WETLAND DELINEATION REPORT & FUNCTIONAL ASSESSMENT

Talkeetna Sewer System Upgrades

Project No.: 19-008P

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ABBREVIATIONS

ADF&G .....Alaska Department of Fish and Game
ASGDC.....Alaska State Geo-spatial Data Clearinghouse
ATV.....all-terrain vehicle
CWA .....Clean Water Act
FAC .....facultative neutral plants
FACU.....facultative upland plants
FACW ..... facultative wetland plants
FGDC .....Federal Geographic Data Committee
GIS .....Geographic Information System
HDL .....HDL Engineering Consultants, LLC
MSB.....Matanuska-Susitna Borough
NWI..... National Wetland Inventory
NRCS .....Natural Resources Conservation Service
OBL .....obligate wetland plants
TNW .....Traditional Navigable Water
U.S..... United States
USACE ..... U.S. Army Corps of Engineers
USEPA .....U.S. Environmental Protection Agency
USDA.....U.S. Department of Agriculture
USGS .....U.S. Geological Survey
WWTP .....Wastewater Treatment Plant

1.0 INTRODUCTION

The Matanuska-Susitna Borough (MSB) is proposing upgrades to the existing Talkeetna Wastewater Treatment Plant (WWTP) to bring it into compliance with discharge limits stipulated in its Alaska Pollutant Discharge Elimination System permit. HDL Engineering Consultants, LLC (HDL) is under contract with the MSB to prepare a wetland delineation report (report) documenting baseline wetland information for the project area. The work performed for this report includes field wetland determinations, classification and mapping of wetlands and waterbodies, a preliminary jurisdictional determination, and a functions and values assessment.

This report is intended to support preparation of National Environmental Policy Act documentation, planning for avoidance and minimization of wetland impacts during the project's design phase, and to provide the necessary wetland data to the U.S. Army Corps of Engineers (USACE) to make a formal jurisdictional determination under Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act. This report was prepared following the guidelines for jurisdictional determination reports contained in Special Public Notice 2010-45 (USACE 2010).

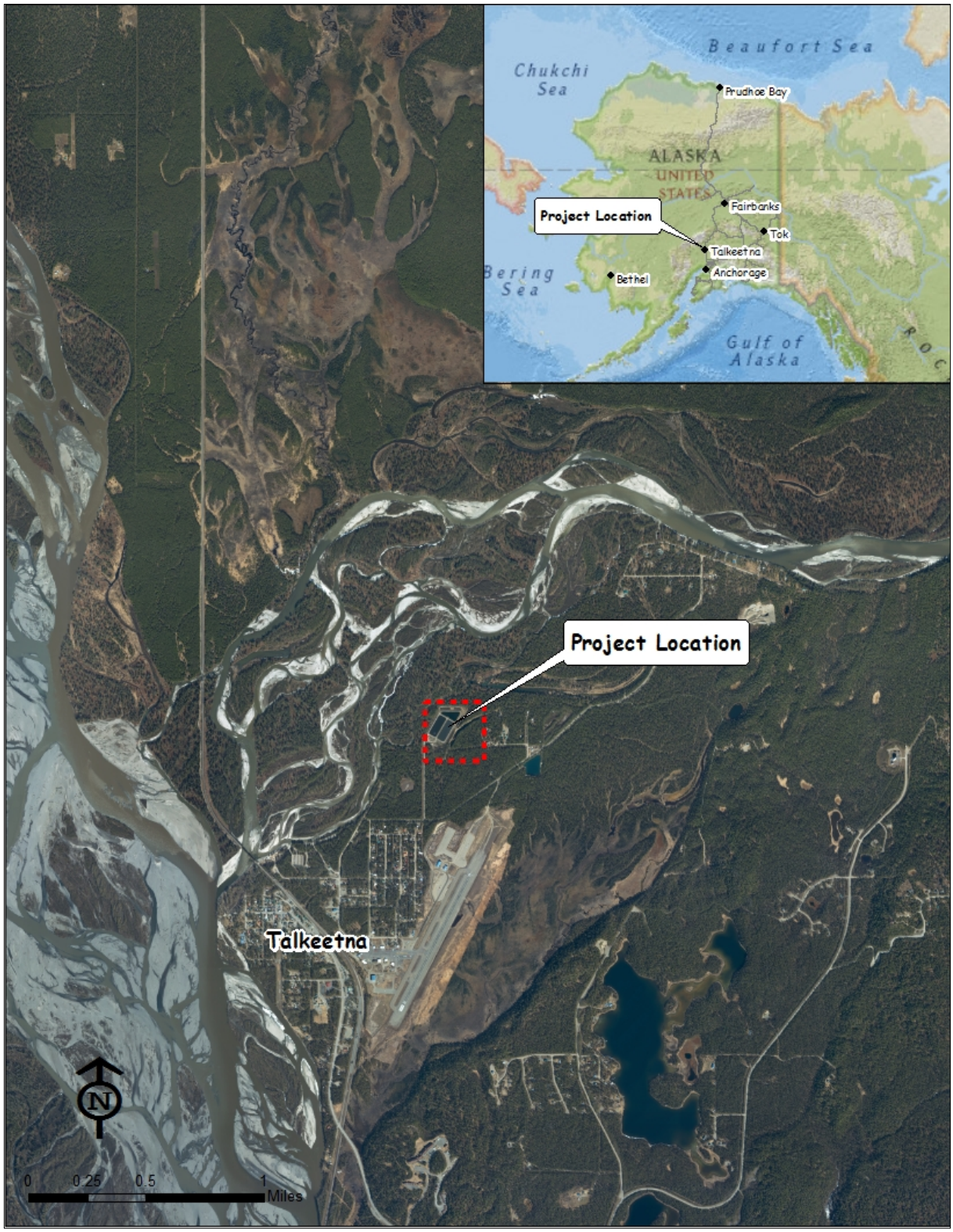
The USACE defines wetlands as "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (USACE 1987).

1.1 Project Location and Study Area

The project is located in Section 19 of Township 26N, Range 4W, Seward Meridian on U.S. Geological Survey (USGS) Quadrangle *Talkeetna B-1*. The study area consists of the area within the existing property boundary of the Talkeetna WWTP, approximately 40 acres. The footprint of existing WWTP is approximately 8.5 acres in size. The study area is located at latitude 62.33428°N, longitude 150.08924°W (project center) (Figure 1).

The study area is located in the Cook Inlet ecological region. This ecoregion has one of the mildest climates in Alaska and is located in the south central part of the State adjacent to the Cook Inlet. This region has a variety of vegetation communities but is dominated by stands of spruce and hardwood species. The area is generally free from permafrost but was intensely glaciated during the Pleistocene epoch (Gallant et al. 1995).

Figure 1: Project Location Map



2.0 METHODS

2.1 Preliminary Mapping

HDL wetland scientists reviewed existing environmental data and wetlands mapping available for the study area. This information was used to prepare maps of the project area containing known wetland and waterbody locations (Appendix A). Sources of environmental data and other geographic information included the following:

- 2017 LIDAR of the project area provided by MSB.
- USGS 1:63,360 Series (Topographic) Maps: Quadrangle *Talkeetna B-1* (USGS 1994).
- Relevant environmental Geographic Information System (GIS) layers and shapefiles provided by the Alaska State Geo-spatial Data Clearinghouse (ASGDC) website (ASGDC 2018).
- Cook Inlet Wetlands (Gracz 2015)
- Alaska Department of Fish and Game (ADF&G) Anadromous Waters Catalog (ADF&G 2018).

Using the information presented above, known wetlands and waterbodies, and additional areas that may have the potential to contain wetlands were planned for field investigation.

2.2 Field Survey

HDL wetland scientists, Brooke Therrien and Owen Means, conducted a field survey on October 3, 2018, to investigate the wetland status, jurisdiction, and functions of specific habitats within the study area.

Investigators visited 8 sites (sampling points) where information on vegetation communities, soil characteristics, and hydrological conditions were collected. The type of investigation performed and the information collected at each sampling point depended on the geomorphological, hydrological, and vegetative character of the sampling point area, its proximity to areas where wetland/upland status can be assumed (e.g., constructed road embankments, permanent open or flowing water, etc.), or a site's similarity to other sites where sufficient data to characterize the site has been previously recorded. Sampling points were divided between full wetland determinations and photo points. Wetland mapping located in Appendix A, Figure 2 shows the sampling point locations for this investigation.

2.2.1 Full Wetland Determination Points

Full wetland determinations were performed at four sites and followed the three-parameter approach described in the USACE *Wetlands Delineation Manual* (USACE 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region, Version 2.0* (USACE 2007a). To be classified as a wetland using USACE methods, a site must possess wetland hydrology, support hydrophytic vegetation, and have hydric soils. Data sheets following the USACE Routine Wetland Determination methodology were used to record vegetation, hydrologic, and soil characteristics observed at each determination site. Wetland determination data forms are included in Appendix B.

Vegetation was assessed by estimating percent live aerial cover of plant species in the tree, shrub, and herbaceous vegetation stratums. Taxonomic nomenclature (common and scientific plant names) and wetland indicator status for all plant species followed *The National Wetland Plant List*, *2016 wetland ratings* (Lichvar et al. 2016). Dominant species were determined for

each stratum using standard USACE 50/20 methods. The dominance test and prevalence index indicators were used for each site to determine the presence of hydrophytic vegetation.

Plant guidebooks used to identify plant species included the following:

- *Wetland Sedges of Alaska* (Tande and Lipkin 2003).
- *A Field Guide to Alaska Grasses* (Skinner et al. 2012).
- *Alaska Trees and Shrubs* (Viereck and Little 2007).
- *Plants of the Western Forest: Alaska to Minnesota, Boreal and Aspen Parkland* (Johnson et al. 1995).
- *Willows of Southcentral Alaska* (Collet 2004).
- *Flora of Alaska and Neighboring Territories: A Manual of the Vascular Plants* (Hultén 1968).

Soil characteristics were documented at sites where no standing water was observed by digging soil pits deep enough to observe hydric soil indicators or a restrictive layer—generally to a maximum of 22 inches below the soil surface. Soil layers and characteristics were described, including texture, color, saturation, depth to water table, and the presence of hydric soil indicators. Soil color was determined using *Munsell Soil Color Charts* (Munsell 2009).

Hydrology characteristics were assessed by recording the presence of wetland hydrology indicators, including but not limited to standing water, soil saturation, depth to water table, or the presence of hydrogen sulfide odor.

2.2.2 Photo Points

At sites where vegetation, landform, and landscape position were substantially similar to sites already determined, or where wetland/upland status can be assumed (see definition of "assumed" in Section 2.2), site conditions were documented with photos and notes describing visible surface hydrology observations, dominant vegetation, local relief, and landscape position. Photo points were recorded at 4 sites.

Photo points were typically performed at sites where the wetland/upland boundary appeared to be obvious or abrupt (e.g., linear wetland/upland boundaries between existing WWTP embankments and saturated/flooded wetlands; and where embankments are defined, linearly sloped, and contain upland colonizers, and the wetland contains relatively permanent surface water). Photo point documentation forms are included in Appendix B.

2.3 Habitat Classification and Mapping

2.3.1 Wetlands and Water Bodies

Wetland scientists classified wetland and waterbody habitats according to the Cowardin Classification System (Federal Geographic Data Committee [FGDC] 2013), which is also the classification scheme used by the U.S. Fish and Wildlife Service's National Wetland Inventory (NWI). An evaluation of each habitat's landscape position, local geomorphology, plant community composition and structure, bottom substrate, and general hydrology characteristics provided information needed to determine the classification of each habitat. In general, Palustrine habitats were classified to the subclass level, while Riverine Habitats were classified to the class level. Water regime and special modifier codes were applied to all habitats where

applicable following the code definitions in FGDC 2013 and the NWI Wetlands and Deepwater Map Code Diagram (NWI 2015).

Wetland boundaries identified during preliminary mapping were modified at sampling point locations based on wetland determinations and observations made at the site. Wetland boundaries were then extrapolated to the remainder of the wetland or wetland complex within the study area by interpreting color signature, visible water patterns, 2-foot elevation contours, and topographic relief from aerial imagery and other spatial data. Wetland map polygons were drawn digitally and their acreages were calculated in ArcMap GIS.

2.4 Preliminary Jurisdiction Determination

Wetlands and water bodies identified in the study area during the field survey were preliminarily evaluated for jurisdiction under Section 404 of the CWA and Section 10 of the Rivers and Harbors Act. The evaluation followed guidelines described in the joint USACE/U.S. Environmental Protection Agency (USEPA) June 2007 memorandum, *Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos v. United States & Carabell v. United States* (USACE & USEPA 2007) and the USACE *Jurisdictional Determination Form Instructional Guidebook* (USACE 2007b). Waters of the U.S. under USACE jurisdiction include the following:

- Traditional navigable waters (TNW).
- Wetlands adjacent to TNWs.
- Relatively permanent non-navigable tributaries (Relatively Permanent Waters) of TNWs typically flowing year-round or with at least seasonally continuous flow (e.g., typically three months duration).
- Wetlands directly abutting such tributaries.

For waters identified within the study area that do not fall under the criteria above, wetland scientists considered whether the water has a significant effect on the chemical, physical, or biological integrity of a downstream TNW and, therefore, a significant nexus. Significant nexus analyses included assessment of the hydrologic and ecological functions and services provided by the waters.

The following waters may fall under USACE jurisdiction following determination of a significant nexus with a TNW:

- Non-navigable tributaries that are not relatively permanent.
- Wetlands adjacent to such tributaries.
- Wetlands adjacent to, but not directly abutting, a relatively permanent non-navigable tributary.

2.5 Wetland Function and Value / Habitat Assessment

Wetland scientists conducted an assessment of the function and value provided by waters preliminarily determined to be subject to USACE jurisdiction. The assessment consisted of a best professional judgment characterization as outlined in USACE Alaska District Regulatory Guidance Letter 09-01 (USACE 2009). The result of this assessment is categorization of all jurisdictional waters mapped in the study area in accordance with the wetland categories and mitigation ratios described in USACE Alaska District's May 2014 guidance (USACE 2014).

Wetlands with similar habitat characteristics, geomorphology, and landscape position were aggregated into unique assessment groups. Each group is generally defined by waters with similar landscape position, landform, water regime, and functions and values they provide. A description of each wetland assessment group is provided in Section 4.4 Habitat Functions and Values ratings for wetlands, and the rationale used to assign ratings, were then recorded on a best professional judgment form for each wetland assessment group.

Using the best professional judgment of wetland scientists in combination with field observations, relevant scientific literature, and existing environmental data, function and value of wetlands were rated as low, moderate, or high, depending on the extent function and value criteria were met and/or site characteristics were present. Ratings reflect both the capability and opportunity for a given function to be performed and extend to all similarly situated portions of wetlands and waters, including those outside the study area. The functions and values rated in this assessment included the following:

- Hydrological functions
- Water quality functions
- Habitat functions
- Other functions including a combination of subsistence, recreational, educational and scientific uses

Water bodies are rated generally for their degree of naturalization and capability to support fish. Water body ratings have been recorded on a water body characterization form and are included in Appendix C.

3.0 FIELD CONDITIONS

This section summarizes the wetland indicators and other environmental conditions observed during the field survey. Where full determination points were completed, all information on vegetation, soil, and hydrology needed to accurately document the presence or absence of wetland indicators was collected.

Excluding the footprint of the existing WWTP, the degree of disturbance observed throughout the study area was primarily undisturbed; however, some areas of disturbance were identified and included an existing power line right-of-way and an all-terrain vehicle (ATV) trail. The ATV trail parallels the west and north property boundaries of the project area. Disturbance from these and other sources resulted in vegetation communities, hydrological patterns, and soil conditions that differed from adjacent undisturbed areas. Where possible, wetlands data and observations were observed in adjacent undisturbed areas and extrapolated to the disturbed area if there were no significant changes in topography or other environmental factors.

3.1 Vegetation

Indicators of hydrophytic vegetation are the dominance or prevalence of plant species rated as obligate wetland plants (OBL), facultative wetland plants (FACW), and/or facultative plants (FAC). Sites exhibiting hydrophytic vegetation typically included communities dominated by sedge species (*Carex* sp. [FACW/OBL]), bluejoint (*Calamagrostis canadensis* [FAC], and horsetails (*Equisetum* sp. [FAC]).

Uplands within the study area generally consisted of forest communities located on flat or nearly flat uplands, Cottonwood (*Populus balsamifera*) rated as facultative upland plants (FACU) were dominant and formed a closed canopy with an understory dominated by Highbush Cranberry (*Viburum edule* [FACU]), horsetails (*Equisetum* sp. [FAC]) and Lady Fern (*Athyrium cyclosorum* [FAC]).

3.2 Soil

Indicators of hydric soil are physical or chemical conditions that occur when a soil experiences saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile (U.S. Department of Agriculture [USDA] 1994). The only hydric soil indicator observed in wetlands where there was no surface water present was indicator A3, saturation.

3.3 Hydrology

Indicators of wetland hydrology are intended to reflect a site's medium- to long-term hydrological history (USACE 2007a). Indicator A1, surface water, was common at sites where wetlands were identified.

Climatic conditions that can influence the hydrology portion of field wetland determinations include above or below normal precipitation during the period preceding the field survey. Above normal precipitation can result in episaturated conditions or seasonal flooding of some wetlands or uplands that may not occur during normal conditions. Below normal precipitation can result in absence of surface water in stream channels. Either condition may result in inaccurately estimating the limits of wetland boundaries or the ordinary high water mark of streams, or incorrectly assessing the jurisdictional status of some waters.

In order to determine whether precipitation amounts were normal, above normal, or below normal for the time of year, and whether recent climatic conditions could have affected hydrology observations in the field, a comparison between the historical precipitation amounts for the previous ten-year period (2008-2017) and current year (2018) for July, August, and September was completed following the methods outlined in the Natural Resources Conservation Service (NRCS) *Engineering Field Handbook* (NRCS 1997). The comparison uses a formula based on the average precipitation over the given time period, with a higher weight placed on the most recent preceding month and a lower weight placed on the least recent month used in the comparison (e.g., rainfall amounts during the month of September are a greater factor than July in determining whether hydrological conditions were normal during the October field effort).

Precipitation data was taken from the Talkeetna AP station (station no. 508976) located approximately one mile south of the study area (NRCS 2018). Precipitation totals were normal in July, above normal in August, and normal in September (Figure 2). Using the NRCS formula, the conditions were determined to be within the normal range of precipitation (Table 1). Hydrological conditions at the time of the field survey were assumed to be representative of typical conditions, and wetland scientists applied indicators of wetland hydrology as observed.

Figure 2: Current versus 10-year Monthly Precipitation Averages

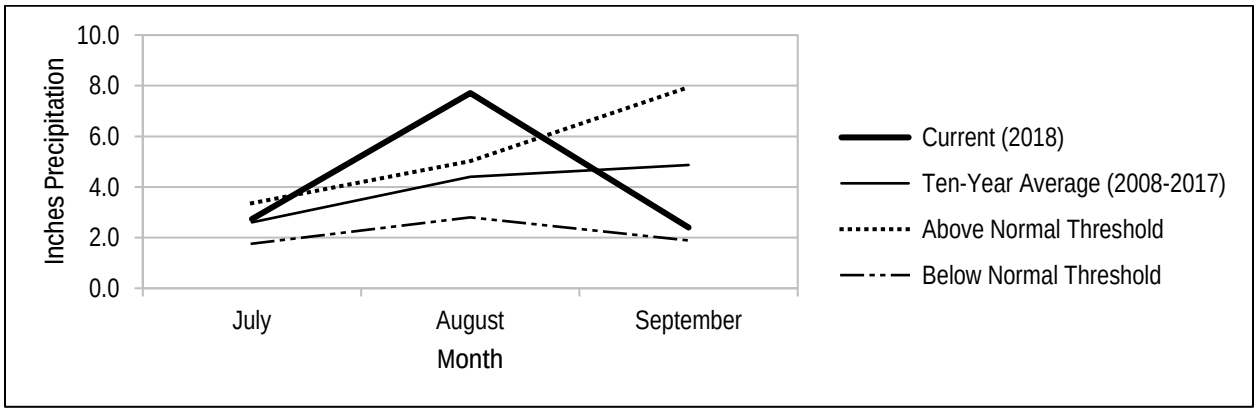


Table 1: Precipitation Worksheet

Month	Precipitation Thresholds (inches) Below	Normal	Above	Current Precipitation	Condition	Condition Value	Month Weight	Condition x Weight
	< 1.76	1.76 - 3.36	> 3.36	2.74	Normal	2	1	2
	< 2.80	2.80 - 5.02	> 5.02	7.71	Wet	3	2	6
	< 1.89	1.89 - 7.94	> 7.94	2.40	Normal	2	3	6
	If sum is				Condition Value:	Dry=1 Normal=2 Wet=3	Sum	14
	6-9:	then period has been drier than normal						
	10-14:	then period has been normal						
	15-18:	then period has been wetter than normal						

Precipitation calculations per NRCS *Engineering Field Handbook*, Figure 19-7, Rainfall documentation worksheet (NRCS 1997).

4.0 RESULTS AND DISCUSSION

4.1 Wetland Habitat Classification

The sections below present the rationale for classifying wetlands and other waters found in the study area into their respective habitat types. Table 2 defines the habitat and vegetation classifications used in this report. Wetlands mapping in Appendix A, Figure 2 contains the location of sampling points and the wetland/upland boundaries delineated for each wetland identified. Wetlands data, photos, and observations recorded in the field for each sampling point are included in data forms located in Appendix B.

Table 2: Wetland and Waterbody Habitat Types found Within the Study Area

Cowardin / NWI Classification	
Code	Description
PEM1B	Palustrine; emergent; persistent; seasonally saturated
PUBH	Palustrine; unconsolidated bottom; permanently flooded
R3UBH	Riverine; upper perennial; unconsolidated bottom; permanently flooded
U	Upland

4.1.1 Wetlands

Emergent Wetlands

Emergent wetland habitats are mesic to wet marshes containing primarily herbaceous vegetation. Species found dominating these habitats were bluejoint (*Calamagrostis canadensis*), sedge species (*Carex* sp.), and horsetails (*Equisetum* sp.). Wetlands within the project area exhibited saturated soil conditions within 12 inches of the soil surface and are classified according to the NWI/Cowardin as PEM1B.

Pond

Pond wetlands are freshwater waterbodies classified in the Palustrine system. These wetland habitats have 25 percent or less vegetative cover and are typically less than 20 acres in size, less than 6.5 feet deep, and lack shoreline features. Ponds mapped within the study area are relict river channels with sedge meadow fringes and have been classified according to the NWI/Cowardin as PUBH.

4.1.2 Water Bodies

Upper Perennial Stream

Upper Perennial streams have flowing water year-round during normal hydrological conditions. The water table is located above the streambed for most of the year. The substrate consists of rock, cobbles, or gravel with occasional patches of sand. The natural dissolved oxygen concentration is normally near saturation and the fauna is characteristic of running water, and there are few or no planktonic forms. The waterbody within the project area is a side channel of the Talkeetna River. This channel is characterized by low gradient flow with defined bed, banks, and channel and has been classified according to NWI/Cowardin as R3UBH.

4.2 Preliminary Jurisdictional Determination

The Talkeetna River, a braided stream, is considered navigable under U.S. Coast Guard Section 9 jurisdiction. This river is also known for use by recreational watercraft and would be considered navigable-in-fact and subject to USACE Section 10 jurisdiction. The Talkeetna River discharges into the Susitna River, approximately 1.0 mile downstream of the project area, which eventually drains to Cook Inlet, a territorial sea.

Wetlands and waterbodies mapped within the study area have a surface water or wetland connection to the Talkeetna River via a side channel, or are reasonably close[1] and are considered adjacent. These waters are subject to USACE's jurisdiction under Section 404 of the CWA.

A decommissioned wastewater treatment lagoon, with defined berms and standing water in the bottom, exists south of the existing WWTP lagoons. This decommissioned lagoon is located entirely within an upland area. Surface water collects in the bottom of the lagoon. As defined under the CWA title 33 U.S.C. Section 230.3 (4)(a), water treatment systems, including treatment ponds or lagoons designed to meet the requirements of the CWA are not classified as waters of the U.S. Furthermore, the guidelines described USACE & USEPA 2007 provided guidance regarding when agencies will generally not assert jurisdiction. Geographic features

[1] To be "reasonably close", the proximity of wetlands or waters to other jurisdictional waters is close enough to support the science-based inference that an ecological interconnection exists between such waters.

that are generally not considered jurisdictional waters include areas are excavated entirely within and draining only upland areas and that do not carry a relatively permanent flow of water.

4.3 Mapping Summary

The study area for this report was approximately 40.0 acres. Wetlands mapped within the study area total 2.72 acres. Water bodies (i.e., streams) totaled 0.35 acre of stream channel. A summary of jurisdictional wetlands and streams is located in Table 3. The remaining 36.93 acres within the study area are non-jurisdictional uplands, including unpaved roadways, building pads, existing/decommissioned wastewater treatment ponds, and other constructed surfaces (Table 3).

Table 3: Summary of Jurisdictional and Non-Jurisdictional Wetlands and Habitat Types

Cowardin/NWI Classification		Associated Field Sampling Points		Acres
Subsystem or Class	Code	Full Determination Points	Photo Points	
Jurisdictional				
Wetlands - Palustrine				
Emergent	PEM1B	3		0.27
Unconsolidated Bottom	PUBH		4	2.44
Waterbodies - Riverine				
Upper Perennial	R3UBH		6	0.35
Non-Jurisdictional				
Wetlands – Wastewater Cell	N/A	1		8.81
Upland	U	2,5	7,8	28.13
			Total Jurisdictional Wetlands and Water of the U.S.:	3.06
			Total Non-Jurisdictional Wetlands and Uplands:	36.94
			Total Study Area Acreage:	40.0
			Percent of Study Area that is Wetlands or other Waters of the U.S.:	7.65%
			Percent of Study Area that is Uplands/Non-Jurisdictional Wetlands::	92.35%

4.4 Habitat Functions and Values

The function and value of all waters preliminarily determined to be subject to USACE's jurisdiction have been evaluated using the best professional judgment of wetland scientists, resulting in categorization of those waters corresponding with the wetland categories and mitigation ratios outlined in USACE Alaska District's May 2014 mitigation guidance. Wetlands and water bodies were separated into two unique assessment groups representing the two major types of habitat identified.

Ratings and rationale for the habitat assessment are presented below and in Table 4.

<u>Group 1</u>

Assessment Group 1 includes the Talkeetna River and all branches of the river that have direct surface water connection. According to the ADF&G, the Talkeetna River (assessment Group 1) is an anadromous stream. Due to this waterbody's ability to support anadromous fish, the functional assessment of the Group 1 waterbody (Talkeetna River) resulted in assigning this waterbody a USACE mitigation Category I.

<u>Group 2</u>

Assessment Group 2 consists of palustrine wetlands occupying relict river channels that are somewhat disturbed or fragmented but have a hydrological connection to the Talkeetna River

via ground water. Hydrologic and flood control functions are often characteristic of depressed or closed systems where the wetland has the ability to receive flood flows and has constrictions that likely store water during flood events. These wetlands exhibit moderate value for the regulation of floodwaters, but overall are rated low due to their abundance in the region. Wetlands in assessment Group 2 have been rated low and assigned mitigation Category III.

Table 4: Wetland Function and Value Ratings

Function	Assessment Group	
	1	2
Flood Flow Regulation	-	M
Sediment, Nutrient, and Toxicant Removal	-	M
Erosion Control and Shoreline Stabilization	-	NR
Production of Organic Matter and its Export		L
General Habitat Suitability	-	M
General Fish Habitat	-	NR
Native Plant Richness	-	M
Educational, Scientific, Recreational, or Subsistence Use	-	L
Uniqueness and Special Status	-	L
Acres	0.35	2.71
Overall Qualitative Rating	High	Low
USACE Mitigation Category	I	III

Qualitative ratings: H=High, M=Moderate, L=Low, NR=Not rated.

5.0 CONCLUSION AND SUMMARY

This report was prepared following the guidelines for jurisdictional determination reports contained in USACE Alaska District's Special Public Notice 2010-45. Wetland determinations were performed in accordance with the USACE *Wetlands Delineation Manual* and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region, Version 2.0*.

HDL wetland scientists conducted a field survey of the study area, comprised of the existing property boundaries of the Talkeetna WWTP, on October 3, 2018. Climatic and hydrological conditions were normal for the time of year and normal circumstances were present at most sampling point locations. Wetlands data and observations were collected at 8 sampling points within the study area. Following the field survey, wetlands were mapped in GIS and analyzed for their jurisdictional status under the CWA. The functions and values of those wetlands preliminarily determined to be subject to CWA jurisdiction were then assessed.

The total acreage of jurisdictional wetlands, including water bodies classified as waters of the U.S., was 3.06 acres, equaling 7.65 percent of the study area. This report is considered preliminary until verified or modified by USACE in a formal Jurisdictional Determination.

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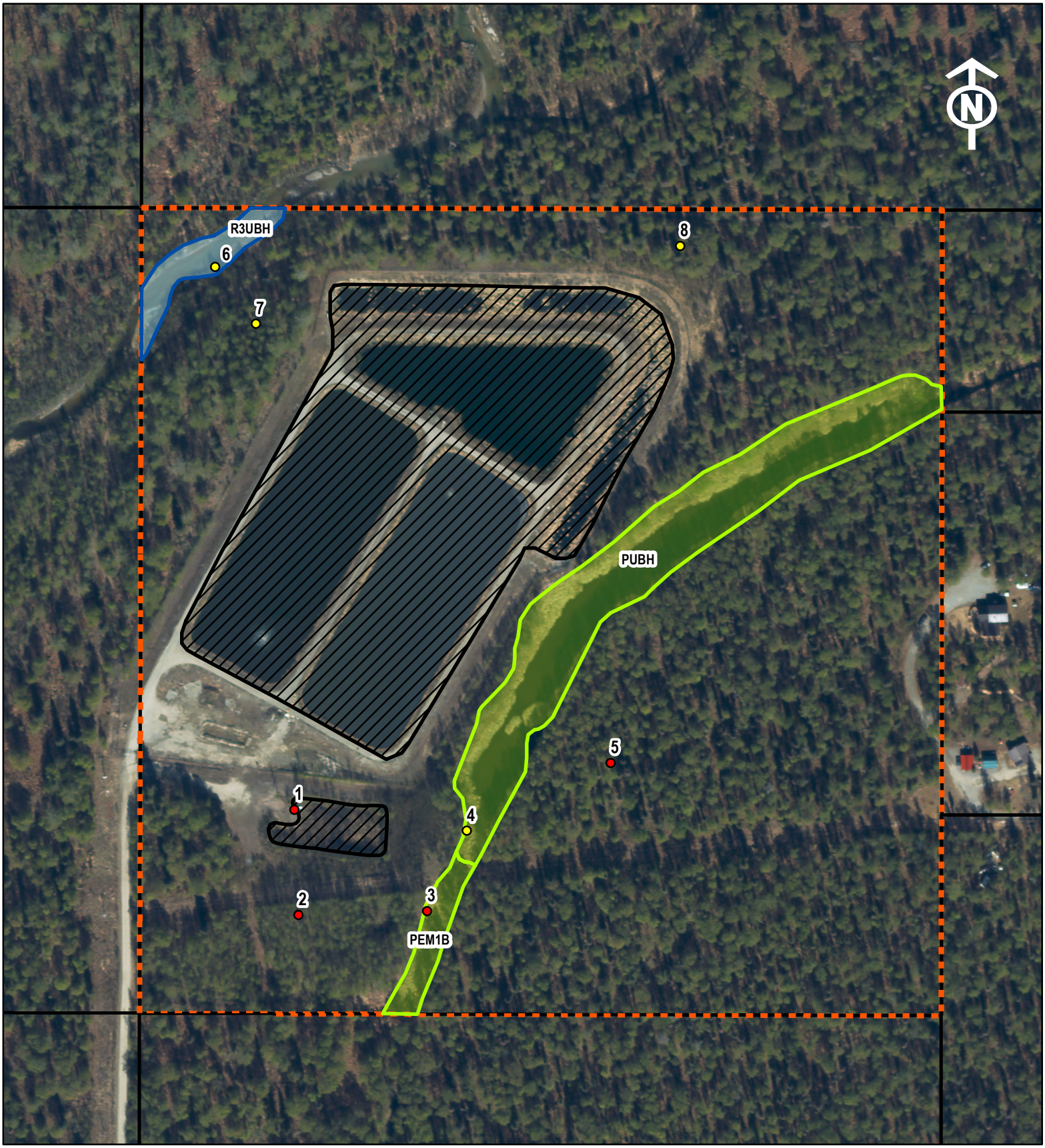
APPENDIX A

Wetland Mapping



Determination Points
Photo Points
Study Area
Property Lines

Wetland Habitats

Riverine
Palustrine
Non-Jurisdictional

Functional Assessment Groups

Group 1
Group 2

Talkeetna Sewer System Upgrades
Project No.: 19-008P

0 100 200 400 Feet

Figure 2
Wetland Mapping

APPENDIX B

Wetland Data Forms

FULL DETERMINATION POINT

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: Talkeetna Sewer System Upgrades Borough/City: Talkeetna Alaska Sampling Date: 10/2/2018

Applicant/Owner: Matanuska-Susitna Borough Sampling Point: 1

Investigator(s): Brooke Therrien/Owen Means Landform (hillside, terrace, hummocks, etc.): artifical lowland

Local relief (concave, convex, none): none Slope (%): 0

Subregion: Cook Inlet Wetlands Lat: 62.33345 Long: -150.09255 Datum: NAD83

Soil Map Unit Name: Susivar and Niklavar fine sandy loams NWI classification: N/A

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 x No _____	**Is the Sampled Area within a Wetland?** Yes x No _____
Hydric Soil Present?	Yes x No _____	
Wetland Hydrology Present?	Yes x No _____	

Remarks:

VEGETATION – Use scientific names of plants. List all species in the plot.

Tree Stratum			Absolute % Cover	Dominant Species?	Indicator Status
1.					
2.					
3.					
4.					
Total Cover:			0		
50% of total cover: 0			20% of total cover: 0		
Sapling/Shrub Stratum					
1.					
2.					
3.					
4.					
5.					
6.					
Total Cover:			0		
50% of total cover: 0			20% of total cover: 0		
Herb Stratum					
1.	carlen	*Carex lenticularis*	40	Yes	OBL
2.	carath	*Carex atherodes*	40	Yes	OBL
3.	calcan	*Calamagrostis canadensis*	10	No	FAC
4.					
5.					
6.					
7.					
8.					
9.					
10.					
Total Cover:			90		
50% of total cover: 45			20% of total cover: 18		

Plot size (radius, or length x width) 15 foot radius % Bare Ground 10

% Cover of Wetland Bryophytes (Where applicable) 5 Total Cover of Bryophytes 5

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% (A/B)

Prevalence Index worksheet:

	Total % Cover of:		Multiply by:	
OBL species	80	x 1 =	80	
FACW species	0	x 2 =	0	
FAC species	10	x 3 =	30	
FACU species	0	x 4 =	0	
UPL species	0	x 5 =	0	
Column Totals:	90	(A)	110	(B)

Prevalence Index = B/A = 1.22

Hydrophytic Vegetation Indicators:

Y Dominance Test is >50%

Y Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

FULL DETERMINATION POINT

SOIL

Sampling Point: 1

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

[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:

___ Histosol or Histel (A1)
___ Histic Epipedon (A2)
___ Hydrogen Sulfide (A4)
___ Thick Dark Surface (A12)
___ Alaska Gleyed (A13)
___ Alaska Redox (A14)
___ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

___ Alaska Color Change (TA4)[4]
___ Alaska Alpine Swales (TA5)
___ Alaska Redox With 2.5Y Hue
___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.
[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

Suface water present. No soil pit.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

X 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)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-stained Leaves (B9)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Salt Deposits (C5)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No _____ Depth (inches): 1
Water Table Present? Yes _____ No _____ Depth (inches): _____
Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): _____

Wetland Hydrology Present? Yes X No _____

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

Remarks:

FULL DETERMINATION POINT
PHOTO DOCUMENTATION FORM

Project/Site:	Talkeenta Wastewater Treatment Plant	Sampling Date:	10/3/2018
Applicant/Owner:	Matanuska-Susitna Borough	Sampling Point:	1
Investigator(s):	BT/OM	Watershed/Stream (N/A if upland):	N/A

Remarks: Decommissioned lagoon adjacent to the wastewater treatment facility. Standing water present.

Subject: Vegetation

FULL DETERMINATION POINT

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: Talkeetna Sewer System Upgrades Borough/City: Talkeetna Alaska Sampling Date: 10/2/2018

Applicant/Owner: Matanuska-Susitna Borough Sampling Point: 2

Investigator(s): Brooke Therrien/Owen Means Landform (hillside, terrace, hummocks, etc.): _____

Local relief (concave, convex, none): _____ Slope (%): 0

Subregion: Cook Inlet Wetlands Lat: 62.33297 Long: -150.09251 Datum: NAD83

Soil Map Unit Name: Susivar and Niklavar fine sandy loams NWI classification: Upland

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:

VEGETATION – Use scientific names of plants. List all species in the plot.

			Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum					
1.	popbal	*Populus balsamifera*	80	Yes	FACU
2.					
3.					
4.					
		Total Cover:	80		
		50% of total cover: 40		20% of total cover: 16	
Sapling/Shrub Stratum					
1.	popbal	*Populus balsamifera*	15	Yes	FACU
2.	betpap	*Betula papyrifera*	10	Yes	FACU
3.					
4.					
5.					
6.					
		Total Cover:	25		
		50% of total cover: 12.5		20% of total cover: 5	
Herb Stratum					
1.	equarv	*Equisetum arvense*	30	Yes	FAC
2.	athcyc	*Athyrium cyclosorum*	15	Yes	FAC
3.	ortsec	*Orthilia secunda*	10	No	FACU
4.					
5.					
6.					
7.					
8.					
9.					
10.					
		Total Cover:	55		
		50% of total cover: 27.5		20% of total cover: 11	

Plot size (radius, or length x width) 15 foot radius % Bare Ground _____

% Cover of Wetland Bryophytes (Where applicable) _____ Total Cover of Bryophytes _____

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	45	x 3 =	135
FACU species	115	x 4 =	460
UPL species	0	x 5 =	0
Column Totals:	160 (A)		595 (B)

Prevalence Index = B/A = 3.72

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 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 X

Remarks:

FULL DETERMINATION POINT

SOIL

Sampling Point: 2

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
0-22	7.5YR 5/2	100					SiCl	

[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:

___ Histosol or Histel (A1)
___ Histic Epipedon (A2)
___ Hydrogen Sulfide (A4)
___ Thick Dark Surface (A12)
___ Alaska Gleyed (A13)
___ Alaska Redox (A14)
___ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

___ Alaska Color Change (TA4)[4]
___ Alaska Alpine Swales (TA5)
___ Alaska Redox With 2.5Y Hue
___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.

[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ 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)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-stained Leaves (B9)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Salt Deposits (C5)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

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

Remarks:

FULL DETERMINATION POINT
PHOTO DOCUMENTATION FORM

Project/Site:	MSB Talkeetna Sewer Design	Sampling Date:	10/3/2018
Applicant/Owner:	Matanuska-Susitna Borough	Sampling Point:	2
Investigator(s):	BT/OM	Watershed/Stream (N/A if upland):	N/A

Remarks:

Subject: Plot Area

Subject: Soil

FULL DETERMINATION POINT

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: Talkeetna Sewer System Upgrades Borough/City: Talkeetna Alaska Sampling Date: 10/2/2018

Applicant/Owner: Matanuska-Susitna Borough Sampling Point: 3

Investigator(s): Brooke Therrien/Owen Means Landform (hillside, terrace, hummocks, etc.): lowland

Local relief (concave, convex, none): _____ Slope (%): 0

Subregion: Cook Inlet Wetlands Lat: 62.33299 Long: -150.09126 Datum: NAD83

Soil Map Unit Name: Susitna silt loam, 0-2 percent slopes NWI classification: PEM1B

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks:

VEGETATION – Use scientific names of plants. List all species in the plot.

			Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum					
1.					
2.					
3.					
4.					
		Total Cover:	0		
		50% of total cover: 0		20% of total cover: 0	
Sapling/Shrub Stratum					
1.	salmyr	*Salix myrtillifolia*	10	Yes	FACW
2.					
3.					
4.					
5.					
6.					
		Total Cover:	10		
		50% of total cover: 5		20% of total cover: 2	
Herb Stratum					
1.	carath	*Carex atherodes*	25	Yes	OBL
2.	calcan	*Calamagrostis canadensis*	30	Yes	FAC
3.	equarv	*Equisetum arvense*	30	Yes	FAC
4.	athcyc	*Athyrium cyclosorum*	5	No	FAC
5.	delgla	*Delphinium glaucum*	1	No	FACW
6.					
7.					
8.					
9.					
10.					
		Total Cover:	91		
		50% of total cover: 45.5		20% of total cover: 18.2	

Plot size (radius, or length x width) 15 foot radius % Bare Ground _____

% Cover of Wetland Bryophytes (Where applicable) _____ Total Cover of Bryophytes _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	25	x 1 =	25
FACW species	11	x 2 =	22
FAC species	65	x 3 =	195
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	101 (A)		242 (B)

Prevalence Index = B/A = 2.40

Hydrophytic Vegetation Indicators:

Y Dominance Test is >50%

Y Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

FULL DETERMINATION POINT

SOIL

Sampling Point: 3

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 %	Type[1]	Loc[2]	Texture	Remarks
0-10	7.5YR 4/1	70	10YR 3/4	30	C	PL	SiCl	
10-15	10YR 5/1	100					Cl	

[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:

___ Histosol or Histel (A1)
___ Histic Epipedon (A2)
___ Hydrogen Sulfide (A4)
___ Thick Dark Surface (A12)
___ Alaska Gleyed (A13)
___ Alaska Redox (A14)
___ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

___ Alaska Color Change (TA4)[4]
___ Alaska Alpine Swales (TA5)
___ Alaska Redox With 2.5Y Hue
___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
X Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.
[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: Debris
Depth (inches): 15

Hydric Soil Present? Yes X No ____

Remarks:

Soils disturbed. Large debris (logs) encountered at 15" in two different pits. Gleyed soils beginning to devleop below 12".

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
X 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)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-stained Leaves (B9)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Salt Deposits (C5)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____
Water Table Present? Yes ____ No X Depth (inches): ____
Saturation Present? (includes capillary fringe) Yes X No ____ Depth (inches): 8

Wetland Hydrology Present? Yes X No ____

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

Remarks:

Tussocks present.

FULL DETERMINATION POINT
PHOTO DOCUMENTATION FORM

Project/Site:	MSB Talkeetna Sewer Design	Sampling Date:	10/3/2018
Applicant/Owner:	Matanuska-Susitna Borough	Sampling Point:	3
Investigator(s):	BT/OM	Watershed/Stream (N/A if upland):	Talkeetna River

Remarks:

Subject: Vegetation

Subject: Soil

PHOTO POINT

Project/Site:	Talkeetna Sewer System Upgrades					Sampling Date:	10/2/2018
Applicant/Owner:	Matanuska-Susitna Borough					Sampling Point:	4
Investigator(s):	BT/OM	Lat:	62.33335	Long:	-150.09088	Datum:	NAD83
Watershed/Stream (N/A if upland):	N/A				NWI Classification:		PUBH
If Still Water, Approximate Size (acres):	1.38	&	Estimated depth at deepest:	10			
If Flowing Water, Average Width (ft):	N/A	,	Avg. depth (ft):	N/A	&	Substrate:	N/A

Remarks: Relict river channel. Palustrine sedge/grass meadow.

Subject: Vegetation

FULL DETERMINATION POINT

WETLAND DETERMINATION DATA FORM – Alaska Region

Project/Site: Talkeetna Sewer System Upgrades Borough/City: Talkeetna Alaska Sampling Date: 10/2/2018

Applicant/Owner: Matanuska-Susitna Borough Sampling Point: 5

Investigator(s): Brooke Therrien/Owen Means Landform (hillside, terrace, hummocks, etc.): floodplain/lowland

Local relief (concave, convex, none): _____ Slope (%): 0

Subregion: Cook Inlet Wetlands Lat: 62.33366 Long: -150.08949 Datum: NAD83

Soil Map Unit Name: Susitna silt loam, 0-2 percent slopes NWI classification: Upland

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

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X 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 X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	

Remarks:

VEGETATION – Use scientific names of plants. List all species in the plot.

Tree Stratum			Absolute % Cover	Dominant Species?	Indicator Status
1.	betpap	*Betula papyrifera*	30	Yes	FACU
2.					
3.					
4.					
		Total Cover:	30		
		50% of total cover: 15		20% of total cover: 6	
Sapling/Shrub Stratum					
1.	oplhor	*Oplopanax horridus*	15	No	FACU
2.	corcan	*Cornus canadensis*	5	No	FACU
3.	vibedu	*Viburnum edule*	50	Yes	FACU
4.	chaang	*Chamaenerion angustifolium*	10	No	FACU
5.	rosaci	*Rosa acicularis*	5	No	FACU
6.					
		Total Cover:	85		
		50% of total cover: 42.5		20% of total cover: 17	
Herb Stratum					
1.	equpra	*Equisetum pratense*	10	Yes	FACW
2.	calcan	*Calamagrostis canadensis*	5	Yes	FAC
3.	dryexp	*Dryopteris expansa*	10	Yes	FACU
4.					
5.					
6.					
7.					
8.					
9.					
10.					
		Total Cover:	25		
		50% of total cover: 12.5		20% of total cover: 5	

Plot size (radius, or length x width) 15 foot radius % Bare Ground _____

% Cover of Wetland Bryophytes (Where applicable) _____ Total Cover of Bryophytes _____

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40% (A/B)

Prevalence Index worksheet:

	Total % Cover of:	Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	5	x 3 =	15
FACU species	125	x 4 =	500
UPL species	0	x 5 =	0
Column Totals:	140 (A)		535 (B)

Prevalence Index = B/A = 3.82

Hydrophytic Vegetation Indicators:

No Dominance Test is >50%

No Prevalence Index is ≤3.0

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 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 X

Remarks:

FULL DETERMINATION POINT

SOIL

Sampling Point: 5

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
0-14	7.5YR 4/3	100					SiCl	
14-22	7.5YR 5/1	100					Sa	

[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:

___ Histosol or Histel (A1)
___ Histic Epipedon (A2)
___ Hydrogen Sulfide (A4)
___ Thick Dark Surface (A12)
___ Alaska Gleyed (A13)
___ Alaska Redox (A14)
___ Alaska Gleyed Pores (A15)

Indicators for Problematic Hydric Soils[3]:

___ Alaska Color Change (TA4)[4]
___ Alaska Alpine Swales (TA5)
___ Alaska Redox With 2.5Y Hue
___ Alaska Gleyed Without Hue 5Y or Redder Underlying Layer
___ Other (Explain in Remarks)

[3]One indicator of hydrophytic vegetation, one primary indicator of wetland hydrology, and an appropriate landscape position must be present.
[4]Give details of color change in Remarks.

Restrictive Layer (if present):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ 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)
___ Marl Deposits (B15)
___ Hydrogen Sulfide Odor (C1)
___ Dry-Season Water Table (C2)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-stained Leaves (B9)
___ Drainage Patterns (B10)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Salt Deposits (C5)
___ Stunted or Stressed Plants (D1)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ Microtopographic Relief (D4)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____
Water Table Present? Yes _____ No X Depth (inches): _____
Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

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

Remarks:

FULL DETERMINATION POINT
PHOTO DOCUMENTATION FORM

Project/Site:	MSB Talkeetna Sewer Design	Sampling Date:	10/2/2018
Applicant/Owner:	Matanuska-Susitna Borough	Sampling Point:	5
Investigator(s):	BT/OM	Watershed/Stream (N/A if upland):	N/A

Remarks:

Subject: Vegetation

Subject: Soil

PHOTO POINT

Project/Site:	Talkeetna Sewer System Upgrades					Sampling Date:	10/2/2018
Applicant/Owner:	Matanuska-Susitna Borough					Sampling Point:	6
Investigator(s):	BT/OM	Lat:	62.33589	Long:	-150.09332	Datum:	NAD83
Watershed/Stream (N/A if upland):	Talkeetna River				NWI Classification:		R3UBH
If Still Water, Approximate Size (acres):	N/A	&	Estimated depth at deepest:		N/A		
If Flowing Water, Average Width (ft):	30	,	Avg. depth (ft):	4	&	Substrate:	Sand

Remarks: Discharge point of the Talkeetna Wastewater Treament Plant into adjacent side channel of the Talkeetna River. River banks are defined with approximately 5 feet elevation above the water surface.

Subject: Surface Water

Subject: Defined Bank

PHOTO POINT

Project/Site:	Talkeetna Sewer System Upgrades					Sampling Date:	10/2/2018
Applicant/Owner:	Matanuska-Susitna Borough					Sampling Point:	7
Investigator(s):	BT/OM	Lat:	62.33563	Long:	-150.09293	Datum:	NAD83
Watershed/Stream (N/A if upland):	N/A				NWI Classification:	Upland	
If Still Water, Approximate Size (acres):	N/A	&	Estimated depth at deepest:	N/A			
If Flowing Water, Average Width (ft):	N/A	,	Avg. depth (ft):	N/A	&	Substrate:	N/A

Remarks: Dominant species includes *Populus balsamifera* , *Betula papyrifera* , *Viburnum edule* , *Rosa acicularis* , *Picea glauca* , and *Equisetum arvense* .

Subject: Vegetation

PHOTO POINT

Project/Site:	Talkeetna Sewer System Upgrades					Sampling Date:	10/2/2018
Applicant/Owner:	Matanuska-Susitna Borough					Sampling Point:	8
Investigator(s):	BT/OM	Lat:	62.33598	Long:	-150.08882	Datum:	NAD83
Watershed/Stream (N/A if upland):	N/A				NWI Classification:	Upland	
If Still Water, Approximate Size (acres):	N/A	&	Estimated depth at deepest:	N/A			
If Flowing Water, Average Width (ft):	N/A	,	Avg. depth (ft):	N/A	&	Substrate:	N/A

Remarks: Dominant species includes *Populus balsamifera, Betula papyrifera, Viburnum edule, Rosa acicularis, Picea glauca, and Equisetum arvense.*

Subject: Vegetation

APPENDIX C

Wetland Functional Assessment Forms

Project: MSB Talkeetna Sewer Design Date: October 3, 2018 Wetland Assessment Group ID: 1 Assessor: B. Therrien/O. Means
Approximate Location: Talkeetna Wastewater Treatment Plant
Watershed/Stream(s): Talkeetna River
Notes: The Talkeetna River is an anadromous stream.

Waterbody Type	Waterbody Characteristics				Category	
Flowing Waterbody	Any flowing waterbody that is documented or suspected critical or primary habitat for listed or candidate threatened or endangered species.				1	☐
	Any flowing waterbody that is secondary habitat for listed or candidate threatened or endangered species or primary critical habitat for other species of concern.				2	☐
	Stream	Open Channel; perennial, seasonal intermittent, temporary, or ephemeral	Natural (undisturbed) or naturalized (recovered from disturbance, with natural-like banks, sinuosity, substrate)	Supports Salmon	1	☒
				Supports resident and other non-salmon fish species	2	☐
				Not known or thought to support fish	3	☐
			Channelized and not naturalized	Supports salmon	1	☐
				Does not support salmon	3	☐
		Originally a stream; now in a culvert/pipe	Fish passage rating of "no impact on fish passage"	Supports salmon	2	☐
				Does not support salmon	3	☐
			Fish passage rating of "may impact fish passage" or "likely impacts fish passage"	Supports salmon	3	☐
				Does not support salmon	4	☐
	Ditch (originally formed by excavation; did not originally replace a stream)	Open channel; supports salmon			2	☐
		Naturalized; does not support salmon			3	☐
		Not naturalized; does not support salmon			4	☐
	Inactive (abandoned channel)	Seasonally or more often connected to active channel			Same as active channel	☐
		Irregularly (less than annually) connected to active channel that is:	Category 1		1	☐
			Category 2		2	☐
			Category 3		3	☐
			Category 4		4	☐
		No existing connection to an active channel, even at high water			4	☐
Still Waterbody	Any still waterbody that is documented or suspected critical or primary habitat for listed or candidate threatened or endangered species.				1	☐
	Any still waterbody that is secondary habitat for listed or candidate threatened or endangered species or primary critical habitat for other species of concern.				2	☐
	Other still waterbodies	Supports salmon	Spawning or rearing habitat		1	☐
			Migratory route only		2	☐
		Supports resident and other non-salmon fish species used for subsistence or recreation	Spawning or rearing habitat		1	☐
			Migratory route only		2	☐
		Supports fish not used by humans			3	☐
		Not known or thought to support fish			3	☐

Wetland Functions Data Form – Alaska Regulatory Best Professional Judgment Characterization
(Modified by HDL, September 2015)

Project: MSB Talkeetna Sewer Design Date: October 3, 2018 Wetland Assessment Group ID: 2 Assessor: B. Therrien/O. Means
Approximate Location: Talkeetna Wastewater Treatment Plant Watershed/Nearest Stream: Talkeetna River
Approximate Size (acres): N/A Percent (%) Wetland/Waterbody: N/A

A. Flood Flow Regulation (storage and desynchronization)	Rating: MODERATE
1. Wetland is capable of retaining much higher volumes of water during storm events than under normal rainfall conditions. 2. Wetland is a closed (depressional) system subject to flooding or shows evidence of flooding. 3. If flow-through, wetland has constricted outlet with signs of fluctuating water levels, algal mats, and/or lodged debris. 4. Wetland has dense (>40% cover) woody vegetation. 5. Wetland receives floodwater from an adjacent water course at least once every 10 years. 6. Floodwaters enter and flow through wetland predominantly as sheet flow rather than channel flow.	Likely or not likely to Provide (Y or N) 1. Y☒ N☐ 2. Y☒ N☐ 3. Y☐ N☒ 4. Y☐ N☒ 5. Y☐ N☒ 6. Y☒ N☐ # of Attributes: 3 > 4 attributes (Y)—High Function 2-3 attributes (Y)—Moderate Function 0-1 attributes (Y)—Low Function
B. Sediment, Nutrient (N and P), Toxicant Removal	Rating: MODERATE
1. Sediment, nutrients and/or toxicants (from tillage, mining, construction or other sources of pollution) appear to be or are likely to be entering the wetland. 2. Slow-moving or still water is present or occurs during flooding that happens at least once every 10 years. 3. Dense (≥50% cover) herbaceous vegetation is present. 4. At least moderate interspersion of vegetation and water is present or occurs during flooding that happens at least once every 10 years. 5. Sediment deposits are present (evidence of deposition during floods). 6. Thick surface organic horizon and/or abundant fine organic litter is present.	Likely or not likely to Provide (Y or N) 1. Y☐ N☒ 2. Y☒ N☐ 3. Y☐ N☒ 4. Y☒ N☐ 5. Y☐ N☒ 6. Y☐ N☒ # of Attributes: 2 > 4 attributes (Y)—High Function 2-3 attributes (Y)—Moderate Function 0-1 attributes (Y)—Low Function
C. Erosion Control and Shoreline Stabilization (only assess if wetland directly abuts permanent or relatively permanent water)	Rating: Not Rated
1. Wetland has dense, energy absorbing vegetation (trees, shrubs) bordering the water course and no evidence of erosion. 2. An at least moderately dense herbaceous layer is present.	Likely or not likely to Provide (Y or N) 1. Y☐ N☐ 2. Y☐ N☐ # of Attributes: _____ 1-2 attributes (Y)—High Function None—Low Function
D. Production of Organic Matter and its Export	Rating: LOW
1. Wetland has at least 30% cover of herbaceous vegetation. 2. Woody plants in wetland are mostly deciduous. 3. High degree of plant community structure, vegetation density, and species richness present. 4. Interspersion of vegetation and water is at least moderate. 5. Wetland is flooded at least once every 10 years. 6. A more than minimal amount of organic matter is flushed from the wetland by water flow at least once every 10 years.**	Likely or not likely to Provide (Y or N) 1. Y☐ N☒ 2. Y☒ N☐ 3. Y☐ N☒ 4. Y☒ N☐ 5. Y☒ N☐ 6. Y☐ N☒ # of Attributes: 3 > 4 attributes (Y)—High Function 2-3 attributes (Y)—Moderate Function 0-1 attributes (Y)—Low Function **If Function 5 or 6 is N, then automatically Low function #6 is checked "No" therefore automatically low function rating.
E. General Habitat Suitability	Rating: MODERATE
1. Wetland is not fragmented by development. 2. Upland surrounding wetland is undisturbed. 3. Diversity (evenness of cover) of plant species is moderately high (>5 species with at least 10% cover each). 4. Plant community has two or more strata, with at least two of those strata having >10% total cover. 5. Wetland has at least a moderate degree of Cowardin Class interspersion. 6. Evidence of wildlife use (e.g., nests, tracks, scat, gnawed stumps, survey data) is present.	Likely or not likely to Provide (Y or N) 1. Y☒ N☐ 2. Y☐ N☒ 3. Y☐ N☒ 4. Y☐ N☒ 5. Y☐ N☒ 6. Y☒ N☐ # of Attributes: 2 > 5 attributes (Y)—High Function 2-4 attributes (Y)—Moderate Function 0-1 attributes (Y)—Low Function

F. General Fish Habitat (must be associated with a fish-bearing water)	Rating: Not Rated
1. Wetland has perennial or intermittent surface water connection to a fish-bearing water body. 2. Wetland has sufficient size and depth of open water so as not to freeze completely during winter. 3. Fish are present or are known to be present. 4. Herbaceous and/or woody vegetation is present in wetland and/or buffer to provide cover, shade, and/or detrital matter. 5. Spawning areas are present (aquatic vegetation and/or gravel beds 6. Juvenile rest areas present (e.g. pools with organic debris or overhanging vegetation).	Likely or not likely to Provide (Y or N) 1. Y☐ N☐ 2. Y☐ N☐ 3. Y☐ N☐ 4. Y☐ N☐ 5. Y☐ N☐ 6. Y☐ N☐ # of Attributes:_____ > 5 attributes (Y)—High Function 3-4 attributes (Y)—Moderate Function 0-2 attributes (Y)—Low Function
G. Native Plant Richness	Rating: MODERATE
1. At least 20 native plant species occur in the wetland. 2. Wetland contains two or more Cowardin Classes. 3. Wetland has three or more strata of vegetation with at least 10% cover in each stratum.	Likely or not likely to Provide (Y or N) 1. Y☐ N☒ 2. Y☒ N☐ 3. Y☐ N☒ # of Attributes: 1 > 2 attributes (Y)—High Function 1 attribute (Y)—Moderate Function None—Low Function
H. Educational, Scientific, Recreational, or Subsistence Use	Rating: LOW
1. Site has documented scientific or educational use. 2. Wetland is in public ownership. 3. Accessible trails are available. 4. Wetland supports subsistence activities (e.g., hunting, fishing, berry picking).	Likely or not likely to Provide (Y or N) 1. Y☐ N☒ 2. Y☐ N☒ 3. Y☐ N☒ 4. Y☐ N☒ # of Attributes: 0 > 2 attributes (Y)—High Function 1 attribute (Y)—Moderate Function None—Low Function
I. Uniqueness and Special Status	Rating: LOW
1. Wetland contains documented occurrence of a state or federally listed threatened or endangered species.** 2. Wetland contains documented critical habitat, high quality ecosystems, or priority species, respectively designated by the U.S. Fish and Wildlife Service. 3. Wetland has biological, geological, or other features that are determined to be rare. 4. Wetland has been determined significant because it provides functions scarce for the area.	Likely or not likely to Provide (Y or N) 1. Y☐ N☒ 2. Y☐ N☒ 3. Y☐ N☒ 4. Y☐ N☒ # of Attributes: 0 > 2 attributes (Y)—High Function 1 attribute (Y)—Moderate Function None—Low Function **If attribute 1 is Y, then automatically High Function