

U.S. 287 at Lamar: Wetlands and Waters of the U.S., and CDOT Wetland Finding

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1.0 Introduction and Project Description

This Technical Memorandum discusses issues related to wetlands that may arise from the construction and operation of the proposed U.S. 287 at Lamar project. This document describes existing conditions, identifies potential impacts, and proposes measures to avoid, minimize and mitigate potentially significant impacts to wetlands and waters of the U.S. This document also includes the Wetland Finding as required by the Colorado Department of Transportation (CDOT) *Project Development Manual*.

This document has been written in compliance with Executive Order 11990, "Protection of Wetlands," and is in accordance with Title 23 of the Code of Federal Regulations (CFR) Parts 771 and 777, and Federal Highway Administration (FHWA) Technical Advisory T6640.8A.

Issues related to noxious weeds, rare or sensitive plants and animals, and plant communities and wildlife are addressed in these separate Technical Memoranda:

- *U.S. 287 at Lamar: Noxious Weed Management Plan,*
- *U.S. 287 at Lamar: Threatened and Endangered Species,* and
- *U.S. 287 at Lamar: Plant Communities and Wildlife.*

1.1 Proposed Action

The proposed action will relocate U.S. 287 and U.S. 50 from Main Street to a new alignment approximately one mile east of Lamar, Colorado. The proposed action consists of new mainline, ultimately four lanes wide, three new interchanges, and provisions for two future local access points along the route. In addition, the new alignment includes a new crossing of the Arkansas River. The three interchange locations are at the southern terminus, the northern portion and east of Lamar at a point along the alignment where it crosses U.S. 50.

At the southern terminus, located just north of County Road CC, the proposed interchange is a grade separated trumpet configuration with Main Street, providing a free-flow movement into downtown Lamar. A 1.2-mile segment of existing U.S. 287 will be reconfigured to serve as a frontage road providing local access.

A local access point to serve the Prowers County Medical Center will be provided at Lake Road approximately three miles north of the southern interchange. (The proposed action includes constructing an at-grade intersection, with connecting roads to be built by others in

the future.) A grade separated crossing (no access) is proposed over existing Parmenter Street. An extension of Parmenter Street to the east will be constructed to provide access back to U.S. 50.

The east interchange with U.S. 50 consists of a grade separated wide diamond with future directional loop ramps to be added when traffic volumes warrant. The mainline will cross the UPRR and County Road HH.50 at a grade-separated crossing (no access) just north of the existing U.S. 50. To facilitate this interchange configuration a 1.8-mile segment of U.S. 50 will be realigned about 1,000 feet south of its present location.

A second local access point to U.S. 287 will be provided approximately one mile north of the U.S. 50 interchange. This connection will allow the City and/or County to construct an extension of existing Crystal Street east to connect with relocated U.S. 287/U.S. 50. (The proposed action includes constructing an at-grade intersection, with connecting roads to be built by others in the future.)

The mainline will cross the Arkansas River approximately 1.4 miles downstream of the existing U.S. 287/U.S. 50 bridge. The proposed bridge is a 1,400-foot-long multi-span structure to provide adequate flood capacity and wildlife movement along the riparian corridor. A grade separated crossing (no access) is proposed over existing SH 196 just north of the new Arkansas River bridge.

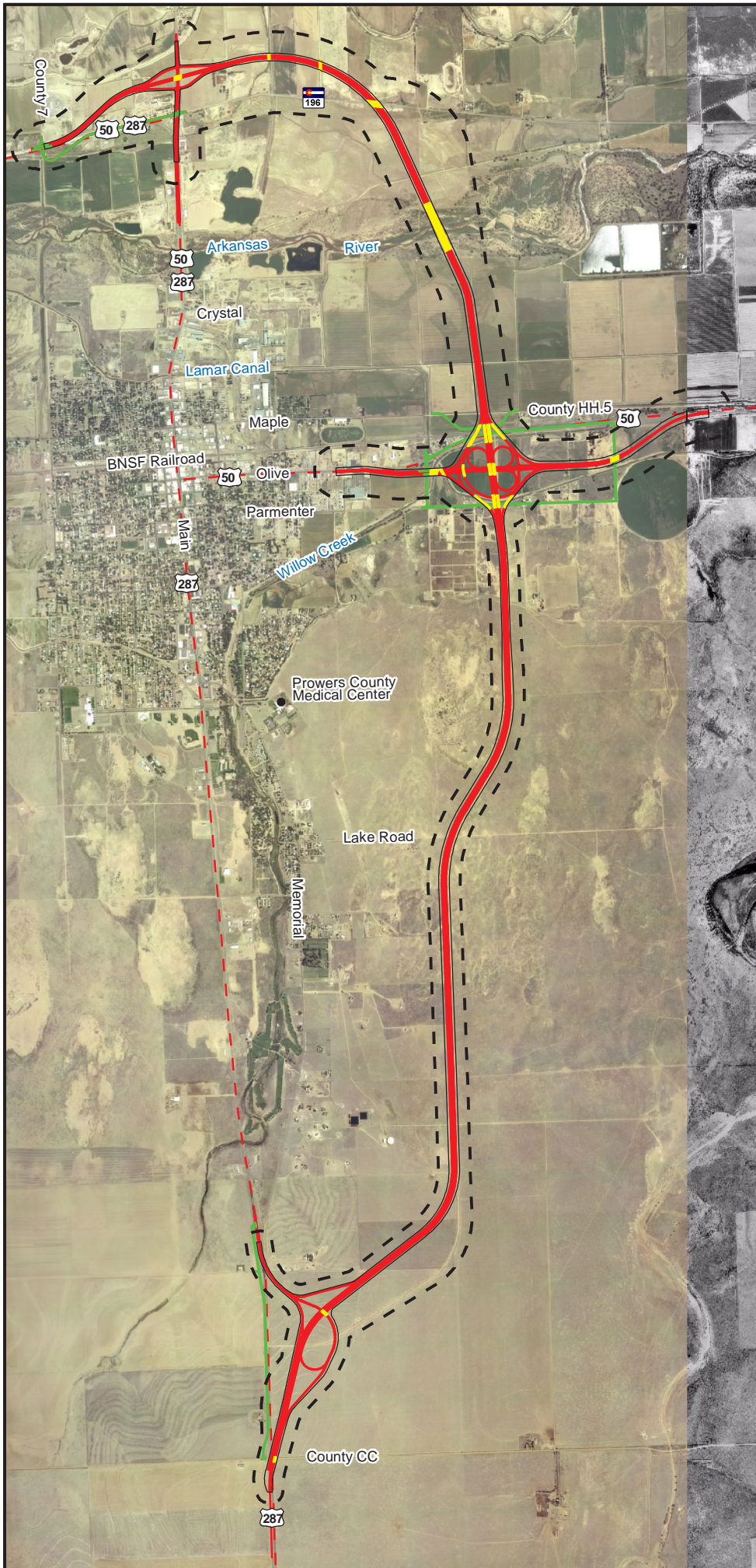
Along the northern portion of the alignment, a grade separated diamond interchange is proposed with SH 196. The realignment of U.S. 287 will reconnect with the existing highway at County Road 7 just west of the Port of Entry station. The existing east/west portion of U.S. 287/U.S. 50 south of the realignment will be reconfigured to serve as a frontage road to maintain access to existing businesses along U.S. 287/U.S. 50. This new frontage road will be extended west approximately 600 feet and connect to County Road 7 with an improved at-grade intersection.

The existing high-speed curve of U.S. 287/U.S. 50, known locally as the “KLMR curve” for the radio station near the west tangent of the curve, will be removed. The existing U.S. 287/U.S. 50 route north of the Arkansas River bridge will be designated as Main Street, and will consist of a four-lane section north to the proposed interchange at SH 196.

The “study area” in which environmental resources were evaluated is 600 feet wide south of U.S. 50 and 1,200 feet wide north of U.S. 50. The “project footprint” or “preferred alignment” comprises a 300-foot-wide right-of-way, including the features described above, and is illustrated in Figure 1.

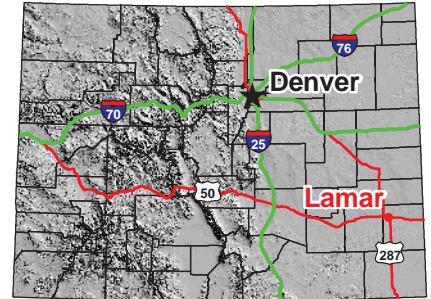
2.0 Methodology

Waters of the U.S. including wetlands (jurisdictional waters) were identified in the study area in accordance with the requirements of Section 404 Clean Water Act (CWA). Additionally, nonjurisdictional wetlands were identified for compliance with the CDOT *Project Development Manual*.



Legend

- Study Area
- Proposed Project Footprint
- Frontage Roads
- Bridges
- Existing US 50 and 287



Location Map



Sources:

CH2MHILL
 Kirkham-Michael
 Color Aerials 2002
 BW Aerials 1988

Projection:

Colorado State Plane Grid
 South Zone, NAD83

Figure 1
Proposed Action

US 287 at Lamar

Wetlands in the study area were identified and boundaries delineated using the methodology defined in the U.S. Army Corps of Engineers (USACE) Routine Determination procedure set forth in *U.S. Army Corps of Engineers Wetlands Delineation Manual* (USACE 1987). Wetland boundaries were defined based on vegetation, soil, and hydrologic indicators that under normal conditions would indicate wetland conditions.

Prior to field surveys, study area boundaries and potential wetland areas were mapped on the U.S. Geological Survey quadrangle map (Lamar East 1974) and recent aerial photographs using Geographic Information System (GIS) technology. National Wetlands Inventory (NWI) maps and the Prowers County Soil Survey (U.S. Department of Agriculture, 1966) were also reviewed.

Field surveys were conducted in August and September 2002, and April 2003. Jurisdictional status and flagged delineation boundaries were confirmed in the field by USACE and CDOT representatives. Field survey data of wetland boundaries were converted to GIS coverages and plotted on aerial photographs of the study area.

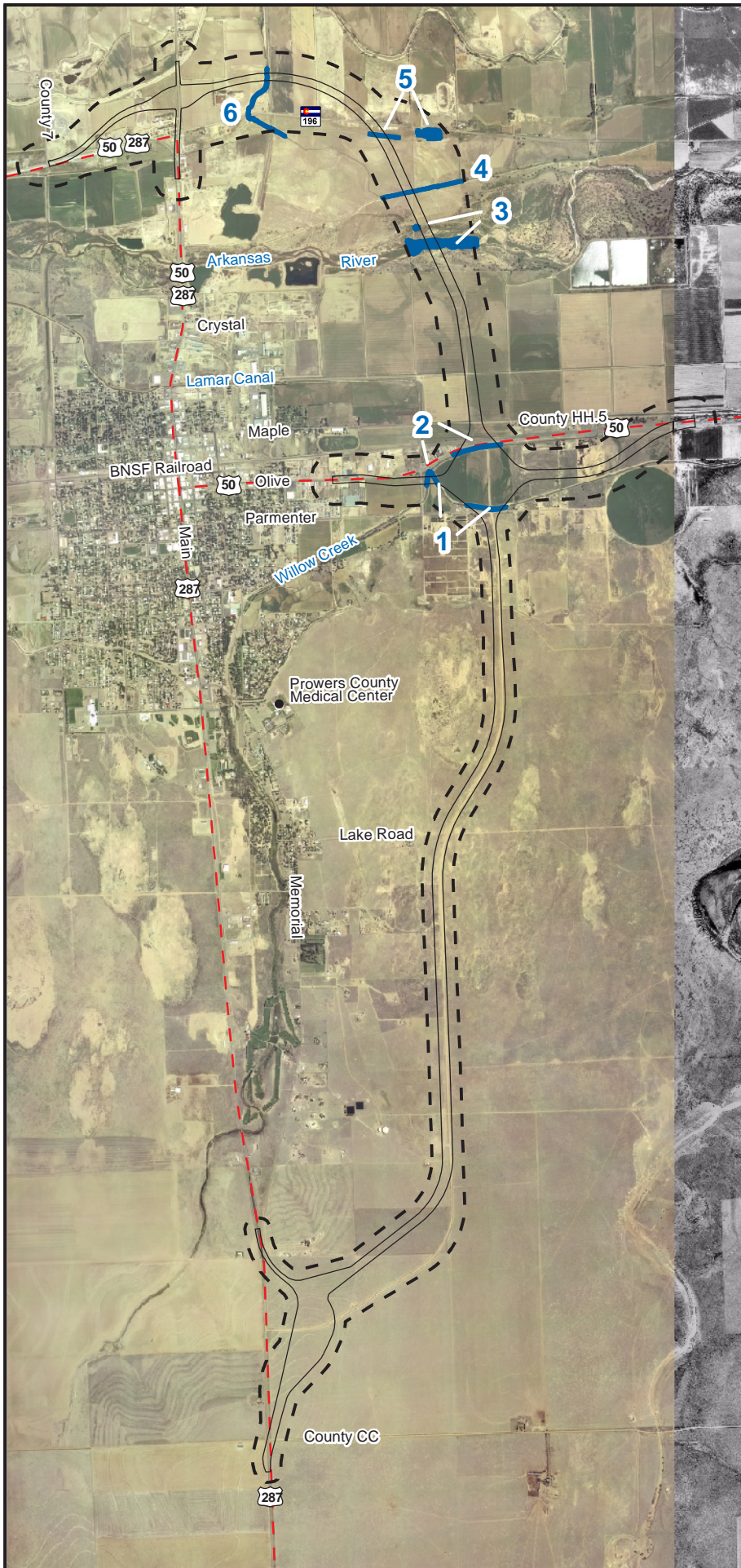
3.0 Affected Environment

Six surface waters including wetlands were identified in the study area as shown in Figures 2 and 3. Summary wetland descriptions including jurisdictional status and NWI classification are provided in Table 1. Based on review of existing data and field conditions, and in consultation with USACE and CDOT during an onsite meeting in September 2002, three waters – Willow Creek (WL-2), Arkansas River (WL-3), and Markham Arroyo (WL-6) – are jurisdictional under Section 404 CWA and CDOT requirements. Project activities conducted in these jurisdictional areas are subject to Section 404 CWA regulations and permitting requirements as administered by the USACE.

The three remaining wetlands – Lamar Canal (WL-1), Hyde Canal (WL-4), and Vista del Rio ditch (WL-5) – are nonjurisdictional and subject only to CDOT requirements.

Complete wetland descriptions recorded on field datasheets indicating vegetation, soil, and hydrologic conditions are provided in Attachment A. Photographs of wetlands in the study area are provided in Attachment B.

Four of the wetlands crossed by the project (Lamar Canal, Willow Creek, Hyde Canal, and Vista del Rio Ditch) are relatively low-quality systems highly disturbed and impacted by urban and/or agricultural activities. These wetland systems, characterized by channelized and maintained streambeds, distribute agricultural irrigation water. The Arkansas River and the Markham Arroyo in the study area are characterized as higher quality, more natural systems. However, the riparian areas adjacent to the Arkansas River have been invaded by thick stands of tamarisk, a phreatophyte that is replacing native vegetation.



Legend

- Identified Wetlands
- Study Area
- Proposed Project Footprint
- Existing US 50 and 287

No.	Name	Acres*
1	Lamar Canal	0.79
2	Willow Creek	0.96
3	Arkansas River	1.46
4	Hyde Canal	0.08
5	Vista del Rio Ditch	0.15
6	Markham Arroyo	0.10

*Acres within project footprint.



Sources:

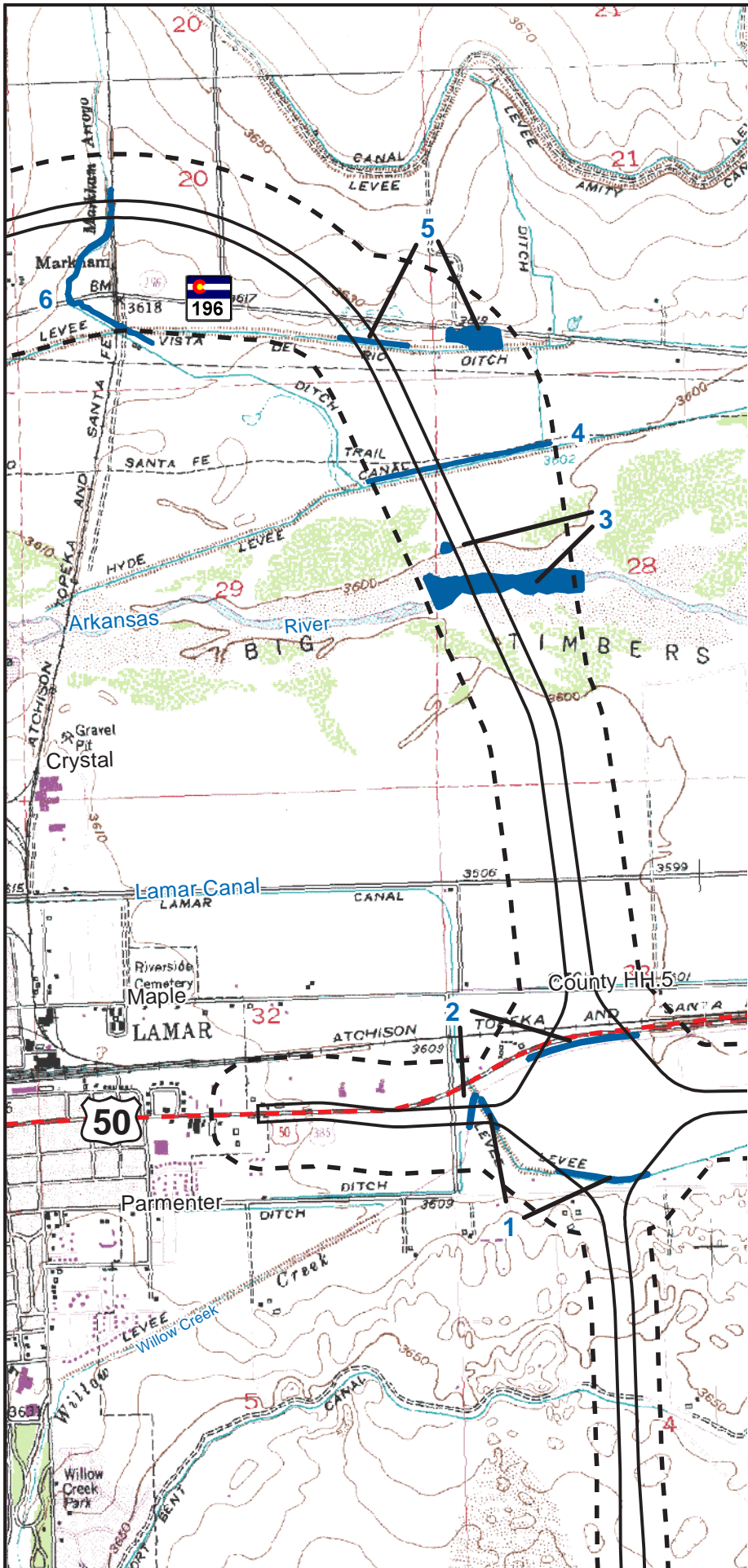
CH2MHILL
 Kirkham-Michael
 Color Aerials 2002
 BW Aerials 1988

Projection:

Colorado State Plane Grid
 South Zone, NAD83

Figure 2
Identified Wetlands

US 287 at Lamar



Legend

- Identified Wetlands
- Study Area
- Proposed Project Footprint
- Existing US 50 and 287

No.	Name	Acres*
1	Lamar Canal	0.79
2	Willow Creek	0.96
3	Arkansas River	1.46
4	Hyde Canal	0.08
5	Vista del Rio Ditch	0.15
6	Markham Arroyo	0.10

*Acres within project footprint.



Sources:
 CH2MHILL
 Kirkham-Michael
 USGS 24K Quad

Projection:
 Colorado State Plane Grid
 South Zone, NAD83

Figure 3
Identified Wetlands

US 287 at Lamar

3.1 Jurisdictional Wetlands

Willow Creek (WL-2) is characterized by narrow fringe wetlands adjacent to the perennial creek. Willow Creek in the study area is highly disturbed, with a channelized streambed and steep, high banks adjacent to U.S. 50. Streambanks are lined with concrete riprap in some areas. Water quality is poor, likely due to upstream urban and agricultural discharges. Wetland vegetation is varied, but dominated by spikerush (*Eleocharis macrostachya*) and reed canarygrass (*Phalaris arundinacea*). Invasive, weedy vegetation dominated by kochia (*Kochia scoparia*) and Russian thistle (*Salsola collina*) exists in the upland transitional area. Adjacent land uses to Willow Creek in the study area are urban and agricultural, including roads and cropland.

The most important jurisdictional wetlands in the study area are the riparian wetlands adjacent to the north and south banks of the Arkansas River (WL-3). Located on high banks in the floodplain above a winding, wide riverbed, these wetlands are characterized by dense stands of willow (*Salix exigua*) and tamarisk (*Tamarisk ramosissima*). The NWI classifies the river and adjacent wetlands as riverine, lower perennial, open water, intermittently exposed permanents. Additionally, some wetland areas adjacent to the river are classified by NWI as palustrine, scrub-shrub or forested, intermittently flooded temporary.

At the time of the survey, which was conducted during a significant drought, the tops of the riverbanks were 10 to 15 feet above the river bottom. Portions of the jurisdictional line were identified based on vegetation as the ordinary high-water mark on the riverbank. Soils were characterized as loamy sand, with soils in the wetland areas being characterized as having higher organic content. Hydrology varies seasonally based on river flood stages. Drought conditions appeared to have affected water-table levels and growth of herbaceous vegetation species. River flows were low, and large sandbars were exposed in the riverbed.

The riparian wetlands adjacent to the Arkansas River in the study area were generally undisturbed, with the exception of cattle grazing in a small area of the northeast portion of wetlands. Tamarisk, a phreatophyte and an invasive noxious weed species, is intermixed with the willows adjacent to the river. Tamarisk becomes the dominant species upland of the wetland transitional line. Several large cottonwoods (*Populus deltoides*) were also observed upland of the wetland transitional line. Land use adjacent to the river in the study area is characterized as rangeland and pasture north of the river, and irrigated agriculture south of the river.

The Markham Arroyo (WL-6) in the study area is characterized by narrow fringe wetlands adjacent to a winding channel. Wetland vegetation is dominated by watercress (*Nasturium officinale*) and rushes (*Juncus balticus*). Observed water appears relatively clear, and the ditch supports minnow populations, submerged aquatic plants, and waterfowl. Adjacent land uses in the study area are irrigated cropland on the north side and a dirt road/former railroad right-of-way on the south side.

3.2 Nonjurisdictional Wetlands

Nonjurisdictional wetlands to be evaluated for CDOT regulatory compliance consist of three agricultural irrigation ditches (Lamar Canal, Hyde Canal, and Vista del Rio Ditch). Representatives of the USACE confirmed lack of jurisdictional status during the field meeting. The Lamar Canal (WL-1) is characterized as highly disturbed, with a channelized

streambed, steep, high banks covered with concrete rip-rap, a narrow-fringe wetland, and invasive weedy vegetation in the upland transitional area. The Hyde Canal (WL-4) is a channelized streambed with heavily eroded banks from intense cattle use. Water quality in both these canals appeared to be poor. The Vista del Rio Ditch (WL-5) is an intermittent shallow ditch that did not have surface flow during the site reconnaissance, though wetland vegetation and soils were observed in portions of the intermittent channel in the study area.

4.0 Potential Impacts and Mitigations

The proposed action is the preferred alternative that was selected from among several alignments based on numerous criteria, including minimizing potential wetlands and threatened and endangered species.

The proposed action will impact a maximum area of 3.64 acres of wetlands, consisting of 2.57 acres of jurisdictional and 1.07 acres of nonjurisdictional wetlands, as shown in Table 1. Impacts will occur where the proposed highway crosses water features on culverts or structures. This is a conservative estimate because it reflects the entire area of intersection between the project footprint and water features, when actual permanent impacts will be limited to the footprint of bridge abutments and piers, and temporary impacts will be limited to construction disturbance areas. The permanent impact to wetlands and waters of the U.S. is expected to be considerably less than 3.64 acres, particularly at the crossing of the Arkansas River. This will be confirmed during final design when bridges and culverts are designed and the 404 permit is submitted to the USACE.

Impacts to wetlands and waters that cannot be avoided will be compensated with mitigation measures approved by USACE and CDOT. Detailed mitigation design plans will be developed during final design with the agencies.

Under current regulations of CWA Section 404, impacts of 3.64 acres would be eligible for Nationwide Permit 14 (Linear Transportation Projects). Permitting requirements under then existing Section 404 CWA, as administered by the USACE, will be determined during final design before the permit application is prepared.

4.1 Best Management Practices

Implementing and monitoring compliance with several best management practices (BMPs) can avoid and reduce potential impacts to wetlands in the study area. The BMPs listed below apply to construction activities and potential permanent impacts.

- Clearly identify the perimeter of construction activity to avoid disturbing wetlands and waters of the U.S. and ensure boundary markings remain clearly visible for the duration of construction activity.
- Clearly mark and fence wetlands outside the perimeter of construction activity areas to prevent disturbance during construction.
- Remove excavated materials to a stable upland site to prevent erosion back into wetland areas.

TABLE 1
Wetlands and Waters of the U.S. in the Study Area

Existing Waters and Wetland Acreage in Study Area				Jurisdiction	
Wetland Number/ Name	Maximum Wetland Area Affected by Project (acres)	NWI Classification ¹	Dominant Wetland Vegetation	USACE	CDOT
1 – Lamar Canal	0.79	R4SBKC	<i>Typha latifolia/augustifolia</i> <i>Polypogon monspeliensis</i>	No	Yes
2 – Willow Creek	0.96	R4SBKC	<i>Eleocharis macrostachya</i> <i>Phalaroides arundinaceus</i>	Yes	Yes
3 – Arkansas River	1.46	R20WZ	<i>Salix exigua</i> <i>Tamarisk ramosissima</i>	Yes	Yes
4 – Hyde Canal	0.08	R4SBKC	<i>Juncus balticus</i> <i>Polypogon monspeliensis</i>	No	Yes
5 – Vista del Rio Ditch	0.15	R4SBKC	<i>Juncus balticus</i> <i>Typha latifolia/augustifolia</i>	No	Yes
6 – Markham Arroyo	0.10	PEMC	<i>Nasturium officinale</i> <i>Juncus balticus</i> <i>Typha latifolia/augustifolia</i>	Yes	Yes
Total:	3.64				

FOOTNOTES

¹NWI classification codes

R	=	Riverine
2	=	Lower Perennial
4	=	Intermittent
SB	=	Streambed
K	=	Artificial
C	=	Seasonal
OW	=	Open Water
Z	=	Intermittently
P	=	Palustrine
EM	=	Emergent

- Implement erosion control and bank stabilization measures during construction, and maintain the systems for a designated period after construction is complete.
- Locate hazardous materials used in construction, including fuels, oils, and solvents, away from wetlands and riparian areas to minimize the potential for spills or leaching into aquatic habitats.
- Conduct compliance inspections periodically during construction to ensure BMPs are followed.

4.2 Mitigation Measures

In addition to implementing BMPs the actions listed below can be implemented to avoid, reduce and mitigate impacts to wetlands in the study area. The items listed below apply to construction activities and potential permanent impacts.

- Design bridge abutment and pier supports near wetlands and waters of the U.S. to the minimum safe size for the facility and site conditions.
- Design stormwater management systems to treat runoff and create wetlands before entering surface waters or wetlands.
- Minimize riprap placed in the Arkansas River and irrigation canals to reduce bank disturbance and preserve natural conditions.
- Enhance **acres of riparian habitat near the Arkansas River crossing by permanently removing tamarisk. Controlling tamarisk will improve wetland conditions and reduce water use.
- Restore impacted areas with natural landscaping and native plantings. Native species and wildflowers will be used in revegetation to enhance and restore disturbed areas. Roadsides will be replanted in accordance with the 23 Code of Federal Regulations 752 and *CDOT Environmental Procedures Manual*, using a site-specific revegetation plan that will be developed during final design.
- Obtain concurrence or appropriate permit(s) from USACE during final design. The project, given preliminary design and current Section 404 regulations, would be eligible for a Nationwide Permit 14.

4.3 Cumulative Impacts

Cumulative impacts are impacts to the environment which results from the incremental impact of the proposed action when added to other past, present, and reasonable foreseeable future actions regardless of who undertakes those actions.

Past actions that have affected wetlands include introduction of farming and ranching activities that have converted historic wetlands to crop and range lands. Irrigated agriculture has increased water features in the semiarid study area, creating new wetlands, though these features are located in and along canals and ditches used only seasonally, and irrigation can adversely affect water quality with higher sedimentary and chemical loads. Development of agricultural and municipal reservoirs in other locations in Prowers County has created wetlands outside the study area.

Construction of the existing U.S. 287/U.S. 50 likely impacted wetlands along the Arkansas River, Willow Creek, and other water features. Development of the gravel pits along the Arkansas River at the current U.S. 287/U.S. 50 bridge destroyed wetlands that may have been located along the riparian corridor.

If land use is not controlled by local governments, the proposed action could result in increased disturbance from commercial development along the new highway alignment, particularly near access points such as the interchanges and frontage roads. Such projects also could adversely affect wetlands, particularly nonjurisdictional wetlands outside the

management of the USACE. Proper planning for development of the area could identify wetlands to ensure avoidance in future land use decisions.

5.0 References

- U.S. Army Corps of Engineers (USACE). (1987.) *U.S. Army Corps of Engineers Wetland Delineation Manual*. USACE Waterways Experiment Station, Vicksburg, MS.
- U.S. Department of Agriculture. (1966.) *Soil Survey of Prowers County, Colorado*. Soil Conservation Service.
- U.S. Fish and Wildlife Service. (1988.) *National List of Plant Species that Occur in Wetlands: Colorado*. National Wetlands Inventory.
- U.S. Fish and Wildlife Service. (1979.) *National Wetlands Inventory Map, Lamar East, 1975*.
- U.S. Geological Survey. (1979.) *Lamar East Quadrangle*.

ATTACHMENT A
Field Data Forms

DATA FORM

**ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)**

Project/Site	US 287 at Lamar/Lamar Canal	Date	8/6/02
Contract / Owner		County	Prowers
Investigator	J. Gourlie/J. Duwaldt/CH2M HILL	State	CO
Do Normal Circumstances exist on the site?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Community ID	WL - 1
Is the site significantly disturbed (Atypical Situation)?	YES <input checked="" type="checkbox"/> NO	Transect ID	
Is the area a potential Problem Area? (If needed, explain on reverse)	YES <input checked="" type="checkbox"/> NO	Plot ID	

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 Distichlis spicata	F	NI	9		
2 Polypogon mono	F	O	10		
3 Typha augustifolia	E	O	11		
4 Tamarisk r.	T	FACW	12		
5			13		
6			14		
7			15		
8			16		

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 70 %

Remarks

Channelized canal; narrow fringe wetland; steep banks, riprap, poor water quality

HYDROLOGY

<input checked="" type="checkbox"/> Recorded Data (Describe in Remarks) USGS Quad <input type="checkbox"/> Stream, Lake, or Tide Gauge <input checked="" type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available		WETLAND HYDROLOGY INDICATORS	
FIELD OBSERVATIONS		Primary Indicators: <input type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <input checked="" type="checkbox"/> Water Marks <input checked="" type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands	
Depth of Surface Water	6 (in)	Secondary Indicators (2 or more Required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input checked="" type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)	
Depth to Free Water in Pit	NA(in)		
Depth to Saturated Soil	4 (in)		

DATA FORM

**ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)**

Project/Site	US 287 at Lamar/Willow Creek	Date	8/6/02
Contract / Owner		County	Prowers
Investigator	J. Gourlie/J. Duwaldt/CH2M HILL	State	CO
Do Normal Circumstances exist on the site?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Community ID	WL - 2
Is the site significantly disturbed (Atypical Situation)?	YES <input checked="" type="checkbox"/> NO	Transect ID	
Is the area a potential Problem Area? (If needed, explain on reverse)	YES <input checked="" type="checkbox"/> NO	Plot ID	

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 Eleocharis macro.	F	O	9		
2 Polypogon mono	F	O	10		
3 Typha augustifolia	E	O	11		
4 Salix exigua	T	O	12		
5 Nasturtium officinales	A	O	13		
6			14		
7			15		
8			16		

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 80 %

Remarks

Channelized creek; narrow fringe wetland; steep banks, riprap, poor water quality

HYDROLOGY

<input checked="" type="checkbox"/> Recorded Data (Describe in Remarks) USGS Quad <input type="checkbox"/> Stream, Lake, or Tide Gauge <input checked="" type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available		WETLAND HYDROLOGY INDICATORS	
FIELD OBSERVATIONS		Primary Indicators: <input checked="" type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <input checked="" type="checkbox"/> Water Marks <input checked="" type="checkbox"/> Drift Lines <input type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands	
Depth of Surface Water	6 (in)	Secondary Indicators (2 or more Required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input checked="" type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)	
Depth to Free Water in Pit	NA(in)		
Depth to Saturated Soil	4 (in)		

DATA FORM

ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site	US 287 at Lamar/Arkansas River	Date	8/6/02
Client / Owner		County	Prowers
Investigator	J. Gourlie/J. Duwaldt/CH2M HILL	State	CO
Do Normal Circumstances exist on the site? (Drought conditions)	YES NO	Community ID	WL - 3
Is the site significantly disturbed (Atypical Situation)?	YES <input checked="" type="checkbox"/> NO	Transect ID	
Is the area a potential Problem Area? (If needed, explain on reverse)	YES <input checked="" type="checkbox"/> NO	Plot ID	

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 Salix exigua	T	O	9		
2 Tamarisk ramj	T	FACW	10		
3			11		
4			12		
5			13		
6			14		
7			15		
8			16		

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 90 %

Remarks

Dense stands of willow and tamarix; tamarix becoming more dominant on wetland transitional edge; minimal herbaceous cover due to drought conditions

HYDROLOGY

<p><input checked="" type="checkbox"/> Recorded Data (Describe in Remarks) USGS Quad</p> <p><input type="checkbox"/> Stream, Lake, or Tide Gauge</p> <p><input checked="" type="checkbox"/> Aerial Photographs</p> <p><input type="checkbox"/> Other</p> <p><input type="checkbox"/> No Recorded Data Available</p>	<p align="center">WETLAND HYDROLOGY INDICATORS</p> <p>Primary Indicators:</p> <p><input type="checkbox"/> Inundated</p> <p><input type="checkbox"/> Saturated in Upper 12 Inches</p> <p><input checked="" type="checkbox"/> Water Marks</p> <p><input checked="" type="checkbox"/> Drift Lines</p> <p><input checked="" type="checkbox"/> Sediment Deposits</p> <p><input checked="" type="checkbox"/> Drainage Patterns in Wetlands</p>
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FIELD OBSERVATIONS	
Depth of Surface Water	NA – drought conditions(in)
Depth to Free Water in Pit	NA(in)
Depth to Saturated Soil	NA(in)

Secondary Indicators (2 or more Required):

- Oxidized Root Channels in Upper 12 Inches
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

DATA FORM

**ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)**

Project/Site	US 287 at Lamar/Hyde Canal	Date	8/6/02
Applicant / Owner		County	Prowers
Investigator	J. Gourlie/J. Duwaldt/CH2M HILL	State	CO
Do Normal Circumstances exist on the site?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Community ID	WL - 4
Is the site significantly disturbed (Atypical Situation)?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	Transect ID	
Is the area a potential Problem Area? (If needed, explain on reverse)	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	Plot ID	

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 Juncus articus	F	FACW	9		
2 Typha augustifolia	F	O	10		
3 Distichlis spicata	F	NI	11		
4			12		
5			13		
6			14		
7			15		
8			16		

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 90 %

Remarks Drainage ditch in pasture that has been grazed by cattle

HYDROLOGY

<input checked="" type="checkbox"/> Recorded Data (Describe in Remarks) USGS Quad <input type="checkbox"/> Stream, Lake, or Tide Gauge <input checked="" type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available		WETLAND HYDROLOGY INDICATORS Primary Indicators: <input checked="" type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <input checked="" type="checkbox"/> Water Marks <input checked="" type="checkbox"/> Drift Lines <input checked="" type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more Required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input checked="" type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)	
FIELD OBSERVATIONS			
Depth of Surface Water		6 (in)	
Depth to Free Water in Pit		8 (in)	
Depth to Saturated Soil		4 (in)	

DATA FORM

**ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)**

Project/Site	US 287 at Lamar/Vista del Rio Ditch	Date	8/6/02
Contract / Owner		County	Prowers
Investigator	J. Gourlie/J. Duwaldt/CH2M HILL	State	CO
Do Normal Circumstances exist on the site?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Community ID	WL - 5
Is the site significantly disturbed (Atypical Situation)?	YES <input checked="" type="checkbox"/> NO	Transect ID	
Is the area a potential Problem Area? (If needed, explain on reverse)	YES <input checked="" type="checkbox"/> NO	Plot ID	

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 Juncus articus	F	FACW	9		
2 Typha augustifolia	F	O	10		
3 Distichlis spicata	F	NI	11		
4			12		
5			13		
6			14		
7			15		
8			16		

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 90 %

Remarks Drainage ditch in pasture that has been grazed by cattle

HYDROLOGY

<input checked="" type="checkbox"/> Recorded Data (Describe in Remarks) USGS Quad <input type="checkbox"/> Stream, Lake, or Tide Gauge <input checked="" type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available		WETLAND HYDROLOGY INDICATORS	
FIELD OBSERVATIONS		Primary Indicators: <input type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <input checked="" type="checkbox"/> Water Marks <input checked="" type="checkbox"/> Drift Lines <input checked="" type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands	
Depth of Surface Water	NA(in)	Secondary Indicators (2 or more Required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input checked="" type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)	
Depth to Free Water in Pit	10 (in)		
Depth to Saturated Soil	4 (in)		

**ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)**

Project/Site	US 287 at Lamar/Markham Arroyo Ditch	Date	8/6/02
Applicant / Owner		County	Prowers
Investigator	J. Gourlie/J. Duwaldt/CH2M HILL	State	CO
Do Normal Circumstances exist on the site?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Community ID	WL - 6
Is the site significantly disturbed (Atypical Situation)?	YES <input checked="" type="checkbox"/> NO	Transect ID	
Is the area a potential Problem Area? (If needed, explain on reverse)	YES <input checked="" type="checkbox"/> NO	Plot ID	

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1 Juncus articus	F	FACW	9		
2 Scirpus	F	O	10		
3 Polypogon	E	O	11		
4 Nasturtium officinalis	E	O	12		
5			13		
6			14		
7			15		
8			16		

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 80 %

Remarks Relatively natural creek channel with clear water, minnows and waterfowl

HYDROLOGY

<input checked="" type="checkbox"/> Recorded Data (Describe in Remarks) USGS Quad <input type="checkbox"/> Stream, Lake, or Tide Gauge <input checked="" type="checkbox"/> Aerial Photographs <input type="checkbox"/> Other <input type="checkbox"/> No Recorded Data Available		WETLAND HYDROLOGY INDICATORS Primary Indicators: <input checked="" type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 Inches <input checked="" type="checkbox"/> Water Marks <input checked="" type="checkbox"/> Drift Lines <input checked="" type="checkbox"/> Sediment Deposits <input type="checkbox"/> Drainage Patterns in Wetlands	
FIELD OBSERVATIONS			
Depth of Surface Water		8 (in)	Secondary Indicators (2 or more Required): <input type="checkbox"/> Oxidized Root Channels in Upper 12 Inches <input checked="" type="checkbox"/> Water-Stained Leaves <input type="checkbox"/> Local Soil Survey Data <input type="checkbox"/> FAC-Neutral Test <input type="checkbox"/> Other (Explain in Remarks)
Depth to Free Water in Pit		6 (in)	
Depth to Saturated Soil		4 (in)	

ATTACHMENT B
Photographs

ATTACHMENT B

Photographs



WILLOW CREEK, VIEWED TOWARD EAST FROM SOUTH BANK



MARKHAM ARROYO, VIEWED FROM BANK



LAMAR CANAL, VIEWED FROM NORTH BANK TOWARD EAST



ARKANSAS RIVER IN STUDY AREA



MARKHAM ARROYO IN STUDY AREA