MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2013

Rostad Ranch
Meagher County, Montana



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December 2013

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MDT Project Number STPX-0002(749)
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Cover: View of the inundated man-made impoundment at the Rostad Ranch wetland mitigation site.

1. INTRODUCTION

The Rostad Ranch Wetland Mitigation 2013 Monitoring Report presents the results of the first year of post-construction monitoring at the Rostad Ranch wetland mitigation site. The Montana Department of Transportation (MDT) Rostad Ranch wetland mitigation project is located in the southwest quarter of Section 12, Township 8 North, Range 11 East, Meagher County, Montana. The property is located approximately 0.6 miles northeast of Martinsdale, Montana (Figure 1). The wetland site was constructed to provide MDT with an estimated 39.70 acres of wetland mitigation credits on a private ranch that has been historically utilized for grazing cattle and hay production.

Long-term protection of the wetland mitigation site is provided by a MDT Wetland Conservation Easement with the land owner and encompasses the entire 60-acre mitigation monitoring area. The site is demarcated by a newly installed fence along the boundaries of the MDT Conservation Easement.

Figures 2 and 3 in Appendix A show the site Monitoring Activity Locations and Mapped Site Features, respectively. The 2008 MDT Mitigation Site Monitoring Form, US Army Corps of Engineers (USACE) Wetland Determination Data Forms Great Plains Region (USACE 2010), and the 2008 MDT Montana Wetland Assessment Forms are included in Appendix B. Project area photographs are included in Appendix C and the Project Plan Sheet is included in Appendix D.

The wetland mitigation 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 Ranch site was selected based on site evaluations and project feasibility assessments initiated by MDT in 2002.

The project objectives include:

- Provide 39.70 acres of wetland mitigation credits resulting 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.) Lacustrine, littoral – emergent zones around the open water areas around the perimeter of wetlands.

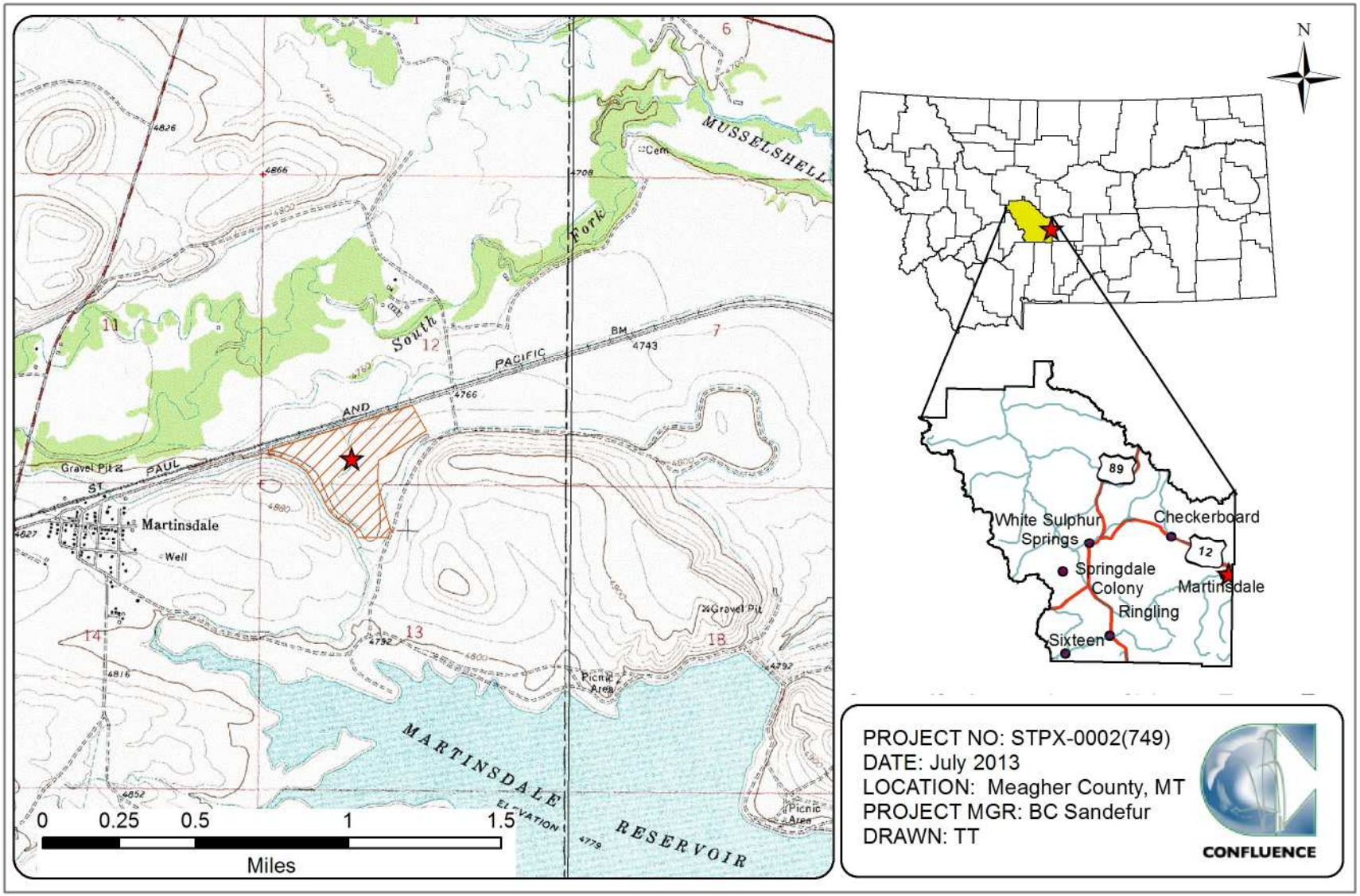


Figure 1. Project location of Rostad Ranch wetland mitigation site.

The project credit ratios as presented in the Rostad Ranch Wetland Mitigation Plan approved by the USACE are shown in Table 1.

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

Compensatory Mitigation Type	Proposed Wetland Type (Cowardin)	Anticipated Mitigation Area (acres)	Approved Mitigation Ratios*	Anticipated Mitigation Credit (acres)
Restoration (Re-establishment)	Palustrine Emergent & Scrub/shrub Lacustrine, Littoral	27.11	1:1	27.11
Creation (Establishment)	Palustrine Emergent & Scrub/shrub Lacustrine, Littoral	9.84	1:1	9.84
Restoration (Rehabilitation)	Palustrine Emergent & Lacustrine, Littoral	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 Acre**	**39.70**

*Mitigation credit ratios utilized were from the Montana Corps Regulatory Programs 2005 Wetland Credit Ratios (USACE 2005)

The USACE approved performance standards are listed below.

1. **Wetland Characteristics**: All restored, created, enhanced, and preserved wetlands within the project limits will meet the standard three criteria (hydrology, hydrophytic vegetation, and hydric soils) established for determining wetland areas as outlined in the *1987 Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987) and the *2010 Regional Supplement to the USACE of Engineers Manual: Great Plains Region* (USACE 2010).

    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 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. Since 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 Montana State-listed noxious weeds do not exceed 5 percent absolute cover. The following concept of "dominance", as defined in the new Regional supplement to the 1987 US Army Corps of Engineers Wetland Delineation Manual for the Great Plains Region, 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. We anticipate natural colonization of woody plant species from nearby sources after construction activities are complete. The rate and extent of natural woody plant colonization will be dependant 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 hairgrass (*Deschampsia cespitosa*), Northwest Territory sedge (*Carex utriculata*), Arctic rush (*Juncus arcticus*), American sloughgrass (*Beckmannia syzigachne*), American mannagrass (*Glyceria grandis*), and bluejoint reedgrass (*Calamagrostis canadensis*).

2. **Open Water Areas –** It is the intent of the project 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 (39.70 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, degree of infestation within the site, and control measures based on the monitoring results will be implemented by MDT to minimize and/or eliminate 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 wetland mitigation site.

Construction entailed filling of existing ditches, excavation and grading the site to distribute water across the mitigation site, and creation of open water areas. The primary source of wetland hydrology for the site is groundwater. A groundwater seep located in the southern portion of the site contributes water to the site during high groundwater periods. Also, the site is supplemented by surface water from an irrigation ditch that runs along the south boundary of the site. A diversion structure was installed at the south end of the project to direct surface water onto the site as a supplement to the groundwater.

Revegetation tasks included a combination of wetland seed mixes, planting native shrubs/trees, and planting willow cuttings from a variety of native species. Mitigation habitat types 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.

Monitoring of the MDT wetland mitigation site will be completed according to MDT's Standard Monitoring Protocol utilized for all 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. METHODS

The first year of monitoring at the Rostad Ranch wetland mitigation site was completed on August 21, 2013. During this visit, MDT and Confluence personnel established permanent photo points and vegetation transects within the site. Information for the Mitigation Monitoring Form and Wetland Determination Data Form was entered electronically in the field on a palmtop computer during the field investigation (Appendix B). Monitoring activity sites were located with a global positioning system (GPS) as shown on Figure 2 (Appendix A). Information collected included a wetland delineation, vegetation community mapping, vegetation transect monitoring, soil and hydrology data collection, bird and wildlife use documentation, photographic documentation, and a non-engineering 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 during the site visit. The data were recorded on the electronic Wetland Determination Data Form (Appendix B). Hydrologic assessments allow evaluation of mitigation criteria addressing inundation/saturation requirements.

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 wetlands. The growing season is defined for purposes of this report as the number of days when there is a 50 percent probability that the minimum daily temperature is greater than or equal to 28.5 degrees Fahrenheit (Environmental Laboratory 1987). Temperature data recorded for the meteorological station at Martinsdale 3NNW, Montana (245387) weather station located approximately 1 mile from the wetland mitigation site has a median (5 years in 10) growing season length of 119 days. Areas 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 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 Form (Appendix B).

2.2. Vegetation

The boundaries of the dominant vegetation communities were determined in the field during the active growing season and subsequently delineated on the 2013 aerial photograph. Percent cover of dominant species within a community type was visually estimated and recorded using the following classes: 0 (less than 1 percent), 1 (1 to 5 percent), 2 (6 to10 percent), 3 (11 to 20 percent), 4 (21 to 50

percent), and 5 (greater than 50 percent) (Appendix B). Community types were named based on the dominant vegetation species that characterized each mapped polygon (Figure 3, Appendix A).

Temporal changes in vegetation will be evaluated through annual assessments of static belt transects established in August, 2013 (Figure 2, Appendix A). Vegetation composition was assessed and recorded along three vegetation belt transects (T-1, T-2, T-3) approximately 10 feet wide and 422, 453, and 320 feet long, respectively (Figure 2, Appendix A).

The transect locations were recorded with a resource-grade GPS unit. 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 used for the vegetation community composition (Figure 3, Appendix B). Photographs were taken at the endpoints of each transect during the monitoring event (Appendix C).

The survival of woody species planted onsite was recorded during monitoring. Survival rates will be evaluated annually. The Montana State Noxious Weed List (September 2010), prepared by the Montana Department of Agriculture, 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 (Figure 3, Appendix A). The noxious weed species identified are color-coded and the locations are denoted with the symbol "**x**", "▲", or "■" representing 0 to 0.1 acre, .1 to 1 acre, or greater than 1 acre in extent, respectively. Cover classes are represented by T, L, M, or H, for less than 1 percent, 1 to 5 percent, 6 to 25 percent, and 26 to 100 percent, respectively.

2.3. Soil

Soil information was obtained from the *Soil Survey for Meagher County Area* (SSURGO 2012) and *in situ* soil descriptions. Soil cores were excavated using a hand auger and evaluated according to procedures outlined in the 1987 Manual and the 2010 Regional Supplement. 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 U.S. including special aquatic sites and jurisdictional wetlands were delineated throughout the project area in accordance with criteria established in the 1987 Manual and the 2010 Regional Supplement. The technical criteria for hydrophytic vegetation, hydric soil, and wetland hydrology described in the 2010 Regional Supplement must be satisfied to delineate a representative area as jurisdictional. The name and indicator status of plant species was derived from the Draft 2012 National Wetland Plant List (NWPL) (Lichvar and Kartesz. 2009). 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 electronically on the Wetland Determination Data Form (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 GPS surveyed and is shown on the 2013 aerial photograph (Figure 3). Wetland areas were estimated using geographic information system (GIS) methods.

2.5. Wildlife

Observations of mammal, reptile, amphibian, and bird use were recorded on the Mitigation Monitoring form during the site visit. Indirect use indicators including tracks, scat, burrow, 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 species list of wildlife observed during the annual monitoring periods has been compiled and is presented in the results section.

2.6. Functional Assessment

The 1999 MDT Montana Wetland Assessment Method (Berglund 1999) was used to evaluate the functions and values of the 1.2 acres of existing wetlands identified on the site in 2004. The 2008 MDT Montana Wetland Assessment Method (Berglund and McEldowney 2008) was used to evaluate functions and values of wetland delineated on the site in 2013. This method provides an objective means of assigning wetlands an overall rating and provides regulators 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. The Wetland Assessment Form was completed for one assessment area (AA) that included both created and existing wetlands within the mitigation site (Appendix B).

2.7. Photo Documentation

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

2.8. GPS Data

Site features and survey points were collected with a resource grade Thales Pro Mark III GPS unit during the 2013 monitoring season. Points were collected using WAAS-enabled differential correction satellites, typically improving resolution to sub-meter accuracy. The collected data were then transferred to a personal computer, imported into GIS, and presented in Montana State Plane Single Zone NAD 83 meters. Site features and survey points that were located with GPS included wetland boundaries, fence boundaries, photograph points, transect endpoints, and wetland/upland data points.

2.9. Maintenance Needs

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

3. 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 13.24 inches from January 1893 to July 2012 (Western Region Climate Center [WRCC] 2013). This station was missing precipitation data for the latter part of 2011 and for 2012, with recorded precipitation for both 2011 and 2012 an underestimation of the actual precipitation at this station. The historic precipitation average from January to August (1893 through 2012) was 10.55 inches. The Martinsdale 10NW station is near the site with a period of record beginning May 2012. Based on data recorded at both stations for the January through August time period, precipitation totals for the region of this mitigation site received 13.49 inches in 2011, 5.87 inches in 2012, and 9.59 inches in 2013. The data since construction show below average precipitation in 2012 and near average precipitation in 2013.

The hydrology for the wetland mitigation site is supplied from multiple sources, including a shallow seasonal groundwater table, groundwater emerging from a natural spring located near the willow (*salix sp*.) stand in southern portion of the site, direct precipitation, and surface runoff. Construction included excavation and grading to fill drainage ditches, distribute water across the mitigation site, create open water areas, and also the installation of a diversion structure in the southern end of the site to direct irrigation water to the mitigation site. To supplement the groundwater, MDT has secured water rights to utilize surface water as a secondary source of hydrology and ensure long-term viability of the wetland mitigation site.

During the 2013 field survey, approximately 40 percent of the wetland area was inundated. Water depths in the lacustrine, littoral areas ranged from 0.25 to 3.5 feet and averaged 0.5 feet. Areas not inundated exhibited seasonal soil saturation within 12 inches of the ground surface. One groundwater monitoring well (MW-1) located along the constructed dike (Figure 2, Appendix A) was dry at

the time of survey. Other evidence of wetland hydrology observed on the site in 2013 included drainage patterns, soil saturation, water marks, drift deposits, algal mat, and geomorphic position.

Four data points were sampled to determine the wetland/upland boundaries. Data points Ro-1w and Ro-2w were located in areas that met the wetland criteria. Wetland hydrology indicators at Ro-1w, located near the edge of a created wetland cell, included saturation at 12 inches below the ground surface and drainage patterns. Data point Ro-2w was located near the southern end of the site in an area recently excavated to lower the ground surface elevation. One primary wetland hydrology indicator (iron deposits), and two secondary indicators (surface soil cracks and FAC-neutral test) provided positive signs of wetland hydrology at this data point. There were no hydrological indicators observed at data points Ro-1u or Ro-2u.

3.2. Vegetation

Monitoring year 2013 marked the first year of monitoring on the Rostad Ranch wetland mitigation site. A total of fifty-six plant species were observed on the site in 2013 (Table 2). Vegetation plant communities were identified by plant composition and dominance. Four community types were identified in 2013 and included upland Type 1 – *Phleum pratense/Trifolium* spp., wetland Type 2 – *Juncus arcticus/Carex nebrascensis*, wetland Type 3 – *Salix exigua*, and wetland Type 4 – Open water. The community composition is provided on the Monitoring Form in Appendix B and the community boundaries are shown on Figure 3 in Appendix A. These community types are discussed below.

Upland community Type 1 – *Phleum pratense/Trifolium* spp. was identified across the majority of the site on approximately 46.26 acres. This community generally represented the undisturbed uplands historically used for hay and cattle production and areas where spoils from excavation activities were deposited. Dominant species included common timothy (*Phleum pratense*) and white clover (*Trifolium repens*), with other common species including red clover (*Trifolium pratense*), Kentucky bluegrass (*Poa pratensis*), creeping wild rye (*Elymus repens*), smooth brome (*Bromus inermis*), and alfalfa (*Medicago sativa*). A total of thirty-five species were identified in this community.

Wetland community Type 2 – *Juncus arcticus/Carex nebrascensis* represented the majority of the total wetland area delineated in 2013. This community was mapped across 10.59 acres within creation, re-establishment, and rehabilitation areas of the mitigation site. Arctic rush (*Juncus arcticus*), Nebraska sedge (*Carex nebrascensis*) and American Slough grass (*Beckmannia syzigachne*) were common components of this community. Community Type 2 included a diverse mix of wetland species, including Great Basin calico-flower (*Downingia laeta*), a species identified by the Montana Natural Heritage Program (MTNHP) as a species rated S2S3, rare in Montana.

Table 2. Vegetation species observed in 2013 at the Rostad Ranch Wetland Mitigation Site.

Scientific Names	Common Names	GP Indicator Status[1]
Achillea millefolium	Common Yarrow	FACU
Agrostis gigantea	Black Bent	FACW
Algae, green	Algae, green	NL
Alopecurus pratensis	Field Meadow-Foxtail	FACW
Amaranthus retroflexus	Red-Root	FACU
Ambrosia acanthicarpa	Flatspine Burr Ragweed	UPL
Aster sp.	Aster	NL
Bassia scoparia	Mexican-Fireweed	FACU
Beckmannia syzigachne	American Slough Grass	OBL
Berteroa incana	Hoary False Madwort	UPL
Bromus arvensis	Japanese Brome	FACU
Bromus carinatus	California Brome	UPL
Bromus inermis	Smooth Brome	FAC
Carex nebrascensis	Nebraska Sedge	OBL
Carex utriculata	Northwest Territory Sedge	OBL
Centaurea maculosa	Spotted knapweed	UPL
Chenopodium album	Lamb's-Quarters	FACU
Chenopodium sp.	Goosefoot	NL
Cirsium arvense	Canadian Thistle	FACU
Cynoglossum officinale	Gypsy-Flower	FACU
Deschampsia caespitosa	Tufted Hairgrass	FACW
Descurainia sophia	Herb Sophia	UPL
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
Helianthus annuus	Common Sunflower	FACU
Hordeum jubatum	Fox-Tail Barley	FACW
Juncus arcticus	Arctic Rush	FACW
Juncus articulatus	Joint-Leaf Rush	OBL
Juncus bufonius	Toad Rush	OBL
Lactuca serriola	Prickly Lettuce	FAC
Lepidium densiflorum	Miner's Pepperwort	FAC
Medicago sativa	Alfalfa	UPL
Pascopyrum smithii	Western-Wheat Grass	FACU

[1]Draft NWPL (Lichvar and Kartesz, 2009).

Table 2. (Continued). Vegetation species observed in 2013 at the Rostad Ranch Wetland Mitigation Site.

Scientific Names	Common Names	GP Indicator Status[1]
Phalaris arundinacea	Reed Canary Grass	FACW
Phleum pratense	Common Timothy	FACU
Poa palustris	Fowl Blue Grass	FACW
Poa pratensis	Kentucky Blue Grass	FACU
Polypogon monspeliensis	Annual Rabbit's-Foot Grass	FACW
Populus angustifolia	Narrow-Leaf Cottonwood	FACW
Ranunculus cymbalaria	Alkali Buttercup	OBL
Rumex crispus	Curly Dock	FAC
Rumex occidentalis	Western Dock	OBL
Salix exigua	Narrow-Leaf Willow	FACW
Sinapis Arvensis	Charlock Mustard	UPL
Sonchus arvensis	Field Sow-Thistle	FAC
Taraxacum officinale	Common Dandelion	FACU
Thlaspi arvense	Field Penny-Cress	FACU
Tragopogon dubius	Yellow Salsify	UPL
Trifolium arvense	Rabbitfoot Clover	UPL
Trifolium pratense	Red Clover	FACU
Trifolium repens	White Clover	FACU
Typha latifolia	Broad-Leaf Cat-Tail	OBL
Veronica peregrina	Neckweed	FACW

[1]Draft NWPL (Lichvar and Kartesz, 2009).

Wetland community Type 3 – *Salix exigua* consisted of the 0.31-acre pre-existing wetland area in the southern end that remained undisturbed during the 2012 construction of the mitigation site. Narrow-leaf willow (*Salix exigua*) dominated this area and exhibited willow regeneration around the margins of the community, likely to result in an increase of this community type over time. Fowl bluegrass (*Poa palustris*), Nebraska sedge, Northwest Territory sedge (*Carex utriculata*), field meadow-foxtail (*Alopecurus pratensis*), black bentgrass (*Agrostis gigantea*), tufted hairgrass (*Deschampsia caespitosa*), annual rabbit's-foot grass (*Polypogon monspeliensis*), and neckweed (*Veronica peregrina*) were also identified within this community.

Wetland community Type 4 – Open water was mapped on 2.83 acres and was characterized by inundated conditions during the 2013 field survey. Two areas of community Type 4 have been constructed within the mitigation site and include an area of open water impounded by a constructed dike in the northern portion of the site and an excavated depression in the southern half. Very low vegetation cover was documented throughout this community and likely reflects an insufficient amount of time following construction disturbance in 2012 for the establishment of aquatic plants adapted for growth in perennial inundated

conditions. Common spikerush (*Eleocharis palustris*), broad-leaf cat-tail (*Typha latifolia*), and American slough grass were noted around the shallower margins of this community. The Great Basin calico-flower was also identified along the margin of this community. A trace amount of green algae (a protist) was present in the open water.

Vegetation cover was measured along three transects at the Rostad Ranch Mitigation Site in 2013 (Figure 2, Appendix A). The data recorded on Transect 1 (Monitoring Forms, Appendix B) are summarized in tabular and graphical formats in Table 3 and Chart 1 and Chart 2, respectively. Photographs of the transect ends are provided on Page C-4 of Appendix C. Transect T-1 extends 422 feet from a corner of the easement area into the large open water area impounded by the constructed dike. This transect intercepted upland community Type 1, Type 2 wetland, and ended within the open water community (Type 4). A total of 27 vegetative species were identified along this transect and included nine hydrophytes. Approximately 30 percent of the length of this transect was located in the Type 2 (*Juncus arcticus/Carex nebrascensis)* hydrophytic community and approximately twelve percent of the transect intercepted the open water.

Table 3. Data summary for Transect T-1 from 2013 at the Rostad Ranch Wetland Mitigation Site.

Monitoring Year	**2013**
Transect Length (feet)	**422**
Vegetation Community Transitions along Transect	4
Vegetation Communities along Transect	2
Hydrophytic Vegetation Communities along Transect	1
Total Vegetative Species	27
Total Hydrophytic Species	9
Total Upland Species	18
Estimated % Total Vegetative Cover	90
% Transect Length Comprising Hydrophytic Vegetation Communities	30.6
% Transect Length Comprising Upland Vegetation Communities	56.9
% Transect Length Comprising Unvegetated Open Water	12.6
% Transect Length Comprising Bare Substrate	0

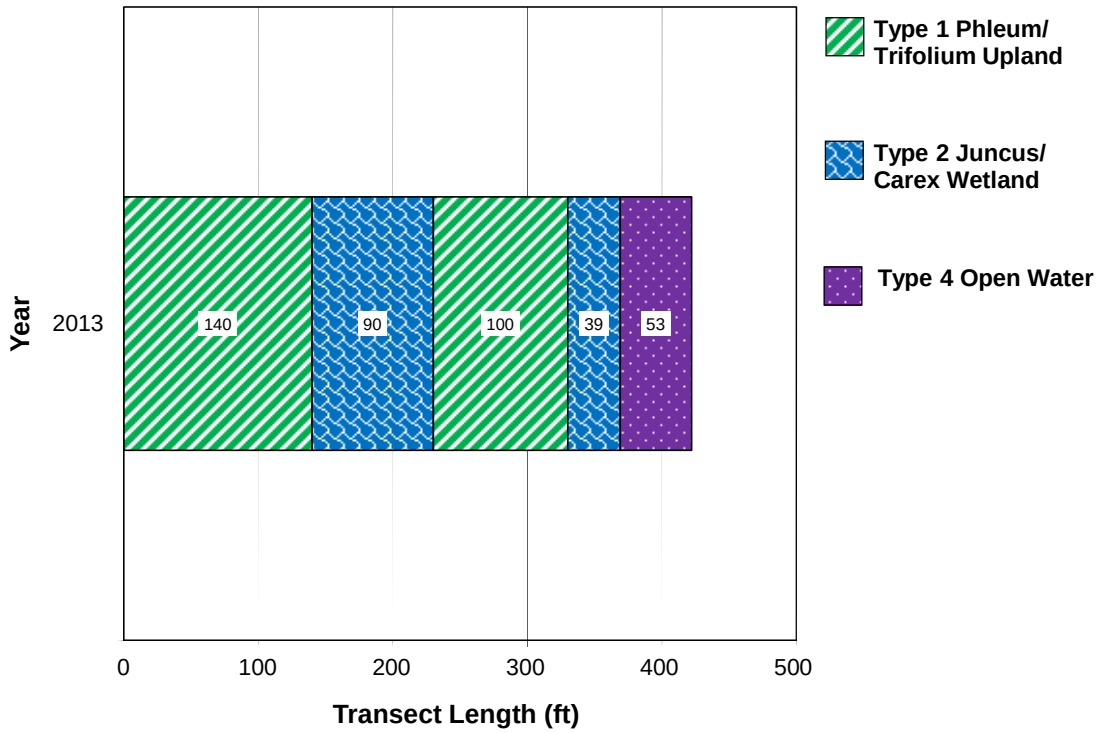


Chart 1. Transect maps showing community types on Transect T-1 in 2013 at the Rostad Ranch Wetland Mitigation Site.

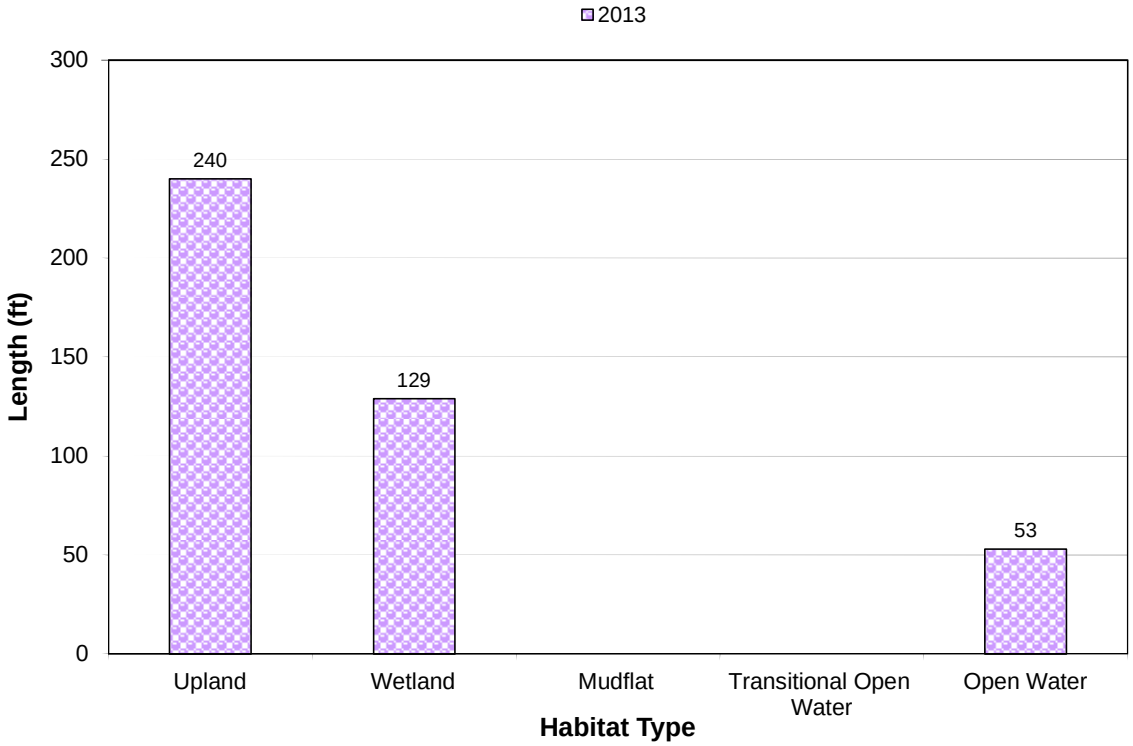


Chart 2. Length of habitat types within Transect T-1 in 2013 at the Rostad Ranch Wetland Mitigation Site.

Data collected on Transect T-2 (Monitoring Form, Appendix B) are summarized in tabular and graphic formats (Table 4, Charts 3 and 4, respectively) with photographs taken at the endpoints provided on Page C-4 of Appendix C. This transect began at a mature cottonwood (*Populus sp*.) near the entrance of the site and extended 453 feet, alternating between upland community Type 1 and wetland community Type 2. Approximately forty-five percent of this transect was located in Type 2 community.

Table 4. Data summary for Transect T-2 in 2013 at the Rostad Ranch Wetland Mitigation Site.

Vegetation Community Transitions along Transect	4
Vegetation Communities along Transect	2
Hydrophytic Vegetation Communities along Transect	1
Total Vegetative Species	26
Total Hydrophytic Species	8
Total Upland Species	18
Estimated % Total Vegetative Cover	90
% Transect Length Comprising Hydrophytic Vegetation Communities	44.6
% Transect Length Comprising Upland Vegetation Communities	55.4
% Transect Length Comprising Unvegetated Open Water	0
% Transect Length Comprising Bare Substrate	0

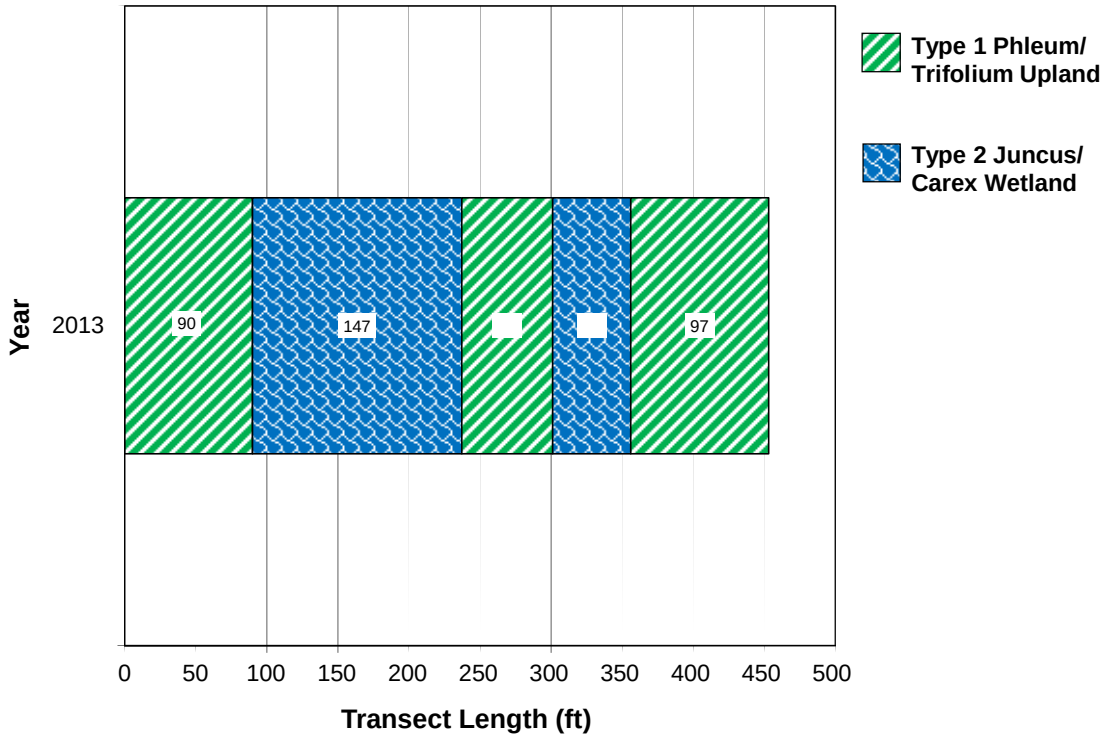


Chart 3. Transect maps showing community types on Transect T-2 in 2013 at the Rostad Ranch Wetland Mitigation Site.

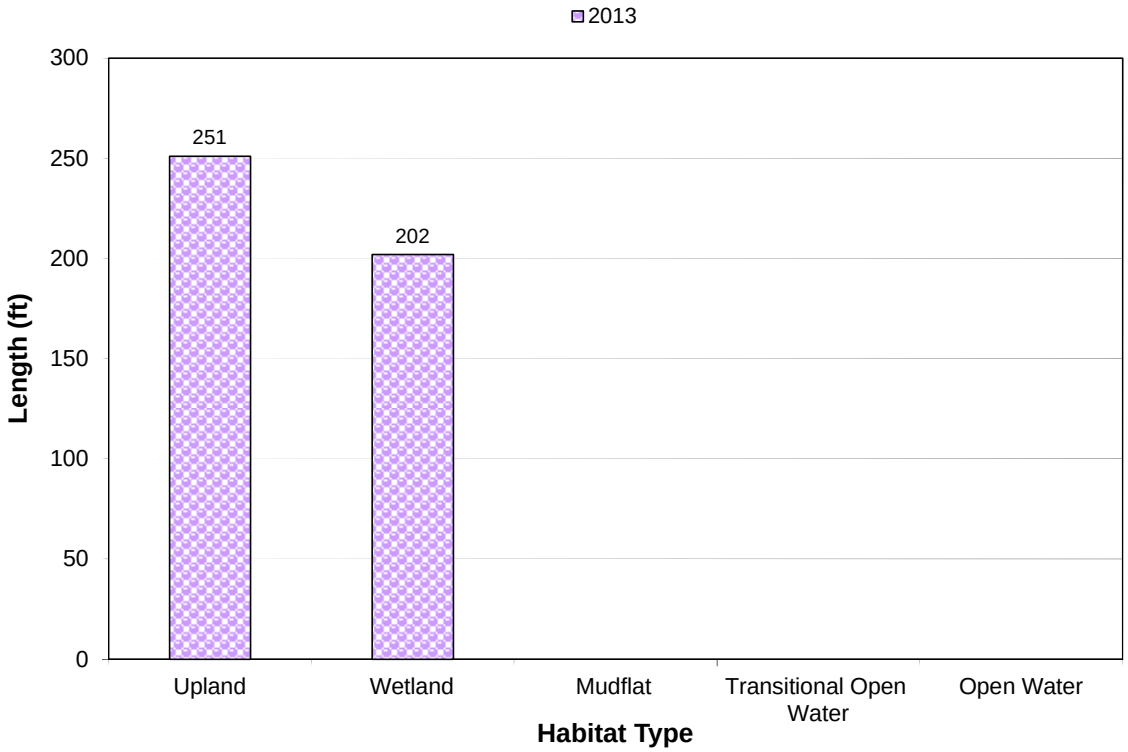


Chart 4. Length of habitat types within Transect T-2 in 2013 at the Rostad Ranch Wetland Mitigation Site.

Transect T-3 was established in the southern end of the mitigation site and traversed the excavated re-establishment and rehabilitation credit areas. Transect T-3 also began at a mature cottonwood and extended east for 320 feet (Figure 2, Appendix A). This transect originated in the upland *Phleum* community, transitioned into community Type 2, continued through the excavated open water depression, and ended in community Type 2. Approximately fifteen percent of this transect consisted of bare ground reflecting the recently disturbed conditions of constructed wetland mitigation area.

Table 5. Data summary for Transect T-3 in 2013 at the Rostad Ranch Wetland Mitigation Site.

Monitoring Year	**2013**
Transect Length (feet)	**320**
Vegetation Community Transitions along Transect	3
Vegetation Communities along Transect	2
Hydrophytic Vegetation Communities along Transect	1
Total Vegetative Species	25
Total Hydrophytic Species	14
Total Upland Species	11
Estimated % Total Vegetative Cover	85
% Transect Length Comprising Hydrophytic Vegetation Communities	65.3
% Transect Length Comprising Upland Vegetation Communities	6.6
% Transect Length Comprising Unvegetated Open Water	28.1
% Transect Length Comprising Bare Substrate	15

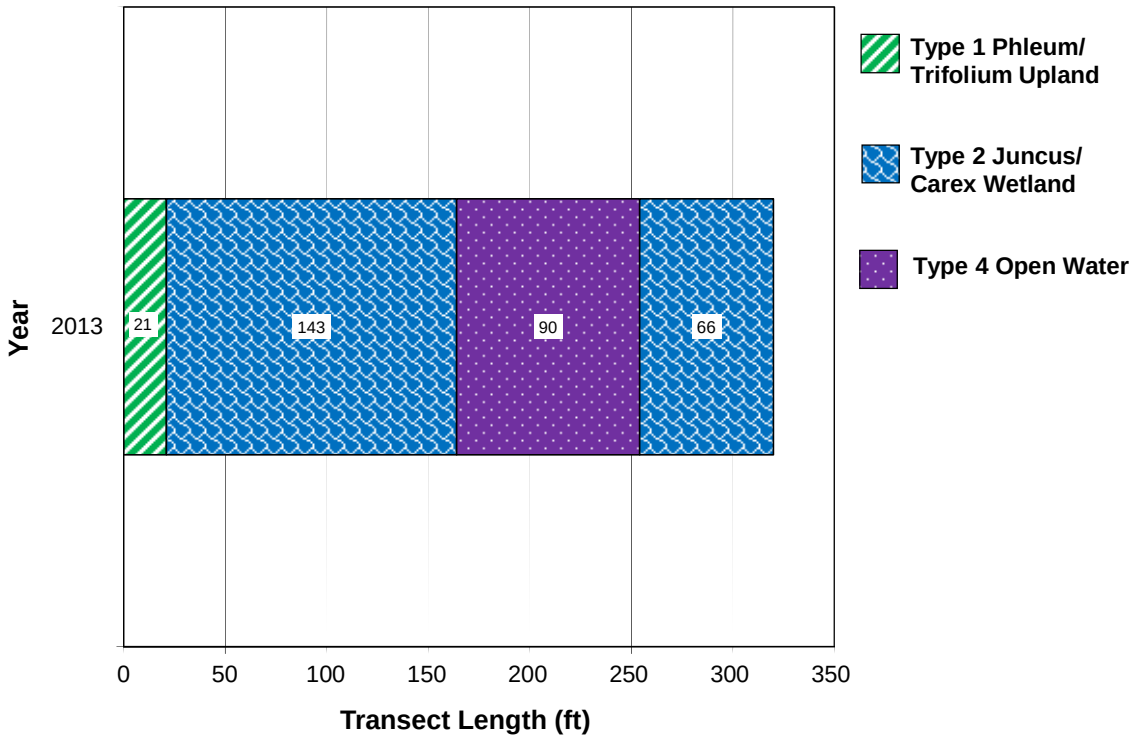


Chart 5. Transect maps showing community types on Transect T-3 in 2013 at the Rostad Ranch Wetland Mitigation Site.

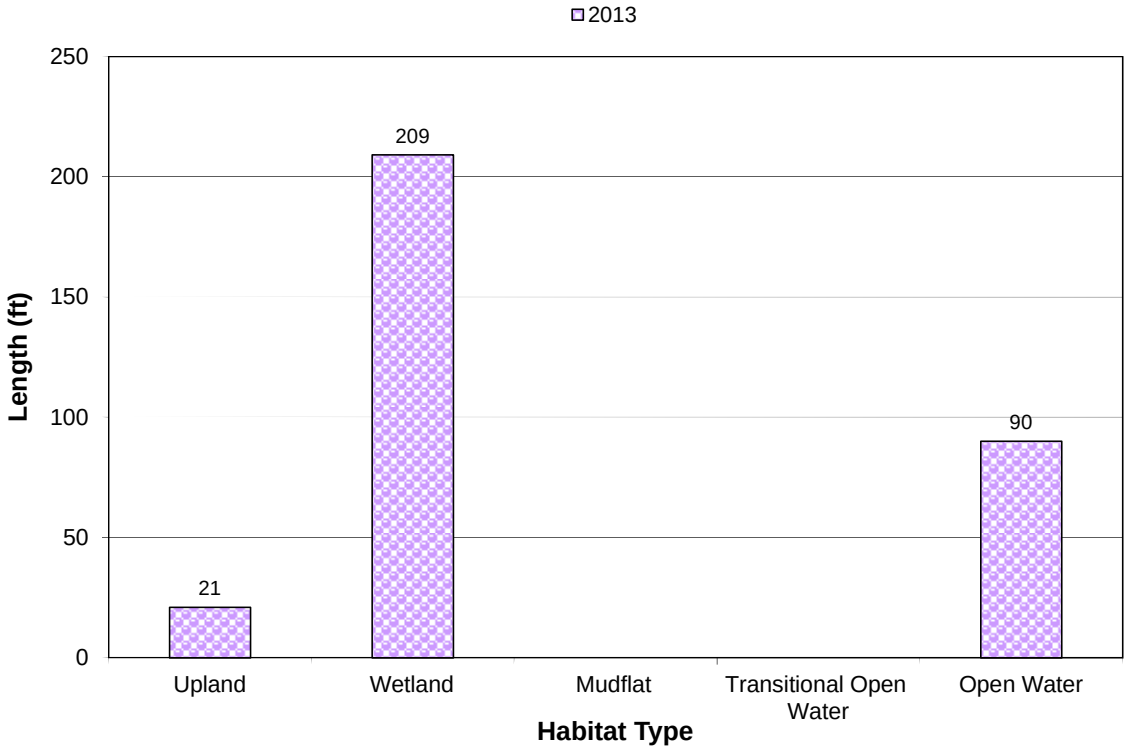


Chart 6. Length of habitat types within Transect T-3 in 2013 at the Rostad Ranch Wetland Mitigation Site.

Priority 2B noxious weeds identified within the Rostad Ranch mitigation site included spotted knapweed (*Centaurea maculosa*), Gypsy-flower (Houndstongue – *Cynoglossum officinale*), Canadian thistle (*Cirsium arvense*), field bindweed (*Convulvulus arvensis*), and the Priority 2A listed hoary false madwort (Hoary alyssum-*Berteroa incana*). A total of seventeen infestation areas were mapped in 2013, ranging in size from less than 0.1 acre to 1 to 5 acres in size. The majority of the infestation areas were located in upland community Type 1 and appeared to have been established within the site prior to mitigation construction.

Approximately 2,000 willow cuttings were planted throughout the excavated wetland mitigation areas. A survival rate of approximately 95 percent among the willow cuttings was observed during the 2013 site visit. These cuttings looked healthy with little to no browse and were growing vigorously. Additionally, 100 black cottonwoods (*Populus balsamifera*) and 100 quaking aspens (*Populus tremuloides*) were installed around the perimeter of the proposed open water areas. Survival among these containerized (5-gallon) plantings was estimated around 95 percent.

3.3. Soil

The project site was identified in the *Meagher County Soil Survey* (SSURGO 2012) within the Varney-Notter cobbly loams and Delpoint variant-Marmarth-Cabbart loams mapped soil series. The Varney-Notter mapped soil unit was located across the northern half of the mitigation site and the Delpoint variant-Marmarth-Cabbart loams were mapped across the southern half. These series generally consist of very deep, well drained soils formed in alluvium. These mapped soil units were not identified on the Montana Hydric Soils list.

Soil test pits were excavated at four locations (Figure 2, Appendix A). Data points Ro-1u and Ro-1w were located in areas originally mapped in the Varney-Notter series and generally conformed to the Varney series. Data points Ro-2u and Ro-2w were located in areas mapped in the Delpoint variant-Marmarth-Cabbart loam series. Soils in these two pits generally confirmed the mapped Delpoint series. Data points Ro-1w and Ro-2w were located in areas that qualified as hydric soils. The soil at Ro-1w consisted of a dark grayish brown (10YR 4/2) clay matrix with ten percent dark yellowish brown (10YR 4/6) redoximorphic concentrations and qualified as hydric with a depleted matrix (F3). The soil profile at Ro-2w exhibited a gray (10YR 5/1) sandy clay loam with ten percent strong brown (7.5YR 4/6) redoximorphic concentrations and met the hydric criteria for a depleted matrix (F3). The soil profile at Ro-1u expressed redox concentrations below 12 inches, indicating a fluctuating water table below one foot of the surface at this location. No redoximorphic characteristics were identified within the soil profile at Ro-2u.

3.4. Wetland Delineation

Four data points were used to define the wetland boundary in 2013 (Figure 2, Appendix A and Wetland Determination Data Forms, Appendix B). Data points Ro-1w and Ro-2w were located in areas that qualified as wetlands. The total

wetland acreage delineated in 2013, including pre-existing wetland areas, totaled 13.74 acres (Table 6). The 2013 delineation included the 0.25 wetland preservation area, 10.89 wetland acres within the re-establishment credit area, 1.53 acres within the wetland rehabilitation credit area, and 1.07 acres of created wetland. As this year represents the first baseline year of monitoring, the site has the potential to expand and develop over the course of the 5-year monitoring period.

Table 6. Total wetland acres delineated in 2013 at the Rostad Ranch Wetland Mitigation Site.

WETLAND AND UPLAND HABITATS	2013 Delineated Acres
Project Area	60.00
Total Wetlands	13.74
Created Wetlands	1.07
Restoration Wetlands (Re-establishment)	10.89
Restoration Wetlands (Rehabilitation)	1.53
Preservation Wetlands	0.25
Upland Buffer	46.26

3.5. Wildlife

A comprehensive list of bird and other wildlife species observed directly or indirectly in 2013 is presented in Table 7. Seven bird species were identified and included an American goldfinch (*Spinus tristus*), a northern harrier (*Circus cyaneus*), four sandhill cranes (*Grus Canadensis*), a Wilson's snipe (*Gallinago delicata*), two grasshopper sparrows (*Ammodramus savannarum*), a red-tailed hawk (*Buteo jamaicensis*), and several dozen Canada Geese (*Branta canadensis*). Black bear (*Ursus americanus*) scat was observed within the mitigation boundary. Deer (*Odocoileus* sp.) tracks and muskrat (*Ondatra zibethicus*) tracks were also documented within the site.

Table 7. Wildlife species observed in 2013 at the Rostad Ranch Wetland Mitigation Site.

COMMON NAME	SCIENTIFIC NAME
BIRDS	
American Goldfinch	*Spinus tristus*
Brewer's Blackbird*	*Euphagus cyanocephalus*
Canada Goose	*Branta canadensis*
Grasshopper Sparrow	*Ammodramus savannarum*
Green-winged Teal*	*Anas crecca*
Mallard	*Anas platyrhynchos*
Northern Harrier	*Circus cyaneus*
Red-tailed Hawk	*Buteo jamaicensis*
Sandhill Crane	*Grus canadensis*
Spotted Sandpiper*	*Actitis macularius*
Tree Swallow*	*Tachycineta bicolor*
Wilson's Snipe	*Gallinago delicata*
MAMMALS	
Black Bear	*Ursus americanus*
Coyote*	*Canis latrans*
Deer Sp.	*Odocoileus sp.*
Raccoon*	*Procyon lotor*
Muskrat	*Ondatra zibethicus*

*Species observed by MDT Wetland Mitigation Specialist

3.6. Functional Assessment

The 1999 MDT Montana Wetland Assessment Method (MWAM) (Berglund 1999) was used to evaluate the three existing wetlands identified within the site in 2004. The 2008 MWAM (Berglund and McEldowney 2008) was used to evaluate the site in 2013. All wetlands identified in 2013 were evaluated as one AA. The results of the 2004 and 2013 assessments are summarized in Table 8. The completed 2013 MWAM form is located in Appendix B.

The 2004 assessment identified a total of 3.4 acres of Category III wetlands. The majority of the existing wetlands within the site prior to construction consisted of man-made drainage and irrigation ditches constructed through the site to drain and disperse water through the site. The only remnants of these areas are the willow thicket and the roadside drainage ditch. These wetlands averaged 34 percent of the possible score and attained a total of 12.46 functional units. Due to the complex boundaries of the proposed mitigation credits within the site, the Rostad Ranch mitigation wetland was assessed as one AA in 2013. The 2013 AA totaled 13.74 acres and rated as a Category II wetland, scoring 65.6 percent of the possible points and attaining 72.1 functional units. This AA included high ratings for MTNHP species habitat (documented primary habitat for the Great Basin calico-flower), short and long term surface water storage, production

export/food chain support, and groundwater discharge/recharge. The total functional units are expected to increase within this AA as the recently disturbed areas establish wetland vegetation and additional wetland areas develop within the site.

Table 8. Functions and Values of the Rostad Ranch Wetland Mitigation Site from 2013.

Function and Value Parameters from the Montana Wetland Assessment Method	2004* W-1-04	2004* W-2-04	2004* W-3-04	2013**
Listed/Proposed T&E Species Habitat	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)
MTNHP Species Habitat	Low (0.2)	Low (0.2)	Low (0.2)	High (0.9)
General Wildlife Habitat	Low (0.3)	Low (0.3)	Low (0.3)	Mod (0.5)
General Fish/Aquatic Habitat	NA	NA	NA	NA
Flood Attenuation	NA	NA	NA	NA
Short and Long Term Surface Water Storage	Low (0.2)	Low (0.2)	Low (0.2)	High (0.8)
Sediment/Nutrient/Toxicant Removal	Mod (0.6)	Mod (0.6)	Mod (0.6)	Mod (0.7)
Sediment/Shoreline Stabilization	Mod (0.6)	Mod (0.6)	NA	NA
Production Export/Food Chain Support	Mod (0.7)	Mod (0.7)	Low (0.3)	High (0.9)
Groundwater Discharge/Recharge	High (1.0)	High (1.0)	NA	High (1.0)
Uniqueness	Low (0.2)	Low (0.2)	Low (0.2)	Mod (0.4)
Recreation/Education Potential (bonus points)	Low (0.1)	Low (0.1)	Low (0.1)	Low (0.05)
Actual Points/Possible Points	**3.9 / 10**	**3.9 / 10**	**1.9 / 8**	**5.25 / 8**
% of Possible Score Achieved	**39.0%**	**39.0%**	**24.0%**	**65.6%**
Overall Category	**III**	**III**	**III**	**II**
Total Acreage of Assessed Wetlands within Site	**1.2**	**1.8**	**0.4**	**13.74**
Functional Units (acreage x actual points)	**4.68**	**7.02**	**0.76**	**72.1**

*1999 MWAM form (Berglund, 1999)

**2008 MWAM form (Berglund and McEldowney, 2008)

3.7. Photo Documentation

Photographs taken at photo points one through seven (PP1 through PP7; Figure 2, Appendix A) in 2013 are shown on pages C-1 to C-3 of Appendix C**.** Vegetation transect end points are shown on page C-4. Photographs of the data points are included on page C-5.

3.8. Maintenance Needs

Priority 2B noxious weeds identified within the Rostad Ranch mitigation site included spotted knapweed, Gypsy-flower, Canadian thistle, field bindweed, and the Priority 2A listed hoary false madwort. A total of seventeen infestation areas were mapped in 2013, ranging in size from less than 0.1 acre to 1 to 5 acres in size. The majority of the infestation areas were located in upland community Type 1 and appeared to have been established within the site prior to mitigation construction.

The irrigation diversion structure was closed during the August 2013 investigation. Several areas of the constructed embankment dike around the northern cell had breached during the early summer and MDT had made some

temporary repairs with coir logs and rock to prevent further washouts and degradation of the structure. Subsequent evaluation of the embankment dike structure indicated that it had been constructed at an elevation lower than the constructed outlet structure. MDT required the contractor to undertake corrective actions in November 2013 to raise the level of the dike and repair all breaches in the structure. In addition to the structure, spreader berms were extended at several locations to spread water further across the site. Seven bluebird boxes had been installed around the site perimeter. Several of the bird boxes appeared to be occupied and all were in good condition. The wildlife-friendly fence installed around the easement area was intact. Besides those corrective actions undertaken by MDT to repair the northern embankment structure, no maintenance was identified for any of the structures in 2013.

3.9. Current Credit Summary

Table 9 summarizes the current wetland credits based on the USACE-approved credit ratios and the wetland delineation completed in August 2013. Proposed mitigation credit from the 2007 Rostad Ranch Mitigation Plan included the re-establishment of 27.11 acres, rehabilitation of 2.63 wetland acres, creation of 9.84 acres, preservation of 0.25 acres, and maintenance of a 6.76-acre upland buffer (Table 1). The actual wetland acreages delineated in 2013 included 10.89 acres within the re-establishment credit area, 1.53 acres of rehabilitated wetland, 1.07 acres of created wetland, and 0.25 acres of preservation wetland (community Type 3). The total mitigation credit estimated in 2013, including the upland buffer credit and deducting the 0.41-acre wetland impact incurred during construction of the mitigation site, totaled 13.89 acres.

All wetlands delineated at the Rostad Ranch wetland mitigation site in 2013 satisfied the three wetland criteria of wetland hydrology, hydrophytic vegetation, and hydric soils. Willow stakes planted within the site exhibited a 95 percent survival rate during the first year of planting. Although recently disturbed, the site was moderately well-vegetated with aerial coverage by state-listed noxious weed less than 5 percent. The extent of the open water surveyed in 2013 comprised 20 percent of the total wetland acreage, exceeding the cap of 10 percent stipulated in the USACE-approved performance criteria. The percentage of open water is expected to decrease as additional emergent wetlands develop on site. The entire 60-acre easement area has been fenced to exclude grazing.

Table 9. Summary of wetland credits at the Rostad Ranch Wetland Mitigation Site from 2013.

Compensatory Mitigation Type	Wetland Type (Cowardin)	Anticipated Mitigation Area (acres)	Approved Migiation Ratios*	Anticipated Mitigation Credit (acres)	2013 Delineated Mitigation Areas (acres)	2013 Estimated Mitigation Credit (acres)
Restoration (Re-establishment)	Palustrine Emergent, Lacustrine, Littoral	27.11	1:1	27.11	10.89	10.89
Creation (Establishment)	Palustrine Emergent, Lacustrine, Littoral	9.84	1:1	9.84	1.07	1.07
Restoration (Rehabilitation)	Palustrine Emergent & Lacustrine, Littoral	2.63	1.5:1	1.75	1.53	1.02
Preservation	Palustrine, Scrub/shrub	0.25	4:1	0.06	0.25	0.06
Upland Buffer	N/A	6.76	5:1	1.35	6.76	1.35
Permanent Wetland Impact	N/A	N/A	1:1	-0.41	N/A	-0.41
	Totals	**46.59**		**39.70**	**20.5**	**13.98**

*Mitigation credit ratios utilized were from the Montana Corps Regulatory Programs 2005 Wetland Credit Ratios (USACE 2005)

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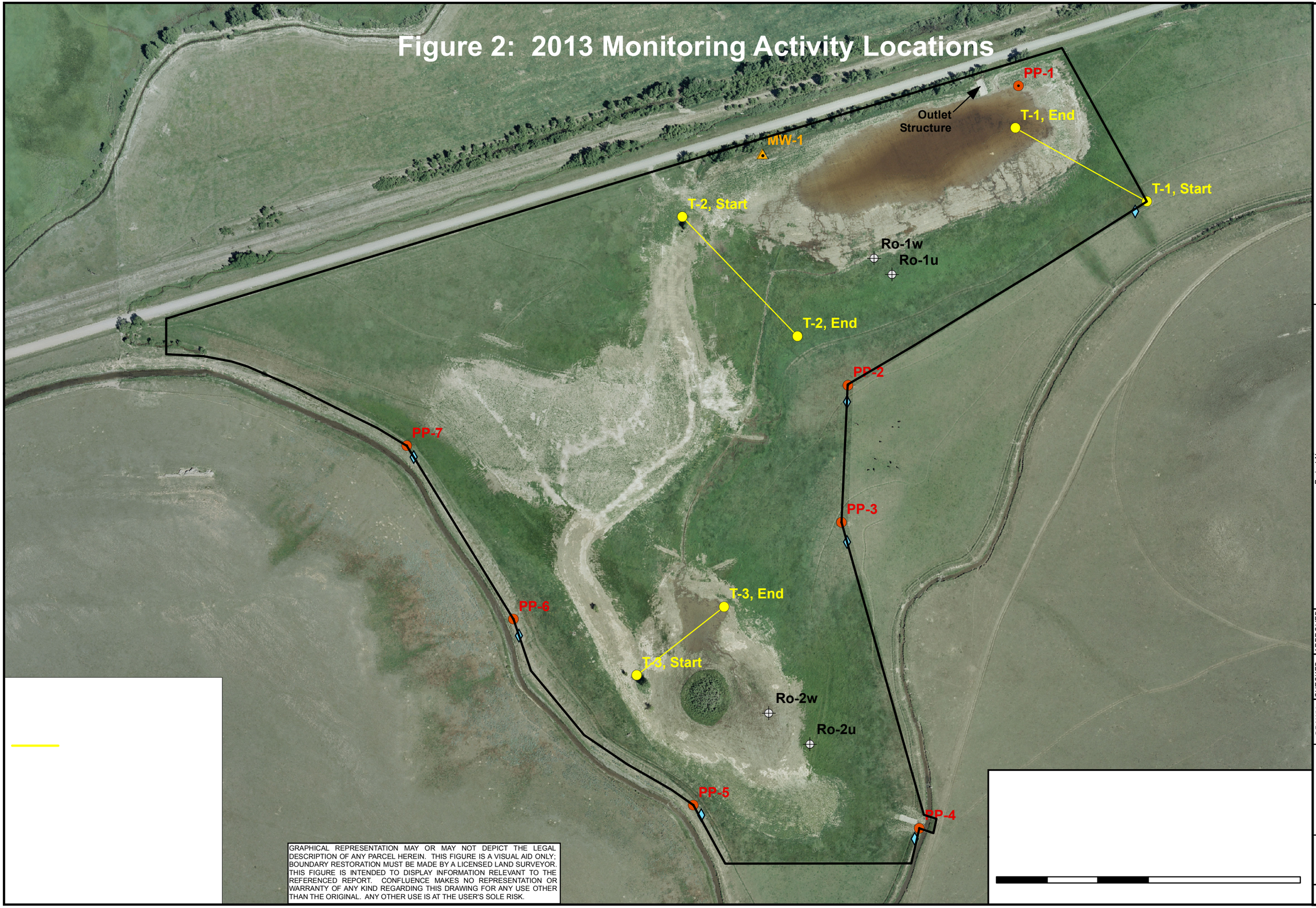
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Appendix A

Project Area Maps – Figures 2 and 3

MDT Wetland Mitigation Monitoring
Rostad Ranch
Meagher County, Montana

Figure 2: 2013 Monitoring Activity Locations



GRAPHICAL REPRESENTATION MAY OR MAY NOT DEPICT THE LEGAL DESCRIPTION OF ANY PARCEL HEREIN. THIS FIGURE IS A VISUAL AID ONLY; BOUNDARY RESTORATION MUST BE MADE BY A LICENSED LAND SURVEYOR. THIS FIGURE IS INTENDED TO DISPLAY INFORMATION RELEVANT TO THE REFERENCED REPORT. CONFLUENCE MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND REGARDING THIS DRAWING FOR ANY USE OTHER THAN THE ORIGINAL. ANY OTHER USE IS AT THE USER'S SOLE RISK.

LOCATION: Meagher Co., MT

PROJ NO: STPX-0002(749)

FILE: Rostad/Monitor2013.mxd

Project Name
Rostad Ranch Wetland Mitigation Site

Drawing Title
2013 Monitoring Activity Locations

DRAWN	CHECKED	APPROVED
BCS	EN	LU

SCALE: Noted

Drawn: September 12, 2013

PROJ MGR: B Sandefur

CONFLUENCE
consulting incorporated

Figure 2

REV -

Figure 3: 2013 Mapped Site Features

ACREAGES

Project Area	60.00 acres
Total Wetlands	13.74 acres
Existing Wetlands	12.67 acres
Created Wetlands	1.07 acres
Upland	46.26 acres

Noxious Weeds
- Centaurea maculosa
- Cynoglossum officinale
- Berteroa incana
- Cirsium arvense
- Convulvulus arvensis

Infestation Size
- X = <0.1 acre
- ▲ = 0.1 to 1 acre
- ■ = 1 to 5 acre

Cover Class
- T = Trace (<1% cover)
- L = Low (1-5% cover)
- M = Moderate (6-25% cover)
- H = High (26-100% cover)

Vegetation Community Types
1. Phleum pratense/Trifolium spp.
2. Juncus arcticus/Carex nebrascensis
3. Salix exigua
4. Open Water

Legend
- Monitoring Limits
- Wetland Limits
- Vegetation Communities

Base Photography Date: July 15, 2013

GRAPHICAL REPRESENTATION MAY OR MAY NOT DEPICT THE LEGAL DESCRIPTION OF ANY PARCEL HEREIN. THIS FIGURE IS A VISUAL AID ONLY; BOUNDARY RESTORATION MUST BE MADE BY A LICENSED LAND SURVEYOR. THIS FIGURE IS INTENDED TO DISPLAY INFORMATION RELEVANT TO THE REFERENCED REPORT. CONFLUENCE MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND REGARDING THIS DRAWING FOR ANY USE OTHER THAN THE ORIGINAL. ANY OTHER USE IS AT THE USER'S SOLE RISK.

N

0 125 250 500

Feet

LOCATION: Meagher Co., MT

PROJ NO: STPX-0002(749)

FILE: Rostad/Veg2013.mxd

Project Name: Rostad Ranch Wetland Mitigation Site

Drawing Title: 2013 Mapped Site Features

DRAWN: BCS

CHECKED: EN

APPROVED: LU

SCALE: Noted

Drawn: September 12, 2013

PROJ MGR: B Sandefur

CONFLUENCE consulting incorporated

Figure 3

REV -

Appendix B

2013 MDT Wetland Mitigation Site Monitoring Form
2013 USACE Wetland Determination Data Form
2013 MDT Montana Wetland Assessment Form

MDT Wetland Mitigation Monitoring
Rostad Ranch
Meagher County, Montana

MDT WETLAND MITIGATION SITE MONITORING FORM

Project Site: Rostad Ranch Assessment Date/Time 8/21/2013 7:57:34 AM

Person(s) conducting the assessment: E Nyquist, B Sandefur

Weather: Sunny & smokey, warm Location: Martinsdale, MT

MDT District: 5 Milepost:

Legal Description: T 8N R 11E Section(s) 12 and 13

Initial Evaluation Date: 8/21/2013 Monitoring Year: 1 #Visits in Year: 1

Size of Evaluation Area: 60 (acres)

Land use surrounding wetland:

Agriculture

HYDROLOGY

Surface Water Source: Groundwater, supplemental hydrology from ditch/headgate, surface runoff

Inundation: ☑ Average Depth: 0.5 **(ft)** Range of Depths: 0.25-3.5 **(ft)**

Percent of assessment area under inundation: 40 %

Depth at emergent vegetation-open water boundary: 0.5 **(ft)**

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, iron deposits, surface soil cracks, algal mat, geomorphic position, positive FAC-neutral test.

Groundwater Monitoring Wells

Record depth of water surface below ground surface, in feet.

Well ID	Water Surface Depth (ft)
MW-1	DRY

Additional Activities Checklist:

☑ Map emergent vegetation-open water boundary on aerial photograph.

☑ Observe extent of surface water during each site visit and look for evidence of past surface water elevations (drift lines, erosion, vegetation staining, etc.)

☑ Use GPS to survey groundwater monitoring well locations, if present.

Hydrology Notes:

MW-1 with groundwater greater than 6ft below ground surface, located in upland near levee.

VEGETATION COMMUNITIES

Site Rostad Ranch

(Cover Class Codes **0** = < 1%, **1** = 1-5%, **2** = 6-10%, **3** = 11-20%, **4** = 21-50% , **5** = >50%)

Community # 1 **Community Type:** Phleum pratense / Trifolium spp. **Acres** 46.26

Species	Cover class	Species	Cover class
Achillea millefolium	1	Amaranthus retroflexus	0
Ambrosia acanthicarpa	0	Aster sp.	0
Bare Ground	0	Bassia scoparia	3
Berteroa incana	0	Brassica kaber	0
Bromus arvensis	0	Bromus carinatus	0
Bromus inermis	1	Centaurea maculosa	0
Chenopodium sp.	2	Cirsium arvense	0
Cynoglossum officinale	0	Deschampsia cespitosa	0
Descurainia sophia	1	Elymus repens	2
Elymus trachycaulus	0	Festuca pratensis	1
Helianthus annuus	1	Hordeum jubatum	1
Juncus arcticus	0	Lactuca serriola	0
Medicago sativa	1	Pascopyrum smithii	1
Phalaris arundinacea	0	Phleum pratense	4
Poa pratensis	2	Populus angustifolia	1
Rumex occidentalis	0	Taraxacum officinale	0
Thlaspi arvense	0	Tragopogon dubius	0
Trifolium arvense	0	Trifolium pratense	1
Trifolium repens	3		

Comments:

One upland community on site and represented by previously grazed meadow.

Community # 2 **Community Type:** Juncus arcticus / Carex nebrascensis **Acres** 10.59

Species	Cover class	Species	Cover class
Algae, green	0	Bare Ground	3
Bassia scoparia	0	Beckmannia syzigachne	3
Carex nebrascensis	4	Centaurea maculosa	0
Chenopodium sp.	0	Deschampsia cespitosa	0
Downingia laeta	0	Eleocharis palustris	0
Elymus repens	0	Epilobium ciliatum	0
Hordeum jubatum	1	Juncus arcticus	4
Juncus articulatus	0	Juncus bufonius	0
Lactuca serriola	0	Lepidium densiflorum	0
Open Water	0	Pascopyrum smithii	0
Phalaris arundinacea	1	Phleum pratense	0
Poa palustris	0	Ranunculus cymbalaria	0
Rumex crispus	0	Rumex occidentalis	0
Salix exigua	1	Sonchus arvensis	0
Thlaspi arvense	0	Trifolium pratense	0
Typha latifolia	1	Veronica peregrina	0

Comments:

Wet meadow community, mostly disturbed during construction.

Community # 3 **Community Type:** Salix exigua / **Acres** 0.31

Species	Cover class	Species	Cover class
Agrostis gigantea	0	Alopecurus pratensis	1
Beckmannia syzigachne	0	Carex nebrascensis	1
Carex utriculata	1	Deschampsia cespitosa	1
Poa palustris	2	Polypogon monspeliensis	0
Salix exigua	5	Veronica peregrina	0

Comments:

Undisturbed salix community near southern extent of monitoring boundary.

Community # 4 **Community Type:** Open Water / **Acres** 2.83

Species	Cover class	Species	Cover class
Algae, green	0	Bare Ground	1
Beckmannia syzigachne	0	Berteroa incana	0
Chenopodium album	0	Downingia laeta	0
Eleocharis palustris	1	Open Water	5
Polypogon monspeliensis	0	Typha latifolia	0
Veronica peregrina	0		

Comments:

VEGETATION TRANSECTS

Site: Rostad Ranch Date: 8/21/2013 7:57:34 AM

Transect Number: 1 **Compass Direction from Start:** 290

Interval Data:

Ending Station 140 **Community Type:** Phleum pratense / Trifolium spp.

Species	Cover class	Species	Cover class
Achillea millefolium	1	Aster sp.	2
Bromus inermis	5	Centaurea maculosa	0
Cirsium arvense	0	Cynoglossum officinale	0
Medicago sativa	1	Pascopyrum smithii	1
Phleum pratense	1	Taraxacum officinale	1
Tragopogon dubius	1	Trifolium pratense	2

Ending Station 230 **Community Type:** Juncus arcticus / Carex nebrascensis

Species	Cover class	Species	Cover class
Bare Ground	1	Carex nebrascensis	1
Eleocharis palustris	1	Juncus arcticus	3
Phalaris arundinacea	1	Phleum pratense	1
Poa palustris	3	Rumex crispus	0
Trifolium pratense	2		

Ending Station 330 **Community Type:** Phleum pratense / Trifolium spp.

Species	Cover class	Species	Cover class
Amaranthus retroflexus	1	Bromus carinatus	2
Cynoglossum officinale	0	Lactuca serriola	1
Medicago sativa	1	Pascopyrum smithii	2
Phleum pratense	3	Thlaspi arvense	1
Trifolium pratense	2		

Ending Station 369 **Community Type:** Juncus arcticus / Carex nebrascensis

Species	Cover class	Species	Cover class
Bare Ground	3	Beckmannia syzigachne	1
Carex nebrascensis	2	Eleocharis palustris	2
Juncus arcticus	1	Phleum pratense	1
Rumex crispus	0	Thlaspi arvense	0
Trifolium pratense	0		

Ending Station 422 **Community Type:** Open Water /

Species	Cover class	Species	Cover class
Chenopodium album	0	Eleocharis palustris	0
Open Water	5	Typha latifolia	0

Transect Number: 2 **Compass Direction from Start:** 120

Interval Data:

Ending Station 90 **Community Type:** Phleum pratense / Trifolium spp.

Species	Cover class	Species	Cover class
Achillea millefolium	0	Aster sp.	1
Bare Ground	2	Bassia scoparia	1
Bromus inermis	3	Chenopodium sp.	2
Cirsium arvense	0	Descurainia sophia	1
Elymus repens	2	Phleum pratense	2
Populus angustifolia	0	Rumex occidentalis	1
Taraxacum officinale	1	Thlaspi arvense	0
Trifolium pratense	3		

Ending Station 237 **Community Type:** Juncus arcticus / Carex nebrascensis

Species	Cover class	Species	Cover class
Carex nebrascensis	3	Juncus arcticus	4
Rumex occidentalis	0	Salix exigua	1
Trifolium pratense	3	Typha latifolia	1

Ending Station 301 **Community Type:** Phleum pratense / Trifolium spp.

Species	Cover class	Species	Cover class
Achillea millefolium	0	Bromus inermis	3
Elymus trachycaulus		Hordeum jubatum	1
Pascopyrum smithii	0	Phleum pratense	5
Trifolium arvense	1	Trifolium pratense	2

Ending Station 356 **Community Type:** Juncus arcticus / Carex nebrascensis

Species	Cover class	Species	Cover class
Bare Ground	2	Carex nebrascensis	3
Juncus arcticus	3	Pascopyrum smithii	1
Phalaris arundinacea	2	Phleum pratense	1
Poa palustris	1	Rumex occidentalis	0
Salix exigua	1	Trifolium pratense	0
Typha latifolia	0		

Ending Station 453 **Community Type:** Phleum pratense / Trifolium spp.

Species	Cover class	Species	Cover class
Achillea millefolium	1	Aster sp.	0
Bromus inermis	2	Elymus repens	2
Elymus trachycaulus	2	Hordeum jubatum	0
Juncus arcticus	1	Medicago sativa	0
Pascopyrum smithii	2	Phalaris arundinacea	2
Phleum pratense	2	Rumex occidentalis	0
Taraxacum officinale	0	Trifolium pratense	1

Transect Notes:

Transect Number: 3 **Compass Direction from Start:** 30

Interval Data:

Ending Station 21 **Community Type:** Phleum pratense / Trifolium spp.

Species	Cover class	Species	Cover class
Amaranthus retroflexus	2	Bare Ground	2
Brassica kaber	1	Bromus arvensis	1
Cynoglossum officinale	0	Deschampsia cespitosa	0
Elymus repens	2	Hordeum jubatum	0
Phleum pratense	1	Populus angustifolia	4

Ending Station 164 **Community Type:** Juncus arcticus / Carex nebrascensis

Species	Cover class	Species	Cover class
Bare Ground	2	Beckmannia syzigachne	1
Carex nebrascensis	0	Chenopodium sp.	1
Deschampsia cespitosa	3	Epilobium ciliatum	0
Hordeum jubatum	3	Juncus arcticus	1
Juncus articulatus	0	Juncus bufonius	2
Ranunculus cymbalaria	0	Sonchus arvensis	0
Veronica peregrina	0		

Ending Station 254 **Community Type:** Open Water /

Species	Cover class	Species	Cover class
Algae, green	1	Beckmannia syzigachne	0
Downingia laeta	0	Eleocharis palustris	0
Open Water	5	Polypogon monspeliensis	0
Typha latifolia	0	Veronica peregrina	0

Ending Station 320 **Community Type:** Juncus arcticus / Carex nebrascensis

Species	Cover class	Species	Cover class
Algae, green	0	Beckmannia syzigachne	1
Centaurea maculosa		Eleocharis palustris	4
Juncus arcticus	1	Open Water	3
Typha latifolia	2		

Transect Notes:

PLANTED WOODY VEGETATION SURVIVAL

Rostad Ranch

Planting Type	#Planted	#Alive	Notes
Black cottonwoods	100		95% survival rate approximated during field survey
Quaking aspen	100		95% survival rate approximated during field survey
Willow cuttings	2000		95% survival rate approximated during field survey

Comments

Willow stakes were planted in Spring 2013 with observations of approximately 95% survival. Plants looked healthy with little to no browse and growing vigorously. Approximately 95% survival of planted cottonwoods and quaking aspen.

Rostad Ranch

WILDLIFE

Birds

Were man-made nesting structures installed? Yes

If yes, type of structure: Blue bird boxes

How many? 7

Are the nesting structures being used? Yes

Do the nesting structures need repairs? No

Nesting Structure Comments:

All blue bird boxes were in good functioning condition with evidence of use (feathers, droppinc etc.) in 4 of the 7 boxes

Species	#Observed	Behavior	Habitat
American Goldfinch	1	F	MF, OW, WM
Canada Goose	82	FO	OW, WM
Grasshopper Sparrow	2	F, FO	WM
Northern Harrier	1	F, FO	UP, WM
Red-tailed Hawk	1	F, FO	WM
Sandhill Crane	4	F, FO	MF, WM
Wilson's Snipe	1	F, L	AB, MA, WM

Bird Comments

BEHAVIOR CODES

BP = One of a breeding pair **BD** = Breeding display **F** = Foraging **FO** = Flyover **L** = Loafing **N** = Nesting

HABITAT CODES

AB = Aquatic bed **SS** = Scrub/Shrub **FO** = Forested **UP** = Upland buffer **I** = Island

WM = Wet meadow **MA** = Marsh **US** = Unconsolidated shore **MF** = Mud Flat **OW** = Open Water

Mammals and Herptiles

Species	# Observed	Tracks	Scat	Burrows	Comments
Black Bear		No	Yes	No	
Deer Sp.		Yes	Yes	No	
Muskrat		Yes	No	No	

Wildlife Comments:

Rostad Ranch

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.

Photo #	Latitude	Longitude	Bearing	Description
1406	46.462532	-110.294189	45	Ro-1w
14-20	46.458241	-110.29377	290	PP-4, panoramic 190-340 degrees
1-5	46.463894	-110.292686	140	PP-1, panoramic 140-240 degrees
21-26	46.458417	-110.296185	200	PP-5, panoramic 300-110 degrees
27	46.459839	-110.298195	30	PP-6
28	46.45982	-110.298035	100	PP-6
29-34	46.461119	-110.299371	300	PP-7, panoramic 0-300 degrees
35	46.46286	-110.296341	130	T-2, start
36	46.46191	-110.295059	310	T-2, end
37	46.463043	-110.291222	290	T-1, start
38	46.463577	-110.29274	110	T-1, end
39	46.462399	-110.294083	340	Ro-1u
40	46.459026	-110.295227	250	Ro-2w
41	46.458927	-110.295059	260	Ro-2u
43	46.459347	-110.296814	30	T-3, start
46	46.459827	-110.295876	210	T-3, end
47-53	46.460579	-110.294502	270	PP-3, panoramic 160-360 degrees
				3
6-13	46.461612	-110.294534	180	PP-2, panoramic 180-70 degrees

Comments:

Rostad Ranch

ADDITIONAL ITEMS CHECKLIST

Hydrology

☐ Map emergent vegetation/open water boundary on aerial photos.
☐ Observe extent of surface water. Look for evidence of past surface water elevations (e.g. drift lines, vegetation staining, erosion, etc).

Photos

☐ One photo from the wetland toward each of the four cardinal directions
☐ One photo showing upland use surrounding the wetland.
☐ One photo showing the buffer around the wetland
☐ One photo from each end of each vegetation transect, toward the transect

Vegetation

☑ Map vegetation community boundaries

☑ Complete Vegetation Transects

Soils

☑ Assess soils

Wetland Delineations

☑ Delineate wetlands according to applicable USACE protocol (1987 form or Supplement)
☑ Delineate wetland – upland boundary onto aerial photograph.

Wetland Delineation Comments

Functional Assessments

☑ Complete and attach full MDT Montana Wetland Assessment Method field forms.

Functional Assessment Comments:

Maintenance

Were man-made nesting structure installed at this site? Yes

If yes, do they need to be repaired? No

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 in need of repair? No

If yes, describe the problems below.

Water control structure and bird boxes appear to be in good functioning condition

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Rostad Ranch City/County: Meagher Co. Sampling Date: 8/21/2013

Applicant/Owner: MDT State: MT Sampling Point: Ro-1u

Investigator(s): E Nyquist Section, Township, Range: 12 8N 11E

Landform (hillslope, terrace, etc.): Lowland Local relief (concave, convex, none): flat Slope (%): 3.49

Subregion (LRR): LRR F Lat: 46.4624566666667 Long: -110.294063333333 Datum: WGS84

Soil Map Unit Name: Varney-Notter cobbly loam NWI classification: Upland

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

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

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

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

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

Remarks: DP companion to R-1w, gradual wetland boundary transition into upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size: 5ft)			
1. Phleum pratense	20	☑	FACU
2. Pascopyrum smithii	10	☐	FACU
3. Elymus trachycaulus	20	☑	FACU
4. Juncus arcticus	10	☐	FACW
5. Trifolium pratense	40	☑	FACU
6.	0	☐	
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	10	x 2 =	20
FAC species	0	x 3 =	0
FACU species	90	x 4 =	360
UPL species	0	x 5 =	0
Column Totals	100 (A)		380 (B)

Prevalence Index = B/A = 3.8

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 Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ☐ No ☑

Remarks:

SOIL

Sampling Point: Ro-1u

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/3	100					Clay Loam	
12-18	10YR 4/2	95	C M	5YR	4/6	5	Clay Loam	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ☑

Remarks: No redox in upper 12in, hydric below 12in.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ 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)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

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

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

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

Wetland Hydrology Present? Yes _____ No ☑

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

Remarks: No hydro indicators, seasonal groundwater below 1 foot based on redox in soil profile.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Rostad Ranch City/County: Meagher Co. Sampling Date: 8/21/2013

Applicant/Owner: MDT State: MT Sampling Point: Ro-1w

Investigator(s): E. Nyquist Section, Township, Range: 12 8N 11E

Landform (hillslope, terrace, etc.): Lowland Local relief (concave, convex, none): flat Slope (%): 3.49

Subregion (LRR): LRR F Lat: 46.4625766666667 Long: -110.294263333333 Datum: WGS84

Soil Map Unit Name: Varney-Notter cobbly loam NWI classification: Upland

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

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

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

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

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

Remarks: DP in undisturbed wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size: 5ft)			
1. Elymus repens	20	☑	FACU
2. Juncus arcticus	60	☑	FACW
3. Carex nebrascensis	10	☐	OBL
4. Poa palustris	10	☐	FACW
5.	0	☐	
6.	0	☐	
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.00% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	70	x 2 =	140
FAC species	0	x 3 =	0
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals	100 (A)		230 (B)

Prevalence Index = B/A = 2.3

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 Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ☑ No ☐

Remarks:

SOIL

Sampling Point: Ro-1w

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 4/2	90	C M	10YR	4/6	10	Clay	
8-14	10YR 5/1	85	C M	5YR	4/6	15	Clay	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☑ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ 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)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☑ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

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

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

Saturation Present? (includes capillary fringe) Yes ☑ No ☐ Depth (inches): 12

Wetland Hydrology Present? Yes ☑ No ☐

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

Remarks: Hydro from seepage along ditch.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Rostad Ranch City/County: Meagher Co. Sampling Date: 8/21/2013

Applicant/Owner: MDT State: MT Sampling Point: Ro-2u

Investigator(s): E Nyquist Section, Township, Range: 13 8N 11E

Landform (hillslope, terrace, etc.): Lowland Local relief (concave, convex, none): flat Slope (%): 3.49

Subregion (LRR): LRR F Lat: 46.4588916666667 Long: -110.294915 Datum: WGS84

Soil Map Unit Name: Delpoint variant-Marmarth-Cabbart loams NWI classification: Upland

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

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

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

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

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

Remarks: DP companion to R-2w.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size: 5ft)			
1. Bromus inermis	25	☑	UPL
2. Phleum pratense	20	☑	FACU
3. Trifolium pratense	20	☑	FACU
4. Achillea millefolium	5	☐	FACU
5. Festuca pratensis	15	☐	FACU
6. Elymus repens	15	☐	FACU
7.	0	☐	
8.	0	☐	
9.	0	☐	
10.	0	☐	
	100 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	75	x 4 =	300
UPL species	25	x 5 =	125
Column Totals	100 (A)		425 (B)

Prevalence Index = B/A = 4.25

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 Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ☐ No ☑

Remarks:

SOIL

Sampling Point: Ro-2u

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16	10YR 4/3	100					Sandy Loam	
16-22	10YR 4/2	100					Sandy Loam	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ☑

Remarks: No hydric soil indicators observed.

HYDROLOGY

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ 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)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

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

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

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

Wetland Hydrology Present? Yes _____ No ☑

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

Remarks: No hydrology indicators observed.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Rostad Ranch City/County: Meagher Co. Sampling Date: 8/21/2013

Applicant/Owner: MDT State: MT Sampling Point: Ro-2w

Investigator(s): E Nyquist Section, Township, Range: 13 8N 11E

Landform (hillslope, terrace, etc.): Lowland Local relief (concave, convex, none): flat Slope (%): 3.49

Subregion (LRR): LRR F Lat: 46.4591216666667 Long: -110.295368333333 Datum: WGS84

Soil Map Unit Name: Delpoint variant-Marmarth-Cabbart loams NWI classification: Upland

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

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

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

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

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

Remarks: DP along margin of wetland. Primary hydrology source is groundwater seepage. Surface rill present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
3.	0	☐	
4.	0	☐	
5.	0	☐	
	0 = Total Cover		
Herb Stratum (Plot size: 5ft)			
1. Phleum pratense	15	☑	FACU
2. Carex nebrascensis	15	☑	OBL
3. Juncus bufonius	10	☑	OBL
4. Beckmannia syzigachne	5	☑	OBL
5. Juncus arcticus	15	☑	FACW
6. Poa palustris	5	☑	FACW
7. Deschampsia caespitosa	5	☑	FACW
8.	0	☐	
9.	0	☐	
10.	0	☐	
	70 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.	0	☐	
2.	0	☐	
	0 = Total Cover		

% Bare Ground in Herb Stratum 40

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 85.71% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	30	x 1 =	30
FACW species	25	x 2 =	50
FAC species	0	x 3 =	0
FACU species	15	x 4 =	60
UPL species	0	x 5 =	0
Column Totals	70 (A)		140 (B)

Prevalence Index = B/A = 2

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 Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ☑ No ☐

Remarks:

SOIL

Sampling Point: Ro-2w

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/3	100					Sandy Clay Loa	
6-18	10YR 5/1	90	C M	7.5YR	4/6	10	Sandy Clay Loa	

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

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

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR F**)
- ☐ 1 cm Muck (A9) (**LRR F, G, H**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ☐ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR I, J**)
- ☐ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ☐ Dark Surface (S7) (**LRR G**)
- ☐ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☑ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☑ Iron Deposits (B5)
- ☐ 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)

Secondary Indicators (minimum of two required)

- ☑ Surface Soil Cracks (B6)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Drainage Patterns (B10)
- ☐ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☑ FAC-Neutral Test (D5)
- ☐ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

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

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

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

Wetland Hydrology Present? Yes ☑ No ☐

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

Remarks:

MDT Montana Wetland Assessment Form (revised March 2008)

1. Project name Rostad Ranch **2. MDT project#** STPX-0002(749) **Control#** 5565

3. Evaluation Date 9/21/2013 **4. Evaluators** E. Nyquist **5. Wetland/Site# (s)** Rostad Ranch - all wetlands

6. Wetland Location(s): **T** 8N **R** 11E **Sec1** 12 **T** 8N **R** 11E **Sec2** 13

Approx Stationing or Mileposts

Watershed 10040201 **Watershed/County** Upper Musselshell River Watershed, Meagher County

7. Evaluating Agency Confluence for MDT

8. Wetland size acres 13.74

Purpose of Evaluation

How assessed: Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

9. Assesssment area (AA) size (acres) 13.74

☐ **Mitigation Wetlands: pre-construction**

How assessed: Measured e.g. by GPS

☑ **Mitigation Wetlands: post construction**

☐ **Other**

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
Slope	Emergent Wetland	Excavated	Seasonal/Intermittent	60
Slope	Scrub-Shrub Wetland		Seasonal/Intermittent	5
Depressional	Unconsolidated Bottom	Excavated	Permanent/Perennial	35

11. Estimated Relative Abundance Common

12. General Condition of AA

i. Disturbance: (use matrix below to determine [circle] appropriate response – see instructions for Montana-listed noxious weed and aquatic nuisance vegetation species (**ANVS**) lists)

Conditions within AA	*Predominant conditions adjacent to (within 500 feet of) 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%.	low disturbance	low disturbance	moderate disturbance
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	moderate disturbance	high 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%.	high disturbance	high disturbance	high disturbance

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 moving across site. Site was revegetated in Fall 2012/Spring 2013 with good growth observed during the first growing season (2013) following construction activities.

ii. Prominent noxious, aquatic nuisance, other exotic species:

Spotted knapweed, Canada thistle, houndstongue, field bindweed

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 preventing (passive) existence of additional vegetated classes?		Modified Rating
>=3 (or 2 if 1 is forested) classes	H	NA	NA	NA
2 (or 1 if forested) classes	M	NA	NA	NA
1 class, but not a monoculture	M	<NO	YES>	L
1 class, monoculture (1 species comprises>=90% of total cover)	L	NA	NA	NA

Comments: Emergent and scrub-shrub vegetative communities on site.

SECTION PERTAINING to FUNCTIONS VALUES ASSESSMENT

14A. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals:

i. AA is Documented (D) or Suspected (S) to contain (check one based on definitions contained in instructions):

Primary or critical habitat (list species)	◉ D ◉ S	
Secondary habitat (list Species)	◉ D ◉ S	
Incidental habitat (list species)	◉ D ◉ S	
No usable habitat	☑ S	

ii. Rating (use the conclusions from i above and the matrix below to arrive at [check] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
Functional Points and Rating	1H	.9H	.8H	.7M	.3L	.1L	0L

Sources for documented use: USFWS list for Meagher County; no habitat specification present for species or documented occurences.

14B. Habitat for plant or animals rated S1, S2, or S3 by the Montana Natural Heritage Program: (not including species listed in14A above)

i. AA is Documented (D) or Suspected (S) to contain (check one based on definitions contained in instructions):

Primary or critical habitat (list species)	◉ D ○ S	Downingia laeta (S2S3)
Secondary habitat (list Species)	◉ D ○ S	Long-billed curlew (S3B); Mountain plover (S2B)
Incidental habitat (list species)	◉ D ◉ S	
No usable habitat	☐ S	

ii. Rating (use the conclusions from i above and the matrix below to arrive at [check] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
S1 Species: *Functional Points and Rating*	1H	.8H	.7M	.6M	.2L	.1L	0L
S2 and S3 Species: *Functional Points and Rating*	.9H	.7M	.6M	.5M	.2L	.1L	0L

Sources for documented use: Observed Downingia laeta in wetland during 2013 site visit; past observation of curlew/plover

14C. General Wildlife Habitat Rating:

i. Evidence of overall wildlife use in the AA (check substantial, moderate, or low based on supporting evidence):

Moderate

Substantial (based on any of the following [check]):

- ☐ observations of abundant wildlife #s or high species diversity (during any period)
- ☐ abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ☐ presence of extremely limiting habitat features not available in the surrounding area
- ☐ interviews with local biologists with knowledge of the AA

Minimal (based on any of the following [check]):

- ☐ few or no wildlife observations during peak use periods
- ☐ little to no wildlife sign
- ☐ sparse adjacent upland food sources
- ☐ interviews with local biologists with knowledge of the AA

Moderate (based on any of the following [check]):

- ☑ observations of scattered wildlife groups or individuals or relatively few species during peak periods
- ☐ common occurrence of wildlife sign such as scat, tracks, nest structures, game trails, etc.
- ☑ adequate adjacent upland food sources
- ☐ interviews with local biologists with knowledge of the AA

ii. Wildlife habitat features (Working from top to bottom, check appropriate AA attributes in matrix to arrive at rating. Structural diversity is from #13. For class cover to be considered evenly distributed, the most and least prevalent **vegetated** classes must be within 20% of each other in terms of their percent composition of the AA (see #10). Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; and A = absent [see instructions for further definitions of these terms])

Structural diversity (see #13)	High								Moderate								Low			
Class cover distribution (all vegetated classes)	Even				Uneven				Even				Uneven				Even			
Duration of surface water in ≥ 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12i)	E	E	E	H	E	E	H	H	E	H	H	M	E	H	M	M	E	H	M	M
Moderate disturbance at AA (see #12i)	H	H	H	H	H	H	H	M	H	H	M	M	H	M	M	L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	L	M	L	L	L	L	L	L	L

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [check] the functional points and rating)

Evidence of wildlife use (i)	*Wildlife habitat features rating (ii)*			
	Exceptional	High	Moderate	Low
Substantial	1E	.9H	.8H	.7M
Moderate	.9H	.7M	.5M	.3L
Minimal	.6M	.4M	.2L	.1L

Comments Moderate use of the AA area by wildlife observed.

14D. General Fish Habitat Rating: (Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not used by fish, fish use is not restorable due to habitat constraints, or is not desired from a management perspective [such as fish entrapped in a canal], then check ☑ **NA** here and proceed to 14E.)

i. Habitat Quality and Known / Suspected Fish Species in AA (use matrix to arrive at [check the functional points and rating)

Duration of surface water in AA	Permanent / Perennial						Seasonal / Intermittent						Temporary / Ephemeral					
Aquatic hiding / resting / escape cover	Optimal		Adequate		Poor		Optimal		Adequate		Poor		Optimal		Adequate		Poor	
Thermal cover optimal / suboptimal	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S
FWP Tier I fish species	1E	.9H	.8H	.7M	.6M	.5M	.9H	.8H	.7M	.6M	.5M	.4M	.7M	.6M	.5M	.4M	.3L	.3L
FWP Tier II or Native Game fish species	.9H	.8H	.7M	.6M	.5M	.5M	.8H	.7M	.6M	.5M	.4M	.4M	.6M	.5M	.4M	.3L	.2L	.2L
FWP Tier III or Introduced Game fish	.8H	.7M	.6M	.5M	.5M	.4M	.7M	.6M	.5M	.4M	.4M	.3L	.5M	.4M	.3L	.2L	.2L	.1L
FWP Non-Game Tier IV or No fish species	.5M	.5M	.5M	.4M	.4M	.3L	.4M	.4M	.4M	.3L	.3L	.2L	.2L	.2L	.2L	.1L	.1L	.1L

Sources used for identifying fish sp. potentially found in AA:

ii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1)
a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity ***or*** *is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support,* ***or*** *do aquatic nuisance plant or animal species (see* ***Appendix E****) occur in fish habitat?* **Y** ◯ **N** ◉ *If yes, reduce score in* ***i*** *above by 0.1:* **Modified Rating**

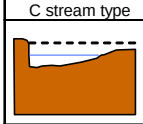
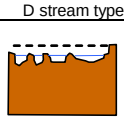
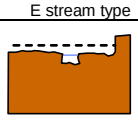
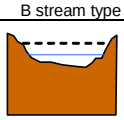
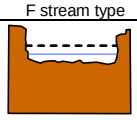
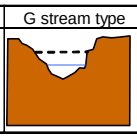
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ◯ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

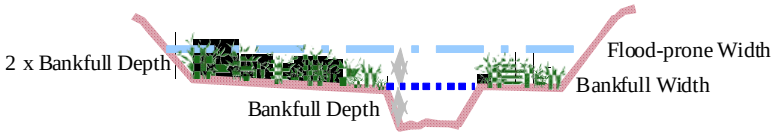
iii. Final Score and Rating: 0 NA **Comments:** No perennially flowing water within AA for fish habitat.

14E. Flood Attenuation: (Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, click ☑ **NA** here and proceed to 14F.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	Slightly entrenched - C, D, E stream types			Moderately entrenched – B stream type			Entrenched-A, F, G stream types		
% 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**	1H	.9H	.6M	.8H	.7M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.8H	.5M	.7M	.6M	.4M	.3L	.2L	.1L

Slightly Entrenched ER = >2.2			**Moderately Entrenched 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
						



Floodprone width _____ **/ Bankfull width** _____ **= Entrenchment ratio** _____

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 (check)? **Y** ◯ **N** ◉

Comments: No flooding occurs via in-channel or overbank flow.

14F. Short and Long Term Surface Water Storage: (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, click ☐ **NA** here and proceed to 14G.)

i. Rating (Working from top to bottom, use the matrix below to arrive at [check] the functional points and rating. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see instructions 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 feet			1.1 to 5 acre feet			≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond **≥ 5 out of 10 years**	1H	.9H	.8H	.8H	.6M	.5M	.4M	.3L	.2L
Wetlands in AA flood or pond **< 5 out of 10 years**	.9H	.8H	.7M	.7M	.5M	.4M	.3L	.2L	.1L

Comments: Depressional area and portions of slope wetlands maintain water perennially. Estimating approximately 10 acres indundated to 0.5 foot.

14G. Sediment/Nutrient/Toxicant Retention and Removal: (Applies to wetlands 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, click ☐ **NA** here and proceed to 14H.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating [H = high, M = moderate, or L = low])

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver levels of sediments, nutrients, or compounds at levels such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	≥ 70%		< 70%		≥ 70%		< 70%	
Evidence of flooding / ponding in AA	Yes	No	Yes	No	Yes	No	Yes	No
AA contains **no or restricted outlet**	1H	.8H	.7M	.5M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.7M	.6M	.4M	.4M	.3L	.2L	.1L

Comments: Approximately 60 percent of the AA is vegetated. A restricted outlet is located on the depressional area as a constructed overflow channel.

14H Sediment/Shoreline Stabilization: (Applies only if AA occurs on or within the banks or 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, click ☑ **NA** here and proceed to 14I.)

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

*% Cover of **wetland** streambank or shoreline by species with stability ratings of ≥6 (see **Appendix F**).*	*Duration of surface water adjacent to rooted vegetation*		
	Permanent / Perennial	Seasonal / Intermittent	Temporary / Ephemeral
≥ 65%	1H	.9H	.7M
35-64%	.7M	.6M	.5M
< 35%	.3L	.2L	.1L

Comments: The AA does not occur within the banks of a stream or drainage subject to wave action.

14I. Production Export/Food Chain Support:

i. Level of Biological Activity (synthesis of wildlife and fish habitat ratings [check])

General Fish Habitat Rating (14D.iii.)	**General Wildlife Habitat Rating (14C.iii.)**		
	E/H	M	L
E/H	H	H	M
M	H	M	M
L	M	M	L
N/A	H	M	L

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

A	Vegetated component >5 acres						Vegetated component 1-5 acres						Vegetated component <1 acre					
B	High		Moderate		Low		High		Moderate		Low		High		Moderate		Low	
C	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	1E	.7H	.8H	.5M	.6M	.4M	.9H	.6M	.7H	.4M	.5M	.3L	.8H	.6M	.6M	.4M	.3L	.2L
S/I	.9H	.6M	.7H	.4M	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.5M	.5M	.3L	.3L	.2L
T/E/A	.8H	.5M	.6M	.3L	.4M	.2L	.7H	.4M	.5M	.2L	.3L	.1L	.6M	.4M	.4M	.2L	.2L	.1L

iii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1.) **Vegetated Upland Buffer (VUB)**: Area with ≥ 30% plant cover, ≤ 15% noxious weed or ANVS cover, and that is not subjected to periodic mechanical mowing or clearing (unless for weed control).

a) Is there an average ≥ 50 foot-wide vegetated upland buffer around ≥ 75% of the AA circumference? **Y** ◉ **N** ○ *If yes, add 0.1 to the score in **ii** above and adjust rating accordingly:* **Modified Rating** .9H

Comments: Moderate biological activity; no fish habitat; vegetative component >5 acres with a upland buffer.

14J. Groundwater Discharge/Recharge: (check the appropriate indicators in i & ii below)

i. Discharge Indicators

- [x] The AA is a slope wetland
- [x] Springs or seeps are known or observed
- [x] Vegetation growing during dormant season/drought
- [x] Wetland occurs at the toe of a natural slope
- [ ] Seeps are present at the wetland edge
- [x] AA permanently flooded during drought periods
- [x] Wetland contains an outlet, but no inlet
- [ ] Shallow water table and the site is saturated to the surface
- [ ] Other:

ii. Recharge Indicators

- [ ] Permeable substrate present without underlying impeding layer
- [ ] Wetland contains inlet but no outlet
- [ ] Stream is a known 'losing' stream; discharge volume decreases
- [ ] Other:

iii. Rating (use the information from i and ii above and the table below to arrive at [check] the functional points and rating)

	Duration of saturation at AA Wetlands *FROM GROUNDWATER DISCHARGE OR WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM*			
Criteria	P/P	S/I	T	None
Groundwater Discharge or Recharge	1H	.7M	.4M	.1L
Insufficient Data/Information		NA		

Comments: Saturation present throughout the majority of the AA late in the growing season with little precipitation for growing season.

14K. Uniqueness:

i. Rating (working from top to bottom, use the matrix below to arrive at [check] the functional points and rating)

Replacement potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland **or** plant association listed as "S1" by the MTNHP			AA does not contain previously cited rare types **and** structural diversity (#13) is high **or** contains plant association listed as "S2" by the MTNHP			AA does not contain previously cited rare types or associations **and** structural diversity (#13) is low-moderate		
Estimated relative abundance (#11)	rare	common	abundant	rare	common	abundant	rare	common	abundant
Low disturbance at AA (#12i)	1H	.9H	.8H	.8H	.6M	.5M	.5M	.4M	.3L
Moderate disturbance at AA (#12i)	.9H	.8H	.7M	.7M	.5M	.4M	.4M	.3L	.2L
High disturbance at AA (#12i)	.8H	.7H	.6M	.6M	.4M	.3L	.3L	.2L	.1L

Comments: Downingia laeta was observed in wetland area.

14L. Recreation/Education Potential: (affords "bonus" points if AA provides recreation or education opportunity)

i. Is the AA a known or potential rec./ed. site: (check) **Y** (●) **N** (○) (if 'Yes' continue with the evaluation; if 'No' then click ☐ **NA** here and proceed to the overall summary and rating page)

ii. Check categories that apply to the AA: ☑ Educational/scientific study; ☐ Consumptive rec.; ☑ Non-consumptive rec.; ☐ Other

iii. Rating (use the matrix below to arrive at [check] the functional points and rating)

Known or Potential Recreation or Education Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	.2H	.15H
Private ownership with general public access (no permission required)	.15H	.1M
Private or public ownership without general public access, or requiring permission for public access	.1M	.05L

Comments:

Currently no recreation/education occurs at the site.

General Site Notes

Several areas of the constructed embankment dike around the northern cell had breached during the early summer, and MDT had made some temporary repairs with coir logs and rock to prevent further washouts and degradation of the structure. Subsequent evaluation of the embankment dike structure indicated that it had been constructed at an elevation lower than the constructed outlet structure. MDT required the contractor to undertake corrective actions in November of 2013 to raise the level of the dike and repair all breaches in the structure. In addition to the structure, spreader berms were extended at several locations to spread water further across the site.

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S): Rostad Ranch - all wetlands

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	L	0	1	0	☐
B. MT Natural Heritage Program Species Habitat	H	.9	1	12.366	☑
C. General Wildlife Habitat	M	.5	1	6.87	☐
D. General Fish Habitat	NA	0	0	0	☐
E. Flood Attenuation	NA	0	0	0	☐
F. Short and Long Term Surface Water Storage	H	.8	1	10.992	☑
G. Sediment/Nutrient/Toxicant Removal	M	.7	1	9.618	☐
H. Sediment/Shoreline Stabilization	NA	0	0	0	☐
I. Production Export/Food Chain Support	H	.9	1	12.366	☑
J. Groundwater Discharge/Recharge	H	1	1	13.74	☑
K. Uniqueness	M	.4	1	5.496	☐
L. Recreation/Education Potential (bonus points)	L	.05	NA	0.687	☐
Totals:		5.25	8	72.135	
Percent of Possible Score			**65.63** %		

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; **or**
- ☐ Score of 1 functional point for Uniqueness; **or**
- ☐ Score of 1 functional point for Flood Attenuation **and** answer to Question 14E.ii is "yes"; **or**
- ☐ 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; otherwise go to Category III)
- ☐ "Low" rating for Uniqueness; **and**
- ☐ Vegetated wetland component < 1 acre (do not include upland vegetated buffer); **and**
- ☐ Percent of possible score < 35% (round to nearest whole #).

OVERALL ANALYSIS AREA RATING:
(check appropriate category based on the criteria outlined above)

I	II	III	IV

Appendix C

Project Area Photographs

MDT Wetland Mitigation Monitoring
Rostad Ranch
Meagher County, Montana



Photo Point 1 – *Panorama*
Bearing: 140-240 degrees

Location: Northeast corner of site
Taken in 2013



Photo Point 2 – *Panorama*
Bearing: 180 -70 degrees

Location: East fence corner
Taken in 2013



Photo Point 3 – *Panorama*
Bearing: 160-360 degrees

Location: East fence line
Taken in 2013



Photo Point 4 – *Panorama*
Bearing: 190-340 degrees

Location: Southeast fence corner
Taken in 2013



Photo Point 5 – *Panorama*
Bearing: 300-110 degrees

Location: Southwest fence corner
Taken in 2013



Photo Point 6 – *Photo 1*
Bearing: 30 degrees
Location: West fence line
Taken in 2013



Photo Point 6 – *Photo 2*
Bearing: 100 degrees
Location: West fence line
Taken in 2013



Photo Point 7 – *Panorama*
Bearing: 0-330 degrees
Location: West fence corner
Taken in 2013



Transect 1 – *Beginning*
Bearing: 290 degrees

Location: NE branch of site
Taken in 2013



Transect 1 – *End*
Bearing: 110 degrees

Location: NE branch of site
Taken in 2013



Transect 2 – *Beginning*
Bearing: 130 degrees

Location: North central
Taken in 2013



Transect 2 – *End*
Bearing: 310 degrees

Location: North central
Taken in 2013



Transect 3 – *Beginning*
Bearing: 30 degrees

Location: South branch of site
Taken in 2013



Transect 3 – *End*
Bearing: 210 degrees

Location: South branch of site
Taken in 2013



Data Point – Ro-1u
Bearing: 340 degrees
Location: Veg community 1
Taken in 2013



Data Point – Ro-1w
Bearing: 45 degrees
Location: Veg community 2
Taken in 2013



Data Point – Ro-2u
Bearing: 260 degrees
Location: Veg community 1
Taken in 2013



Data Point – Ro-2w
Bearing: 250 degrees
Location: Veg community 2
Taken in 2013

Appendix D

Project Plan Sheets

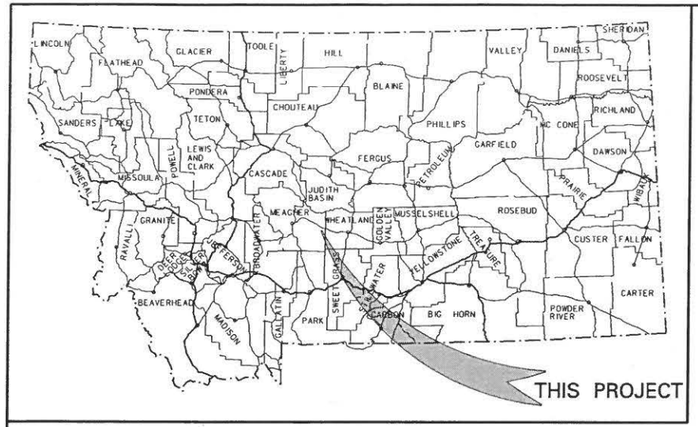
MDT Wetland Mitigation Monitoring
Rostad Ranch
Meagher County, Montana

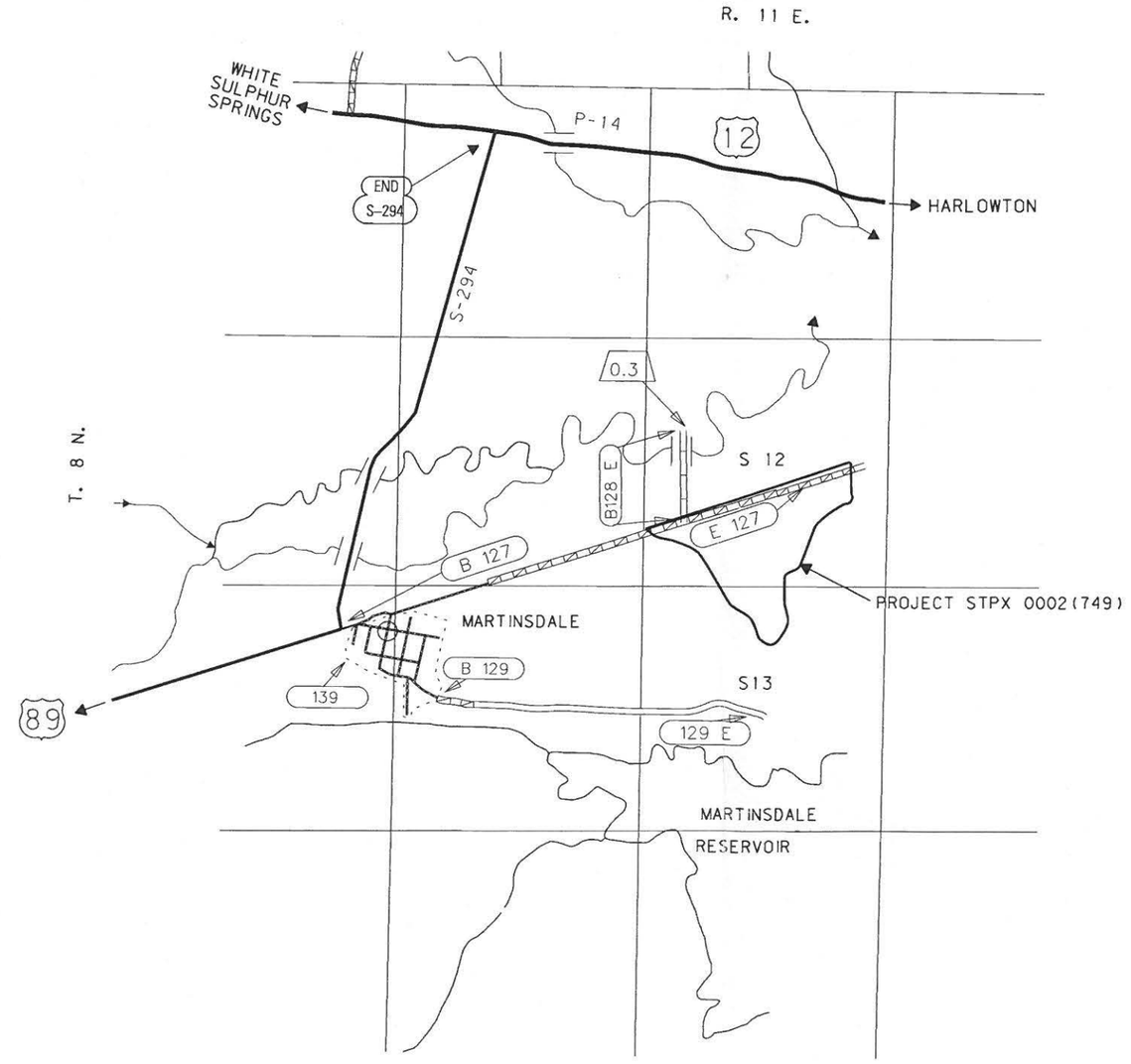
MONTANA DEPARTMENT OF TRANSPORTATION

FEDERAL AID PROJECT NO. STPX 0002(749)

ROSTAD RANCH WETLAND

MEAGHER COUNTY





MORRISON MAIERLE, INC.

PLANS PREPARED BY

MORRISON–MAIERLE, INC.

1 ENGINEERING PLACE
P.O. BOX 6147
HELENA, MT 59604

PHONE (406) 442-3050
FAX (406) 442-7862

RELATED PROJECTS

ASSOCIATED PROJECT AGREEMENT NUMBERS	
R / W & I.C.	STPX 0002(749)
P. E.	STPX 0002(749)

MORRISON–MAIERLE, INC.

BY Phillip J. Forbes

DATE 05.11.12

MONTANA PHILLIP J. FORBES 9112 PE REGISTERED PROFESSIONAL ENGINEER

MONTANA DEPARTMENT OF TRANSPORTATION

RECEIVED

BY CONSULTANT DESIGN ENGINEER — DATE MAY 14, 2012

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED :

DIVISION ADMINISTRATOR — DATE

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\5565000rdtttz01.dgn	DESIGNED BY			ROSTAD MITIGATION
2		5/17/2012	REVIEWED BY			MEAGHER COUNTY
1		9:40:00 AM CPS - U2160	CHECKED BY			

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MORRISON MAIERLE, INC.
ENGINEERS SURVEYORS PLANNERS
An Energy+ Owned Company

NOTES

TEMPORARY EROSION AND SEDIMENT CONTROL

REFER TO SECTION 208 OF THE MDT DETAILED DRAWINGS FOR EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES. INSTALL TEMPORARY EROSION CONTROL MEASURES AS DEEMED NECESSARY BY THE ENGINEER. PAYMENT TO BE DETERMINED BY USING THE EROSION AND SEDIMENT CONTROL RATE SCHEDULE AND PAID FOR UNDER MISCELLANEOUS WORK. ALL INSTALLED TEMPORARY EROSION CONTROL BLANKETS MUST BE COMPOSED AND CONSTRUCTED OF 100% BIODEGRADABLE FIBERS, NETTING, AND STITCHING.

SOILS INFORMATION

TO OBTAIN THE COMPLETE SOILS INFORMATION CONTACT THE MDT GEOTECHNICAL SECTION AT (406) 444-6281.

UTILITIES

CONTACT THE UTILITIES UNDERGROUND LOCATION CENTER (1-800-424-5555) OR OTHER NOTIFICATION SYSTEM FOR THE MARKING AND LOCATION OF ALL LINES AND SERVICES BEFORE EXCAVATING.

CLEARING AND GRUBBING

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

TOPSOIL SALVAGING AND PLACING

TOPSOIL QUANTITIES SHOWN IN THE PLANS ARE SUFFICIENT TO RE-TOPSOIL IN AREAS WHERE CUTS OR FILLS EXCEED 1 FOOT. ALL REMAINING GRADING IS CONSIDERED UNCLASSIFIED EXCAVATION.

PIEZOMETER REMOVAL

SEE SHEET 10 FOR LOCATIONS OF PIEZOMETERS ON THE PROJECT. ABANDON WELLS IN ACCORDANCE WITH ARM 36.21.810.

WETLANDS

ONLY WETLANDS WITHIN THE PROJECT LIMITS HAVE BEEN DELINEATED. WETLANDS MAY EXIST BEYOND THE PROJECT LIMITS AND ANY ACTION AFFECTING SUCH WETLANDS IS THE RESPONSIBILITY OF THE CONTRACTOR.

WETLANDS LEGEND

DELINEATED WETLANDS

IMPACTED WETLANDS

COMBINATION SCALE FACTOR

ALL SURVEY AND STAKING WILL REQUIRE THE USE OF A COMBINATION SCALE FACTOR (CSF) 0.99922160. ALL DIMENSIONS ON THE PLANS ARE GRID DIMENSIONS AND MUST BE DIVIDED BY THE CSF TO ARRIVE AT GROUND DIMENSIONS.

SURVEY DATA

DTM FILES FORMATTED FOR TRIMBLE, LEICA, AND TOPCON SURVEY CONTROLLERS ARE AVAILABLE UPON REQUEST. CONTACT WADE SALYARDS, MDT WETLAND ENGINEER, AT 444-0451.

LINEAR & LEVEL DATA

BEARING SOURCE

NAD 83 (1992)

LEVEL DATUM SOURCE

NAVD 88

BENCH MARKS

SEE CONTROL ABSTRACT FOR BENCHMARK INFORMATION

2JEB

CONTROL DIAGRAM

77E

Control marks 1 through 7 were established to provide control in the areas of future wetlands mitigation. MDT secondary control procedures were used to establish the state plane coordinates and GPS derived orthometric heights of the new control.

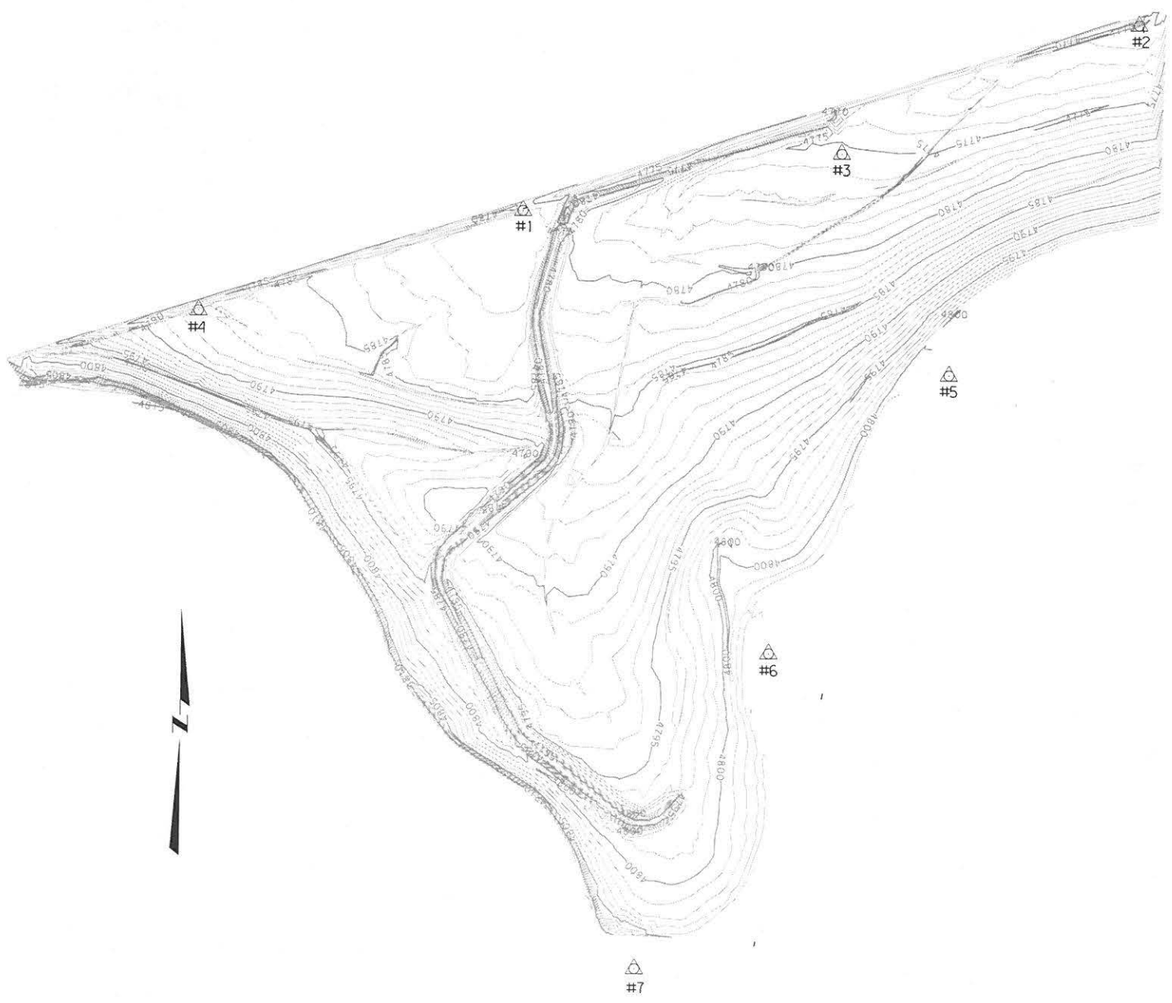
Coordinates shown hereon are referenced to the Montana Coordinate System NAD83(1992), international feet. Elevations are referenced to NAVD88, U.S. Feet (Geoid03). Redundant GPS RTK methods of survey were used to tie this survey to MDT control survey CN 4889, which was tied to the National Spatial Reference System through first-order order or better control points "A 295", "B80RESET" and "KBT2", using GPS static procedures with dual-frequency GPS receivers.

In order to maintain a relative accuracy of 1:50,000, one Combination Scale Factor can be used for this project: .99922160, which is the Combination Scale Factor for CN 4889.

CONTROL MARK ABSTRACT

POINT NAME/NUMBER	N OR Y COORDINATE	E OR X COORDINATE	POINT ELEVATION	LOCATION AND DESCRIPTION
2JEB	820176.707	1755842.913	4837.33	FOUND USGS BENCHMARK. FROM THE JUNCTION OF HIGHWAY 294 AND 12, GO 2 MILES WEST ALONG HIGHWAY 12. THE MARK IS 95' NORTHWEST OF AND 69' SOUTHWEST OF A "T" ROAD GOING NORTH OFF OF HIGHWAY 12, 71' WEST OF AN IRRIGATION DITCH CROSSING HIGHWAY 12, 1' NORTH OF SOUTH R/W FENCE AND POST WITH SURVEY MARKER SIGN, BRASS CAP STAMPED "2-JEB, 1972."
77E	815626.843	1773445.444	4735.58	FOUND MDT CONTROL CAP AT MP 17.55, A STANDARD MDT CONTROL CAP ON 5/8" REBAR 0.03m BELOW GROUND STAMPED "77E 2003". CAP IS 250' NORTH OF THE PTM, 195' NORTH OF CORNER IN NORTH R/W FENCE WEST OF THE NORTH ROAD TO MARTINSDALE HUTTERITE COLONY, 82' WEST OF WEST FENCE ALONG THE ROAD, 42' WEST OF AN IRRIGATION DITCH, 75' EAST OF A POWER POLE "TAP B", AND ON HIGH POINT ABOVE AN IRRIGATION DITCH. WITNESS POSTS SET 7' NORTH AND SOUTH.
1	807908.694	1767815.256	4781.01	SET MDT CONTROL CAP, FLUSH WITH GROUND, STAMPED "1 2008". MARK IS 2.6' NORTH OF THE SOUTH ROW FENCE OF MARTINSDALE ROAD, 15' WEST OF AN APPROACH, AND 2.6' NORTH OF A WITNESS POST.
2	808455.543	1769626.308	4770.81	SET MDT CONTROL CAP, FLUSH WITH GROUND, STAMPED "2 2008". MARK IS 2' SOUTH OF THE SOUTH ROW FENCE OF MARTINSDALE ROAD, 7.7' WEST OF A FENCE CORNER, 35' WEST OF AN APPROACH, AND 2' SOUTH OF A WITNESS POST.
3	808076.674	1768751.668	4775.16	SET MDT CONTROL CAP, FLUSH WITH GROUND, STAMPED "3 2008". MARK IS 100' SOUTH OF THE SOUTH ROW FENCE OF MARTINSDALE ROAD, AND 2' NORTH OF A WITNESS POST.
4	807615.353	1766864.291	4787.63	SET MDT CONTROL CAP, FLUSH WITH GROUND, STAMPED "4 2008". MARK IS 3' SOUTH OF THE SOUTH ROW FENCE OF MARTINSDALE ROAD, 450' EAST OF A DIVERSION STRUCTURE, AND 2' SOUTH OF A WITNESS POST.
5	807432.042	1769072.531	4808.98	SET MDT CONTROL CAP, FLUSH WITH GROUND, STAMPED "5 2008". MARK IS 2' NORTH OF AN EAST-WEST FENCE, AND 2' SOUTH OF A WITNESS POST.
6	806616.942	1768550.880	4806.07	SET MDT CONTROL CAP, FLUSH WITH GROUND, STAMPED "6 2008". MARK IS IN AN OPEN FIELD, 30' EAST OF AN IRRIGATION CANAL, AND 2' SOUTH OF A WITNESS POST.
7	805695.871	1768165.498	4812.40	SET MDT CONTROL CAP, FLUSH WITH GROUND, STAMPED "7 2008". MARK IS ON TOP OF THE EAST BANK OF CANAL, 40' NORTH OF AN EAST-WEST FENCE, 120' SOUTHEAST OF CONCRETE DIVERSION STRUCTURE, AND 2' SOUTH OF A WITNESS POST.

NOTE: CONTROL DIAGRAM NOT TO SCALE



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3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\5565000rdttlz01.dgn	DESIGNED BY			WETLAND PLANS		ROSTAD RANCH WETLAND	PROJECT NO. STPX 0002(749)
2		5/21/2012	REVIEWED BY			MEAGHER COUNTY		CSF = 0.99922160 / UPN NUMBER 5565	SHEET 3 OF 19
1		10:31:43 AM CPS-U2160	CHECKED BY						

SUMMARY

GRADING

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

FOR INFORMATION ONLY

NOTE: 20% SHRINK FACTOR APPLIED TO GRADING

REVEGETATION

STATION		lump sum		cubic yards	acres	REMARKS
FROM	TO	REVEGE-TATION	TREE & SHRUB PLANTING **	TOPSOIL SALVAGING & PLACING	WETLAND SEEDING *	
		1	1	22,235	35.83	
TOTAL		1	1	22,235	~	

* FOR INFORMATION ONLY

** SEE SHEET 17 FOR CONCEPTUAL REVEGETATION PLAN

ABANDON PIEZOMETER

STATION	ITEM DESCRIPTION	square yards	cubic yards	each	REMARKS
	ABANDON WELL			4	SEE SHEET 10 FOR LOCATIONS
TOTAL		~	~	4	

CULVERTS (INCLUDED IN CULVERT SUMMARY RECAP)

CULVERT	BASIC BID ITEMS											PIPE OPTIONS in		COATING *	END SECTIONS		cubic yards				square yards	linear feet	SKEW ANGLE	CULVERT IN PL. in x ft	REMARKS
	CULVERT PIPE in	linear feet				cubic yards					square yards				LEFT	RIGHT	FOUND-ATION MATERIAL	BEDDING MATERIAL	CLASS "DD" CONCRETE	CULVERT RIPRAP CLASS	GEOTEX-TILE #	HEIGHT OF COVER			
		LENGTH OF PIPE	RELAY CULVERT	CLEAN CULVERT	REMOVE CULVERT	CULVERT EXC. **	FOUND-ATION MATERIAL	BEDDING MATERIAL	CLASS "DD" CONCRETE	CULVERT RIPRAP CLASS	GEOTEX-TILE #	CONCRETE STEEL - 2 2/3 x 1/2 CORR. ALUMINUM - 2 2/3 x 1/2 CORR.	CLASS OR THK.											
CULVERT A					23.0																			18 X 23.0 CMP	REMOVE
CULVERT B					75.0																			18 X 75.0 CMP	REMOVE
CULVERT C					22.0																			18 X 22.0 CMP	REMOVE
CULVERT D					42.0																			18 X 42.0 CMP	REMOVE
TOTAL	~	~	~	~	162.0	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	~	

BROAD-CRESTED WEIR

STATION		cubic yards	square yards	each						REMARKS
FROM	TO	BANK PROTECTION	TURF REINFORCEMENT MAT	CANAL GATE	HEAD GATE	TRASH GUARD	CHECK	TURNOUT	REMOVE IRRIGATION STRUC-TURE	
		TYPE 3	TYPE C350	in	in					BROAD-CRESTED WEIR
		35	120							
TOTAL		35	120	~	~	~	~	~	~	

CULVERT SUMMARY RECAP

BASIC BID	linear feet				cubic yards				square yards	
	NEW PIPE (TOTAL)	RELAY CULVERT	CLEAN CULVERT	REMOVE CULVERT	FOUND-ATION MATERIAL	BEDDING MATERIAL	CLASS "DD" CONCRETE	CULVERT RIPRAP CLASS	GEOTEXTILE	PERM. EROS. CNTRL. SURV. CLASS
				162.0						
TOTAL	~	~	~	162.0	~	~	~	~	~	

FENCING

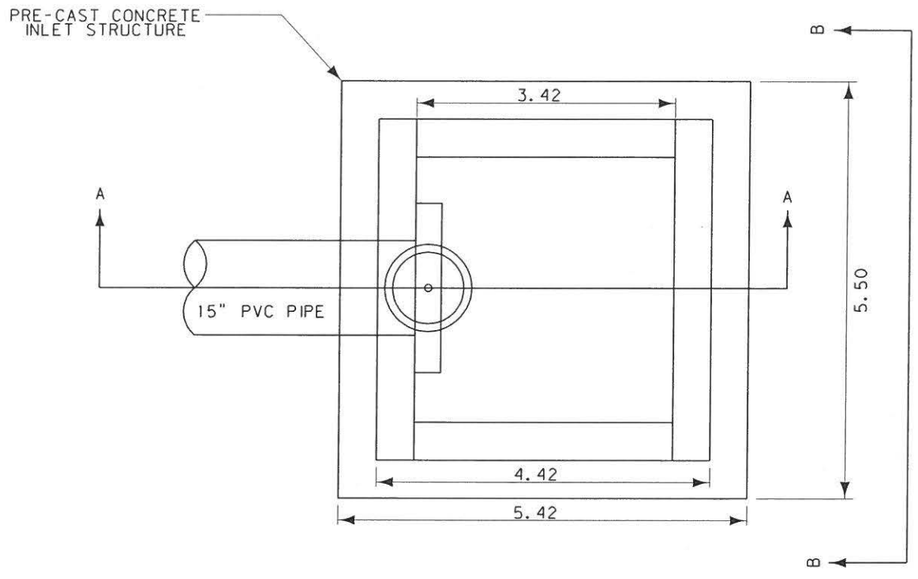
STATION		linear feet			each			linear feet		REMARKS
		WILDLIFE FRIENDLY FENCE		REMOVE FENCE	WILDLIFE FRIENDLY FENCE PANEL		DEADMAN	FARM GATE*		
FROM	TO	TYPE 1 - FM	TYPE 1 - FW		SINGLE	DOUBLE		TYPE G2	TYPE G3	
		2,592.4		2,592.4	4	1		12		
		495.2			1	1		12		
		974.6				2				
		379.2			1	1				
		838.9				2				
		215.8			1	4		12		
		530.3				1				
		99.5			1	1				
		2,271.7			4	1				
TOTAL		8,397.6	~	# 2,592.4	12	14	~	36	~	

FOR INFORMATION ONLY

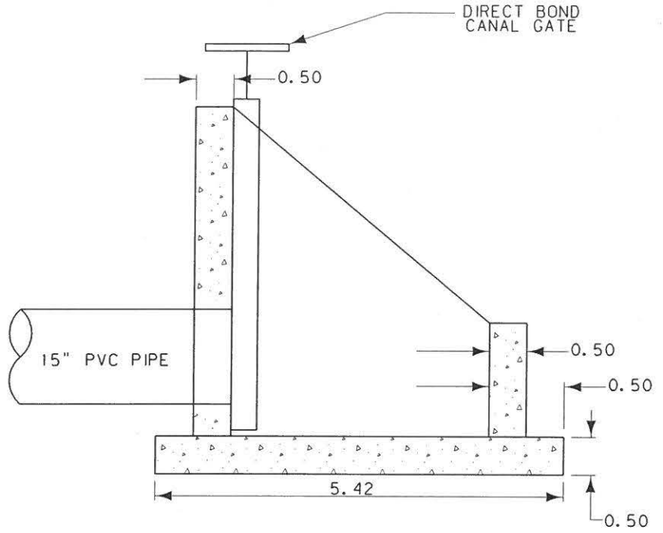
DIVERSION STRUCTURE

DIVERSION	cubic yard	square yard	each		feet	lump sum	REMARKS
	CLASS "DD" CONC.	BANK PROTECTION	TURF REINFORCEMENT MAT	CANAL GATE	HEAD GATE	PVC PIPE	TOTAL	
		TYPE 3	TYPE C350	15 in	15 in	15 in		
	4			1		20.0	1	SEE DETAIL
		20	70					SEE DETAIL
	~	20	70	~	~	~	1	

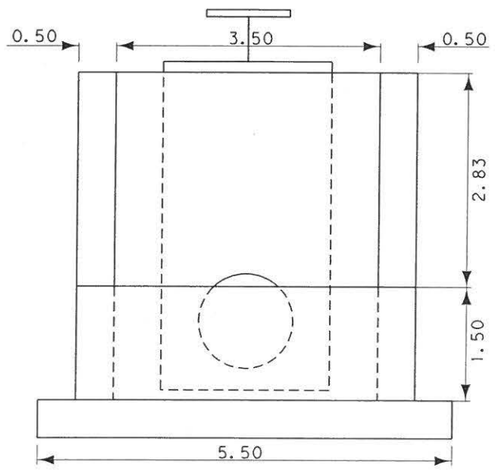
DETAIL



PLAN VIEW



SECTION A-A



SECTION B-B

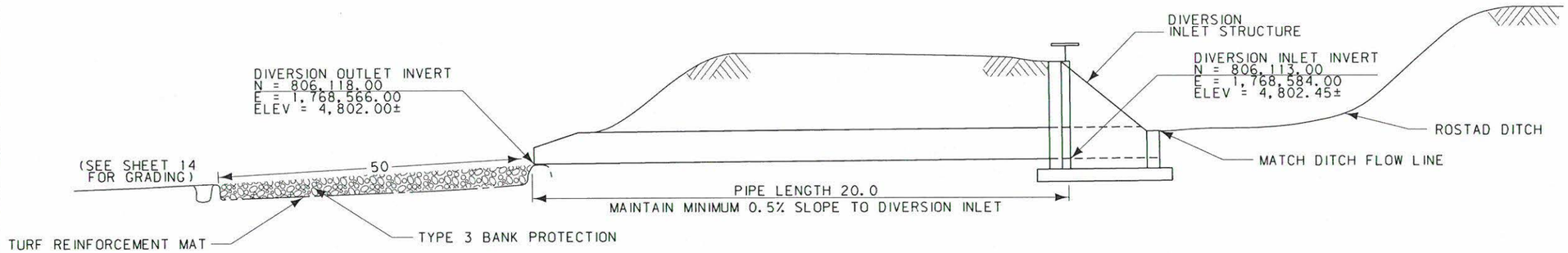
DIVERSION INLET STRUCTURE

NTS

NOTE: ALL DIMENSION IN FEET UNLESS OTHERWISE NOTED

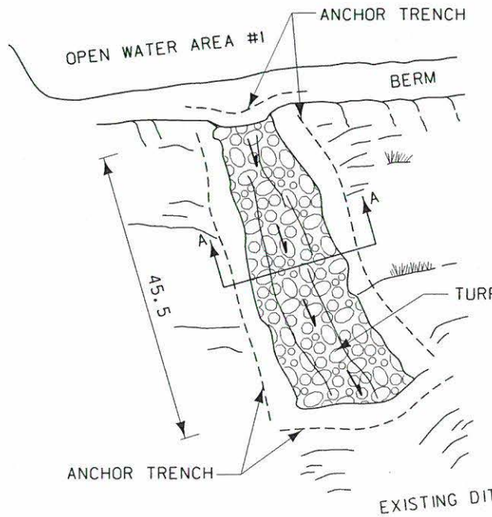
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2		5/21/2012	REVIEWED BY					
1		10:31:57 AM CPS - U2160	CHECKED BY			MEAGHER COUNTY	CSF = 0.99922160 UPN NUMBER 5565	SHEET 5 OF 19

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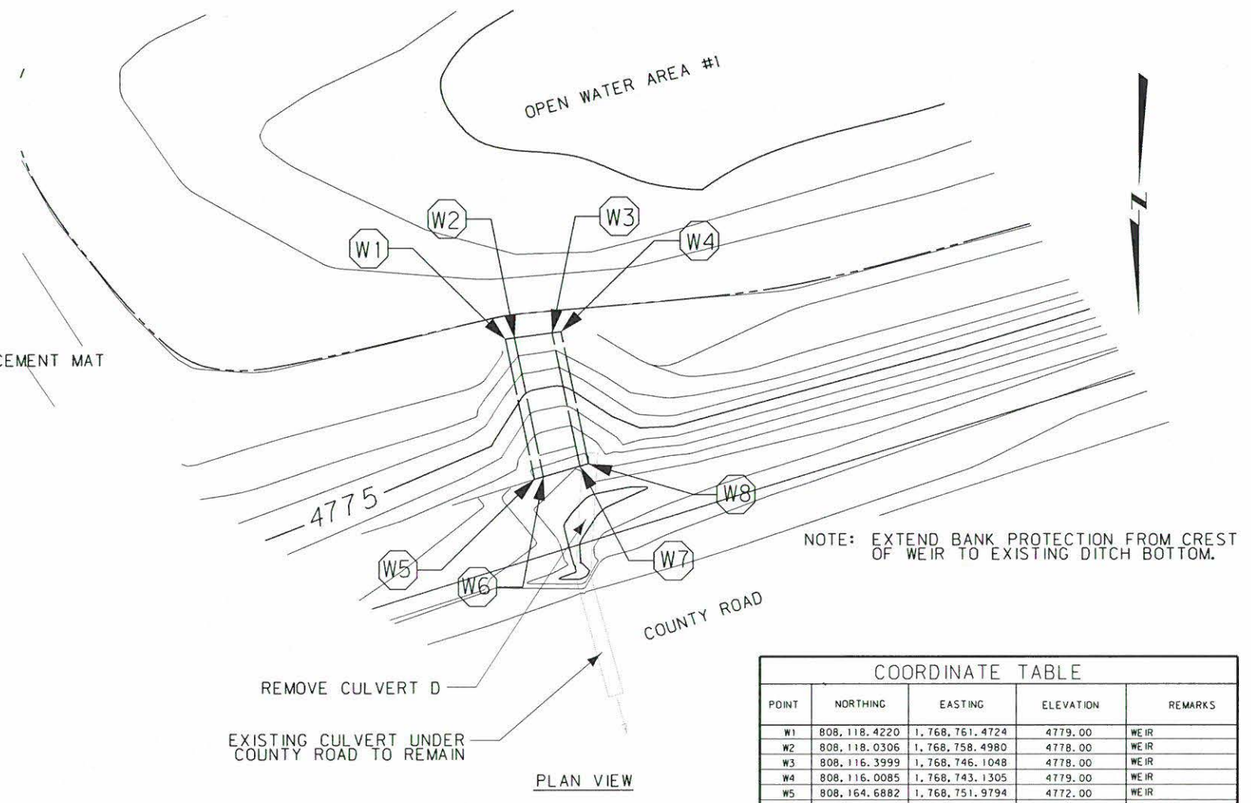


DIVERSION STRUCTURE CROSS SECTION

NTS



SECTION A-A



PLAN VIEW

NOTE: EXTEND BANK PROTECTION FROM CREST OF WEIR TO EXISTING DITCH BOTTOM.

COORDINATE TABLE

POINT	NORTHING	EASTING	ELEVATION	REMARKS
W1	808,118.4220	1,768,761.4724	4779.00	WEIR
W2	808,118.0306	1,768,758.4980	4778.00	WEIR
W3	808,116.3999	1,768,746.1048	4778.00	WEIR
W4	808,116.0085	1,768,743.1305	4779.00	WEIR
W5	808,164.6882	1,768,751.9794	4772.00	WEIR
W6	808,163.8578	1,768,749.0875	4771.00	WEIR
W7	808,160.3978	1,768,737.0378	4771.00	WEIR
W8	808,159.5674	1,768,734.1459	4772.00	WEIR

BROAD-CRESTED WEIR

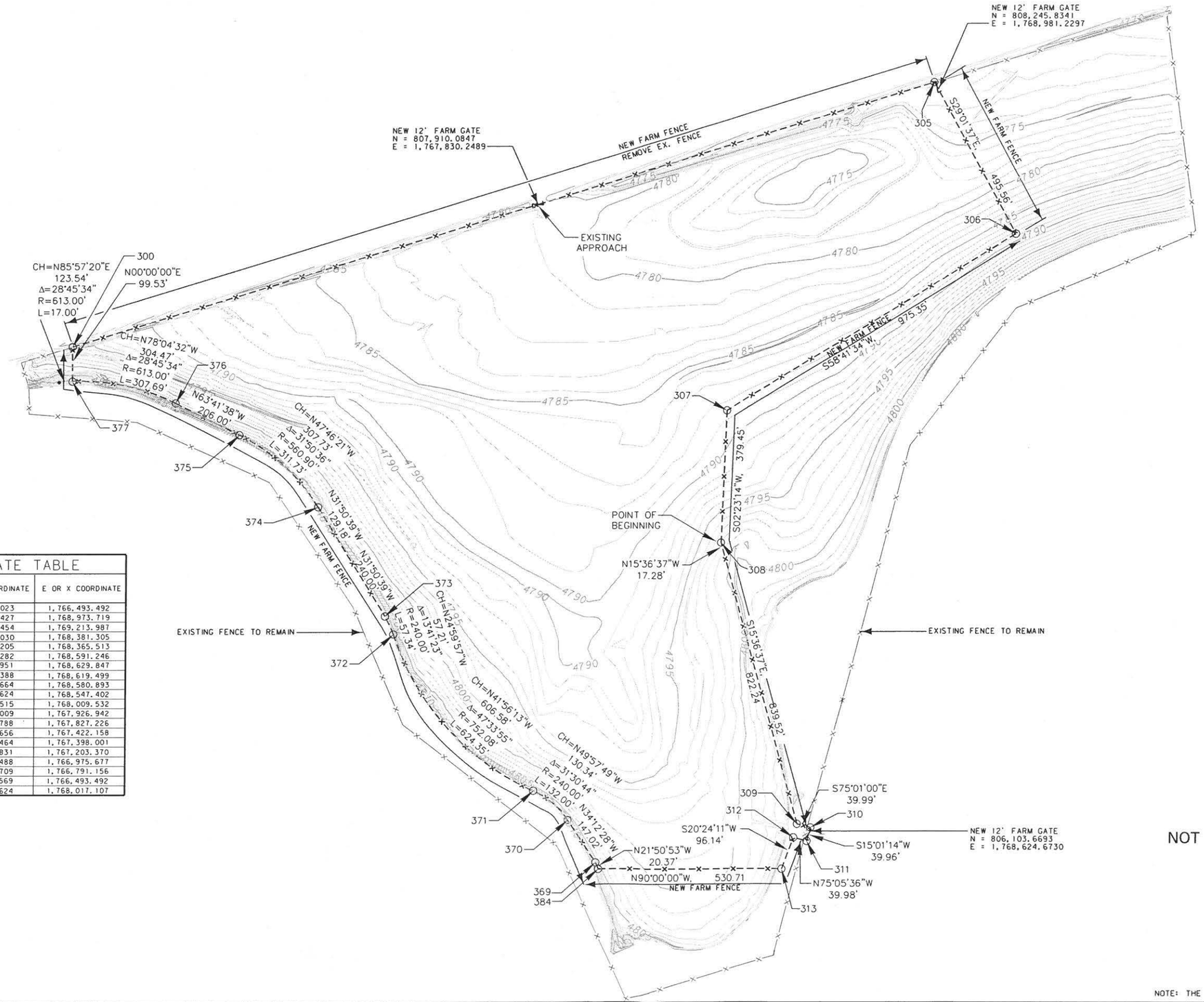
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NOTE: ALL DIMENSION IN FEET UNLESS OTHERWISE NOTED

MORRISON MAIERLE, INC.

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\5565000rddetz01.dgn	DESIGNED BY		WETLAND PLANS	ROSTAD RANCH WETLAND	PROJECT NO. STPX 0002(749)
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1		10:32:00 AM CPS - U2160	CHECKED BY				

FENCING DETAIL



COORDINATE TABLE		
POINT #	N OR Y COORDINATE	E OR X COORDINATE
300	807,505.023	1,766,493.492
305	808,259.427	1,768,973.719
306	807,826.454	1,769,213.987
307	807,320.030	1,768,381.305
308	806,941.205	1,768,365.513
309	806,133.282	1,768,591.246
310	806,122.951	1,768,629.847
311	806,084.388	1,768,619.499
312	806,094.664	1,768,580.893
313	806,004.624	1,768,547.402
369	806,023.515	1,768,009.532
370	806,145.009	1,767,926.942
371	806,228.788	1,767,827.226
372	806,679.656	1,767,422.158
373	806,731.464	1,767,398.001
374	807,044.831	1,767,203.370
375	807,251.488	1,766,975.677
376	807,342.709	1,766,791.156
377	807,405.569	1,766,493.492
384	806,004.624	1,768,017.107

N

NOT TO SCALE

NOTE: THE CSF HAS BEEN APPLIED TO ALL DIMENSIONS ON THIS SHEET.

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3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\5565000rdplnz03.dgn				WETLAND PLANS	ROSTAD RANCH WETLAND MITIGATION	PROJECT NO. STPX 0002(749)
2		5/21/2012				MEAGHER COUNTY	CSF = 0.99922160 UPN NUMBER 5565	SHEET 7 OF 19
1		10:32:12 AM CPS - U2160						

DETAIL



TYPICAL SECTION

NOTES:

COMPACT PROPOSED EMBANKMENT AS SPECIFIED BY STD SPEC 203.03.3 TO 90% COMPACTION (OPTIMUM MOISTURE CONTENT MAY VARY).

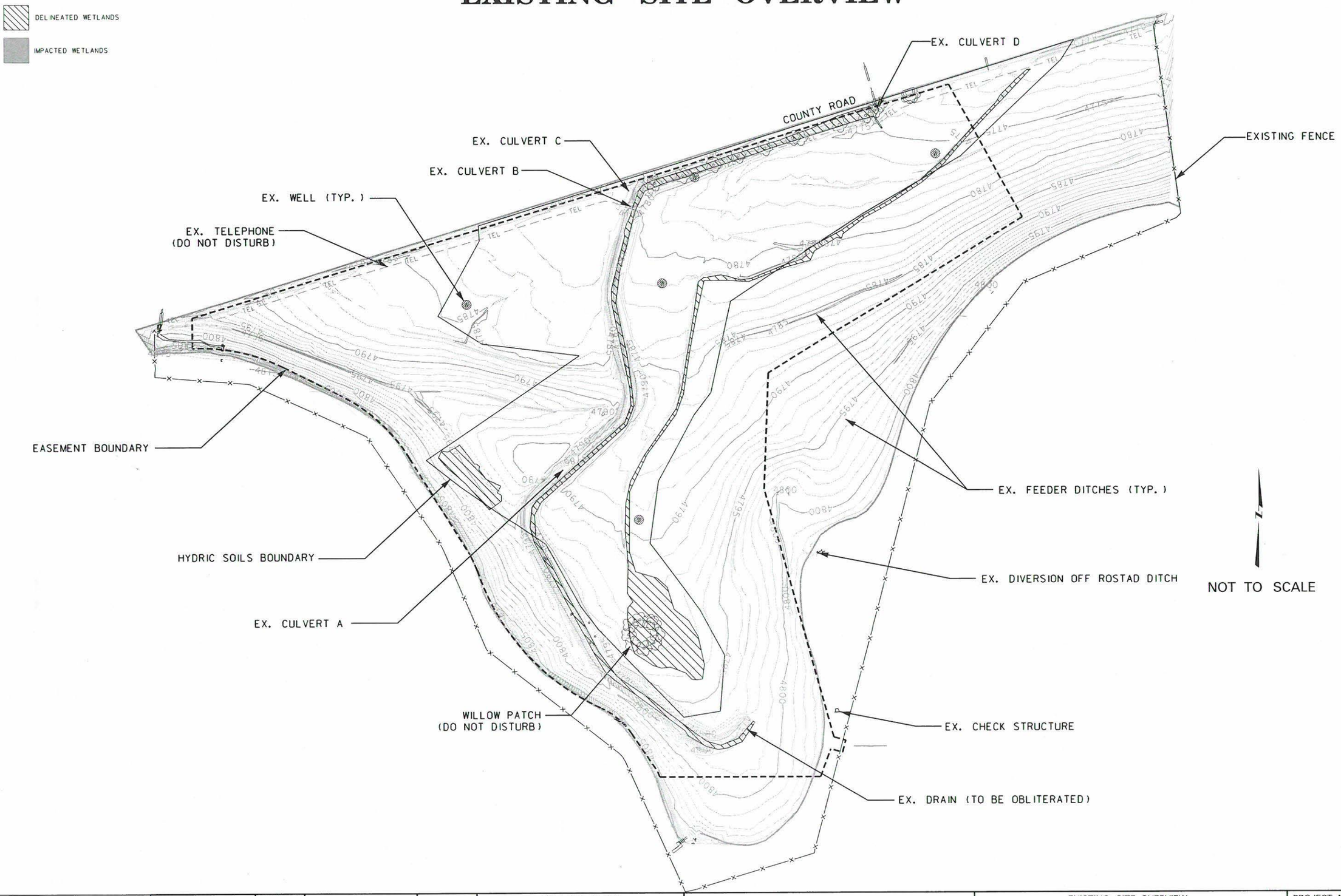
OBLITERATE 'DRAIN

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An Erickson-Hurst Company

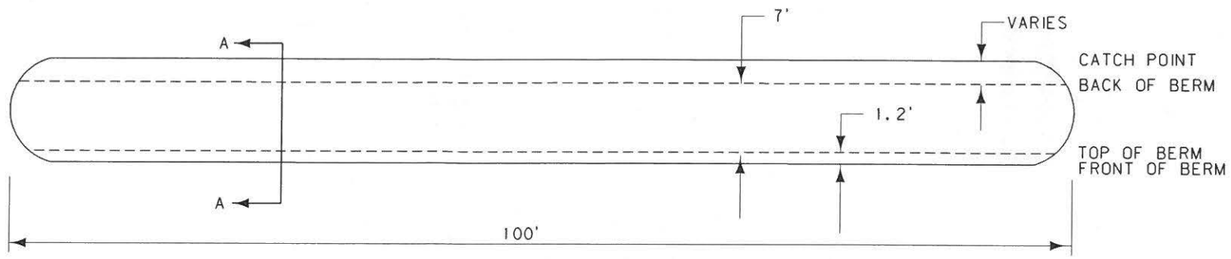
EXISTING SITE OVERVIEW



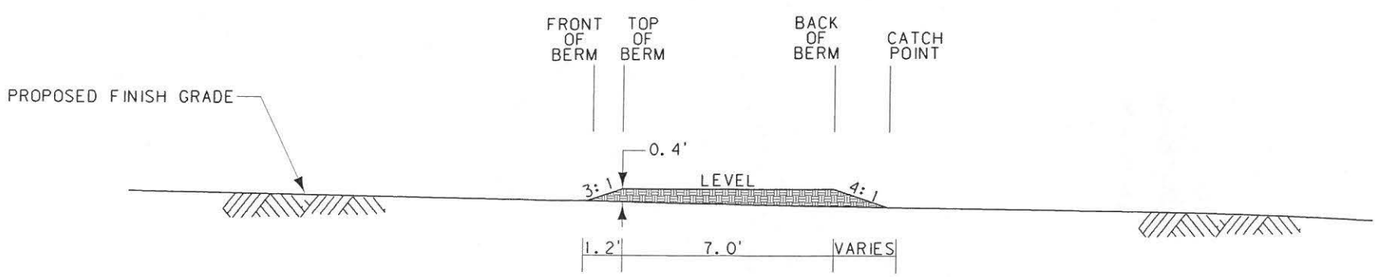
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An Engineer Owned Company
Est. 1945

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\5565000rdplnz01.dgn	DESIGNED BY			WETLAND PLANS	EXISTING SITE OVERVIEW	PROJECT NO. STPX 0002(749)
2		5/21/2012	REVIEWED BY			MEAGHER COUNTY	CSF = 0.99922160 UPN NUMBER 5565	SHEET 10 OF 19
1		10:32:38 AM CPS - U2160	CHECKED BY					

DETAIL



PLAN VIEW



SECTION A-A

SPREADER BERM

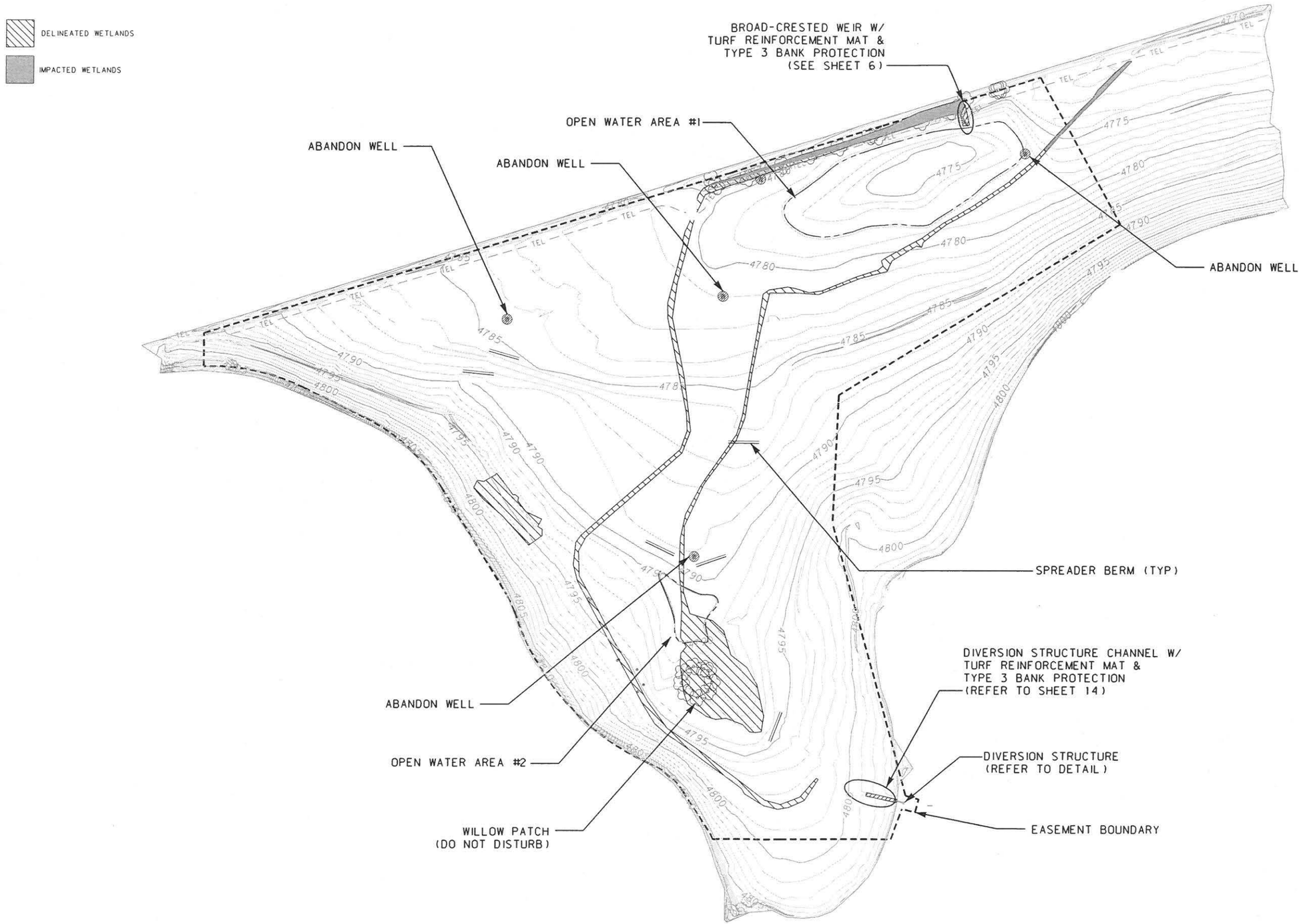
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NOTE: SEE POINTS B1 THROUGH B36 ON SHEETS 14 AND 15.

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\5565000rddetz03.dgn	DESIGNED BY			WETLAND PLANS	ROSTAD RANCH WETLAND MITIGATION	PROJECT NO. STPX 0002(749)
2		5/21/2012	REVIEWED BY					
1		10:32:29 AM CPS - U2160	CHECKED BY			MEAGHER COUNTY	CSF = 0.99922160 UPN NUMBER 5565	SHEET 9 OF 19

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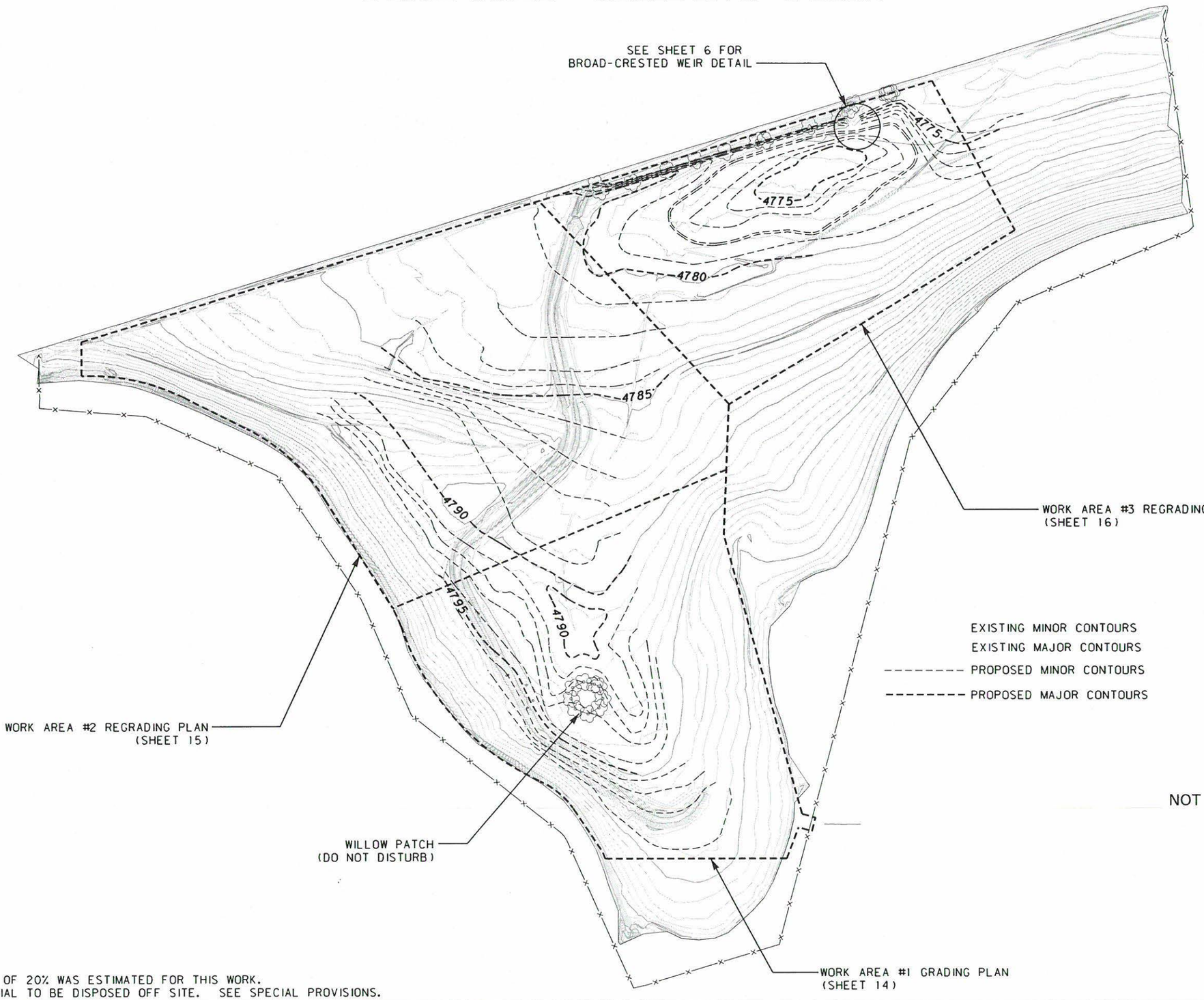
PROPOSED SITE OVERVIEW



MORRISON MAIERLE, INC.

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PROPOSED GRADING PLAN

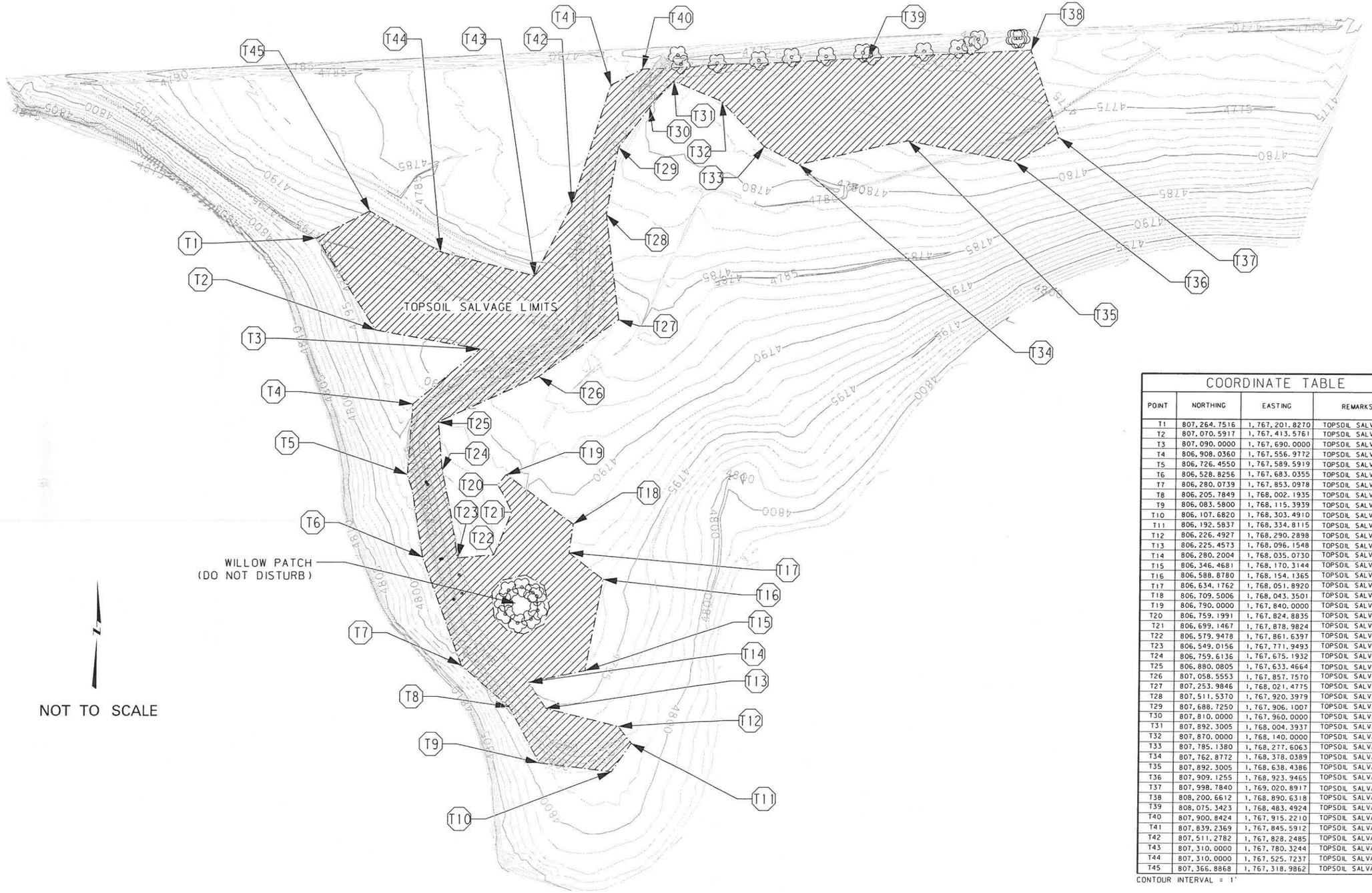


NOTE: A SHRINK FACTOR OF 20% WAS ESTIMATED FOR THIS WORK.
ALL WASTE MATERIAL TO BE DISPOSED OFF SITE. SEE SPECIAL PROVISIONS.

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3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\5565000rdplnz01.dgn				WETLAND PLANS	ROSTAD RANCH WETLAND	PROJECT NO. STPX 0002(749)
2		5/21/2012				MEAGHER COUNTY	CSF = 0.99922160 UPN NUMBER 5565	SHEET 12 OF 19
1		10:32:47 AM CPS - U2160						

TOPSOIL SALVAGE PLAN



COORDINATE TABLE			
POINT	NORTHING	EASTING	REMARKS
T1	807,264.7516	1,767,201.8270	TOPSOIL SALVAGE LIMIT
T2	807,070.5917	1,767,413.5761	TOPSOIL SALVAGE LIMIT
T3	807,090.0000	1,767,690.0000	TOPSOIL SALVAGE LIMIT
T4	806,908.0360	1,767,556.9772	TOPSOIL SALVAGE LIMIT
T5	806,726.4550	1,767,589.5919	TOPSOIL SALVAGE LIMIT
T6	806,528.8256	1,767,683.0355	TOPSOIL SALVAGE LIMIT
T7	806,280.0739	1,767,853.0978	TOPSOIL SALVAGE LIMIT
T8	806,205.7849	1,768,002.1935	TOPSOIL SALVAGE LIMIT
T9	806,083.5800	1,768,115.3939	TOPSOIL SALVAGE LIMIT
T10	806,107.6820	1,768,303.4910	TOPSOIL SALVAGE LIMIT
T11	806,192.5837	1,768,334.8115	TOPSOIL SALVAGE LIMIT
T12	806,226.4927	1,768,290.2898	TOPSOIL SALVAGE LIMIT
T13	806,225.4573	1,768,096.1548	TOPSOIL SALVAGE LIMIT
T14	806,280.2004	1,768,035.0730	TOPSOIL SALVAGE LIMIT
T15	806,346.4681	1,768,170.3144	TOPSOIL SALVAGE LIMIT
T16	806,588.8780	1,768,154.1365	TOPSOIL SALVAGE LIMIT
T17	806,634.1762	1,768,051.8920	TOPSOIL SALVAGE LIMIT
T18	806,709.5006	1,768,043.3501	TOPSOIL SALVAGE LIMIT
T19	806,790.0000	1,767,840.0000	TOPSOIL SALVAGE LIMIT
T20	806,759.1991	1,767,824.8835	TOPSOIL SALVAGE LIMIT
T21	806,699.1467	1,767,878.9824	TOPSOIL SALVAGE LIMIT
T22	806,579.9478	1,767,861.6397	TOPSOIL SALVAGE LIMIT
T23	806,549.0156	1,767,771.9493	TOPSOIL SALVAGE LIMIT
T24	806,759.6136	1,767,675.1932	TOPSOIL SALVAGE LIMIT
T25	806,880.0805	1,767,633.4664	TOPSOIL SALVAGE LIMIT
T26	807,058.5553	1,767,857.7570	TOPSOIL SALVAGE LIMIT
T27	807,253.9846	1,768,021.4775	TOPSOIL SALVAGE LIMIT
T28	807,511.5370	1,767,920.3979	TOPSOIL SALVAGE LIMIT
T29	807,688.7250	1,767,906.1007	TOPSOIL SALVAGE LIMIT
T30	807,810.0000	1,767,960.0000	TOPSOIL SALVAGE LIMIT
T31	807,892.3005	1,768,004.3937	TOPSOIL SALVAGE LIMIT
T32	807,870.0000	1,768,140.0000	TOPSOIL SALVAGE LIMIT
T33	807,785.1380	1,768,277.6063	TOPSOIL SALVAGE LIMIT
T34	807,762.8772	1,768,378.0389	TOPSOIL SALVAGE LIMIT
T35	807,892.3005	1,768,638.4386	TOPSOIL SALVAGE LIMIT
T36	807,909.1255	1,768,923.9465	TOPSOIL SALVAGE LIMIT
T37	807,998.7840	1,769,020.8917	TOPSOIL SALVAGE LIMIT
T38	808,200.6612	1,768,890.6318	TOPSOIL SALVAGE LIMIT
T39	808,075.3423	1,768,483.4924	TOPSOIL SALVAGE LIMIT
T40	807,900.8424	1,767,915.2210	TOPSOIL SALVAGE LIMIT
T41	807,839.2369	1,767,845.5912	TOPSOIL SALVAGE LIMIT
T42	807,511.2782	1,767,828.2485	TOPSOIL SALVAGE LIMIT
T43	807,310.0000	1,767,780.3244	TOPSOIL SALVAGE LIMIT
T44	807,310.0000	1,767,525.7237	TOPSOIL SALVAGE LIMIT
T45	807,366.8868	1,767,318.9862	TOPSOIL SALVAGE LIMIT

CONTOUR INTERVAL = 1'

NOTE: SALVAGE TOPSOIL A MINIMUM OF 10 INCHES IN THE AREA SHOWED.
ALL REMAINING GRADING IS CONSIDERED UNCLASSIFIED EXCAVATION.

MORRISON MAIERLE, INC.
ENGINEERS SURVEYORS PLANNERS
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MDT MONTANA DEPARTMENT OF TRANSPORTATION

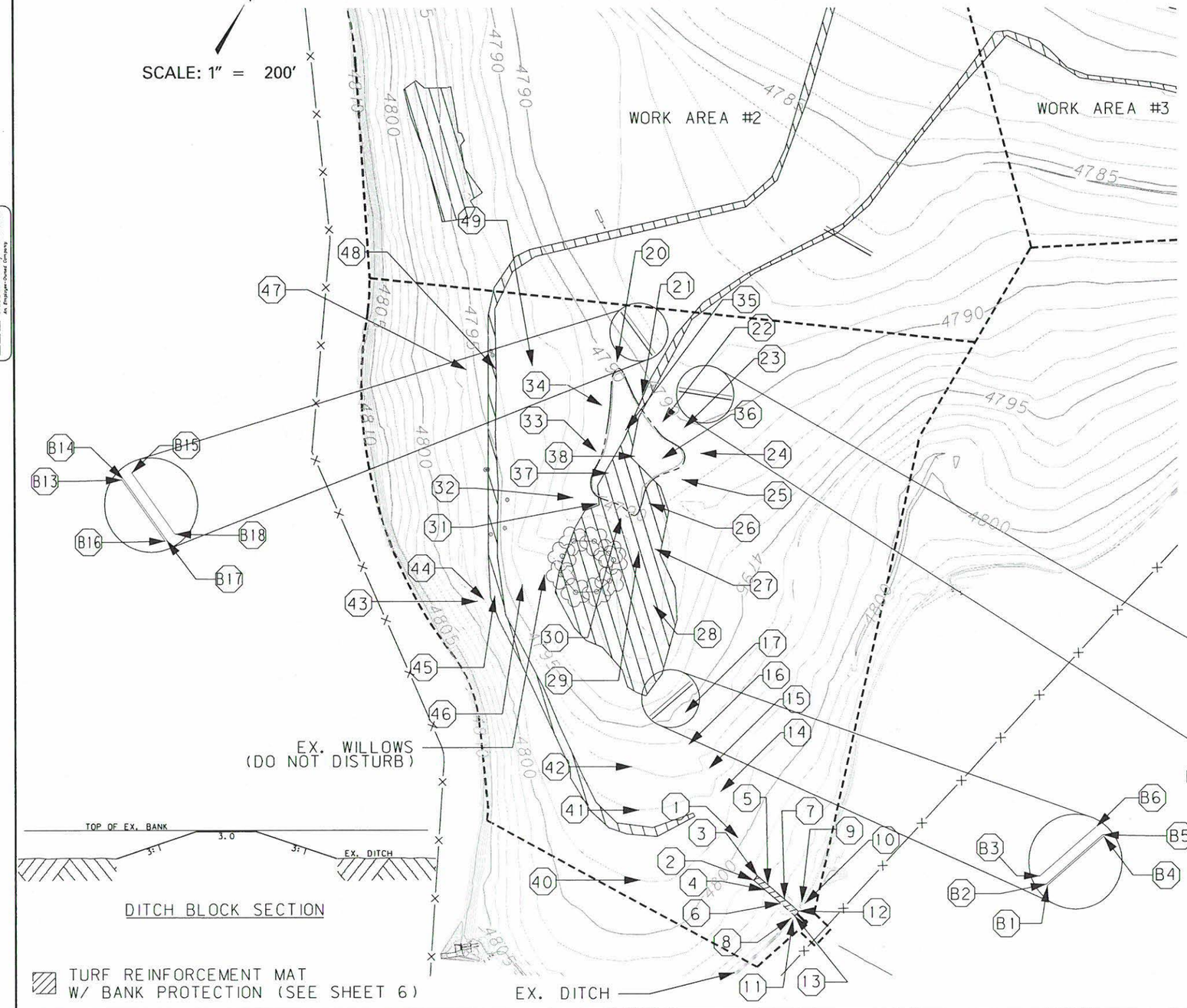
3	c:\dgn\5565000rddetz03.dgn	DESIGNED BY			WETLAND PLANS	ROSTAD RANCH WETLAND MITIGATION	PROJECT NO. STPX 0002(749)
2	5/21/2012	REVIEWED BY					
1	10:32:56 AM . CPS - U2160	CHECKED BY			MEAGHER COUNTY	CSF = 0.99922160 UPN NUMBER 5565	SHEET 13 OF 19

WORK AREA # 1 PLAN

DELINEATED WETLANDS

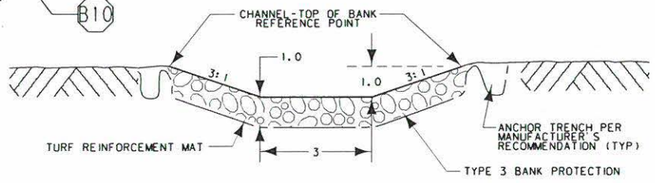
IMPACTED WETLANDS

SCALE: 1" = 200'



TOP OF EX. BANK
3:1
3.0
3:1
EX. DITCH

DITCH BLOCK SECTION



CHANNEL SECTION

COORDINATE TABLE

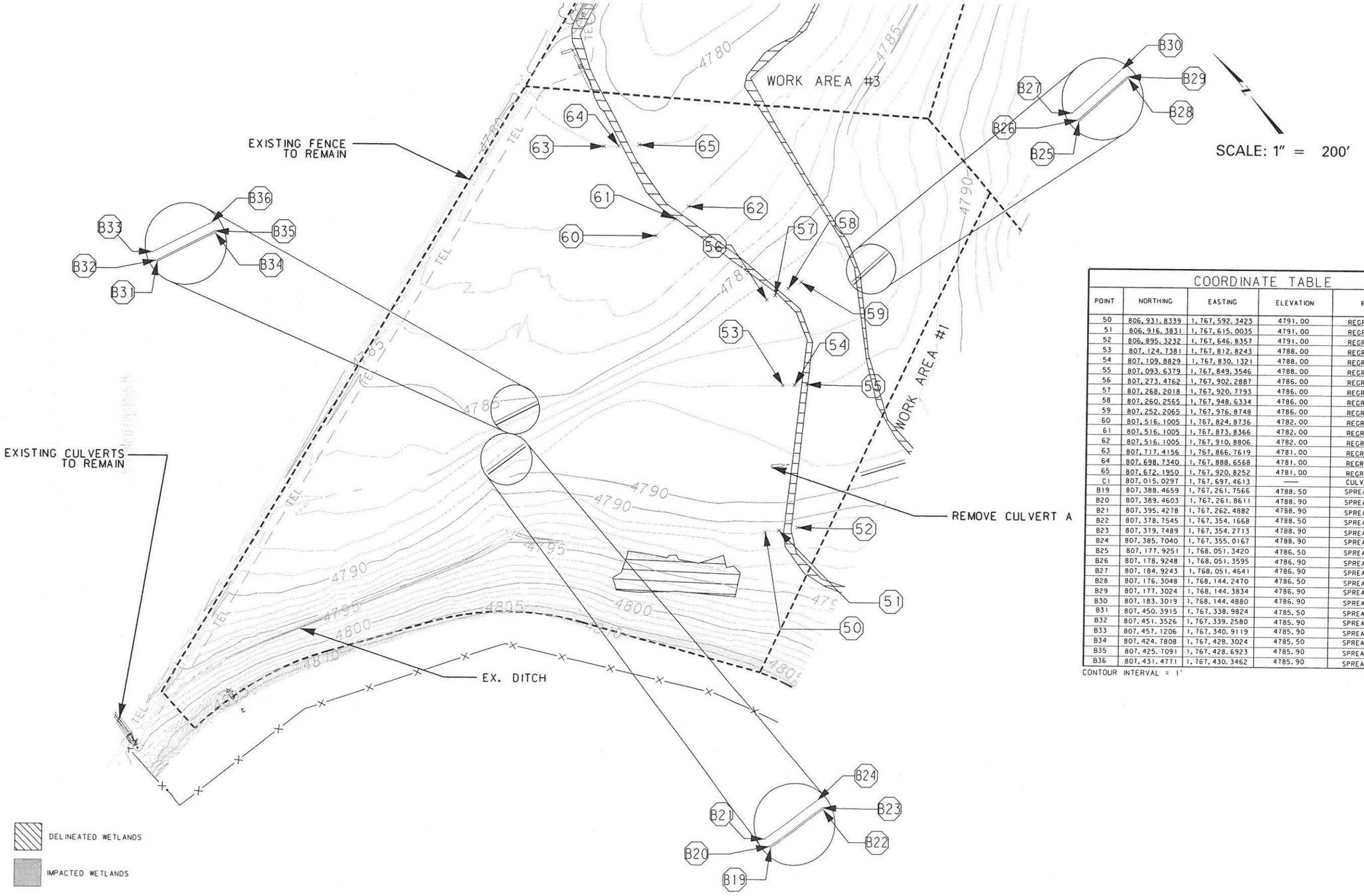
POINT	NORTHING	EASTING	ELEVATION	REMARKS
1	806,183.7684	1,768,414.9164	4799.20	CHANNEL
2	806,132.9122	1,768,472.4120	4801.30	CHANNEL-TOP OF BANK
3	806,142.6865	1,768,474.5246	4801.30	CHANNEL-TOP OF BANK
4	806,127.5586	1,768,497.1812	4802.00	CHANNEL-TOP OF BANK
5	806,137.7688	1,768,497.3283	4802.00	CHANNEL-TOP OF BANK
6	806,119.9620	1,768,532.3148	4802.45	CHANNEL-TOP OF BANK
7	806,129.7231	1,768,534.4863	4802.45	CHANNEL-TOP OF BANK
8	806,106.6996	1,768,558.4394	4804.00	CHANNEL-DITCH BLOCK
9	806,139.1246	1,768,563.4538	4804.00	CHANNEL-DITCH BLOCK
10	806,139.7844	1,768,569.1690	4804.00	CHANNEL-DITCH BLOCK
11	806,105.6421	1,768,564.2952	4804.00	CHANNEL-DITCH BLOCK
12	806,123.1108	1,768,565.0944	4803.00	CHANNEL-TOP OF BANK
13	806,113.3365	1,768,562.9818	4803.00	CHANNEL-TOP OF BANK
14	806,239.0870	1,768,349.4505	4798.50	CHANNEL
15	806,264.2403	1,768,312.9344	4797.50	CHANNEL
16	806,283.6638	1,768,262.2391	4796.50	CHANNEL
17	806,329.2134	1,768,230.8726	4795.50	CHANNEL
20	806,806.3859	1,767,843.6451	4790.50	OPEN WATER AREA # 2 EXTERIOR
21	806,776.2491	1,767,908.9437	4790.50	OPEN WATER AREA # 2 EXTERIOR
22	806,751.8351	1,767,961.3927	4790.50	OPEN WATER AREA # 2 EXTERIOR
23	806,760.6282	1,767,998.4262	4790.50	OPEN WATER AREA # 2 EXTERIOR
24	806,735.9179	1,768,044.1600	4790.50	OPEN WATER AREA # 2 EXTERIOR
25	806,681.3181	1,768,037.1836	4790.50	OPEN WATER AREA # 2 EXTERIOR
26	806,618.4258	1,768,006.4424	4790.50	OPEN WATER AREA # 2 EXTERIOR
27	806,554.3518	1,768,052.1552	4790.50	OPEN WATER AREA # 2 EXTERIOR
28	806,467.6404	1,768,095.9506	4790.50	OPEN WATER AREA # 2 EXTERIOR
29	806,537.7578	1,768,030.1275	4790.50	OPEN WATER AREA # 2 EXTERIOR
30	806,574.1908	1,767,976.1301	4790.50	OPEN WATER AREA # 2 EXTERIOR
31	806,576.0841	1,767,928.9690	4790.50	OPEN WATER AREA # 2 EXTERIOR
32	806,565.2908	1,767,887.2322	4790.50	OPEN WATER AREA # 2 EXTERIOR
33	806,653.4524	1,767,885.6327	4790.50	OPEN WATER AREA # 2 EXTERIOR
34	806,728.1229	1,767,856.9940	4790.50	OPEN WATER AREA # 2 EXTERIOR
35	806,710.2073	1,767,912.0477	4789.50	OPEN WATER AREA # 2 INTERIOR
36	806,695.9364	1,767,989.8888	4789.50	OPEN WATER AREA # 2 INTERIOR
37	806,631.0688	1,767,921.1292	4789.50	OPEN WATER AREA # 2 INTERIOR
38	806,678.0000	1,767,947.0000	4789.00	OPEN WATER AREA # 2 BOTTOM
40	806,040.6685	1,768,299.6277	4799.00	REGRADE EX. DITCH
41	806,145.0003	1,768,240.9999	4798.00	REGRADE EX. DITCH
42	806,205.0003	1,768,194.9999	4797.00	REGRADE EX. DITCH
43	806,329.0003	1,767,824.4999	4798.00	REGRADE EX. DITCH
44	806,337.2215	1,767,833.6240	4797.00	REGRADE EX. DITCH
45	806,351.8947	1,767,846.4795	4796.00	REGRADE EX. DITCH
46	806,391.3380	1,767,879.5246	4794.00	REGRADE EX. DITCH
47	806,671.0527	1,767,620.0033	4796.00	REGRADE EX. DITCH
48	806,696.3214	1,767,663.6379	4794.00	REGRADE EX. DITCH
49	806,731.3791	1,767,717.5281	4793.00	REGRADE EX. DITCH
B1	806,293.2331	1,768,187.1786	4794.50	SPREADER BERM
B2	806,293.5914	1,768,186.2451	4794.90	SPREADER BERM
B3	806,295.7416	1,768,180.6432	4794.90	SPREADER BERM
B4	806,379.9810	1,768,220.4766	4794.50	SPREADER BERM
B5	806,380.3393	1,768,219.5431	4794.90	SPREADER BERM
B6	806,382.6006	1,768,213.9839	4794.90	SPREADER BERM
B7	806,811.8007	1,767,961.0310	4789.50	SPREADER BERM
B8	806,812.7460	1,767,960.7046	4789.90	SPREADER BERM
B9	806,818.4195	1,767,958.7509	4789.90	SPREADER BERM
B10	806,842.0534	1,768,048.8864	4789.50	SPREADER BERM
B11	806,842.9988	1,768,048.5609	4789.90	SPREADER BERM
B12	806,848.7110	1,768,046.7197	4789.90	SPREADER BERM
B13	806,885.5189	1,767,808.5176	4789.50	SPREADER BERM
B14	806,886.4176	1,767,808.9559	4789.90	SPREADER BERM
B15	806,891.8108	1,767,811.5863	4789.90	SPREADER BERM
B16	806,844.7870	1,767,892.0334	4789.50	SPREADER BERM
B17	806,845.6857	1,767,892.4717	4789.90	SPREADER BERM
B18	806,851.0267	1,767,895.2089	4789.90	SPREADER BERM

CONTOUR INTERVAL = 1'

MORRISON MAIERLE, INC.
CIVIL ENGINEERS SURVEYORS PLANNERS SINCE 1945
An Employee-Owned Company

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\5565000rdplnz02.dgn	DESIGNED BY			WETLAND PLANS	ROSTAD RANCH WETLAND	PROJECT NO. STPX 0002(749)
2		5/21/2012	REVIEWED BY					
1		10:33:08 AM CPS - U2160	CHECKED BY			MEAGHER COUNTY	SCALE: 1' = 200' UPN NUMBER 5565	SHEET 14 OF 19

WORK AREA # 2 PLAN



COORDINATE TABLE

POINT	NORTHING	EASTING	ELEVATION	REMARKS
50	806,931.8339	1,767,592.3423	4791.00	REGRADE EX. DITCH
51	806,916.3831	1,767,615.0035	4791.00	REGRADE EX. DITCH
52	806,895.3232	1,767,646.8357	4791.00	REGRADE EX. DITCH
53	807,124.7381	1,767,812.8243	4788.00	REGRADE EX. DITCH
54	807,109.8829	1,767,830.1321	4788.00	REGRADE EX. DITCH
55	807,093.6379	1,767,849.3546	4788.00	REGRADE EX. DITCH
56	807,273.4762	1,767,902.2887	4786.00	REGRADE EX. DITCH
57	807,268.2018	1,767,920.7793	4786.00	REGRADE EX. DITCH
58	807,260.2565	1,767,948.6334	4786.00	REGRADE EX. DITCH
59	807,252.2065	1,767,976.8748	4786.00	REGRADE EX. DITCH
60	807,516.1005	1,767,824.8736	4782.00	REGRADE EX. DITCH
61	807,516.1005	1,767,873.8366	4782.00	REGRADE EX. DITCH
62	807,516.1005	1,767,910.8806	4782.00	REGRADE EX. DITCH
63	807,717.4156	1,767,866.7619	4781.00	REGRADE EX. DITCH
64	807,698.7340	1,767,888.6568	4781.00	REGRADE EX. DITCH
65	807,672.1950	1,767,920.8252	4781.00	REGRADE EX. DITCH
C1	807,015.0297	1,767,697.4613	——	CULVERT A
B19	807,388.4659	1,767,261.7566	4788.50	SPREADER BERM
B20	807,389.4603	1,767,261.8611	4788.90	SPREADER BERM
B21	807,395.4278	1,767,262.4882	4788.90	SPREADER BERM
B22	807,378.7545	1,767,354.1668	4788.50	SPREADER BERM
B23	807,379.7489	1,767,354.2713	4788.90	SPREADER BERM
B24	807,385.7040	1,767,355.0167	4788.90	SPREADER BERM
B25	807,177.9251	1,768,051.3420	4786.50	SPREADER BERM
B26	807,178.9248	1,768,051.3595	4786.90	SPREADER BERM
B27	807,184.9243	1,768,051.4641	4786.90	SPREADER BERM
B28	807,176.3048	1,768,144.2470	4786.50	SPREADER BERM
B29	807,177.3024	1,768,144.3834	4786.90	SPREADER BERM
B30	807,183.3019	1,768,144.4880	4786.90	SPREADER BERM
B31	807,450.3915	1,767,338.9824	4785.50	SPREADER BERM
B32	807,451.3526	1,767,339.2580	4785.90	SPREADER BERM
B33	807,457.1206	1,767,340.9119	4785.90	SPREADER BERM
B34	807,424.7808	1,767,428.3024	4785.50	SPREADER BERM
B35	807,425.7091	1,767,428.6923	4785.90	SPREADER BERM
B36	807,431.4771	1,767,430.3462	4785.90	SPREADER BERM

CONTOUR INTERVAL = 1'

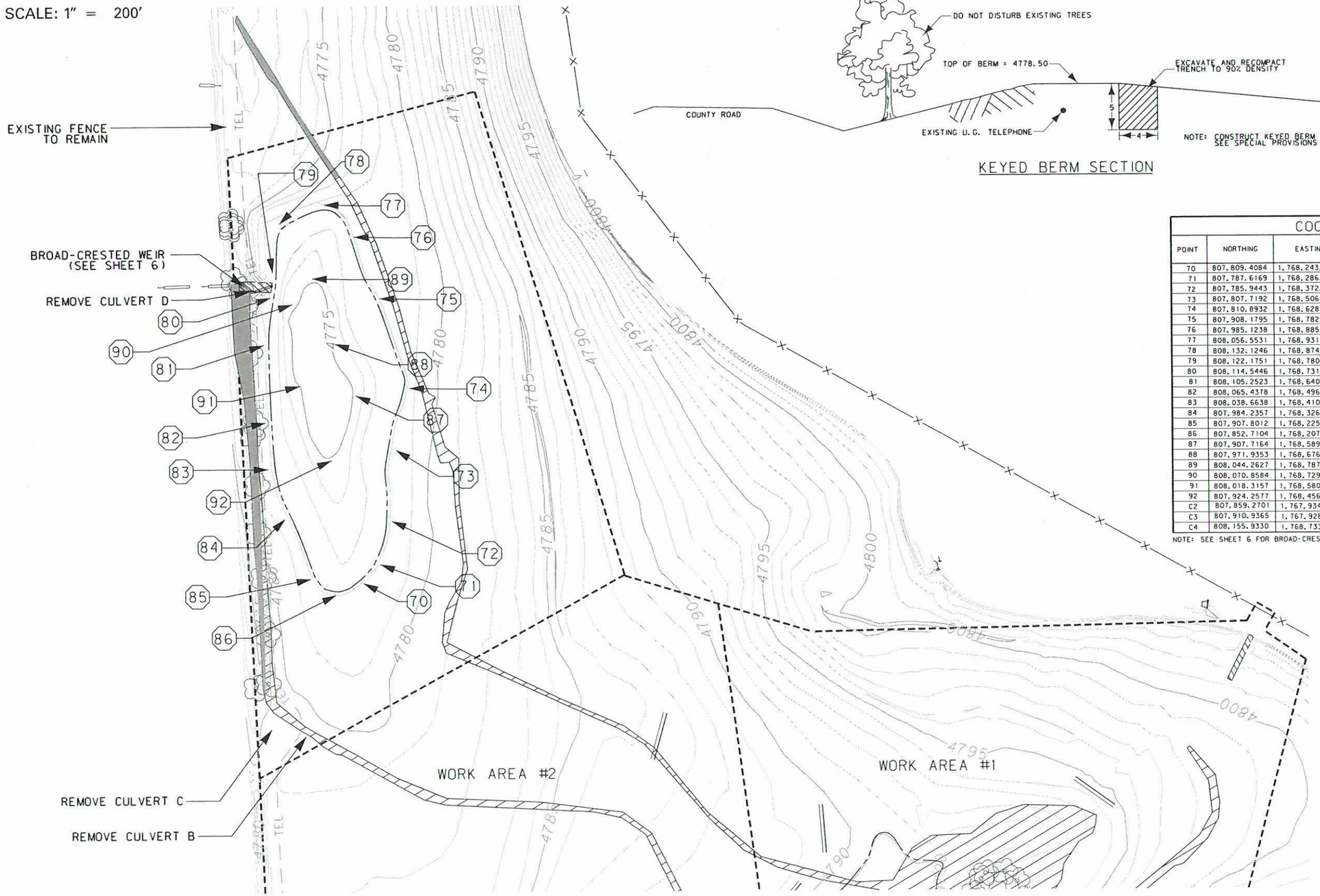
MORRISON MAIERLE, INC. ENGINEERS SURVEYORS PLANNERS SINCE 1945 A Professional Limited Liability Company

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\5565000rdplnz02.dgn	DESIGNED BY			WETLAND PLANS	
2		5/21/2012	REVIEWED BY			MEAGHER COUNTY	
1		10:33:11 AM CPS - U2160	CHECKED BY				

ROSTAD RANCH WETLAND | SCALE: 1' = 200' | UPN NUMBER 5565 | PROJECT NO. STPX 0002(749) | SHEET 15 OF 19

WORK AREA # 3 PLAN

SCALE: 1" = 200'



KEYED BERM SECTION

COORDINATE TABLE

POINT	NORTHING	EASTING	ELEVATION	REMARKS
70	807,809.4084	1,768,243.5785	4778.50	OPEN WATER AREA # 1 EXTERIOR
71	807,787.6169	1,768,286.8196	4778.50	OPEN WATER AREA # 1 EXTERIOR
72	807,785.9443	1,768,372.4129	4778.50	OPEN WATER AREA # 1 EXTERIOR
73	807,807.7192	1,768,506.7200	4778.50	OPEN WATER AREA # 1 EXTERIOR
74	807,810.8932	1,768,628.8023	4778.50	OPEN WATER AREA # 1 EXTERIOR
75	807,908.1795	1,768,782.5774	4778.50	OPEN WATER AREA # 1 EXTERIOR
76	807,985.1238	1,768,885.7440	4778.50	OPEN WATER AREA # 1 EXTERIOR
77	808,056.5531	1,768,931.6118	4778.50	OPEN WATER AREA # 1 EXTERIOR
78	808,132.1246	1,768,874.1809	4778.50	OPEN WATER AREA # 1 EXTERIOR
79	808,122.1751	1,768,780.3660	4778.50	OPEN WATER AREA # 1 EXTERIOR
80	808,114.5446	1,768,731.7721	4778.50	OPEN WATER AREA # 1 EXTERIOR
81	808,105.2523	1,768,640.0309	4778.50	OPEN WATER AREA # 1 EXTERIOR
82	808,065.4378	1,768,496.0431	4778.50	OPEN WATER AREA # 1 EXTERIOR
83	808,038.6638	1,768,410.1362	4778.50	OPEN WATER AREA # 1 EXTERIOR
84	807,984.2357	1,768,326.2839	4778.50	OPEN WATER AREA # 1 EXTERIOR
85	807,907.8012	1,768,225.8626	4778.50	OPEN WATER AREA # 1 EXTERIOR
86	807,852.7104	1,768,207.2386	4778.50	OPEN WATER AREA # 1 EXTERIOR
87	807,907.7164	1,768,589.0907	4775.30	OPEN WATER AREA # 1 INTERIOR
88	807,971.9353	1,768,676.0132	4775.30	OPEN WATER AREA # 1 INTERIOR
89	808,044.2627	1,768,787.5855	4775.15	OPEN WATER AREA # 1 INTERIOR
90	808,070.8584	1,768,729.8534	4775.33	OPEN WATER AREA # 1 INTERIOR
91	808,018.3157	1,768,580.0092	4775.00	OPEN WATER AREA # 1 INTERIOR
92	807,924.2577	1,768,456.7607	4775.20	OPEN WATER AREA # 1 INTERIOR
C2	807,859.2701	1,767,934.9130	——	CULVERT B
C3	807,910.9365	1,767,928.8917	——	CULVERT C
C4	808,155.9330	1,768,733.3687	——	CULVERT D

NOTE: SEE SHEET 6 FOR BROAD-CRESTED WEIR LOCATION

DELINEATED WETLANDS

IMPACTED WETLANDS

TURF REINFORCEMENT MAT W/ BANK PROTECTION (SEE SHEET 6)

MORRISON MAIERLE, INC. — Engineers, Surveyors, Planners, Since 1945 — An Employee-Owned Company

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\5565000rdplnz02.dgn	DESIGNED BY			WETLAND PLANS	ROSTAD RANCH WETLAND — PROJECT NO. STPX 0002(749)
2		5/21/2012	REVIEWED BY			MEAGHER COUNTY	SCALE: 1' = 200' — UPN NUMBER 5565 — SHEET 16 OF 19
1		10:33:14 AM CPS - U2160	CHECKED BY				

WETLAND MITIGATION OVERVIEW

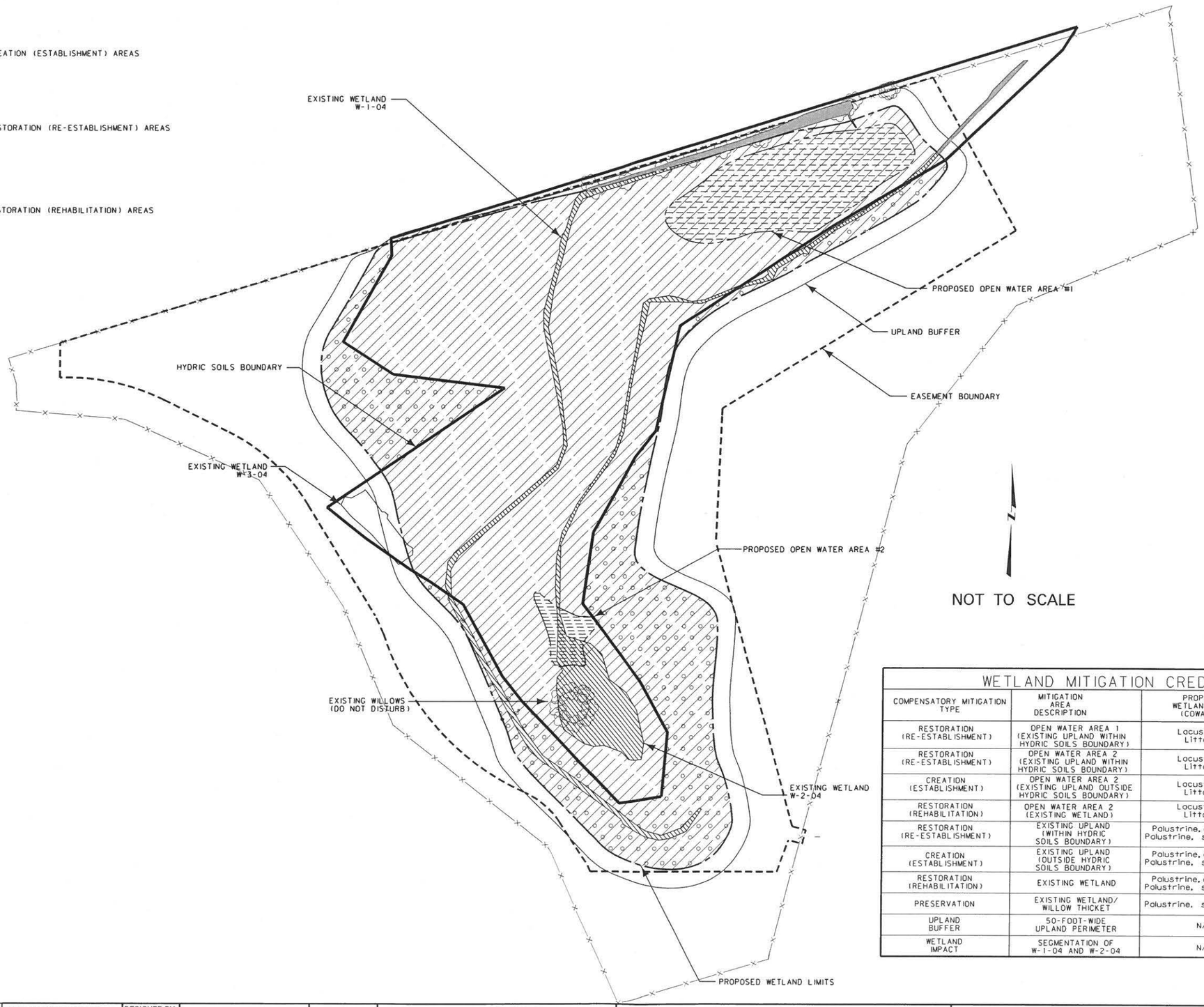
PROPOSED OPEN WATER AREAS

PROPOSED CREATION (ESTABLISHMENT) AREAS

PROPOSED RESTORATION (RE-ESTABLISHMENT) AREAS

PROPOSED RESTORATION (REHABILITATION) AREAS

IMPACT AREAS



N

NOT TO SCALE

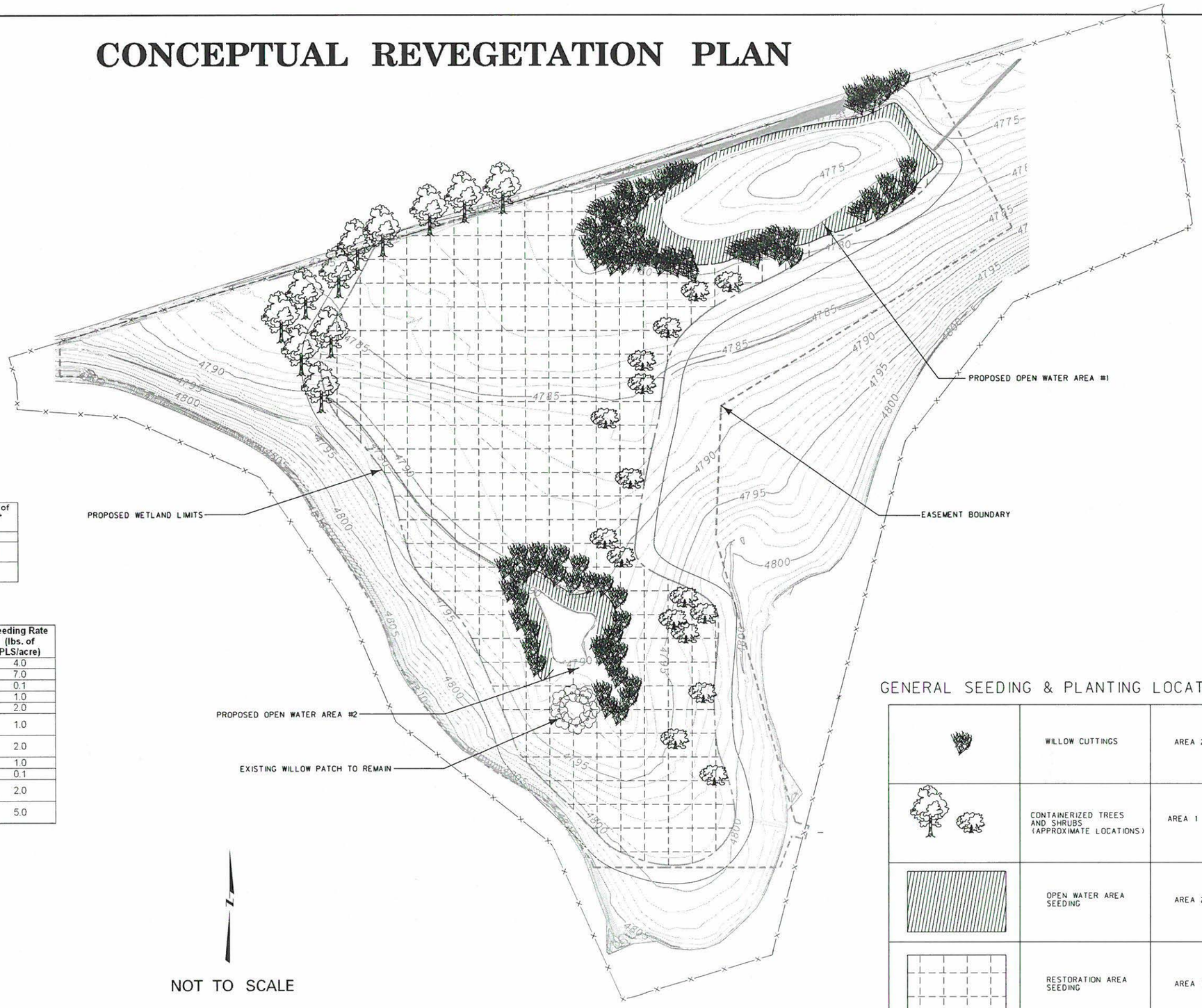
WETLAND MITIGATION CREDITING STRATEGY TABLE

COMPENSATORY MITIGATION TYPE	MITIGATION AREA DESCRIPTION	PROPOSED WETLAND TYPE (COWARDIN)	MITIGATION SURFACE AREA (acres)	ANTICIPATED MITIGATION RATIOS	ANTICIPATED MITIGATION CREDIT (acres)
RESTORATION (RE-ESTABLISHMENT)	OPEN WATER AREA 1 (EXISTING UPLAND WITHIN HYDRIC SOILS BOUNDARY)	Lacustrine, Littoral	3.21	1:1	3.21
RESTORATION (RE-ESTABLISHMENT)	OPEN WATER AREA 2 (EXISTING UPLAND WITHIN HYDRIC SOILS BOUNDARY)	Lacustrine, Littoral	0.45	1:1	0.45
CREATION (ESTABLISHMENT)	OPEN WATER AREA 2 (EXISTING UPLAND OUTSIDE HYDRIC SOILS BOUNDARY)	Lacustrine, Littoral	0.04	1:1	0.04
RESTORATION (REHABILITATION)	OPEN WATER AREA 2 (EXISTING WETLAND)	Lacustrine, Littoral	0.30	1.5:1	0.20
RESTORATION (RE-ESTABLISHMENT)	EXISTING UPLAND (WITHIN HYDRIC SOILS BOUNDARY)	Palustrine, emergent/ Palustrine, scrub-shrub	23.45	1:1	23.45
CREATION (ESTABLISHMENT)	EXISTING UPLAND (OUTSIDE HYDRIC SOILS BOUNDARY)	Palustrine, emergent/ Palustrine, scrub-shrub	9.80	1:1	9.80
RESTORATION (REHABILITATION)	EXISTING WETLAND	Palustrine, emergent/ Palustrine, scrub-shrub	2.33	1.5:1	1.55
PRESERVATION	EXISTING WETLAND/ WILLOW THICKET	Palustrine, scrub-shrub	0.25	4:1	0.06
UPLAND BUFFER	50-FOOT-WIDE UPLAND PERIMETER	N/A	6.76	5:1	1.35
WETLAND IMPACT	SEGMENTATION OF W-1-04 AND W-2-04	N/A	N/A	1:1	-0.41
				TOTAL MITIGATION CREDIT =	39.70

MORRISON MAIERLE, INC. Engineers Surveyors Planners Est. 1946 An Employee-Owned Company

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\5565000rdplnz03.dgn	DESIGNED BY			WETLAND PLANS	ROSTAD RANCH WETLAND MITIGATION	PROJECT NO. STPX 0002(749)
2		5/21/2012	REVIEWED BY			MEAGHER COUNTY	CSF = 0.99922160 UPN NUMBER 5565	SHEET 17 OF 19
1		10:33:26 AM CPS - U2160	CHECKED BY					

CONCEPTUAL REVEGETATION PLAN



NOT TO SCALE

Table 1. Live Plantings

Area Descriptions 16A	Species – Common Name	Species – Scientific Name	Planting Methodology	Number of Plants*
2	Willows**	*Salix species*	Cuttings	2,000
1, 3	quaking aspen	*Populus tremuloides*	Containerized trees (5 gallon)	100
	black cottonwood	*Populus balsamifera*	Containerized trees (5 gallon)	100

*Plant locations to be provided in the field by MDT personnel.
** Willow cuttings should be from a variety of species found in the region.

Table 2. Seed Mixtures

Area Descriptions 16A	Species – Common Name	Species – Scientific Name	Seeding Rate (lbs. of PLS/acre)
Wetland Seed Mixture – Open Water Areas (2)	American mannagrass	*Glyceria grandis*	4.0
	American sloughgrass	*Beckmannia syzigachne*	7.0
	Baltic rush	*Juncus balticus*	0.1
	Beaked sedge	*Carex utriculata*	1.0
	Nebraska sedge	*Carex nebrascensis*	2.0
	'Nortran' tufted hairgrass	*Deschampsia cespitosa*	1.0
Wetland Seed Mixture – Restoration Area (1)	'Nortran' tufted hairgrass	*Deschampsia cespitosa*	2.0
	Bluejoint reedgrass	*Calamagrostis canadensis*	1.0
	Baltic rush	*Juncus balticus*	0.1
	'Prior' slender wheatgrass	*Elymus trachycaulus*	2.0
	'Rosana' western wheatgrass	*Pascopyrum smithii*	5.0

Seed application rate by drill seeding (rates double for broadcast seeding)

GENERAL SEEDING & PLANTING LOCATIONS

	WILLOW CUTTINGS	AREA 2
	CONTAINERIZED TREES AND SHRUBS (APPROXIMATE LOCATIONS)	AREA 1 & 3
	OPEN WATER AREA SEEDING	AREA 2
	RESTORATION AREA SEEDING	AREA 1

MORRISON MAIERLE, INC.

3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\5565000rdplnz03.dgn	DESIGNED BY			WETLAND PLANS	ROSTAD RANCH WETLAND MITIGATION	PROJECT NO. STPX 0002(749)
2		5/21/2012	REVIEWED BY			MEAGHER COUNTY	CSF = 0.99922160 / UPN NUMBER 5565	SHEET 18 OF 19
1		10:33:30 AM CPS - U2160	CHECKED BY					

WATER DISTRIBUTION OVERVIEW



NOT TO SCALE

NOTE: FOR INFORMATION PURPOSES ONLY

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3	MDT MONTANA DEPARTMENT OF TRANSPORTATION	c:\dgn\5565000rddetz03.dgn	DESIGNED BY			WETLAND PLANS	ROSTAD RANCH WETLAND MITIGATION	PROJECT NO. STPX 0002(749)
2		5/21/2012	REVIEWED BY			MEAGHER COUNTY	CSF = 0.99922160 / UPN NUMBER 5565	SHEET 19 OF 19
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