# Twin Tunnels Environmental Assessment Study Area Wetland Delineation Report



Prepared by:



June 2012

# 1.0 Introduction

# 1.1 Purpose of this Report

The purpose of this report is to document the wetlands and other waters of the U.S. present in the Twin Tunnels Environmental Assessment Study Area. The wetland delineation was completed for the proposed Colorado Department of Transportation (CDOT) roadway improvements for the eastbound lanes of I-70 between Milepost (MP) 241 and MP 244 located in Clear Creek County, Colorado. This report can also be used as support for US Army Corps of Engineers (USACE) Section 404 permitting.

# 1.2 Study Area Description

The study area is I-70 between MP 241 and MP 244. The study area is found on the Squaw Pass US Geological Survey 7.5-minute quadrangle and has the following coordinates (datum is NAD 83):

- Township 35, Range 72W, Section 32
- Latitude, Longitude: 39 44 37.24 N, 105 28 24.27 W

The study area is located along Clear Creek which is a large tributary of the South Platte River. The elevation of the study area is approximately 7,400 feet above mean sea level. All of the study area wetlands are located in the Clear Creek floodplain riparian vegetation community.

# 2.0 Wetland Delineation Methods

Robert Belford and Francesca Tordonato surveyed the entire study area on October 13<sup>th</sup> and 20<sup>th</sup>, 2011 to identify wetlands and other waters of the U.S. Wetlands were delineated using the procedures outlined in the 1987 Corps of Engineers Wetland Delineation Manual and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (USACE 2011). The detailed wetland delineation included collection of vegetation, soil, and hydrology data. All the data was recorded on USACE Western Mountain, Valleys, and Coast Region Data Forms.

The Region 8/Intermountain National List of Plant Species that Occurs in Wetlands (Reed 1988) was used to determine the wetland indicator status for each dominant plant species in the wetlands. If at least 50 percent of the plant species had an indicator status of facultative, facultative wet, or obligate the potential wetland area meets the USACE criteria for wetland vegetation.

Soils were examined at each sampling point to identify the presence of hydric soil indicators. At each soil data point, a soil probe was inserted to a depth of 12-14 inches to observe the soil profile.

In addition to recording plant species and identifying soil characteristics, wetland sites were assessed for sources of hydrology. The study area wetland sites all had saturated soils primarily from seasonal inundation.

All wetland boundaries were mapped using a Trimble GeoXH hand-held Global Position System that records positions to sub-meter accuracy.

#### 3.0 Wetlands

The study area contains seven wetland areas that encompass a total of approximately 0.88 acre. All of these wetlands are associated with Clear Creek and were located on the banks of the stream. Using the standard wetland classification system (Cowardin et al. 1979) all seven wetland areas are classified as palustrine emergent and palustrine scrub/shrub combination (PEM/PSS). These wetland areas are primarily composed of equal parts PEM and PSS. Figure 1 and 2 shows the location of the seven wetland areas. Wetland data sheets are located in Appendix A. Representative wetland photographs are located in Appendix B.

# Study Area Wetlands

#### Wetland Area 1

Wetland area 1 is located along the north bank of Clear Creek. This wetland area is 0.02 acre. Dominant vegetation and hydric soil characteristics are provided below.

## **Dominant Vegetation:**

Coyote willow (Salix exigua) – OBL Thin-leaf alder (Alnus incana tenuifolia) – FACW Mountain rush (Juncus balticus) – OBL Redtop (Agrostis alba) – FACW Sedge species unidentified (Carex sp.) - OBL

### Soils:

Generally consists of silty sandy soils with a depleted matrix.

# Hydrology:

Hydrology is provided from Clear Creek. Soils were saturated at the surface and water table was present at six inches.

# Wetland Area 2a

Wetland area 2a is a streamside bench along Clear Creek. This wetland area is 0.03 acre. Dominant vegetation and hydric soil characteristics are provided below.

#### **Dominant Vegetation:**

Thin-leaf alder – FACW
Coyote willow– OBL
Willow species unidentified (Salix sp.) - OBL
Redtop- FACW
Bluejoint (Calamagrostis Canadensis) - FACW

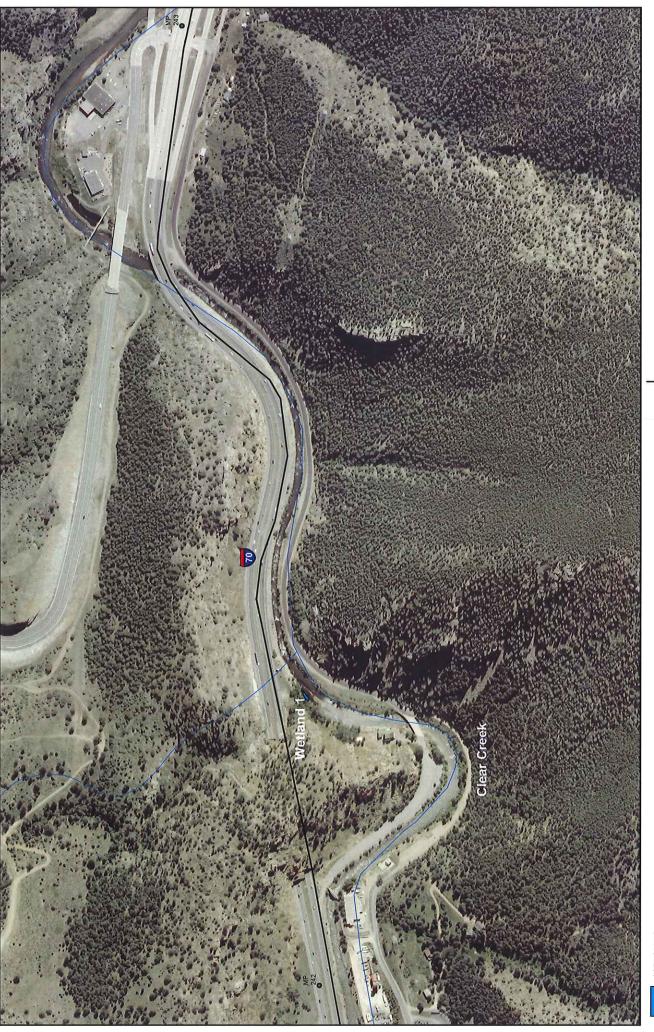
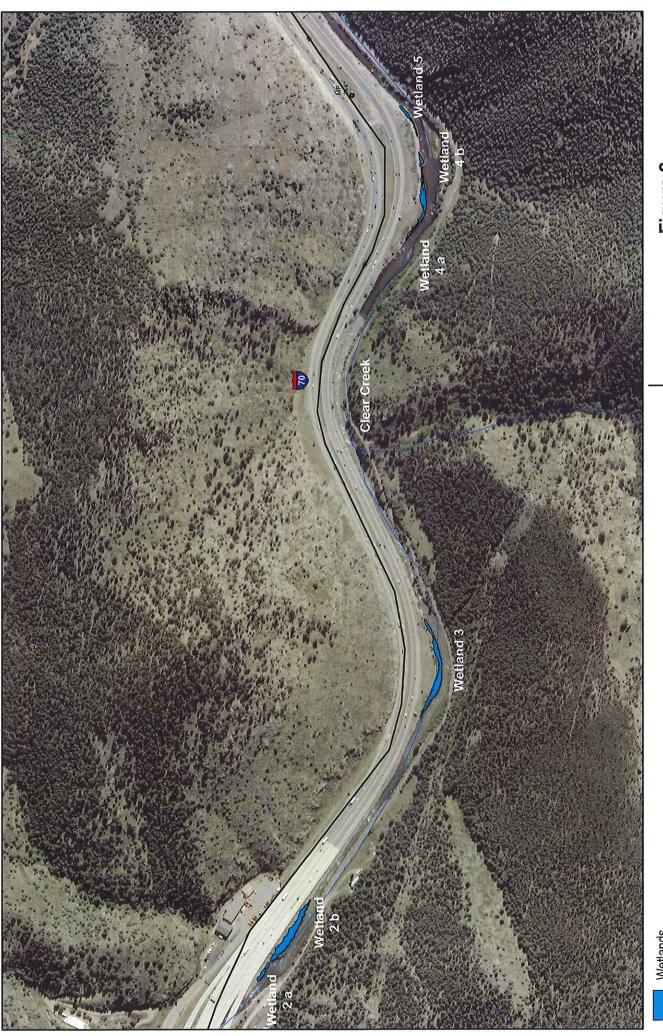


Figure 1 Wetland Locations



1:6,000



# Figure 2 Wetland Locations



1:6,000

Wetlands

#### Soils:

Generally consist of fine sand with distinct redox features.

# Hydrology:

Soils are likely saturated during higher flow events on Clear Creek. Drift lines and sediment deposits were observed from higher flows during the spring high water period.

## Wetland Area 2b

Wetland area 2b is a streamside bench along Clear Creek. This wetland area is .29 acre. Dominant vegetation and hydric soil characteristics are provided below.

# **Dominant Vegetation:**

Coyote willow – OBL Thin-leaf alder- FACW Willow species unidentified – No determination Redtop – FACW Bluejoint – FACW

#### Soils:

Soils consist of fine sand with distinct redox features.

# Hydrology:

Soils are likely saturated during higher flow events on Clear Creek. Drift lines and sediment deposits were observed from higher flows during the spring high water period.

### Wetland Area 3

Wetland area 3 is a streamside bench along Clear Creek. The wetland area is 0.30 acre. Dominant vegetation and hydric soil characteristics are provided below.

# **Dominant Vegetation:**

Coyote willow – OBL
Thin-leaf willow- FACW
Willow species unidentified – No determination
Mountain rush – OBL
Redtop – FACW
Bluejoint – FACW
Sedge species unidentified- OBL

#### Soils:

Soils consist of a fine silty loam with a depleted matrix.

# Hydrology:

Soils are saturated at the surface from direct connection to Clear Creek. Water marks and sediment deposits were also observed in the wetland area.

# Wetland Area 4a

Wetland area 4a is a streamside bench along Clear Creek. The wetland area is 0.14 acre. Dominant vegetation and hydric soil characteristics are provided below.

# **Dominant Vegetation:**

```
Thin-leaf willow – FACW
Coyote willow – OBL
Mountain rush – OBL
Redtop - FACW
Reed canary grass (Phalaris arundinacea) – OBL
```

#### Soils:

Soils consist of a fine silty loam with a depleted matrix.

# Hydrology:

Soils are saturated at the surface from connectivity to Clear Creek. Other primary hydrology indicators observed in the field survey included sediment deposits and drift deposits.

# Wetland 4b

Wetland area 4b is a streamside bench along Clear Creek. The wetland area is 0.03 acre. Dominant vegetation and hydric soil characteristics are provided below.

# **Dominant Vegetation:**

```
Coyote willow – OBL
Mountain rush – OBL
Sedge unidentified species – OBL
Redtop – FACW
```

#### Soils:

Soils consist of a silt loam with a depleted matrix.

# Hydrology:

Soils are saturated at the surface from connectivity to Clear Creek. Drift deposits were observed within the wetland during the field survey.

#### Wetland 5

Wetland area 5 is a streamside bench along Clear Creek. The wetland area is 0.07 acre. Dominant vegetation and hydric soil characteristics are provided below.

# **Dominant Vegetation:**

Redtop – FACW Mountain rush – OBL

#### Soils:

Soils consist of a silty loam with a depleted matrix.

# Hydrology:

Soils are saturated at the surface from connectivity to Clear Creek. Other primary hydrology indicators observed within the wetland were sediment deposits and drift deposits.

# 3.1 Functional Assessment of Colorado Wetlands (FACWet) Method

FACWet is a rapid assessment methodology that rates wetland conditions through evaluation of ecological stressors that drive wetland functions. Each state variable is rated on a scale of 0.0 to 1.0 (non-functioning to reference standard or essentially pristine, respectively). The FACWet method was used to evaluate the general condition of the delineated wetlands that occur along the north bank of Clear Creek within the study area. Based on this methodology, the study area wetlands were rated at the higher end of the functioning category. Table 1 shows the study area wetland scoring for the seven FACWet criteria.

**Table 1 FACWet Score Card** 

Functional Capacity Indices (FCI)	Wetland Variable Score
Support of Characteristic Wildlife Habitat	.75
Support of Characteristic Fish/Aquatic Habitat	.81
Flood Attenuation	.80
Short-and-Long-term Water Storage	.79
Nutrient/Toxicant Removal	.70
Sediment Retention/Shoreline Stabilization	.75
Production Export/Food Chain Support	.80
Composite FCI Score (out of 100)	77

The study area wetlands are supported by a reliable hydrology source and a diverse mix of both emergent wetland plant species with a significant shrub component that result in functional wetlands. The channelization and slope armoring along I-70 on the north side of Clear Creek has resulted in the elimination of wetlands/riparian habitat in the study area. The study area wetlands are rated as functioning, but are fragmented because of historic wetland loss along the Clear Creek corridor and lack of habitat connectivity.

# 4.0 Other Waters of the U.S.

Clear Creek represents the only other waters of the U.S. present within the study area. The Clear Creek ordinary high water mark was mapped using the current edge-of-water survey and adding the two-year flood event. This methodology was approved by the USACE. The Clear Creek edge-of-water survey was completed in October and November 2011.

# 5.0 References

Cowardin, Lewis M., Virginia Carter, Frances C. Golet, and Edward T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service, FWS/OBS-79/31.

Reed, P.B. Jr. 1988. National List of Plant Species that Occur in Wetlands: Intermountain Region (Region 8). Prepared for National Wetland Inventory, U.S. Fish and Wildlife Service.

US Army Corps of Engineers. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountain, Valleys, and Coast Region. May 2010.

# Appendix A – USACE Data Sheets

# WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Twin Tunnelo - EA		ChulCa	nuntu	Cla	en Cheek . Sampling Date: 10:20.11
Applicant/Owner: CDOT Region 1		City/Ct	Junty		State: CO Sampling Point: Wet-1
Investigator(s): R. Be   Ford & F. Tordona	La			N N SER	
Landform (hillslope, terrace, etc.): Streams idl					
Subregion (LRR): LRR - E	_ Lat: <u>_3</u> *	9041	43	7.24 N	Long: 105° 28' 24.27' W Datum: NAD 83
Soil Map Unit Name:/U/A					NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this	s time of ye	ar? Ye	98 <u>v</u>		(if no, explain in Remarks.)
Are Vegetation, Soil, or Hydrologys	ignificantly	disturb	ed?	Are "	"Normal Circumstances" present? Yes V
Are Vegetation, Soil, or Hydrology n	aturally pro	blema	tic?	(If ne	eeded, explain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map	showing	sam	plin	g point l	ocations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes N	0				1
	0	1		e Sampled In a Wetlar	
	o		WILL	a vvetiai	103
Remarks:					
VEGETATION – Use scientific names of plan	ts.		-		
	Absolute			Indicator	Dominance Test worksheet:
Tree Stratum (Plot size:)	% Cover	0.0000000000000000000000000000000000000		Status	Number of Dominant Species
1					That Are OBL, FACW, or FAC: (A)
2		1407	0.50550	Weller I were the first of the	Total Number of Dominant
3.					Species Across All Strata: (B)
4		= Tot	al Co	ver	Percent of Dominant Species That Are OBL, FACW, or FAC: (A/B)
Sapling/Shrub Stratum (Plot size:)	100000	-			Prevalence Index worksheet:
1. Salix oxigua				OBL	Total % Cover of: Multiply by:
21 Alnus inlana ssp. tenvitolia	10	NO		FACW	OBL species x 1 =
3		10 <del>-</del>			FACW species x 2 =
4		1419			FAC species x 3 =
5					FACU species x 4 =
	20	_ = Tot	al Co	ver	UPL species x 5 =
Herb Stratum (Plot size:)	110	110		NRL	Column Totals: (A) (B)
1. Juneus balticus	16	111	es	PANI	, , , , , , , , , , , , , , , , , , , ,
Agustis alba	20	180	1	ORL	Prevalence Index = B/A =
3. Ctrex sp.	30	yes	<u> </u>	00-	Hydrophytic Vegetation Indicators:
					✓1 - Rapid Test for Hydrophytic Vegetation     2 - Dominance Test is >50%
5 6					3 - Prevalence Index is ≤3.0¹
7					3 - Prevalence Index is \$5.0 4 - Morphological Adaptations <sup>1</sup> (Provide supporting
8.					data in Remarks or on a separate sheet)
9					5 - Wetland Non-Vascular Plants <sup>1</sup>
10.					Problematic Hydrophytic Vegetation¹ (Explain)
11		160			<sup>1</sup> Indicators of hydric soil and wetland hydrology must
	100	= Tota	al Co	ver	be present, unless disturbed or problematic.
Woody Vine Stratum (Plot size:)	•			man editti.	5000000 - 500000
1					Hydrophytic
2					Vegetation Present? Yes Veg No
N. Barro Comund in Und Starting		_= Tota	al Co	ver	100 5
% Bare Ground in Herb Stratum	****				
Tromano.					

SOIL						Sampling Point: We + /	
Profile Desc	ription: (Des	scribe to	the dep	th needed to document the indicator or confli	m the absenc	e of Indicators.)	
Depth	52.53	atrix		Redox Features			
(inches)	Color (mo		%	Color (moist) % Type <sup>1</sup> Loc <sup>2</sup>	Texture	Remarks	
0-6	10 Vr	3/2	70			Silly Sand	
		7-					
					•	• ————	
					27 (22		
		- 3 4	**			-	
					•		
				=Reduced Matrix, CS=Covered or Coated Sand C LRRs, unless otherwise noted.)		ocation: PL=Pore Lining, M=Matrix. tors for Problematic Hydric Solis <sup>3</sup> :	
		мррисац	ne to an			The state of the	
Histosol	(A1) lipedon (A2)			Sandy Redox (S5) Stripped Matrix (S6)		cm Muck (A10) ed Parent Material (TF2)	
Black His	(50)			Loamy Mucky Mineral (F1) (except MLRA 1		ery Shallow Dark Surface (TF12)	
	n Sulfide (A4)	)		Loamy Gleyed Matrix (F2)		her (Explain in Remarks)	
	Below Dark		(A11)	Depleted Matrix (F3)			
	rk Surface (A			Redox Dark Surface (F6)	<sup>3</sup> Indicators of hydrophytic vegetation and		
	lucky Mineral			Depleted Dark Surface (F7)	wetland hydrology must be present,		
	leyed Matrix (			Redox Depressions (F8)	unle	ess disturbed or problematic.	
Restrictive L		ent):					
Туре: <u></u>					1000 100 00		
Depth (inc	thes):				Hydric So	Il Present? Yes No	
Remarks:	CI	44.50	^	Achie a lead	. 1-1	man tat	
	2011	100		something water To	USIR J	Tusen's ci	
				Saturated - water to	,		
HYDROLOG	GY						
Wetland Hyd	E-180	ators.					
(T)	3.000		require	i; check all that apply)	Sec	ondary Indicators (2 or more required)	
	Water (A1)	ini di dile	require	Water-Stained Leaves (B9) (except	The second second	Water-Stained Leaves (B9) (MLRA 1, 2,	
- In-1-optic out the section	ter Table (A2)			MLRA 1, 2, 4A, and 4B)		4A, and 4B)	
Saturatio		,		Salt Crust (B11)		Drainage Patterns (B10)	
	arks (B1)			Aquatic Invertebrates (B13)		Dry-Season Water Table (C2)	
	t Deposits (B	2)		Hydrogen Sulfide Odor (C1)	9	Saturation Visible on Aerial Imagery (C9)	
STATE CONTRACTOR	osits (B3)	-,		Oxidized Rhizospheres along Living Re	oots (C3)	Geomorphic Position (D2)	
	t or Crust (B4	)		Presence of Reduced Iron (C4)		Shallow Aquitard (D3)	
	osits (B5)	•		Recent Iron Reduction in Tilled Soils (		FAC-Neutral Test (D5)	
	Soil Cracks (B	36)		Stunted or Stressed Plants (D1) (LRR		Raised Ant Mounds (D6) (LRR A)	
	n Visible on A		agery (B	7) Other (Explain in Remarks)		Frost-Heave Hummocks (D7)	
Sparsely	Vegetated Co	oncave S	urface (l	38)			
Fleid Observ	ations:						
Surface Wate	r Present?	Yes	u	No Depth (inches):			
Water Table I		Yes	$\overline{}$	No Depth (inches):			
Saturation Pro		Yes		- (	tland Hydrolo	gy Present? Yes No	
(includes cap	Illary fringe)				1971		
Describe Rec	orded Data (s	stream ga	auge, mo	nitoring well, aerial photos, previous inspections	), if available:		

Small wetland Gringe That baders riparian habitat. Hydrology Gran Clear Creek

Remarks:

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

Project/Site: Twin Tunnel1 - EA	City/C	country Olea	r Creek Sampling Date: 10 · 13 · 201
Applicant/Owner: CDOT Region I	Only/O	ounty	State: CO Sampling Point: Wef - 2
Investigator(s): R. Belferd F. Torder	4		
Landform (hillslope, terrace, etc.): Streamside			
Subregion (LRR): ZRN-E	_ Lat: 39°44	1'46.25"N	Long: 105° 28' 23.05'W Datum: NAD 83
			NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this	s time of year? Y	'es No	(If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrologys	ignificantly distur	bed? Are "l	Normal Circumstances" present? Yes No
Are Vegetation, Soil, or Hydrology n	aturally problems	atic? (If ne	eded, explain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map	showing san	npling point lo	ocations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes N	o		_
Hydric Soil Present? Yes N	o	is the Sampled	
Wetland Hydrology Present? Yes N	0	within a Wetlan	de Yes No
Remarks:			
VEGETATION - Use scientific names of plan	ts.		
		ninant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size:)	% Cover Spe		Number of Dominant Species
1			That Are OBL, FACW, or FAC: (A)
2.			Total Number of Dominant
3		· · · · · · · · · · · · · · · · · · ·	Species Across All Strata: (B)
4	2 20 - 21 - 21 / 22 - 21	otal Cover	Percent of Dominant Species
Sapling/Shrub Stratum (Plot size:)			That Are OBL, FACW, or FAC: (A/B)
1. Alnus incana ssp. terripolio	30 y	es FACW	Prevalence index worksheet:
2. Salix exima	25 de		Total % Cover of: Multiply by:
3. Salix Al.	10 'n	10 082	OBL species x 1 =
4			FACW species x 2 =
5			FAC species x 3 = FACU species x 4 =
	(05 = To	otal Cover	UPL species x 5 =
Herb Stratum (Plot size:)	- V		Column Totals: (A) (B)
1. Agrostis alba 2. Calamagnostis Canadensis	25 1	es Hacio	977 PW 45 Ya 1982-95
		O) MINO	Prevalence Index = B/A =
3			Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation
4			2 - Dominance Test is >50%
5 6			3 - Prevalence Index is ≤3.0¹
7			4 - Morphological Adaptations¹ (Provide supporting
8.			data in Remarks or on a separate sheet)
9.			5 - Wetland Non-Vascular Plants <sup>1</sup>
10			Problematic Hydrophytic Vegetation¹ (Explain)
11.			<sup>1</sup> Indicators of hydric soil and wetland hydrology must
	55 = To	tal Cover	be present, unless disturbed or problematic.
Woody Vine Stratum (Plot size:)	-	ಾಯ ಪರಿಸ್ ವಿವರ್ಷದ ಪೆ	
1			Hydrophytic
2			Vegetation Present? Yes \ No
	= To	tal Cover	Present? Yes No
% Bare Ground in Herb Stratum			
Remarks: Streamside Hench ac Welland/ Riporion Co	diagent -	to Clear	Creek.
Washer of I Day	- dear	A CONTRACTOR OF THE PROPERTY O	*
wylana / Niparian Co	nysjeg		

Profile Description: (Describe to the d	epth needed to docum	ent the indicator	or confirm	the absence	of Indicators.)
Depth Matrix	Redox	Features			
(inches) Color (moist) %	Color (moist)	% Type¹	Loc <sup>2</sup>	Texture	Remarks
0-16 10 yr 4/2 60	10 yr 5/10	40			Fine Sand
					**************************************
			· · · · · · · · · · · ·		
	-				
<sup>1</sup> Type: C=Concentration, D=Depletion, R			d Sand Gra		cation: PL=Pore Lining, M=Matrix.
Hydric Soil Indicators: (Applicable to					rs for Problematic Hydric Solis <sup>3</sup> :
Histosol (A1)	Sandy Redox (S	- 51			n Muck (A10)
Histic Epipedon (A2) Black Histic (A3)	Stripped Matrix (	່ວວ) ineral (F1) (excep	MIDA 4		Parent Material (TF2)  Shallow Dark Surface (TF12)
Hydrogen Sulfide (A4)	Loamy Gleyed N	the control of the co	i MEROA I)		er (Explain in Remarks)
Depleted Below Dark Surface (A11)	Depleted Matrix				,
Thick Dark Surface (A12)	Redox Dark Sur	face (F6)		3Indicato	rs of hydrophytic vegetation and
Sandy Mucky Mineral (S1)	Depleted Dark S				nd hydrology must be present,
Sandy Gleyed Matrix (S4)	Redox Depressi	ons (F8)	3	unles	s disturbed or problematic.
Restrictive Layer (if present):					
Type:					
Depth (inches):			120		Present? Yes No
Remarks: Fine Sano	I wil distinct	4 1-0-1	~ (		
The sund	wy chomic	read	1-100	tues	
Fine Sano Throughou	ct Soil mo	file			
HYDROLOGY			*		
Wetland Hydrology Indicators:		•			
Primary Indicators (minimum of one requi	red; check all that apply	)		Secor	ndary Indicators (2 or more required)
Surface Water (A1)	Water-Stair	ned Leaves (B9) (	xcept	w	/ater-Stained Leaves (B9) (MLRA 1, 2,
High Water Table (A2)	MLRA 1	, 2, 4A, and 4B)			4A, and 4B)
Saturation (A3)	Salt Crust (				rainage Patterns (B10)
Water Marks (B1)		ertebrates (B13)			ry-Season Water Table (C2)
Sediment Deposits (B2)		Sulfide Odor (C1)			aturation Visible on Aerial Imagery (C9)
Drift Deposits (B3)					Geomorphic Position (D2)
Algal Mat or Crust (B4)		f Reduced Iron (C			hallow Aquitard (D3)
Iron Deposits (B5)		Reduction in Tille			AC-Neutral Test (D5)
Surface Soil Cracks (B6)		Stressed Plants (D	11) (LRR A)		taised Ant Mounds (D6) (LRR A)
Inundation Visible on Aerial Imagery		ain in Remarks)			rost-Heave Hummocks (D7)
Sparsely Vegetated Concave Surface	9 (00)		20 y 100		
Field Observations:	_ No Depth (inc	hael·			
	_ No Depth (inc		- 1		om.
	_ No Depth (inc			nd Hudrolos	y Present? Yes No
(includes capillary fringe)		0.0000			y 11000iii 100 NO
Describe Recorded Data (stream gauge,	monitoring well, aerial p	hotos, previous in	spections), i	f available:	
Remarks:				1 2	G . 10
Willand 1	Kely South	rated d	wing	higher	-tous events-
wish 1	, 0, 1	iodea o	1	,0,-,	- Flow quents - Clear Creek.

# WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Twin Tunnels - EA	177	City/County: C/C	ear Creek sa	mpling Date: 10 - 20 - 20
Applicant/Owner: CDOT Region /	-			mpling Point: W2 - OU
Investigator(s): R. Belfold & F. Torden	a lo	Section Township		
Landform (hillslope, terrace, etc.): Hillslope		Local relief (concav	e course nous).	Sione (%): 3-4
Subregion (LRR): $\angle RR - E$	Lat: 39	10 114 46 25"	N Lang: 105°28'22.0	5"W DatumWAD 82
Soil Map Unit Name: NA	_ Lat. <u>~ /</u>	A 5 3 5 5	NWI classification	
Are climatic / hydrologic conditions on the site typical for this	time of ye		(If no, explain in Rema	
Are Vegetation, Soil, or Hydrology si			re "Normal Circumstances" prese	-
Are Vegetation, Soil, or Hydrology n			needed, explain any answers in	
SUMMARY OF FINDINGS - Attach site map	20 00 000 00 00 00 00 00 00 00 00 00 00	2000 KB WINDOWS BOX 500 KB		
Hydrophytic Vegetation Present? Yes No			**************************************	
Hydric Soil Present? Yes No		Is the Samp	led Area land? Yes	No. 1
Wetland Hydrology Present? Yes No		within a vve	nandr res	NO_P_
Remarks: Higher quality sipo	ion	u/ uno	Censtory of	
upland spec	ies.		U	
VEGETATION - Use scientific names of plant	ts.			
Tana Shartum (Diat also)	Absolute	Dominant Indicate Species? Status	8 879 10 9539 15 00 95	SA 17-508
	30	Ves NI	<ul> <li>Number of Dominant Speci</li> <li>That Are OBL, FACW, or F.</li> </ul>	
2. Populus angustifolia	20	Ves FAC		50 - S - S - S - S - S - S - S - S - S -
3 Pinus panderosa	10	NO FACE	Total Number of Dominant Species Across All Strata:	(B)
4.		72121		1 - 3 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -
	60	= Total Cover	Percent of Dominant Specie That Are OBL, FACW, or F.	es AC: (A/B)
Sapling/Shrub Stratum (Plot size:  1. (Alnus Incana sop. tenvitolia  2. Salix sp.	20	VEN FARM	Prevalence Index worksh	eet:
2 Salix AD	10	NO DRI	Total % Cover of:	Multiply by:
3	10	100 000	OBL species	_ x1=
4			FACW species	1411
5	-		FAC species	1970
	30	= Total Cover	FACU species	
Herb Stratum (Plot size:)		. /-	UPL species	W
1. Bromus in emis	90	yes NI	Column Totals:	_ (A) (B)
2 States sp.	10	NO _	Prevalence Index = E	3/A =
3. Cirpium arvense				AND
4				
5			2 - Dominance Test is	00.0
6			3 - Prevalence Index is	
7			4 - Morphological Adap	otations¹ (Provide supporting on a separate sheet)
8.			5 - Wetland Non-Vascu	
9			Problematic Hydrophyl	100
10			Indicators of hydric soil an	
11	75	= Total Cover	be present, unless disturbe	d or problematic.
Woody Vine Stratum (Plot size:)		_ Total Gover		
1			Hydrophytic	
2			Vegetation Veg	No
% Bare Ground in Herb Stratum	X	= Total Cover	Present? Yes_	140
% Bare Ground in Herb Stratum		****		
Tromains.				

Profile Description: (Describe to the dep		
Depth Matrix (Inches) Color (moist) %	Redox Features Color (moist)	Texture Remarks
0-le 10 yr 4/4 100/		Gravelly loam w/
		large pebbles
		0 /
		, , , , , , , , , , , , , , , , , , , ,
1Type: C=Concentration D=Depletion BM	=Reduced Matrix, CS=Covered or Coated Sand G	Project 2 continue DI = Doro Lining M=Matrix
Hydric Soil indicators: (Applicable to ali		Grains. <sup>2</sup> Location: PL=Pore Lining, M=Matrix. Indicators for Problematic Hydric Solis <sup>3</sup> :
Histosol (A1)	Sandy Redox (S5)	2 cm Muck (A10)
Histic Epipedon (A2)	Stripped Matrix (S6)	Red Parent Material (TF2)
Black Histic (A3)	Loamy Mucky Mineral (F1) (except MLRA 1	
Hydrogen Sulfide (A4)	Loamy Gleyed Matrix (F2)	Other (Explain in Remarks)
Depleted Below Dark Surface (A11)	Depleted Matrix (F3)	
Thick Dark Surface (A12)	Redox Dark Surface (F6)	<sup>3</sup> Indicators of hydrophytic vegetation and
Sandy Mucky Mineral (S1)	Depleted Dark Surface (F7)	wetland hydrology must be present,
Sandy Gleyed Matrix (S4)	Redox Depressions (F8)	unless disturbed or problematic.
Restrictive Layer (if present):		
Type: KOCK	river sales	
Depth (inches):		Hydric Soil Present? Yes No
Remarks:		
I		
HYDROLOGY		
HYDROLOGY  Wetland Hydrology Indicators:	•	
	d; check all that apply)	Secondary Indicators (2 or more required)
Wetland Hydrology Indicators:	d; check all that apply) Water-Stained Leaves (B9) (except	Secondary Indicators (2 or more required)  Water-Stained Leaves (B9) (MLRA 1, 2,
Wetland Hydrology Indicators:  Primary Indicators (minimum of one required  Surface Water (A1)	Water-Stained Leaves (B9) (except	Water-Stained Leaves (B9) (MLRA 1, 2,
Wetland Hydrology Indicators:  Primary Indicators (minimum of one required  Surface Water (A1)  High Water Table (A2)	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B)	Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
Wetland Hydrology Indicators:  Primary Indicators (minimum of one required  Surface Water (A1)	Water-Stained Leaves (B9) (except	Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) Drainage Patterns (B10)
Wetland Hydrology Indicators:  Primary Indicators (minimum of one required  Surface Water (A1)  High Water Table (A2)  Saturation (A3)	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11)	Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
Wetland Hydrology Indicators:  Primary Indicators (minimum of one required  Surface Water (A1)  High Water Table (A2)  Saturation (A3)  Water Marks (B1)  Sediment Deposits (B2)	Water-Stained Leaves (B9) (except MLRA 1, 2, 4A, and 4B) Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1)	Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) Drainage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (C9)
Wetland Hydrology Indicators:  Primary Indicators (minimum of one required Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3)	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 Ro	Water-Stained Leaves (B9) (MLRA 1, 2,  4A, and 4B)  Drainage Patterns (B10)  Dry-Season Water Table (C2)  Saturation Visible on Aerial Imagery (C9)  oots (C3) Geomorphic Position (D2)
Wetland Hydrology Indicators:  Primary Indicators (minimum of one required Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4)	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 Ro Presence of Reduced Iron (C4)	Water-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) Drainage Patterns (B10) Dry-Season Water Table (C2) Saturation Visible on Aerial Imagery (C9) oots (C3) Geomorphic Position (D2) Shallow Aquitard (D3)
Primary Indicators (minimum of one required  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)	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 Ro Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Solls (C	Water-Stained Leaves (B9) (MLRA 1, 2,  4A, and 4B)  Drainage Patterns (B10)  Dry-Season Water Table (C2)  Saturation Visible on Aerial Imagery (C9)  oots (C3) Geomorphic Position (D2)  Shallow Aquitard (D3)  FAC-Neutral Test (D5)
Wetland Hydrology Indicators:  Primary Indicators (minimum of one required Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4)	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 Ro Presence of Reduced Iron (C4)  Recent Iron Reduction in Tilled Soils (C	Water-Stained Leaves (B9) (MLRA 1, 2,  4A, and 4B)  Drainage Patterns (B10)  Dry-Season Water Table (C2)  Saturation Visible on Aerial Imagery (C9)  oots (C3) Geomorphic Position (D2)  Shallow Aquitard (D3)  FAC-Neutral Test (D5)
Wetland Hydrology Indicators:  Primary Indicators (minimum of one required 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)	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 Ro Presence of Reduced Iron (C4)  Recent Iron Reduction in Tilled Soils (C)  Stunted or Stressed Plants (D1) (LRR 17)  Other (Explain in Remarks)	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)  A)  Raised Ant Mounds (D6) (LRR A)
Wetland Hydrology Indicators:  Primary Indicators (minimum of one required 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 (B	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 Ro Presence of Reduced Iron (C4)  Recent Iron Reduction in Tilled Soils (C)  Stunted or Stressed Plants (D1) (LRR 17)  Other (Explain in Remarks)	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)  A)  Raised Ant Mounds (D6) (LRR A)
Wetland Hydrology Indicators:  Primary Indicators (minimum of one required 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 (B)  Sparsely Vegetated Concave Surface (I	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 Ro Presence of Reduced Iron (C4)  Recent Iron Reduction in Tilled Soils (C)  Stunted or Stressed Plants (D1) (LRR A)  Other (Explain in Remarks)	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)  A)  Raised Ant Mounds (D6) (LRR A)
Wetland Hydrology Indicators:  Primary Indicators (minimum of one required 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 (B  Sparsely Vegetated Concave Surface (Indicated Surface Water Present?	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 Rome Presence of Reduced Iron (C4)  Recent Iron Reduction in Tilled Soils (C4)  Stunted or Stressed Plants (D1) (LRR 4)  Other (Explain in Remarks)	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)  A)  Raised Ant Mounds (D6) (LRR A)
Wetland Hydrology Indicators:  Primary Indicators (minimum of one required 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 (B')  Sparsely Vegetated Concave Surface (Indicated Concave Surfac	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 Roman Presence of Reduced Iron (C4)     Recent Iron Reduction in Tilled Soils (C1)     Stunted or Stressed Plants (D1) (LRR 17)     Other (Explain in Remarks)  No Depth (inches):	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)  A)  Raised Ant Mounds (D6) (LRR A)  Frost-Heave Hummocks (D7)
Wetland Hydrology Indicators:  Primary Indicators (minimum of one required 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 (B')  Sparsely Vegetated Concave Surface (Indicated Concave Surfac	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 Role     Presence of Reduced Iron (C4)     Recent Iron Reduction in Tilled Soils (Company)     Stunted or Stressed Plants (D1) (LRR 4)     Other (Explain in Remarks)  No Depth (inches):	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)  A)  Raised Ant Mounds (D6) (LRR A)
Wetland Hydrology Indicators:  Primary Indicators (minimum of one required 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 (B)  Sparsely Vegetated Concave Surface (Indicated Water Present?  Water Table Present?  Yes  Saturation Present?  Yes  (includes capillary fringe)	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 Roman Presence of Reduced Iron (C4)     Recent Iron Reduction in Tilled Soils (C1)     Stunted or Stressed Plants (D1) (LRR 17)     Other (Explain in Remarks)  No Depth (inches):	
Wetland Hydrology Indicators:  Primary Indicators (minimum of one required 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 (B)  Sparsely Vegetated Concave Surface (Indicated Water Present?  Water Table Present?  Yes  Saturation Present?  Yes  (includes capillary fringe)	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 Roman Presence of Reduced Iron (C4)      Recent Iron Reduction in Tilled Soils (Cartes)      Stunted or Stressed Plants (D1) (LRR 10)  Other (Explain in Remarks)  No Depth (inches):	
Wetland Hydrology Indicators:  Primary Indicators (minimum of one required 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 (B6)  Surface Soil Cracks (B6)  Inundation Visible on Aerial Imagery (B)  Sparsely Vegetated Concave Surface (Beld Observations:  Surface Water Present?  Water Table Present?  Yes  Saturation Present?  Yes  (includes capillary fringe)  Describe Recorded Data (stream gauge, model)	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 Rome Presence of Reduced Iron (C4)  Recent Iron Reduction in Tilled Soils (C4)  Stunted or Stressed Plants (D1) (LRR 17)  Other (Explain in Remarks)  No Depth (inches):  No Depth (inches):  Wellowitoring well, aerial photos, previous inspections)	
Wetland Hydrology Indicators:  Primary Indicators (minimum of one required 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 (B  Sparsely Vegetated Concave Surface (Indicated Water Present? Yes  Water Table Present? Yes  Saturation Present? Yes  (includes capillary fringe)  Describe Recorded Data (stream gauge, model)	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 Ro Presence of Reduced Iron (C4)  Recent Iron Reduction in Tilled Soils (C)  Stunted or Stressed Plants (D1) (LRR A)  Other (Explain in Remarks)  No Depth (Inches):  No Depth (Inches):  Well  Initoring well, aerial photos, previous inspections)	
Wetland Hydrology Indicators:  Primary Indicators (minimum of one required 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 (B  Sparsely Vegetated Concave Surface (Indicated Water Present? Yes  Water Table Present? Yes  Saturation Present? Yes  (includes capillary fringe)  Describe Recorded Data (stream gauge, model)	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 Ro Presence of Reduced Iron (C4)  Recent Iron Reduction in Tilled Soils (C)  Stunted or Stressed Plants (D1) (LRR A)  Other (Explain in Remarks)  No Depth (Inches):  No Depth (Inches):  Well  Initoring well, aerial photos, previous inspections)	
Wetland Hydrology Indicators:  Primary Indicators (minimum of one required 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 (B  Sparsely Vegetated Concave Surface (Indicated Water Present? Yes  Water Table Present? Yes  Saturation Present? Yes  (includes capillary fringe)  Describe Recorded Data (stream gauge, model)	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 Ro Presence of Reduced Iron (C4)  Recent Iron Reduction in Tilled Soils (C)  Stunted or Stressed Plants (D1) (LRR A)  Other (Explain in Remarks)  No Depth (Inches):  No Depth (Inches):  Well  Initoring well, aerial photos, previous inspections)	

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

				A .	^
Project/Site: Twin Tunnel	s EA		City/County:	Clear	Creek Sampling Date: 10.20
Applicant/Owner: CDOT Re	ston 1				State: <u>CO</u> Sampling Point: <u>W - 3</u>
		nato			nge: T35 R72 W Section 33
					convex, none): Slope (%):
andform (nillslope, terrace, etc.):	11 camajac	20	LOCAL TELET	20"nl	Long: 105°27'11.23"W Datum: NAD
		_ Lat: 37	1.44 04	20 10	Long: 103 27 11.03 10 Datum: 1011
Soil Map Unit Name: NA					NWI classification:
Are climatic / hydrologic conditions on the	e site typical for this	s time of yea	ar? Yes 🚩		
Are Vegetation, Soil, or I	Hydrologys	significantly	disturbed?	Are "	Normal Circumstances" present? Yes No
Are Vegetation, Soll, or I	-lydrology r	naturally pro	blematic?	(If ne	eded, explain any answers in Remarks.)
SUMMARY OF FINDINGS - A	tach site map	showing	sampling	point lo	ocations, transects, important features, etc
Hydrophytic Vegetation Present?	Yes N	lo			
Hydric Soil Present?	Yes _ L N	lo		Sampled	
Wetland Hydrology Present?	Yes N	lo	with	n a Wetlan	id? Yes_V No
Remarks: Streamsial	bench				
/EGETATION - Use scientific	names of plan	its.			0
		Absolute			Dominance Test worksheet:
Tree Stratum (Plot size:		A CHINESE	Species?		Number of Dominant Species
1		-			That Are OBL, FACW, or FAC: (A)
2					Total Number of Dominant
3					Species Across All Strata: (B)
4		-			Percent of Dominant Species
Sapling/Shrub Stratum (Plot size:	1	-	_ = Total Cov	er	That Are OBL, FACW, or FAC: (A/B)
1. Salix exiqua		30	ves	ORL	Prevalence Index worksheet:
2. Salix DO.		20	ues o		Total % Cover of: Multiply by:
3. Alnus incana sor	2 tenu: folia			FROW	OBL species x 1 =
4.			7		FACW species x 2 =
5.					FAC species x 3 =
		70	= Total Cov	er	FACU species x 4 =
Herb Stratum (Plot size:	)	10			UPL species x 5 =
Trucus balticus		30	yes_	031	Column Totals: (A) (B)
2 Corex sp.		20	yes_	081	Prevalence Index = B/A =
3. Agrishs alba 4. Warnayastis Canad		10	100	MCW	Hydrophytic Vegetation Indicators:
4. Warnage tis Canad	ensis		NO_	MECO	1 - Rapid Test for Hydrophytic Vegetation
5					2 - Dominance Test is >50%
6					3 - Prevalence Index is ≤3.0¹
7					4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
8					5 - Wetland Non-Vascular Plants <sup>1</sup>
9					Problematic Hydrophytic Vegetation¹ (Explain)
10					¹Indicators of hydric soil and wetland hydrology must
11.	<i>y</i>	80	= Total Cov		be present, unless disturbed or problematic.
Woody Vine Stratum (Plot size:		_00	_ dotal Cov	er	
1					Hydrophytic
2.					Vegetation
					Present? Yes No
			= Total Cov	er	
% Bare Ground in Herb Stratum			_= Total Cov	er	

Profile Desc	ription: (De	scribe t	o the dep	th needed to docu	ment the I	ndicator	or confirm	the absence	of indicate	ors.)	
Depth		/atrix			x Feature:		. 9				
(inches)	Color (m		%	Color (moist)	%	Type <sup>1</sup>	Loc2	Texture	_	Remarks	100
0-6	1cyr	0/2	<u>80</u>	10 yr 5/ce	20_	KM	<u>_///</u> _		Fine	Dilly	10am
		-		670 61 MARKET					75 <del>-74</del>		
	***************************************			ACA CONTRACTOR OF THE PARTY OF		-					
	-								V		
									7	J. 1001	
									80-		***************************************
	<u> </u>		100 CONTROL	255 ANY SQUARE OF ALL PARK			STATES VALUE	n.			
				Reduced Matrix, C			d Sand Gra			Pore Lining, Note that the Pore Lining is	
· a verse se		Applica	ipie to all	LRRs, unless othe		Ba.)				Action in the XIII and	C 30118 :
Histosol				Sandy Redox ( Stripped Matrix					n Muck (A1 I Parent Ma	u) Iterial (TF2)	
	oipedon (A2) stic (A3)			Surpped Matri		1) (excent	MLRA 1)			ark Surface (T	F12)
A Company of the Comp	n Sulfide (A4	<b>)</b>		Loamy Gleyed						in Remarks)	
Carried Mark Park	d Below Dark	·	(A11)	Depleted Matri	x (F3)			Artic No.	52	20 200 27 20	
	ark Surface (			Redox Dark Si						phytic vegetatl	
	Mucky Minera			Depleted Dark		7)				gy must be pre I or problematio	
Restrictive	Bleyed Matrix			Redox Depres	sions (F8)	4		unies	oo ulaturbed	or problematic	,
Type:	Calph										
Depth (in	-			•				Hydric Soli	Present?	Yes X	No
Remarks:	wies)							1.,4110 0011			
Nomarks.											
LIVERALA	CV										
HYDROLO					r		10000		- 22		
Wetland Hy	(55.40)			li abaak all that a	h.A			Cana	ndanı India	ators (2 or mor	a required)
		um ot or	ie required	t; check all that app	ined Leav	on (BO) (	voort		10 20 0	ed Leaves (B9)	The State of the S
Investigation and a	Water (A1)	<b>)</b> \		A CONTRACTOR CONTRACTOR	ined Leav 1, 2, 4A, a		vceht	^	4A, and	2000 mm	(MLRM I, Z,
Saturation	iter Table (A2	-)		Salt Crus	ACCUSED MARKET	u 40)		r	E. 872323 DOM	itterns (B10)	
	on (A3) larks (B1)				vertebrate	s (B13)		200	SECTION AND PROPERTY OF STREET	Water Table (0	(22)
	nt Deposits (f	32)		19 CARLO HOUSE DE LOS	Sulfide O					isible on Aeria	Name of the Party
	nosits (B3)	/				Control of Management of the Control	Living Roo			Position (D2)	
	at or Crust (B	4)			of Reduce				Shallow Aqu		ii .
	osits (B5)						d Soils (C6		AC-Neutra		
E	Soil Cracks (	B6)		100000000000000000000000000000000000000			1) (LRR A)			Mounds (D6) (I	.RR A)
	on Visible on	·	nagery (B		plain in Re					Hummocks (D	
	Vegetated (										
Field Obser					***						
Surface Wat	er Present?	Ye	s	No <u> </u>	nches):		_				
Water Table	Present?	Ye	s	No Depth (ir	nches):		_				
Saturation P		Ye	s	No Depth (ir	nches):	<u> </u>	_   Wetla	and Hydrolog	y Present	Yes	No
(includes car	corded Data			nitoring well, aerial			pections)	if available:			
Describe Ke	Windy Daid	(ou call)	gauge, mc	monny wen, acriai	Prioros, bi	- 11-JUG 1113	-conone),				
Remarks:				. 1	20 0	,	. , , ;	-1 0	آم		
Nomanda.	J	tigh	qua	elity r	ipari	an/	wetla	and a	ony	e71	
	·	0.	, 0	1 10 0	1000	2	,		*		
		00	yacer	H TO C	teen (	JULIUM (	_				
			1-57								

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

Project/Site: TwinTunnels EA		City/County: Clear	CLECK Sampling Date: 10.20.20
Applicant/Owner: CDOT Region 1		City/County.	State: CO Sampling Point: W - 4a
Investigator(s): A. Befford & F. Tordon	nei to		nge: T35 R72W Section 33
interest gardines in the contract of the contr			
Landform (hillslope, terrace, etc.): Streams in Cl			convex, none): Slope (%):
Subregion (LRR): LRR - E	Lat: <u>39</u>	9°44'35.16"1	) Long: 105° 210′ 40 .310″ WDatum: NAD 83
Soil Map Unit Name:			NWI classification: N/1-
Are climatic / hydrologic conditions on the site typical for	this time of ye	ar? 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			eeded, explain any answers in Remarks.)
			ocations, transects, important features, etc
Hydrophytic Vegetation Present? Yes	No		
Hydric Soil Present? Yes	No	Is the Sampled	
CONTROL OF	No	within a Wetlar	nd? Yes No
Remarks: 5 treamside bench			The second secon
Streamostoce isoloti			
VEGETATION - Use scientific names of pl	ants.		
	Absolute	Dominant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size:)	% Cover	Species? Status	Number of Dominant Species
1.			That Are OBL, FACW, or FAC: (A)
2			Total Number of Dominant
3			Species Across All Strata: (B)
4			Percent of Dominant Species
Sapling/Shrub Stratum (Plot size:)		_ = Total Cover	That Are OBL, FACW, or FAC: (A/B)
1 A nus incana sp. tenuste	100 40	yes FACW	Prevalence Index worksheet:
2 Salix exigua	20	ches OBL	Total % Cover of: Multiply by:
3. Salix on.	10	NO -	OBL species x 1 =
4.			FACW species x 2 =
5.			FAC species x 3 =
ST	70	= Total Cover	FACU species x 4 =
Herb Stratum (Plot size:)			UPL species x 5 =
1. Juneus balticus	30_	yes OBL	Column Totals: (A) (B)
2 Agrostis alba	_20_	yes From	Prevalence Index = B/A =
3 Phalaris arundinacea	20	yes OBL	Hydrophytic Vegetation Indicators:
4. Conex sp.	10	NO OBL	1 - Rapid Test for Hydrophytic Vegetation
5. Her acleum lanatum.	_ 5_	NO FAC	2 - Dominance Test is >50%
6.			3 - Prevalence Index is ≤3.01
7			4 - Morphological Adaptations (Provide supporting
8			data in Remarks or on a separate sheet)  5 - Wetland Non-Vascular Plants¹
9			9- Wedand Non-Vascular Frants Problematic Hydrophytic Vegetation¹ (Explain)
10		<del></del>	¹Indicators of hydric soil and wetland hydrology must
11.	85	= Total Cover	be present, unless disturbed or problematic.
Woody Vine Stratum (Plot size:)		Total Cover	
1		100000000000000000000000000000000000000	Hydrophytic
2			Vegetation
		= Total Cover	Present? Yes No No
% Bare Ground in Herb Stratum			
Remarks:			

SOIL	Sampling Point: 10-70
Profile Description: (Describe to the depth needed to document the indicator or co	onfirm the absence of indicators.)
Depth Matrix Redox Features	
	DC <sup>2</sup> Texture Remarks
0.6 10 Vr 3/2 100	Silty Joan
6-12 10 yr 4/4 70 10yr 5/10 30 RM N	1 " " Silter loan,
1 10 10 11 10 AM 10	
Transport of the Department of	and Combined Distriction of the Combined Combine
Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sa	Indicators for Problematic Hydric Soils <sup>3</sup> :
Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)	
Histosol (A1) Sandy Redox (S5)	2 cm Muck (A10)
Histic Epipedon (A2) Stripped Matrix (S6)	Red Parent Material (TF2)
Black Histic (A3) Loamy Mucky Mineral (F1) (except MLI	
Hydrogen Sulfide (A4) Loamy Gleyed Matrix (F2)	Other (Explain in Remarks)
Depleted Below Dark Surface (A11)	3
Thick Dark Surface (A12) Redox Dark Surface (F6)	<sup>3</sup> Indicators of hydrophytic vegetation and
Sandy Mucky Mineral (S1) Depleted Dark Surface (F7)	wetland hydrology must be present,
Sandy Gleyed Matrix (S4) Redox Depressions (F8)	unless disturbed or problematic.
Restrictive Layer (if present):	
Type:	
Depth (inches):	Hydric Soil Present? Yes No
Remarks:	and a second
Processing and the second of t	
HYDROLOGY	
Wetland Hydrology Indicators:	
Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)
Surface Water (A1) Water-Stained Leaves (B9) (excep	t Water-Stained Leaves (B9) (MLRA 1, 2,
High Water Table (A2) MLRA 1, 2, 4A, and 4B)	4A, and 4B)
Saturation (A3) Salt Crust (B11)	Drainage Patterns (B10)
Water Marks (B1) Aquatic Invertebrates (B13)	Dry-Season Water Table (C2)
Sediment Deposits (B2)  Hydrogen Sulfide Odor (C1)	Saturation Visible on Aerial Imagery (C9)
	g Roots (C3) Geomorphic Position (D2)
	Shallow Aquitard (D3)
Iron Deposits (B5) Recent Iron Reduction in Tilled Soi	The state of the s
Surface Soil Cracks (B6) Stunted or Stressed Plants (D1) (L	The second secon
Inundation Visible on Aerial Imagery (B7) Other (Explain in Remarks)	Frost-Heave Hummocks (D7)
Sparsely Vegetated Concave Surface (B8)	
Field Observations:	
Surface Water Present? Yes No Depth (inches):	
Water Table Present? Yes No Depth (inches):	
The state of the s	Wetland Hydrology Present? Yes No
Saturation Present? Yes No Depth (inches):	Wetland Hydrology Present? Yes No
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspecti	ons), if available:
Donato.	
Remarks:	
_	
The second secon	

#### WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region City/County: Clear Creek Sampling Date: 10.20.201/ Applicant/Owner: CDOT Kegion / Sampling Point: Wet 46 Investigator(s): L. ScHad & F. Tordona to Section, Township, Range: T38 1872W Section 33 Landform (hillstope, terrace, etc.): Stranside bench. Local relief (concave, convex, none): varu. Stope (%): \_\_\_\_ Lat: 39044135,22"N Long: 105020 37.03"W Datum: NAD 83 Subregion (LRR): LKR-E Are climatic / hydrologic conditions on the site typical for this time of year? Yes 1 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 Hydric Soil Present? within a Wetland? Wetland Hydrology Present? Remarks: **VEGETATION** – Use scientific names of plants. Absolute Dominant Indicator Dominance Test worksheet: Tree Stratum (Plot size: \_\_\_\_\_) % Cover Species? Status **Number of Dominant Species** That Are OBL, FACW, or FAC: (A) Total Number of Dominant Species Across All Strata: Percent of Dominant Species That Are OBL, FACW, or FAC: \_ (A/B) Sapling/Shrub Stratum (Plot size: \_\_\_\_\_) Prevalence Index worksheet: 1Salix exigua Total % Cover of: Multiply by: OBL species \_\_\_\_\_ x 1 = \_\_\_\_\_ FACW species \_\_\_\_\_ x 2 = \_\_\_\_ FAC species \_\_\_\_\_ x 3 = \_\_\_\_ FACU species \_\_\_\_\_ x 4 = \_\_\_\_ 30 \_ = Total Cover UPL species \_\_\_\_\_ x 5 = \_\_\_\_ Herb Stratum (Plot size: Column Totals: \_\_\_\_\_ (A) \_\_\_\_ (B) 1. Juneus balticus Prevalence Index = B/A = Hydrophytic Vegetation Indicators: 4/ alanostis Canadensis 1 - Rapid Test for Hydrophytic Vegetation \_\_ 2 - Dominance Test is >50% 6. 3 - Prevalence Index is ≤3.01 4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet) 5 - Wetland Non-Vascular Plants1 Problematic Hydrophytic Vegetation<sup>1</sup> (Explain) <sup>1</sup>Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. \_/OO\_= Total Cover Woody Vine Stratum (Plot size: \_\_\_\_\_ Hydrophytic Vegetation Present? = Total Cover

Remarks:

% Bare Ground in Herb Stratum

	cription: (Describe	to me aspi	h needed to docum	nent tue i	ndicator	or commm	n the absence	of indicators.)
Depth	Matrix			x Feature:				027)
(Inches)	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
0-10	10 yr 3/2	1001	•					5,1/y loan
7 01	10 Ve 3/2	70%	Kyr5/Le	20	RM	M	W 11	Silly loan.
1-1-	10 41 -75	101.	1041 Ju		73141	101		
			***************************************					
				•97				
		000		.00				
				92				
	-	-	VI-0-19-AV-/AVP-1-AV-/AV-/AV-/AV-/AV-/AV-/AV-/AV-/AV-/AV-					
¹Type: C=C	Concentration, D=Dep	letion, RM=	Reduced Matrix, CS	S=Covered	or Coate	d Sand Gr		eation: PL=Pore Lining, M=Matrix.
Hydric Soll	Indicators: (Applic	able to all L	.RRs, unless other	rwise not	ed.)		indicato	rs for Problematic Hydric Solis <sup>3</sup> :
Histoso	il (A1)	7 <u>-</u>	Sandy Redox (S	S5)			2 cm	n Muck (A10)
Histic E	pipedon (A2)		Stripped Matrix	(S6)				Parent Material (TF2)
Black H	listic (A3)		Loamy Mucky N		15 15 EC	MLRA 1)		/ Shallow Dark Surface (TF12)
	en Sulfide (A4)	-	Loamy Gleyed I		)		Othe	er (Explain in Remarks)
	ed Below Dark Surface	e (A11)	Depleted Matrix				3, ,, ,	5 hd hdlac(-1) d
and the second s	Park Surface (A12)	10	Redox Dark Sur	1979	71			rs of hydrophytic vegetation and
	Mucky Mineral (S1) Gleyed Matrix (S4)		Depleted Dark S Redox Depress		")			nd hydrology must be present, s disturbed or problematic.
	Layer (if present):	-	Redux Depless	ions (i o)		V <del></del>	T	s disturbed of problemade.
Time:	COPPLE						1	
Depth (in	10		_				Hydric Soll	Present? Yes No
	iciles)	. 4					Tiyano con	11000111 100 100
Remarks:	Soil is ve	9	ahora Led	1				
ر	10 10	3	ज्यान स्कर्					
HYDROLO	OGY					-		
HYDROLC Wetland Hy			TO ACCOUNT OF THE PARTY OF THE					
Wetland Hy	drology indicators:	ne required	check all that appli	, , , , , , , , , , , , , , , , , , ,			Secon	ndary indicators (2 or more required)
Wetland Hy Primary Indi	drology Indicators:	ne required			ns /B0) /a	woont		ndary Indicators (2 or more required)
Wetland Hy Primary Indi Surface	ydrology Indicators: icators (minimum of o o Water (A1)	ne required	Water-Stal	ined Leav	the second second	xcept		/ater-Stained Leaves (B9) (MLRA 1, 2,
Wetland Hy Primary Indi Surface High W	ydrology Indicators: icators (minimum of o water (A1) ater Table (A2)	ne required	Water-Stal	ined Leav 1, 2, 4A, a	the second second	xcept	v	/ater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B)
Wetland Hy Primary Indi Surface High Wa	ydrology Indicators: icators (minimum of o b Water (A1) ater Table (A2) ion (A3)	ne required	Water-Stal MLRA Salt Crust	ined Leav 1, 2, 4A, a (B11)	and 4B)	xcept	v	/ater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10)
Wetland Hy Primary Indi Surface High Water M	ydrology Indicators: icators (minimum of o water (A1) ater Table (A2) ion (A3) Marks (B1)	ne required	Water-Stal MLRA Salt Crust Aquatic Inv	ined Leav 1, 2, 4A, a (B11) vertebrate	and 4B) s (B13)	xcept	v	Vater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rrainage Patterns (B10) ry-Season Water Table (C2)
Wetland Hy Primary Indi Surface High Water M Sedime	ydrology Indicators: icators (minimum of o b Water (A1) ater Table (A2) ion (A3) Marks (B1) int Deposits (B2)	ne required	Water-Stal MLRA Salt Crust Aquatic Inv	ined Leav 1, 2, 4A, a (B11) vertebrate Sulfide Od	and 4B) s (B13) dor (C1)		W D s	Vater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rrainage Patterns (B10) rry-Season Water Table (C2) aturation Visible on Aerial Imagery (C9)
Wetland Hy Primary Indi Surface High W Saturati Water M Sedime Drift De	ydrology Indicators: icators (minimum of o b Water (A1) later Table (A2) ion (A3) Marks (B1) int Deposits (B2) iposits (B3)	ne required	Water-Stal MLRA Salt Crust Aquatic Inv Hydrogen Oxidized F	ined Leav 1, 2, 4A, a (B11) vertebrate Sulfide Od Rhizosphe	nnd 4B) s (B13) dor (C1) res along	Living Roo	N D S ots (C3) G	Vater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rrainage Patterns (B10) rry-Season Water Table (C2) aturation Visible on Aerial Imagery (C9) decomorphic Position (D2)
Wetland Hy Primary Indi Surface High W Saturati Water M Sedime Drift De Algal M	ydrology Indicators: icators (minimum of o o Water (A1) fater Table (A2) ion (A3) Marks (B1) int Deposits (B2) iposits (B3) at or Crust (B4)	ne required	Water-Stal MLRA Salt Crust Aquatic Inv Hydrogen Oxidized F	ined Leav 1, 2, 4A, a (B11) vertebrate Sulfide Oc Rhizosphe of Reduce	s (B13) dor (C1) res along d Iron (C4	Living Roo	W D S ots (C3) G	Vater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) ry-Season Water Table (C2) aturation Visible on Aerial Imagery (C9) teomorphic Position (D2) hallow Aquitard (D3)
Wetland Hy Primary Indi Surface High W Saturati Water M Sedime Drift De Algal M Iron De	ydrology Indicators: icators (minimum of o o Water (A1) fater Table (A2) ion (A3) Marks (B1) iont Deposits (B2) ionsits (B3) fat or Crust (B4) posits (B5)	ne required	Water-Stal MLRA Salt Crust Aquatic In Hydrogen Oxidized F Presence	ined Leave 1, 2, 4A, a (B11) vertebrate Sulfide Or Rhizosphe of Reduce in Reducti	s (B13) dor (C1) res along d Iron (C4 on in Tille	Living Roo 4) d Soils (Ce	W D S ots (C3) G S	Vater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) ry-Season Water Table (C2) aturation Visible on Aerial Imagery (C9) beomorphic Position (D2) hallow Aquitard (D3) AC-Neutral Test (D5)
Wetland Hy Primary Indi Surface High W Saturati Water M Sedime Drift De Algal M Iron De Surface	ydrology Indicators: icators (minimum of o water (A1) iater Table (A2) ion (A3) Marks (B1) int Deposits (B2) iposits (B3) iat or Crust (B4) posits (B5) is Soil Cracks (B6)		Water-Stal MLRA Salt Crust Aquatic Inv Hydrogen Oxidized F Presence of Recent Iro Stunted or	ined Leav 1, 2, 4A, a (B11) vertebrate Sulfide Oc Rhizosphe of Reduce n Reducti	s (B13) dor (C1) res along d Iron (Co on in Tille Plants (D	Living Roo 4) d Soils (Ce	N D S ots (C3) G S 6) F	Vater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) ry-Season Water Table (C2) aturation Visible on Aerial Imagery (C9) becomorphic Position (D2) hallow Aquitard (D3) AC-Neutral Test (D5) taised Ant Mounds (D6) (LRR A)
Wetland Hy Primary Indi Surface High W Saturati Water M Sedime Drift De Algal M Iron De Surface Inundat	ydrology Indicators: icators (minimum of o water (A1) iater Table (A2) ion (A3) Marks (B1) int Deposits (B2) iposits (B3) iat or Crust (B4) posits (B5) is Soil Cracks (B6) ion Visible on Aerial I	magery (B7	Water-Stal MLRA Salt Crust Aquatic Inv Hydrogen Oxidized F Presence of Recent Iro Stunted or Other (Exp	ined Leav 1, 2, 4A, a (B11) vertebrate Sulfide Oc Rhizosphe of Reduce n Reducti	s (B13) dor (C1) res along d Iron (Co on in Tille Plants (D	Living Roo 4) d Soils (Ce	N D S ots (C3) G S 6) F	Vater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) ry-Season Water Table (C2) aturation Visible on Aerial Imagery (C9) beomorphic Position (D2) hallow Aquitard (D3) AC-Neutral Test (D5)
Wetland Hy Primary Indi Surface High W Saturati Water M Sedime Drift De Algal M Iron De Surface Inundat Sparsel	ydrology Indicators: icators (minimum of o b Water (A1) iater Table (A2) ion (A3) Marks (B1) int Deposits (B2) iposits (B3) iat or Crust (B4) posits (B5) b Soil Cracks (B6) idon Visible on Aerial I ly Vegetated Concave	magery (B7	Water-Stal MLRA Salt Crust Aquatic Inv Hydrogen Oxidized F Presence of Recent Iro Stunted or Other (Exp	ined Leav 1, 2, 4A, a (B11) vertebrate Sulfide Oc Rhizosphe of Reduce n Reducti	s (B13) dor (C1) res along d Iron (Co on in Tille Plants (D	Living Roo 4) d Soils (Ce	N D S ots (C3) G S 6) F	Vater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) ry-Season Water Table (C2) aturation Visible on Aerial Imagery (C9) becomorphic Position (D2) hallow Aquitard (D3) AC-Neutral Test (D5) taised Ant Mounds (D6) (LRR A)
Wetland Hy Primary Indi Surface High Water Mater	icators (minimum of o b Water (A1) dater Table (A2) dion (A3) Marks (B1) ant Deposits (B2) aposits (B3) dat or Crust (B4) posits (B5) a Soil Cracks (B6) dion Visible on Aerial I by Vegetated Concaver	magery (B7 e Surface (B	Water-Stal MLRA Salt Crust Aquatic Inv Hydrogen Oxidized F Presence G Recent Iro Stunted or Other (Exp	ined Leav 1, 2, 4A, a (B11) vertebrate Sulfide Oc Rhizosphe of Reduce in Reducti Stressed blain in Re	s (B13) dor (C1) res along d Iron (Co on in Tille Plants (D	Living Roo 4) d Soils (Ce	N D S ots (C3) G S 6) F	Vater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) ry-Season Water Table (C2) aturation Visible on Aerial Imagery (C9) becomorphic Position (D2) hallow Aquitard (D3) AC-Neutral Test (D5) taised Ant Mounds (D6) (LRR A)
Wetland Hy Primary Indi Surface High W Saturati Water M Sedime Drift De Algal M Iron De Surface Inundat Sparsel Field Obser	ydrology Indicators: icators (minimum of o water (A1) ater Table (A2) ion (A3) Marks (B1) int Deposits (B2) ionosits (B3) at or Crust (B4) posits (B5) io Soil Cracks (B6) ition Visible on Aerial I y Vegetated Concave rvations: ter Present?	magery (B7 s Surface (B	Water-Stal MLRA Salt Crust Aquatic Inv Hydrogen Oxidized F Presence of Recent Iro Stunted or Other (Exp.	ined Leav 1, 2, 4A, a (B11) vertebrate Sulfide Or Rhizosphe of Reduce in Reducti Stressed blain in Re	s (B13) dor (C1) res along d Iron (Co on in Tille Plants (D	Living Roo 4) d Soils (Ce	N D S ots (C3) G S 6) F	Vater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) ry-Season Water Table (C2) aturation Visible on Aerial Imagery (C9) becomorphic Position (D2) hallow Aquitard (D3) AC-Neutral Test (D5) taised Ant Mounds (D6) (LRR A)
Wetland Hy Primary Indi Surface High W Saturati Water M Sedime Drift De Algal M Iron De Surface Inundat Sparsel Field Obset Surface Water Table	ydrology Indicators: icators (minimum of o water (A1) ater Table (A2) ion (A3) Marks (B1) int Deposits (B2) ionosits (B3) at or Crust (B4) posits (B5) ionovisible on Aerial I y Vegetated Concave rvations: ter Present?  Y	magery (B7 Surface (B es N	Water-Stal  MLRA Salt Crust Aquatic Inv Hydrogen Oxidized F Presence of Recent Iro Stunted or Other (Exp 8)  Depth (Inc	ined Leav 1, 2, 4A, a (B11) vertebrate Sulfide Oc Rhizosphe of Reduce in Reducti Stressed blain in Re ches): ches):	s (B13) dor (C1) res along d Iron (Co on in Tille Plants (D	Living Roo 4) d Soils (Ce 1) (LRR A	W D S ots (C3) G S 6) F	Vater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) rry-Season Water Table (C2) aturation Visible on Aerial Imagery (C9) becomorphic Position (D2) hallow Aquitard (D3) AC-Neutral Test (D5) taised Ant Mounds (D6) (LRR A) rost-Heave Hummocks (D7)
Wetland Hy Primary Indi Surface High W Saturati Sedime Drift De Algal M Iron De Surface Inundat Sparsel Field Obset Surface Wat Water Table Saturation F	ydrology Indicators: icators (minimum of o water (A1) ater Table (A2) ion (A3) Marks (B1) int Deposits (B2) ionosits (B3) iat or Crust (B4) posits (B5) is Soil Cracks (B6) ition Visible on Aerial I y Vegetated Concave rvations: ter Present? Present? Y	magery (B7 Surface (B es N	Water-Stal MLRA Salt Crust Aquatic Inv Hydrogen Oxidized F Presence of Recent Iro Stunted or Other (Exp.	ined Leav 1, 2, 4A, a (B11) vertebrate Sulfide Oc Rhizosphe of Reduce in Reducti Stressed blain in Re ches): ches):	s (B13) dor (C1) res along d Iron (Co on in Tille Plants (D	Living Roo 4) d Soils (Ce 1) (LRR A	W D S ots (C3) G S 6) F	Vater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) ry-Season Water Table (C2) aturation Visible on Aerial Imagery (C9) becomorphic Position (D2) hallow Aquitard (D3) AC-Neutral Test (D5) taised Ant Mounds (D6) (LRR A)
Wetland Hy Primary Indi Surface High Water M Sedime Drift De Algal M Iron De Surface Inundat Sparsel Surface Wat Water Table Saturation F (includes ca	ydrology Indicators: icators (minimum of o water (A1) ater Table (A2) ion (A3) Marks (B1) int Deposits (B2) iposits (B3) at or Crust (B4) posits (B5) ion Visible on Aerial I ly Vegetated Concave rvations: ter Present? Present? Y Present? Y Present? Y Present? Y	magery (B7 e Surface (B es N es N	Water-Stal MLRA Salt Crust Aquatic Inv Hydrogen Oxidized F Presence of Recent Iro Stunted or Other (Exp 8) Depth (inc	ined Leav 1, 2, 4A, a (B11) vertebrate Sulfide Oc Rhizosphe of Reduce in Reducti Stressed blain in Re ches): ches):	s (B13) dor (C1) res along d Iron (C4) on in Tille Plants (D marks)	Living Root 4) d Soils (C6 1) (LRR A	W D S ots (C3) S 6) F \ F	Vater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) rry-Season Water Table (C2) aturation Visible on Aerial Imagery (C9) becomorphic Position (D2) hallow Aquitard (D3) AC-Neutral Test (D5) taised Ant Mounds (D6) (LRR A) rost-Heave Hummocks (D7)
Wetland Hy Primary Indi Surface High Water M Sedime Drift De Algal M Iron De Surface Inundat Sparsel Surface Wat Water Table Saturation F (includes ca	ydrology Indicators: icators (minimum of o water (A1) ater Table (A2) ion (A3) Marks (B1) int Deposits (B2) ionosits (B3) iat or Crust (B4) posits (B5) is Soil Cracks (B6) ition Visible on Aerial I y Vegetated Concave rvations: ter Present? Present? Y	magery (B7 e Surface (B es N es N	Water-Stal MLRA Salt Crust Aquatic Inv Hydrogen Oxidized F Presence of Recent Iro Stunted or Other (Exp 8) Depth (inc	ined Leav 1, 2, 4A, a (B11) vertebrate Sulfide Oc Rhizosphe of Reduce in Reducti Stressed blain in Re ches): ches):	s (B13) dor (C1) res along d Iron (C4) on in Tille Plants (D marks)	Living Root 4) d Soils (C6 1) (LRR A	W D S ots (C3) S 6) F \ F	Vater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) rry-Season Water Table (C2) aturation Visible on Aerial Imagery (C9) becomorphic Position (D2) hallow Aquitard (D3) AC-Neutral Test (D5) taised Ant Mounds (D6) (LRR A) rost-Heave Hummocks (D7)
Wetland Hy Primary Indi Surface High W Saturati Water N Sedime Drift De Algal M Iron De Surface Inundat Sparsel Field Obset Surface Wat Water Table Saturation F (includes ca Describe Re	ydrology Indicators: icators (minimum of o water (A1) ater Table (A2) ion (A3) Marks (B1) int Deposits (B2) iposits (B3) at or Crust (B4) posits (B5) ion Visible on Aerial I ly Vegetated Concave rvations: ter Present? Present? Present? Y ipillary fringe) acorded Data (stream	magery (B7 s Surface (B es N es N gauge, mor	Water-Stal MLRA Salt Crust Aquatic Inv Hydrogen Oxidized F Presence of Recent Iro Stunted or Other (Exp  B) Depth (Inc Depth (Inc	ined Leav 1, 2, 4A, a (B11) vertebrate Sulfide Oc Rhizosphe of Reduce in Reducti Stressed olain in Re ches): ches): ches):	s (B13) dor (C1) res along d Iron (C4) on in Tille Plants (D marks)	Living Root 4) d Soils (C6 1) (LRR A	W D S S S S S S F S F I and Hydrolog if available:	Vater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) rry-Season Water Table (C2) aturation Visible on Aerial Imagery (C9) becomorphic Position (D2) hallow Aquitard (D3) AC-Neutral Test (D5) taised Ant Mounds (D6) (LRR A) rost-Heave Hummocks (D7)
Wetland Hy Primary Indi Surface High Water M Sedime Drift De Algal M Iron De Surface Inundat Sparsel Surface Wat Water Table Saturation F (includes ca	ydrology Indicators: icators (minimum of o water (A1) ater Table (A2) ion (A3) Marks (B1) int Deposits (B2) iposits (B3) at or Crust (B4) posits (B5) ion Visible on Aerial I ly Vegetated Concave rvations: ter Present? Present? Present? Y ipillary fringe) acorded Data (stream	magery (B7 s Surface (B es N es N gauge, mor	Water-Stal MLRA Salt Crust Aquatic Inv Hydrogen Oxidized F Presence of Recent Iro Stunted or Other (Exp  B) Depth (Inc Depth (Inc	ined Leav 1, 2, 4A, a (B11) vertebrate Sulfide Oc Rhizosphe of Reduce in Reducti Stressed olain in Re ches): ches): ches):	s (B13) dor (C1) res along d Iron (C4) on in Tille Plants (D marks)	Living Root 4) d Soils (C6 1) (LRR A	W D S S S S S S F S F I and Hydrolog if available:	Vater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) rry-Season Water Table (C2) aturation Visible on Aerial Imagery (C9) becomorphic Position (D2) hallow Aquitard (D3) AC-Neutral Test (D5) taised Ant Mounds (D6) (LRR A) rost-Heave Hummocks (D7)
Wetland Hy Primary Indi Surface High W Saturati Water N Sedime Drift De Algal M Iron De Surface Inundat Sparsel Field Obset Surface Wat Water Table Saturation F (includes ca Describe Re	ydrology Indicators: icators (minimum of o water (A1) ater Table (A2) ion (A3) Marks (B1) int Deposits (B2) iposits (B3) at or Crust (B4) posits (B5) ion Visible on Aerial I ly Vegetated Concave rvations: ter Present? Present? Present? Y ipillary fringe) acorded Data (stream	magery (B7 s Surface (B es N es N gauge, mor	Water-Stal MLRA Salt Crust Aquatic Inv Hydrogen Oxidized F Presence of Recent Iro Stunted or Other (Exp  B) Depth (Inc Depth (Inc	ined Leav 1, 2, 4A, a (B11) vertebrate Sulfide Oc Rhizosphe of Reduce in Reducti Stressed olain in Re ches): ches): ches):	s (B13) dor (C1) res along d Iron (C4) on in Tille Plants (D marks)	Living Root 4) d Soils (C6 1) (LRR A	W D S S S S S S F S F I and Hydrolog if available:	Vater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) rry-Season Water Table (C2) aturation Visible on Aerial Imagery (C9) becomorphic Position (D2) hallow Aquitard (D3) AC-Neutral Test (D5) taised Ant Mounds (D6) (LRR A) rost-Heave Hummocks (D7)
Wetland Hy Primary Indi Surface High W Saturati Water N Sedime Drift De Algal M Iron De Surface Inundat Sparsel Field Obset Surface Wat Water Table Saturation F (includes ca Describe Re	ydrology Indicators: icators (minimum of o water (A1) ater Table (A2) ion (A3) Marks (B1) int Deposits (B2) iposits (B3) at or Crust (B4) posits (B5) ion Visible on Aerial I ly Vegetated Concave rvations: ter Present? Present? Present? Y ipillary fringe) acorded Data (stream	magery (B7 s Surface (B es N es N gauge, mor	Water-Stal MLRA Salt Crust Aquatic Inv Hydrogen Oxidized F Presence of Recent Iro Stunted or Other (Exp  B) Depth (Inc Depth (Inc	ined Leav 1, 2, 4A, a (B11) vertebrate Sulfide Oc Rhizosphe of Reduce in Reducti Stressed olain in Re ches): ches): photos, pr	s (B13) dor (C1) res along d Iron (C4) on in Tille Plants (D marks)	Living Root 4) d Soils (C6 1) (LRR A	W D S S S S S S F S F I and Hydrolog if available:	Vater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) rry-Season Water Table (C2) aturation Visible on Aerial Imagery (C9) becomorphic Position (D2) hallow Aquitard (D3) AC-Neutral Test (D5) taised Ant Mounds (D6) (LRR A) rost-Heave Hummocks (D7)
Wetland Hy Primary Indi Surface High W Saturati Water N Sedime Drift De Algal M Iron De Surface Inundat Sparsel Field Obset Surface Wat Water Table Saturation F (includes ca Describe Re	ydrology Indicators: icators (minimum of o water (A1) ater Table (A2) ion (A3) Marks (B1) int Deposits (B2) iposits (B3) at or Crust (B4) posits (B5) ion Visible on Aerial I ly Vegetated Concave rvations: ter Present? Present? Present? Y ipillary fringe) acorded Data (stream	magery (B7 s Surface (B es N es N gauge, mor	Water-Stal MLRA Salt Crust Aquatic Inv Hydrogen Oxidized F Presence of Recent Iro Stunted or Other (Exp 8) Depth (inc	ined Leav 1, 2, 4A, a (B11) vertebrate Sulfide Oc Rhizosphe of Reduce in Reducti Stressed olain in Re ches): ches): photos, pr	s (B13) dor (C1) res along d Iron (C4) on in Tille Plants (D marks)	Living Root 4) d Soils (C6 1) (LRR A	W D S S S S S S F S F I and Hydrolog if available:	Vater-Stained Leaves (B9) (MLRA 1, 2, 4A, and 4B) rainage Patterns (B10) rry-Season Water Table (C2) aturation Visible on Aerial Imagery (C9) becomorphic Position (D2) hallow Aquitard (D3) AC-Neutral Test (D5) taised Ant Mounds (D6) (LRR A) rost-Heave Hummocks (D7)

# WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

7 = 1	1	11	0
Project/Site: /win Tranels En			1 Creek Sampling Date: 10.30.
Applicant/Owner: CDOT Resion			State: Sampling Point: <u>W - 5</u> .
			nge: T35 R72W Section 33
			convex, none): Slope (%):
Subregion (LRR):	Lat: <u>-</u>	39°44'35.70"N	) Long: 105°20'34.30"W Datum: NAD
Soil Map Unit Name: W//			NWI classification: N/A
Are climatic / hydrologic conditions on the	site typical for this time of y	ear? Yes No _	(If no, explain in Remarks.)
Are Vegetation, Soil, or Hy			"Normal Circumstances" present? Yes No
Are Vegetation, Soil, or Hy			eeded, explain any answers in Remarks.)
		37.0	ocations, transects, important features, e
Hydrophytic Vegetation Present?	Yes No No		
Hydric Soil Present?	Yes No	Is the Sampled	
Wetland Hydrology Present?	Yes No	within a Wetlar	ildr res No No
Remarks: Streamside	bench adjae	ent to Clean	Oreck
VEGETATION – Use scientific n	ames of plants.		
Tree Stratum (Plot size:	Absolute	Dominant Indicator Species? Status	Dominance Test worksheet:
1			Number of Dominant Species That Are OBL, FACW, or FAC: (A
2.			
3.			Total Number of Dominant Species Across All Strata: (B
4.			
		_ = Total Cover	Percent of Dominant Species That Are OBL, FACW, or FAC: (A
Sapling/Shrub Stratum (Plot size:		110 001	Prevalence Index worksheet:
1. Salix exigna		NO OBL	Total % Cover of: Multiply by:
2.		7	OBL species x 1 =
3 4			FACW species x 2 =
5.			FAC species x 3 =
V			FACU species x 4 =
Herb Stratum (Plot size:			UPL species x 5 =
1. Agrostis alba	50	yes paco	Column Totals: (A) (I
2. Tuncus balticus		ULS OBL	Prevalence Index = B/A =
3. Corex sp.			Hydrophytic Vegetation Indicators:
4			1 - Rapid Test for Hydrophytic Vegetation
5			2 - Dominance Test is >50%
6			3 - Prevalence Index is ≤3.0¹ 4 - Morphological Adaptations¹ (Provide support
7,			data in Remarks or on a separate sheet)
9			5 - Wetland Non-Vascular Plants <sup>1</sup>
10			Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
11.			¹Indicators of hydric soil and wetland hydrology mus
	1001	_ = Total Cover	be present, unless disturbed or problematic.
Woody Vine Stratum (Plot size:			
1			Hydrophytic Vegetation
2		= Total Cover	Present? Yes No
% Bare Ground in Herb Stratum			
Remarks:		**	

0	0	ı	H	
3	u	ı	U	_

Profile Description: (Describe to the dep	th needed to document the Indicator or confirm	the absence of indicators.)
Depth Matrix	Redox Features	
(Inches) Color (moist) %	Color (moist) % Type <sup>1</sup> Loc <sup>2</sup>	Texture Remarks
0-4 10 yr 3/2 100	10 1 61 0 011 11	Silty loam
4-12 10 419/8 70	10 yr 5/4 30 RM M	" " Silty loan
1-		2
Hydric Soll Indicators: (Applicable to all	=Reduced Matrix, CS=Covered or Coated Sand Gra	ains. <sup>2</sup> Location: PL=Pore Lining, M=Matrix. Indicators for Problematic Hydric Solis <sup>3</sup> :
Histosol (A1)		
Histic Epipedon (A2)	Sandy Redox (S5) Stripped Matrix (S6)	2 cm Muck (A10) Red Parent Material (TF2)
Black Histic (A3)	Loamy Mucky Mineral (F1) (except MLRA 1)	Very Shallow Dark Surface (TF12)
Hydrogen Sulfide (A4)	Jamy Gleyed Matrix (F2)	Other (Explain in Remarks)
Depleted Below Dark Surface (A11)	Depleted Matrix (F3)	•
Thick Dark Surface (A12)	Redox Dark Surface (F6)	<sup>3</sup> Indicators of hydrophytic vegetation and
Sandy Mucky Mineral (S1) Sandy Gleyed Matrix (S4)	Depleted Dark Surface (F7) Redox Depressions (F8)	wetland hydrology must be present, unless disturbed or problematic.
Restrictive Layer (if present):	Redox Depressions (Fo)	unless disturbed or problematic.
Type:		_ [
Depth (inches):		Hydric Soil Present? Yes No
Remarks:		Tryano don riddom ridd No
romano.		
HYDROLOGY		
Wetland Hydrology Indicators:	• "· · · · · · ·	
Primary Indicators (minimum of one required	t; check all that apply)	Secondary Indicators (2 or more required)
Surface Water (A1)	Water-Stained Leaves (B9) (except	Water-Stained Leaves (B9) (MLRA 1, 2,
High Water Table (A2)	MLRA 1, 2, 4A, and 4B)	4A, and 4B)
✓ Saturation (A3)	Salt Crust (B11)	Drainage Patterns (B10)
Water Marks (B1)	Aquatic Invertebrates (B13)	Dry-Season Water Table (C2)
Sediment Deposits (B2)	Hydrogen Sulfide Odor (C1)	Saturation Visible on Aerial Imagery (C9)
Drift Deposits (B3)	Oxidized Rhizospheres along Living Root	s (C3) Geomorphic Position (D2)
Algal Mat or Crust (B4)	Presence of Reduced Iron (C4)	Shallow Aquitard (D3)
Iron Deposits (B5)	Recent Iron Reduction in Tilled Soils (C6)	Water State Company of the Company o
Surface Soil Cracks (B6)	Stunted or Stressed Plants (D1) (LRR A)	
Inundation Visible on Aerial Imagery (B	fi — i see con New Introducer and a contract (	Frost-Heave Hummocks (D7)
Sparsely Vegetated Concave Surface ( Field Observations:	oo)	
	No. 1 Double (inches):	
Property of the second	No Depth (inches):	
:		nd Hydrology Present? Yes No
(includes capillary fringe)	Vetta	nd Hydrology Present? Yes No
	nitoring well, aerial photos, previous inspections), if	f available:
Remarks:		A
Nomano.	beach adjagent to	()   1 () 40.144
Stremside	bench adjacent to	Clean Creuk
Stranside	bench adjacent to l	Clean Creuk
Stremsiale	bench adjacent to l	Clean Creuk
Streamsiale	bench adjacent to (	Clean Creuk

# Appendix B – Photographs

# PHOTO DOCUMENTATION

Twin Tunnels Environmental Assessment Study Area (Photos taken Francesca Tordonato, Jacobs)

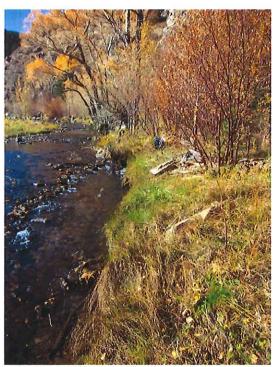


Photo 1: Wetland 1 along Clear Creek.

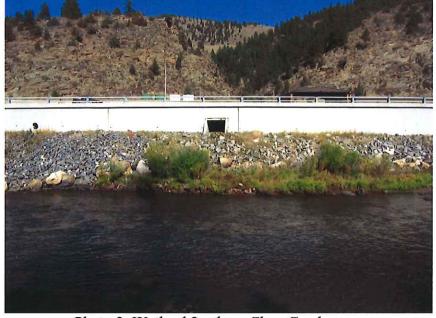


Photo 2: Wetland 2a along Clear Creek.

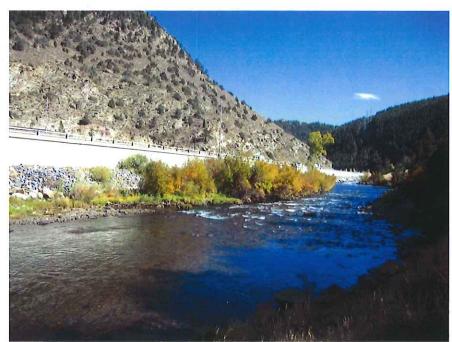
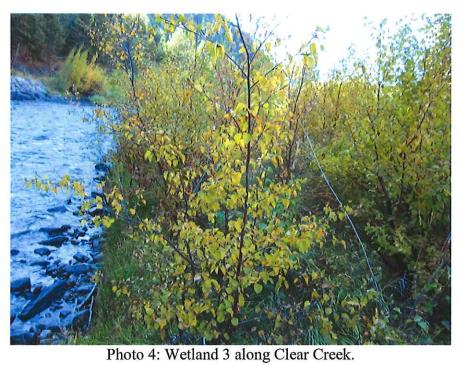


Photo 3: Wetland 2b along Clear Creek.



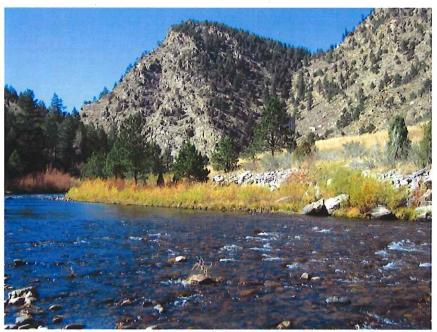


Photo 5: Wetland 4a and 4b along Clear Creek

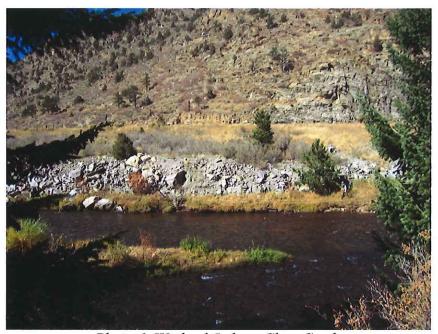


Photo 6: Wetland 5 along Clear Creek

# Appendix C – FACWet Data Sheets

#### **ADMINISTRATIVE CHARACTERIZATION** Date of Evaluation: General Information 11/9/12 Frontage Road + Project Twin Tunnels Environmental Assessment Site Name or ID: Project Name: 404 or Other Permit CDOT Application #: Applicant Name: Senior Biologist Evaluator's professional position and Wilson + Company Robert Belford Evaluator Name(s): organization Location Information: Geographic Site Location Datum Used (Lat./Long. or UTM): (NAD 83 1:24,000 1:100,000 Map Scale: USGS Quadrangle (Circle one) Other Мар: 1: Wetland Sub basin Name(8 Private 10190004 Ownership: digit HUC): Project Information: Potentially Impacted Wetlands Purpose of Mitigation; Pre-construction Evaluation ✓ Project Wetland Mitigation; Post-construction This evaluation is (check all being performed at: Mitigation Site Monitorina applicable): (Check applicable box) Other (Describe) Intent of Project: (Check all applicable) ☐ Restortation Enhancement Creation 12 wetland along clear creek Measured - GPS - Includes Total Size of Wetland Involved: .96 ac. (Record Area, Check and Describe Polygons Estimated Measurement Method Used) Assessment Area (AA) Size (Record 3.3 Measured ac. ac. ac. ac. Area, check appropriate box. Additional spaces are used to record acreage when more than one AA is cc banks Estimated ac. ac. ac. included in a single assessment) banks within the Frontage Road + Twin Tunnels Project Areas. The large AA was used because all of the wetlands are all the was used because all Characteristics or Method used for AA boundary determination: of the wetlands are of the same HGM Class. Notes:

# ECOLOGICAL DESCRIPTION 1

Special Co	ncerns	Check all that apply		, A Late	4 1 2			
	s including Histosols or ne AA (i.e., AA includes			74.05	eatened or endangered D to occur in the AA?	species are		
	directly impact organic seas possessing either H		92					
	s are known to occur an wetland of which the AA				oncern according to the IHP) are known to occu			
The wetland urbanized la	l is a habitat oasis in an indscape?	otherwise dry or .			cated within a potential ccurrence buffer area a			
	reatened or endangered AA? List Below.	species areKNOWN to	П	Other specia	il concerns (please desc	cribe)		
			. '			To 2		
	j	IYDROGEOMOR	PHI	C SETTII	vg ·			
If the above			nd typ	e if discerna	ble using the table bel	4 4		
Current Co	nditions	Describe the hydrogeor that apply.	norph	ic setting of	the wetland by circling	all conditions		
	Water source	Surface flow	C	Froundwater	Precipitation	Unknown		
	Hydrodynamics	Unidirectional		Vertical	Bi-directional			
-	Wetland Gradient	0-29	<b>%</b>	2-4%	4-10% >10	%		
	# Surface Inlets	Over-bank	>	0 1	2 3	>3		
HGM Setting	# Surface Outlets			) 1	2 3	>3		
TOW Octung	Geomorphic Setting (Narrative Description. Include approx. stream order for riverine)	The wetlands Creek is a wetlands as wetlands as	first rek	cour in t-order present	a riverine so stream. All along the	the banks of		
	HGM class	Riverine	N.	Slope	Depressional	Lacustrine		
listorical Co	nditions	System of the production	Л	= 15	20 BL	-		
	Water source	Surface flow	C	Froundwater	Precipitation	Unknown		
1 * 9) * N	Hydrodynamics	Unidirectional		Vertical				
Previous wetland typology	Geomorphic Setting (Narrative Description)		(2)	N T				
	Previous HGM Class	Riverine		Slope	Depressional	Lacustrine		
Notes (include in	formation on the AA's I	HGM subclass and regio	nal su	bclass):				

# ECOLOGICAL DESCRIPTION 2

System	η. [	Subsys	stem	- 23	Clas	SS		S	ubcla	ass	115		Wat	er Re	egime	9	Ot	ther I	Modi	fiers	1 %	AA
Riverin	rine Palustrine		E	m/5	5	Co	bble	- 6	rav	el	-		E	385				/			/	
	e Se		V.	18	1	ng fiv				8 +	01 S.TE		5 5 7 (0) (0)			d at		11 11				5. 76.
e 11,072 is		7		a v	4. 1.	1. /		7. I		7.0	4			4. 5	-11		. :-	ox ox m	ii je			Ţ
. ,		a 61	Y	۰				8.0	6 11 1					pa 6	, = e			- 1		· .		
		9 ,		6.2					-,	0.7 T		2 E			- 1	e f	112.5				-	
	N, Le		A II a		380					13						2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	6 to		10. 15.	F. 1		
			" "		5 17			, (m)	100 A 2							, p (*		, 5		a e	1	62
· · · · ·			3						./2 /8	b <sub>e</sub> i					•		1	. 10			,	
			Ž.	2 1	V, 86= <sup>36</sup>		, ii., 1	ž 2	e " e'	Fav.	98.5		- 9		ar eus	, 577s	G.F.	941 S 25		- 3 <sup>W</sup>	1 22.1	
acustrine		oral; inoral						1						vor.		W F	H	Hypers Eusa	aline(7 line(8)			
Palustrine	Pal	ustrine			ck Bot				ing va	A STATE OF		T	empor		oded(	4);	Mixo	saline(	(9); Fre d(a);	esh(0);		
* * .1 = *	-	1 4		Aqu	atic Be	om(UB) ed(AB) re(RS)	- Ve		l; Persi			Š	Season		oded(( sat.(E)		MST-0250	ircumr aline/ca	eutral			
	Lov	ver pere	nnial:	Unc	on Sho	re(US)	V25050		aved o				emi-P	erm. flo	oded(	- -);		anic(g) eaver(b				
Riverine	Up	per pere	nnial;	Shri		ıb(SS)			ble - g and; M				Artificia	ally floo	posed ded(K	);	Dr	ained/ Farn		d(d);		
				1 10	rested	(FO)	1		Organi						m./Seas. (Y); permenant(Z)		Farmed(f); Diked/impounded(h); Artificial Substrate(r);		ounde			
200	linte	1														-1-7	Arti	ticial S	ubstra	te(r),	19371	120
			<del></del>		. <del>Tradesia</del>	0.44 u					.we-no-1		and the second	CI-LUI II			Spo	il(s); E	xcavat	ted(x)		
	p					nap of to					nt port	ions o	f the v		d, AA	bound	Spo dary, s	il(s); E	ires, l	ted(x) nabitat	class	ees, a
= 2	p											ions o	f the v		d, AA	bound	Spo dary, s	il(s); E	ires, l	ted(x) nabitat	class	ees, a
- 1	p											ions o	f the v		d, AA	bound	Spo dary, s	il(s); E	ires, l	ted(x) nabitat	class	ees, a
	p											ions o	f the v		d, AA	bound	Spo dary, s	il(s); E	ires, l	ted(x) nabitat	class	ees, a
= 2	p											ions o	f the v		d, AA	bound	Spo dary, s	il(s); E	ires, l	ted(x) nabitat	class	es, a
	p											ions o	f the v		d, AA	bound	Spo dary, s	il(s); E	ires, l	ted(x) nabitat	class	es, a
= 2	p											ions o	f the v		d, AA	bound	Spo dary, s	il(s); E	ires, l	ted(x) nabitat	classs	ees,
	0						s.				da	ions o	f the v		d, AA	bound	Spo dary, s	il(s); E	ires, l	ted(x) nabitat	class	ees,
	0				ficant		s.				da	ions o	f the v	عب	d, AA	bound	Spo	il(s); E	ires, l	nabitat	class	
= 2	0				ficant		s.	Se			da	ions o	f the v	عب	d, AA	bound	Spo	il(s); E	ires, l	nabitat	class	
	0				ficant		s.	Se	•		da	ions o	f the v	عب	d, AA	bound	Spo	il(s); E	ires, l	abitat	class	
	0				ficant		s.	Se	•		10	ions o	f the v	عب	d, AA	bound	Spo	il(s); E	ires, l	abitat		
= 2	0				ficant		s.	Se	•		10	ions o	f the v	عب	d, AA	bound	Spo	il(s); E	ires, l	abitat		
- 1	0				ficant		s.	Se	•		10	ions o	f the v	عب	d, AA	bound	Spo	structu	ires, l	abitat		
Site Mar	0				ficant		s.	Se	•		100	ions o	f the v	عب	d, AA	bound	Spool Spool	structu	ires, l	abitat		

# 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 and hydric soils 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 labitat Connectivity Envelope (HCE)
- 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).

	, in the second			
855 680 - 6			Variable 1 Score	. 65
	ec e v			L
Notes:	* 1 * 1			

# 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 or 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.

T	A STATE OF THE PARTY OF THE PAR	Stressors	Comments/description
· V	/	Major Highway	I-70 - Bank Zuracts and Channelzation.
ers ers	- )	Secondary Highway	
barriers	/	Tertiary Roadway	Frontage Road - Bank Impacts, Encroachmenton
	A	Railroad	
artiricia V		Bike Path	Encreachant on rhavian corridor.
		Urban Development	
<u>м</u>		Agricultural Development	
	-	Artificial Water Body	
		Fence	
		Ditch or Aqueduct	
n -		Aquatic Organism Barriers	
			A
1411 592			

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 wetland/riparian habitat 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 wetland/riparian habitat. 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 wetland/riparian habitat. 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 wetland/riparian habitat 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 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.

	W	Stressors	Comments/description
		Industrial/commercial	
es.	- 2	Urban	
Change		Residential	
ha	(4)	Rural	The second of th
0	9	Dryland Farming	
Use	5.75	Intensive Agriculture	
and (	(F)	Orchards or Nurseries	
ğ		Livestock Grazing	
ī	~	Transportation Corridor	Impermeable surface, roadway run-off
SIS		Urban Parklands	
SS		Dams/impoundments	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Stressors		Artificial Water body	
(i)		Physical Resource Extraction	
		Biological Resource Extraction	
	9	a spe	

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 • 69

# 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 8.

# 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.

· A	Stressors	Comments/description
Marketon	Ditches or Drains (tile, etc.)	
	Dams	
	Diversions	
	Groundwater pumping	
	Draw-downs	M 40° a 2 a a a a a a a a a a a a a a a a a
	Culverts or Constrictions	
	Point Source (urban, ind., ag.)	
	Non-point Source	
	Increased Drainage Area	
	Storm Drain/Urban Runoff	
	Impermeable Surface Runoff	
л х	Irrigation Return Flows	
	Mining/Natural Gas Extraction	
Si .	Transbasin Diversion	
11.7	Actively Managed Hydrology	
	N 4	

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 increase 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 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. In most cases, the Water Source variable score will set the upper limit for the Water Distribution score.

/	Stressors	Comments/description
	Alteration of Water Source	
	Ditches	
	Ponding/Impoundment	
	Culverts	
1	Road Grades	Encroachment on flood plan.
	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	
	Enlarged Channel	
V	Artificial Banks/Shoreline	Roadway alteration of banks.
	Weirs	set As at the set of t
	Dikes/Levees/Berms	
e	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

.72

# 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. In most cases the Water Source variable will set the upper limit for the Water Outflow score.

1	Stressors	Comments/description
	Alteration of Water Source	
	Ditches	
	Dikes/Levees	9 2 3 5 5 6 4 6 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6
	Road Grades	
	Culverts	
1	Diversions	
	Constrictions	
	Channel Incision/Entrenchment	
	Hardened/Engineered Channel	V 1
	Artificial Stream Banks	4 1 7 2 E K
LUNE.	Weirs	
	Confined Bridge Openings	
	T 7 T 7 C 4.	

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 cutflow 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

.90

# 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		# J ##8 V			200	
PROPERTY	-	Dredging/Excavation/Mining		E Assa	2 7 75.00				
5.75		Fill, including dikes, road grades, etc.		- 20			8 8 8 8 8	. = 6	9 2
	1	Grading						. 10	-
11-2	=	Compaction		e i i i i i i i i i i i i i i i i i i i			Y	2 5	
	eral	Plowing/Disking	F 4 1 4		- 10.00		- 1 %		
	en	Excessive Sedimentation	= u <sup>2</sup> = 20	1 = 1		- a - I	4		=
- 1	O	Dumping							
	4	Hoof Shear/Pugging		7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Tipe Tipe Tipe Tipe Tipe Tipe Tipe Tipe	W.			
		Aggregate or Mineral Mining		1 3	Ti.				
		Sand Accumulation							
		Channel Instability/Over Widening		AND DESCRIPTION OF THE PROPERTY OF THE PARTY		A STATE OF STREET, WINGS AND	ALPHA TIME WATER THE PLAN HEAD	TO SEE BY A BASE OF THE PARTY O	Print have y a so in Control
_	2	Excessive Bank Erosion		E .	. 7 1				
<b>V</b>	Only	Channelization	I-70 4	nehosehner	on (	lear	Creek	9 8	535
	S	Reconfigured Stream Channels	2 10 05	_II, <sub>11</sub> ;	Feet:			9	
V	nnels	Artificial Banks/Shoreline	I-70 .	enchrosoho	ent on	Clear	Creek		
- 50	hai	Beaver Dam Removal			100			- W. H	0 3
	ਹ	Substrate Embeddedness	E 8 18		=(a) _ a = 0				
		Lack or Excess of Woody Debris	A MARKET	100, 31 = 324 =		21 <sup>(3,0)</sup> 3	5 (0) 75 (1) 15 (1)		9, 2
		4.0		2 2 9	1) d = 1	j.	7.0		

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 welland 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 65

# 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.

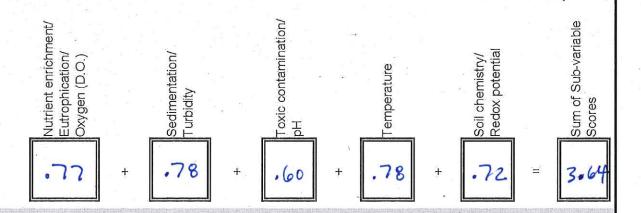
Stressor Category	Stressor Indicator	1	Comments	Sub-
	Livestock			variable
W (e)	Agricultural Runoff		42	Score
Nutrient Enrichment/	Septic/Sewage			77
Eutrophication/	Excessive Algae or Aquatic Veg.			
Oxygen (D.O.)	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List		a 2 5g	
	Excessive Erosion	1/A		
	Excessive Deposition			
	Fine Sediment Plumes			
O a dima a mtati a m /	Agricultural Runoff		(1     7)	70
Sedimentation/	Excessive Turbidity			.78
Turbidity	Nearby Construction Site		4 2 1	
	Cumulative Watershed NPS			
	CDPHE Impairment/TMDL List	1 7	11	7/
			N I	/
	Recent Chemical Spills	CAST CONTRACT CONTRAC		
	Nearby Industrial Sites			
	Road Drainage/Runoff			
2- 45 4	Livestock			1
	Agricultural Runoff		FO 1 3 3 3	
	Storm Water Runoff			
Toxic contamination/	Fish/Wildlife Impacts			.60
рН	Vegetation Impacts		V II N	
	Cumulative Watershed NPS		# V 2	
	Acid Mine Drainage			
	Point Source Discharge			
	CDPHE Impairment/TMDL List	s 5	1	10.0
	Metal staining on rocks and veg.			
	Excessive Temperature Regime			
	Lack of Shading		1	
	Reservoir/Power Plant Discharge		= 1,	20
Temperature	Industrial Discharge			.78
	Cumulative Watershed NPS		N	
A 0 5	CDPHE Impairment/TMDL List			
				_/
	Unnatural Saturation/Desaturation		1	
0.11	Mechanical Soil Disturbance			71
Soil chemistry/	Dumping/introduced Soil		STEEL STREET	72
Redox potential	CDPHE Impairment/TMDL List		9 2 2 2 2 2 2	
	# CE		× - * . * . *	

# Variable 8: 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	Eunctioning 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.



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

Variable Score	Condition	Scoring Rules				
Score	Class	Single Factor	$\chi_{i,1}=1$	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

.72

# 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 required in cases where a stratum has been thinned or removed, enter the expected coverage of that laye 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.

	1	/egetatio	n Layers		,
Layers Scored (check boxes to right to indicate scored layers)		/			
Stressor	Tree	Shrub	Herb	Aquatio	Comments
Noxious Weeds	A <sub>S</sub>				
Exotic/Invasive spp.		0 2			
Tree Harvest					<b>Z</b> ( )
Brush Cutting/Shrub Removal					•
Livestock Grazing			ii.		
Excessive Herbivory					
Mowing/Haying			7	-	2 2 3 1
Herbicide					
Loss of Zonation/Homogenization					
Dewatering					1 22
Over Saturation			9 8		
III II ÷ U		***************************************		,	
		and an array of		- S.S	
Percent Cover of Layer	+	60 +	40 +	-8	= percent
Veg. Layer Sub- variable Score	X	.90	, 90	X II	See sub-variable scoring guidelines on following page
Weighted Sub-variable Score	+	54 +	36+		= 90
					Variable 9 Score

# **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.

THE RESERVE OF THE PARTY OF THE	BLE SCORE			
Buffer & Landscape Context	Variable 1:	Habitat Connectivity - Neighboring Wetland Habitat Loss	.65	
	Variable 2:	Habitat Connectivity - Migration/Dispersal Barriers	.65	e Server
	Variable 3:	Buffer Capacity	.69	
Hydrology	Variable 4:	Water Source	.90	2
	Variable 5:	Water Distribution	.72 -	
	Variable 6:	Water Outflow	-90	
Abiotic and Biotic Habitat	Variable 7:	Geomorphology	.65	
	Variable 8:	Chemical Environment	•72	
	Variable 9:	Vegetation Structure and Complexity	.90	
	nal Capacity	Indices		
unction 1	Support of C	haracteristic Wildlife Habitat Total		nction
V1 <sub>wetloss</sub>	+ V2 <sub>barriers</sub> +	V3 <sub>buffer</sub> + (2 x V9 <sub>veg</sub> ) Functional Points		apacity Index
.65	+ 65 +	.69 + 1.8 + + = 3.79	+ 5 = 0	.70
		haracteristic Fish/aquatic Habitat	ط ا	0.0
	+ (2 x V5 <sub>dist</sub> ) +			
2.7	+ 1.44 +	1.8 + .72 + .65 + = 7.3	÷ 9 =	31
unction 3	Flood Attenu	ation		1, 1
V3 <sub>buffer</sub>	+,2 x V4 <sub>source</sub> +	$(2 \times V5_{dist}) + 2 \times V6_{outflow} + V7_{geom} + V9_{veg}$		
.69	+ 1.8 +	1.44 + 1.8 + .65 + .90 = 7.28	$] \div 9 = \boxed{.8}$	30
unction 4	Short- and Lo	ong-term Water Storage		
/4 <sub>source</sub>	+ (2 x V5 <sub>dist</sub> ) +	2 x V6 <sub>outflow</sub> ) V7 <sub>geom</sub>	× ×	
.90	+ 1.44 +	1.8 + 165 + + = 4.79	]÷ 6 =	19
	Nutrient/Toxi	55 52		W 1
(2 x V5 <sub>dist</sub> )	+ V8 <sub>chem</sub> +	V7 <sub>geom</sub>	9	. 18
1.44	+ .72 +	+ + = 2.81	+ 4 = 0	70
		ention/Shoreline Stabilization		2.7
	+ (2 x V7 <sub>geo</sub> ) +		4	
.69	+ 1.3 +	1.8 + + + = 3.79	÷ 5 =   •	75
		xport/Food Chain Support		v to
V1 <sub>welloss</sub>	+ 2 x V6 <sub>outflow</sub> +	$V8_{chem}$ + $V7_{geo.}$ + $(2 \times V9_{veg})$		0 -
.65	+ 1,8 +	.72 + .65 + 1.8 + = 5.62	÷ 7 =	80
		Sum of Individual FCI	Scores 5	4
7.5	Name of the Control o	Divide by the Number of Function		71.5

Composite FCI Score