MONTANA DEPARTMENT OF TRANSPORTATION
WETLAND MITIGATION MONITORING REPORT: YEAR 2014

American Colloid Mitigation Site
Alzada, Carter County, Montana



Prepared for:

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December 2014

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WETLAND MITIGATION MONITORING REPORT:

YEAR 2014

American Colloid
Carter County, Montana

Initial Construction: 2001
MDT Project Number NH STPS BR 6(10)
Control Number 1396

Watershed 16 Repair: 2010
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Control Number 6714

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Cover: *Spartina*-dominated wetland fringe along open water habitat at American Colloid.

1. INTRODUCTION

The American Colloid 2014 Wetland Mitigation Monitoring Report presents the results of the fourth year of monitoring at the American Colloid wetland mitigation site since the berm and outlet structure were reconstructed in 2010. The 2010 construction repaired damages to the dike sustained from erosion along the outlet pipe that caused a subsequent failure in 2007. The American Colloid mitigation project is situated approximately 2 miles south and 7 miles west of Alzada, Montana, on Montana School Trust Land in Lot 7, Lot 10, and Lot 11 of Section 36, Township 9 South, Range 58 East (Figure 1). Figures 2 and 3 in Appendix A show the Monitoring Activity Locations and Mapped Site Features, respectively. The Montana Department of Transportation (MDT) Wetland Mitigation Site Monitoring Form, the US Army Corps of Engineers (USACE) Wetland Determination Data Forms (USACE 2010), and the 2008 MDT Montana Wetland Assessment Form (MWAM) (Berglund and McEldowney 2008) are included in Appendix B. Appendix C shows project area photographs and Appendix D presents the project plan sheet.

The mitigation site is located in Watershed 16, the Little Missouri River Basin, in the Glendive District on land owned by the Montana Department of Natural Resources and Conservation (DNRC). The elevation is approximately 3,518 feet above mean sea level. The land was formerly leased to the American Colloid Mining Company. The site was mined for bentonite clay prior to the 1971 Open Cut Mining Act and is currently surrounded by topography typical of open cut mining activities. A dike approximately 190 feet in length was constructed along a topographic depression to impound precipitation runoff from a 167-acre ephemeral drainage. Soil borings at the site revealed highly erodible clay soils underlain by shale, suitable for impounding and storing surface water. The property is managed for perpetuity in a conservation easement between DNRC and MDT. A fenced enclosure surrounds the 15-acre easement that includes the proposed 5-acre wetland and a 10-acre buffer zone of upland vegetation. The mitigation monitoring limits, per MDT guidance and for purposes of this report, encompass only the 6.44-acre monitoring boundary as depicted on Figure 2. However, the entire 15-acre site is included for purposes of calculating mitigation credits (Table 6). Mitigation ratios of 1:1 (impact to credit) for the created wetland and open water habitat and a ratio of 5:1 for the preservation and maintenance of the upland buffer were used for calculating credit acres for the American Colloid mitigation site.

The MDT designed and constructed the American Colloid wetland mitigation project. The site was initially constructed in October 2001 to mitigate for 4.4 acres of wetland impacts associated within the Alzada-West and Alzada-South projects in Watershed 16. The initial mitigation monitoring event was conducted in 2002. Monitoring ceased in 2007 following the dike failure and resumed in 2011 following the dike repair in 2010.

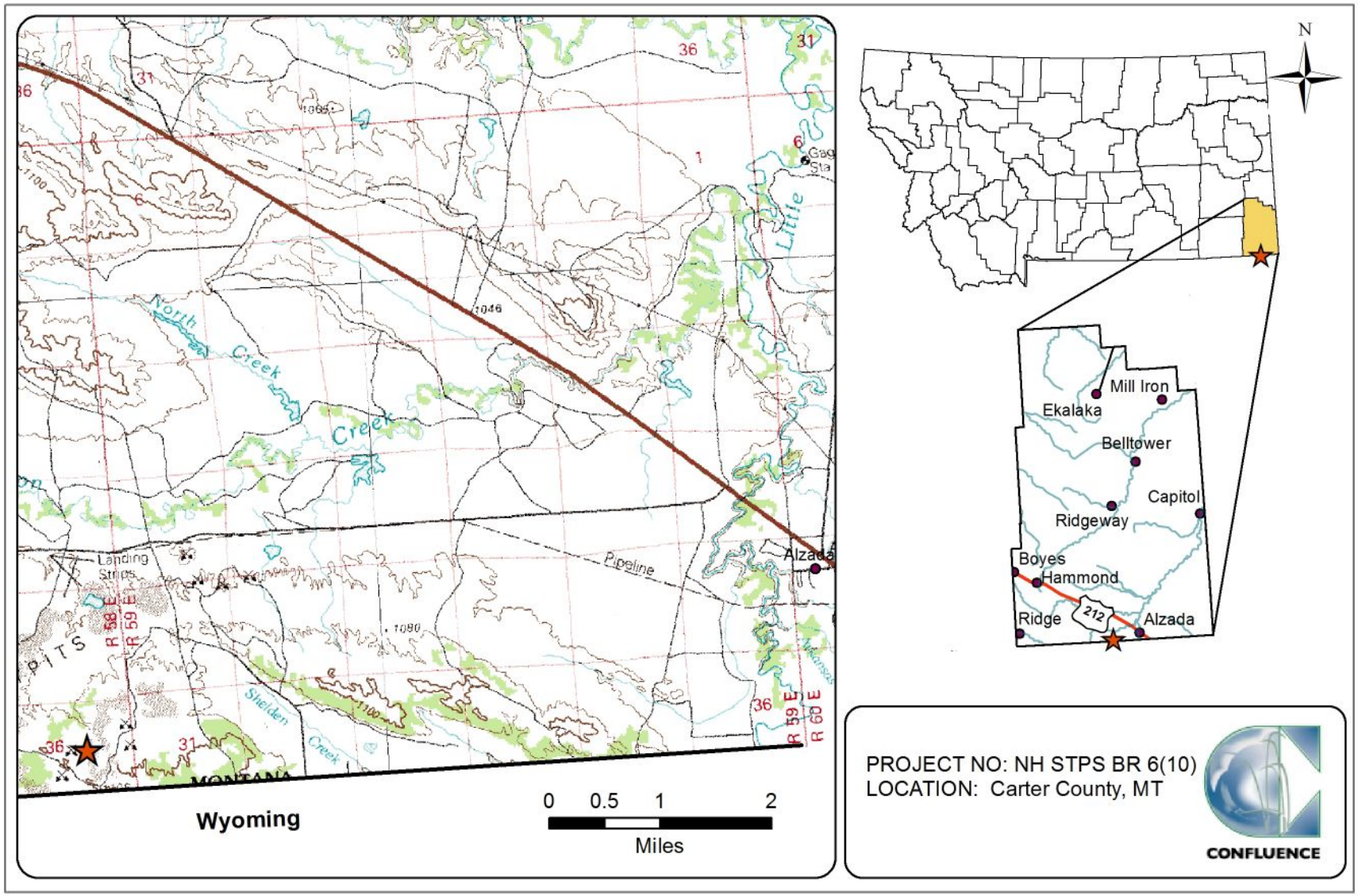


Figure 1. Project location of American Colloid Wetland Mitigation Site.

No specific goals or success criteria were defined for this project, which was originally constructed prior to release of the 2008 USACE mitigation rule that requires such components. Wetland success will be based on the following performance standards:

1. **Wetland Characteristics**: All restored, created, enhanced, and preserved wetlands within the project limits will meet the three parameter criteria for hydrology, vegetation, and soils established for determining wetland areas as outlined in the *1987 Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987) and the *2010 Regional Supplement to the Corps of Engineers Manual: Great Plains Region (Version 2.0)* (USACE 2010).
    a) **Wetland Hydrology Success** will be achieved where wetland hydrology is present as per the technical guidelines in the 1987 Wetland Manual and the 2010 Regional Supplement, including soil saturation present for at least 12.5 percent of the growing season.
    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 and the soil is able to support plant cover. Soil characterization 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 and 2010 Regional Supplement. 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 through the delineation of developing wetlands utilizing the technical guidelines established in the 1987 Wetland Manual and the 2010 Regional Supplement. The following concept of "dominance", as defined in the 1987 Manual, will be applied during future routine wetland determinations in 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 areal cover (herbaceous understory), and/or greatest number of stems (woody vines).*"

2. **Upland Buffer Success** will be achieved when noxious weeds do not exceed 10 percent of cover within the buffer areas on site. Any area within the creditable buffer zone disturbed by project construction must have at least 30 percent areal cover of non-weed species by the end of the monitoring period. *Note: The areal coverage for the upland buffer success criteria was decreased from 50 percent to 30 percent based on the high proportion of bare ground within the adjacent undisturbed upland areas and apparent climax vegetation cover for the region (climate/soils limit vegetation development).*

3. **Weed Control** will be based upon annual monitoring of the site to determine weed species and degree of infestation within the site, and control measures based upon the monitoring results will be implemented by MDT to minimize and/or eliminate the intrusion of State Listed Noxious weed species within the site. The MDT will manage the wetland conservation easement area to meet a goal of having less than 10 percent absolute cover of state listed noxious weed species across the site.

4. **Fencing** of the proposed mitigation site has been installed along the boundaries to protect the integrity of the wetland and upland buffer from disturbance that may be detrimental to the site. Fencing installed along the perimeter of the site has been designed to be "wildlife friendly" to allow for wildlife movement into and out of the wetland complex.

5. **Monitoring** of this MDT mitigation site will be based upon the MDT standard monitoring protocols utilized for all MDT wetland mitigation sites for a minimum period of five years or longer as determined by the US Army Corps Montana Regulatory Office's review of annual monitoring reports for the site and whether or not the site has met the wetland success criteria.

2. METHODS

The 2014 monitoring event was completed on July 9, 2014. Information for the Mitigation Monitoring Form and Wetland Determination Data Forms was entered in the field on an electronic tablet during the site investigation (Appendix B). Monitoring activity sites were located with a global positioning system (GPS) and are illustrated in Figure 2 (Appendix A). Information collected included a wetland delineation, vegetation community mapping, vegetation transect data, soil and hydrology data, 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 Forms was documented at two data points established within the project area. The hydrologic indicators were evaluated according to features observed *in situ* during the site visit. The data were recorded on electronic field data sheets (Appendix B). Hydrologic assessments allow evaluation of mitigation performance standards addressing inundation and 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 in the 1987 Wetland Delineation Manual (Environmental Laboratory 1987) as the number of days where there is a

50 percent probability that the minimum daily temperature is greater than or equal to 28 degrees Fahrenheit. The growing season recorded for the predominant soil map unit, Neldore-rock outcrop complex (58D), averages 120 days (USDA 2011). Areas defined as wetlands would require 15 days of continuous 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 approximately 18 inches of the ground surface. The data were recorded on the Wetland Determination Data Form (Appendix B). No monitoring wells were installed at this site.

2.2. Vegetation

The boundaries of dominant-species based vegetation communities were determined in the field during the active growing season and subsequently delineated on the 2014 aerial photograph. Community types were named based on the predominant vegetation species that characterized each mapped polygon (Figure 3, Appendix A). Percent cover of dominant species within a community type was estimated and recorded using the following values: 0 (less than 1 percent), 1 (1 to 5 percent), 2 (6 to 10 percent), 3 (11 to 20 percent), 4 (21 to 50 percent), and 5 (greater than 50 percent) (Appendix B). No woody species were planted at the American Colloid Mitigation Site.

Temporal changes in vegetation are evaluated through annual assessments of a single static belt transect, which was originally established in July 2002 and reestablished in 2011. Vegetation composition was assessed and recorded along a 10-foot wide and 300-foot long belt transect (T-1) (Figure 2, Appendix A). The transect location was 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 polygon data (Appendix B). Photographs were taken at the transect endpoints during the monitoring event (Appendix C).

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 photo with noxious weed species color-coded (Figure 3, Appendix A). The locations are denoted with the symbol "**x**", "▲", or "■" representing 0 to 0.1 acre, 0.1 to 1 acre, or greater than 1 acre in extent, respectively. Cover classes are represented by a 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 Carter County Area* (USDA 2011) and *in situ* soil descriptions. Soil cores were excavated using a hand auger and evaluated according to procedures outlined in the 1987 Manual and 2010 Regional Supplement. A description of the soil profile, including hydric

soil indicators when present, was recorded on the electronic Wetland Determination Data Form for each profile (Appendix B).

2.4. Wetland Delineation

Waters of the U.S. including special aquatic sites and wetlands were delineated throughout the project area in accordance with criteria established in the 1987 Manual and the 2010 Regional Supplement to the Corps of Engineers Manual: Great Plains Region (Version 2.0). The technical criteria for hydrophytic vegetation, hydric soil, and wetland hydrology described in the 2010 Regional Supplement to the Corps of Engineers Manual must be satisfied to delineate a representative area as a wetland. The name and indicator status of plant species was derived from the 2014 National Wetland Plant List (NWPL) (Lichvar *et al*. 2014). Following USACE guidance, the 2014 NWPL scientific plant names were used in this report. 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 for vegetation, soil or hydrology, or special aquatic site, i.e., mudflat. The wetland boundaries were surveyed using resource-grade GPS and imported into Geographic Information System (GIS) format. Wetland areas reported have been calculated using GIS spatial quantification methodology.

2.5. Wildlife

Direct observations and other positive indicators of use of mammal, reptile, amphibian, and bird species 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 wildlife species list of animals observed from 2011 to 2014 was compiled for this report.

2.6. Functional Assessment

The 2008 MDT MWAM was used to evaluate functions and values on the site from 2011 through 2014. 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. One Wetland Assessment form was completed for the project area (Appendix B).

2.7. Photo Documentation

Monitoring at photo points provided supplemental information documenting wetland, upland, and transect conditions; site trends; and current land uses surrounding the site. Photographs were taken at established photo points throughout the mitigation site 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 2014 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 projected in Montana State Plane Single Zone NAD 83 meters. Site features and survey points that were located with GPS included fence boundaries, photographic points, transect endpoints, and wetland data points.

2.9. Maintenance Needs

Engineered structures including the dike and outlet structure, 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 Albion 1 N, Montana (240088), located approximately 16 miles northeast of the site, recorded an average annual precipitation rate of 14.23 inches from 1945 to 2010 (WRCC 2012). The total precipitation recorded in 2010 was 23.6 inches, 9.37 inches above the 65-year average. The Western Regional Climate Center precipitation data for the Albion 1 N station was incomplete for 2011 through 2014. Monthly precipitation totals collected at the Broadus meteorological station (241127), located approximately 50 miles northwest of the mitigation site, were used to provide additional regional climate data. The mean annual precipitation total for the period of record at Broadus (93 years) is 13.96 inches. The annual precipitation totals recorded at the Broadus station were 17.26 inches in 2011, 9.15 inches in 2012, and 18.00 inches in 2013, indicating above average precipitation for the first year of monitoring (2011), significantly below average precipitation for 2012, and above-average precipitation in 2013. The total from January to August was 10.9 inches (long-term average), 16.48 inches (2011), 7.68 inches (2012), 13.85 inches (2013), and 10.21 inches (2014). These data indicate the region received above-

or near average precipitation during the 2011, 2013, and 2014 growing seasons and below-average precipitation in 2012, as reflected in the lower water level observed within the constructed impoundment during the 2012 field survey compared to the 2011, 2013, and 2014 water levels.

The wetland basin was constructed in an ephemeral drainage within a 167-acre watershed. Wetland hydrology at the site is provided solely through direct precipitation and surface runoff. During the site inspection, the constructed dike was impounding surface water and functioning as designed. There were approximately 2.87 acres of surface water at depths ranging from 0.0 to 2.7 feet. Hydrologic indicators observed during the investigation indicated that water levels measured in July were less than the maximum elevation attained during spring runoff at the beginning of the growing season. The water surface was approximately 0.8 foot below the outlet elevation. Surface soil cracks, water-stained leaves, drift deposits, water marks, and an algal crust were noted at the water's edge. Inundation was also visible on the aerial imagery. Rills and other drainage patterns were observed throughout the uplands surrounding the inundated basin. Surface water from the wetland depression discharges to the ephemeral drainage through a series of downgradient wetlands into an unnamed tributary of Thompson Creek and eventually into the Little Missouri River located approximately 15 miles downstream of the mitigation site. Precipitation, surface water runoff, and evaporation rates are the dominant factors influencing seasonal water elevations within the wetland. Groundwater input is limited based on the low hydraulic conductivity of the soil forming the unconsolidated bottom of the basin.

No groundwater monitoring wells were installed within this site. Hydrological data were collected at two data points, AC-1u and AC-1w. Data point AC-1w located a few feet from the water's edge exhibited saturation at 8 inches below the ground surface (bgs). No primary or secondary indicators of wetland hydrology were observed at AC-1u, located on the upland slope directly above AC-1w.

3.2. Vegetation

Forty plant species have been identified onsite from 2011 through 2014 (Table 1). Vegetation community types were mapped based on the dominant species within an area and the results of the wetland delineation data. The 2014 vegetation communities were the same as the previous three years, Type 1 – *Ericameria nauseosa/Atriplex argentea* Upland; Type 2 – *Schizachyrium scoparium/Grindelia squarrosa* Upland; and Type 3 – *Spartina pectinata* Wetland. The impounded depression, defined by polygon 4, encompassed 2.87 acres of open water in 2014, a decrease of approximately 0.33 acres from 2013 (Figure 3, Appendix A and Monitoring Form, Appendix B). The dominant species for each community type are presented in descending order of abundance in the following discussions.

Table 1. Vegetation species observed from 2011 thru 2014 at the American Colloid Wetland Mitigation Site.

Scientific Name	Common Name	GP Indicator Status[1]
Achillea millefolium	Common Yarrow	FACU
Algae, green	Algae, green	NL
Amaranthus retroflexus	Red-Root	FACU
Artemisia tridentata	Big Sagebrush	NL
Aster sp.	Aster	NL
Atriplex argentea	Silverscale	FAC
Avena fatua	Wild Oats	NL
Beckmannia syzigachne	American Slough Grass	OBL
Bromus arvensis	Field Brome	FACU
Bromus tectorum	Cheatgrass	NL
Calamovilfa longifolia	Prairie Sandreed	NL
Chenopodium album	**Lamb's-Quarters**	**FACU**
Chenopodium leptophyllum	Narrow-Leaf Goosefoot	FACU
Chenopodium sp.	Goosefoot	NL
Cirsium arvense	Canadian Thistle	FACU
Echinochloa crus-galli	Large Barnyard Grass	FAC
Eleocharis palustris	Common Spike-Rush	OBL
Elymus elymoides	Western Bottle-Brush Grass	UPL
Elymus repens	Creeping Wild Rye	FACU
Ericameria nauseosa	Rubber Rabbitbrush	NL
Festuca pratensis	Meadow Fescue	NL
Grindelia squarrosa	Curly-Cup Gumweed	UPL
Gutierrezia sarothrae	Broom Snakeweed	NL
Hordeum jubatum	Fox-Tail Barley	FACW
Juncus tenuis	Lesser Poverty Rush	FAC
Juniperus communis	Common Juniper	UPL
Opuntia polyacantha	Plains Pricklypear	NL
Panicum capillare	Common Panic Grass	FAC
Pascopyrum smithii	Western-Wheat Grass	FACU
Poa sp.	Blue Grass	NL
Puccinellia nuttalliana	Nuttall's Alkali Grass	OBL
Rumex acetosella	Common Sheep Sorrel	FAC
Rumex crispus	**Curly Dock**	**FAC**
Sarcobatus vermiculatus	Greasewood	FAC
Schizachyrium scoparium	Little False Bluestem	FACU
Schoenoplectus maritimus	Saltmarsh Club-Rush	OBL
Spartina pectinata	Freshwater Cord Grass	FACW
Spergula arvensis	Cornspurry	NL
Typha latifolia	Broad-Leaf Cat-Tail	OBL
Xanthium strumarium	Rough Cockleburr	FAC

[1] 2014 NWPL (Lichvar *et al*., 2014)

New species identified in 2014 are bolded.

Upland Community Type 1 – *Ericameria nauseosa/Atriplex argentea* has developed on approximately 1.73 acres within the site perimeter. Rubber rabbitbrush (*Ericameria nauseosa* - *Chrysothamnus nauseousus* on 1988 list), silverscale salt bush (*Atriplex argentea*), fox-tail barley (*Hordeum jubatum*), curly-

cup gumweed (*Grindelia squarrosa*), big sagebrush (*Artemisia tridentata*), field brome (*Bromus arvensis*), plains pricklypear (*Opuntia polyacantha*), and greasewood (*Sarcobatus vermiculatus*) dominated the vegetation cover. Common juniper (*Juniperus communis*) was present in trace amounts. Approximately 60 to 70 percent of the area characterized by the community was bare ground.

Upland Community Type 2 – *Schizachyrium scoparium/Grindelia squarrosa* characterized the 1.13-acre community that abuts the wetland fringe surrounding the open water. The community acreage remained the same from 2013 to 2014. The vegetation was dominated by little false bluestem (*Schizachyrium scoparium*), curly-cup gumweed, prairie sandreed (*Calamovilfa longifolia*) and thirteen other species observed at less than five percent cover. Approximately 11 to 20 percent of the total cover was bare ground.

Wetland Community Type 3 – *Spartina pectinata* (freshwater cord grass) dominated the 0.71-acre wetland community that characterized the wetland fringe adjacent to the open water. The decrease of 0.85 acres in wetland area from 2012 to 2013 was the result of a corresponding increase in the open water area. As slightly decreased water levels were observed in 2014, this community displayed a corresponding increase in aerial extent. Freshwater cord grass continued to dominate the community with less cover contributed by narrow-leaf goosefoot (*Chenopodium leptophyllum*), curly-cup gumweed, fox-tail barley, saltmarsh club-rush (*Schoenoplectus maritimus*, called *Scirpus maritimus* on 1988 list), broad-leaf cattail (*Typha latifolia*), broom snakeweed (*Gutierrezia sarothrae*), little false bluestem, and seven other species. The cover class for bare ground was estimated at 21 to 50 percent.

Approximately 2.87 acres of open water (Polygon 4) covered slightly less than half of the area within the constructed wetland cell. This represented a decrease of 0.33 acres in open water from 2013 to 2014 and fluctuates seasonally. The open water contained less than five percent cover of green algae, freshwater cord grass, broad leaf cattail, saltmarsh club-rush, common spike-rush (*Eleocharis palustris*), common sheep sorrel (*Rumex acetosella*), and Canadian thistle (*Cirsium arvense*). The wetland cell was flooded following construction in 2001 through sometime in 2007 prior to dike failure. The area has supported open water since the dike repair in 2010. Productivity levels in the open water are likely limited by the presence of suspended clay particles and a high level of turbidity that restricts photosynthesis through the water column.

Data collected on Transect 1 (Monitoring Form, Appendix B) are summarized in tabular and graphic formats (Table 2, Charts 1 and 2, respectively). The start and finish of Transect 1 were photographed as shown on Page C-5 of Appendix C. The transect intersected Type 3 – *Spartina pectinata* wetland and open water (Polygon 4). Hydrophytic vegetation was identified on 1.7 percent of the belt transect and open water extended across 98.3 percent of the transect. The

upland community identified at the end of T-1 in 2011 and 2012 converted to wetland in 2013 and persisted as wetland in 2014.

Table 2. Data summary for Transect 1 from 2011 thru 2014 at the American Colloid Wetland Mitigation Site.

Monitoring Year	2011	2012	2013	2014
Transect Length (feet)	300	300	300	300
Vegetation Community Transitions along Transect	3	3	2	1
Vegetation Communities along Transect	2	2	1	1
Hydrophytic Vegetation Communities along Transect	1	1	1	1
Total Vegetative Species	7	12	11	8
Total Hydrophytic Species	4	5	4	5
Total Upland Species	3	7	7	3
Estimated % Total Vegetative Cover	12	15	15	15
Estimated % Unvegetated	88	85	85	85
% Transect Length Comprising Hydrophytic Vegetation Communities	7.3	8.3	6.3	1.7
% Transect Length Comprising Upland Vegetation Communities	4.3	6.7	0	0
% Transect Length Comprising Unvegetated Open Water	88.3	85.0	93.7	98.3
% Transect Length Comprising Mudflat	0.0	0.0	0	0

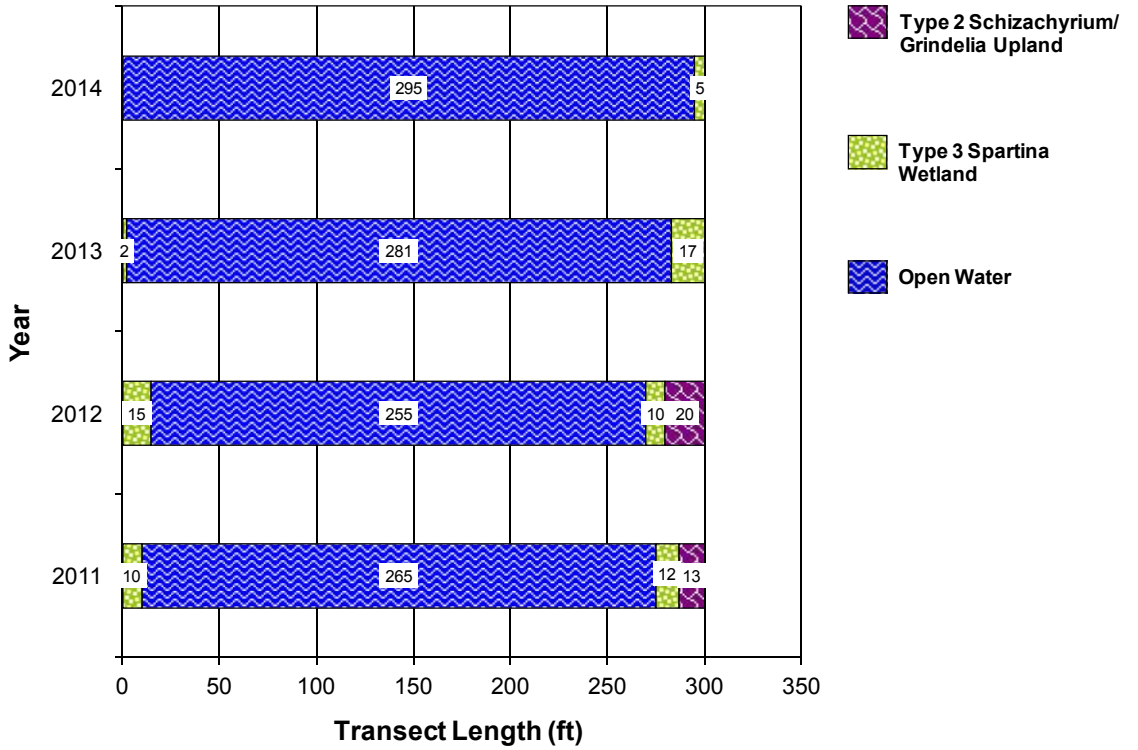


Chart 1. Transect map showing community types on Transect 1 from 2011 thru 2014 from start (0 feet) to finish (300 feet) at the American Colloid Wetland Mitigation Site.

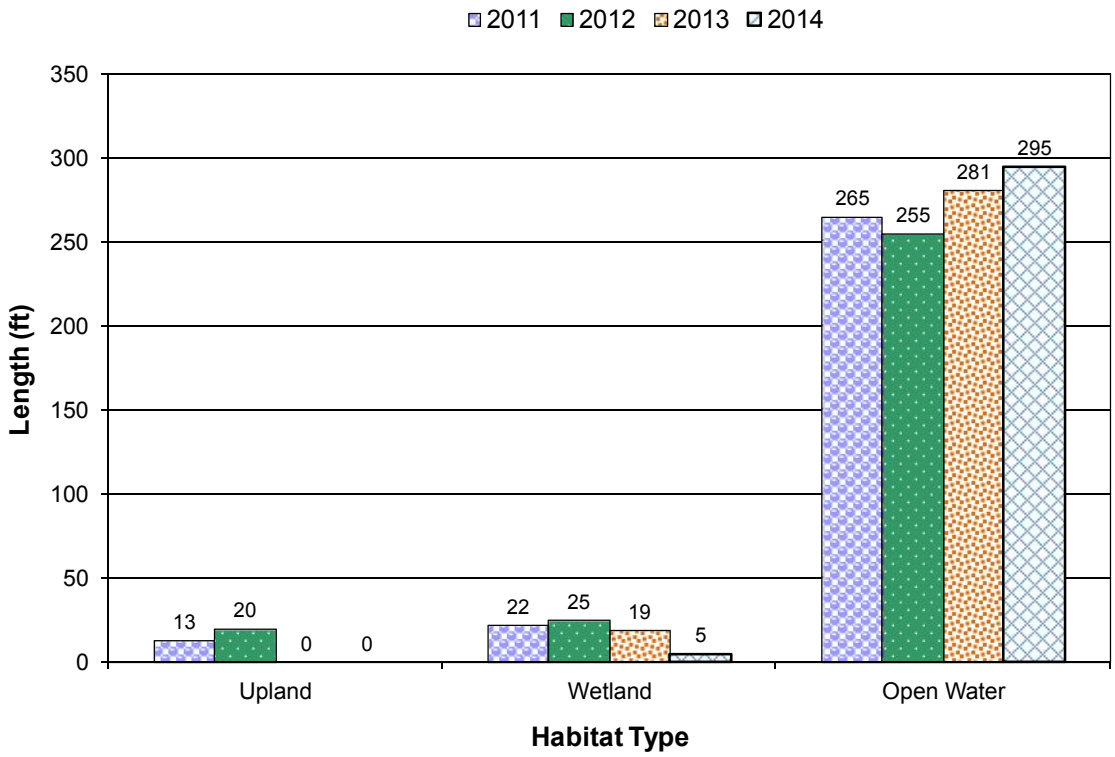


Chart 2. Length of habitat types within Transect 1 from 2011 thru 2014 at the American Colloid Wetland Mitigation Site.

Two clusters of Canadian thistle, a Priority 2B weed, were noted on less than 0.1 acre near the northwest mitigation boundary at the edge of wetland and open water. The cover class was less than 1 percent. The MDT has an ongoing weed control program that annually manages State noxious weed infestations on each mitigation site.

3.3. Soil

The project site was mapped in the *Carter County Soil Survey* (USDA 2011) within the Neldor-Rock outcrop complex at 4 to 15 percent slopes on hill slopes. The parent material of this complex is clay residuum over semi-consolidated shale. These are well drained, low-permeable, non-hydric soils with clay loam inclusions. The test pit results generally confirmed the presence of clay soil.

Soil pit AC-1w was located in wetland community 3 in the vegetated fringe along the open water. The soil profile revealed a black (10 YR 2/1) clay with five percent dark yellowish brown redoximorphic concentrations (10 YR 4/6) in the matrix. The redox dark surface provided a positive indication of hydric soil. The soil profile at AC-1u, located in the adjacent upland just upslope of AC-1w, was gray (10 YR 5/1) clay without redox features. There were no hydric soil indicators in the soil profile.

3.4. Wetland Delineation

Two data points, AC-1w and AC-1u, were evaluated to confirm the wetland boundary determination. Between 2012 and 2013, the wetland acreage

decreased by 0.85 acre and the open water aquatic habitat increased by 1.16 acres. This change was predominantly the result of increased inundation levels in the impoundment observed during the 2013 survey. A slight decrease in open water (0.33 acres) with a corresponding increase in wetland acreage was noted between 2013 and 2014. The extent of overall aquatic habitat remained the same in 2014. A total of 3.58 acres of vegetated wetland and unvegetated open water aquatic habitat was delineated in 2014 (Table 3).

Table 3. Total wetland acres delineated from 2011 thru 2014 at the American Colloid Wetland Mitigation Site.

WETLAND AND AQUATIC HABITAT ACREAGES	2011	2012	2013	2014
Wetlands	0.26	1.23	0.38	0.71
Open Water	3.01	2.04	3.20	2.87
Total	3.27	3.27	3.58	3.58

3.5. Wildlife

A comprehensive list of bird and other wildlife species observed directly or indirectly from 2011 through 2014 is presented in Table 4. Seven bird species were observed in 2014, killdeer (*Charadrius vociferus*), mourning dove (*Zenaida macroura*), turkey vulture (*Cathartes aura*), song sparrow (*Melospiza melodia*), red-winged blackbird (*Agelaius phoeniceus),* red-tailed hawk (*Buteo jamaicensis*), and American goldfinch (*Spinus tristis*). Two northern leopard frogs (*Rana pipiens*) and deer (*Odocoileus sp*.) tracks and scat were noted onsite in 2014.

Table 4. Wildlife species observed from 2011 thru 2014 within the American Colloid Wetland Mitigation Site.

COMMON NAME	SCIENTIFIC NAME
AMPHIBIANS	
Northern Leopard Frog	***Rana pipiens***
BIRDS	
American Goldfinch	***Spinus tristus***
Canada Goose	*Branta canadensis*
Grasshopper Sparrow	*Ammodramus savannarum*
Killdeer	***Charadrius vociferus***
Mallard	*Anas platyrhynchos*
Mourning Dove	***Zenaida macroura***
Northern Harrier	*Circus cyaneus*
Red-tailed Hawk	***Buteo jamaicensis***
Red-winged Blackbird	***Agelaius phoeniceus***
Song Sparrow	***Melospiza melodia***
Turkey Vulture	***Cathartes aura***
Vesper Sparrow	*Pooecetes gramineus*
MAMMALS	
Beaver	*Castor canadensis*
Deer Sp.	***Odocoileus sp.***
Mule Deer	*Odocoileus hemionus*
Muskrat	*Ondatra zibethicus*
Pronghorn	*Antilocapra americana*
REPTILES	
Turtle sp.	

Species identified in 2014 are bolded.

3.6. Functional Assessment

The 2011 monitoring data provided a baseline for subsequent functional assessments. The 2008 MWAM has been used from 2011 through 2014 to evaluate the assessment area (AA) that included the open water depression and adjacent herbaceous-dominated wetland fringe (Appendix B). The site is situated within the semiarid Pierre Shale Plains with a surrounding habitat of undulating rolling plains and vegetation cover consisting of shortgrass prairie and scattered stands of Ponderosa pine. The AA is located on DNRC property under a MDT conservation easement. There are no active mining or roads within 500 feet of the assessment area (AA) and there are a few isolated ponds and wetland areas near the AA.

The functional points and ratings remained the same from 2013 to 2014. The size of the AA increased from 3.27 acres in 2012 to 3.58 acres in 2013 as a result of the increase in the extent of inundation in the depression and remained consistent in 2014. Table 5 summarizes the function and value ratings of the AA from 2011 to 2014. The AA was rated as a Category III wetland with 42 percent of the total points possible in 2013 and 2014. This AA achieved 13.60 functional units in 2013 and 2014, an increase from 12.75 in 2012. The increase in

functional units was related to the increase of total wetland acreage at this site. A modification to the production export/food chain support rating between 2012 and 2013 to 2014 was related to the reevaluation of the vegetated component within the AA. The short and long term surface water storage was rated as high in 2013 and 2014 as a result of the large depression containing perennial surface water. The AA received moderate ratings for general wildlife habitat, sediment/nutrient/toxicant removal, production export/food chain support, and uniqueness.

Table 5. Functional assessment results from 2011 thru 2014 for the American Colloid Wetland Mitigation Site.

Function and Value Parameters from the 2008 Montana Wetland Assessment Method	2011	2012	2013	2014
Listed/Proposed T&E Species Habitat	Low (0.0)	Low (0.0)	Low (0.0)	Low (0.0)
MTNHP Species Habitat	Low (0.1)	Low (0.1)	Low (0.1)	Low (0.1)
General Wildlife Habitat	Mod (0.4)	Mod (0.6)	Mod (0.6)	Mod (0.6)
General Fish/Aquatic Habitat	NA	NA	NA	NA
Flood Attenuation	NA	NA	NA	NA
Short and Long Term Surface Water Storage	High (1.0)	High (1.0)	High (1.0)	High (1.0)
Sediment/Nutrient/Toxicant Removal	Mod (0.6)	Mod (0.6)	Mod (0.6)	Mod (0.6)
Sediment/Shoreline Stabilization	Low (0.3)	Low (0.3)	Low (0.3)	Low (0.3)
Production Export/Food Chain Support	Mod (0.7)	High (0.8)	Mod (0.7)	Mod (0.7)
Groundwater Discharge/Recharge	Low (0.1)	Low (0.1)	Low (0.1)	Low (0.1)
Uniqueness	Low (0.3)	Mod (0.4)	Mod (0.4)	Mod (0.4)
Recreation/Education Potential (bonus points)	NA	NA	NA	NA
Actual Points/Possible Points	**3.5 / 9**	**3.9 / 9**	**3.8 / 9**	**3.8 / 9**
% of Possible Score Achieved	**39%**	**43%**	**42%**	**42%**
Overall Category	**III**	**III**	**III**	**III**
Total Acreage of Assessed Wetlands within Site Boundaries	**3.27**	**3.27**	**3.58**	**3.58**
Functional Units (acreage x actual points)	**11.45**	**12.75**	**13.60**	**13.60**

There were no disturbances to the site from 2012 to 2014 and there was one vegetation class, emergent. Wildlife use was minimal during the site visit. The assessment yielded 13.60 functional units for the American Colloid wetland mitigation site in 2014. The percent cover of wetland species at the edge of open water may increase in subsequent growing seasons, contingent on the continued presence of wetland hydrology, which would generate an associated increase in functional units.

3.7. Photo Documentation

Photographs taken from five photo points, PP1 to PP5, are shown on pages C-1 to C-4 of Appendix C. Photos of the transect end points are presented on page C-5 and the delineation data points are shown on page C-6 (Appendix C). In general, these photos show that vegetation cover in both the wetland and upland communities has been slow to develop.

3.8. Maintenance Needs

There were no nesting structures installed at the site. The outlet control structure was repaired in 2010. The water-control standpipes and armored earthen berm were in good condition and working as designed during the 2014 investigation. A wildlife friendly fence that surrounds the 15-acre site was in good condition and did not require maintenance. Two clusters of Canadian thistle, a Priority 2B weed less than 0.1 acre in size, were noted near the northwest mitigation boundary. The cover class was less than 1.0 percent. The MDT administers an ongoing weed control program that annually assesses the location and size of State noxious weed infestations on each mitigation site.

The vegetation cover in the upland communities at the site is estimated at 30 percent, just meeting the success criteria for the upland buffer. Reseeding the bare areas with appropriate species may facilitate an overall increase in vegetation cover and soil stability although a sizeable increase in vegetation cover is likely unachievable. The sparsely vegetated substrate consists of extremely dry and easily erodible clayey soils. Harsh soil properties and high rates of erosion and deposition are driving environmental variables supporting very low vegetation cover. The open water area accounted for 80 percent of the wetland area and supported less than 5 percent cover. As noted in section 3.2, vegetation development in the open water are likely limited by the presence of suspended clay particles and a high level of turbidity that restricts photosynthesis through the water column.

3.9. Current Credit Summary

The calculation of credit acres shown in Table 6 assumed a mitigation ratio of 1:1 (impact to credit) for the created wetland and open water aquatic habitat within the wetland depression and a 5:1 credit ratio for preservation and maintenance of the upland buffer. The wetland and aquatic habitat acreage totaled 3.27 acres in 2011 and 2012 and 3.58 acres in 2013 and 2014 (Table 6). The full acreage (11.42 acres) of the fenced upland buffer was used to calculate the upland preservation credit acreage of 2.28 in 2013 and 2014. The increase in aquatic habitat acreage in 2013 was reflected in the corresponding increase in total credit acres from 5.62 in 2011 and 2012 to 5.86 in 2013. This value remained consistent in 2014. The proposed credit acreage for this site was 7 credit acres, based on the design plan that defined the creation of 5 acres of wetlands and the preservation of 10 acres of upland buffer. The 5.86 estimated credit acres based on data collected in 2013 and 2014 were 1.14 acres less than the proposed credits for the American Colloid wetland mitigation site.

The status of key performance standards evaluated in 2014 is summarized below and shown in Table 7.

- The vegetation community identified as *Spartina pectinata* surrounding the open water area meets the three parameter criteria for wetland characteristics.

- Very little aquatic vegetation (<5%) has established within the impounded open water. The percent cover of aquatic macrophytes may increase in the open water area in the long term eventually creating an aquatic bed vegetation class; however, suspended clay particles in the water column appears to limit photosynthesis and likely inhibits development of the aquatic bed. This 2.87-acre area currently meets the USACE criteria for deep water aquatic habitat, not wetland.
- The wetland depression was inundated throughout the growing season.
- Hydric soil indicators were evident at both wetland data points, within the open water area and along the wetland fringe.
- The 0.71-acre wetland area supported a dominance of hydrophytic vegetation.
- The vegetation cover of the upland buffer within the mitigation site has been estimated at approximately 30 percent, four years after the dam was repaired and just meets the upland criteria of at least 30 percent vegetation cover.
- The noxious weed cover is less than 10 percent site wide and MDT continues to administer a weed management plan for the site.
- The 15-acre easement area has been fenced with wildlife-friendly fencing.
- The criteria for monitoring the site for a minimum period of five years has yet to be achieved and will be met in 2015.

Table 6. Credit summary from 2011 thru 2014 for the American Colloid Wetland Mitigation Site.

COMPENSATORY MITIGATION TYPE	USACE MITIGATION RATIO	PROPOSED ACRES	2011 DELINEATED ACRES	2011 CREDIT ACRES	2012 DELINEATED ACRES	2012 CREDIT ACRES
Creation: Establishment (wetland)	1:1	5	0.26	0.26	1.23	1.23
Creation: Establishment (open water)	1:1		3.01	3.01	2.04	2.04
Upland Buffer (Preservation and Maintenance)	5:1	10 (2 credit acres)	11.73*	2.35	11.73*	2.35
Total		7	15.00	5.62	15.00	5.62

Table 6. Continued.

COMPENSATORY MITIGATION TYPE	2013 DELINEATED ACRES	2013 CREDIT ACRES	2014 DELINEATED ACRES	2014 CREDIT ACRES
Creation: Establishment (wetland)	0.38	0.38	0.71	0.71
Creation: Establishment (open water)	3.2	3.20	2.87	2.87
Upland Buffer (Preservation and Maintenance)	11.42*	2.28	11.42*	2.28
Total	15.00	5.86	15.00	5.86

*Value includes all uplands within fenced 15-acre site

Table 7. Summary of success criteria and site performance.

Performance Standards	Success Criteria	Criteria Achieved Y/N	Discussion
Wetland Characteristics	Meet the three parameter criteria for hydrology, vegetation, and soils as outlined in the 1987 Wetland Delineation Manual and 2010 Great Plains Region.	Y	Approximately 0.71 acres of the site (Spartina community) met the three parameter criteria for wetland habitat.
		N	The 2.87 acres identified as open water supported less than 5 percent vegetation cover and meet the diagnostic environmental characteristics for deep water aquatic habitat, not wetland.
Wetland Hydrology	Soil saturation present for at least 12.5 percent of the growing season.	Y	Approximatley 3.58 acres of the site exhibit soil saturation for a minimum 12.5 percent of growing season.
Hydric Soil	Hydric soil conditions present or appear to be forming.	Y	Hydric soil characteristics, including redoximorphic concentrations and depleted matrix, have developed throughout the constructed wetland.
	Soil is able to support plant cover.	Y	Site-wide plant cover estimated at approximately 30% after fourth monitoring year; vegetation is present.
Hydrophytic Vegetation	Achieved when wetland vegetation is delineated as hydrophytic utilizing technical guidelines.	Y	Areas identified as wetland habitat within the mitigation site support a prevalence of hydrophytic vegetation (OBL, FACW, and FAC).
		N	Areas identified as open water does not support sufficient hydrophytic vegetation cover to classify as wetland.
Upland Buffer	Noxious weeds do not exceed 10 percent cover within upland buffer area.	Y	Noxious weed cover is less than 10 percent within the upland buffer.
	Any area disturbed within creditable buffer zone must have at least 30 percent aerial cover of non-weed species by end of monitoring period.	Y	Disturbed areas have established approximately 30 percent vegetation cover by non-weed species.
Weed Control	Less than 10 percent absolute cover of state-listed noxious weed species across the site.	Y	State-listed noxious weed species across the site is less than 5 percent absolute cover.
Fencing	Install wildlife-friendly fencing along the easement boundaries.	Y	Wildlife-friendly fencing has been installed around the easement boundaries and is in good condition.
Monitoring	Monitor the site for a minimum period of five years or longer as determined by the US Army Corps.	N	Comprehensive site monitoring has been on-going for 4 years following the completion of repair activities in 2010.

4. REFERENCES

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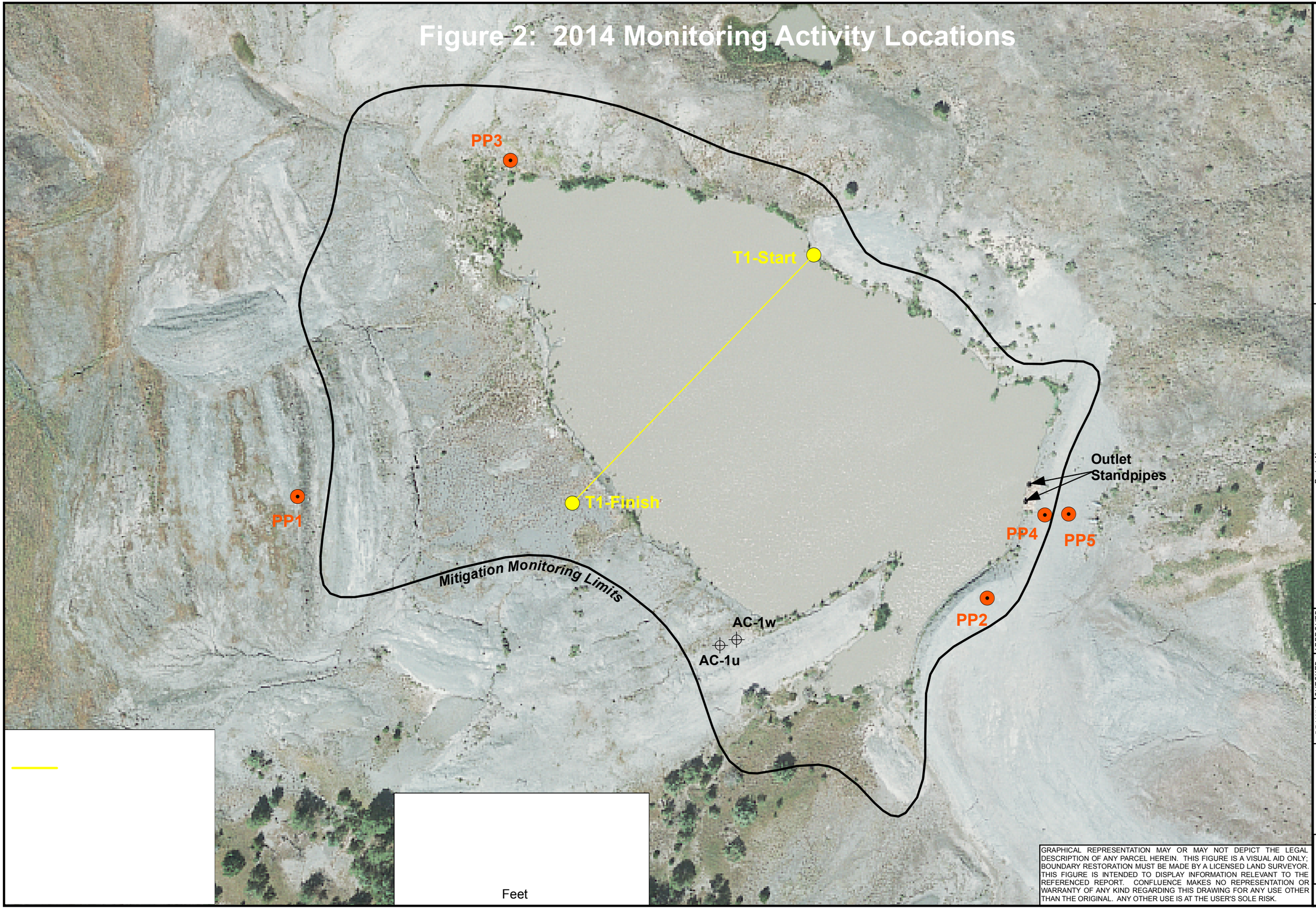
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Appendix A

Project Area Maps – Figures 2 and 3

MDT Wetland Mitigation Monitoring
American Colloid
Carter County, Montana

Figure 2: 2014 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: Carter Co., MT

PROJECT NO: STPX 6(15)

FILE: AmericanColloid/Monitor2014.mxd

Project Name
American Colloid Mitigation Site

Drawing Title
2014 Monitoring Activity Locations

DRAWN	CHECKED	APPROVED
BCS	BV	LU

SCALE: Noted

Drawn: October 7, 2014

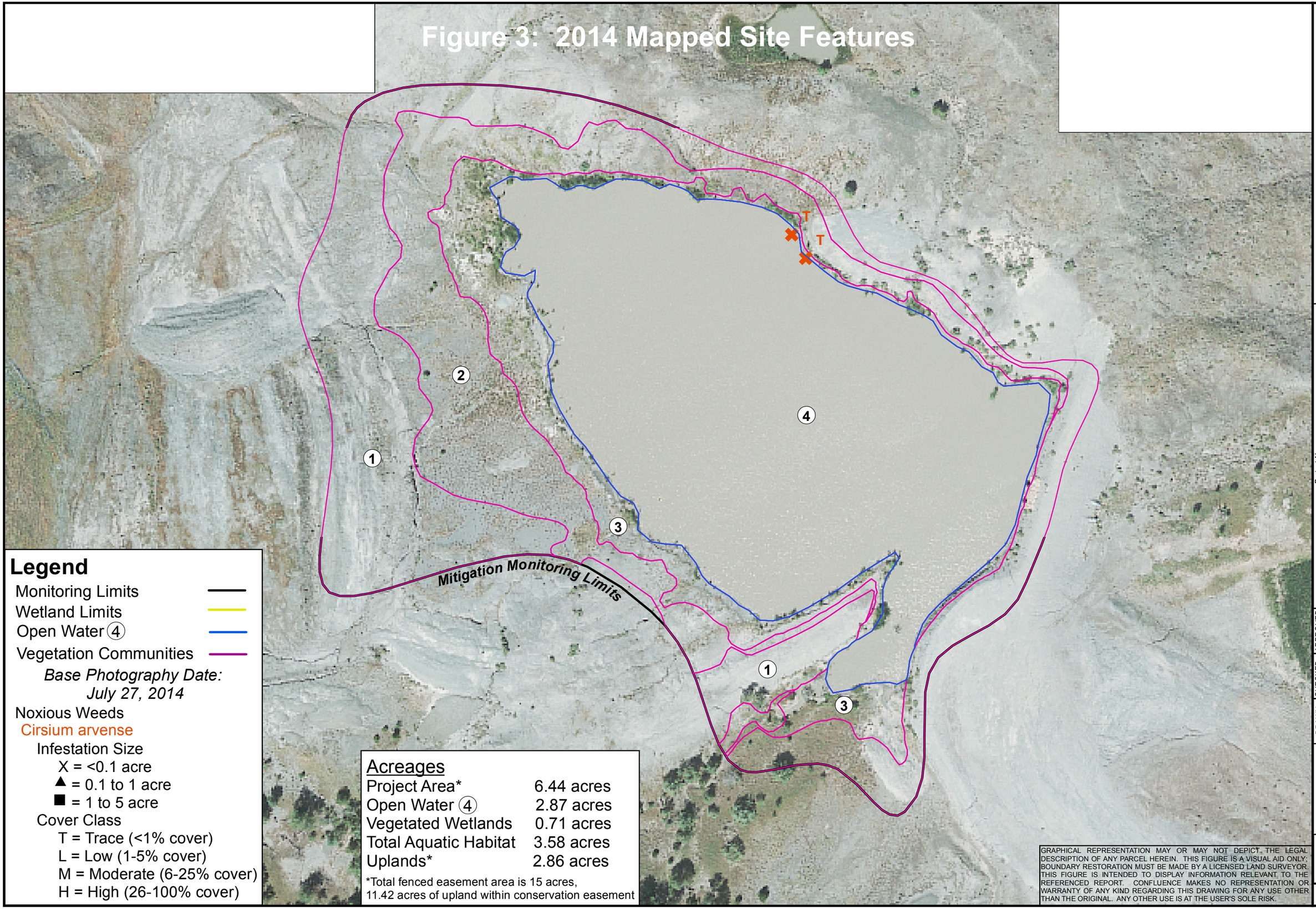
PROJ MGR: B Sandefur

CONFLUENCE
consulting incorporated

Figure
2

REV -

Figure 3: 2014 Mapped Site Features



Legend

- Monitoring Limits
- Wetland Limits
- Open Water (4)
- Vegetation Communities

Base Photography Date: July 27, 2014

Noxious Weeds

Cirsium arvense

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)

Acreages

Project Area*	6.44 acres
Open Water (4)	2.87 acres
Vegetated Wetlands	0.71 acres
Total Aquatic Habitat	3.58 acres
Uplands*	2.86 acres

*Total fenced easement area is 15 acres, 11.42 acres of upland within conservation easement

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: Carter Co., MT

PROJECT NO: STPX 6(15)

FILE: AmericanColloid/Veg2014.mxd

Project Name: American Colloid Mitigation Site

Drawing Title: 2014 Mapped Site Features

DRAWN	CHECKED	APPROVED
BCS	BV	LU

SCALE: Noted

Drawn: October 7, 2014

PROJ MGR: B Sandefur

CONFLUENCE consulting incorporated

Figure 3

REV -

Appendix B

2014 MDT Wetland Mitigation Site Monitoring Form
2014 USACE Wetland Determination Data Form
2014 MDT Montana Wetland Assessment Form

MDT Wetland Mitigation Monitoring
American Colloid
Carter County, Montana

MDT WETLAND MITIGATION SITE MONITORING FORM

Project Site: American Colloid Assessment Date/Time 7/9/2014 9:45:55 AM

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

Weather: Warm & sunny, breezy Location: Alzada, MT

MDT District: Billings Milepost: NA

Legal Description: T 9S R 58E Section(s) 36

Initial Evaluation Date: 8/9/2011 Monitoring Year: 4 #Visits in Year: 1

Size of Evaluation Area: 6.44 (acres)

Land use surrounding wetland:

Bentonite mine, open range

HYDROLOGY

Surface Water Source: Precipitation, runoff

Inundation: ☑ Average Depth: 1.2 **(ft)** Range of Depths: 0-2.7 **(ft)**

Percent of assessment area under inundation: 50 %

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:

Soil cracks, water-stained leaves, drift deposits, inundation visible on aerial imagery, and algal crust.

Groundwater Monitoring Wells

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

Well ID	Water Surface Depth (ft)
No Wells	

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:

Over 3 acres of surface water present within the impounded basin, water surface approximately 0.8-ft below outlet elevation.

VEGETATION COMMUNITIES

Site American Colloid

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

Community # 1 **Community Type:** Ericameria nauseosa / Atriplex argentea **Acres** 1.73

Species	Cover class	Species	Cover class
Artemisia tridentata	1	Atriplex argentea	3
Bare Ground	5	Bromus arvensis	1
Elymus repens	0	Ericameria nauseosa	3
Grindelia squarrosa	2	Hordeum jubatum	2
Juniperus communis	0	Opuntia polyacantha	1
Pascopyrum smithii	0	Sarcobatus vermiculatus	1

Comments:

Community # 2 **Community Type:** Schizachyrium scoparium / Grindelia squarrosa **Acres** 1.13

Species	Cover class	Species	Cover class
Achillea millefolium	0	Artemisia tridentata	1
Atriplex argentea	1	Bare Ground	3
Bromus tectorum	1	Calamovilfa longifolia	2
Chenopodium album	1	Echinochloa crus-galli	1
Elymus elymoides	1	Grindelia squarrosa	3
Hordeum jubatum	1	Panicum capillare	0
Puccinellia nuttalliana	1	Sarcobatus vermiculatus	1
Schizachyrium scoparium	3	Spartina pectinata	1
Xanthium strumarium	1		

Comments:

Community # 3 **Community Type:** Spartina pectinata / **Acres** 0.71

Species	Cover class	Species	Cover class
Achillea millefolium	0	Atriplex argentea	0
Bare Ground	4	Chenopodium leptophyllum	1
Cirsium arvense	0	Echinochloa crus-galli	0
Grindelia squarrosa	1	Gutierrezia sarothrae	1
Hordeum jubatum	1	Panicum capillare	0
Rumex crispus	0	Sarcobatus vermiculatus	0
Schizachyrium scoparium	1	Schoenoplectus maritimus	1
Spartina pectinata	2	Typha latifolia	1
Xanthium strumarium	0		

Comments:

Community # 4 **Community Type:** Open Water / **Acres** 2.87

Species	Cover class	Species	Cover class
Algae, green	1	Cirsium arvense	0
Eleocharis palustris	0	Open Water	5
Rumex acetosella	0	Schoenoplectus maritimus	1
Spartina pectinata	1	Typha latifolia	1

Comments:

Total Vegetation Community Acreage **6.44**

(Note: some area within the project bounds may be open water or other non-vegetative ground cover.)

VEGETATION TRANSECTS

Site: American Colloid Date: 7/9/2014 9:45:55 AM

Transect Number: 1 **Compass Direction from Start:** 130

Interval Data:

Ending Station 295 **Community Type:** Open Water /

Species	Cover class	Species	Cover class
Algae, green	1	Cirsium arvense	0
Eleocharis palustris	0	Open Water	5
Spartina pectinata	0		

Ending Station 300 **Community Type:** Spartina pectinata /

Species	Cover class	Species	Cover class
Bare Ground	5	Panicum capillare	1
Rumex crispus	0	Schizachyrium scoparium	0
Spartina pectinata	2	Xanthium strumarium	0

Transect Notes:

PLANTED WOODY VEGETATION SURVIVAL

American Colloid

Planting Type	#Planted	#Alive	Notes
None planted			

Comments

No woody vegetation planted at this site.

American Colloid

WILDLIFE

Birds

Were man-made nesting structures installed? No

If yes, type of structure: _____

How many? _____

Are the nesting structures being used? No

Do the nesting structures need repairs? No

Nesting Structure Comments:

Species	#Observed	Behavior	Habitat
American Goldfinch	2	F	OW, UP
Killdeer	4	F, FO	OW, US
Mourning Dove	2	F	UP
Red-tailed Hawk	1	FO	OW, UP
Red-winged Blackbird	9	L	OW
Song Sparrow	1	F, L	OW, UP
Turkey Vulture	1	FO	OW, UP

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
Deer Sp.		Yes	Yes	No	
Northern Leopard Frog	2	No	No	No	

Wildlife Comments:

American Colloid

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
3049-55	45.003201	-104.547737	130	PP-1
3057	45.004108	-104.547676	310	T-1, end
3067-76	45.004951	-104.547249	230	PP-2
3077	45.00523	-104.547684	185	PP-4
3078	45.00523	-104.547684	10	PP-5
3087	45.004608	-104.548531	130	T-1, start
3097-3100	45.003777	-104.549034	80	PP-3
3102	45.005005	-104.548141	0	AC-1w
3108	45.005051	-104.548088	180	AC-1u

Comments:

American Colloid

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? No

If yes, do they need to be repaired?

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 standpipes and armoured earthen berm in good condition.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: American Colloid City/County: Carter Co. Sampling Date: 7/9/2014

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

Investigator(s): B Sandefur Section, Township, Range: 36 9S 58E

Landform (hillslope, terrace, etc.): Swale Local relief (concave, convex, none): concave Slope (%): _____

Subregion (LRR): LRR G Lat: 45.004301 Long: -105.547212 Datum: WGS84

Soil Map Unit Name: Neldore-Rock outcrop 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 ☑	
Hydric Soil Present?	Yes ☐	No ☑	Is the Sampled Area within a Wetland? Yes ☐ No ☑
Wetland Hydrology Present?	Yes ☐	No ☑	

Remarks: Data point in ephemeral swale above wetland fringe around open water.

VEGETATION - Use scientific names of plant

Tree Stratum Plot size (30 Foot Radius)

	Absolute % Cover:	Domiant Species?	Indicator Status

Sapling/Shrub Stratum Plot size (15 Foot Radius)

Herbaceous Stratum Plot size (5 Foot Radius)

Ericameria nauseosa	10	☑	NL
Grindelia squarrosa	5	☑	UPL
Gutierrezia sarothrae	20	☑	NL
Hordeum jubatum	5	☑	FACW

Woody Vine Stratum Plot size (30 Foot Radius)

Percent Bare Ground 60

Dominance Test worksheet

Number of Dominant Species that are OBL, FACW or FAC: 1 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 25.0 % (A/B)

Prevalence Index worksheet

Total % Cover of:		Multiply by:
OBL species	0 X 1	0
FACW species	5 X 2	10
FAC species	0 X 3	0
FACU species	0 X 4	0
UPL species	5 X 5	25
Column Totals	10 (A)	35 (B)

Prevalence Index = B/A = 3.50

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance Test is >50%
- ☐ 3 - Prevalence Index is <= 3.0
- ☐ 4 - Morphological Adaptations (Provide supporting data in remarks or on separate sheet.
- ☐ 5 - Wetland Non-Vascular Plants
- ☐ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric sil and wetland hydrology must be present, unless disturbed or problematic for #3, 4, 5.

Hydrophytic Vegetation Present? Yes ☐ NO ☑

Remarks:

SOIL

Sampling Point: AC-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
0-6	10YR 3/1	100					Silty Clay	
6-16	10YR 5/1	100					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: No redoximorphic features within upper 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: Data point located above the influence of the seasonal high water level within the impounded basin.

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: American Colloid | City/County: Carter Co. | Sampling Date: 7/9/2014

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

Investigator(s): B Sandefur | Section, Township, Range: 36 9S 58E

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

Subregion (LRR): LRR G | Lat: 45.004342 | Long: -104.547228 | Datum: WGS84

Soil Map Unit Name: Neldore-Rock outcrop | 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:

VEGETATION - Use scientific names of plant

Tree Stratum Plot size (30 Foot Radius)

	Absolute % Cover:	Domiant Species?	Indicator Status

Sapling/Shrub Stratum Plot size (15 Foot Radius)

Herbaceous Stratum Plot size (5 Foot Radius)

Festuca pratensis	15	☑	NL
Grindelia squarrosa	10	☐	UPL
Hordeum jubatum	15	☑	FACW
Spartina pectinata	40	☑	FACW

Woody Vine Stratum Plot size (30 Foot Radius)

Percent Bare Ground

Dominance Test worksheet

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

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

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

Prevalence Index worksheet

Total % Cover of:			Multiply by:
OBL species	0	X 1	0
FACW species	55	X 2	110
FAC species	0	X 3	0
FACU species	0	X 4	0
UPL species	10	X 5	50
Column Totals	65 (A)		160 (B)

Prevalence Index = B/A = 2.46

Hydrophytic Vegetation Indicators

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance Test is >50%
- ☑ 3 - Prevalence Index is <= 3.0
- ☐ 4 - Morphological Adaptations (Provide supporting data in remarks or on separate sheet.
- ☐ 5 - Wetland Non-Vascular Plants
- ☐ Problematic Hydrophytic Vegetation (Explain)

Indicators of hydric sil and wetland hydrology must be present, unless disturbed or problematic for #3, 4, 5.

Hydrophytic Vegetation Present? Yes ☑ NO ☐

Remarks:

SOIL

Sampling Point: AC-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 2/1	100					Clay	
8-16	10YR 2/1	97	10YR 4/6	3	C	M	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): 8

Wetland Hydrology Present? Yes ☑ No ☐

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

Remarks: Hydrology from surface impoundments, no high water table.

MDT Montana Wetland Assessment Form (revised March 2008)

1. Project name American Colloid **2. MDT project#** STPX 6(15) **Control#** 6714

3. Evaluation Date 7/9/2014 **4. Evaluators** B Sandefur **5. Wetland/Site# (s)** American Colloid

6. Wetland Location(s): **T** 9S **R** 58E **Sec1** 36 **T** **R** **Sec2**

Approx Stationing or Mileposts NA

Watershed 10110201 **Watershed/County** Little Missouri/Carter County, MT

7. Evaluating Agency Confluence for MDT

8. Wetland size acres 3.58

Purpose of Evaluation

How assessed: Measured e.g. by GPS

☐ **Wetlands potentially affected by MDT project**

9. Assesssment area (AA) size (acres) 3.58

☐ **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
Depressional	Unconsolidated Bottom	Impounded	Permanent/Perennial	90
Depressional	Emergent Wetland	Impounded	Seasonal/Intermittent	10

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)

No disturbance to site or AA since dam breach was repaired in 2011. Hydrology from precipitation and surface runoff. AA is fenced to include a 10-acre upland buffer. Area surrounding site mined for bentonite although there is no active mining within 500 ft. of AA.

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

Cirsium arvense in low amounts

iii. Provide brief descriptive summary of AA and surrounding land use/habitat

AA located on DNRC property under an MDT conservation easement. No active mining or roads within 500 ft of AA. A few isolated ponds and wetland areas near AA. Site is situated within the semiarid Pierre Shale Plains with surrounding habitat of undulating rolling plains and vegetation of shortgrass prairie and some scattered stands of Ponderosa pine.

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 vegetation class.

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 T&E list.

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	
Secondary habitat (list Species)	○ D ○ S	
Incidental habitat (list species)	○ D ◉ S	Greater Sage-Grouse (S2)
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 MTNHP SOC list for Carter County.

14C. General Wildlife Habitat Rating:

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

Low

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 Minimal wildlife observation during site visits, limited upland food sources.

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**

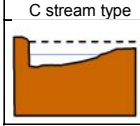
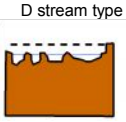
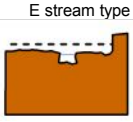
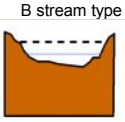
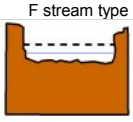
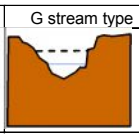
b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? ○ **Y** ◉ **N** *If yes, add 0.1 to the adjusted score in* ***i*** *or* ***iia*** *above:*
Modifed Rating

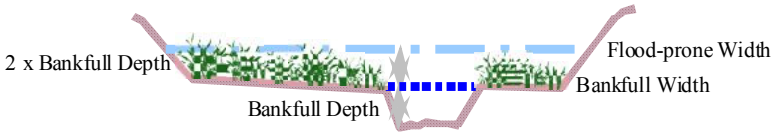
iii. Final Score and Rating: 0 NA **Comments:**

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:

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: Hydrology source for AA from precip and upland surface runoff. Approx 3-acres of surface water present during the majority of the year with an average depth of 2-3 feet.

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: The depression contains a surface water outlet, water level approx 8 inches below max design elevation at time of 2014 visit.

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: Three acres of open water subject to wave action. The vegetation cover of species w/ high stability ratings (Spartina, bulrush, spikerush) is <35%.

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** .7M

Comments: Vegetated component of AA is <0.5-ac.

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

i. Discharge Indicators

- ☐ The AA is a slope wetland
- ☐ Springs or seeps are known or observed
- ☐ Vegetation growing during dormant season/drought
- ☐ Wetland occurs at the toe of a natural slope
- ☐ Seeps are present at the wetland edge
- ☐ AA permanently flooded during drought periods
- ☐ 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: The AA contains an unconsolidated bottom composed of bentonite with minimal permeability.

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:

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:

General Site Notes

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S): American Colloid

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	L	.1	1	0.358	☐
C. General Wildlife Habitat	M	.6	1	2.148	☑
D. General Fish Habitat	NA	0	0	0	☐
E. Flood Attenuation	NA	0	0	0	☐
F. Short and Long Term Surface Water Storage	H	1	1	3.58	☑
G. Sediment/Nutrient/Toxicant Removal	M	.6	1	2.148	☑
H. Sediment/Shoreline Stabilization	L	.3	1	1.074	☐
I. Production Export/Food Chain Support	M	.7	1	2.506	☑
J. Groundwater Discharge/Recharge	L	.1	1	0.358	☐
K. Uniqueness	M	.4	1	1.432	☐
L. Recreation/Education Potential (bonus points)	NA	0	NA	0	☐
Totals:		3.8	9	13.604	
Percent of Possible Score			**42.22** %		

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
American Colloid
Carter County, Montana



Photo Point 1 – *Photo 1*
Bearing: ~270-10 Degrees

Location: Outside south boundary.
Taken in 2012



Photo Point 1 – *Photo 1*
Bearing: ~270-10 Degrees

Location: Outside south boundary.
Taken in 2013



Photo Point 1 – Photo 1
Bearing: ~270-10 Degress

Location: Outside south boundary.
Taken in 2014



Photo Point 2 – *Photo 1*
Bearing: 230 Degrees

Location: Northeast edge of wetland cell.
Taken in 2012



Photo Point 2 – *Photo 1*
Bearing: 230 Degrees

Location: Northeast edge of wetland cell.
Taken in 2013



Photo Point 2 – Photo 1
Bearing: 230 Degrees

Location: Northeast edge of wetland cell.
Taken in 2014



Photo Point 3 – *Photo 1*
Bearing: 30-80 Degrees

Location: Southwest edge of wetland cell.
Taken in 2012



Photo Point 3 – *Photo 1*
Bearing: 30-80 Degrees

Location: Southwest edge of wetland cell.
Taken in 2013



Photo Point 3 – Photo 1
Bearing: 30-80 Degrees

Location: Southwest edge of wetland cell.
Taken in 2014



Photo Point 4 – *Photo 1* **Location:** North edge of cell.
Bearing: 185 Degrees **Taken in 2012**



Photo Point 5 – *Photo 1* **Location:** Outside N border.
Bearing: 10 Degrees **Taken in 2012**



Photo Point 4 – *Photo 1* **Location:** North edge of cell.
Bearing: 185 Degrees **Taken in 2013**



Photo Point 5 – *Photo 1* **Location:** Outside N border.
Bearing: 10 Degrees **Taken in 2013**



Photo Point 4 – *Photo 1* **Location:** North edge of cell.
Bearing: 185 Degrees **Taken in 2014**



Photo Point 5 – *Photo 1* **Location:** Outside N border.
Bearing: 10 Degrees **Taken in 2014**



Transect 1 – *Start*
Bearing: 130 Degrees

Location: NW wet boundary
Taken in 2012



Transect 1 – *End*
Bearing: 310 Degrees

Location: SE wet boundary.
Taken in 2012





ınsect 1 – *End*
aring: 310 Degrees

Location: SE wet boundary.
Taken in 2013



Transect 1 – *End*
Bearing: 310 Degrees

Location: SE wet boundary.
Taken in 2014



Transect 1 – *End*
Bearing: 310 Degrees

Location: SE wet boundary.
Taken in 2014



Data Point – *AC-1u*
Bearing: 0 Degrees

Location: Veg Comm 2
Taken in 2014



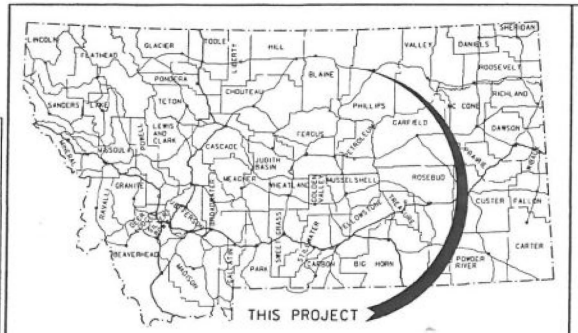
Data Point – *AC-1w*
Bearing: 180 Degrees

Location: Veg Comm 3
Taken in 2014

Appendix D

Project Plan Sheet

MDT Wetland Mitigation Monitoring
American Colloid
Carter County, Montana



MONTANA DEPARTMENT OF TRANSPORTATION

FEDERAL AID PROJECT NO. NH 1-8(26)454 F
GRADE, GRAVEL, PL. MIX SURF. & STRUCTURE
DODSON – EAST
PHILLIPS COUNTY

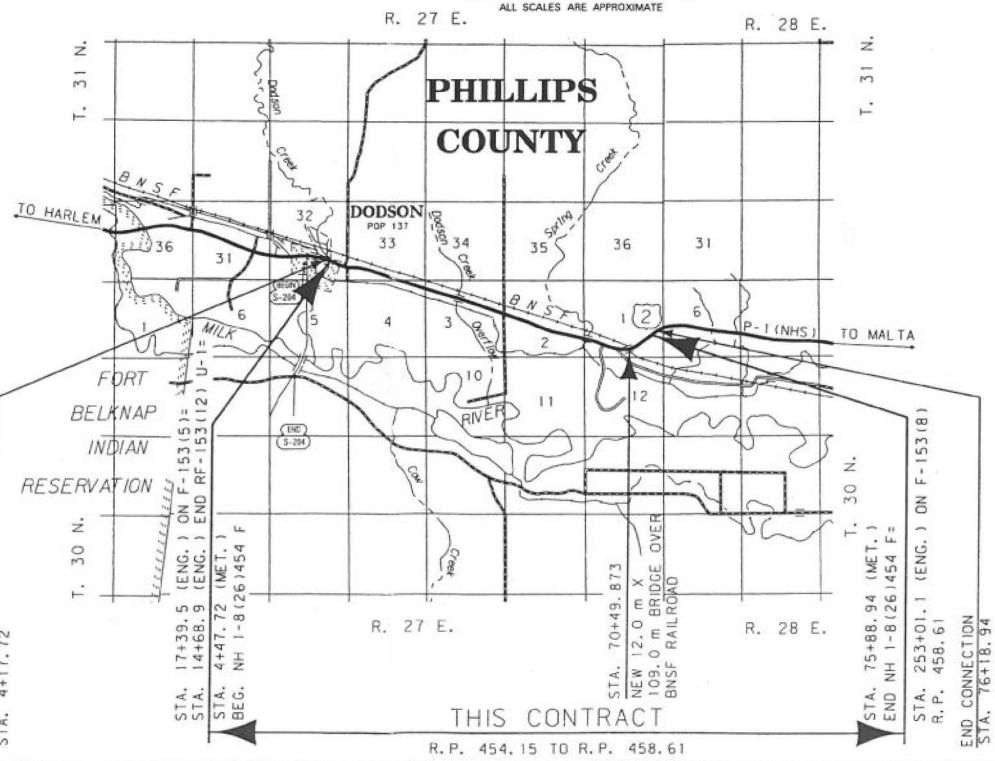
DESIGN DATA
2003 A.D.T. = 1160
2023 A.D.T. = 1410
D.H.V. = 180
D. = 55-45%
T. = 12.1%
V. = 110 km/h
80 kN ESAL'S = 115
GROWTH RATE = 1.0%

LETTING DATE – _____

LENGTH 7.1 kilometers

SCALES
VERTICAL: 1 : 100
HORIZONTAL: 1 : 1000
CROSS SECTION – HORIZONTAL & VERTICAL: 1 : 100
REDUCED PRINTS ONE-HALF ORIGINAL SCALE
ALL SCALES ARE APPROXIMATE

SURFACING SOURCES - CONTRACTOR FURNISHED



RELATED PROJECTS

ASSOCIATED PROJECT AGREEMENT NUMBERS	
R/W & I.C.	NH 1-8(32)454 F
P.E.	NH-F 1-8(15)454 F

CONTROL NO. 1516

MONTANA DEPARTMENT OF TRANSPORTATION
APPROVED Nov 15, 20 06
JIM LYNCH
DIRECTOR OF TRANSPORTATION
BY _____
HIGHWAYS ENGINEER
PAUL R. FERRY 6425E PROFESSIONAL ENGINEER
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
APPROVED
DIVISION ADMINISTRATOR DATE

DESIGNED BY GLENDVE DISTRICT
DRAWN BY
CHECKED BY
QUANTITIES BY
DATE 11/15/2006 PW
1516\RD\1516lt.dgn
MONTANA DEPARTMENT OF TRANSPORTATION
MONTANA CADD

STATE	PROJECT NUMBER	SHEET
MONTANA	NH 1-8(26)454 F	

SUMMARY

CULVERTS

STATION	BASIC BID ITEMS: CULVERT PIPE mm	BASIC BID ITEMS: meters LENGTH OF PIPE	BASIC BID ITEMS: square meters STAB. GEOTEXTILE	BASIC BID ITEMS: cubic meters FOUNDATION MATERIAL	BASIC BID ITEMS: cubic meters CULVERT EXCAVATION *	PIPE OPTIONS mm: CONCRETE STEEL ALUMINUM	PIPE OPTIONS mm: CLASS OR THK.	END SECTIONS: LEFT	END SECTIONS: RIGHT	square meters STAB. GEOTEXTILE	cubic meters FOUNDATION MATERIAL	cubic meters BEDDING MATERIAL	meters HEIGHT OF COVER	SKEW ANGLE	meters REMOVE CULVERT mm x m	REMARKS
12+00.0	600	31.0			35	600 RCP ■ 600 CSP (68 x 13 CORR.) 600 CAP (68 x 13 CORR.)	CL.2 2.01 1.52	FETS FETS FETS	FETS FETS FETS				1.2			NEW MAINLINE DRAIN
13+29.4					50										610 mm X 23.8 m CMP	REMOVE DRAIN IN PTW LT.
30+00.0	600	40.0			20	600 RCP ■ 600 CSP (68 x 13 CORR.) 600 CAP (68 x 13 CORR.)	CL.2 2.01 1.52	FETS FETS FETS	FETS FETS FETS				1.5			NEW MAINLINE DRAIN
30+60.0	600	42.5			25	600 RCP ■ 600 CSP (68 x 13 CORR.) 600 CAP (68 x 13 CORR.)	CL.2 2.01 1.52	FETS FETS FETS	FETS FETS FETS				1.8			NEW MAINLINE DRAIN
41+90.0	600	39.5			5	600 RCP ■ 600 CSP (68 x 13 CORR.) 600 CAP (68 x 13 CORR.)	CL.2 2.01 1.52	FETS FETS FETS	FETS FETS FETS				1.5			NEW MAINLINE DRAIN
42+30.0	600	37.5			25	600 RCP ■ 600 CSP (68 x 13 CORR.) 600 CAP (68 x 13 CORR.)	CL.2 2.01 1.52	FETS FETS FETS	FETS FETS FETS				1.2			NEW MAINLINE DRAIN
56+02.0					105										DOUBLE 1219 mm X 19.0 m CMP	REMOVE DBL DRAIN IN PTW LT.
56+15.0	1050	46.0	169.7	83	20	1050 RCP ■ 1200 CSP (68 x 13 CORR.) 1200 CAP (75 x 25 CORR.)	CL.3 2.01 1.52	FETS FETS FETS	FETS FETS FETS	169.7 85.6 85.6	83 75 75		2.4	20°LT.		NEW MAINLINE DRAIN
66+32.3					310										1372 mm X 24.7 m RCP	REMOVE DRAIN IN PTW RT.
66+38.5	1200	72.5	294.8	153	185	1200 RCP ■ 1350 CSP (75 x 25 CORR.) 1350 CAP (75 x 25 CORR.)	CL.5 2.01 1.91	FETS 2:1 STEP BEV. 2:1 STEP BEV.	FETS 2:1 STEP BEV. 2:1 STEP BEV.	294.8 307.7 307.7	153 135 135	138 138	8.4	9°50' RT		NEW MAINLINE DRAIN
72+23.5	900	89.0			10	900 RCP ■ 900 CSP (68 x 13 CORR.) 900 CAP (68 x 13 CORR.)	CL.5 2.01 2.01	FETS FETS FETS	FETS FETS FETS				10.2	16°LT		NEW MAINLINE DRAIN
72+30.0					2 550										914 mm X 53.0 m RCP	REMOVE DRAIN IN PTW RT.
TOTAL	~	~	464.5	236	~	~	~	~	~	~	~	~	~	~	139.5	

* FOR INFORMATIONAL PURPOSES ONLY
■ COAT IN ACCORDANCE WITH SECTION 709.05 OF THE STANDARD SPECIFICATIONS

* PRECAST REINFORCED CONCRETE BOX CULVERTS

STATION	meters RCB DBL 4200 mm x 2400 mm r	meters RCB 4800 mm x 2400 mm r	END SECTIONS LEFT	END SECTIONS RIGHT	cubic meters CULVERT EXCAVATION *	cubic meters CLASS "OD" CONCRETE	cubic meters BEDDING MATERIAL	cubic meters COARSE AGGREGATE -CONCRETE	cubic meters FOUNDATION MATERIAL	square meters PERMANENT EROSION CONTROL MOD. SURV.	square meters STAB. GEOTEXTILE	HEIGHT OF COVER IN meters	SKEW ANGLE	NBI ■	REMARKS
18+40		46.0	SQUARE	SQUARE	550		195.4	118.9	198.7	719	395	1.6	30°RT.		SEE DETAIL SHEET
34+77	48.0		2:1 BEV	2:1 BEV	655	10.8	179.9		268.9		511	2.5	32°LT.	P00001456+00301	SEE DETAIL SHEET
42+78		50.0	SQUARE	SQUARE	5		212.5	118.9	216.0	786	429	1.7	41°LT.		SEE DETAIL SHEET
61+32		73.0	2:1 BEV	2:1 BEV	370	11.3	162.0		275.3		518	1.0	11°LT.	P00001457+06701	SEE DETAIL SHEET (DBL RCB 2-36.5 m)
TOTAL	48.0	169.0	~	~	~	22.1	749.8	237.8	958.9	1 505	1 853	~	~	~	

* SEE DETAIL SHEETS
■ FOR INFORMATIONAL PURPOSES ONLY

ITEMS USED IN PLACE FOR INFORMATION ONLY

STATION	REMARKS
18+60.8	381 mm CMP DRAIN IN PTW LT.
21+12.8	381 mm CMP APP PIPE LT.
22+62.6	610 mm CMP SYPHON LT.
22+63.0	762 mm CMP IRR LT.
28+03.8	457 mm CMP APP PIPE LT.
34+25.7	331 mm CMP IRR PIPE /HEADGATE LT.
34+61.0	24.3 m FLUME LT.
44+37.0	381 mm CMP APP PIPE LT.
44+37.4	CONCRETE CHECK LT.
44+44.8	381 mm CMP IRR LT.
44+60.3	914 mm CMP IRR APP PIPE LT.
50+78.0	914 mm CMP IRR IN PTW LT.
52+72.1	457 mm CMP APP PIPE LT.
57+54.5	457 mm CMP APP PIPE LT.
66+66.6	DBL 914 mm CMP LT.
66+71.8	DBL 914 mm CMP LT.

WETLAND SITE (LUMP SUM)

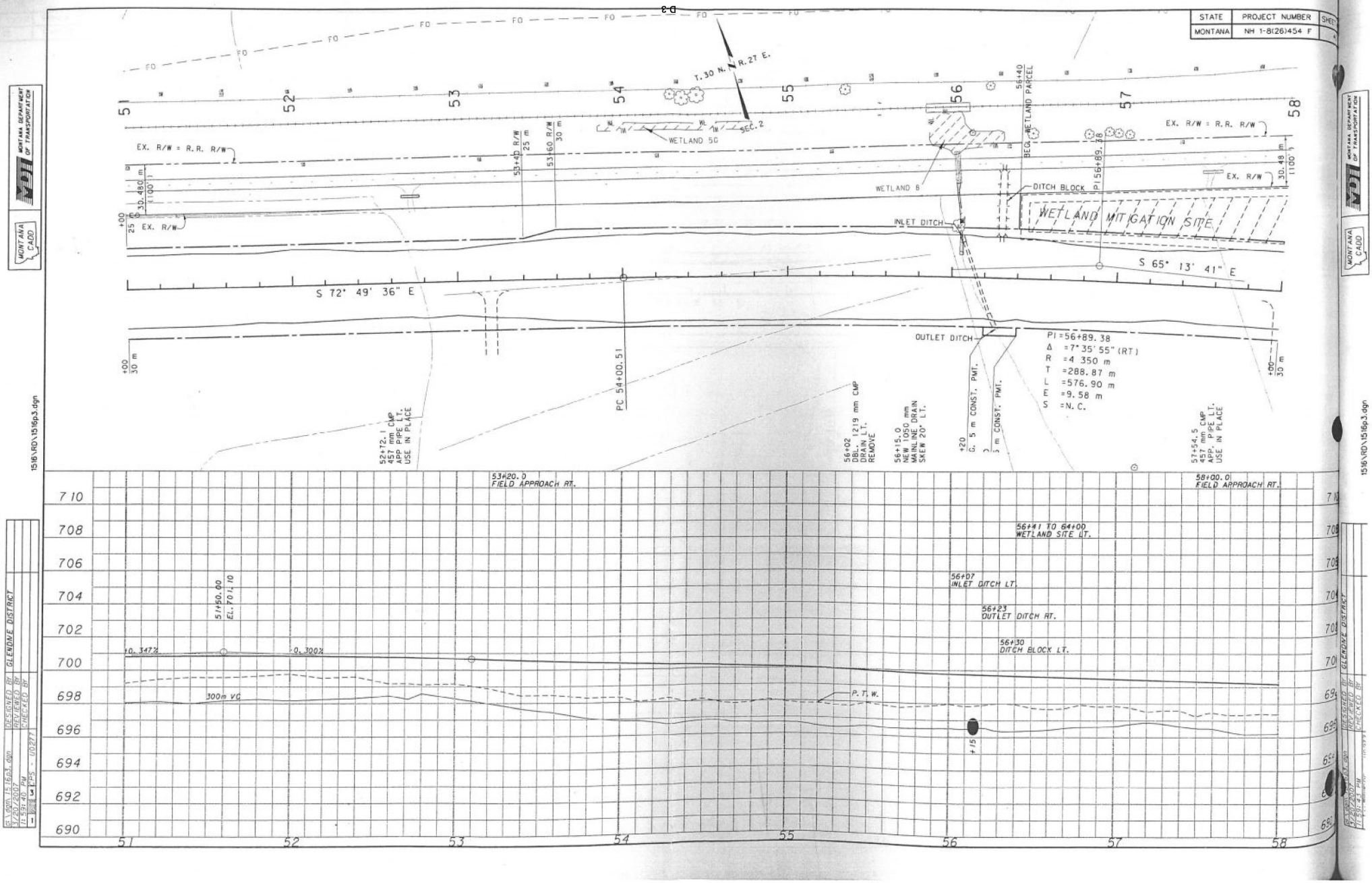
STATION FROM	STATION TO	LUMP SUM	FOR INFORMATIONAL PURPOSES ONLY: cubic meters EXCAVATION	cubic meters TOPSOIL SALVAGING AND PLACING	hectare SEEDING	meters FENCING FSM	meters GATES G2	each SINGLE PANEL	each DOUBLE PANEL	each DEADMAN	REMARKS
56+41.00	64+00.00	1	46 415	3 553	3.6	1 494.2	4.8	6	8	4	LT. OF MAINLINE (SEE DETAIL SHEET)
TOTAL		1	~	~	~	~	~	~	~	~	

WATER LINE & CASING

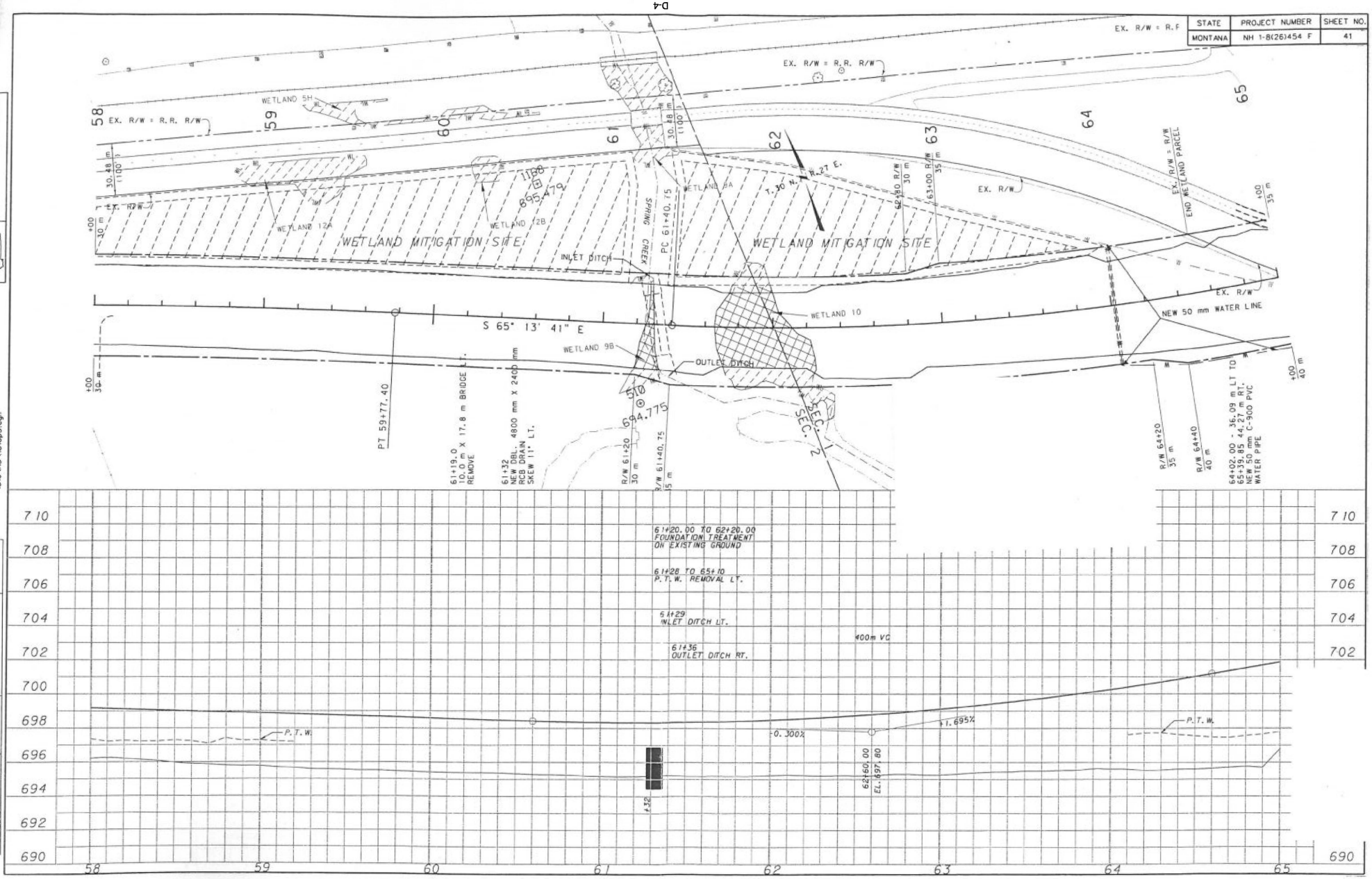
STATION FROM	STATION TO	meters WATER PIPE C-900 PVC 50 mm	meters WATER PIPE C-900 PVC 100 mm	meters TRENCH BACKFILL *	meters SDR 40 PVC CASING 250 mm	cubic meters BEDDING MATERIAL	each FIRE HYDRANT ASSEMBLY	each GATE VALVE 200 mm	kg DUCTILE IRON FITTINGS	REMARKS
7+31.20			24.0	24.0	24.0	5	1	1	84	TOWN OF DODSON
64+02.00					71.0					PRIVATE WATER LINE
64+02.00 LT.	65+39.85 RT.	214.0		214.0		45				PRIVATE WATER LINE
TOTAL		214.0	24.0	~	95.0	50	1	1	84	

* COST FOR TRENCH BACKFILL IS INCLUDED IN RESPECTIVE PIPE COSTS.

MONTANA DEPARTMENT OF TRANSPORTATION
MONTANA CADD
151653.DGN
C:\DGN\151653.dgn 5/20/2007 11:54:40 PM
DESIGNED BY GLENDIVE DISTRICT
REVIEWED BY
CHECKED BY
PLOTTED BY
PLOT SCALE = 1.0000 '/ IN.
PLOT DATE = 5/20/2007


STATE
MONTANA
PROJECT NUMBER
NH 1-8(26)454 F
T. 30 N. R. 27 E.
SEC. 2
WETLAND 5G
WETLAND B
EX. R/W = R.R. R/W
EX. R/W
BEG. WETLAND PARCEL
DITCH BLOCK
INLET DITCH
OUTLET DITCH
WETLAND MITIGATION SITE
S 72° 49' 36" E
S 65° 13' 41" E
PC 54+00.51
PI = 56+89.38
Δ = 7° 35' 55" (RT)
R = 4 350 m
T = 288.87 m
L = 576.90 m
E = 9.58 m
S = N. C.
52+72.1 457 mm CMP APP PIPE LT. USE IN PLACE
56+02 DBL. 1219 mm CMP DRAIN LT. REMOVE
56+15.0 NEW 1050 mm MAINLINE DRAIN SKEW 20° LT.
+20 C. 5 m CONST. PMT.
5 m CONST. PMT.
57+54.5 457 mm CMP APP. PIPE LT. USE IN PLACE
53+20.0 FIELD APPROACH RT.
58+00.0 FIELD APPROACH RT.
56+41 TO 64+00 WETLAND SITE LT.
56+07 INLET DITCH LT.
56+23 OUTLET DITCH RT.
56+30 DITCH BLOCK LT.
51+50.00 EL. 701.10
+0.347%
-0.300%
300m VC
P. T. W.
+15
GLENDIVE DISTRICT
DESIGNED BY
REVIEWED BY
CHECKED BY
1516\RD\1516p3.dgn

STATE	PROJECT NUMBER	SHEET NO.
MONTANA	NH 1-8(26)454 F	41



1516\RD\1516p3.dgn

MONTANA DEPARTMENT OF TRANSPORTATION

MONTANA CADD

DESIGNED BY GLENDALE DISTRICT
REVIEWED BY
CHECKED BY

STATE	PROJECT NUMBER
MONTANA	NH 1-8(26)454 F

DETAIL

NEW WETLAND SITE

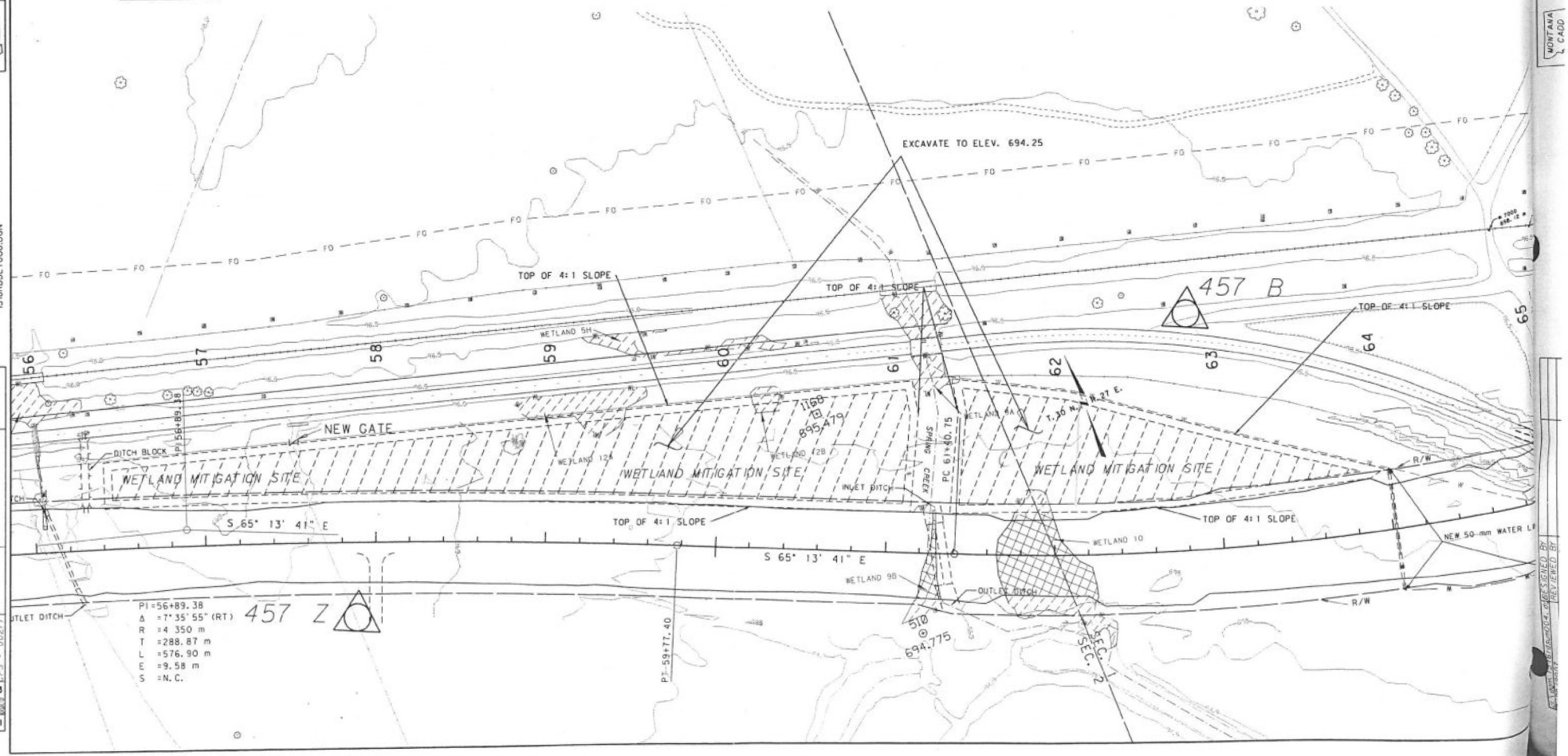
NO SCALE

7 acres

NEW WETLAND SITE
EXCAVATE TO ELEV. 694.25

SALVAGE WETLAND VEGETATION AND ASSOCIATED SOILS AND PLACE IN NEW WETLAND SITE

CONSTRUCT NEW F5M FENCING AROUND PERIMETER OF WETLAND SITE ON TOP OF 4:1 CUT SLOPE



1516RDDET006.DGN

MONTANA DEPARTMENT OF TRANSPORTATION

MONTANA CADD