



TECHNICAL MEMORANDUM

To: Pando Holdings
205 Detroit St., Ste. 203
Denver, CO 80206-481

From: Lynn Bacon, PWS
TerraQuatic, LLC
1336 Cherry Drive
Bozeman, MT 59715

Date: December 21, 2022

Subject: *Hillview Subdivision Aquatic Resources Delineation Technical Memorandum*

INTRODUCTION

An aquatic resources delineation was conducted within the proposed Hillview Subdivision property located in Missoula, Montana in Missoula County (SESE Section 6 and SWSW Section 5, Township 12 North, Range 19 West: **Figures 1 and 1a**; 46.821427, -114.022690). The proposed project site is located within agricultural grassland and includes one home.

METHODS

Wetlands were delineated using the 2010 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys and Coast (Version 2.0) (U. S. Army Corps of Engineers [USACE] 2010). The 2018 National Wetland Plant List (USACE 2018)) was used to determine vegetation indicator status rating. Data points (DP) were established within all potential wetland (WL) area(s) and adjacent uplands (UPL), i.e., nonwetland areas (**Exhibit A, Appendix A**). At each data point wetland indicator data were collected and analyzed using USACE wetland determination data forms (**Appendix B**). In general, an area qualifies as a wetland if a site exhibits positive wetland indicators for three parameters: vegetation, soils, and hydrology. In certain circumstances, an area may still qualify as a wetland in the absence of one or more indicators. Photographs are included in **Appendix C**. NRCS (2021) soil map and Montana Natural Heritage Program wetland inventory (MNHP 2021) map are included in **Appendix D**. City of Missoula stormwater utility map is included in Appendix E. Cushing Terrell conducted the wetland boundary survey and the channel bed width and area were estimated based on wetland scientist observations.



Figure 1. Proposed Hillview Subdivision delineation investigation area (pink polygon), Missoula, Montana.



Figure 1a. Proposed Hillview Subdivision delineation investigation area (pink polygon), Missoula, Montana.

RESULTS

An aquatic resources delineation was conducted within the proposed Hillview Subdivision project site on September 28, 2021 (**Ex- A, Appendix A**). One aquatic feature was identified in the southwest corner of the property. The feature includes an unnamed perennial stream channel (NWW-1: 375 sqft) within Moose Can Gully and a narrow wetland fringe (WL-1: 2,580 sqft) along both sides. The stream channel is narrow and averages 1 to 1.5 feet wide. A feature identified as a pond in the center of the property by Montana Natural Heritage Program (2021) does not exist.

Moose Can Gully is located within a robust riparian swale with steep slopes along both sides. The vegetation community along the slopes is comprised of quaking aspen (*Populus tremuloides*), ponderosa pine (*Pinus ponderosa*), choke cherry (*Prunus virginiana*), snowberry (*Symphoricarpos* sp.), and nonnative grass species (orchard grass: *Dactylus glomerata*, timothy: *Phleum pratense*, and smooth brome: *Bromus inermis*). Dominant wetland species along the channel include nonnative spreading bent (*Agrostis stolonifera*), sedge species (*Carex* sp.) and manna grass along the perennial stream channel. Soils within the wetland fringe and upland slope areas are very dark grayish brown (10YR 3/2) and very rocky at a depth of 12 inches below ground surface (BGS; unable to excavate deeper). Given true hydric indicators could not be observed within the wetland fringe because of the large broken rock interface at 12 inches BGS, soils were classified as hydric based on proximity to the perennial stream, potential for saturation, geomorphic position, and dominance of hydrophytic species. The Moose Can Gully aquatic resource qualifies as a riverine, perennial, rock bottom, palustrine, emergent channel bed wetland system (Cowardin 1979).

Water conveyed downslope within Moose Can Gully enters the City of Missoula stormwater conveyance system in the vicinity of the southeast intersection corner of 23rd Avenue and Garland Drive (City of Missoula 2022; **Appendix E**). The stormwater system outfalls on the east bank of the Bitterroot River. Therefore, Moose Can Gully, its channelbed and wetland fringe are likely under federal USACE jurisdiction. At this time, development of the Hillview Subdivision proposes no impact to likely federally-regulated aquatic features within Moose Can Gully. However, if impacts are proposed in the future a Section 404 Permit would likely be required. The USACE makes the final jurisdictional determination at the time of permitting. Other environmental permits (e.g., MT310) or certification (MTDEQ 401) may also be required. In general, perennial streams do require a MT310 Permit, however the Missoula County Conservation District should be consulted to determine whether any future proposed impacts would require this authorization.

REFERENCES

- City of Missoula. 2022. Missoula Maps, Infrastructure & Utilities: <https://missoulamaps-cityofmissoula.hub.arcgis.com/pages/30d6486e778848b9b6879fdadea114ef>. Site reviewed December 20, 2022.
- Cowardin, L., V. Carter, F. Golet, and E. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. FWS/OBS-79/31. USDI Fish and Wildlife Service. Washington, D.C.
- Montana Natural Heritage Program (MNHP). 2021. Wetland and Riparian Mapping <http://mtnhp.org/mapviewer/?t=8>, site accessed August 2021.
- Natural Resource Conservation Service (NRCS). 2021. Soil Survey, Hydric Rating by Map Unit. <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>, site accessed August 2021.
- U.S. Army Corps of Engineers (USACE). 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0), ed. J.S. Wakely, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-10-3. Vicksburg, MS: U.S. Army Engineer Research and Development Center.
- U.S. Army Corps of Engineers (USACE). 2018. National Wetland Plant List, Great Plains - 2018, U.S. Army Corps of Engineers, version 3.4. Engineer Research and Development Center Cold Regions Research and Engineering Laboratory, Hanover, NH.

APPENDIX A

EXHIBIT A: HILLVIEW SUBDIVISION AQUATIC RESOURCES DELINEATION MAP

APPENDIX B

USACE WETLAND DETERMINATION DATA FORMS

U.S. Army Corps of Engineers WETLAND DETERMINATION DATA SHEET – Western Mountains, Valleys, and Coast Region See ERDC/EL TR-10-3; the proponent agency is CECW-CO-R		OMB Control #: 0710-0024, Exp: 11/30/2024 Requirement Control Symbol EXEMPT: (Authority: AR 335-15, paragraph 5-2a)																																																																																																																																																							
Project/Site: <u>Hillview Subdivision</u> City/County: <u>Missoula/Missoula</u> Sampling Date: <u>9/28/21</u>																																																																																																																																																									
Applicant/Owner: <u>Pando Holdings</u> State: <u>MT</u> Sampling Point: <u>DP-1W</u>																																																																																																																																																									
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Landform (hillside, terrace, etc.): <u>terrace</u> Local relief (concave, convex, none): <u>flat</u> Slope (%): <u>1</u>																																																																																																																																																									
Subregion (LRR): <u>LRR E</u> Lat: <u>46.820152</u> Long: <u>-114.028420</u> Datum: <u>NAVD 88</u>																																																																																																																																																									
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Are Vegetation <input type="checkbox"/> , Soil <input type="checkbox"/> , or Hydrology <input type="checkbox"/> naturally problematic? (If needed, explain any answers in Remarks.)																																																																																																																																																									
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Remarks: Drainage appears intermittent, currently flowing as result of rain. Soil pit very rocky, excavation limited to 12-inch depth: dominant hydrophytic vegetation and geomorphic position, close to saturation zone.																																																																																																																																																									
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SOIL

Sampling Point: DP-1W

[illegible]

HYDROLOGY

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one is required; check all that apply)		Secondary Indicators (2 or more required)	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input checked="" type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input checked="" type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> FAC-Neutral Test (D5)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)	
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)			
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)			
Field Observations:			
Surface Water Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <input type="text"/>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Water Table Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <input type="text"/>		
Saturation Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <input type="text"/>		
(includes capillary fringe)			
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks:			
Vegetation unquestionably comprised of dominant hydrophytic species within property boundary. Though currently raining, investigation conducted during dry fall conditions.			

U.S. Army Corps of Engineers WETLAND DETERMINATION DATA SHEET – Western Mountains, Valleys, and Coast Region See ERDC/EL TR-10-3; the proponent agency is CECW-CO-R		OMB Control #: 0710-0024, Exp: 11/30/2024 Requirement Control Symbol EXEMPT: (Authority: AR 335-15, paragraph 5-2a)																																																																																																																																												
Project/Site: <u>Hillview Subdivision</u> City/County: <u>Missoula/Missoula</u> Sampling Date: <u>9/28/21</u>																																																																																																																																														
Applicant/Owner: <u>Pando Holdings</u> State: <u>MT</u> Sampling Point: <u>DP-1U</u>																																																																																																																																														
Investigator(s): <u>L Bacon/TerraQuatic, LLC</u> Section, Township, Range: <u>SESE Section 8, T12N, R 19W</u>																																																																																																																																														
Landform (hillside, terrace, etc.): <u>hillside</u> Local relief (concave, convex, none): <u>convex</u> Slope (%): <u>1</u>																																																																																																																																														
Subregion (LRR): <u>LRR E</u> Lat: <u>46.820110</u> Long: <u>-114.028499</u> Datum: <u>NAVD 88</u>																																																																																																																																														
Soil Map Unit Name: <u>17: Bigam gravelly loam, 4-15% slopes (0 hydric rating)</u> NWI classification: _____																																																																																																																																														
Are climatic / hydrologic conditions on the site typical for this time of year? Yes <u>X</u> No _____ (If no, explain in Remarks.)																																																																																																																																														
Are Vegetation <u>N</u> , Soil <u>N</u> , or Hydrology <u>N</u> significantly disturbed? Are "Normal Circumstances" present? Yes <u>X</u> No _____																																																																																																																																														
Are Vegetation <u>N</u> , Soil <u>N</u> , or Hydrology <u>N</u> naturally problematic? (If needed, explain any answers in Remarks.)																																																																																																																																														
SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.																																																																																																																																														
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 40%; padding: 5px;"> Hydrophytic Vegetation Present? Yes _____ No <u>X</u> Hydric Soil Present? Yes _____ No <u>X</u> Wetland Hydrology Present? Yes _____ No <u>X</u> </td> <td style="width: 60%; padding: 5px;"> Is the Sampled Area within a Wetland? Yes _____ No <u>X</u> </td> </tr> </table>			Hydrophytic Vegetation Present? Yes _____ No <u>X</u> Hydric Soil Present? Yes _____ No <u>X</u> Wetland Hydrology Present? Yes _____ No <u>X</u>	Is the Sampled Area within a Wetland? Yes _____ No <u>X</u>																																																																																																																																										
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Remarks: <u>Upland along drainage is steep hillside.</u>																																																																																																																																														
VEGETATION – Use scientific names of plants.																																																																																																																																														
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Sampling Point: DP-1U

HYDROLOGY

Wetland Hydrology Indicators:

Western Mountains, Valleys, and Coast – Version 2.0

APPENDIX C

DELINEATION AND GENERAL SITE PHOTOGRAPHS



Photo 1. General proposed subdivision vegetation community; view northeast.



Photo 2. Bare spot in west center of property where wildlife likely congregate.

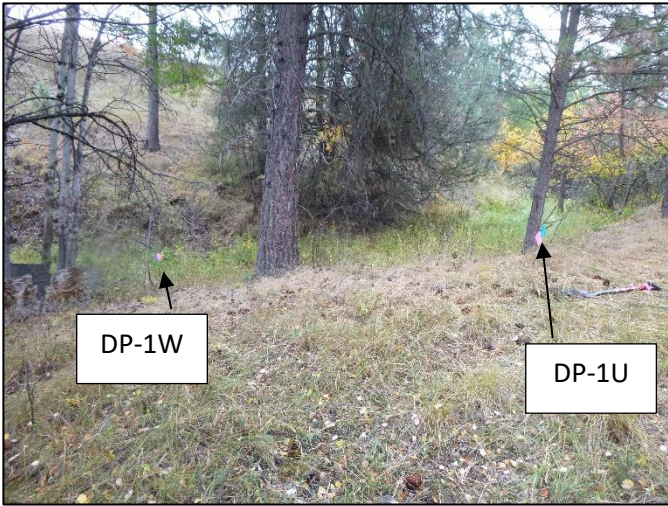


Photo 3. Wetland-1 (green vegetation in gully center) along perennial channel bed (NWW-1) within Moose Can Gully; DP-1W (wetland data point: left blue/pink flags) and DP-1U (upland); view southwest.



Photo 4. General photo of Moose Can Gully vegetation within wetland fringe and upland slope; view west.



























APPENDIX D

NRCS SOIL REPORT AND MNHP WETLAND MAP



NRCS Soil Map (2021); red polygon is approximate site boundary.

MAP LEGEND

Area of Interest (AOI)		Transportation	
 Area of Interest (AOI)		 Rails	
Soils		 Interstate Highways	
Soil Rating Polygons		 US Routes	
 Hydric (100%)		 Major Roads	
 Hydric (66 to 99%)		 Local Roads	
 Hydric (33 to 65%)		Background	
 Hydric (1 to 32%)		 Aerial Photography	
 Not Hydric (0%)			
 Not rated or not available			
Soil Rating Lines			
 Hydric (100%)			
 Hydric (66 to 99%)			
 Hydric (33 to 65%)			
 Hydric (1 to 32%)			
 Not Hydric (0%)			
 Not rated or not available			
Soil Rating Points			
 Hydric (100%)			
 Hydric (66 to 99%)			
 Hydric (33 to 65%)			
 Hydric (1 to 32%)			
 Not Hydric (0%)			
 Not rated or not available			
Water Features			
 Streams and Canals			

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: Missoula County Area, Montana

Survey Area Data: Version 18, Jun 4, 2020

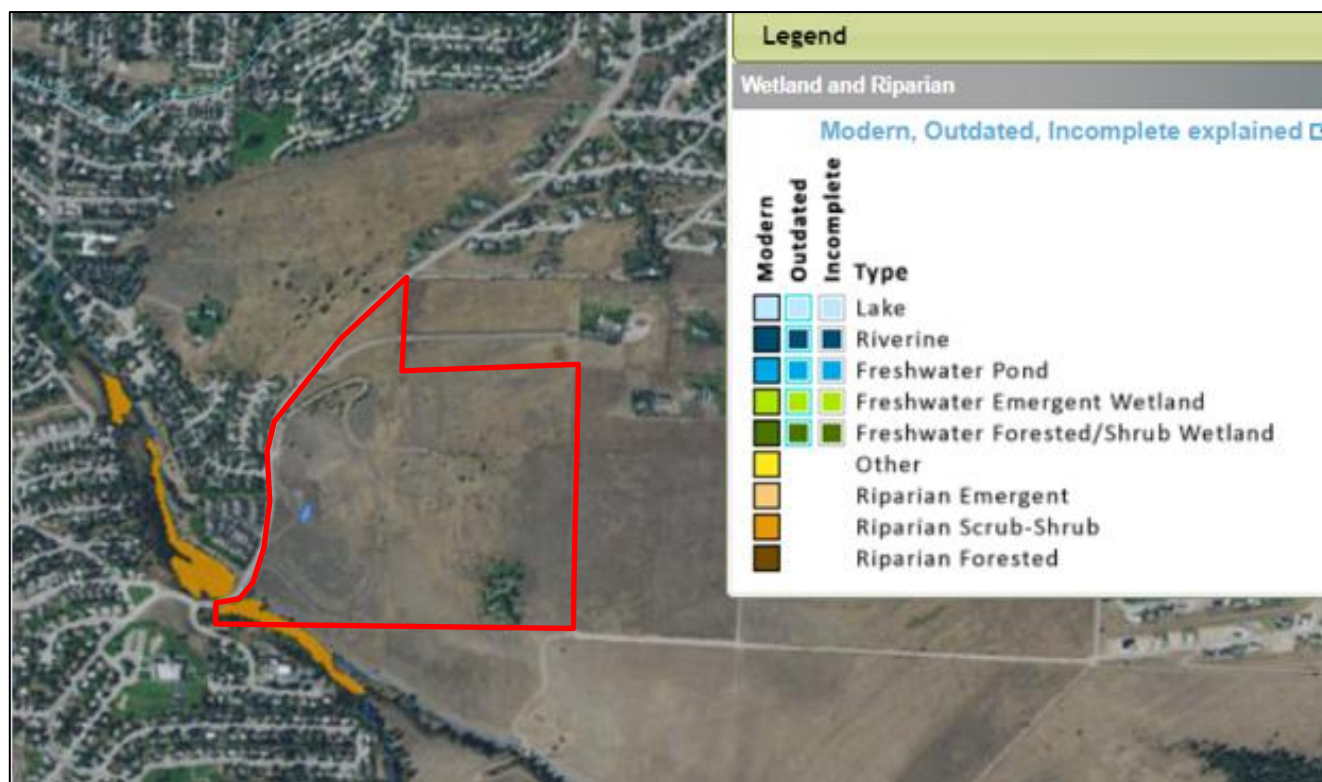
Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 6, 2014—Nov 2, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydric Rating by Map Unit

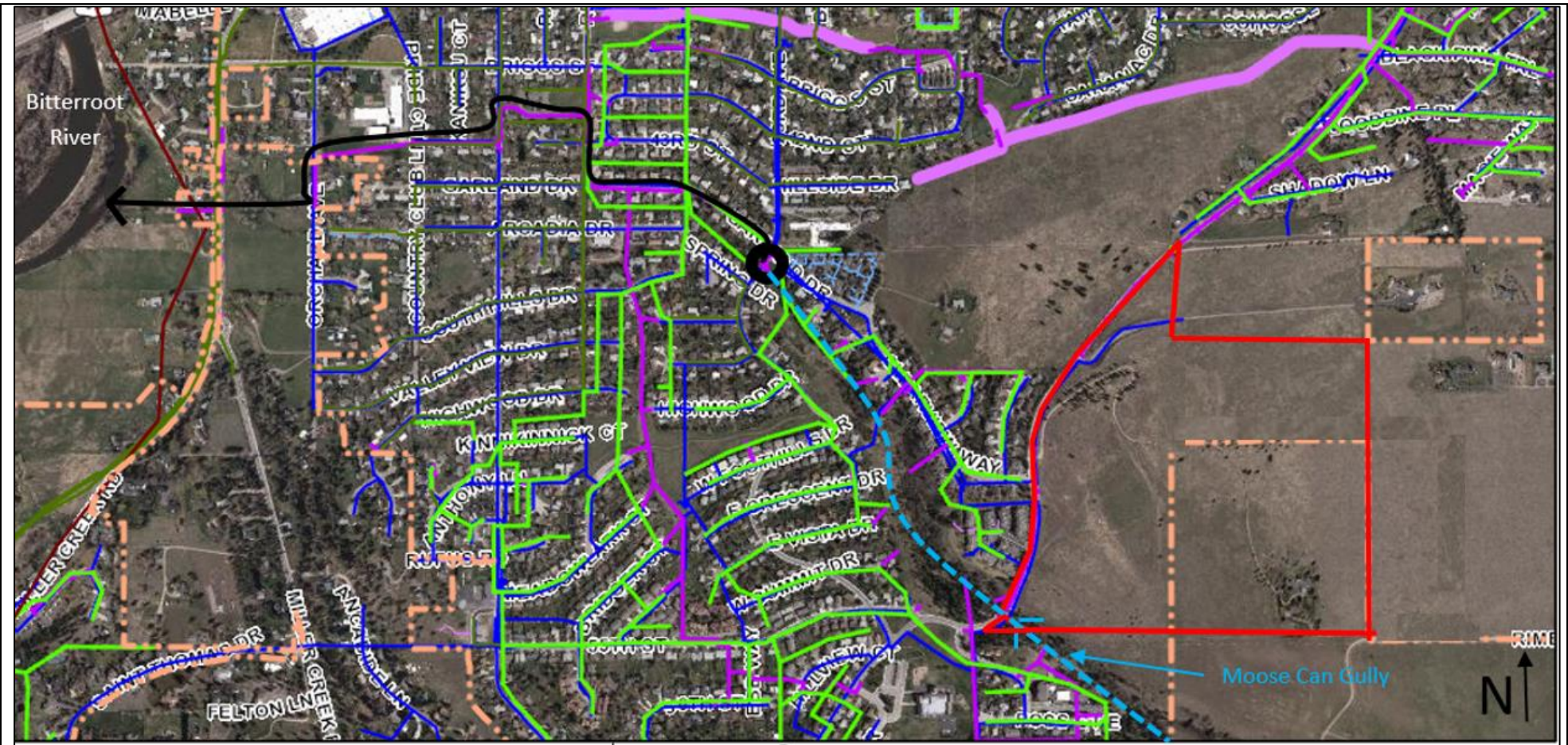
Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8	Minesinger-Bigarm complex, 4 to 15 percent slopes	0	201.6	55.6%
9	Bigarm-Minesinger complex, 15 to 30 percent slopes	0	37.0	10.2%
16	Bigarm gravelly loam, 0 to 4 percent slopes	2	3.3	0.9%
17	Bigarm gravelly loam, 4 to 15 percent slopes	0	31.3	8.6%
18	Bigarm gravelly loam, 15 to 30 percent slopes	0	84.4	23.3%
88	Pits, gravel	0	4.9	1.4%
Totals for Area of Interest			362.4	100.0%



Montana Natural Heritage Program Wetland Inventory Map (MNHP 2021), red polygon illustrates approximate site boundary.

APPENDIX E

MOOSE CAN GULLY PERENNIAL STREAM/WETLAND FRINGE STORMWATER CONNECTION TO BITTERROOT RIVER



Stormwater connection of Moose Can Gully to the Bitterroot River (City of Missoula 2022): black line overlays City of Missoula pink line that indicates stormwater path and inflow on east bank of Bitterroot River; black circle indicates where Moose Can Gully runoff enters city stormwater system; blue dashed line is flow direction of perennial stream within Moose Can Gully; and, red polygon is approximate proposed Hillview Subdivision boundary.