653 sf (0.08 acres) and would be classified as palustrine, emergent, persistent, temporarily flooded (PEM1A). Attempts were made to ascertain whether the shallow surface hydrology in Wetland E actually discharges through the darker swale-like feature (Data Plots 0, 1, 1a, 2 on Figure 5) to the UPRR culvert. I determined that only in winter or early spring during high runoff or snowmelt periods would any surface water actually move to this culvert. The hydrology in this wetland is not high groundwater, but rather surface water ponding in a slight depression in the meadow.

Thus the total wetland area within the property boundaries as shown on the figures is 2.05 acres.

Regulatory Permitting Process: Types of Permits - Corps of Engineers

Under the Clean Water Act, the Corps has the authority to regulate the discharge or fill or dredged material into "Waters of the US". There are three Permits the Corps uses to regulate fill into wetlands.

(1) Nationwide General (NWP): This permit is authorized for specific activities nationwide with minimal impact and minimal evaluation time. The NWPs typically have a ½ acre limit for fill in wetlands and 300 linear foot limit for fill in stream channels. A Pre-Construction Notification application (PCN) must be submitted to the appropriate field office (Walla Walla District). Typically, less than 1/10-acre of wetland fill does not require mitigation (though a PCN is required), and up to ½ acre of wetland fill, requires mitigation. (See below for **Compensation for unavoidable Wetland Impacts**). There are Regional Conditions for Nationwide Permits www.nww.usace.army.mil/Portals/28/Users/108/44/1644/Final%20NWW%20Regional%20Conditions%202017%20NWPs.pdf. There are 54 Nationwide Permits each regarding specific activities proposed in wetlands. (www.nww.usace.army.mil/Business-With-Us/Regulatory-Division/Nationwide-Permits/

(2) Regional General: Authorized for unique activities in a specific state. These are general permits (GP) for activities that typically only occur in certain area, have minimal impact with minimal evaluation times. A PCN can also be used to apply for a general permit when appropriate. *This permit is not appropriate for most private sites.*

(3) Individual: This a standard permit that authorizes activities that exceed the limits of the Nationwide Permits (greater than ½ acre wetland fill), or if the activity does not meet the Regional Conditions of an available NWP. Individual permits are generally reserved for projects with potential for substantial environmental impacts. This permit requires a full public interest review, including public notices and coordination with involved agencies, interested parties, and the general public. The individual permit application is different from the nationwide permit application. This is a complicated process dealing with wetland fills in excess of 1/2 acre of fill. I doubt this will be needed.

When any permit application is received, it is evaluated based upon three criteria: **avoidance, minimization, and mitigation**. Once the applicant meets these criteria, a permit can be issued.

Compensation for unavoidable Wetland Impacts

According to the 2008 Final Mitigation Rule (Federal Register/Vol. 73, No. 70 / Thursday, April 10, 2008 / Rules and Regulations), under § 332.1 (c) the Final Mitigation Rule maintains the requirements set forth in Section 404(b)(1) Guidelines at 40 CFR part 230 which state that *"the permit applicant [is required] to take all appropriate and practicable steps to **avoid** and **minimize adverse impacts** to waters of the United States. Practicable means available and capable of being done after **taking into consideration cost, existing technology, and logistics in light of overall project purposes**. Compensatory mitigation for unavoidable impacts may be required to ensure that an activity requiring a section 404 permit complies with the Section 404(b)(1) Guidelines"* (emphasis mine).

According to §230.93 (a)(2), **restoration** of impacted wetland is the first priority in the compensation sequence followed by purchasing credits (employing the use of approved Wetland Mitigation Banks within the service area) §230.93 (b)(2).

The 1999 Montana Wetland Assessment Method is used to calculate the number of Wetland Credits to be purchased from the Valencia Wetland Mitigation Bank in Priest River should there be any wetland impacts (fill) greater than 1/10 acre required as a result of the proposed development.

The ***City of Sandpoint*** Ordinance does not identify any wetland setbacks.

Let me know if you have any questions. Thank you for requesting my services.

Tom Duebendorfer, PWS Emeritus

Attachments:

Figure 1 - Vicinity Map
Figure 2 - Site, National Wetland Inventory , and NRCS Soils Map
Figure 3 - Wetland Delineation Map
Figure 4 - Wetland Delineation and Data Plots - North Section Map
Figure 5 - Wetland Delineation and Data Plots - South Section Map

Appendix A - Wetland Delineation Methodology
Appendix B - Wetland Indicator Status
Data Plot Forms ([13] 2-page forms)

References

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. Office of Biological Services, Fish and Wildlife Service, U.S. Dept. of the Interior, FWS/OBS-79/31.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1*, US Army Engineer Waterways Experiment Station, Vicksburg, Miss. (and as amended by the Regional Supplement).

ESRI. ArcGIS software (ArcMap 10.5.1) fieldwork involved using an Arrow 100 GPS unit (sub-meter accuracy).

Google Earth mapping software. (USDI National Wetland Inventory and NRCS Soils Web overlays).

Hitchcock, C.L., A. Cronquist, M. Ownbey, and J.W. Thompson. 1977. *Vascular Plants of the Pacific Northwest*. University of Washington Press. Seattle, Washington (five volumes).

NRCS. 2018. Field Indicators of Hydric Soils in the United States, Version 8.0.

NTCHS. 1995. National Technical Committee for Hydric Soils, Natural Resources Conservation Service (formerly Soil Conservation Service).

Reed Jr., P.B. 1988. *National List of Plant Species that Occur in Wetlands: 1988 Northwest (Region 9)*. Biological Report 88 (26.9), U.S. Fish and Wildlife Service, Inland Freshwater Ecology Section, St. Petersburg, Florida. pp. 86. (See also US Army Corps of Engineers 1994). Updated by Corps in 2018.

USGS. 7.5' topographic quadrangle (Sandpoint, ID).

Vepraskas, M.J. 1992. Redoximorphic Features for Identifying Aquic Conditions. North Carolina Agricultural Research Service. Raleigh, North Carolina.

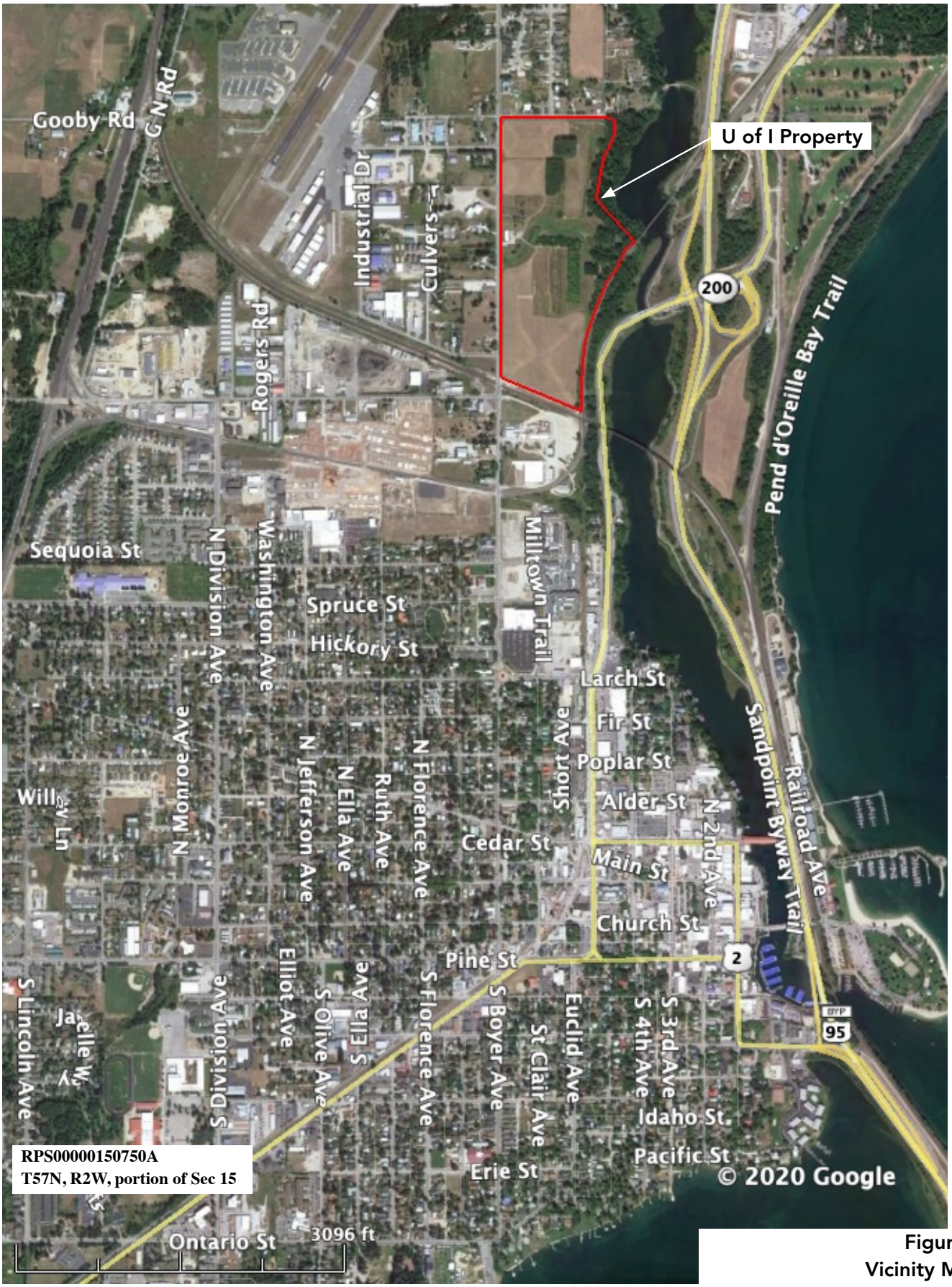

Figure 1
Vicinity Map
University of Idaho Property

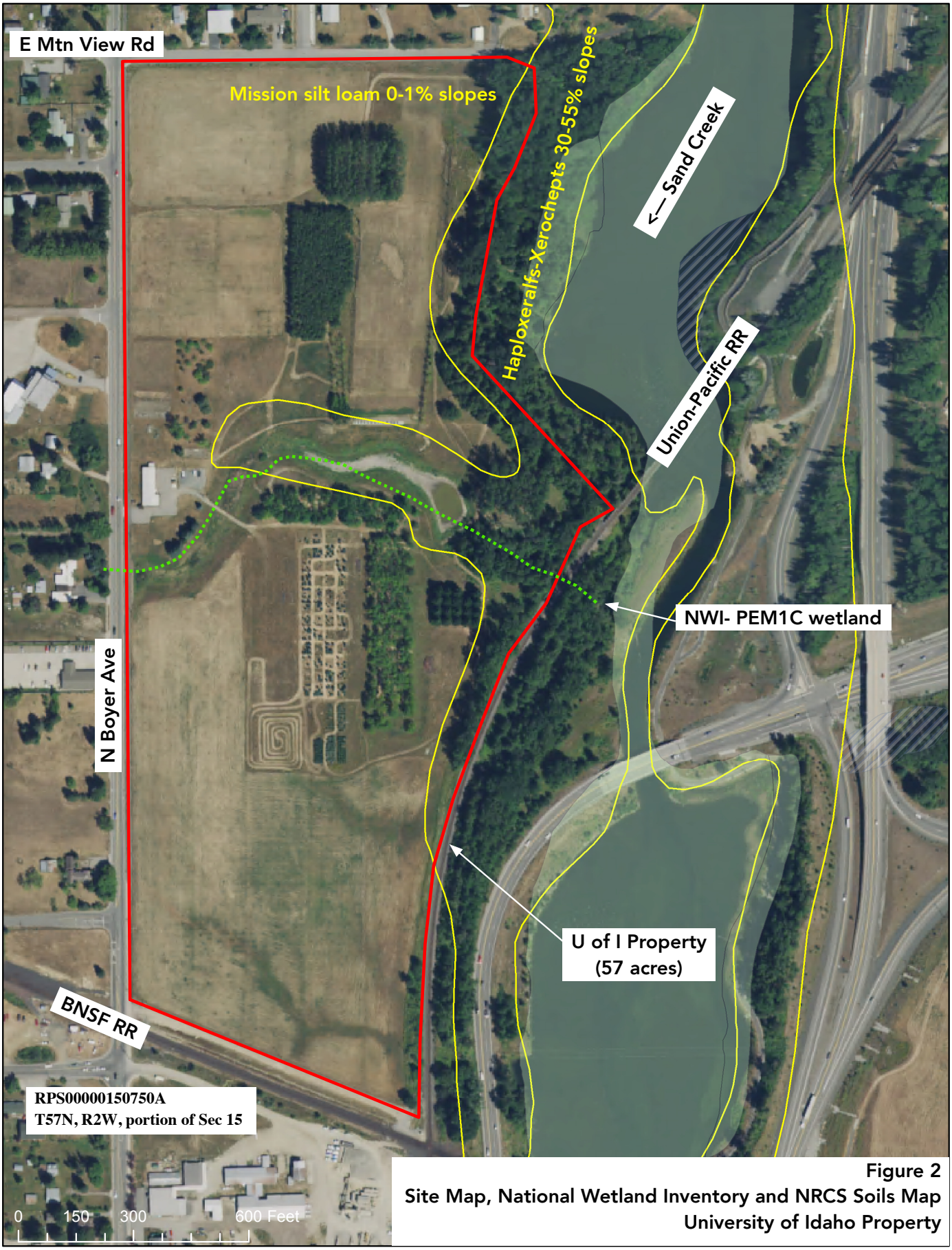

Figure 2
Site Map, National Wetland Inventory and NRCS Soils Map
University of Idaho Property

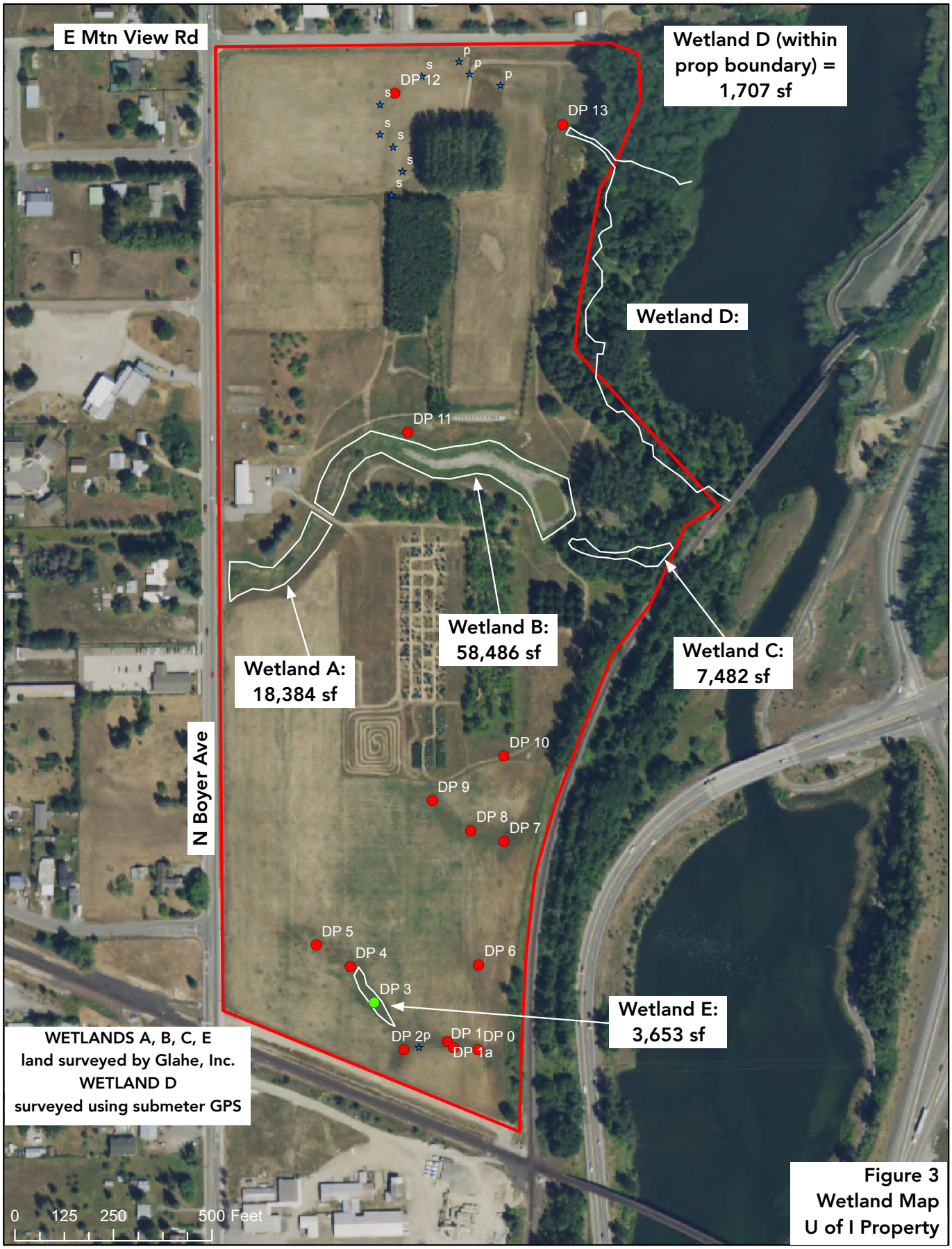

Figure 3
Wetland Map
U of I Property

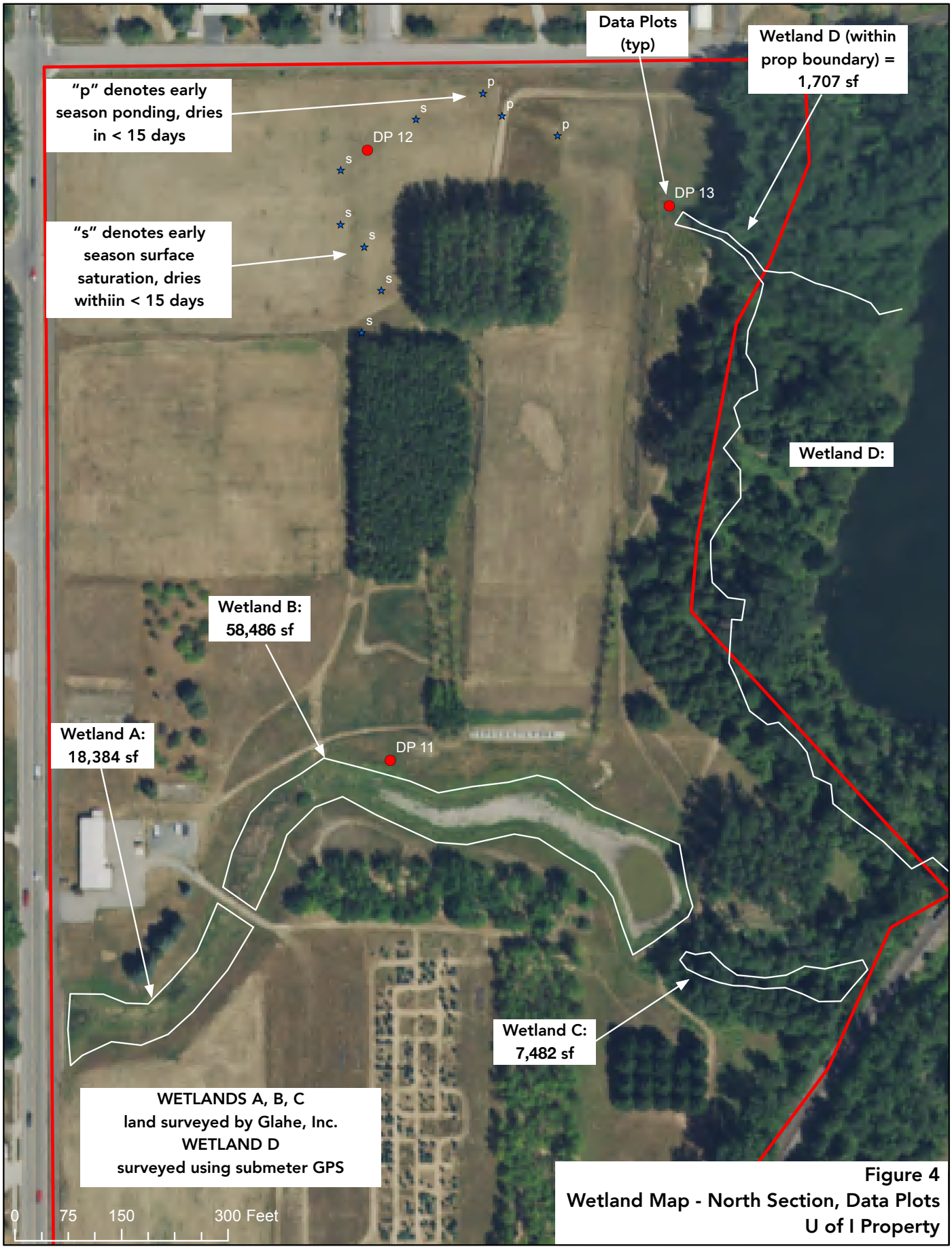

Figure 4
Wetland Map - North Section, Data Plots
U of I Property

Figure 5
Wetland Map - South Section, Data Plots
U of I Property

APPENDIX A:
Wetland Delineation Methods

Wetland investigations were undertaken utilizing the *Corps of Engineers Wetland Delineation Manual* (Technical Report Y-87-1, and as amended by the 2010 Regional Supplement). This method requires that evidence of three parameters (a dominance of hydrophytic vegetation, hydric soils, and wetland hydrology) be simultaneously present for a jurisdictional wetland determination. Hydric Soils of the United States (NTCHS, NRCS, 2018) acts as an amendment to the Corps manual and is used for determining hydric soils. Analysis of wetlands on-site involves collecting preliminary data and conducting a site-specific investigation. The methods used in these approaches are described below.

Preliminary Research

Review of existing information was conducted to develop background knowledge of physical features and to identify the potential for wetland occurrence on the subject property. Information related to topography, drainage, and water features was obtained from these sources. The following resource documents were available for preliminary review of the site conditions:

- US Department of Agriculture, National Soils Conservation Service (website);
- US Department of the Interior, US Geological Survey Map (Sandpoint quadrangle);
- US Department of the Interior, National Wetland Inventory Map (1987) (website)
- NAIP color aerial photographs (2013, 2015)

Site-Specific Investigation

Vegetation: Hydrophytic vegetation criteria for wetlands are where: (1) the total dominants of obligate (OBL) and facultative wetland (FACW) plant species exceed the total dominants of facultative upland (FACU) and upland (UPL) species; or (2) the Prevalence Index value is less than 3.0. Representative sample plots were located in areas of homogeneous vegetation. All dominant herbaceous species were identified in the 0.01-acre (11.8-foot radius) data plots. For trees and shrubs, the plot size was increased to a 30-foot radius. Nomenclature of plant species follows *Vascular Plants of the Pacific Northwest* (Hitchcock et al., 1977), or as modified by Reed (1988, revised 1994, and NWPL 2014). Percent cover within the plots is determined by ocular observation. Cover is assigned to cover classes, and the species ranked according to the midpoints of their respective cover classes. The midpoints of ranked species are cumulatively summed until 50 percent of the total for all species midpoints is immediately exceeded.

All species contributing to the cumulative total plus any species having 20 percent of the total midpoint value are considered dominants. Plant indicator status is then assigned (per Reed 1988, 1994, and NWPL 2018) to each dominant to determine the percent of hydrophytes. Vegetation in areas where more than 50 percent of the dominant species are hydrophytes (plant species adapted to saturated conditions, i.e., FAC or wetter) was considered to be hydrophytic. Plant indicator status definitions are given in Appendix B.

Soils: Hydric soil is defined as *soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part*. In accordance with the methodology, soil samples were taken at all data plots as well as other points on the site. The test of this definition is met when the following indicators of hydric conditions are present, direct observation of flooding, ponding, or surface saturation, thick organic layers, and low soil matrix chromas (chroma of 1 without redoximorphic features or chroma of 2 or less and value of 4 or more with redoximorphic features). Low chroma soils are indicative of reducing conditions (typically during the growing season when soil oxygen is being utilized by soil microorganisms as well as plants). Redoximorphic features occur in areas of fluctuating water table levels (alternating reducing and oxidizing environments). Soils were moistened during the dry season to accurately determine colors on the Munsell Color Charts. During the dry season, apparent surface indicators of wetland hydrology was used to assess flooding or ponding. Duration of flooding, ponding, or saturation is also important. Hydric soils must be flooded or ponded for long (7 to 30 days) or very long (more than 30 days) duration during the growing season. Hydric soils must be saturated in the upper part for a significant period (usually more than one week) during the growing season.

Hydrology: Wetland hydrology is defined as *all hydrological characteristics of area that are periodically inundated or have soils saturated to the surface at some time during the growing season*. The criteria are: (1) inundation (flooding or ponding) occurring for 7 consecutive days or longer during the growing season in most years (50% chance or more); or (2) saturation at or near the surface occurring for 14 consecutive days or longer during the growing season in most years (50% chance or more). Soils may be considered to be saturated to the surface when the water table is within: (a) 0.5 ft of the surface for coarse sand, sand or fine sandy soils; or (b) 1.0 ft of the surface for all other soils.

Areas with evident characteristics of wetland hydrology are those areas where the presence of water has an overriding influence on characteristics of vegetation and soils because anaerobic and reducing conditions exist. The test of this definition is met when data plots show direct observation of wetland hydrology, or a sufficient number of apparent indicators, including indirect evidence of flooding, ponding, or saturation, water marks, drainage patterns, oxidized root rhizospheres, water-stained leaves, or sediment deposits. Duration of hydrologic conditions creating anaerobic and reducing conditions must also be satisfied.

Wetland Determination

Jurisdictional wetlands were delineated where vegetation, soils, and hydrology all reflect anaerobic conditions as defined and described above. Wetland boundaries were field-flagged and located by Glahe, Inc. (Wetlands A, B, C, and E) and Wetland D using sub-meter GPS unit. Boundary point shapefiles available upon request.

APPENDIX B:
Wetland Indicator Status System
(Reed 1988, revised 1994; NWPL 2016)

Indicator category	**Indicator Symbol**	**Definition**
OBLIGATE WETLAND PLANTS	OBL	Plants that occur almost always (estimated probability >99%) in wetlands under natural conditions, but which may also occur rarely (estimated probability <1%) in non-wetlands.
FACULTATIVE WETLAND PLANTS	FACW	Plants that occur usually (estimated probability 67% to 99%) in wetlands, but also occur (estimated probability 1% to 33%) in non-wetlands.
FACULTATIVE PLANTS	FAC	Plants with a similar likelihood (estimated probability 33% to 67%) of occurring in both wetlands and non-wetlands.
FACULTATIVE UPLAND PLANTS	FACU	Plants that occur sometimes (estimated probability 1% to <33%) in wetlands, but occur more often (estimated probability 67% to 99%) in non-wetlands.
UPLAND PLANTS	UPL	Plants that occur rarely (estimated probability <1%) in wetlands under natural conditions.
NO INDICATOR STATUS	NI	Plants which do not have sufficient data available to estimate their probability of occurrence in wetlands.
If a plant is not listed in Reed	NL	Corps manual states that these species are **obligate upland.**

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Univ of Idaho Property **City/County:** Sandpoint, Bonner **Sampling Date:** 24-Apr-20

Applicant/Owner: K-M Enterprises/M&W Holdings **State:** ID **Sampling Point:** **DP 0**

Investigator(s): Tom Duebendorfer, PWS **Section, Township, Range:** **S** 15 **T** 57N **R** 2W

Landform (hillslope, terrace, etc.): Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 **% /** 0.0 **°**

Subregion (LRR): LRR E **Lat.:** 48°17'16.044"N **Long.:** 116°33'15.41"W **Datum:** WGS 84

Soil Map Unit Name: Mission silt loam **NWI classification:** none

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○	No ◉	
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:
Vegetation is hydrophytic (pasture grasses), soils not hydric, no hydrology (although short-lived surface saturation in early Apri, as the snow melted). Plot not located in wetland.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	0	**= Total Cover**	
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	0	**= Total Cover**	
Herb Stratum (Plot size:)			
1. Dactylis glomerata	50	☑ 43.5%	FACU
2. Agrostis stolonifera	35	☑ 30.4%	FAC
3. Elymus repens	30	☑ 26.1%	FAC
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	115	**= Total Cover**	
Woody Vine Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	**= Total Cover**	

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	65	x 3 =	195
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	115 (A)		395 (B)

Prevalence Index = B/A = 3.435

Hydrophytic Vegetation Indicators:

- ☐ **1 - Rapid Test for Hydrologic Vegetation**
- ☑ **2 - Dominance Test is > 50%**
- ☐ **3 - Prevalence Index is ≤3.0** [1]
- ☐ **4 - Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **5 - Wetland Non-Vascular Plants** [1]
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:
Vegetation is hydrophytic - dominance test met

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP 0

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type[1]	Loc[2]	Texture	Remarks
0-18	7.5YR	3/3	100%						Silt Loam	

[1]Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

no hydric indicators

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (LRR A)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available:

Remarks:

Surface saturation on 4/3/20, none on 4/8/20, no water in pit 4/24/20. Hydrology lacking.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Univ of Idaho Property **City/County:** Sandpoint, Bonner **Sampling Date:** 24-Apr-20

Applicant/Owner: K-M Enterprises/M&W Holdings **State:** ID **Sampling Point:** DP 1

Investigator(s): Tom Duebendorfer, PWS **Section, Township, Range:** S 15 T 57N R 2W

Landform (hillslope, terrace, etc.): Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °

Subregion (LRR): LRR E **Lat.:** 48°17'16.104"N **Long.:** 116°33'16.321"W **Datum:** WGS 84

Soil Map Unit Name: Mission silt loam **NWI classification:** none

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○	No ◉	
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:
Vegetation is hydrophytic (pasture grasses), soils not hydric, no hydrology (although observed short-lived surface ponding in early Apri, as the snow melted). Plot not located in wetland.

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	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	0	= Total Cover	
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	115	= Total Cover	
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Prevalence Index = B/A = 3.435

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- ☑ **2 - Dominance Test is > 50%**
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- ☐ **5 - Wetland Non-Vascular Plants** [1]
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:
Vegetation is hydrophytic - dominance test met

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type[1]	Loc[2]	Texture	Remarks
0-18	7.5YR	3/3	100%						Silt Loam	

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Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

no hydric indicators

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
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- ☐ Aquatic Invertebrates (B13)
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- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (LRR A)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
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- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available:

Remarks:

Shallow ponding (to 3") on 4/3/20, none on 4/8/20, no water in pit 4/24/20. Hydrology lacking.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Univ of Idaho Property **City/County:** Sandpoint, Bonner **Sampling Date:** 24-Apr-20

Applicant/Owner: K-M Enterprises/M&W Holdings **State:** ID **Sampling Point:** DP 1a

Investigator(s): Tom Duebendorfer, PWS **Section, Township, Range:** S 15 T 57N R 2W

Landform (hillslope, terrace, etc.): Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °

Subregion (LRR): LRR E **Lat.:** 48°17'16.257"N **Long.:** 116°33'16.551"W **Datum:** WGS 84

Soil Map Unit Name: Mission silt loam **NWI classification:** none

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○	No ◉	
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:
Vegetation is hydrophytic (pasture grasses), soils not hydric, no hydrology. Plot not located in wetland.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	0	= Total Cover	
Herb Stratum (Plot size:)			
1. Dactylis glomerata	50	☑ 43.5%	FACU
2. Agrostis stolonifera	35	☑ 30.4%	FAC
3. Elymus repens	30	☑ 26.1%	FAC
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	115	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	= Total Cover	

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	65	x 3 =	195
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	115 (A)		395 (B)

Prevalence Index = B/A = 3.435

Hydrophytic Vegetation Indicators:

- ☐ **1 - Rapid Test for Hydrologic Vegetation**
- ☑ **2 - Dominance Test is > 50%**
- ☐ **3 - Prevalence Index is ≤3.0** [1]
- ☐ **4 - Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **5 - Wetland Non-Vascular Plants** [1]
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:
Vegetation is hydrophytic - dominance test met

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP 1a

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type[1]	Loc[2]	Texture	Remarks
0-18	7.5YR	3/3	100%						Silt Loam	

[1]Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

no hydric indicators

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (LRR A)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available:

Remarks:

No water in pit 4/24/20. Hydrology lacking.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Univ of Idaho Property **City/County:** Sandpoint, Bonner **Sampling Date:** 24-Apr-20

Applicant/Owner: K-M Enterprises/M&W Holdings **State:** ID **Sampling Point:** DP 2

Investigator(s): Tom Duebendorfer, PWS **Section, Township, Range:** S 15 T 57N R 2W

Landform (hillslope, terrace, etc.): Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °

Subregion (LRR): LRR E **Lat.:** 48°17'16.053"N **Long.:** 116°33'18.176"W **Datum:** WGS 84

Soil Map Unit Name: Mission silt loam **NWI classification:** none

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○	No ◉	
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:
Vegetation is hydrophytic (pasture grasses), soils not hydric, no hydrology. Plot not located in wetland.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	0	= Total Cover	
Herb Stratum (Plot size:)			
1. Dactylis glomerata	50	☑ 43.5%	FACU
2. Agrostis stolonifera	35	☑ 30.4%	FAC
3. Elymus repens	30	☑ 26.1%	FAC
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	115	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	= Total Cover	

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	65	x 3 =	195
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	115 (A)		395 (B)

Prevalence Index = B/A = 3.435

Hydrophytic Vegetation Indicators:

- ☐ **1 - Rapid Test for Hydrologic Vegetation**
- ☑ **2 - Dominance Test is > 50%**
- ☐ **3 - Prevalence Index is ≤3.0** [1]
- ☐ **4 - Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **5 - Wetland Non-Vascular Plants** [1]
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:
Vegetation is hydrophytic - dominance test met

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type[1]	Loc[2]	Texture	Remarks
0-18	7.5YR	3/3	100%						Silt Loam	

[1]Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

no hydric indicators

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (LRR A)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available:

Remarks:

5" water in pit 4/3/20, none on 4/8/20, no water on 4/24/20. Hydrology lacking.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Univ of Idaho Property **City/County:** Sandpoint, Bonner **Sampling Date:** 24-Apr-20

Applicant/Owner: K-M Enterprises/M&W Holdings **State:** ID **Sampling Point:** DP 3

Investigator(s): Tom Duebendorfer, PWS **Section, Township, Range:** S 15 T 57N R 2W

Landform (hillslope, terrace, etc.): Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °

Subregion (LRR): LRR E **Lat.:** 48°17'17.24"N **Long.:** 116°33'19.275"W **Datum:** WGS 84

Soil Map Unit Name: Mission silt loam **NWI classification:** none

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○	No ◉	
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:
Vegetation is hydrophytic (pasture grasses), soils not hydric, no hydrology (shallow surface ponding 4/8/20, no water 4/24/20) . Plot not located in wetland.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	0	**= Total Cover**	
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	0	**= Total Cover**	
Herb Stratum (Plot size:)			
1. Dactylis glomerata	50	☑ 43.5%	FACU
2. Agrostis stolonifera	35	☑ 30.4%	FAC
3. Elymus repens	30	☑ 26.1%	FAC
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	115	**= Total Cover**	
Woody Vine Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	**= Total Cover**	

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	65	x 3 =	195
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	115 (A)		395 (B)

Prevalence Index = B/A = 3.435

Hydrophytic Vegetation Indicators:

- ☐ **1 - Rapid Test for Hydrologic Vegetation**
- ☑ **2 - Dominance Test is > 50%**
- ☐ **3 - Prevalence Index is ≤3.0** [1]
- ☐ **4 - Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **5 - Wetland Non-Vascular Plants** [1]
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:
Vegetation is hydrophytic - dominance test met

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type[1]	Loc[2]	Texture	Remarks
0-18	7.5YR	3/3	100%						Silt Loam	

[1]Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

no hydric indicators

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (LRR A)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available:

Remarks:

Shallow surface ponding 4/3/20, none on 4/8/20, no water on 4/24/20. Hydrology lacking.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Univ of Idaho Property **City/County:** Sandpoint, Bonner **Sampling Date:** 24-Apr-20

Applicant/Owner: K-M Enterprises/M&W Holdings **State:** ID **Sampling Point:** DP 4

Investigator(s): Tom Duebendorfer, PWS **Section, Township, Range:** S 15 T 57N R 2W

Landform (hillslope, terrace, etc.): Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °

Subregion (LRR): LRR E **Lat.:** 48°17'18.148"N **Long.:** 116°33'20.185"W **Datum:** WGS 84

Soil Map Unit Name: Mission silt loam **NWI classification:** none

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○	No ◉	
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:
Vegetation is hydrophytic (pasture grasses), soils not hydric, no hydrology (shallow surface saturation on 4/3/20, none on 4/8/20, no water 4/24/20) . Plot not located in wetland.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	0	**= Total Cover**	
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	0	**= Total Cover**	
Herb Stratum (Plot size:)			
1. Dactylis glomerata	50	☑ 43.5%	FACU
2. Agrostis stolonifera	35	☑ 30.4%	FAC
3. Elymus repens	30	☑ 26.1%	FAC
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	115	**= Total Cover**	
Woody Vine Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	**= Total Cover**	

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	65	x 3 =	195
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	115 (A)		395 (B)

Prevalence Index = B/A = 3.435

Hydrophytic Vegetation Indicators:

- ☐ **1 - Rapid Test for Hydrologic Vegetation**
- ☑ **2 - Dominance Test is > 50%**
- ☐ **3 - Prevalence Index is ≤3.0** [1]
- ☐ **4 - Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **5 - Wetland Non-Vascular Plants** [1]
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:
Vegetation is hydrophytic - dominance test met

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-18	7.5YR 3/3	100%					Silt Loam	

[1]Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

no hydric indicators

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (LRR A)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available:

Remarks:

Shallow surface saturation on 4/3/20, none on 4/8/20, no water on 4/24/20. Hydrology lacking.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Univ of Idaho Property **City/County:** Sandpoint, Bonner **Sampling Date:** 24-Apr-20

Applicant/Owner: K-M Enterprises/M&W Holdings **State:** ID **Sampling Point:** DP 5

Investigator(s): Tom Duebendorfer, PWS **Section, Township, Range:** S 15 T 57N R 2W

Landform (hillslope, terrace, etc.): Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °

Subregion (LRR): LRR E **Lat.:** 48°17'18.688"N **Long.:** 116°33'21.452"W **Datum:** WGS 84

Soil Map Unit Name: Mission silt loam **NWI classification:** none

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○	No ◉	
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:
Vegetation is hydrophytic (pasture grasses), soils not hydric, no hydrology (water in soil pit at 14" on 4/3/20, none on 4/8/20, no water 4/24/20) . Plot not located in wetland.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	0	**= Total Cover**	
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	0	**= Total Cover**	
Herb Stratum (Plot size:)			
1. Dactylis glomerata	50	☑ 43.5%	FACU
2. Agrostis stolonifera	35	☑ 30.4%	FAC
3. Elymus repens	30	☑ 26.1%	FAC
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	115	**= Total Cover**	
Woody Vine Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	**= Total Cover**	

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	65	x 3 =	195
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	115 (A)		395 (B)

Prevalence Index = B/A = 3.435

Hydrophytic Vegetation Indicators:

- ☐ **1 - Rapid Test for Hydrologic Vegetation**
- ☑ **2 - Dominance Test is > 50%**
- ☐ **3 - Prevalence Index is ≤3.0** [1]
- ☐ **4 - Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **5 - Wetland Non-Vascular Plants** [1]
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:
Vegetation is hydrophytic - dominance test met

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type[1]	Loc[2]	Texture	Remarks
0-18	7.5YR	3/3	100%						Silt Loam	

[1]Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

no hydric indicators

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (LRR A)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available:

Remarks:

H2O in soil pit at 14" on 4/3/20, none on 4/8/20, no water on 4/24/20. Hydrology lacking.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Univ of Idaho Property **City/County:** Sandpoint, Bonner **Sampling Date:** 24-Apr-20

Applicant/Owner: K-M Enterprises/M&W Holdings **State:** ID **Sampling Point:** DP 6

Investigator(s): Tom Duebendorfer, PWS **Section, Township, Range:** S 15 T 57N R 2W

Landform (hillslope, terrace, etc.): Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °

Subregion (LRR): LRR E **Lat.:** 48°17'18.176"N **Long.:** 116°33'15.368"W **Datum:** WGS 84

Soil Map Unit Name: Mission silt loam **NWI classification:** none

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○	No ◉	
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:
Vegetation is hydrophytic (pasture grasses), soils not hydric, no hydrology (no surface saturation or ponding on 4/3/20, none on 4/8/20, no water 4/24/20) . Plot not located in wetland.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	0	= Total Cover	
Herb Stratum (Plot size:)			
1. Dactylis glomerata	50	☑ 43.5%	FACU
2. Agrostis stolonifera	35	☑ 30.4%	FAC
3. Elymus repens	30	☑ 26.1%	FAC
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	115	= Total Cover	
Woody Vine Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	= Total Cover	

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	65	x 3 =	195
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	115 (A)		395 (B)

Prevalence Index = B/A = 3.435

Hydrophytic Vegetation Indicators:

- ☐ **1 - Rapid Test for Hydrologic Vegetation**
- ☑ **2 - Dominance Test is > 50%**
- ☐ **3 - Prevalence Index is ≤3.0** [1]
- ☐ **4 - Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **5 - Wetland Non-Vascular Plants** [1]
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:
Vegetation is hydrophytic - dominance test met

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP 6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type[1]	Loc[2]	Texture	Remarks
0-18	7.5YR	3/3	100%						Silt Loam	

[1]Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

no hydric indicators

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (LRR A)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available:

Remarks:

No surface saturation or ponding on 4/3/20, none on 4/8/20, no water on 4/24/20. Hydrology lacking.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Univ of Idaho Property **City/County:** Sandpoint, Bonner **Sampling Date:** 24-Apr-20

Applicant/Owner: K-M Enterprises/M&W Holdings **State:** ID **Sampling Point:** DP 7

Investigator(s): Tom Duebendorfer, PWS **Section, Township, Range:** S 15 T 57N R 2W

Landform (hillslope, terrace, etc.): Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °

Subregion (LRR): LRR E **Lat.:** 48°17'21.257"N **Long.:** 116°33'14.394"W **Datum:** WGS 84

Soil Map Unit Name: Mission silt loam **NWI classification:** none

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○	No ◉	
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:
Vegetation is hydrophytic (pasture grasses), soils not hydric, no hydrology (very shallow ponding on 4/3/20, none on 4/8/20, no water 4/24/20) . Plot not located in wetland.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	0	**= Total Cover**	
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	0	**= Total Cover**	
Herb Stratum (Plot size:)			
1. Dactylis glomerata	50	☑ 43.5%	FACU
2. Agrostis stolonifera	35	☑ 30.4%	FAC
3. Elymus repens	30	☑ 26.1%	FAC
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	115	**= Total Cover**	
Woody Vine Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	**= Total Cover**	

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	65	x 3 =	195
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	115 (A)		395 (B)

Prevalence Index = B/A = 3.435

Hydrophytic Vegetation Indicators:

- ☐ **1 - Rapid Test for Hydrologic Vegetation**
- ☑ **2 - Dominance Test is > 50%**
- ☐ **3 - Prevalence Index is ≤3.0** [1]
- ☐ **4 - Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **5 - Wetland Non-Vascular Plants** [1]
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:
Vegetation is hydrophytic - dominance test met

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP 7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type[1]	Loc[2]	Texture	Remarks
0-18	7.5YR	3/3	100%						Silt Loam	

[1]Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

no hydric indicators

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (LRR A)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available:

Remarks:

Very shallow surface ponding on 4/3/20, none on 4/8/20, no water on 4/24/20. Hydrology lacking.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Univ of Idaho Property **City/County:** Sandpoint, Bonner **Sampling Date:** 24-Apr-20

Applicant/Owner: K-M Enterprises/M&W Holdings **State:** ID **Sampling Point:** DP 8

Investigator(s): Tom Duebendorfer, PWS **Section, Township, Range:** S 15 T 57N R 2W

Landform (hillslope, terrace, etc.): Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °

Subregion (LRR): LRR E **Lat.:** 48°17'21.514"N **Long.:** 116°33'15.624"W **Datum:** WGS 84

Soil Map Unit Name: Mission silt loam **NWI classification:** none

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○	No ◉	
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:
Vegetation is hydrophytic (pasture grasses), soils not hydric, no hydrology (no ponding on 4/3/20, none on 4/8/20, no water 4/24/20) . Plot not located in wetland.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	0	**= Total Cover**	
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	0	**= Total Cover**	
Herb Stratum (Plot size:)			
1. Dactylis glomerata	50	☑ 43.5%	FACU
2. Agrostis stolonifera	35	☑ 30.4%	FAC
3. Elymus repens	30	☑ 26.1%	FAC
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	115	**= Total Cover**	
Woody Vine Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	**= Total Cover**	

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	65	x 3 =	195
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	115 (A)		395 (B)

Prevalence Index = B/A = 3.435

Hydrophytic Vegetation Indicators:

- ☐ **1 - Rapid Test for Hydrologic Vegetation**
- ☑ **2 - Dominance Test is > 50%**
- ☐ **3 - Prevalence Index is ≤3.0** [1]
- ☐ **4 - Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **5 - Wetland Non-Vascular Plants** [1]
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:
Vegetation is hydrophytic - dominance test met

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP 8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type[1]	Loc[2]	Texture	Remarks
0-18	7.5YR	3/3	100%						Silt Loam	

[1]Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

no hydric indicators

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (LRR A)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available:

Remarks:

No ponding on 4/3/20, none on 4/8/20, no water on 4/24/20. Hydrology lacking.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Univ of Idaho Property **City/County:** Sandpoint, Bonner **Sampling Date:** 24-Apr-20

Applicant/Owner: K-M Enterprises/M&W Holdings **State:** ID **Sampling Point:** DP 9

Investigator(s): Tom Duebendorfer, PWS **Section, Township, Range:** S 15 T 57N R 2W

Landform (hillslope, terrace, etc.): Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 % / 0.0 °

Subregion (LRR): LRR E **Lat.:** 48°17'22.285"N **Long.:** 116°33'17.066"W **Datum:** WGS 84

Soil Map Unit Name: Mission silt loam **NWI classification:** none

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○	No ◉	
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:
Vegetation is hydrophytic (pasture grasses), soils not hydric, no hydrology (surface saturation on 4/3/20 and 4/8/20, no water 4/24/20) . Plot not located in wetland.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	0	**= Total Cover**	
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	0	**= Total Cover**	
Herb Stratum (Plot size:)			
1. Dactylis glomerata	50	☑ 43.5%	FACU
2. Agrostis stolonifera	35	☑ 30.4%	FAC
3. Elymus repens	30	☑ 26.1%	FAC
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	115	**= Total Cover**	
Woody Vine Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	**= Total Cover**	

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	65	x 3 =	195
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	115 (A)		395 (B)

Prevalence Index = B/A = 3.435

Hydrophytic Vegetation Indicators:

- ☐ **1 - Rapid Test for Hydrologic Vegetation**
- ☑ **2 - Dominance Test is > 50%**
- ☐ **3 - Prevalence Index is ≤3.0** [1]
- ☐ **4 - Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **5 - Wetland Non-Vascular Plants** [1]
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:
Vegetation is hydrophytic - dominance test met

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP 9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type[1]	Loc[2]	Texture	Remarks
0-18	7.5YR	3/3	100%						Silt Loam	

[1]Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

no hydric indicators

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (LRR A)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available:

Remarks:

Surface saturation on 4/3/20 and 4/8/20, no water on 4/24/20. Hydrology lacking.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Univ of Idaho Property **City/County:** Sandpoint, Bonner **Sampling Date:** 24-Apr-20

Applicant/Owner: K-M Enterprises/M&W Holdings **State:** ID **Sampling Point:** **DP 10**

Investigator(s): Tom Duebendorfer, PWS **Section, Township, Range:** **S** 15 **T** 57N **R** 2W

Landform (hillslope, terrace, etc.): Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 **% /** 0.0 **°**

Subregion (LRR): LRR E **Lat.:** 48°17'23.38"N **Long.:** 116°33'14.36"W **Datum:** WGS 84

Soil Map Unit Name: Mission silt loam **NWI classification:** none

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○	No ◉	
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:
Vegetation is hydrophytic (pasture grasses), soils not hydric, no hydrology (water in soil pit @ 10" on 4/3/20; none on 4/8/20, no water 4/24/20). Plot located in older farm road. Plot not located in wetland.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	0	**= Total Cover**	
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	0	**= Total Cover**	
Herb Stratum (Plot size:)			
1. Agrostis stolonifera	60	☑ 57.1%	FAC
2. Festuca rubra	25	☑ 23.8%	FAC
3. Hieracium pratense	10	☐ 9.5%	UPL
4. Tanacetum vulgare	5	☐ 4.8%	FACU
5. Taraxacum officinale	5	☐ 4.8%	FACU
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	105	**= Total Cover**	
Woody Vine Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	**= Total Cover**	

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	85	x 3 =	255
FACU species	10	x 4 =	40
UPL species	10	x 5 =	50
Column Totals:	105 (A)		345 (B)

Prevalence Index = B/A = 3.286

Hydrophytic Vegetation Indicators:

- ☐ **1 - Rapid Test for Hydrologic Vegetation**
- ☑ **2 - Dominance Test is > 50%**
- ☐ **3 - Prevalence Index is ≤3.0** [1]
- ☐ **4 - Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **5 - Wetland Non-Vascular Plants** [1]
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:
Vegetation is hydrophytic - dominance test met

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP 10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type[1]	Loc[2]	Texture	Remarks
0-18	7.5YR	3/3	100%						Silt Loam	

[1]Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

no hydric indicators

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (LRR A)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available:

Remarks:

water in soil pit @ 10" on 4/3/20; none on 4/8/20, no water on 4/24/20. Hydrology lacking.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Univ of Idaho Property **City/County:** Sandpoint, Bonner **Sampling Date:** 24-Apr-20

Applicant/Owner: K-M Enterprises/M&W Holdings **State:** ID **Sampling Point:** **DP 11**

Investigator(s): Tom Duebendorfer, PWS **Section, Township, Range:** **S** 15 **T** 57N **R** 2W

Landform (hillslope, terrace, etc.): Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 **% /** 0.0 **°**

Subregion (LRR): LRR E **Lat.:** 48°17'31.51"N **Long.:** 116°33'17.922"W **Datum:** WGS 84

Soil Map Unit Name: Haploxeralfs and Xerochrepts 30-55% slopes **NWI classification:** none

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○	No ◉	
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:
Vegetation is hydrophytic (canarygrass), soils not hydric, no hydrology on 4/3/20; none on 4/8/20, no water 4/24/20). Plot located in small swale approaching Wetland B. Plot not located in wetland.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	0	**= Total Cover**	
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	0	**= Total Cover**	
Herb Stratum (Plot size:)			
1. Phalaris arundinacea	100	☑ 100.0%	FACW
2.		☐ 0.0%	
3.		☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	100	**= Total Cover**	
Woody Vine Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	**= Total Cover**	

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	100	x 2 =	200
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	100 (A)		200 (B)

Prevalence Index = B/A = 2.000

Hydrophytic Vegetation Indicators:

- ☐ **1 - Rapid Test for Hydrologic Vegetation**
- ☑ **2 - Dominance Test is > 50%**
- ☑ **3 - Prevalence Index is ≤3.0** [1]
- ☐ **4 - Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **5 - Wetland Non-Vascular Plants** [1]
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:
Vegetation is hydrophytic - both tests met

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP 11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR	3/3	100%						Silt Loam	
10-16	2.5YR	5/3	100%						Silt Loam	

[1]Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

no hydric indicators

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (LRR A)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available:

Remarks:

water in soil pit on 4/3/20. Hydrology lacking.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Univ of Idaho Property **City/County:** Sandpoint, Bonner **Sampling Date:** 24-Apr-20

Applicant/Owner: K-M Enterprises/M&W Holdings **State:** ID **Sampling Point:** **DP 12**

Investigator(s): Tom Duebendorfer, PWS **Section, Township, Range:** **S** 15 **T** 57N **R** 2W

Landform (hillslope, terrace, etc.): Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 **% /** 0.0 **°**

Subregion (LRR): LRR E **Lat.:** 48°17'39.97"N **Long.:** 116°33'18.311"W **Datum:** WGS 84

Soil Map Unit Name: Mission silt loam **NWI classification:** none

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○	No ◉	
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:
Vegetation is hydrophytic (pasture grasses), soils not hydric, no hydrology (water in soil pit @ 4" on 4/8/20, no water 4/24/20). Plot not located in wetland.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	0	**= Total Cover**	
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	0	**= Total Cover**	
Herb Stratum (Plot size:)			
1. Agrostis stolonifera	60	☑ 54.5%	FAC
2. Elymus repens	40	☑ 36.4%	FAC
3. Dactylis glomerata	10	☐ 9.1%	FACU
4.		☐ 0.0%	
5.		☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	110	**= Total Cover**	
Woody Vine Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	**= Total Cover**	

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	100	x 3 =	300
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	110 (A)		340 (B)

Prevalence Index = B/A = 3.091

Hydrophytic Vegetation Indicators:

- ☐ **1 - Rapid Test for Hydrologic Vegetation**
- ☑ **2 - Dominance Test is > 50%**
- ☐ **3 - Prevalence Index is ≤3.0** [1]
- ☐ **4 - Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **5 - Wetland Non-Vascular Plants** [1]
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:
Vegetation is hydrophytic - dominance test met

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP 12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type[1]	Loc[2]	Texture	Remarks
0-18	7.5YR	3/3	100%						Silt Loam	

[1]Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

no hydric indicators

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (LRR A)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available:

Remarks:

water in soil pit @ 4" on 4/8/20, no surface water on 4/24/20. Hydrology lacking.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Univ of Idaho Property **City/County:** Sandpoint, Bonner **Sampling Date:** 24-Apr-20

Applicant/Owner: K-M Enterprises/M&W Holdings **State:** ID **Sampling Point:** **DP 13**

Investigator(s): Tom Duebendorfer, PWS **Section, Township, Range:** **S** 15 **T** 57N **R** 2W

Landform (hillslope, terrace, etc.): Flat **Local relief (concave, convex, none):** flat **Slope:** 0.0 **% /** 0.0 **°**

Subregion (LRR): LRR E **Lat.:** 48°17'39.161"N **Long.:** 116°33'12.038"W **Datum:** WGS 84

Soil Map Unit Name: Mission silt loam **NWI classification:** none

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ **(If no, explain in Remarks.)**

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **significantly disturbed?** **Are "Normal Circumstances" present?** Yes ◉ No ○

Are Vegetation ☐ **, Soil** ☐ **, or Hydrology** ☐ **naturally problematic?** **(If needed, explain any answers in Remarks.)**

Summary of Findings - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○	**Is the Sampled Area within a Wetland?** Yes ○ No ◉
Hydric Soil Present?	Yes ○	No ◉	
Wetland Hydrology Present?	Yes ○	No ◉	

Remarks:
Vegetation is hydrophytic (pasture grasses), soils not hydric, no hydrology (on 4/8/20 or 4/24/20). Plot not located in wetland.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species? Rel.Strat. Cover	Indicator Status
Tree Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
	0	**= Total Cover**	
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
3.	0	☐ 0.0%	
4.	0	☐ 0.0%	
5.	0	☐ 0.0%	
	0	**= Total Cover**	
Herb Stratum (Plot size:)			
1. Agrostis stolonifera	60	☑ 54.5%	FAC
2. Elymus repens	40	☑ 36.4%	FAC
3. Dactylis glomerata	10	☐ 9.1%	FACU
4.		☐ 0.0%	
5.		☐ 0.0%	
6.	0	☐ 0.0%	
7.	0	☐ 0.0%	
8.	0	☐ 0.0%	
9.	0	☐ 0.0%	
10.	0	☐ 0.0%	
11.	0	☐ 0.0%	
	110	**= Total Cover**	
Woody Vine Stratum (Plot size:)			
1.	0	☐ 0.0%	
2.	0	☐ 0.0%	
	0	**= Total Cover**	

% Bare Ground in Herb Stratum: 0

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	100	x 3 =	300
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	110 (A)		340 (B)

Prevalence Index = B/A = 3.091

Hydrophytic Vegetation Indicators:

- ☐ **1 - Rapid Test for Hydrologic Vegetation**
- ☑ **2 - Dominance Test is > 50%**
- ☐ **3 - Prevalence Index is ≤3.0** [1]
- ☐ **4 - Morphological Adaptations** [1] **(Provide supporting data in Remarks or on a separate sheet)**
- ☐ **5 - Wetland Non-Vascular Plants** [1]
- ☐ **Problematic Hydrophytic Vegetation** [1] **(Explain)**

[1] **Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.**

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:
Vegetation is hydrophytic - dominance test met

*Indicator suffix = National status or professional decision assigned because Regional status not defined by FWS.

Soil

Sampling Point: DP 13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)		%	Redox Features Color (moist)		%	Type[1]	Loc[2]	Texture	Remarks
0-18	7.5YR	3/3	100%						Silt Loam	

[1]Type: C=Concentration. D=Depletion. RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining. M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Muck Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) (except in MLRA 1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

no hydric indicators

Hydrology

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (LRR A)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ☐ Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
- ☐ Drainage Patterns (B10)
- ☐ Dry Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (LRR A)
- ☐ Frost Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitor well, aerial photos, previous inspections), if available:

Remarks:

No surface water or in pit on 4/8/20 or 4/24/20. Hydrology lacking.