

Appendix 4D. Narratives for Flood Mitigation Projects

4D-1. Flood Mitigation Project ID: 143000003

Name: Small pond at San Elizario

Description: Construct a new 0.34 ac-ft pond to relieve roadway flooding. Described as Alternative 3 from City of San Elizario “Drainage Feasibility Study” (2018).

Affected Jurisdictions: City of San Elizario

Discussion on Cultural Resources Background: Two National Register Districts and five archaeological sites are located within and /or adjacent to the proposed project area. As the project area is located within one National Register Districts, Section 106 of the NHPA will take effect and a cultural resources survey of the entire project area will be required to evaluate any unrecorded, potential cultural resources that can contribute to this district, and determine if any adverse effects will happen on historic properties.

Table 4D. Cultural Resources Within and/or Adjacent to FMP ID: 143000003

Resource Name	Resource Type	Prehistoric/ Historic	NRHP Eligibility	Location
Archaeological Site	Historic Structure	Historic	Ineligible	Adjacent
Archaeological Site	Historic Structure	Historic	Ineligible	Adjacent
Archaeological Site	Historic Structure	Historic	Ineligible	Adjacent
Archaeological Site	Historic Homestead	Historic	Ineligible	Adjacent
Archaeological Site	Historic Homestead	Historic	Ineligible	Adjacent
EPCWID	National Register District	Historic	Listed	Intersects
San Elizario Historic District	National Register District	Historic	Listed	Adjacent

Discussion on Flood Risk: The Drainage Feasibility Study (Brock & Bustillos, Inc., 2018) describes the existing flood risk for the project as the following:

“The City of San Elizario, Texas has continuously experienced flooding of the intersections of Socorro Rd. and San Antonio St., and Socorro Rd. and Main St. as shown in Figure 1. The flooding occurs on practically any storm event and causes disruption to traffic, area residents, and business owners. It also creates unsanitary conditions as trash and debris accumulates in the area as these are transported by the storm water. The City of San Elizario contracted the services of Brock & Bustillos Inc. (B&B) to develop a feasibility study to determine up to three (3) potential alternatives to mitigate flooding and ponding problems at these intersections. This study identifies existing drainage infrastructure, determines the contributing watershed area, determines expected storm water flows, identifies potential regional ponding areas, presents flood mitigating alternatives, determines

estimated probable construction costs, and provides a recommendation for flooding mitigation.”

Project Description: The Drainage Feasibility Study (Brock & Bustillos, Inc., 2018) describes the project as the following:

“This alternative was identified by City of San Elizario officials due to its practical and proximity location to the flooding intersections. It consists of the creation of a new pond located in a portion of 1408 San Antonio St. identified by EPCAD Property ID 394930. The proposed layout is shown on Exhibit D. Unfortunately, the vacant portion where a pond can be located is only about 0.128-Ac and has approximate capacity of 0.34-Ac-ft or only 3% of the required 10.4-Ac-ft expected runoff from a 1% AC storm event.”

Estimated Cost for FMP:

Total FMP Cost	
Subtotal 1 – Drainage Feasibility Study Construction Cost (Brock&Bustillos, Dec. 2018)	\$ 81,183
Subtotal 2 – RFP Construction Cost (September 2020, using CCI)	\$ 83,455
Subtotal 3 – RFP Construction Contingency (35%)	\$ 29,209
Total Construction Cost	\$ 112,664
Subtotal 4 – Drainage Feasibility Study Land Acquisition Cost (Brock&Bustillos, Dec. 2018)	\$ 50,000
Subtotal 5 – RFP Land Acquisition Cost (September 2020, using CPI)	\$ 51,801
Subtotal 6 – RFP Final Design Cost (20%)	\$ 22,533
Subtotal 7 – RFP Permitting Cost (10%)	\$ 11,266
Subtotal 8 – RFP Construction Oversight Cost (8%)	\$ 9,013
Subtotal 9 – RFP Geotech Cost (15%)	\$ 16,900
Total Non-Construction Cost	\$ 111,512
Total FMP Cost	\$ 224,000

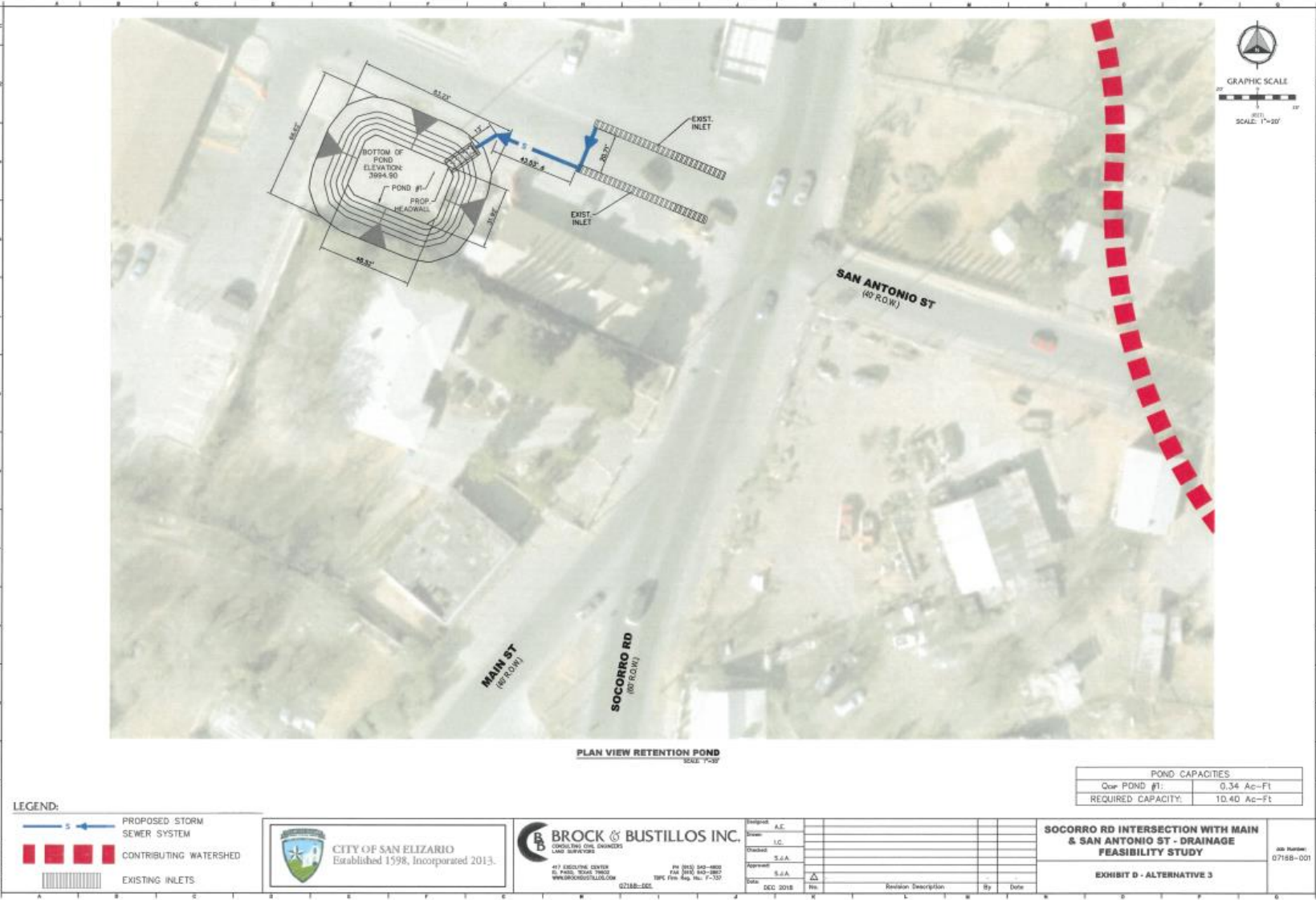


Figure 4D-1: Exhibit D, Alternative 3 from Drainage Feasibility Study Socorro Rd. Intersections with San Antonio St. & Main St. (Brock & Bustillos, 2018)

4D-2. Flood Mitigation Project ID: 143000005

Name: SH20 Drainage Improvements from Doniphan Drive to Texas Avenue

Description: Improvements to inlet and culvert capacities at eight crossings, with cost estimates and prioritizations available.

Affected Jurisdictions: City of El Paso

Discussion on Cultural Resources Background: No cultural resources are located within or immediately adjacent to the project area. Given the proposed design includes facility improvements, SWCA recommends no cultural resources survey of the project area based on current design plans.

Discussion on Flood Risk: The “Drainage Study for SH20 (Mesa Street), from Doniphan Drive to Texas Avenue” (AECOM, 2019) describes the existing flood risk for the project as the following:

“Most of the existing drainage crossings have adequate capacity to convey the 1% AC flows without overtopping the roadway. The primary issue is the inability of the runoff from offsite areas and at some locations runoff from within the SH 20 ROW to efficiently drain to the crossings.”

Project Description: The “Drainage Study for SH20 (Mesa Street), from Doniphan Drive to Texas Avenue” (AECOM, 2019) describes the project as the following:

“Potential drainage improvements were developed at a conceptual level for locations with a LOS less than a 10-yr event. The drainage improvements recommended in this report are conceptual and require further study before detailed design. Each drainage improvement will improve the LOS around each crossing or identified flooding location and reduce the frequency of flooding. It should be expected that roadway flooding will occur post improvements for storm events in excess of a 20% AC 24-hour storm event.”

Each of the recommended and prioritized drainage improvements is described below in order of priority, from the “Drainage Study for SH20 (Mesa Street), from Doniphan Drive to Texas Avenue” (AECOM, 2019):

“10-1 - Increase the length of the weir along Mesa Hills drive to increase the capacity by 75 cfs.

10-2 - Add inlets along Festival Drive connected to crossings 7D. Estimated necessary capacity 75 cfs.

10-3 - Increase the capacity of the inlets and crossing at 9A & 9B by 30 cfs.

10-4 - Add an inlet upstream of the inlet along E Castellano Drive. Also increase the size of the inlet at the sag at the intersection of E Castellano Drive and SH 20. Connect both inlets to crossing 11. Estimated necessary capacity of each inlet 75 cfs.

10-5 - Add inlets along SH 20 connecting to crossings 12A. Estimated necessary capacity: Approximately 250 cfs.

10-6 - Add inlets at the sag at the Brentwood intersection. Connect the inlets to the downstream side of crossing 14B. Estimated necessary capacity: Approximately 90 cfs.

10-7 - Add inlets at the sag near crossing 18. Connect the inlets to crossing 18. Estimated capacity: Approximately 50 cfs.

10-8 - Add inlets at the Sag within the Kerbey intersection and the sag near crossing 19. Connect the inlets to crossing 19. Estimated necessary capacity for each inlet: Approximately 60 cfs.”

Estimated Cost for FMP:

Total FMP Cost	
Subtotal 1 – Drainage Study for SH20 Construction Cost (AECOM, Jan. 2019)	\$ 1,774,823
Subtotal 2 – RFP Construction Cost (September 2020, using CCI)	\$ 1,813,170
Subtotal 3 – RFP Construction Contingency (35%)	\$ 634,610
Total Construction Cost	\$ 2,447,780
Subtotal 4 – Drainage Study SH-20 2019 Land Acquisition Cost (Jan. 2019)	\$ -
Subtotal 5 – RFP Land Acquisition Cost (September 2020, using CPI)	\$ -
Subtotal 6 – RFP Final Design Cost (20%)	\$ 489,556
Subtotal 7 – RFP Permitting Cost (10%)	\$ 244,778
Subtotal 8 – RFP Construction Oversight Cost (8%)	\$ 195,822
Subtotal 9 – RFP Geotech Cost (15%)	\$ 367,167
Total Non-Construction Cost	\$ 1,297,323
Total FMP Cost	\$ 3,745,000

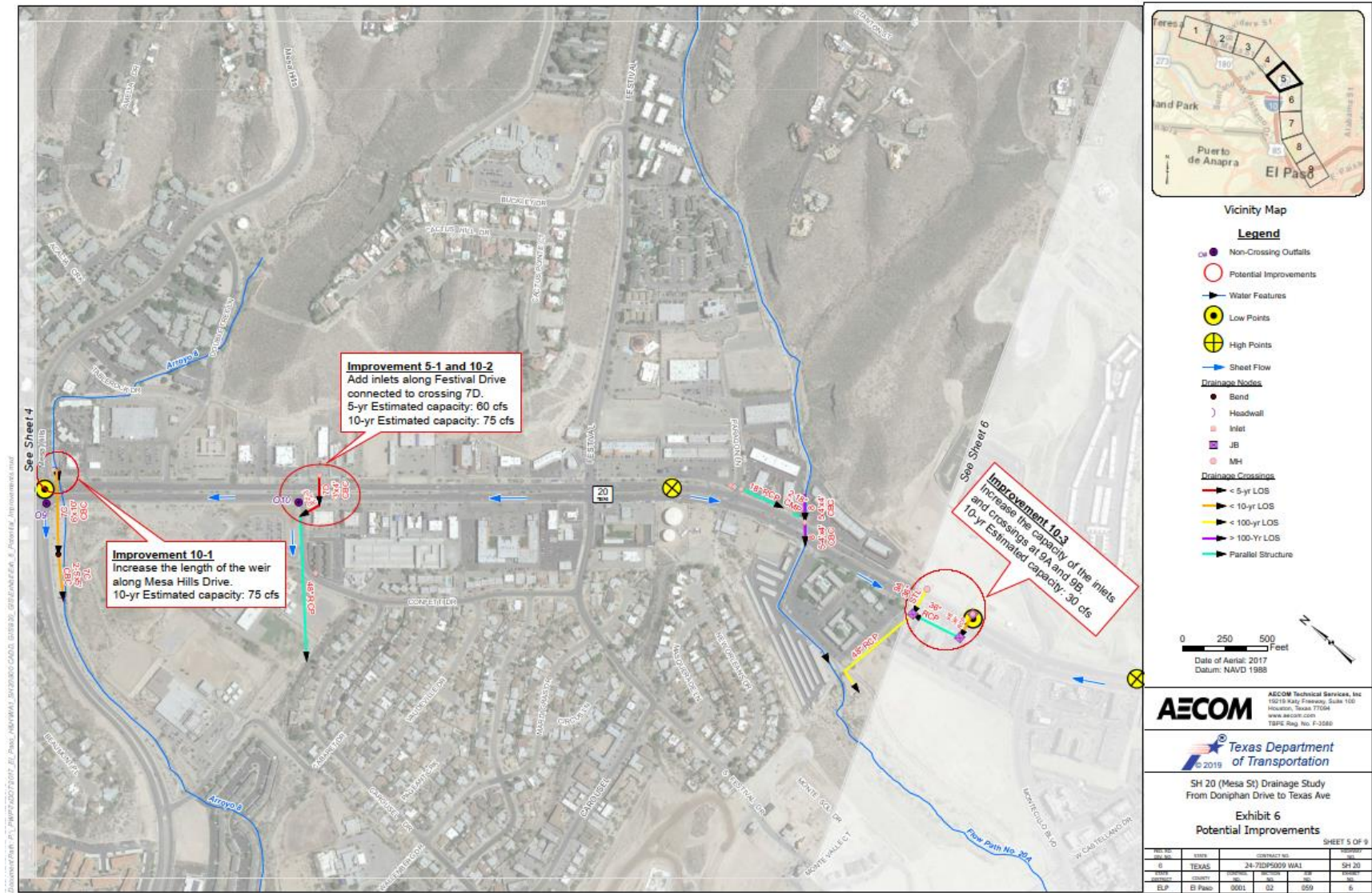


Figure 4D-2.1: Exhibit 6, Sheet 5 from Drainage Study for SH20 (Mesa Street) from Doniphan Drive to Texas Avenue (AECOM, 2019)

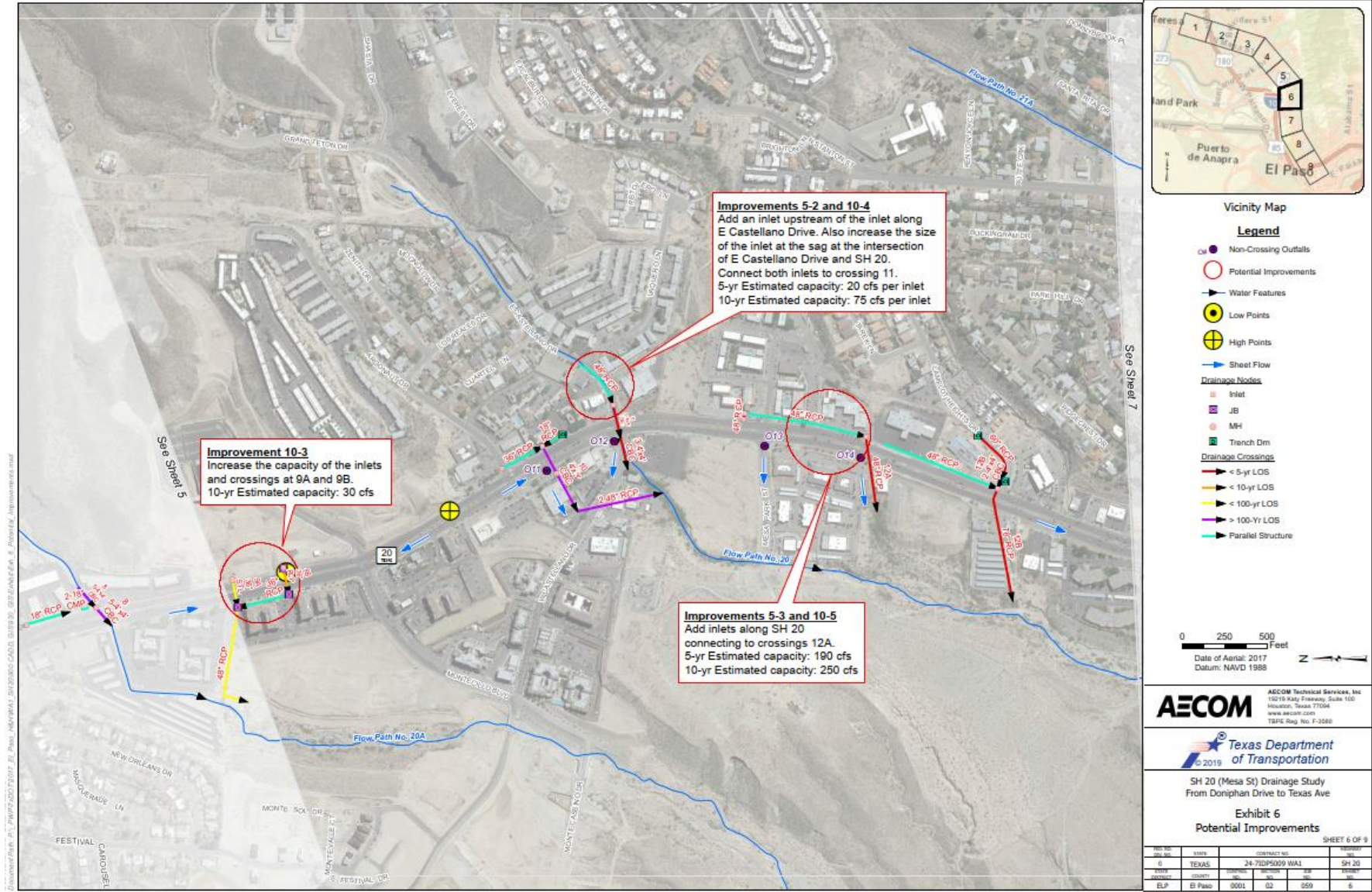


Figure 4D-2.2: Exhibit 6, Sheet 6 from Drainage Study for SH20 (Mesa Street) from Doniphan Drive to Texas Avenue (AECOM, 2019)

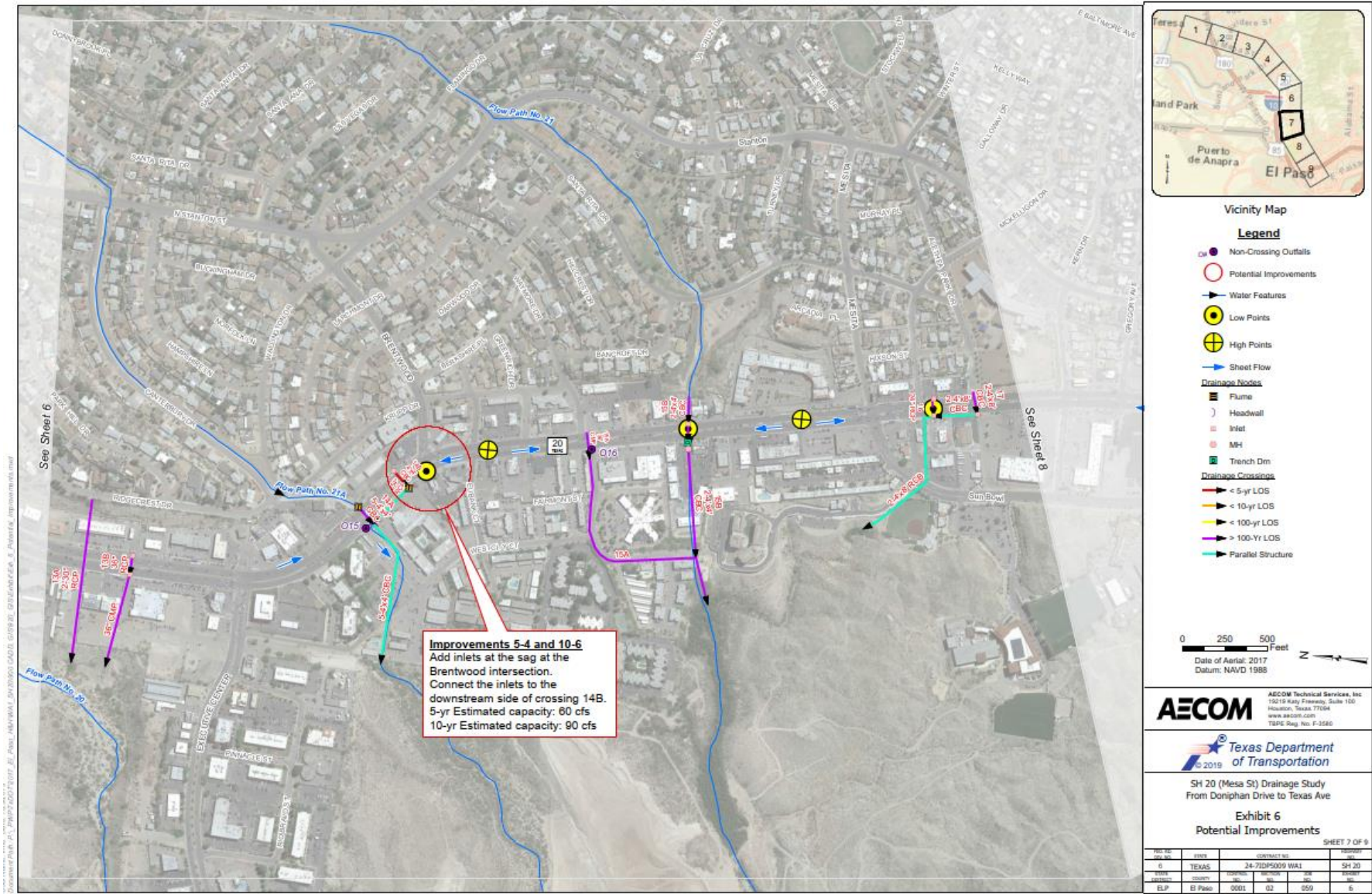


Figure 4D-2.3: Exhibit 6, Sheet 7 from Drainage Study for SH20 (Mesa Street) from Doniphan Drive to Texas Avenue (AECOM, 2019)

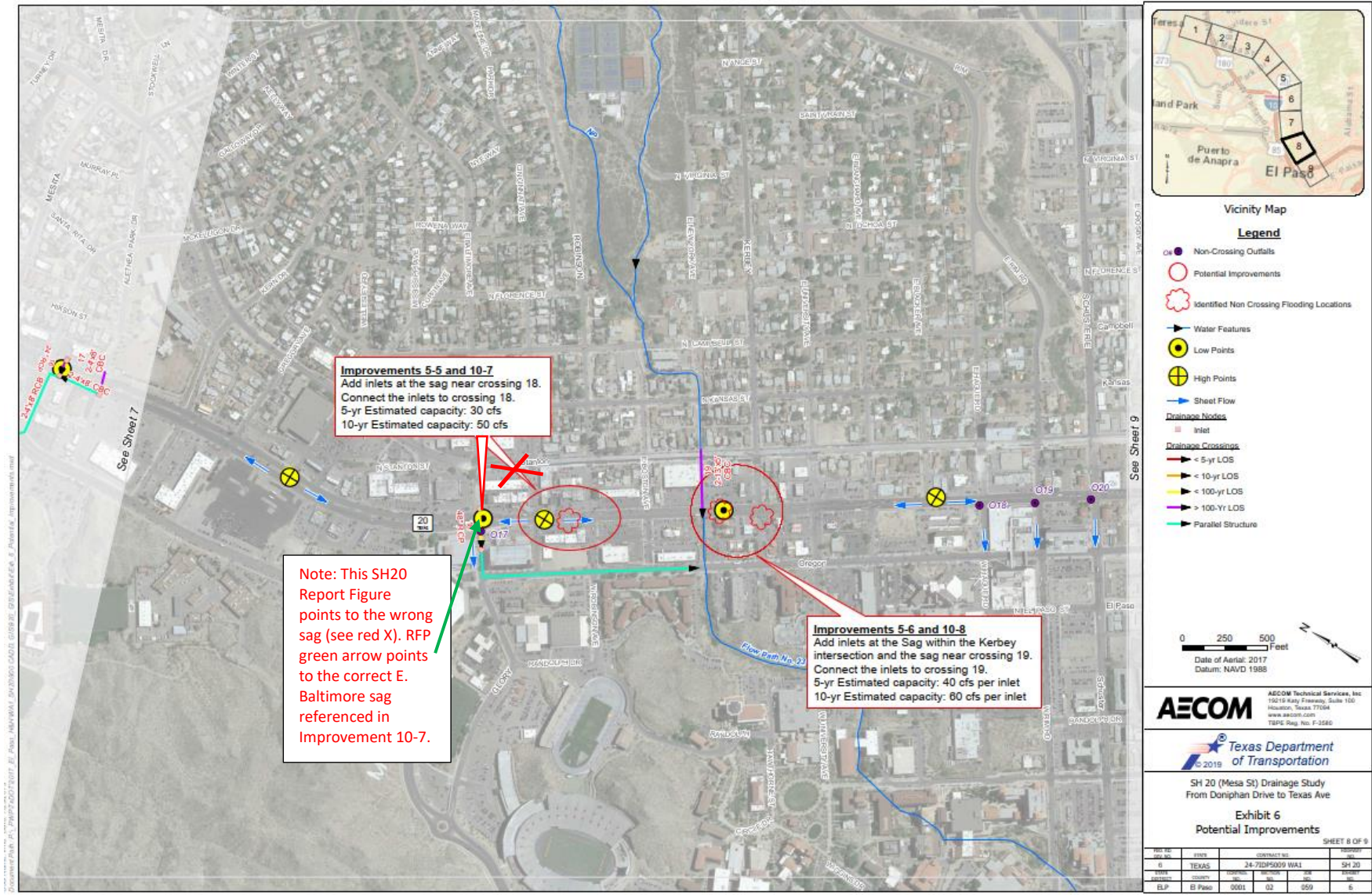


Figure 4D-2.4: Exhibit 6, Sheet 8 from Drainage Study for SH20 (Mesa Street) from Doniphan Drive to Texas Avenue (AECOM, 2019)

4D-3. Flood Mitigation Project ID: 143000007

Name: Install Flood Gates in Marfa and Monitoring Gage on North Alamito Creek and Highway 17

Description: Add flood gates to roadways at 4 LWCs on Alamito Creek, and a monitoring gage/early detection on North Alamito Creek at Hwy 17 Bridge upstream of Marfa. This provides early warning for Emergency Management to deploy before imminent road flooding.

Affected Jurisdictions: City of Marfa, Presidio County

Discussion on Cultural Resources Background: No cultural resources are located within or immediately adjacent to the project area. Assuming that the project design just includes facility updates and no ground disturbing activities are planned, SWCA recommends no cultural resources survey is necessary.

Project Description: A total of four flood gates will be added to the low water crossings shown in **Exhibit Map 20.7** of *Chapter 5*, and a new flood gage will be installed at North Alamito Creek under Hwy 17 Bridge to aid in providing early warning. While the FMS ID: 142000025 also affects early warning in the City of Marfa, the FMS depends on the implementation of a gage system which requires recurring costs, unlike this FMP. While the FMS would improve early warning times associated with this FMP, it is not required to be implemented before or after this FMP is constructed. A bid is included in **Appendix 4G**, provided by High Sierra Electronics, Inc. to City of Marfa on January 26, 2022 for the equipment and services associated with this FMP.

Estimated Cost for FMP:

Total FMP Cost	
Subtotal 1 – High Sierra Electronics Construction/Equipment Cost (Jan. 2022)	\$ 253,425
Subtotal 2 – RFP Construction/Equipment Cost (September 2020, using CCI)	\$ 232,099
RFP Total Construction/Equipment Cost (Sept. 2020)	\$ 232,099
Subtotal 3 – High Sierra Electronics Services/Installation Cost (Jan. 2022)	\$ 132,189
Subtotal 4 – High Sierra Electronics Maintenance/Operation Training Cost (Jan. 2022)	\$ 3,566
High Sierra Total Non Construction Cost (Jan 2022)	\$ 135,755
RFP Total Non-Construction Cost (September 2020, using CPI)	\$ 125,679
Total FMP Cost	\$ 358,000

4D-4. Flood Mitigation Project ID: 143000009

Name: Develop and Implement Floodplain Ordinance to Regulate Development at Hudspeth County

Description: Coordinate with Hudspeth County Commissioners, Road & Bridge Departments, Safety & Inspection Departments, and County Attorney to draft a floodplain ordinance (or modify an existing subdivision ordinance) to regulate development standards in Hudspeth County.

Affected Jurisdictions: Hudspeth County

Discussion on Cultural Resources Background: One NHRP District, 172 archaeological sites, and two cemeteries are located within Hudspeth County. The Butterfield Overland Mail Route National Register District is located within the northeastern corner of Hudspeth County, near Guadalupe Mountains National Park. The district includes multiple nineteenth century to mid-twentieth century road segments associated with the broad national pattern of western expansion and settlement . As the most significant cultural resource within the county, and the association of many archaeological sites within and outside of the district limits, cultural resources survey will be required within the district boundaries through Section 106; SWCA recommends cultural resource survey anywhere within 0.6-mile (1.0 kilometer) of the district boundary.

Project Description: A request submitted by Hudspeth County to receive an earmark for Federal funding from FEMA in April 2022 stated the following:

“Task 1. Develop and implement floodplain management regulations within Hudspeth County. In recent years, paid residential development has occurred in Hudspeth County in the region covered by this project. The County lacks an administrative and legal structure to require review and approval of drainage impacts of these developments. This task was recommended in the 2019 Colonia Area Plan, and endorsed as a potential non-structural Floodplain Mitigation Project (FMP) by the URGFGP. Cost is estimated at \$50,000.”

Estimated Cost for FMP:

The funding earmark request submitted by Hudspeth County included an estimated cost of **\$50,000** based on coordination with the Regional Flood Planning Group (RFPG) and El Paso County. A coordination call was held with Hudspeth County, El Paso County, and the RFPG on April 7, 2022 to discuss the needs of Hudspeth County concerning regulation of new development and to seek input from El Paso County based on their current system. El Paso County described their challenges and successes related to new development. The discussion

aided in the decision on an appropriate cost estimate for a consultant to evaluate Hudspeth County's development process and make recommendations for improvements.

4D-5. Flood Mitigation Project ID: 143000011

Name: SSA4

Description: Detention Basin SSA4.

Affected Jurisdictions: City of Socorro, Sparks CDP, El Paso County

Discussion on Cultural Resources Background: The entire project area has been previously surveyed in 2010 by Geo-Marine Inc. on behalf of United States Army Corps of Engineers for a proposed detention basin, resulting in no newly documented cultural resources within the project area. SWCA, therefore, recommends no cultural resource survey necessary based on current design plans.

Discussion on Flood Risk: The El Paso County Stormwater Master Plan (AECOM, 2021) describes the existing flood risk for the project as the following:

“Uncontrolled flows originating in the upper end of the watershed pose a flood risk to the WWTP at the upstream end of the Sparks Arroyo and to residences located adjacent to the arroyo. Runoff from the development in Horizon City and other undeveloped areas on the mesa enters the upper tributaries of the watershed that converge to form the Sparks Arroyo. According to the USACE feasibility study, flows from these tributaries pose a flood risk to the WWTP at the upstream end of the Sparks Arroyo. The tributaries converge approximately 300 feet downstream of the WWTP. At this location, flows from the tributaries exceed the capacity of the Sparks Arroyo and pose a flood risk to residences downstream.”

Project Description: The El Paso County Stormwater Master Plan (AECOM, 2021) describes the project as the following:

“This project involves constructing a detention basin at the upper end of the Sparks Arroyo, just upstream of the WWTP. The proposed basin requires approximately 550 acre-feet of excavation for flood and sediment pool storage. The outlet structure for this basin consists of a 4-foot RCP. The basin has two primary purposes:

- Capture sediment being transported down the arroyos and reduce deposition in the downstream channels and floodplains; and
- Detain the flood flows coming down the arroyos and release them slowly from the detention basin at a rate that will reduce flooding downstream.”

Estimated Cost for FMP:

Total FMP Cost	
Subtotal 1 – El Paso County 2021 SWMP Construction Cost (February 2020)	\$ 6,768,982
Subtotal 2 – RFP Construction Cost (September 2020, using CCI)	\$ 6,830,162
Subtotal 3 – RFP Construction Contingency (35%)	\$ 2,390,557
Total Construction Cost	\$ 9,220,718
Subtotal 4 – El Paso County 2021 SWMP Land Acquisition Cost (February 2020)	\$ 632,000
Subtotal 5 – RFP Land Acquisition Cost (September 2020, using CPI)	\$ 635,914
Subtotal 6 – RFP Final Design Cost (20%)	\$ 1,844,144
Subtotal 7 – RFP Permitting Cost (10%)	\$ 922,072
Subtotal 8 – RFP Construction Oversight Cost (8%)	\$ 737,657
Subtotal 9 – RFP Geotech Cost (15%)	\$ 1,383,108
Total Non-Construction Cost	\$ 5,522,895
Total FMP Cost	\$ 14,744,000

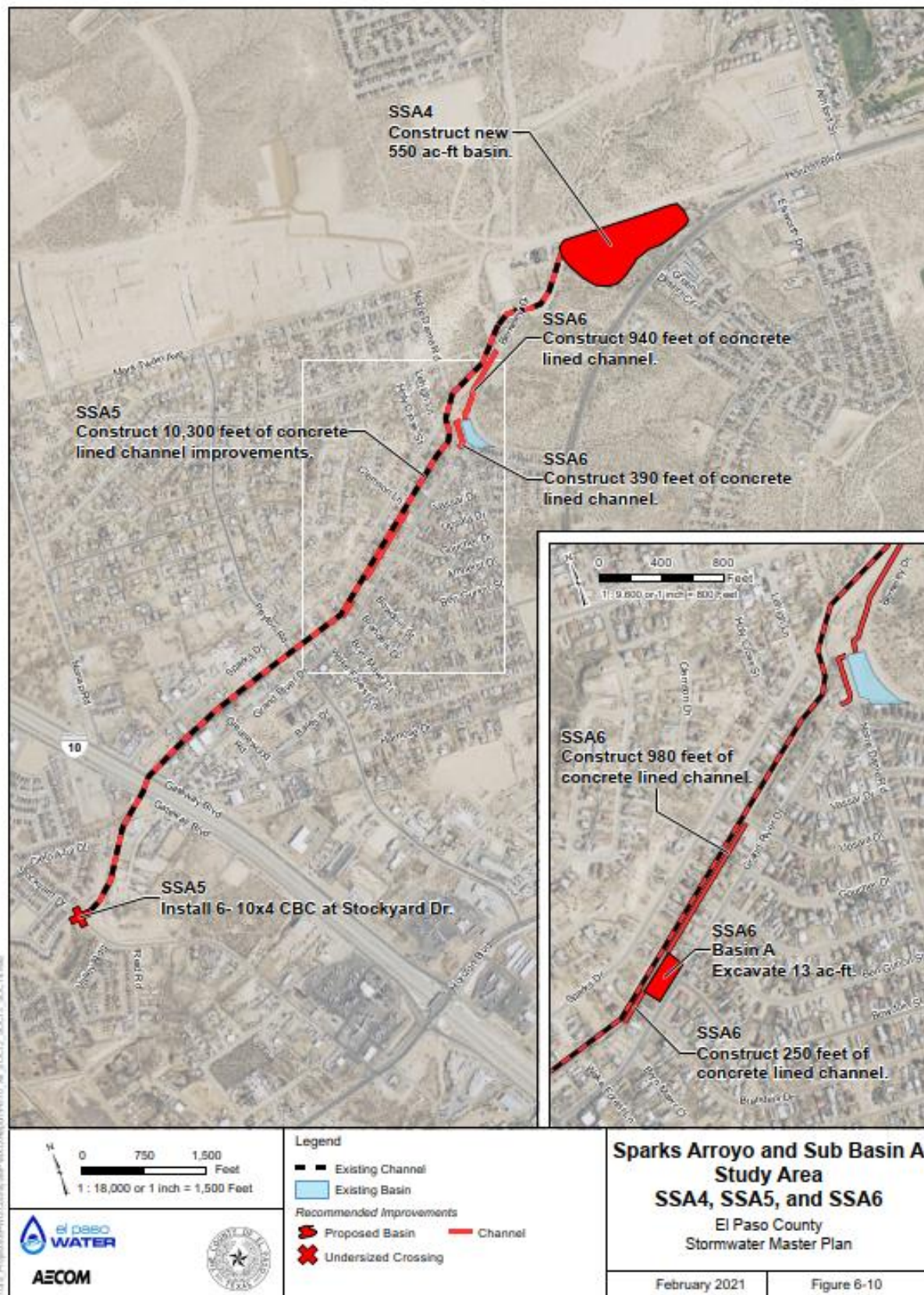


Figure 4D-5: Figure 6-10 from the El Paso County Stormwater Master Plan (AECOM, 2021)
4D-6. Flood Mitigation Project ID: 143000021

Name: SOC4

Description: Sediment/Detention Basin at “Mankato Arroyo”.

Affected Jurisdictions: El Paso County, City of Socorro, Athena West Colonia

Discussion on Cultural Resources Background: The project area is located within the EPCWID National Register District. As such, Section 106 of the NHPA will take effect and a cultural resources survey of the entire project area will be required to evaluate any unrecorded, potential cultural resources that can contribute to this district, and determine if any adverse effects will happen on historic properties.

Discussion on Flood Risk: The El Paso County Stormwater Master Plan (AECOM, 2021) describes the existing flood risk for the project as the following:

“Uncontrolled flows originating in the upper end of the watershed pose a flood risk to residences upstream of the intersection of Stream 5.5 and the Mesa Spur Drain. Runoff from undeveloped areas along the mesa is conveyed through the watershed via Stream 5.5. Additional runoff and sediment are accumulated as flows travel through the steepest part of the watershed. Several feet of sediment have been observed on Gateway E. Drive after major storm events. Approximately 1,000 feet upstream of the intersection of Stream 5.5 and Mankato Road, development and agricultural lands are present on both sides of the arroyo. The arroyo passes over a low water crossing at Mankato Road, depositing sediment before converging with the Mesa Spur Drain. The flows in the arroyo are uncontrolled and pose a flood risk to residences and agricultural lands adjacent to Stream 5.5.”

Project Description: The El Paso County Stormwater Master Plan (AECOM, 2021) describes the project as the following:

“This project involves constructing a detention basin at the lower end of Stream 5.5. The proposed embankment is approximately 29 feet tall and requires approximately 11 acre-feet of excavation for flood and sediment pool storage. The outlet structure for this basin consists of a 2-foot by 2-foot CBC. The basin has two primary purposes:

- Capture sediment being transported down the arroyos and reduce deposition in the downstream channels and floodplains.
- Detain the flood flows coming down the arroyos and release them slowly from the detention basin at a rate that will reduce flooding downstream.”

Estimated Cost for FMP:

Total FMP Cost	
Subtotal 1 – El Paso County 2010 SWMP Construction Cost (February 2010)	\$ 739,907
Subtotal 2 – RFP Construction Cost (September 2020, Using CCI)	\$ 980,000
Subtotal 3 – El Paso County 2021 SWMP Additional Construction Cost due to Atlas 14	\$ 70,000
Subtotal 4 – RFP Construction Contingency (35%)	\$ 367,500
Total Construction Cost	\$ 1,417,500
Subtotal 5 – El Paso County 2010 Land Acquisition Cost (February 2010)	\$ 178,626
Subtotal 6 – RFP Land Acquisition Cost (September 2020, Using CPI)	\$ 214,508
Subtotal 7 – RFP Final Design Cost (20%)	\$ 283,500
Subtotal 8 – RFP Permitting Cost (10%)	\$ 141,750
Subtotal 9 – RFP Construction Oversight Cost (8%)	\$ 113,400
Subtotal 10 – RFP Geotech Cost (15%)	\$ 212,625
Total Non-Construction Cost	\$ 965,783
Total FMP Cost	\$ 2,383,000

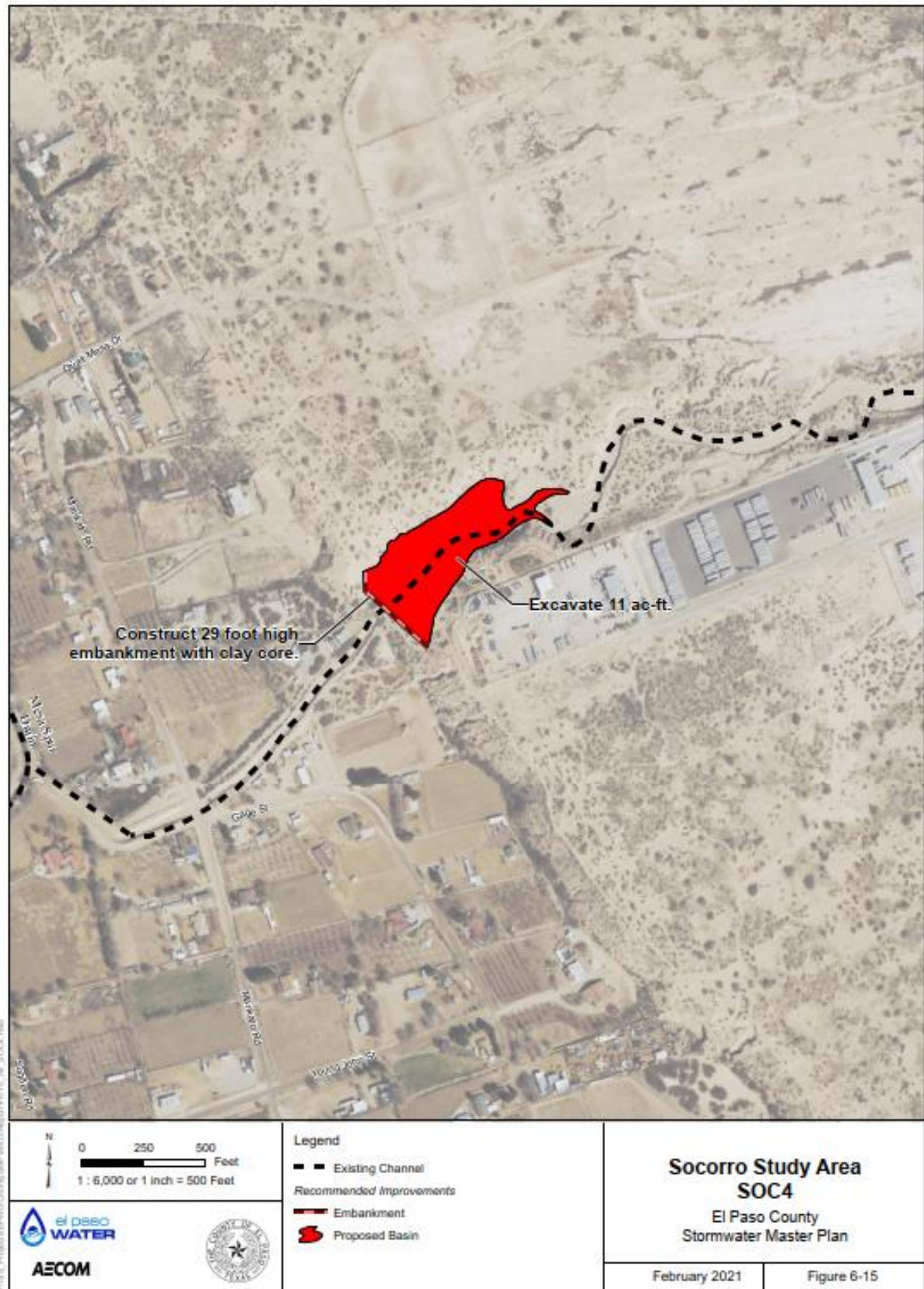


Figure 4D-6: Figure 6-15 from the El Paso County Stormwater Master Plan (AECOM, 2021)

4D-7. Flood Mitigation Project ID: 143000024

Name: MON3

Description: Sediment/Retention Basin.

Affected Jurisdictions: Homestead Meadows North CDP, Homestead Meadows South CDP, Butterfield CDP, El Paso County

Discussion on Cultural Resources Background: One prehistoric archaeological site is located within the proposed project area with undetermined NRHP eligibility. Given the proposed project includes significant ground disturbance and potential for cultural resources, SWCA recommends a structured cultural resources survey of the project area for due diligence.

Discussion on Flood Risk: The El Paso County Stormwater Master Plan (AECOM, 2021) describes the existing flood risk for the project as the following:

“Uncontrolled flows originating in the slopes above Flowpaths M-2, M-3, and M-5 spread out over a vast area, merging and diverging from each other at various points. The majority of the flows concentrate at a narrow opening between hills located approximately 2,000 feet south of the intersection of Stagecoach Drive and Old Butterfield Trail. From here, these flows continue westward down Flowpath M-3 contributing to flooding of numerous residences and conveying debris that overwhelms a series of culvert crossings. These flows ultimately terminate at several large natural depressions. Several residences are located within this natural depression and are impacted by major storm events.”

Project Description:

The El Paso County Stormwater Master Plan (AECOM, 2021) describes the project as the following:

“This project involves constructing a detention basin on Flowpath M-3. The proposed basin controls flows from the upper end of the watershed and contains two embankments. The proposed embankments for the basin are approximately 25 feet tall and 27 feet tall and require approximately 4 acre-feet of excavation for flood and sediment pool storage. The outlet structure for the basin consists of two 4-foot by 4-foot CBCs. The basin has two primary purposes:

- Capture sediment being transported down the arroyos and reduce deposition in the downstream channels and floodplains.
- Detain the flood flows coming down the arroyos and release them slowly from the detention basin at a rate that will reduce flooding downstream.”

Estimated Cost for FMP:

Total FMP Cost	
Subtotal 1 – El Paso County 2021 SWMP Construction Cost (February 2020)	\$ 12,970,769
Subtotal 2 – RFP Construction Cost (September 2020, using CCI)	\$ 13,088,002
Subtotal 3 – RFP Construction Contingency (35%)	\$ 4,580,801
Total Construction Cost	\$ 17,668,803
Subtotal 4 – El Paso County 2021 SWMP Land Acquisition Cost (February 2010)	\$ -
Subtotal 5 – RFP Land Acquisition Cost (September 2020, using CPI)	\$ -
Subtotal 6 – RFP Final Design Cost (20%)	\$ 3,533,761
Subtotal 7 – RFP Permitting Cost (10%)	\$ 1,766,880
Subtotal 8 – RFP Construction Oversight Cost (8%)	\$ 1,413,504
Subtotal 9 – RFP Geotech Cost (15%)	\$ 2,650,320
Total Non-Construction Cost	\$ 9,364,465
Total FMP Cost	\$ 27,033,000

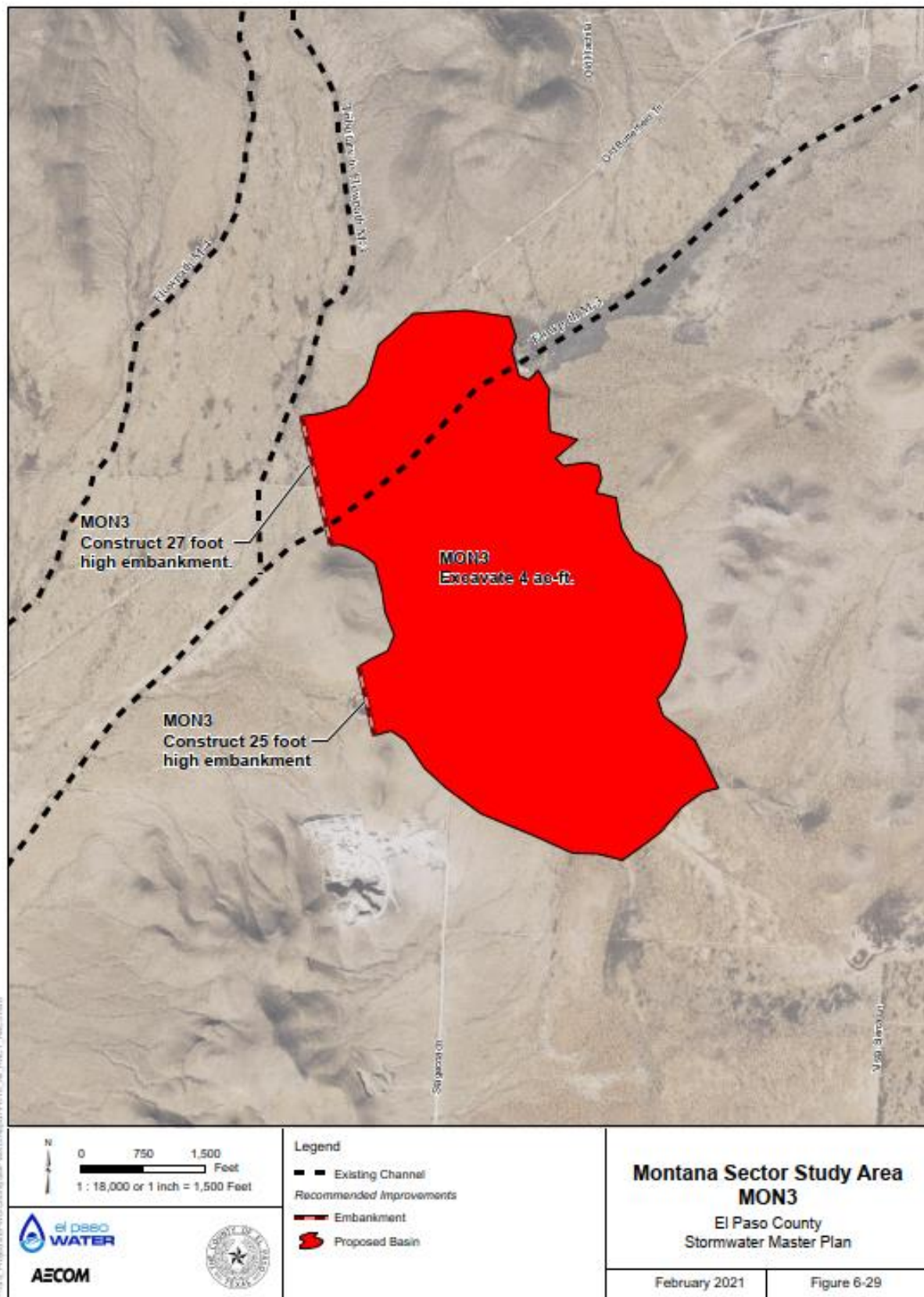


Figure 4D-7: Figure 6-29 from the El Paso County Stormwater Master Plan (AECOM, 2021)

4D-8. Flood Mitigation Project ID: 143000025

Name: HAC3

Description: Sediment/Retention Basin.

Affected Jurisdictions: El Paso County

Discussion on Cultural Resources Background: El Paso County Water Improvement District No. 1 (EPCWID) National Register District is located 770 feet (234 meters) to the west of the proposed project area. The EPCWID National Register District is an operational, historic-age irrigation system designed by the Bureau of Reclamation in the early twentieth century. The historic irrigation system is located within the El Paso Valley of the Rio Grande River, serving over 56,000 acres of farmland through the major Franklin and Riverside canals. The system helped to transform local and statewide irrigation agriculture as El Paso Valley shifted exclusively to the production of cash crops. Only publicly owned properties are included within this district; this does not include privately owned features, such as ditches and fields, served by the publicly owned portions of the system, or the thousands of properties lying between the ditches defining the system (National Park Service 1997). As the project area is located within a National Register District, Section 106 of the NHPA will take effect and a cultural resources survey of the entire project area will be required to evaluate any unrecorded, potential cultural resources that can contribute to this district, and determine if any adverse effects will happen on historic properties.

Discussion on Flood Risk: The El Paso County Stormwater Master Plan (AECOM, 2021) describes the existing flood risk for the project as the following:

“Uncontrolled flows originating in the upper end of the watershed are causing flooding at the mouth of Stream 8, upstream of Northloop Drive. Runoff from undeveloped areas along the mesa is conveyed through the watershed via Stream 8. Additional runoff and sediment are accumulated as flows travel through the steepest part of the watershed. Approximately 1,500 feet east of the intersection of Virrey Road and Reina Road, the arroyo becomes undefined, with no clear outfall to the Mesa Drain. At this location, flows spread out flooding a number of residences and depositing sediment.”

Project Description: The El Paso County Stormwater Master Plan (AECOM, 2021) describes the project as the following:

“This project involves constructing a retention basin at the lower end of Stream 8. The proposed embankment is approximately 6 feet tall and requires approximately 68 acre-feet of excavation for flood and sediment pool storage. The outlet structure for the basin consists of a 2-foot by 2-foot CBC. The basin has two primary purposes:

- Capture sediment being transported down the arroyos and reduce deposition in the downstream channels and floodplains; and
- Retain the flood flows coming down the arroyos and allow minimal releases.”

Estimated Cost for FMP:

Total FMP Cost	
Subtotal 1 – El Paso County 2010 SWMP Construction Cost (February 2010)	\$ 1,582,638
Subtotal 2 – RFP Construction Cost (September 2020, Using CCI)	\$ 2,100,000
Subtotal 3 – El Paso County 2021 SWMP Additional Construction Cost due to Atlas 14	\$ 120,000
Subtotal 4 – RFP Construction Contingency (35%)	\$ 777,000
Total Construction Cost	\$ 2,997,000
Subtotal 5 – El Paso County 2010 Land Acquisition Cost (February 2010)	\$ 27,833
Subtotal 6 – RFP Land Acquisition Cost (September 2020, Using CPI)	\$ 33,424
Subtotal 7 – RFP Final Design Cost (20%)	\$ 599,400
Subtotal 8 – RFP Permitting Cost (10%)	\$ 299,700
Subtotal 9 – RFP Construction Oversight Cost (8%)	\$ 239,760
Subtotal 10 – RFP Geotech Cost (15%)	\$ 449,550
Total Non-Construction Cost	\$ 1,621,834
Total FMP Cost	\$ 4,619,000

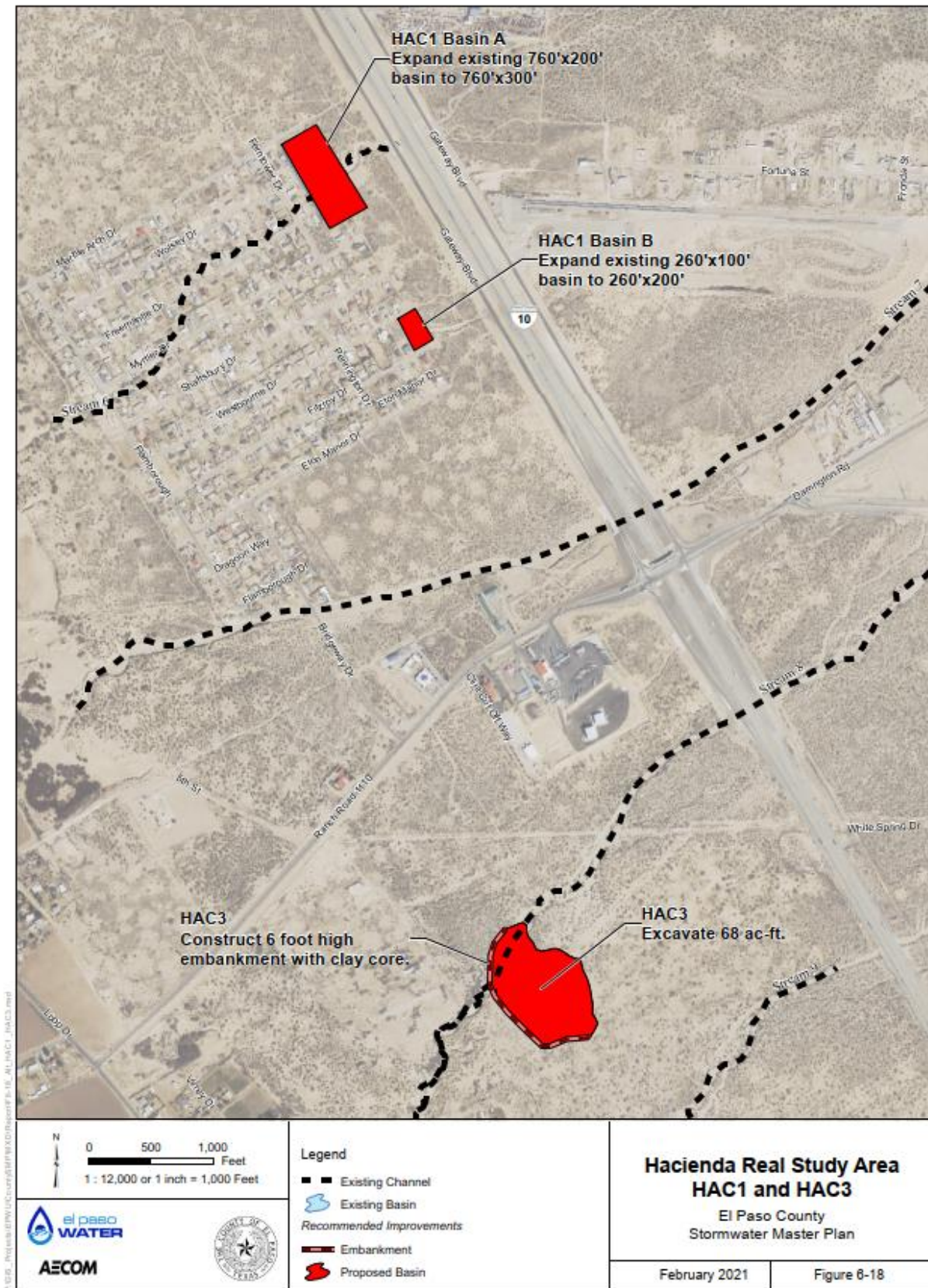


Figure 4D-8: Figure 6-18 from the El Paso County Stormwater Master Plan (AECOM, 2021)

4D-9. Flood Mitigation Project ID: 143000097

Name: NW16

Description: Expand channel from Village Ct to Doniphan Dr.

Affected Jurisdictions: City of El Paso

Discussion on Cultural Resources Background: The proposed project area is located within the Elephant Butte Irrigation National Register District. The Elephant Butte Irrigation National Register District is an operational, historic-age irrigation system designed by the Bureau of Reclamation in the early twentieth century. The historic irrigation system is located within the Rincon and Mesilla Valley of the Rio Grande River, serving over 100,000 acres of farmland between New Mexico and Texas. The system was developed in 1906 by the Bureau of Reclamation, impacting local and statewide irrigation agriculture as El Paso Valley shifted exclusively to the production of cash crops. Only publicly owned properties are included within this district; this does not include privately owned features, such as ditches and fields, served by the publicly owned portions of the system (National Park Service 1997). As the project area is located within a National Register District, Section 106 of the NHPA will take effect and a cultural resources survey of the entire project area will be required to evaluate any unrecorded, potential cultural resources that can contribute to this district, and determine if any adverse effects will happen on historic properties.

Discussion on Flood Risk: The El Paso Water Utilities and City of El Paso Stormwater Master Plan (AECOM, 2009) describes the existing flood risk for the project (White Spur Drain – Upstream) as the following:

“East extent of White Spur Drain is undersized.”

Project Description:

The El Paso Water Utilities and City of El Paso Stormwater Master Plan (AECOM, 2009) describes the project as the following:

“The hydraulic analysis indicates the channel in the upper section of the White Spur Drain is undersized. The existing concrete-lined channel has a depth of 3 feet, with side slopes of 1.25H:1V, and a bottom width of 6 feet. The proposed channel should be 4.5 feet deep, with side slopes of 1.25H:1V and a bottom width of 6 feet.”

Estimated Cost for FMP:

Total FMP Cost	
Subtotal 1 – EPW 2009 SWMP Construction Cost (March 2009)	\$ 561,481
Subtotal 2 – RFP Construction Cost (September 2020, using CCI)	\$ 760,000
Subtotal 3 – RFP Construction Contingency (35%)	\$ 266,000
Total Construction Cost	\$ 1,026,000
Subtotal 4 – EPW 2009 SWMP Land Acquisition Cost (March 2009)	\$ -
Subtotal 5 – RFP Land Acquisition Cost (September 2020, using CPI)	\$ -
Subtotal 6 – RFP Final Design Cost (20%)	\$ 205,200
Subtotal 7 – RFP Permitting Cost (10%)	\$ 102,600
Subtotal 8 – RFP Construction Oversight Cost (8%)	\$ 82,080
Subtotal 9 – RFP Geotech Cost (15%)	\$ 153,900
Total Non-Construction Cost	\$ 543,780
Total FMP Cost	\$ 1,570,000



Figure 4D-9: Figure 8-5-12 from EPWater & COEP Stormwater Master Plan (AECOM, 2021)

4D-10. Flood Mitigation Project ID: 143000100

Name: NE3B

Description: Alcan Pond: new catch basin to capture FP15 upstream.

Affected Jurisdictions: City of El Paso

Discussion on Cultural Resources Background: No cultural resources are located within or immediately adjacent to the project area, and the area has not been previously surveyed for cultural resources. Given that the proposed design includes facility improvements, SWCA recommends no cultural resources survey of the project area are necessary based on current design plans.

Discussion on Flood Risk: The City of El Paso Stormwater Master Plan (AECOM, 2021) describes the existing flood risk for the project as the following:

“Undersized crossings, unfinished earthen channels, and sediment transfer clogging culverts.”

Project Description: The City of El Paso Stormwater Master Plan (AECOM, 2021) describes the existing flood risk for the project as the following:

“Construct Alcan Pond: new catch basin to capture Flow Path 15 upstream.”

Estimated Cost for FMP:

Total FMP Cost	
Subtotal 1 – EPW 2021 SWMP Construction Cost (December 2018)	\$ 10,000,000
Subtotal 2 – RFP Construction Cost (September 2020, using CCI)	\$ 10,280,000
Subtotal 3 – RFP Construction Contingency (35%)	\$ 3,598,000
Total Construction Cost	\$ 13,878,000
Subtotal 4 – EPW 2021 SWMP Land Acquisition Cost (December 2018)	\$ -
Subtotal 5 – RFP Land Acquisition Cost (September 2020, using CPI)	\$ -
Subtotal 6 – RFP Final Design Cost (20%)	\$ 2,775,600
Subtotal 7 – RFP Permitting Cost (10%)	\$ 1,387,800
Subtotal 8 – RFP Construction Oversight Cost (8%)	\$ 1,110,240
Subtotal 9 – RFP Geotech Cost (15%)	\$ 2,081,700
Total Non-Construction Cost	\$ 7,355,340
Total FMP Cost	\$ 21,234,000



Figure 4D-10: Figure 8-4-3 from EPWater & COEP Stormwater Master Plan (AECOM, 2021)

4D-11. Flood Mitigation Project ID: 143000105

Name: EA10A

Description: Build sediment/detention basin upstream of Paseo del Este Drive.

Affected Jurisdictions: City of El Paso, City of Socorro, El Paso County

Discussion on Cultural Resources Background: No cultural resources are within or immediately adjacent to the project area. Given the lack of cultural resources, and overall, shallowly buried, weakly developed soils within the area, SWCA recommends no cultural resources survey of the project area, based on current design plans.

Discussion on Flood Risk: The City of El Paso Stormwater Master Plan (AECOM, 2021) describes the existing flood risk for the project as the following:

“Undersized crossings, unfinished earthen channels, and sediment transfer clogging culverts.”

Project Description: The City of El Paso Stormwater Master Plan (AECOM, 2021) describes the existing flood risk for the project as the following:

“The proposed improvements at Mercantile Channel consist of two phases, as shown on Figure. Phase 1 consists of a 140 acre-feet desilting/detention basin. The desilting/detention basin would be located upstream of the Mercantile Channel crossing at Mercantile Avenue. Phase 2 consists of one new concrete-lined channel section. The concrete-lined channel section would consist of a trapezoidal section with approximate dimensions consisting of a 20-foot bottom, 1H:1V side slopes and 5-foot normal depth.”

Estimated Cost for FMP:

Total FMP Cost	
Subtotal 1 – EPW 2009 SWMP Construction Cost (March 2009)	\$ 3,438,519
Subtotal 2 – RFP Construction Cost (September 2020, using CCI)	\$ 4,630,000
Subtotal 3 – RFP Construction Contingency (35%)	\$ 1,620,500
Total Construction Cost	\$ 6,250,500
Subtotal 4 – EPW 2009 SWMP Land Acquisition Cost (March 2009)	\$ 67,766
Subtotal 5 – RFP Land Acquisition Cost (September 2020, using CPI)	\$ 83,536
Subtotal 6 – RFP Final Design Cost (20%)	\$ 1,250,100
Subtotal 7 – RFP Permitting Cost (10%)	\$ 625,050
Subtotal 8 – RFP Construction Oversight Cost (8%)	\$ 500,040
Subtotal 9 – RFP Geotech Cost (15%)	\$ 937,575
Total Non-Construction Cost	\$ 3,396,301
Total FMP Cost	\$ 9,647,000

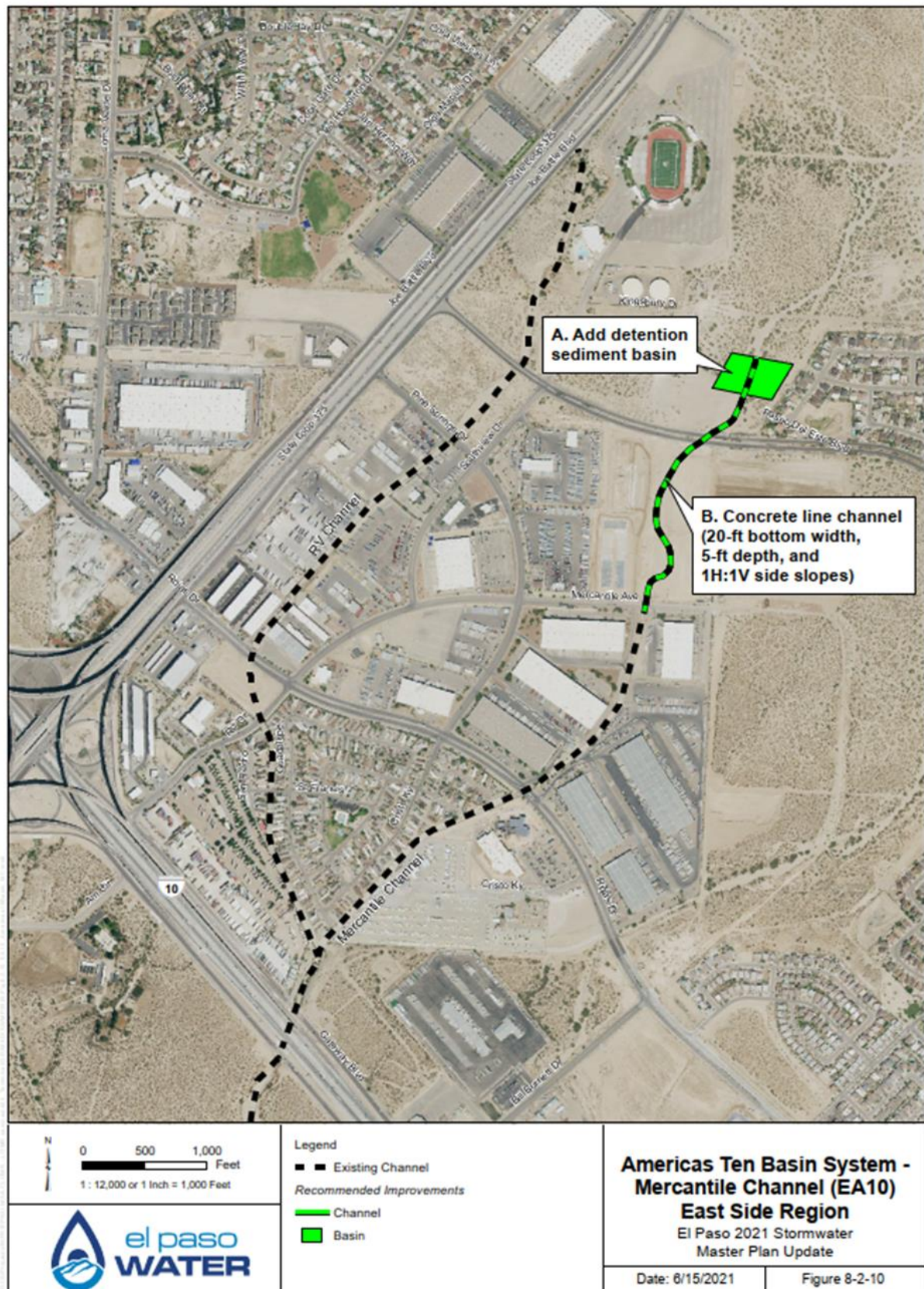


Figure 4D-11: Figure 8-2-10 from EPWater & COEP Stormwater Master Plan (AECOM, 2021)

4D-12. Flood Management Evaluation ID: 143000111

Name: NW3

Description: Construction of new larger capacity Doniphan Pump Station to replace PS1, with new force main directly to the Rio Grande. Install new catch basin with mechanical bar screen upstream of PS2.

Affected Jurisdictions: City of El Paso

Discussion on Cultural Resources Background: The proposed project area is located within the Elephant Butte Irrigation National Register District. As the project area is located within a National Register District, Section 106 of the NHPA is triggered, however, as the project consists of facility upgrades and is located along a developed, concrete roadway, SWCA proposes no cultural resources survey and instead a consultation with THC for concurrence of no survey.

Discussion on Flood Risk: The City of El Paso Stormwater Master Plan (AECOM, 2021) describes the existing flood risk for the project as the following:

“PSs in Doniphan system are undersized.”

The El Paso Water Utilities and City of El Paso Stormwater Master Plan (URS, MCI, 2009) describes the existing flood risk for the project as the following:

“The two pump stations (PS13 and PS14) located along Doniphan Drive currently take flow from the roadway and discharge it into the Keystone Dam Outlet Conduit. This is not a preferred condition as it can adversely affect the functionality of the Keystone Dam Outlet Conduit and the pump stations. The proposed solution is to have the pump stations discharge directly into Doniphan Ditch via a 36-inch pipe for PS14 and a 42-inch pipe for PS13, as shown on Figure 8-36. As PS13 is within the State of New Mexico, coordination with relevant stakeholders will be required. This project will only be possible after projects NW1 and NW2 are complete.”

Project Description: The City of El Paso Stormwater Master Plan (AECOM, 2021) describes the existing flood risk for the project as the following:

“Acquire land, construct a permanent wetland, install a storm drain system to Doniphan Drive, construct pipeline to Doniphan Pump Station and build new pump station to control flood levels.”

Estimated Cost for FME:

Total FMP Cost	
Subtotal 1 – Feasibility Study Construction Cost (URS, July 2014)	\$ 6,680,900
Subtotal 2 – RFP Construction Cost (September 2020, using CCI)	\$ 7,810,000
Subtotal 3 – RFP Construction Contingency (35%)	\$ 2,733,500
Total Construction Cost	\$ 10,543,500
Subtotal 4 – EPW 2021 SWMP Land Acquisition Cost (December 2018)	\$ -
Subtotal 5 – RFP Land Acquisition Cost (September 2020, using CPI)	\$ -
Subtotal 6 – RFP Final Design Cost (20%)	\$ 2,108,700
Subtotal 7 – RFP Permitting Cost (10%)	\$ 1,054,350
Subtotal 8 – RFP Construction Oversight Cost (8%)	\$ 843,480
Subtotal 9 – RFP Geotech Cost (15%)	\$ 1,581,525
Total Non-Construction Cost	\$ 5,588,055
Total FMP Cost	\$ 16,132,000

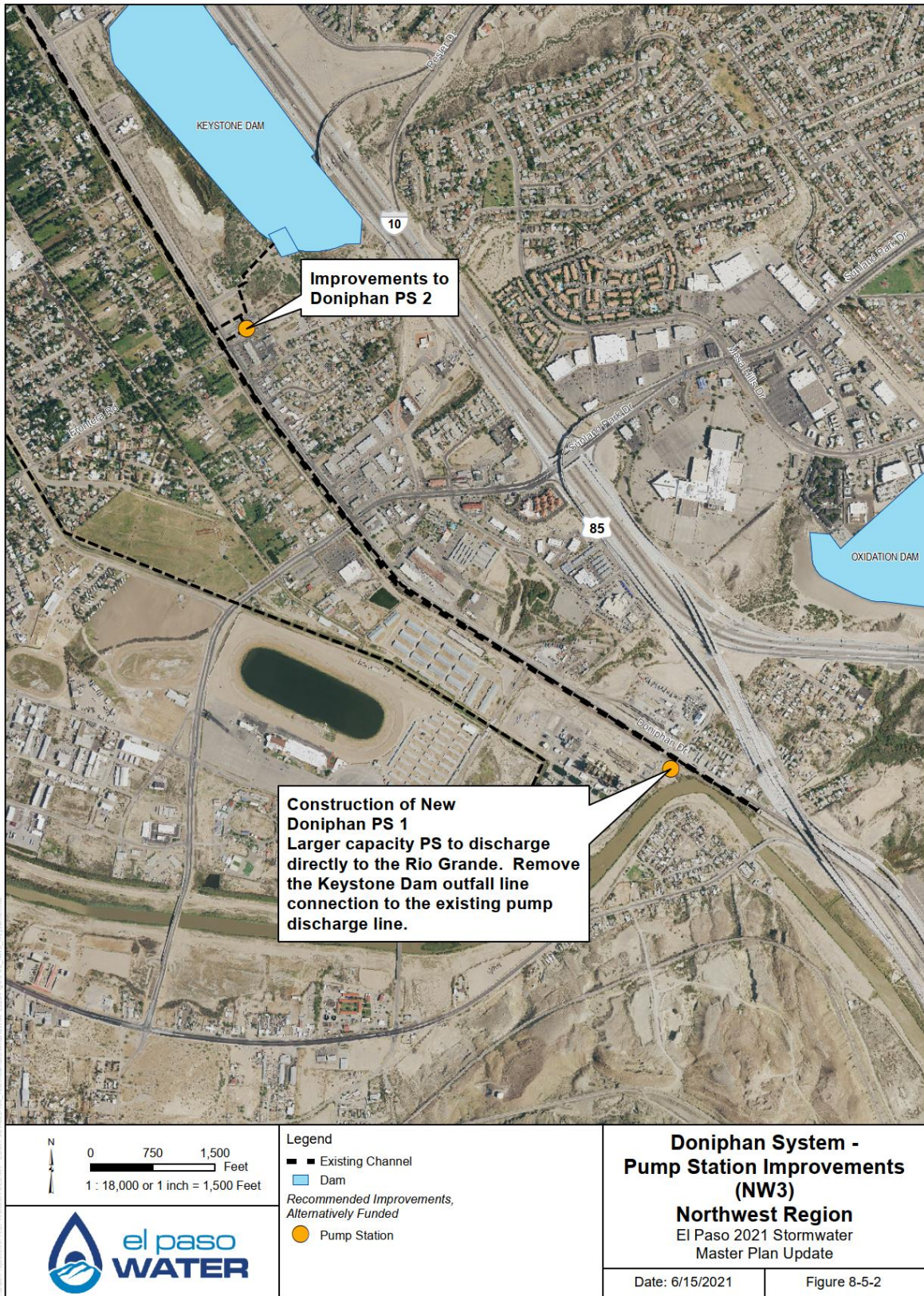


Figure 4D-12: Figure 8-5-2 from EPWater & COEP Stormwater Master Plan (AECOM, 2021)

4D-13. Flood Mitigation Project ID: 143000113

Name: NW26

Description: Acquire land, construct a permanent wetland, install a storm drain system to Doniphan Drive, construct pipeline to Doniphan Pump Station, and build new pump station to control flood levels.

Affected Jurisdictions: City of El Paso, City of Sunland Park (New Mexico)

Discussion on Cultural Resources Background: No cultural resources are located within or immediately adjacent to the project area. The Elephant Butte Irrigation National Register District is located 0.2 miles (0.3 kilometers) to the northeast of the proposed project area. As such, SWCA recommends that a structured cultural resources survey of the final design plan, for due diligence, be performed to accurately assess the presence and significance of unrecorded cultural resources within its boundaries, especially in relation to the Elephant Butte Irrigation National Register District.

Discussion on Flood Risk: The City of El Paso Stormwater Master Plan (AECOM, 2021) describes the existing flood risk for the project as the following:

“Reduce flooding of Doniphan Drive and create control of the Montoya Drain System & Keystone Outfall with new pump station”

Project Description: The City of El Paso Stormwater Master Plan (AECOM, 2021) describes the existing flood risk for the project as the following:

“Acquire land, construct a permanent wetland, install a storm drain system to Doniphan Drive, construct pipeline to Doniphan Pump Station and build new pump station to control flood levels.”

Estimated Cost for FMP:

Total FMP Cost	
Subtotal 1 – EPW 2021 SWMP Construction Cost (December 2018)	\$ 16,582,175
Subtotal 2 – RFP Construction Cost (September 2020, using CCI)	\$ 17,058,829
Subtotal 3 – Planning, Design & Const. of Nature-based Solution (Wetland) (Jan 2015)	\$ 101,175
Subtotal 4 – RFP Nature-Based Solution Cost (Wetland) (September 2020, using CCI)	\$ 116,668
Subtotal 3 – RFP Construction Contingency (35%)	\$ 5,970,590
Total Construction Cost	\$ 23,247,000
Subtotal 4 – EPW 2021 SWMP Land Acquisition Cost (December 2018)	\$ -
Subtotal 5 – RFP Land Acquisition Cost (September 2020, using CPI)	\$ -
Subtotal 6 – RFP Final Design Cost (20%)	\$ 4,649,400
Subtotal 7 – RFP Permitting Cost (10%)	\$ 2,324,700
Subtotal 8 – RFP Construction Oversight Cost (8%)	\$ 1,859,760
Subtotal 9 – RFP Geotech Cost (15%)	\$ 3,487,050
Total Non-Construction Cost	\$ 12,320,910
Total FMP Cost	\$ 35,568,000



Figure 4D-13: Figure 8-5-14 from EPWater & COEP Stormwater Master Plan (AECOM, 2021)

4D-14. Flood Mitigation Project ID: 143000116

Name: EA9A

Description: Build sediment/detention basin upstream of Paseo del Este Drive.

Affected Jurisdictions: City of El Paso, City of Socorro

Discussion on Cultural Resources Background: No cultural resources are within or immediately adjacent to the project area. Given the lack of cultural resources, and overall, shallowly buried, weakly developed soils within the area, SWCA recommends no cultural resources survey of the project area, based on current design plans.

Discussion on Flood Risk: The City of El Paso Stormwater Master Plan (AECOM, 2021) describes the existing flood risk for the project as the following:

“Undersized crossings, unfinished earthen channels, and sediment transfer clogging culverts.”

Project Description: The City of El Paso Stormwater Master Plan (AECOM, 2021) describes the existing flood risk for the project as the following:

“The proposed improvements at RV Channel consist of two phases, as shown on Figure 8-14. Phase 1 consists of an 80 acre-feet desilting/detention basin. The desilting/detention basin would be located upstream of the RV Channel crossing at Paseo del Este Boulevard. Phase 2 consists of three concrete-lined channel sections. The first concrete-lined channel section would consist of a trapezoidal section with approximate dimensions consisting of a 20-foot bottom, 1H:1V side slopes and 4-foot normal depth. The second concrete-lined channel section would consist of a trapezoidal section with approximate dimensions consisting of a 30-foot bottom, 1H:1V side slopes and 4-foot normal depth. The third concrete-lined channel section would consist of a trapezoidal section with approximate dimensions consisting of a 40-foot bottom, 1H:1V side slopes and 2-foot normal depth, located downstream of the junction point with the Mercantile Channel heading towards IH-10.”

Estimated Cost for FMP:

Total FMP Cost	
Subtotal 1 – EPW 2009 SWMP Construction Cost (March 2009)	\$ 4,273,333
Subtotal 2 – RFP Construction Cost (September 2020, using CCI)	\$ 5,760,000
Subtotal 3 – RFP Construction Contingency (35%)	\$ 2,016,000
Total Construction Cost	\$ 7,776,000
Subtotal 4 – EPW/COEP 2009 SWMP Land Acquisition Cost (March 2009)	\$ 3,155,850
Subtotal 5 – RFP Land Acquisition Cost (Land is Acquired per EPWater Coordination)	\$ -
Subtotal 6 – RFP Final Design Cost (20%)	\$ 1,555,200
Subtotal 7 – RFP Permitting Cost (10%)	\$ 777,600
Subtotal 8 – RFP Construction Oversight Cost (8%)	\$ 622,080
Subtotal 9 – RFP Geotech Cost (15%)	\$ 1,166,400
Total Non-Construction Cost	\$ 4,121,280
Total FMP Cost	\$ 11,897,000

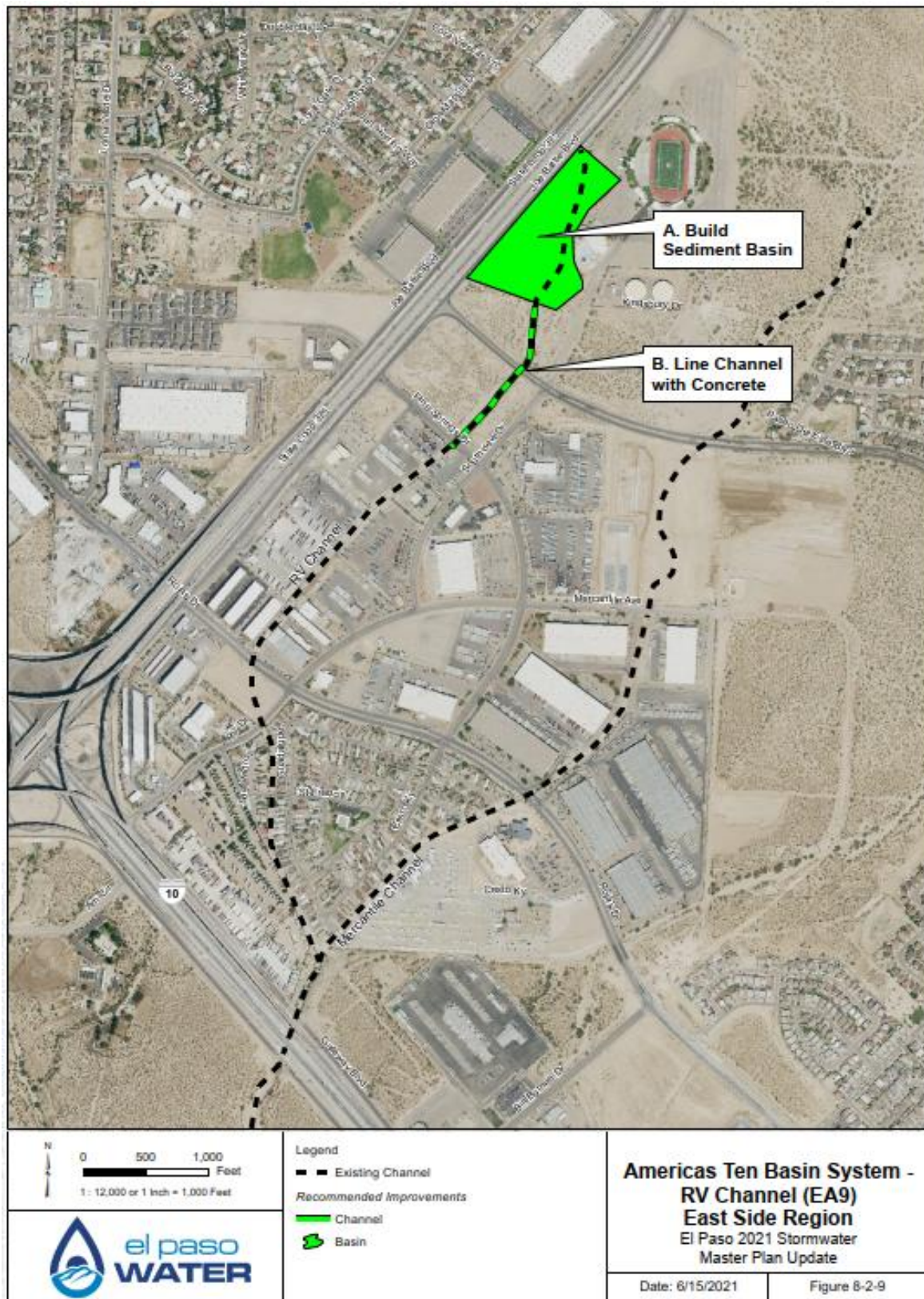


Figure 4D-14: Figure 8-2-9 from EPWater & COEP Stormwater Master Plan (AECOM, 2021)

4D-15. Flood Mitigation Project ID: 143000117

Name: Gateway Ponds

Description: Phase I includes two major components.

1. Proposed detention basin construction (North Side of I-10), including an intertie between the existing North Pond and Proposed Pond
2. Proposed construction of large capacity pump station (PS), partially equipped and force main (North Side of I-10), routed to existing gravity outfall opening at the existing pond at the south Side of I-10 along Durazno Avenue

Phase II includes two major components.

1. Proposed construction of fully equipping PS North of I-10 and proposed force main to a proposed elevated outfall structure at the Rio Grande.
2. Proposed construction to cut and plug the force main of Phase I, fill it with grout and abandon it in-place

Affected Jurisdictions: City of El Paso, TXDOT, USIBWC

Discussion on Cultural Resources Background:

Discussion on Flood Risk: The project area has been flood-prone since the construction of I-10 in the 1960's. In this section of I-10, adjacent to the existing ponds is a low area of the interstate situated between two overpasses, one at Copia Street and one at Piedras Street. Additionally, this section of I-10 intercepts a large urban watershed. Per recent hydrologic modeling, during large storm events (2% AC flood and greater) flood flows conveyed by city streets rapidly fill the existing detention pond at the north side of I-10, and overflows flooding a large area north of I-10. This area overflows through the Piedras Street overpass to the low area south of I-10, filling the existing pond south of I-10 and flooding a large area between I-10 and the Union Pacific Railroad (UPRR) embankment. In addition, flooding occurs within the urban area south of the UPRR due to pond discharges into the gravity line intended to drain that area.

The basic concept for addressing the flooding is to add to existing flood detention and provide expanded pump station capacity. The existing detention pond located across I-10 on the south side of the interstate, is interconnected with the existing north detention pond by a 72-inch diameter pipe; however, during the 2% AC and 1% AC storm events, the north side pond is inundated, fills and overtops before the south side detention pond can fully fill, since the volume of flow from the watershed far exceeds the capacity of the 72-inch diameter intertie pipe. Once filled; however, under these two storm events, the south side detention pond will also overtop. The proposed additional storage capacity in conjunction with the proposed pump

station (PS) will serve to flatten the peak flow before overtopping occurs and the proposed PS will not only remove stormwater from the detention ponds during such events, but it is necessary to keep the pond system in a dry state before the next storm event. Therefore, when the next storm event occurs, the pond system will have 100% available capacity to capture the flow and effectively manage it through the use of the PS that will convey the stormflow to the Rio Grande.

Project Description-Gateway Ponds System: The proposed project will include two phases. Phase I is designed to fully control the 2% AC flood, i.e. all flood flows are contained within the expanded detention pond north of I-10 and within the existing pond south of I-10. Following Phase I during the 2% AC flood, I-10 is estimated to not overflow, and flooding is removed from large areas north and south of I-10. Phase II expands this protection to control the 1% AC flood.

Phase I is proposed to include a new 79-acre-foot detention pond, located in the vicinity of the existing detention pond on the north side of I-10. Also included in Phase I is a proposed 350-CFS PS, but not fully equipped. This PS would be equipped with two proposed high flow low head pumps generally, at a capacity of approximately 58.33-CFS, to be used to drain the pond system, so that the ponds can be kept available for storm events with 100% holding capacity. The force main associated with the Phase I pumping condition would be an approximately sized 42-inch diameter force main. This force main at 2,000-LF would convey flow from the PS to the existing dual 5-foot by 5-foot box culverts that serve as the overflow line for the existing south detention pond. This overflow line is the Cebada conduit that conveys stormflow to the existing Cebada PS.

Under Phase II, the proposed PS of Phase I would be fully equipped with 6-pumps total, each with a capacity of approximately 58.33-CFS for the total pumping capacity of 350-CFS. The associated force main would generally be sized at 96-inches in diameter with a length of approximately 6,000-LF. At the outfall location at the Rio Grande, an elevated discharge structure would allow pumped flow to enter the river from above the water surface of the river.

Estimated Cost for FMP:

Total FMP Cost	
Subtotal 1-RFP Construction Cost	\$ 8,568,340
Subtotal 2-RFP PS Cost, Partially Equiped, FM to South Pond Overflow	\$ 16,945,500
Total Construction Cost	\$ 25,513,840
Subtotal 3-RFP EPWater Land Acquisition	\$ 4,000,000
Subtotal 4-RFP Preliminary Engineering Cost (10%)	\$ 2,551,384
Subtotal 5-RFP Final Design / Bidding Cost (20%)	\$ 5,102,768
Subtotal 6-RFP Construction Administration Cost (8%)	\$ 2,041,107
Subtotal 7-RFP Construction Inspection Cost (15%)	\$ 3,827,076
Total Non-Construction Cost	\$ 17,522,335
Phase I Total FMP Cost	\$ 46,036,175

Total FMP Cost	
Subtotal 1-Fully Equipping PS, FM & Elevated Outfall Structure at Rio Grande	\$ 40,000,000
Subtotal 2-Cutting / Plugging Phase I FM and Tie-in to South Pond Overflow	\$ 2,607,000
Total Construction Cost	\$ 42,607,000
Subtotal 3-RFP Preliminary Engineering Cost (10%)	\$ 4,260,700
Subtotal 4-RFP Final Design / Bidding Cost (20%)	\$ 8,521,400
Subtotal 5-RFP Construction Administration Cost (8%)	\$ 3,408,560
Subtotal 6-RFP Construction Inspection Cost (15%)	\$ 6,391,050
Total Non-Construction Cost	\$ 22,581,710
Phase II Total FMP Cost	\$ 65,188,710

Phase I & Phase II Total FMP Cost	\$ 108,224,885
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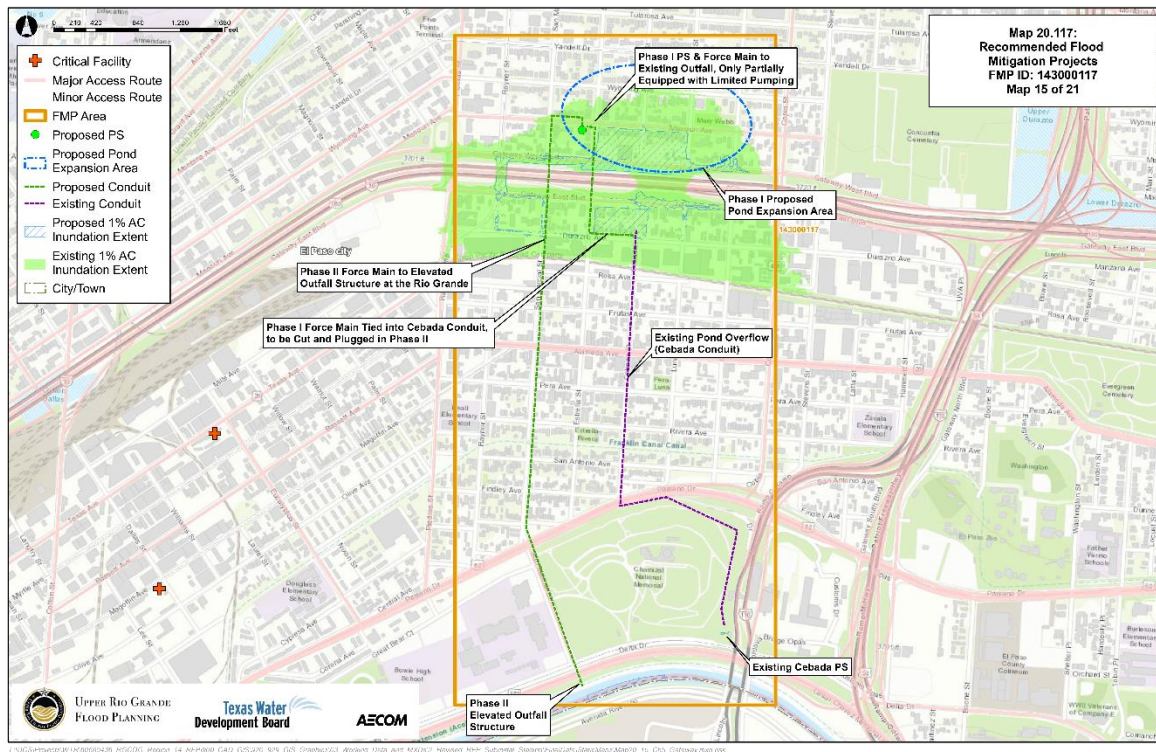


Figure 4D-15: Project Map (AECOM, 2023)

4D-16. Flood Mitigation Project ID: 143000118

Name: Vinton 1

Description: Vinton 1 was originally conceived as Project VIN1 within the Storm Water Master Plan for El Paso County. Vinton 1 consists of three parts: Basin A, a diversion channel, and Basin B. Basin A intercepts flood and sediment flow from the ephemeral stream Flow Path 45. Basin B, intercepts flood and sediment along Flow Path 45A. Downstream of these two retention basins, a diversion channel and channel improvements run north to south between the contributing watershed and the neighborhood to be protected by this project.

Affected Jurisdictions: El Paso County

Discussion on Cultural Resources Background: No cultural resources are located within or immediately adjacent to the project area.

Discussion on Flood Risk: Flow Path Number 45 capacity is exceeded causing flooding in the Vinton study area.

Project Description: Vinton 1 incorporates three improvements to address this issue. Basin A is designed as a retention basin to capture flood flows and sediment from the tributary to Flow Path Number 45. A diversion channel is designed parallel to and upstream of Remington Drive to intercept flood flows from the watershed downstream of Basin A. This diversion channel discharges into Flow Path Number 45 upstream of Tom Mays Drive. The diversion would increase flood flows in Flow Path Number 45 without a linked improvement along that channel. Basin B is the proposed improvement on Flow Path Number 45. This basin is designed as a retention basin and intercepts flood and sediment flows from Flow Path Number 45; resulting in a net reduction of flows into Vinton along Flow Path Number 45.

Figure 4D-16 shows Flow Path Number 45 and a tributary to Flow Path Number 45 in the area immediately upstream of the El Paso Natural Gas (EPNG) Pipeline Road. Immediately upstream of the intersection of this tributary with the road, flows from the tributary split during floods, with the bulk of the flows proceeding southwest to the junctions with Flow Path Number 45. The remainder of the flood flow in this tributary heads due west across Westway Boulevard and the EPNG Pipeline Road. Split flow arrives from the east and entering Vinton near Banker Road, Flow Path Number 45A, and their intersection with Remington Drive. The split flow exceeds the capacity of the existing Flow Path Number 45A and causes flood damages in this part of Vinton and downstream to the immediate west.

The proposed basin on Flow Path Number 45 requires approximately 230 acre-feet of excavation for flood and sediment pool storage, and the proposed basin on the flow path contributing to Flow Path Number 45 requires approximately 440 acre-feet of excavation for flood and sediment pool storage. Sediment sources are identified in the upstream watershed of Flow Path Number 45 within the City of El Paso Stormwater Master Plan. The sediment

pools within the basins are included to intercept flood-borne sediment that currently deposits and blocks drainage crossings downstream within Vinton.

Results of the modeling with this proposed project demonstrate the removal of 392 structures from the 1% AC floodplain. This is a removal of 91% of structures, which protects a population of approximately 879 people that are presently at risk of flooding during that event.

Total FMP Cost	
Subtotal 1-RFP Construction Cost	\$ 42,157,000
Subtotal 2-RFP Construction Contingency	\$ 8,431,000
Total Construction Cost	\$ 50,588,000
Subtotal 3-Drainage Feasibility Study Land Acquisition Cost	\$ 80,000
Subtotal 4-RFP Land Acquisition Cost	\$ 668,000
Subtotal 5-RFP Final Design Cost	\$ 7,307,000
Subtotal 6-RFP Permitting Cost	\$ 180,000
Subtotal 7-RFP Construction Oversight Cost	\$ 363,000
Subtotal 8-RFP Geotech Cost	\$ 200,000
Total Non-Construction Cost	\$ 8,798,000
Total FMP Cost	\$ 59,386,000



Name: Pecos 1

Description: Construct detention pond on city-owned parcel in western part of Town of Pecos City.

Affected Jurisdictions: Town of Pecos City, Lindsay Census Designated Place, Reeves County

Discussion on Cultural Resources Background: No cultural resources are located within or immediately adjacent to the project area.

Discussion on Flood Risk: The Town of Pecos City incorporated area is located adjacent and to the north of Lindsay CDP in Reeves County. For the 1% AC flood, per mapping performed for the RFP, the floodplain potentially causes damage to over 1,900 structures and restricts travel.

Extent of 1% AC flood risk is depicted in Figure 4D-17. As part of the public outreach effort, a public roadshow meeting was held in the Pecos on February 9, 2022. Approximate flood inundation maps were presented to local flood-related entities, who confirmed that flooding throughout large areas can be a problem due to the extremely flat topography and raised embankments of roadways and railroads, which sometimes re-direct runoff. A playa lake known as Mosquito Lake was also confirmed to be present southeast of the City of Pecos.

The watershed impacting Town of Pecos City extends west encompassing close to 700 square miles. In the event of a significant storm distributed across the contributing watershed, flows from the west will greatly impact the city. Town of Pecos City and associated staff identified six areas of flood concern during a RFP-related meeting on March 24th, 2023. This FMP reduces routine flooding in 4 of those areas.

The flood extents modeled for the Atlas 14 statistical 50% AC, 20% AC, and 10% AC floods are worse than have been experienced in the town's memory, suggesting the hydrology in the model is overly conservative. This may be due to large losses in the watershed which are not being considered, or due to use of an unrealistic uniformly distributed rain pattern over the large watershed. The volume of flood runoff into the area being addressed by this FMP in the flood is estimated by the modeling to exceed 4,000 acre-feet.

Project Description:

The proposed pond will be located on a Town-owned parcel of land bordering County Road 204. Due to the size of this watershed, a flood structure large enough to address the 1% AC flood would have to detain tens of thousands of acre-feet and be prohibitively expensive. As such, the proposed project is suggested as a Phase 1 solution to address the city's flood risk. This pond will provide emergency storage to reduce the scale of routine flooding described in meetings with the Town of Pecos City.

The pond will be 32-acre footprint constructed within the approximately 160-acre parcel. This pond will capture 130 ac-ft of upstream flows from the contributing watershed that stretches across 702 square miles. The pond size is an engineering judgment based estimate as to the

size needed to address the type and extent of relatively routine flooding described by Town of Pecos City staff. The pond will provide essentially no improvement to the large theoretical flood risk to residential structures identified in the RFP, but will provide significant improvement to road access during routine floods.

Modeling results suggest the proposed project will reduce flooding at 120 structures within the existing 1% AC floodplain and completely removes 51 of those structures (many vacant, and all non-residential), potentially increasing the safety of approximately 143 people (non-residents).

To support the town, the suggested strategy will be to construct the detention basin which helps with theoretical routine flooding and update the existing FME in the URGFP to include performance of a study addressing the loss rates in the Pecos watershed.

Estimated Cost for FMP:

Total FMP Cost	
Subtotal 1-RFP Construction Cost	\$ 7,711,000
Subtotal 2-RFP Construction Contingency	\$ 1,542,000
Total Construction Cost	\$ 9,253,000
Subtotal 3-Drainage Feasibility Study Land Acquisition Cost	\$ 45,000
Subtotal 4-RFP Land Acquisition Cost	\$ 000
Subtotal 5-RFP Final Design Cost	\$ 1,378,000
Subtotal 6-RFP Permitting Cost	\$ 130,000
Subtotal 7-RFP Construction Oversight Cost	\$ 255,000
Subtotal 8-RFP Geotech Cost	\$ 100,000
Total Non-Construction Cost	\$ 1,908,000
Total FMP Cost	\$ 11,161,000

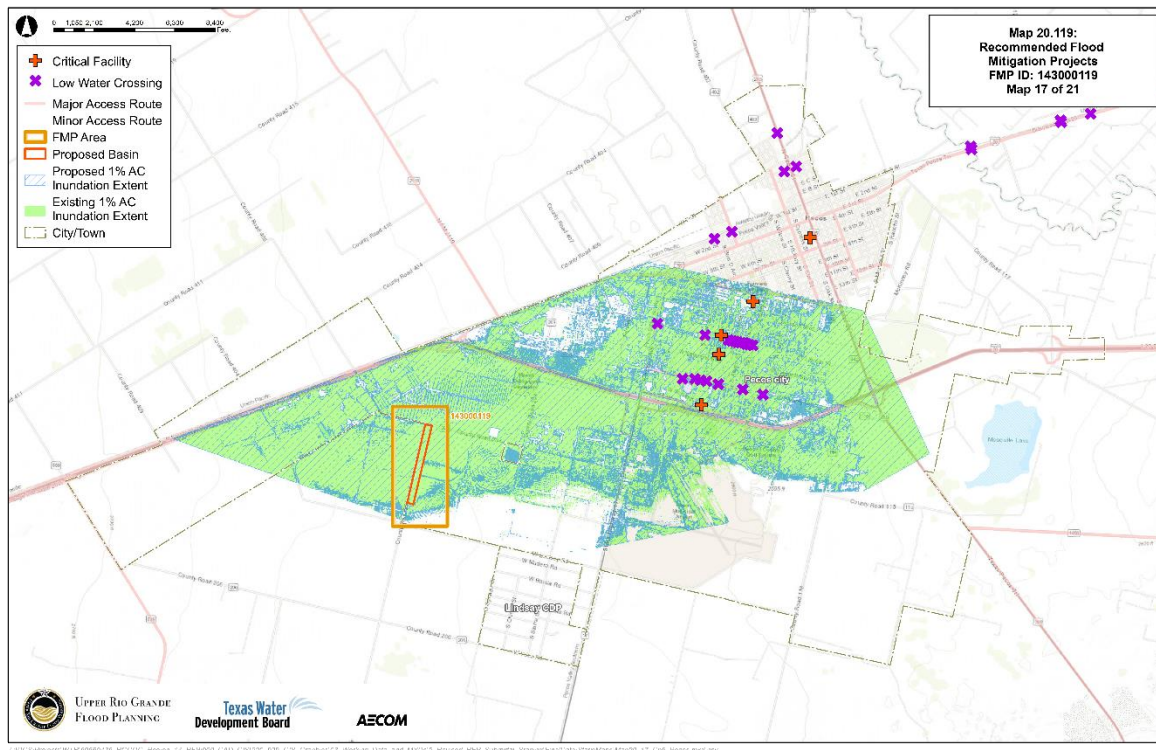


Figure 4D-17: Project Map (AECOM, 2023)

4D-18. Flood Mitigation Project ID: 143000120

Name: City of Presidio 1

Description: Construct two basins and an outlet pipe to reduce flooding of buildings and emergency access roadways.

Affected Jurisdictions: City of Presidio, Presidio County

Discussion on Cultural Resources Background: No cultural resources are located within the proposed project area.

Discussion on Flood Risk: The City of Presidio is an incorporated area in Presidio County. Approximate modeling performed as a task for the RFP identified over 650 structures at risk in the 1% Annual Chance (AC) flood within the City of Presidio, assuming the Cibolo Creek levees (which are not certified) are absent. Extent of 1% AC flood risk is depicted in Figure 4D-18. The City of Presidio Comprehensive Plan 2020-2030 (Kleinman, 2020) provides a concept for future drainage infrastructure to address flooding associated with the smaller arroyos east of Cibolo Creek. Fifteen stormwater detention ponds are proposed in the Plan.

Project Description: This proposed FMP for City of Presidio will result in reduction of flooding in 10 structures and remove 9 buildings from the 100-yr floodplain as well as 1.6 miles of road. This removal of flooding on Hurd Rd will allow emergency access to two critical facilities (powerplant and school) during a 1% AC storm event.

The project includes the development of two basins and a drainage pipe extending from the western basin to discharge into a natural channel. The detention basin on the east will be approximately 3-feet deep and have a 0.9-acre footprint. The western retention basin with the outlet pipe will be approximately 6-feet deep and have a 1.4-acre footprint. The gravity-fed outlet pipe will have a 24" diameter and release to an open channel along the western side of the powerplant. Locations shown in the figure are approximate.

Estimated Cost for FMP:

Total FMP Cost	
Subtotal 1-RFP Construction Cost	\$ 2,172,000
Subtotal 2-RFP Construction Contingency	\$ 434,000
Total Construction Cost	\$ 2,606,000
Subtotal 3-Drainage Feasibility Study Land Acquisition Cost	\$ 90,000
Subtotal 4-RFP Land Acquisition Cost	\$ 5,000
Subtotal 5-RFP Final Design Cost	\$ 560,000
Subtotal 6-RFP Permitting Cost	\$ 258,000
Subtotal 7-RFP Construction Oversight Cost	\$ 510,000
Subtotal 8-RFP Geotech Cost	\$ 200,000
Total Non-Construction Cost	\$ 1,624,000
Total FMP Cost	\$ 4,230,000

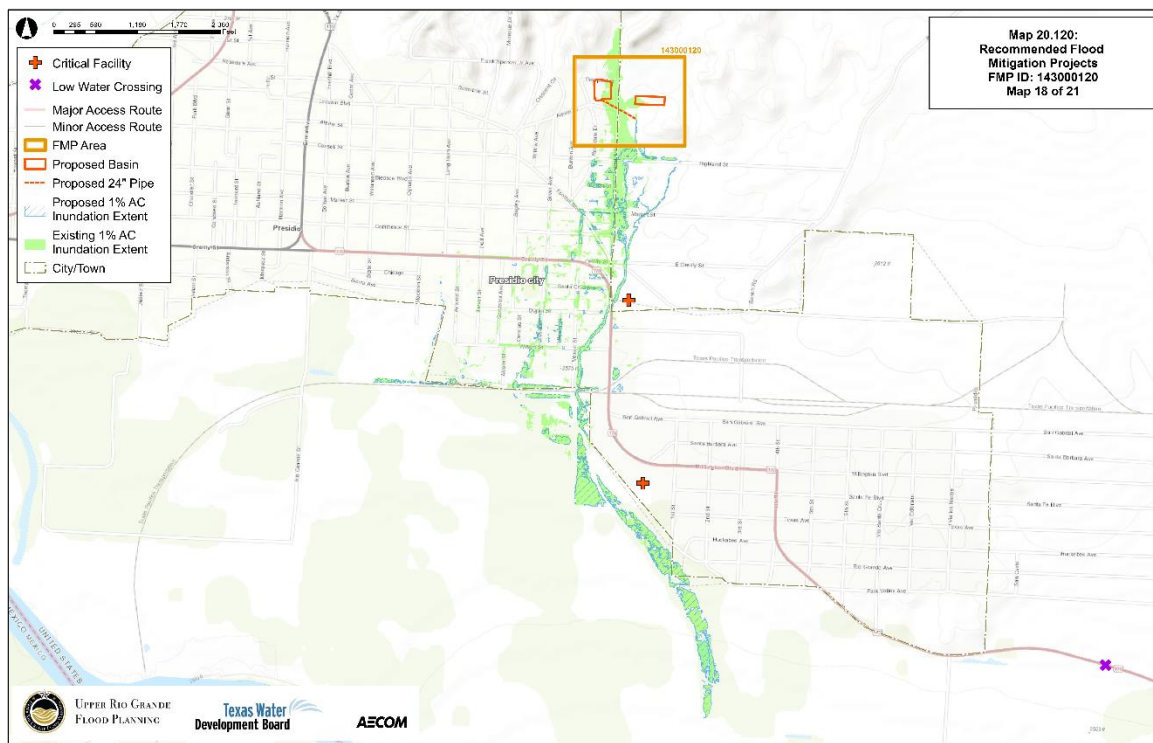


Figure 4D-18: Project Map (AECOM, 2023)

4D-19. Flood Mitigation Project ID: 143000121

Name: Dallas Basin

Description: The project includes two major components.

Phase I includes two major components.

1. Proposed detention basin construction (North Side of I-10)
2. Proposed construction of large capacity pump station (PS), partially equipped and force main (North Side of I-10), routed to the existing pump station discharge box at the existing east Dallas Street pond.

Phase II includes 4 major components.

1. Proposed construction of fully equipping PS North of I-10 and proposed force main to a proposed elevated outfall structure at the Rio Grande.
2. Proposed construction for cutting and modifying the force main of Phase I to serve as a highwater gravity-flow conduit from the new pond of Phase I to the east Dallas Street pond, for continued gravity-flow conveyance to the Cebada PS. Removal of the existing pump station discharge box and replacement with a standard gravity-flow headwall opening to the existing Williams Street gravity-flow conduit.
3. Proposed construction of smaller capacity PS (South of I-10 and North of Rio Grande) and its force main to a separate elevated outfall structure at the Rio Grande.
4. Construction for cutting and plugging existing Dallas Street outfall conduit at the location of south-most proposed PS for flow diversion from the Dallas Street conduit to the smaller capacity PS. Cutting and plugging the existing Dallas Street gravity-flow conduit opening at the river.

Affected Jurisdictions: City of El Paso, TXDOT, USIBWC

Discussion on Cultural Resources Background: If the proposed project area is located within public ROWs, it would therefore fall under the purview of the THC and require an ACT permit. Additionally, as listed below, the project intersects three National Register Districts and NRHP listed properties; therefore, the project would also trigger Section 106 of the NHPA. The project intersects the Franklin Canal, the EPCWID, and the Magoffin Historic District, all of which are NRHP districts. The Magoffin Historic District was listed in 2016 (National Park Service 2016) for its architectural significance comprising Late Victoria, Adobe, to Spanish Colonial Revival style structures. The district also includes the original Magoffin home site, resided in by Joseph Magoffin who was an important figure to local El Paso history¹³. Finally, the project area also

intersects with a historic age archaeological site, consisting of an early to mid-twentieth century telecommunications line, with NRHP eligibility remaining undetermined according to the SHPO.

As the project area is located within multiple NRHP districts, Section 106 of the NHPA, and an ACT permit through the THC will take effect and a cultural resources survey of the entire project area will be required to evaluate any unrecorded, potential cultural resources that can contribute to this district and historic properties, and determine if any adverse effects will happen on historic properties.

Resource Name	Resource Type	Prehistoric / Historic	NRHP Eligibility	Location
Archaeological Site	Historic Structure	Historic	Undetermined	Intersects
Magoffin Historic District	National Register District	Historic	Listed	Intersects
Franklin Canal	National Register District / Property	Historic	Listed	Intersects
El Paso County Water Improvement District No. 1	National Register District	Historic	Listed	Intersects

Discussion on Flood Risk: The proposed project includes two areas, the first area is generally at the intersection of Cotton Street and Interstate-10 (I-10), due to inland flooding and the second area is generally south of the first project area, located generally between Paisano (Hwy-62) and the Rio Grande, due to river flooding. The combined areas have been flood-prone since the construction of I-10 in the 1960's. This proposed project is further necessitated as a result of TXDOTs current planning of the anticipated I-10 Reimagination Project.

TXDOT's project is intended to eliminate the existing Dallas Street Stormwater Pump Station, which is integral to managing and disposing of stormwater that collects within the TXDOT controlled ponds underneath the Cotton Street overpass, referred to as Dallas Street Ponds. Additionally, limited existing detention pond capacity continues to result in significant flooding at this location, that generally results in the spread of floodwater south to Paisano (Hwy-62) and generally east to Palm Street. The area south of I-10 and north of the Rio Grande is also subject to flooding when flow in the Rio Grande surcharges the Dallas Street gravity-flow outfall line and overflows into streets through existing drop inlets. This type of flooding occurs during high water elevations of the Rio Grande, while in a flood stage condition.

Project Description-Dallas Basin:

- Phase I is proposed to include a new 143-acre-foot detention pond that will utilize approximately three city blocks. The sizing will accommodate both the 2% AC flood and, if the Phase II improvements are built, the 1% AC flood. Also, under Phase I, a proposed 250 cfs pump station would replace the existing pump station and be located in the area of the

proposed pond, on the north side of I-10. The proposed pump station would be sized for the 1% AC flood, but would not be fully equipped with all pumps. It would only be provided with enough pumping capacity, using one duty pump sized at approximately 42 cfs and one stand-by pump sized at 42 cfs to drain the proposed pond after a flood. These pumps will discharge to the existing pump station discharge box, located at the east Dallas Street Pond, where the Williams Street gravity-flow conduit begins. This existing gravity-flow conduit ultimately discharges into the existing Cebada pump station. Under Phase I, the proposed force main will be approximately 800-lf of 36-inch diameter pipe that will pump to existing discharge box. The existing Dallas Street Pond is separated into two ponds by Dallas Street, with an intertie from the west pond to the east pond. The east pond is where the Williams Street conduit begins.

- Phase II would fully equip the proposed 250 cfs pump station with a total of six (6 ea.) high-flow, low-head pumps at approximately 42 cfs each, to handle the 1% AC flood. Phase II also includes an 84-inch diameter force main. The force main is proposed to be routed within the Cotton Street alignment directly to the Rio Grande, at approximately 8,000 lf in length, where an elevated outfall structure would be constructed for the discharge of stormflow into the river. The proposed elevated outfall into the river would eliminate the existing under-the-levee outfall conduit that currently discharges directly within the river channel.

Phase II would also include modifying the 36-inch force main of Phase I to serve as a highwater gravity-flow outfall from the new pond to the existing east Dallas Pond. This converted gravity-flow conduit would convey flow from the proposed pond to the existing east Dallas Street pond. All stormflow that collects within the existing east Dallas Street pond would continue to be conveyed by gravity within the Williams Street conduit alignment. The existing pump station outfall box at the existing east Dallas pond would be demolished and replaced with a standard head-wall gravity-flow opening.

Phase II will include cutting and plugging the east side leg of the existing cross-fitting at the Dallas Street pond intertie, isolating the two Dallas Street ponds from one another. All stormflow conveyed to the west side Dallas Street pond, including pumped flow from the downtown area, will be conveyed as it is currently, within the existing Dallas Street conduit to a smaller capacity PS at 180-cfs. This new pump station will be located generally between Hwy-62 and the river. Flow within the existing Dallas Street outfall conduit will be diverted to this proposed 180-cfs PS under Phase II for the 1% AC flood condition.

The proposed 180-cfs PS will mitigate flooding in the area south of I-10 and north of the river and will discharge this flow to a similar but smaller elevated outfall structure, proposed in the vicinity of the existing Dallas Street outfall opening, which will be cut and plugged. The proposed smaller capacity pump station with 36-inch force main, approximately 2,000-lf in

length will eliminate the threat of flooding caused when the Rio Grande exceeds its flood stage elevation for the 1% AC flood.

Estimated Cost for FMP:

Total FMP Cost	
Subtotal 1-RFP Construction Cost	\$ 15,507,305
Subtotal 2-RFP PS Cost, Partially Equipped, FM	\$ 13,904,000
Total Construction Cost	\$ 29,411,305
Subtotal 3-RFP EPWater Land Acquisition	\$ 3,000,000
Subtotal 4-RFP Preliminary Engineering Cost (10%)	\$ 2,941,131
Subtotal 5-RFP Final Design / Bidding Cost (20%)	\$ 5,882,261
Subtotal 6-RFP Construction Administration Cost (8%)	\$ 2,352,904
Subtotal 7-RFP Construction Inspection Cost (15%)	\$ 4,411,696
Total Non-Construction Cost	\$ 18,587,992
Phase I Total FMP Cost	\$ 47,999,297

Total FMP Cost	
Subtotal 1-Fully Equipping PS, FM & Elevated Outfall Structure	\$ 46,000,000
Subtotal 2-Modifications to Williams St Outfall Opening	\$ 2,607,000
Subtotal 3-Southern most PS, FM & Elevated Outfall Structure	\$ 21,464,300
Subtotal 4-Dallas St Outfall cutting / plugging, Flow Diversion	\$ 2,172,500
Total Construction Cost	\$ 72,246,800
Subtotal 3-Drainage Feasibility Study Land Acquisition Cost	\$ 2,000,000
Subtotal 4-RFP Land Acquisition Cost	\$ 7,224,380
Subtotal 5-RFP Final Design Cost	\$ 14,448,760
Subtotal 6-RFP Permitting Cost	\$ 5,779,504
Subtotal 7-RFP Constuction Oversight Cost	\$ 10,836,570
Total Non-Construction Cost	\$ 40,289,214
Phase II Total FMP Cost	\$ 112,533,014

Phase I & Phase II Total FMP Cost	\$ 160,532,311
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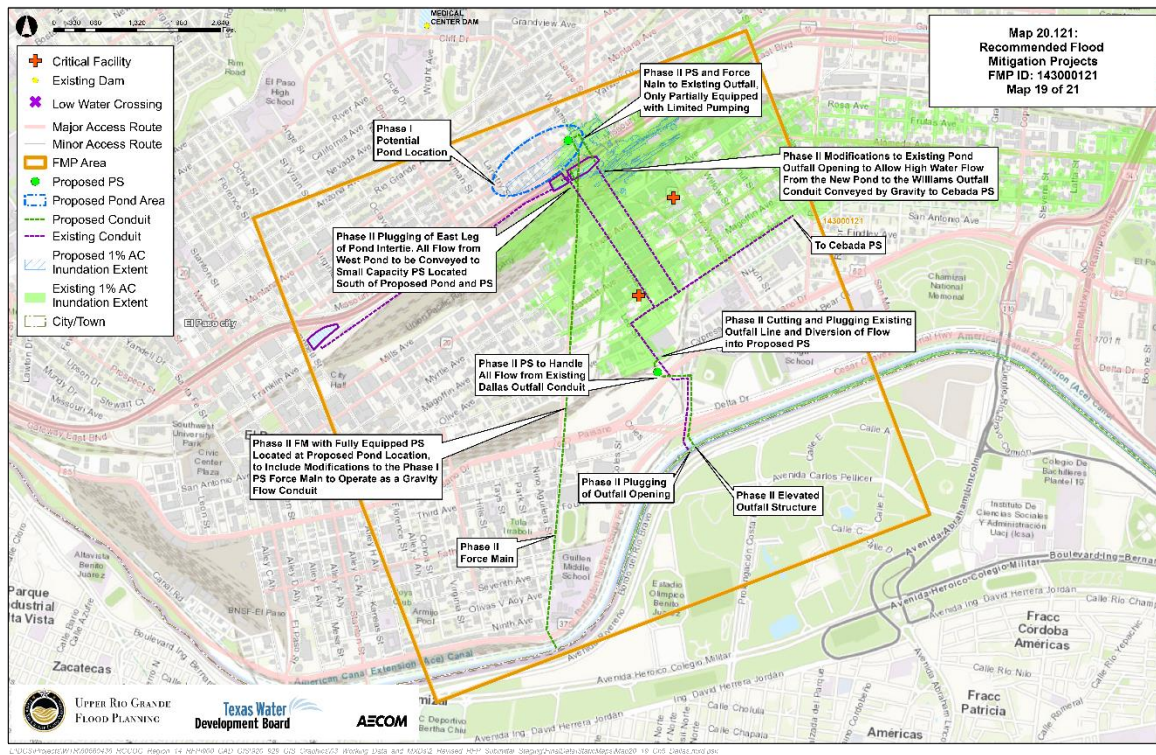


Figure 4D-19: Project Map (AECOM, 2023)

4D-20. Flood Mitigation Project ID: 143000122

Name: Canterbury Channel (WC1)

Description: Canterbury Channel involves the construction of a 5.7 ac-ft debris retention basin. The project was originally conceived and approved as Project WC1 in the Storm Water Master Plan for the City of El Paso (2010, with 2023 update).

Affected Jurisdictions: City of El Paso

Discussion on Cultural Resources Background: No cultural resources are located within the project area.

Discussion on Flood Risk: In 2006, protracted high volume rainfall over several days filled existing natural alluvial channels and triggered debris flows: a viscous mixture of floodwater, sediment, and cobbles. These debris flows blocked downstream culverts and filled small detention ponds, allowing overflow to proceed uncontrolled through structures and blocking critical access routes. A similar significant risk exists within the watershed that feeds flood flows to Canterbury Channel.

Project Description: Studies documented in the City of El Paso Drainage Design Manual have presented analytical procedures for the sizing of debris basins to address debris flow risk within El Paso County watersheds. These procedures estimated a recommended retention basin size of 5.7 acre-feet. The project consists of constructing a 5.7 ac-ft debris retention basin to the east of Stanton Street at the end of Kenyon Joyce Lane. Hydraulic benefits will be achieved by allowing existing stormwater infrastructure to operate unimpeded during significant storm events.

Results of modeling the 1% AC storm event indicate that the construction of this project will prevent the blockage of drainage structures likely to be blocked during this event, removing 102 structures from the 1% annual chance floodplain, and positively impacting a population of approximately 349 people.

Estimated Cost for FMP:

Total FMP Cost	
Subtotal 1-RFP Construction Cost	\$ 2,328,000
Subtotal 2-RFP Construction Contingency	\$ 466,000
Total Construction Cost	\$ 2,793,000
Subtotal 3-Drainage Feasibility Study Land Acquisition Cost	\$ 90,000
Subtotal 4-RFP Land Acquisition Cost	\$ 150,000
Subtotal 5-RFP Final Design Cost	\$ 595,000
Subtotal 6-RFP Permitting Cost	\$ 260,000
Subtotal 7-RFP Construction Oversight Cost	\$ 510,000
Subtotal 8-RFP Geotech Cost	\$ 200,000
Total Non-Construction Cost	\$ 1,668,000
Total FMP Cost	\$ 4,462,000

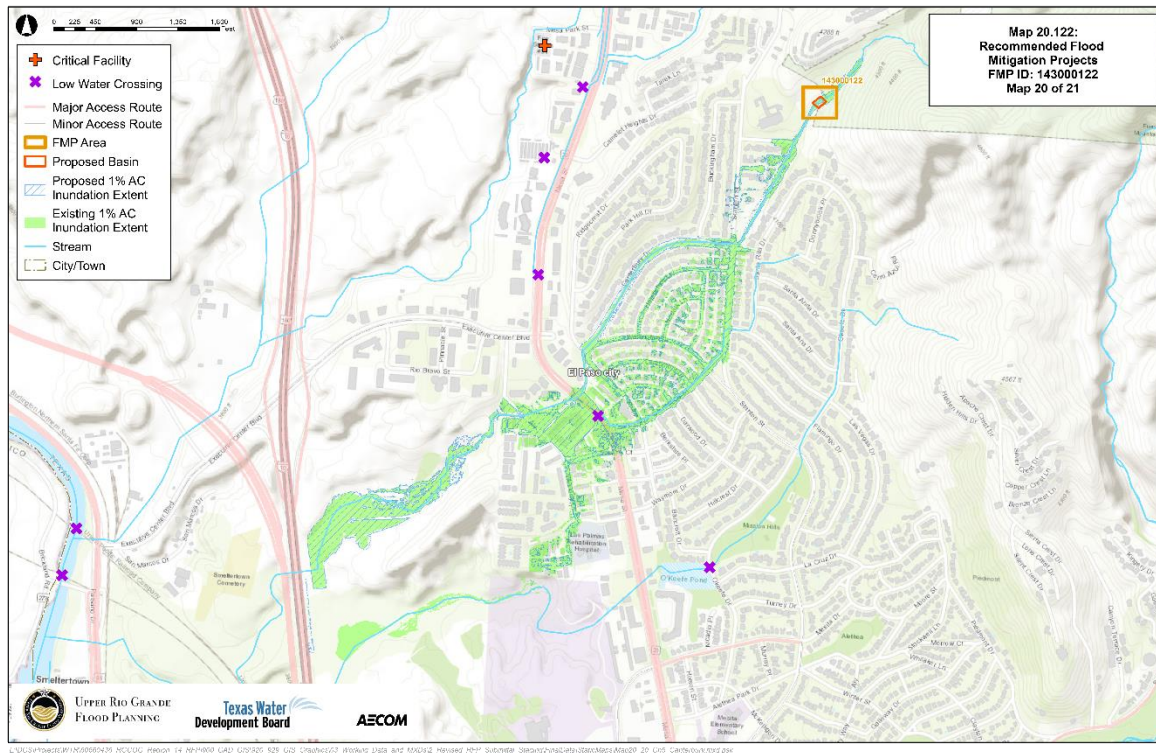


Figure 4D-20: Project Map (AECOM, 2023)

4D-21. Flood Mitigation Project ID: 143000123

Name: New Detention Pond (WC4)

Description: Construct a new 37.6 ac-ft detention pond to intercept Flow Path No. 21 to relieve roadway flooding on Mesa Street. The project was originally conceived and approved as Project WC4 in the Storm Water Master Plan for the City of El Paso (2010, with 2023 update).

Affected Jurisdictions: City of El Paso

Discussion on Cultural Resources Background: No cultural resources are located within or immediately adjacent to the project area.

Discussion on Flood Risk:

Flow Path No. 21 carries flow from the Franklin Mountains to the Rio Grande. This FMP addresses two identified flood risks:

- Under existing conditions, flooding of Mesa Street in this area impacts emergency access routes across the city and to a hospital within this project area.
- In 2006, protracted high volume rainfall over several days filled existing natural alluvial channels and triggered debris flows: a viscous mixture of floodwater, sediment and cobbles. These debris flows blocked downstream culverts and filled small detention ponds, allowing overflow to proceed uncontrolled through structures and blocking critical access routes. A similar significant risk exists within the Flow Path 21 watershed.

Project Description: The intent of the Flow Path No. 21 detention basin is to increase both debris and stormwater capacity. The basin is intended to be constructed on El Paso Water property in the current location of significant ponding. The debris capacity is intended to lengthen the time between required maintenance to remove debris, while maintaining the required stormwater capacity. The increase in stormwater capacity will reduce the load on undersized existing infrastructure.

Damages to be relieved by this project are associated with the expected blockage with debris of an existing conduit at the site of the future detention basin. The proposed basin will prevent the blockage of this conduit and reduce flood risk at 15 structures within the 1% annual chance floodplain, reducing flood risk for a population of approximately 109 lives. This project will additionally remove a critical facility (hospital) from the 1% AC floodplain.

Estimated Cost for FMP:

Total FMP Cost	
Subtotal 1-RFP Construction Cost	\$ 6,998,000
Subtotal 2-RFP Construction Contingency	\$ 1,400,000
Total Construction Cost	\$ 8,398,000
Subtotal 3-Drainage Feasibility Study Land Acquisition Cost	\$ 45,000
Subtotal 4-RFP Land Acquisition Cost	\$ 000
Subtotal 5-RFP Final Design Cost	\$ 1,270,000
Subtotal 6-RFP Permitting Cost	\$ 130,000
Subtotal 7-RFP Construction Oversight Cost	\$ 255,000
Subtotal 8-RFP Geotech Cost	\$ 100,000
Total Non-Construction Cost	\$ 1,800,000
Total FMP Cost	\$ 10,198,000

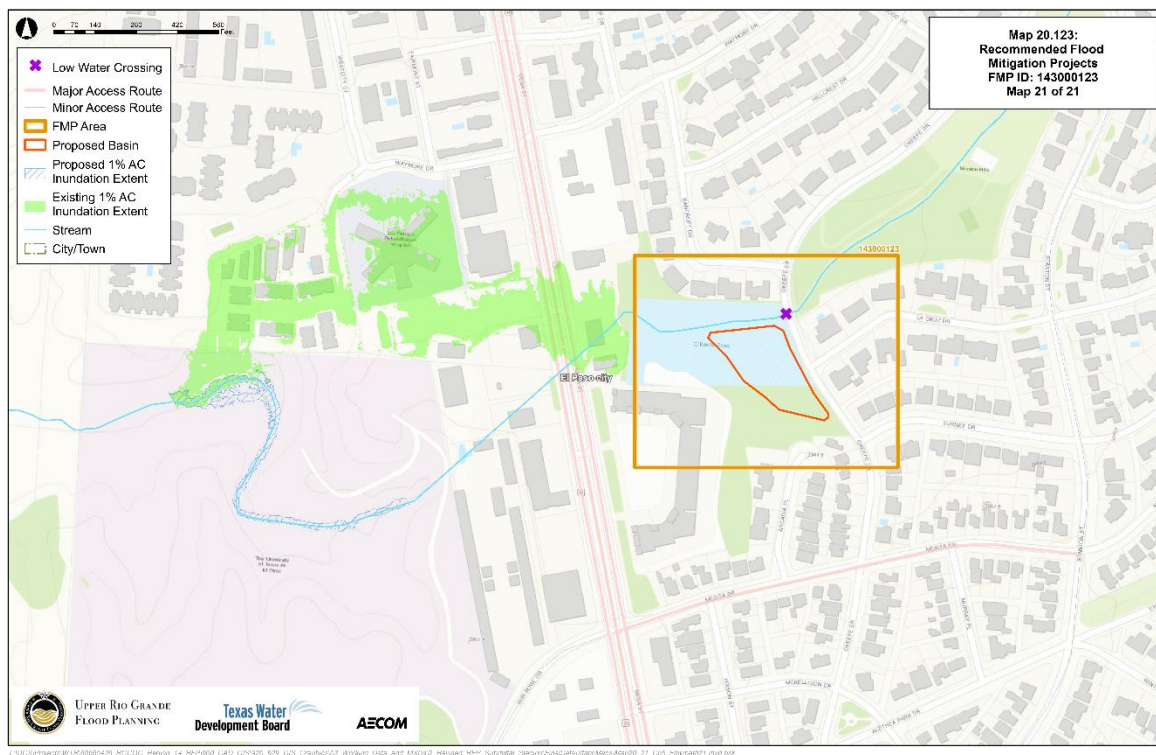


Figure 4D-21: Project Map (AECOM, 2023)