# MONTANA DEPARTMENT OF TRANSPORTATION WETLAND MITIGATION MONITORING REPORT

### ROSTAD RANCH MITIGATION SITE MEAGHER COUNTY, MONTANA

PROJECT COMPLETED: 2012

MONITORING REPORT #5: DECEMBER 2017



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# Montana Department of Transportation Wetland Mitigation Monitoring Report: Year 2017

# ROSTAD RANCH MITIGATION SITE MEAGHER COUNTY, MONTANA

MDT Project Number STPX-0002 (749) Control Number 5565

USACE: NWO-2006-90851-MTB

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December 2017

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#### 1.0 INTRODUCTION

The Rostad Ranch 2017 Wetland Mitigation Monitoring Report presents the results of the fifth year of post-construction monitoring at the Rostad Ranch wetland mitigation site. The Montana Department of Transportation (MDT) Rostad Ranch project is located in the southwestern quarter of Section 12 and the northwestern quarter of Section 13, Township 8 North, Range 11 East, Meagher County, Montana. The property is located approximately 0.6 mile northeast of Martinsdale, Montana, as illustrated in Figure 1-1. The site was constructed to provide MDT with an estimated 39.70 acres of wetland mitigation credits on a private ranch that had been historically used for grazing cattle and hay production.

The entire 60-acre mitigation site is protected long-term by an MDT wetland conservation easement agreement with the landowner. A fence that was installed along the boundaries of the wetland conservation easement demarcates the site.

Figures A-2 and A-3 in Appendix A show the 2017 monitoring activity locations and mapped site features, respectively. The MDT Mitigation Site Monitoring form, US Army Corps of Engineers (USACE) Wetland Determination Data forms for the Great Plains (GP) Region [USACE, 2010], and the 2008 MDT Montana Wetland Assessment Method (MWAM) forms [Berglund and McEldowney, 2008] are included in Appendix B. Project site photographs are included in Appendix C, and the Preliminary Design Plan and Profile and 2017 Record Drawings for additional construction at the site are provided in Appendix D.

The Rostad Ranch site is located within Watershed #10 – Musselshell River Basin. Wetlands were developed at this location to provide compensatory mitigation for wetland impacts associated with future transportation projects in the Musselshell River Basin. The Rostad Ranch site was selected based on site evaluations and project feasibility assessments initiated by MDT in 2002.

The project objectives include the following:

- Provide 39.70 acres of wetland mitigation credits that result from restoration, creation, rehabilitation, and preservation within the site.
- Establish three types of wetland vegetation communities, including:
  - 1. Palustrine emergent wet meadow
  - 2. Palustrine scrub/shrub
  - 3. Emergent zones around the open-water areas
  - 4. Upland buffer established around the wetland perimeter.

The project credit ratios as presented in the *Rostad Ranch Wetland Mitigation Plan, Meagher County, Montana* [MDT, 2007], which was approved by the USACE, are shown in Table 1-1.

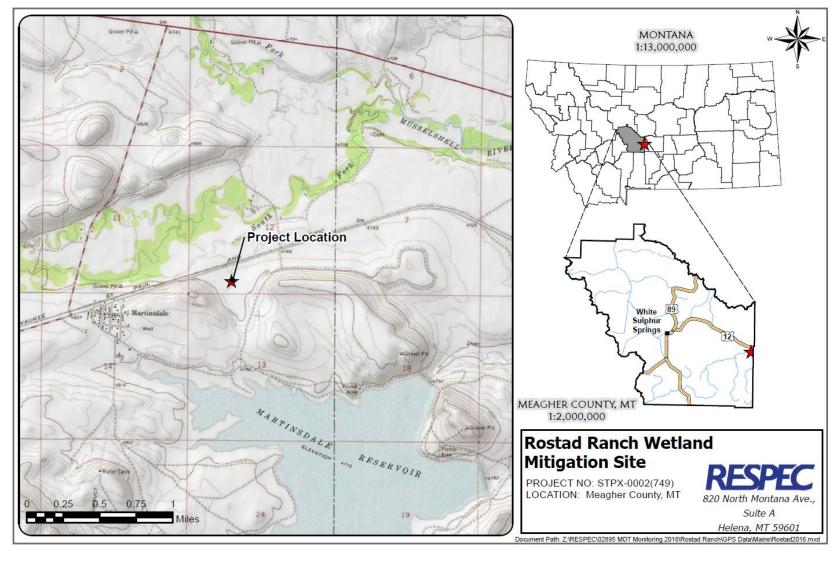


Figure 1-1. Project Location of the Rostad Ranch Site.

Compensatory Mitigation Type	Proposed Wetland Type <sup>(a)</sup>	Anticipated Mitigation Area (acres)	Approved Mitigation Ratios <sup>(b)</sup>	Anticipated Mitigation Credit (acres)		
Restoration (Reestablishment)	Palustrine emergent and scrub/shrub	27.11	1:1	27.11		
Creation (Establishment)	Palustrine emergent and scrub/shrub	9.84	1:1	9.84		
Restoration (Rehabilitation)	Palustrine emergent	2.63	1.5:1	1.75		
Preservation	Palustrine, scrub/shrub	0.25	4:1	0.06		
Upland Buffer	N/A	6.76	5:1	1.35		
Permanent Wetland Impact	N/A	N/A	1:1	-0.41		
Totals	Site Acreage	46.59	Credit Acreage	39.70		

Table 1-1. Wetland Credit Determination for the Rostad Ranch Site

The USACE-approved performance standards are listed below.

- Wetland Characteristics: All of the restored, created, enhanced, and preserved wetlands within the project limits will meet the three parameter criteria for hydrology, vegetation, and soils established for determining wetland areas as outlined in the 1987 Corps of Engineers Wetland Delineation Manual (1987 Wetland Manual) [Environmental Laboratory, 1987] and the 2010 Regional Supplement to the Corps of Engineers Manual: Great Plains Region (Version 2.0) (2010 GP Regional Supplement) [USACE, 2010]. These methodologies were used to establish baseline wetland conditions on site.
  - a. Wetland Hydrology Success will be achieved where wetland hydrology is observed according to technical guidelines in the above-referenced documents. The USACE technical standard for monitoring wetland hydrology requires 14 or more consecutive days of flooding or ponding, or a water table that is 12 inches (30 centimeters) or less below the soils surface during the growing season at a minimum frequency of 5 years in 10 (50 percent or higher probability).
  - b. Hydric Soil Success will be achieved where hydric soil conditions are present (per the most recent Natural Resource Conservation Service [NRCS] definitions for hydric soil) or appear to be forming, the soil is sufficiently stable to prevent erosion, and the soil is able to support plant cover. Soil sampling will be conducted during the course of the monitoring period to determine if wetland areas are exhibiting characteristics of hydric soils per the 1987 Wetland Manual. Because typical hydric soil indicators may require long periods to form, a lack of distinctive hydric soil features will not be considered a failure if hydrologic and vegetation success is achieved.
  - c. **Hydrophytic Vegetation Success** will be achieved where combined absolute cover of facultative or wetter species is greater than or equal to 70 percent and state-listed

<sup>(</sup>a) Cowardin et al. [1979].

<sup>(</sup>b) Mitigation credit ratios used were from the Montana Corps Regulatory Programs 2005 Wetland Credit Ratios [USACE, 2005].

noxious weeds do not exceed 5 percent absolute cover. The following concept of "dominance," as defined in the 2010 GP Regional Supplement, will be applied during future routine wetland determinations in the created/restored wetlands: "Subjectively determine the dominant species by estimating those having the largest relative basal area (woody overstory), greatest height (woody understory), greatest percentage of aerial cover (herbaceous understory), and/or greatest number of stems (woody vines)."

- i. Woody Plants Plantings will be considered successful where they exceed 50 percent survival after 5 years. MDT anticipates that natural colonization of woody plant species from nearby sources after construction activities are complete. The rate and extent of natural woody plant colonization will depend on factors such as habitat availability, animal activity, seed sources, and other natural selection factors.
- ii. **Herbaceous Plants** At the conclusion of the monitoring period, ocular coverage of desirable hydrophytic vegetation (wetland plants listed as OBL, FACW, and FAC) will be at least 80 percent. A wetland seed mix was prepared for this site that included tufted hair grass (*Deschampsia caespitosa*), Northwest Territory sedge (*Carex utriculata*), Baltic rush (*Juncus balticus*), American slough grass (*Beckmannia syzigachne*), American mannagrass (*Glyceria grandis*), and bluejoint reed grass (*Calamagrostis canadensis*).
- Open-Water Areas: The intent of the project is to provide seasonal open water in the
  wetland enhancement areas where excavation in the existing wetland and upland will be
  completed. Open water that is established within the designated open-water areas will be
  considered successful and creditable if it does not exceed 10 percent of the total wetland
  acreage (39.83 acres).
- 3. Upland Buffer: Success will be achieved when noxious weeds do not exceed 5 percent of cover within the buffer areas on site. Any area within the creditable buffer zone disturbed by project construction must have at least 50 percent aerial cover of desirable upland plant species by the end of the monitoring period.
- 4. **Weed Control:** Implementation of weed control will be based on annual monitoring of the site to determine the weed species present and degree of infestation within the site. Based on the monitoring results, control measures will be implemented by MDT to reduce and eventually minimize infestations of state-listed noxious weed species within the site.
- 5. Fencing: Fencing for the proposed mitigation site has been installed along the perimeter of the easement boundary to protect the integrity of the wetland from disturbance that may be detrimental to the site. The installed fencing is designed to be wildlife-friendly to allow for wildlife movement into and out of the site.

Initial construction entailed filling of existing ditches, excavating and grading the site to distribute water across the site, and creating open-water areas. The primary source of wetland hydrology for the site is groundwater. A groundwater seep located in the south portion of the site provides water to the site during high groundwater periods. Surface water from an irrigation ditch that runs along the southern boundary of the site augments the site hydrology. A diversion structure was installed at the southern end of the project to direct irrigation water onto the site to recharge groundwater.

Revegetation tasks included using a combination of wetland seed mixes, native tree/shrub plantings, and willow cuttings that were collected from a variety of native species found in the area. Mitigation habitat types that were developed on the site through the construction process include restored open water; created, restored, and enhanced wetland areas; and upland buffer areas. Specific revegetation tasks were developed for each habitat type.

Post-construction monitoring at this site between 2013 and 2016 revealed that less than half of the anticipated mitigation credits had developed at the site with no encouraging signs that more wetland would develop without modifications to the site. During the spring of 2017, a series of small berms and supply ditches were constructed at the site to help spread irrigation water across a broader area than had been previously flooded. The Record Drawings for this work are included in Appendix D. 2017 represents the first year of monitoring since site improvements were completed.

Monitoring the site will be completed according to MDT's *Standard Monitoring Protocol*, which has been used for all of the MDT wetland mitigation sites since 1998. Monitoring will be implemented for a minimum of 5 years or longer as determined by the USACE Montana Regulatory Office's review of the annual monitoring reports for the site. The USACE will make the final decision as to whether the site has met wetland success criteria.

#### 2.0 METHODS

The first year of monitoring at the Rostad Ranch site was completed on August 21, 2013. During this visit, MDT established permanent photo points and vegetation transects within the site. The 2017 monitoring event was completed on July 10, 2017. During the 2017 monitoring event, one additional vegetation transect and three new photo points were established to help document future wetland development at the site as a result of 2017 site modifications. Information for the Wetland Mitigation Site Monitoring form and Wetland Determination Data forms was recorded in the field during the site investigation (Appendix B). Monitoring activity sites were located with a global positioning system (GPS) and are illustrated on Figure A-2 (Appendix A). Data-collection activities included a wetland delineation, vegetation community mapping, vegetation transect monitoring, soil and hydrology data collection, bird- and wildlife-use documentation, photographic documentation, functional assessment, and a nonengineering examination of the infrastructure established within the mitigation project area.

#### 2.1 HYDROLOGY

The presence of hydrological indicators as outlined on the Wetland Determination Data form was assessed at four data points established within the project area. The hydrologic indicators were evaluated according to features observed in situ during the site visit. The data were recorded on the Wetland Determination Data forms (Appendix B). Hydrologic assessments allow mitigation goals that address inundation and saturation requirements to be evaluated.

Technical criteria for wetland hydrology guidelines have been established as "permanent or periodic inundation, or soil saturation within 12 inches of the ground surface for a significant period

(12.5 percent of the growing season) during the growing season" [USACE, 2010]. Systems with continuous inundation or saturation for greater than 12.5 percent of the growing season are considered jurisdictional wetlands. The growing season is defined for purposes of this report as the number of days when a 50 percent probability exists that the minimum daily temperature is greater than or equal to 28.5 degrees Fahrenheit [USACE, 2010]. Temperature data recorded for the meteorological station at the Martinsdale 3NNW, Montana (245387), weather station, which is located approximately 3.3 miles northwest of the site, have a median (5 years in 10) growing season length of 119 days. Areas that were defined as wetlands would require 15 days of inundation or saturation within 12 inches of the ground surface to meet the hydrology criteria.

Soil pits that were excavated during the wetland delineation were used to evaluate groundwater levels within 18 inches of the ground surface. The data were recorded on the Wetland Determination Data forms (Appendix B). Precipitation data from the Martinsdale 3NNW, Montana (245387), meteorological station were also reviewed and compared to long-term averages for this site.

#### 2.2 VEGETATION

The boundaries of general dominant-species-based vegetation communities were determined in the field during the active growing season and subsequently delineated on the 2016 aerial photographs. The percent cover of dominant species within a community type was estimated and recorded using the following values: 0 (< 1 percent), 1 (1–5 percent), 2 (6–10 percent), 3 (11–20 percent), 4 (21–50 percent), and 5 (> 50 percent) (Appendix B). Community types were named based on the predominant vegetation species that characterized each mapped polygon (Figure A-3, Appendix A).

Temporal changes in vegetation were evaluated through annual assessments of a static belt transect established in August 2013 and July 2017 (Figure A-2, Appendix A). Vegetation composition was assessed and recorded along four vegetation belt transects (T-1, T-2, T-3, and T-4), which are approximately 10 feet wide and 422, 453, 320, and 412 feet long, respectively (Figure A-2, Appendix A). The transect endpoints were recorded with a resource-grade GPS unit. The survival of woody species that were planted on the site was recorded during each monitoring event.

Spatial changes in the dominant vegetation communities were recorded along the stationed transect. The percent aerial cover of each vegetation species within the belt transect was estimated using the same values and cover ranges that were used for the vegetation community polygon data (Appendix B). Photographs were taken at the transect endpoints during the monitoring event (Appendix C).

The *Montana Noxious Weed List* (February 2017), which was prepared by the Montana Department of Agriculture [2017], was used to categorize weeds identified within the site. The location of noxious weeds was noted in the field and mapped on the aerial photograph with noxious weed species color-coded (Figure A-3, Appendix A). Cover classes are represented by a T, L, M, or H, which represent less than 1 percent, 1–5 percent, 6–25 percent, and 26–100 percent, respectively. The total cover by noxious weeds overall across the site was estimated based on the noxious weed cover classes and project acreage.

#### **2.3 SOIL**

Soil information was obtained from the *Web Soil Survey for Meagher County Area* [US Department of Agriculture, 2014] and soil core descriptions. Soil cores were excavated by using a Montana sharpshooter shovel and evaluated according to procedures outlined in the 1987 Wetland Manual [Environmental Laboratory, 1987] and the 2010 GP Regional Supplement [USACE, 2010]. A description of the soil profile, including hydric soil indicators when present, was recorded on the Wetland Determination Data form for each profile (Appendix B).

#### 2.4 WETLAND DELINEATION

Waters of the US, including special aquatic sites and jurisdictional wetlands, were delineated throughout the project area according to criteria established in the 1987 Wetland Manual and the 2010 GP Regional Supplement. The technical criteria for hydrophytic vegetation, hydric soil, and wetland hydrology that were described in the 2010 GP Regional Supplement must be satisfied to delineate a representative area as jurisdictional. The name and indicator status of plant species was derived from the 2016 National Wetland Plant List (NWPL) [Lichvar et al., 2016]. A routine level-2 on-site determination method [Environmental Laboratory, 1987] was used to delineate jurisdictional areas within the project boundaries. The information was recorded onto the Wetland Determination Data forms (Appendix B).

The wetland boundary was determined in the field based on changes in plant communities and/or hydrology and changes in soil characteristics. Topographic relief boundaries within the project area were also examined and cross-referenced with soil and vegetation communities as supportive information for this delineation. Vegetation composition, soil characteristics, and hydrology were assessed at likely wetland and adjacent upland locations. If all three parameters met the criteria, the area was designated as wetland and mapped by vegetation community type. If any one of the parameters did not exhibit positive wetland indicators, the area was determined to be upland unless the site was classified as an atypical situation, potential problem area, or special aquatic site (i.e., mudflat). The wetland boundary was surveyed and identified on the 2017 aerial photographs. Wetland areas were calculated using GIS methods.

#### 2.5 WILDLIFE

Observations and other positive indicators of use by mammal, reptile, amphibian, and bird species were recorded on the Wetland Mitigation Site Monitoring forms during each of the site visits. Indirect-use indicators, including tracks, scat, burrows, eggshells, skins, and bones, were also recorded. These signs were recorded while traversing the site for other required activities. Direct sampling methods, such as snap traps, live traps, and pitfall traps, were not used. A comprehensive wildlife species list of animals that have been observed from 2013 through 2017 was compiled for this report.

#### 2.6 FUNCTIONAL ASSESSMENT

The 1999 MDT MWAM [Berglund, 1999] was used to evaluate the functions and values of the 3.4 acres of existing wetlands identified on the site in 2004. The 2008 MDT MWAM [Berglund and

McEldowney, 2008] was used to evaluate functions and values of wetlands delineated on the site from 2013 through 2017. This method provides an objective means of assigning wetlands an overall rating and provides regulators with a means of assessing mitigation success based on wetland functions. Functions are self-sustaining properties of a wetland ecosystem that exist in the absence of society and relate to ecological significance without regard to subjective human values [Berglund and McEldowney, 2008]. Field data for this assessment were collected during the site visit. MWAM forms were completed for one assessment area (AA) that included both created and existing wetlands within the mitigation site (Appendix B).

#### 2.7 PHOTOGRAPHIC DOCUMENTATION

Monitoring at photo points provided supplemental information that documented wetland, upland, and transect conditions; site trends; and current land uses that surround the site. Photographs were taken at established photo points throughout the site during the site visit (Appendix C). Photo-point locations were recorded with a resource-grade GPS unit (Figure A-2, Appendix A).

#### 2.8 GLOBAL POSITIONING SYSTEM DATA

Site features and survey points were collected by using a resource-grade (± 1 meter) Trimble R1 GNSS GPS receiver and companion Android tablet during the 2017 monitoring season. The collected data were then transferred to a personal computer, imported into GIS, and projected in Montana State Plane Single Zone NAD 83 meters. Site features and survey points that were located with GPS included wetland boundaries, fence boundaries, photo points, transect endpoints, noxious weed infestations, and wetland data points.

#### 2.9 MAINTENANCE NEEDS

Channels, engineered structures, fencing, bird boxes, and other man-made features were examined during the site visit for obvious signs of breaching, damage, or other problems. This examination was cursory and did not constitute an engineering-level structural inspection.

#### 3.0 RESULTS

#### 3.1 HYDROLOGY

Climate data from the meteorological station at the Martinsdale 3 NNW, Montana (245387), weather station recorded an average annual precipitation rate of 13.61 inches from January 1893 to July 2012 [Western Region Climate Center, 2013]. The historic precipitation average from January to August (1893–2012) was 10.55 inches. This station, however, was missing precipitation data for the latter part of 2011 through 2014. The Lennep 6 WSW (244954) weather station [Western Regional Climate Center, 2017] is located near the site (approximately 11 miles southwest) and has a period of record that extends from August 1959 through August 2017. Based on data recorded from the Lennep Station for the January through August time period, precipitation totals for this region were 12.50 inches (long-term average), 16.32 inches (2011), 9.42 inches (2012), 12.3 inches (2013), 14.27 inches (2014), 11.77 inches (2015), 10.81 inches (2016), and 8.16 inches (2017). The data

that were collected after construction indicate below-average precipitation in 2012, 2015, 2016, and 2017; near-average precipitation in 2013; and above-average precipitation in 2014.

The hydrology for the site is supplied from multiple sources, including a shallow seasonal groundwater table, groundwater that emerges from a natural spring located near the narrow-leaf willow (*Salix exigua*) stand in the south portion of the site, direct precipitation, surface runoff, and surface-water diversion out of an adjacent irrigation canal. Construction included excavating and grading to fill drainage ditches, distributing water across the site, creating open-water areas, and installing a diversion structure in the southern end of the site to direct irrigation water to the site. MDT has secured water rights to use surface water as a secondary source of hydrology to supplement the groundwater and ensure long-term viability of the site. The irrigation canal originates west of Martinsdale and is supplied by flows from the South Fork Musselshell River.

During the 2017 field survey, approximately 75 percent of the wetland area was inundated, including one wetland depression that was impounded by a constructed dike in the northern half of the site and two excavated depressions located in the southern half of the site. MDT turned the irrigation water into the Rostad site on May 6; this water was shut off on July 5. In total, approximately 106 acre-feet of water was used at the site in 2017.

Adaptive management activities in the spring of 2017 created areas of open water towards the middle of the site and helped distribute water to other areas of the mitigation site. Some upland areas contained standing water during the July 10 visit and have the potential to develop into wetlands, assuming that this inundation is repeated annually and for long enough during the growing season to create anaerobic soil conditions. Overall, inundation increased from approximately 15 acres in 2016 to more than 25 acres across the site in 2017. Overall precipitation levels were below average between 2015 and 2017, and the lack of snowpack affected moisture regimes for the entire watershed and site in 2017.

Water depths ranged from 0.25 to 3.0 feet across the site and averaged 1.0 foot. Water depth at the edge of the open-water boundary was 0.5 foot in the lower cell where water depths reach close to 3 feet. Vegetation around the perimeter of the open-water boundary in the lower cell increased in 2017 from previous years. Areas that were not inundated across the site exhibited seasonal soil saturation to the ground surface. Evidence of wetland hydrology that was observed on the site in 2017 included drainage patterns, soil saturation, a high water table, oxidized rhizospheres, geomorphic position, water marks, drift deposits, and a positive FAC-neutral test.

Four data points were sampled to determine the upland and wetland boundaries (Wetland Determination Data forms, Appendix B). DP-1W and DP-2W were located near the center of the site in areas that met the wetland criteria. Wetland hydrology indicators at DP-1W, which is located near the edge of a created wetland cell, included drainage patterns and a positive FAC-neutral test. DP-2W was located in a newly delineated wetland swale and included the following wetland hydrology indicators: a high water table within 2 inches of the soil surface, saturation to the ground surface, oxidized rhizospheres on living roots, drainage patterns, and a positive FAC-neutral test. No

primary or secondary indicators of wetland hydrology were observed at DP-1U or DP-2U, which are located upslope of the wetland data points in upland community Type 8.

#### 3.2 VEGETATION

A total of 68 plant species were identified on the site from 2013 through 2017, as provided in Table 3-1. No new species were identified on the site in 2017, including noxious weeds. Vegetation plant communities were identified by plant composition and dominance. The following vegetation community types were identified in 2017:

- Upland Type 8 Bromus inermis/Trifolium spp.
- Upland Type 9 Bare Ground/Disturbed
- Wetland Type 2 Juncus balticus/Carex nebrascensis
- Wetland Type 3 Salix exigua
- Wetland Type 5 Glyceria grandis/Typha latifolia
- Wetland Type 6 Open Water/Aquatic Macrophytes
- Wetland Type 7 Phalaris arundinacea.

Upland Type 9 – Bare Ground/Disturbed was a new community in 2017. The community composition is provided in full detail on the Wetland Mitigation Site Monitoring form (Appendix B), and the community boundaries are shown on Figure A-3 (Appendix A). These community types are discussed below.

Upland community Type 8 – *Bromus inermis/Trifolium* spp. was identified on approximately 30.17 acres across the site. This community was previously identified as Type 1 – *Phleum pretense/Trifolium* spp. from 2013 through 2015. The community generally represented undisturbed uplands that were historically used for hay and cattle production and areas where spoils from excavation activities were deposited. A total of 42 species were identified within the community. Dominant species included smooth brome (*Bromus inermis*) and white clover (*Trifolium repens*), with lesser percent coverage of creeping wild rye (*Elymus repens*), meadow false rye grass (*Schedonorus pratensis*), spotted knapweed (*Centaurea stoebe*), red clover (*Trifolium pratense*), and yellow sweet clover (*Melilotus officinalis*).

Upland community Type 9 – Bare Ground/Disturbed was identified on approximately 3.04 acres across the site. This community represents excavated and bermed areas across the site that were constructed in the spring of 2017 and were comprised of more than 50 percent bare ground. Common plant species associated with Type 9 include goosefoot (Chenopodium sp.), slender wild rye (Elymus trachycaulus), and western wheatgrass (Pascopyrum smithii). This community type will vegetate over time and convert to upland and wetland communities.

Table 3-1. Vegetation Species Observed From 2013 Through 2017 at the Rostad Ranch Site (Page 1 of 2)

Scientific Names	Common Names	GP Indicator Status <sup>(a)</sup>
Achillea millefolium	Common Yarrow	FACU
Agropyron cristatum	Crested Wheatgrass	NI
Agrostis gigantea	Black Bentgrass	FACW
Algae, green	Algae, green	NL
Alopecurus pratensis	Field Meadow Foxtail	FACW
Amaranthus retroflexus	Red-Root	FACU
Ambrosia acanthicarpa	Flat-Spine Ragweed	NL
Aster sp.	Aster	NL
Bassia scoparia	Mexican-Fireweed	FACU
Beckmannia syzigachne	American Slough Grass	OBL
Berteroa incana	Hoary False-Alyssum	NL
Bromus arvensis	Field Brome	FACU
Bromus carinatus	California Brome	NL
Bromus inermis	Smooth Brome	UPL
Carex nebrascensis	Nebraska Sedge	OBL
Carex utriculata	Northwest Territory Sedge	OBL
Centaurea stoebe	Spotted Knapweed	NL
Chenopodium album	Lamb's-Quarters	FACU
Chenopodium sp.	Goosefoot	NL
Cirsium arvense	Canada Thistle	FACU
Convolvulus arvensis	Field Bindweed	NL
Cynoglossum officinale	Gypsy-Flower	FACU
Cyrtorhyncha cymbalaria	Alkali Buttercup	OBL
Deschampsia caespitosa	Tufted Hair Grass	FACW
Descurainia sophia	Herb Sophia	NL
Downingia laeta	Great Basin Calico Flower	NL
Eleocharis palustris	Common Spike-Rush	OBL
Elymus repens	Creeping Wild Rye	FACU
Elymus trachycaulus	Slender Wild Rye	FACU
Epilobium ciliatum	Fringed Willowherb	FACW
Glyceria grandis	American Mannagrass	OBL
Glycyrrhiza lepidota	American Licorice	FACU
Helianthus annuus	Common Sunflower	FACU
Hordeum jubatum	Foxtail Barley	FACW
Juncus articulatus	Joint-Leaf Rush	OBL
Juncus balticus	Baltic Rush	FACW

Table 3-1. Vegetation Species Observed From 2013 Through 2016 at the Rostad Ranch Site (Page 2 of 2)

Scientific Names	Common Names	GP Indicator Status <sup>(a)</sup>
Juncus bufonius	Toad Rush	OBL
Lactuca serriola	Prickly Lettuce	FAC
Lepidium densiflorum	Miner's Pepperwort	FAC
Medicago sativa	Alfalfa	UPL
Melilotus albus	White Sweet Clover	NL
Melilotus officinalis	Yellow Sweet Clover	FACU
Mentha arvensis	American Wild Mint	FACW
Pascopyrum smithii	Western Wheatgrass	FACU
Phalaris arundinacea	Reed Canary Grass	FACW
Phleum pratense	Common Timothy	FACU
Poa palustris	Fowl Bluegrass	FACW
Poa pratensis	Kentucky Bluegrass	FACU
Polypogon monspeliensis	Annual Rabbit's-Foot Grass	FACW
Populus angustifolia	Narrow-Leaf Cottonwood	FACW
Populus balsamifera	Balsam Poplar	FACW
Populus tremuloides	Quaking Aspen	FAC
Potentilla gracilis	Graceful Cinquefoil	FAC
Rumex crispus	Curly Dock	FAC
Rumex occidentalis	Western Dock	OBL
Salix exigua	Narrow-Leaf Willow	FACW
Schedonorus pratensis	Meadow False Rye Grass	FACU
Sinapis arvensis	Wild Mustard	NI
Sonchus arvensis	Field Sow-Thistle	FAC
Tanacetum vulgare	Common Tansy	FACU
Taraxacum officinale	Common Dandelion	FACU
Thlaspi arvense	Field Pennycress	FACU
Tragopogon dubius	Meadow Goat's-Beard	NL
Trifolium arvense	Rabbit-foot Clover	NL
Trifolium pratense	Red Clover	FACU
Trifolium repens	White Clover	FACU
Typha latifolia	Broad-Leaf Cattail	OBL
Veronica peregrina	Neckweed	FACW

<sup>(</sup>a) 2016 NWPL [Lichvar et al., 2016].New species that were identified in 2017 are **bolded**.

Wetland community Type 2 – *Juncus balticus/Carex nebrascensis* characterized a majority of the wetland areas delineated from 2013 through 2017. The community was mapped across 9.6 acres

within the creation, reestablishment, and rehabilitation areas of the site. A total of 35 species were identified within the community. Baltic rush (*Juncus balticus*), Nebraska sedge (*Carex nebrascensis*), and American slough grass (*Beckmannia syzigachne*) were dominant components of this community. Other species included foxtail barley (*Hordeum jubatum*), tufted hair grass (*Deschampsia caespitosa*), reed canary grass (*Phalaris arundinacea*), common spike-rush (*Eleocharis palustris*), and narrow-leaf willow (*Salix exigua*).

Wetland community Type 3 – *Salix exigua* was identified within the 0.42-acre preexisting wetland area in the southern end of the site that remained undisturbed during 2012 construction. Narrow-leaf willow dominated the area. Many willow cuttings were installed around this community, which exhibited an approximate 50 percent survival during the 2017 field survey. This community is expected to expand over time, as indicated by the willow saplings/cuttings noted around the margins of the community. Fowl bluegrass (*Poa palustris*), tufted hair grass, Nebraska sedge, Northwest Territory sedge (*Carex utriculata*), field meadow foxtail (*Alopecurus pratensis*), American slough grass (*Beckmannia syzigachne*), black bentgrass (*Agrostis gigantea*), broad-leaf cattail (*Typha latifolia*), common spike-rush, and neckweed (*Veronica peregrina*) were also identified within the community.

Wetland community Type 5 – *Glyceria grandis/Typha latifolia* was observed around the margins of inundated cells located in the south and north half of the site. The 3.4-acre community was dominated by emergent species, including American mannagrass (*Glyceria grandis*), broad-leaf cattail, common spike-rush, and American slough grass.

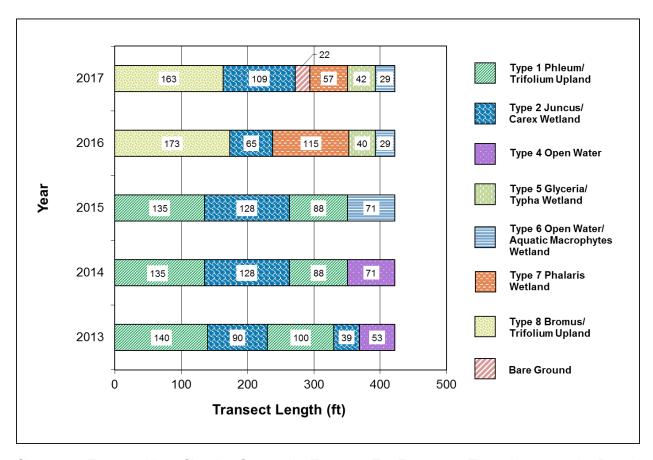
Wetland community Type 6 – Open Water/Aquatic Macrophytes was identified on 2.97 acres and included three inundated areas: one was impounded by a constructed dike in the northern half of the site, and the other two associated with excavated depressions located in the middle of the site. Emergent and submergent species are expected to continue to establish in subsequent monitoring years. Twelve species were observed within the community, including common spike-rush, broadleaf cattail, American slough grass, and American mannagrass. A trace amount of green algae (a protist) was present in the open water.

Wetland community Type 7 – *Phalaris arundinacea* was identified on 8.1 acres of the site, which is a significant increase since 2016. The increase in reed canary grass could be attributed to the expanded area of inundation in 2017 because of site improvements.

Vegetation cover was measured along four transects at the site in 2017 (Figure A-2, Appendix A). The data recorded on T-1 (Wetland Mitigation Site Monitoring form, Appendix B) are summarized in tabular and graphical formats in Table 3-2 and Charts 3-1 and 3-2, respectively. Photographs of the transect ends are provided in Appendix C. T-1 extends 422 feet from a corner of the easement area into the large wetland depression that was impounded by the constructed dike. The transect intercepted upland community Types 8 – *Bromus inermis/Trifolium* spp. and 9 – Bare Ground/ Disturbed and wetland community Types 2 – *Juncus balticus/Carex nebrascensis*, 5 – *Glyceria grandis/Typha latifolia*, 6, and 7 – *Phalaris arundinacea*. Ten hydrophytic and thirteen upland species were identified along the transect. The low dike feature in this area was extended into the existing transect, which resulted in a short segment of mostly disturbed bare ground.

Table 3-2. Data Summary for T-1 From 2013 Through 2017 at the Rostad Ranch Site

Monitoring Year	2013	2014	2015	2016	2017
Transect Length (feet)	422	422	422	422	422
Vegetation Community Transitions Along Transect	4	3	3	4	5
Vegetation Communities Along Transect	2	2	3	5	5
Hydrophytic Vegetation Communities Along Transect	1	1	2	4	4
Total Vegetative Species	27	30	30	26	23
Total Hydrophytic Species	9	9	9	10	10
Total Upland Species	18	21	21	16	13
Estimated % Total Vegetative Cover	90	95	95	95	95
Estimated % Unvegetated	10	5	5	5	5
% Transect Length Comprising Hydrophytic Vegetation Communities	30.6	30.3	47.2	59.0	56.0
% Transect Length Comprising Upland Vegetation Communities	56.9	52.8	52.8	41.0	44.0
% Transect Length Comprising Unvegetated Open Water	12.6	16.8	0	0	0
% Transect Length Comprising Mudflat	0	0	0	0	0



**Chart 3-1.** Transect Maps Showing Community Types on T-1 From 2013 Through 2017 at the Rostad Ranch Site.

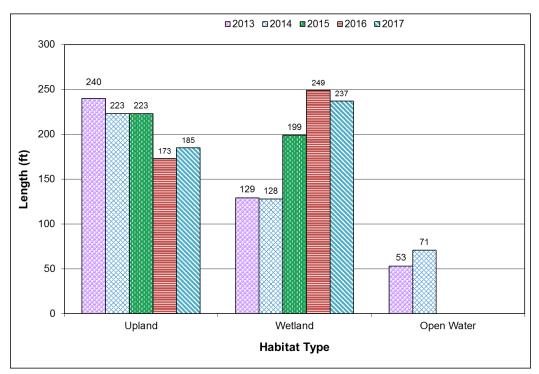
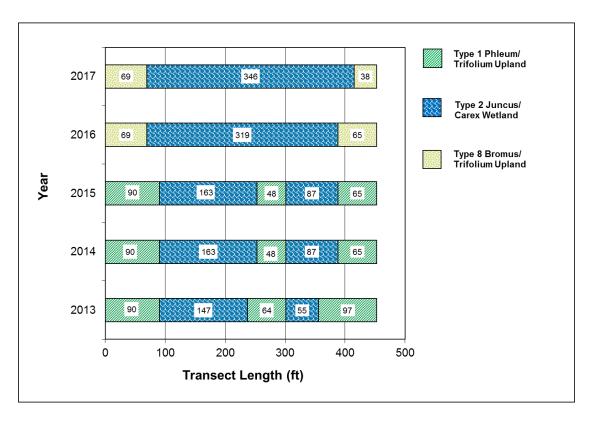


Chart 3-2. Length of Habitat Types Within T-1 From 2013 Through 2017 at the Rostad Ranch Site.

Data collected on T-2 (Wetland Mitigation Site Monitoring form, Appendix B) are summarized in tabular and graphic formats in Table 3-3 and Charts 3-3 and 3-4, respectively. Photographs at the transect endpoints are provided in Appendix C. This transect began at a mature narrow-leaf cottonwood (*Populus angustifolia*) tree near the entrance of the site, extended 453 feet, and alternated between upland community Type 8 and wetland community Type 2. Six hydrophytic and eleven upland species were identified along the transect. Hydrophytic vegetation composed 76 percent of T-2 in 2017.

Table 3-3. Data Summary for T-2 From 2013 Through 2017 at the Rostad Ranch Site

Monitoring Year	2013	2014	2015	2016	2017
Transect Length (feet)	453	453	453	453	453
Vegetation Community Transitions Along Transect	4	4	4	2	2
Vegetation Communities Along Transect	2	2	2	2	2
Hydrophytic Vegetation Communities Along Transect	1	1	1	1	1
Total Vegetative Species		27	27	25	17
Total Hydrophytic Species	8	7	7	7	6
Total Upland Species	18	20	20	18	11
Estimated % Total Vegetative Cover	90	95	95	95	95
Estimated % Unvegetated	10	5	5	5	5
% Transect Length Comprising Hydrophytic Vegetation Communities	44.6	55.2	55.2	70.0	76.0
% Transect Length Comprising Upland Vegetation Communities	55.4	44.8	44.8	30.0	24.0
% Transect Length Comprising Unvegetated Open Water	0	0	0	0	0
% Transect Length Comprising Mudflat	0	0	0	0	0



**Chart 3-3.** Transect Maps Showing Community Types on T-2 From 2013 Through 2017 at the Rostad Ranch Site.

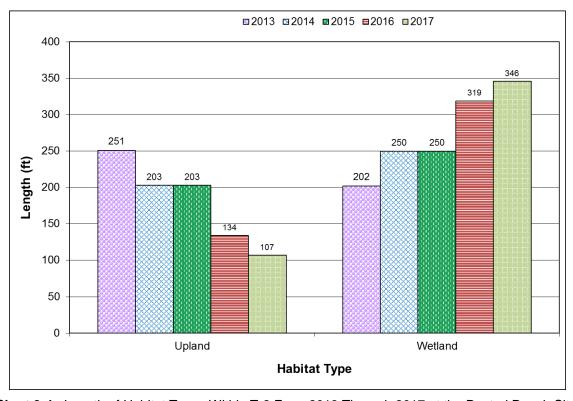
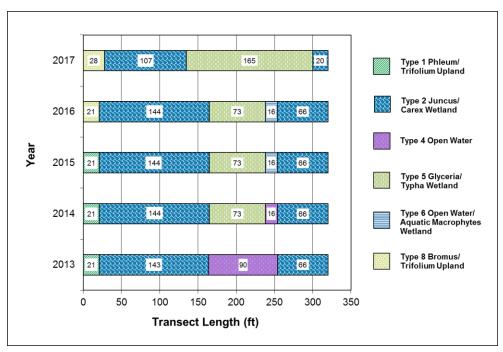


Chart 3-4. Length of Habitat Types Within T-2 From 2013 Through 2017 at the Rostad Ranch Site.

T-3 was established in the southern end of the mitigation site and traversed the excavated reestablishment and rehabilitation credit areas. Data collected on T-3 (Wetland Mitigation Site Monitoring form, Appendix B) are summarized in tabular and graphic formats in Table 3-4 and Charts 3-5 and 3-6, respectively. T-3 also began at a mature narrow-leaf cottonwood tree and extended east for 320 feet (Figure A-2, Appendix A). Photographs of the transect endpoints are shown in Appendix C. This transect originated in upland community Type 8, transitioned into wetland community Type 2, continued through wetland community Type 5 and ended in wetland community Type 2. Wetland community Type 5 has replaced all of the open water along this transect. Hydrophytic vegetation communities represented 91 percent of the transect intervals.

Table 3-4. Data Summary for T-3 From 2013 Through 2017 at the Rostad Ranch Site

Monitoring Year		2014	2015	2016	2017
Transect Length (feet)	320	320	320	320	320
Vegetation Community Transitions Along Transect	3	4	4	4	3
Vegetation Communities Along Transect	2	3	4	4	3
Hydrophytic Vegetation Communities Along Transect	1	2	3	3	2
Total Vegetative Species	25	31	31	31	23
Total Hydrophytic Species		16	16	16	15
Total Upland Species		15	15	15	8
Estimated % Total Vegetative Cover		90	90	90	80
Estimated % Unvegetated		10	10	10	20
% Transect Length Comprising Hydrophytic Vegetation Communities		88.4	93.4	93.4	91.0
% Transect Length Comprising Upland Vegetation Communities		6.6	6.6	6.6	9.0
% Transect Length Comprising Unvegetated Open Water		5	0	0	0
% Transect Length Comprising Mudflat	0	0	0	0	0



**Chart 3-5.** Transect Maps Showing Community Types on T-3 From 2013 Through 2017 at the Rostad Ranch Site.

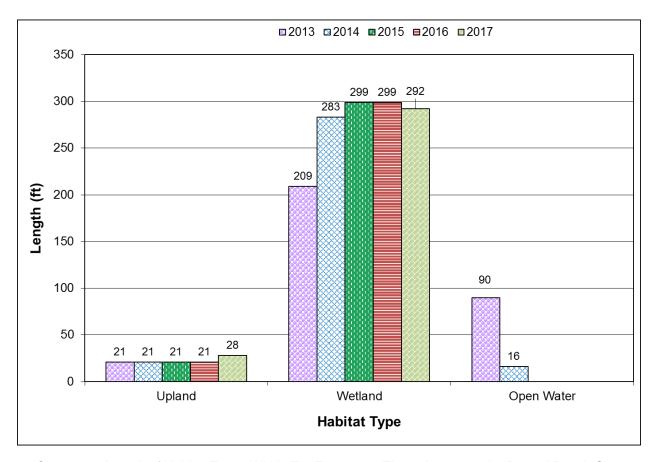


Chart 3-6. Length of Habitat Types Within T-3 From 2013 Through 2017 at the Rostad Ranch Site.

T-4 was established in 2017 to assess hydrologic and plant community changes on the western portion of the site caused by the adaptive management changes initiated in 2017. Data collected on T-4 (Wetland Mitigation Site Monitoring form, Appendix B) are summarized in tabular and graphic formats in Table 3-5 and Charts 3-7 and 3-8, respectively. T-4 starts on a newly constructed berm, extends northerly for 412 feet, and terminates at an interpretive sign adjacent to the main roadway adjacent to the property (Figure A-2, Appendix A). Photographs of the transect endpoints are shown in Appendix C. This transect originates in upland community Type 9 – Bare Ground/Disturbed, transitions into wetland Type 7 – *Phalaris arundinacea*, and then alternates between upland Types 8 – *Bromus inermis/Trifolium* spp. and 9. Inundation was noted across much of this transect in 2017 because of irrigation water being spread across the site. Recent inundation had not caused plant community changes in this area in 2017.

Table 3-5. Data Summary for T-4 in 2017 at the Rostad Ranch Site

Monitoring Year  Transect Length (feet)	2017 412
Vegetation Community Transitions Along Transect	412
Vegetation Communities Along Transect	3
Hydrophytic Vegetation Communities Along Transect	1
Total Vegetative Species	10
Total Hydrophytic Species	1
Total Upland Species	10
Estimated % Total Vegetative Cover	70
Estimated % Unvegetated	30
% Transect Length Comprising Hydrophytic Vegetation Communities	12
% Transect Length Comprising Upland Vegetation Communities	88
% Transect Length Comprising Unvegetated Open Water	0
% Transect Length Comprising Mudflat	0

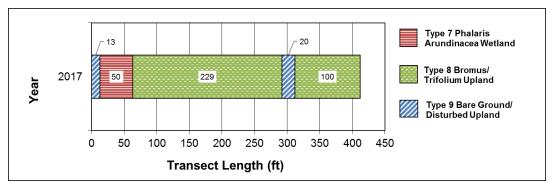


Chart 3-7. Transect Maps Showing Community Types on T-4 in 2017 at the Rostad Ranch Site.

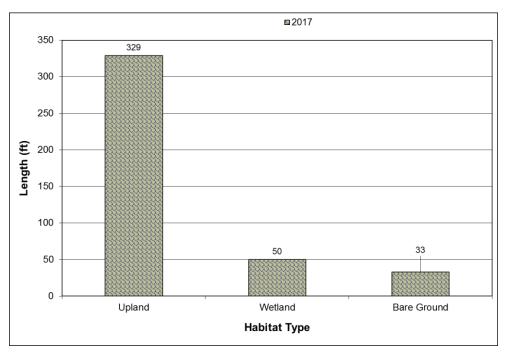


Chart 3-8. Length of Habitat Types Within T-4 at the Rostad Ranch Site.

Priority 2B noxious weeds that were identified within the Rostad Ranch site included hoary alyssum (*Berteroa incana*), spotted knapweed, Canada thistle (*Cirsium arvense*), gypsy-flower (*Cynoglossum officinale*), field bindweed (*Convolvulus arvensis*), and common tansy (*Tanacetum vulgare*). A total of 31 infestation areas were mapped in 2017. The majority of the infestations have cover classes that range from a trace (less than 1 percent) to moderate (6–25 percent). Most of the infestation are associated with constructed wetlands in upland community Type 8 – *Bromus inermis/Trifolium* spp. and Type 9 – Bare Ground/Disturbed. Weeds were sprayed at this site on July 10, 2017, which is the same day the monitoring was completed.

Approximately 2,000 willow cuttings were planted throughout the excavated areas. An estimated 50 percent of the willow cuttings survived through 2017. The cuttings appeared healthy and vigorous with some sign of browse. A total of 100 black cottonwoods (*Populus balsamifera*) and 100 quaking aspens (*Populus tremuloides*) were installed around the perimeter of the proposed open-water areas in 2012. Survival of these containerized, 5-gallon plant materials was also estimated at 50 percent in 2017. Natural recruitment of woody species may be occurring, but extremely tall grass in the herbaceous layer makes surveying for and identifying planted and volunteer shrubs across the site very difficult.

#### 3.3 **SOIL**

The Web Soil Survey for Meagher County [US Department of Agriculture, 2014] indicates two soil complexes occurring within the project site. These soil complexes are identified as the Varney-Notter cobbly loam and Delpoint variant- Marmath-Cabbart loam soils. The Varney-Notter cobbly loam mapped soil unit was located across the northern half of the site while the Delpoint variant-Marmarth-Cabbart loam mapped soil unit was located across the southern half. Both series generally consist of very deep, well-drained soils formed in alluvium. The mapped soil units were not identified on the *Montana Hydric Soils List* [US Department of Agriculture, 2015].

Soil test pits were excavated at four locations, all within what was originally mapped as the Delpoint variant-Marmarth-Cabbart loam soil series (Figure A-2, Appendix A). DP-1W and DP-2W are located in areas that exhibited hydric soils. The soil at DP-1W, which is located at the edge of an excavated depression, consisted of an upper 4-inch, brown (10YR 4/3) loam and a lower 12-inch, dark gray (10YR 4/1) clay loam with 10 percent yellowish brown (10YR 5/6), redoximorphic concentrations. The soil met the criteria for depleted matrix (F3) and classification as a hydric soil. DP-1U, which is located upslope from DP-1W, displayed a dark grayish brown (10YR 4/2), sandy clay loam and did not meet the criteria for any hydric soil indicators. The soil profile at DP-2W, revealed a single 16-inch layer of 10YR 5/2 clay loam with 10 percent, yellowish brown (10YR 5/6), redoximorphic concentrations. The soil met the criteria for depleted matrix (F3) and classification as a hydric soil. DP-2U, which is located upslope from DP-2W, exhibited a dark grayish-brown (10YR 4/2), clay loam and did not meet the criteria for any hydric soil indicators; however, this area was inundated and may develop over time.

#### 3.4 WETLAND DELINEATION

Four data points were evaluated in 2017 to determine the wetland and upland boundaries at this site (Figure A-2, Appendix A; Wetland Determination Data forms, Appendix B). DP-1W and DP-2W are

located in areas that met the wetland criteria. The total wetland acreage delineated in 2017, including preexisting wetland areas, was 26.42 acres, which is an increase of 11.52 acres since 2016. The delineated acreages are provided in Table 3-6. The adaptive management strategies implemented in 2017 resulted in broader inundation across the site, and in response to the inundation, some areas that were previously delineated as upland were delineated as wetland in 2017. Some areas quickly responded to the increased inundation and reed canary grass dominated the vegetation. Other areas, like the upland habitat near vegetation transect T-4, was inundated at the time of the survey, but vegetation had not changed, and these areas were left out of the delineation. The adaptive management measures also created areas of open water that were just beginning to support wetland vegetation. All open-water areas were included in the delineation.

The proposed wetland areas that were identified within the mitigation plan were overlaid with the wetlands surveyed in 2017 to identify the extent of wetlands within each crediting area. The 2017 wetland delineation included 0.25 acre within the preservation credit area, 14.62 acres within the reestablishment credit area, 0.81 acres within the wetland rehabilitation credit area, and 10.74 acres within the creation credit area. To date, the site is 20.17 acres short of the intended goal of 46.59 acres across the site. Corrective actions in 2017 resulted in over 11 acres of additional wetland at the site, with additional area that was inundated but had not yet developed wetland characteristics. Continued monitoring will determine how much additional wetlands develops at the site.

Table 3-6. Total Wetland Acres Delineated From 2013 Through 2017 at the Rostad Ranch Site

Wetland and Upland Habitats	2013 Delineated Acres	2014 Delineated Acres	2015 Delineated Acres	2016 Delineated Acres	2017 Delineated Acres
Project Area	60.00	60.00	60.00	60.00	60.00
Created Wetlands	1.07	2.68	3.18	3.18	10.74
Restoration Wetlands (Reestablishment)	10.89	9.91	9.91	9.97	14.62
Restoration Wetlands (Rehabilitation)	1.53	1.56	1.56	1.56	0.81
Preservation Wetlands	0.25	0.25	0.25	0.25	0.25
Total Wetlands	13.74	14.40	14.90	14.96	26.42

#### 3.5 WILDLIFE

A comprehensive list of birds and other wildlife species that were observed directly or indirectly from 2013 through 2017 is presented in Table 3-7 and the Wetland Mitigation Site Monitoring form in Appendix B. White-tailed deer (*Odocoileus virginianus*), pronghorn antelope (*Antilocapra americana*), Richardson's ground squirrel (*Urocitellus richardsonii*), mountain cottontail (*Sylvilagus nuttallii*), raccoon (*Procyon lotor*), and 20 bird species were observed in 2017. Wildlife that were observed in 2017 are bolded in Table 3-7.

Table 3-7. Wildlife Species Observed From 2013 Through 2017 at the Rostad Ranch Site (Page 1 of 2)

Common Name	Scientific Name
	Amphibian
Boreal Chorus Frog	Pseudacris maculata
Frog Sp.	
	Bird
American Crow	Corvus brachyrhynchos
American Goldfinch	Spinus tristus
American Robin	Turdus migratorius
American White Pelican	Pelecanus erythrorhynchos
Bank Swallow	Riparia riparia
Blue-Winged Teal	Anas discors
Bobolink	Dolichonyx oryzivorus
Brewer's Blackbird	Euphagus cyanocephalus
Brown-Headed Cowbird	Molothrus ater
Canada Goose	Branta canadensis
Cinnamon Teal	Spatula cyanoptera
Common Grackle	Quiscalus quiscula
Common Yellowthroat	Geothlypis trichas
Eared Grebe	Podiceps nigricollis
Eastern Kingbird	Tyrannus tyrannus
Ferruginous Hawk	Buteo regalis
Grasshopper Sparrow	Ammodramus savannarum
Green-Winged Teal	Anas crecca
Killdeer	Charadrius vociferous
Long-Billed Curlew	Numenius americanus
Mallard	Anas platyrhynchos
Northern Flicker	Colaptes auratus
Northern Harrier	Circus cyaneus
Northern Shoveler	Anas clypeata
Red-Tailed Hawk	Buteo jamaicensis
Red-Winged Blackbird	Agelaius phoeniceus
Ring-Necked Pheasant	Phasianus colchicus
Sandhill Crane	Grus canadensis
Song Sparrow	Melospiza melodia
Sparrow sp.	
Spotted Sandpiper	Actitis macularius
Tree Swallow	Tachycineta bicolor
Vesper Sparrow	Pooecetes gramineus
Western Meadowlark	Sturnella neglecta
Willet	Tringa semipalmata
Wilson's Phalarope	Phalaropus tricolor
Wilson's Snipe	Gallinago delicata
Yellow-Headed Blackbird	Xanthocephalus xanthocephalus

Table 3-7. Wildlife Species Observed From 2013 Through 2017 at the Rostad Ranch Site (Page 2 of 2)

Common Name	Scientific Name			
Mammal				
Black Bear	Ursus americanus			
Coyote	Canis latrans			
Deer sp.	Odocoileus sp.			
Mountain Cottontail	Sylvilagus nuttallii			
Muskrat	Ondatra zibethicus			
Pronghorn	Antilocapra Americana			
Raccoon	Procyon lotor			
Richardson's Ground Squirrel	Urocitellus richarsonii			
White-Tailed Deer	Odocoileus virginianus			

Species that were identified in 2017 are bolded.

#### 3.6 FUNCTIONAL ASSESSMENT

The 1999 MDT MWAM [Berglund, 1999] was used to evaluate the three existing wetlands that were identified within the site in 2004. The 2008 MWAM [Berglund and McEldowney, 2008] has been used to evaluate the site from 2013 through 2017. All of the wetlands that were identified from 2013 through 2017 were evaluated as one AA. The results of the 2004 and 2013–2017 assessments are summarized in Table 3-8. The completed 2017 MWAM form is included in Appendix B.

The 2004 assessment identified 3.4 acres of Category III wetlands. The majority of the existing wetlands within the site before construction consisted of man-made drainage and irrigation ditches that had been constructed to drain and disperse water throughout the site. The only remnants of the historic wetlands are a willow thicket and roadside drainage ditch. The preexisting wetlands averaged 34 percent of the possible score and attained a total of 12.46 functional units. Wetlands across the site remain Category III with high ratings for Montana Natural Heritage Program (MTNHP) species habitat, sediment/nutrient/toxicant removal, sediment/shoreline stabilization, and production export/food chain support. The 11.52-acre increase in wetland acreage from 2016 to 2017 increased the total functional units from 85.7 to 159.85.

#### 3.7 PHOTOGRAPHIC DOCUMENTATION

Photographs that were taken at Photo-Points 1–10 (PP1 to PP7), transect endpoints, and wetland determination data points are shown in Appendix C. Photo-Points 8, 9, and 10 are new in 2017.

#### 3.8 MAINTENANCE NEEDS

Priority 2B noxious weeds that were identified within the Rostad Ranch site included hoary alyssum, spotted knapweed, Canada thistle, gypsy-flower, field bindweed, and common tansy. A total of 31 infestation areas were mapped in 2017. The majority of the infestations, with cover classes that range from trace (less than 1 percent) to moderate (6–25 percent), were located at the edge of the constructed wetlands in upland community Type 8 *–Bromus inermis/Trifolium* spp. A weed contractor with MDT treated the site on July 10, 2017, with treatment concentrated in areas of

infestation by the six noxious weed species observed on site. MDT has an ongoing weed-control program for their mitigation sites that includes an annual assessment of weeds identified at each location during the yearly monitoring and treatment of mapped weeds to contain and control identified populations.

Table 3-8. Functions and Values of the Rostad Ranch Site From 2004 and 2013 Through 2017

Function and Value Parameters From the Montana Wetland Assessment Method	2004 <sup>(a)</sup> W-1-04	2004 <sup>(a)</sup> W-2-04	2004 <sup>(a)</sup> W-3-04	2013 <sup>(b)</sup>	2014 <sup>(b)</sup>	2015 <sup>(b)</sup>	2016 <sup>(b)</sup>	2017 <sup>(b)</sup>
Listed/Proposed Threatened and Endangered (T&E) Species Habitat	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)	Low (0)	Low (0)	Low (0)	Low (0)
MTNHP Species Habitat	Low (0.2)	Low (0.2)	Low (0.2)	High (0.9)	High (0.9)	High (0.9)	High (0.9)	High (0.9)
General Wildlife Habitat	Low (0.3)	Low (0.3)	Low (0.3)	Mod (0.5)	Low (0.3)	Mod (0.5)	Mod (0.5)	Mod (0.5)
General Fish/Aquatic Habitat	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Flood Attenuation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Short- and Long-Term Surface- Water Storage	Low (0.2)	Low (0.2)	Low (0.2)	High (0.8)	Mod (0.6)	Mod (0.6)	Mod (0.6)	High (0.9)
Sediment/Nutrient/Toxicant Removal	Mod (0.6)	Mod (0.6)	Mod (0.6)	Mod (0.7)	Mod (0.7)	High (1.0)	High (1.0)	High (1.0)
Sediment/Shoreline Stabilization	Mod (0.6)	Mod (0.6)	N/A	N/A	Mod (0.6)	High (0.9)	High (0.9)	High (0.9)
Production Export/Food Chain Support	Mod (0.7)	Mod (0.7)	Low (0.3)	High (0.9)	Mod (0.6)	High (0.8)	High (0.8)	High (0.8)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	N/A	High (1.0)	Mod (0.7)	Mod (0.7)	Mod (0.7)	Mod (0.7)
Uniqueness	Low (0.2)	Low (0.2)	Low (0.2)	Mod (0.4)	Low (0.2)	Low (0.3)	Low (0.3)	Low (0.3)
Recreation/Education Potential (bonus points)	Low (0.1)	Low (0.1)	Low (0.1)	Low (0.05)	Low (0.05)	Low (0.05)	Low (0.05)	Low (0.05)
Actual Points/Possible Points	3.9/10	3.9/10	1.9/8	5.25/8	4.65/9	5.75/9	5.75/9	6.05/9
% of Possible Score Achieved	39.0%	39.0%	24.0%	65.6%	51.7%	63.9%	63.9%	67%
Overall Category	III	III	III	II	III	III	III	11
Total Acreage of Assessed Wetlands Within Site Boundaries	1.2	1.8	0.4	13.74	14.40	14.90	14.96	26.42
Functional Units (acreage × actual points)	4.68	7.02	0.76	72.1	67.0	85.7	86.02	159.85

<sup>(</sup>a) 1999 MWAM form [Berglund, 1999].

The wildlife-friendly fence that was installed around the easement area was intact during the 2017 site visit. Seven bluebird boxes were installed around the site perimeter in 2012 and were in good condition in 2017. Swallows occupied one bird box during the 2017 site visit. The irrigation headgate structure was in good condition during the 2017 site visit. A small amount of fine sediment was beginning to accumulate in the stilling pool but did not appear to inhibit hydrology or the function of the structure. During future monitoring efforts, inspecting this structure and stilling pool is recommended to ensure proper functionality.

<sup>(</sup>b) 2008 MWAM form [Berglund and McEldowney, 2008].

#### 3.9 CURRENT CREDIT SUMMARY

Table 3-9 summarizes the estimated wetland credits based on the USACE-approved credit ratios and the wetland delineation completed in July 2017. Proposed mitigation credits from the 2007 *Rostad Ranch Mitigation Plan, Meagher County, Montana* [MDT, 2007] included reestablishing 27.11 wetland acres, rehabilitating 2.63 wetland acres, creating 9.84 wetland acres, preserving 0.25 wetland acre, and maintaining 6.76 acres of upland buffer. The wetland acreages that were delineated in 2017 included 14.62 acres of reestablished wetlands, 0.81 acres of rehabilitated wetland, 10.74 acres of created wetland, and 0.25 acre of preservation wetland (community Type 3 – *Salix exigua*). Adaptive management activities on the site in 2017 resulted in a shift of crediting, which decreased the overall rehabilitated wetland acreage and increased the reestablished wetland acreage The total mitigation credit estimated in 2017, including the upland buffer credit and the deduction for the 0.41-acre wetland impact incurred during mitigation construction, totaled 26.90 credit acres, which is an increase of 11.71 acres over 2016.

Table 3-10 provides a summary of the approved performance standards and success criteria based on site conditions documented in 2017. All of the wetlands that were delineated at the Rostad Ranch site in 2017 satisfied the three criteria of wetland hydrology, hydrophytic vegetation, and hydric soils. Willow stakes that were planted within the site exhibited a 50 percent survival rate; however, not all of the live cuttings may have been located because of tall grass. Even at 50 percent, this criteria is still being met. Although the site was recently disturbed from construction efforts in 2017, vegetation is successfully establishing, with aerial coverage by desirable plants estimated at greater than 90 percent. The coverage of state-listed noxious weeds in the upland buffer was approximately 5 percent in 2017. The cover of noxious weeds within the delineated wetlands was less than 5 percent. The extent of the open water surveyed in 2017 composed approximately 10 percent of the total wetland acreage, which is right at the cap of 10 percent stipulated in the USACE-approved performance criteria. The percentage of open water may continue to decrease as additional emergent wetlands develop on the site. The entire 60-acre easement area has been fenced to exclude grazing.

Table 3-9. Summary of Wetland Credits at the Rostad Ranch Site From 2014 Through 2017

Compensatory Mitigation Type	Wetland Type <sup>(a)</sup>	Approved Mitigation Ratio <sup>(b)</sup>	Anticipated Mitigation Area (acres)	Anticipated Mitigation Credit (acres)	2014 Delineated Mitigation Areas (acres)	2014 Estimated Mitigation Areas (acres)	2015 Delineated Mitigation Areas (acres)	2015 Estimated Mitigation Credit (acres)	2016 Delineated Mitigation Areas (acres)	2016 Estimated Mitigation Credit (acres)	2017 Delineated Mitigation Areas (acres)	2017 Estimated Mitigation Credit (acres)
Restoration (Reestablishment)	Palustrine emergent	1:1	27.11	27.11	9.91	9.91	9.91	9.91	9.96	9.96	14.62	14.62
Creation (Establishment)	Palustrine emergent	1:1	9.84	9.84	2.68	2.68	3.18	3.18	3.18	3.18	10.74	10.74
Restoration (Rehabilitation)	Palustrine emergent	1.5:1	2.63	1.75	1.56	1.04	1.56	1.04	1.56	1.04	0.81	0.54
Preservation	Palustrine, scrub/shrub	4:1	0.25	0.06	0.25	0.06	0.25	0.06	0.25	0.06	0.25	0.06
Upland Buffer	N/A	5:1	6.76 <sup>(c)</sup>	1.35	6.76	1.35	6.76	1.35	6.76	1.35	6.76	1.35
Permanent Wetland Impact	N/A	1:1	N/A	-0.41	N/A	-0.41	N/A	-0.41	N/A	-0.41	N/A	-0.41
	Totals		46.59	39.70	21.16	14.63	21.66	15.13	21.72	15.19	33.18	26.90

 <sup>(</sup>a) Cowardin et al. [1979].
 (b) The mitigation credit ratios that were used are from the Montana Corps Regulatory Programs 2005 Wetland Credit Ratios [USACE, 2005].
 (c) The anticipated upland buffer credit was used until wetland areas expand to full extent.

Table 3-10. Summary of Performance Standards and Success Criteria (Page 1 of 2)

Performance Standards	Success Criteria	Criteria Achieved Y/N	Discussion
Wetland Characteristics	The three parameter criteria for hydrology, vegetation, and soils are met as outlined in the 1987 Wetland Manual and 2010 GP Regional Supplement.	Y	Wetland habitat areas within the mitigation site meet the three parameter criteria.
Wetland Hydrology	Soil saturation is present for at least 12.5 percent of the growing season.	Y	Irrigation water was turned into the site on May 4 and turned off on July 6, 2017. All wetlands within the project area were likely saturated for greater than the minimum 12.5 percent of growing season.
Hydric Soil	Hydric soil conditions are present or appear to be forming.	Y	The recently constructed wetland complex exhibits weak hydric soil development in areas that had been originally identified as upland before construction. Preexisting hydric soil characteristics are present in several areas that had been identified as wetland before project construction.
	Soil is sufficiently stable to prevent erosion.	Y	Disturbed soil is stable and does not exhibit signs of erosion.
	Soil is able to support plant cover.	Y	Plant cover has continued to develop across disturbed soils.
Hydrophytic Vegetation	Combined absolute cover of facultative or wetter species is greater than or equal to 70 percent.	Y	Areas identified as wetland habitat within the mitigation site support a prevalence of hydrophytic vegetation (OBL, FACW, and FAC) with absolute cover exceeding 70 percent.
	Noxious weeds do not exceed 5 percent cover.	Y	Many noxious weed infestations have been mapped across this site, primarily outside of site wetlands. Estimated noxious weed cover within delineated wetlands is below 5 percent.
Woody Plants	Plantings exceed 50 percent survival after 5 years.	Y	Approximately 50 percent of the woody plantings observed were alive in 2017, which meets the 50 percent survival rate.
Herbaceous Plants	At the conclusion of the monitoring period, ocular coverage of desirable hydrophytic vegetation will be at least 80 percent.	Y	Created wetlands generally exhibited greater than 90 percent vegetation cover during the 2017 monitoring event and showed increased vegetation cover from 2013.
Open-Water Areas	Open water that is established within the designated wetland cells will be considered successful and creditable if open water does not exceed 10 percent of the total wetland acreage.	Y	Open water was mapped within 10 percent of the total wetland acreage in 2017. These areas are exhibiting emergent vegetation development and are anticipated to continue to develop aquatic macrophyte communities within the 5-year monitoring period.

Table 3-10. Summary of Performance Standards and Success Criteria (Page 2 of 2)

Performance Standards	Success Criteria	Criteria Achieved Y/N	Discussion
Upland Buffer	Success will be achieved when noxious weeds do no exceed 5 percent cover within the buffer areas on site.	Y	Many noxious weed infestations, including field bindweed, gypsy-flower, Canada thistle, spotted knapweed, common tansy, and hoary alyssum were mapped within the site in 2017. Although a variety of noxious weeds are present throughout the site, aerial coverage does not exceed 5 percent.
	Any area that was disturbed within creditable buffer zone must have at least 50 percent aerial cover of desirable upland plant species by the end of the monitoring period.	Y	Upland buffers that surround wetland areas within the site exhibited greater than 50 percent aerial cover of non-weed species in 2017.
Weed Control	Weed-control measures are implemented to minimize and/or eliminate infestations of state-listed noxious weed species within the site.	Y	State-listed noxious weed species across the site have been estimated at 5 percent absolute cover in 2017.
Fencing	Wildlife-friendly fencing is installed along the easement boundaries.	Y	Wildlife-friendly fencing has been installed around the easement boundaries and is in good condition.

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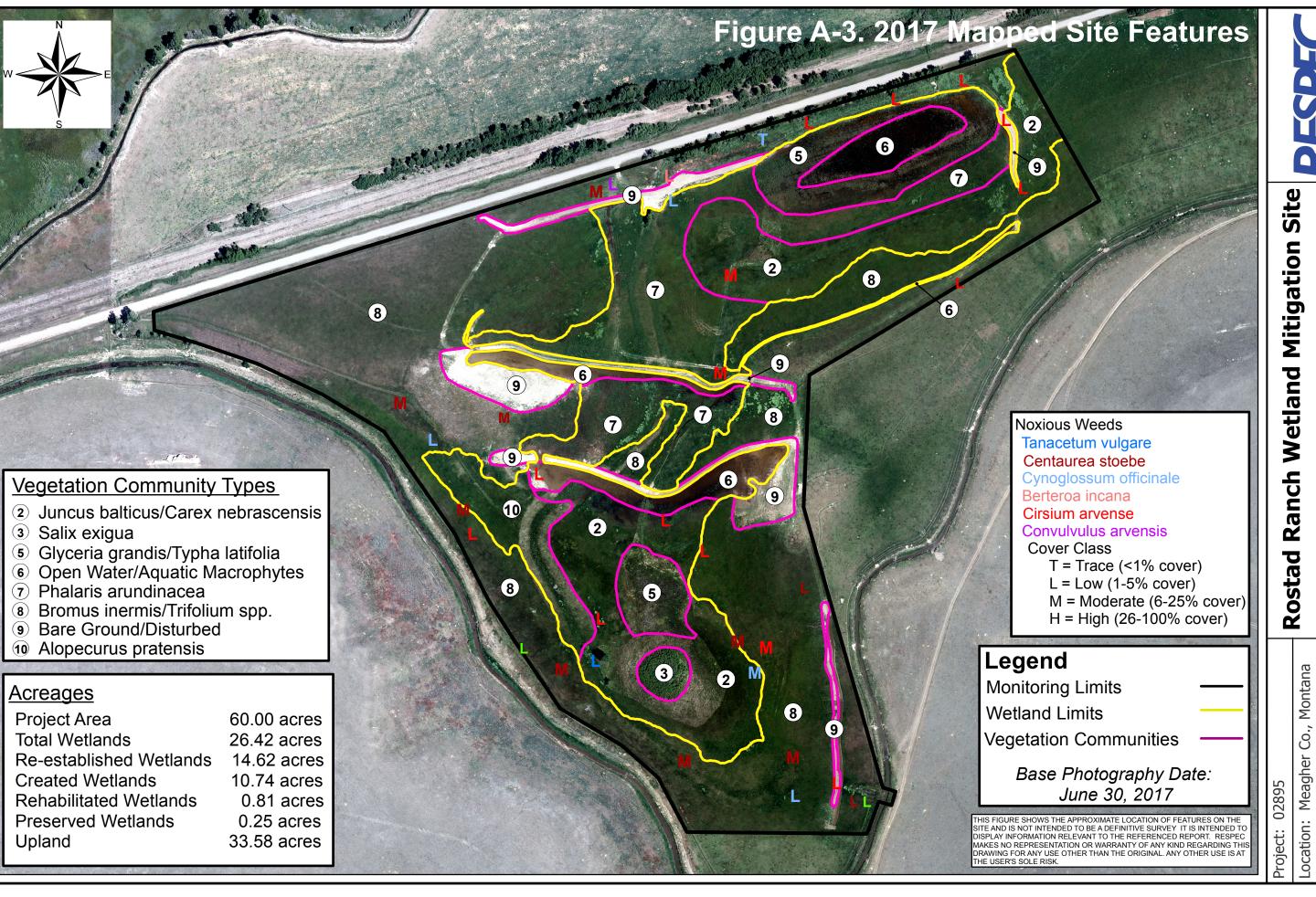
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# APPENDIX A PROJECT AREA MAPS

MDT Wetland Mitigation Monitoring Rostad Ranch Mitigation Site Meagher County, Montana





# **Features** 2017 Mapped Site

December

# APPENDIX B MONITORING FORMS

MDT Wetland Mitigation Monitoring Rostad Ranch Mitigation Site Meagher County, Montana

### RESPEC/MDT WETLAND MITIGATION SITE MONITORING FORM

Assessment Date: <u>July 10, 20</u> Location: <u>Martinsdale, Mon</u> Milepost: Legal Description: T <u>8N</u>	mrtinsdale, Montana  MDT District: Billings  oost:  ption: T 8N R 11E Section 12 and 13  ditions: Sunny, T-storms, 75 degrees  tion Date: August 21, 2013  Monitoring Year: 5 # Visits in Year: 1				
	Н	YDROLOG	GY		
Surface Water Source: Groundwater, supplemental hydrology from ditch/headgate, surface runoff Inundation: Present Average Depth: 1.0 feet Range of Depths: 0.25-3 ft.  Percent of assessment area under inundation: 45% Depth at emergent vegetation-open water boundary: 0.5 feet If assessment area is not inundated then are the soils saturated within 12 inches of surface: Yes Other evidence of hydrology on the site (ex. – drift lines, erosion, stained vegetation, etc.): Drainage patterns, soil saturation, water marks, drift deposits, oxidized rhizospheres on living roots, geomorphic position, FAC-nuetral test					
Groundwater Monitoring We Record depth of water below		n feet):			
Well Number Depth	Well Number	Depth	Well Number	Depth	]
MW-1		_			1
141 44 - 1					
141 44 - 1					
Additional Activities Checkli  Map emergent vegetation  Observe extent of surface elevations (drift lines, ero  Use GPS to survey ground	open water bound water during each sion, vegetation s	h site visit a staining, etc.	nd look for evidend	ce of past su	urface water
Additional Activities Checkli  Map emergent vegetation  Observe extent of surface elevations (drift lines, ero	open water bound water during each sion, vegetation so lwater monitoring S: signed and const e site. Increased	h site visit and taining, etc.  g well location	nd look for evidend) ons, if present. ne site in spring 20	017 to spre	ad surface water

#### **VEGETATION COMMUNITIES**

Community Number: **8** Community Title (main spp): **Bromus inermis / Trifolium spp.** 

Dominant Species	% Cover	Dominant Species	% Cover
Bromus inermis	5 = > 50%	Pascopyrum smithii	1 = 1-5%
Trifolium repens	3 = 11-20%	Phleum pratense	1 = 1-5%
Schedonorus pratensis	2 = 6-10%	Populus angustifolia	1 = 1-5%
Elymus repens	2 = 6-10%	Taraxacum officinale	1 = 1-5%
Melilotus officinalis	2 = 6-10%	Trifolium pratense	1 = 1-5%
Achillea millefolium	1 = 1-5%	Centaurea stoebe	1 = 1-5%

Comments / Problems: <u>Previously recorded as community Type 1 with a prevalence of Phleum pratense</u>. <u>Upland communities across the site are dominated by Bromus inermis.</u>

Community Number: 2 Community Title (main spp): Juncus balticus / Carex nebrascensis

Dominant Species	% Cover	Dominant Species	% Cover
Carex nebrascensis	4 = 21-50%	Open Water	1 = 1-5%
Juneus balticus	4 = 21-50%	Poa palustris	1 = 1-5%
Beckmannia syzigachne	3 = 11-20%	Sonchus arvensis	1 = 1-5%
Phalaris arundinacea	2 = 6-10%	Deschampsia caespitosa	1 = 1-5%
Hordeum jubatum	2 = 6-10%	Rumex crispus	1 = 1-5%
Eleocharis palustris	1 = 1-5%	Typha latifolia	1 = 1-5%

Comments / Problems: Wet meadow, revegetation successful since 2013.

Community Number: 3 Community Title (main spp): Salix exigua /

Dominant Species	% Cover	Dominant Species	% Cover
Salix exigua	5 = > 50%	Alopecurus pratensis	1 = 1-5%
Deschampsia caespitosa	2 = 6-10%	Carex nebrascensis	1 = 1-5%
Poa palustris	2 = 6-10%	Agrostis gigantea	+=<1%
Beckmannia syzigachne	1 = 1-5%	Veronica peregrina	+=<1%
Carex utriculata	1 = 1-5%	Typha latifolia	+=<1%
Eleocharis palustris	1 = 1-5%		

Comments / Problems: Undisturbed salix community near southern extent of monitoring boundary.

Community Number: 5 Community Title (main spp): Glyceria grandis / Typha latifolia

Dominant Species	% Cover	<b>Dominant Species</b>	% Cover
Glyceria grandis	4 = 21-50%		
Typha latifolia	3 = 11-20%		
Eleocharis palustris	3 = 11-20%		
Open Water	3 = 11-20%		
Beckmannia syzigachne	2 = 6-10%		
-			

Comments .	/ Problems:	

#### **VEGETATION COMMUNITIES (continued)**

Community Number: **6** Community Title (main spp): **Open Water / Aquatic macrophytes** 

Dominant Species	% Cover	Dominant Species	% Cover
Open Water	5 = > 50%	Carex nebrascensis	+ = < 1%
Eleocharis palustris	1 = 1-5%	Juncus balticus	+ = < 1%
Typha latifolia	1 = 1-5%	Polypogon monspeliensis	+ = < 1%
Beckmannia syzigachne	1 = 1-5%	Downingia laeta	+ = < 1%
Glyceria grandis	1 = 1-5%	Rumex crispus	+ = < 1%
Algae, green	+=<1%	Veronica peregrina	+ = < 1%

Comments / Problems:

Community Number: 7 Community Title (main spp): Phalaris arundinacea /

Dominant Species	% Cover	Dominant Species	% Cover
Phalaris arundinacea	5 = > 50%		
Elymus trachycaulus	3 = 11-20%		
Poa pratensis	1 = 1-5%		
Trifolium pratense	1 = 1-5%		
Medicago sativa	+=<1%		
Thlaspi arvense	1 = 1-5%		

Comments / Problems:

Community Number: **9** Community Title (main spp): **Bare Ground / Disturbed** 

Dominant Species	% Cover	Dominant Species	% Cover
Bare Ground	5 = > 50%		
Chenopodium sp.	3 = 11-20%		
Elymus trachycaulus	2 = 6-10%		
Pascopyrum smithii	1 = 1-5%		

Comments / Problems: Construction in spring 2017 resulted in several berms and other disturbed areas that were lightly vegetated at the time of the monitoring. These areas will vegetate over time.

Community Number: **10** Community Title (main spp): **Alopecurus pratensis** 

Dominant Species	% Cover	Dominant Species	% Cover
Alopecurus pratensis	4 = 21-50%		
Phalaris arundinacea	3 = 11-20%		
Agrostis gigantea	2 = 6-10%		
Juneus balticus	2 = 6-10%		
Hordeum jubatum	1 = 1-5%		

(	Comments	/ Problems:	
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#### PLANTED WOODY VEGETATION SURVIVAL

Plant Species	Number Originally Planted	Number Observed	Mortality Causes
Populus balsamifera	100		Estimated 50% survival
Populus tremuloides	100		Estimated 50% survival
Salix spp.	2000		Estimated 50% survival
		_	

Comments / Problems: Willow stakes were planted in spring 2013. Due to tall herbaceous vegetation, locating all plantings was difficult during the site visit. Especially difficult was locating plants (stems) that had died. Those plants observed looked healthy with minor deer browse noted. Survival in 2017 was estimated at 50% survival based on the number of live stems observed.

Transect Number: 1 Approximate Transect Length: 422 feet Compass Direction from Start: 290 Note:

Transect Interval Length: 163 feet (station 0-163)	
Vegetation Community Type: Bromus inermis / Trifolium	spp.
Plant Species	Cover
Bromus inermis	4 = 21-50%
Poa palustris	2 = 6-10%
Trifolium pratense	2 = 6-10%
Achillea millefolium	1 = 1-5%
Medicago sativa	1 = 1-5%
Phleum pratense	1 = 1-5%
Tragopogon dubius	1 = 1-5%
Taraxacum officinale	1 = 1-5%
Total Vegetative Cover:	80%

Transect Interval Length: 109 feet (station 163-272)	
Vegetation Community Type: Juncus balticus / Carex nebrascensis	
Plant Species	Cover
Poa palustris	3 = 11-20%
Juneus balticus	3 = 11-20%
Carex nebrascensis	2 = 6-10%
Phalaris arundinacea	2 = 6-10%
Trifolium pratense	2 = 6-10%
Eleocharis palustris	1 = 1-5%
Deschampsia caespitosa	1 = 1-5%
Phleum pratense	1 = 1-5%
Alopecurus pratensis	1 = 1-5%
Total Vegetative Cover:	85%

Transect Interval Length: 22 feet (station 272-294)	
Vegetation Community Type: Bare Ground	
Plant Species	Cover
Bare Ground	5 = > 50%
Elymus trachycaulus	1 = 1-5%
Total Vegetative Cover:	2%

Transect Interval Length: 57 feet (station 294-351)	
Vegetation Community Type: Phalaris arundinacea	
Plant Species	Cover
Phalaris arundinacea	5 = > 50%
Elymus trachycaulus	3 = 11-20%
Phleum pratense	2 = 6-10%
Poa pratensis	1 = 1-5%
Trifolium pratense	1 = 1-5%
Total Vegetative Cover:	80%

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#### MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Rostad Ranch** Date: **July 10, 2017** Examiner: **M. Traxler** 

Transect Number: 1 Approximate Transect Length: 422 feet Compass Direction from Start: 290 Note:

Transect Interval Length: 42 feet (station 351-393)	
Vegetation Community Type: Glyceria grandis / Typah la	tifolia
Plant Species	Cover
Glyceria grandis	2 = 6-10%
Phalaris arundinacea	2 = 6-10%
Typha latifolia	2 = 6-10%
Eleocharis palustris	2 = 6-10%
Rumex crispus	2 = 6-10%
Total Vegetative Cover:	75%

Transect Interval Length: 29 feet (station 393-422)	
Vegetation Community Type: Open Water / Aquatic macrophytes	
Plant Species	Cover
Open Water	5 = > 50%
Glyceria grandis	5 = > 50%
Eleocharis palustris	2 = 6-10%
Typha latifolia	2 = 6-10%
Beckmannia syzigachne	1 = 1-5%
Total Vegetative Cover:	50%

Transect Interval Length:	
Vegetation Community Type:	
Plant Species	Cover
Total Vegetative Cover:	%

Transect interval Length:	
Vegetation Community Type:	
Plant Species	Cover
Total Vegetative Cover:	%

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MDT WETLAND MONITORING - VEGETATION TRANSECT

Transect Number: 2 Approximate Transect Length: 453 feet Compass Direction from Start: 120 Note:

Transect Interval Length: 69 feet (station 0-69)	
Vegetation Community Type: Bromus inermis / Trifolium spp.	
Plant Species	Cover
Bromus inermis	5 = > 50%
Trifolium pratense	3 = 11-20%
Melilotus officinalis	3 = 11-20%
Elymus repens	3 = 11-20%
Phalaris arundinacea	3 = 11-20%
Populus angustifolia	3 = 11-20%
Poa palustris	2 = 6-10%
Cirsium arvense	1 = 1-5%
Taraxacum officinale	1 = 1-5%
Descurainia sophia	1 = 1-5%
Total Vegetative Cover:	85%

Transect Interval Length: 346 feet (station 69-415)	
Vegetation Community Type: Juncus balticus / Carex nebrascensis	
Plant Species	Cover
Juneus balticus	4 = 21-50%
Carex nebrascensis	3 = 11-20%
Trifolium pratense	2 = 6-10%
Phleum pratense	2 = 6-10%
Phalaris arundinacea	4 = 21-50%
Poa pratensis	2 = 6-10%
Salix exigua	1 = 1-5%
Pascopyrum smithii	1 = 1-5%
Alopecurus pratensis	1 = 1-5%
Total Vegetative Cover:	90%

Transect Interval Length: 38 feet (station 415-453)	
Vegetation Community Type: Bromus inermis / Trifolium spp.	
Plant Species	Cover
Bromus inermis	4 = 21-50%
Trifolium pratense	3 = 11-20%
Poa pratensis	2 = 6-10%
Elymus trachycaulus	2 = 6-10%
Juneus balticus	2 = 6-10%
Pascopyrum smithii	2 = 6-10%
Elymus repens	2 = 6-10%
Phalaris arundinacea	1 = 1-5%
Phleum pratense	+=<1%
Total Vegetative Cover:	75%

Transect Interval Length:	
Vegetation Community Type:	
Plant Species	Cover
Total Vegetative Cover:	%

## B-9

#### MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: **Rostad Ranch** Date: **July 10, 2017** Examiner: **M. Traxler** 

Transect Number: 3 Approximate Transect Length: 320 feet Compass Direction from Start: 30 Note:

Transect Interval Length: 28 feet (station 0-28)	
Vegetation Community Type: Bromus inermis / Trifolium	spp.
Plant Species	Cover
Populus angustifolia	4 = 21-50%
Phalaris arundinacea	3 = 11-20%
Elymus repens	2 = 6-10%
Amaranthus retroflexus	1 = 1-5%
Phleum pratense	1 = 1-5%
Bare Ground	1 = 1-5%
Bromus arvensis	1 = 1-5%
Total Vegetative Cover:	70%

Total Vegetative Cover:	/0%
-	
Transect Interval Length: 165 feet (station 135-300)	
Vegetation Community Type: Glyceria grandis / Typha la	tifolia
Plant Species	Cover
Glyceria grandis	4 = 21-50%
Typha latifolia	4 = 21-50%
Eleocharis palustris	3 = 11-20%
Alopecurus pratensis	3 = 11-20%
Beckmannia syzigachne	2 = 6-10%
Open Water	1 = 1-5%
Total Vegetative Cover:	75%

Transect Interval Length: 107 feet (station 28-135)	
Vegetation Community Type: Juncus balticus / Carex nebrascensis	
Plant Species	Cover
Hordeum jubatum	3 = 11-20%
Deschampsia caespitosa	3 = 11-20%
Juneus balticus	2 = 6-10%
Phalaris arundinacea	2 = 6-10%
Salix exigua	2 = 6-10%
Trifolium pratense	2 = 6-10%
Alopecurus pratensis	1 = 1-5%
Carex nebrascensis	1 = 1-5%
Epilobium ciliatum	1 = 1-5%
Beckmannia syzigachne	1 = 1-5%
Juncus bufonius	1 = 1-5%
Total Vegetative Cover:	70%

Transect Interval Length: 20 feet (station 300-320)	
Vegetation Community Type: Juncus balticus / Carex nebrascensis	
Plant Species	Cover
Eleocharis palustris	5 = > 50%
Phalaris arundinacea	2 = 6-10%
Salix exigua	1 = 1-5%
Typha latifolia	+=<1%
Elymus trachycaulus	+=<1%
Beckmannia syzigachne	+=<1%
Hordeum jubatum	+=<1%
Deschampsia caespitosa	+=<1%
Juneus balticus	+=<1%
Total Vegetative Cover:	75%

#### MDT WETLAND MONITORING – VEGETATION TRANSECT

Site: Rostad Ranch Date: July 10, 2017 Examiner: M. Traxler

Transect Number: 4 Approximate Transect Length: 412 feet Compass Direction from Start: 0 Note:

Transect Interval Length: 13 feet (station 0-13)	
Vegetation Community Type: Bare Ground / Disturbed	
Plant Species	Cover
Chenopodium sp.	1 = 1-5%
Cardaria draba	1 = 1-5%
Phleum pratense	1 = 1-5%
Bare Ground	5 = > 50%
Total Vegetative Cover:	15%

Transect Interval Length: 50 feet (station 13-63)	
Vegetation Community Type: Phalaris arundinacea	
Plant Species	Cover
Phalaris arundinacea	3 = 11-20%
Bromus inermis	3 = 11-20%
Phleum pratense	3 = 11-20%
Poa pratensis	1 = 1-5%
Total Vegetative Cover:	75%

Transect Interval Length: 229 feet (station 63-292)	
Vegetation Community Type: Bromus inermis/Trifolium	sp.
Plant Species	Cover
Trifolium pratense	3 = 11-20%
Bromus inermis	5 = > 50%
Phleum pratense	3 = 11-20%
Medicago sativa	1 = 1-5%
Taraxacum officinale	1 = 1-5%
Poa pratensis	2 = 6-10%
Total Vegetative Cover:	80%

Transect Interval Length: 20 feet (station 292-312)	
Vegetation Community Type: Bare Ground / Disturbed	
Plant Species	Cover
Bare Ground	5 = > 50%
Chenopodium sp.	2 = 6-10%
Cardaria draba	1 = 1-5%
Total Vegetative Cover:	10%

Site: Rostad Ranch
Transect Number: 4

Approximate Transect Length: 412 feet

Compass Direction from Start: 0 Note:

Transect Interval Length: 100 feet (station 312-412)	
Vegetation Community Type: Bromus inermis/Trifolium s	sp.
Plant Species	Cover
Trifolium pratense	3 = 11-20%
Bromus inermis	5 = > 50%
Phleum pratense	2 = 6-10%
Poa pratensis	2 = 6-10%
Total Vegetative Cover:	80%

Transect Interval Length: Vegetation Community Type:	
Plant Species	Cover
Total Vegetative Cover:	%

Transect Interval Length:	
Vegetation Community Type:	
Plant Species	Cover
-	
Total Vegetative Cover:	%

Transect Interval Length:	
Vegetation Community Type:	
Plant Species	Cover
-	
Total Vegetative Cover:	%

#### MDT WETLAND MONITORING - VEGETATION TRANSECT

Cover Estima	te	Indicator Class	Source
+ = < 1%	3 = 11-10%	+ = Obligate	P = Planted
1 = 1-5%	4 = 21-50%	<ul><li>- = Facultative/Wet</li></ul>	V = Volunteer
2 = 6-10%	5 = > 50%	0 = Facultative	

Percent of perimeter developing wetland vegetation (excluding dam/berm structures): \_\_\_\_%

Establish transects perpendicular to the shoreline (or saturated perimeter). The transect should begin in the upland area. Permanently mark this location with a standard metal fencepost. Extend the imaginary transect line towards the center of the wetland, ending at the 3 foot depth (in open water), or at the point where water depths or saturation are maximized. Mark this location with another metal fencepost.

Estimate cover within a 10 foot wide "belt" along the transect length. At a minimum, establish a transect at the windward and leeward sides of the wetland. Remember that the purpose of this sampling is to monitor, not inventory, representative portions of the wetland site.

Comments: \_\_\_\_

#### **PHOTOGRAPHS**

Take photographs of the following permanent reference points listed in the check list below. Record the direction of the photograph using a compass. When at the site for the first time, establish a permanent reference point by setting a ½ inch rebar or fencepost extending 2-3 feet above ground. Survey the location with a resource grade GPS and mark the location on the aerial photograph.

Photograph Checklist:
One photograph for each of the four cardinal directions surrounding the wetland.
At least one photograph showing upland use surrounding the wetland. If more than one upland
exists then take additional photographs.
At least one photograph showing the buffer surrounding the wetland.
One photograph from each end of the vegetation transect, showing the transect.

Location	Photograph Frame #	Photograph Description & Lat/Long	Compass Reading (°)
PP-1		Photo Point 1 (Pano): 46.463894 / -110.292686	140-240
PP-2		Photo Point 2 (Pano): 46.461612 / -110.294534	180-70
PP-2		Photo Point 2 (WNW): 46.461612 / -110.294534	275
PP-3		Photo Point 3 (Pano): 46.460579 / -110.294502	160-360
PP-4		Photo Point 4 (Pano): 46.458241 / -110.29377	190-340
PP-5		Photo Point 5 (Pano): 46.458417 / -110.296185	300-110
PP-6		Photo Point 6 (NNE): 46.459839 / -110.298195	30
PP-6		Photo Point 6 (ESE): 46.459839 / -110.298195	100
PP-7		Photo Point 7 (Pano): 46.461119 / -110.299371	0-300
PP-8		Photo Point 8 (E): 46.460987 / -110.298118	90
PP-9		Photo Point 9 (SW): 46.461106 / -110.294579	240
PP-10		Photo Point 10 (ENE): 46.461759 / -110.298593	80
T-1 start		Transect 1 start: 46.463043 / -110.291222	290
T-1 end		Trasnect 1 end: 46.463577 / -110.29274	110
T-2 start		Transect 2 start: 46.46286 / -110.296341	130
T-2 end		Transect 2 end: 46.46191 / -110.295059	310
T-3 start		Transect 3 start: 46.459347 / -110.296814	30
T-3 end		Transect 3 end: 46.459827 / -110.295876	210
T-4 start		Transect 4 start: 46.462945 / -110.297834	0
T-4 end		Transect 4 end: 46.461803 / -110.297953	180
DP-1W		Wetland soil pit #1: 46.462577 / -110.294263	
DP-1U		Upland soil pit #1: 46.462457 / -110.294063	
DP-2W		Wetland soil pit #2: 46.459969 / -110.295985	
DP-2U		Upland soil pit #2: 46.460004 / -110.295729	

Comments / Problems: <u>PP-2 (WNW), PP-8, PP-9, and PP-10 are new photos in 2017 to capture wetland expansion due to construction of new dikes across site. Transect 4 start and end photos are also new in 2017. DP-2W and DP-2U were moved in 2017.</u>

#### **GPS SURVEYING**

Using a resource grade GPS survey the items on the checklist below. Collect at least 3 location points set at a 5 second recording rate. Record file numbers for site in designated GPS field notebook.

GPS Checklist:
☐ Upland/wetland boundary.
4-6 landmarks that are recognizable on the aerial photograph.
$\boxtimes$ Start and End points of vegetation transect(s).
Photograph reference points.
Groundwater monitoring well locations.
Bird nest boxes.
Comments / Problems:
WETLAND DELINEATION
(attach COE delineation forms)
At each site conduct these checklist items:
Delineate wetlands according to the 1987 Army COE manual and regional supplement.
Delineate wetland – upland boundary onto aerial photograph.
Comments / Problems:
DUNCTIONIAL ACCECCMENT
FUNCTIONAL ASSESSMENT  Complete and attach full MDT Montana Watland Assessment Mathad field forms
Complete and attach full MDT Montana Wetland Assessment Method field forms.
Comments / Problems:
Comments / 1 Toolems.
MAINTENANCE
Were man-made nesting structure installed at this site? Yes
If yes, do they need to be repaired? <b>No</b>
If yes, describe the problems below and indicate if any actions were taken to remedy the problems.
Were man-made structures built or installed to impound water or control water flow into or out of the
wetland? Yes
If yes, are the structures working properly and in good working order? Yes
If no, describe the problems below.
Comments / Problems:

#### WILDLIFE

#### **Birds**

Were man-made nesting structures installed? <u>Yes</u> If yes, type of structure: <u>Box</u> How many? <u>7</u> Are the nesting structures being used? <u>Yes</u> Do the nesting structures need repairs? <u>No</u>

#### **Mammals and Herptiles**

Mammal and Harntila Species	Number		Indir	ect Indicatio	on of Use
Mammal and Herptile Species	Observed	Tracks	Scat	Burrows	Other
White-tailed Deer	3				
Pronghorn	1				
Mountain cottontail	1				
Richardson's Ground Squirrel				$\boxtimes$	
Raccoon					

#### **Additional Activities Checklist:**

**NA** Macroinvertebrate Sampling (if required)

Comments / Problems: One bird boxe in use by tree swallows. One dead pronghorn fawn that appeared to have died from a gunshot wound was observed on the south end of the property near the ditch headgate. Approximately 20 pronghorn were observed on the adjacent property.

#### **BIRD SURVEY - FIELD DATA SHEET**

Site: **Rostad Ranch** Date: 7/10/17

Survey Time: \_\_\_\_\_ to \_\_\_\_

Bird Species	#	Behavior	Habitat	Bird Species	#	Behavior	Habitat
Song sparrow	2	L BP	UP				
Mallard	6	LF	OW				
Brown-headed cowbird	15	F L FO	UP				
Wilson's phalarope	6						
Killdeer	12	F FO	MF UP				
Spotted Sandpiper	2	F FO	UP MA				
Red-winged Blackbird	12	LFFO	MA UP				
Tree Swallow	4	BP FO	UP				
Bobolink	4	L FO	UP				
Eared grebe	3	FL	OW				
Brewer's Blackbird	12	FO L	UP				
Sandhill Crane	2	FO N	UP				
Western Meadowlark	2	L	UP				
Vesper sparrow	4	L	UP				
Ferruginous hawk	2	FO	UP				
Common yellowthroat	1	L	UP				
Cinnamon teal	2	L	OW				
Wislon's snipe	2	F	MA				
American crow	2	FO	UP				
Long-billed curlew	1	L	UP				

#### **BEHAVIOR CODES**

**BP** = One of a breeding pair **BD** = Breeding display

F = Foraging FO = Flyover

L = LoafingN = Nesting HABITAT CODES

AB = Aquatic bed
FO = Forested
I = Island
WM = Wet meadow
WA = Marsh
US = Unconsolidated shore

 $\mathbf{MF} = \mathbf{Mud} \ \mathbf{Flat}$  $\mathbf{OW} = \mathbf{Open} \ \mathbf{Water}$ 

Weather: 75 degrees, partly cloudy

Notes: One dead turkey was observed on site.

#### WETLAND DETERMINATION DATA FORM - Great Plains Region

ty: Meagher	Sampling Date: 10-Jul-17
State:	E: MT Sampling Point: DP-1U
Township, Ra	ange: S 12 T 8N R 11E
ief (concave, o	<b>convex, none):</b> convex <b>Slope:</b> 1.5% 0.9
	Long.: -110.294063
es	NWI classification: Not Mapped
Yes   No	
? Are "N	Normal Circumstances" present? Yes  No
	eded, explain any answers in Remarks.)
`	cations, transects, important features, etc.
	· · · · · · · · · · · · · · · · · · ·
the Sampled A	
thin a Wetland	<sub>d?</sub> Yes ○ No •
	gion: GP
? t. Indicator	Dominance Test worksheet:
Status	Number of Dominant Species
	That are OBL, FACW, or FAC:  O (A)
	Total Number of Dominant
	Species Across All Strata:1(B)
	Percent of dominant Species
l Cover	That Are OBL, FACW, or FAC: 0.0% (A/B)
	Providence Volder market eats
	Prevalence Index worksheet:  Total % Cover of: Multiply by:
	0BL species 0 x 1 = 0
	FACW species 15 x 2 = 30
	FAC species0 x 3 = _0_
l Cover	FACU species x 4 =
	UPL species $\frac{65}{}$ x 5 = $\frac{325}{}$
% UPL	Column Totals: <u>85</u> (A) <u>375</u> (B)
% FACU	
% UPL  FACW	Prevalence Index = B/A = 4.412
% FACVV	Hydrophytic Vegetation Indicators:
%	1 - Rapid Test for Hydrophytic Vegetation
%	2 - Dominance Test is > 50%
%	3 - Prevalence Index is ≤3.0 <sup>1</sup>
%	4 - Morphological Adaptations (Provide supporting
%	data in Remarks or on a separate sheet)
l Cover	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.
	be present.
Cover	Hydrophytic Vegetation
	Present? Yes No
	+
ıl	al Cover

US Army Corps of Engineers

Soil Sampling Point: DP-1U

Бериі —	Matrix			lox Featur				
inches) Color (n			Color (moist)	<u>%</u>	Type 1	Loc <sup>2</sup>	Texture	Remarks
0-18 10YR	4/2	100					Sandy Clay Loam	
							n-	
Type: C=Concentration. D	=Depletion F	RM=Reduced	Matrix CS=Cover	ed or Coate	d Sand Grai	ns <sup>2</sup> l oca	ation: PL=Pore Lining. M=Ma	ntrix
dric Soil Indicators: (	•				u ounu onu	2000	Indicators for Proble	
Histosol (A1)	(- <b></b>	,	Sandy Gleyed				1 cm Muck (A9) (L	•
Histic Epipedon (A2)			Sandy Redox					ox (A16) (LRR F, G, H)
Black Histic (A3)			Stripped Matri				Dark Surface (S7)	
Hydrogen Sulfide (A4)			Loamy Mucky	Mineral (F1	)		High Plains Depres	· · ·
Stratified Layers (A5) (L	_RR F)		Loamy Gleyed	Matrix (F2)	)		(LRR H outside	of MLRA 72 and 73)
1 cm Muck (A9) (LRR F,			Depleted Mati				Reduced Vertic (F1	8)
Depleted Below Dark Su			Redox Dark S				Red Parent Materia	I (TF2)
Thick Dark Surface (A12	•		Depleted Dark		7)		Very Shallow Dark	
Sandy Muck Mineral (S1	•		Redox depres				Other (Explain in R	
2.5 cm Mucky Peat or P			High Plains D				<sup>3</sup> Indicators of hydrophyt	ic vegetation and wetland
5 cm Mucky Peat or Pea	at (S3) (LRR F	=)	(MLRA 72	and 73 of	LRR H)		hydrology must be pres	ent, unless disturbed or problen
trictive Layer (if pres	ent):							
Туре:								
Depth (inches):			_				Hydric Soil Present?	Yes ○ No •
	bserved.							
	bserved.							
nydric soil indicators o	observed.							
nydric soil indicators o							Secondary Indica	ors (minimum of two requi
nydric soil indicators o  drology tland Hydrology Indic	cators:	required; (	check all that ap	oly)			Secondary Indica	
nydric soil indicators o  drology  tland Hydrology Indic	cators:	required; (	check all that ap				Surface Soil (	Cracks (B6)
nydric soil indicators o drology tland Hydrology Indic mary Indicators (minir	cators:	erequired; (		311)	B13)		Surface Soil ( Sparsely Veg	Cracks (B6) etated Concave Surface (B8)
drology tland Hydrology Indic mary Indicators (minir Surface Water (A1) High Water Table (A2)	cators:	e required; o	Salt Crust (I	311) ertebrates (I	,		Surface Soil ( Sparsely Veg Drainage Pat	Cracks (B6) Setated Concave Surface (B8) Serns (B10)
drology tland Hydrology Indicators (minir Surface Water (A1)	cators:	e required; (	Salt Crust (I	311) ertebrates (l ulfide Odor	(C1)		Surface Soil ( Sparsely Veg Drainage Pat Oxidized Rhiz	Cracks (B6) etated Concave Surface (B8) eerns (B10) cospheres on Living Roots (C3)
drology tland Hydrology Indic mary Indicators (minin Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1)	cators: mum of one	e required; o	Salt Crust (I Aquatic Inve	811) ertebrates (l ulfide Odor Water Table	(C1) e (C2)	oots (C3)	Surface Soil ( Sparsely Veg Drainage Pat Oxidized Rhiz	Cracks (B6) etated Concave Surface (B8) eerns (B10) ospheres on Living Roots (C3)
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High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on A	cators: mum of one  Aerial Imagery (B9)  Yes O Yes O Yes O	No (B7)  No (O)  No (O)  No (O)	Salt Crust (I Aquatic Invo Hydrogen S Dry Season Oxidized Rh (where Presence of Thin Muck S Other (Explain Depth (inc	ertebrates (I ulfide Odor Water Table izospheres (I not tilled) Reduced Ire urface (C7) ain in Rema hes): hes):	(C1) e (C2) on Living Ro on (C4) rks)	Wetla	Surface Soil ( Sparsely Veg Drainage Pat Oxidized Rhiz (where Crayfish Burn Saturation Vi Geomorphic FAC-neutral Frost Heave	cracks (B6) etated Concave Surface (B8) eterns (B10) cospheres on Living Roots (C3) tilled) cows (C8) sible on Aerial Imagery (C9) Position (D2) Fest (D5) Hummocks (D7) (LRR F)
rdrology  etland Hydrology Indicators (minimary Ind	cators: mum of one  Aerial Imagery (B9)  Yes O Yes O Yes O	No (B7)  No (O)  No (O)  No (O)	Salt Crust (I Aquatic Invo Hydrogen S Dry Season Oxidized Rh (where Presence of Thin Muck S Other (Explain Depth (inc	ertebrates (I ulfide Odor Water Table izospheres (I not tilled) Reduced Ire urface (C7) ain in Rema hes): hes):	(C1) e (C2) on Living Ro on (C4) rks)	Wetla	Surface Soil ( Sparsely Veg Drainage Pat Oxidized Rhiz (where Crayfish Burn Saturation Vi Geomorphic FAC-neutral Frost Heave	cracks (B6) etated Concave Surface (B8) eterns (B10) cospheres on Living Roots (C3) tilled) cows (C8) sible on Aerial Imagery (C9) Position (D2) Fest (D5) Hummocks (D7) (LRR F)
drology  etland Hydrology Indicators of imary Indicators (mining)  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)  Inundation Visible on A  Water-Stained Leaves (Cald Observations:  face Water Present?  uration Present?  cludes capillary fringe)  escribe Recorded Data	cators: mum of one  Aerial Imagery (B9)  Yes O Yes O Yes O	No (B7)  No (O)  No (O)  No (O)	Salt Crust (I Aquatic Invo Hydrogen S Dry Season Oxidized Rh (where Presence of Thin Muck S Other (Explain Depth (inc	ertebrates (I ulfide Odor Water Table izospheres (I not tilled) Reduced Ire urface (C7) ain in Rema hes): hes):	(C1) e (C2) on Living Ro on (C4) rks)	Wetla	Surface Soil ( Sparsely Veg Drainage Pat Oxidized Rhiz (where Crayfish Burn Saturation Vi Geomorphic FAC-neutral Frost Heave	cracks (B6) etated Concave Surface (B8) eterns (B10) cospheres on Living Roots (C3) tilled) cows (C8) sible on Aerial Imagery (C9) Position (D2) Fest (D5) Hummocks (D7) (LRR F)
drology  tland Hydrology Indic mary Indicators (minir 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) Inundation Visible on A Water-Stained Leaves ( Id Observations: face Water Present? ter Table Present? uration Present?	cators: mum of one  Aerial Imagery (B9)  Yes O Yes O Yes O	No (B7)  No (O)  No (O)  No (O)	Salt Crust (I Aquatic Invo Hydrogen S Dry Season Oxidized Rh (where Presence of Thin Muck S Other (Explain Depth (inc	ertebrates (I ulfide Odor Water Table izospheres (I not tilled) Reduced Ire urface (C7) ain in Rema hes): hes):	(C1) e (C2) on Living Ro on (C4) rks)	Wetla	Surface Soil ( Sparsely Veg Drainage Pat Oxidized Rhiz (where Crayfish Burn Saturation Vi Geomorphic FAC-neutral Frost Heave	cracks (B6) etated Concave Surface (B8) eterns (B10) cospheres on Living Roots (C3) tilled) cows (C8) sible on Aerial Imagery (C9) Position (D2) Fest (D5) Hummocks (D7) (LRR F)

US Army Corps of Engineers Great Plains - Version 2.0

#### WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Rostad Ranch			City/County:	Meagher	Sam	pling Date: 10-Jul-17
Applicant/Owner: MDT				State:	: MT Sampling Point	t: <b>DP-1W</b>
nvestigator(s): M. Traxler			Section, To	wnship, Ra	ange: S 12 T 8N	<b>R</b> _11E
Landform (hillslope, terrace, etc.): Lowlan	ıd		Local relief	(concave, o	convex, none): concave	Slope: 1.5% 0.9
ubregion (LRR): LRR F		 <b>Lat.:</b> 46	.462577		<b>Long.:</b> -110.294263	Datum: WGS_19
pil Map Unit Name: Delpoint variant-Marm	arth Cabbart Ioa				NWI classification	
e climatic/hydrologic conditions on the sit				s • No		
		significantly	-		ormal Circumstances" present?	
		,			-	
Are Vegetation ☐ , Soil ☐ , or  Summary of Findings - Attach	_	naturally pro		-	eded, explain any answers in Re	-
Hydrophytic Vegetation Present? Yes			mihimia h		duviis, transects, imp	Ortanic reacures, ecc.
Hydric Soil Present? Yes	_			Sampled A		
Wetland Hydrology Present? Yes			withir	n a Wetland	<sub>1?</sub> Yes • No •	
Remarks:						
Wetland sample point. Point moved slight  VEGETATION - Use scientific		ants	Dominant	FWS Re	gion: GP	
		Absolute	Species? Rel.Strat.	Indicator	Dominance Test worksheet:	
<b>Tree Stratum</b> (Plot size: 30 Foot Radius		% Cover		Status	Number of Dominant Species	
1			<u> </u>	- ——	That are OBL, FACW, or FAC:	2 (A)
2			Ц		Total Number of Dominant	
3. 4.			<u> </u>		Species Across All Strata:	2 (B)
4		0_			Percent of dominant Species	
_Sapling/Shrub Stratum_ (Plot size: 15 Foo	ot Radius )	0	= Total Co	ver	That Are OBL, FACW, or FAC:	100.0% (A/B)
1		0			Prevalence Index worksheet:	
2.						Multiply by:
3					OBL species 0	<b>x 1</b> = 0
4.		0				x 2 = 190
5		0			FAC species0_	x 3 = 0
		0	= Total Co	ver		x 4 = 0
Herb Stratum (Plot size: 5 Foot Radius	_)		_		·	x 5 = 0
1. Phalaris arundinacea		40	42.1%	FACW	Column Totals: 95	(A) 190 (B)
2. Agrostis gigantea			31.6%	FACW		
<ol> <li>Alopecurus pratensis</li> <li>Juncus balticus</li> </ol>			10.5%	FACW	Prevalence Index = B/A =	= 2
5				FACW FACW	Hydrophytic Vegetation Indica	ators:
6. Hordeum Jubatum			0.0%	IAOV	✓ 1 - Rapid Test for Hydrop	hytic Vegetation
7.			0.0%		✓ 2 - Dominance Test is > 5	50%
8.			0.0%		✓ 3 - Prevalence Index is ≤	<b>3.0</b> <sup>1</sup>
9.		0	0.0%		4 - Morphological Adapta	tions <sup>1</sup> (Provide supporting
10.		0	0.0%		data in Remarks or on a	a separate sheet)
		95	= Total Co	ver	Problematic Hydrophytic	Vegetation <sup>1</sup> (Explain)
Woody Vine Stratum (Plot size: 30 Foot		0			<sup>1</sup> Indicators of hydric soil and be present.	d wetland hydrology must
1						
2		0	Ш			
2						
		0	= Total Co	over	Hydrophytic Vegetation	
2		0	= Total Co	over	Vegetation	0

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Soil Sampling Point: DP-1W

Depth	Ma	atrix			dox Featu			absence of indicators	•
inches)	Color (mo	oist)	%	Color (moist)	%	Tvpe 1	Loc <sup>2</sup>	Texture	Remarks
0-4	10YR	4/3	100					Loam	
4-16	10YR	4/1	90	10YR 5/6	10	D	M	Clay Loam	mottles
, ·	on (A2) (A3) (Fide (A4) (A5) (LRR F,G (LRR F,G W Dark Surf (rface (A12)	p <b>plicable</b> R F) ,H)	e to all LRF	ed Matrix, CS=Cove  Sandy Gleye Sandy Redoo Stripped Mat Loamy Muck: Loamy Gleye Depleted Ma Redox Dark: Depleted Da Redox depre	ise noted. d Matrix S4 (S5) rix (S6) y Mineral (F d Matrix (F) trix (F3) Surface (F6 rk Surface (	) (	ins <sup>2</sup> Loca	1 cm Muck (A9 Coastal Prairie Dark Surface (\$ High Plains De (LRR H out Reduced Vertic Red Parent Ma	blematic Hydric Soils <sup>3</sup> : ) (LRR I, J) Redox (A16) (LRR F, G, H) S7) (LRR G) pressions (F16) side of MLRA 72 and 73) (F18) terial (TF2) bark Surface (TF12)
,		. (60) (15	20 0 11		, ,	(54.4)		Other (Explain	· ·
2.5 cm Mucky 5 cm Mucky Pe				High Plains [	Depressions  2 and 73 c	` '			phytic vegetation and wetland present, unless disturbed or problem
strictive Layer			•	•		•		1	
<b>strictive Laye</b> r Туре:	i (ii biesel								
Depth (inches):	:							Hydric Soil Present	? Yes 💿 No 🔾
emarks:								-	
dox features st	iai iiiy at 4	THICHES.							
etland Hydrolo								Secondary Ind	licators (minimum of two requir
etland Hydrolo	ors (minim		ne required	; check all that a				Surface S	oil Cracks (B6)
etland Hydrolo imary Indicato Surface Water	ors (minim r (A1)		ne required	Salt Crust	(B11)	(0.1.0)		Surface S Sparsely	oil Cracks (B6) Vegetated Concave Surface (B8)
etland Hydrolo imary Indicato Surface Water High Water Ta	ors (minim r (A1) able (A2)		ne required	Salt Crust Aquatic In	(B11) vertebrates	` '		Surface S Sparsely Drainage	oil Cracks (B6) Vegetated Concave Surface (B8) Patterns (B10)
etland Hydrolo imary Indicato  Surface Water  High Water Ta  Saturation (A	ors (minim r (A1) able (A2) 3)		ne required	Salt Crust Aquatic In	(B11) vertebrates Sulfide Odo	or (C1)		Surface S Sparsely  In Drainage Oxidized	oil Cracks (B6) Vegetated Concave Surface (B8) Patterns (B10) Rhizospheres on Living Roots (C3)
etland Hydrolo imary Indicato Surface Water High Water Ta Saturation (A: Water Marks (	ors (minim r (A1) able (A2) 3) (B1)		ne required	Salt Crust Aquatic Inv Hydrogen	(B11) vertebrates Sulfide Odo n Water Tak	or (C1) ole (C2)	oots (C3)	Surface S Sparsely Drainage Oxidized (who	oil Cracks (B6)  Vegetated Concave Surface (B8)  Patterns (B10)  Rhizospheres on Living Roots (C3)  ere tilled)
etland Hydrolo imary Indicato Surface Water High Water Ta Saturation (Ad Water Marks ( Sediment Dep	ors (minim r (A1) able (A2) 3) (B1) posits (B2)		ne required	Salt Crust Aquatic In Hydrogen Dry Seasor Oxidized R	(B11) vertebrates Sulfide Odo n Water Tak hizospheres	or (C1) ole (C2) s on Living R	oots (C3)	Surface S Sparsely Drainage Oxidized (whe	oil Cracks (B6)  Vegetated Concave Surface (B8)  Patterns (B10)  Rhizospheres on Living Roots (C3)  ere tilled)  Surrows (C8)
etland Hydrolo rimary Indicato Surface Water High Water Tal Saturation (Ad Water Marks of Sediment Dep Drift deposits	ors (minim r (A1) able (A2) 3) (B1) posits (B2) (B3)		ne required	Salt Crust Aquatic In Hydrogen Dry Seasor Oxidized R	(B11) vertebrates Sulfide Odo n Water Tak hizospheres e not tilled	or (C1) cole (C2) s on Living R	oots (C3)	Surface S Sparsely Drainage Oxidized (wheee Crayfish B Saturatio	oil Cracks (B6) Vegetated Concave Surface (B8) Patterns (B10) Rhizospheres on Living Roots (C3) ere tilled) Burrows (C8) n Visible on Aerial Imagery (C9)
etland Hydrolo imary Indicato Surface Water High Water Ta Saturation (A: Water Marks ( Sediment Dep Drift deposits Algal Mat or C	ors (minim r (A1) lable (A2) 3) (B1) cosits (B2) (B3) Crust (B4)		ne required	Salt Crust Aquatic In Hydrogen Dry Season Oxidized R (where	(B11) vertebrates Sulfide Odo n Water Tak hizospheres e not tilled f Reduced	or (C1) ble (C2) s on Living R ) Iron (C4)	oots (C3)	Surface S Sparsely Drainage Oxidized (wh Crayfish B Saturatio Geomorp	oil Cracks (B6) Vegetated Concave Surface (B8) Patterns (B10) Rhizospheres on Living Roots (C3) ere tilled) Burrows (C8) n Visible on Aerial Imagery (C9) hic Position (D2)
etland Hydrolo imary Indicato Surface Water High Water Ta Saturation (A: Water Marks ( Sediment Dep Drift deposits Iron Deposits	ors (minim r (A1) able (A2) 3) (B1) oosits (B2) (B3) Crust (B4)	um of or		Salt Crust Aquatic In Hydrogen Dry Season Oxidized R (where Presence of	(B11) vertebrates Sulfide Odo n Water Tak hizospheres e not tilled f Reduced Surface (CT	or (C1) ble (C2) s on Living R ) Iron (C4)	oots (C3)	Surface S Sparsely Drainage Oxidized (wh Crayfish I Saturatio Geomorp FAC-neut	oil Cracks (B6)  Vegetated Concave Surface (B8)  Patterns (B10)  Rhizospheres on Living Roots (C3)  ere tilled)  Burrows (C8)  n Visible on Aerial Imagery (C9)  hic Position (D2)  ral Test (D5)
etland Hydrolo imary Indicato Surface Water High Water Ta Saturation (Ad Water Marks of Sediment Dep Drift deposits Algal Mat or Co Iron Deposits Inundation Vi	ors (minim r (A1) able (A2) 3) (B1) cosits (B2) (B3) Crust (B4) (B5)	um of or		Salt Crust Aquatic In Hydrogen Dry Season Oxidized R (where Presence of	(B11) vertebrates Sulfide Odo n Water Tak hizospheres e not tilled f Reduced	or (C1) ble (C2) s on Living R ) Iron (C4)	oots (C3)	Surface S Sparsely Drainage Oxidized (wh Crayfish I Saturatio Geomorp FAC-neut	oil Cracks (B6) Vegetated Concave Surface (B8) Patterns (B10) Rhizospheres on Living Roots (C3) ere tilled) Burrows (C8) n Visible on Aerial Imagery (C9) hic Position (D2)
etland Hydrolo imary Indicato Surface Water High Water Tai Saturation (A: Water Marks ( Sediment Dep Drift deposits Algal Mat or C Iron Deposits Inundation Vi Water-Stained	ors (minim r (A1) able (A2) 3) (B1) cosits (B2) (B3) Crust (B4) (B5) sible on Aer	um of or		Salt Crust Aquatic In Hydrogen Dry Season Oxidized R (where Presence of	(B11) vertebrates Sulfide Odo n Water Tak hizospheres e not tilled f Reduced Surface (CT	or (C1) ble (C2) s on Living R ) Iron (C4)	oots (C3)	Surface S Sparsely Drainage Oxidized (wh Crayfish I Saturatio Geomorp FAC-neut	oil Cracks (B6)  Vegetated Concave Surface (B8)  Patterns (B10)  Rhizospheres on Living Roots (C3)  ere tilled)  Burrows (C8)  n Visible on Aerial Imagery (C9)  hic Position (D2)  ral Test (D5)
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#### WETLAND DETERMINATION DATA FORM - Great Plains Region

nt slopes Yes Sturbed?  lematic?  Is the Sa within a  Dominant Species? Rel.Strat.	No (If r Are "Normal Circo (If needed, explaint locations, sampled Area a Wetland? Yes  FWS Region: GP Indicator Status Number of That are of That Are Prevalence Prevalence	NWI classification: Into property in any answers in Rentransects, impo  No  No  No  No  No  No  No  No  No	R 11E  Slope: 1.0%  Datum: WO  Not Mapped  S.)  Yes  No Marks.)	0.6 ° GS_19
cocal relief (or 60004  nt slopes  Yes  sturbed?  lematic?  npling poi  Is the Sa  within a  Dominant Species? Rel.Strat. In Cover S	No (If r Are "Normal Circi (If needed, explaint locations, ampled Area a Wetland? Yes  FWS Region: GP Indicator Status  Number of That are of That Are  Percent of That Are  Prevalence	NWI classification: Into property in any answers in Rentransects, impo  No  No  No  No  No  No  No  No  No	Slope: 1.0%  Datum: WC  Not Mapped  S.)  Yes No  narks.)  ortant feature  1  3	(A) (B)
nt slopes Yes Sturbed? ematic? Is the Sa within a	No (If r Are "Normal Circo (If needed, explaint locations, ampled Area a Wetland? Yes  FWS Region: GP  Indicator Status  Number of That are of That Are  Percent of That Are  Prevalence	NWI classification: In o, explain in Remarks umstances" present?  In any answers in Rentransects, impo  No  No  No  The Test worksheet:  If Dominant Species DBL, FACW, or FAC:  In the of Dominant cross All Strata:  Of dominant Species OBL, FACW, or FAC:	Datum: WC Not Mapped s.) Yes No No marks.) Prtant feature	(A) (B)
responsible to the state of the	No (If r Are "Normal Circo (If needed, explaint locations, sampled Area a Wetland? Yes  FWS Region: GP Indicator Status Number of That are of That Are Prevalence Prevalence	NWI classification: Ino, explain in Remarks umstances" present? In any answers in Remarks in any answers in Remarks.  No  No  No  Dominant Species DBL, FACW, or FAC: Inber of Dominant Cross All Strata: Of dominant Species DBL, FACW, or FAC: Inber of Dominant Species DBL, FACW, or FAC: Indianated the Company of the Compa	Not Mapped  S.)  Yes  No Marks.)  Prtant feature	(A) (B)
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Is the Sa within a	(If needed, explaint locations, sampled Area a Wetland? Yes FWS Region: GP Indicator Status Formula (Indicator Status Form	No One No One of Dominant Species OBL, FACW, or FAC:		(A) (B)
Is the Sa within a  Dominant Species? — Rel.Strat. In Cover S	FWS Region: GP  Indicator Status  Total Num Species A Percent of That Are  Prevalence	No No Test worksheet:  of Dominant Species DBL, FACW, or FAC:  of dominant Species DBL, FACW, or FAC:		(A) (B)
Is the Sa within a Dominant Species?—Rel.Strat. In Cover S	FWS Region: GP  Indicator Status Number of That are of That Are  Percent of That Are  Prevalence	No N	1	(A) (B)
Dominant   Species? Rel.Strat. In Cover S	FWS Region: GP  Indicator Status	nce Test worksheet:  If Dominant Species DBL, FACW, or FAC: Inher of Dominant cross All Strata:  of dominant Species OBL, FACW, or FAC:	3	(B)
Dominant Species? — Rel.Strat. II	FWS Region: GP  Indicator Status  Number of That are 0  Total Num Species Are Percent of That Are  Prevalence	nce Test worksheet:  If Dominant Species DBL, FACW, or FAC: Inher of Dominant cross All Strata:  of dominant Species OBL, FACW, or FAC:	3	(B)
Species? — Rel.Strat. II Cover S	Total Num Species Are Prevalence	of Dominant Species OBL, FACW, or FAC: Inber of Dominant cross All Strata: Of dominant Species OBL, FACW, or FAC:	3	(B)
Species? — Rel.Strat. II Cover S	Total Num Species Are Prevalence	of Dominant Species OBL, FACW, or FAC: Inber of Dominant cross All Strata: Of dominant Species OBL, FACW, or FAC:	3	(B)
Species? — Rel.Strat. II Cover S	Total Num Species Are Prevalence	of Dominant Species OBL, FACW, or FAC: Inber of Dominant cross All Strata: Of dominant Species OBL, FACW, or FAC:	3	(B)
Species? — Rel.Strat. II Cover S	Total Num Species Are Prevalence	of Dominant Species OBL, FACW, or FAC: Inber of Dominant cross All Strata: Of dominant Species OBL, FACW, or FAC:	3	(B)
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= Total Cove	Total Num Species Ar Percent of That Are Prevalence	nber of Dominant cross All Strata: of dominant Species OBL, FACW, or FAC:	3	(B)
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= Total Cove	Percent of That Are	of dominant Species OBL, FACW, or FAC:		
= Total Cove	That Are	OBL, FACW, or FAC:	33.3%	(A/B)
	That Are		33.3%	(A/B)
] ] ]				
] ]		ce Index worksheet:		
	<u> l o</u> i	tal % Cover of: N	Multiply by:	
	OBL spec	cies <u>0</u> x	<b>(1 =</b>	
<u> </u>	FACW spe	ecies <u>35</u> x	<b>2</b> = <u>70</u>	
	FAC spec		<b>3</b> = <u>0</u>	
= Total Cove	FACU spe	ecles <u>60</u> x	<b>4</b> = <u>240</u>	
<b>✓</b> 33.3% F	FACU UPL spec	ci es <u>10</u> x	<b>5</b> = <u>50</u>	
	FACU Col umn	Totals: <u>105</u> (	(A) <u>360</u>	(B)
		valence Index = B/A =	_3.429_	
	LIDI	ytic Vegetation Indicat		
9.5% F	FACW			
0.0%				
0.0%			_	
				_
	4 - M	lorphological Adaptation	ons '(Provide sup separate sheet)	porting
			•	in)
		tors of hydric soil and	wetland hydrolog	w must
$\neg$			Wedalia ilyai olog	y mast
<u> </u>				
- Total Cove	Hydroph	ıvtic		
= 10tal Cove	Vegetati	ion V O N-	•	
	Present	163 - 165		
	,			
	0.0% 0.0% 0.0% 0.0% = Total Cove	0.0%	2 - Dominance Test is > 50   0.0%   3 - Prevalence Index is ≤ 3   0.0%   4 - Morphological Adaptatic data in Remarks or on a second problematic Hydrophytic V   1 Indicators of hydric soil and be present.	2 - Dominance Test is > 50%   0.0%   3 - Prevalence Index is ≤3.0¹   0.0%   4 - Morphological Adaptations¹(Provide supplication in Remarks or on a separate sheet)   Problematic Hydrophytic Vegetation¹ (Explain in Indicators of hydric soil and wetland hydrolog be present.   Hydrophytic Vegetation   Hydrophytic Vegetat

US Army Corps of Engineers

Soil Sampling Point: DP-2U

Profile Description: (De	scribe to th Matrix	ie depui ne		ox Featu		illillilli tile	absence of indicators.)	
DepthColor (	moist)	%	Color (moist)	<u>%</u>	Tvpe <sup>1</sup>	Loc2	Texture	Remarks
0-4 10YR	4/2	100					Loam	
4-16 10YR	4/2	99	10YR 5/6	1			Clay Loam	
			-	-				
•				-			-	
1Type: C=Concentration. I		. RM=Reduc	ed Matrix, CS=Covere	ed or Coat	– ——— ted Sand Gra	ins <sup>2</sup> Loca	ation: PL=Pore Lining. M=Ma	ıtrix
Hydric Soil Indicators:							Indicators for Proble	
Histosol (A1)	<b>CPF</b>		Sandy Gleyed		•		1 cm Muck (A9) (LF	•
Histic Epipedon (A2)			Sandy Redox (				= ' ' '	ox (A16) (LRR F, G, H)
Black Histic (A3)			Stripped Matri:				Dark Surface (S7) (	•
Hydrogen Sulfide (A4)	(100.5)		Loamy Mucky				High Plains Depres	
Stratified Layers (A5) (  1 cm Muck (A9) (LRR F			Loamy Gleyed	•	2)			of MLRA 72 and 73)
Depleted Below Dark S		)	Depleted Matr	` '	)		Reduced Vertic (F1	•
Thick Dark Surface (A1	` '	,	Depleted Dark	` '	•		Red Parent Materia	
Sandy Muck Mineral (S	•		Redox depress		,		Very Shallow Dark Other (Explain in R	* *
2.5 cm Mucky Peat or	Peat (S2) (LF	RR G, H)	High Plains De	pressions	(F16)		_ ` '	ic vegetation and wetland
5 cm Mucky Peat or Pe	eat (S3) (LRR	? F)	(MLRA 72	and 73 o	of LRR H)			ent, unless disturbed or problemation
Restrictive Layer (if pre	sent):							
Туре:								
Depth (inches):							Hydric Soil Present?	Yes ○ No •
Depth (inches):							Hydric Soil Present?	Yes ○ No ●
Remarks:							Hydric Soil Present?	Yes ○ No ●
Remarks:							Hydric Soil Present?	Yes O No •
Remarks: Hydric soil developing.							Hydric Soil Present?	Yes ○ No ●
Remarks: Hydric soil developing.							Hydric Soil Present?	Yes ○ No ●
Remarks: Hydric soil developing.	cators:							Yes ○ No ● ors (minimum of two required)
Remarks: Hydric soil developing.  Hydrology		ne required	; check all that app	oly)				ors (minimum of two required)
Remarks: Hydric soil developing.  Hydrology Wetland Hydrology Indi		ne required	; check all that app				Secondary Indicat Surface Soil C	ors (minimum of two required)
Remarks: Hydric soil developing.  Hydrology  Wetland Hydrology Indi Primary Indicators (min	imum of or	ne required		11)	(B13)		Secondary Indicat Surface Soil C	ors (minimum of two required) Tracks (B6) Stated Concave Surface (B8)
Remarks: Hydric soil developing.  Hydrology  Wetland Hydrology Indi Primary Indicators (min Surface Water (A1)	imum of or	ne required	Salt Crust (B	11) rtebrates			Secondary Indicat Surface Soil C Sparsely Vege Drainage Patt	ors (minimum of two required) Tracks (B6) Stated Concave Surface (B8)
Remarks: Hydric soil developing.  Hydrology  Wetland Hydrology Indi Primary Indicators (min Surface Water (A1) High Water Table (A2)	imum of or	ne required	Salt Crust (B	11) rtebrates ılfide Odo	r (C1)		Secondary Indicat Surface Soil C Sparsely Vege Drainage Patt	ors (minimum of two required) Fracks (B6) Stated Concave Surface (B8) Ferns (B10) Ospheres on Living Roots (C3)
Remarks: Hydrology  Wetland Hydrology Indi Primary Indicators (min Surface Water (A1) High Water Table (A2) Saturation (A3)	imum of or	ne required	Salt Crust (B Aquatic Inve	11) rtebrates ılfide Odo Water Tab	or (C1) ole (C2)	oots (C3)	Secondary Indicat Surface Soil C Sparsely Vege Drainage Patt Oxidized Rhiz	ors (minimum of two required) cracks (B6) etated Concave Surface (B8) erns (B10) ospheres on Living Roots (C3)
Remarks: Hydrology  Wetland Hydrology Indi Primary Indicators (min Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1)	imum of or	ne required	Salt Crust (B Aquatic Inve Hydrogen Su Dry Season	11) rtebrates ılfide Odo Water Tab	or (C1) ole (C2) s on Living R	oots (C3)	Secondary Indicat Surface Soil C Sparsely Vege Drainage Patt Oxidized Rhiz (where	ors (minimum of two required) cracks (B6) etated Concave Surface (B8) erns (B10) ospheres on Living Roots (C3)
Remarks: Hydrology  Wetland Hydrology Indi Primary Indicators (min Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B:	imum of or ) 2)	ne required	Salt Crust (B Aquatic Inve Hydrogen Su Dry Season	11) rtebrates ulfide Odo Water Tab zospheres	or (C1) ole (C2) s on Living R	oots (C3)	Secondary Indicat Surface Soil C Sparsely Vege Drainage Patt Oxidized Rhiz (where	ors (minimum of two required) bracks (B6) etated Concave Surface (B8) erns (B10) ospheres on Living Roots (C3) tilled) ows (C8) sible on Aerial Imagery (C9)
Remarks: Hydrology  Wetland Hydrology Indi Primary Indicators (min Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B3) Drift deposits (B3)	imum of or ) 2)	ne required	Salt Crust (B Aquatic Inve Hydrogen St Dry Season Oxidized Rhi (where	11) rtebrates ulfide Odo Water Tab zospheres not tilled Reduced I	or (C1) ble (C2) s on Living R ) Iron (C4)	oots (C3)	Secondary Indicat Surface Soil C Sparsely Vege Drainage Patt Oxidized Rhiz (where to Crayfish Burro	ors (minimum of two required) bracks (B6) etated Concave Surface (B8) erns (B10) ospheres on Living Roots (C3) tilled) bws (C8) sible on Aerial Imagery (C9) Position (D2)
Remarks: Hydrology  Wetland Hydrology Indi Primary Indicators (min Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B3) Algal Mat or Crust (B4)	imum of or ) 2)		Salt Crust (B Aquatic Inve Hydrogen St Dry Season V Oxidized Rhi (where	ntebrates ulfide Odo Water Tab zospheres not tilled Reduced I	or (C1) ble (C2) s on Living R ) Iron (C4)	oots (C3)	Secondary Indicat Surface Soil C Sparsely Vege Drainage Patt Oxidized Rhiz (where Crayfish Burro Saturation Vis Geomorphic F FAC-neutral T	ors (minimum of two required) bracks (B6) etated Concave Surface (B8) erns (B10) ospheres on Living Roots (C3) tilled) bws (C8) sible on Aerial Imagery (C9) Position (D2)
Remarks: Hydrology  Wetland Hydrology Indi Primary Indicators (min Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B3) Algal Mat or Crust (B4 Iron Deposits (B5)	imum of or  )  2)  Aerial Image		Salt Crust (B Aquatic Inve Hydrogen Su Dry Season V Oxidized Rhi (where Presence of Thin Muck S	ntebrates ulfide Odo Water Tab zospheres not tilled Reduced I	or (C1) ble (C2) s on Living R ) Iron (C4)	oots (C3)	Secondary Indicat Surface Soil C Sparsely Vege Drainage Patt Oxidized Rhiz (where Crayfish Burro Saturation Vis Geomorphic F FAC-neutral T	ors (minimum of two required) bracks (B6) etated Concave Surface (B8) erns (B10) ospheres on Living Roots (C3) tilled) bws (C8) bible on Aerial Imagery (C9) bosition (D2) fest (D5)
Remarks: Hydrology  Wetland Hydrology Indi Primary Indicators (min Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on	imum of or  )  2)  Aerial Image (B9)	ery (B7)	Salt Crust (B Aquatic Inve Hydrogen Su Dry Season Oxidized Rhi (where Presence of Thin Muck S Other (Expla	ntebrates ulfide Odo Water Tab zospheres not tilled Reduced I	or (C1) ble (C2) s on Living R ) Iron (C4)	oots (C3)	Secondary Indicat Surface Soil C Sparsely Vege Drainage Patt Oxidized Rhiz (where Crayfish Burro Saturation Vis Geomorphic F FAC-neutral T	ors (minimum of two required) bracks (B6) etated Concave Surface (B8) erns (B10) ospheres on Living Roots (C3) tilled) bws (C8) bible on Aerial Imagery (C9) bosition (D2) fest (D5)
Remarks: Hydrology  Wetland Hydrology Indi Primary Indicators (min Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B3) Algal Mat or Crust (B4 Iron Deposits (B5) Inundation Visible on Water-Stained Leaves	imum of or  )  2)  Aerial Image	ery (B7)	Salt Crust (B Aquatic Inve Hydrogen Su Dry Season Oxidized Rhi (where Presence of Thin Muck S Other (Expla	ntebrates ulfide Odo Water Tab zospheres not tilled Reduced I urface (C7 in in Rem	or (C1) ble (C2) s on Living R ) Iron (C4)	oots (C3)	Secondary Indicat Surface Soil C Sparsely Vege Drainage Patt Oxidized Rhiz (where Crayfish Burro Saturation Vis Geomorphic F FAC-neutral T	ors (minimum of two required) bracks (B6) etated Concave Surface (B8) erns (B10) ospheres on Living Roots (C3) tilled) bws (C8) bible on Aerial Imagery (C9) bosition (D2) fest (D5)
Remarks: Hydrology  Wetland Hydrology Indi Primary Indicators (min Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Water-Stained Leaves  Field Observations:	imum of or  )  2)  Aerial Image (B9)	ery (B7) No <b>●</b>	Salt Crust (B Aquatic Inve Hydrogen Su Dry Season 1 Oxidized Rhi (where Presence of Thin Muck S Other (Expla	11) rtebrates ilfide Odo Water Tab zospheres not tilled Reduced I urface (C7 in in Rem	or (C1) ble (C2) s on Living R ) Iron (C4)	oots (C3)	Secondary Indicat Surface Soil C Sparsely Vege Drainage Patt Oxidized Rhiz (where Crayfish Burro Saturation Vis Geomorphic F FAC-neutral T	ors (minimum of two required) bracks (B6) etated Concave Surface (B8) erns (B10) ospheres on Living Roots (C3) tilled) bws (C8) sible on Aerial Imagery (C9) Position (D2) fest (D5) dummocks (D7) (LRR F)
Remarks: Hydrology  Wetland Hydrology Indi Primary Indicators (min Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Water-Stained Leaves  Field Observations: Surface Water Present?	imum of or  2)  Aerial Image (B9)  Yes  Yes	ory (B7) ○ No	Salt Crust (B Aquatic Inve Hydrogen Su Dry Season V Oxidized Rhi (where Presence of Thin Muck S Other (Expla	ntebrates alfide Odo Water Tab zospheres not tilled Reduced I urface (C7 in in Rem hes):	or (C1) ple (C2) s on Living R ) Iron (C4) 7) harks)	-	Secondary Indicat Surface Soil C Sparsely Vege Drainage Patt Oxidized Rhiz (where Crayfish Burro Saturation Vis Geomorphic F FAC-neutral T	ors (minimum of two required) bracks (B6) etated Concave Surface (B8) erns (B10) ospheres on Living Roots (C3) tilled) bws (C8) bible on Aerial Imagery (C9) bosition (D2) fest (D5)
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Remarks: Hydrology  Wetland Hydrology Indi Primary Indicators (min Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Water-Stained Leaves  Field Observations: Surface Water Present? Water Table Present? Saturation Present?	imum of or  2)  Aerial Image (B9)  Yes  Yes	ory (B7)  No   No   No   No   No   No   No   No	Salt Crust (B Aquatic Inve Hydrogen Su Dry Season I Oxidized Rhi (where Presence of Thin Muck S Other (Expla	ntebrates alfide Odo Water Tab zospheres not tilled Reduced I urface (C7 in in Rem hes): hes):	or (C1) ple (C2) s on Living R ) Iron (C4) 7) harks)	- Wetla	Secondary Indicat Surface Soil C Sparsely Vege Drainage Patt Oxidized Rhiz (where and Crayfish Burro Saturation Vis Geomorphic F FAC-neutral T Frost Heave F	ors (minimum of two required) bracks (B6) etated Concave Surface (B8) erns (B10) ospheres on Living Roots (C3) tilled) bws (C8) sible on Aerial Imagery (C9) Position (D2) fest (D5) dummocks (D7) (LRR F)
Remarks: Hydrology  Wetland Hydrology Indi Primary Indicators (min Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Water-Stained Leaves Field Observations: Surface Water Present? Water Table Present? Saturation Present? (includes capillary fringe) Describe Recorded Data	imum of or  2)  Aerial Image (B9)  Yes  Yes	ory (B7)  No   No   No   No   No   No   No   No	Salt Crust (B Aquatic Inve Hydrogen Su Dry Season I Oxidized Rhi (where Presence of Thin Muck S Other (Expla	ntebrates alfide Odo Water Tab zospheres not tilled Reduced I urface (C7 in in Rem hes): hes):	or (C1) ple (C2) s on Living R ) Iron (C4) 7) harks)	- Wetla	Secondary Indicat Surface Soil C Sparsely Vege Drainage Patt Oxidized Rhiz (where and Crayfish Burro Saturation Vis Geomorphic F FAC-neutral T Frost Heave F	ors (minimum of two required) bracks (B6) etated Concave Surface (B8) erns (B10) ospheres on Living Roots (C3) tilled) bws (C8) sible on Aerial Imagery (C9) Position (D2) fest (D5) dummocks (D7) (LRR F)
Remarks: Hydrology  Wetland Hydrology Indi Primary Indicators (min Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Water-Stained Leaves  Field Observations: Surface Water Present? Water Table Present? Saturation Present? (includes capillary fringe)	imum of or  2)  Aerial Image (B9)  Yes  Yes	ory (B7)  No   No   No   No   No   No   No   No	Salt Crust (B Aquatic Inve Hydrogen Su Dry Season I Oxidized Rhi (where Presence of Thin Muck S Other (Expla	ntebrates alfide Odo Water Tab zospheres not tilled Reduced I urface (C7 in in Rem hes): hes):	or (C1) ple (C2) s on Living R ) Iron (C4) 7) harks)	- Wetla	Secondary Indicat Surface Soil C Sparsely Vege Drainage Patt Oxidized Rhiz (where and Crayfish Burro Saturation Vis Geomorphic F FAC-neutral T Frost Heave F	ors (minimum of two required) bracks (B6) etated Concave Surface (B8) erns (B10) ospheres on Living Roots (C3) tilled) bws (C8) sible on Aerial Imagery (C9) Position (D2) fest (D5) dummocks (D7) (LRR F)
Remarks: Hydrology  Wetland Hydrology Indi Primary Indicators (min Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B3) Algal Mat or Crust (B4 Iron Deposits (B5) Inundation Visible on Water-Stained Leaves  Field Observations: Surface Water Present? Water Table Present? Saturation Present? (includes capillary fringe) Describe Recorded Data	imum of or  2)  Aerial Image (B9)  Yes  Yes  (stream ga	No O No O No O auge, moni	Salt Crust (B Aquatic Inve Hydrogen Su Dry Season I Oxidized Rhi (where Presence of Thin Muck S Other (Expla)  Depth (inc Depth (inc	ntebrates alfide Odo Water Tab zospheres not tilled Reduced I urface (C7 in in Rem hes):hes):hes):ttos, prev	or (C1) ple (C2) s on Living R ) Iron (C4) 7) harks)	- Wetla	Secondary Indicat Surface Soil C Sparsely Vege Drainage Patt Oxidized Rhiz (where and Crayfish Burro Saturation Vis Geomorphic F FAC-neutral T Frost Heave F	ors (minimum of two required) bracks (B6) etated Concave Surface (B8) erns (B10) ospheres on Living Roots (C3) tilled) bws (C8) sible on Aerial Imagery (C9) Position (D2) fest (D5) dummocks (D7) (LRR F)

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#### WETLAND DETERMINATION DATA FORM - Great Plains Region

Project/Site: Rostad Ranch	c	City/County:	Meagher	Sampling Date: 10-Jul-17
pplicant/Owner: MDT			State:	: MT Sampling Point: DP-2W
vestigator(s): M. Traxler		Section, To	wnship, Ra	ange: S 12 T 8N R 11E
Landform (hillslope, terrace, etc.): Swale		Local relief	(concave, c	convex, none): concave Slope: 1.5% 0.9
ibregion (LRR): LRR F	<b>Lat.:</b> 46.	.459965		<b>Long.:</b> -110.295985 <b>Datum:</b> WGS_19
il Map Unit Name: <u>Delpoint variant-Marmarth-Cabbart loa</u>	ım, 2 to 8 perc	cent slopes		NWI classification: PEM
climatic/hydrologic conditions on the site typical for this	s time of year?	? Yes	s • No	(If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology	significantly of	disturbed?	Are "N	lormal Circumstances" present? Yes   No
Are Vegetation, Soil, or Hydrology	naturally pro	blematic?	(If ne	eded, explain any answers in Remarks.)
ummary of Findings - Attach site map sl	howing sa	mpling p	oint loc	cations, transects, important features, etc
lydrophytic Vegetation Present? Yes  No		To the	Sampled A	
Hydric Soil Present? Yes ● No ○			Sampled A	drea d? Yes  ● No ○
Vetland Hydrology Present? Yes ● No ○		withir	ı a Wetiand	j? Tes 🐸 NO 🐸
Remarks:				
New point in 2017.				
/EGETATION - Use scientific names of p	lants	Dominant _Species?	FWS Re	gion: GP
(Diet size: 20 Foot Padius.)		Rel.Strat.	Indicator	Dominance Test worksheet:
<u>Tree Stratum</u> (Plot size: 30 Foot Radius )	<u>% Cover</u>	Cover	Status	Number of Dominant Species
1			-	That are OBL, FACW, or FAC: 3 (A)
2				Total Number of Dominant
3 4.				Species Across All Strata: 3 (B)
		= Total Co	ver	Percent of dominant Species
Gapling/Shrub Stratum (Plot size: 15 Foot Radius )		- 1000. 00	VEI	That Are OBL, FACW, or FAC: 100.0% (A/B)
1	0			Prevalence Index worksheet:
2				Total % Cover of: Multiply by:
3	0			0BL species50 x 1 =50
4				FACW species 40 x 2 = 80
5		Ц		FAC species x 3 = 0
(5)	0	= Total Co	ver	FACU species x 4 =0
Herb Stratum (Plot size: 5 Foot Radius )				UPL species $0 \times 5 = 0$
1. Juncus balticus		22.2%	FACW	
Juncus balticus     Eleocharis palustris	20	22.2%	OBL	Column Totals: 90 (A) 130 (B)
<ol> <li>Juncus balticus</li> <li>Eleocharis palustris</li> <li>Typha latifolia</li> </ol>	20 20	<b>✓</b> 22.2% <b>✓</b> 22.2%	OBL OBL	Col umn Total s:         90         (A)         130         (B)           Prevalence Index = B/A =         1.444
<ol> <li>Juncus balticus</li> <li>Eleocharis palustris</li> <li>Typha latifolia</li> <li>Salix exigua</li> </ol>	20 20 10	22.2%	OBL	Column Totals: 90 (A) 130 (B)
<ol> <li>Juncus balticus</li> <li>Eleocharis palustris</li> <li>Typha latifolia</li> <li>Salix exigua</li> <li>Alopecurus pratensis</li> <li>Carex nebrascensis</li> </ol>	20 20 10 10	✓ 22.2% ✓ 22.2% ☐ 11.1%	OBL OBL FACW	Col umn Total s:         90         (A)         130         (B)           Prevalence Index = B/A =         1.444
<ol> <li>Juncus balticus</li> <li>Eleocharis palustris</li> <li>Typha latifolia</li> <li>Salix exigua</li> <li>Alopecurus pratensis</li> <li>Carex nebrascensis</li> <li>7.</li> </ol>	20 20 10 10	22.2% 22.2% 11.1% 11.1%	OBL OBL FACW	Col umn Total s: 90 (A) 130 (B)  Prevalence Index = B/A = 1.444  Hydrophytic Vegetation Indicators:
<ol> <li>Juncus balticus</li> <li>Eleocharis palustris</li> <li>Typha latifolia</li> <li>Salix exigua</li> <li>Alopecurus pratensis</li> <li>Carex nebrascensis</li> <li>8.</li> </ol>	20 20 10 10 10	✓       22.2%         ✓       22.2%         Interpretation       11.1%         Interpretation       11.1%	OBL OBL FACW	Col umn Total s:90
<ol> <li>Juncus balticus</li> <li>Eleocharis palustris</li> <li>Typha latifolia</li> <li>Salix exigua</li> <li>Alopecurus pratensis</li> <li>Carex nebrascensis</li> <li>8.</li> <li>9.</li> </ol>	20 20 10 10 10 0 0	✓       22.2%         ✓       22.2%         11.1%       11.1%         0.0%       0.0%         0.0%       0.0%	OBL OBL FACW	Col umn Total s:90
<ol> <li>Juncus balticus</li> <li>Eleocharis palustris</li> <li>Typha latifolia</li> <li>Salix exigua</li> <li>Alopecurus pratensis</li> <li>Carex nebrascensis</li> <li>8.</li> <li>9.</li> </ol>	20 20 10 10 10 0 0	✓       22.2%         ✓       22.2%         11.1%       11.1%         0.0%       0.0%         0.0%       0.0%         0.0%       0.0%	OBL OBL FACW FACW OBL	Col umn Total s:90
1. Juncus balticus 2. Eleocharis palustris 3. Typha latifolia 4. Salix exigua 5. Alopecurus pratensis 6. Carex nebrascensis 7. 8. 9.	20 20 10 10 10 0 0	✓       22.2%         ✓       22.2%         11.1%       11.1%         0.0%       0.0%         0.0%       0.0%	OBL OBL FACW FACW OBL	Col umn Total s:90 (A)130 (B)  Prevalence Index = B/A =1.444_  Hydrophytic Vegetation Indicators:  ✓ 1 - Rapid Test for Hydrophytic 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)  — Problematic Hydrophytic Vegetation¹ (Explain)
1. Juncus balticus 2. Eleocharis palustris 3. Typha latifolia 4. Salix exigua 5. Alopecurus pratensis 6. Carex nebrascensis 7. 8. 9. 10.  Woody Vine Stratum (Plot size: 30 Foot Radius )	20 20 10 10 10 0 0 0 0	✓       22.2%         ✓       22.2%         11.1%       11.1%         0.0%       0.0%         0.0%       0.0%         0.0%       0.0%	OBL OBL FACW FACW OBL	Col umn Total s:90(A)130(B)  Prevalence Index = B/A =1.444  Hydrophytic Vegetation Indicators:  ✓ 1 - Rapid Test for Hydrophytic Vegetation ✓ 2 - Dominance Test is > 50% ✓ 3 - Prevalence Index is ≤3.0¹  — 4 - Morphological Adaptations¹(Provide supporting data in Remarks or on a separate sheet)  — Problematic Hydrophytic Vegetation¹(Explain)  ¹ Indicators of hydric soil and wetland hydrology must
1. Juncus balticus 2. Eleocharis palustris 3. Typha latifolia 4. Salix exigua 5. Alopecurus pratensis 6. Carex nebrascensis 7. 8. 9. 10.  Woody Vine Stratum (Plot size: 30 Foot Radius ) 1.	20 20 10 10 10 0 0 0 0	✓       22.2%         ✓       22.2%         11.1%       11.1%         0.0%       0.0%         0.0%       0.0%         0.0%       0.0%	OBL OBL FACW FACW OBL	Col umn Total s:90 (A)130 (B)  Prevalence Index = B/A =1.444_  Hydrophytic Vegetation Indicators:  ✓ 1 - Rapid Test for Hydrophytic 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)  — Problematic Hydrophytic Vegetation¹ (Explain)
1. Juncus balticus 2. Eleocharis palustris 3. Typha latifolia 4. Salix exigua 5. Alopecurus pratensis 6. Carex nebrascensis 7. 8. 9. 10.  Woody Vine Stratum (Plot size: 30 Foot Radius )	20 20 10 10 10 0 0 0 0	✓       22.2%         ✓       22.2%         11.1%       11.1%         0.0%       0.0%         0.0%       0.0%         0.0%       0.0%	OBL OBL FACW FACW OBL	Col umn Total s:90(A)130(B)  Prevalence Index = B/A =1.444  Hydrophytic Vegetation Indicators:  ✓ 1 - Rapid Test for Hydrophytic Vegetation ✓ 2 - Dominance Test is > 50% ✓ 3 - Prevalence Index is ≤3.0¹  — 4 - Morphological Adaptations¹(Provide supporting data in Remarks or on a separate sheet)  — Problematic Hydrophytic Vegetation¹ (Explain)  ¹ Indicators of hydric soil and wetland hydrology must be present.
1. Juncus balticus 2. Eleocharis palustris 3. Typha latifolia 4. Salix exigua 5. Alopecurus pratensis 6. Carex nebrascensis 7. 8. 9. 10.  Woody Vine Stratum (Plot size: 30 Foot Radius ) 1.	20 20 10 10 10 0 0 0 0 0	✓       22.2%         ✓       22.2%         11.1%       11.1%         0.0%       0.0%         0.0%       0.0%         0.0%       0.0%	OBL OBL FACW FACW OBL	Col umn Total s:90(A)130(B)  Prevalence Index = B/A =1.444  Hydrophytic Vegetation Indicators:  ✓ 1 - Rapid Test for Hydrophytic Vegetation ✓ 2 - Dominance Test is > 50% ✓ 3 - Prevalence Index is ≤3.0¹  — 4 - Morphological Adaptations¹(Provide supporting data in Remarks or on a separate sheet)  — Problematic Hydrophytic Vegetation¹(Explain)  ¹ Indicators of hydric soil and wetland hydrology must

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Soil Sampling Point: DP-2W

Depth inches         Matrix         Redox Features           0-16         10YR         5/2         90         10YR         5/6         10         D         M	Z Texture Remarks
0-16	
	Clay Loam mottl es
upor C. Concentration, D. Donletion, DM. Doduced Matrix, CS. Covered or Coated Sand Crains, 21	Location, DL Poro Lining M Matrix
	Location: PL=Pore Lining. M=Matrix  Indicators for Problematic Hydric Soils 3:
dric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)  Histosol (A1) Sandy Gleyed Matrix S4	1 cm Muck (A9) (LRR I, J)
Histic Epipedon (A2)  Sandy Redox (S5)	Coastal Prairie Redox (A16) (LRR F, G, H)
Black Histic (A3) Stripped Matrix (S6)	Dark Surface (S7) (LRR G)
Hydrogen Sulfide (A4) Loamy Mucky Mineral (F1)	High Plains Depressions (F16)
Stratified Layers (A5) (LRR F) Loamy Gleyed Matrix (F2)	(LRR H outside of MLRA 72 and 73)
1 cm Muck (A9) (LRR F,G,H) Depleted Matrix (F3)	Reduced Vertic (F18)
Depleted Below Dark Surface (A11)  Redox Dark Surface (F6)	Red Parent Material (TF2)
Thick Dark Surface (A12)  Sandy Muck Mineral (S1)  Depleted Dark Surface (F7)  Redox depressions (F8)	Very Shallow Dark Surface (TF12)
2.5 cm Mucky Peat or Peat (S2) (LRR G, H) High Plains Depressions (F16)	Other (Explain in Remarks)
5 cm Mucky Peat or Peat (S3) (LRR F) (MLRA 72 and 73 of LRR H)	<sup>3</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or probler
trictive Layer (if present):	Individed in problem
Type:	
Depth (inches):	Hydric Soil Present? Yes  No
•	
marks:	
d meets criteria for F3 Depleted Matrix.	
drology	
tland Hydrology Indicators:	Secondary Indicators (minimum of two requi
mary Indicators (minimum of one required; check all that apply)	Surface Soil Cracks (B6)
	Sparsely Vegetated Concave Surface (B8)
Surface Water (A1) Salt Crust (B11)	✓ Drainage Patterns (B10)
Surface Water (A1) Salt Crust (B11)	✓ Oxidized Rhizospheres on Living Roots (C3)
Surface Water (A1) Salt Crust (B11) High Water Table (A2) Aquatic Invertebrates (B13)	<ul><li>Oxidized Rhizospheres on Living Roots (C3)</li><li>(where tilled)</li></ul>
Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Hydrogen Sulfide Odor (C1)	(where tilled)
Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Hydrogen Sulfide Odor (C1)  Dry Season Water Table (C2)	(where tilled)
Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Hydrogen Sulfide Odor (C1)  Dry Season Water Table (C2)  Oxidized Rhizospheres on Living Roots (C3)	(where tilled) C3) Crayfish Burrows (C8)
Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift deposits (B3)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Hydrogen Sulfide Odor (C1)  Dry Season Water Table (C2)  Oxidized Rhizospheres on Living Roots (C3)  (where not tilled)	(where tilled) C3) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9)
Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)  Drift deposits (B3)  Algal Mat or Crust (B4)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Hydrogen Sulfide Odor (C1)  Dry Season Water Table (C2)  Oxidized Rhizospheres on Living Roots (C3)  (where not tilled)  Presence of Reduced Iron (C4)	(where tilled) Cayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Geomorphic Position (D2)
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)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Hydrogen Sulfide Odor (C1)  Dry Season Water Table (C2)  Oxidized Rhizospheres on Living Roots (C3)  (where not tilled)  Presence of Reduced Iron (C4)  Thin Muck Surface (C7)	(where tilled) C3)
Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Dry Season Water Table (C2)  Sediment Deposits (B2)  Drift deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Inundation Visible on Aerial Imagery (B7)  Water Marks (B1)  Oxidized Rhizospheres on Living Roots (C3)  (where not tilled)  Presence of Reduced Iron (C4)  Thin Muck Surface (C7)  Other (Explain in Remarks)	(where tilled) C3)
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)  Inundation Visible on Aerial Imagery (B7)  Water-Stained Leaves (B9)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Aquatic Invertebrates (B13)  Aquatic Invertebrates (B13)  (where not tilled)  Presence of Reduced Iron (C4)  Thin Muck Surface (C7)  Other (Explain in Remarks)	(where tilled) C3)
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)  Inundation Visible on Aerial Imagery (B7)  Water Surface Water Present?  Yes  No  Salt Crust (B11)  Aquatic Invertebrates (B13)  Avaitable	(where tilled) C3)
Surface Water (A1) Salt Crust (B11) High Water Table (A2) Aquatic Invertebrates (B13) Saturation (A3) Hydrogen Sulfide Odor (C1) Water Marks (B1) Dry Season Water Table (C2) Sediment Deposits (B2) Oxidized Rhizospheres on Living Roots (C3) Drift deposits (B3) (where not tilled) Algal Mat or Crust (B4) Presence of Reduced Iron (C4) Iron Deposits (B5) Thin Muck Surface (C7) Inundation Visible on Aerial Imagery (B7) Other (Explain in Remarks) Water-Stained Leaves (B9)  Ind Observations: face Water Present? Yes No Depth (inches):  Depth (inches): Depth (inches):	(where tilled) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) ✓ Geomorphic Position (D2) ✓ FAC-neutral Test (D5) Frost Heave Hummocks (D7) (LRR F)
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)  Inundation Visible on Aerial Imagery (B7)  Water-Stained Leaves (B9)  Algal Observations:  face Water Present?  Yes  No  Depth (inches):  Date Crust (B1)  Aquatic Invertebrates (B13)  Aquatic Invertebrates (B1)  Aquatic Inver	(where tilled) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) ✓ Geomorphic Position (D2) ✓ FAC-neutral Test (D5) Frost Heave Hummocks (D7) (LRR F)
Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Dry Season Water Table (C2)  Sediment Deposits (B2)  Drift deposits (B3)  Algal Mat or Crust (B4)  Iron Deposits (B5)  Inundation Visible on Aerial Imagery (B7)  Water-Stained Leaves (B9)  Salt Crust (B11)  Aquatic Invertebrates (B13)  Hydrogen Sulfide Odor (C1)  Dry Season Water Table (C2)  Oxidized Rhizospheres on Living Roots (C3)  (where not tilled)  Presence of Reduced Iron (C4)  Thin Muck Surface (C7)  Other (Explain in Remarks)  Water-Stained Leaves (B9)  Seld Observations:  face Water Present?  Yes No  Depth (inches):  Depth (inches):  Depth (inches):	(where tilled) Cayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) ✓ Geomorphic Position (D2) ✓ FAC-neutral Test (D5) Frost Heave Hummocks (D7) (LRR F)
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)  Inundation Visible on Aerial Imagery (B7)  Water-Stained Leaves (B9)  Algal Observations:  Iface Water Present?  Yes No  Depth (inches):	(where tilled) Cayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) ✓ Geomorphic Position (D2) ✓ FAC-neutral Test (D5) Frost Heave Hummocks (D7) (LRR F)
Surface Water (A1) Salt Crust (B11) High Water Table (A2) Aquatic Invertebrates (B13) Saturation (A3) Hydrogen Sulfide Odor (C1) Water Marks (B1) Dry Season Water Table (C2) Sediment Deposits (B2) Oxidized Rhizospheres on Living Roots (C3) Drift deposits (B3) (where not tilled) Algal Mat or Crust (B4) Presence of Reduced Iron (C4) Iron Deposits (B5) Thin Muck Surface (C7) Inundation Visible on Aerial Imagery (B7) Other (Explain in Remarks)  Water-Stained Leaves (B9)  Ind Observations: Face Water Present? Yes No Depth (inches): Inter Table Present? Yes No Depth (inches):  Very Very No Depth (inches):  Very No Depth	(where tilled) Cayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) ✓ Geomorphic Position (D2) ✓ FAC-neutral Test (D5) Frost Heave Hummocks (D7) (LRR F)
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)  Inundation Visible on Aerial Imagery (B7)  Water-Stained Leaves (B9)  Ald Observations:  face Water Present?  Yes No  No  Depth (inches):	(where tilled) Cayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) ✓ Geomorphic Position (D2) ✓ FAC-neutral Test (D5) Frost Heave Hummocks (D7) (LRR F)

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#### MDT MONTANA WETLAND ASSESSMENT FORM (revised March 2008)

1.	Project Name: Rostad Ranch	<u>1</u> 2. MDT Project #: <u>STPX-00</u>	02(749) 3. Control #: 5565		
3.	Evaluation Date: July 10, 20	17 4. Evaluator(s): Mark Trax	der 5. Wetland/Site #(s): Ro	stad Ranch - created and existi	ng wetland
6.	Wetland Location(s): Towns	ship <u>8 N</u> , Range <u>11 E</u> , Section <u>1</u>	12; Township 8 N, Range 11 E	, Section <u>13</u>	
	Approximate Stationing or	Roadposts:			
	Watershed: 10 - Musselshel	County: Meagher			
7.	Evaluating Agency: RESPE Purpose of Evaluation:	C for MDT	8. Wetland Size (acre)	: (visually estimated) 26.42 (measured, e.g. GPS)	
	<ul> <li>☐ Wetland potentially affe</li> <li>☐ Mitigation wetlands; pr</li> <li>☐ Mitigation wetlands; po</li> <li>☐ Other</li> </ul>	e-construction	Assessment Area (a see manual for determination)	AA) Size (acre): (visual rmining AA) (measu	
1(	<ul><li>☐ Mitigation wetlands; pr</li><li>☑ Mitigation wetlands; po</li><li>☐ Other</li></ul>	e-construction	(see manual for dete	rmining AA) <u>26.42</u> (measu	
1(	<ul><li>☐ Mitigation wetlands; pr</li><li>☑ Mitigation wetlands; po</li><li>☐ Other</li></ul>	e-construction st-construction	(see manual for dete	rmining AA) <u>26.42</u> (measu	
1	☐ Mitigation wetlands; pr ☑ Mitigation wetlands; po ☐ Other D. CLASSIFICATION OF WET	e-construction st-construction LAND AND AQUATIC HABITA	(see manual for dete	rmining AA) <u>26.42</u> (measu initions.)	red, e.g. GPS)
1 (	☐ Mitigation wetlands; pr ☑ Mitigation wetlands; po ☐ Other D. CLASSIFICATION OF WET HGM Class (Brinson)	e-construction ost-construction LAND AND AQUATIC HABITA Class (Cowardin)	(see manual for dete ATS IN AA (See manual for def Modifier (Cowardin)	rmining AA) 26.42 (measurable initions.)  Water Regime	red, e.g. GPS)
1	☐ Mitigation wetlands; pr☐ Mitigation wetlands; pr☐ Other  D. CLASSIFICATION OF WET  HGM Class (Brinson)  Slope	e-construction ost-construction  LAND AND AQUATIC HABITA Class (Cowardin) Emergent Wetland	(see manual for dete ATS IN AA (See manual for def Modifier (Cowardin)	rmining AA) 26.42 (measurable initions.)  Water Regime  Seasonal / Intermittent	% <b>OF AA</b>
1	☐ Mitigation wetlands; pr ☐ Mitigation wetlands; po ☐ Other  D. CLASSIFICATION OF WET ☐ HGM Class (Brinson) ☐ Slope ☐ Slope	e-construction ost-construction  LAND AND AQUATIC HABITA Class (Cowardin) Emergent Wetland Scrub-Shrub Wetland	(see manual for dete ATS IN AA (See manual for def Modifier (Cowardin) Excavated	rmining AA) 26.42 (measurable initions.)  Water Regime  Seasonal / Intermittent Seasonal / Intermittent	% <b>OF AA</b> 78 2
1	Mitigation wetlands; pr Mitigation wetlands; po Other CLASSIFICATION OF WET HGM Class (Brinson) Slope Slope Depressional	e-construction ost-construction  LAND AND AQUATIC HABITA Class (Cowardin) Emergent Wetland Scrub-Shrub Wetland Unconsolidated Bottom	(see manual for dete ATS IN AA (See manual for def Modifier (Cowardin) Excavated Excavated	rmining AA) 26.42 (measurable initions.)  Water Regime  Seasonal / Intermittent Seasonal / Intermittent Seasonal / Intermittent	% OF AA 78 2 6

Comments:

11. ESTIMATED RELATIVE ABUNDANCE (of similarly classified sites within the same Major Montana Watershed Basin; see manual.) <a href="mailto:common">common</a>

#### 12. GENERAL CONDITION OF AA

 i. Disturbance: Use matrix below to select the appropriate response; see manual for Montana listed noxious weed and aquatic nuisance vegetation species lists.

	Predominar	nt Conditions Adjacent to (within	500 feet of) AA		
Conditions within AA	Managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings; and noxious weed or ANVS cover is ≤15%.	Land not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to minor clearing; contains few roads or buildings; noxious weed or ANVS cover is ≤30%.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >30%.		
AA occurs and is managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings; and noxious weed or ANVS cover is ≤15%.					
AA not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads or buildings; noxious weed or ANVS cover is ≤30%.		moderate disturbance			
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >30%.					

Comments (types of disturbance, intensity, season, etc.): The wetland mitigation site was constructed in Fall 2012/Spring 2013. Extensive excavation occurred to create depressional areas and spread out water across the site. Site was revegetated Fall 2012/Spring 2013 with good growth observed during the first growing season (2013) following construction activities. Significant increases in vegetative growth were observed in 2014 and 2015 since the 2013 monitoring effort. Decreased disturbance from cultivation, grazing, and construction since 2013 led to moderate disturbance rating in 2017.

- ii. Prominent noxious, aquatic nuisance, and other exotic vegetation species: Spotted knapweed, Canada thistle, houndstongue, hoary alyssum, field bindweed, common tansy
- iii. Provide brief descriptive summary of AA and surrounding land use/habitat: The AA is a historically drained wetland area/meadow that was heavily grazed by cattle. A drainage ditch bisected the property prior to wetland mitigation construction. Existing wetlands were expanded through construction activities with emergent and scrub-shrub wetland communities present. Surrounding land use includes transportation (county road, historic railroad berm), agriculture (hay production and cattle grazing), and the South Fork of the Musselshell River located to the north of the mitigation site.

13. STRUCTURAL DIVERSITY (Based on number of "Cowardin" vegetated classes present [do not include unvegetated classes]; see #10 above.)

Existing # of "Cowardin" Vegetated Classes in AA	Initial Rating	Is current management peristence of additional v		Modified Rating
≥3 (or 2 if one is forested) classes		NA	NA	NA
2 (or 1 if forested) classes	mod	NA	NA	NA
1 class, but not a monoculture		←NO	YES→	
1 class, monoculture (1 species comprises ≥90% of total cover)		NA	NA	NA

Comments: Emergent and scrub-shrub vegetation classes

14A. HABITAT FOR FEDERAL	LY LISTED	OR PR	OPOSED	THRI	EATEN	IED (	OR EN	NDANG	ERED	PLA	NTS C	R AN	IMALS	3				
Primary or critical habitat (list secondary habitat (list specie	species) es)	D D	□s □s □s		ox base	ed on	defin	itions in	manu	al.								
ii. Rating: Based on the stronge	est habitat c	hosen in	14A(i) al	ove,	select t	the co	orresp	onding	function	onal p	oint a	nd rati	ng.					
Highest Habitat Level	Doc/Prima	ry Su	s/Primary	/ Do	oc/Sec	onda	iry	Sus/Se	conda	ry	Doc/Ir	ncider	ntal	Sus	/Incide	ntal	Non	e
Functional Point/Rating						-		-									0L	
Sources for documented use (documented occurences.	Secondary habitat (list species)   D   S   S   Secondary habitat (list species)   D   S   Secondary habitat (list species)   D   S   Secondary habitat (list species)   Do/Primary   Sus/Primary   Doc/Secondary   Sus/Secondary   Doc/Incidental   Sus/Incidental   None   Functional Point/Rating																	
			D S1, S2	, OR	S3 BY	THE	MON	TANA I	IUTAN	RALI	HERIT	AGE F	PROG	RAM				
Primary or critical habitat (list secondary habitat (list specie	species) ` es)	´⊠ D ⊠ D	☐ S <u>Do</u> ☐ S <u>Lor</u> ☐ S	vningi	ia laeta	(S2S	S3 <u>)</u>				<u>2B)</u>							
				_														
	Doc/Prima	ry Su	s/Primary	/ Do	oc/Sec	onda	iry	Sus/Se	conda	ry	Doc/Ir	ncider	ntal	Sus/	Incide	ntal	None	*
Functional Point/Rating						-		-										
	.9H					-		-										
Sources for documented use (of curlew/plover	e.g. observa	ations, re	ecords): C	bser	/ations	of Do	ownin	gia laet	a in we	etland	l during	g 2013	3-2015	site \	visits; p	oast o	bserva	tions
14C GENERAL WILDLIEF HAL	DITAT DAT	ING																
			eck subst	antial	, mode	rate,	or lov	w based	on su	pport	ing evi	dence						
☐ observations of abundant☐ abundant wildlife sign sucl☐ presence of extremely limi☐ interview with local biologi	wildlife #s on as scat, transiting habitat st with know	or high spacks, ne features vledge o	pecies divest structures not availed the AA	res, g	ame tra	ails, e	etc.	od)		ew or ttle to parse	no wil no wi adjac	Idlife o Idlife s ent up	bserva ign oland fo	ations ood s	during ources	g peak	use p	
<ul> <li>☑ observations of scattered v</li> <li>☐ common occurrence of wil</li> <li>☒ adequate adjacent upland</li> </ul>	wildlife grou dlife sign su food source	ips or induction as so	dividuals o cat, tracks	or rela s, nest	tively f	ew sp ures,	pecies game	s during e trails,	peak etc.	perio	ds							
For class cover to be considered percent composition of the AA (s	evenly dist ee #10). Al	ributed, bbreviati	the most ons for su	and le ırface	ast pre water	valer durat	nt <b>veg</b> ions a	getated are as fo	classe	s mu P/P :	st be v = perm	vithin 2 nanent	20% of /peren	each				
Structural Diversity			High						×	Mo	derate					<b>□</b> L	.ow	
	□ E	ven		☐ Un	even			□ E	ven			⊠ Un	even			□ E	ven	
Duration of Surface Water in ≥ 10% of AA	P/P S/I	T/E	A P/P	S/I	T/E	Α	P/P	S/I	T/E	Α	P/P	S/I	T/E	Α	P/P	S/I	T/E	Α
□ Low Disturbance at AA (see #12i)																		Ī
Moderate Disturbance     at AA (see #12i)												М						
☐ High Disturbance at																		ļ
AA (see #12i)							<u> </u>	1		<u> </u>				<u>                                     </u>				
iii. Rating: Use the conclusions	trom i and	ıı above								oint a	and rat	ing.		7				
Evidence of Wildlife Use (i)		ceptiona			e Habıı   High	at Fe	ature	es Ratii ⊠ Mo	ng (II) oderate	<u> </u>		☐ Lo	w					
☐ Substantial	<u> </u>		··				T	<u> </u>						1				
Moderate								.!	БМ									

								W	etland	d/Site	#(s): <u>R</u>	ostad F	Ranch	- crea	ated an	d exist	ing we	etland		
14	4D. GENERAL FISH HABITA' If the AA is not used by fis entrapped in a canal], then	h, fish	use is		storab	le due	to hal		onstra	iints, c	r is not	desire	ed fron	n a ma	anagen	nent pe	erspec	tive [s	uch as	s fish
	Assess this function if the precluded by perched culv					existin	g situa	ation is	corr "corr	ectab	e" such	that t	he AA	could	be use	ed by f	ish [i.e	., fish	use is	;
	Type of Fishery:  Colo	d Wate	er (CW	) 🗆 \	Narm	Water	(WW	) Use	the C	CW or	WW gu	ideline	es in th	e mar	ual to	comple	te the	matriz	Κ.	
i.	Habitat Quality and Known /	Susp	ected	Fish S	pecie	s in A	A: Us	se mat	rix to	select	the fun	ctiona	l point	and r	ating.					-
	Duration of Surface Water in AA	□Р	erman	ent / P	erenn	ial		□s	easoı	nal / Ir	ntermit	tent		□т	empoi	rary / E	Ephen	neral		
	Aquatic Hiding / Resting /		J .	٦. ۵	]				]	[		_[			ጋ .	<u>, ,</u> [	J ,	_[		
	Escape Cover Thermal Cover:	Opti		Adeq		Po		Opti			quate	Po		•	imal	Adec			or	
	optimal / suboptimal	0	S	0	S	0	S	0	S	0	S	0	S	0	S	0	S	0	S	
	FWP Tier I fish species																			
	FWP Tier II or Native Game fish species			-																
	FWP Tier III or Introduced Game fish																			
	FWP Non-Game Tier IV or No fish species																			
S	ources used for identifying fi	sh sn	n note	entially	/ foun	d in A	Δ.		<u> </u>	<u> </u>										<u> </u>
				-																
	Modified Rating: NOTE: Mo																			
M	) Is fish use of the AA significar IDEQ list of waterbodies in nee upport, <b>or</b> do aquatic nuisance	d of TI	MDL d	evelopi	ment v	vith list	ted "P	robabi	le Imp	aired	Uses" i	ncludir	ng cold	d or wa	arm wa	iter fisl	hery of	r aqua	tic life	
ь,	) Does the AA contain a docum ative fish or introduced game fi	nented	spawr	ing are	ea or c	ther c	ritical i	habita	t featu	ıre (i.e	., sanc					•				
	i. Final Score and Rating:			-				_				sitot								
"	. Final Score and Rating.	Comm	ients.	ivo per	enna	ily HOW	ing wa	ater w	uiiii P	VA IOI	IISII IIal	<u>niai.</u>								
14	4E. FLOOD ATTENUATION Applies only to wetlands the If wetlands in AA are not f	hat are	subje	IA (pro ct to flo in-chan	oding	via in	-chanr	nel or	overba	ank flo	w. box an	d proc	eed to	14F.						
_								,				•			ا الماعات ال	/ /  -	<b>4</b> 11	-141- \		
	ntrenchment Ratio (ER) Estir lood-prone width = estimated h																		of the	stream.
		= _							4									:		
flo	ood prone width / bankfull width	n = ent	renchr	nent ra	tio		2 x F	Bankfu	ll Dent	h	A VELL	(E) Van	WALL Y	٠ -	ekek.	6kuri	Flo	od-pro	ne Wi	dth
										VII.	00000000	000	***********	£	• yana	in and	Bankfı	ıll Wid	lth	
											Ban	kfull D	epth	Onduction	A					
	Slightly Entr		d					y Ent		ed					renche					
	ER ≥ 2. C stream type D stream t	_	Fsti	eam ty	ne			<b>1.41 –</b> eam ty			A stra	am tyr	ne I		: <b>1.0 –</b> 'ream ty		G eti	ream t	vne	
		, pc	_ 50				D 500		_4		7.500			. 30	Jun ty	ا <mark>ہے</mark>	5 311	ا الم	7,00	
				7			7	=	3					Ę						

,	Slightly Entrenche ER ≥ 2.2	ed	ER = 1.41 - 2.2		Entrenched ER = 1.0 – 1.4	
C stream type	D stream type	E stream type	B stream type	A stream type	F stream type	G stream type

i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating.

Estimated or Calculated Entrenchment	☐ SI	ightly Entrei	nched	☐ Mod	lerately Enti	renched	☐ Entrenched			
(Rosgen 1994, 1996)	C, D	C, D, E stream types			stream typ	e	A, F, G stream types			
Percent of Flooded Wetland Classified as Forested and/or Scrub/Shrub	75%	 25-75%	□ <25%	75%	 25-75%	□ <25%	 75%	 25-75%	□ <25%	
AA contains no outlet or restricted outlet										
AA contains unrestricted outlet										

ii. Are ≥10 acres of wetland in the AA subject to flooding AND are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA? ☐ YES ☐ NO Comments: No flooding occurs via in-channel or overbank flow.

	· / ·
14	IF. SHORT AND LONG TERM SURFACE WATER STORAGE \( \square\) NA (proceed to 14G)
	Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow.
	If no wetlands in the AA are subject to flooding or ponding, then check the NA box and proceed to 14G.
i.	Rating: Working from top to bottom, use the matrix below to select the functional point and rating. Abbreviations for surface water durations are as
	follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see manual for further definitions of these terms].

Estimated Maximum Acre Feet of Water Contained in Wetlands within the AA that are Subject to Periodic Flooding or Ponding		>5 acre fe	eet	□ 1.1	to 5 ac	re feet	☐ ≤1 acre foot		
Duration of Surface Water at Wetlands within the AA	□ P/P	⊠ S/I	□ <b>T/E</b>	□ P/P	□ S/I	□ T/E	□ <b>P/P</b>	□ S/I	□ <b>T/E</b>
Wetlands in AA flood or pond ≥ 5 out of 10 years		.9H							
Wetlands in AA flood or pond < 5 out of 10 years									

Comments: Depressional area and portions of slope wetlands maintain water seasonally/intermittently. Adaptive management in 2017 resulted in an increased score for this function.

#### 

Applies to wetland with potential to receive sediments, nutrients, or toxicants through influx of surface or ground water or direct input. If no wetlands in the AA are subject to such input, check the NA box and proceed to 14H.

i. Rating: Working from top to bottom, use the matrix below to select the functional point and rating.

Sediment, Nutrient, and Toxicant Input Levels within AA	AA receive has potent nutrients, such that substantia sedimenta toxicants, present.	tial to delive or compou other funct ally impaire ation, sourc	er sedime inds at lev ions are n ed. Minor ees of nutr	ents, rels not rients or	Waterbody is need of TMDI causes" relat toxicants or A has potential nutrients, or c functions are sedimentation or signs of eu	developmer ed to sedime AA receives of to deliver hig compounds s substantially n, sources of	nt for "probal nt, nutrients, or surroundin gh levels of s such that oth or impaired. M nutrients or	ole or g land use ediments, er ajor
% Cover of Wetland Vegetation in AA	<b>⊠</b> ≥	70%	_ \	70%	□≥7	70%	□ <	70%
Evidence of Flooding / Ponding in AA		☐ No	☐ Yes	☐ No	☐ Yes	☐ No	☐ Yes	☐ No
AA contains no or restricted outlet	1H							
AA contains unrestricted outlet								

**Comments:** More than 80 percent of the non-open water area is covered with wetland vegetation. A restricted outlet is located on the depressional area as a constructed overflow channel.

#### **14H. SEDIMENT / SHORELINE STABILIZATION** NA (proceed to 14I)

Applies only if AA occurs on or within the banks of a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action.

If 14H does not apply, check the NA box and proceed to 14I.

% Cover of Wetland Streambank or Shoreline by Species with Stability	Duration of Surface Water Adjacent to Rooted Vegetation						
Ratings of ≥6 (see Appendix F).	☐ Permanent / Perennial	Seasonal / Intermittent	☐ Temporary / Ephemeral				
⊠ ≥ 65%		.9H					
□ 35-64%							
☐ < 35%							

Comments: AA supports open water areas subject to wave action.

#### 14I. PRODUCTION EXPORT / FOOD CHAIN SUPPORT

i. Level of Biological Activity: Synthesis of wildlife and fish habitat rates (select).

General Fish Habitat Rating	Genera	l Wildlife Habitat Rati	ng (14Ciii)
(14Diii)	□ E/H	$\boxtimes$ M	L
☐ E/H			
■ M			
□ L			
⊠ NA		M	

ii. Rating: Working from top to bottom, use the matrix below to select the functional point and rating. Factor A = acreage of vegetated wetland component in the AA; Factor B = level of biological activity rating from above (14li); Factor C = whether or not the AA contains a surface or subsurface outlet; the final three rows pertain to the duration of surface water in the AA, where P/P, S/I, and T/E were previously defined, and A = "absent" [see manual for further definitions of these terms].

Α	☑ Vegetated Component >5 acres							☐ Vegetated Component 1-5 acres						☐ Vegetated Component <1 acre				
В	B 🔲 High		$\boxtimes$ M	oderate	Low		☐ High [			derate	☐ Low		☐ High				☐ Low	
С	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P																		
S/I			.7M															
T/E/A																		

			vvelianic	#(3	). <u>11031au 11ai 1</u>	cii - cieateu a	nu existing	Welland	
14I. PRODUCTION EXPORT / FOOD CH	IAIN SI	UPPORT (contir	nued)						
ii. Modified Rating: Note: Modified scor	e cann	ot exceed 1.0 o	r be less than	0.1.					
Vegetated Upland Buffer: Area with mowing or clearing (unless for weed colls there an average ≥ 50-foot wide veg	ontrol).						•		
v. Final Score and Rating: <u>.8H</u> Comn	nents:	Moderate biolog	ial activity; no	fish habi	tat; vegetative	component >	5 acres wit	h a upland b	ouffer.
4J. GROUNDWATER DISCHARGE / R. Check the appropriate indicators in  i. Discharge Indicators  \[ \text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\text{\texi\texi{\text{\texi\texi{\text{\text{\text{\text{\t	i and ii or obse ormant s a natura	below. erved. season/drought. al slope.		☐ Per ☐ Wer ☐ Stre	rge Indicators meable substr land contains am is a knowr er:	ate present wi inlet but no ou	utlet.	, , ,	0 ,
	ng drou ut no ir site is sa	ght periods. nlet. aturated to the s		act the fu	octional point :	and rating			
n. Kathig. Ose the information normalist	u II abu		Saturation at				ER DISCH	ARGE or	1
		<u>WITH W</u>	<u>'ATER THAT I</u>	S RECH	ARGING THE	GROUNDWA	TER SYS	TEM	
Criteria		☐ P/P	<u> </u>		T		☐ Non		
☐ Insufficient Data/Information	arge		.7M						
Comments: Seasonal water regime within	ΔΔ								<u>]</u>
omments. Geasonal water regime with	1701.								
14K. UNIQUENESS									
. Rating: Working from top to bottom, us	e the n	natrix below to s	select the func	tional poi	nt and rating.				
Replacement Potential	g, warm >80 yr-old) R plant s "S1" by	cited r divers contai	es not contail are types ANI ity (#13) is hig ns plant asso as "S2" by the	Structural gh OR ciation					
Estimated Relative Abundance (#11)	□ Rar	e 🗆 Common	□ Abundant		☐ Common		□ Rare		□ Abundan
Low Disturbance at AA (#12i)									
Moderate Disturbance at AA (#12i)								.3L 	
☐ High Disturbance at AA (#12i)  Comments: PEM and PSS wetlands of the									
vetlands.	is type	are common in	ine area. Siru	ictural di	<u>reisity is not n</u>	ign and there	are no bog	s, rens, or re	restea
Affords 'bonus' points if AA provides  Is the AA a known or potential recrea  Check categories that apply to the A	a recreational  A:	eational or educational  Educational/Sci	site? X YES	inity. <b>5</b> , go to ii	. <b>NO</b> , che	eck the NA box	к.	nptive recrea	ational
: Potimer loo the gratiin belong to a loo	_	Other:	d ratio						
ii. Rating: Use the matrix below to select		nctional point ar al Recreational		al Aras			Known	Potential	
Public ownership or public easemer					n required)		Known		`
The second of th		J P	( P					1	

Comments: Currently no recreation/education occurs at the site.

Private ownership with general public access (no permission required)

Private or public ownership without general public access, or requiring permission for public access

15. **GENERAL SITE NOTES:** A supplemental hydrology source was identified in 2014 -2016 during the site visits. Water is entering the site along the southern boundary from the ditch located upslope. This additional hydrology has resulting in minor increased wetland acreage in 2015/2016.

Function & Value Variables	Rating – Actual Functional Points	Possible Functional Points	Functional Units: Actual Points x Estimated AA Acreage	Indicate the Four Most Prominent Functions with an Asterisk		
A. Listed / Proposed T&E Species Habitat	low 0.00	1.00	0			
B. MT Natural Heritage Program Species Habitat	high 0.90	1.00	23.78	*		
C. General Wildlife Habitat	mod 0.50	1.00	13.21			
D. General Fish Habitat	NA	NA	0			
E. Flood Attenuation	NA	NA	0			
F. Short and Long Term Surface Water Storage	high 0.90	1.00	15.85			
G. Sediment / Nutrient / Toxicant Removal	high 1.00	1.00	26.42	*		
H. Sediment / Shoreline Stabilization	high 0.90	1.00	23.78	*		
I. Production Export / Food Chain Support	high 0.80	1.00	21.14	*		
J. Groundwater Discharge / Recharge	mod 0.70	1.00	18.49			
K. Uniqueness	low 0.30	1.00	7.93			
L. Recreation / Education Potential (bonus point)	low 0.05		1.32			
Total Points	6.05	9	159.85 Total	Functional Units		
Percent of Possible Score 67% (round to nearest whole number)						

	Category I Wetland: (must satisfy one of the following criteria; otherwise go to Category II)
	Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; <b>or</b>
	☐ Score of 1 functional point for Uniqueness; <b>or</b>
	☐ Score of 1 functional point for Flood Attenuation <b>and</b> answer to Question 14E.ii is "yes"; <b>or</b>
	Percent of possible score > 80% (round to nearest whole #).
	Category II Wetland: (Criteria for Category I not satisfied and meets any one of the following criteria; otherwise go to Category IV)  □ Score of 1 functional point for MT Natural Heritage Program Species Habitat; or □ Score of .9 or 1 functional point for General Wildlife Habitat; or □ Score of .9 or 1 functional point for General Fish Habitat; or □ "High" to "Exceptional" ratings for both General Wildlife Habitat and General Fish/Aquatic Habitat; or □ Score of .9 functional point for Uniqueness; or □ Percent of possible score > 65% (round to nearest whole #).
	☐ Category III Wetland: (Criteria for Categories I, II, or IV not satisfied)
	Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; if not go to Category III)  "Low" rating for Uniqueness; and
	☐ Vegetated <u>wetland</u> component < 1 acre (do <u>not</u> include upland vegetated buffer); <b>and</b>
	Percent of possible score < 35% (round to nearest whole #).
0	<b>OVERALL ANALYSIS AREA (AA) RATING:</b> Check the appropriate category based on the criteria outlined above.

## APPENDIX C PROJECT AREA PHOTOGRAPHS

MDT Wetland Mitigation Monitoring Rostad Ranch Mitigation Site Meagher County, Montana



Photo Point 1 – Panorama; Location: Northeast Corner; Bearing 200 degrees; Year 2013



Photo Point 1 – Panorama; Location: Northeast Corner; Bearing 200 degrees; Year 2015



Photo Point 1 – Panorama; Location: Northeast Corner; Bearing 200 degrees; Year 2016



Photo Point 1 – Panorama; Location: Northeast Corner; Bearing 200 degrees; Year 2017



Photo Point 2 – Panorama; Location: East Fence Corner; Bearing 125 degrees; Year 2013



Photo Point 2 – Panorama; Location: East Fence Corner; Bearing 125 degrees; Year 2015



Photo Point 2 - Panorama; Location: East Fence Corner; Bearing 125 degrees; Year 2016



Photo Point 2 - Panorama; Location: East Fence Corner; Bearing 125 degrees; Year 2017



Photo Point 2 Bearing: 275 degrees Location: East Fence Corner

Year: 2017

2017 was first year for this photo – rest of page saved for 2018–2022 Photos.



Photo Point 3 – Panorama; Location: East Fence Line; Bearing 280 degrees; Year 2013



Photo Point 3 – Panorama; Location: East Fence Line; Bearing 280 degrees; Year 2015



Photo Point 3 – Panorama; Location: East Fence Line; Bearing 280 degrees; Year 2016



Photo Point 3 – Panorama; Location: East Fence Line; Bearing 280 degrees; Year 2017



Photo Point 4 – Panorama; Location: SE Fence Corner; Bearing 240 degrees; Year 2013



Photo Point 4 – Panorama; Location: SE Fence Corner; Bearing 240 degrees; Year 2015



Photo Point 4 – Panorama; Location: SE Fence Corner; Bearing 240 degrees; Year 2016



Photo Point 4 – Panorama; Location: SE Fence Corner; Bearing 240 degrees; Year 2017



Photo Point 5 – Panorama; Location: SW Fence Corner; Bearing 200 degrees; Year 2013



Photo Point 5 - Panorama; Location: SW Fence Corner; Bearing 200 degrees; Year 2015



Photo Point 5 – Panorama; Location: SW Fence Corner; Bearing 200 degrees; Year 2016



Photo Point 5 - Panorama; Location: SW Fence Corner; Bearing 200 degrees; Year 2017





Photo Point 6 Bearing: 100 degrees

Location: West Fence Line Year: 2013



Photo Point 6 Bearing: 100 degrees

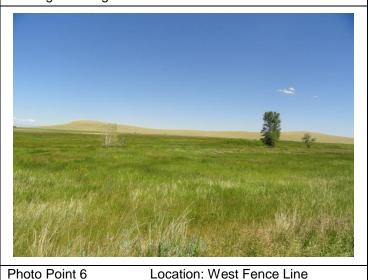


Location: West Fence Line Year: 2014



Photo Point 6 Bearing: 100 degrees

Location: West Fence Line Year: 2015



Bearing: 100 degrees Year: 2016



Photo Point 6 Bearing: 100 degrees

Location: West Fence Line



Photo Point 7 – Panorama; Location: West Fence Corner; Bearing 90 degrees; Year 2013



Photo Point 7 – Panorama; Location: West Fence Corner; Bearing 90 degrees; Year 2015



Photo Point 7 – Panorama; Location: West Fence Corner; Bearing 90 degrees; Year 2016



Photo Point 7 – Panorama; Location: West Fence Corner; Bearing 90 degrees; Year 2017



Photo Point 8 Bearing: 90 degrees

Location: West Central Year: 2017



Photo Point 9 Location: East Fence Line Bearing: 240 degrees Year: 2017



Bearing: 80 degrees

Year: 2017



Transect 1: Start Bearing: 290 degrees

Location: NE Branch of site Year: 2013



Transect 1: Start Bearing: 290 degrees

Location: NE Branch of site Year: 2014



Transect 1: Start Bearing: 290 degrees

Location: NE Branch of site Year: 2015



Transect 1: Start Bearing: 290 degrees

Location: NE Branch of site Year: 2016



Transect 1: Start Bearing: 290 degrees

Location: NE Branch of site



Transect 1: End Bearing: 110 degrees

Location: NE Branch of site Year: 2013



Transect 1: End Bearing: 110 degrees

Location: NE Branch of site Year: 2014



Transect 1: End Bearing: 110 degrees

Location: NE Branch of site Year: 2015



Transect 1: End Bearing: 110 degrees

Location: NE Branch of site Year: 2016



Transect 1: End Bearing: 110 degrees

Location: NE Branch of site



Bearing: 130 degrees



Bearing: 310 degrees



Transect 2: End Bearing: 310 degrees

Location: North Central Year: 2014



Transect 2: End Bearing: 310 degrees

Location: North Central Year: 2015



Transect 2: End Bearing: 310 degrees

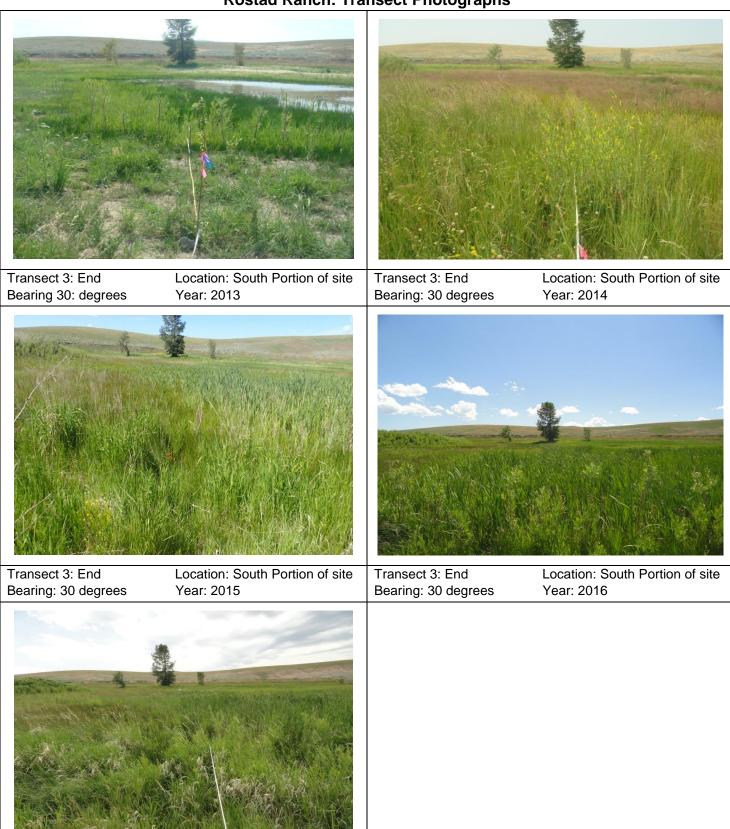
Location: North Central Year: 2016



Transect 2: End Bearing: 310 degrees

Location: North Central





Transect 3: End Bearing: 30 degrees

Location: South Portion of site



Transect 4: Start Bearing: 0 degrees

Location: Northwest Portion Year: 2017

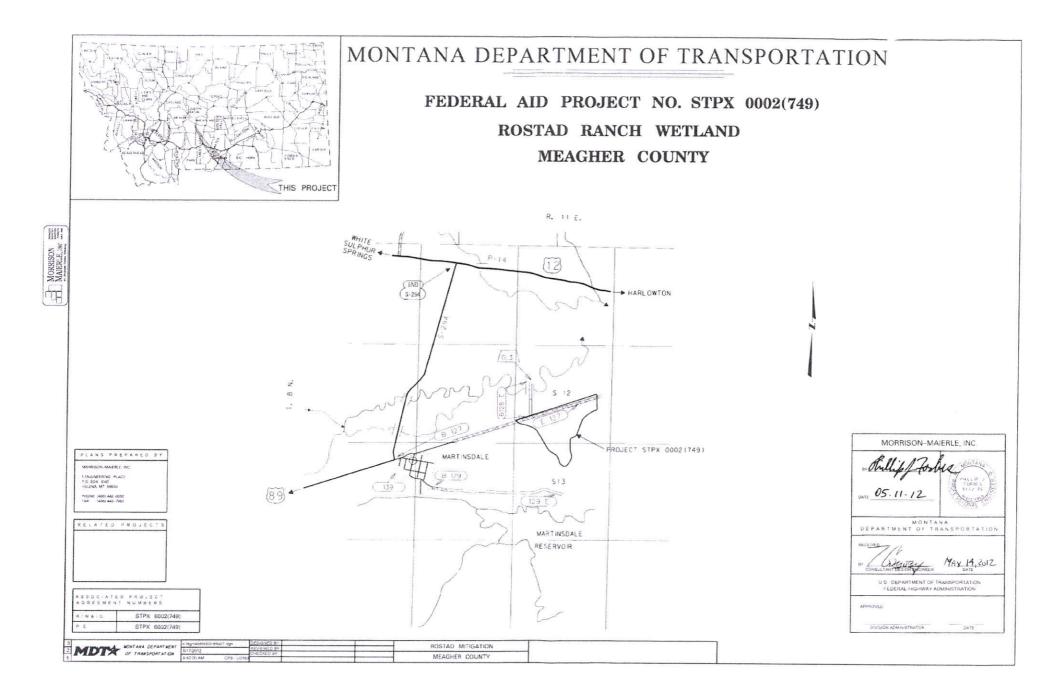
Transect 4: End Bearing: 180 degrees

Location: Northwest Portion Year: 2017



# APPENDIX D PROJECT PLAN SHEETS

MDT Wetland Mitigation Monitoring Rostad Ranch Mitigation Site Meagher County, Montana



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WATER DISTRIBUTION OVERVIEW	19

### NOTES

#### TEMPORARY EROSION AND SEDIMENT CONTROL

REFER TO SECTION FOR OF THE WOT DETAILED DRAWNINGS FOR ROSSON AND SEDEMENT CONTROL BEST MANAGEMENT PRACTICES. MISTAL TEMPORARE RESSON CONTROL MANAGEMENT AS DESCRIBED THE RESSON CONTROL MANAGEMENT AS DESCRIBED THE RESSON CONTROL MAD FAIR TO BE DETERMINED BY JUNIOR THE RESSON CONTROL MAD FAIR FOR INDER MISCELLA MEDION WHEN ALL MASTALLED TEMPORARE RESSONS CONTROL BEAMAGEMENT OF THE COMPOSED AND CONSTRUCTED OF TODG ROSGERADABLE FIRERS, NETTING, AND STITTMENT AND STREET OF THE PROSECULAR PROSPECTION OF THE COMPOSED AND CONSTRUCTED OF TODG ROSGERADABLE FIRERS, NETTING, AND STITTMENT.

#### SOILS INFORMATION

TO DETAIN THE COMPLETE SDLS BEGGMATION CONTACT THE MOT GEOTECHNICAL SECTION AT (406) 444-6881.

ESNIACT THE UTSITIES UNDERSHOUND LOCATION CENTER (1-800-424-5555) ON OTHER HOLFICATION SYSTEM FOR THE MARKING AND LOCATION OF ALL LINES AND SERVICES BEFORE EXCLARATING.

#### CLEARING AND GRUBBING

CLEAR AND GRUB TO STAKES GRADING LIMITS. INCLUDE THE COST OF CLEARING AND GRUBBING IN THE UNIT PRICE BID FOR UNCLASSIFIED EXCAVATION.

#### TOPSOIL SALVAGING AND PLACING

TOPSON DUANTITIES SHOWN IN THE PLANS ARE SUFFICIENT TO RE-TOPSON IN AREAS HARRE EXIS ON FILES EXCEED 1.8007. ALL REMAINING GRAPHIC IS CONSIDERED UNCLASSIFE DE JECCHASTORIES

#### PIEZOMETER REMOVAL

SEE SHEET TO FOR LOCATIONS OF PREDMETERS ON THE PROJECT.
AGARDON WELLS IN ACCORDANCE WITH ARM 36 21, BIG.

#### WETLANDS

#### WETLANDS LEGEND



# COMBINATION SCALE FACTOR

ALL SURVEY AND STAKED WILL REDURE THE USE OF A COMBINATION SCALE FACTOR LCSF FO. 99922160. ALL DWENSIONS ON THE PLANS ARE CROED DWENSIONS AND WUST BE DIVIDED BY THE CSF TO ARRIVE AT CROUND DWENSIONS.

DIM FRES FORMATTED FOR TRIMBLE, LEICA, AND TOPTON SURVEY CONTROLLERS ARE AVER ABLE UPON RECURS). CONTACT MADE SALVAROS, MOT METLAND ENERGER, 81 444 0457.

# LINEAR & LEVEL DATA

BEARING SOURCE

NAD 83 (1992)

LEVEL DATUM SOURCE

NAVD 88

#### BENCH MARKS

SEE CONTROL ABSTRACT FOR BENCHMARK INFORMATION

<b>■</b>					
3 MONTANA DEPARTMENT C SIGN SON	enticontract ap DESIGNED SY BRANCATO BY	WETLAND PLANS	ROSTAD RAN	CH WETLAND	PROJECT NO. STPX 0002(749)
MDT OF TRANSPORTATION	AM CPS U2160	MEAGHER COUNTY	CSF = 0.99922160	UPN NUMBER 5565	SHEET 2 OF 19

# **CONTROL DIAGRAM**

76

Control marks 1 through 1 were established to provide control in the dreus of future welloads intigation. MCT accordary control procedures were used to establish the state place coordinates and offs derived orthogenic heights of the new control.

Coordinates shown revenue to the entire donor to the donor conducts System NAD83/19921, international feet. Celestions are referenced to MAD88, U.S. Seet (Geologis), Resundant which was that to the MAD98 foreign specified and to the MAD98 foreign specified so that the MAD98 foreign specified spe

in order to maintain a relative occuracy of 1:50,000, one Combination Scale Factor can be used for this project: . 99922:60, which is the Combination Scale Factor for CN 4888.

			CONTR	OL MARK ABSTRACT
PONT NAME / NUMBER	COORDINATE	E DR X EDOROMATE	PDM1 ELEVATION	COCATION AND DESCRIPTION
2,128	820 1E 707	1755843, 915	4837.33	FORCE SSSS INVARIABLE FROM THE SIMPLEND OF MERCHAN SAF ARE TO GO F MATS. MESS ADORS CHEMAN 12. THE MARK SAF SHEME HAS SO FAMOUR SUBJECT OF A PRODUCTION OF THE MARK SAF SHEME HAS SO FOR AN UNIFICATION OF THE MARK SAF SHEME AS TO P AN UNIFICATION OF THE MARK SAF SHEME AND PROSE THAT SAFENCE MAKE ITS SHAW SHEME AND PROSE THAT SAFENCE MAKE ITS SHAW SHAWED 37. MESS THAT SAFENCE AND PROSE THAT SAFENCE MAKE ITS SHAW SHAWED 37. MESS THAT SAFENCE MAKE ITS SHAW SHAW SHAWED 37. MESS THAT SAFENCE MAKE ITS SHAW SHAW SHAWED 37. MESS THAT SAFENCE MAKE ITS SHAW SHAW SHAW SHAW SHAW SHAW SHAW SHA
115	B15626, 843	१८१३वर्षः १४व	4715.58	Johns Mel Johans, and Almid Mel J. S.A. A Stadyhold of Charles. Cah on Sar's Repair O 15th BLOW REGION STAMPS 1712 2001. Early 550 color to the Part and John Blow Region Stamps 1712 2001. Early 550 color to the United States of the Part and John Blow Region Stamps 1712 2001. Early 550 color to the United States of the States John Blow Region States 1712 color to the States of the States of the States REGION BOTH. IS East of a Politik Politic Tab 6. And the Hope Point Right in REGION BOTH. IS East of a Politik Politic Tab 6. And the Hope Point Right in REGION BOTH. IN PLASS 1811 TO REGION AND STATES OF THE POLITICAL PROPERTY IN REGION BOTH TO THE POLITICAL PROPERTY IN THE STATES OF THE POLITICAL PROPERTY IN THE POLITICAL
1	807908, 594	1781915, 256	4781.01	SET MEDITONIFIES EMPLICATION MATERIALS AND STANFIES TO AND APPROACH, AND 2,5 NORTH OF THE SOLUTION ROW SENCE OF MATERIALS ROAD, 12 MEST OF AN APPROACH, AND 2,5 NORTH OF A MEMORS POST.
7	805+35, 343	:769675.308	4770.8	SET NOT LEAVING CAP, FLUSH MITT CHOUND, STANFED Z 2008 MARK IS Z 500TH DE THE STATE NOW FEWL DE MATERISCALE RODG, 1. T. MCST OF A FENLE COMMEN. 35 MCST OF AN APPROXICE, AND Z 500TH OF A MITNESS NESS.
3	808076.674	: FEBTS: - 668	4775.16	SET MET CONTROL CAP FLUSH WITH DROUND, STAMPED 3 TODG MARKS O TOO SOUTH OF THE SOUTH ROW FENCE OF WARTHISDALL ROUND, AND 2 WORTH OF A WITHLES POST
•	8GF6+8, 353	-156864, 251	+184.5)	SET MOT CONTROL CAF. FLICH ME'N CHOOMS: STAMPED '4 2008' MARKS 6 I SQU'M DF THE COUTH NOW TIME I DE MARKETSDALE BOAD, 650 EAST OF A DIVERSION STRUCFLINE. AND 2 DOING OF A MINESS SHOW.
5	#01432. \$43	1769072, 531	*408.98	SET MDS CONTROL CHY FELION WITH DRODING, SEAMPED 'S 2008 WARM IS 2 MORTH OF AN EAST MEST FEMEE AND I SOLITH OF A WINESS MUST
6	806516, 942	768950, 880	4906, UT	SET MOT CONTROL CAT. FEIGH BITH SECOND, STAMPED 'S ECOE. MARK IS IN AN DPEN FELO, 30 LAS' DE MY MERCATION CANAL, AND 2' SCUIN DE A MITHESS POST.
7	893595-611	(1941-05, 490	4817.40	SET WOT CONTROL CAP, FLUSH WITH CROSSED STAMPS: 7 2008 MAKE 12 ON TOP OF THE 2451 BANK OF SAMAL, NO NORTH OF AN EAST MEST FLAGE 1207 SOUTHEAD OF CONSPETS SOUTHEACH STRUITURE MAKE 2 SECTION OF AN MILEST MOST

NOTE CONTROL BUILDING NOT TO SCALE

	#2	
See The see of the see	H3	
	23 26	
PLANS	ROSTAD RANCH WETLAND PROJECT N	10

MDTX WINTAWA DEPARTMENT CONTRIBUTIONS SO

\*\*\*SPECIONALET 4U\*\* CESSOCIETE 2Y\*\*

\*\*\*CONTINUE 21\*\*

\*\*\*CONTINUE

 ROSTAD RANCH WETLAND
 PROJECT NO. STPX 0002/749;

 CSF = 0.99922160
 UPN NUMBER 5565
 SHEET 3 OF 19

# **SUMMARY**

		GRAI	DING	
		cubic yards		
TOTAL	UNCL EXC	EXCESS EXCAVATION	EMB +	REMARKS
	9,400 500	9,400	500	SITE GRADING KEYED BERM
TOTAL	9,900	# 9,400	# 500	

		lami	p sum	cubic yands	acres	
STA	TION	REVECE TATION	TREE & SHRIZE	TOPSOIL SALVAGING	WETLAND SEEDING	REMARKS
FROM	10		**	a r crossec		
		1 1	1	22.236	35.83	
YO	TAL	1	1	22 235		

	ABA	NDON	PIEZOM	ETER	
STATION	ITEM DESCRIPTION	square yards	cubic yards	nase	REMARKS
	ABANDON WELL			4	SEE SHEET 10 FOR LOCATIONS
TOTAL			~	4	

# FOR INFORMATION ONLY NOTE: 20% SHRINK FACTOR APPLIED TO GRADING

													CULV	ERTS	INCLUDED I	N CULVERT	SUMMARY R	ECAP)							
	T					BASIC B	ID ITEMS					PIPE OPTIONS in						cube	yards		square yards	linear Seet			1
	Contracting.		linea	teel				cuber yards			aguare yarda	CONCRETE	CLASS	COATING	END SE	CTIONS	FOUND			CULVERT	GEOTEX-	HEIGHT	SKEW	CULVERY IN PL	REMARKS
ULVERT	CULVERT	LENGTH	RELAY	CLEAN	REMOVE	CULVERT	FOUND- ATION	BEDDING	CLASS DO	CULVERT	GEOTEX-	STEEL - 2 2/3 x 1/2 CORR	CLASS OR THK.	*			ATION	MATERIAL MATERIAL	CONCRETE	RIPRAP	TILE	OF SOVER	ANGLE	in x ft	THE WAY THE
	45	OF PIPE	CLEVERT	CULVERT	CULVERT	EXC.	MATERIAL	MATERIAL	CONCRETE	CLASS	THE	ALUMINUM - 2 2/3 x 1/2 CORR	1104.		LEFT	RIGHT	MATCHIAL			CLASS		SEAFE			
VERT A				-	23.0																			18 X 23.0 CMP	REMOVE
DERT 6	***************************************	************			75.0									1			1000				PERSONAL PROPERTY.			18 X 75.0 CMP	REMOVE
VERT C	-				22.0	designation and a					100													18 X 22.0 CMP	REMOVE
VERT B VERT C ZERT D					42.0				-	1	-													18 X 42.0 CMP	REMOVE
TOTAL	-				162 0				-	-					4.0	200			A-0	-		-0		· · · · · ·	

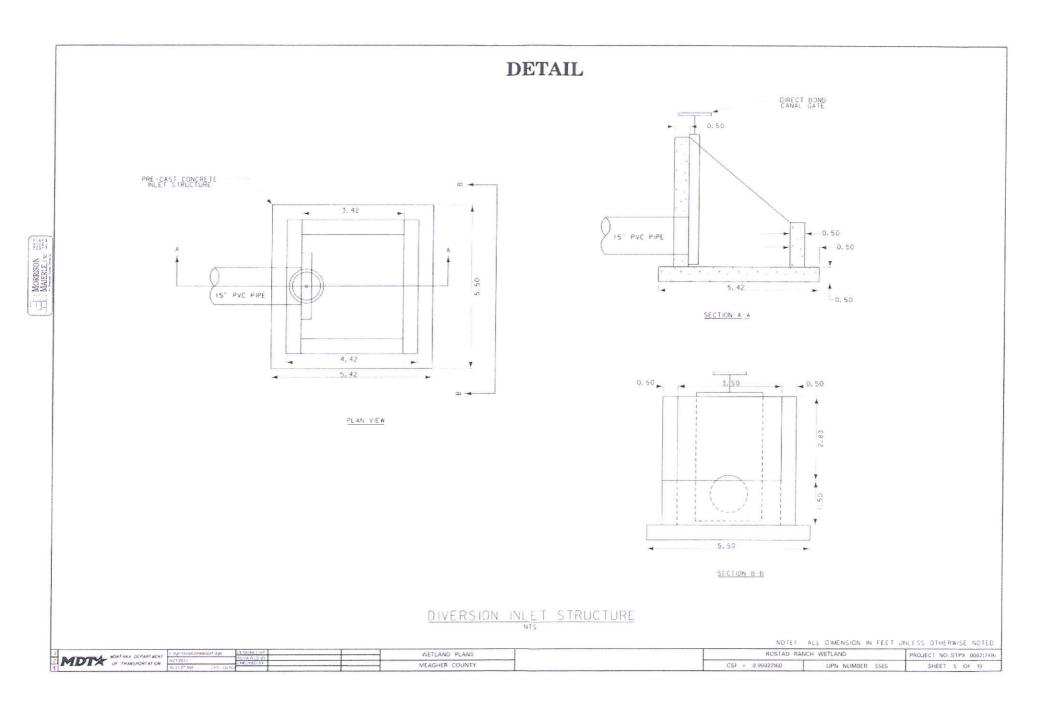
				BROA	D-CRES	TED WE	IR			
		Cubic yards	admine Assaz			6.0	igh.	2000		
STATION BANK PROTECT		BANK PROTECTION	TURE REINFOHCEMENT MAT	CANA: GATE	₩EAÐ GATE	TRASH GUARD	CHECK	TURNOUT	REMOVE BRRIGATION STRUG-	REMARKS
FROM	10	E39YI	TYPE Caso	10	90				TURE	
		35	120							BROAD-CRESTED WEIR
10	STAL	35	126	100				- 740	10-	

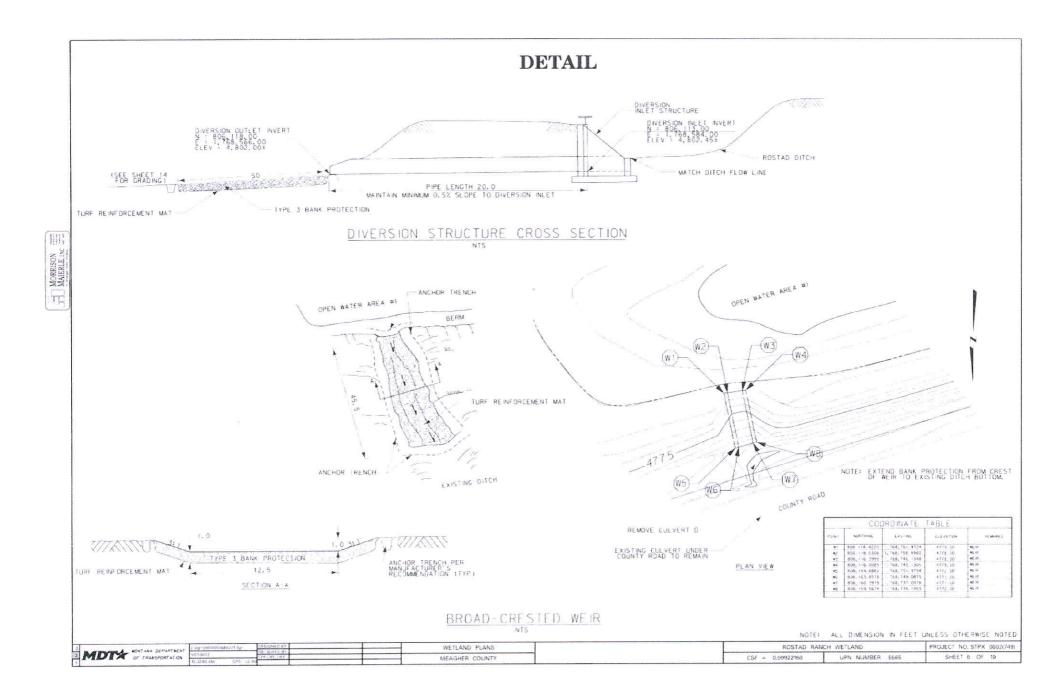
			CULVE	RT SUN	IMARY I	RECAP			
	T	linea	r feet			cubic	yards.		square yards
BASIC								CULVERT	GEOTEXTILE
HID	NEW	RELAY	CLEAN	REMOVE	ATION	BEDDING	CLASS 'DD'	RIPRAP	PERM EROS CNTRL
	(TOTAL)	CULVERT	CULVERT	CULVERT	MATERIAL	MATERIAL	CONCRETE	CLASS	SURV
	_			162.0				CLINO	CLASS
TOTAL		154,1	2-20	162.0	12	335	75-5		

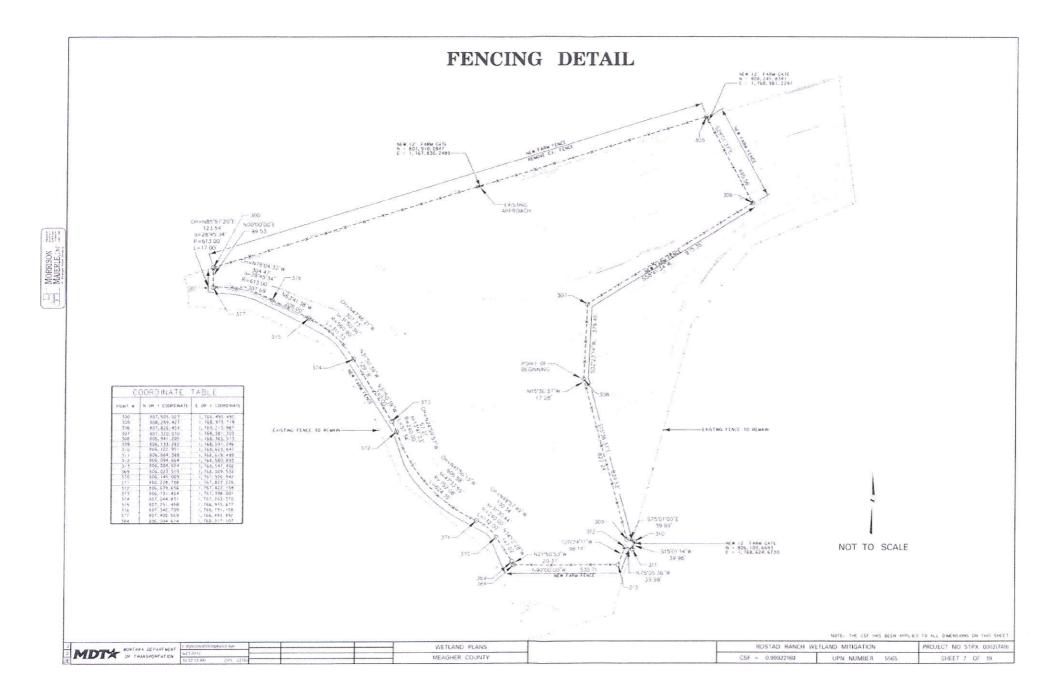
				FEN	CING					
			inear leet			each		linea	r toet	
ST	ATION		ENDLY FUNCE	REMOVE FENCE	VIR OLIFE FENCE	FRIENDLY PANEL	DEADMAN	FARM	GATE!	REMARKS
FROM	T 10	TYPE 1 - FM	TYPE 1-6W		SINGLE	DOUBLE		TYPE GZ	TYPE G3	water the same of
		2,592.4 495.2 974.6		2.592.4	- 1	1 2		12 12		
		579.7 838.9 215.8			1			12		STATE OF THE STATE
		530.3 99.5 2.271.7			4	1				
	OTAL	8.397.5	-	# 2 592.4	12	14		36	200	

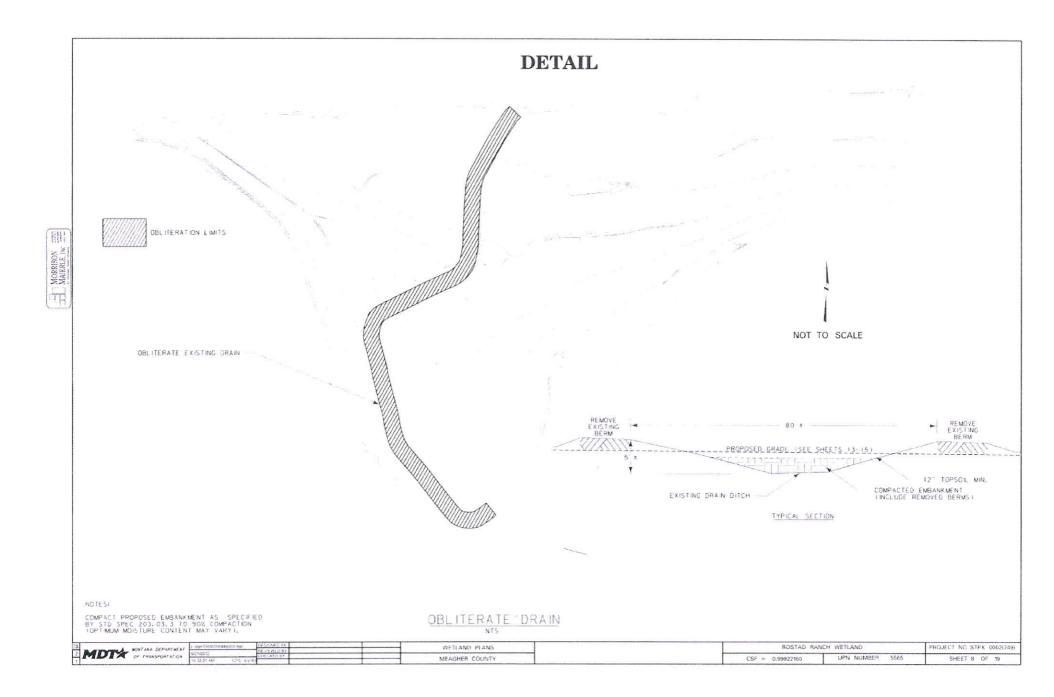
			DIVERSION	N STRU	CTURE			
	Cut	sic yard	square yard	6.2	ich.	Shot	lump stan	
DIVERSION	CLASS "DU" CONG.	BANK PROTECTION	TURF REINFORCEMENT MAT	GANAL GATE	HEAD GATE	PH-E PVC	TOTAL	REMARKS
	LUNE,	TYPE 3	TYPE 0350	15 in	15 in	15 in		
	4					28.0	1	SEE DE FAIL
		20	70					SEE DETAIL
		20	70	The same	1700	Still	1	

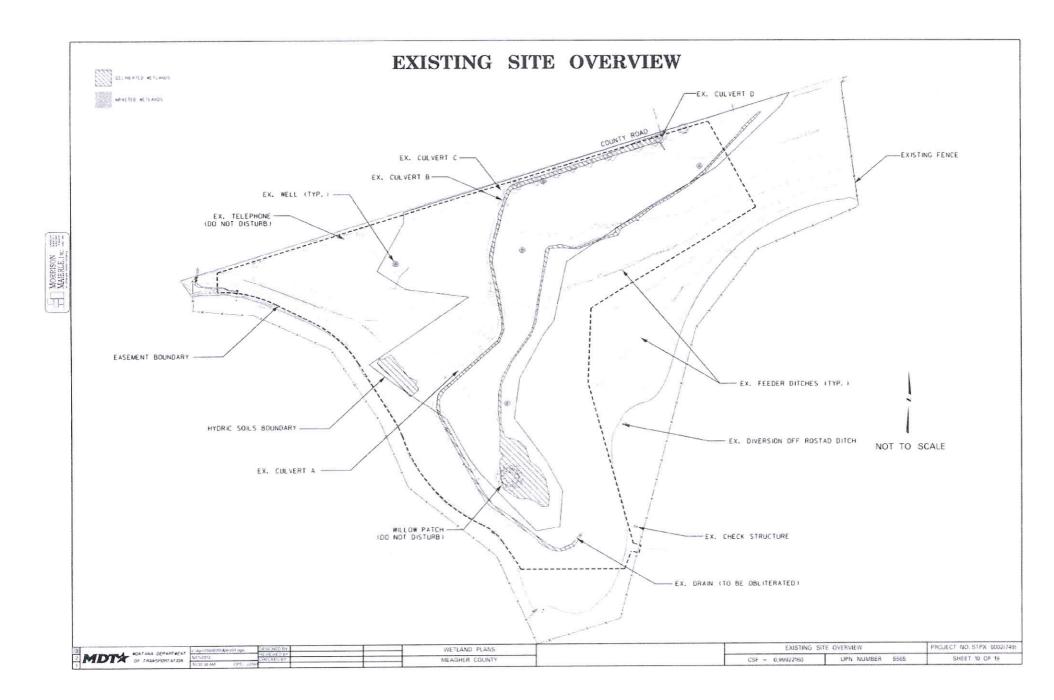
3 CHARLA OCHARLAGA CHARLAGA CH		DESIGNED BY	/		WETLAND PLANS	ROSTAD RANCH W	PROJECT NO. STPX 0002(749)	
MDTX OF THANSPORTATION	5232812 123149 AM CPS 12160	CHECKELLBY			MEAGHER COUNTY	CSF - 0.99922160	UPN NUMBER 5565	SHEET 4 OF 19



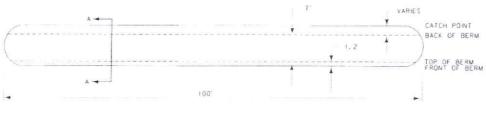




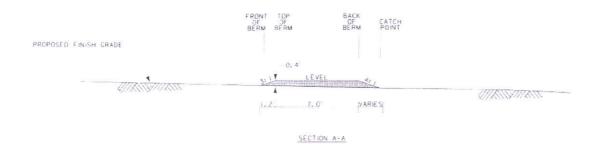




# **DETAIL**



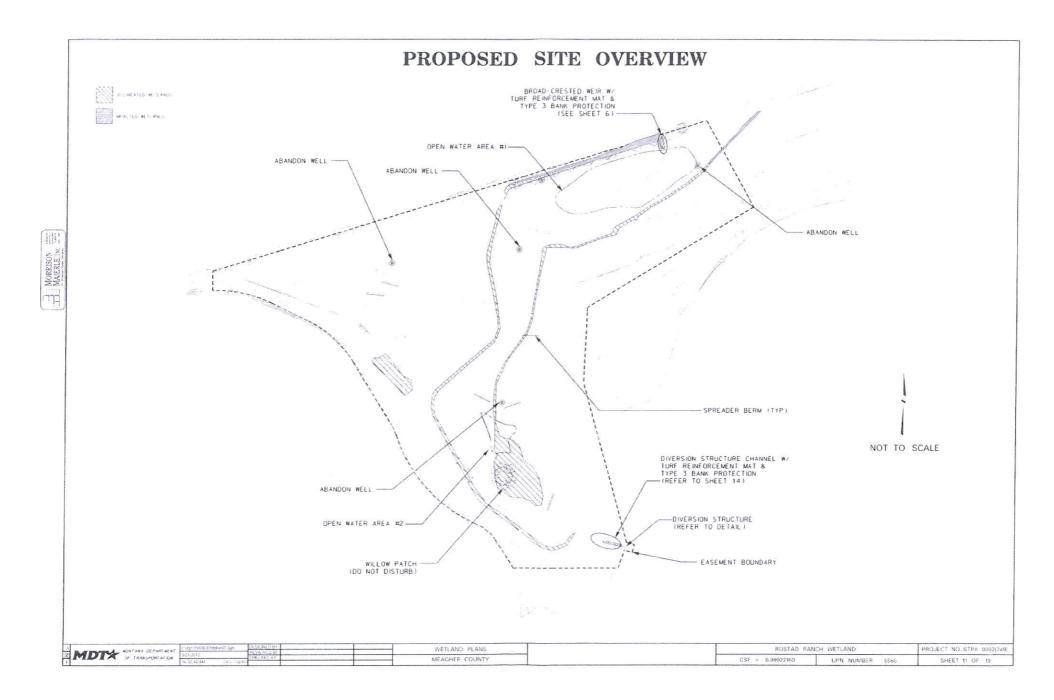
PLAN VIEW

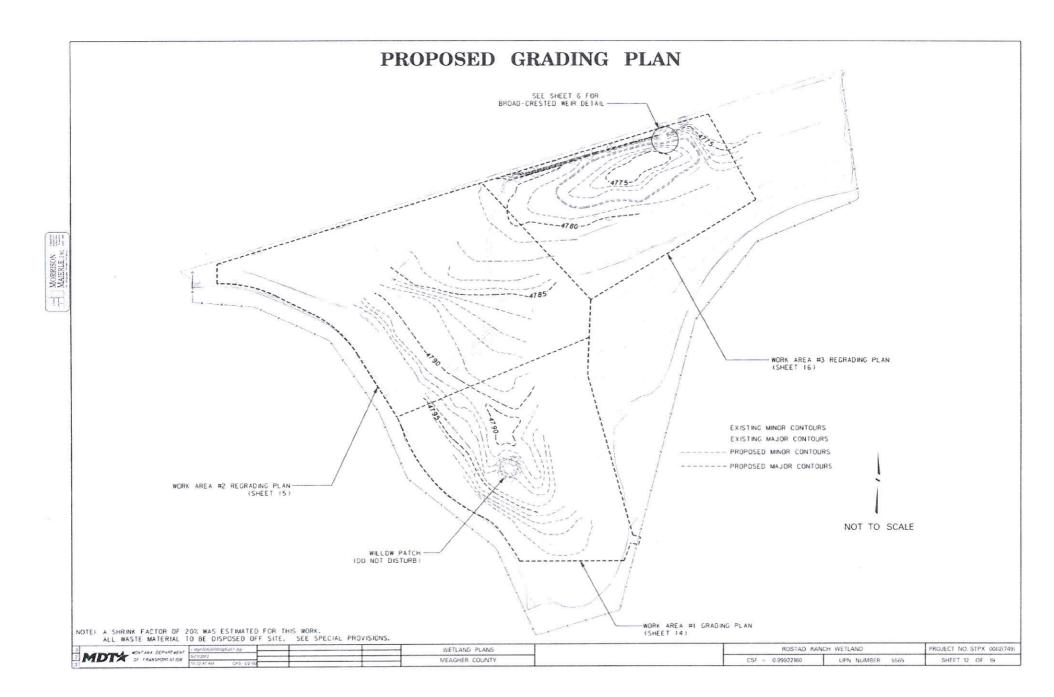


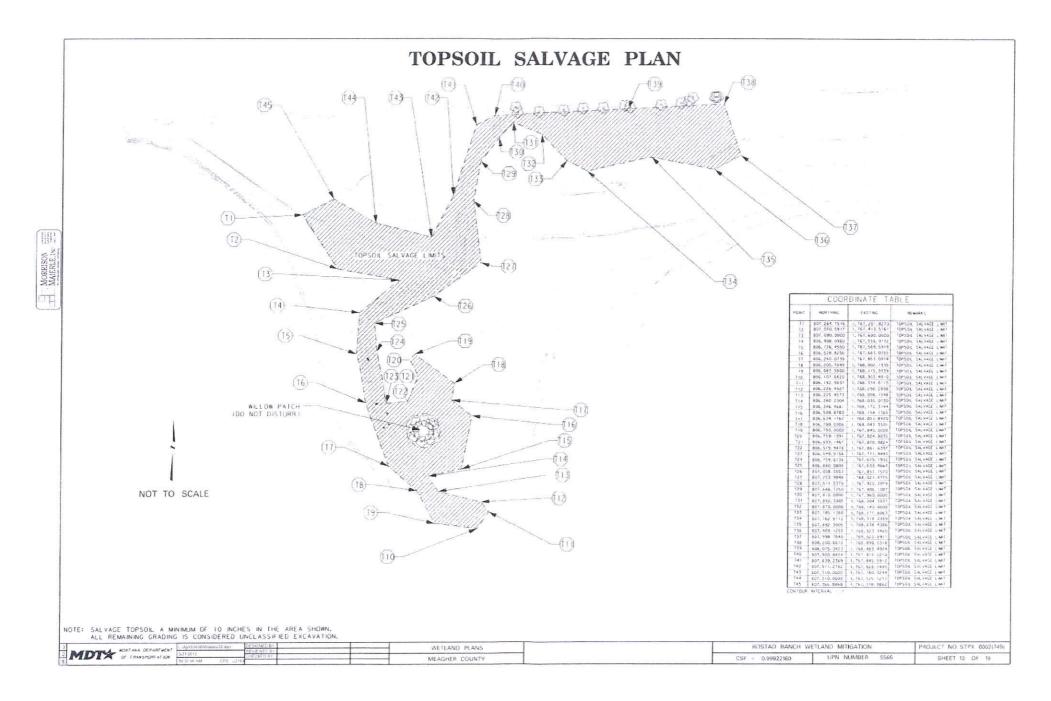
SPREADER BERM

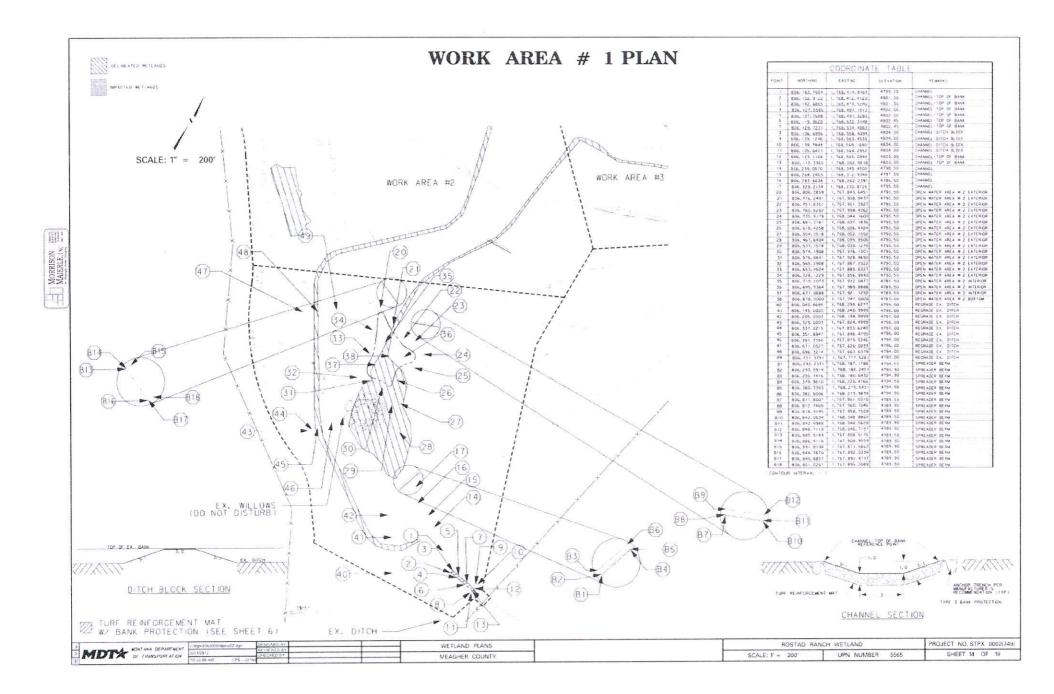
NOTE: SEE POINTS BY THROUGH 836 ON SHEETS 14 AND 15.

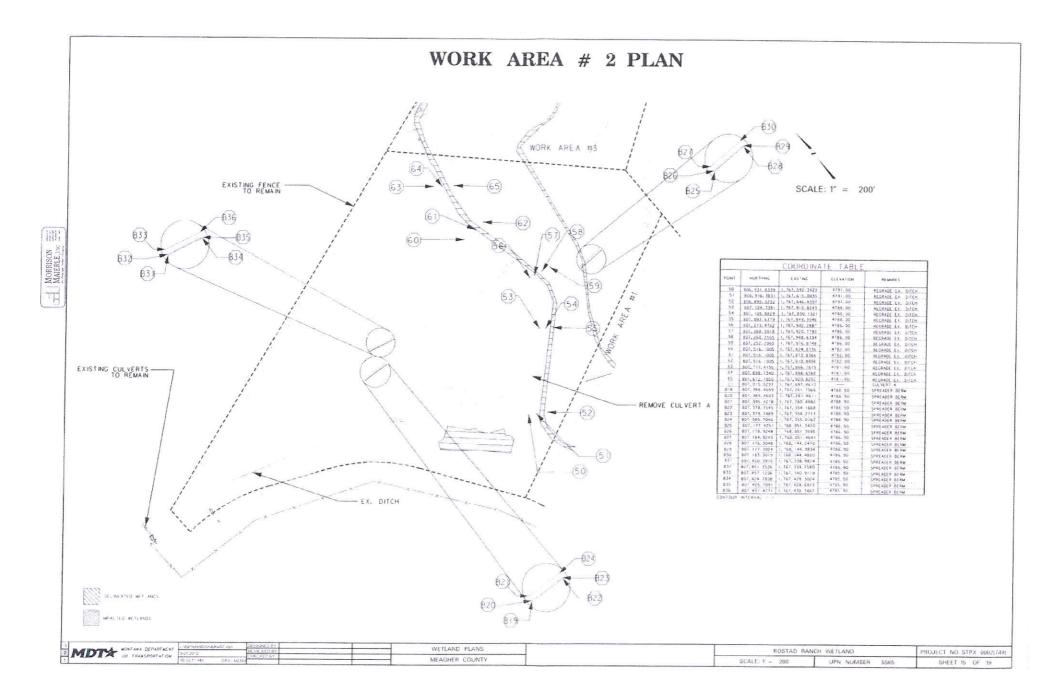
2 MDT OF TRANSPORTATION	e tuge shistocktrideess01 dgn	Mondaeco Edge DESKRED BY DESKRED BY		WETLAND PLANS	ROSTAD RANCH WETLAND MITIGATION			PROJECT NO. STPX 0002(749)	
1 AVAIDA	OF THANSPORTATION	10:37:29 AM CPS - (12:16)	CHECKED BY		MEAGHER COUNTY	CSF *	0,99922160	UPN NUMBER 5565	SHEET 9 OF 19

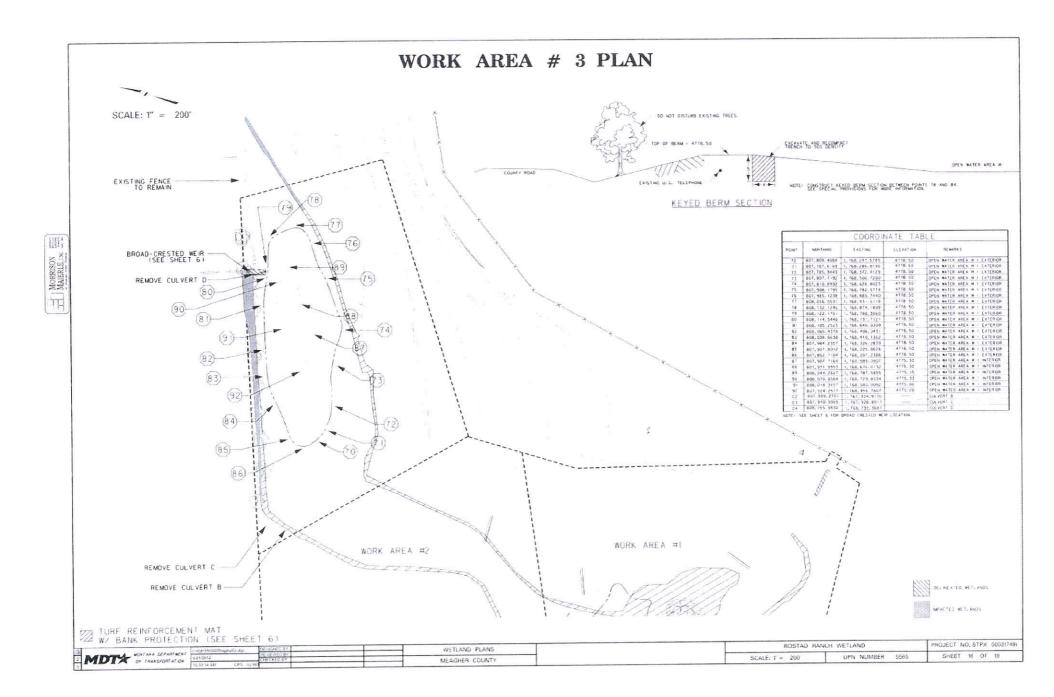


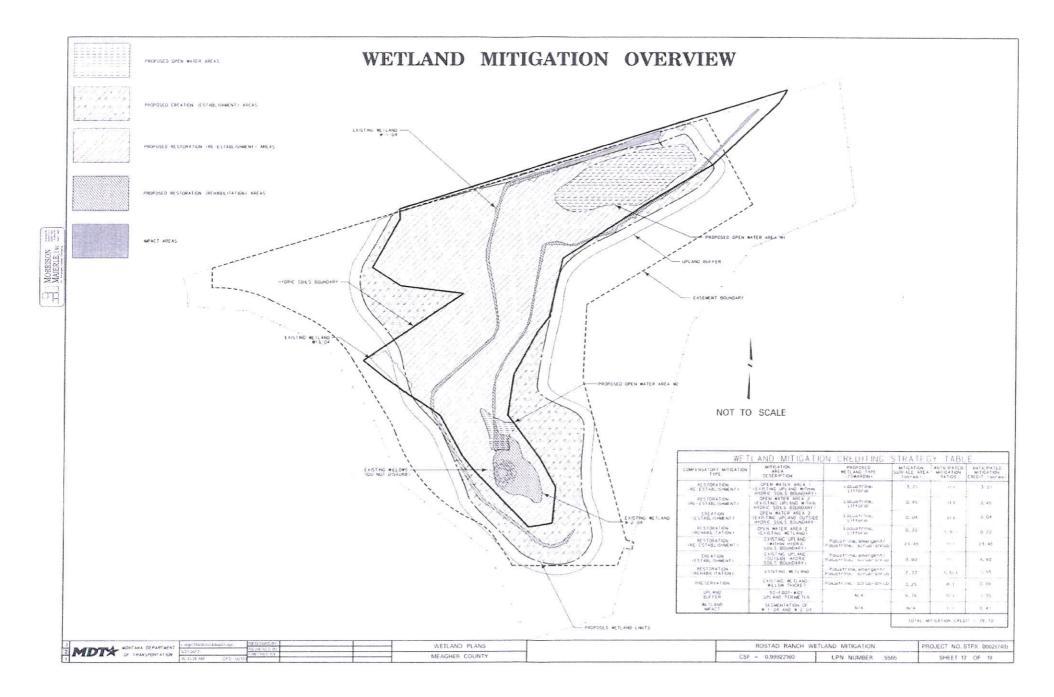


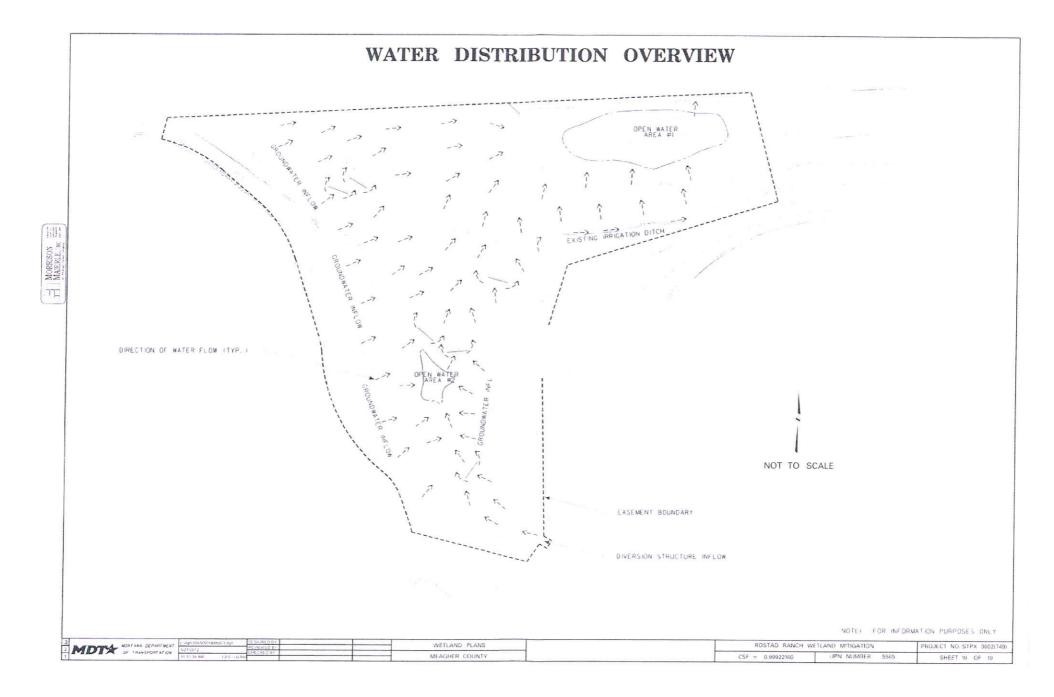






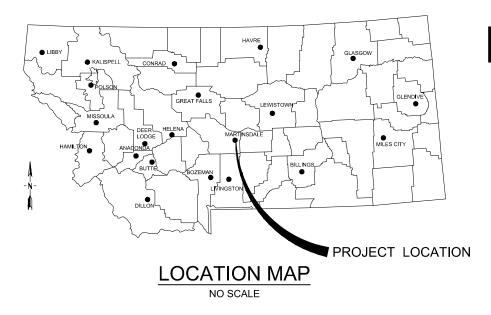






# ROSTAD RANCH WETLAND MITIGATION SITE MARTINSDALE, MONTANA

AUGUST 2016



# RECORD DRAWINGS MAY 2017

PREPARED BY:



1 Engineering Place, Helena, MT 59602 Phone: 406.442.3050 | Fax: 406.442.7862

PREPARED FOR:



2701 Prospect Ave, Helena, MT 59601



VICINITY MAP

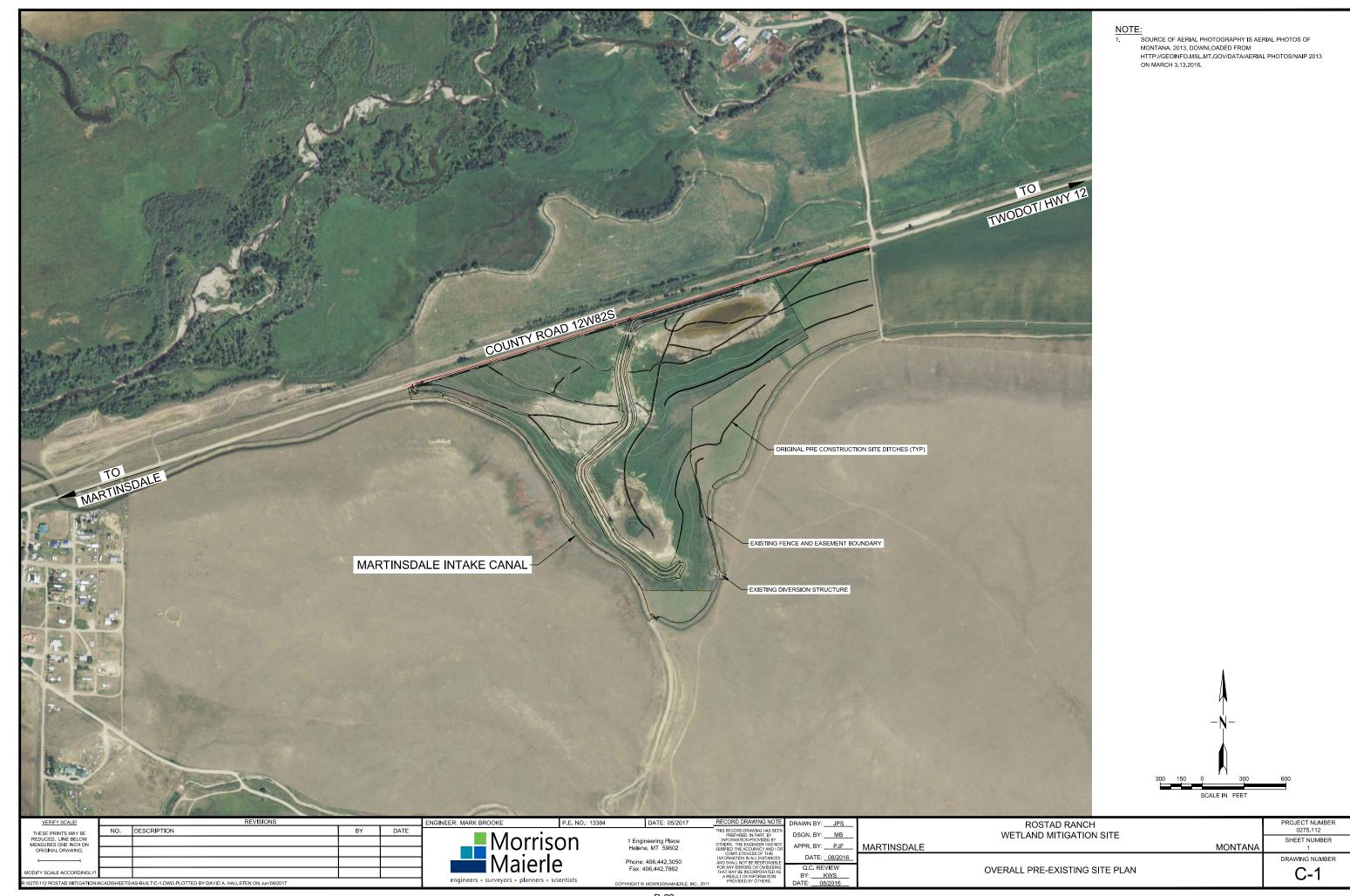
# SHEET INDEX

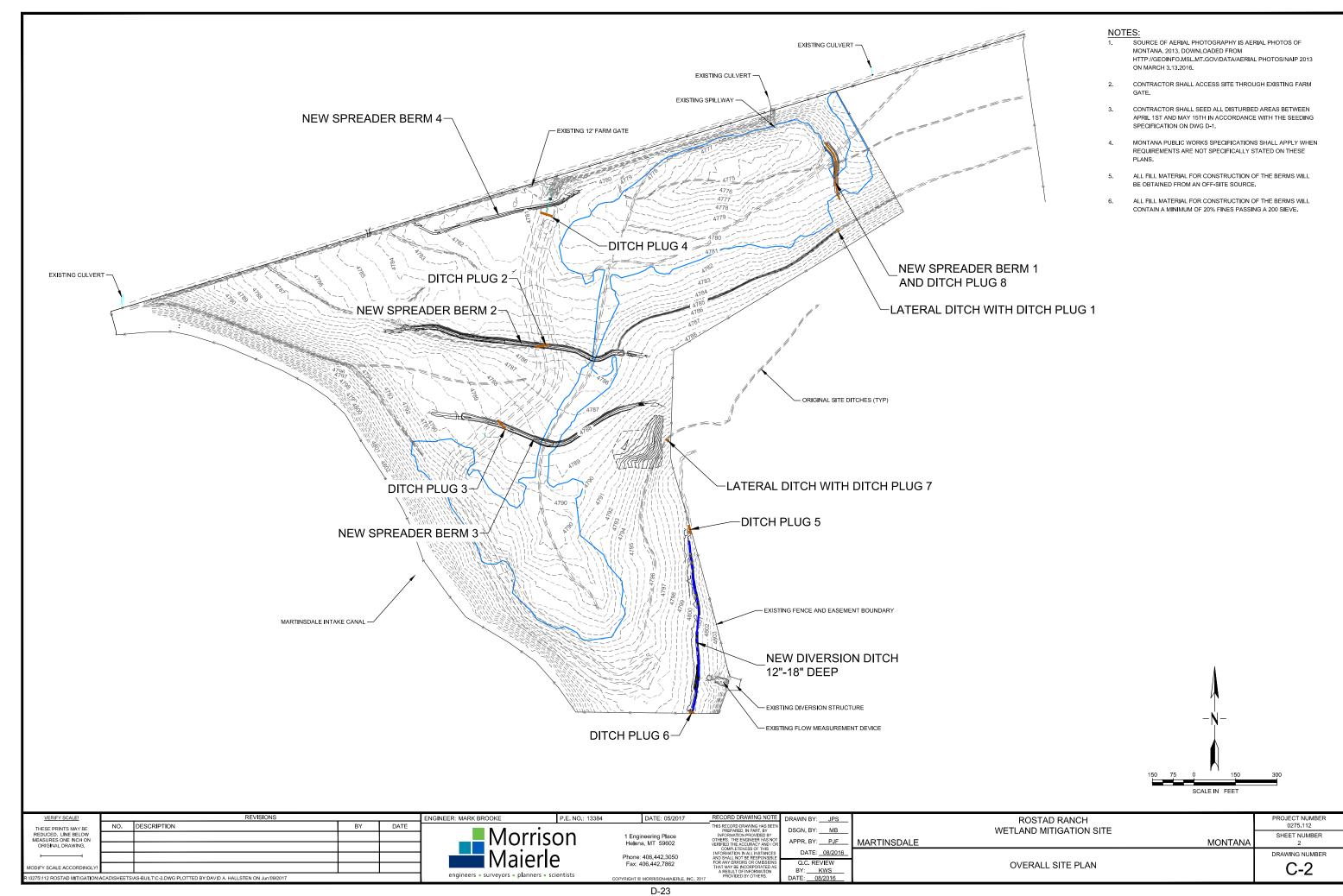
SHEET TITLE	DRAWIN	G NO.	SHEET NO.
COVER SHEET, VICINITY MAP, LOCATION MAP AND SHEET INDEX			
OVERALL PRE-EXISTING SITE PLAN	C-1		1
OVERALL SITE PLAN	C-2		2
SHEET INDEX PLAN	C-3		3
SPREADER BERM 1 PLAN AND PROFILE	C-4		4
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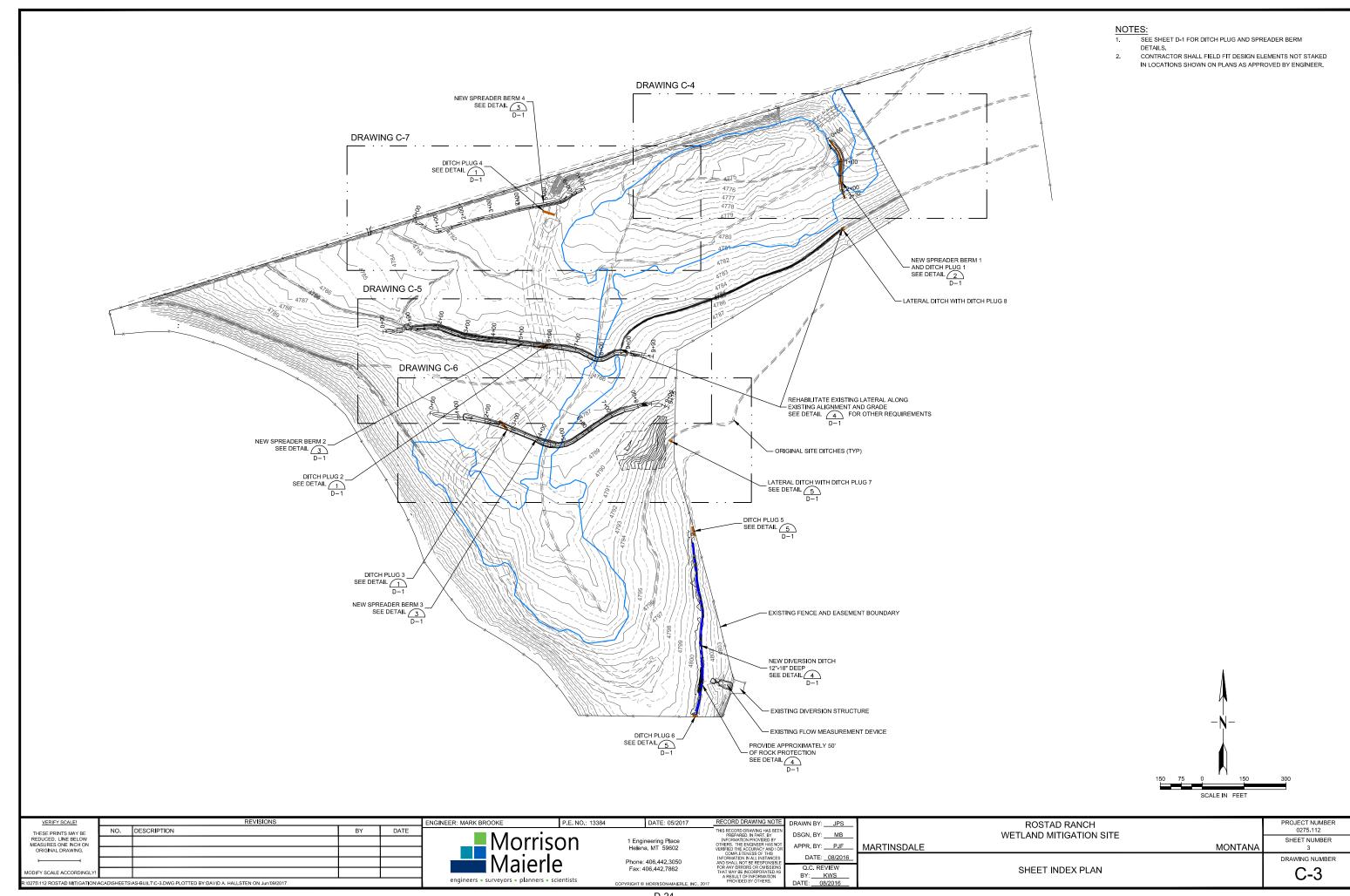
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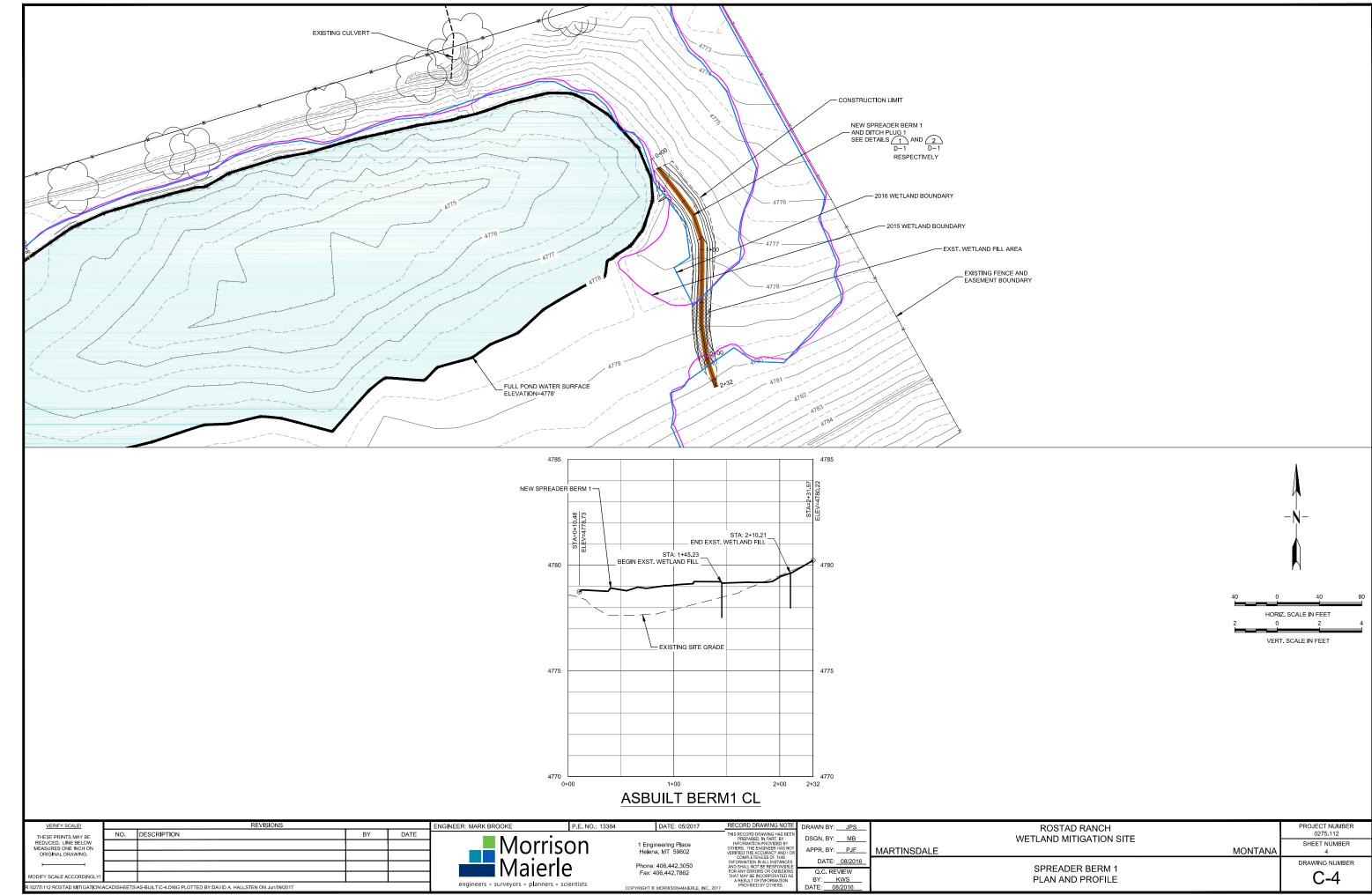
PHILLIP J. FORBES
Project Manager

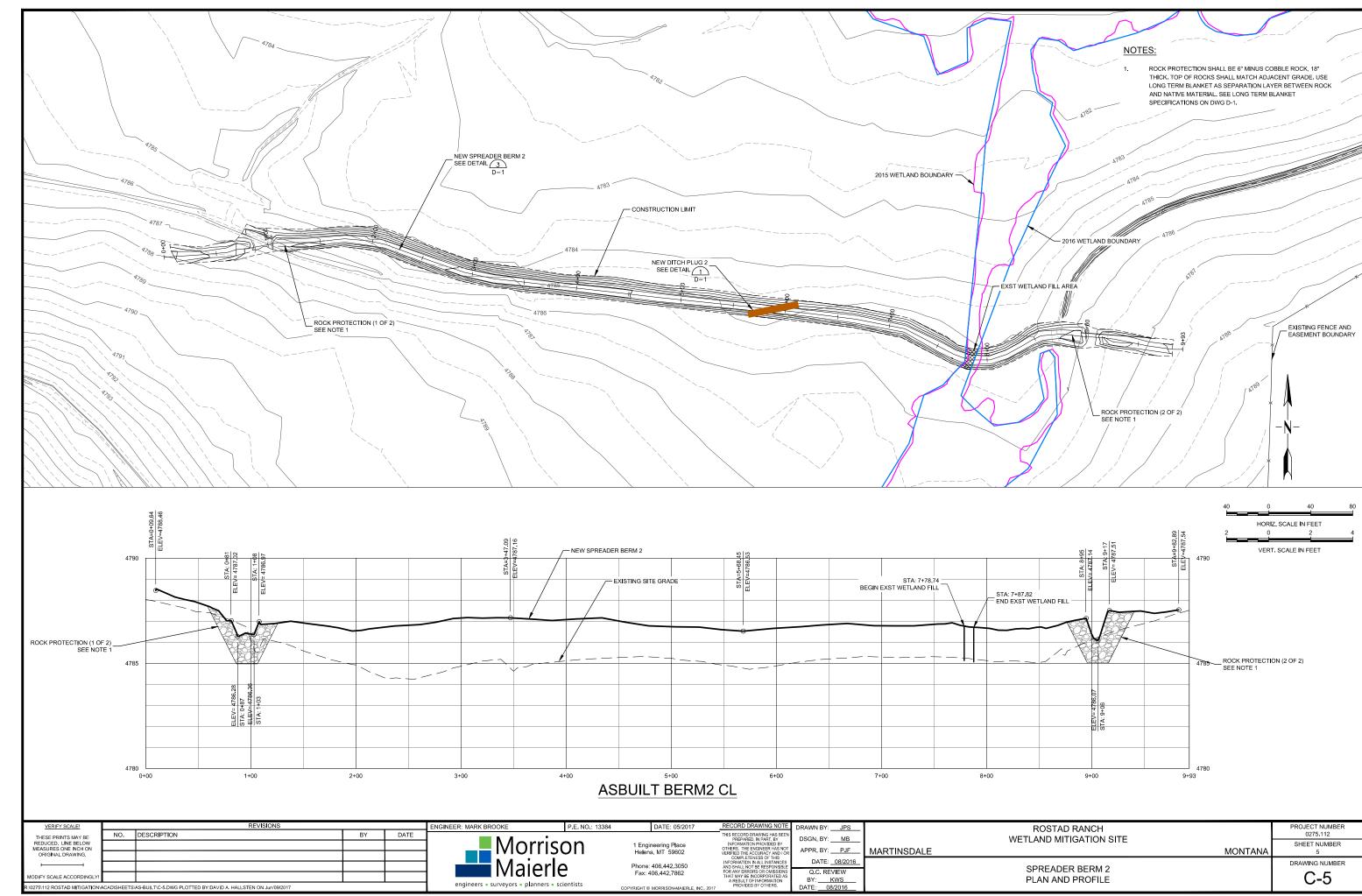
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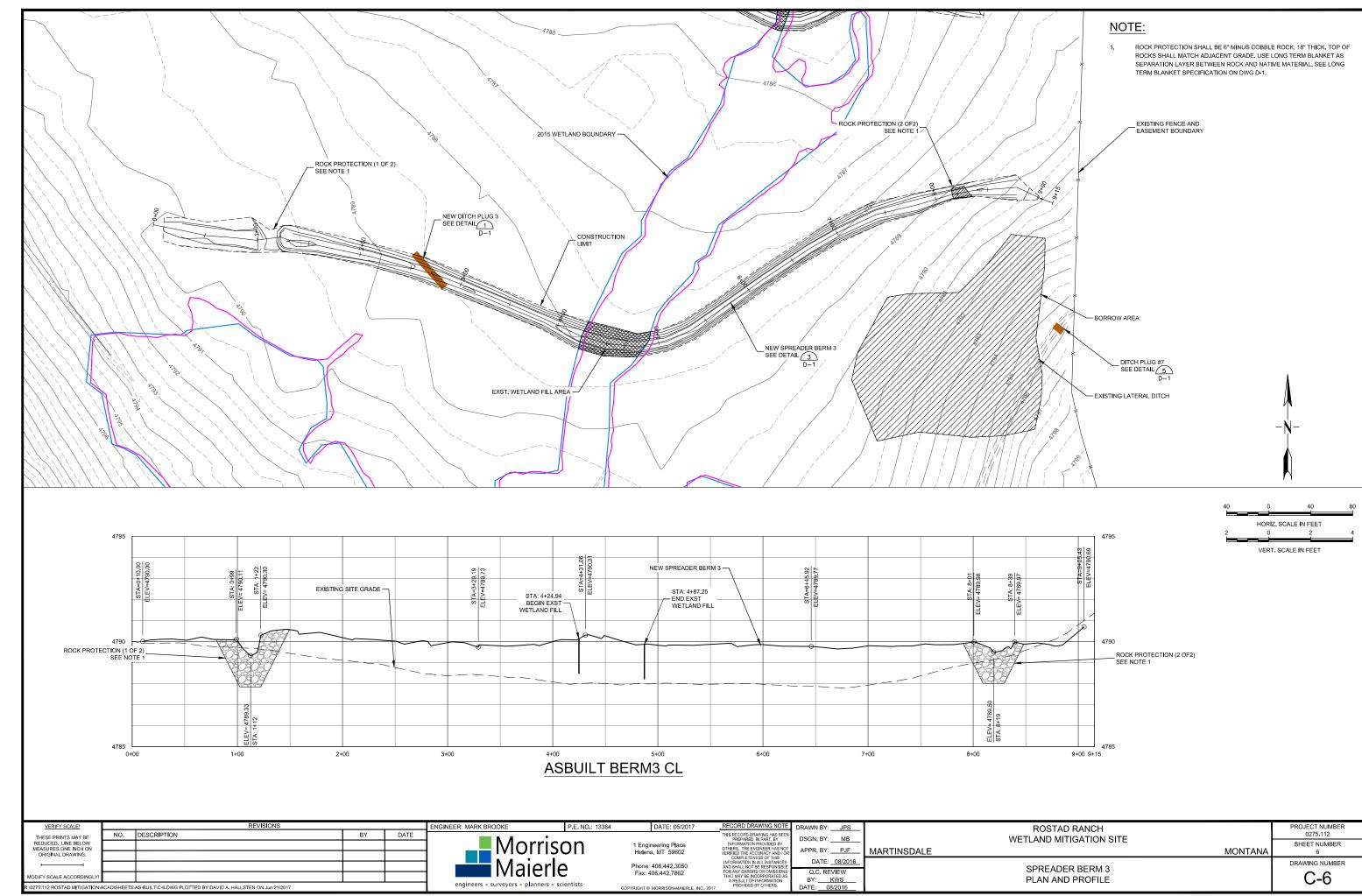


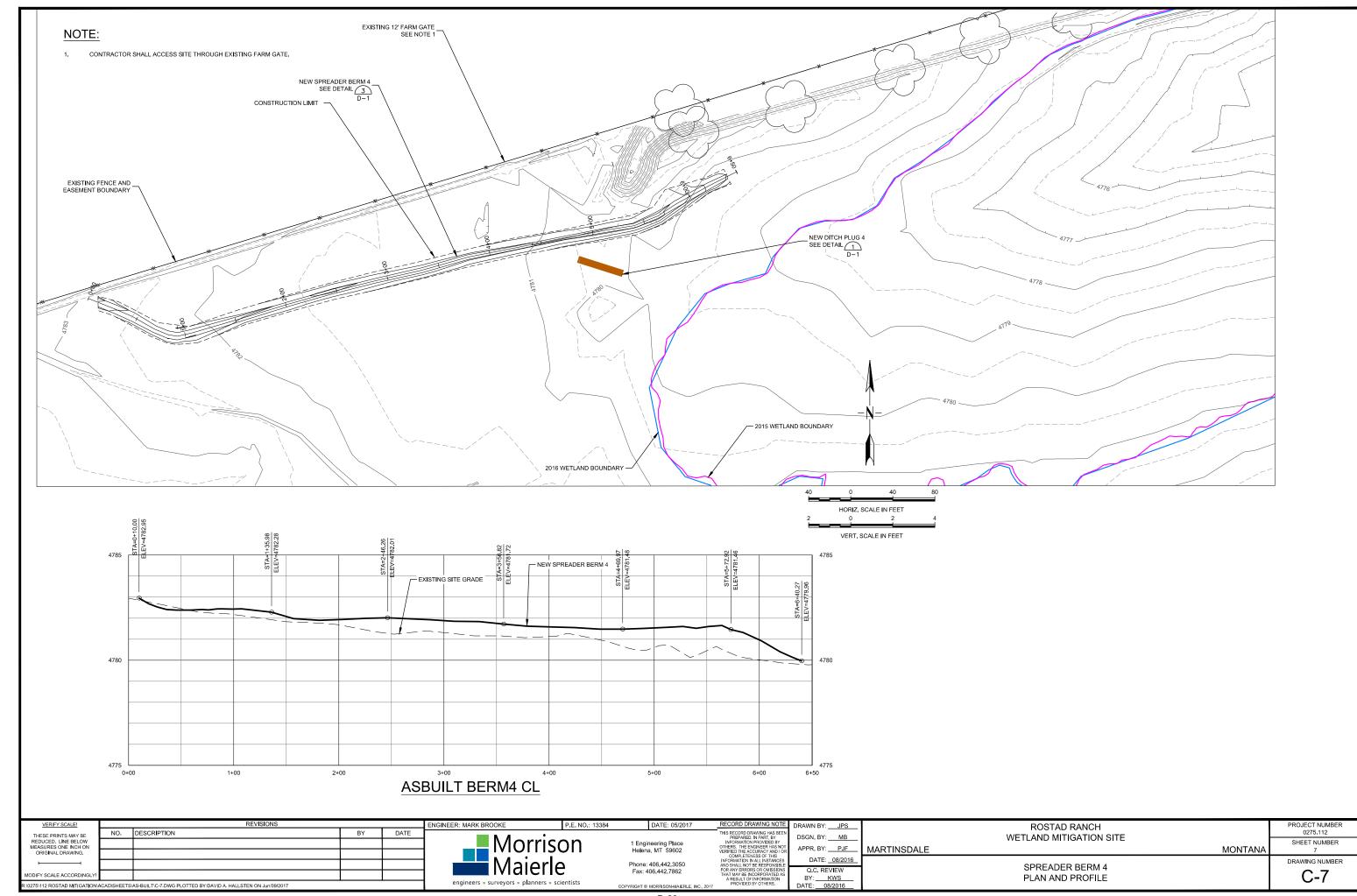


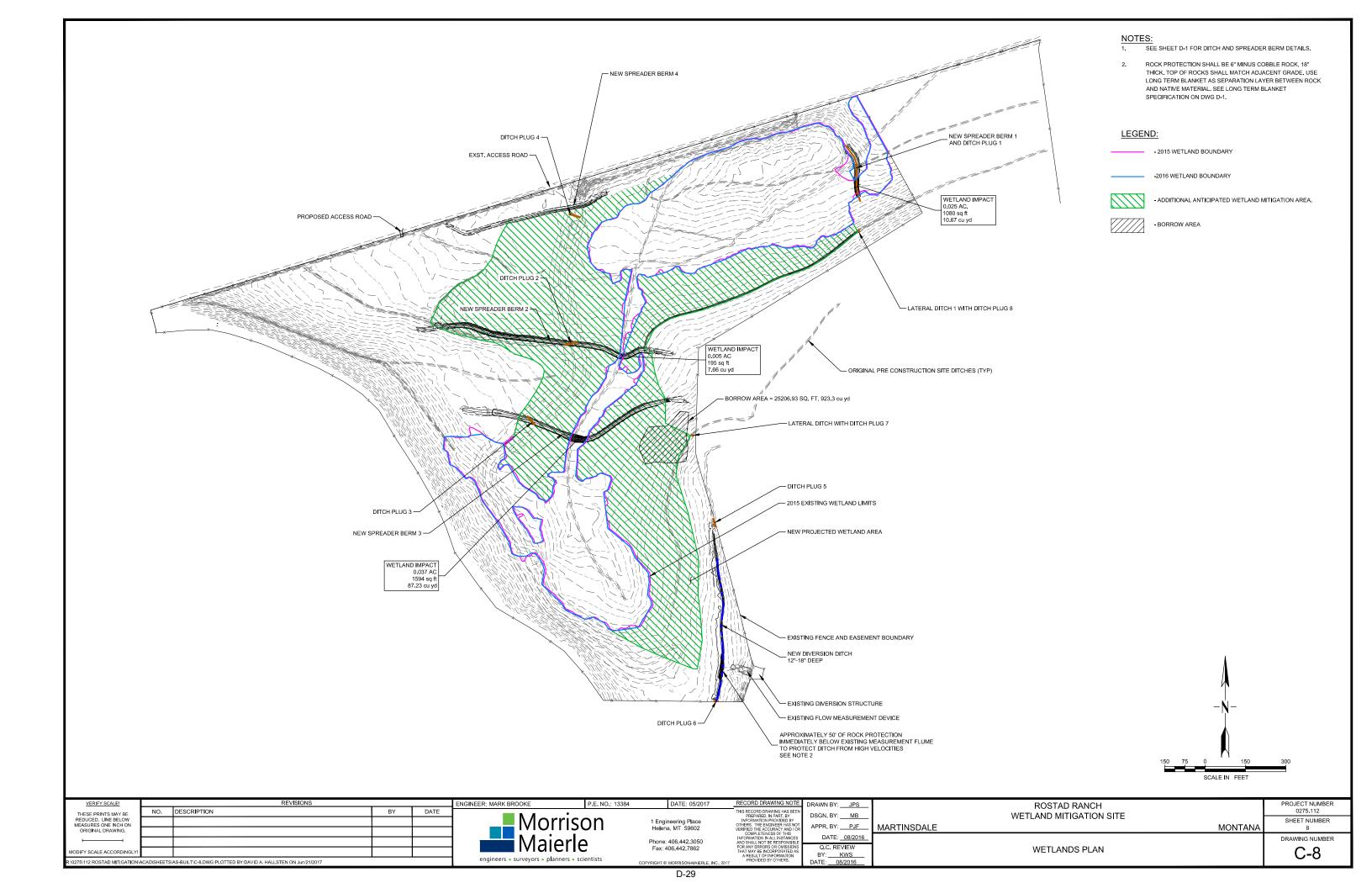


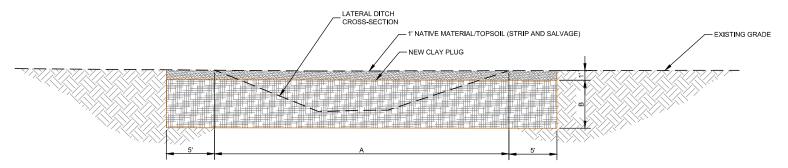






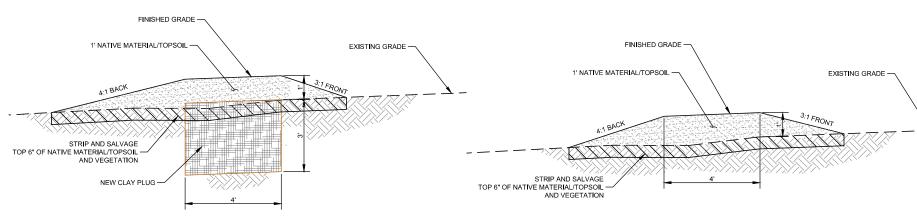






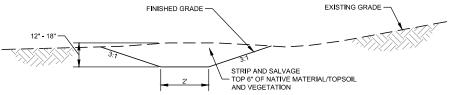
DITCH PLUG DETAIL 1

DITCH PLUG	DIMENSION A (FT)	DIMENSION B (FT)	THICKNESS (FT)
3	43	5	4
4	44	5	4
2	48	6	4



SPREADER BERM 1 AND DITCH PLUG 1 DETAIL 2

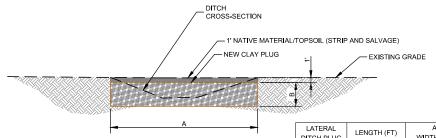
SPREADER BERM 2, 3 AND 4 DETAIL 3



#### NOTE:

- GRADE DIVERSION DITCH TO 0% AND REMOVE SPOILS PILES SO DITCH CAN INTERCEPT AND SPILL WATER EVENLY ALONG ENTIRE LENGTH.
- WATER EVENLY ALONG ENTIRE LENGTH.
  2. SEE C-3 FOR ROCK PROTECTION PLACEMENT AND NOTE 3.
- ROCK PROTECTION SHALL BE 6" MINUS COBBLE ROCK, 18" THICK, TOP OF ROCKS SHALL MATCH ADJACENT GRADE, USE LONG TERM BLANKET AS SEPARATION LAYER BETWEEN ROCK AND NATIVE MATERIAL. SEE LONG TERM BLANKET SPECIFICATION, THIS SHEET.





LATERAL DITCH PLUG	LENGTH (FT)	A WIDTH (FT)	B DEPTH (FT)
5	34	11	3
6	17	11	3
7	12	6	3
8	12	6	3

DETAIL FOR LATERAL AND DIVERSION DITCH PLUGS 5, 6, 7, 8 5

#### NOTES:

- CONTRACTOR SHALL WHEEL COMPACT BERMS TO REMOVE VOIDS AND PROVIDE EVEN DENSITY AND LEVEL BEFORE PLACING SALVAGED TOPSOIL AND VEGETATION.
- 2. SALVAGED TOPSOIL AND VEGETATION SHALL BE PLACED ON TOP OF NEW BERMS.

#### LONG TERM BLANKET:

AN EROSION CONTROL BLANKET COMPOSED OF ONE OF THE FOLLOWING MATERIALS.

- PROCESSED SLOW DEGRADING NATURAL OR POLYMER FIBERS MECHANICALLY-BOUND TOGETHER BETWEEN TWO SLOW DEGRADING SYNTHETIC OR NATURAL FIBER NETTINGS TO FORM A CONTINUOUS MATRIX,
- AN OPEN WEAVE TEXTILE COMPOSED OF PROCESSED SLOW DEGRADING NATURAL OR POLYMER YARNS OR TWINES WOVEN INTO A CONTINUOUS MATRIX.
   MEET THE REQUIREMENTS FOR TYPE III-B BLANKET IN ACCORDANCE WITH TABLE 713-5.

#### TABLE 713-5 TEMPORARY ROLLED EROSION CONTROL

PROPERTY		TYF	PΕΙΙ		TYF	E III	TYPE IV	TEST METHOD	
	Α	В	С	D	A <sup>1</sup>	В			
TYPICAL FUNCTIONAL LONGEVITY <sup>2</sup> (MONTHS)	12			2	4	36	N/A		
MINIMUM TENSILE STRENGTH <sup>3</sup> LBS/FT <sup>2</sup> (KG/M <sup>2</sup> )	5 (24.4)	50 (244.1)		75 (366.2)	25 (122.1)	100 (488.2)	125 (610.3)	ASTM D4595	
MAXIMUM "C" FACTOR <sup>4</sup>	0.10 AT 1V:5H			0.10 AT 1V:2H	0.10 AT 1V:5H	0.25 AT 1V:1.5H	0.25 AT 1V:1H	ASTM D6459	
MINIMUM PERMISSIBLE SHEAR STRESS <sup>5, 6</sup> PSF (PA)	.25 (12)	.50 (23.9)	1.5 (71.8)	1.75 (83.8)	.25 (12)	2.00 (95.8)	2.25 (107.7)	ASTM D6460	

#### NOTES:

- OBTAIN MAX "C" FACTOR AND ALLOWABLE SHEAR STRESS FOR MULCH CONTROL NETTINGS WITH THE NETTING USED IN CONJUNCTION WITH PRE-APPLIED MULCH MATERIAL.
- FUNCTIONAL LONGEVITIES ARE FOR GUIDANCE ONLY. ACTUAL FUNCTIONAL LONGEVITIES MAY VARY BASED ON SITE AND CLIMATIC CONDITIONS.
- 3. MINIMUM AVERAGE ROLL VALUES, MACHINE DIRECTION.
- "C" FACTOR CALCULATED AS RATIO OF SOIL LOSS FROM ROLLED EROSION CONTROL PRODUCT PROTECTED SLOPE (TESTED AT SPECIFIED OR GREATER GRADIENT, V:H) TO RATIO OF SOIL LOSS FROM UNPROTECTED (CONTROL) PLOT IN LARGE-SCALE TESTING. THESE PERFORMANCE TEST VALUES SHOULD BE SUPPORTED BY PERIODIC BENCH SCALE TESTING UNDER SIMILAR TEST CONDITIONS AND FAILURE CRITERIA USING FROSION CONTROL TECHNOLOGY COLINCII (FCTC) TEST METHOD #2
- MINIMUM SHEAR STRESS THE ROLLED EROSION CONTROL PRODUCT (UN-VEGETATED) CAN SUSTAIN WITHOUT PHYSICAL DAMAGE OR EXCESS EROSION (>1/2-INCH (13MM) SOIL LOSS) DURING A 30-MINUTE FLOW EVENT IN LARGE-SCALE TESTING. THESE PERFORMANCE TEST VALUES SHOULD BE SUPPORTED BY PERIODIC BENCH SCALE TESTING UNDER SIMILAR TEST CONDITIONS AND FAILURE CRITERIA USING ECTC TEST METHOD #3
- 6. THE PERMISSIBLE SHEAR STRESS LEVELS ESTABLISHED FOR EACH PERFORMANCE CATEGORY ARE BASED ON HISTORICAL EXPERIENCE WITH PRODUCTS CHARACTERIZED BY MANNING'S ROUGHNESS COEFFICIENTS IN THE RANGE OF 0.01 TO 0.05.

#### SEEDING SPECIFICATION:

SEED MIX	SPECIES-COMMON NAME	SPECIES-SCIENTIFIC NAME	SEEDING RATE (LBS. OF PLS/ACRE)		
	'NORTRAN' TUFTED HAIRGRASS	DESCHAMPSIA CESPITOSA	2.0		
	BLUEJOINT REEDGRASS	CALAMAGROSTIS CANADENSIS	1.0		
WET AND OFFE	BALTIC RUSH	JUNCUS BALTICUS	0.1		
WETLAND SEED RESTORATION MIXTURE	'PRIOR' SLENDER WHEATGRASS	ELYMUS TRACHYCAULUS	2.0		
	'ROSANA' WESTERN WHEATGRASS	PASCOPRYUM SMITHII	5.0		
	'NUTTAL' ALKALIGRASS	PUCCINELLIA NUTTALLIANA	2.0		
	'SHOSHONE' CREEPING WILD RYE	LEYMUS TRITICOIDES	4.0		

SEED APPLICATION RATE BY DRILL SEEDING.
(RATES DOUBLE FOR BROADCAST SEEDING).

BERM, DITCH AND PLUG DETAILS

VERIFY SCALE!		REVISIONS								
THESE PRINTS MAY BE	NO.	DESCRIPTION	BY	DATE	r					
REDUCED, LINE BELOW MEASURES ONE INCH ON					1					
ORIGINAL DRAWING.					1					
					1					
MODIFY SCALE ACCORDINGLY!					]					
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SIBLE

O.C. REVIEW

ROSTAD RANCH WETLAND MITIGATION MARTINSDALE

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