Wetland Finding
for
County Road 229 (South Crow Cutoff) Over Muddy Creek

April 2011

Federal Aid Project # BRO C020-035
SA (17814)

Pueblo County, Colorado

SEH No. 114349

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Prepared for: Pueblo County Department of Public Works

Introductory Paragraph

The following is a wetland finding for the County Road 229 (South Crow Cutoff) Over Muddy Creek project and has been written in compliance with Executive Order 11990, "Protection of Wetlands," and is in accordance with 23 CFR 771, 23 CFR 777, and Technical Advisory T6640.8A.

Project Location

The County Road 229 (South Crow Cutoff) Over Muddy Creek project is located approximately four (4.0) miles (~ 6.4 km) north of Colorado City, Colorado at Mainline Station 12+25.00 to 19+75.00 in Pueblo County, Colorado as shown on Figure 1. The project is located on the Colorado City USGS quadrangle map in the northeast quarter of Section 2, Township 24S, Range 67 W in Pueblo County, Colorado. The latitude/longitude for the approximate center point of the project is 37°59'41.83"N, 104°51'2.67"W. This gravel section of County Road 229 at the existing bridge location is maintained by Pueblo County Department of Public Works and consists of local traffic and is approximately 20.0 feet (~ 6.1 m) wide. See **General Layout**.

The replacement of this bridge will be funded through Federal Highway Administration (FHWA) funds and administered by the Colorado Department of Transportation (CDOT) as a local agency project.

Project Description

The project will involve a proposed bridge replacement of County Road 229 (South Crow Cutoff) at Muddy Creek. The existing bridge consists of steel girders, concrete deck and concrete piers and is being considered for replacement since it is in poor condition. The bridge is 24.0 feet (~ 7.3 m) wide and 49.5 feet (~ 15.1 m) in length. The project consists of the demolition of the existing bridge and construction of a new bridge in the same general location, although the new bridge will be elevated above the grade of the existing bridge requiring a slight realignment of the road. The new structure will be a 70.0 foot (~ 21.3 m) single-span bridge, 32 feet (~ 10 m) in width supported on a deep foundation system consisting of driven H-piles and wing walls on both bridge abutments. The bridge deck will consist of a bare concrete surface with type 10 bridge rails and concrete curb. The approaches to the bridge will consist of asphalt concrete (AC) pavement.

Construction of the new bridge will require a detour road to be built upstream of the existing bridge. This detour will require a temporary crossing of Muddy Creek and its associated wetlands. It is expected that temporary wetland impacts will result from construction of the detour and the piers and abutments of the new bridge. See the attached **Wetland Impacts** for those areas where wetland impacts will occur including existing wetland areas.

Erosion and sedimentation control Best Management Practices (BMPs) will be installed prior to any earth work and will consist at the minimum of installation of a rock construction entrance, silt fence or erosion

logs at the toe of fill slopes, erosion control blanket on disturbed slopes, seed and mulch application to all disturbed areas and permanent stabilization.

Due to the construction requirements of this project, a one lane temporary detour will be constructed to the west of the existing bridge. This will consist of temporary culvert pipes to handle the stream flow, geotextile material, weed-free straw and appropriate bed material to support vehicular and equipment loads.

Project Alternatives

This bridge is being replaced as it is structurally deficient with a sufficiency rating of 62.6. Several bridge alternatives were considered but not selected. New bridge alignments upstream and downstream were looked at but involved steeper terrain and potentially greater environmental impacts. This would have realigned County Road 229 and required additional right-of way. For these reasons these alternatives were eliminated. Furthermore a fringe wetland occurs along Muddy Creek, thus impacts to wetlands still would have occurred. For these reasons, it was determined that a bridge replacement on the existing alignments was the best alternative.

Temporary wetland impacts were minimized by keeping the detour as close as possible to the existing bridge and by steepening up the side slopes. Construction of the detour road will occur after the existing wetland vegetation is cut down to within two (2) inches (~ 5 cm) of ground level. The vegetation will then be covered with a geotextile material followed by 12” (~ 30 cm) of straw and then the fill material. As the fill material is being removed, the straw will act as an indicator of proximity to the ground level. Once the straw is exposed, the equipment operator will carefully remove the remaining material and straw. The removal of the geotextile material will expose the native ground and vegetation allowing for the vegetation to become reestablished. The impacts associated with the detour will be temporary in nature. A culvert pipe will be installed to convey flows from Muddy Creek throughout the project site. A portion of the area where the temporary detour will be located is partially devoid of vegetation.

Permanent impacts to wetlands were minimized by using the least amount of rip rap at the abutments as possible. However, keying in the riprap for the abutments can’t avoid the existing wetland as subgrade excavation is required.

Indirect impacts to the wetlands and Muddy Creek will be avoided with the use of erosion and sedimentation control BMPs. These BMPs include installation of a rock construction entrance at the entrance of the project, silt fence or erosion logs at the toe of disturbed slopes, soil retention blankets on steep slopes once final grade is established and permanent vegetative stabilization.

Complete avoidance of wetland impacts was not possible in the project area due to the existing location of the bridge and the project’s topography. The proposed bridge replacement is situated to minimize grading and land disturbance including impacts to wetlands. Impacts to wetlands outside the work area will be avoided by utilizing protective fencing and erosion and sedimentation controls to protect adjacent areas.

Wetlands

A wetland delineation was performed on April 18, 2011. The purpose of this investigation was to determine the presence/absence and/or extent of wetland and surface water features within and surrounding the immediate vicinity of the project area. Habitats meeting the technical criteria for wetlands were delineated and classified based upon the U.S. Army Corps of Engineers (USACE), Technical Report Y-87-1, Corps of Engineers Wetland Delineation Manual 1987, and the Western Mountains, Valleys, and Coast Regional Supplement. The resultant delineation is the basis on which wetland impacts from the proposed project were determined.

Wetland Survey

Topographic maps, aerial photographs, Natural Resource Conservation Service (NRCS) digital soils map and data for Pueblo County, U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) mapping and preliminary project plans were reviewed prior to visiting the site to locate potential wetland habitats. The NWI mapping review indicated the presence of a R4SBW (Riverine, intermittent, streambed, intermittently flooded) type wetland along Muddy Creek within the project area. Wetland delineation results are reflected on the **Wetland Impacts** plan sheet.

Field Procedures

The project site was investigated using the Routine Onsite Determination Method (RODM) to establish wetland criteria in accordance with the *1987 Manual* and the *Western Mountains, Valleys, and Coast Region Regional Supplement.* These two documents stipulate that all three wetland parameters be present in order for an area to be classified as a wetland.

Soil samples, vegetative composition, photographs and notes were taken at representative locations in each wetland. Data was transferred to Wetland Determination Data Forms (see **Attachments**). Photographs of each site are also attached and labeled as **Site Photographs**. Each data form references sample locations along the identified wetland boundary. Data sheets are also labeled as "Wetland Sample Point" for data collected within the wetland and "Upland Sample Point" for data collected in non-wetland habitat.

Wetland plant species nomenclature follows the *National List of Plant Species that Occur in Wetlands* (U.S. Department of the Interior, 1988). Identification was aided when necessary with field guides for the region. Soils were observed for hydric soil characteristics via examination of soil profiles taken at a depth of 12.0 to 14.0 inches (~ 30.4 – 35.6 cm). Soil profiles were examined for: (1) observation of an adequate portion of the soil profile to determine presence/absence of hydric soil characteristics; (2) observation of hydrology including depth to the water table and saturated soils; and (3) identification of disturbances (*e.g.*, buried horizon, plow line, etc.). Site conditions precluding the observation of soil profile depths at the typical 18.0-24.0 inches (~ 45.7 – 61.0 cm) below ground surface are justified and provided within the data forms. Soil color determinations were made using MUNSELL Soil Color Charts (Gretag-Macbeth, 2000).

Site soil characteristics were compared to those mapped and described in the Soil Survey for Pueblo Area, Colorado, Parts of Pueblo and Custer Counties (USDA Web Soil Survey, 2011). Hydric soil characteristics were compared to those identified in the *Western Mountains, Valleys, and Coast Region Regional Supplement* and the most recent version of the NRCS publication *Field Indicators of Hydric Soils in the United States, Version 7.0* (USDA, 2010). According to the soil survey, soils in the project area are mapped as Table Mountain association (TM) and are not listed as a hydric soil. This map unit is typically found on stream terraces and valley floors with a well drained drainage class.

Wetland 1 – Muddy Creek Embankments

Wetland 1 is situated within a section of the Muddy Creek channel (perennial stream) and its associated banks and narrow floodplain. This is a continuous fringe wetland along both sides of Muddy Creek that runs throughout the project area. Muddy Creek originates in southwestern Pueblo County near State Highway (SH) 165. It travels northeast through part of Pueblo County where it passes underneath County Road 229 within the project area and eventually drains into Greenhorn Creek. Greenhorn Creek is a tributary to the St. Charles River which flows into the Arkansas River south of U.S. 50 near the City of Pueblo, Colorado. The size of the drainage basin has an estimated area of 26.7 square miles (~ 69.2 km) based on existing topography from *National Geographic Topo! Maps* (National Geographic Holdings, 2011).

Five (5) total sampling points were taken with three (3) points (1, 3 and 5) determined as wetland habitat and two (2) points determined as upland habitat.

Vegetation was not easily identifiable due to observed, recent and intense grazing activity; however, all dominant vegetative species were identified. Wetland 1 vegetation is situated primarily on the Muddy Creek embankment or within the small section of floodplain within the wetland boundary. In addition, small amounts of emergent vegetation were observed. Three wetland sample points were evaluated and the findings are described below. The wetland vegetative community in Sample Point 1 is dominated by water sedge (*Carex aquatilis* – OBL) and broadleaf cattail (*Typha latifolia* – OBL) in the herbaceous layer and narrowleaf willow (*Salix exigua* - OBL) in the shrub layer. Sample Point 3 was approximately 95% devoid of vegetation with small amounts of common dandelion (*Taraxacum officinale* - FACU) and alfalfa (*Medicago sativa* – UPL) in the herbaceous layer. This area was included within the wetland boundary based on guidance in the *Western Mountains, Valleys, and Coast Region Regional Supplement* that indicates that a wetland determination should be based on hydric soils and wetland hydrology if an area is significantly impacted by grazing**.** The wetland vegetative community in Sample Point 5 is dominated with common bulrush (*Shoenoplectus pungens* – OBL) and broadleaf cattail in the herbaceous layer and narrowleaf willow in the shrub layer.

The soils in Sample Point 1 have a MUNSELL color of 2.5 Y 4/2 with 7.5 YR 3/3 depletions in pore linings of the top four (4) inches and Gley 2.5/N matrix with 5 YR 3/3 depletions between four (4) and 12.0 inches (~ 10.0 – 30.0 cm). The soils in Sample Point 3 are comprised of a matrix with a MUNSELL color of 5Y 4/2 and 5 YR 4/6 reduced matrix. The soils in Sample Point 5 are a loamy sand with a MUNSELL color of Gley 2.5/N and Gley 4/10Y and redox features of 10YR 4/4 in the pore lining.

Hydrologic indicators at Sample Point 1 included saturation throughout the soil profile, presence of a water table at eight (8) inches (~ 20.0 cm), drift deposits, water-stained leaves, oxidized rhizospheres along living roots and geomorphic position. Indicators at Sample Point 3 included saturation within the upper 10.0 inches (~ 25 cm), water-stained leaves and geomorphic position adjacent to the stream. Sample Point 5 indicators included approximately two 2.0 inches (~ 5.0 cm) of surface water, soil saturation throughout the soil profile, drift deposits, water-stained leaves and oxidized rhizospheres along living roots and geomorphic position.

Wetland 1 was identified as a Riverine wetland and a Riverine 2 SWCC code below the wetland boundary.

Upland data for Wetland 1 at Sample Point 2 included a vegetative community dominated with common mullein (*Verbascum Thapsus* – UPL) and prickly pear cactus (*Opuntia polyacantha* – UPL) in the herbaceous layer, narrowleaf willow in the shrub layer and Rocky Mountain juniper (*Juniperus scopulorum* – UPL) in the tree layer. Sample Point 4 was dominated with smooth brome (*bromus inermis* - UPL) in the herbaceous layer and narrowleaf willow in the shrub layer. Soils at Sample Point 2 have a MUNSELL color of 10 YR 3/3 and 5Y 5/4 at Sample Point 4 with no hydric soil or wetland hyrology indicators.

Table 1
Wetland Characteristics

Wetland ID	Classifications	Location	Project Impacts
Wetland 1	Riverine; Riverine 2	Muddy Creek	Wetland impacts by placement of fill for temporary detour and rip rap for scour protection

Functions and Values

A Functional Assessment of Colorado Wetlands (FACWet) analysis was completed on April 22, 2011. The wetland received a Functional Capacity Index of 0.72 out of 1.00. Out of the nine variables that were evaluated, the wetland was rated: functioning for water source, water distribution, chemical environment, water outflow and geomorphology; functioning impaired for habitat connectivity, buffer capacity, habitat connectivity and vegetation structure and complexity. The completed FACWet Scorecard can be found in the **List of Attachments.**

Jurisdictional Status

Based on conversations with the U.S. Army Corps of Engineers (USACE), Albuquerque District, Southern Colorado Regulatory Office, Wetland 1 is considered under the jurisdiction of the Clean Water Act since Muddy Creek is a tributary to the Arkansas River which is a water of the U.S.

Wetland Impacts

Wetland boundaries were delineated with a *Trimble Geo XT, 2005 Series* Global Positioning System (GPS) and subsequently mapped onto project plan sheets. The wetland boundary is considered the highest extent of the wetland basin; areas above the boundary fail to meet the three required wetland parameters while areas below the edge meet the wetland parameters required by the field delineation methodology.

Construction of the County Road 229 bridge at Muddy Creek would result in unavoidable temporary and permanent impacts to Wetland 1 because of its proximity to the bridge. Impacts to wetlands were avoided to the maximum extent practicable and unavoidable impacts have been minimized.

Temporary wetland impacts are approximately 1,565 square feet (0.0359 acres) occurring at areas to be utilized as access and work areas for construction of the new structure, destruction of the existing structure and construction of the temporary detour. The temporary wetland impact areas are highlighted in orange on the attached **Wetland Impacts** plan sheets**.** Secondary and indirect wetland impacts are not anticipated.

Permanent wetland impacts are approximately 1,150 square feet (0.0264 acres) for the placement of rip rap at the new abutments. The permanent wetland impacts are highlighted in red on the attached **Wetland Impacts** plan sheets**.**

This project will utilize Nationwide Permit 3: Maintenance and a Pre-Construction Notification will be submitted to the USACE, Albuquerque District, Southern Colorado Regulatory Office prior to the start of construction.

Wetland Mitigation

For temporary impacts associated with the detour during construction, the wetlands will be protected in place. This will be achieved by cutting the vegetation to ground level and installing a geotextile material and a 12” (~ 0.6 m) layer of straw covered by fill material. When the detour is removed, the straw acts as an indicator of where the existing ground level is and that caution should be applied to the removal of the remaining material. This will allow the existing wetland vegetation to reestablish itself within the following growing season.

Permanent impacts associated with the placement of rip rap at the abutments and regarding of the channel will be 1,150 square feet (0.00264 acres) and mitigation will involve salvaging the top 18 inches (~ 46 cm) of wetland soil and stockpiling it on site. Once construction of the abutments is complete, the wetland soil will be put back to its original elevation to allow the wetland to become re-established. Willow sprigs

cut from the adjacent shrubs will also be planted to ensure success of the re-establishment of vegetation under the bridge. The density of vegetation in the permanently impacted wetland is very thin. A total of 50 willow sprigs will be planted where the wetland topsoil is placed in the fall once the willows have gone dormant. Planting will be done in accordance to CDOT's Section 214 Planting Standard Specification. The previous hydrology will remain intact for the restored wetland. Since this wetland is being restored on site and at a 1:1 ratio no water rights will be impacted.

A wetland biologist will be present during the construction and removal of the detour and during the removal and replacement of the wetland topsoil from the permanently impacted wetland. The wetland biologist will also monitor the project and provide guidance throughout the duration of the project. Once the project is accepted by CDOT, R2 environmental staff will be responsible to make sure the wetland restoration site meets standard success criteria established by the USACE, which include:

1) At least 80% foliar cover consisting of at least 50% dominant species consisting of those species that are facultative or wetter;
2) Willows sprigging shall have a survival rate of at least 85% which may include volunteer specimens; and
3) All Colorado List A noxious weeds shall be eradicated from the wetland and List B weeds hall consist of no more than 10% of the total cover in the mitigation area.

If the wetland mitigation site is not meeting these success criteria within 2 yrs, R2 Environmental CDOT staff will evaluate the site and take appropriate actions to ensure the mitigation site meets success criteria.

Closing Statement

Based on the above considerations, it is determined that there is no practicable alternative to the proposed new construction in relation to existing wetland areas. In addition, the proposed action includes all practicable measures to minimize impacts to wetlands which may result from such use.

References

Colorado Climate Center, Department of Atmospheric Science [CCC], 2011. Water Year Data. < http://ccc.atmos.colostate.edu/dataaccess.php>. Accessed on 15 April, 2011.

Colorado Department of Transportation [CDOT]. January 2011. Functional Assessment of Colorado Wetlands (FACWet) Method – Version 2.0. Fort Collins, Colorado.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe, 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service. 131 pp.

Gretag-Macbeth, 2000. MUNSELL SOIL COLOR CHARTS. Macbeth Division of Kollmorgen Instruments Corporation, Newburgh, New York.

National Atlas of the United States. US Department of the Interior. (NAUSA). April 15, 2011. <http://nationalatlas.gov/> Accessed on 15 April, 2011.

Shaw, S.P. and C.G. Fredine, 1956. Wetlands of the United States. U.S. Fish and Wildlife Service, Circular 39. 67 pp.

Statewide Wetland Classification and Characterization: Wetland Plant Associations of Colorado. April 2003. Colorado Department of Natural Resources. Denver, CO.

U.S. Department of Agriculture -Natural Resource Conservation Service April 6, 2011 Weld Pueblo Area, Colorado, Parts of Pueblo and Custer Counties Soil Survey <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>. Accessed on 15 April, 2011.

U.S. Department of Agriculture, Natural Resources Conservation Service. 2010. Field Indicators of Hydric Soils in the United States, Version 7.0. L.M. Vasilas, G.W. Hurt, and C.V. Noble (eds.). USDA, NRCS, in cooperation with the National Technical Committee for Hydric Soils.

U.S. Department of Agriculture - Soil Conservation Service, 1991. Hydric Soils of the United States. In cooperation with the National Technical Committee for Hydric Soils. USDA-SCS, Washington, D.C.

U.S. Department of Commerce – National Oceanic and Atmospheric Administration – Earth System Research Laboratory – Physical Sciences Division website: <http://www.esrl.noaa.gov/psd/boulder/rank.html>. Accessed on 15 April 2011.

U.S. Department of the Interior, 1988. National List of Plant Species that Occur in Wetlands: East Rock Mountain (Region 4). Biological Report 88 (26.3), Fish and Wildlife Service. In cooperation with the National and Regional Interagency Review Panels. Washington, D.C.

U.S. Fish and Wildlife Service National Wetlands Inventory Map, provided by National Wetland Inventory website: <http://wetlandsfws.er.usgs.gov/download.html>. Accessed on 15 April 2011.

U.S. Geological Survey [USGS] 7.5' Quadrangle Map, Colorado City, Colorado Quadrangle, 2010. Scale: 1" = 2,000'.

USGS. National Biological Information Infrastructure GAP Analysis Program (GAP). 2011. <http://www.gap.uidaho.edu/landcoverviewer.html>. Accessed 15 April 2011.

Vepraskas, M. J. 1994. Redoximorphic Features for Identifying Aquic Conditions. Technical Bulletin 301. North Carolina State University, Raleigh, North Carolina.

Attachments

Figure 1

U.S. DEPARTMENT OF THE INTERIOR
U. S. GEOLOGICAL SURVEY

The National Map US Topo

COLORADO CITY QUADRANGLE
COLORADO
7.5-MINUTE SERIES

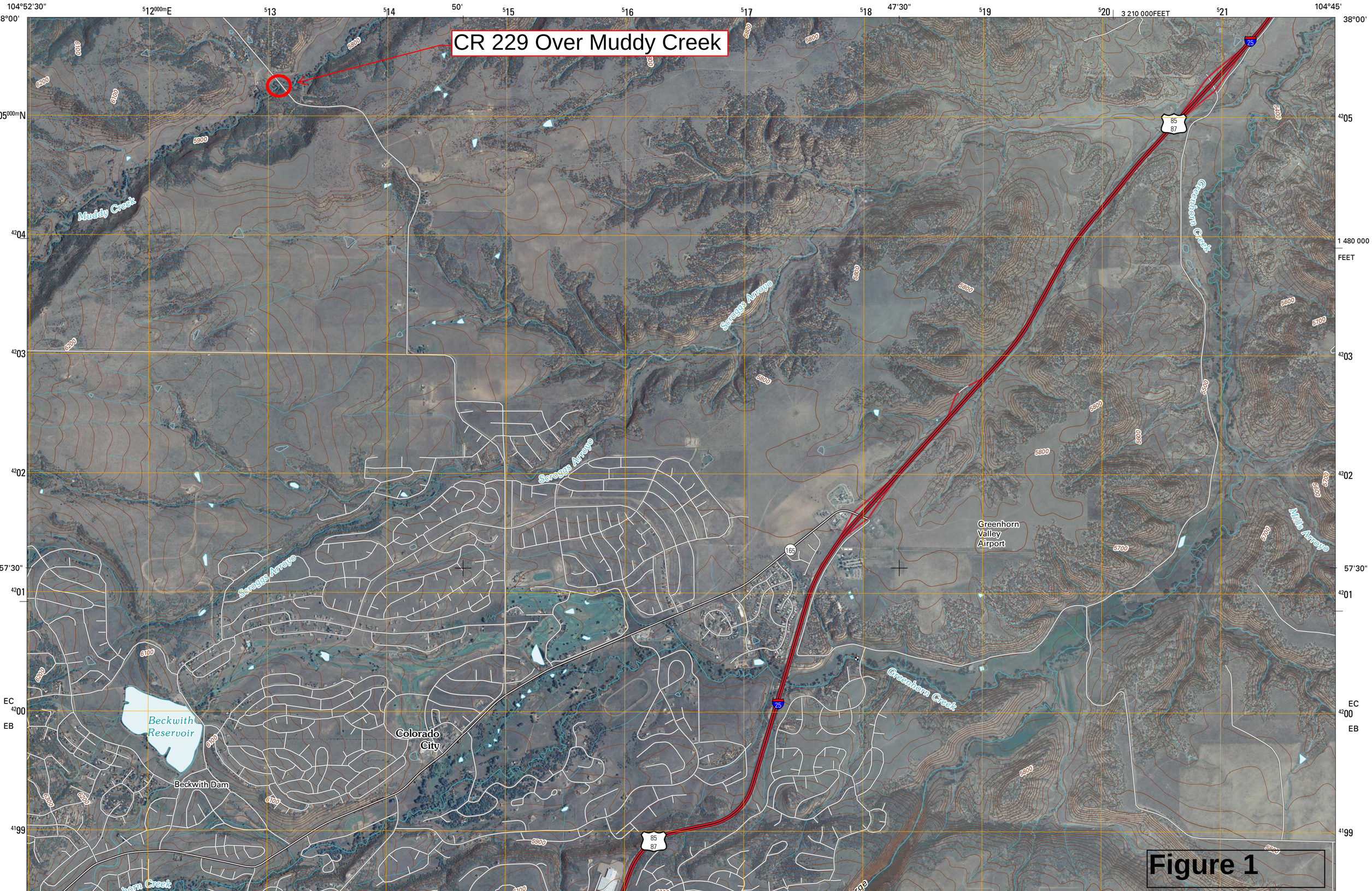
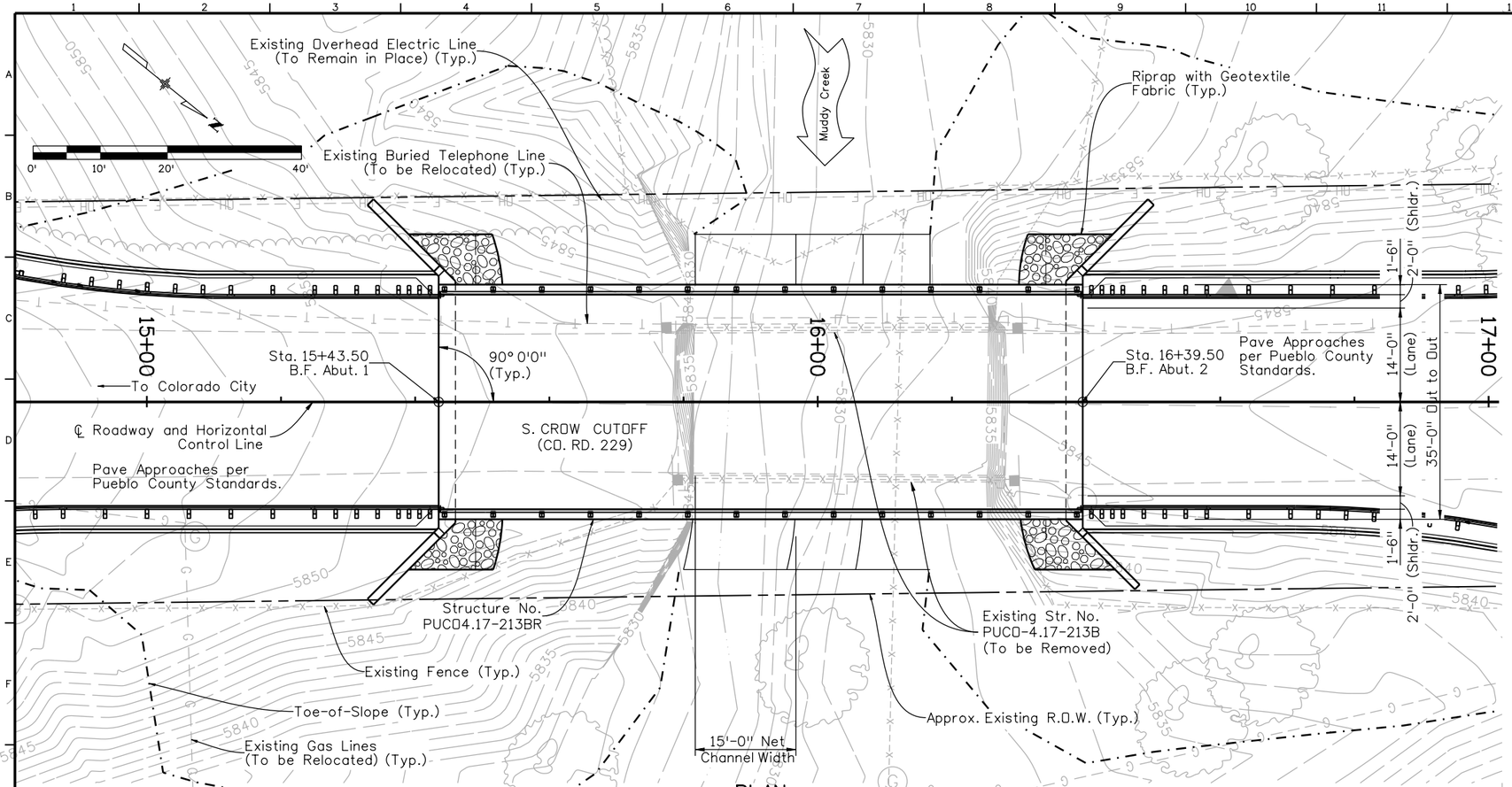
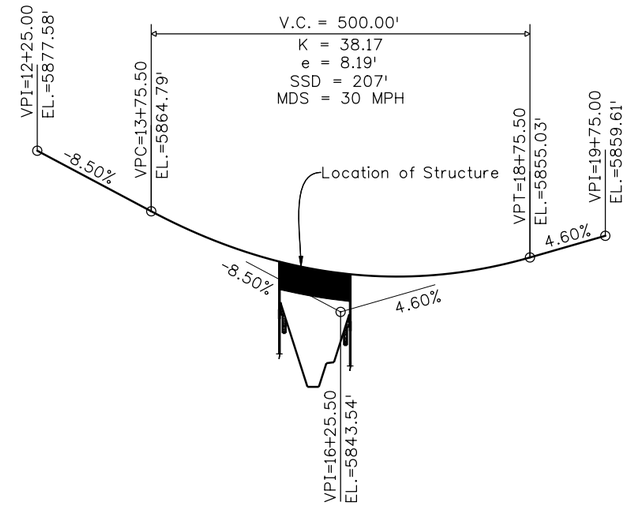


Figure 1

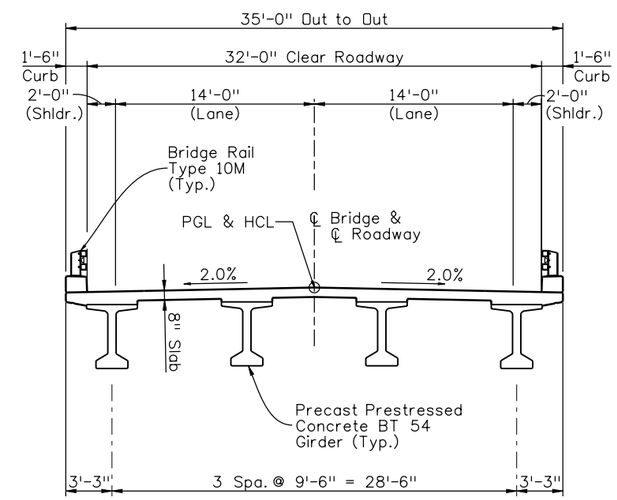
General Layout



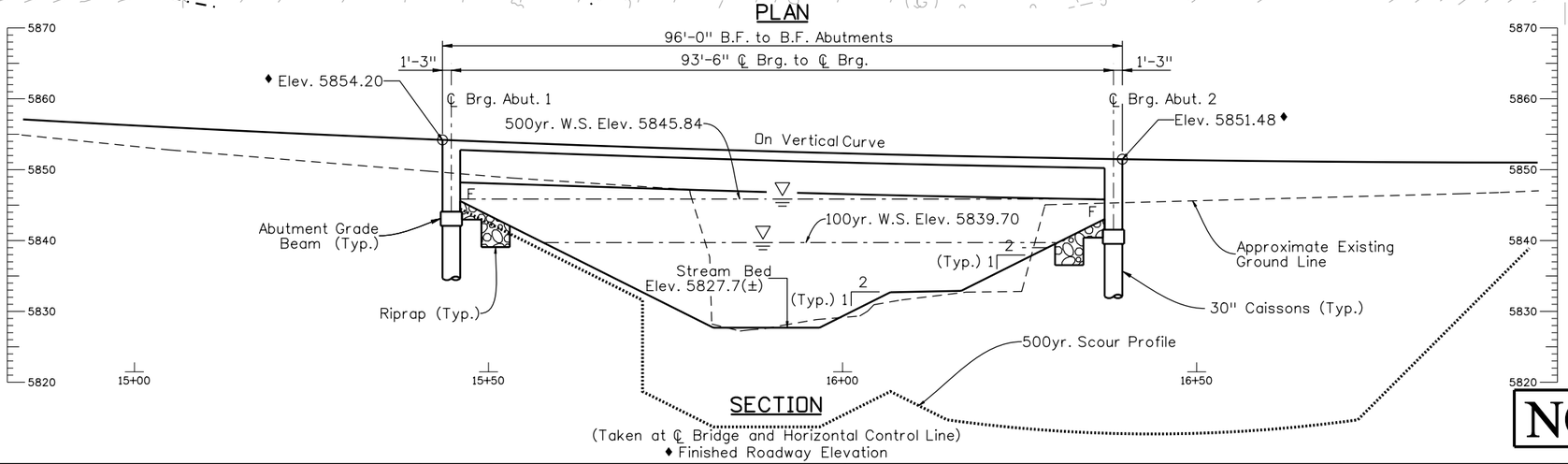
PLAN



PROFILE GRADE



TYPICAL SECTION



SECTION

(Taken at ℄ Bridge and Horizontal Control Line)
♦ Finished Roadway Elevation

NOT FOR CONSTRUCTION

Revision Dates	
(Preliminary Stage Only)	
MM/YY	

Quantities			
	INITIAL	DATE	
Quantities By	XXX	MM/YY	
Checked By	XXX	MM/YY	

Detail			
	INITIAL	DATE	
Detailed By	XXX	MM/YY	
Checked By	XXX	MM/YY	

Design			
	INITIAL	DATE	
Designed By	XXX	MM/YY	
Checked By	XXX	MM/YY	

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Print Date: 3/28/2011
File Name: MC_General Layout.dgn
Horiz. Scale: 1:20 Vert. Scale: As Noted
Unit Information Unit Leader Initials

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R-X

Sheet Revisions		
Date:	Comments	Init.

Pueblo County Department of Public Works
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Pueblo, Colorado 81001-4895
Tele. (719) 583-6040
Fax (719) 948-9641

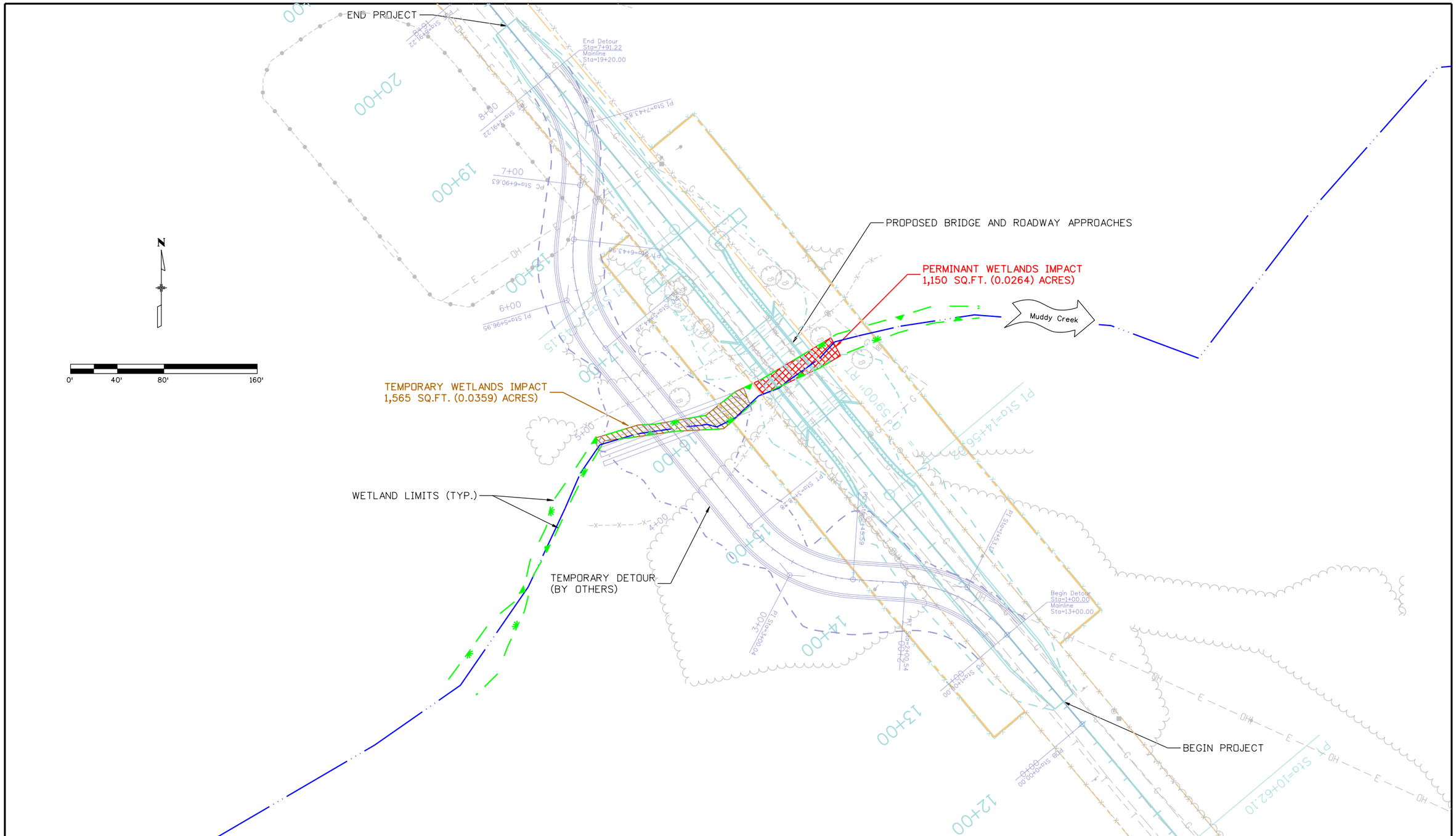
As Constructed
No Revisions:
Revised:
Void:

GENERAL LAYOUT

Designer: M.I. MacLachlan
Detailer: S.W. Barnett
Sheet Subset: BRIDGE
Structure Numbers: PUCO4.17-213BR
Subset Sheets: B2 of 22

Project No./Code
BRO C020-035
17814
Sheet Number 19

Wetland Impacts



Print Date: 4/25/2011		Sheet Revisions	Pueblo County Department of Public Works	As Constructed	WETLAND IMPACTS	Project No./Code
File Name: Wetlands Impacts.dgn		Date: / Comments / Init.		No Revisions:		BRO C020-035
Horiz. Scale: 1:80 Vert. Scale: As Noted	R-X		33601 United Avenue Pueblo, Colorado 81001-4895 Tele. (719) 583-6040 Fax (719) 948-9641	Revised:	Designer: M.I. MacLachlan / Structure Numbers: PUCO4.17-213BR	17814
Unit Information Unit Leader Initials				Void:	Detailer: S.W. Barnett	Sheet Number
Short Elliott Hendrickson Inc. Colorado Center, Tower One, Suite 6000 2000 South Colorado Blvd. Denver, Colorado 80222-7900 Tele. (720) 540-6800 (800) 490-4966 Fax (720) 540-6801					Sheet Subset: WETLAND / Subset Sheets: 1 of 1	

sbarnett 2:17:02 PM P:\PT\P\PUEBC\114349\5-dsgn\51-cadd\Structural\Bridge\Drawings\Wetlands Impacts.dgn

Data Sheets

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: County Road 229, Muddy Creek City/County: Pueblo County Sampling Date: 4/18/11
Applicant/Owner: Pueblo County State: CO Sampling Point: 1
Investigator(s): Matthew Yurkovich, SEH Section, Township, Range: 2, T24S, R67W
Landform (hillslope, terrace, etc.): — Local relief (concave, convex, none): — Slope (%): —
Subregion (LRR): F Lat: 37° 59' 42.11" Long: 104° 51' 1.86" Datum: _____
Soil Map Unit Name: Table Mountain association NWI classification: Riverine
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 throughout project area has been heavily grazed.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 10x10)			
1. Salix exigua	20	yes	OBL
2.			
3.			
4.			
5.			
	20 = Total Cover		
Herb Stratum (Plot size: 10x10)			
1. Typha latifolia	50	yes	OBL
2. Carex aquatilis	20	yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	70 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 20

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
___ 1 - Rapid Test for Hydrophytic Vegetation
✓ 2 - Dominance Test is >50%
___ 3 - Prevalence Index is ≤3.0[1]
___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ 5 - Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)
[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks: This wetland is a very narrow band of wetland along Muddy Creek.

SOIL

Sampling Point: 1

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	2.5Y 4/2	85	7.5YR 3/3	15	D	PL	loamy sand	
4-12	Gley 2.5/N	80	5YR 3/3	20	D	PL	more sandy	

[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)
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ✓ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ 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)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ✓ No ___ Depth (inches): 8"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0"

Wetland Hydrology Present? Yes ✓ No ___

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

Remarks: Muddy Creek 3-5' wide and 4-6" deep near sample point 1.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: County Road 202, Muddy Creek City/County: Pueblo County Sampling Date: 4/18/11

Applicant/Owner: Pueblo County State: CO Sampling Point: 2

Investigator(s): Matthew Yurkovich, SEH Section, Township, Range: 2, T24S, R67W

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

Subregion (LRR): E Lat: 37°59'41.92" Long: 104°51'1.55" Datum: —

Soil Map Unit Name: Table Mountain association NWI classification: —

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 ✓
Wetland Hydrology Present?	Yes _____	No ✓

Is the Sampled Area within a Wetland? Yes _____ No ✓

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15x15)	Absolute % Cover	Dominant Species?	Indicator Status
1. Juniperus scopulorum	10	yes	UPL
2.			
3.			
4.			
	10 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15x15)			
1. Salix exigua	80	yes	OBL
2.			
3.			
4.			
5.			
	80 = Total Cover		
Herb Stratum (Plot size: 15x15)			
1. Verbascum thapsus	5	yes	~~UPL~~
2. Opuntia polyacantha	5	yes	~~UPL~~
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	10 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 75

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 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: Rocky Mountain juniper and common mullen assumed to be UPL since they are not listed.

SOIL

Sampling Point: 2

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 3/3	100					Sandy silt	Gravel 1-20%

[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)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks: No hydric soil indicators

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)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

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: Sample Point 2 is approximately 2' above Muddy Creek.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: County Road 229 Muddy Creek City/County: Pueblo County Sampling Date: 4/18/11

Applicant/Owner: Pueblo County State: CO Sampling Point: 3

Investigator(s): Matthew Gurtovich / LEH Section, Township, Range: 2, T24S, R67W

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

Subregion (LRR): E Lat: 37°59' 41.75" Long: 104°51' 3.29" Datum: —

Soil Map Unit Name: Table Mountain association NWI classification: R4ssim c

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 has been completely trampled by cattle since soil compacted

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		

Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		

Herb Stratum (Plot size: 15 X 15)			
1. Taraxacum officinale	3	yes	FACU
2. Medicago sativa	3	yes	UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	_____ = Total Cover		

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 95

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: Hydrophytic vegetation not present but this area has been trampled by cattle and horses.

SOIL

Sampling Point: 3

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	5Y 5/2	90	5YR 4/6	10	RM	PL	Sandy loam	

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

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

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ 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: Soil has been heavily compacted by livestock.

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)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

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): 10"

Wetland Hydrology Present? Yes ✓ No ___

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

Remarks: Wetland indicators were not strong but small area was included because of guidance on page 104 of Regional Supplement. Determination made based on hydric soils/hydrology.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: County Road 229, Muddy Creek City/County: Pueblo County Sampling Date: 4/18/11

Applicant/Owner: Pueblo County State: CO Sampling Point: 4

Investigator(s): Matthew Yurkovich, SEH Section, Township, Range: 2, T24S, R62W

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

Subregion (LRR): E Lat: 37°59' 40.83" Long: 104°51' 3.84" Datum: _____

Soil Map Unit Name: Table Mountain association NWI classification: ~~Riverine~~

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 ~~N/A~~	**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 plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 15x15)			
1. Salix exigua	20	yes	OBL
2.			
3.			
4.			
5.			
	20 = Total Cover		
Herb Stratum (Plot size: 15x15)			
1. Bromus inermis	60	yes	UPL
2. Verbascum thapsus	1	No	UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	62 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 28

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: 4

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-14	5Y 5/4						silt loam	gravel - common

[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)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ 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)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) **(LRR A)**
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) **(LRR A)**
- ___ Frost-Heave Hummocks (D7)

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: Sample pt. 3-5' above Muddy on terrace.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: County Road 222, Muddy Creek City/County: Pueblo County Sampling Date: 4/18/11

Applicant/Owner: Pueblo County State: CO Sampling Point: 5

Investigator(s): Matthew Gutkowski, SEL Section, Township, Range: 2, T24S, R67W

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

Subregion (LRR): E Lat: 37° 59' 40.96" Long: 104° 51' 4.40" Datum: -

Soil Map Unit Name: Table Mountain association NWI classification: Riverine

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 plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: 10 x 10)			
1. Salix exigua	25	yes	OBL
2.			
3.			
4.			
5.			
	25 = Total Cover		
Herb Stratum (Plot size: 10x10)			
1. Typha latifolia	10	yes	OBL
2. Schoenoplectus pungens	50	yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	60 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 40

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

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

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

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	_____	x 1 = _____
FACW species	_____	x 2 = _____
FAC species	_____	x 3 = _____
FACU species	_____	x 4 = _____
UPL species	_____	x 5 = _____
Column Totals:	_____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No _____

Remarks:

SOIL

Sampling Point: 5

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	Gley2 5/N	95	10YR 4/4	2	RM	PL	loamy	sand
			Gley 4/10Y	3	D	M		

[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)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ✓ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ 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)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 2"

Water Table Present? Yes ✓ No ___ Depth (inches): 0"

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (inches): 0"

Wetland Hydrology Present? Yes ✓ No ___

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

Remarks:

Site Photographs

Muddy Creek on east side of bridge facing northwest at existing natural gas pipeline crossing

Wetland 1 at soil pit at Sample Point 1 Facing Southeast

Wetland 1 near Sample Point 1 facing upstream and northwest

Wetland 1 near Sample Point 2 facing east

Wetland 1 near Sample Point 3 facing downstream and northeast

Upland sample point near Sample Point 4 facing upstream and southwest

Wetland 1 near Sample Point 5 facing downstream and northeast

Looking upstream and facing southwest from the existing bridge

Looking downstream and facing northeast from the existing bridge

Site Photographs (County Road 229 – S. Crow Cutoff Over Muddy Creek Bridge Replacement)

FACWet Scorecard

ADMINISTRATIVE CHARACTERIZATION

General Information		Date of Evaluation:	4/18/2011
Site Name or ID:	Muddy Creek Wetlands	Project Name:	County Road 229 (S. Crow Cutoff) C
404 or Other Permit Application #:		Applicant Name:	Pueblo County Dept. of Public Works
Evaluator Name(s):	Matthew Yurkovich	Evaluator's professional position and organization:	Short Elliott Hendrickson

Location Information:			
Site Location (Lat./Long. or UTM):	37°59'41.83"N, 104°51'2.67"W	Geographic Datum Used (NAD 83	
USGS Quadrangle Map:	Colorado City	Map Scale: (Circle one)	1:24,000 1:100,000 Other 1:
Sub basin Name (8 digit HUC):	11020002	Wetland Ownership:	Private and within Pueblo County ROW

Project Information:

This evaluation is being performed at: *(Check applicable box)*
- [X] *Project Wetland*
- [ ] *Mitigation Site*

Purpose of Evaluation (check all applicable):
- [X] *Potentially Impacted Wetlands*
- [ ] *Mitigation; Pre-construction*
- [ ] *Mitigation; Post-construction*
- [ ] *Monitoring*
- [ ] *Other (Describe)*

Intent of Project: *(Check all applicable)* [ ] Restortation [ ] Enhancement [ ] Creation

Total Size of Wetland Involved: (Record Area, Check and Describe Measurement Method Used)	ac.	[ ] Measured					
		[ ] Estimated					
Assessment Area (AA) Size (Record Area, check appropriate box. Additional spaces are used to record acreage when more than one AA is included in a single assessment)	ac.	[ ] Measured	ac.	ac.	ac.	ac.
		[ ] Estimated	ac.	ac.	ac.	ac.
Characteristics or Method used for AA boundary determination:	Entire area delineated as wetlands within project area is the AA						

Notes:	The AA encompasses both west and east sides of Muddy Creek on either side of the County Road 229

ECOLOGICAL DESCRIPTION 1

Special Concerns

Check all that apply

- [ ] Organic soils including Histosols or Histic Epipedons are present in the AA (i.e., AA includes core fen habitat).
- [ ] Project will directly impact organic soil portions of the AA including areas possessing either Histosol soils or histic epipedons.
- [ ] Organic soils are known to occur anywhere within the contiguous wetland of which the AA is part.
- [ ] The wetland is a habitat oasis in an otherwise dry or urbanized landscape?
- [ ] Federally threatened or endangered species are **KNOWN** to occur in the AA? List Below.

_____

_____

- [ ] Federally threatened or endangered species are **SUSPECTED** to occur in the AA?

_____

_____

_____

- [ ] Species of concern according to the Colorado Natural Heritage (CNHP) are known to occur in the AA?
- [ ] The site is located within a potential conservation area or element occurrence buffer area as determined by CNHP?
- [ ] Other special concerns (please describe)

_____

HYDROGEOMORPHIC SETTING

- [X] AA wetland maintains its fundamental natural hydrogeomorphic characteristics
- [ ] AA wetland has been subject to change in HGM classes as a result of anthropogenic modification
  If the above is checked, please describe the original wetland type if discernable using the table below.
- [ ] AA wetland was created from an upland setting.

Current Conditions

Describe the hydrogeomorphic setting of the wetland by bolding all conditions that apply.

HGM Setting	**Water source**	**Surface flow**	**Groundwater**	Precipitation	Unknown		
	Hydrodynamics	Unidirectional	Vertical	**Bidirectional**			
	Wetland Gradient	**0 - 2%**	2-4%	4-10%	>10%		
	# Surface Inlets	**Over-bank**	0	1	2	3	>3
	# Surface Outlets		0	**1**	2	3	>3
	Geomorphic Setting (Narrative Description)	This is a riverine wetland within the floodplain and banks of Muddy Creek.					
	HGM class	**Riverine**	Slope	Depressional	Lacustrine		

Historical Conditions

Previous wetland typology	**Water source**	Surface flow	Groundwater	Precipitation	Unknown
	Hydrodynamics	Unidirectional	Vertical		
	Geomorphic Setting (Narrative Description)				
	Previous HGM Class	Riverine	Slope	Depressional	Lacustrine

Notes (include information on charcteristics used to formulate reference standard): HGM class has not been altered.

ECOLOGICAL DESCRIPTION 2

Vegetation Habitat Description

US FWS habitat classification according as reported in Cowardin et al. (1979).

System	Subsystem	Class	Subclass	Water Regime	Other Modifiers	% AA
Riverine	Intermittent	Emergent	Rooted Vascular	Intermittently flooded		20
Riverine	Intermittent	Shrub-scrub	Rooted Vascular	Intermittently flooded		80

Lacustrine	Littoral; Limnoral	Rock Bot. (RB) Uncon Bottom(UB) Aquatic Bed(AB) Rocky Shore(RS) Uncon Shore(US) Emergent(EM) Shrub-scrub(SS) Forested (FO)	Floating vascular; Rooted vascular; Algal; Persistent; Non-Persistent; Broad-leaved deciduous; Needle-leaved evergreen; Cobble - gravel; Sand; Mud; Organic	**Examples** Temporarily flooded(A); Saturated(B); Seasonally flooded(C); Seas.-flood./sat.(E); Semi-Perm. flooded(F); Intermittently exposed(G); Artificially flooded(K); Sat./semiperm./Seas. (Y); Int. exposed/permenant(Z)	Hypersaline(7) ; Eusaline(8); Mixosaline(9); Fresh(0); Acid(a); Circumneutral(c); Alkaline/calcareous(i); Organic(g); Mineral(n); Beaver(b); Partially Drained/ditched(d); Farmed(f); Diked/impounded(h); Artificial Substrate(r); Spoil(s); Excavated(x)	
Palustrine	Palustrine					
Riverine	Lower perennial; Upper perennial; Intermittent					

Site Map

Scale: 1 sq. =

Draw a sketch map of the site including relevant portions of the wetland, AA boundary, structures, habitat classes, and other significant features.

Variable 1: Habitat Connectivity - Neighboring Wetland Habitat Loss

This variable is a measure of how isolated from other naturally-occurring wetland or riparian habitat the AA has become as a result of the loss of that habitat. To score this variable, estimate the percent of naturally- occurring wetland/riparian habitat that has been lost (by filling, draining, development, or whatever means) within a 500-meter-wide belt surrounding the AA. This surrounding area is called the Habitat Connectivity Envelope (HCE). Historical photographs and NWI maps can be helpful in scoring this variable. In most cases the evaluator must use best professional judgment in estimating the amount of natural wetland loss. Evaluation of landforms and habitat patterns in the context of perceivable land use change should be used to steer estimates of the amount of wetland loss within the HCE. This variable is not meant to penalize AAs that are naturally isolated, or unique to the landscape. Rather, it should measure the degree to which natural habitat connectivity has been lost.

Rules for Scoring:

1. On the aerial photo, create a 500 meter perimeter around the AA.

2. The area within this perimeter is the **Habitat Connectivity Envelope (HCE)**

3. Within the HCE, outline the current extent of naturally occurring wetland and riparian habitat. Do not include habitats such as excavated ponds or reservoir induced fringe wetlands.

4. Outline the historical extent of wetland and riparian habitats (i.e., existing natural wetlands plus those that have been destroyed).

- Use your knowledge of the history of the area and evident land use change to identify where habitat losses have occurred. Additional research could be utilized to increase the accuracy of this estimate including consideration of floodplain maps, historical aerial photographs, etc.

5. Calculate the area of existing and historical wetlands. Divide the area values to determine the percentage of naturally occurring wetland habitat that remains in the HCE, and determine the variable score using the guidelines below.

Variable Score	Condition Category	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Wetland losses are absent or negligible or there is no evidence to suggest the native landscape within the HCE historically contained other wetland habitats
<0.9 - 0.8	*Highly Functioning*	More than 80% of historical wetland habitat area within the HCE is still present (less than 20% of habitat area lost).
<0.8 - 0.7	*Functioning*	80 to 60% of historical wetland habitat area within the HCE is still present (20% to 40% of habitat area lost).
<0.7 - 0.6	*Functioning Impaired*	Less than 60 to 25% of historical wetland habitat area within the HCE is still present (more than 40 to 75% of habitat area lost).
<0.6	*Non-functioning*	Less than 25% of the historical wetland habitat area within the HCE still in existence (more than 70% of habitat lost).

Variable 1 Score 0.7

Notes:Wetlands at the bridge abutments and road fill slopes were likely impacted. Impacts have occurred from

Variable 2: Habitat Connectivity - Migration/Dispersal Barriers

This variable is intended to rate the degree to which the AA has become isolated from existing neighboring wetland and riparian habitat by artificial barriers that inhibit migration or dispersal of organisms. On the aerial photograph, identify the man-made barriers within the HCE that intercede between the AA and surrounding wetlands and riparian areas, and identify them by type on the stressor list. Score this variable based on the barriers' impermeability to migration and dispersal and the amount of surrounding wetland/riparian habitat they affect.

Rules for Scoring:

1. On the aerial photo, outline **all** existing wetland and riparian habitat areas within the HCE. This includes naturally occurring habitats as well as those purposefully created or induced by land use change.

2. Identify artificial barriers to dispersal and migration of organisms within the HCE that intercede between the AA and surrounding habitats. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

3. Considering the composite effect of all of identified barriers to migration and dispersal (i.e., stressors), assign an overall variable score using the scoring guidelines.

Stressors = artificial barriers

✔	Stressors	Comments/description
	Major Highway	
	Secondary Highway	
X	Tertiary Roadway	County Road 229
	Railroad	
	Bike Path	
	Urban Development	
X	Agricultural Development	Heavy grazing activity by livestock in NCE
	Artificial Water Body	
X	Fence	Barbed wire fences and gates present upstream and downstream
	Ditch or Aqueduct	
	Aquatic Organism Barriers	

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	No appreciable barriers exist between the AA and other wetland and riparian habitats in the HCE; or there are no other wetland and riparian areas in the HCE.
<0.9 - 0.8	*Highly Functioning*	Barriers impeding migration/dispersal between the AA and up to 33% of surrounding WHA highly permeable and easily passed by most organisms. Examples could include gravel roads, minor levees, ditches or barbed-wire fences. More significant barriers (see "functioning category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.8 - 0.7	*Functioning*	Barriers to migration and dispersal retard the ability of many organisms/propagules to pass between the AA and up to 66% of WHA. Passage of organisms and propagules through such barriers is still possible, but it may be constrained to certain times of day, be slow, dangerous or require additional travel. Busy two-lane roads, culverted areas, small to medium artificial water bodies or small earthen dams would commonly rate a score in this range. More significant barriers (see "functioning impaired" category below) could affect migration to up to 10% of surrounding wetland/riparian habitat.
<0.7 - 0.6	*Functioning Impaired*	Barriers to migration and dispersal preclude the passage of some types of organisms/propagules between the AA and up to 66% of surrounding WHA. Travel of those animals which can potential negotiate the barrier are strongly restricted and may include a high chance of mortality. Up to 33% of surrounding wetland/riparian habitat could be functionally isolated from the AA.
<0.6	*Non-functioning*	AA is essentially isolated from surrounding WHA by impermeable migration and dispersal barriers. An interstate highway or concrete-lined water conveyance canal are examples of barriers which would generally create functional isolation between the AA and wetland/riparian habitat in the HCE.

Variable 2 Score 0.65

Variable 3: Buffer Capacity

The buffer area is defined as a 250-meter-wide belt surrounding the perimeter of the AA. This variable is a measure of the capacity of that area to function as an effective buffer for the wetland against the deleterious effects of surrounding land use change. To score the variable, assume that the AA is 100% buffered except where land use changes inside the buffer area have diminished this quality. Identify these land use types as specific stressors in the list. For each stressor, rate severity and extent within the buffer area; then use this list to make an overall rating for the buffer's departure from reference conditions. When rating buffer capacity, consider both the intensity of the impact and the proximity of the stressor to the AA.

Rules for Scoring:

1. On the aerial photograph, delimit the buffer area (BA) as the zone within 250 meters of the outer boundary of the AA.

2. Use the stressor list to record land use changes that affect buffering capacity within the buffer area. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

3. Considering all of the identified stressors, their composite severity, extent and proximity to the AA assign an overall variable score using the scoring guidelines.

Stressors = Land Use Changes	✔	Stressors	Comments/description
		Industrial/commercial	
		Urban	
		Residential	
		Rural	
		Dryland Farming	
		Intensive Agriculture	
		Orchards or Nurseries	
	X	Livestock Grazing	Heavy livestock grazing and passage
	X	Transportation Corridor	County Road 229 with bridge over Muddy Creek
		Urban Parklands	
		Dams/impoundments	
		Artificial Water body	
		Physical Resource Extraction	
		Biological Resource Extraction	

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	No appreciable land use change has been imposed within the TBA and it provides the full buffering capacity.
<0.9 - 0.8	*Highly Functioning*	Some land use change has occurred in the BA, but such changes little impair the area's ability to provide a buffering function, either because land use is not intensive, for example haying, light grazing, or low intensity silviculture, or more substantial changes occur in approximately less than 10% of the BA.
<0.8 - 0.7	*Functioning*	BA has been subjected to a marked shift in land use, however, the land retains much of its original buffering capacity. Moderate-intensity land uses such as dry-land farming, urban "green" corridors, or moderate cattle grazing would commonly be placed within this scoring range.
<0.7 - 0.6	*Functioning Impaired*	Land use changes within the BA has been substantial including the a moderate to high coverage (up to 50%) of impermeable surfaces, bare soil, or other artificial surface; considerable in-flow urban runoff or fertilizer-rich waters common. While, the buffering capacity of the land has been greatly diminished it is not extinguished. Intensively logged areas, low-density urban developments, some urban parklands and some cropping situations would commonly rate a score within this range.
<0.6	*Non-functioning*	The area within the BA provides essentially no buffering capacity. Many Commercial developments or highly urban landscapes would rate a score of less than 0.6.

Variable 3 score 0.68

Variable 4: Water Source

This variable is concerned with up-gradient hydrologic connectivity. It is a measure of the impacts to the AA's water source, including the ability of source water to perform work such as sediment transport, erosion, soil pore flushing, etc. To score this variable, identify stressors that alter the source of water to the AA, and record their presence on the stressor list. Stressors can impact water source by depletion, augmentation, or alteration of inflow timing or hydrodynamics. For riverine systems, this variable is primarily concerned with the connection of the channel to the floodplain. This variable is designed to assess water quantity, power and timing, not water quality. Water quality will be evaluated in Variable 7.

Scoring rules:

1. Use the stressor list and knowledge of the watershed to catalog type-specific impairments of the AA's water source. Mark the stressors present with a check in the first column and describe the general nature, severity and extent of each. List additional stressors in empty rows at the bottom of the table and explain.

2. Considering the composite effect of stressors on the water source, rate the condition of this variable with the aid of the scoring guidelines.

✔	Stressors	Comments/description
	Ditches or Drains (tile, etc.)	
	Dams	
	Diversions	
	Groundwater pumping	
	Draw-downs	
	Culverts or Constrictions	
X	Point Source (urban, ind., ag.)	Small amount of runoff from gravel roadway
X	Non-point Source	Livestock excrement present within wetland and surrounding areas
	Increased Drainage Area	
	Storm Drain/Urban Runoff	
	Impermeable Surface Runoff	
	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
	Transbasin Diversion	
	Actively Managed Hydrology	

Variable Score	Condition Class	Depletion	Augmentation
1.0 - 0.9	*Reference Standard*	Unnatural drawdown events minor, rare or non-existent, very slight uniform depletion, or trivial alteration of hydrodynamics.	Unnatural high-water events minor, rare or non-existent, slight uniform increase in amount of inflow, or trivial alteration of hydrodynamics.
<0.9 - 0.8	*Highly Functioning*	Unnatural drawdown events occasional, short duration and/or mild; or uniform depletion up to 20%; or mild to moderate reduction of peak flows or capacity of water to perform work.	Occasional unnatural high-water events, short in duration and/or mild in intensity; or uniform augmentation up to 20%; or mild to moderate increase of peak flows or capacity of water to perform work.
<0.8 - 0.7	*Functioning*	Unnatural drawdown events common and of mild to moderate intensity and/or duration; or uniform depletion up to 50%; or moderate to substantial reduction of peak flows or capacity of water to perform work.	Common occurrence of unnatural high-water events, of a mild to moderate intensity and/or duration; or uniform augmentation up to 50%; or moderate to substantial reduction of peak flows or capacity of water to perform work.
<0.7 - 0.6	*Functioning Impaired*	Unnatural drawdown events occur frequently with a moderate to high intensity and/or duration; or uniform depletion up to 75%; or substantial reduction of peak flows or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**	Common occurrence of unnatural high-water events, some of which may be severe in nature or exist for a substantial portion of the growing season; or uniform augmentation more than 50% or capacity of water to perform work. **Wetlands with actively managed or wholly artificial hydrology will usually score in this range or lower.**
<0.6	*Non-functioning*	Water source diminished enough to threaten or extinguish wetland hydrology in the AA.	Frequency, duration or magnitude of unnaturally high-water great enough to change the fundamental characteristics of the wetland.

Variable 4 Score 0.8

Variable 5: Water Distribution

This variable is concerned with hydrologic connectivity ***within*** *the AA. It is a measure of alteration to the spatial distribution of surface and groundwater within the AA. These alterations are manifested as local changes to the hydrograph and generally* ***result*** *from geomorphic modifications. To score this variable, identify stressors that alter flow patterns and impact the hydrograph within the AA, including localized increases or decreases to the depth or duration of the water table or surface water. In most cases, the Water Source variable score will determine the maximum achievable score for Water Distribution, since the condition of the water source exerts a primary control on the wetland's capacity to distribute water in a characteristic fashion and exhibit a natural hydrograph.*

Scoring rules:

1. Identify impacts to the natural distribution of water throughout the AA and catalog them in the stressor table.
2. Considering all of the stressors identified, assign an overall variable score using the scoring guidelines.

✔	Stressors	Comments/description
X	Alteration of Water Source	Compacted soils at livestock passage
	Ditches	
	Ponding/Impoundment	
	Culverts	
X	Road Grades	Bridge abutments and fill slopes
X	Channel Incision/Entrenchment	Channel has been deeply incised downstream of bridge
	Hardened/Engineered Channel	
	Enlarged Channel	
	Artificial Banks/Shoreline	
	Weirs	
	Dikes/Levees/Berms	
	Diversions	
	Sediment/Fill Accumulation	

Variable Score	Condition Class	Non-riverine	Riverine
1.0 - 0.9	*Reference Standard*	Little or no alteration has been made to the way in which water is distributed throughout the wetland. AA maintains a natural hydrologic regime.	Natural active floodplain areas flood on a normal recurrence interval. No evidence of alteration of flooding and subirrigation duration and intensity.
<0.9 - 0.8	*Highly Functioning*	Less than 10% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in less than a 2 in. (5 cm) change in mean growing season water table elevation.	Channel-adjacent areas have occasional unnatural periods of drying or flooding; or uniform shift in the hydrograph less than typical root depth.
<0.8 - 0.7	*Functioning*	Between 10 and 33% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 4 in. (5 cm) or less change in mean growing season water table elevation.	In channel-adjacent area, periods of drying or flooding are common; or uniform shift in the hydrograph near root depth.
<0.7 - 0.6	*Functioning Impaired*	33 to 66% of the AA is affected by *in situ* hydrologic alteration; or more widespread impacts result in a 6 in. (15 cm) or less change in mean growing season water table elevation. Water table behavior must still meet jurisdictional criteria to merit this rating.	Adjacent to the channel, unnatural periods of drying or flooding are the norm; or uniform shift in the hydrograph greater than root depth.
<0.6	*Non-functioning*	More than 66% of the AA is affected by hydrologic alteration which changes the fundamental functioning of the wetland system, generally exhibited as a conversion to upland or deep water habitat.	Historical active floodplain areas are almost never wetted from overbank flooding, and/or groundwater infiltration is effectively cut off.

Variable 5 Score 0.8

Variable 6: Water Outflow

This variable is concerned with down-gradient hydrologic connectivity and the flow of water (transporting materials and energy) out of the AA. It is a measure of impacts that affect the hydrologic outflow of water including the passage of water through its normal low- and high-flow surface outlets, and infiltration/groundwater recharge. In some cases, alteration of evapotranspiration rates may be significant enough of a factor to consider in scoring. Score this variable by identifying stressors that impact the means by which water is exported from the AA. In Variable 5, the stressors were evaluated in light of their impact on water distribution within the AA. To evaluate this variable focus on the AA's ability to export water, energy and associated materials to habitats down-gradient of the AA. In most cases, the Water Source variable score will determine the maximum achievable score for Water Outflow, since the condition of the water source exerts a primary control over the wetland's capacity to export water and associated materials.

Scoring rules:

1. Identify impacts to the natural outflow of water from the AA and catalog them in the stressor table.

2.Considering all of the stressors identified, assign an overall variable score using the scoring guidelines. Take in to account the cumulative effect of stressors on the wetland's ability to export water and water-borne materials.

✔	Stressors	Comments/description
	Alteration of Water Source	
	Ditches	
	Dikes/Levees	
	Road Grades	
	Culverts	
	Diversions	
	Constrictions	
X	Channel Incision/Entrenchment	Channel is deeply incised downstream of bridge
	Hardened/Engineered Channel	
	Artificial Stream Banks	Banks of stream have been impacted by heavy livestock usage upstream of bridge
	Weirs	
	Confined Bridge Openings	

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stressors have little to no effect on the magnitude, timing or hydrodynamics of the AA water outflow regime.
<0.9 - 0.8	*Highly Functioning*	High- or low-water outflows are mildly to moderately affected, but at intermediate ("normal") levels flow continues essentially unaltered in quantity or character.
<0.8 - 0.7	*Functioning*	High- or low-water outflows are moderately affected, mild alteration of intermediate level outflow occurs; or hydrodynamics moderately affected.
<0.7 - 0.6	*Functioning Impaired*	Outflow at all stages is moderately to highly impaired resulting in persistent flooding of portions of the AA or unnatural drainage; or outflow hydrodynamics severely disrupted.
<0.6	*Non-functioning*	The natural outflow regime is profoundly impaired. Down-gradient hydrologic connection severed or nearly so. Alterations may cause widespread unnatural persistent flooding or dewatering of the wetland system.

Variable 6 Score 0.75

Variable 7: Geomorphology

This variable is a measure of the degree to which the geomorphic setting has been altered within the AA. Changes to the surface configuration and natural topography constitute stressors. Such stressors may be observed in the form of fill, excavation, diking, sedimentation due to absence of flushing floods, etc. In riverine systems geomorphic changes to stream channel should be considered if the channel is within the AA. Alterations may include bed surface changes (embeddedness or morphology changes), stream bank instability, and stream channel reconfiguration. Geomorphic changes are usually ultimately manifested as changes to wetland hydrology and water relations with vegetation. Geomorphic alteration can also directly affect soil properties, such as near-surface texture, and the wetland chemical environment, such as the redox state or nutrient composition in the rooting zone. In rating this variable, do not include the resultant effects of geomorphic change; rather focus on the physical impacts ***within the footprint*** *of the alteration. The effects of geomorphic change are addressed by other variables. All alterations to geomorphology should be evaluated including small-scale impacts such as pugging, hoof sheer, and sedimentation which constitute important, but not immediately apparent, impacts.*

Scoring Rules:

1. Identify impacts to geomorphological setting and topography within the AA and record them on the stressor checklist.
2. Considering all of the stressors identified, assign an overall variable score using the scoring guidelines.

✓		Stressors	Comments
	General	Dredging/Excavation/Mining	
X	General	Fill, including dikes, road grades, etc.	Fill placed in wetlands downstream of bridge at recent pipeline crossing
X	General	Grading	Downstream areas near pipeline crossing have been recently graded
X	General	Compaction	Soils around livestock passage have become significantly compacted
	General	Plowing/Disking	
	General	Excessive Sedimentation	
	General	Dumping	
	General	Hoof Shear/Pugging	
	General	Aggregate or Mineral Mining	
	General	Sand Accumulation	
X	Channels Only	Channel Instability/Over Widening	Stream width has been increased in area of livestock passage
X	Channels Only	Excessive Bank Erosion	Banks eroded near livestock passage
	Channels Only	Channelization	
	Channels Only	Reconfigured Stream Channels	
	Channels Only	Artificial Banks/Shoreline	
	Channels Only	Beaver Dam Removal	
	Channels Only	Substrate Embeddedness	
	Channels Only	Lack or Excess of Woody Debris	

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Topography essentially unaltered from the natural state, or alterations appear to have a minimal effect on wetland functioning and condition. Patch or microtopographic complexity may be slightly altered, but native plant communities are still supported.
<0.9 - 0.8	*Highly Functioning*	Alterations to topography result in small but detectable changes to habitat conditions in some or all of the AA; or more severe impacts exist but affect less than 10% of the AA.
<0.8 - 0.7	*Functioning*	Changes to AA topography may be pervasive but generally mild to moderate in severity. May include patches of more significant habitat alteration; or more severe alterations affect up to 20 % of the AA.
<0.7 - 0.6	*Functioning Impaired*	At least one important surface type or landform has been eliminated or created; microtopography has been strongly impacted throughout most or all of the AA; or more severe alterations affect up to 50% of the AA. Evidence that widespread diminishment or alteration of native plant community exist due to physical habitat alterations. Most incidentally created wetland habitat such as that created by roadside ditches and the like would score in this range or lower.
<0.6	*Non-functioning*	Pervasive geomorphic alterations have caused a fundamental change in site character and functioning, commonly resulting in a conversion to upland or deepwater habitat.

Variable 7 Score 0.71

Variable 8: Water and Soil Chemical Environment

This variable concerns the chemical environment of the soil and water media within the AA, including pollutants and water quality. The origin of pollutants may be in the AA or delivered from up-gradient or surrounding areas. Score this variable by listing indicators of chemical stress in the AA. Consider point source and non-point sources of pollution, as well as mechanical or hydrologic changes that alter the chemical environment. Because water quality frequently cannot be inferred directly, the presence of many stressors is identified via indirect indicators.

Scoring rules:

1. Stressors are grouped into categories which have a similar signature or set of causes.
2. Use the indicator list to identify each stressor impacting the chemical environment of the AA.
3. For each stressor category, determine the sub-variable score using the scoring guideline table provided on the second page of the scoring sheet.
   -If the AA is part of a water body that is recognized as impaired or recommended for TMDL development for one of the factors, then score that sub-variable 0.65 or lower.
4. Transcribe sub-variable scores to the following variable scoring page and compute the sum.
5. Determine the variable score by following the scoring guidelines.

Stressor Category	Stressor Indicator	✔	Comments	Sub-variable Score
Nutrient Enrichment/ Eutrophication/ Oxygen (D.O.)	Livestock	X	Major upstream and at bridge	0.70
	Agricultural Runoff	X	Minor	
	Septic/Sewage			
	Excessive Algae or Aquatic Veg.			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Sedimentation/ Turbidity	Excessive Erosion	X	Bank erosion by livestock	0.71
	Excessive Deposition			
	Fine Sediment Plumes			
	Agricultural Runoff			
	Excessive Turbidity			
	Nearby Construction Site	X	Recent pipeline crossing unvege	
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
	Roadway Maintenance	X	Minor in winter	
Toxic contamination/ pH	Recent Chemical Spills			0.69
	Nearby Industrial Sites			
	Road Drainage/Runoff	X	Minor County Road 229	
	Livestock	X	Major upstream and at bridge	
	Agricultural Runoff	X	minor	
	Storm Water Runoff			
	Fish/Wildlife Impacts			
	Vegetation Impacts			
	Cumulative Watershed NPS			
	Acid Mine Drainage			
	Point Source Discharge			
	CDPHE Impairment/TMDL List			
Temperature	Excessive Temperature Regime			0.80
	Lack of Shading	X	Both sides of creek in areas	
	Reservoir/Power Plant Discharge			
	Industrial Discharge			
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List			
Soil chemistry/ Redox potential	Unnatural Saturation/Desaturation			0.80
	Mechanical Soil Disturbance	X	Recent pipeline crossing unvege	
	Dumping/introduced Soil			
	CDPHE Impairment/TMDL List			

Variable 7: Water and Soil Chemical Environment

Sub-variable Scoring Guidelines

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stress indicators not present or trivial.
<0.9 - 0.8	*Highly Functioning*	Stress indicators scarcely present and mild, or otherwise not occurring in more than 10% of the AA.
<0.8 - 0.7	*Functioning*	Stress indicators present at mild to moderate levels, or otherwise not occurring in more than 33% of the AA.
<0.7 - 0.6	*Functioning Impaired*	Stress indicators present at moderate to high levels, or otherwise not occurring in more than 66% of the AA
<0.6	*Non-functioning*	Stress indicators strongly evident throughout the AA at levels which apparently alter the fundamental chemical environment of the wetland system

Input each factor score from the stressor list and calculate the sum.

Nutrient enrichment/ Eutrophication/ Oxygen (D.O.)		Sedimentation/ Turbidity		Toxic contamination/ pH		Temperature		Soil chemistry/ Redox potential		Sum of Sub-variable Scores
0.70	+	0.71	+	0.69	+	0.80	+	0.80	=	3.70

Use the table to score the Chemical Environment Variable circling the applicable scoring rules.

Variable Score	Condition Class	Scoring Rules		
		Single Factor		**Composite Score**
1.0 - 0.9	*Reference Standard*	No single factor scores < 0.9	or	The factor scores sum > 4.5
<0.9 - 0.8	*Highly Functioning*	Any single factor scores ≥ 0.8 but < 0.9	or	The factor scores sum >4.0 but ≤4.5
<0.8 - 0.7	*Functioning*	Any single factor scores ≥ 7.0 but < 0.8	or	The factor scores sum >3.5 but ≤ 4.0
<0.7 - 0.6	*Functioning Impaired*	Any single factor scores ≥ 0.6 but <0.7	or	The factor scores sum >3.0 but ≤3.5
< 0.6	*Non-functioning*	Any single factor scores < 0.6	or	The factor scores sum < 3.0

Variable 8 Score 0.76

Variable 9: Vegetation Structure and Complexity

This variable is a measure of the condition of the wetland's vegetation relative to its native state. It is particularly relevant to the wetland's ability to perform higher-order functions such as support of wildlife populations, although it also affects primary functions such as flood-flow attenuation. Score this variable by listing stressors that have affected the diversity, composition and cover of each vegetation cover class that would normally be present for the wetland type being assessed. For this variable, stressor severity is a measure of how much each vegetation stratum differs functionally from its natural condition.

Rules for Scoring:

1. Determine the number and types of vegetation layers present within the AA. Make a judgment as to whether additional layers were historically present using direct evidence such as stumps, root wads or historical photographs. Indirect evidence such as local knowledge and expert opinion can also be used in this determination. Check each present or suspected vegetation layer in the third row of the table.

2. Do not score vegetation layers that would not normally be present in the wetland type being assessed.

3. Estimate the percent coverage of each vegetation layer. Aerial photographs can be helpful for this but are not requirec In cases where a stratum has been thinned or removed, enter the expected coverage of that layer **not** the current percent coverage.

4. Enter the percent cover values as decimals in the row of the stressor table labeled "Percent Cover of Layer". Note, percentages will often sum to more than 100% (1.0).

5. Determine the severity of stressors acting on each individual canopy layers, indicating their presence with checks in the appropriate boxes of the stressor table.

6. Determine the sub-variable score for each valid vegetation layer using the scoring guidelines on the second page of the scoring sheet. Enter each sub-variable score in the appropriate cell of the row labeled "Veg. Layer Sub-variable Score".

7. Add the "Veg. Layer Sub-variable Scores" and enter the sum in the labeled cell to the right of the individual scores. Follow this same process for the "Percent Cover of Layer".

8. Divide the sum of "Veg. Layer Sub-variable Scores" by the total coverage of all layers scored. This product is the Variable 9 score. Enter this number in the labeled box at the bottom of this page.

	Vegetation Layers				
Layers Scored *(check boxes to right to indicate scored layers)*					
Stressor	**Tree**	**Shrub**	**Herb**	**Aquatic**	**Comments**
Noxious Weeds					
Exotic/Invasive spp.					
Tree Harvest					
Brush Cutting/Shrub Removal					
Livestock Grazing		X	X	X	Heavy grazing
Excessive Herbivory					
Mowing/Haying					
Herbicide					
Loss of Zonation/Homogenization					
Dewatering					
Over Saturation					

Percent Cover of Layer		+	60.00	+	75.00	+	10.00	=	145
	x		x		x		x		
Veg. Layer Sub-variable Score			0.6		0.6		0.6	÷	
	II		II		II		II		
Weighted Sub-variable Score		+	36.00	+	45.00	+	6.00	=	87

See sub-variable scoring guidelines on following page

Variable 9 Score 0.60

Sub-variable 9 Scoring Guidelines

Based on the list of stressors identified above, rate the severity of their cumulative effect on vegetation structure and complexity for each vegetation layer.

Variable Score	Condition Class	Scoring Guidelines
1.0 - 0.9	*Reference Standard*	Stressors not present or with an intensity low enough as to not detectably affect the structure, diversity or composition of the vegetation layer.
<0.9 - 0.8	*Highly Functioning*	Stressors present at intensity levels sufficient to cause detectable, but minor, changes in layer composition. Stress related change should generally be less than 10% for any given attribute (e.g., 10% cover of invasive, 10% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as high as 33% for a given attribute if stressors are confined to patches comprising less than 10% of the wetland.
<0.8 - 0.7	*Functioning*	Stressors present with enough intensity to cause significant changes in the character of vegetation, including alteration of layer coverage, structural complexity and species composition. The vegetation layer retains its essential character though. AA's with a high proportion of non-native grasses will commonly fall in this class. Stress related change should generally be less than 33% for any given attribute (e.g., 33% cover of invasive, 33% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 66% for a given attribute if stressors are confined to patches comprising less than 25% of the wetland.
<0.7 - 0.6	*Functioning Impaired*	Stressor intensity severe enough to cause profound changes to the fundamental character of the vegetation layer. Stress-related change should generally be less than 66% for any given attribute (e.g., 66% cover of invasive, 66% reduction in richness or cover) if the stressor is evenly distributed throughout the wetland. Stress related change could be as much as 80% of a given attribute if stressors are confined to patches comprising less than 50% of the wetland.
<0.6	*Non-functioning*	Vegetation layer has been completely removed or altered to the extent that is no longer comparable to the natural structure, diversity and composition.

FACWet Score Card

Scoring Procedure:

1. Transcribe variable scores from each variable data sheet to the corresponding cell in the variable score table.
2. In each Functional Capacity Index (FCI) equation, enter the corresponding variable scores in the equation cells. Do not enter values in the crossed cells lacking labels.
3. Add the variable scores to calculate the total functional points achieved for each function.
4. Divide the total functional points achieved by the functional points possible. The typical number of total points possible is provided, howe if a variable is added or subtracted to FCI equation the total possible points must be adjusted
5. Calculate the Composite FCI, by adding the FCI scores and dividing by the total number of functions scored (usually 7).
6. If scoring is done directly in the Excel spreadsheet, all values will be transferred and calculated automatically.

VARIABLE SCORE TABLE

Buffer & Landscape Context	**Variable 1:**	**Habitat Connectivity - Neighboring Wetland Habitat Loss**	0.70
	Variable 2:	**Habitat Connectivity - Migration/Dispersal Barriers**	0.65
	Variable 3:	**Buffer Capacity**	0.68
Hydrology	**Variable 4:**	**Water Source**	0.80
	Variable 5:	**Water Distribution**	0.80
	Variable 6:	**Water Outflow**	0.75
Abiotic and Biotic Habitat	**Variable 7:**	**Geomorphology**	0.71
	Variable 8:	**Chemical Environment**	0.76
	Variable 9:	**Vegetation Structure and Complexity**	0.60

Functional Capacity Indices

Function	Equation	Total Functional Points	Functional Capacity Index
Function 1 -- Support of Characteristic Wildlife Habitat	$V1_{wetloss}$ + $V2_{barriers}$ + $V3_{buffer}$ + (2 x $V9_{veg}$)		
	0.70 + 0.65 + 0.68 + 1.20 + + =	3.23	÷ 5 = 0.65
Function 2 -- Support of Characteristic Fish/aquatic Habitat	(3 x $V4_{source}$) + (2 x $V5_{dist}$) + 2 x $V6_{outflow}$ + $V8_{chem}$ + $V7_{geom}$		
	2.40 + 1.60 + 1.50 + 0.76 + 0.71 + + =	6.97	÷ 9 = 0.77
Function 3 -- Flood Attenuation	$V3_{buffer}$ + 2 x $V4_{source}$ + (2 x $V5_{dist}$) + 2 x $V6_{outflow}$ + $V7_{geom}$ + $V9_{veg}$		
	0.68 + 1.60 + 1.60 + 1.50 + 0.71 + 0.60 =	6.69	÷ 9 = 0.74
Function 4 -- Short- and Long-term Water Storage	$V4_{source}$ + (2 x $V5_{dist}$) + 2 x $V6_{outflow}$) $V7_{geom}$		
	0.80 + 1.60 + 1.50 + 0.71 + + =	4.61	÷ 6 = 0.77
Function 5 -- Nutrient/Toxicant Removal	(2 x $V5_{dist}$) + $V8_{chem}$ + $V7_{geom}$		
	1.60 + 0.76 + 0.71 + + + =	3.07	÷ 4 = 0.77
Function 6 -- Sediment Retention/Shoreline Stabilization	$V3_{buffer}$ + (2 x $V7_{geo}$) + (2 x $V9_{veg}$)		
	0.68 + 1.42 + 1.20 + + + =	3.30	÷ 5 = 0.66
Function 7 -- Production Export/Food Chain Support	$V1_{wetloss}$ + 2 x $V6_{outflow}$ + $V8_{chem}$ + $V7_{geo}$ + (2 x $V9_{veg}$)		
	0.70 + 1.50 + 0.76 + 0.71 + 1.20 + =	4.87	÷ 7 = 0.70

Sum of Individual FCI Scores **5.06**

Divide by the Number of Functions Scored **÷ 7**

Composite FCI Score **0.72**

Wetland Mitigation Site Selection Form

Wetland Mitigation Site Selection Form
Colorado Department of Transportation
Attachment to Wetland Finding

Project Name/No.: County Road 229 (South Crow Cutoff) Over Muddy Creek	
Sub-account No.:	**Region:** 2
Author: Matthew Yurkovich	**Firm:** Short Elliott Hendrickson, Inc.
Date Submitted: April 26, 2011	

Mitigation Options Available	**(1) Mitigation bank available?** (yes/no) No
	(2) Project impacts in 1°, 2° service area? Not Applicable (N/A)
	(3) HUC units: 11020002
	(4) On-site mitigation available? (yes/no) Yes
	(5) Off-site mitigation available? (yes/no) No
	(6) In-lieu fee arrangement available? (yes/no) No *In-lieu fee sponsor:*
	(7) Mitigation ratio(s) other than 1:1 involved? (yes/no) No *Ratio(s):*

		Impact Site	Mitigation Site
Site Characteristics	**(8) Geographic location**	Section 2, Township 24S, Range 67W, 6th PM	Section 2, Township 24S, Range 67W, 6th PM
	(9) Wetland Community Type, % of each type	Riverine, 100%	Riverine, 100%
	(10) Functions, values	Functions: GW-M, SS-M, SR-M, N-M, WH-M, Values: V-L	Functions: GW-M, SS-M, SR-M, N-M, WH-M, Values: V-L
	(11) Size of impacts, % of total area	Temporary: 1,565 square feet (0.0359 acres). Permanent: 1,150 square feet (0.0264 acres)	N/A
Wildlife/Habitat	**(12) T&E species/habitat present?**	No	No
	(13) Species? Status?	None	None
	(14) Migratory Bird Treaty Act?	Yes – surveys for nests will be performed prior to construction.	N/A
	(15) Other wildlife issues?	No	No
	(16) Status of aquatic resource?	None	None
	(17) Special aquatic site?	No	No
	(18) Unique? Quality? Ranking?	No	No
	(19) Watershed, ecosystem issues?	None	None
Other	**(20) Likelihood of success?**	N/A	High – adjacent to existing wetland
	(21) Interagency agreement?	No	No

a c		Impact Site	Mitigation Site
	(22) Project logistics, size/scope?	Temporary impacts are approximately 1,565 square feet (0.0359 acres). Permanent impacts are approximately 1,150 square feet (0.0264 acres)	Temporary impacts; wetlands protected in place and permanently impacted wetlands to be restored
	(23) Cost considerations?	None	None
	(24) Buffer used?	No	Willow sprigs will be planted

Water Issues	**(25) Individual 404 permit condition?**	NWP #3 authorization will be required	NWP #3 authorization will be required
	(26) 404 (b)(1) Guidelines?	All impacts mitigated at a 1:1 ration	All impacts mitigated at a 1:1 ratio
	(27) NWP gen. reg. conditions?	Yes. NWP 3: Maintenance. Temporary impacts will be mitigated by using the final regional conditions applicable to all nationwide permits in Colorado (removal of temporary fills)	Yes
	(28) Regulatory letters?	N/A	N/A
	(29) S.B. 40?	Yes, application process initiated	Yes, application process initiated
	(30) Water rights issues?	No	No
NEPA Issues	**(31) Cumulative impact issues?**	No	No
	(32) Agency policy, input?	None at this time	None at this time
	(33) Public involvement?	No	No

(34) Basis for Decision (Describe factors that are instrumental in the selection of the chosen mitigation decision.)
The project will follow the guidance of the Final Regional Conditions Applicable to All Nationwide Permits within Colorado regarding removal of temporary fills. When temporary fills are placed in wetlands in Colorado, a horizontal marker (i.e. fabric, certified weed-free straw, etc.) must be used to delineate the existing ground elevation of wetlands that will be temporarily filled during construction.

For temporary impacts associated with the detour during construction, the wetlands will be protected in place. This will be achieved by cutting the vegetation to ground level and installing a geotextile material and a 12” (~ 0.6 m) layer of straw covered by fill material. When the detour is removed, the straw acts as an indicator of where the existing ground level is and that caution should be applied to the removal of the remaining material. This will allow the existing wetland vegetation to reestablish itself within the following growing season.

For permanent impacts associated with the placement of rip rap at the abutments and the construction of the bridge pier, mitigation will involve salvaging the top 18 inches (~ 46 cm) of wetland soil and stockpiling it on site. Once construction of the abutments and the bridge pier is complete, the wetland soil will be put back to its original place. Willow sprigs cut from the adjacent shrubs will also be planted to ensure success of the re-establishment of vegetation. Willows density in the permanently impacted wetland is rather thin. A total of 50 willow sprigs will be planted in the fall once the willows have gone dormant. Planting will be done in accordance to CDOT’s Section 214 Planting Standard Specification. This bridge project will not change the existing ground profile; therefore the previous hydrology will remain intact for the restored wetland. Since this wetland is being restored on site and at a 1:1 ratio no water rights will be impacted.

A wetland biologist will be present during the construction and removal of the detour and during the removal and replacement of the wetland topsoil from the permanently impacted wetland. The wetland biologist will also monitor the project and provide guidance throughout the duration of the project. Once the project is accepted by CDOT, R2 environmental staff will be responsible to make sure the wetland restoration site meets standard success criteria established by the USACE, which include:

1) At least 80% foliar cover consisting of at least 50% dominant species consisting of those species that are facultative or wetter;
2) Willows sprigging shall have a survival rate of at least 85% which may include volunteer specimens; and
3) All Colorado List A noxious weeds shall be eradicated from the wetland and List B weeds hall consist of no more than 10% of the total cover in the mitigation area.

If the wetland mitigation site is not meeting these success criteria within 2 yrs, R2 Environmental CDOT staff will evaluate the site and take appropriate actions to ensure the mitigation site meets success criteria.

This decision was based on the benefit this wetland provides to the local area. The values and functions of this wetland will remain after construction.

(35) Decision

For temporary wetland impacts, the wetlands will be protected in place during construction. For permanent impacts, mitigation will involve salvaging the wetland topsoil and placing on top of rip rap and planting willow sprigs cut from adjacent shrubs.

(36) Contingency Plans

A wetland scientist will be present during the construction and removal of the detour and during the removal and replacement of the wetland topsoil from the permanently impacted wetland. The wetland scientist will also monitor the project and provide guidance throughout the duration of the project. Once the project is accepted by CDOT, R2 environmental staff will be responsible to make sure the wetland restoration site meets standard success criteria established by the USACE, which include:

1) At least 80% foliar cover consisting of at least 50% dominant species consisting of those species that are facultative or wetter;
2) Willows sprigging shall have a survival rate of at least 85% which may include volunteer specimens; and
3) All Colorado List A noxious weeds shall be eradicated from the wetland and List B weeds hall consist of no more than 10% of the total cover in the mitigation area.

The wetland mitigation will be monitored until it is successful based upon the above criteria. If the wetland mitigation site is not meeting these success criteria within 2 years, R2 Environmental CDOT staff will evaluate the site and take appropriate actions to ensure the mitigation site meets success criteria that may include additional plantings or additional excavation to improve wetland hydrology.