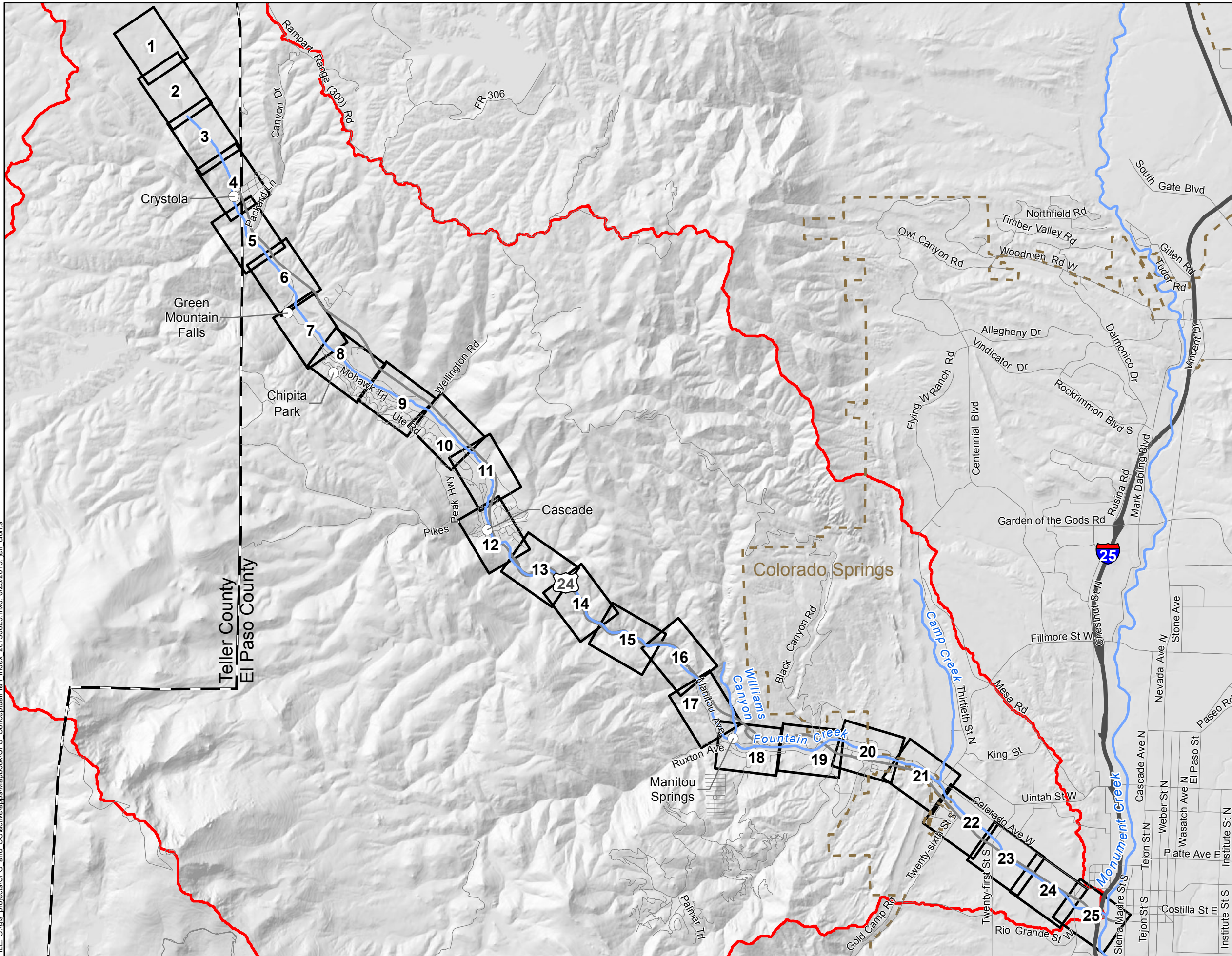


Appendix E:
Reach Alternatives and Screening Parameters

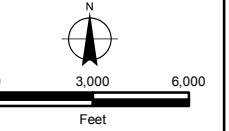
Creek Walk Photos
(See attached KMZ files)

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Map Index

Upper Fountain Creek
Conceptual Plan
El Paso County, CO



Legend

- Sheet
- Creek
- Upper Fountain Creek Watershed
- City/Town
- Colorado Springs Boundary
- County Boundary
- Interstate
- Highway
- Major Road

Teller County
El Paso County

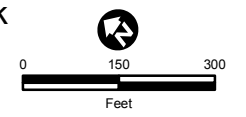


COLORADO
Colorado Water
Conservation Board
Department of Natural Resources

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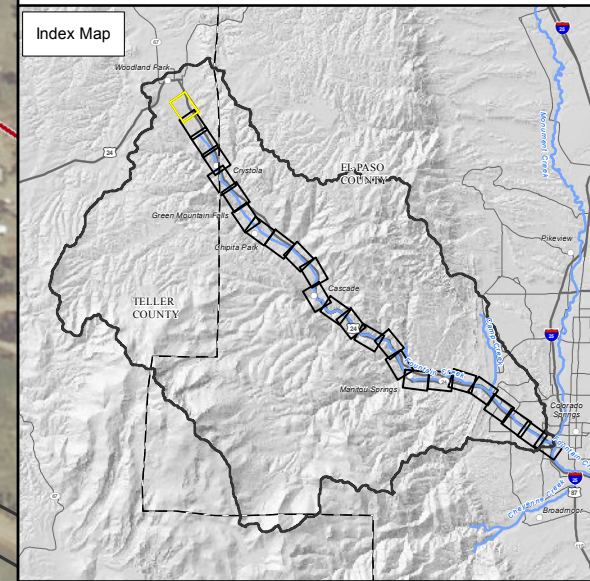


Sheet 1 of 25
 UFCP-01 thru UFCP-02
 Upper Fountain Creek
 Conceptual Plan
 El Paso County, CO



Legend

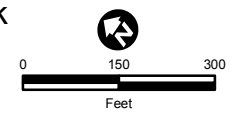
Wastewater Line	Immediate Response Project
Water Line	Immediate Response Project
Gas Line	Identified Projects
Underground Electric	Detention Potential
Substation Fence	Cut Banks
County Boundary	Steep Slopes
Stream Centerline	Proposed Drop Structure
100-yr Simulated Flood Zone	Detention Basin
Bridge	Engineered Bank / Channel
Culvert	Proposed Foot Trail
Hydraulic Model Cross Section	Reach Alternatives
USGS Proposed Detention Pond	Natural Channel Design
Subbasin	Protect In Place
Ownership	Protect In Place & Monitor
Private	Small Drop Structures w/ Toe Protection
Public	Active Cutbanks
	High
	Medium
	Low



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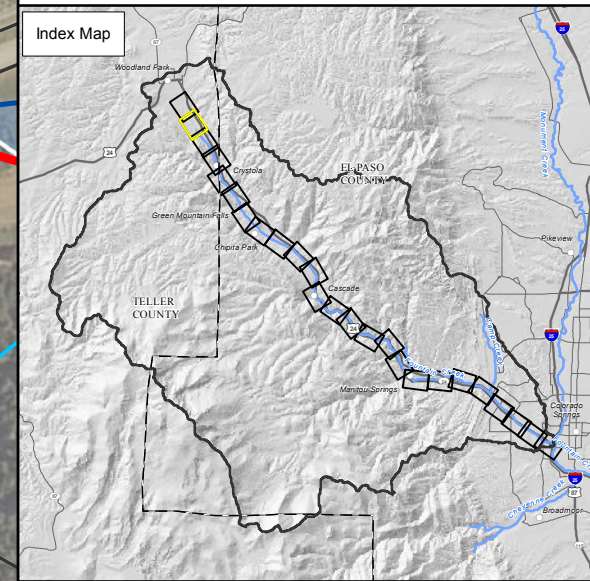


Sheet 2 of 25
 UFCP-02
 Upper Fountain Creek
 Conceptual Plan
 El Paso County, CO

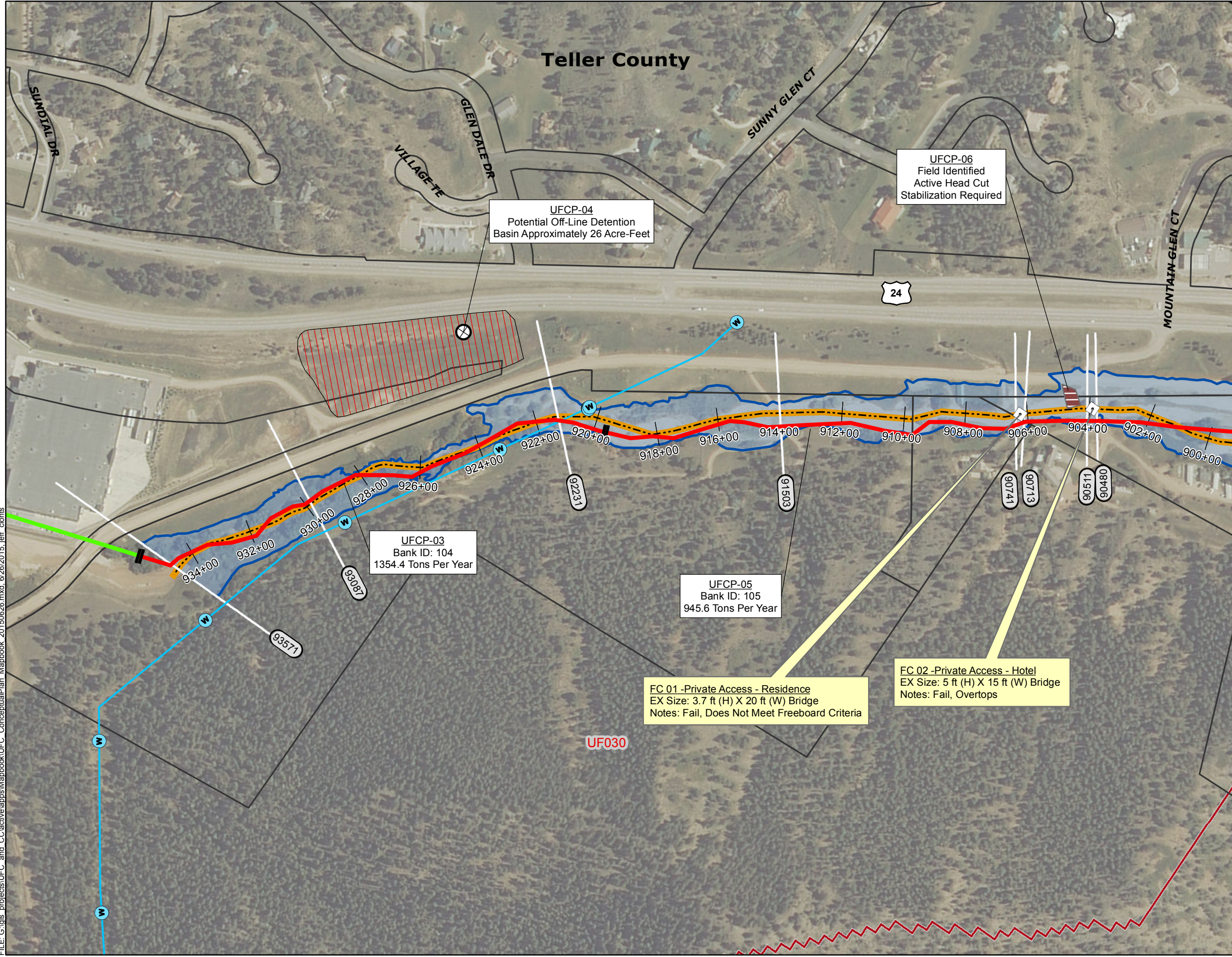


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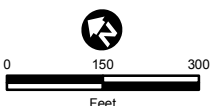
Wastewater Line	Immediate Response Project
Water Line	Immediate Response Project
Gas Line	Identified Projects
Underground Electric	Detention Potential
Substation Fence	Cut Banks
County Boundary	Steep Slopes
Stream Centerline	Proposed Drop Structure
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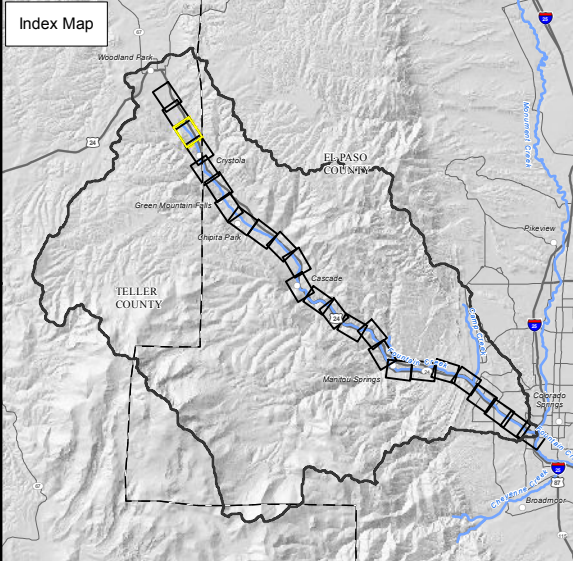
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Sheet 3 of 25
UFCP-03 thru UFCP-06
Upper Fountain Creek
Conceptual Plan
El Paso County, CO



- Legend**
- Wastewater Line
 - Water Line
 - Gas Line
 - Underground Electric
 - Substation Fence
 - County Boundary
 - Stream Centerline
 - 100-yr Simulated Flood Zone
 - Bridge
 - Culvert
 - Hydraulic Model Cross Section
 - USGS Proposed Detention Pond
 - Subbasin
 - Ownership: Private, Public
- Immediate Response Project**
- Immediate Response Project
 - Identified Projects
 - Detention Potential
 - Cut Banks
 - Steep Slopes
 - Proposed Drop Structure
 - Detention Basin
 - Engineered Bank / Channel
 - Proposed Foot Trail
- Reach Alternatives**
- Natural Channel Design
 - Protect In Place
 - Protect In Place & Monitor
 - Small Drop Structures w/ Toe Protection
- Active Cutbanks**
- High
 - Medium
 - Low



UFCP-04
Potential Off-Line Detention Basin Approximately 26 Acre-Feet

UFCP-06
Field Identified Active Head Cut Stabilization Required

UFCP-03
Bank ID: 104
1354.4 Tons Per Year

UFCP-05
Bank ID: 105
945.6 Tons Per Year

FC 01 -Private Access - Residence
EX Size: 3.7 ft (H) X 20 ft (W) Bridge
Notes: Fail, Does Not Meet Freeboard Criteria

FC 02 -Private Access - Hotel
EX Size: 5 ft (H) X 15 ft (W) Bridge
Notes: Fail, Overtops

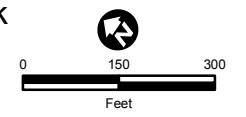
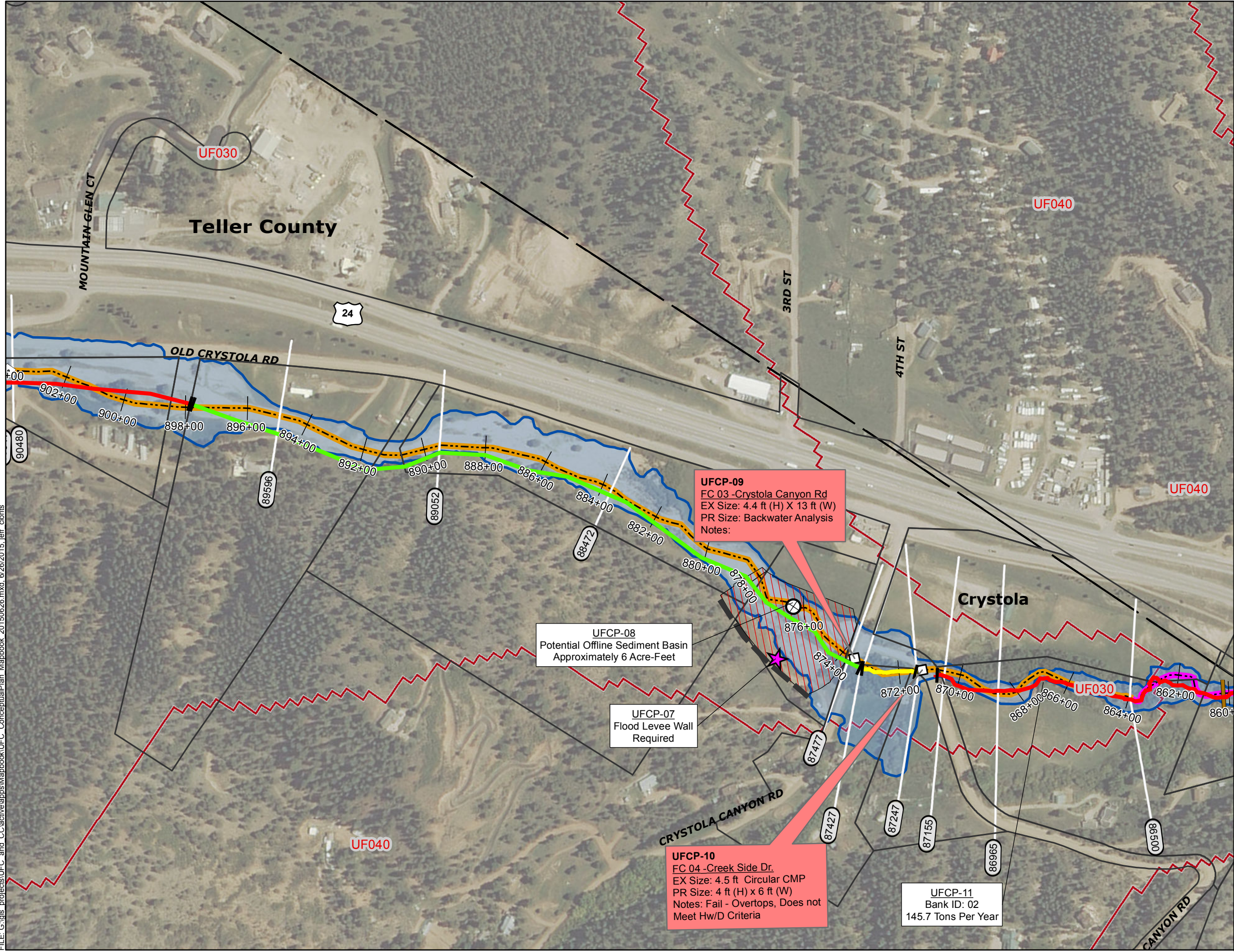
UF030

Matrix
DESIGN GROUP

FOUNTAIN CREEK WATERSHED
FLOOD CONTROL & GREENWAY DISTRICT

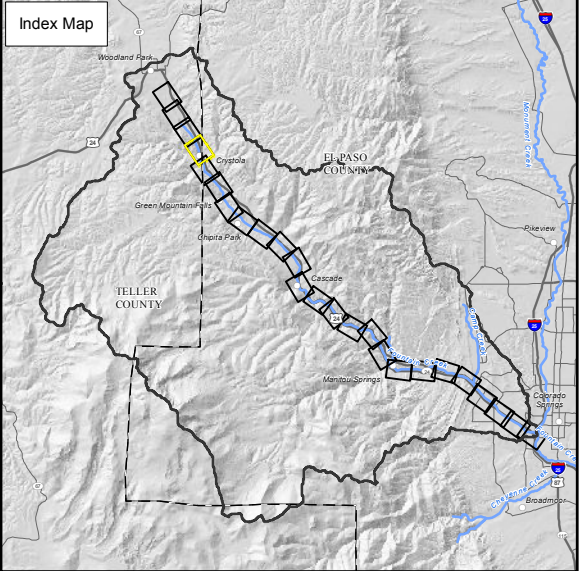
COLORADO
Colorado Water Conservation Board
Department of Natural Resources

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Legend

Wastewater Line	Immediate Response Project
Water Line	Immediate Response Project
Gas Line	Identified Projects
Underground Electric	Detention Potential
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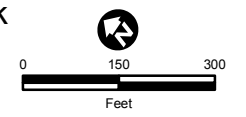
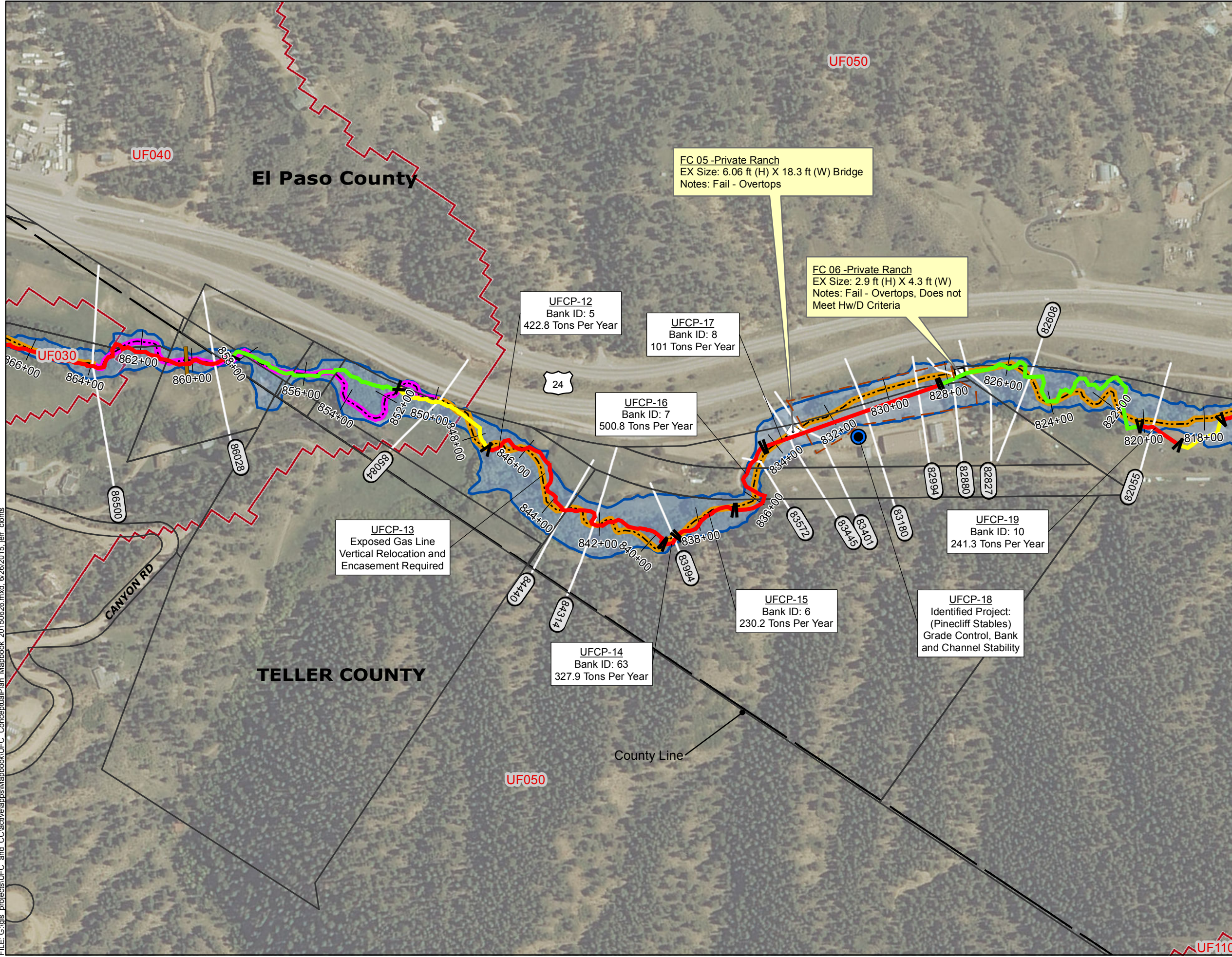


Matrix DESIGN GROUP

FOUNTAIN CREEK WATERSHED
 FLOOD CONTROL & GREENWAY DISTRICT

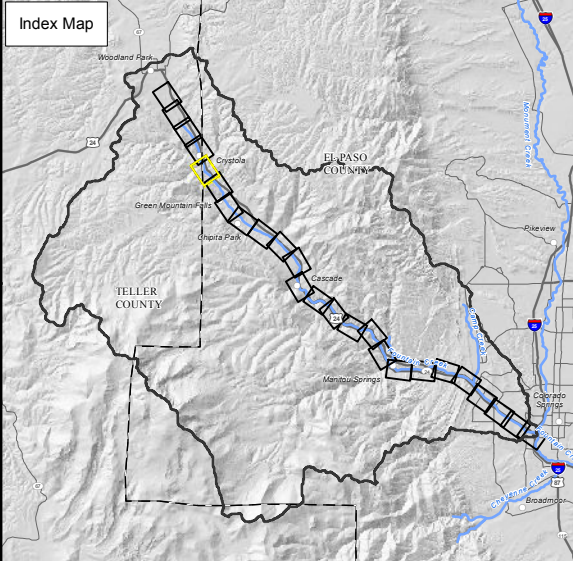
COLORADO
 Colorado Water Conservation Board
 Department of Natural Resources

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Legend

	Wastewater Line	Immediate Response Project
	Water Line	Immediate Response Project
	Gas Line	Identified Projects
	Underground Electric	Detention Potential
	Substation Fence	Cut Banks
	County Boundary	Steep Slopes
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Private		Small Drop Structures w/ Toe Protection
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		High
		Medium
		Low

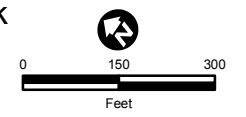
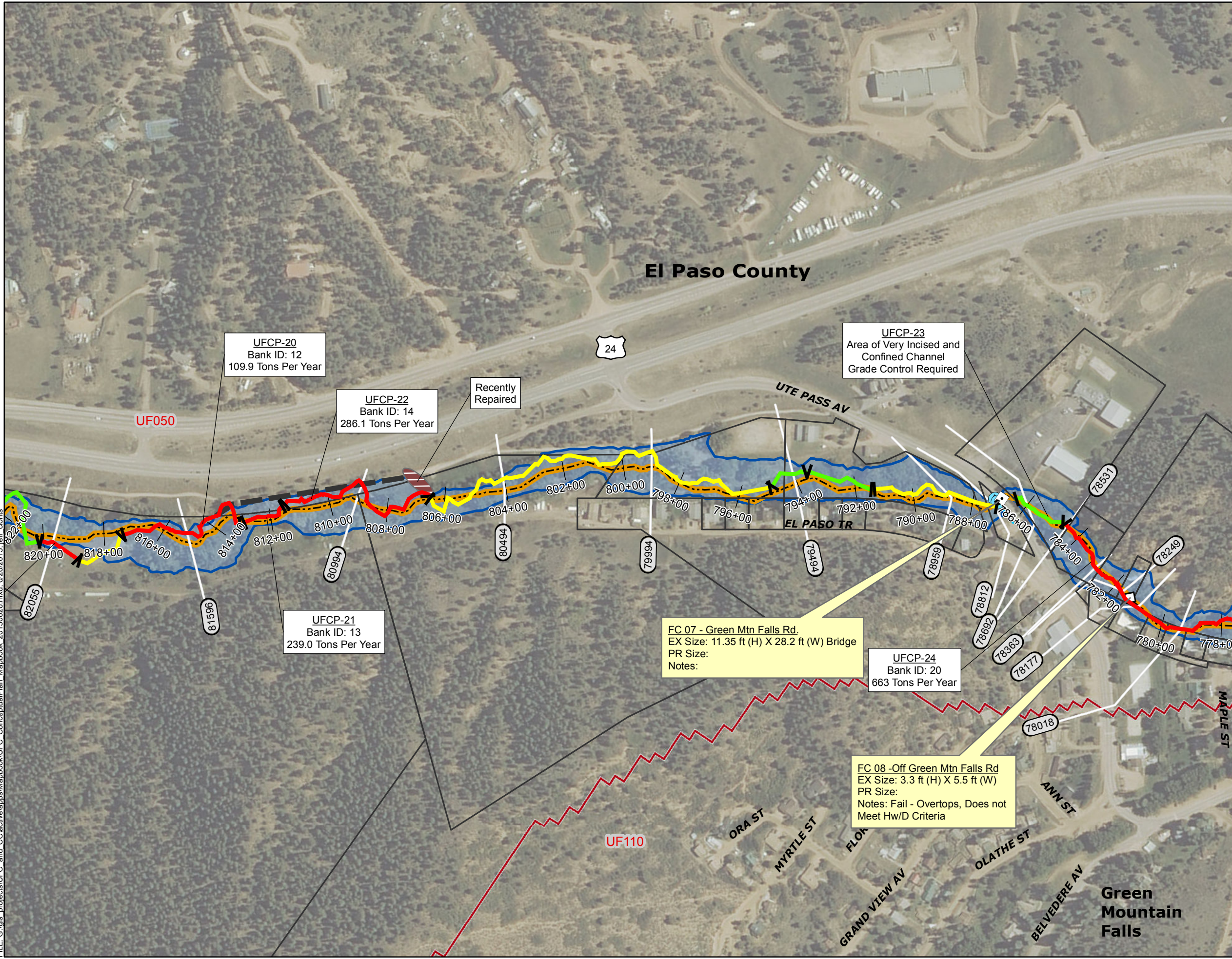


Matrix DESIGN GROUP

FOUNTAIN CREEK WATERSHED
FLOOD CONTROL & GREENWAY DISTRICT

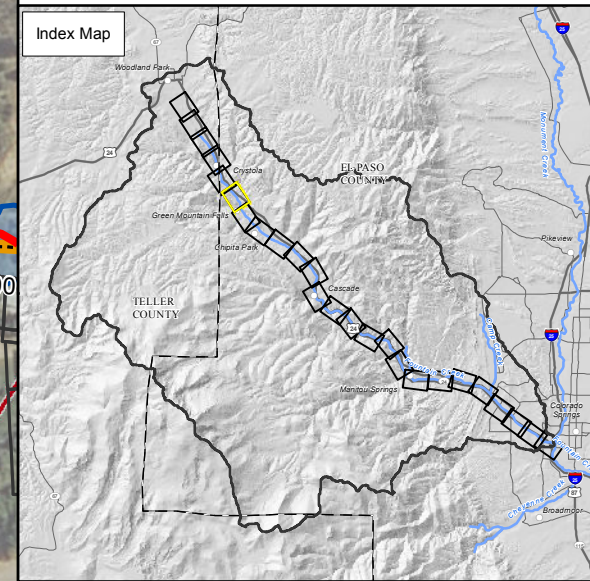
COLORADO
Colorado Water Conservation Board
Department of Natural Resources

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Legend

Wastewater Line	Immediate Response Project
Water Line	Immediate Response Project
Gas Line	Identified Projects
Underground Electric	Detention Potential
Substation Fence	Cut Banks
County Boundary	Steep Slopes
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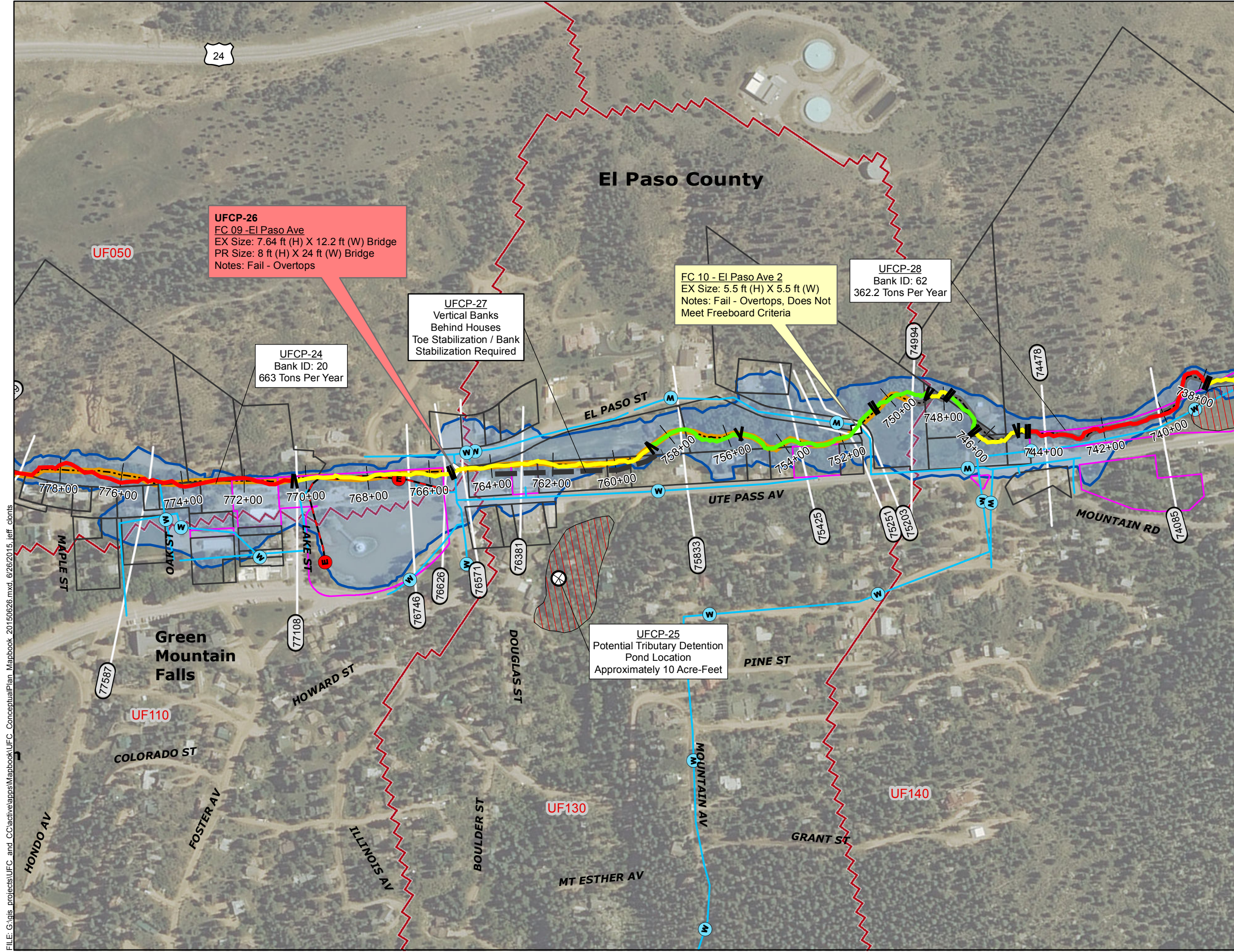


FC 07 - Green Mtn Falls Rd.
 EX Size: 11.35 ft (H) X 28.2 ft (W) Bridge
 PR Size:
 Notes:

UFCP-24
 Bank ID: 20
 663 Tons Per Year

FC 08 - Off Green Mtn Falls Rd
 EX Size: 3.3 ft (H) X 5.5 ft (W)
 PR Size:
 Notes: Fail - Overtops, Does not Meet Hw/D Criteria

Green Mountain Falls



UFCP-26
 FC 09 - El Paso Ave
 EX Size: 7.64 ft (H) X 12.2 ft (W) Bridge
 PR Size: 8 ft (H) X 24 ft (W) Bridge
 Notes: Fail - Overtops

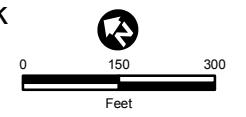
UFCP-27
 Vertical Banks
 Behind Houses
 Toe Stabilization / Bank
 Stabilization Required

UFCP-24
 Bank ID: 20
 663 Tons Per Year

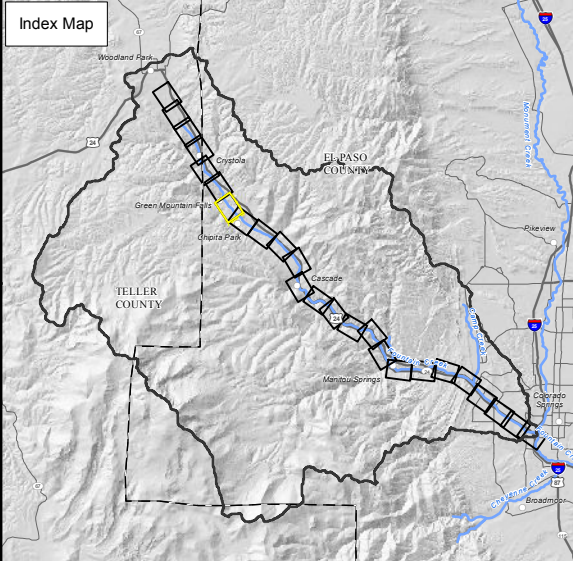
FC 10 - El Paso Ave 2
 EX Size: 5.5 ft (H) X 5.5 ft (W)
 Notes: Fail - Overtops, Does Not
 Meet Freeboard Criteria

UFCP-28
 Bank ID: 62
 362.2 Tons Per Year

UFCP-25
 Potential Tributary Detention
 Pond Location
 Approximately 10 Acre-Feet

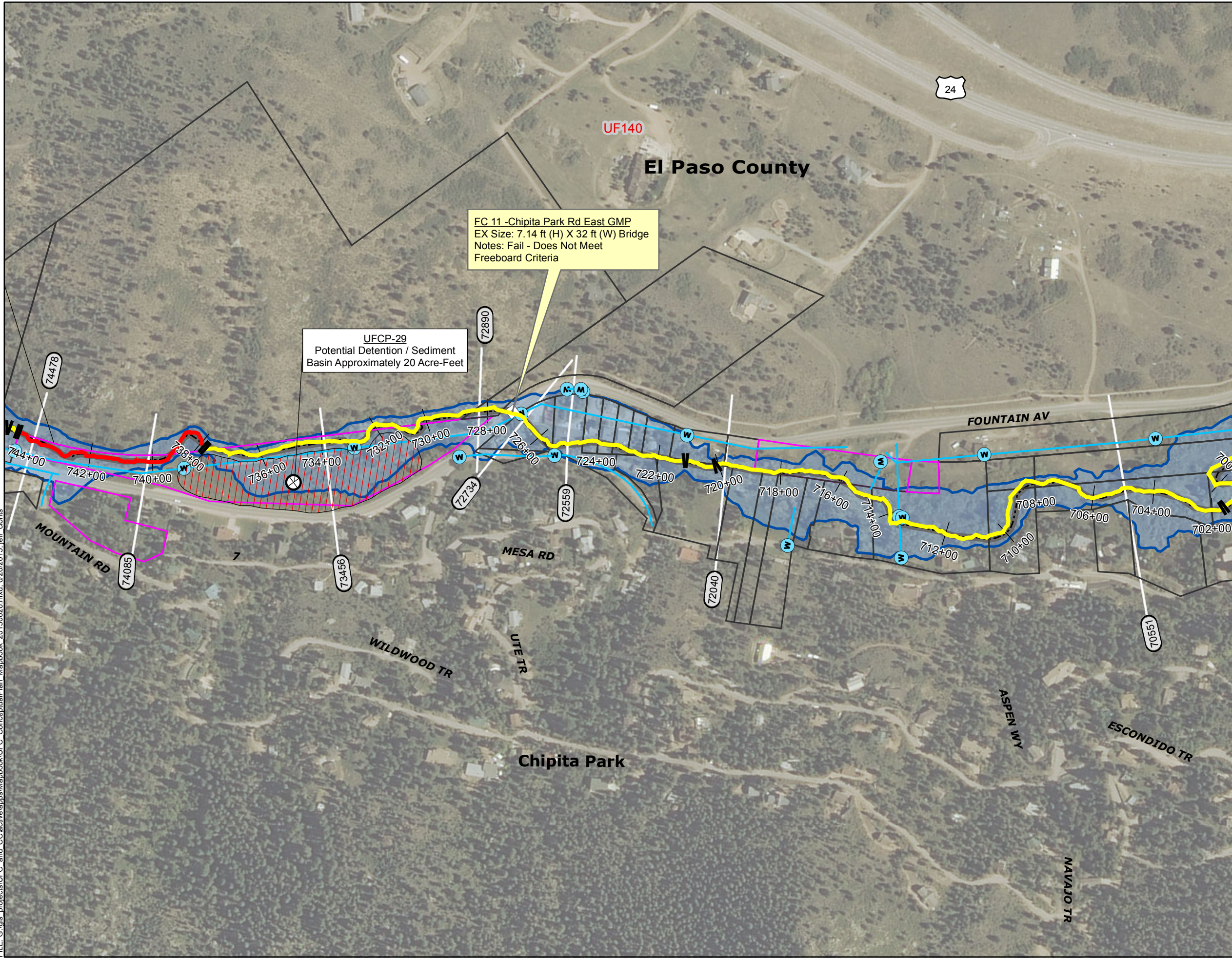


- Legend**
- | | |
|-------------------------------|---|
| Wastewater Line | Immediate Response Project |
| Water Line | Immediate Response Project |
| Gas Line | Identified Projects |
| Underground Electric | Detention Potential |
| Substation Fence | Cut Banks |
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| Stream Centerline | Proposed Drop Structure |
| 100-yr Simulated Flood Zone | Detention Basin |
| Bridge | Engineered Bank / Channel |
| Culvert | Proposed Foot Trail |
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| USGS Proposed Detention Pond | Natural Channel Design |
| Subbasin | Protect In Place |
| Ownership | Protect In Place & Monitor |
| Private | Small Drop Structures w/ Toe Protection |
| Public | Active Cutbanks |
| | High |
| | Medium |
| | Low |



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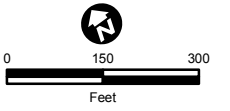
FC 11 -Chipita Park Rd East GMP
EX Size: 7.14 ft (H) X 32 ft (W) Bridge
Notes: Fail - Does Not Meet
Freeboard Criteria

UFCP-29
Potential Detention / Sediment
Basin Approximately 20 Acre-Feet

Sheet 8 of 25

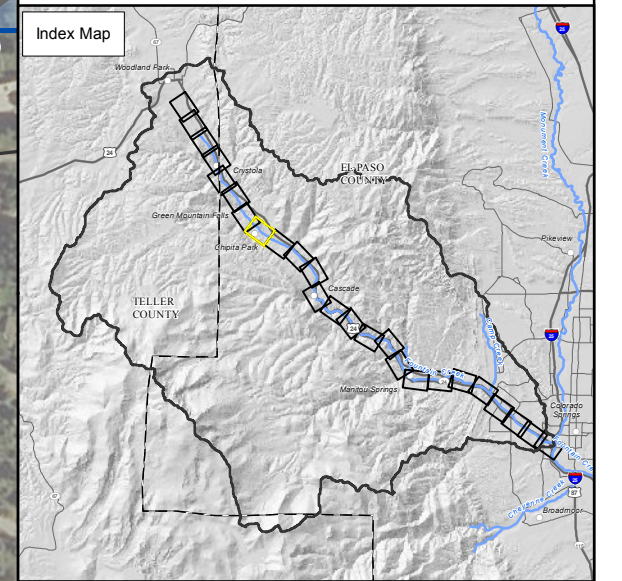
UFCP-29

Upper Fountain Creek
Conceptual Plan
El Paso County, CO



Legend

- | | | |
|--|-------------------------------|---|
| | Wastewater Line | Immediate Response Project |
| | Water Line | Immediate Response Project |
| | Gas Line | Identified Projects |
| | Underground Electric | Detention Potential |
| | Substation Fence | Cut Banks |
| | County Boundary | Steep Slopes |
| | Stream Centerline | Proposed Drop Structure |
| | 100-yr Simulated Flood Zone | Detention Basin |
| | Bridge | Engineered Bank / Channel |
| | Culvert | Proposed Foot Trail |
| | Hydraulic Model Cross Section | Reach Alternatives |
| | USGS Proposed Detention Pond | Natural Channel Design |
| | Subbasin | Protect In Place |
| | Ownership | Protect In Place & Monitor |
| | Public | Small Drop Structures w/ Toe Protection |
| | | Active Cutbanks |
| | | High |
| | | Medium |
| | | Low |

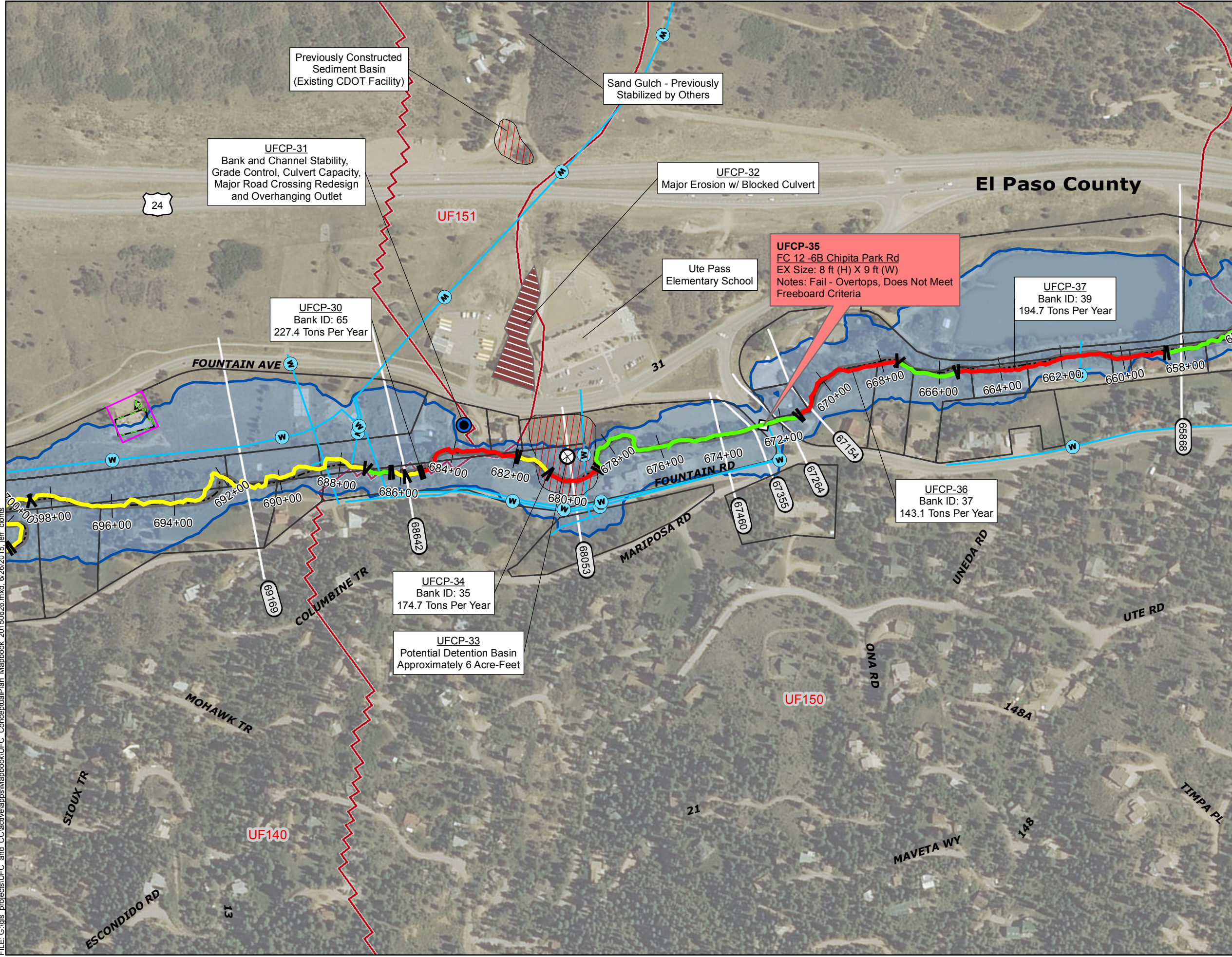


MATRIX
DESIGN GROUP

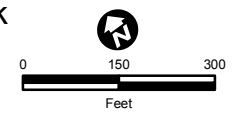
FOUNTAIN CREEK WATERSHED
FLOOD CONTROL & GREENWAY DISTRICT

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

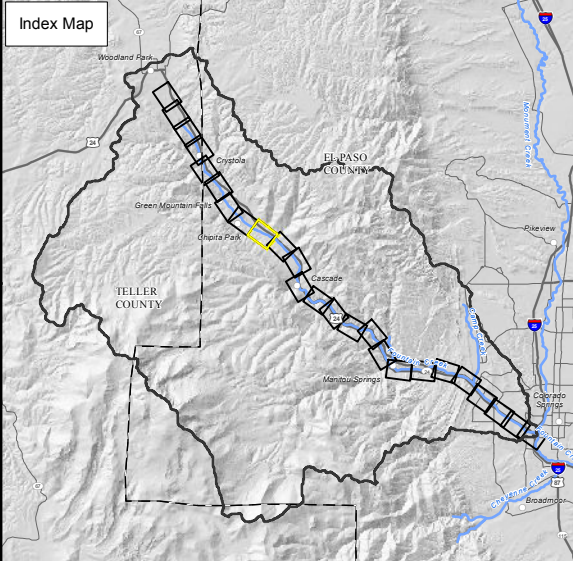
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Sheet 9 of 25
 UFCP-30 thru UFCP-37
 Upper Fountain Creek
 Conceptual Plan
 El Paso County, CO



- Legend**
- Wastewater Line
 - Water Line
 - Gas Line
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 - County Boundary
 - Stream Centerline
 - 100-yr Simulated Flood Zone
 - Bridge
 - Culvert
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- Active Cutbanks**
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 - Medium
 - Low

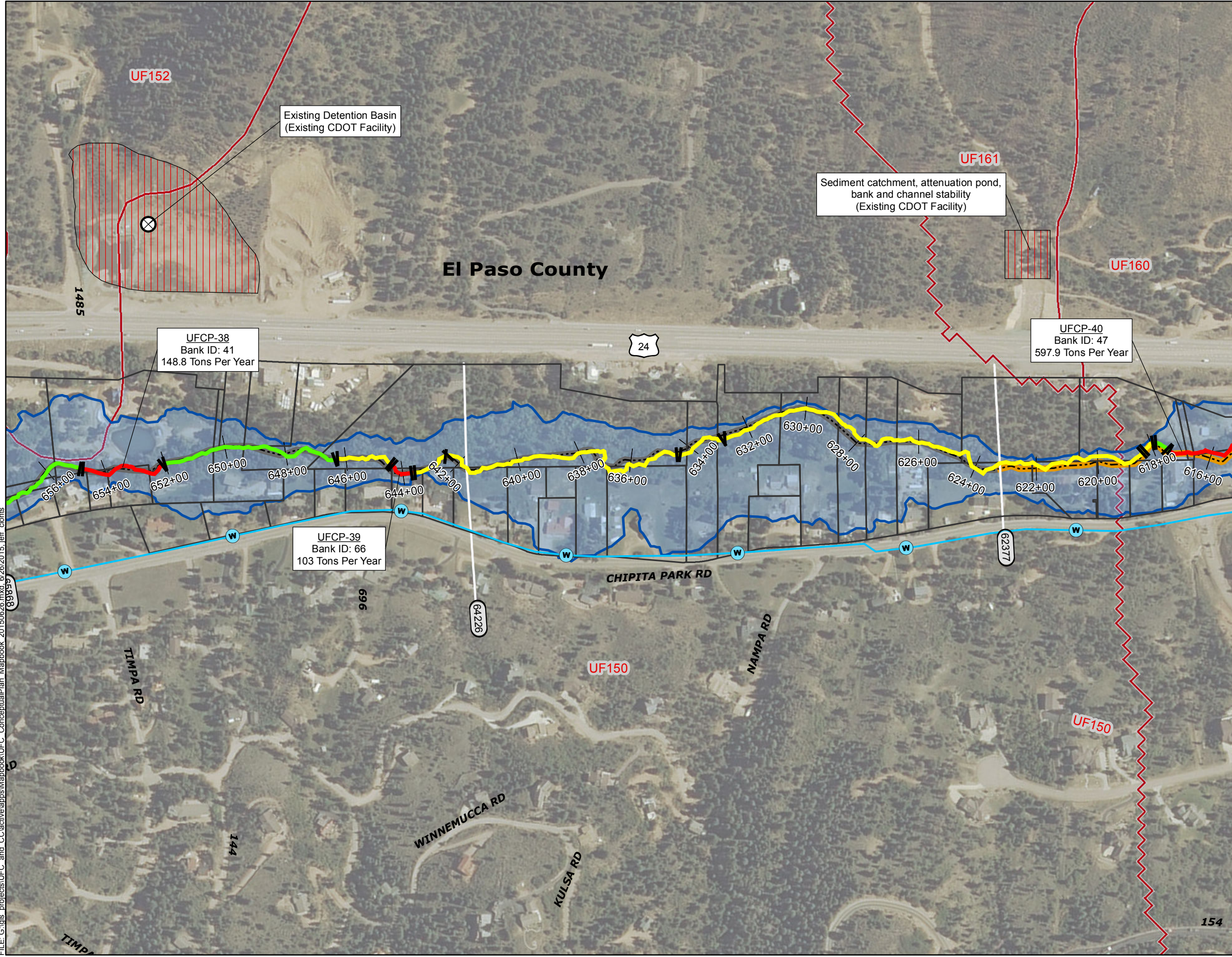


Matrix DESIGN GROUP

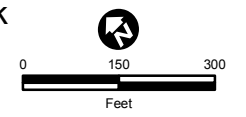
FOUNTAIN CREEK WATERSHED
 FLOOD CONTROL & GREENWAY DISTRICT

COLORADO
 Colorado Water Conservation Board
 Department of Natural Resources

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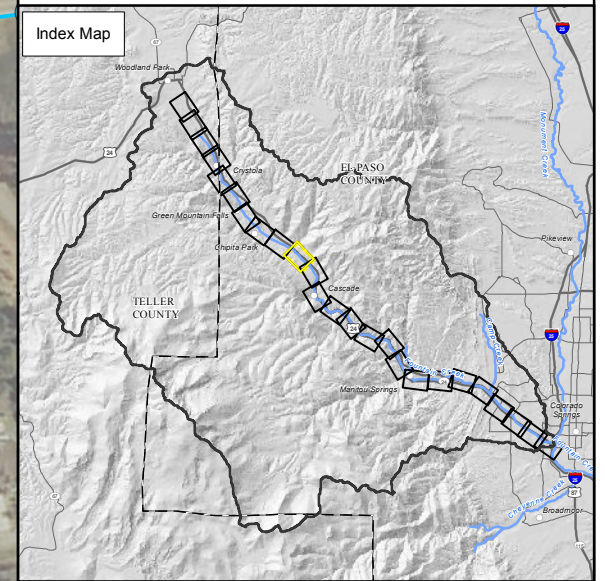


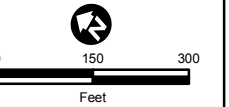
Sheet 10 of 25
 UFCP-38 thru UFCP-40
 Upper Fountain Creek
 Conceptual Plan
 El Paso County, CO



Legend

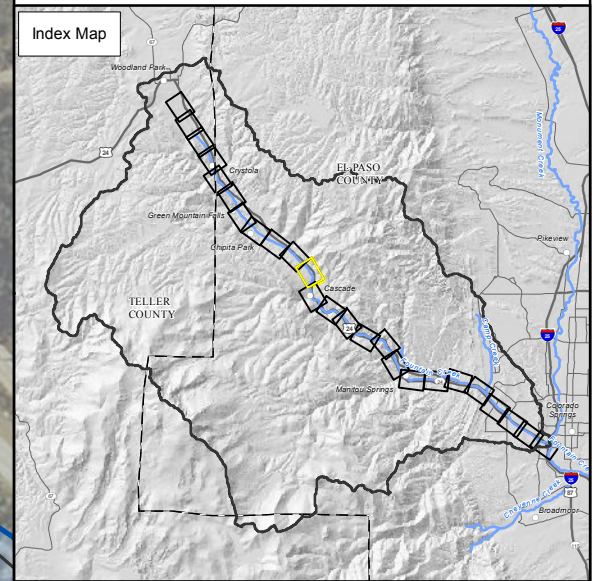
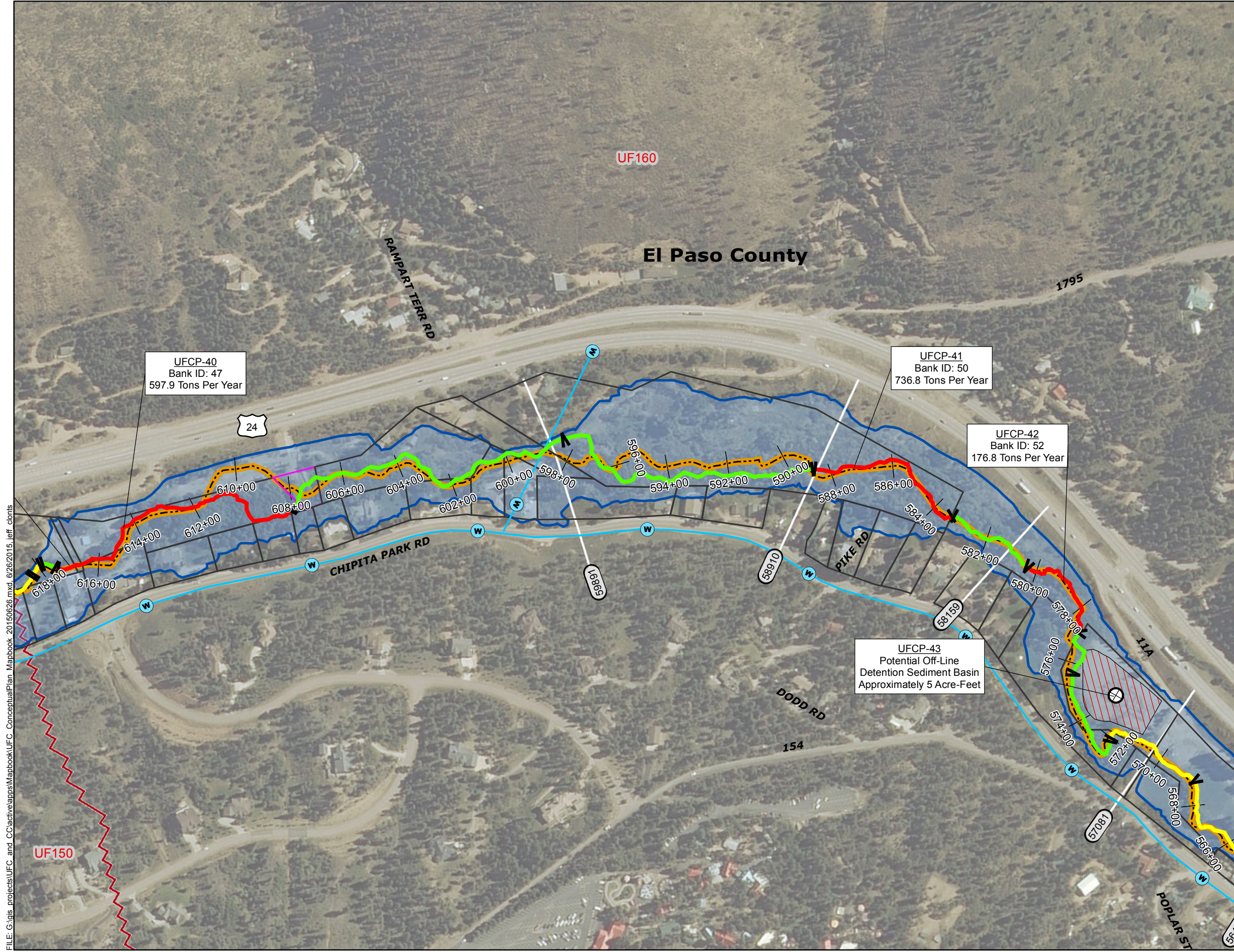
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	Water Line	
	Gas Line	
	Underground Electric	
	Substation Fence	
	County Boundary	
	Stream Centerline	
	100-yr Simulated Flood Zone	
	Bridge	
	Culvert	
	Hydraulic Model Cross Section	Reach Alternatives
	USGS Proposed Detention Pond	
	Subbasin	
	Ownership Private	
	Ownership Public	
		Active Cutbanks





Legend

- Wastewater Line
 - Water Line
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 - County Boundary
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 - Natural Channel Design
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 - Small Drop Structures w/ Toe Protection
 - Active Cutbanks**
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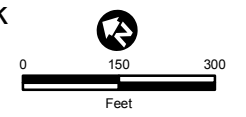
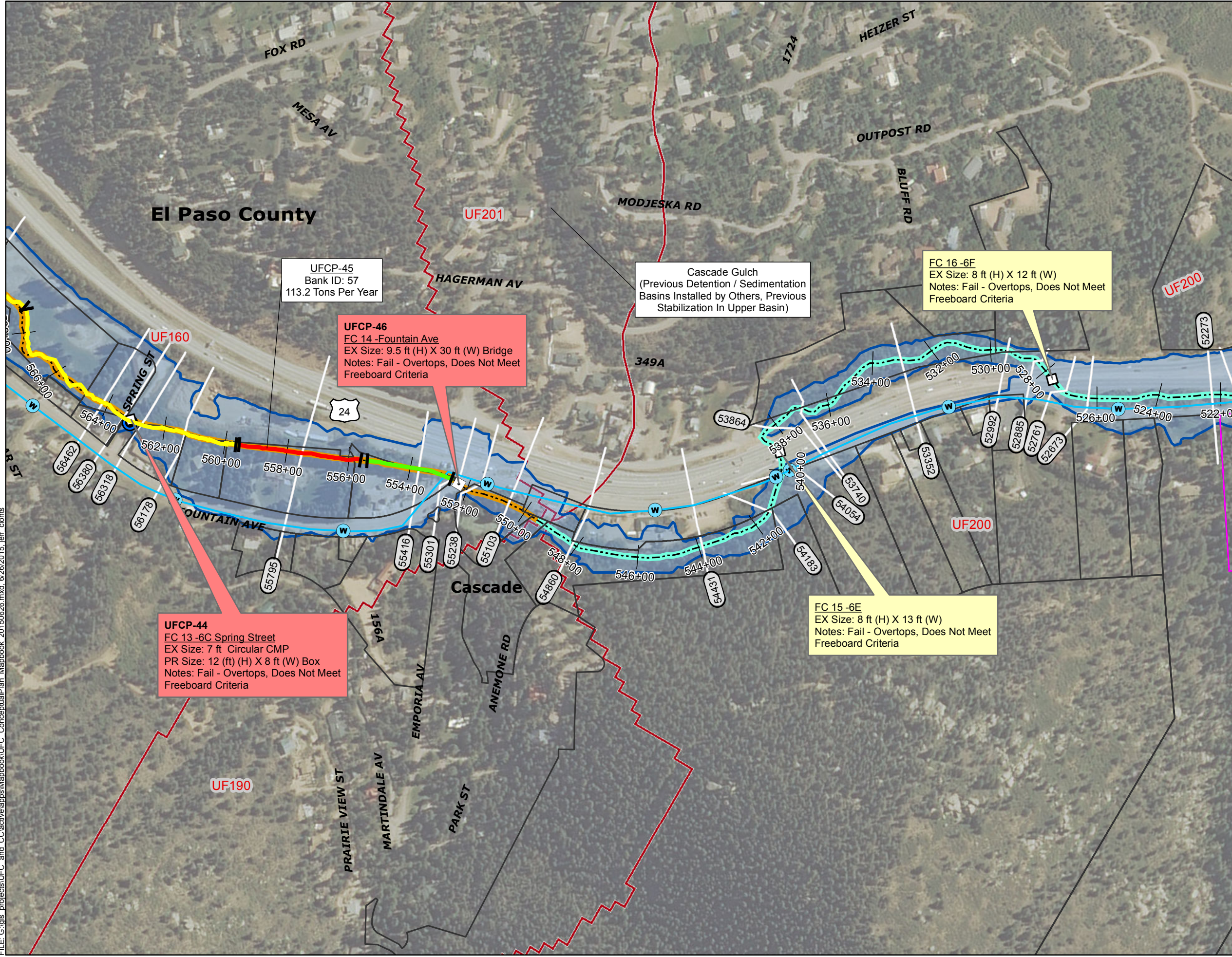
MATRIX
DESIGN GROUP

FOUNTAIN CREEK WATERSHED
FLOOD CONTROL & GREENWAY DISTRICT

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

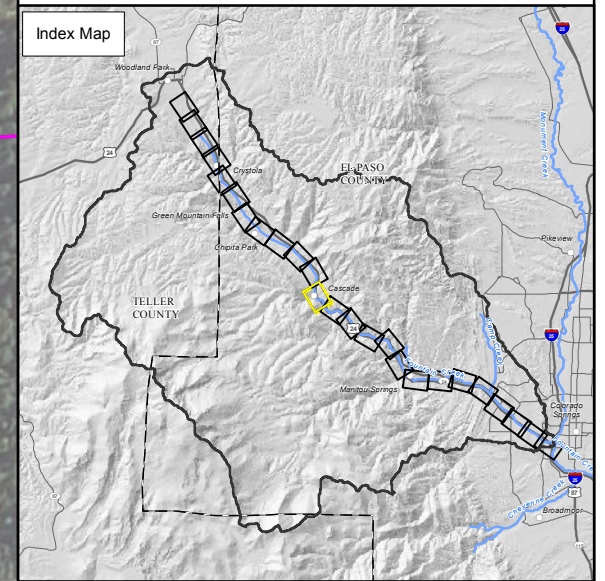
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Legend

	Wastewater Line		Immediate Response Project
	Water Line		Identified Projects
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	Public		Active Cutbanks
			High
			Medium
			Low



UFCP-45
 Bank ID: 57
 113.2 Tons Per Year

UFCP-46
 FC 14 -Fountain Ave
 EX Size: 9.5 ft (H) X 30 ft (W) Bridge
 Notes: Fail - Overtops, Does Not Meet Freeboard Criteria

Cascade Gulch
 (Previous Detention / Sedimentation Basins Installed by Others, Previous Stabilization In Upper Basin)

FC 16-6F
 EX Size: 8 ft (H) X 12 ft (W)
 Notes: Fail - Overtops, Does Not Meet Freeboard Criteria

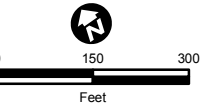
UFCP-44
 FC 13 -6C Spring Street
 EX Size: 7 ft Circular CMP
 PR Size: 12 (ft) (H) X 8 ft (W) Box
 Notes: Fail - Overtops, Does Not Meet Freeboard Criteria

FC 15-6E
 EX Size: 8 ft (H) X 13 ft (W)
 Notes: Fail - Overtops, Does Not Meet Freeboard Criteria

MATRIX
 DESIGN GROUP

FOUNTAIN CREEK WATERSHED
 FLOOD CONTROL & GREENWAY DISTRICT

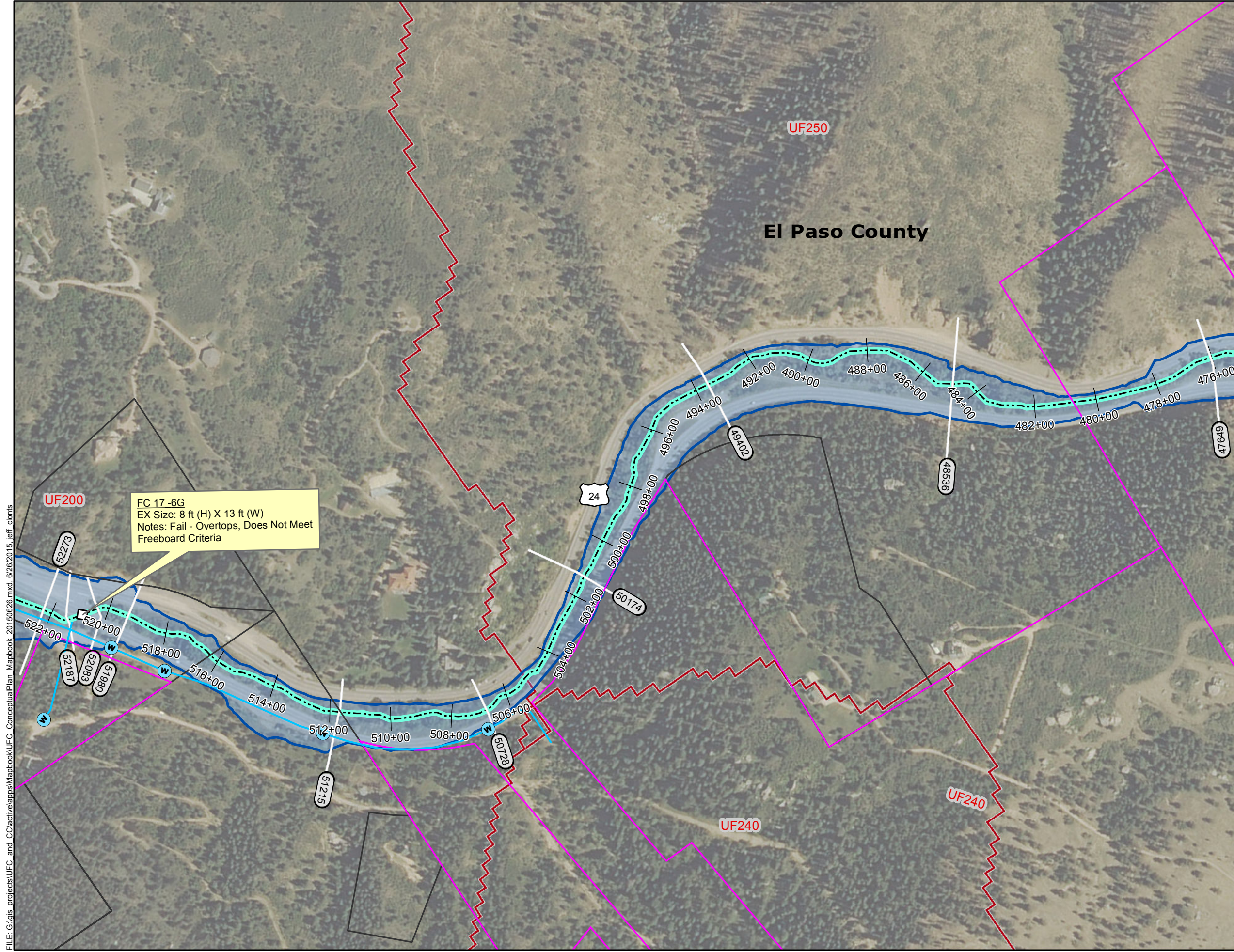
COLORADO
 Colorado Water Conservation Board
 Department of Natural Resources



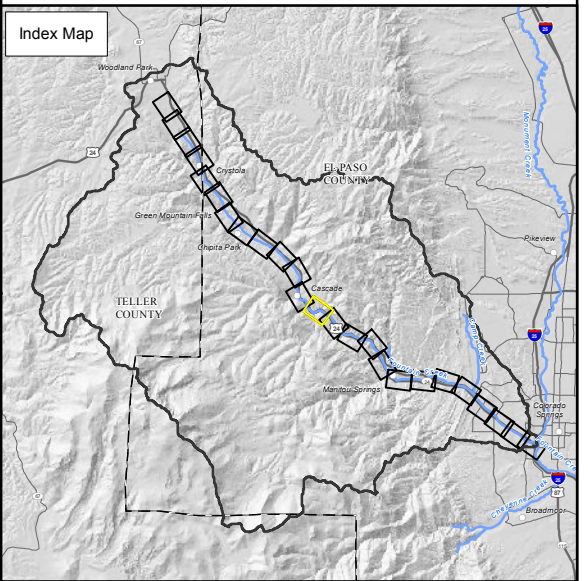
Legend

- | | | |
|--|-------------------------------|-----------------------------------|
| | Wastewater Line | Immediate Response Project |
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| | Gas Line | |
| | Underground Electric | |
| | Substation Fence | |
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| | 100-yr Simulated Flood Zone | |
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| | Culvert | |
| | Hydraulic Model Cross Section | Reach Alternatives |
| | USGS Proposed Detention Pond | |
| | Subbasin | |
| | Private | |
| | Public | |
| | | Active Cutbanks |
| | | |
| | | |
| | | |

El Paso County

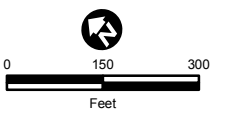
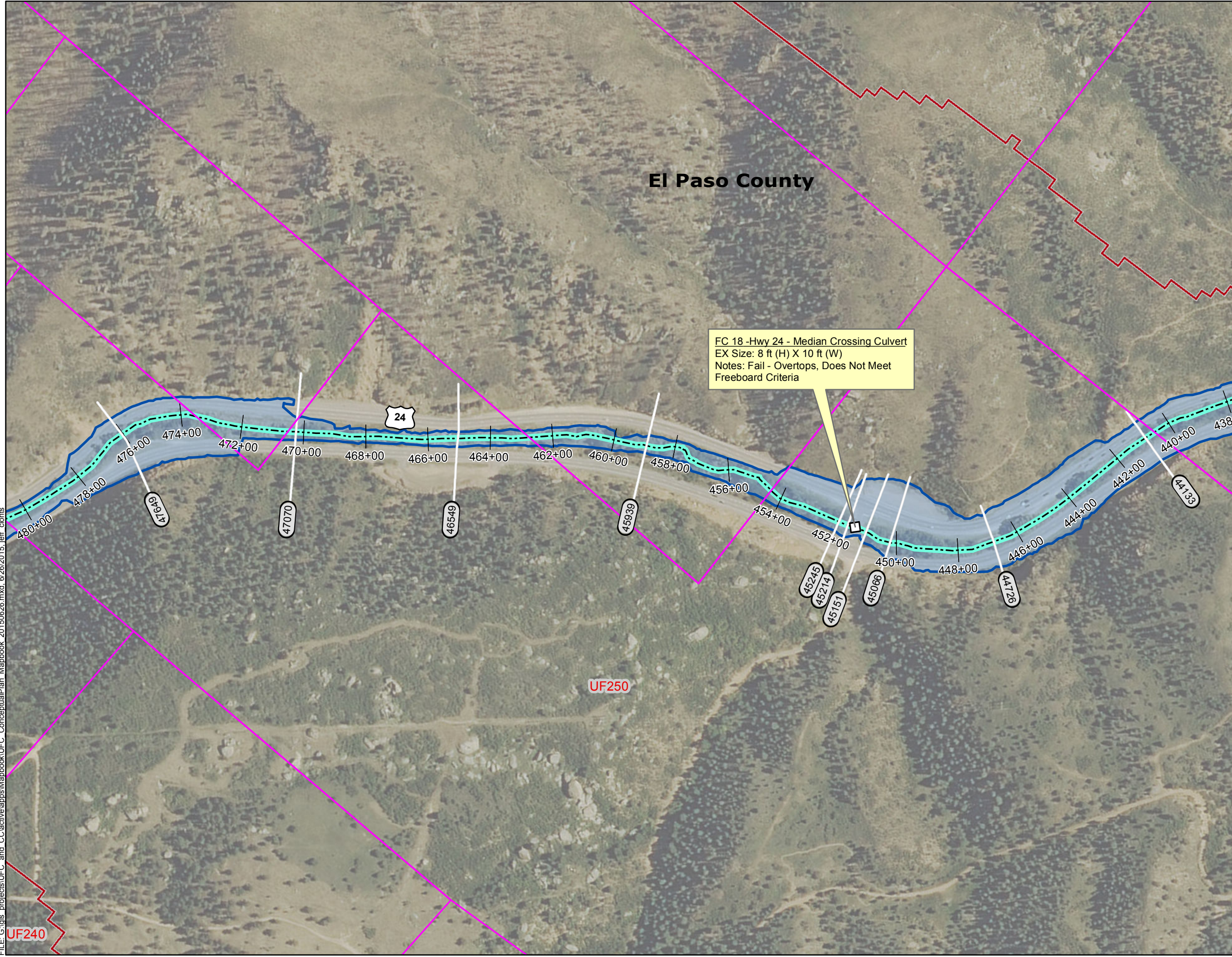


FC 17-6G
EX Size: 8 ft (H) X 13 ft (W)
Notes: Fail - Overtops, Does Not Meet Freeboard Criteria



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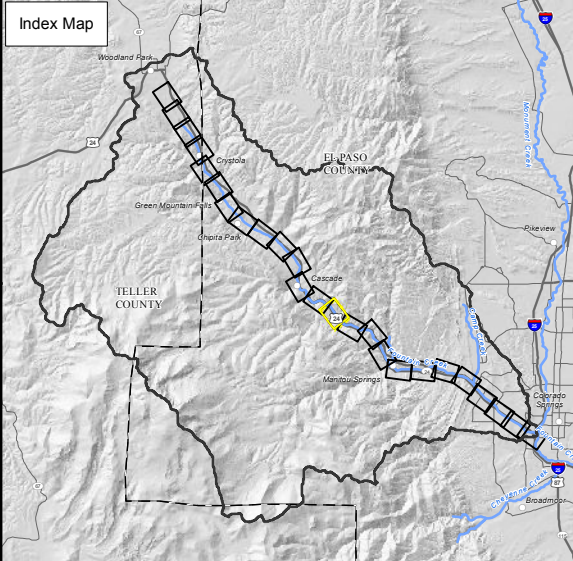
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Legend

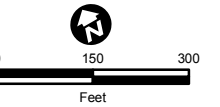
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Water Line	Immediate Response Project
Gas Line	Identified Projects
Underground Electric	Detention Potential
Substation Fence	Cut Banks
County Boundary	Steep Slopes
Stream Centerline	Proposed Drop Structure
100-yr Simulated Flood Zone	Detention Basin
Bridge	Engineered Bank / Channel
Culvert	Proposed Foot Trail
Hydraulic Model Cross Section	Reach Alternatives
USGS Proposed Detention Pond	Natural Channel Design
Subbasin	Protect In Place
Ownership	Protect In Place & Monitor
Private	Small Drop Structures w/ Toe Protection
Public	Active Cutbanks
	High
	Medium
	Low

FC 18 - Hwy 24 - Median Crossing Culvert
EX Size: 8 ft (H) X 10 ft (W)
Notes: Fail - Overtops, Does Not Meet Freeboard Criteria



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UF240

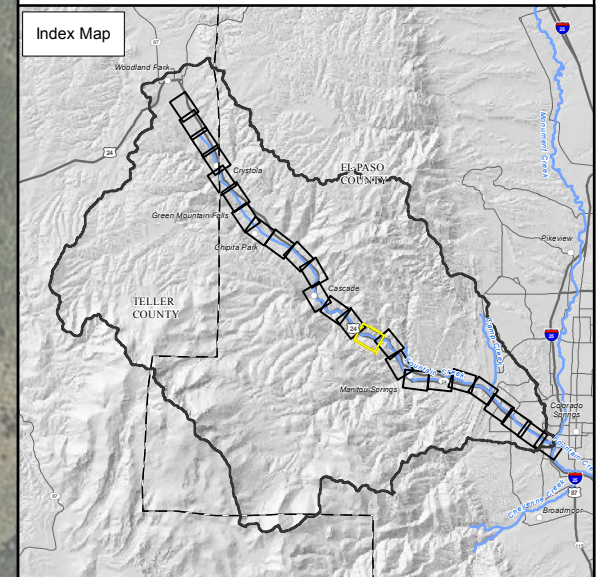
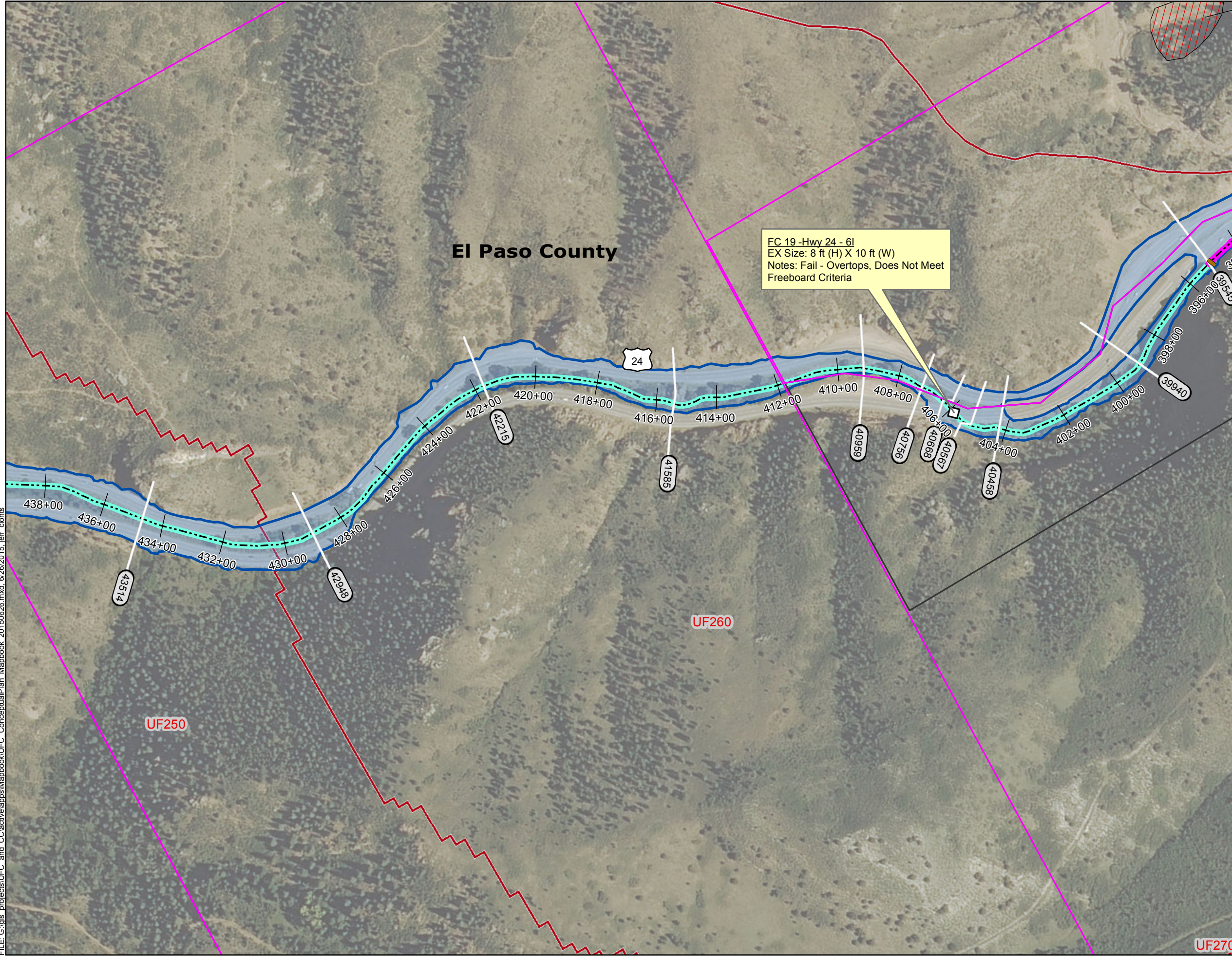


Legend

- Wastewater Line
 - Water Line
 - Gas Line
 - Underground Electric
 - Substation Fence
 - County Boundary
 - Stream Centerline
 - 100-yr Simulated Flood Zone
 - Bridge
 - Culvert
 - Hydraulic Model Cross Section
 - USGS Proposed Detention Pond
 - Subbasin
 - Ownership: Private, Public
- Immediate Response Project**
 - Immediate Response Project
 - Identified Projects
 - Detention Potential
 - Cut Banks
 - Steep Slopes
 - Proposed Drop Structure
 - Detention Basin
 - Engineered Bank / Channel
 - Proposed Foot Trail
 - Reach Alternatives**
 - Natural Channel Design
 - Protect In Place
 - Protect In Place & Monitor
 - Small Drop Structures w/ Toe Protection
 - Active Cutbanks**
 - High
 - Medium
 - Low

El Paso County

FC 19 -Hwy 24 - 6I
EX Size: 8 ft (H) X 10 ft (W)
Notes: Fail - Overtops, Does Not Meet Freeboard Criteria



Matrix DESIGN GROUP

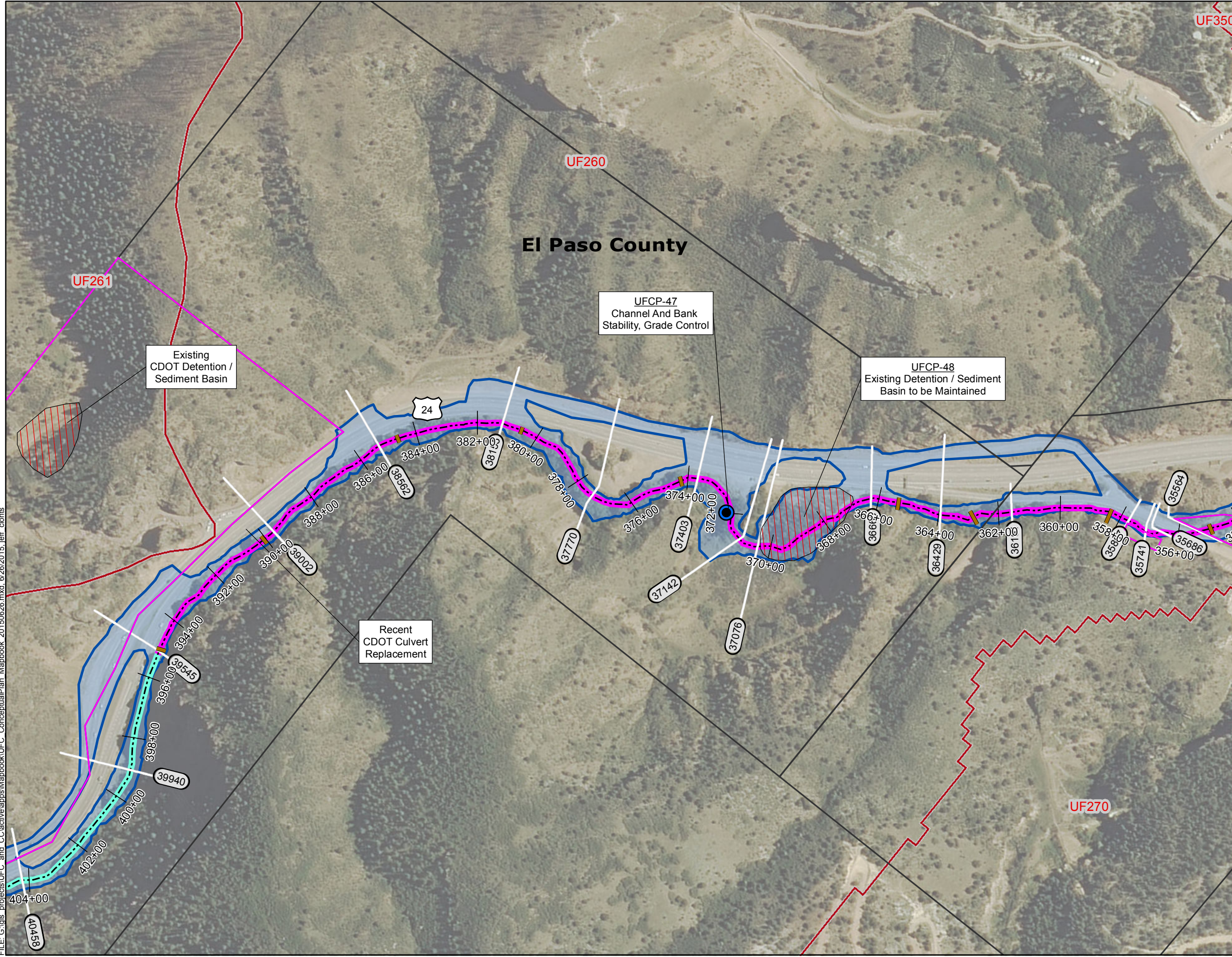
FOUNTAIN CREEK WATERSHED
FLOOD CONTROL & GREENWAY DISTRICT

CO DNR

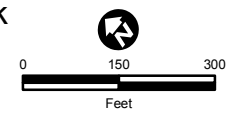
COLORADO
Colorado Water Conservation Board
Department of Natural Resources

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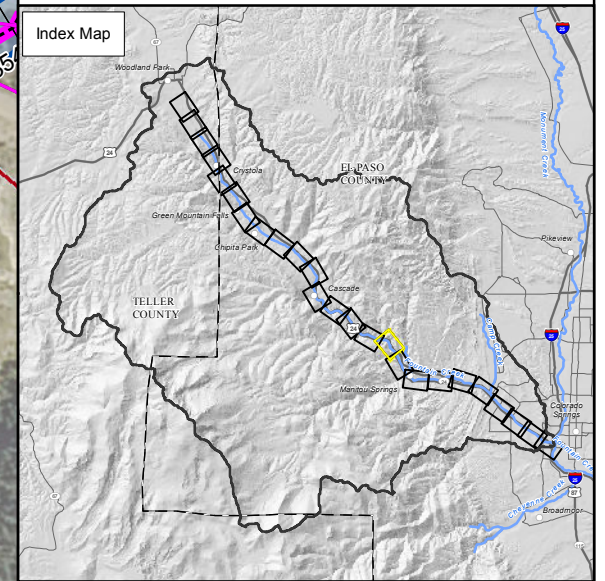


Sheet 16 of 25
UFCP-47 thru UFCP-48
Upper Fountain Creek
Conceptual Plan
El Paso County, CO



Legend

Wastewater Line	Immediate Response Project
Water Line	Immediate Response Project
Gas Line	Identified Projects
Underground Electric	Detention Potential
Substation Fence	Cut Banks
County Boundary	Steep Slopes
Stream Centerline	Proposed Drop Structure
100-yr Simulated Flood Zone	Detention Basin
Bridge	Engineered Bank / Channel
Culvert	Proposed Foot Trail
Hydraulic Model Cross Section	Reach Alternatives
USGS Proposed Detention Pond	Natural Channel Design
Subbasin	Protect In Place
Ownership	Protect In Place & Monitor
Private	Small Drop Structures w/ Toe Protection
Public	Active Cutbanks
	High
	Medium
	Low

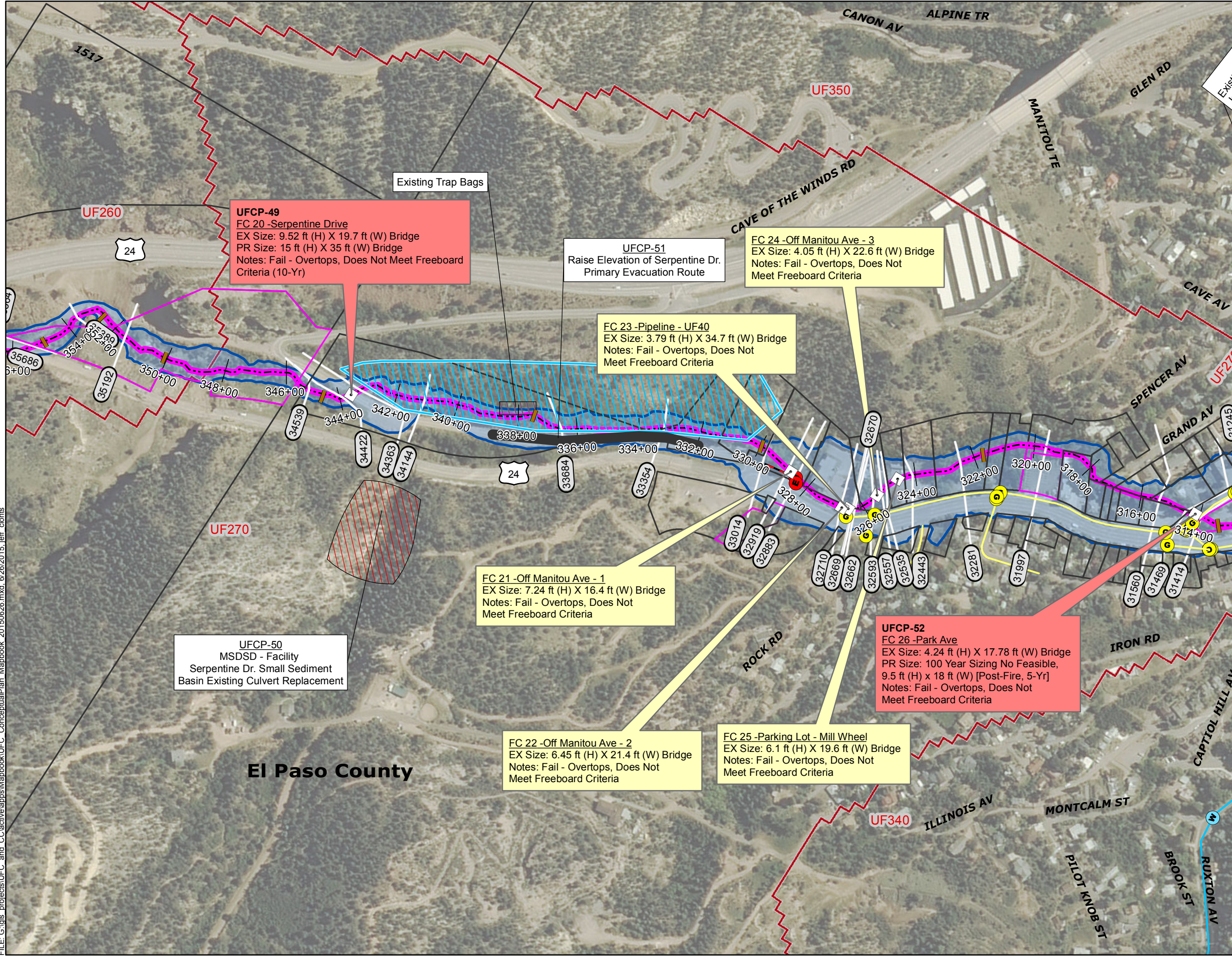


Matrix
DESIGN GROUP

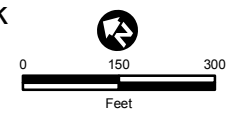
FOUNTAIN CREEK WATERSHED
FLOOD CONTROL & GREENWAY DISTRICT

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

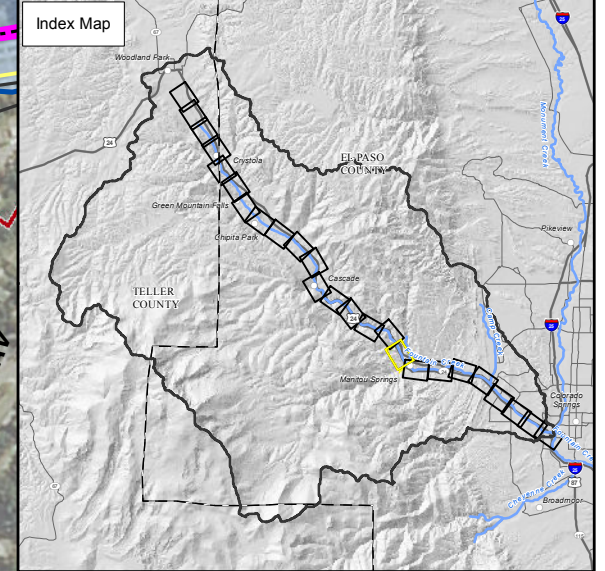
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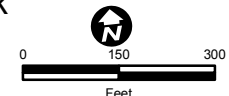


Sheet 17 of 25
 UFCP-49 thru UFCP-52
 Upper Fountain Creek
 Conceptual Plan
 El Paso County, CO



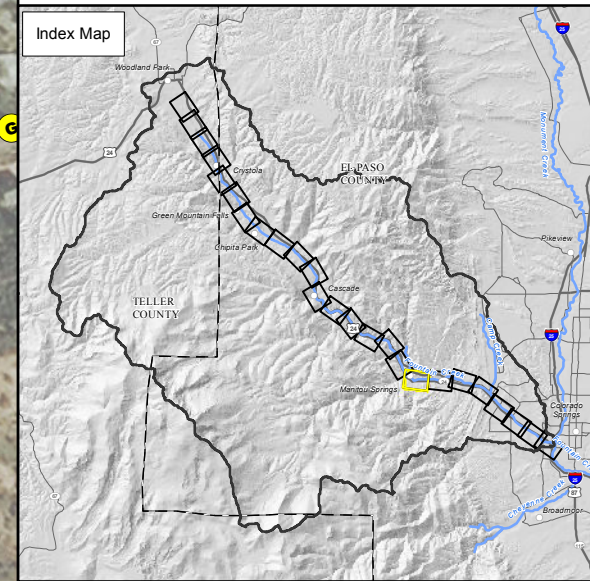
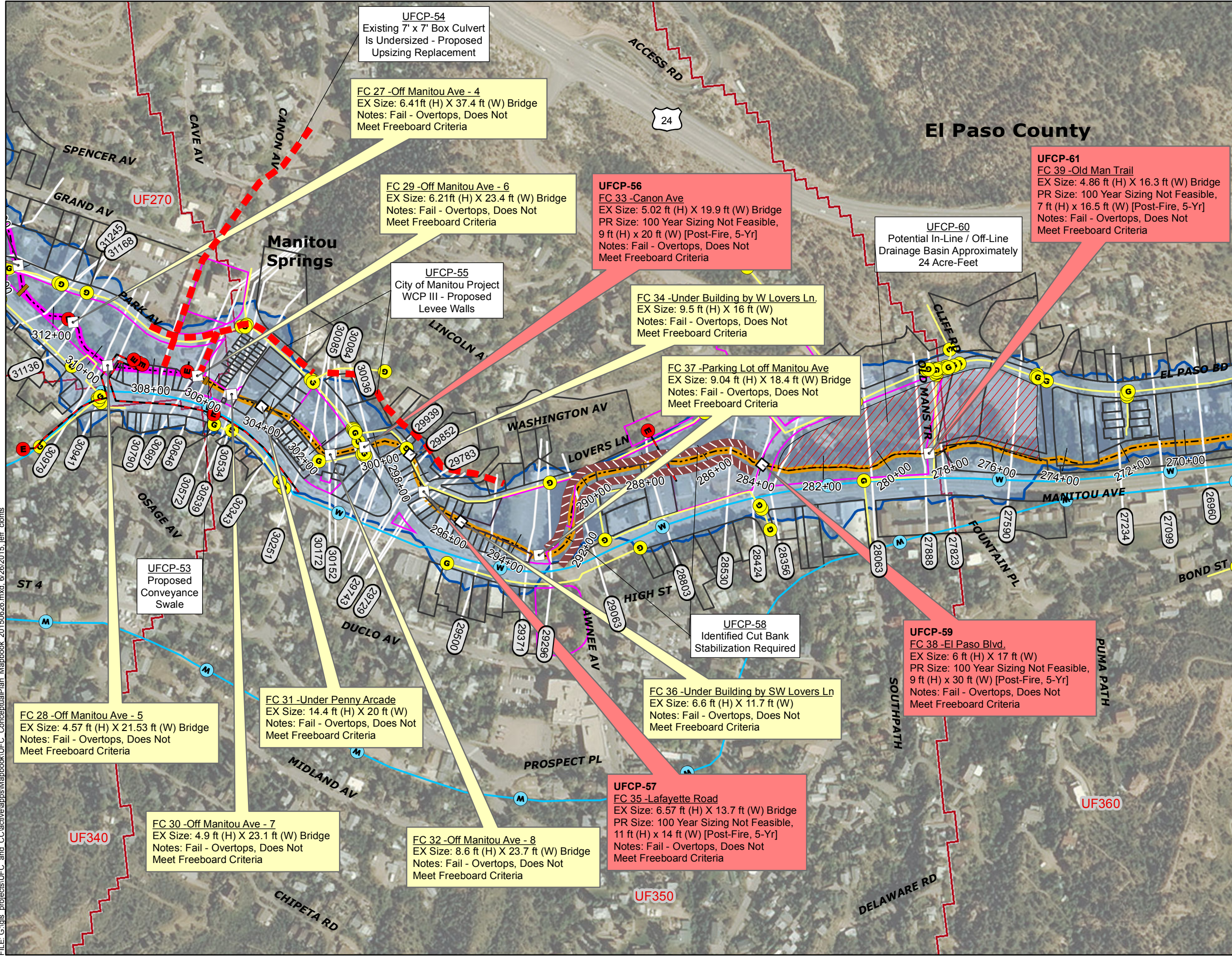
- Legend**
- | | |
|-------------------------------|---|
| Wastewater Line | Immediate Response Project |
| Water Line | Immediate Response Project |
| Gas Line | Identified Projects |
| Underground Electric | Detention Potential |
| Substation Fence | Cut Banks |
| County Boundary | Steep Slopes |
| Stream Centerline | Proposed Drop Structure |
| 100-yr Simulated Flood Zone | Detention Basin |
| Bridge | Engineered Bank / Channel |
| Culvert | Proposed Foot Trail |
| Hydraulic Model Cross Section | Reach Alternatives |
| USGS Proposed Detention Pond | Natural Channel Design |
| Subbasin | Protect In Place |
| Ownership | Protect In Place & Monitor |
| Private | Small Drop Structures w/ Toe Protection |
| Public | Active Cutbanks |
| | High |
| | Medium |
| | Low |





Legend

- Wastewater Line
- Water Line
- Gas Line
- Underground Electric
- Substation Fence
- County Boundary
- Stream Centerline
- 100-yr Simulated Flood Zone
- Bridge
- Hydraulic Model Cross Section
- USGS Proposed Detention Pond
- Subbasin
- Ownership: Private, Public
- Immediate Response Project: Immediate Response Project
- Identified Projects: Identified Projects
- Detention Potential: Detention Potential
- Cut Banks: Cut Banks
- Steep Slopes: Steep Slopes
- Proposed Drop Structure: Proposed Drop Structure
- Detention Basin: Detention Basin
- Engineered Bank / Channel: Engineered Bank / Channel
- Proposed Foot Trail: Proposed Foot Trail
- Reach Alternatives: Natural Channel Design, Protect In Place, Protect In Place & Monitor, Small Drop Structures w/ Toe Protection
- Active Cutbanks: High, Medium, Low



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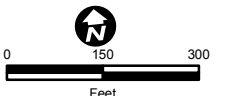
MATRIX
DESIGN GROUP

FOUNTAIN CREEK WATERSHED
FLOOD CONTROL & GREENWAY DISTRICT

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

El Paso County

Sheet 19 of 25
 UFCP-62 thru UFCP-65
 Upper Fountain Creek
 Conceptual Plan
 El Paso County, CO



- Legend**
- Wastewater Line
 - Water Line
 - Gas Line
 - Underground Electric
 - Substation Fence
 - County Boundary
 - Stream Centerline
 - 100-yr Simulated Flood Zone
 - Bridge
 - Culvert
 - Hydraulic Model Cross Section
 - USGS Proposed Detention Pond
 - Subbasin
 - Ownership: Private, Public
- Immediate Response Project**
- Immediate Response Project
 - Identified Projects
 - Detention Potential
 - Cut Banks
 - Steep Slopes
 - Proposed Drop Structure
 - Detention Basin
 - Engineered Bank / Channel
 - Proposed Foot Trail
- Reach Alternatives**
- Natural Channel Design
 - Protect In Place
 - Protect In Place & Monitor
 - Small Drop Structures w/ Toe Protection
- Active Cutbanks**
- High
 - Medium
 - Low

UFCP-64
 FC 41 - Mayfair Ave
 EX Size: 4.14ft (H) X 17.6 ft (W) Bridge
 PR Size: 100 Year Sizing Not Feasible,
 8.5 ft (H) x 23.5 ft (W) [Post-Fire, 5-Yr]
 Notes: Fail - Overtops, Does Not Meet Freeboard Criteria

UFCP-66
 FC 48 - Garden of the Gods Place
 EX Size: 23.48 ft (H) X 96.6 ft (W) Bridge
 PR Size: 100 Year Sizing Not Feasible,
 23.5 ft (H) x 97 ft (W) [Post-Fire, 5-Yr]
 Notes: Fail - Overtops, Does Not Meet Freeboard Criteria

FC 49 - Hwy 24 - 3
 EX Size: 43.21 ft (H) X 194.7 ft (W) Bridge

FC 45 - Ent Pikes Peak RV Park
 EX Size: 6.11ft (H) X 27.8 ft (W) Bridge
 Notes: Fail - Overtops, Does Not Meet Freeboard Criteria

FC 40 - Ent to Blue Skies Inn
 EX Size: 2.14 ft (H) X 28.8 ft (W) Bridge
 Notes: Fail - Overtops, Does Not Meet Freeboard Criteria

FC 42 - Old Bridge off Manitou Ave - 1
 EX Size: 7.23ft (H) X 28.8 ft (W) Bridge
 Notes: Fail - Overtops, Does Not Meet Freeboard Criteria, Exposed and Vulnerable Utilities

UFCP-63
 Raise Elevation of Manitou Ave.
 Primary Evacuation Route

UFCP-65
 Potential Joint Use Park/Flood Relief Area
 Approximately 8 Acre-Feet

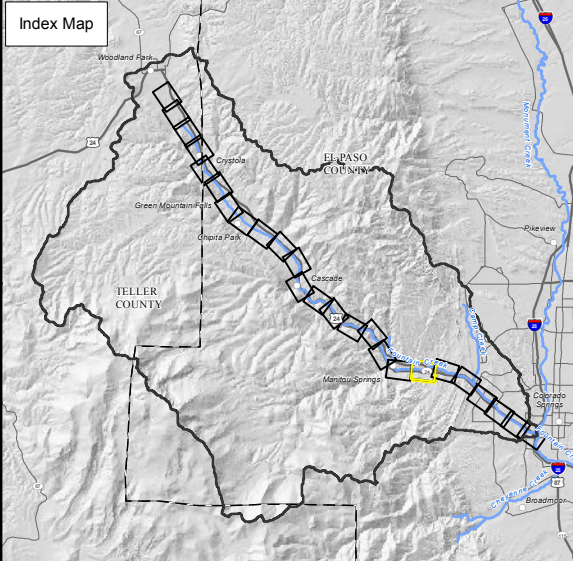
UFCP-62
 Proposed Inlet with 3 - 36" Culverts

FC 43 - Old Bridge off Manitou Ave - 2
 EX Size: 7.9 ft (H) X 33.88 ft (W) Bridge
 Notes: Fail - Overtops, Does Not Meet Freeboard Criteria

FC 44 - Ent to Willow Motel
 EX Size: 6.69 ft (H) X 27 ft (W) Bridge
 Notes: Fail - Overtops, Does Not Meet Freeboard Criteria

FC 47 - Manitou Springs Swimming Pool
 EX Size: 6.62 ft (H) X 30.3 ft (W) Bridge
 Notes: Fail - Overtops, Does Not Meet Freeboard Criteria

FC 46 - US-MS-Swimming Pool
 EX Size: 6.6 ft (H) X 37.85 ft (W) Bridge
 Notes: Fail - Overtops, Does Not Meet Freeboard Criteria



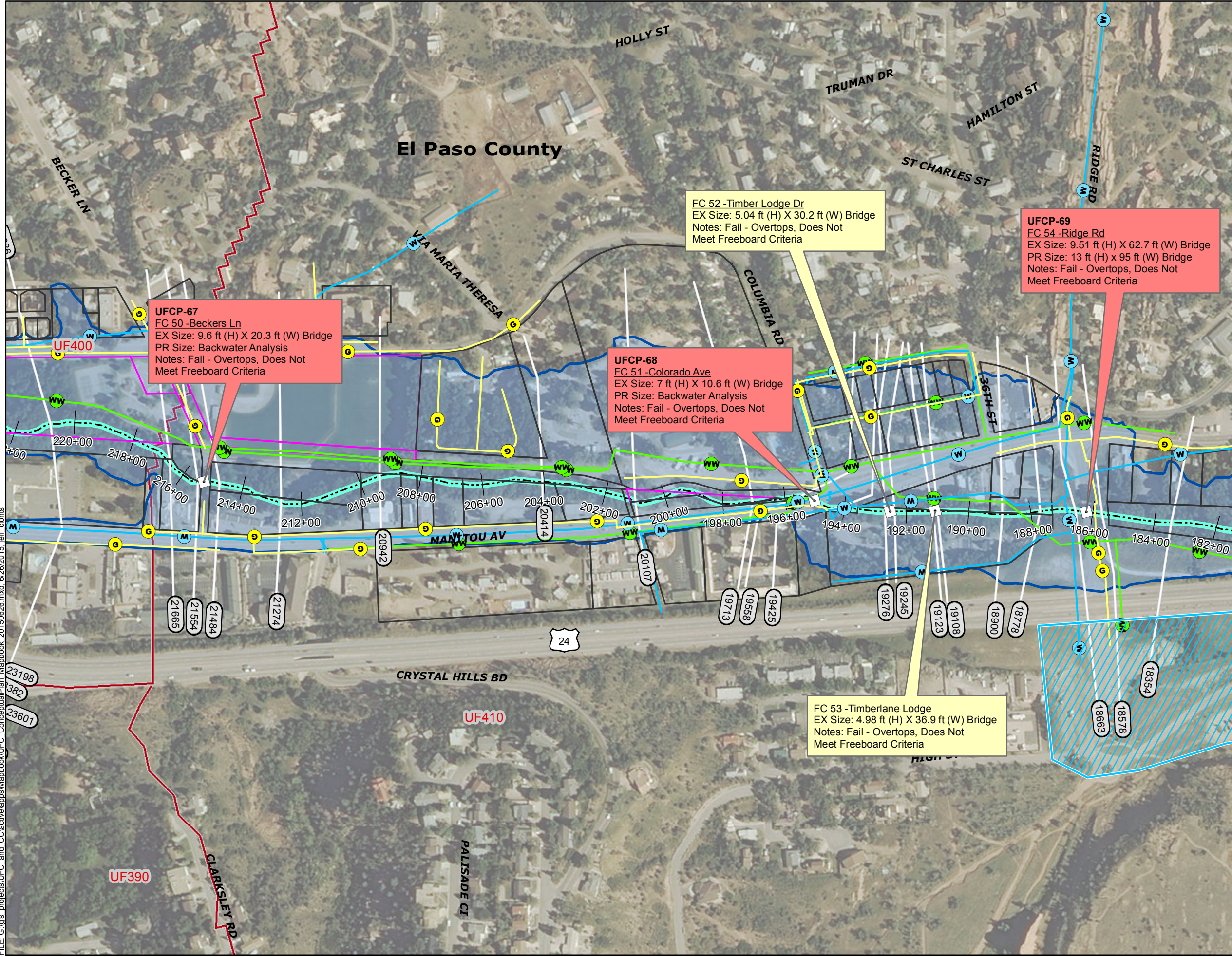
MATRIX DESIGN GROUP

FOUNTAIN CREEK WATERSHED
 FLOOD CONTROL & GREENWAY DISTRICT

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 Colorado Water Conservation Board
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UFCP-67
 FC 50 -Beckers Ln
 EX Size: 9.6 ft (H) X 20.3 ft (W) Bridge
 PR Size: Backwater Analysis
 Notes: Fail - Overtops, Does Not Meet Freeboard Criteria

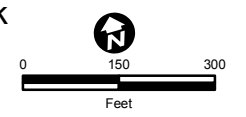
FC 52 -Timber Lodge Dr
 EX Size: 5.04 ft (H) X 30.2 ft (W) Bridge
 Notes: Fail - Overtops, Does Not Meet Freeboard Criteria

UFCP-68
 FC 51 -Colorado Ave
 EX Size: 7 ft (H) X 10.6 ft (W) Bridge
 PR Size: Backwater Analysis
 Notes: Fail - Overtops, Does Not Meet Freeboard Criteria

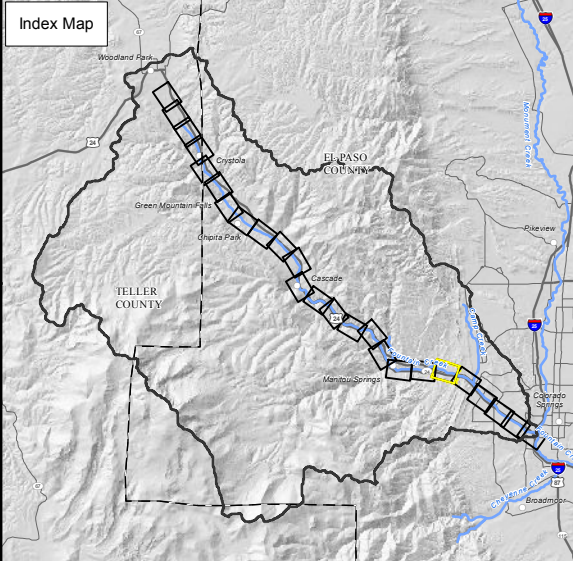
UFCP-69
 FC 54 -Ridge Rd
 EX Size: 9.51 ft (H) X 62.7 ft (W) Bridge
 PR Size: 13 ft (H) x 95 ft (W) Bridge
 Notes: Fail - Overtops, Does Not Meet Freeboard Criteria

FC 53 -Timberlane Lodge
 EX Size: 4.98 ft (H) X 36.9 ft (W) Bridge
 Notes: Fail - Overtops, Does Not Meet Freeboard Criteria

Sheet 20 of 25
 UFCP-67 thru UFCP-69
 Upper Fountain Creek
 Conceptual Plan
 El Paso County, CO



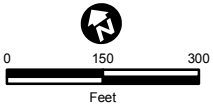
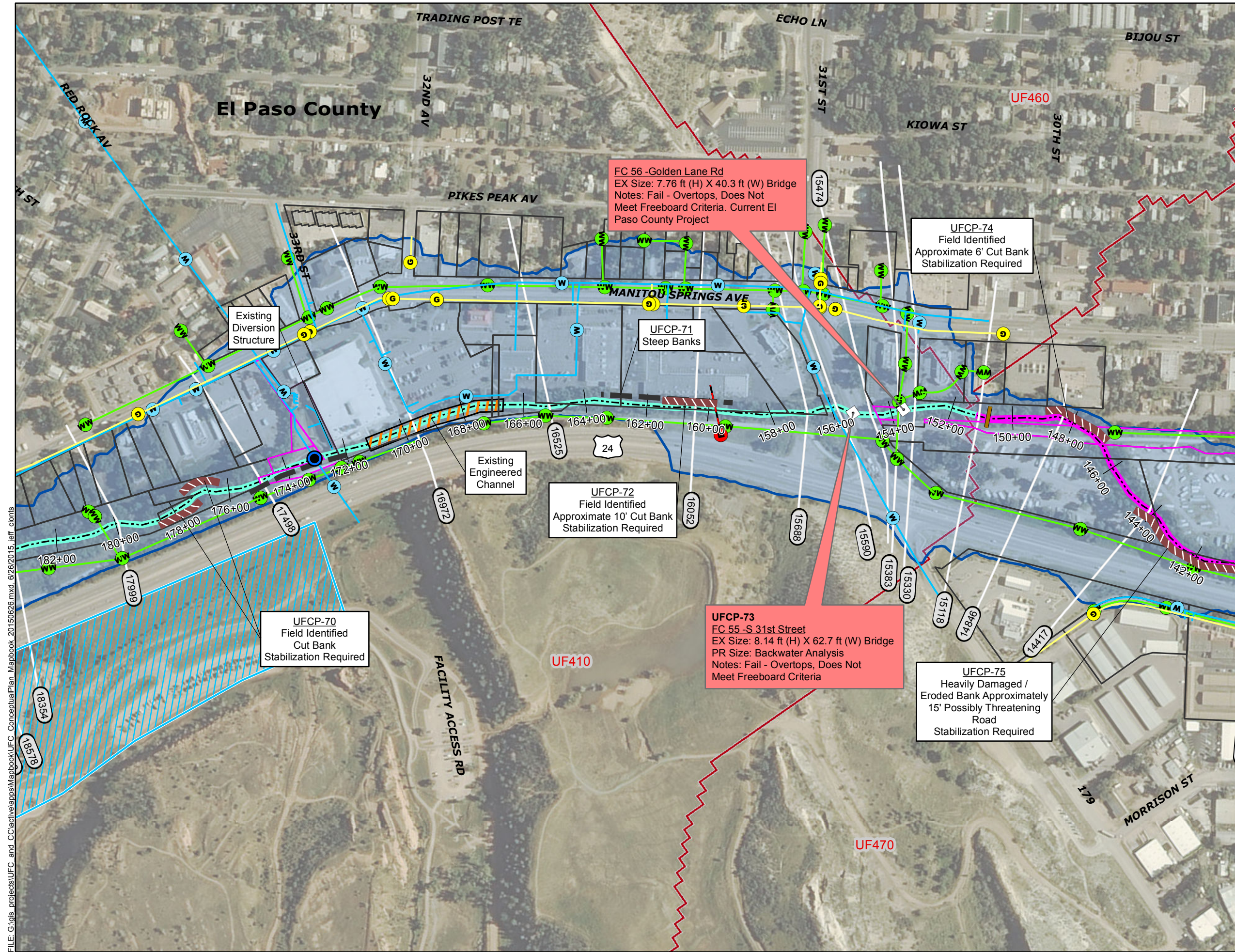
- Legend**
- Wastewater Line
 - Water Line
 - Gas Line
 - Underground Electric
 - Substation Fence
 - County Boundary
 - Stream Centerline
 - 100-yr Simulated Flood Zone
 - Bridge
 - Culvert
 - Hydraulic Model Cross Section
 - USGS Proposed Detention Pond
 - Subbasin
 - Ownership: Private, Public
- Immediate Response Project**
- Immediate Response Project
 - Identified Projects
 - Detention Potential
 - Cut Banks
 - Steep Slopes
 - Proposed Drop Structure
 - Detention Basin
 - Engineered Bank / Channel
 - Proposed Foot Trail
- Reach Alternatives**
- Natural Channel Design
 - Protect In Place
 - Protect In Place & Monitor
 - Small Drop Structures w/ Toe Protection
- Active Cutbanks**
- High
 - Medium
 - Low



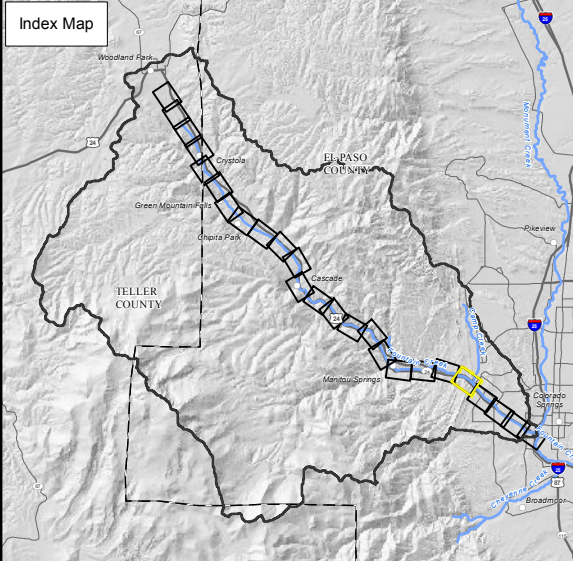
Matrix DESIGN GROUP

FOUNTAIN CREEK WATERSHED
 FLOOD CONTROL & GREENWAY DISTRICT

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 Department of Natural Resources

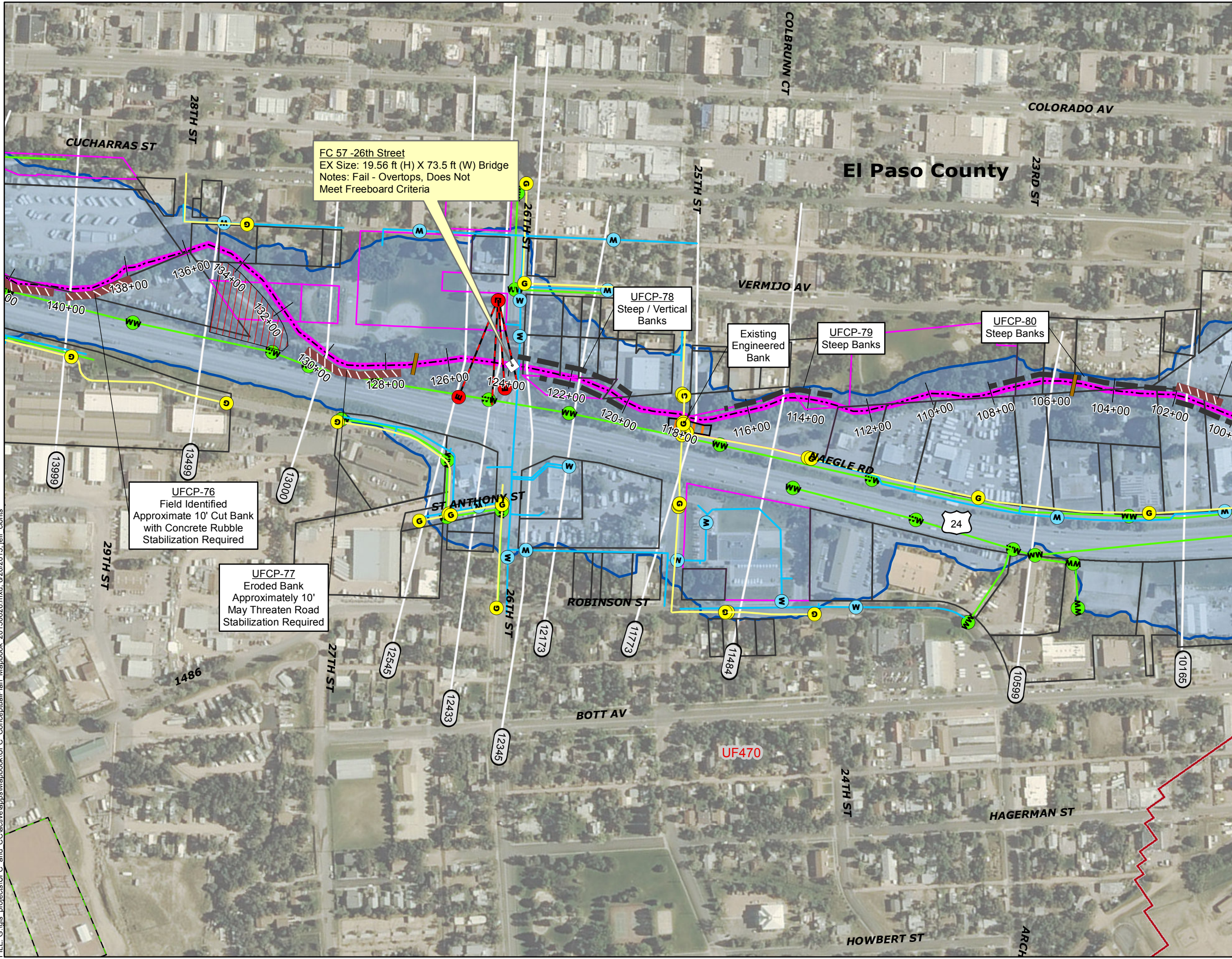


- Legend**
- Wastewater Line
 - Water Line
 - Gas Line
 - Underground Electric
 - Substation Fence
 - County Boundary
 - Stream Centerline
 - 100-yr Simulated Flood Zone
 - Bridge
 - Culvert
 - Hydraulic Model Cross Section
 - USGS Proposed Detention Pond
 - Subbasin
 - Ownership: Private, Public
- Immediate Response Project**
- Immediate Response Project
 - Identified Projects
 - Detention Potential
 - Cut Banks
 - Steep Slopes
 - Proposed Drop Structure
 - Detention Basin
 - Engineered Bank / Channel
 - Proposed Foot Trail
- Reach Alternatives**
- Natural Channel Design
 - Protect In Place
 - Protect In Place & Monitor
 - Small Drop Structures w/ Toe Protection
- Active Cutbanks**
- High
 - Medium
 - Low



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FC 57 -26th Street
 EX Size: 19.56 ft (H) X 73.5 ft (W) Bridge
 Notes: Fail - Overtops, Does Not Meet Freeboard Criteria

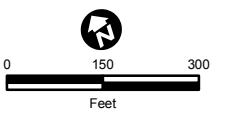
UFCP-76
 Field Identified
 Approximate 10' Cut Bank
 with Concrete Rubble
 Stabilization Required

UFCP-77
 Eroded Bank
 Approximately 10'
 May Threaten Road
 Stabilization Required

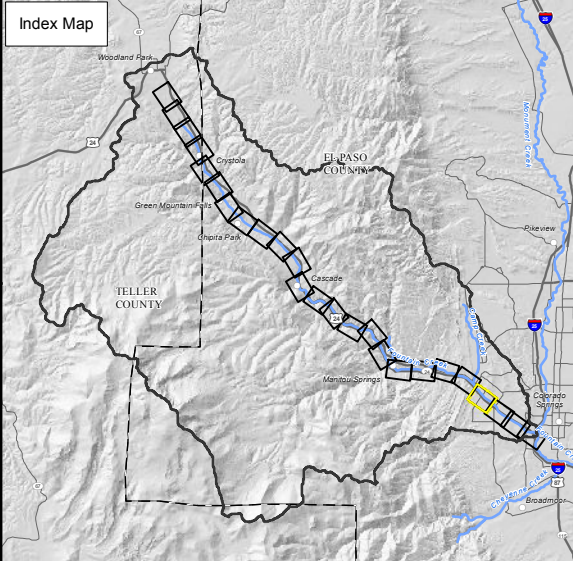
UFCP-78
 Steep / Vertical
 Banks

UFCP-79
 Steep Banks

UFCP-80
 Steep Banks



- Legend**
- Wastewater Line
 - Water Line
 - Gas Line
 - Underground Electric
 - Substation Fence
 - County Boundary
 - Stream Centerline
 - 100-yr Simulated Flood Zone
 - Bridge
 - Culvert
 - Hydraulic Model Cross Section
 - USGS Proposed Detention Pond
 - Subbasin
 - Ownership: Private, Public
- Immediate Response Project**
- Immediate Response Project
 - Identified Projects
 - Detention Potential
 - Cut Banks
 - Steep Slopes
 - Proposed Drop Structure
 - Detention Basin
 - Engineered Bank / Channel
 - Proposed Foot Trail
- Reach Alternatives**
- Natural Channel Design
 - Protect In Place
 - Protect In Place & Monitor
 - Small Drop Structures w/ Toe Protection
- Active Cutbanks**
- High
 - Medium
 - Low

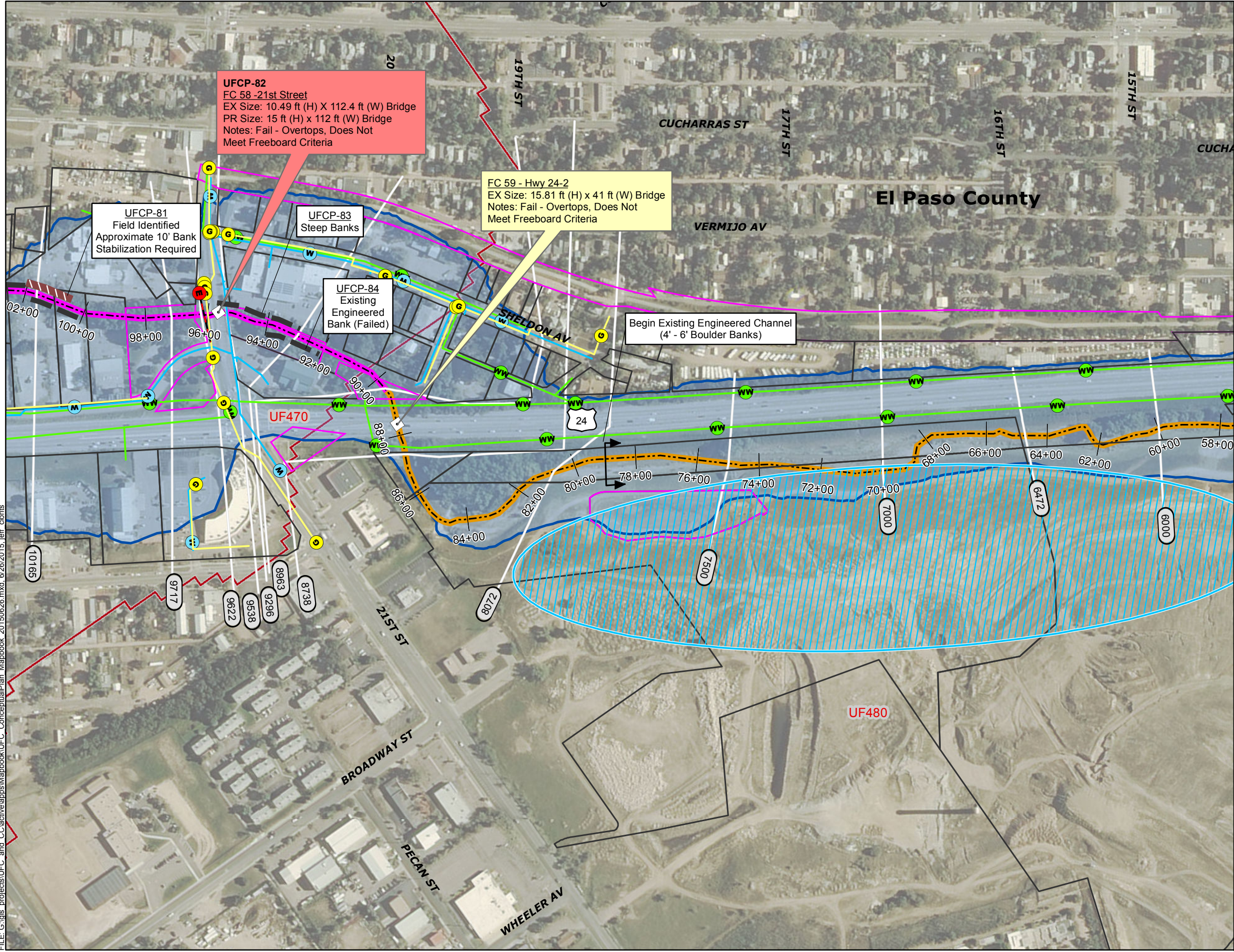


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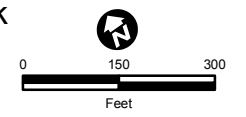
FOUNTAIN CREEK WATERSHED
 FLOOD CONTROL & GREENWAY DISTRICT

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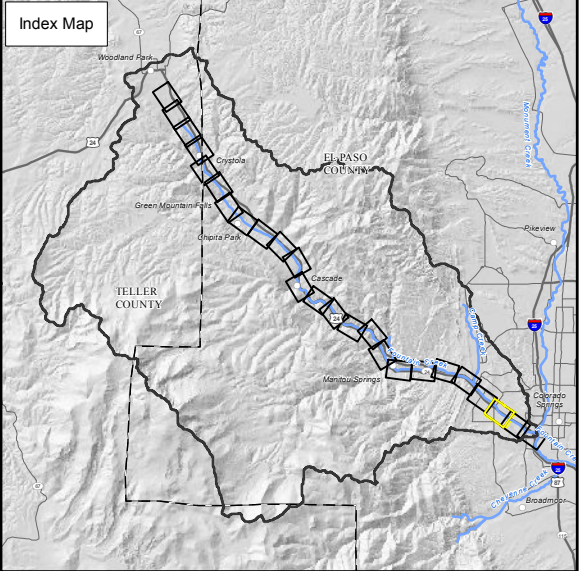
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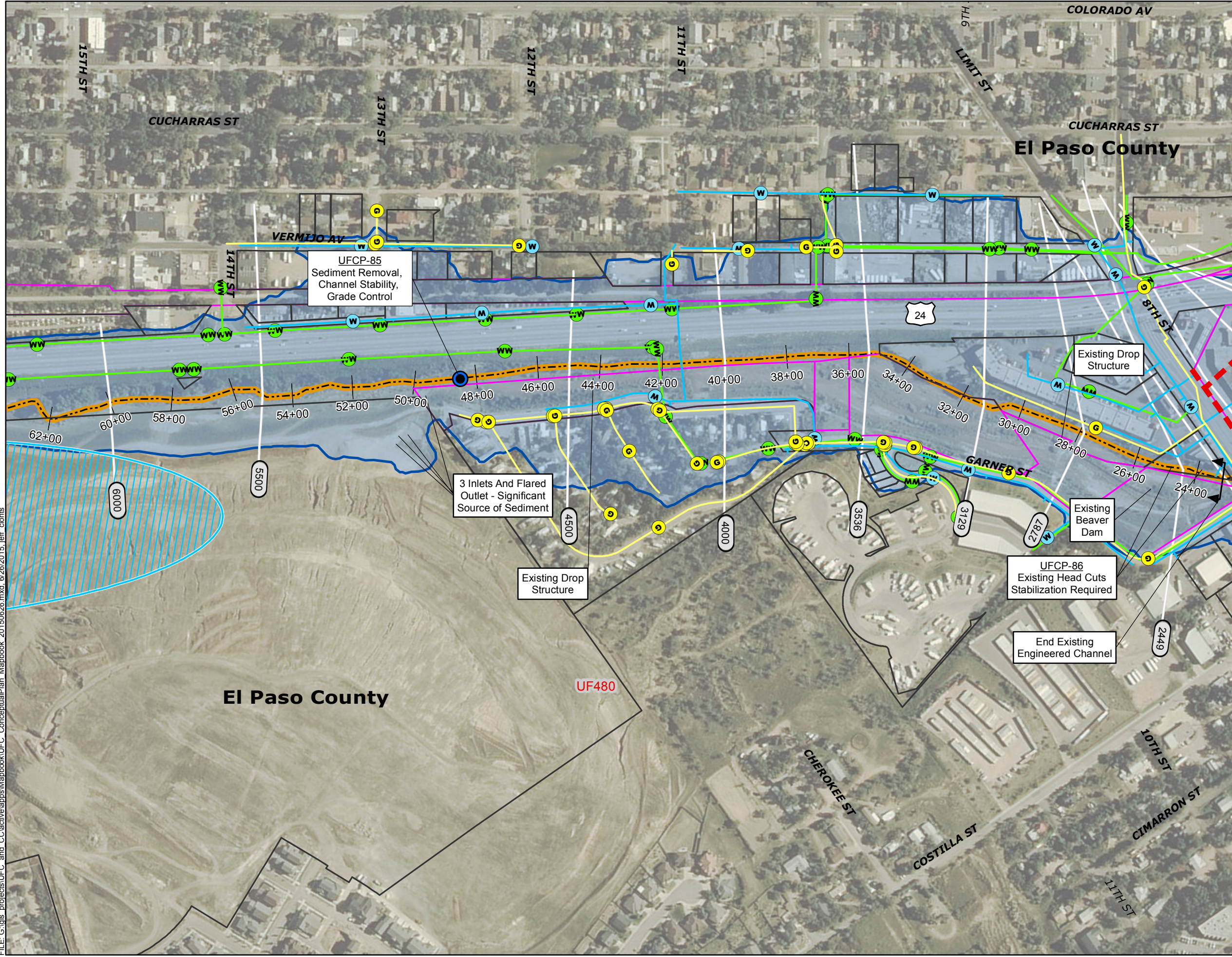
Sheet 23 of 25
 UFCP-81 thru UFCP-84
 Upper Fountain Creek
 Conceptual Plan
 El Paso County, CO



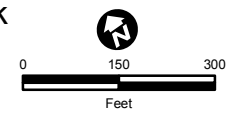
- Legend**
- Wastewater Line
 - Water Line
 - Gas Line
 - Underground Electric
 - Substation Fence
 - County Boundary
 - Stream Centerline
 - 100-yr Simulated Flood Zone
 - Bridge
 - Culvert
 - Hydraulic Model Cross Section
 - USGS Proposed Detention Pond
 - Subbasin
 - Ownership: Private (White), Public (Pink)
- Immediate Response Project**
- Immediate Response Project (Star)
 - Identified Projects (Blue Circle)
 - Detention Potential (Circle with Plus)
 - Cut Banks (Red Hatched)
 - Steep Slopes (Black Hatched)
 - Proposed Drop Structure (Brown Hatched)
 - Detention Basin (Red Hatched)
 - Engineered Bank / Channel (Orange Hatched)
 - Proposed Foot Trail (Pink Dashed)
- Reach Alternatives**
- Natural Channel Design (Orange)
 - Protect In Place (Black)
 - Protect In Place & Monitor (Light Blue)
 - Small Drop Structures w/ Toe Protection (Pink)
- Active Cutbanks**
- High (Red)
 - Medium (Yellow)
 - Low (Green)



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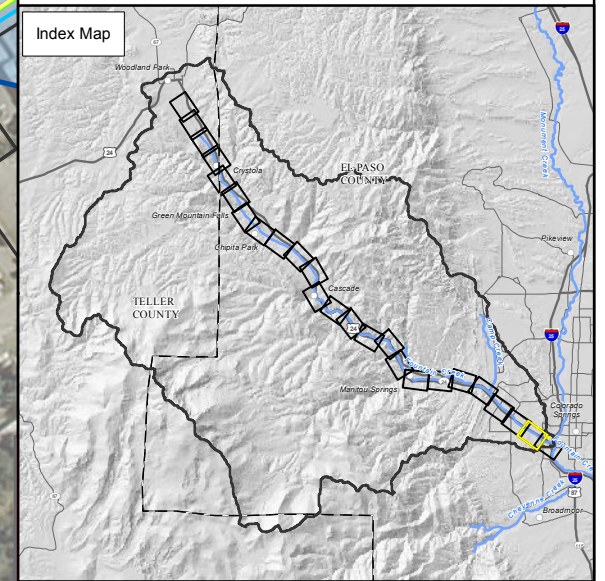


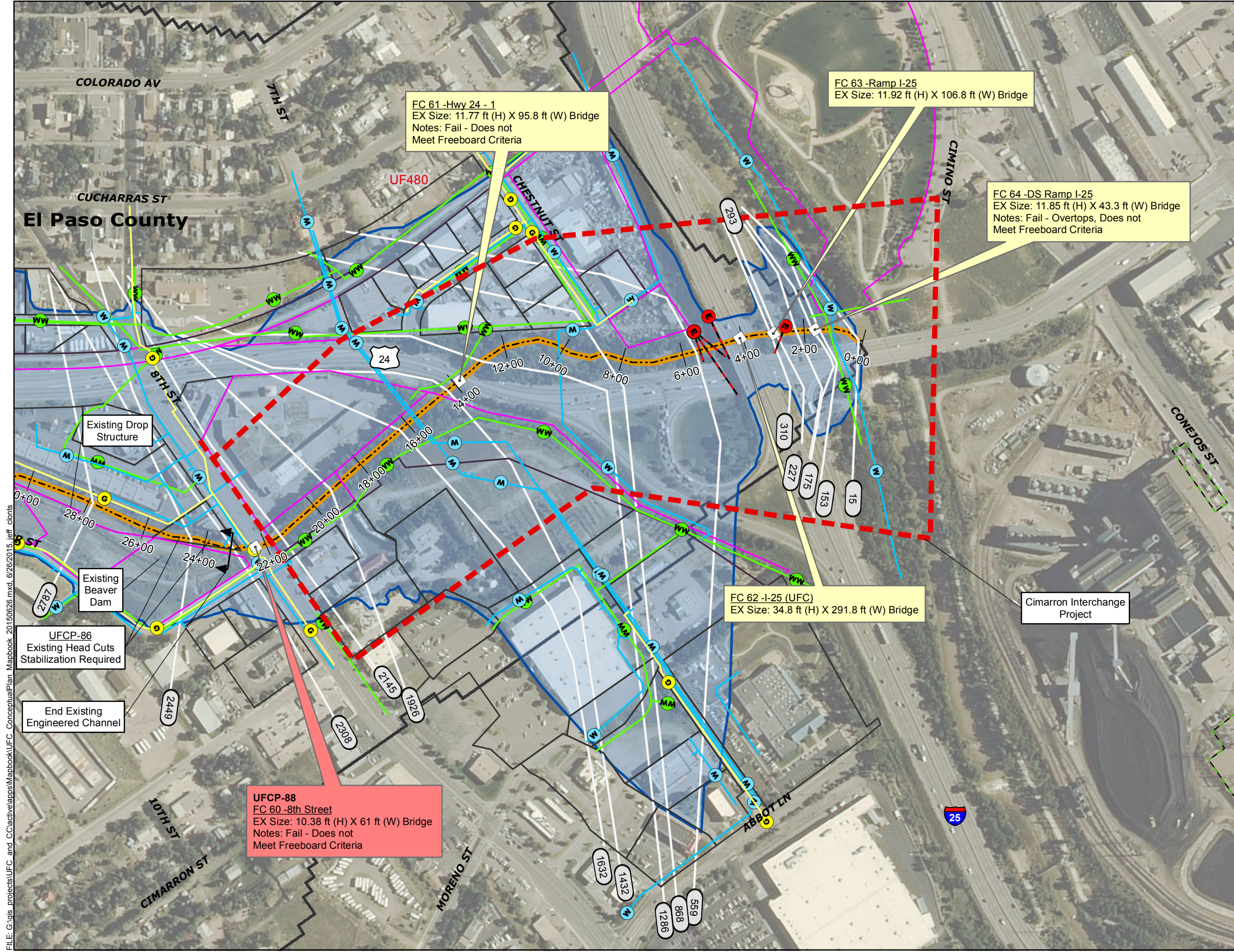
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 UFCP-85 thru UFCP-86
 Upper Fountain Creek
 Conceptual Plan
 El Paso County, CO



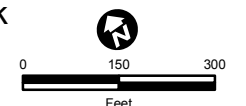
Legend

Wastewater Line	Immediate Response Project
Water Line	Immediate Response Project
Gas Line	Identified Projects
Underground Electric	Detention Potential
Substation Fence	Cut Banks
County Boundary	Steep Slopes
Stream Centerline	Proposed Drop Structure
100-yr Simulated Flood Zone	Detention Basin
Bridge	Engineered Bank / Channel
Culvert	Proposed Foot Trail
Hydraulic Model Cross Section	Reach Alternatives
USGS Proposed Detention Pond	Natural Channel Design
Subbasin	Protect In Place
Ownership	Protect In Place & Monitor
Private	Small Drop Structures w/ Toe Protection
Public	Active Cutbanks
	High
	Medium
	Low

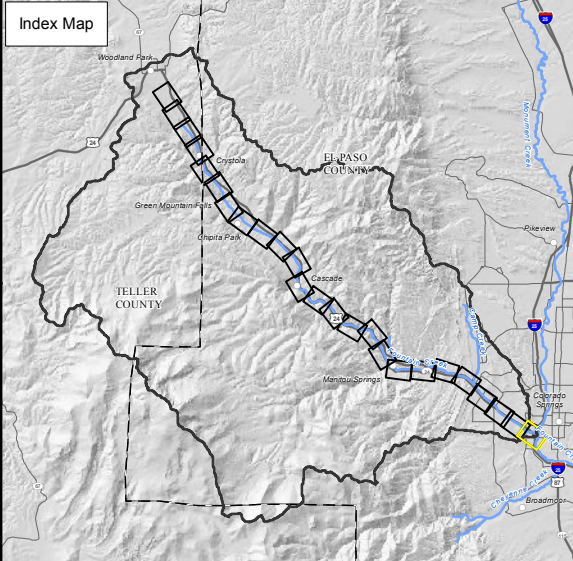




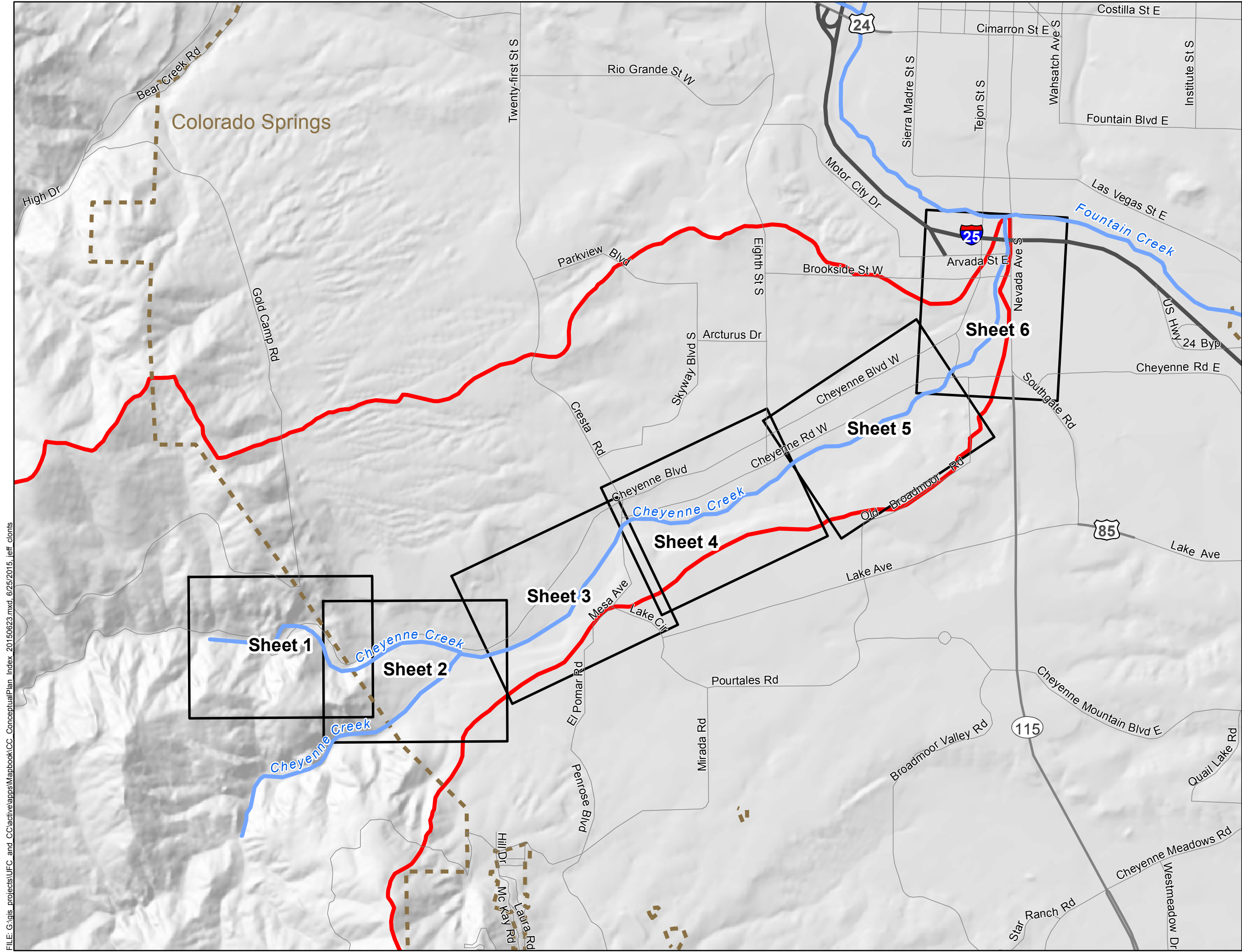
Sheet 25 of 25
 UFCP-87
 Upper Fountain Creek
 Conceptual Plan
 El Paso County, CO



- Legend**
- Wastewater Line
 - Water Line
 - Gas Line
 - Underground Electric
 - Substation Fence
 - County Boundary
 - Stream Centerline
 - 100-yr Simulated Flood Zone
 - Bridge
 - Culvert
 - Hydraulic Model Cross Section
 - USGS Proposed Detention Pond
 - Subbasin
 - Ownership: Private, Public
- Immediate Response Project**
- Immediate Response Project
 - Identified Projects
 - Detention Potential
 - Cut Banks
 - Steep Slopes
 - Proposed Drop Structure
 - Detention Basin
 - Engineered Bank / Channel
 - Proposed Foot Trail
- Reach Alternatives**
- Natural Channel Design
 - Protect In Place
 - Protect In Place & Monitor
 - Small Drop Structures w/ Toe Protection
- Active Cutbanks**
- High
 - Medium
 - Low

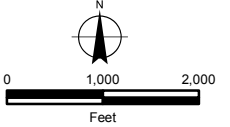


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Map Index

Cheyenne Creek
Conceptual Plan
El Paso County, CO



Legend

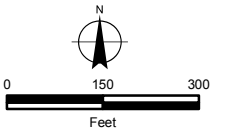
-  Sheet
-  Creek
-  Cheyenne Creek Watershed
-  Colorado Springs Boundary
-  Interstate
-  Highway
-  Major Road

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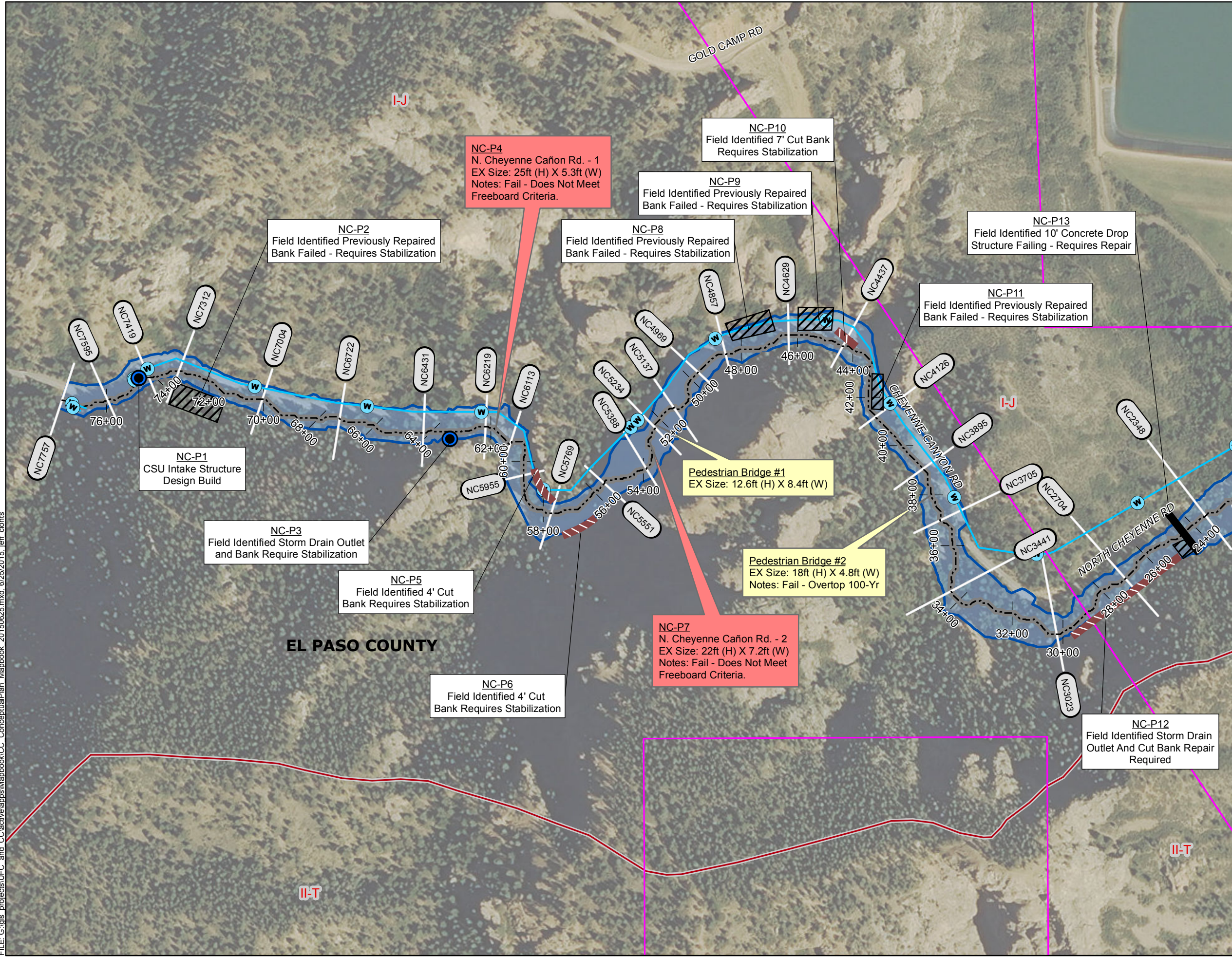
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Conservation Board
Department of Natural Resources

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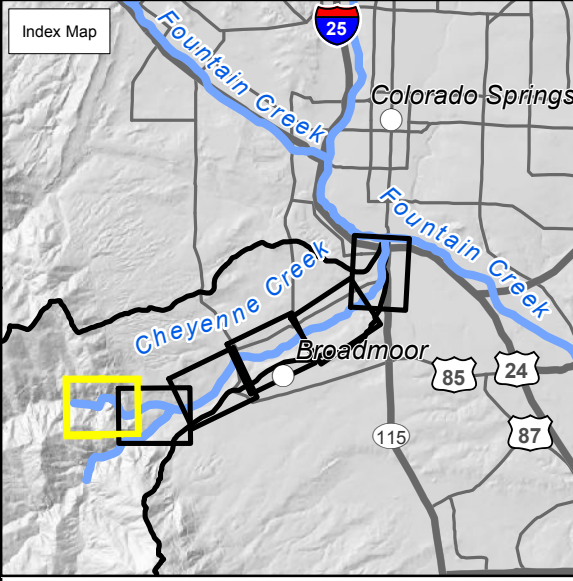


Legend

	Wastewater Line	Ownership	
	Water Line		Private
	Gas Line		Public
	Underground Electric	Identified Project	
	County Boundary		Planned Project
	City/Town		Immediate Response Project
	Stream Centerline		Previously Repaired
	100-yr Simulated Flood Zone		Proposed Drop Structure
	Bridge		Detention Basin
	Existing Drop Structure		Cut Banks
	Hydraulic Model	Reach Alternatives	
	Cross Sections		Protect In Place
	Subbasin		Small Drop Structures w/ Toe Protection



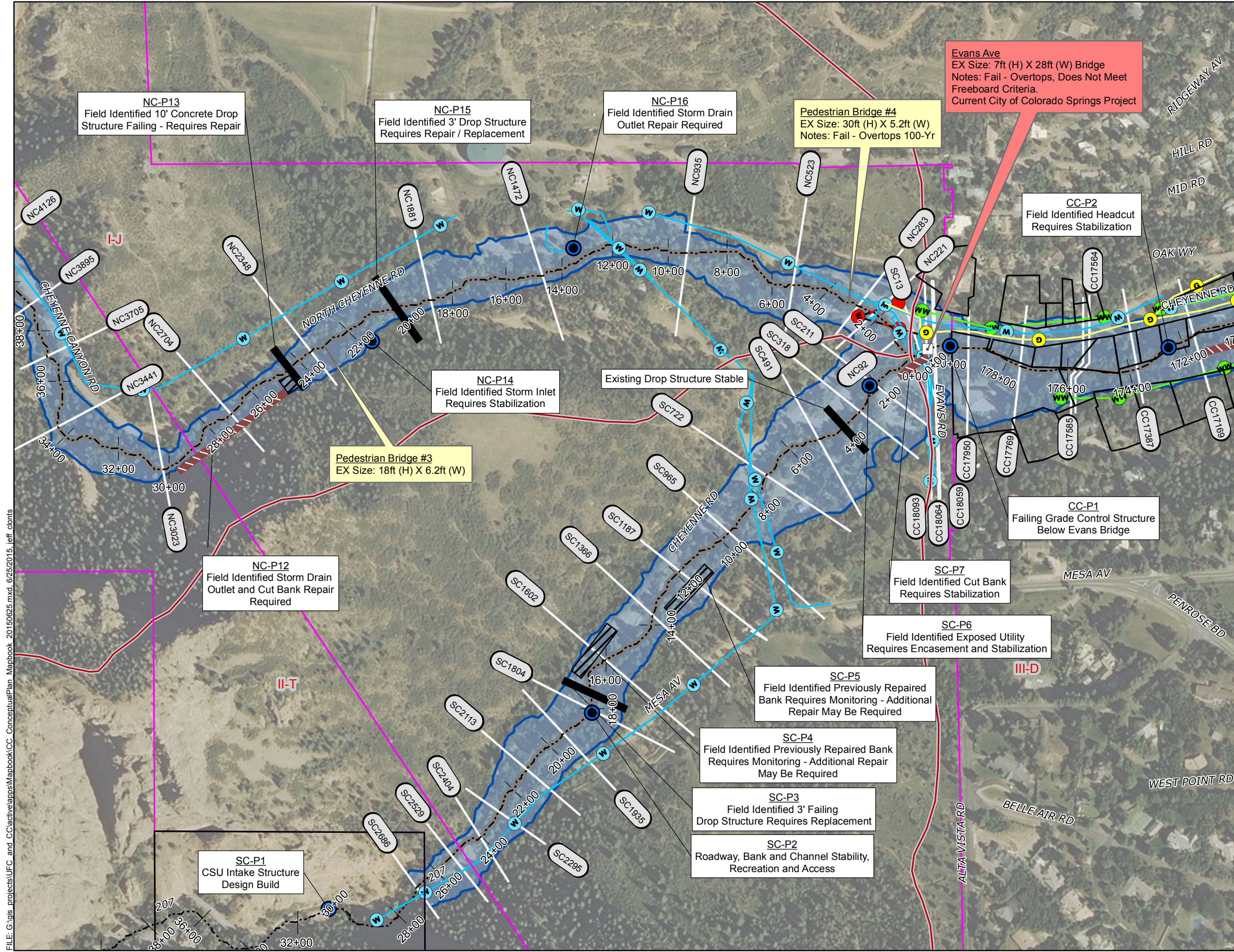
EL PASO COUNTY



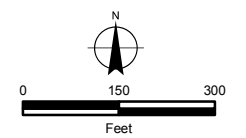
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FOUNTAIN CREEK WATERSHED
FLOOD CONTROL & GREENWAY DISTRICT

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Colorado Water Conservation Board
Department of Natural Resources

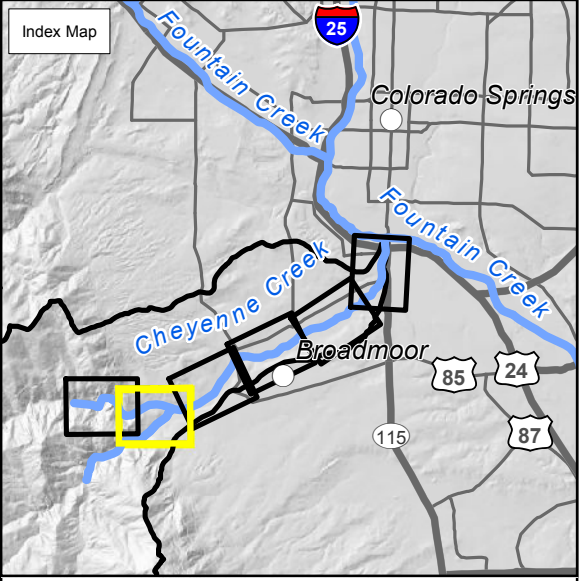


Sheet 2 of 6
 NC-P13 thru NC-P16
 SC-P1 thru SC-P7
 CC-P1 thru CC-P2
Cheyenne Creek
Conceptual Plan
 El Paso County, CO



Legend

Wastewater Line	Ownership
Water Line	Private
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Underground Electric	Identified Project
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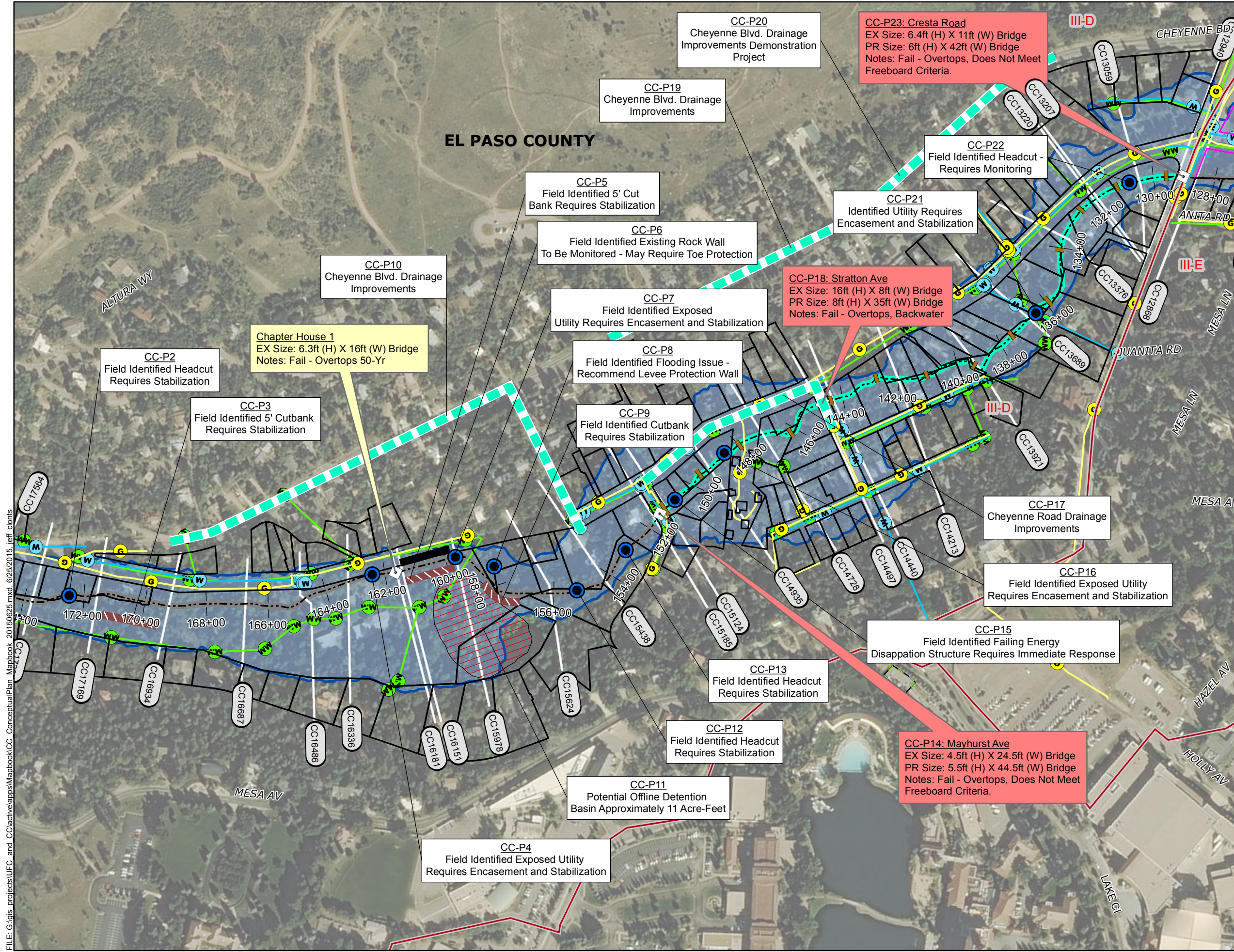


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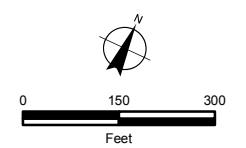
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Department of Natural Resources

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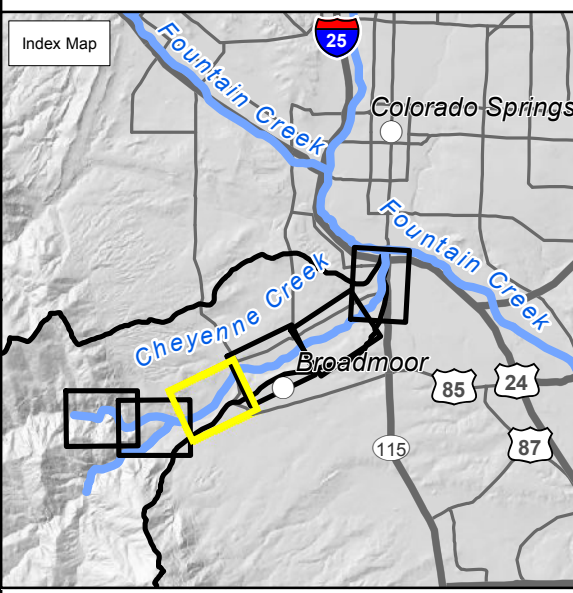


Sheet 3 of 6
 CC-P2 thru CC-P22

**Cheyenne Creek
 Conceptual Plan**
 El Paso County, CO



- Legend**
- | | |
|--------------------------------|---|
| Wastewater Line | Ownership |
| Water Line | Private |
| Gas Line | Public |
| Underground Electric | Identified Project |
| County Boundary | Planned Project |
| City/Town | Immediate Response Project |
| Stream Centerline | Previously Repaired |
| 100-yr Simulated Flood Zone | Proposed Drop Structure |
| Bridge | Detention Basin |
| Existing Drop Structure | Cut Banks |
| Hydraulic Model Cross Sections | Reach Alternatives |
| Subbasin | Protect In Place |
| | Small Drop Structures w/ Toe Protection |



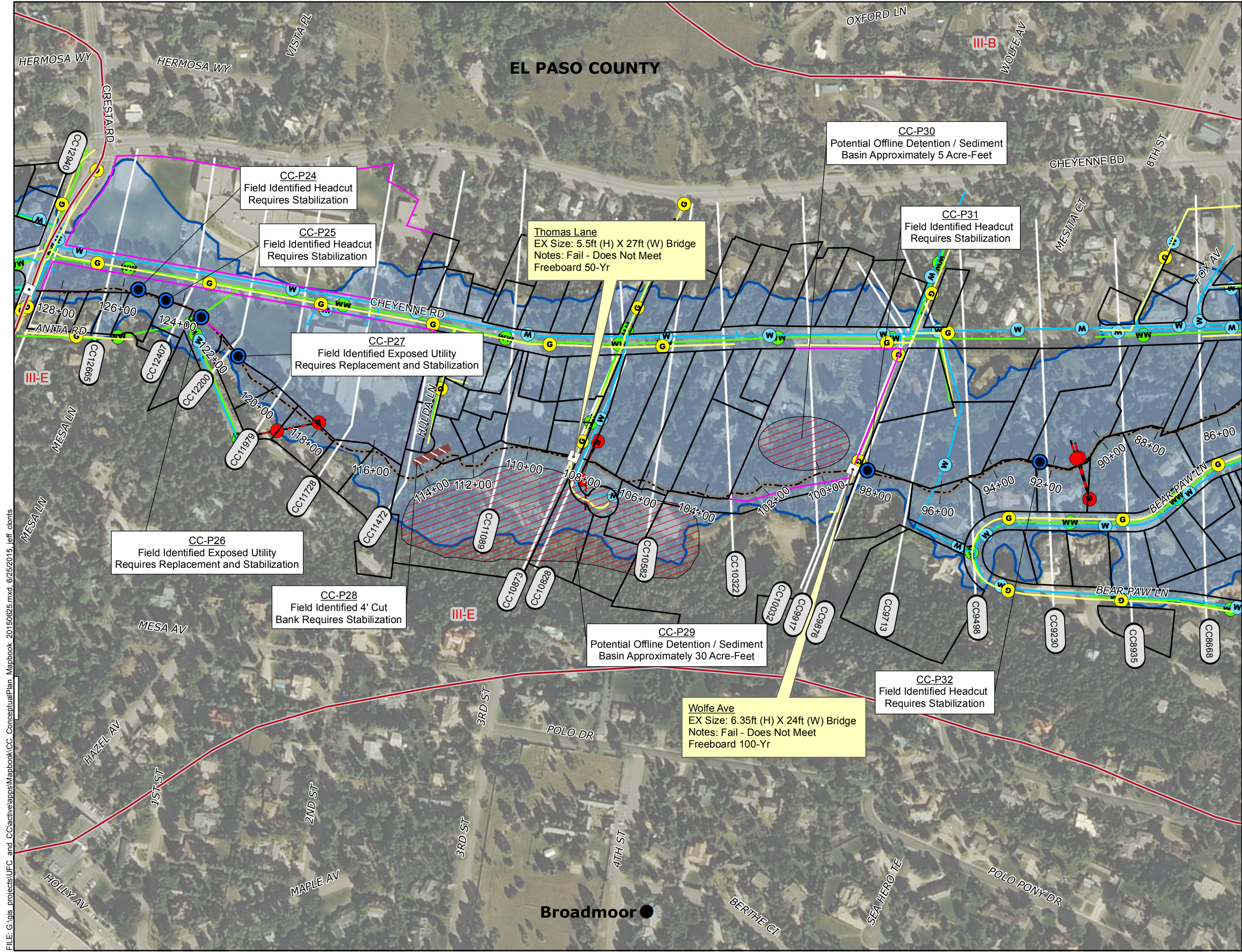
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CO **DNR**

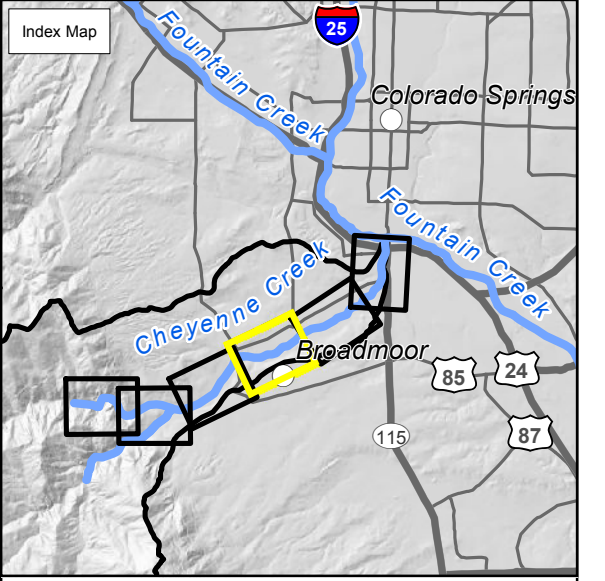
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 Department of Natural Resources

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Legend

Wastewater Line	Ownership
Water Line	Private
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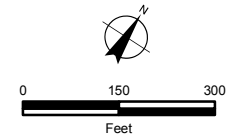
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FOUNTAIN CREEK WATERSHED
FLOOD CONTROL & GREENWAY DISTRICT

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Department of Natural Resources

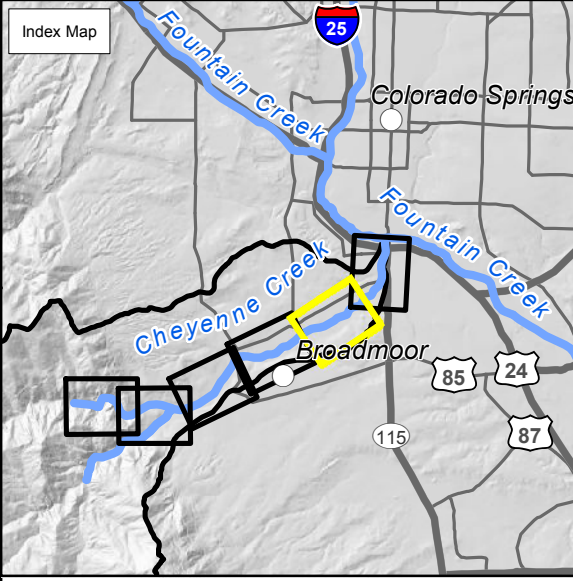
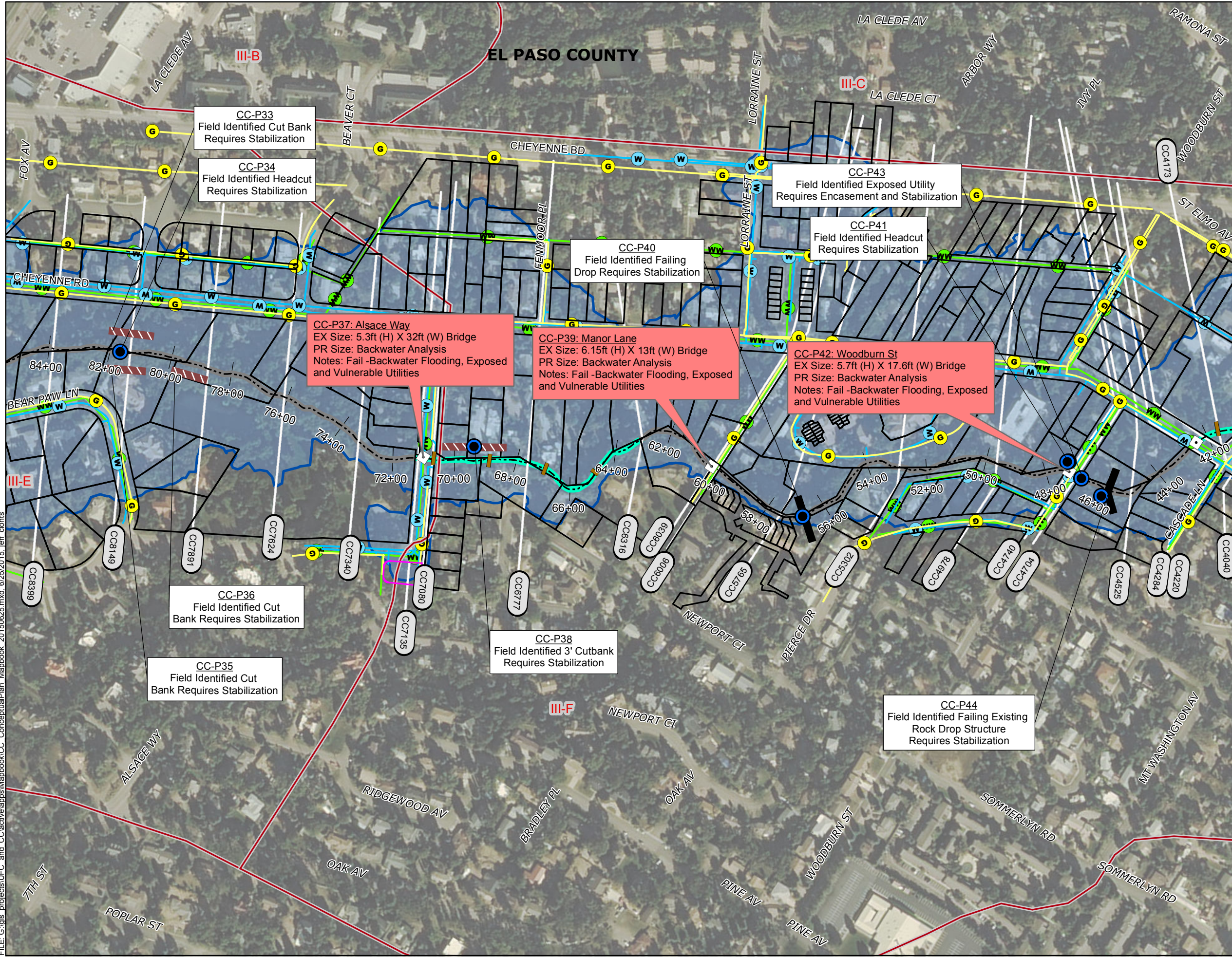
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Cheyenne Creek
Conceptual Plan
El Paso County, CO



Legend

- | | | | |
|--|--------------------------------|---------------------------|---|
| | Wastewater Line | | Private |
| | Water Line | | Public |
| | Gas Line | Identified Project | |
| | Underground Electric | | Planned Project |
| | County Boundary | | Immediate Response Project |
| | City/Town | | Previously Repaired |
| | Stream Centerline | | Proposed Drop Structure |
| | 100-yr Simulated Flood Zone | | Detention Basin |
| | Bridge | | Cut Banks |
| | Existing Drop Structure | Reach Alternatives | |
| | Hydraulic Model Cross Sections | | Protect In Place |
| | Subbasin | | Small Drop Structures w/ Toe Protection |



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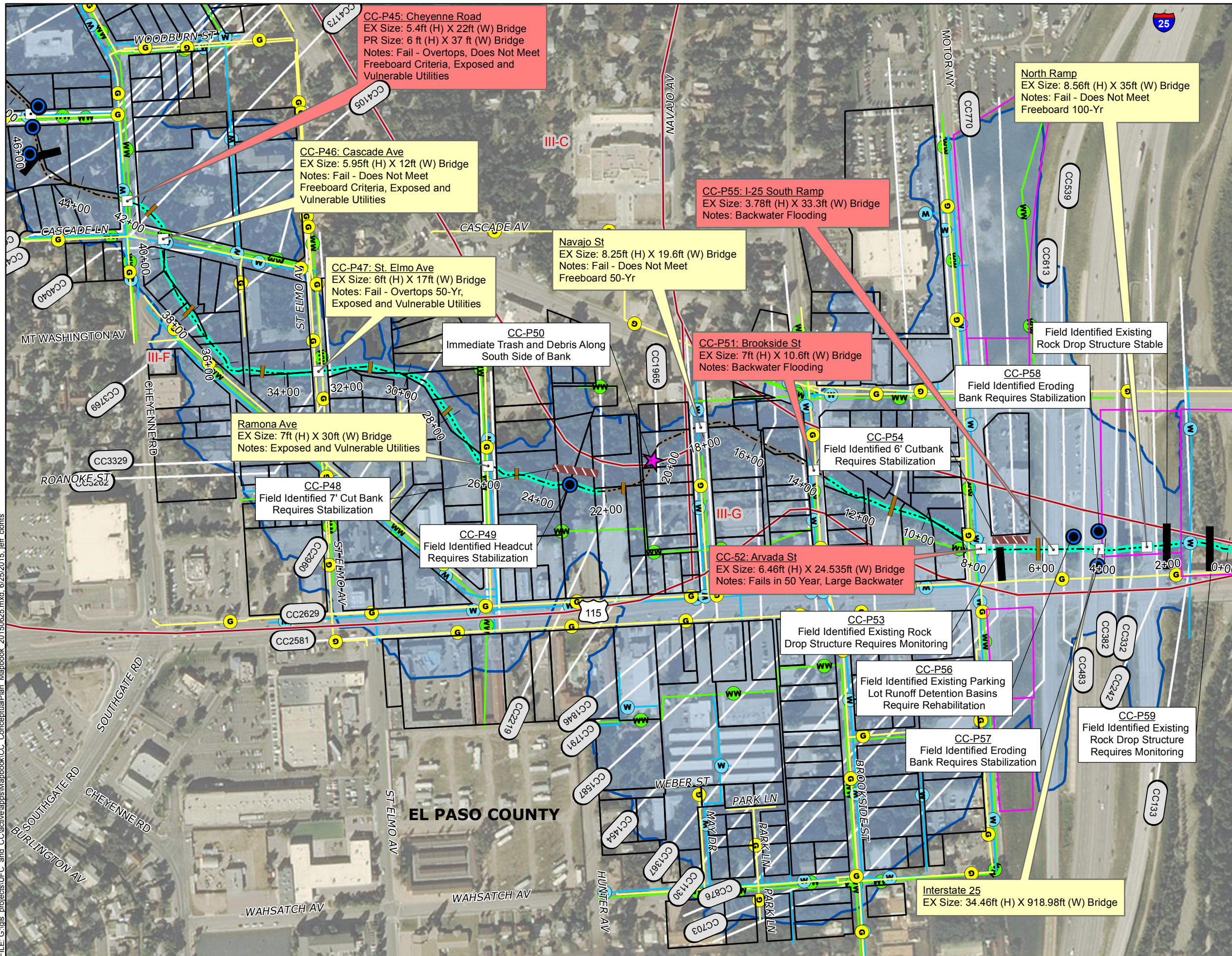
FOUNTAIN CREEK WATERSHED
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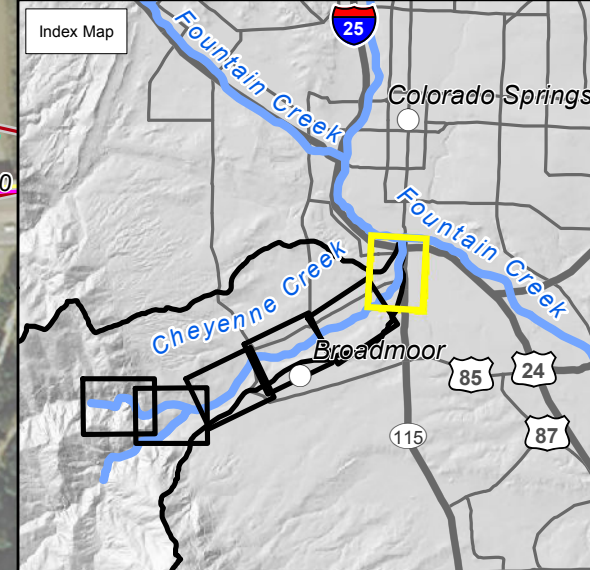
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Legend

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Reach Alternative Spreadsheets

Upper Fountain Creek Planning Study

Reach Alternative Screening

Screening Parameter		Notes																						
Protect in Place		If the reach is currently in a stable condition																						
Sinuosity		Used in calculating low flow design slope. Referenced from example of B4 stream type in Final Waldo Canyon Fire Master Restoration page 127																						
Width/Depth Ratio		Referenced from Waldo Canyon Fire Master Restoration Plan Page 127																						
Max. 2-yr Channel Shear Stress		Based on average calculated channel shear stress for existing reaches that are stable																						
Max. 100-yr Floodplain Shear Stress		Based on professional judgement referencing shear stress from erosion control blanket performance specifications																						
Max. Stable Slope for NCD		Maximum slope for existing reaches that are stable																						
Required Width for NCD		Required width = 2x width of low flow																						
Min. 3-ft Drop Structure Spacing		Estimated based on aesthetics																						
Maximum Exposed Structure Height (Small Drops)		A maximum structure height of 3 ft will be exposed at the Target Slope while an additional 3 ft will be keyed in below grade																						
Pool-to-Pool Spacing for NCD		Hydraulic Design of Stream Restoration Projects (TR-01-28), USACE 2001. Using 5' WLow Flow (range is 5-7).																						
Maximum Exposed Structure Height (NCD)		A maximum boulder height of 1.5 ft would be exposed or a maximum exposed riffle drop height of 1.5 ft would be used.																						
Reach	Manning's n-value ¹	RAS Sections	Stable Reach? ²	Reach Length (ft)	Drainage Area (mi ²)	Reach Slope (ft/ft) ³	Q ₂ ⁴ (cfs)	Q ₁₀₀ ⁴ (cfs)	Q _{Low Flow} ⁵ (cfs)	W _{Low Flow} ⁶ (ft)	Low Flow Design Slope ⁷ (ft/ft)	Returned to Historical Flows?	2-yr Channel Shear Stress (lb/ft ²) ⁸	100-yr Floodplain Shear Stress (lb/ft ²) ⁸	Available Width (ft) ⁹	Required Width (ft) ¹⁰	# of 3-ft Drops	Distance Between 3-ft Drops	Reach Alternative	Pool-to-Pool Spacing	1.5ft drop/STR Spacing	Depth (ft)	Sill Length (4:1 bank +6')	Total Width (ft)
RUF020	0.02	N/A	No	6,651	1.11	0.030	51	450	5	5	0.0265	Yes	0.00	0.00		20	8.0	831		-	-	-	-	-
RUF030	0.05	93571 - 86500	No	9,189	3.14	0.026	65	660	10	7	0.0234	Yes	1.44	1.02	215	20	10.0	919	Natural Channel Design	32,6481	483,6263	0.2177	13,7412	20,2709
RUF040	0.06	86500 - 85084	No	1,227	5.51	0.019	88	1000	14	8	0.0167	Yes	1.70	2.30	250	20	1.0	1227	Small Drop Structures w/ Toe Protection	-	-	-	-	-
RUF050	0.06	85084 - 82055	No	3,184	11.75	0.022	93	1300	24	10	0.0199	Yes	2.15	1.58	30	20	3.0	1061	Natural Channel Design	49,3373	530,6667	0.3289	14,6313	24,4988
RUF051	0.06	82055 - 79494	No	2,400	15.32	0.020	93	1300	28	11	0.0180	Yes	2.15	1.58	30	30	2.0	1200	Natural Channel Design	53,6110	600,0000	0.3574	14,8593	25,5814
RUF052	0.06	79494 - 77587	No	1,700	16.35	0.023	93	1300	30	11	0.0204	Yes	2.15	1.58	30	30	2.0	850	Natural Channel Design	54,7049	425,0000	0.3647	14,9176	25,8586
RUF053	0.06	77587 - 76571	No	1,400	16.92	0.022	93	1300	30	11	0.0191	Yes	2.15	1.58	30	30	2.0	700	Natural Channel Design	55,2946	466,6667	0.3686	14,9490	26,0080
RUF130	0.06	76571 - 74994	No	1,425	30.81	0.019	120	2000	45	13	0.0169	Yes	1.66	1.53	30	30	2.0	713	Natural Channel Design	66,6960	475,0000	0.4446	15,5571	28,8963
RUF140	0.05	74994 - 73546	Yes	1,825	34.97	0.017	120	2000	49	14	0.0150	Yes	1.25	0.86	45	30	2.0	913	Protect In Place	-	-	-	-	-
RUF141	0.05	73546 - 68642	Yes	4,500	35.28	0.017	120	2000	49	14	0.0147	Yes	1.25	0.86	45	30	3.0	1500	Protect In Place	-	-	-	-	-
RUF150	0.05	68642 - 65868	Yes	2,300	37.87	0.014	150	2500	52	14	0.0125	Yes	2.04	1.44	55	30	2.0	1150	Protect In Place	-	-	-	-	-
RUF151	0.05	65868 - 62377	Yes	3,850	39.52	0.015	150	2500	53	14	0.0132	Yes	2.04	1.44	55	30	3.0	1283	Protect In Place	-	-	-	-	-
RUF160	0.05	62377 - 55103	No	7,124	42.23	0.013	370	3100	55	15	0.0118	No	1.68	1.08	70	30	4.0	1781	Natural Channel Design	73,6093	890,4875	0.4907	15,9258	30,6477
RUF200	0.05	55103 - 50728	Yes	4,504	51.73	0.032	460	4100	63	16	0.0281	No	5.56	0.99	60	40	6.0	751	Protect In Place & Monitor	-	-	-	-	-
RUF250	0.05	50728 - 43514	Yes	7,784	63.67	0.033	540	5000	73	17	0.0289	No	5.28	1.45	60	40	10.0	778	Protect In Place & Monitor	-	-	-	-	-
RUF260	0.06	43514 - 39545	Yes	4,476	64.13	0.059	550	5220	73	17	0.0522	No	10.18	2.21	70	40	11.0	407	Protect In Place & Monitor	-	-	-	-	-
RUF261	0.06	39545 - 36191	No	2,700	65.86	0.047	590	5600	74	17	0.0416	No	13.31	5.76	70	40	5.0	540	Small Drop Structures w/ Toe Protection	-	-	-	-	-
RUF262	0.06	36191 - 35192	No	1,281	65.86	0.082	590	5600	74	17	0.0726	No	2.19	17.47	80	40	5.0	256	Small Drop Structures w/ Toe Protection	-	-	-	-	-
RUF270	0.07	35192 - 30646	Man Made	4,329	68.52	0.032	720	6900	76	17	0.0281	No	3.82	3.25	80	40	6.0	722	Small Drop Structures w/ Toe Protection	-	-	-	-	-
RUF350	0.06	30646 - 27823	Man Made	2,789	87.46	0.022	780	8300	89	18	0.0195	No	2.77	1.34	80	40	3.0	930	Natural Channel Design	92,4282	557,8200	0.6162	16,9295	35,4152
RUF360	0.08	27823 - 23731	No	4,312	91.06	0.014	1200	11000	92	19	0.0122	No	2.49	1.82	100	40	3.0	1437	Natural Channel Design	93,6024	862,3800	0.6240	16,9921	35,7126
RUF400	0.06	23731 - 21665	Yes	1,918	96.99	0.014	1300	13000	96	19	0.0119	No	4.89	3.70	120	40	1.0	1918	Protect In Place & Monitor	-	-	-	-	-
RUF410	0.08	21665 - 15118	Yes	6,959	100.17	0.013	1400	14000	98	19	0.0115	No	2.84	2.47	115	40	4.0	1740	Protect In Place & Monitor	-	-	-	-	-
RUF470	0.07	15118 - 8963	No	6,243	114.36	0.010	2100	20000	107	20	0.0092	No	3.62	2.90	80	40	3.0	2081	Small Drop Structures w/ Toe Protection	-	-	-	-	-
RUF480	0.07	8963 - 0	No	9,350	116.21	0.007	2200	21000	108	20	0.0065	No	3.45	2.07	110	40	3.0	3117	Natural Channel Design	101,0195	1558,3833	0.6735	17,3877	37,5916

Notes:

- ¹ Channel Manning's n-value determined in the Hydrology Section
- ² Reach appears to be stable in its existing condition. Based on limited field observation and inspection of aerial photography. The entire reach has to be stable in order to be considered a stable reach. Need to verify with Wildland observations.
- ³ Reach length and slope for the creek were determined using HEC-HMS, Google Earth, and HEC-RAS.
- ⁴ Peak flow From HMS data
- ⁵ Referenced from Figure 36, Page 45 of Final Waldo Canyon Fire Master Restoration Plan
- ⁶ Referenced Equations from Pages 43 and 45 of the Final Waldo Canyon Fire Restoration Master Plan.
- ⁷ Equation comes from Page 43 of the Final Waldo Canyon Fire Master Restoration Plan. Initial Slope is valley slope divided by sinuosity.
- ⁸ From HEC-RAS for reaches that were modeled with HEC-RAS.
- ⁹ Measured in Google Earth.
- ¹⁰ At minimum, 2x width of the low flow channel. Low flow channel widths of 10,15, and 20 ft were used to determine required widths.

Cheyenne Creek Planning Study
Reach Alternative Screening

Screening Parameter	Notes	
Protect in Place	If the reach is currently in a stable condition and if the detained condition flows are less than, or equal to, the existing conditions flows	
Sinuosity	1.13	Used in Calculating low flow design slope. Referenced from example of B4 stream type in Final Waldo Canyon Fire Master Restoration page 127
Width/Depth Ratio	13	Referenced from Waldo Canyon Fire Master Restoration Plan Page 127
Max. 2-yr Channel Shear Stress	18.18 lb/ft ²	Based on average calculated channel shear stress for existing reaches that are stable
Max. 100-yr Floodplain Shear Stress	2.25 lb/ft ²	Based on professional judgement referencing shear stress from erosion control blanket performance specifications
Max. Stable Slope for NCD	0.123 ft/ft	Maximum slope for existing reaches that are stable =
Required Width for NCD	13	Required width = 2x width of low flow
Min. 3-ft Drop Structure Spacing	40 ft	Estimated based on aesthetics
Maximum Exposed Structure Height (Small Drops)	3 ft	A maximum structure height of 3 ft will be exposed at the Target Slope while an additional 3 ft will be keyed in below grade
Pool-to-Pool Spacing for NCD	5 Mult. of WLow Flow	Hydraulic Design of Stream Restoration Projects (TR-01-28), USACE 2001. Using 5*WLow Flow (range is 5-7)
Maximum Exposed Structure Height (NCD)	1.5 ft	A maximum boulder height of 1.5 ft would be exposed or a maximum exposed riffle drop height of 1.5 ft would be used.

Reach	Manning's n-value	Location Notes	Stable Reach? ²	Reach Length (ft)	Drainage Area (mi ²)	Reach Slope (ft/ft) ³	Q ₂ ⁴ (cfs)	Q ₁₀₀ ⁴ (cfs)	Q _{Low Flow} ⁵ (cfs)	W _{Low Flow} ⁶ (ft)	Low Flow Design Slope ⁷ (ft/ft)	Returned to Historical Flows? ⁸	2-yr Channel Shear Stress (lb/ft ²) ⁹	100-yr Floodplain Shear Stress (lb/ft ²) ⁹	Available Width (ft) ⁹	Required Width (ft) ¹⁰	# of 3-ft Drops ¹¹	Distance Between 3-ft Drops	Reach Alternative
NCC1	0.211	-	Yes	445	0.0567	0.1230	30	969	0.711	1.861	0.00285	Yes	43.44	21.61	50	7.420	18	24.722	Protect In Place
NCC2	0.242	-	Yes	1453	0.2417	0.2072	30	969	1.848	2.930	0.00285	Yes	59.22	48.89	50	12.332	99	14.677	Protect In Place
NCC3	0.187	-	Yes	1493	0.4319	0.0489	30	969	2.708	3.512	0.00285	Yes	10.55	14.46	45	15.111	23	64.913	Protect In Place
NCC4	0.187	-	Yes	1824	0.6642	0.0540	30	969	3.595	4.019	0.00285	Yes	15.5	8.53	55	17.569	32	57.000	Protect In Place
NCC5	0.179	-	Yes	1380	0.8400	0.0448	30	969	4.197	4.325	0.00285	Yes	12.45	7.62	45	19.075	20	69.000	Protect In Place
SCC1	0.189	-	No	282	0.9961	0.0566	26	1226	4.695	4.561	0.00257	Yes	27.87	8.75	75	20.248	6	47.000	Small Drop Structures w/ Toe Protection
SCC2	0.152	-	No	360	1.1954	0.0461	26	1226	5.294	4.829	0.00257	Yes	7.95	5.63	70	21.584	6	60.000	Small Drop Structures w/ Toe Protection
SCC3	0.137	-	No	617	1.5370	0.0420	26	1226	6.247	5.224	0.00257	Yes	6.18	4.32	70	23.570	9	68.556	Small Drop Structures w/ Toe Protection
SCC4	0.198	-	No	243	1.6715	0.0441	26	1226	6.602	5.363	0.00257	Yes	2.23	7.31	65	24.273	4	60.750	Small Drop Structures w/ Toe Protection
SCC5	0.203	-	No	478	1.9361	0.0397	26	1226	7.273	5.615	0.00257	Yes	7.89	4.17	40	25.555	6	79.667	Small Drop Structures w/ Toe Protection
CC1	0.040	-	Yes	2907.6	2.4388	0.0199	45	2175	8.467	6.035	0.00176	Yes	1.34	2.1	22	27.706	18	161.533	Protect In Place
CC2	0.041	-	Man Made	2240.61	2.8261	0.0194	46	2259	9.331	6.320	0.00170	Yes	1.91	1.14	25	29.174	14	160.044	Small Drop Structures w/ Toe Protection
CC3	0.037	-	Yes	5799.27	3.0907	0.0153	95	2521	9.897	6.499	0.00153	Yes	1.31	2.33	40	30.103	27	214.788	Protect In Place
CC4	0.035	-	No	353.61	3.1112	0.0130	95	2521	9.940	6.513	0.00153	Yes	0.82	0.67	25	30.173	2	176.805	Small Drop Structures w/ Toe Protection
CC5	0.039	-	Yes	2031.55	3.2289	0.0104	95	2521	10.187	6.589	0.00153	Yes	1.35	0.85	20	30.568	7	290.221	Protect In Place
CC6	0.037	-	Man Made	2060.42	3.3483	0.0102	95	2521	10.433	6.664	0.00153	Yes	1.35	0.88	20	30.959	6	343.403	Small Drop Structures w/ Toe Protection
CC7	0.045	-	Yes	598.73	3.3830	0.0148	95	2521	10.504	6.686	0.00153	Yes	1.62	0.65	15	31.071	3	199.577	Protect In Place
CC8	0.040	-	Man Made	996.49	3.4407	0.0073	95	2521	10.622	6.721	0.00153	Yes	0.8	0.85	18	31.256	2	498.245	Small Drop Structures w/ Toe Protection

Notes:

- ¹ Channel Manning's n-value determined in the Hydrology Section
- ² Reach appears to be stable in it's existing condition. Based on limited field observation and inspection of aerial photography. The entire reach has to be stable in order to be considered a stable reach.
- ³ Reach length and slope for the main stem of each tributary were adjusted from the values reported in the Alternatives Analysis in order to correspond with the length, alignment, and slope of the center line delineated for the HEC-RAS models. Initially, the lengths and slopes were obtained from the reaches delineated in the Hydrology Section. Changes were not significant. No changes were made to the minor tributaries as they were not modeled with HEC-RAS.
- ⁴ Peak flow with all proposed detention in place
- ⁵ Referenced Technical Memorandum - Low Flow Estimation for Natural Channel Design dated April 9th, 2013 prepared for the updated to the City DCM. QLow Flow with this equation is much higher than Q2. Assume this is OK because QLow Flow only impacts estimated stable slope.
- ⁶ Referenced Section 3.1.1.1 in update to City DCM. This is the width that was used for all structure widths. Bankfull data for the Falcon Watershed correlated very well with bankfull data for the Jimmy Camp Creek Watershed. Using Low Flow channel width as outlined in DCM to provide a more conservative cost estimate.
- ⁷ Referenced Section 3.1.2 in update to City DCM. Doubled Small Drops slopes as per phone conversation with Jeff Rice 2/21.
- ⁸ From HEC-RAS for reaches that were modeled with HEC-RAS. From FlowMaster calculations for all other reaches.
- ⁹ Measured in GIS. Estimated using the most restrictive location for each reach. Available reach width is constricted by: FEMA floodplain, adjacent property lines, ridges, minimizing potential earthwork, and the incised portion of the channel if it's extremely deep. Assuming the channel can only be filled if there is not an upstream reach present or where the reach is severely degraded and filling the reach will not obstruct flow in the upstream reach.
- ¹⁰ Estimated using Equation 32 in Table 7.7 for Belt Width in Stream Corridor Restoration, Federal Interagency Stream Restoration Working Group 1998 (Rev 2001). Adopted as Part 653 of the National Engineering Handbook, USDA-Natural Resources Conservation Service. Using low flow channel width instead of bankfull channel width therefore this should be a conservative number.
- ¹¹ Halved Small Drop structures(rounding up for an odd number of structures) per phone conversation with Jeff Rice 2/21/14.

Culvert Analysis Spreadsheets

Upper Fountain Creek Planning Study																																		
Existing Drainageway Crossing Deficiency Analysis																																		
Crossing	River Station	Tributary	Location	Crossing Size ¹					Material ¹	Shape ¹	Flow (cfs) ²	Upstream Invert (ft) ³			Downstream Invert (ft) ³			Tw El. (ft) ⁵	Minimum Weir Elev. (ft) ⁴	Calculated HW (ft) ⁴	Cross-Section Area (SF)	Calculated HW/D	Hydraulic Classification ⁵	Roadway Classification	Overtopping Depth at Road (ft)	Max Allowable Overtopping Elev. (ft) ⁶	Fail Overtopping ⁷	Allowable HW/D ⁸	Max Allowable Hw Elev (ft) ⁸	Fail HW/D ⁸	Bridge Freeboard (ft) ⁹	Fail Bridge Freeboard ⁷	FAIL?	Reason
				# of Cells	Diameter (ft)	Rise (ft)	Span	Length				Total Span	Cell 1	Cell 2	Cell 3	Cell 1	Cell 2																	
2 Year Event																																		
FC 01	90727	Fountain Creek	Private Access - Residence			3.7	20		20	Concrete	Bridge	65	8038.9			8043.51	8039.96	74.07	0.2865	Bridge	Local	-3.55	8043.843	No	Bridge	8040.6	Bridge	2.64	No	No				
FC 02	90496	Fountain Creek	Private Access - Hotel			5	15		15	Concrete	Bridge	65	8032.3			8036.01	8033.58	51.06	0.2560	Culvert	Local	-2.43	8036.343	No	Bridge	8039.8	No		No	No				
FC 03	87452	Fountain Creek	Cristola Canyon Rd	1		4.4	13	40	13	Concrete	Arch	65	7946.4			7949.97	7947.9	42.96	0.3409	Culvert	Collector	-2.07	7950.303	No	Bridge	7953	No		No	No				
FC 04	87246	Fountain Creek	Creek Side Dr.	2	4.5			50	9	CMP	Circular	65	7936	7936		7942.01	7938.5	15.9	0.5556	Culvert	Collector	-3.51	7942.343	No	Bridge	7942.75	No		No	No				
FC 05	83423	Fountain Creek	Private Ranch			6.06	18.3		18.3	Concrete	Bridge	93.5	7846			7851.99	7848.17	100.62	0.3647	Culvert	Local	-3.82	7852.323	No	Bridge	7855.05	No		No	No				
FC 06	82852	Fountain Creek	Private Ranch	1		2.9	4.3	30	4.3	Concrete	Elliptical	93.5	7831.6			7835.47	7836.21	9.79	1.5931	Culvert	Local	0.74	7835.803	Yes	Bridge	7835.94	Yes		Yes	Yes	Overtops, Does Not Meet Hw/D Criteria			
FC 07	78785	Fountain Creek	Green Mtn Falls Rd.			11.35	28.2		28.2	Concrete	Bridge	93.5	7744.1			7754.31	7746.85	284.47	0.2388	Bridge	Collector	-7.46	7754.643	No	Bridge	7753.49	Bridge	8.64	No	No				
FC 08	78215	Fountain Creek	Off Green Mtn Falls Rd	1		3.3	5.5	38	5.5	CMP	Elliptical	93.5	7732			7736.59	7736.44	14.01	1.3394	Culvert	Collector	-0.15	7736.923	No	Bridge	7736.97	No		No	No				
FC 09	76601	Fountain Creek	El Paso Ave			7.64	12.2		12.2	Concrete	Bridge	93.5	7696.6			7705.39	7699.21	87.31	0.3469	Culvert	Collector	-6.18	7705.723	No	Bridge	7708.02	No		No	No				
FC 10	75225	Fountain Creek	El Paso Ave 2	2		5.5	5.5	31	11	CMP	Arch	117.7	7670.6			7676.35	7672.52	34.01	0.3418	Culvert	Collector	-3.83	7676.683	No	Bridge	7676.89	No		No	No				
FC 11	72800	Fountain Creek	Chipita Park Rd East GMP			7.14	32		32	Concrete	Bridge	120.5	7628			7637.15	7630.51	192.86	0.3515	Bridge	Collector	-6.64	7637.483	No	Bridge	7633.14	Bridge	4.63	No	No				
FC 12	67310	Fountain Creek	6B Chipita Park Rd	2		8	9	51.5	18	Concrete	Box	145.2	7544.5			7554.72	7545.51	59.04	0.2513	Culvert	Collector	-8.21	7555.053	No	Bridge	7556.5	No		No	No				
FC 13	56352	Fountain Creek	6C Spring Street	1	7			36.5	7	CMP	Circular	368.5	7386.3			7394.01	7394.81	31.26	1.2157	Culvert	Collector	0.8	7394.343	Yes	Bridge	7396.8	No		Yes	Overtops				
FC 14	55270	Fountain Creek	Fountain Ave			9.5	30		30	Concrete	Bridge	368.5	7370.5			7382.01	7375.44	243.15	0.5200	Bridge	Collector	-6.57	7382.343	No	Bridge	7378	Bridge	4.56	No	No				
FC 15	54000	Fountain Creek	6E	2		8	13	126	26	Concrete	Box	458.4	7322			7334.01	7324.91	104	0.3637	Bridge	Collector	-9.1	7334.343	No	Bridge	7328	Bridge	5.09	No	No				
FC 16	52800	Fountain Creek	6F	2		8	12	104	24	Concrete	Box	458.4	7284			7296.01	7287.45	96	0.4312	Bridge	Collector	-8.56	7296.343	No	Bridge	7290	Bridge	4.55	No	No				
FC 17	52132	Fountain Creek	6G	2		8	13	72	26	Concrete	Box	458.4	7263			7273.71	7266.69	104	0.4612	Bridge	Collector	-7.02	7274.043	No	Bridge	7269	Bridge	4.31	No	No				
FC 18	45190	Fountain Creek	Hwy 24 - Median Crossing Culvert	2		8	10	44	20	Concrete	Box	535.9	7021			7032.06	7024.84	80	0.4800	Bridge	Arterial	-7.22	7032.060	No	Bridge	7027	Bridge	4.16	No	No				
FC 19	40620	Fountain Creek	Hwy 24 - 6I	2		8	10	72	20	Concrete	Box	587.5	6834			6842.01	6839.08	80	0.6350	Bridge	Arterial	-2.93	6842.010	No	Bridge	6840	Bridge	2.92	No	No				
FC 20	34389	Fountain Creek	Serpentine Drive			9.52	19.7		19.7	Concrete	Bridge	719.8	6426.5			6438.69	6433.04	163.52	0.6891	Culvert	Collector	-5.65	6439.023	No	Bridge	6440.76	No		No	No				
FC 21	32904	Fountain Creek	Off Manitou Ave - 1			7.24	16.4		16.4	Concrete	Bridge	719.8	6379.4			6387.31	6385.88	101.12	0.9006	Culvert	Collector	-1.43	6387.643	No	Bridge	6390.22	No		No	No				
FC 22	32683	Fountain Creek	Off Manitou Ave - 2			6.45	21.4		21.4	Concrete	Bridge	719.8	6375.2			6381.92	6381.75	116.8	1.0171	Bridge	Collector	-0.17	6382.253	No	Bridge	6379.64	Bridge	-0.11	Yes	Yes	Does Not Meet Freeboard Criteria			
FC 23	32665	Fountain Creek	Pipeline - UF40			3.79	34.7		34.7	Concrete	Bridge	719.8	6375.2			6379.09	6381.05	61.98	1.5462	Bridge	Collector	1.96	6379.423	Yes	Bridge	6376.98	Bridge	-2.07	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria			
FC 24	32574	Fountain Creek	Off Manitou Ave - 3			4.05	22.6		22.6	Concrete	Bridge	719.8	6373.5			6378.09	6381.01	79.56	1.8593	Bridge	Collector	2.92	6378.423	Yes	Bridge	6375.53	Bridge	-3.48	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria			
FC 25	32493	Fountain Creek	Parking Lot - Mill Wheel			6.11	19.6		19.6	Concrete	Bridge	719.8	6372.3			6379.51	6380.96	93.68	1.4206	Culvert	Collector	1.45	6379.843	Yes	Bridge	6381.445	No		Yes	Overtops				
FC 26	31443	Fountain Creek	Park Ave			4.24	17.78		17.78	Concrete	Bridge	719.8	6350			6353.53	6355.05	62.34	1.1910	Culvert	Collector	1.52	6353.863	Yes	Bridge	6356.36	No		Yes	Overtops				
FC 27	31154	Fountain Creek	Off Manitou Ave - 4			6.41	37.4		37.4	Concrete	Bridge	719.8	6344.2			6350.19	6349.05	184.25	0.7613	Bridge	Local	-1.14	6350.523	No	Bridge	6348.58	Bridge	1.53	Yes	Yes	Does Not Meet Freeboard Criteria			
FC 28	30961	Fountain Creek	Off Manitou Ave - 5			4.57	21.3		21.3	Concrete	Bridge	719.8	6336.7			6346.76	6342.46	84.92	1.2604	Bridge	Local	-4.3	6347.093	No	Bridge	6339.27	Bridge	-1.19	Yes	Yes	Does Not Meet Freeboard Criteria			
FC 29	30667	Fountain Creek	Off Manitou Ave - 6			6.21	23.4		23.4	Concrete	Bridge	719.8	6331.9			6338.86	6338.08	109.48	0.9919	Bridge	Local	-0.78	6339.193	No	Bridge	6336.13	Bridge	0.05	Yes	Yes	Does Not Meet Freeboard Criteria			
FC 30	30552	Fountain Creek	Off Manitou Ave - 7			4.9	23.1		23.1	Concrete	Bridge	784	6328.8			6338.73	6334.66	95.95	1.2000	Bridge	Local	-4.07	6339.963	No	Bridge	6331.68	Bridge	-0.98	Yes	Yes	Does Not Meet Freeboard Criteria			
FC 31	30439	Fountain Creek	Under Penny Arcade	1		14.4	20	175	20	Concrete	Box	784	6327.6			6342.07	6333.49	288	0.4111	Bridge	Local	-8.58	6342.403	No	Bridge	6339.97	Bridge	8.48	No	No				
FC 32	30162	Fountain Creek	Off Manitou Ave - 8			8.6	23.7		23.7	Concrete	Bridge	784	6321.3			6331.51	6329.46	130.27	0.9488	Bridge	Local	-2.05	6331.843	No	Bridge	6327.9	Bridge	0.44	Yes	Yes	Does Not Meet Freeboard Criteria			
FC 33	30063	Fountain Creek	Canon Ave			5.02	19.9		19.9	Concrete	Bridge	784	6320			6330.12	6325.98	93.76	1.1952	Culvert	Collector	-4.14	6330.453	No	Bridge	6327.51	No		No	No				
FC 34	29893	Fountain Creek	Under Building by W Lovers Ln.	1		9.5	16	63	16	Concrete	Box	784	6317.3			6328.32	6324.18	152	0.7274	Culvert	Collector	-4.14	6328.653	No	Bridge	6331.52	No		No	No				
FC 35	29769	Fountain Creek	Lafayette Road			6.57	13.7		13.7	Concrete	Bridge	784	6314.1			6323.34	6322.88	90.91	1.3333	Culvert	Collector	-0.46	6323.673	No	Bridge	6323.975	No		No	No				
FC 36	29610	Fountain Creek	Under Building by SW Lovers Ln	1		6.6	11.7	201	11.7	Concrete	Box	784	6313.6			6320.65	6320.41	77.22	1.0394	Culvert	Collector	-0.24	6320.983	No	Bridge	6323.45	No		No	No				
FC 37	29332	Fountain Creek	Parking Lot off Manitou Ave			9.04	18.4		18.4	Concrete	Bridge	784	6309			6318.92	6315.98	152.18	0.7765	Culvert	Local	-2.94	6319.253	No	Bridge	6322.52	No		No	No				
FC 38	28397	Fountain Creek	El Paso Blvd.	1		6	17	40	17	Concrete	Elliptical	784	6290.2			6298.9	6297.77	80.11	1.2683	Culvert	Collector	-1.13	6299.233	No	Bridge	6298.16	No		No	No				
FC 39	27859	Fountain Creek	Old Man Trail			4.86	16.3		16.3	Concrete	Bridge	784	6282.2			6293.2	6291.42	66.87	1.8951	Culvert	Local	-1.78	6293.533	No	Bridge	6289.5	Yes		Yes	Does Not Meet Hw/D Criteria				
FC 40	25919	Fountain Creek	Ent to Blue Skies Inn			2.14	28.8		28.8	Concrete	Bridge	1155.2	6256.6			6261.82	6263.84	45.62	3.4019	Bridge	Local	2.02	6262.153	Yes	Bridge	6256.7	Bridge	-5.14	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria			
FC 41	25727	Fountain Creek	Mayfair Ave			4.14	17.6		17.6	Concrete	Bridge	1155.2	6253.4			6259.97	6262.05	55.9	2.0966	Culvert	Collector	2.08	6260.303	Yes	Bridge	6259.58	Yes		Yes	Overtops, Does Not Meet Hw/D Criteria				
FC 42	25503	Fountain Creek	Old Bridge off Manitou Ave - 1			7.23	28.8		28.8	Concrete	Bridge	1155.2	6248.4			6256.3	6258.19	156.24	1.3555	Bridge	Local	1.89	6256.633	Yes	Bridge	6253.62	Bridge	-2.57	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria			
FC 43	25238	Fountain Creek	Old Bridge off Manitou Ave - 2			7.9	33.88		33.88	Concrete	Bridge	1155.2	6245			6253.64	6252.09	177.42	0.8975	Bridge	Local	-1.55	6253.973	No	Bridge	6250.9	Bridge	0.81	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria			
FC 44	24989	Fountain Creek	Ent to Willow Motel			6.69	27		27	Concrete	Bridge	1155.2	6241.8			6248.79	6249.94	135.41	1.2227	Bridge	Local	1.15	6249.123	Yes	Bridge	6246.45	Bridge	-1.49	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria			
FC 45	24673	Fountain Creek	Ent Pikes Peak RV Park			6.11	27.8		27.8	Concrete	Bridge	1155.2	6238			6243.88	6246.05	131.63	1.3224	Bridge	Local	2.17	6244.213	Yes	Bridge	6242.08	Bridge	-1.97	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria			
FC 46	24179	Fountain Creek	US-MS-Swimming Pool			6.6	37.85		37.85	Concrete	Bridge	1155.2	6230.6			6239.19	6236.1	212.3	0.8348	Bridge	Local	-3.09	6239.523	No	Bridge	6235.19	Bridge	1.09	Yes	Yes	Does Not Meet Freeboard Criteria			

Upper Fountain Creek Planning Study																																		
Existing Drainageway Crossing Deficiency Analysis																																		
Crossing	River Station	Tributary	Location	Crossing Size ¹					Material ¹	Shape ¹	Flow (cfs) ²	Upstream Invert (ft) ³			Downstream Invert (ft) ³			Tw El. (ft) ⁵	Minimum Weir Elev. (ft) ⁴	Calculated HW (ft) ⁴	Cross-Section Area (SF)	Calculated HW/D	Hydraulic Classification ⁵	Roadway Classification	Overtopping Depth at Road (ft)	Max Allowable Overtopping Elev. (ft) ⁶	Fail Overtopping ⁶	Allowable HW/D ⁶	Max Allowable Hw Elev (ft) ⁶	Fail Hw/D ⁶	Bridge Freeboard (ft) ⁶	Fail Bridge Freeboard ⁶	FAIL?	Reason
				# of Cells	Diameter (ft)	Rise (ft)	Span	Length				Total Span	Cell 1	Cell 2	Cell 3	Cell 1	Cell 2																	
5 Year Event																																		
FC 01	90727	Fountain Creek	Private Access - Residence			3.7	20		20	Concrete	Bridge	124.1	8038.9			8038.4			8043.51	8040.51	74.07	0.4351	Bridge	Local	-3	8043.843	No	Bridge	8040.6	Bridge	2.09	No	No	
FC 02	90496	Fountain Creek	Private Access - Hotel			5	15		15	Concrete	Bridge	124.1	8032.3			8031.8			8036.01	8034.26	51.06	0.3920	Culvert	Local	-1.75	8036.343	No	Bridge	8039.8	No	No	No	No	
FC 03	87452	Fountain Creek	Crystola Canyon Rd	1		4.4	13	40	13	Concrete	Arch	124.1	7946.4			7945.4			7949.97	7948.77	42.96	0.5386	Culvert	Collector	-1.2	7950.303	No	Bridge	7953	No	No	No	No	
FC 04	87246	Fountain Creek	Creek Side Dr.	2	4.5		50	9	9	CMP	Circular	124.1	7936	7936		7932			7942.01	7939.59	15.9	0.7978	Culvert	Collector	-2.42	7942.343	No	Bridge	7942.75	No	No	No	No	
FC 05	83423	Fountain Creek	Private Ranch			6.06	18.3		18.3	Concrete	Bridge	199.9	7846			7845.1			7851.99	7849.08	100.62	0.5149	Culvert	Local	-2.91	7852.323	No	Bridge	7855.05	No	No	No	No	
FC 06	82852	Fountain Creek	Private Ranch	1		2.9	4.3	30	4.3	Concrete	Elliptical	199.9	7831.6			7831.6			7835.47	7837.48	9.79	2.0310	Culvert	Local	2.01	7835.803	Yes	Bridge	7835.94	Yes	Yes	Yes	Overtops, Does Not Meet Hw/D Criteria	
FC 07	78785	Fountain Creek	Green Mtn Falls Rd			11.35	28.2		28.2	Concrete	Bridge	199.9	7744.1			7744.1			7754.31	7747.74	284.47	0.3172	Bridge	Collector	-6.57	7754.643	No	Bridge	7753.49	Bridge	7.75	No	No	
FC 08	78215	Fountain Creek	Off Green Mtn Falls Rd	1		3.3	5.5	38	5.5	CMP	Elliptical	199.9	7732			7729.3			7736.59	7737.85	14.01	1.7667	Culvert	Collector	1.26	7736.923	Yes	Bridge	7736.97	Yes	Yes	Yes	Overtops, Does Not Meet Hw/D Criteria	
FC 09	76601	Fountain Creek	El Paso Ave			7.64	12.2		12.2	Concrete	Bridge	199.9	7696.6			7696			7705.39	7700.35	87.31	0.4961	Culvert	Collector	-5.04	7705.723	No	Bridge	7708.02	No	No	No	No	
FC 10	75225	Fountain Creek	El Paso Ave 2	2		5.5	5.5	31	11	CMP	Arch	267.8	7670.6			7670.4			7676.35	7674.12	34.01	0.6327	Culvert	Collector	-2.23	7676.683	No	Bridge	7676.88	No	No	No	No	
FC 11	72800	Fountain Creek	Chipita Park Rd East GMP			7.14	32		32	Concrete	Bridge	274.8	7628			7624			7637.15	7631.67	192.86	0.5140	Bridge	Collector	-5.48	7637.483	No	Bridge	7633.14	Bridge	3.47	No	No	
FC 12	67310	Fountain Creek	6B Chipita Park Rd	2		8	9	51.5	18	Concrete	Box	339.8	7544.5			7542.5			7554.72	7548.08	59.04	0.4475	Culvert	Collector	-6.64	7555.053	No	Bridge	7556.5	No	No	No	No	
FC 13	56352	Fountain Creek	6C Spring Street	1	7			36.5	7	CMP	Circular	631	7386.3			7384.3			7394.01	7395.39	31.26	1.2986	Culvert	Collector	1.38	7394.343	Yes	Bridge	7396.8	No	Yes	Yes	Overtops	
FC 14	55270	Fountain Creek	Fountain Ave			9.5	30		30	Concrete	Bridge	631	7370.5			7371			7382.01	7376.57	243.15	0.6389	Bridge	Collector	-5.44	7382.343	No	Bridge	7378	Bridge	3.43	No	No	
FC 15	54000	Fountain Creek	6E	2		8	13	126	26	Concrete	Box	801.1	7322			7318			7334.01	7326.16	104	0.5200	Bridge	Collector	-7.85	7334.343	No	Bridge	7328	Bridge	3.84	No	No	
FC 16	52800	Fountain Creek	6F	2		8	12	104	24	Concrete	Box	801.1	7284			7282			7296.01	7288.75	96	0.5938	Bridge	Collector	-7.26	7296.343	No	Bridge	7290	Bridge	3.25	No	No	
FC 17	52132	Fountain Creek	6G	2		8	13	72	26	Concrete	Box	801.1	7263			7262			7273.71	7268.3	104	0.6625	Bridge	Collector	-5.41	7274.043	No	Bridge	7269	Bridge	2.7	No	No	
FC 18	45190	Fountain Creek	Hwy 24 - Median Crossing Culvert	2		8	10	44	20	Concrete	Box	965.7	7021			7020			7032.06	7026.87	80	0.7337	Bridge	Arterial	-5.19	7032.060	No	Bridge	7027	Bridge	2.13	No	No	
FC 19	40620	Fountain Creek	Hwy 24 - 6I	2		8	10	72	20	Concrete	Box	1070.7	6834			6828			6842.01	6841.6	80	0.9500	Bridge	Arterial	-0.41	6842.010	No	Bridge	6840	Bridge	0.4	Yes	Yes	Does Not Meet Freeboard Criteria
FC 20	34389	Fountain Creek	Serpentine Drive			9.52	19.7		19.7	Concrete	Bridge	1316.6	6426.5			6423.8			6438.69	6435.81	163.52	0.9800	Culvert	Collector	-2.88	6439.023	No	Bridge	6440.76	No	No	No	No	
FC 21	32904	Fountain Creek	Off Manitou Ave - 1			7.24	16.4		16.4	Concrete	Bridge	1316.6	6379.4			6379			6387.31	6390.64	101.12	1.5580	Culvert	Collector	3.33	6387.643	Yes	Bridge	6390.22	Yes	Yes	Yes	Overtops, Does Not Meet Hw/D Criteria	
FC 22	32683	Fountain Creek	Off Manitou Ave - 2			6.45	21.4		21.4	Concrete	Bridge	1316.6	6375.2			6375.1			6381.92	6383.88	116.8	1.3473	Bridge	Collector	1.96	6382.253	Yes	Bridge	6379.64	Bridge	-2.24	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 23	32665	Fountain Creek	Pipeline - UF40			3.79	34.7		34.7	Concrete	Bridge	1316.6	6375.2			6375.2			6379.09	6382.29	61.98	1.8734	Bridge	Collector	3.2	6379.423	Yes	Bridge	6376.98	Bridge	-3.31	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 24	32574	Fountain Creek	Off Manitou Ave - 3			4.05	22.6		22.6	Concrete	Bridge	1316.6	6373.5			6373			6378.09	6382.22	79.56	2.1580	Bridge	Collector	4.13	6378.423	Yes	Bridge	6375.53	Bridge	-4.69	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 25	32493	Fountain Creek	Parking Lot - Mill Wheel			6.11	19.6		19.6	Concrete	Bridge	1316.6	6372.3			6372			6379.51	6382.11	93.68	1.6170	Culvert	Collector	2.65	6379.843	Yes	Bridge	6381.445	Yes	Yes	Yes	Overtops, Does Not Meet Hw/D Criteria	
FC 26	31443	Fountain Creek	Park Ave			4.24	17.78		17.78	Concrete	Bridge	1316.6	6350			6348.1			6353.53	6355.72	62.34	1.3491	Culvert	Collector	2.19	6353.863	Yes	Bridge	6356.36	No	Yes	Yes	Overtops	
FC 27	31154	Fountain Creek	Off Manitou Ave - 4			6.41	37.4		37.4	Concrete	Bridge	1316.6	6344.2			6343.1			6350.19	6350.94	184.25	1.0562	Bridge	Local	0.75	6350.523	Yes	Bridge	6348.58	Bridge	-0.36	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 28	30961	Fountain Creek	Off Manitou Ave - 5			4.57	21.3		21.3	Concrete	Bridge	1316.6	6336.7			6336.6			6346.76	6348.83	84.92	2.6543	Bridge	Local	2.07	6347.093	Yes	Bridge	6339.27	Bridge	-7.56	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 29	30667	Fountain Creek	Off Manitou Ave - 6			6.21	23.4		23.4	Concrete	Bridge	1316.6	6331.9			6331.5			6338.86	6343.12	109.48	1.8035	Bridge	Local	4.26	6339.193	Yes	Bridge	6336.13	Bridge	-4.99	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 30	30552	Fountain Creek	Off Manitou Ave - 7			4.9	23.1		23.1	Concrete	Bridge	1476.3	6328.8			6327.4			6338.73	6342.05	95.95	2.7082	Bridge	Local	3.32	6339.063	Yes	Bridge	6331.68	Bridge	-8.37	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 31	30439	Fountain Creek	Under Penny Arcade	1		14.4	20	175	20	Concrete	Box	1476.3	6327.6			6326.9			6342.07	6336.93	288	0.6500	Bridge	Local	-5.14	6342.063	No	Bridge	6339.97	Bridge	5.04	No	No	
FC 32	30162	Fountain Creek	Off Manitou Ave - 8			8.6	23.7		23.7	Concrete	Bridge	1476.3	6321.3			6321			6331.51	6335.02	130.27	1.5953	Bridge	Local	3.51	6331.843	Yes	Bridge	6327.9	Bridge	-5.12	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 33	30063	Fountain Creek	Canon Ave			5.02	19.9		19.9	Concrete	Bridge	1476.3	6320			6318.5			6330.12	6334.69	93.76	2.9303	Culvert	Collector	4.57	6330.453	Yes	Bridge	6327.51	Yes	Yes	Yes	Overtops, Does Not Meet Hw/D Criteria	
FC 34	29893	Fountain Creek	Under Building by W Lovers Ln.	1		9.5	16	63	16	Concrete	Box	1476.3	6317.3			6317.2			6328.32	6329.88	152	1.3274	Culvert	Collector	1.56	6328.653	Yes	Bridge	6331.52	No	Yes	Yes	Overtops	
FC 35	29769	Fountain Creek	Lafayette Road			6.57	13.7		13.7	Concrete	Bridge	1476.3	6314.1			6313.3			6323.34	6328.75	90.91	2.2268	Culvert	Collector	5.41	6323.673	Yes	Bridge	6323.975	Yes	Yes	Yes	Overtops, Does Not Meet Hw/D Criteria	
FC 36	29610	Fountain Creek	Under Building by SW Lovers Ln	1		6.6	11.7	201	11.7	Concrete	Box	1476.3	6313.6			6313.3			6320.65	6323.27	77.22	1.4727	Culvert	Local	2.62	6320.983	Yes	Bridge	6323.45	No	Yes	Yes	Overtops	
FC 37	29332	Fountain Creek	Parking Lot off Manitou Ave			9.04	18.4		18.4	Concrete	Bridge	1476.3	6309			6307.9			6318.92	6318.51	152.18	1.0564	Culvert	Local	-0.41	6319.253	No	Bridge	6322.52	No	No	No	No	
FC 38	28397	Fountain Creek	El Paso Blvd.	1		6	17	40	17	Concrete	Elliptical	1476.3	6290.2			6289.7			6298.9	6300.38	80.11	1.7033	Culvert	Collector	1.48	6299.233	Yes	Bridge	6299.16	Yes	Yes	Yes	Overtops, Does Not Meet Hw/D Criteria	
FC 39	27859	Fountain Creek	Old Man Trail			4.86	16.3		16.3	Concrete	Bridge	1476.3	6282.2			6281.4			6293.2	6294.23	66.87	2.4733	Culvert	Local	1.03	6293.533	Yes	Bridge	6293.53	Yes	Yes	Yes	Overtops, Does Not Meet Hw/D Criteria	
FC 40	25919	Fountain Creek	Ent to Blue Skies Inn			2.14	28.8		28.8	Concrete	Bridge	2113.7	6256.6			6256.1			6261.82	6264.5	45.62	3.7103	Bridge	Local	2.68	6262.153	Yes	Bridge	6256.7	Bridge	-5.8	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 41	25727	Fountain Creek	Mayfair Ave			4.14	17.6		17.6	Concrete	Bridge	2113.7	6253.4			6253.3			6259.97	6263.54	55.9	2.4565	Bridge	Collector	3.57	6260.303	Yes	Bridge	6255.51	Bridge	-6.03	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 42	25503	Fountain Creek	Old Bridge off Manitou Ave - 1			7.23	28.8		28.8	Concrete	Bridge	2113.7	6248.4			6248.2			6256.3	6259.13	156.24	1.4855	Bridge	Local	2.83	6256.633	Yes	Bridge	6253.62	Bridge	-3.51	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 43	25238	Fountain Creek	Old Bridge off Manitou Ave - 2			7.9	33.88		33.88	Concrete	Bridge	2113.7	6245			6244.1																		

Upper Fountain Creek Planning Study																																				
Existing Drainageway Crossing Deficiency Analysis																																				
Crossing	River Station	Tributary	Location	Crossing Size ¹					Material ¹	Shape ¹	Flow (cfs) ²	Upstream Invert (ft) ³			Downstream Invert (ft) ³			Tw El. (ft) ⁵	Minimum Weir Elev. (ft) ⁴	Calculated HW (ft) ⁴	Cross-Section Area (SF)	Calculated HW/D	Hydraulic Classification ⁵	Roadway Classification	Overtopping Depth at Road (ft)	Max Allowable Overtopping Elev. (ft) ⁶	Fail Overtopping ⁶	Allowable Hw/D ⁶	Max Allowable Hw Elev (ft) ⁶	Fail Hw/D ⁶	Bridge Freeboard (ft) ⁶	Fail Bridge Freeboard ⁶	FAIL?	Reason		
				# of Cells	Diameter (ft)	Rise (ft)	Span	Length				Total Span	Cell 1	Cell 2	Cell 3	Cell 1	Cell 2																		Cell 3	
10 Year Event																																				
FC 01	90727	Fountain Creek	Private Access - Residence			3.7	20	20	Concrete	Bridge	195.5	8038.9			8038.4			8043.51	8041.07	74.07	0.5865	Bridge	Local	-2.44	8043.843	No	Bridge	8040.6	Bridge	1.53	Yes	Yes	Does Not Meet Freeboard Criteria			
FC 02	90496	Fountain Creek	Private Access - Hotel			5	15	15	Concrete	Bridge	195.5	8032.3			8031.8			8036.01	8034.94	51.06	0.5280	Culvert	Local	-1.07	8036.343	No	Bridge	8033.8	No			No	No			
FC 03	87452	Fountain Creek	Crystola Canyon Rd			4.4	13	40	13	Concrete	Arch	195.5	7946.4			7945.4			7949.97	7949.73	42.96	0.7568	Culvert	Collector	-0.24	7950.303	No	Bridge	7953	No			No	No		
FC 04	87246	Fountain Creek	Creek Side Dr.	1	4.5			50	9	CMP	Circular	195.5	7936	7936			7932			7942.01	7942.74	15.9	1.0533	Culvert	Collector	-1.27	7942.343	No	Bridge	7942.75	No			No	No	
FC 05	83423	Fountain Creek	Private Ranch			6.06	18.3		18.3	Concrete	Bridge	337	7846			7845.1			7851.99	7849.98	100.62	0.6634	Culvert	Local	-2.01	7852.323	No	Bridge	7852.03	No			No	No		
FC 06	82852	Fountain Creek	Private Ranch	1		2.9	4.3	30	4.3	Concrete	Elliptical	337	7831.6			7831.6			7835.47	7838.25	9.79	2.2966	Culvert	Local	-2.78	7835.803	Yes	Bridge	7835.94	Yes			Yes	Overtops, Does Not Meet Hw/D Criteria		
FC 07	78785	Fountain Creek	Green Mtn Falls Rd.			11.35	28.2		28.2	Concrete	Bridge	337	7744.1			7744.1			7754.31	7748.56	284.47	0.3894	Bridge	Collector	-5.75	7754.643	No	Bridge	7753.49	Bridge	6.93	No	No	No		
FC 08	78215	Fountain Creek	Off Green Mtn Falls Rd.	1		3.3	5.5	38	5.5	CMP	Elliptical	337	7732			7729.3			7736.59	7738.61	14.01	1.9939	Culvert	Collector	2.01	7736.923	Yes	Bridge	7736.97	Yes			Yes	Overtops, Does Not Meet Hw/D Criteria		
FC 09	76601	Fountain Creek	El Paso Ave			7.64	12.2		12.2	Concrete	Bridge	337	7696.6			7696			7705.39	7701.69	87.31	0.6715	Culvert	Collector	-3.7	7705.723	No	Bridge	7708.02	No			No	No		
FC 10	75225	Fountain Creek	El Paso Ave 2	2		5.5	5.5	31	11	CMP	Arch	468.8	7670.6			7670.4			7676.35	7676.08	34.01	0.9891	Culvert	Collector	-0.27	7676.883	No	Bridge	7676.89	No			No	No		
FC 11	72800	Fountain Creek	Chipta Park Rd East GMP			7.14	32		32	Concrete	Bridge	481.6	7628			7624			7637.15	7632.61	192.86	0.6457	Bridge	Collector	-4.54	7637.483	No	Bridge	7633.14	Bridge	2.53	No	No	No		
FC 12	67310	Fountain Creek	6B Chipta Park Rd	2		8	9	51.5	18	Concrete	Box	601.9	7544.5			7542.5			7554.72	7549.83	59.04	0.6662	Culvert	Collector	-4.89	7555.053	No	Bridge	7556.5	No			No	No		
FC 13	56352	Fountain Creek	6C Spring Street	1	7			36.5	7	CMP	Circular	943.9	7386.3			7384.3			7394.01	7395.78	31.26	1.3543	Culvert	Collector	1.77	7394.343	Yes	Bridge	7396.8	No			Yes	Overtops		
FC 14	55270	Fountain Creek	Fountain Ave			9.5	30		30	Concrete	Bridge	943.9	7370.5			7371			7382.01	7377.57	243.15	0.7442	Bridge	Collector	-4.44	7382.343	No	Bridge	7378	Bridge	2.43	No	No	No		
FC 15	54000	Fountain Creek	6E	2		8	13	126	26	Concrete	Box	1219.5	7322			7318			7334.01	7327.3	104	0.6625	Bridge	Collector	-6.71	7334.343	No	Bridge	7328	Bridge	2.7	No	No	No		
FC 16	52800	Fountain Creek	6F	2		8	12	104	24	Concrete	Box	1219.5	7284			7282			7296.01	7290.04	96	0.7550	Bridge	Collector	-5.97	7296.343	No	Bridge	7290	Bridge	1.96	Yes	Yes	Does Not Meet Freeboard Criteria		
FC 17	52132	Fountain Creek	6G	2		8	13	72	26	Concrete	Box	1219.5	7283			7262			7273.71	7269.89	104	0.8613	Bridge	Collector	-3.82	7274.043	No	Bridge	7269	Bridge	1.11	Yes	Yes	Does Not Meet Freeboard Criteria		
FC 18	45190	Fountain Creek	Hwy 24 - Median Crossing Culvert	2		8	10	44	20	Concrete	Box	1493.5	7021			7020			7032.06	7029.15	80	1.0187	Bridge	Arterial	-2.91	7032.060	No	Bridge	7027	Bridge	-0.15	Yes	Yes	Does Not Meet Freeboard Criteria		
FC 19	40620	Fountain Creek	Hwy 24 - 6I	2		8	10	72	20	Concrete	Box	1665.4	6834			6828			6842.01	6843.46	80	1.1825	Bridge	Arterial	1.45	6842.010	Yes	Bridge	6840	Bridge	-1.46	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria		
FC 20	34389	Fountain Creek	Serpentine Drive			9.52	19.7		19.7	Concrete	Bridge	2047.4	6426.5			6423.8			6438.69	6439.83	163.52	1.4023	Bridge	Collector	1.14	6439.023	Yes	Bridge	6434	Bridge	-3.83	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria		
FC 21	32904	Fountain Creek	Off Manitou Ave - 1			7.24	16.4		16.4	Concrete	Bridge	2047.4	6379.4			6379			6387.31	6390.9	101.12	1.5939	Bridge	Collector	3.59	6387.643	Yes	Bridge	6384.6	Bridge	-4.3	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria		
FC 22	32683	Fountain Creek	Off Manitou Ave - 2			6.45	21.4		21.4	Concrete	Bridge	2047.4	6375.2			6375.1			6381.92	6384.43	116.8	1.4326	Bridge	Collector	2.51	6382.253	Yes	Bridge	6379.64	Bridge	-2.79	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria		
FC 23	32665	Fountain Creek	Pipeline - UF40			3.79	34.7		34.7	Concrete	Bridge	2047.4	6375.2			6375.2			6379.09	6382.53	61.98	1.9367	Bridge	Collector	3.44	6379.423	Yes	Bridge	6376.98	Bridge	-3.55	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria		
FC 24	32574	Fountain Creek	Off Manitou Ave - 3			4.05	22.6		22.6	Concrete	Bridge	2047.4	6373.5			6373			6378.09	6382.38	79.56	2.1975	Bridge	Collector	4.29	6378.423	Yes	Bridge	6375.53	Bridge	-4.85	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria		
FC 25	32493	Fountain Creek	Parking Lot - Mill Wheel			6.11	19.6		19.6	Concrete	Bridge	2047.4	6372.3			6372			6379.51	6382.25	93.88	1.6318	Bridge	Collector	2.74	6379.843	Yes	Bridge	6376.39	Bridge	-3.86	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria		
FC 26	31443	Fountain Creek	Park Ave			4.24	17.78		17.78	Concrete	Bridge	2047.4	6350			6348.1			6353.53	6356.73	62.34	1.5873	Bridge	Collector	3.2	6353.863	Yes	Bridge	6352.24	Bridge	-2.49	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria		
FC 27	31154	Fountain Creek	Off Manitou Ave - 4			6.41	37.4		37.4	Concrete	Bridge	2047.4	6344.2			6343.1			6350.19	6352.48	184.25	1.2964	Bridge	Local	2.29	6350.523	Yes	Bridge	6348.58	Bridge	-1.9	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria		
FC 28	30961	Fountain Creek	Off Manitou Ave - 5			4.57	21.3		21.3	Concrete	Bridge	2047.4	6336.7			6336.6			6346.76	6349.42	84.92	2.7834	Bridge	Local	2.66	6347.093	Yes	Bridge	6339.27	Bridge	-8.15	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria		
FC 29	30667	Fountain Creek	Off Manitou Ave - 6			6.21	23.4		23.4	Concrete	Bridge	2047.4	6331.9			6331.5			6338.86	6345.91	109.48	2.2528	Bridge	Local	7.05	6339.193	Yes	Bridge	6336.13	Bridge	-7.78	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria		
FC 30	30552	Fountain Creek	Off Manitou Ave - 7			4.9	23.1		23.1	Concrete	Bridge	2343.2	6328.8			6327.4			6338.73	6345.67	95.95	3.4469	Bridge	Local	6.94	6339.063	Yes	Bridge	6331.68	Bridge	-11.99	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria		
FC 31	30439	Fountain Creek	Under Penny Arcade	1		14.4	20	175	20	Concrete	Box	2343.2	6327.6			6326.9			6342.07	6340.03	298	0.8653	Bridge	Local	-2.04	6342.403	No	Bridge	6339.97	Bridge	1.94	Yes	Yes	Does Not Meet Freeboard Criteria		
FC 32	30162	Fountain Creek	Off Manitou Ave - 8			8.6	23.7		23.7	Concrete	Bridge	2343.2	6321.3			6321			6331.51	6336.6	130.27	1.7791	Bridge	Local	5.09	6331.843	Yes	Bridge	6327.9	Bridge	-6.7	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria		
FC 33	30063	Fountain Creek	Canon Ave			5.02	19.9		19.9	Concrete	Bridge	2343.2	6320			6318.5			6330.12	6336.37	93.76	3.2649	Bridge	Collector	6.25	6330.453	Yes	Bridge	6323	Bridge	-11.37	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria		
FC 34	29893	Fountain Creek	Under Building by W Lovers Ln.	1		9.5	16	63	16	Concrete	Box	2343.2	6317.3			6317.2			6328.32	6331.19	152	1.4653	Bridge	Local	2.87	6328.653	Yes	Bridge	6324.77	Bridge	-4.42	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria		
FC 35	29769	Fountain Creek	Lafayette Road			6.57	13.7		13.7	Concrete	Bridge	2343.2	6314.1			6313.3			6323.34	6330.03	90.91	2.4216	Bridge	Collector	6.69	6323.673	Yes	Bridge	6318.69	Bridge	-9.34	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria		
FC 36	29610	Fountain Creek	Under Building by SW Lovers Ln	1		6.6	11.7	201	11.7	Concrete	Box	2343.2	6313.6			6311.3			6320.65	6325.85	77.22	1.8636	Bridge	Local	5.2	6320.983	Yes	Bridge	6318.15	Bridge	-5.7	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria		
FC 37	29332	Fountain Creek	Parking Lot off Manitou Ave			9.04	18.4		18.4	Concrete	Bridge	2343.2	6309			6307.9			6318.92	6321.13	152.18	1.3462	Bridge	Local	2.21	6319.253	Yes	Bridge	6316	Bridge	-3.13	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria		
FC 38	28397	Fountain Creek	El Paso Blvd.	1		6	17	40	17	Concrete	Elliptical	2343.2	6290.2			6289.7			6298.9	6301.9	80.11	1.9567	Bridge	Collector	3	6299.233	Yes	Bridge	6294.16	Bridge	-5.74	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria		
FC 39	27859	Fountain Creek	Old Man Trail			4.86	16.3		16.3	Concrete	Bridge	2343.2	6282.2			6281.4			6293.2	6295.31	66.87	2.6955	Bridge	Local	2.11	6293.533	Yes	Bridge	6285.07	Bridge	-8.24	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria		
FC 40	25919	Fountain Creek	Ent to Blue Skies Inn			2.14	28.8		28.8	Concrete	Bridge	3275.3	6256.6			6258.1			6261.82	6268.57	45.62	5.6121	Bridge	Local	6.75	6262.153	Yes	Bridge	6256.7	Bridge	-9.87	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria		
FC 41	25727	Fountain Creek	Mayfair Ave			4.14	17.6		17.6	Concrete	Bridge	3275.3	6253.4			6253.3			6259.97	6268.48	55.9	3.6498	Bridge	Collector	8.51	6260.303	Yes	Bridge	6255.51	Bridge	-10.97	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria		
FC 42	25503	Fountain Creek	Old Bridge off Manitou Ave - 1			7.23	28.8		28.8	Concrete	Bridge	3275.3	6248.4			6248.2			6256.3	6260.37	156.24	1.6570	Bridge	Local	4.07	6256.63										

Upper Fountain Creek Planning Study																																		
Existing Drainageway Crossing Analysis																																		
Crossing	River Station	Tributary	Location	Crossing Size ¹					Material ¹	Shape ¹	Flow (cfs) ²	Upstream Invert (ft) ³			Downstream Invert (ft) ³			Tw El. (ft) ⁴	Minimum Weir Elev. (ft) ⁴	Calculated HW (ft) ⁴	Cross-Section Area (SF)	Calculated HW/D	Hydraulic Classification ⁵	Roadway Classification	Overtopping Depth at Road (ft)	Max Allowable Overtopping Elev. (ft) ⁶	Fail Overtopping ⁶	Allowable HW/D ⁶	Max Allowable Hw Elev (ft) ⁶	Fail Hw/D ⁶	Bridge Freeboard (ft) ⁶	Fail Bridge Freeboard ⁶	FAIL?	Reason
				# of Cells	Diameter (ft)	Rise (ft)	Span	Length				Total Span	Cell 1	Cell 2	Cell 3	Cell 1	Cell 2																	
50 Year Event																																		
FC 01	90727	Fountain Creek	Private Access - Residence			3.7	20		20	Concrete	Bridge	477.3	8038.9			8038.4			8043.51	8042.79	74.07	1.0514	Bridge	Local	-0.72	8043.843	No	Bridge	8040.6	Bridge	-0.19	Yes	Yes	Does Not Meet Freeboard Criteria
FC 02	90496	Fountain Creek	Private Access - Hotel			5	15		15	Concrete	Bridge	477.3	8032.3			8031.8			8036.01	8037.13	51.06	0.9660	Culvert	Local	1.12	8036.343	Yes	Bridge	8039.8	No		Yes	Yes	Overtops
FC 03	87452	Fountain Creek	Cristola Canyon Rd	1		4.4	13	40	13	Concrete	Arch	477.3	7946.4			7945.4			7949.97	7949.53	42.96	0.7114	Culvert	Collector	-0.44	7950.303	No	Bridge	7953	No		Yes	Yes	Overtops
FC 04	87246	Fountain Creek	Creek Side Dr.	2	4.5			50	9	CMP	Circular	477.3	7936	7936		7932	7932		7942.01	7942.72	15.9	1.4933	Culvert	Collector	0.71	7942.343	Yes	Bridge	7942.75	No		Yes	Yes	Overtops
FC 05	83423	Fountain Creek	Private Ranch			6.06	18.3		18.3	Concrete	Bridge	914.9	7846			7845.1			7851.99	7853.09	100.62	1.1766	Culvert	Local	1.1	7852.323	Yes	Bridge	7855.05	No		Yes	Yes	Overtops
FC 06	82852	Fountain Creek	Private Ranch	1		2.9	4.3	30	4.3	Concrete	Elliptical	914.9	7831.6			7831.6			7835.47	7840.02	9.79	2.9069	Culvert	Local	4.55	7835.803	Yes	Bridge	7835.94	Yes		Yes	Yes	Overtops, Does Not Meet Hw/D Criteria
FC 07	78785	Fountain Creek	Green Mtn Falls Rd.			11.35	28.2		28.2	Concrete	Bridge	914.9	7744.1			7744.1			7754.31	7750.9	284.47	0.5956	Bridge	Collector	-3.41	7754.643	No	Bridge	7753.49	Bridge	4.59	No	No	
FC 08	78215	Fountain Creek	Off Green Mtn Falls Rd.	1		3.3	5.5	38	5.5	CMP	Elliptical	914.9	7732			7729.3			7736.59	7740.33	14.01	2.5182	Culvert	Collector	3.74	7736.923	Yes	Bridge	7736.97	Yes		Yes	Yes	Overtops, Does Not Meet Hw/D Criteria
FC 09	76601	Fountain Creek	El Paso Ave			7.64	12.2		12.2	Concrete	Bridge	914.9	7696.6			7696			7705.39	7706.18	87.31	1.2592	Culvert	Collector	0.79	7705.723	Yes	Bridge	7708.02	No		Yes	Yes	Overtops
FC 10	75225	Fountain Creek	El Paso Ave 2	2		5.5	5.5	31	11	CMP	Arch	1358	7670.6			7670.4			7676.35	7678.3	34.01	1.3927	Culvert	Collector	1.95	7676.683	Yes	Bridge	7678.89	No		Yes	Yes	Overtops
FC 11	72800	Fountain Creek	Chipita Park Rd East GMP			7.14	32		32	Concrete	Bridge	1398.1	7628			7624			7637.15	7635.37	192.86	1.0322	Bridge	Collector	-1.78	7637.483	No	Bridge	7633.14	Bridge	-0.23	Yes	Yes	Does Not Meet Freeboard Criteria
FC 12	67310	Fountain Creek	6B Chipita Park Rd	2		8	9	51.5	18	Concrete	Box	1750.1	7544.5			7542.5			7554.72	7555.11	59.04	1.3262	Bridge	Collector	0.39	7555.053	Yes	Bridge	7550.5	Bridge	-2.61	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 13	56352	Fountain Creek	6C Spring Street	1	7			36.5	7	CMP	Circular	2165.2	7386.3	7386.3		7384.3			7394.01	7396.52	31.26	1.4600	Bridge	Collector	2.51	7394.343	Yes	Bridge	7391.3	Bridge	-3.22	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 14	55270	Fountain Creek	Fountain Ave			9.5	30		30	Concrete	Bridge	2165.2	7370.5			7371			7382.01	7380.12	243.15	1.0126	Bridge	Collector	-1.89	7382.343	No	Bridge	7378	Bridge	-0.12	Yes	Yes	Does Not Meet Freeboard Criteria
FC 15	54000	Fountain Creek	6E	2		8	13	126	26	Concrete	Box	2905	7322			7318			7334.01	7334.84	104	1.6050	Bridge	Collector	0.83	7334.343	Yes	Bridge	7328	Bridge	-4.84	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 16	52800	Fountain Creek	6F	2		8	12	104	24	Concrete	Box	2905	7284			7282			7296.01	7295.67	96	1.4588	Bridge	Collector	-0.34	7296.343	No	Bridge	7290	Bridge	-3.67	Yes	Yes	Does Not Meet Freeboard Criteria
FC 17	52132	Fountain Creek	6G	2		8	13	72	26	Concrete	Box	2905	7263			7262			7273.71	7275.35	104	1.5438	Bridge	Collector	1.64	7274.043	Yes	Bridge	7269	Bridge	-4.35	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 18	45190	Fountain Creek	Hwy 24 - Median Crossing Culvert	2		8	10	44	20	Concrete	Box	3610.3	7021			7020			7032.06	7034.14	80	1.6425	Bridge	Arterial	2.08	7032.060	Yes	Bridge	7027	Bridge	-5.14	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 19	40620	Fountain Creek	Hwy 24 - 6I	2		8	10	72	20	Concrete	Box	4037.4	6834			6828			6842.01	6847.15	80	1.6437	Bridge	Arterial	5.14	6842.010	Yes	Bridge	6840	Bridge	-5.15	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 20	34389	Fountain Creek	Serpentine Drive			9.52	19.7		19.7	Concrete	Bridge	4967.2	6426.5			6423.8			6438.69	6445.34	163.52	1.9811	Bridge	Collector	6.65	6439.023	Yes	Bridge	6434	Bridge	-9.34	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 21	32904	Fountain Creek	Off Manitou Ave - 1			7.24	16.4		16.4	Concrete	Bridge	4967.2	6379.4			6379			6387.31	6393.07	101.12	1.8936	Bridge	Collector	5.76	6387.643	Yes	Bridge	6384.6	Bridge	-6.47	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 22	32683	Fountain Creek	Off Manitou Ave - 2			6.45	21.4		21.4	Concrete	Bridge	4967.2	6375.2			6375.1			6381.92	6385.68	116.8	1.6264	Bridge	Collector	3.76	6382.253	Yes	Bridge	6379.64	Bridge	-4.04	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 23	32665	Fountain Creek	Pipeline - UF40			3.79	34.7		34.7	Concrete	Bridge	4967.2	6375.2			6375.2			6379.09	6384.29	61.98	2.4011	Bridge	Collector	5.2	6379.423	Yes	Bridge	6376.98	Bridge	-5.31	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 24	32574	Fountain Creek	Off Manitou Ave - 3			4.05	22.6		22.6	Concrete	Bridge	4967.2	6373.5			6373			6378.09	6383.93	79.56	2.5802	Bridge	Collector	5.84	6378.423	Yes	Bridge	6375.53	Bridge	-6.4	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 25	32493	Fountain Creek	Parking Lot - Mill Wheel			6.11	19.6		19.6	Concrete	Bridge	4967.2	6372.3			6372			6379.51	6383.66	93.68	1.8625	Bridge	Collector	4.15	6379.843	Yes	Bridge	6376.39	Bridge	-5.27	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 26	31443	Fountain Creek	Park Ave			4.24	17.78		17.78	Concrete	Bridge	4967.2	6350			6348.1			6353.53	6358.82	62.34	2.0802	Bridge	Collector	5.29	6353.863	Yes	Bridge	6352.24	Bridge	-4.58	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 27	31154	Fountain Creek	Off Manitou Ave - 4			6.41	37.4		37.4	Concrete	Bridge	4967.2	6344.2			6343.1			6350.19	6353.59	184.25	1.4696	Bridge	Local	3.4	6350.523	Yes	Bridge	6348.58	Bridge	-3.01	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 28	30961	Fountain Creek	Off Manitou Ave - 5			4.57	21.3		21.3	Concrete	Bridge	4967.2	6336.7			6336.6			6346.76	6350.13	84.92	2.9387	Bridge	Local	3.37	6347.093	Yes	Bridge	6339.27	Bridge	-8.86	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 29	30667	Fountain Creek	Off Manitou Ave - 6			6.21	23.4		23.4	Concrete	Bridge	4967.2	6331.9			6331.5			6338.86	6348.11	109.48	2.6071	Bridge	Local	9.25	6339.193	Yes	Bridge	6336.13	Bridge	-9.98	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 30	30552	Fountain Creek	Off Manitou Ave - 7			4.9	23.1		23.1	Concrete	Bridge	5903.2	6328.8			6327.4			6338.73	6347.45	95.95	3.8102	Bridge	Local	8.22	6339.063	Yes	Bridge	6331.68	Bridge	-13.77	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 31	30439	Fountain Creek	Under Penny Arcade	1		14.4	20	175	20	Concrete	Box	5903.2	6327.6			6326.9			6342.07	6347.45	288	1.3806	Bridge	Local	5.38	6342.403	Yes	Bridge	6339.97	Bridge	-5.48	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 32	30162	Fountain Creek	Off Manitou Ave - 8			8.6	23.7		23.7	Concrete	Bridge	5903.2	6321.3			6321			6331.51	6337.49	130.27	1.8826	Bridge	Local	5.98	6331.843	Yes	Bridge	6327.9	Bridge	-7.59	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 33	30063	Fountain Creek	Canon Ave			5.02	19.9		19.9	Concrete	Bridge	5903.2	6320			6318.5			6330.12	6335.55	93.76	3.1016	Bridge	Collector	5.43	6330.453	Yes	Bridge	6323	Bridge	-10.55	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 34	29893	Fountain Creek	Under Building by W Lovers Ln.	1		9.5	16	63	16	Concrete	Box	5903.2	6317.3			6317.2			6328.32	6334.35	152	1.7979	Bridge	Collector	6.03	6328.653	Yes	Bridge	6324.77	Bridge	-7.58	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 35	29769	Fountain Creek	Lafayette Road			6.57	13.7		13.7	Concrete	Bridge	5903.2	6314.1			6313.3			6323.34	6333.85	90.91	3.0030	Bridge	Collector	10.51	6323.673	Yes	Bridge	6318.69	Bridge	-13.16	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 36	29610	Fountain Creek	Under Building by SW Lovers Ln	1		6.6	11.7	201	11.7	Concrete	Box	5903.2	6313.6			6311.3			6320.65	6330.38	77.22	2.5500	Bridge	Collector	9.73	6320.983	Yes	Bridge	6318.15	Bridge	-10.23	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 37	29332	Fountain Creek	Parking Lot off Manitou Ave			9.04	18.4		18.4	Concrete	Bridge	5903.2	6309			6307.9			6318.92	6323.19	152.18	1.5741	Bridge	Local	4.27	6319.253	Yes	Bridge	6316	Bridge	-5.19	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 38	28397	Fountain Creek	El Paso Blvd.	1		6	17	40	17	Concrete	Elliptical	5903.2	6290.2			6289.7			6298.9	6304.84	80.11	2.4467	Bridge	Collector	5.94	6299.233	Yes	Bridge	6294.16	Bridge	-6.68	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 39	27859	Fountain Creek	Old Man Trail			4.86	16.3		16.3	Concrete	Bridge	5903.2	6282.2			6281.4			6293.2	6300.32	66.87	3.7263	Bridge	Local	7.12	6293.533	Yes	Bridge	6285.07	Bridge	-13.25	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 40	25919	Fountain Creek	Ent to Blue Skies Inn			2.14	28.8		28.8	Concrete	Bridge	7893.4	6256.6			6256.1			6261.82	6268.2	45.62	5.4393	Bridge	Local	6.38	6262.153	Yes	Bridge	6256.7	Bridge	-9.5	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 41	25727	Fountain Creek	Mayfair Ave			4.14	17.6		17.6	Concrete	Bridge	7893.4	6253.4			6253.3			6259.97	6267.49	55.9	3.4106	Bridge	Collector	7.52	6260.303	Yes	Bridge	6255.51	Bridge	-9.98	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 42	25503	Fountain Creek	Old Bridge off Manitou Ave - 1			7.23	28.8		28.8	Concrete	Bridge	7893.4	6248.4																					

Upper Fountain Creek Planning Study																																			
Existing Drainageway Crossing Deficiency Analysis																																			
Crossing	River Station	Tributary	Location	Crossing Size ¹					Material ¹	Shape ¹	Flow (cfs) ²	Upstream Invert (ft) ³			Downstream Invert (ft) ³			Tw El. (ft) ⁵	Minimum Weir Elev. (ft) ⁴	Calculated HW (ft) ⁴	Cross-Section Area (SF)	Calculated HW/D	Hydraulic Classification ⁵	Roadway Classification	Overtopping Depth at Road (ft)	Max Allowable Overtopping Elev. (ft) ⁶	Fail Overtopping ⁶	Allowable Hw/D ⁶	Max Allowable Hw Elev (ft) ⁶	Fail Hw/D ⁶	Bridge Freeboard (ft) ⁶	Fail Bridge Freeboard ⁶	FAIL?	Reason	
				# of Cells	Diameter (ft)	Rise (ft)	Span	Length				Total Span	Cell 1	Cell 2	Cell 3	Cell 1	Cell 2																		Cell 3
100 Year Event																																			
FC 01	90727	Fountain Creek	Private Access - Residence			3.7	20		20	Concrete	Bridge	656.3	8038.9			8038.4				8043.51	8043.82	74.07	1.3297	Bridge	Local	0.31	8043.843	No	Bridge	8040.6	Bridge	-1.22	Yes	Yes	Does Not Meet Freeboard Criteria
FC 02	90496	Fountain Creek	Private Access - Hotel			5	15		15	Concrete	Bridge	656.3	8032.3			8031.8				8036.01	8037.96	51.06	1.1320	Culvert	Local	1.95	8036.343	Yes	Bridge	8039.8	No		Yes	Yes	Overtops
FC 03	87452	Fountain Creek	Cristola Canyon Rd	1		4.4	13	40	13	Concrete	Arch	656.3	7946.4			7945.4				7949.97	7949.85	42.96	0.7841	Culvert	Collector	-0.12	7950.303	No	Bridge	7953	No		Yes	No	
FC 04	87246	Fountain Creek	Creek Side Dr.	2	4.5		50	9		CMP	Circular	656.3	7936	7936		7932	7932			7942.01	7942.94	15.9	1.5422	Culvert	Collector	0.93	7942.343	Yes	Bridge	7942.75	Yes	Yes	Yes	Yes	Overtops, Does Not Meet Hw/D Criteria
FC 05	83423	Fountain Creek	Private Ranch	1		6.06	18.3		18.3	Concrete	Bridge	1298.1	7846			7845.1				7851.99	7853.65	100.62	1.2690	Culvert	Local	1.66	7852.323	Yes	Bridge	7855.05	No		Yes	Yes	Overtops, Does Not Meet Hw/D Criteria
FC 06	82852	Fountain Creek	Private Ranch	1		2.9	4.3	30	4.3	Concrete	Elliptical	1298.1	7831.6			7831.6				7835.47	7840.87	9.79	3.2000	Culvert	Local	5.4	7835.803	Yes	Bridge	7835.94	Yes	Yes	Yes	Yes	Overtops, Does Not Meet Hw/D Criteria
FC 07	78785	Fountain Creek	Green Mtn Falls Rd.			11.35	28.2		28.2	Concrete	Bridge	1298.1	7744.1			7744.1				7754.31	7752.11	284.47	0.7022	Bridge	Collector	-2.2	7754.643	No	Bridge	7753.49	Bridge	3.38	No	No	
FC 08	78215	Fountain Creek	Off Green Mtn Falls Rd	1		3.3	5.5	38	5.5	CMP	Elliptical	1298.1	7732			7729.3				7736.59	7740.91	14.01	2.6939	Culvert	Collector	4.32	7736.923	Yes	Bridge	7736.97	Yes	Yes	Yes	Yes	Overtops, Does Not Meet Hw/D Criteria
FC 09	76601	Fountain Creek	El Paso Ave			7.64	12.2		12.2	Concrete	Bridge	1298.1	7696.6			7696				7705.39	7706.55	87.31	1.3076	Culvert	Collector	1.16	7705.723	Yes	Bridge	7708.02	No		Yes	Yes	Overtops
FC 10	75225	Fountain Creek	El Paso Ave 2	2		5.5	5.5	31	11	CMP	Arch	1966.4	7670.6			7670.4				7676.35	7678.84	34.01	1.4909	Bridge	Collector	2.49	7676.683	Yes	Bridge	7674.14	Bridge	-2.7	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 11	72800	Fountain Creek	Chipita Park Rd East GMP			7.14	32		32	Concrete	Bridge	2025.9	7628			7624				7637.15	7636.93	192.86	1.2507	Bridge	Collector	-0.22	7637.483	No	Bridge	7633.14	Bridge	-1.79	Yes	Yes	Does Not Meet Freeboard Criteria
FC 12	67310	Fountain Creek	6B Chipita Park Rd	2		8	9	51.5	18	Concrete	Box	2542.9	7544.5			7542.5				7554.72	7555.97	59.04	1.4338	Bridge	Collector	1.25	7555.053	Yes	Bridge	7550.5	Bridge	-3.47	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 13	56352	Fountain Creek	6C Spring Street	1	7			36.5	7	CMP	Circular	3060.5	7386.3			7384.3				7394.01	7397.02	31.26	1.5314	Bridge	Collector	3.01	7394.343	Yes	Bridge	7391.3	Bridge	-3.72	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 14	55270	Fountain Creek	Fountain Ave			9.5	30		30	Concrete	Bridge	3060.5	7370.5			7371				7382.01	7383.41	243.15	1.3589	Bridge	Collector	1.4	7382.343	Yes	Bridge	7378	Bridge	-3.41	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 15	54000	Fountain Creek	6E	2		8	13	126	26	Concrete	Box	4069.5	7322			7318				7334.01	7336.79	104	1.8488	Bridge	Collector	2.78	7334.343	Yes	Bridge	7328	Bridge	-6.79	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 16	52800	Fountain Creek	6F	2		8	12	104	24	Concrete	Box	4069.5	7284			7282				7296.01	7298.88	96	1.8600	Bridge	Collector	2.87	7296.343	Yes	Bridge	7290	Bridge	-6.88	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 17	52132	Fountain Creek	6G	2		8	13	72	26	Concrete	Box	4069.5	7263			7262				7273.71	7277.66	104	1.8325	Bridge	Collector	3.95	7274.043	Yes	Bridge	7269	Bridge	-6.66	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 18	45190	Fountain Creek	Hwy 24 - Median Crossing Culvert	2		8	10	44	20	Concrete	Box	5034.6	7021			7020				7032.06	7035.8	80	1.8500	Bridge	Arterial	3.74	7032.060	Yes	Bridge	7027	Bridge	-6.8	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 19	40620	Fountain Creek	Hwy 24 - 6I	2		8	10	72	20	Concrete	Box	5619.4	6834			6828				6842.01	6848.55	80	1.8188	Bridge	Arterial	6.54	6842.010	Yes	Bridge	6840	Bridge	-6.55	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 20	34389	Fountain Creek	Serpentine Drive			9.52	19.7		19.7	Concrete	Bridge	6895.2	6426.5			6423.8				6438.69	6446.29	163.52	2.0809	Bridge	Collector	7.6	6439.023	Yes	Bridge	6434	Bridge	-10.29	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 21	32904	Fountain Creek	Off Manitou Ave - 1			7.24	16.4		16.4	Concrete	Bridge	6895.2	6379.4			6379				6387.31	6394.07	101.12	2.0318	Bridge	Collector	6.76	6387.643	Yes	Bridge	6384.6	Bridge	-7.47	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 22	32683	Fountain Creek	Off Manitou Ave - 2			6.45	21.4		21.4	Concrete	Bridge	6895.2	6375.2			6375.1				6381.92	6387.25	116.8	1.8698	Bridge	Collector	5.33	6382.253	Yes	Bridge	6379.64	Bridge	-6.61	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 23	32665	Fountain Creek	Pipeline - UF40			3.79	34.7		34.7	Concrete	Bridge	6895.2	6375.2			6375.2				6379.09	6385.21	61.98	2.6438	Bridge	Collector	6.12	6379.423	Yes	Bridge	6376.98	Bridge	-6.23	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 24	32574	Fountain Creek	Off Manitou Ave - 3			4.05	22.6		22.6	Concrete	Bridge	6895.2	6373.5			6373				6378.09	6384.75	79.56	2.7827	Bridge	Collector	6.66	6378.423	Yes	Bridge	6375.53	Bridge	-7.22	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 25	32493	Fountain Creek	Parking Lot - Mill Wheel			6.11	19.6		19.6	Concrete	Bridge	6895.2	6372.3			6372				6379.51	6384.47	93.68	1.9951	Bridge	Collector	4.96	6379.843	Yes	Bridge	6376.39	Bridge	-6.08	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 26	31443	Fountain Creek	Park Ave			4.24	17.78		17.78	Concrete	Bridge	6895.2	6350			6348.1				6353.53	6359.78	62.34	2.3066	Bridge	Collector	6.25	6353.863	Yes	Bridge	6352.24	Bridge	-5.54	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 27	31154	Fountain Creek	Off Manitou Ave - 4			6.41	37.4		37.4	Concrete	Bridge	6895.2	6344.2			6343.1				6350.19	6354.41	184.25	1.5975	Bridge	Local	4.22	6350.523	Yes	Bridge	6348.58	Bridge	-3.83	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 28	30961	Fountain Creek	Off Manitou Ave - 5			4.57	21.3		21.3	Concrete	Bridge	6895.2	6336.7			6336.6				6346.76	6350.73	84.92	3.0700	Bridge	Local	3.97	6347.093	Yes	Bridge	6339.27	Bridge	-9.46	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 29	30667	Fountain Creek	Off Manitou Ave - 6			6.21	23.4		23.4	Concrete	Bridge	6895.2	6331.9			6331.5				6338.86	6350.49	109.48	2.9903	Bridge	Local	11.63	6339.193	Yes	Bridge	6336.13	Bridge	-12.36	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 30	30552	Fountain Creek	Off Manitou Ave - 7			4.9	23.1		23.1	Concrete	Bridge	8277	6328.8			6327.4				6338.73	6349.89	95.95	4.3082	Bridge	Local	11.16	6339.063	Yes	Bridge	6331.68	Bridge	-16.21	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 31	30439	Fountain Creek	Under Penny Arcade	1		14.4	20	175	20	Concrete	Box	8277	6327.6			6326.9				6342.07	6349.93	288	1.5528	Bridge	Local	7.86	6342.003	Yes	Bridge	6339.97	Bridge	-7.96	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 32	30162	Fountain Creek	Off Manitou Ave - 8			8.6	23.7		23.7	Concrete	Bridge	8277	6321.3			6321				6331.51	6338.81	130.27	2.0360	Bridge	Local	7.3	6331.843	Yes	Bridge	6327.9	Bridge	-8.91	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 33	30063	Fountain Creek	Canon Ave			5.02	19.9		19.9	Concrete	Bridge	8277	6320			6318.5				6330.12	6336.41	93.76	3.2729	Bridge	Collector	6.29	6330.453	Yes	Bridge	6323	Bridge	-11.41	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 34	29893	Fountain Creek	Under Building by W Lovers Ln.	1		9.5	16	63	16	Concrete	Box	8277	6317.3			6317.2				6328.32	6335.98	152	1.9695	Bridge	Collector	7.66	6328.653	Yes	Bridge	6324.77	Bridge	-9.21	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 35	29769	Fountain Creek	Lafayette Road			6.57	13.7		13.7	Concrete	Bridge	8277	6314.1			6313.3				6323.34	6335.62	90.91	3.2725	Bridge	Collector	12.28	6323.673	Yes	Bridge	6318.69	Bridge	-14.93	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 36	29610	Fountain Creek	Under Building by SW Lovers Ln	1		6.6	11.7	201	11.7	Concrete	Box	8277	6313.6			6311.3				6320.65	6332.28	77.22	2.8379	Bridge	Local	11.63	6320.983	Yes	Bridge	6318.15	Bridge	-12.13	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 37	29332	Fountain Creek	Parking Lot off Manitou Ave			9.04	18.4		18.4	Concrete	Bridge	8277	6309			6307.9				6318.92	6324.37	152.18	1.7046	Bridge	Local	5.45	6319.253	Yes	Bridge	6316	Bridge	-6.37	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 38	28397	Fountain Creek	El Paso Blvd.	1		6	17	40	17	Concrete	Elliptical	8277	6290.2			6289.7				6298.9	6306.02	80.11	2.6433	Bridge	Collector	7.12	6299.233	Yes	Bridge	6294.16	Bridge	-9.86	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 39	27859	Fountain Creek	Old Man Trail			4.86	16.3		16.3	Concrete	Bridge	8277	6282.2			6281.4				6293.2	6302.05	66.87	4.0823	Bridge	Local	8.85	6293.533	Yes	Bridge	6285.07	Bridge	-14.98	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 40	25919	Fountain Creek	Ent to Blue Skies Inn			2.14	28.8		28.8	Concrete	Bridge	10887.7	6256.6			6258.1				6261.82	6269.66	45.62	6.1215	Bridge	Local	7.84	6262.153	Yes	Bridge	6256.7	Bridge	-10.96	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria
FC 41	25727	Fountain Creek	Mayfair Ave			4.14	17.6		17.6	Concrete	Bridge	10887.7	6253.4			6253.3				6259.97	6268.92	55.9	3.7560	Bridge	Collector	8.95	6								

Cheyenne Creek Planning Study																																	
Existing Drainageway Crossing Deficiency Analysis																																	
Crossing	River Station	Tributary	Location	Crossing Size ¹				Material ¹	Shape ¹	Q100 ² (cfs)	Upstream Invert ³ (ft)			Downstream Invert ³ (ft)			Tw El. (ft) ²	Minimum Weir Elev. (ft) ⁴	Calculated HW (ft) ⁴	Cross-Section Area (SF)	Calculated HWD	Hydraulic Classification ⁵	Roadway Classification	Overtopping Depth at Road (ft)	Max Allowable Overtopping Elev. (ft) ⁶	Fail Overtopping ⁷	Allowable Hw/D ⁸	Max Allowable Hw Elev (ft) ⁹	Fail Hw/D ⁸	Bridge Freeboard (ft) ⁹	Fail Bridge Freeboard ⁹	FAIL?	Reason
				# of Cells	Diameter (ft)	Rise (ft)	Span				Total Span	Cell 1	Cell 2	Cell 3	Cell 1	Cell 2																	
2 Year Event																																	
N. Cheyenne Canon Rd - 1	6090	N. Cheyenne	N. Cheyenne Canon	1	5.3	25	25	tone and Gro	Bridge	25	6556			6555.57			6565.5	6558.52	42.03	0.4755	Bridge	Collector	-6.98	6565.83	No	Bridge	6559.3	Bridge	2.78	No	No		
N. Cheyenne Canon Rd - 2	5185	N. Cheyenne	N. Cheyenne Canon	1	7.2	22	22	tone and Gro	Bridge	25	6510.38			6504.5			6519.64	6513.43	58.25	0.4236	Bridge	Collector	-6.21	6519.97	No	Bridge	6515.58	Bridge	4.15	No	No		
Evans Ave	18076	Cheyenne Creek	Evans Ave	1	7	28	28	Concrete	Bridge	49	6263			6261.7			6269.76	6263.88	189.07	0.1257	Bridge	Collector	-5.88	6270.09	No	Bridge	6268	Bridge	6.12	No	No		
Chapter House 1	16166	Cheyenne Creek	Chapter House	1	6.3	16	16	Concrete	Bridge	49	6207			6206.5			6214.01	6207.82	135.7	0.1302	Culvert	Collector	-6.19	6214.34	No	1.5	6216.45	No		No	No		
Mayhurst Ave	15155	Cheyenne Creek	Mayhurst Ave	1	4.5	24.5	24.5	Concrete	Bridge	49	6181			6180			6186.52	6181.66	100.47	0.1467	Bridge	Collector	-4.86	6186.85	No	Bridge	6183.5	Bridge	3.84	No	No		
Stratton Ave	14468	Cheyenne Creek	Stratton Ave	1	16	8	8	Concrete	Bridge	49	6159.5			6157.9			6164.01	6164.01	124.9	0.0562	Culvert	Collector	-3.61	6164.34	No	1.5	6183.5	No		No	No		
Cresta Road	12903	Cheyenne Creek	Cresta Road	2	6.4	11	22	Concrete	Bridge	45	6119	6119		6114	6114		6126.59	6120.19	140.96	0.1859	Bridge	Collector	-6.4	6126.92	No	Bridge	6123.4	Bridge	5.21	No	No		
Thomas Lane	10850	Cheyenne Creek	Thomas Lane	1	5.5	27	27	Concrete	Bridge	45	6071			6070			6078.01	6071.56	148.54	0.1018	Bridge	Collector	-6.45	6078.34	No	Bridge	6074.5	Bridge	4.94	No	No		
Wolfe Ave	9895	Cheyenne Creek	Wolfe Ave	2	6.35	24	48	Concrete	Bridge	45	6054.1	6053.4		6054.1	6053		6056.01	6054.33	252.01	0.1465	Bridge	Collector	-1.68	6056.34	No	Bridge	6058.45	Bridge	6.12	No	No		
Alsace Way	7107	Cheyenne Creek	Alsace Way	1	5.3	32	32	Concrete	Bridge	46	5997.6			5996.6			6004.01	5998.12	168.61	0.0981	Bridge	Collector	-5.89	6004.34	No	Bridge	6000.9	Bridge	4.78	No	No		
Manor Lane	6022	Cheyenne Creek	Manor Lane	2	6.15	13	26	CMP	Arch	46	5974.5	5974.5		5974.2	5976.3		5985.7	5975.58	146.41	0.1756	Bridge	Collector	-10.12	5986.03	No	Bridge	5978.65	Bridge	5.07	No	No		
Woodburn St	4723	Cheyenne Creek	Woodburn St	1	5.7	17.6	17.6	Concrete	Bridge	46	5953.8			5953.5			5961.61	5956.76	100.38	0.1684	Culvert	Collector	-8.85	5961.94	No	1.5	5962.35	No		No	No		
Cheyenne Road	4256	Cheyenne Creek	Cheyenne Road	1	5.4	22	22	Concrete	Bridge	46	5948.8			5948.5			5956.01	5949.88	118.86	0.2000	Bridge	Collector	-6.13	5956.34	No	Bridge	5952.2	Bridge	4.32	No	No		
Cascade Ave	4072	Cheyenne Creek	Cascade Ave	2	5.95	12	24	Concrete	Bridge	46	5948.4	5947.1		5946	5946		5957.7	5948.59	142.87	0.2504	Bridge	Collector	-9.11	5958.03	No	Bridge	5952.35	Bridge	5.76	No	No		
St. Elmo Ave	3296	Cheyenne Creek	St. Elmo St	1	6	17	17	Concrete	Bridge	46	5933.7			5933.4			5941.2	5934.55	102.04	0.1417	Culvert	Collector	-6.65	5941.53	No	1.5	5942.7	No		No	No		
Ramona Ave	2605	Cheyenne Creek	Ramona Ave	1	7	30	30	Concrete	Bridge	46	5923.5			5922.8			5933.7	5924.04	210.68	0.0771	Bridge	Collector	-9.66	5924.03	No	Bridge	5928.5	Bridge	6.46	No	No		
Navajo St	1818	Cheyenne Creek	Navajo St	2	8.25	19.6	39.2	Concrete	Bridge	46	5911.1	5911.1		5910.6	5910.5		5923.3	5912.39	448.74	0.1564	Bridge	Collector	-10.91	5923.63	No	Bridge	5917.35	Bridge	6.96	No	No		
Brookside St	1410	Cheyenne Creek	Brookside St	2	7	10.6	21.2	Concrete	Box	46	5907.3	5907.3		5906.8	5906.8		5916	5908.06	148.4	0.1086	Bridge	Collector	-7.94	5916.33	No	Bridge	5912.3	Bridge	6.24	No	No		
Arvada St	840	Cheyenne Creek	Arvada St	1	6.46	24.535	24.535	Concrete	Bridge	46	5902.24			5901.74			5910	5903.38	181.08	0.1765	Bridge	Collector	-6.62	5910.33	No	Bridge	5906.7	Bridge	5.32	No	No		
South Ramp	576	Cheyenne Creek	South Ramp	1	3.78	33.3	33.3	Concrete	Bridge	46	5900.64			5900.14			5909.2	5901.45	143.59	0.2143	Bridge	Arterial	-7.75	5909.20	No	Bridge	5902.42	Bridge	2.97	No	No		
Interstate 25	432	Cheyenne Creek	Interstate 25	1	34.46	918.98	918.98	Concrete	Bridge	46	5899.74			5898.94			5940.01	5900.97	23326.36	0.0357	Bridge	Arterial	-39.04	5940.01	No	Bridge	5932.2	Bridge	33.23	No	No		
North Ramp	286	Cheyenne Creek	North Ramp	1	8.56	35	35	Concrete	Bridge	46	5898.24			5897.04			5910.5	5898.84	297.33	0.0701	Bridge	Arterial	-11.66	5910.50	No	Bridge	5904.8	Bridge	7.96	No	No		
5 Year Event																																	
N. Cheyenne Canon Rd - 1	6090	N. Cheyenne	N. Cheyenne Canon	1	5.3	25	25	tone and Gro	Bridge	93	6556			6555.57			6565.5	6560.29	42.03	0.8094	Bridge	Collector	-5.21	6565.83	No	Bridge	6559.3	Bridge	1.01	Yes	Yes	Does Not Meet Freeboard Criteria	
N. Cheyenne Canon Rd - 2	5185	N. Cheyenne	N. Cheyenne Canon	1	7.2	22	22	tone and Gro	Bridge	93	6510.38			6504.5			6519.64	6514.79	58.25	0.6125	Bridge	Collector	-4.85	6519.97	No	Bridge	6515.58	Bridge	2.79	No	No		
Evans Ave	18076	Cheyenne Creek	Evans Ave	1	7	28	28	Concrete	Bridge	193	6263			6261.7			6269.76	6264.87	189.07	0.2671	Bridge	Collector	-4.89	6270.09	No	Bridge	6268	Bridge	5.13	No	No		
Chapter House 1	16166	Cheyenne Creek	Chapter House	1	6.3	16	16	Concrete	Bridge	193	6207			6206.5			6214.01	6208.87	135.7	0.2968	Culvert	Collector	-5.14	6214.34	No	1.5	6216.45	No		No	No		
Mayhurst Ave	15155	Cheyenne Creek	Mayhurst Ave	1	4.5	24.5	24.5	Concrete	Bridge	193	6181			6180			6186.52	6182.66	100.47	0.3689	Bridge	Collector	-3.86	6186.85	No	Bridge	6183.5	Bridge	2.84	No	No		
Stratton Ave	14468	Cheyenne Creek	Stratton Ave	1	16	8	8	Concrete	Bridge	193	6159.5			6157.9			6164.01	6162.23	124.9	0.1706	Culvert	Collector	-1.78	6164.34	No	1.5	6183.5	No		No	No		
Cresta Road	12903	Cheyenne Creek	Cresta Road	2	6.4	11	22	Concrete	Bridge	201	6119	6119		6114	6114		6126.59	6121.79	140.96	0.4359	Bridge	Collector	-4.8	6126.92	No	Bridge	6123.4	Bridge	3.61	No	No		
Thomas Lane	10850	Cheyenne Creek	Thomas Lane	1	5.5	27	27	Concrete	Bridge	201	6071			6070			6078.01	6072.57	148.54	0.2855	Bridge	Collector	-5.44	6078.34	No	Bridge	6074.5	Bridge	3.93	No	No		
Wolfe Ave	9895	Cheyenne Creek	Wolfe Ave	2	6.35	24	48	Concrete	Bridge	201	6054.1	6053.4		6054.1	6053		6056.01	6055.2	252.01	0.2835	Bridge	Collector	-0.81	6056.34	No	Bridge	6058.45	Bridge	5.25	No	No		
Alsace Way	7107	Cheyenne Creek	Alsace Way	1	5.3	32	32	Concrete	Bridge	208	5997.6			5996.6			6004.01	5999	168.61	0.2642	Bridge	Collector	-5.01	6004.34	No	Bridge	6000.9	Bridge	3.9	No	No		
Manor Lane	6022	Cheyenne Creek	Manor Lane	2	6.15	13	26	CMP	Arch	208	5974.5	5974.5		5974.2	5976.3		5985.7	5977.22	146.41	0.4423	Bridge	Collector	-8.48	5986.03	No	Bridge	5978.65	Bridge	3.43	No	No		
Woodburn St	4723	Cheyenne Creek	Woodburn St	1	5.7	17.6	17.6	Concrete	Bridge	208	5953.8			5953.5			5961.61	5956.38	100.38	0.4526	Culvert	Collector	-5.23	5961.94	No	1.5	5962.35	No		No	No		
Cheyenne Road	4256	Cheyenne Creek	Cheyenne Road	1	5.4	22	22	Concrete	Bridge	208	5948.8			5948.5			5956.01	5951.43	118.86	0.4870	Bridge	Collector	-4.58	5956.34	No	Bridge	5952.2	Bridge	2.77	No	No		
Cascade Ave	4072	Cheyenne Creek	Cascade Ave	2	5.95	12	24	Concrete	Bridge	208	5948.4	5947.1		5946	5946		5957.7	5949.52	142.87	0.4067	Bridge	Collector	-8.18	5958.03	No	Bridge	5952.35	Bridge	4.83	No	No		
St. Elmo Ave	3296	Cheyenne Creek	St. Elmo St	1	6	17	17	Concrete	Bridge	208	5933.7			5933.4			5941.2	5935.76	102.04	0.3433	Culvert	Collector	-5.44	5941.53	No	1.5	5942.7	No		No	No		
Ramona Ave	2605	Cheyenne Creek	Ramona Ave	1	7	30	30	Concrete	Bridge	208	5923.5			5922.8			5933.7	5924.95	210.68	0.2071	Bridge	Collector	-8.75	5924.03	No	Bridge	5928.5	Bridge	5.55	No	No		
Navajo St	1818	Cheyenne Creek	Navajo St	2	8.25	19.6	39.2	Concrete	Bridge	208	5911.1	5911.1		5910.6	5910.5		5923.3	5913.7	448.74	0.3152	Bridge	Collector	-9.6	5923.63	No	Bridge	5917.35	Bridge	5.65	No	No		
Brookside St	1410	Cheyenne Creek	Brookside St	2	7	10.6	21.2	Concrete	Box	208	5907.3	5907.3		5906.8	5906.8		5916	5909.51	148.4	0.3157	Bridge	Collector	-6.49	5916.33	No	Bridge	5912.3	Bridge	4.79	No	No		
Arvada St	840	Cheyenne Creek	Arvada St	1	6.46	24.535	24.535	Concrete	Bridge	208	5902.24			5901.74			5910	5904.8	181.08	0.3963	Bridge	Collector	-5.2	5910.33	No	Bridge	5906.7	Bridge	3.9	No	No		
South Ramp	576	Cheyenne Creek	South Ramp	1	3.78	33.3	33.3	Concrete	Bridge	208	5900.64			5900.14			5909.2	5902.6	143.59	0.5185	Bridge	Arterial	-6.6	5909.20	No	Bridge	5902.42	Bridge	1.82	Yes	Yes	Does Not Meet Freeboard Criteria	
Interstate 25	432	Cheyenne Creek	Interstate 25	1	34.46	918.98	918.98	Concrete	Bridge	208	5899.74			5898.94			5940.01	5902.03	23326.36	0.0665	Bridge	Arterial	-37.98	5940.01	No	Bridge	5932.2	Bridge	32.17	No	No		
North Ramp	286	Cheyenne Creek	North Ramp	1	8.56	35	35	Concrete	Bridge	208	5898.24			5897.04			5910.5	5899.79	297.33	0.1811	Bridge	Arterial	-10.71	5910.50	No	Bridge	5904.8	Bridge	7.01	No	No		

See Next For 10 and 50 Year Event

Notes:

¹ Based on field measurements

Cheyenne Creek Planning Study																																	
Existing Drainageway Crossing Deficiency Analysis																																	
Crossing	River Station	Tributary	Location	Crossing Size ¹				Material ¹	Shape ¹	Q100 ² (cfs)	Upstream Invert ³ (ft)			Downstream Invert ³ (ft)			Tw El. (ft) ²	Minimum Weir Elev. (ft) ⁴	Calculated HW (ft) ⁴	Cross-Section Area (SF)	Calculated HWD	Hydraulic Classification ⁵	Roadway Classification	Overtopping Depth at Road (ft)	Max Allowable Overtopping Elev. (ft) ⁶	Fail Overtopping ⁷	Allowable Hw/D ⁸	Max Allowable Hw Elev (ft) ⁹	Fail Hw/D ⁸	Bridge Freeboard (ft) ⁹	Fail Bridge Freeboard ⁹	FAIL?	Reason
				# of Cells	Diameter (ft)	Rise (ft)	Span				Total Span	Cell 1	Cell 2	Cell 3	Cell 1	Cell 2																	
10 Year Event																																	
N. Cheyenne Canon Rd - 1	6090	N. Cheyenne	N. Cheyenne Canon	1	5.3	25	25	tone and Gro	Bridge	188	6556			6555.57			6565.5	6562.88	42.03	1.298	Bridge	Collector	-3.82	6565.83	No	Bridge	6559.3	Bridge	-1.58	Yes	Yes	Does Not Meet Freeboard Criteria	
N. Cheyenne Canon Rd - 2	5185	N. Cheyenne	N. Cheyenne Canon	1	7.2	22	22	tone and Gro	Bridge	188	6510.38			6504.5			6519.64	6515.82	58.25	0.756	Bridge	Collector	-3.82	6519.97	No	Bridge	6515.58	Bridge	1.76	Yes	Yes	Does Not Meet Freeboard Criteria	
Evans Ave	18076	Cheyenne Creek	Evans Ave	1	7	28	28	Concrete	Bridge	410	6263			6261.7			6269.76	6265.9	189.07	0.414	Bridge	Collector	-3.86	6270.09	No	Bridge	6268	Bridge	4.1	No	No	Does Not Meet Freeboard Criteria	
Chapter House 1	16166	Cheyenne Creek	Chapter House	1	6.3	16	16	Concrete	Bridge	410	6207			6206.5			6214.01	6209.88	135.7	0.457	Culvert	Collector	-4.13	6214.34	No	1.5	6216.45	No		Yes	Yes	Overtops	
Mayhurst Ave	15155	Cheyenne Creek	Mayhurst Ave	1	4.5	24.5	24.5	Concrete	Bridge	410	6181			6180			6186.52	6183.83	100.47	0.629	Bridge	Collector	-2.69	6186.85	No	Bridge	6183.5	Bridge	1.67	Yes	Yes	Does Not Meet Freeboard Criteria	
Stratton Ave	14468	Cheyenne Creek	Stratton Ave	1	16	8	8	Concrete	Bridge	410	6159.5			6157.9			6164.01	6163.55	124.9	0.253	Culvert	Collector	-0.46	6164.34	No	1.5	6183.5	No		Yes	Yes	Overtops	
Cresta Road	12903	Cheyenne Creek	Cresta Road	2	6.4	11	22	Concrete	Bridge	431	6119	6119		6114	6114		6126.59	6123.32	140.96	0.675	Bridge	Collector	-3.27	6126.92	No	Bridge	6123.4	Bridge	2.08	No	No		
Thomas Lane	10850	Cheyenne Creek	Thomas Lane	1	5.5	27	27	Concrete	Bridge	431	6071			6070			6078.01	6073.52	148.54	0.458	Bridge	Collector	-4.49	6078.34	No	Bridge	6074.5	Bridge	2.98	No	No		
Wolfe Ave	9895	Cheyenne Creek	Wolfe Ave	2	6.35	24	48	Concrete	Bridge	431	6054.1	6053.4		6054.1	6053		6056.01	6055.79	252.01	0.376	Bridge	Collector	-0.22	6056.34	No	Bridge	6058.45	Bridge	4.66	No	No		
Alsace Way	7107	Cheyenne Creek	Alsace Way	1	5.3	32	32	Concrete	Bridge	446	5997.6			5996.6			6004.01	5999.99	168.61	0.451	Bridge	Collector	-4.02	6004.34	No	Bridge	6000.9	Bridge	2.91	No	No		
Manor Lane	6022	Cheyenne Creek	Manor Lane	2	6.15	13	26	CMP	Arch	446	5974.5	5974.5		5974.2	5976.3		5985.7	5978.46	146.41	0.644	Bridge	Collector	-7.24	5986.03	No	Bridge	5978.65	Bridge	2.19	No	No		
Woodburn St	4723	Cheyenne Creek	Woodburn St	1	5.7	17.6	17.6	Concrete	Bridge	446	5953.8			5953.5			5961.61	5957.77	100.38	0.696	Culvert	Collector	-3.84	5961.94	No	1.5	5962.35	No		Yes	Yes	Overtops	
Cheyenne Road	4256	Cheyenne Creek	Cheyenne Road	1	5.4	22	22	Concrete	Bridge	446	5948.8			5948.5			5956.01	5952.82	118.86	0.744	Bridge	Collector	-3.19	5956.34	No	Bridge	5952.2	Bridge	1.38	Yes	Yes	Does Not Meet Freeboard Criteria	
Cascade Ave	4072	Cheyenne Creek	Cascade Ave	2	5.95	12	24	Concrete	Bridge	446	5948.4	5947.1		5946	5946		5957.7	5950.67	142.87	0.600	Bridge	Collector	-7.03	5958.03	No	Bridge	5952.35	Bridge	3.68	No	No		
St. Elmo Ave	3296	Cheyenne Creek	St. Elmo St	1	6	17	17	Concrete	Bridge	446	5933.7			5933.4			5941.2	5937.04	102.04	0.557	Culvert	Collector	-4.16	5941.53	No	1.5	5942.7	No		Yes	Yes	Overtops	
Ramona Ave	2605	Cheyenne Creek	Ramona Ave	1	7	30	30	Concrete	Bridge	446	5923.5			5922.8			5933.7	5926	210.68	0.357	Bridge	Collector	-7.7	5934.03	No	Bridge	5928.5	Bridge	4.5	No	No		
Navajo St	1818	Cheyenne Creek	Navajo St	2	8.25	19.6	39.2	Concrete	Bridge	446	5911.1	5911.1		5910.6	5910.5		5923.3	5914.92	448.74	0.463	Bridge	Collector	-8.38	5923.63	No	Bridge	5917.35	Bridge	4.43	No	No		
Brookside St	1410	Cheyenne Creek	Brookside St	2	7	10.6	21.2	Concrete	Box	446	5907.3	5907.3		5906.8	5906.8		5916	5910.98	148.4	0.526	Bridge	Collector	-5.02	5916.33	No	Bridge	5912.3	Bridge	3.32	No	No		
Arvada St	840	Cheyenne Creek	Arvada St	1	6.46	24.535	24.535	Concrete	Bridge	446	5902.24			5901.74			5910	5905.51	181.08	0.506	Bridge	Collector	-4.49	5910.33	No	Bridge	5906.7	Bridge	3.19	No	No		
South Ramp	576	Cheyenne Creek	South Ramp	1	3.78	33.3	33.3	Concrete	Bridge	446	5900.64			5900.14			5909.2	5903.56	143.59	0.772	Bridge	Arterial	-5.64	5909.20	No	Bridge	5902.42	Bridge	0.86	Yes	Yes	Does Not Meet Freeboard Criteria	
Interstate 25	432	Cheyenne Creek	Interstate 25	1	34.46	918.98	918.98	Concrete	Bridge	446	5899.74			5898.94			5940.01	5902.95	23326.36	0.093	Bridge	Arterial	-37.06	5940.01	No	Bridge	5932.2	Bridge	31.25	No	No		
North Ramp	286	Cheyenne Creek	North Ramp	1	8.56	35	35	Concrete	Bridge	446	5898.24			5897.04			5910.5	5900.71	297.33	0.289	Bridge	Arterial	-9.79	5910.50	No	Bridge	5904.8	Bridge	6.09	No	No		
50 Year Event																																	
N. Cheyenne Canon Rd - 1	6090	N. Cheyenne	N. Cheyenne Canon	1	5.3	25	25	tone and Gro	Bridge	591	6556			6555.57			6565.5	6568.08	42.03	2.2792	Bridge	Collector	2.58	6565.83	Yes	Bridge	6559.3	Bridge	-6.78	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria	
N. Cheyenne Canon Rd - 2	5185	N. Cheyenne	N. Cheyenne Canon	1	7.2	22	22	tone and Gro	Bridge	591	6510.38			6504.5			6519.64	6518.82	58.25	1.1917	Bridge	Collector	-0.68	6519.97	No	Bridge	6515.58	Bridge	-1.38	Yes	Yes	Does Not Meet Freeboard Criteria	
Evans Ave	18076	Cheyenne Creek	Evans Ave	1	7	28	28	Concrete	Bridge	1388	6263			6261.7			6269.76	6265.15	189.07	0.8786	Bridge	Collector	-0.61	6270.09	No	Bridge	6268	Bridge	0.85	Yes	Yes	Does Not Meet Freeboard Criteria	
Chapter House 1	16166	Cheyenne Creek	Chapter House	1	6.3	16	16	Concrete	Bridge	1388	6207			6206.5			6214.01	6215.67	135.7	1.3762	Culvert	Collector	1.66	6214.34	Yes	1.5	6216.45	No		Yes	Yes	Overtops	
Mayhurst Ave	15155	Cheyenne Creek	Mayhurst Ave	1	4.5	24.5	24.5	Concrete	Bridge	1388	6181			6180			6186.52	6187.94	100.47	1.5422	Bridge	Collector	1.42	6186.85	Yes	Bridge	6183.5	Bridge	-2.44	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria	
Stratton Ave	14468	Cheyenne Creek	Stratton Ave	1	16	8	8	Concrete	Bridge	1388	6159.5			6157.9			6164.01	6166.83	124.9	0.4581	Culvert	Collector	2.82	6164.34	Yes	1.5	6183.5	No		Yes	Yes	Overtops	
Cresta Road	12903	Cheyenne Creek	Cresta Road	2	6.4	11	22	Concrete	Bridge	1470	6119	6119		6114	6114		6126.59	6126.79	140.96	1.2172	Bridge	Collector	0.2	6126.92	No	Bridge	6123.4	Bridge	-1.39	Yes	Yes	Does Not Meet Freeboard Criteria	
Thomas Lane	10850	Cheyenne Creek	Thomas Lane	1	5.5	27	27	Concrete	Bridge	1470	6071			6070			6078.01	6077.11	148.54	1.1109	Bridge	Collector	-0.9	6078.34	No	Bridge	6074.5	Bridge	-0.61	Yes	Yes	Does Not Meet Freeboard Criteria	
Wolfe Ave	9895	Cheyenne Creek	Wolfe Ave	2	6.35	24	48	Concrete	Bridge	1470	6054.1	6053.4		6054.1	6053		6056.01	6058.08	252.01	0.7370	Bridge	Collector	2.07	6056.34	Yes	Bridge	6058.45	Bridge	2.37	No	Yes	ERROR	
Alsace Way	7107	Cheyenne Creek	Alsace Way	1	5.3	32	32	Concrete	Bridge	1526	5997.6			5996.6			6004.01	6003.73	168.61	1.1566	Bridge	Collector	-0.28	6004.34	No	Bridge	6000.9	Bridge	-0.83	Yes	Yes	Does Not Meet Freeboard Criteria	
Manor Lane	6022	Cheyenne Creek	Manor Lane	2	6.15	13	26	CMP	Arch	1526	5974.5	5974.5		5974.2	5976.3		5985.7	5982.6	146.41	1.3171	Bridge	Collector	-3.1	5986.03	No	Bridge	5978.65	Bridge	-1.95	Yes	Yes	Does Not Meet Freeboard Criteria	
Woodburn St	4723	Cheyenne Creek	Woodburn St	1	5.7	17.6	17.6	Concrete	Bridge	1526	5953.8			5953.5			5961.61	5962.93	100.38	1.6018	Bridge	Collector	1.32	5961.94	Yes	Bridge	5957.5	Bridge	-3.43	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria	
Cheyenne Road	4256	Cheyenne Creek	Cheyenne Road	1	5.4	22	22	Concrete	Bridge	1526	5948.8			5948.5			5956.01	5957.45	118.86	1.6019	Bridge	Collector	1.44	5956.34	Yes	Bridge	5952.2	Bridge	-3.25	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria	
Cascade Ave	4072	Cheyenne Creek	Cascade Ave	2	5.95	12	24	Concrete	Bridge	1526	5948.4	5947.1		5946	5946		5957.7	5952.99	142.87	0.9899	Bridge	Collector	-4.71	5958.03	No	Bridge	5952.35	Bridge	1.36	Yes	Yes	Does Not Meet Freeboard Criteria	
St. Elmo Ave	3296	Cheyenne Creek	St. Elmo St	1	6	17	17	Concrete	Bridge	1526	5933.7			5933.4			5941.2	5942.32	102.04	1.4367	Bridge	Collector	1.12	5941.53	Yes	Bridge	5937.7	Bridge	-2.62	Yes	Yes	Overtops, Does Not Meet Freeboard Criteria	
Ramona Ave	2605	Cheyenne Creek	Ramona Ave	1	7	30	30	Concrete	Bridge	1526	5923.5			5922.8			5933.7	5929.35	210.68	0.8357	Bridge	Collector	-4.35	5934.03	No	Bridge	5928.5	Bridge	1.15	Yes	Yes	Does Not Meet Freeboard Criteria	
Navajo St	1818	Cheyenne Creek	Navajo St	2	8.25	19.6	39.2	Concrete	Bridge	1526	5911.1	5911.1		5910.6	5910.5		5923.3	5918.41	448.74	0.8861	Bridge	Collector	-4.89	5923.63	No	Bridge	5917.35	Bridge	0.94	Yes	Yes	Does Not Meet Freeboard Criteria	
Brookside St	1410	Cheyenne Creek	Brookside St	2	7	10.6	21.2	Concrete	Box	1526	5907.3	5907.3		5906.8	5906.8		5916	5914.08	148.4	0.9686	Bridge	Collector	-0.12	5916.33	No	Bridge	5912.3	Bridge	0.22	Yes	Yes	Does Not Meet Freeboard Criteria	
Arvada St	840	Cheyenne Creek	Arvada St	1	6.46	24.535	24.535	Concrete	Bridge	1526	5902.24			5901.74			5910	5909.88	181.08	1.1827	Bridge	Collector	-0.12	5910.33	No	Bridge	5906.7	Bridge	-1.18	Yes	Yes	Does Not Meet Freeboard Criteria	
South Ramp	576	Cheyenne Creek	South Ramp	1	3.78	33.3	33.3	Concrete	Bridge	1526	5900.64			5900.14			5909.2	5906.63	143.59	1.5847	Bridge	Arterial	-2.57	5909.20	No	Bridge	5902.42	Bridge	-2.21	Yes	Yes	Does Not Meet Freeboard Criteria	
Interstate 25	432	Cheyenne Creek	Interstate 25	1	34.46	918.98	918.98	Concrete	Bridge	1526	5899.74			5898.94			5940.01	5905.74	23326.36	0.1741	Bridge	Arterial	-34.27	5940.01	No	Bridge	5932.2	Bridge	28.46	No	No		
North Ramp	286	Cheyenne Creek	North Ramp	1	8.56	35	35	Concrete	Bridge	1526	5898.24			5897.04			5910.5																

Cheyenne Creek Planning Study																																						
Existing Drainageway Crossing Deficiency Analysis																																						
Crossing	River Station	Tributary	Location	Crossing Size ¹			Material ¹	Shape ¹	Q100 ² (cfs)	Upstream Invert ³ (ft)			Downstream Invert ³ (ft)			Tw El. (ft) ⁵	Minimum Weir Elev. (ft) ⁵	Calculated HW (ft) ⁴	Cross-Section Area (SF)	Calculated HWD	Hydraulic Classification ⁵	Roadway Classification	Overtopping Depth at Road (ft)	Max Allowable Overtopping Elev. (ft) ⁶	Fail Overtopping ⁶	Allowable Hw/D ⁶	Max Allowable Hw Elev (ft) ⁶	Fail Hw/D ⁶	Bridge Freeboard (ft) ⁶	Fail Bridge Freeboard ⁶	FAIL?	Reason						
				# of Cells	Diameter (ft)	Rise (ft)				Span	Total Span	Cell 1	Cell 2	Cell 3	Cell 1																		Cell 2	Cell 3				
100 Year Event																																						
N. Cheyenne Canon Rd - 1	6090	N. Cheyenne	N. Cheyenne Canon	1		5.3	25	25	tone and Gro	Bridge	854	6556			6555.57																							
N. Cheyenne Canon Rd - 2	5185	N. Cheyenne	N. Cheyenne Canon	1		7.2	22	22	tone and Gro	Bridge	854	6510.38			6504.5																							
Evans Ave	18076	Cheyenne Creek	Evans Ave	1		7	28	28	Concrete	Bridge	2051	6263			6261.7																							
Chapter House 1	16166	Cheyenne Creek	Chapter House	1		6.3	16	16	Concrete	Bridge	2051	6207			6206.5																							
Mayhurst Ave	15155	Cheyenne Creek	Mayhurst Ave	1		4.5	24.5	24.5	Concrete	Bridge	2051	6181			6180																							
Stratton Ave	14468	Cheyenne Creek	Stratton Ave	1		16	8	8	Concrete	Bridge	2051	6159.5			6157.9																							
Cresta Road	12903	Cheyenne Creek	Cresta Road	2		6.4	11	22	Concrete	Bridge	2175	6119	6119		6114	6114																						
Thomas Lane	10850	Cheyenne Creek	Thomas Lane	1		5.5	27	27	Concrete	Bridge	2175	6071			6070																							
Wolfe Ave	9895	Cheyenne Creek	Wolfe Ave	2		6.35	24	48	Concrete	Bridge	2175	6054.1	6053.4		6054.1	6053																						
Alsace Way	7107	Cheyenne Creek	Alsace Way	1		5.3	32	32	Concrete	Bridge	2259	5997.6			5996.6																							
Manor Lane	6022	Cheyenne Creek	Manor Lane	2		6.15	13	26	CMP	Arch	2259	5974.5	5974.5		5974.2	5976.3																						
Woodburn St	4723	Cheyenne Creek	Woodburn St	1		5.7	17.6	17.6	Concrete	Bridge	2259	5953.8			5953.5																							
Cheyenne Road	4256	Cheyenne Creek	Cheyenne Road	1		5.4	22	22	Concrete	Bridge	2259	5948.8			5948.5																							
Cascade Ave	4072	Cheyenne Creek	Cascade Ave	2		5.95	12	24	Concrete	Bridge	2259	5948.4	5947.1		5946	5946																						
St. Elmo Ave	3296	Cheyenne Creek	St. Elmo St	1		6	17	17	Concrete	Bridge	2259	5933.7			5933.4																							
Ramona Ave	2605	Cheyenne Creek	Ramona Ave	1		7	30	30	Concrete	Bridge	2259	5923.5			5922.8																							
Navajo St	1818	Cheyenne Creek	Navajo St	2		8.25	19.6	39.2	Concrete	Bridge	2259	5911.1	5911.1		5910.6	5910.5																						
Brookside St	1410	Cheyenne Creek	Brookside St	2		7	10.6	21.2	Concrete	Box	2259	5907.3	5907.3		5906.8	5906.8																						
Arvada St	840	Cheyenne Creek	Arvada St	1		6.46	24.535	24.535	Concrete	Bridge	2259	5907.24			5907.14																							
South Ramp	576	Cheyenne Creek	South Ramp	1		3.78	33.3	33.3	Concrete	Bridge	2259	5900.64			5900.14																							
Interstate 25	432	Cheyenne Creek	Interstate 25	1		34.46	918.98	918.98	Concrete	Bridge	2259	5899.74			5898.94																							
North Ramp	286	Cheyenne Creek	North Ramp	1		8.56	35	35	Concrete	Bridge	2259	5898.24			5897.04																							

Notes:

¹ Based on field measurements

² From HEC-RAS

³ Based on topography and field measurements

⁴ Calculated by HEC-RAS

⁵ Based on the criteria listed on Page 6-10 in the old City DCM. Opening area of less than 200ft², span less than 20ft, and capacity less than 1,500 cfs

⁶ Based on the criteria in Chapter 11 of the revised COS DCM. Residential/Industrial/Collector roads all have the same criteria.

Recommended Culvert Sizing

Upper Fountain Creek Planning Study

Proposed Structure Sizing

Crossing	River Station	Tributary	Location	Proposed Crossing Size ¹					Material ¹	Shape ¹	Flow (cfs) ²
				# of Cells	Diameter (ft)	Rise (ft)	Span (ft)	Length (ft)			
Sizing for 5 Year Event											
FC 03	87452	Fountain Creek	Crystola Canyon Rd	-	-	-	-	40	Concrete	Box	124.1
FC 04	87246	Fountain Creek	Creek Side Dr.	-	-	-	-	50	CMP	Circular	124.1
FC 09	76601	Fountain Creek	El Paso Ave	-	-	-	-	-	-	-	199.9
FC 12	67310	Fountain Creek	6B Chipita Park Rd	-	-	-	-	51.5	Concrete	Box	339.8
FC 13	56352	Fountain Creek	6C Spring Street	1	-	12	8	36.5	Concrete	Box	631
FC 14	55270	Fountain Creek	Fountain Ave	-	-	-	-	-	-	-	631
FC 20	34389	Fountain Creek	Serpentine Drive	-	-	-	-	-	-	-	1316.6
FC 26	31443	Fountain Creek	Park Ave	-	-	9.5	18	-	Concrete	Bridge	1316.6
FC 33	30063	Fountain Creek	Canon Ave	-	-	9	20	-	Concrete	Bridge	1476.3
FC 35	29769	Fountain Creek	Lafayette Road	-	-	11	14	-	Concrete	Bridge	1476.3
FC 38		Fountain Creek	El Paso Ave	-	-	9	30	-	-	-	
FC 39	27859	Fountain Creek	Old Man Trail	-	-	7	16.5	-	Concrete	Bridge	1476.3
FC 41	25727	Fountain Creek	Mayfair Ave	-	-	8.5	23.5	-	Concrete	Bridge	2113.7
FC 48	23682	Fountain Creek	Garden of the Gods Place	-	-	23.5	97	-	Concrete	Bridge	2113.7
FC 50	21526	Fountain Creek	Berkers Ln	-	-	13	20.5	-	Concrete	Bridge	2719.6
FC 51	19477	Fountain Creek	Colorado Ave	-	-	-	-	-	-	-	2719.6
FC 54	18621	Fountain Creek	Ridge Rd	-	-	10	63	-	Concrete	Bridge	2719.6
FC 55	15524	Fountain Creek	S 31st Street	-	-	10.5	112.5	-	Concrete	Bridge	2719.6
FC 58	9563	Fountain Creek	21st Street	-	-	-	-	-	-	-	3829.4
FC 60	2204	Fountain Creek	8th Street	-	-	11.5	61	-	-	-	4077.1
Sizing for 100 Year Event											
FC 03	87452	Fountain Creek	Crystola Canyon Rd	-	-	-	-	40	Concrete	Box	656.3
FC 04	87246	Fountain Creek	Creek Side Dr.	3	-	4	6	50	Concrete	Box	656.3
FC 09	76601	Fountain Creek	El Paso Ave	-	-	8	24	-	Concrete	Bridge	1298.1
FC 12	67310	Fountain Creek	6B Chipita Park Rd	3	-	8	10	51.5	Concrete	Box	2542.9
FC 13	56352	Fountain Creek	6C Spring Street	13	-	8	12	36.5	Concrete	Box	3060.5
FC 14	55270	Fountain Creek	Fountain Ave	-	-	-	-	-	-	-	3060.5
FC 20	34389	Fountain Creek	Serpentine Drive	-	-	15	35	-	Concrete	Bridge	6895.2
FC 26	31443	Fountain Creek	Park Ave	100-yr Sizing not feasible					-	-	6895.2
FC 33	30063	Fountain Creek	Canon Ave	100-yr Sizing not feasible					-	-	8277
FC 35	29769	Fountain Creek	Lafayette Road	100-yr Sizing not feasible					-	-	8277
FC 38		Fountain Creek	El Paso Ave	100-yr Sizing not feasible					-	-	
FC 39	27859	Fountain Creek	Old Man Trail	100-yr Sizing not feasible					-	-	8277
FC 41	25727	Fountain Creek	Mayfair Ave	100-yr Sizing not feasible					-	-	10887.7
FC 48	23682	Fountain Creek	Garden of the Gods Place	100-yr Sizing not feasible					-	-	10887.7
FC 50	21526	Fountain Creek	Berkers Ln	Backwater Analysis					-	-	14484.2
FC 51	19477	Fountain Creek	Colorado Ave	Backwater Analysis					-	-	14484.2
FC 54	18621	Fountain Creek	Ridge Rd	-	-	13	95	-	Concrete	Bridge	14484.2
FC 55	15524	Fountain Creek	S 31st Street	Backwater Analysis					-	-	14484.2
FC 58	9563	Fountain Creek	21st Street	-	-	15	112	-	Concrete	Bridge	20082.1
FC 60	2204	Fountain Creek	8th Street	Backwater Analysis					-	-	21459.5

Notes:

¹ Based on field measurements

² From HEC-RAS

Cheyenne Creek Planning Study

Proposed Sizing

River Station	Tributary	Location	Crossing Size ¹		Q10 ² (cfs)	Notes
			Rise (ft)	Span (ft)		
Sizing for a 10 Year Event						
6090	N. Cheyenne Creek		7	25	188	Increase bridge clearance 2 feet.
5185	N. Cheyenne Creek		8	23	188	Make upstream entrance square, raise low chord 1 foot.
18076	Cheyenne Creek	Evans Ave	-	28	410	-
15155	Cheyenne Creek	Mayhurst Ave	7	24.5	410	Lower creek invert 1'
14468	Cheyenne Creek	Stratton Ave	-	8	410	Passes 10-yr through culvert
12903	Cheyenne Creek	Cresta Road	-	11	431	Passes 10-yr through culvert
7107	Cheyenne Creek	Alsace Way	-	32	446	Passes 10-yr through culvert
6022	Cheyenne Creek	Manor Lane	-	13	446	Passes 10-yr through culvert
4723	Cheyenne Creek	Woodburn St	-	18	446	Passes 10-yr through culvert
4256	Cheyenne Creek	Cheyenne Road	6.4	22	446	Lower creek invert 1'
1410	Cheyenne Creek	Brookside St	-	11	446	Passes 10-yr through culvert
840	Cheyenne Creek	Arvada St	-	25	446	Passes 10-yr through culvert
576	Cheyenne Creek	South Ramp	-	33.5	446	Passes 10-yr through culvert
Sizing for a 50 Year Event						
6090	N. Cheyenne Creek		8.5	35	591	Raise Road 1.5' and increase width 10 feet
5185	N. Cheyenne Creek		8	23	591	Make upstream entrance square, raise low chord 1 foot.
18076	Cheyenne Creek	Evans Ave	-	-	1388	-
15155	Cheyenne Creek	Mayhurst Ave	5.5	44.5	1388	Additional 20' Width and 1' depth and no Ineffective Flow Areas. Raise road 1.5'
14468	Cheyenne Creek	Stratton Ave	8	35	1388	Raise road downslope 3' Increase Bridge size
12903	Cheyenne Creek	Cresta Road	6	42	1470	Increase width of culvert and grade around
7107	Cheyenne Creek	Alsace Way	-	-	1526	Passes 50-yr flow
6022	Cheyenne Creek	Manor Lane	8.5	27	1526	been re-built since model. Estimated new bridge size
4723	Cheyenne Creek	Woodburn St	9	44	1526	Increased Bridge opening substantially and it still fails 50. Backwater Issues?
4256	Cheyenne Creek	Cheyenne Road	6	37	1526	Raise road 1 foot on down slope side. Increase Box size
1410	Cheyenne Creek	Brookside St	8	23.5	1526	Raise road 1-2', replace culverts with pierless bridge
840	Cheyenne Creek	Arvada St	-	-	1526	Backwater Analysis
576	Cheyenne Creek	South Ramp	-	-	1526	Backwater Analysis

Notes:

¹ Based on field measurements

² From HEC-RAS

El Paso County Bridge and Culvert Criteria

TABLE 6-4

ALLOWABLE CULVERT OVERTOPPINGS*

<u>Drainage Classification</u>	<u>Initial Drainage System Maximum Depth</u>	<u>Major Drainage System Maximum Depth</u>
Types A & B (Local/Residential and Collector)	Headwater Depth Ratio is Less Than Pipe Height	12 inches of depth at the gutter flow line
Types A & B (Local/Residential and collector with	Headwater Depth Ratio is Less Than Pipe Height	6 inches of depth at the street
Types C & D (Arterial, Highway or Freeway with or without Roadside Ditch)**	Headwater Depth Ratio is Less Than Pipe Height	No shoulder encroachment

* A culvert is defined as any buried structure with both a clear opening less than 200 square feet, and span less than 20 feet and capacity less than 1500 cfs.

**On state highways, CDOH criteria shall be utilized.

TABLE 6-5

ALLOWABLE CULVERT HEADWATER DEPTHS FOR DESIGN FLOWS

<u>Clear Opening (Ft²)</u>	<u>Hw/D</u>
200 or Greater	See allowable bridge clearance
200 to 50	500 - Area
50 or Less	300
	Greater than 1.5 If approved by City/County.

The Engineer shall consider various factors in determining permissible headwater depths such as backwater effects, possible flooding, embankment erosion, overtopping and public safety.

6.4.2 Allowable Clearance for Bridges and Other Major Drainageway Crossings

All structures classified as bridge shall not be overtopped. For clear span bridges, the minimum clearance between the bridge low chord and the water surface profile shall be a minimum of 2 feet for the 100-year design flow. For box culverts classified as bridges or culverts at major drainageways (100-year flows greater than 1500 cfs) adequate freeboard shall be provided for the passage of debris and should be no less than 2 feet.

At the option of the City/County the designer may design culverts as storm drains with a 10-year design frequency. Under this option the proposed culvert shall be placed on line and grade to permit connection to the future storm drain. The major storm impacts shall be investigated for both the culvert configuration and the proposed storm sewer configuration. The major storm analysis of the storm drain shall include both upstream and downstream reaches sufficient to show that provisions for the major storm can be made when the storm drain is constructed.

6.4.3 Culvert Discharge Velocities

The velocity of discharge from culverts should be limited to those values presented in Table 10-3 and 10-4. Consideration must be given to the effect of high velocities, eddies or other turbulence on the natural channel, downstream properties and roadway embankments, as necessary.

Discharge velocities which exceed this criteria must have special energy dissipator structures at their outlets as shown in Chapter 10.

It is recommended that a minimum velocity of 2.5 feet per second at the design flow be maintained in all drainage structures to prevent siltation. Where doubt exists concerning silt or scour, protection commensurate with the value of the structure and surrounding property shall be installed to ensure that damage to or failure of the structure will not occur.

6.5 Open Channel Design Criteria

6.5.1 Channel Hydraulics

Manning's equation shall be used to approximate flow relationships in open channels.

$$\text{Mannings Equation} \quad Q = \frac{1.486}{n} R^{2/3} S^{1/2} A$$

Q = Flow (cfs)

R = Hydraulic Radius

S = Slope (ft_v/ft)

A = Area (ft²)

n = Roughness Coefficient (See Table 10-1 and 10-2)

6.5.2 Channel Velocity

Concrete, riprap, or soil cement linings as approved by the City/County shall be used where channel bottom velocities exceed 6.0 ft/sec. Grass lined channels shall not be used where velocity exceeds permissible velocities in Table 10-4 or the Froude number is greater than 0.9 for the 100-year storm.

Colorado Springs Bridge and Culvert Criteria

requirements for trail width, vertical clearance, surfacing, and lighting and safety improvements shall be coordinated with the Parks and Trails personnel. The low-flow channel adjacent to the trail bench shall pass the minor storm event or as much flow as practicable without inundating the trail, considering the duration of the flooding, inconvenience to the public, and available alternate routes. The low-flow channel adjacent to the trail shall convey flow at least equal to the capacity of the upstream low-flow channel when one is present. Connections of the trail to the roadway grade must be considered.

2.5 Utility Coordination

Utilities often run parallel to roadways and cross culverts or are located near culvert inlets and outlets. Advance coordination with the appropriate utility representatives is critical to avoid conflicts, provide adequate access, and protect them from damage.

2.6 Channel Stability

Drainage channels crossed by culverts and bridges must be stable for these structures to function as intended and remain structurally sound. The stability of the adjacent channel must be evaluated and addressed so that culverts and bridges are not damaged by channel degradation, sedimentation, erosion or channel migration. Guidance for stable channel design is provided in Chapter 12, Open Channels.

3.0 Culvert and Bridge Sizing

The sizing of a culvert depends on the allowable street overtopping for each designation (i.e., residential, industrial, collector, arterial, or highway), allowable headwater depth and freeboard requirements. All new bridges must be designed to safely handle major storm flows with the required freeboard. The minimum design standards included herein may need to be modified where other factors are considered more important. For example, the designer shall consider flooding of adjacent structures or private property, excessive channel velocities, availability of alternate routes, and other factors pertinent to a specific site. Lesser design criteria for rural areas or low-volume roadways may be approved on a case-by-case basis.

3.1 Allowable Street Overtopping

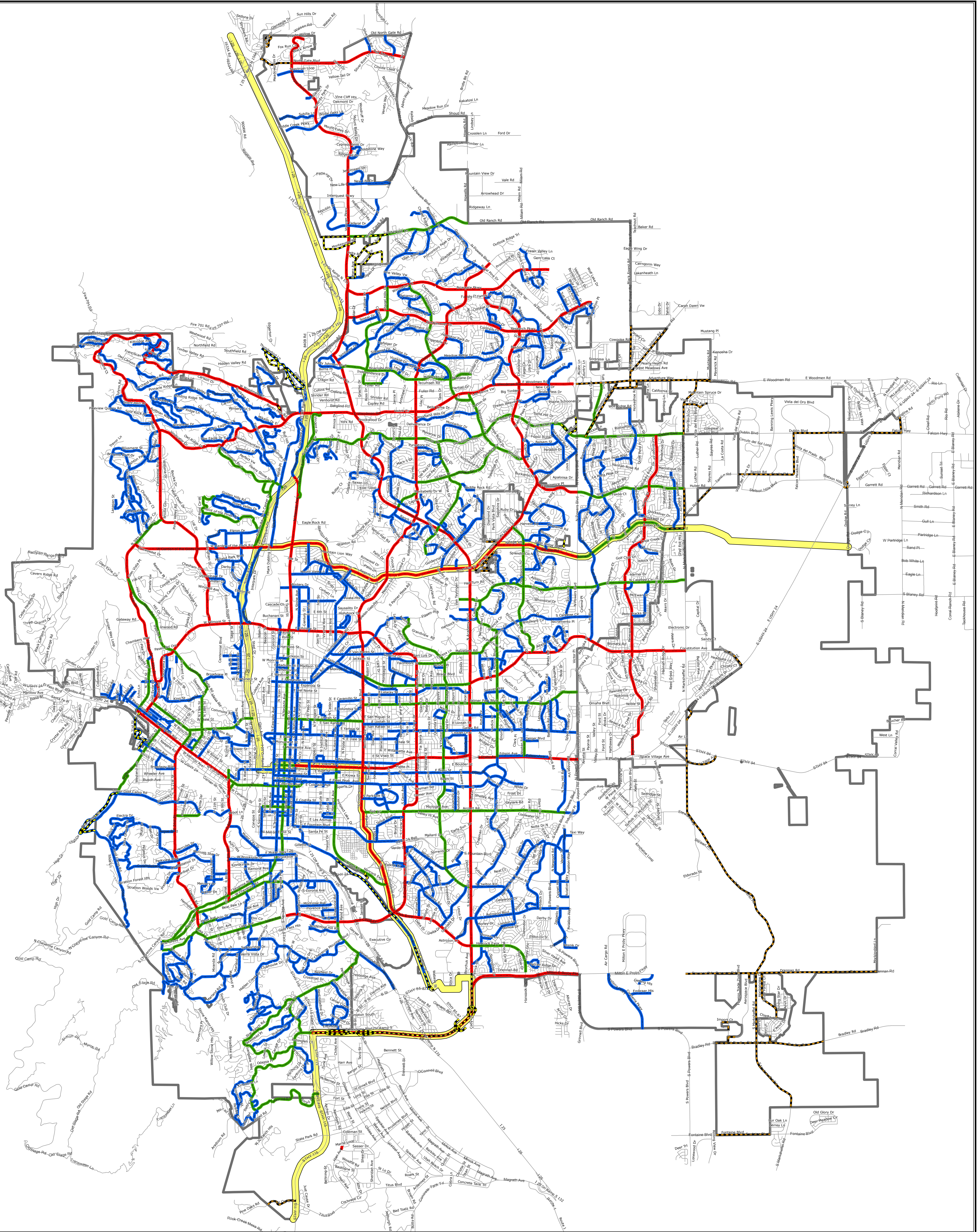
Allowable street overtopping for the various street designations is identified in Table 11-1.

Table 11-1. Allowable Street Overtopping at Culverts

Roadway Designation	Minor Storm	Major Storm
Residential, Industrial and Collector	No overtopping allowed	Less than 12 inches in depth at gutter flowline or 4 inches in depth at crown ¹
Arterial	No overtopping allowed	No overtopping allowed
Freeway/Expressway	No overtopping allowed	No overtopping allowed

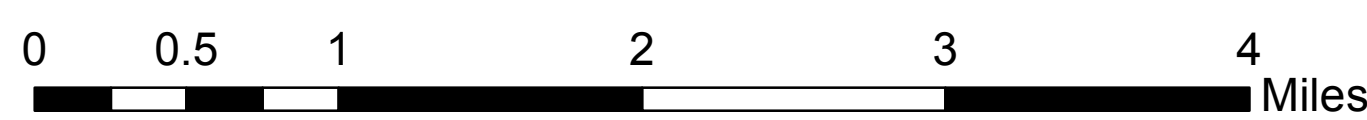
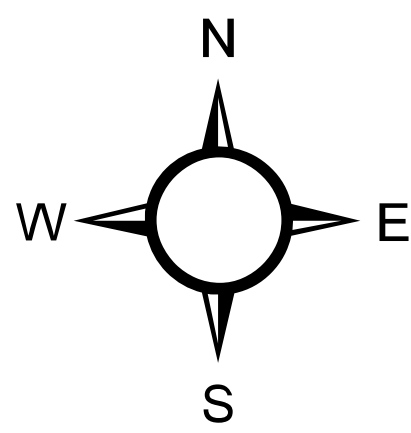
¹ See Street Drainage Chapter, for further discussion regarding allowable flow depth in the street based on roadway designation.

Critical Access Routes



2014-2015 Snow Routes

- Snow Routes**
- IceSlicer
 - Primary
 - Secondary
 - CITY Plows for EL Paso County
 - El Paso County Plows for CITY
 - Roadway
 - City Boundary
 - Area Boundary



CITY OF COLORADO SPRINGS

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PRIORITY ONE ROADS

Akers Dr
Alturas Dr
Antelope Dr
Aries Dr
Ayer Rd
B St
Baptist Rd
Baptist Rd W
Barnes Rd
Beacon Lite Rd
Becky Dr
Black Forest Rd
Blaney Rd E
Blue Rd
Boone Rd
Bradley Rd
Bradshaw Rd
Burgess Rd
Calhan Hwy
Calhan Hwy N
Calhan Hwy S
Chipita Park Rd
Chipita Park Rd (Ramp)
Constitution Ave
Corona Rd
County Line Rd
Curtis Rd
Davenport Rd
Eastonville Rd
Elbert Rd
Ellicott Hwy
Ellicott Rd E
Enoch Rd
Falcon Hwy
Fontaine Blvd
Ford St
Fossinger Rd
Fountain Ave
Fountain Mesa Rd
Furrow Rd
Galley Rd E
Garrett Rd
Goodson Rd
Grinnell Blvd
Hagerman Ave
Hancock Exwy
Handle Rd
Hannah Ridge Dr

Hanover Rd
Harrisville Rd
Hathaway Dr
Herring Rd
Higby Rd
Hodgen Rd
Hodgen Rd W
Huber Rd
Indi Dr
Irwin Ln
Janitell Rd
Jones Rd
Judge Orr Rd
Link Rd
Log Rd
Londonderry Dr
Main St
Marksheffel Rd N
Marksheffel Rd S
Mc Kissick Rd
Mc Laughlin Rd
Meadowbrook Pkwy
Meridian Ranch Blvd
Meridian Rd
Meridian Rd N
Milam Rd
Morgan Rd
Murphy Rd
Murr Rd
Myers Rd
North Gate Blvd
Old Meridian Rd
Old North Gate Rd
Old Pueblo Rd
Old Ranch Rd
Palmer Park Blvd
Peterson Rd
Peyton Hwy
Pyramid Mountain Rd
Rainbow Bridge Dr
Rampart Terrace Rd
Raygor Rd
Remington Rd
Rex Rd
Roller Coaster Rd
Rush Rd
Scott Rd W
Severy Ave
Shoup Rd

Slocum Rd
Space Village Ave
Squirrel Creek Rd
Stapleton Dr
State Hwy 105
Steeplechase Dr
Stella Dr
Swan Rd
Sweet Rd
Swingline Rd
Tamlin Rd
Tari Dr
Templeton Gap Rd
Topeka Ave
Topeka Ave N
Towner Ave
US Hwy 24 Frontage Rd
Vollmer Rd
Wakonda Way
Walker Rd
Winchester Rd
Woodmen Rd E
Yoder Rd
Yoder St (Calhan)

PRIORITY TWO ROADS

Aerospace Blvd
Antelope Ridge Dr
Anvil Dr
Archers Dr
Arnold Ave
Arrowwood Dr
Athletic Ave
Augusta Dr
Baptist Rd W
Birch Dr
Blaney Rd
Blueberry Hills Rd
Boca Raton Hts
Bowstring Rd
Bramble Ln
Bright Wing Trl
Caballero Ave
Capital Dr
Carefree Cir N
Caribou Dr
Caribou Dr W
Chamberlin South
Charro Dr
Charter Pines Dr
Chieftan Dr
Chipita Park Rd
Cimarron Rd
Cody Dr
Colorado Tech Dr
Coventry Dr
Crawford Ave
Cresta Loma Cir E
Crestridge Ave
Dartmouth St N
Dean Dr
Deer Creek Rd
Defoe Ave
Defoe Pl
Del Rio Rd
Doewood Dr
Doolittle Rd
Drennan Rd
Drury Ln
Eastonville Lp
Eastonville Rd
Fairchild Ave
Fairplay Dr
Fairplay Dr (Tract K)

Fairplay Dr (Tract L)
Fordham St
Foreign Trade Zone Blvd
Fountain Ave
Fountain Rd
Fox Rd
Front St (Peyton)
Glen Shadows Dr
Gleneagle Dr
Grama Ridge
Grand Valley Dr
Grinnell St
Hackberry Dr
Hallam Ave
Halleluiah Trl
Happy Landing Dr
Hartford St
Hartford St Ramp
Harvard St
Hathaway Dr
Hay Creek Rd
Horizonview Dr
Horseshoe Rd
Import Ct
Indian Summer Ln
Jack Boot Rd
Jasper Dr
Jersey Ln
Jessie Dr
Kings Deer Pt
Kings Deer Pt E
Knollwood Blvd
Knollwood Dr
Lake Woodmoor Dr
Lariat Cir
Latigo Blvd
Leta Dr
Levi Ln
Lincoln Green Ln
Lockridge Dr
Londonderry Dr
Lone Scout Lookout
Longmeadow Ln
Loomis Ave
Main St (Peyton)
Manitou St (Peyton)
Manzana Dr
Mariposa Rd
Marriott Rd

Martingale Rd
Maxwell St
Mc Laughlin Rd
Medicine Bow Ave
Mesa Ridge Pkwy
Mescalero Dr
Metropolitan St
Modjeska St
Monument Hill Rd
Monument Lake Rd N
Moosa Rd
Mount Herman Rd
Mountain Rd
New London Rd
Norman Dr
Northcliff Rd
Old Antlers Way
Old Glory Dr
Omaha Blvd
Paona Rd
Peaceful Valley Rd
Peak View Blvd
Peyton Hwy
Picabo Rd
Piros Dr
Poa Annua St
Preminger Dr
Pueblo St (Peyton)
Railroad St (Peyton)
Rancho Colorado Blvd
Red Rock Ranch Dr
Red Rocks Dr
Rio Ln
Rio Rd
Riverwalk Pkwy
Roaming Dr
Royal Troon Dr
Saddlehorn Trl
Sand Trap Dr
Sandstone Dr
Scottswood Dr
Security Blvd
Security Cir
Severy Ave
Shadowood Dr
Sherwood Glen N
Sherwood Glen S
Sierra Way
Silver Horn Ln

Sneffels St
Soaring Wing Dr
Spruce Rd
St Andrews Dr
Stagecoach Rd
Stapleton Dr
Stella Dr
Stepler Rd
Stirrup Trl
Struthers Rd
Sumac Dr
Sun Hills Dr
Sunburst Dr
Tam O Shanter Way
Tamlin Rd
Teachout Rd
Timpa Rd
Tom Boy Way
Top O the Moor Dr E
Top O the Moor Dr W
Twisted Pine Dr
Ute Rd
Vista Cerro Ave
Vista Del Pico Blvd
Wageman Dr
Wakonda Way
Wavy Oak Dr
Wayfarer Dr
White Fawn Dr
Widefield Blvd
Widefield Dr
Willis Dr
Winding Hills Rd
Winding Meadow Way
Wing Tip Rd
Winnebago Rd
Woodhaven Dr
Woodlake Rd
Woodmen Hills Dr
Woodmoor Dr
Yucatan Dr

PRIORITY_3_ROADS

ROAD NAME

Abert Way
Abilene Dr
Abo Ln
Academy Blvd S (Frontage Rd)
Academy Cir
Accipiter Dr
Acoma Dr
Acorn Way
Addax Ct
Adrienne Dr
Air Garden Ln
Air Garden Ln (Cds)
Air Ln
Airman Ln
Ajo Way
Alan A Dale
Albatross Dr
Albion St
Alcott Ct
All Sky Dr
Allegiance Dr
Allendale Ct
Allendale Dr
Allens Park Dr
Allgood Dr
Allyn Way
Almont Ave
Alpenglow Dr
Alton Dr
Alturas Cir
Alturas Dr
Ambergate Ct
Amble Ct
Ambleside Dr
Amelia St
Amerind Dr
Amherst St
Amherst St N
Amo Rd
Anacostia Dr
Andover St
Anemone Hill Rd
Angeles Rd
Angelina Dr
Angelina Dr (N Cds)
Angelina Dr (S Cds)
Angelina Dr (W Cds)
Antelope Meadows Cir
Antelope Meadows Cir (cds)
Antler Creek Dr
Anvil Dr

PRIORITY_3_ROADS

Anvil Dr E
Appletree Lp
Aqualane Dr
Arapahoe Dr
Arctic Pl
Arvol Cir
Asbee St
Ascot Rd
Ashland Pl
Aspen Dr
Aspen Grove Way
Aspenwood Dr
Athens Dr
Athletic Ave
Atoka Dr
Autumn Way
Avocet Loop
Axtell South
Aztec Dr
Backwoods Ct
Bacone Ter
Bakers Farm Rd
Bald Mountain Ct
Bali Ct
Ballybunion Rd
Baltusrol Ct
Banberry Dr
Banberry Dr (cde)
Bankhurst Ct
Bardsley Pl
Barkley Rd
Barnstormers Ave
Barnstormers Ave (cde)
Barnum Dr
Barquero Ct
Barrett Rd
Base Camp Rd
Bashley Rd
Baskerville Way
Battle Mountain Rd
Bear Gulch St
Bear Trap Way
Bella Vista Ln
Bellevue St
Belmont St N
Ben Tirran Ct
Benchley Dr
Bend in the Trail Rd
Bent Grass Pl
Bent Nail Way
Bent Oak Ln
Bent Twig Ln

PRIORITY_3_ROADS

Bermuda Dunes Way
Berrey Ln
Bethpage Rd
Beverly St
Bickley Cir
Bickley St
Bickley St (Cds)
Big Cypress Dr
Big Prairie Ct
Bighorn Canyon Dr
Binger Dr
Birchwood Way
Biscayne Dr
Bismark Rd
Bison Dr
Black Elk Dr
Black Forest Rd
Blazer Ct
Blesbok Way
Blue Clover Ln
Blue Fescue Ct
Blue Garter Way
Blue Gill Dr
Blue Heron Spring Ln
Blue River Way
Blue Spruce Ln
Blue Wings Way
Bluegrass Pl
Bluff Rd
Bobby Ct
Bohleen Rd
Boldmere Ct
Bonifay Lp
Borden Dr
Bovary Ct
Bowstring Cds
Box Oak Way
Bradley Cir
Bradley Ln
Bradley St
Braemar Ln
Brandon Dr
Brant Rd
Brant Rd (Cds)
Bray Ct
Breaking Dawn St
Breton Pl
Briargate Pkwy
Briarhaven Ct
Bridal Vail Way
Bridgehead Dr
Bridle Bit Rd

PRIORITY_3_ROADS

Bridle Creek Ct
Briggs Pl
Brinn Ct
Brisk Breeze Ct
Brittinger Way
Brockdell Dr
Brockenbury Ct
Brockton Ln
Broken Fence Way
Broken Saber Ln
Broman Ct
Bronco Gulch Ct
Brook Forest Dr
Brookings Dr
Brookline Ct
Brule Rd
Brundidge Ct
Buckskin Way
Buckwood Ln
Bucolo Ave
Bucolo Ave (cde)
Buffalo Creek Trl
Buffalo Plains Ct
Buffalo Prairie Ct
Buffalo River Trl
Buffalo Springs Ct
Bullet Rd
Bullet Rd (cde)
Bur Oak Ln
Burgundy Ct
Burnham St
Burning Oak Way
Burnt Leaf Way
Burroback Ave
Burroback Ct
Buschborn Rd
Byron Pl
Caballero Ave (Cde)
Cabin Hill Ln
Cabin Hill Ln (cde)
Cabin Ridge Dr
Cable Ln
Cactus Dr
Cairngorm Way
Cala Rojo Dr
Calgary Rd
Calistoga Dr
Calle Corvo
Calle del Fuente
Calley Ct
Calumet Rd
Camargo Rd

PRIORITY_3_ROADS

Cambridge Ave
Cambridge Ct
Campstool Dr
Campstool Dr (Cds)
Camrose Ct
Canada Dr
Candelabra Dr
Candelabra Dr (Cds)
Candlewood Ct
Canterbury Dr
Cantrell Dr
Cantrell Dr (Cds)
Capadaro Ct
Capella Dr
Capital Dr
Capital Peak Way
Caprice Ct
Cardinal St
Cardinal St (Cds)
Caribou Cir
Caribou Way
Carnahan Ct
Carnia Rd
Carriage Horse Dr
Carrington Dr
Casa De Campo Rd
Casper Ct
Caspian Ct
Cassidy St
Castlecombe Ln
Cat Tail Way
Catalina Ct
Catalina Dr
Catalina Pl
Catamaran Ln
Catch Pen Rd
Catherwood Dr
Cattlemans Trl
Caverhill Dr
Cedar Breaks Dr
Cedar Edge Dr
Chadwick Dr
Chamberlin Ave
Chamberlin Ave S
Chamberlin Pl
Chamberlin South Ct
Champie Rd
Chandler Pl
Chantilly Pl
Chapel Royal Ct
Charlottesville Dr
Chasefield Ct

PRIORITY_3_ROADS

Chatfield Dr
Chautauqua Dr
Chenango Dr
Chenoa Ct
Cherokee Dr E
Cherokee Park Pl
Cherry Crossing Dr
Cherry Hills Pl
Cherry Hills Way
Cherry Stage Rd W
Cherry Vista Ct
Chesterfield Ct
Chesterfield St
Cheyenne Way
Chieftan Dr
Chimayo Dr
Chimney Smoke Dr
Chipped Arrow Way
Chippewa Ct
Chippewa Rd
Chiricahua Dr
Chiricahua Lp
Chiricahua Pl
Chisholm Trl
Chisholm Trl Cds
Christy Ct
Chromium Dr
Churchill Pl
Cianco Ln
Cielo Vista St
Cielo Vista St (Cds)
Cimarron Rd
Claiborne Rd
Classic Ct
Clavelito Ln
Clear Brook Ln
Clear Spring Ln
Clearview Dr
Clearview Frontage Rd
Clearview Lp
Cleveland Ct
Cliff Palace
Clifford Dr
Cliffrock Ct
Cliffrose Dr
Cliffrose Dr (Cds)
Cloudcross Ct
Clover Cir
Clover Cir E
Clover Cir W
Cloverleaf Rd
Cloverleaf Way

PRIORITY_3_ROADS

Coal Creek Cir
Cobalt Dr
Cobblestone Way
Coffee Rd
Coker Pl
College View Dr
Colonial Park Dr
Colorado Tech Dr
Colt Ct
Columbine Ln
Columbine Trl
Comeapart Rd
Commanche Rd
Commanchero Ct
Commanchero Dr
Conecrest Ln
Conestoga Trl N
Conestoga Trl S
Congressional Dr
Connaught Dr
Conquistador Ct
Conrad St
Cooke Dr
Cooke Ln
Cool Shadow Ct
Coolidge Ct
Copenhagen Rd
Copenhagen Rd (Cds)
Copper Dr
Copperfield Dr
Coral Ridge Dr
Corliss St
Corn Tassle Dr
Cornell St
Corning Dr
Corning Pl
Corrico Ct
Cortez Dr
Cory Pl
Costigan Dr
Cottage Grove Ct
Cottontail Dr
Cottonwood Dr
Cottonwood Grove Dr
Couch Cir
Couch Pl
Country Dr
Coventry Dr
Cow Palace Rd
Coyote Crossing Ln
Craig Dr
Cranbrook Cir

PRIORITY_3_ROADS

Crandall Dr
Cranston Dr
Crazy Horse Cir
Crazy Horse Cir (Cds)
Crazy Horse Dr
Crebs Dr
Cree Dr
Cressman Dr
Crest Pl
Cresta Loma Cir E
Cresta Loma Cir W
Cresta Loma Pl
Crestwood Dr
Crooked Tree Ln
Crows Nest Way
Cruden Bay Rd
Crystal Downs Rd
Cunningham Dr
Curwood Dr
Cypress Dr
Cypress Pt
Dahlia Dr
Dairy Ln
Dale Rd
Dallas Rd
Danbury Ct
Daredevil Dr
Dark Pine Ct
Darr Cir
Darr Dr
Dartmouth St
Date St
Davie Dr
Daystar Ter
De La Vista Cds
De La Vista Cir
De La Vista Ct
De la Vista Ln
De La Vista Pl
De La Vista St
Dean Dr
Deby Dr
Deby Pl
Deer Creek Cir
Deer Meadow Cir
Deer Shadow Way
Deer Trl
Deercross Ct
Deerfield Rd
Del Rio Rd
Delbrook Dr
Denise Dr

PRIORITY_3_ROADS

Denver Rd
Desert Inn Way
Desert Inn Way (Cds)
Desiree Dr
Dew Drop Ct
Dewhirst Dr
Dexter St
Diamond Dr
Diamondhead Ct
Dix Cir
Dodd Rd
Dodge Rd
Doe Creek Ct
Doewood Cir
Doewood Dr
Dolan Dr
Dooley Way
Doral Way
Doral Way Lp
Doris Dr
Dorncliffe Rd
Double Tree Ct
Dove Creek Cir
Dove Pl
Draco Cir
Draco Dr
Drew Dr
Drew Dr (Cds)
Drummond Cir
Drummond South
Duffield Dr
Duhon Rd
Durasno Ct
Durasno Dr
Durasno Ln
Durasno Ter
Dutch Elm Dr
Duxbury Dr
Dye St
Eagle Bend Dr
Eagle Wing Dr
Eaglet Way
Early Morning Ct
Early Star Dr
Easy St
Eden Ln
Edgedale Way
Edward Pl
El Dorado Way
Elementary Dr
Eliot Ave
Ellesmere Dr

PRIORITY_3_ROADS

Ellicott Hwy Cds
Ely St
Ely St (Cds)
Ely St N
Embassy Ct
Emerald Dr
Emigrant Trl E
Emporia Ave
Emporia Ave (Wye)
Empress Cir
Empress St
Enoch Rd
Ericson Dr
Escondido Rd
Espino Dr
Esther Dr
Estrella Ln
Estrella Vista St
Eudora Cir
Eudora St
Everett Dr
Everglades Dr
Evergreen Dr
Ewing Ct
Excursion Dr
Expedition Dr
Fairfax St
Fairplay Dr (Tract N)
Fairplay Way
Fairway South
Falcon Crest Ct
Falcon Highlands Dr
Falcon Meadow Blvd
Falcon Ridge Ct
Falcons Nest Lp
Fallen Leaf Way
Fallen Tree Rd
Fantasia Dr
Far Hill Dr
Farmcrest Rd
Farnham Royal Ct
Fawnwood Rd
Fay Dr
Fay Dr (Cds)
Feather Reed Rd
February Dr
Feldspar Dr
Fencer Rd
Fennel Dr
Ferguson Rd
Fielding Cir
Fielding Cir (Cds)

PRIORITY_3_ROADS

Fielding Ter
Filly Ln
Firethorn Dr
Fishers Island Rd
Fishers Island Rd (Cds)
Fishers Ln
Flagstone St
Flaming Tree Way
Fleet St
Fleming St
Flowered Meadow Ln
Flynn Ct
Fontley Ct
Ford St
Fordham St
Forest Rd
Forest View Rd
Forestgate Dr
Forsyth Dr
Fort Smith Rd
Fort Worth Rd
Fountain Abbey Ct
Four Winds Way
Fourth St (Crystola)
Fox Creek Ln
Fox Trail Way
Foxchase Way
Foxchase Way (cds)
Foxglove Ct
Foxtail Meadow Ln
Foxwood Dr
Frazier Ln
Fredricksburg Dr
Frontier Dr
Fruited Plains Ct
Fulford Ct
Fulton Ct
Furrow Rd
Furrow Rd (Cds)
Furrow Way
Galley Ct
Gannet Dr
Garden City Rd
Gardiner Rd
Garman Dr
Garnet Dr
Garrison Rd
Garwood Ct
Gershwin Ct
Gibbon St
Gladiator Dr
Gladwater Rd

PRIORITY_3_ROADS

Glasbury Rd
Glen Canyon Dr
Glen Hollow Cir
Glenarm Rd
Glencannon Way
Glenellen Dr
Glengate Ln
Glenrock Dr
Glenthorne Ln
Glenwood Dr
Gold Pan Ct
Golden Arrow Cir
Golden Pine Ln
Golden Sage Dr
Goldfield Dr
Goldpeak Ct
Goldsmith Ct
Goodson Rd
Goodview Ct
Goodview Dr
Gordonsville Dr
Goret Dr
Gossamer St
Goulet Way
Grady Ct
Grama Grass Ct
Grama Ridge
Granby Rd
Grand Blvd
Grand Peak Rd
Grand Teton Dr
Granger Ln
Granite Cir
Grape Dr
Grass Song Pl
Grassland Rd
Great Basin Dr
Great Sky Rd
Green Grass Ct
Green Grass Ct (Temp Access)
Green Pine Way
Green Spring Rd
Greenbelt Dr
Greenbrier Ln
Greenbush Dr
Greenland Forest Dr
Greenough Rd
Greensboro South
Greenwood Dr
Gregs Pond Ln
Griffith Way
Grinnell St

PRIORITY_3_ROADS

Grizzly Ln
Guildford Ct
Guinevere Ct
Guinness Way
Gun Club Trl
Gunbarrel Dr
Hackberry Dr
Hallam Pl
Hallamwood Dr
Hames Dr
Hampton Cir
Hampton South
Handcraft Ct
Hannah Ridge Dr
Harbourne St
Harding St
Harding St (Cds)
Harness Rd
Harness Way
Harrington Dr
Harrisburg Way
Harrogate Ct
Harrow Rd
Hartell Dr
Hartford St
Harvard Pl
Harvard St
Harvard St (Cds)
Harvest Moon Ter
Hat Creek Pl
Hawkesbury Dr
Hayes Dr
Hazy Morning Dr
Headgate Ln
Heatherdowns
Heizer St
Hennings Dr
Herbert Ct
Heritage Rd
Hermits Hollow
Heron Ct
Herring Rd
Hiawatha Dr
Hickory Dr
Hicks Dr
Hidden Marsh Rd
Hidden Pine Dr
Hidden Springs Glen
High Meadow Dr
High Pines Dr
High St W
Highcrest Ln

PRIORITY_3_ROADS

Highview Dr
Hildenshire Pl
Hill Dr
Hilltop Pines Path
Hilton Head Ct
Hinks Ct
Hirono Rd
Hodgen Pond Ct
Holbein Dr
Hollow Rock Dr
Holly Dr
Holmes Rd
Homeland Ct
Honeysuckle Way
Hooper Ct
Hopi St
Hopkins Dr
Horizon Ridge Trl
Horizonpoint Dr
Howland St
Hubbell Dr
Hugh Martin St
Hungry Horse Ln
Hunters Glen Rd
Hunters Run
Hunting Downs Way
Huntington Beach Dr
Huxley Ct
Idylwood Dr
Inca Dr
Indian Echo Ter
Indian Paint Trl
Indian Way
Industry Rd
Insbourough Ct
Iriquois Trl
Iris Dr
Irish Dr
Irish Hunter Trl
Isle Royale Dr
Islehurst Ln
Ithaca St
Ivanhoe Dr
Ivory Lp
Jack Boot Way
Jackrabbit Ln
Jasper Dr
Jayhawk Ave
Jayton Dr
Jeanette Way
Jenna Ct
Jessie Dr

PRIORITY_3_ROADS

Jetton Ct
Jewel Ave
Jocque Ct
John Ross Ct
Jordan Rd
Judson St
Kachina Dr
Kaibab Ct
Kaitlin Ct
Kakatosi Ln
Kari Ct
Kathi Cir
Kearney Ave
Kearney Ave S
Keating Dr
Kenneth Lainer Dr
Kenosha Dr
Kensington Dr
Kersdale Way
Kershaw Ct
Keswick Rd
Ketchum Dr
Kilgore St
Killdeer Ct
Killearn Way
Kilniver Ct
King Arthurs Knoll
Kings Canyon Dr
Kings Cross Ln
Kings Deer Ln
Kingsboro Dr
Kingston Heath Rd
Kingston Heath Rd (Cds)
Kingswood Dr
Kipling St
Kiskadee Ct
Kisker Ct
Kittery Dr
Kiva Rd
Klein Pl
Klipspringer Dr
Klipspringer Dr (Cds)
Klondike Dr
Knights Crossing
Knollwood Blvd
Knollwood Blvd (Cds)
Knollwood Cir
Knotty Pine Way
Kokomo St
Kristy Ln
Kubrick Ct
Kudo Way

PRIORITY_3_ROADS

Kulsa Rd
La Costa Rd
La Jolla Pl
La Loma Cir
La Loma Dr
La Mar Pl
Lake Dr
Lake Forest Ln
Lake Meadow Dr
Lake Shore Ct
Lakenheath Ln
Lakeview Ln
Lambert Rd
Lamplight Dr
Lancers Ct
Landoe Ln
Lanfare Pl
Langtree Ct
Larch Dr
Laredo Ln
Lariat Ln
Lariat Lp
Larimore Dr
Lark Ln
Larks Nest Way
Lashelle Ave
Lashelle Way
Latah Ln
Latah Ln (cde)
Latrobe Cds
Latrobe Ct
Latrobe Dr
Lattern Ct
Laura Rd
Laurel Grass Range Trl
Laurel Grass Range Trl CDS
Lauriston Pl
Lavelett Ln
Lazy E Rd
Lazy Summer Way
Ledoux Rd
Leesburg Rd
Leggins Ct
Leggins Way
Lemhi Dr
Leoti Dr
Leta Dr
Levi Ln
Liano Dr
Libby Ct
Liberty Grove Dr
Lillian Way

PRIORITY_3_ROADS

Lincoln Plaza Dr
Lindal Dr
Linden Dr
Linderman Rd
Lindstrom Dr
Lions Head Dr
Lisa Dr
Litchfield St
Livingston Ave
Llano Cir
Llewelyn Ct
Loch Fyne Ln
Loch Linneh Pl
Lochmere Ct
Lochwinnoch Ln
Lockridge Dr
Lodgepole Way
Lofty Pine Ln
Lolo Dr
Londonderry Dr
Lone Rock Cir
Lone Tree Ct
Long Timber Ln
Longbow Cir
Longhorn Acres Trl
Longspur Ln
Longview Cir
Lonsdale Dr
Loomis Ave
Loomis Cir
Lost Arrowhead Dr
Lost Creek Way
Lost Rock Ln
Lotus St
Lovely Way
Lower Lake Rd
Loy Creek Rd
Lucky Lindy Ln
Lucy Ln
Luna Vista St
Lupan Dr
Luther Rd
Lyne Ct
Lyonsdown Ln
Maddees Way
Magic Lamp Way
Mahan Rd
Majestic Plains Ct
Malaga Dr
Malmsbury Ct
Manassas Way
Manzana Ct

PRIORITY_3_ROADS

Manzana Ln
Maple Dr
Marabou Way
Marble Arch Ct
Margaret Rd
Marian Dr
Mariposa Ln
Mariposa Rd
Marquette Dr
Marriott Rd
Marsh Ct
Marsh Hawk Dr
Martindale Ave
Masthead Way
Maureen Dr
Maverick Rd
Maverick Way
Maveta Rd
Max Rd
Maxwell St
Maxwell St (Cds)
Mc Burney Blvd
Mc Cara Ct
Mc Clure Rd
Mc Connell Ct
Mc Grew Cir
Mc Kay Rd
Mc Kiva Ct
Mc Laughlin Rd
Mc Shane Rd
Meadow Run Cir
Meadowbrook Ln
Meadowbrook Pkwy
Meadowlake Way
Meadowland Blvd
Medinah Rd
Melanie Ann Ct
Melinda Ln
Meridian Rd N
Merrington Ct
Merry Men Cir
Merryhill Ct
Mesa Rd
Mescalero Dr
Metcalf Ln
Metropolitan Cds
Metropolitan St (Cds)
Midnight Rd
Milam Rd
Milburn South
Millburn Dr
Millhaven Pl

PRIORITY_3_ROADS

Minden Cir
Mineola Ct
Mineola Pl
Mineola St
Mineshaft Ct
Minglewood Trl
Minnetonka Pl
Miss Ellie Ln
Mission Hill Way
Mission Rd
Misty Morning Dr
Moccassin Dr
Modell Dr
Mohawk Rd
Mohawk Trl
Mohican Dr
Monk St
Montcrombe Dr
Montero Cir
Montrail Dr
Montrose Dr
Moorcroft Dr
Moosa Rd
Morado Dr
Moran Ct
Morfontaine Rd
Morley Ct
Morningside Dr
Morris Trl
Mortensen Rd
Motley Rd
Mount Evans Dr
Mount Gateway Dr
Mount Lindsey Dr
Mount Princeton Dr
Muhly Ct
Mustang Pl
Mustang Rd
Mustang Way
Muzzle Loader Way
Myakka Way
Nampa Rd
Naples Dr
Narrow Gauge
Navajo Drive
Nelson Ln
Neon Way
New Breed Dr
Newgate Ct
Nez Perce Dr
Niagara St
Nichlas Ct

PRIORITY_3_ROADS

Nielsen Ct
Noble St
Noche Vista St
Nokomis Cir
Nokomis Dr
Norman Dr
Notre Way
Notre Way (cde)
Novia Dr
Nowata Pl
Nubbin Dr
Nugget Ct
Nyala Dr
O Neil Ct
Oak Cliff Way
Oak Hills Dr
Oak St
Oak Tree Ct
Oakland Hills Rd
Oakmont Rd
Oakmont Rd (Cds)
Oakwood Dr
Oberding Dr
Ocean Ave
Oceanside Ln
Oil Baron Dr
Okeechobee Dr
Okeechobee Pl
Old Canon City Rd
Old Cedar Cove
Old England Dr
Old Fort Ln
Old Meridian Rd
Old Pioneer Trl
Old Spec Rd
Oliver Rd
Ona Rd
Orchid St
Oregon Wagon Trl
Orinda Pl
Osage Way
Oto Cir
Otowi Dr
Otto Ln
Outpost Rd
Outrider Way
Overlook Rd
Ox Yoke Way
Oxbridge Rd
Oxmoor Ln
Ozark Pl
Paddington Cir

PRIORITY_3_ROADS

Pagentry Pl
Pahokee Ct
Pahokee Dr
Paint Brush Ln
Painted Rock Dr
Palm Springs Cds N
Palm Springs Cds S
Palm Springs Dr
Palm Springs Way
Palmer's Green Dr
Pamela Way
Panamint Ct
Paonia Ct
Paonia St
Park Crest Ct
Park St
Park Vista Blvd
Parkridge Ct
Parsonage Ln
Paseo Corto
Pathfinder Dr
Pathfinder Dr (Cds)
Pauma Valley Dr
Paver Way
Pawhuska Pl
Pawnee Cir
Pawnee Rd
Pawprint Ct
Payette Dr
Peaceful Meadow St
Peaceful Pond Ln
Pearl Dr
Pebble Beach Way
Pebble Crest Way
Peck Ct
Pecos Dr
Peerless Farms Rd
Pele Ct
Pemble Ct
Peninsula Dr
Penn Cross Pl
Pennington Dr
Pennyroyal Ct
Peregrine Cir
Peregrine Way
Petersburg Ct
Petrel Dr
Pettigrew Pl
Picasso Ct
Pickering Ct
Pictured Rocks Dr
Pike Rd

PRIORITY_3_ROADS

Pike View Way
Pima Dr
Pinal Ln
Pine Ln
Pine Oaks Rd
Pine Valley Cir
Pine Vista Pl
Pinegate Dr
Pinehurst Dr
Pineneedle Ct
Pinenut Ct
Pinewood Lp
Piney Ridge Wy
Pineycove Ct
Pinyon Jay Dr
Pioneer Crsg
Pipestem Ave
Pipestone Ct
Piros Dr
Piute Rd
Platinum Dr
Player Pl
Pleasant View Dr
Pleasant View Ln
Pleier Dr
Pless Ct
Plower Ct
Plowman Dr
Plowman Pl
Poa Annua St
Point Reyes Dr
Pointer Pl
Pompeii Sq
Ponca Rd
Pond Side Dr
Pond View Pl
Ponderosa Dr
Pontiac Lp
Pony Gulch Way
Pony Pond Dr
Poplar St
Portland Rd
Postrock Drive
Poteae Cir
Poteae Dr
Powderhorn Dr
Powderwash Dr
Prairie Dunes Rd
Prairie Fox Ln
Prairie St
Prairie Vista Ln
Prairie Walk Ter

PRIORITY_3_ROADS

Preminger Dr
President Ave
Pristine Dr
Promontory Way
Pronghorn Meadows Cir
Prospero Rd
Pucket Cir
Purple Mountain Trl
Purser Ct
Pushmataha Dr
Putnam Dr
Pyramid Mountain Rd
Quail Run Rd
Quebec Cir
Quebec Pl
Quebec St
Queens Crescent Way
Queensmere Dr
Quill Dr
Quinlan Ct
Radbourne Ct
Raemar Cir
Raemar Dr
Raemar Pl
Raintree Dr
Rampart Range North Fork Rd
Rancho Bernardo Rd
Rancho Pavo Dr
Range View Rd
Rangely Dr
Rathbone Cir
Raton Rd
Red Baron Dr
Red Brooke Dr
Red Canon Ave
Red Canon Pl
Red Cloud St
Red Clover Ln
Red Forest Rd
Red Fox Ln
Red Granite Loop
Red Lodge Rd
Redington Dr
Redtail Dr
Reed Grass Way
Regal Glen Ct
Regatta Ln
Rembrandt Ct
Remple Ct
Renoir Pl
Rex Rd
Richmond Dr

PRIORITY_3_ROADS

Ridge Run Dr
Ridgefield Ln
Ridgeview Cir
Riggin Ct
Rill Valley Way
Rim of the World Dr
Rio Secco Rd
Rio Secco Rd (Cds)
Rising Eagle Pl
River Bend Rd
River Oaks Dr
River Oaks Dr (Cds)
Rivercrest Cir
Riverglen Ln
Riverwalk Pkwy
Roan Dr
Roanfield Ln
Roberts Dr
Robinhood Way
Roca Roja Cir
Rock Creek Canyon Rd
Rock Creek Mesa Rd
Rock Glen Cir
Rock Ledge Ln
Rockingham Dr
Rocklin Dr
Roehampton Ct
Rolling Ridge Rd
Rolling Thunder Way
Rolling View Dr
Rollins St
Rondo Way
Rosalie St
Rose Dr
Rosemont Dr
Roseville Dr
Rosewood Way
Ross Lake Dr
Round Table Ct
Roundup Butte St
Roundup Ridge Rd
Rowe Ln
Roxanne Ct
Royal Archers Ln
Royal Birkdale Rd
Royal County Down Rd
Royal Dornoch Ct
Royal Lytham Ct
Royal Melbourne Cir
Royal Melbourne Cir (Cds)
Royal Portrush Ct
Ruby Dr

PRIORITY_3_ROADS

Rundle Ct
Rushing Leaves Ln
Saberwood Dr
Sable Dr
Saddle Ridge Ct
Saddlebred Way
Saddleman Rd
Sage Grouse Ln
Sailwind Dr
Sailwind Dr (Cds)
Salem Ct
Salinas Rd
Salt Creek Pl
Salt Grass Ct
Salt Lick Way
San Luis Peak Way
Sand Tail Ct
Sand Trap Dr
Sandberg Dr
Sandberg Dr (Cds)
Sandstone Dr
Sapphire Dr
Sara Jo Ln
Sarsi Dr
Sawmill Rd
Saxton Hollow Rd
Sayres Rd
Scamper Rd
Scarsbrook Ct
Schwencks Pl
Scotts Bluff Dr
Scottsdale Dr
Scrub Oak Cir
Scrub Oak Way
Seagull Cir
Seawell Dr
Sebring Dr
Sedgemere Rd
Sedgewick Dr
Sedona Dr
Seneca Rd
Seneca Way
Sequoyah Way
Setting Moon Ct
Settlement Way
Sevilla Dr
Shadow Creek Ct
Shadow Mountain Dr
Shadowood Cir
Shadowood Dr
Shadowtree Ct
Shady Glen Ln

PRIORITY_3_ROADS

Shaugnessy Rd
Shaugnessy Rd (cbs)
Shavano Ct
Shawnee Ct
Shawnee Dr
Shawnee Dr (Cds)
Shawnee Pl
Shawnee Way
Shelbe Ct
Shelly Ct
Sheriffs Cv
Sheriffs Way
Sheringham Dr
Sherri Dr
Sherwood Glen S
Sherwood Ln
Sherwood Trl
Shiloh Pines Dr
Shining Star Dr
Shipman Ln
Short Grass Ct
Shoshone Rd
Shoshone Way
Shoulders Rd
Shreveport Rd
Sierra Vista Rd
Siferd Blvd
Silhouette Way
Silver Bow Dr
Silver Bow Dr (Cds)
Silver Dr
Silver Meadow Cir
Silver Saddle Rd
Silver Sage Way
Silverdale St
Silverheels Ct
Silverton Rd
Sinnes Ln
Sinton Ave
Sioux Cir N
Sioux Cir S
Sioux Trl
Sir Galahad Dr
Siskin Ln
Sitka Dr
Sitter Ct
Six Trees Ln
Sixpenny Ln
Slash Pine Dr
Slate Way
Sleeping Bear Rd
Sleepy Creek Dr

PRIORITY_3_ROADS

Sleepy Hollow Rd
Sleepy Meadows Dr
Sloan Ln
Smugglers Rd
Snaffle Bit Rd
Snead St
Snow Cap Ct
Snowpeak Ct
Soaring Wing Ct
Solitude Ct
Songbird Dr
Sonoran Dr
Sostrin Ln
South Park Dr
Southfork Dr
Sparrow Hawk Way
Spine Creek Pl
Spinnaker Lp
Spinnaker Trl
Spitfire Dr
Spitfire Dr (cde)
Spring St
Spring Time Ct
Spring Valley Dr
Spring Valley Rd
Springside Dr
Spruce Ln
Spur Dr
Spyglass Cir
Squire Ct
Squire St
Squire St (Cds)
St Annes Rd
St George Rd
St Giles Ct
St Moritz Way
Stadia Ct
Staffshire Ln
Stag Ln
Stage Line Ct
Stapleton Dr
Stargate Dr
Starwood Dr
Steinbeck Ln
Stephenville Rd
Sterling Rd
Steven Dr
Still Glen Dr
Stirrup Trl E
Stone View Rd
Stoneleigh Trl
Stratmoor Dr

PRIORITY_3_ROADS

Strawberry Ln
Streambank Dr
Striby Ave
Struthers Ranch Rd
Suburban Dr
Sudbury Rd
Sue Ellen Dr
Sue Ln
Sugar Creek Cir
Sugarbush Dr
Sullivan Ave
Sullivan Cds
Sullivan Cir
Sumac Dr
Summer Meadows Dr
Sun Burst Vista
Sun Burst Vista (Cds)
Sun Light Way
Sunbeam Way
Sundance Trl
Sunningdale Rd
Sunny View Ln
Sunset Crater Dr
Sunview Ct
Susanne Cir
Swearinger Dr
Sylamore Way
Sylvan Meadows Dr
Syracuse St
Tacoma Ct
Taft Ct
Tahlequah Dr
Tail Wind Dr
Talivena Ter
Tall Pine Ln
Tall Timber Ln
Tallman Rd
Talus Ridge Dr
Tamarack Dr
Tanager Ct
Tanager Way
Tari Ct
Tari Ln
Tari Pl
Taversham Ct
Tee Box Ct
Tee Post Ln
Tennis Ln
Terrel Dr
Terminal Ave
Tern Dr
Terra Ridge Cir

PRIORITY_3_ROADS

Terra Ridge Cr
Terra Vista Ln
Terri Lee Dr
Tewa Dr
Tewkesbury Ct
Tex Tan Rd
Texarkanna Rd
Theresa Dr
Theriot Rd
Third St (Crystola)
Thornbird Ct
Thunderbird Trl
Thunderhead Dr
Tibbs Rd
Tibburn Way
Tierra Dr
Tierra Rojo Dr
Tilden St
Timber Meadow Dr
Timber Meadow Dr (cda)
Timberside Ct
Timbertop Ct
Timpa Pl
Timpa Rd
Tiner Trl
Tinkham Ct
Tipperary Rd
Toboggan Hill Rd
Tompkins Rd
Top O the Moor Dr W(Cda)
Top O the Rock Way
Topaz Dr
Topeka Ave
Torrey Pines Way
Torreys Peak Way
Tottenham Ct
Towne Ct
Towner Ave
Traces Ln
Trail Blazer Ct
Trails End Ct
Tranquil Morning Ter
Trappers Pass Trl
Treasure Trail Cir
Trenholme Dr
True Vista Cir
Trumpeters Ct
Turney Rd
Turquoise Dr
Tuskegee Pl
Twilight Canyon Trl
Twin Fawn Way

PRIORITY_3_ROADS

Udella Ct
Uneda Rd
Union Pl
Upchurch Way
Upton Dr
US Hwy 24 Frontage Rd
Ute Rd
Ute Trl
Valjean Pl
Valle Verde Dr
Valley Manor Ct
Valley St
Vanadium Dr
Velliquette Ln
Velvet Antler Way
Venture St
Vessey Rd
Via Tierra Dr
Via Verde Ln
Victory Rd
Villager Dr
Vineland Trl
Violet Dr
Viscount Ct
Vista Clara Ln
Wageman Dr
Wagon Mound Ct
Wainwright Dr
Wait Ct
Wakita Dr
Walden Way
Wallace St
Walnut Canyon Dr
Walton Creek Dr
Walton Dr
Warrenton Way
Washo Cir
Washo Ct
Water Dipper Rd
Waterbury Dr
Waterman Way
Waterwheel St
Watonga Ct
Watson Blvd
Waurika Cir
Waverly Ln
Wayland Pl
Waynoka Pl
Waynoka Rd
Wayside Ct
Weatherstone Dr
Webbed Foot Way

PRIORITY_3_ROADS

Weeping Willow Dr
Weiscamp Rd
Weiscamp Rd (Cds)
Welton Dr
Westchester Dr
Westchester Dr (Cds)
Westchester Dr N
Westcott Ave
Western Dr
Western Pl
Westmark Ave
Wetherill Rd
Wethersfield Dr
Weyburn Way
Wheat Dr
White Cliff Way
White Fir Ln
White Marsh Dr
White Mountain Dr
White Peak Dr
White Sands Ct
White Tail Way
White Water Ln
Whitehall Rd
Wichita Pl
Widefield Blvd
Widefield Dr
Widick St
Wild Berry Way
Wild Duck Ln
Wild Horse Dr
Wild Wood Rd
Wildhaven Ln
Wildwood Ct
Wildwood Way
Wilhelm Dr
Wilkin Dr
Will O the Wisp Way
Willard Dr
Willis Dr
Willow Park Way
Willowick Ct
Willshire Dr
Wind Dance Ln
Windmill Creek Way
Windrow Ct
Windwood Ct
Windy Peak Dr
Windy Pine Dr
Wing Tip Ct
Wing Tip Rd
Wing Walker Dr

PRIORITY_3_ROADS

Winged Foot Rd
Winnemucca Rd
Winslow Dr
Wissler Ranch Rd
Witches Hollow Ln
Witherbee Dr
Withington Dr
Woodall Spa Rd
Woodcliff Dr
Wooddale Rd
Woodglen Ct
Woodmeadow Ct
Woodmen Frontage Rd
Woodmen Hills Dr
Woodpark Dr
Woodrock Path
Woodrose Ct
Woodstock St
Woodstock St Cds
Woodstone Way
Woody Creek Dr
Woody Creek Dr (Cds)
Worcester Ct
Wuthering Heights Dr
Wuthering Heights Dr (Cds)
Yakima Dr
Yakima Way
Yellow Wing Ct
Yeomans Park Dr
Yukon Way
Zermatt Dr
Zuni Dr