

4.0 SEDIMENT AND DEBRIS FLOW HAZARDS

As part of the 2009 SMP, a debris flow hazard survey was conducted to identify areas of erosion susceptibility and channel instability. This survey is still valid, and the discussion of the survey is included in the SMP Update to reinforce the seriousness of the current (2021) hazard. The areas of interest were those that are in active alluvial fans and those that are receiving active debris flows. The geographic focus of this survey is on the upland areas of the Franklin Mountains that are undergoing active alluvial fan sediment transport. This survey was conducted at the reconnaissance level to intermediate level of investigation and may have served to identify areas for future site specific studies when evaluating debris flow hazards and potential mitigating measures. This survey examined an area of over 100 square miles and identified areas that are developing active debris flow processes. Additionally, the survey identified areas that are under active erosion and are considered areas of elevated risk for chronic sedimentation. The full survey can be found in Appendix C of the 2009 SMP.

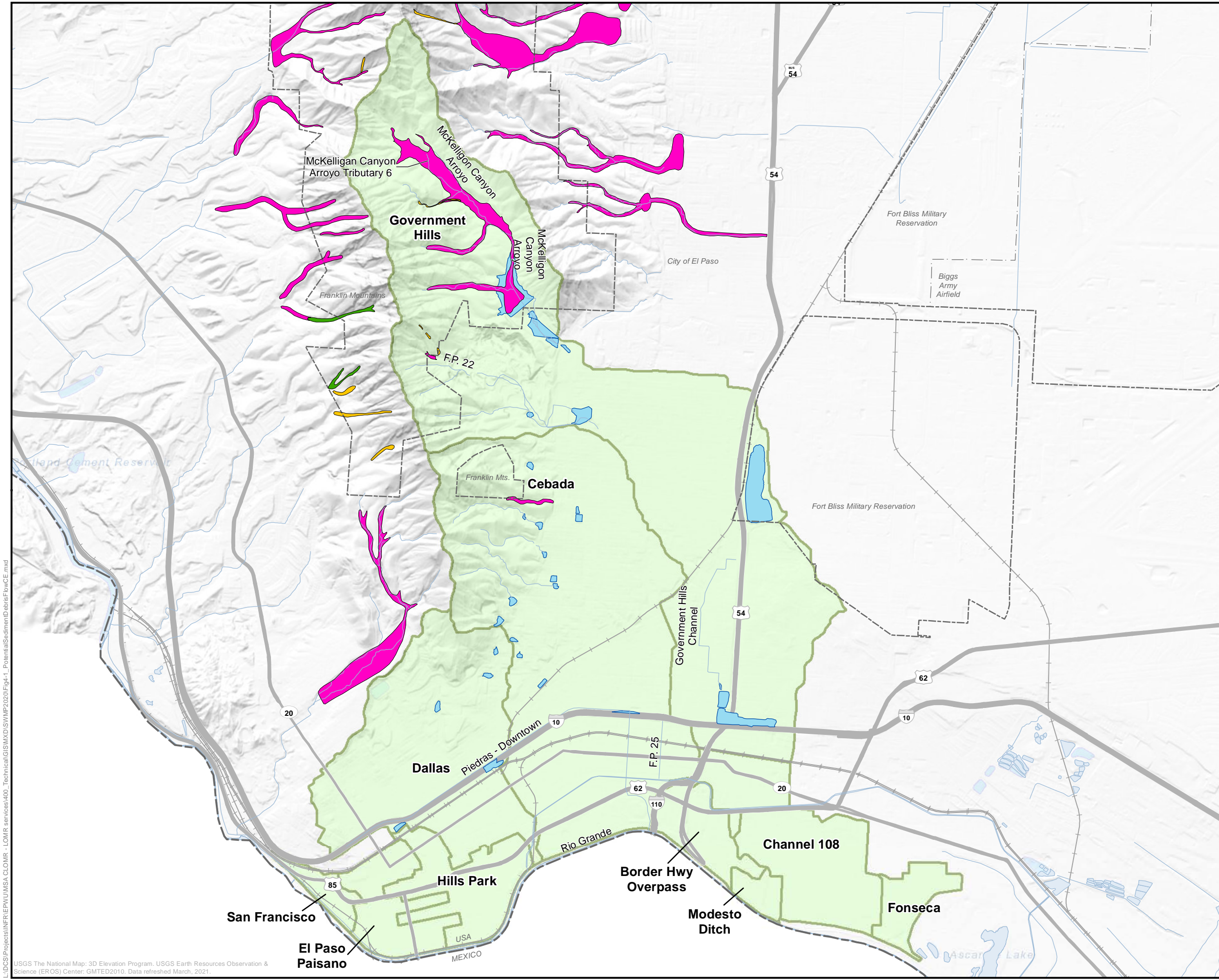
Areas of active or potential debris flow along with areas that were undergoing active alluvial erosion and sediment transport are shown on Figures 4-1 through 4-4. Areas of proximal (high sediment/debris flow risk), medial (medium risk), and distal (relatively low risk) alluvial fan development in the Franklin Mountains region are shown on Figure 4-5. These figures are tools for planning of stormwater and sediment transport mitigation infrastructure per recommendations detailed in Appendix C of the 2009 SMP.

The areas mapped as active debris flow should be the first priority for planning efforts in designing and constructing stormwater infrastructure. The secondary priority is areas mapped as alluvium where active sediment transport is occurring. These alluvium areas should have hydrologic studies as an integral part of planning for stormwater infrastructure. Several areas were identified where debris flows and erosion were chronic and indicated a critical need for mitigating infrastructure. Sediment control basins for these identified areas were included in the project alternative development.

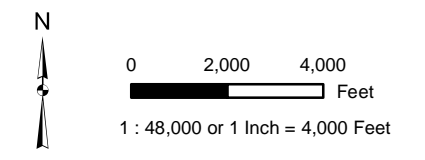
The first priority actions should be to address the potential sources of debris identified in Figures 4-1 through 4-4. Debris originating from these areas is judged to potentially form high velocity, high density, and rock laden flows that potentially pose a major risk to lives and property located downstream. The 2009 SMP developed concept designs for debris basins to control these sources. These projects include WC1, WC8, and NW9.

The second priority is to address upstream sediment sources. The primary risk is that future sediment flows will be mobilized from these sources, proceed downstream, plug existing bridge and culvert openings, and cause road closures and added real property flooding. Maintenance costs following such events are large, making control of these sources not only a damage prevention measure but also a cost avoidance measure. The following projects have been developed to intercept sediment flow from identified sources: NE5, NE7C, NW2 Phase 2, NW5, NW11a, and WC4.

Projects for the control of sediment inflow into the East Side (and downstream Mission Valley) Regions were developed separately from the mapping effort (discussed in Appendix C of the 2009 SMP) performed for the Franklin Mountains. These projects include EA9A and EA10A.



- Legend**
- Potential Sediment Flow Source
 - Known and Potential Debris Flow Source
 - Potential Debris Flow Source
 - Drainage System
 - Dam/Reservoir
 - Major Road
 - Railroad
 - Streamline
 - Water Body
 - State Boundary
 - Corporate Boundary
 - Military Boundary
 - Park Boundary



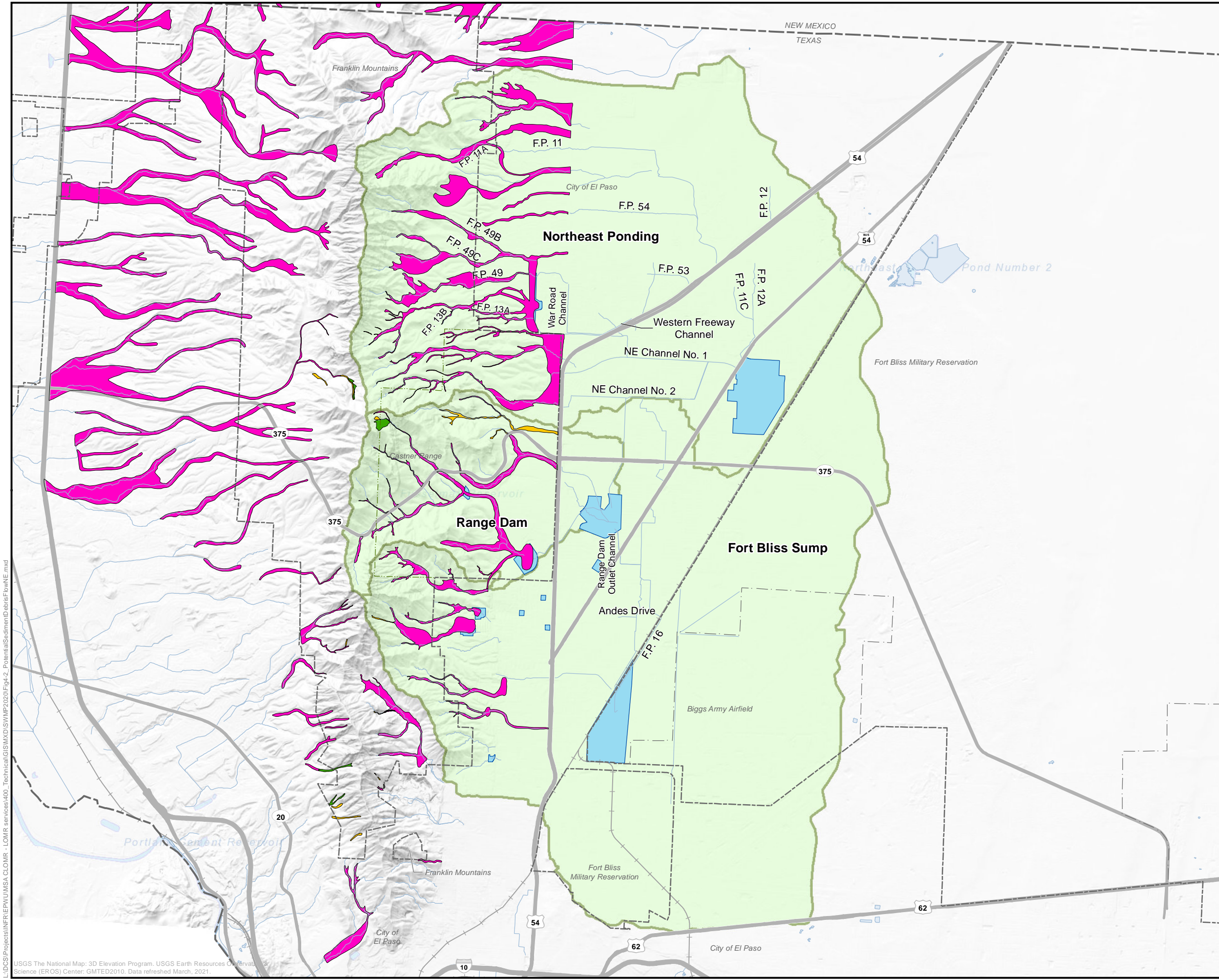
**Potential Sediment and Debris Flow Areas
Central Region**
El Paso 2021 Stormwater Master Plan Update

Date: 6/15/2021 Figure 4-1

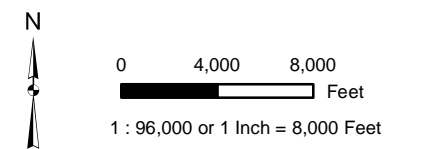


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USGS The National Map: 3D Elevation Program, USGS Earth Resources Observation & Science (EROS) Center, GMTED2010, Data refreshed March, 2021.



- Legend**
- Potential Sediment Flow Source
 - Known and Potential Debris Flow Source
 - Potential Debris Flow Source
 - Drainage System
 - Dam/Reservoir
 - Major Road
 - Railroad
 - River, Stream, Canal
 - Water Body
 - State Boundary
 - Corporate Boundary
 - Military Boundary
 - Park Boundary



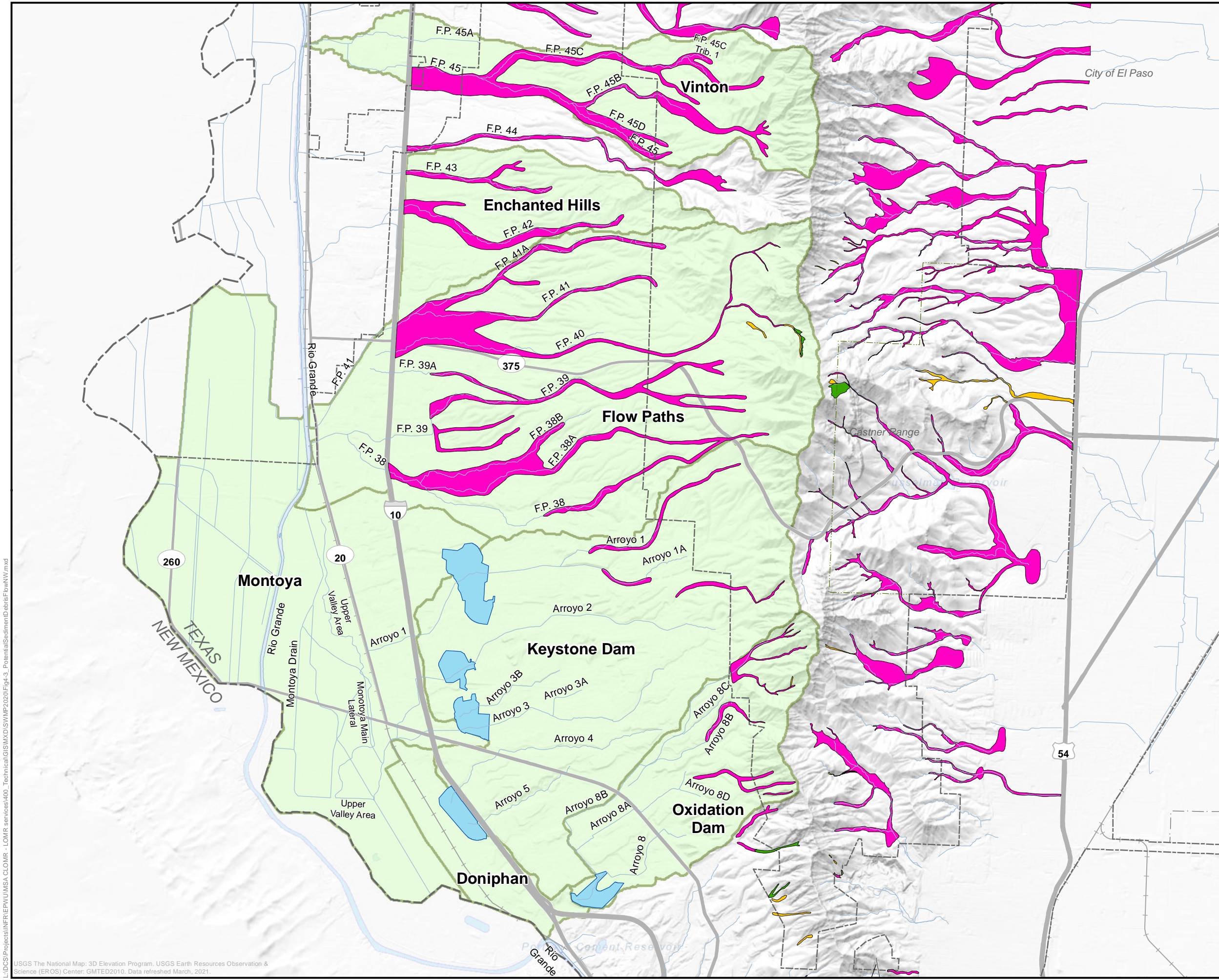
**Potential Sediment and Debris Flow Areas
Northeast Region**
El Paso 2021 Stormwater Master Plan Update

Date: 6/15/2021 Figure 4-2

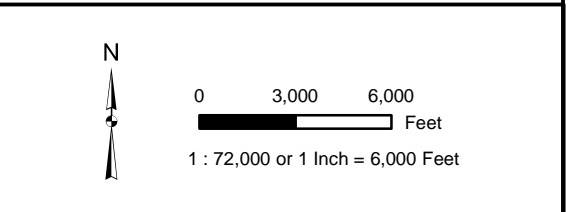


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USGS The National Map: 3D Elevation Program, USGS Earth Resources Observations and Science (EROS) Center, GMTED2010, Data refreshed March, 2021.



- Legend**
- Potential Sediment Flow Source
 - Known and Potential Debris Flow Source
 - Potential Debris Flow Source
 - Drainage System
 - Dam/Reservoir
 - Major Road
 - Railroad
 - Streamline
 - Water Body
 - State Boundary
 - Corporate Boundary
 - Military Boundary
 - Park Boundary



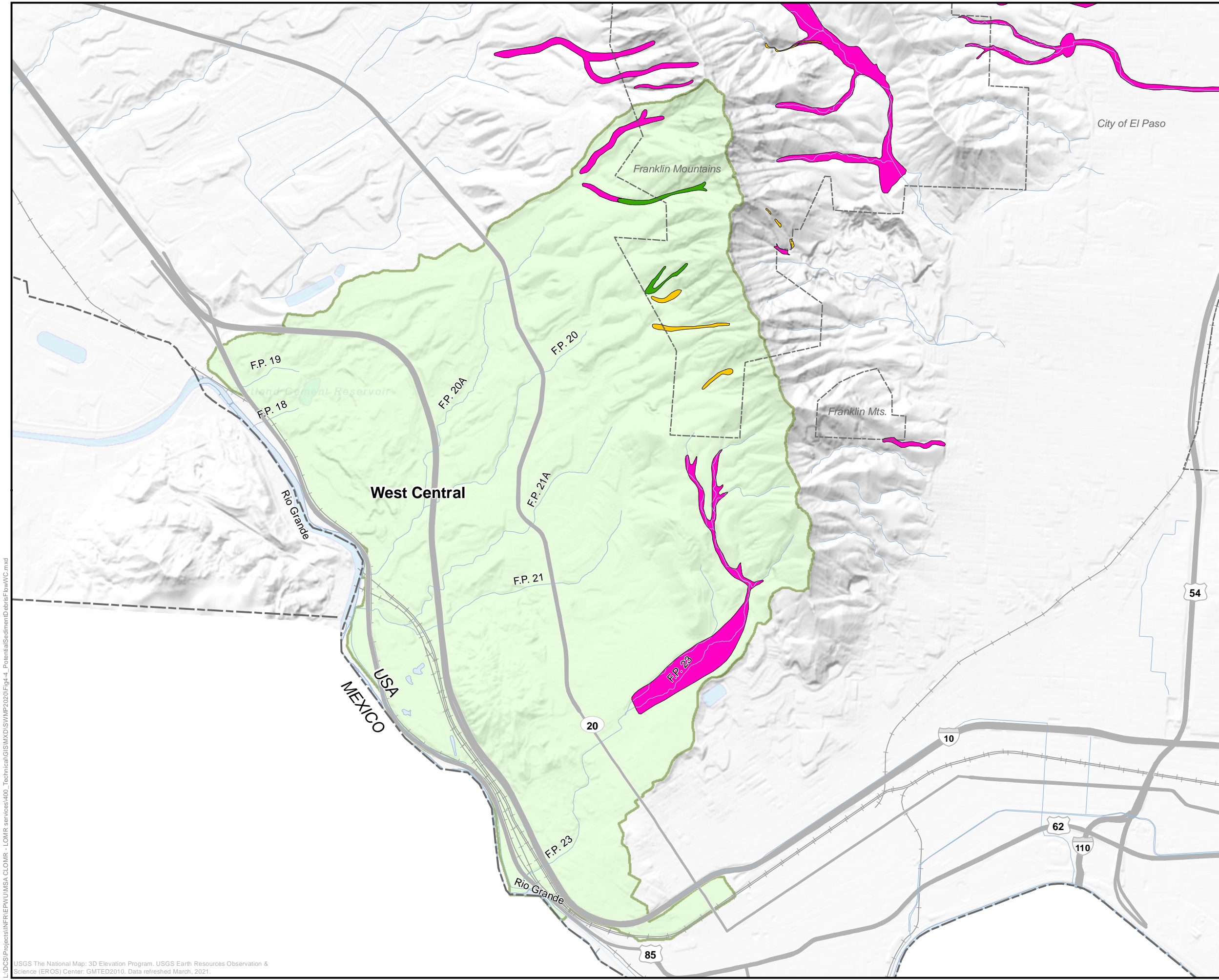
Potential Sediment and Debris Flow Areas Northwest Region
 El Paso 2021 Stormwater Master Plan Update

Date: 6/15/2021 Figure 4-3

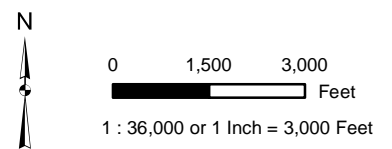


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USGS The National Map: 3D Elevation Program, USGS Earth Resources Observation & Science (EROS) Center, GMTED2010, Data refreshed March, 2021.



- Legend**
- Potential Sediment Flow Source
 - Known and Potential Debris Flow Source
 - Potential Debris Flow Source
 - Drainage System
 - Major Road
 - Railroad
 - Streamline
 - Water Body
 - State Boundary
 - Corporate Boundary
 - Military Boundary
 - Park Boundary



**Potential Sediment and Debris Flow Areas
West Central Region**
El Paso 2021 Stormwater Master Plan Update

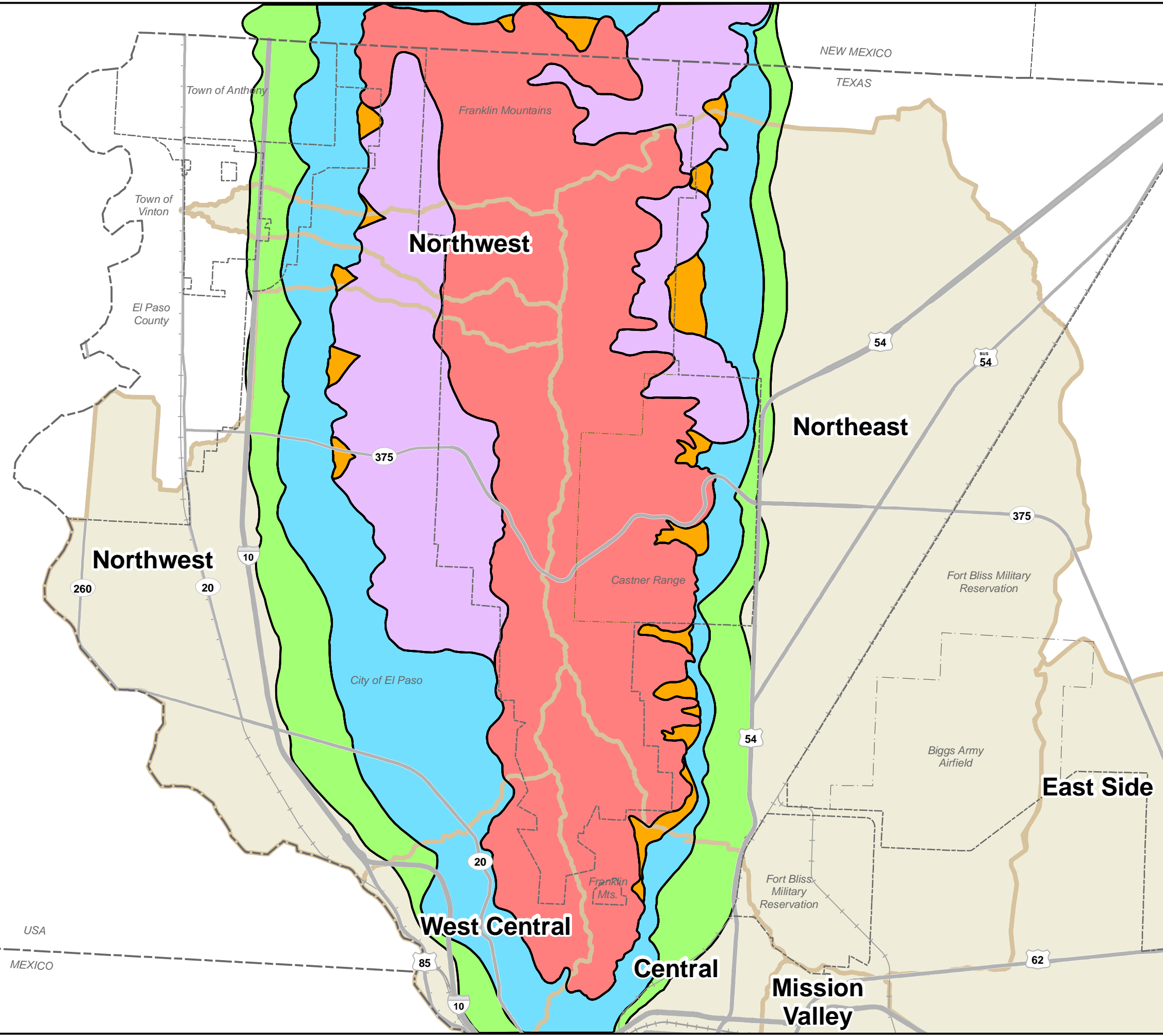
Date: 6/15/2021 Figure 4-4



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USGS The National Map: 3D Elevation Program, USGS Earth Resources Observation & Science (EROS) Center, GMTED2010, Data refreshed March, 2021.

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Legend

NON-DEPOSITIONAL AREA

- Bedrock (Outcrop) Area
- Dissected Fan

ACTIVE FAN PROCESS AREAS

- Proximal Fan Facies
- Distal Fan Facies
- Medial Fan Facies

Master Plan Regional Area

- Major Road
- Railroad
- State Boundary
- County Boundary
- Corporate Boundary
- Military Boundary
- Park Boundary

N

0 0.8 1.6 Miles

1 : 101,376 or 1 inch = 1.6 miles

Alluvial Fan Development

El Paso 2021 Stormwater Master Plan Update

Date: 6/15/2021 Figure 4-5

