

Floodplain Impacts Technical Memorandum

I-25 Improvements Through the Colorado Springs Urbanized Area Project

CDOT Project No. IM 0252-316

Project Control No. 12210

Colorado Department of Transportation

February 2003
(Updated December 2003)

Table of Contents

1.0 Project Description (Proposed Action)	1
2.0 Existing Conditions	2
2.1 FEMA Floodplains	2
2.2 FEMA and Local Agency Floodplain Regulation.....	2
2.3 Existing Streams in the Study Area	3
3.0 Methodology	10
4.0 Impacts of No-Build Alternative	11
5.0 Direct Impacts of Proposed Action	11
6.0 Indirect Impacts of Proposed Action	11
7.0 Mitigation	18
8.0 Attachment	19
Floodplain Reference Maps	

1.0 Project Description (Proposed Action)

The Proposed Action would widen Interstate 25 (I-25) from South Academy Boulevard (Exit 135) to State Highway 105 (Exit 161, Monument), a distance of approximately 26 miles. Within these limits, a six-lane cross-section (three through-lanes in each direction) would be built south of the U.S. Highway 24 Bypass to South Academy and north of Briargate to SH 105. Additionally, for the 12-mile central portion from the US 24 Bypass (Exit 139) to Briargate Parkway (Exit 151), the Proposed Action consists of an eight-lane cross section (four through-lanes in each direction).

In the eight-lane cross-section, the inside (left-most) lane in each direction would be open to general traffic during off-peak hours; during morning and evening peak hours, this lane would be reserved for use by carpools and buses only. To accommodate this flexible use, the high-occupancy-vehicle (HOV) lane would not be barrier-separated from the general-purpose lanes, but would be demarcated by appropriate signage and striping.

The non-barrier HOV treatment also allows for decommissioning of the lanes back to general-purpose operation in the event that the lanes do not result in adequate peak-period usage to justify HOV operations. This will depend in part upon public willingness to fund expanded transit operations that would use the HOV lanes. The HOV lanes are projected to be marginally successful without transit system expansion, but could become solidly successful if used by buses on hypothetical future routes (currently unfunded). Express bus service between Colorado Springs and Monument began in 2002 as a 3-year “demonstration project.”

In conjunction with the additional laneage, the Proposed Action includes interchange reconstruction at several locations. These include major reconstruction of existing interchanges at:

- Exit 141 – Cimarron (U.S. Highway 24)
- Exit 142 – Bijou Street
- Exit 145 – Fillmore
- Exit 147/148 – North Nevada Avenue and Rockrimmon Boulevard (consolidated)
- Exit 156 – North Gate Road, plus freeway-to-freeway ramps for Powers Boulevard
- Exit 158 – Baptist Road

For each of the interchange reconstruction projects, numerous design alternatives were considered and evaluated. These alternatives were presented for review and input at advertised public meetings.

Additionally, minor geometric changes will be made at Exit 146, Garden of the Gods Road. The existing southbound-only ramps at Exit 147A (Corporate Centre Drive) will be closed, with access via a local street connection to the reconfigured Nevada/Rockrimmon interchange. In conjunction with freeway widening on U.S. Air Force Academy property, the Ackerman Overlook will be relocated to a safer location.

2.0 Existing Conditions

2.1 FEMA Floodplains

The City of Colorado Springs and El Paso County participate in the Flood Insurance Program administered by the Federal Emergency Management Agency (FEMA). In conjunction with this program, the City of Colorado Springs and El Paso County regulate development and construction activities within floodplains. The Pikes Peak Regional Building Department Floodplain Administrator coordinates these programs and regulations. The *Flood Insurance Study, El Paso County, Colorado, and Incorporated Areas*, revised August 23, 1999, was prepared by FEMA and includes the drainageways within El Paso County that have regulated floodplains. The FEMA-regulated floodplains are illustrated on the current *Flood Insurance Rate Maps (FIRM), El Paso County, Colorado, and Incorporated Areas*, revised August 23, 1999.

2.2 FEMA and Local Agency Floodplain Regulation

FEMA-regulated floodplains are based on the 100-year return frequency discharge. There are two general types of FEMA 100-year floodplains within the project area. Some are 100-year floodplains that were studied with approximate methods, and have no base flood elevations determined because detailed hydrologic and hydraulic analyses were not performed. Others are 100-year floodplains that were studied with detailed hydrologic and hydraulic analyses, and have base flood elevations determined. The FIRM also include the 500-year floodplain boundaries to indicate additional areas of flood risk for streams studied with detailed methods.

FEMA has developed a floodway concept for use as floodplain management by limiting increases in flood hazard. This concept divides the 100-year floodplain into a floodway and a floodway fringe. Floodways have been established for all the floodplains in the study area that were delineated with detailed methods. The floodway is the main channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without increases of more than 1.0 foot, provided hazardous velocities are not created. Floodways are computed based on equal conveyance reduction on each side of the floodplain. The floodway fringe is the portion of the overbank area of the floodplain that could be used for development by raising the ground.

FEMA requires revision of the FIRM for any construction or development within the floodway that results in an increase in regulatory base flood elevation (BFE), or in an increase in floodplain limits. When this is anticipated by a proposed project, a Conditional Letter of Map Revision (CLOMR) must be obtained from FEMA before construction is initiated. After the project is completed, a Letter of Map Revision (LOMR) must be obtained from FEMA to finish the revision of the FIRM. Development or construction in the floodway fringe is allowed without revision of the FIRM. When improvements result in a decrease in BFEs or floodplain boundaries, an LOMR must also be obtained to revise the FIRM following completion of the project.

The City of Colorado Springs and El Paso County have adopted these same floodplain management requirements as part of their floodplain ordinances. The local ordinances also require delineation of floodplains and floodways for those streams that do not have delineated FEMA floodplains. The Colorado Water Conservation Board must designate new floodplains delineated for unstudied streams before the floodplains can be regulated by local agencies. The Floodplain Administrator must issue a floodplain development permit for any construction within the floodplain.

2.3 Existing Streams in the Study Area

Basin descriptions and existing floodplain information were obtained from the Flood Insurance Study and field review. A brief description of each of the existing FEMA floodplains and their drainage basins follows. The existing 100-year floodplains are shown on the Floodplain Reference Maps in Attachment A. The 100-year floodplains shown on these maps are approximate, and illustrate only the general location and type of floodplain, and not exact FEMA floodplain boundaries.

2.3.1 Monument Creek

Monument Creek is one of the two main streams within the study area, and it begins west of Palmer Lake. This mountain stream flows southeasterly in steep, narrow canyons and through transitional foothills toward Monument, then turns south and generally parallels I-25 to its confluence with Fountain Creek at Cimarron Street in Colorado Springs. Snowpack and springs contribute to this perennial stream. The upper basin is covered with mixed mountain and foothill vegetation. Between Monument and Colorado Springs, the vegetation is mixed trees and shrubs with native grasses. The channel in this reach is flatter and remains entrenched. Within Colorado Springs, there has been significant development of the tributary basins and along the streambanks.

The basin area that is tributary to the I-25 crossing between the Rockrimmon Boulevard and North Nevada Avenue interchanges is about 215.7 square miles, with a 100-year discharge of about 31,000 cubic feet per second (cfs). Just upstream, the existing floodplain is about 300 feet wide, with a depth of flow in the channel of about 12 feet and a velocity of about 12 feet per second (fps).

Just upstream of the confluence with Fountain Creek, the basin area is about 238 square miles, with a 100-year discharge of about 32,000 cfs. The existing floodplain is about 200 feet to 300 feet wide, with a depth of flow in the channel of about 18 feet and a velocity of about 14 fps.

2.3.2 Fountain Creek

Fountain Creek is the other main stream within the study area. The Fountain Creek headwaters are northwest of Woodland Park. This perennial mountain stream flows southeasterly in a steep bedrock channel in narrow canyons with steep walls. Snowpack and springs feed the headwaters from the area around Pikes Peak. The upper basin is covered with aspen, spruce, and pine forest. As Fountain Creek leaves the foothills, the slope of the entrenched channel flattens. The stream flows through Manitou Springs and Colorado Springs. At the confluence with Monument Creek, just east of the I-25 crossing at Cimarron

Street, the channel turns to the south and generally parallels the highway to its confluence with the Arkansas River in Pueblo. Between the foothills and Colorado Springs, the vegetation is rough and broken, ranging from mixed coniferous trees and shrubs to mountain grasses. There has been significant urban development of the drainage basin and along the stream within Manitou Springs and Colorado Springs. To the south of the Colorado Springs urban area, the high plateau gradually changes to rolling hills covered with some scattered shrubs. Deciduous trees line most of the channel banks in the lower reaches.

At the I-25 crossing, the tributary basin is about 120 square miles, with a 100-year discharge of about 20,500 cfs. Just upstream, the existing floodplain is about 2,700 feet wide due to the backwater caused by the existing crossing. Some of the 100-year discharge overflows to the south into Bear Creek. The depth of flow in the channel is about 19 feet, with a velocity of about 17 fps.

Just downstream of the confluence with Monument Creek, the total drainage basin is about 358 square miles, with a 100-year discharge of about 42,200 cfs. The existing floodplain varies between about 300 feet and 500 feet wide, with depths of flow in the channel between 11 feet and 16 feet and velocities between 10 fps and 16 fps.

2.3.3 Crystal Creek

Crystal Creek is a left-bank tributary to Monument Creek. It flows southwesterly, crosses I-25 about 2,700 feet north of the State Highway 105 interchange, and continues about 1.0 miles to the confluence at Monument Lake. Most of the basin is developed as commercial and medium-size lot residential in the pine forest of the Woodmoor area. The main channel is fairly steep and well defined.

The tributary basin at the I-25 crossing is about 0.5 square miles, with a 100-year discharge of about 600 cfs. Just upstream, the existing floodplain is about 130 feet wide due to the backwater caused by the crossing. The 100-year discharge overflows to the south along the east side of I-25, across State Highway 105 and into the Dirty Woman Creek basin. The depth of flow in the channel is about 4 feet, with a velocity of about 6 fps.

2.3.4 Dirty Woman Creek

Dirty Woman Creek is a left-hand tributary to Monument Creek. It flows southwesterly, crosses I-25 at the State Highway 105 interchange, and continues about 1.0 miles to the confluence in Monument. Most of the basin upstream of I-25 is developed as medium-size lot residential in the pine forest of the Woodmoor area. There are a few existing detention areas, including Lake Woodmoor. The main channel is fairly steep and well defined.

The basin drains about 4.3 square miles at the I-25 crossing, with a 100-year discharge of about 2,600 cfs. Just upstream, the existing floodplain is about 500 feet wide due to the backwater caused by the crossing. The 100-year discharge overtops I-25. The depth of flow in the channel is about 18 feet, with a velocity of about 10 fps.

2.3.5 Teachout Creek

Teachout Creek is a left-bank tributary of Monument Creek. It flows southwesterly, crosses I-25 about 7,500 feet south of the Monument interchange, and continues about 0.9 miles to the confluence. The basin upstream of I-25 is an upland area west of the Black Forest that is rapidly being developed as mixed uses in the Jackson Creek and Woodmoor South areas. The main channel is well defined with little erosion.

About 1.0 square miles is tributary to the I-25 crossing. Hydrologic and hydraulic information is not available for Jackson Creek because it was studied with approximate methods by FEMA. A floodway has not been established for this stream. Upstream of the crossing, the approximate floodplain shown on the FIRM is about 200 feet wide.

2.3.6 Jackson Creek

Jackson Creek is a left-bank tributary to Monument Creek. It flows southwesterly, crosses I-25 about 2,800 feet south of the Baptist Road interchange, and continues about 0.5 miles to the confluence. The upper portion of the basin is part of the west side of the Black Forest. There is large-lot residential development in this portion of the basin. The lower part of the basin is an upland area that is being rapidly developed as mixed uses in the Jackson Creek area. There are some detention areas within the drainage basin. The main channel is well defined with only minimal erosion.

The basin tributary to the I-25 crossing is about 4.1 square miles. Hydrologic and hydraulic information is not available for Jackson Creek because it was studied with approximate methods by FEMA. A floodway has not been established for this stream. Upstream of the crossing the approximate floodplain shown on the FIRM is about 180 feet wide.

2.3.7 Black Forest Creek

Black Forest Creek is a left-bank tributary to Monument Creek. It flows southwesterly to the confluence, located on Air Force Academy property. The crossing of I-25 is located about 5,500 feet north of the existing Northgate Boulevard interchange. The basin is an upland area to the west of the Black Forest. The basin is being rapidly developed with mixed uses in the Gleneagle and Jackson Creek areas. There are some detention areas along the main and side channels. The main channel is well defined with only minimal erosion. The lower one-half mile of the channel is on Air Force Academy property.

About 2.0 square miles are tributary to the I-25 crossing, with a 100-year discharge of about 2,100 cfs. Just upstream, the existing floodplain is about 130 feet wide due to the backwater caused by the crossing. The depth of flow in the channel is about 8 feet, with a velocity of about 5 fps.

2.3.8 Black Forest Creek – Middle Tributary

Black Forest Creek – Middle Tributary flows southwesterly, crosses I-25 about 3,500 feet north of the existing Northgate Boulevard interchange, and joins Black Forest Creek within the Air Force Academy. The basin is an upland area to the west of the Black Forest that has been developed with mixed uses in the Gleneagle area. There are some minor detention areas within the basin. The main channel is well defined with only minimal erosion.

The area tributary to I-25 is about 0.4 square miles, with a 100-year discharge of about 300 cfs. Just upstream, the existing floodplain is about 140 feet wide due to the backwater caused by the crossing. The depth of flow in the channel is about 2 feet, with a velocity of about 3 fps.

2.3.9 Smith Creek

Smith Creek is a left-bank tributary to Monument Creek. It flows southwesterly to the confluence, located on Air Force Academy property. The crossing of I-25 is located just south of the existing Northgate Boulevard interchange. The basin begins in the west side of the Black Forest, northeast of Colorado Springs. There is large-lot residential development in the upper portion of the basin. The lower part of the basin is developed with mixed uses in the Gleneagle area. There are some minor detention areas in the basin. The channels are well defined with moderate erosion. The lower one-half mile of the channel is on Air Force Academy property.

The basin drains about 5.2 square miles at the I-25 crossing. At I-25, the floodplain is not regulated by FEMA because it is within the Air Force Academy. Hydrologic and hydraulic information is not available for Smith Creek because it was studied with approximate methods by FEMA. A floodway has not been established for this stream. Upstream of the crossing, the approximate floodplain shown on the FIRM is about 200 feet wide.

2.3.10 Black Squirrel Creek

Black Squirrel Creek is a left-bank tributary to Monument Creek. It flows southwesterly to the confluence, located on the Air Force Academy property. The crossing of I-25 is about 3,900 feet north of the Interquest Parkway interchange. The upper portion of the basin is part of the west side of the Black Forest, northeast of Colorado Springs. There is large-lot residential development in the upper portion of the basin. The lower part of the basin is being rapidly developed with mixed uses in the Liberty Heights area. The main and side channels are steep, narrow, and deeply eroded. The lower mile of the channel is on Air Force Academy property.

About 10.5 miles are tributary to the I-25 crossing. At I-25, the floodplain is not regulated by FEMA because it is within Air Force Academy boundaries. Hydrologic and hydraulic information is not available for Black Squirrel Creek because it was studied with approximate methods by FEMA. A floodway has not been established for this stream. Upstream of the crossing, the approximate floodplain shown on the FIRM is about 250 feet wide.

2.3.11 Kettle Creek

Kettle Creek is a left-bank tributary to Monument Creek. It flows southwesterly to the confluence, located within Air Force Academy boundaries. The drainageway crosses I-25 about 900 feet north of the Briargate Boulevard interchange. The upper portions of the basin are part of the west side of the Black Forest, northeast of Colorado Springs. The middle part of the basin is a high plain with native vegetation. There is some large-lot residential development in the middle and upper part of the basin. Mixed-use development is beginning in the lower portions of the basin near State Highway 83. The main channel is

narrow and deeply eroded. The lower 2.0 miles of the channel are within the Air Force Academy. The Air Force Academy constructed a large detention reservoir just east of the I-25 crossing when the Academy was developed in the 1950s.

The drainage basin tributary to this reservoir is about 16.4 square miles, with a 100-year discharge of about 9,300 cfs. At I-25, the floodplain is not regulated by FEMA because it is within Air Force Academy boundaries. The 100-year floodplain is contained within the detention reservoir and outlet pipe.

2.3.12 Pine Creek

Pine Creek is a left-bank tributary to Monument Creek. It flows southwesterly and crosses I-25 about 2,200 feet north of the Woodmen Road interchange. The upper 20 percent of the basin is high plains with scattered shrubs and native grass vegetation, and some large-lot residential development. The lower 80 percent of the basin is developed as mixed uses in the Briargate area of northeastern Colorado Springs, with heavy commercial development in the Chapel Hills area. The stream is deep, narrow, and severely eroded, especially in the lower reaches. There are some detention areas along the main channel and on the side channels.

At the I-25 crossing, the tributary area is about 9.7 square miles, with a 100-year discharge of about 2,100 cfs. Just upstream the existing floodplain is about 50 feet wide, with a depth of flow in the channel of about 8 feet, and a velocity of about 12 fps.

The main channel of Pine Creek parallels the easterly side of I-25 from the crossing to about 4,000 feet north of the North Academy Boulevard interchange (a length of about 1.8 miles). The basin tributary to this channel reach is about 4.5 square miles, with a 100-year discharge of about 1,300 cfs. Between the crossing and the interchange, the existing floodplain varies between 50 feet and 100 feet wide, with a depth of flow in the channel of about 2 feet to 5 feet, and velocities of about 10 fps. In this reach, the floodplain is about 800 feet away from I-25.

Upstream of the interchange the floodplain is not regulated by FEMA because it is within the Air Force Academy. In this reach the floodplain is about 100 feet away from I-25. The existing floodplain in this reach is about 40 feet wide, with a depth of flow of about 3 feet, and a velocity of about 10 fps.

2.3.13 Cottonwood Creek

Cottonwood Creek is a left-bank tributary to Monument Creek. It flows southwesterly and crosses I-25 about 2,000 feet south of the Woodmen Road interchange. The upper 40 percent of the basin is an undeveloped high plains area vegetated with scattered shrubs and native grass, and some large-lot residential development. The lower 60 percent of the basin is being developed as mixed uses in the Norwood and Briargate areas of northeastern Colorado Springs. The area is moderately sloped. The main and side channels have sand bottoms that are deeply eroded with some rock outcrops on the sides. The sides of the lower channel reaches have significant vegetation that has spread from the adjacent development.

About 17.5 square miles are tributary to the I-25 crossing, with a 100-year discharge of about 10,000 cfs. Just upstream the existing floodplain is about 120 feet wide, with a depth of flow in the channel of about 11 feet and a velocity of about 14 fps.

2.3.14 Rockrimmon Basin

Rockrimmon Basin is a right-bank tributary to Monument Creek. It flows southeasterly and crosses I-25 at the Rockrimmon Boulevard interchange. The entire basin is a foothill area with scrub forest vegetation that has been developed as mixed use in the Rockrimmon area of northwestern Colorado Springs. The area is steep with incised channels that have been constricted by adjacent development.

The tributary basin at the I-25 crossing is about 1.8 square miles, with a 100-year discharge of about 2,500 cfs. Just upstream, the existing floodplain is about 200 feet wide due to the backwater caused by the crossing. The depth of flow in the channel is about 13 feet, with a velocity of about 11 fps.

2.3.15 Douglas Creek North

Douglas Creek North is a right-bank tributary of Monument Creek. It flows southeasterly and crosses I-25 about 1,300 feet south of the Garden of the Gods Road interchange, and continues about 0.4 miles to the confluence. The upper 30 percent of the basin is a foothills area covered with scrub forest vegetation. The channels of the upper basin are natural, steep, and well defined. The lower 70 percent of the basin is being rapidly developed as mixed use in the Mountain Shadows area of western Colorado Springs. Much of the lower main channel has been protected with concrete lining.

The basin tributary to I-25 is about 6.5 square miles, with a 100-year discharge of about 4,600 cfs. Just upstream, the existing floodplain is about 250 feet wide due to the backwater caused by the crossing. The depth of flow in the channel is about 16 feet, with a velocity of about 5 fps.

2.3.16 Douglas Creek South

Douglas Creek South is a right-bank tributary of Monument Creek. It flows southeasterly and crosses I-25 just south of the Ellston Street overpass, about 2,500 feet north of the Fillmore Street interchange, and continues about 0.4 miles to the confluence. The upper 40 percent of the basin is an undeveloped foothill area with scrub forest and native grass cover. The lower 60 percent of the basin is being rapidly developed as mixed use in the Mountain Shadows area of western Colorado Springs. The main channel is steep and incised with some minor detention in the lower portion of the basin.

The basin draining to I-25 includes about 2.2 square miles, with a 100-year discharge of about 3,700 cfs. Just upstream, the existing floodplain is about 500 feet wide due to the backwater caused by the crossing. The depth of flow in the channel is about 20 feet, with a velocity of about 5 fps.

2.3.17 Mesa Basin

Mesa Basin is a right-bank tributary to Monument Creek. It flows southeasterly through the Kissing Camels and Mesa Springs residential areas of western Colorado Springs. Some of the basin has been developed as residential use with significant open areas remaining as foothills with scrub forest vegetation. The main channel is steep and well defined. Development has encroached on the lower channel reach, and it is severely clogged with vegetation. There is some minor detention in the upper portion of the basin. Mesa Basin crosses I-25 about midway between the Uintah Street and Fontanero Street interchanges, and continues about 0.1 miles to the confluence.

The basin drains about 2.2 square miles at the I-25 crossing, with a 100-year discharge of about 2,300 cfs. Just upstream the existing floodplain is about 50 feet wide, with a depth of flow in the channel of about 9 feet and a velocity of about 12 fps.

2.3.18 Bear Creek

Bear Creek is a right-bank tributary to Fountain Creek. It flows northeasterly and crosses I-25 about 2,100 feet south of the Cimarron Street interchange and the confluence of Fountain Creek and Monument Creek. The upper 75 percent of the basin is a steep mountainous area with dense forest cover and large rock outcroppings. The channels in the upper part of the basin are steep and incised. The lower 25 percent of the basin is a foothills area with scattered scrub forest and grasses that is being rapidly developed as mixed use in the Skyway and Motor City areas of southwestern Colorado Springs. The lower main channel is also steep and well defined.

At the I-25 crossing, the drainage basin includes about 10.7 square miles, with a 100-year discharge of about 4,100 cfs. Just upstream, the existing floodplain is about 400 feet wide due to the backwater caused by the crossing. Some of the 100-year discharge overflows to the south into Cheyenne Creek. The depth of flow in the channel is about 12 feet with a velocity of about 13 fps.

2.3.19 Cheyenne Creek

Cheyenne Creek is a right-bank tributary to Fountain Creek. It flows northeasterly and crosses I-25 just upstream of South Nevada Avenue. About 90 percent of basin is a steep mountainous area with dense forest cover and large rock outcroppings. The upper drainageways are very steep and incised channels. The lower 10 percent of the basin is a foothill area with scrub forest that has been developed as small-lot residential in the old Broadmoor area of southwestern Colorado Springs. The lower channel reach has been significantly narrowed and obstructed by the development.

At the I-25 crossing, the basin area is about 25 square miles, with a 100-year discharge of about 13,000 cfs. Just upstream, the existing floodplain is about 4,100 feet wide because limited upstream channel capacity allows overflows on both sides. I-25 to the east of the South Nevada interchange is overtopped by some of this overflow. The depth of flow in the channel is about 12 feet, with a velocity of about 4 fps.

2.3.20 Spring Run

Spring Run is a right-bank tributary to Fountain Creek. It flows northeasterly and crosses I-25 about 3,500 feet north of the Circle Drive (US Highway 85/87)/Lake Avenue interchange, just south of the Martin Luther King, Jr. Bypass (US Highway 24) interchange. Approximately 10 percent of the upper basin is undeveloped foothills covered with scrub forest. The remainder of the basin is mostly developed as mixed use in the Broadmoor and Stratton areas of southwestern Colorado Springs. Much of the main channel has been encroached upon by the existing development. There are a few existing detention areas, including Quail Lake.

About 3.1 square miles drain to the I-25 crossing, with a 100-year discharge of about 1700 cfs. Just upstream, the existing floodplain is about 70 feet wide, with a depth of flow in the channel of about 6 feet and a velocity of about 9 fps.

2.3.21 Fishers Canyon

Fishers Canyon is a right-bank tributary to Fountain Creek. It flows easterly and crosses I-25 about 4,000 feet north of the South Academy Boulevard interchange, just south of the Venetucci Boulevard (US Highway 85/87) overpass. The upper 40 percent of the basin consists of steep mountainous areas and foothills covered with mountain and scrub forest vegetation. The lower reaches are within the Broadmoor and Stratton areas of southwestern Colorado Springs, and are rapidly being developed as mixed uses. The channel is well defined and steep throughout the basin.

The tributary basin at the I-25 crossing is about 5.3 square miles, with a 100-year discharge of about 3,100 cfs. Just upstream, the existing floodplain is about 600 feet wide due to the backwater caused by the crossing. The 100-year discharge overtops I-25. The depth of flow in the channel is about 11 feet, with a velocity of about 13 fps.

2.3.22 Unnamed Streams

There are several unnamed streams in the study area that do not currently have FEMA or other designated floodplains. These streams are in rural areas where little, if any, development has begun. In the future, as development in the study area expands, it is anticipated some of these streams will be studied to identify floodplains.

3.0 Methodology

A location hydraulic study was done for the proposed project, as required in 23 CFR 650.111. The hydrologic and hydraulic analyses were based on the proposed concept design. Existing FEMA floodplain information has been reviewed relative to this conceptual design. Hydraulic reports and information available were reviewed for public and private projects in the corridor that have been completed or are currently under construction. Tributary basins were verified using U.S. Geological Survey (USGS) mapping. Field reviews were conducted for all streams with existing floodplains, and for the other drainage basins in the

study corridor. Potential impacts and general mitigation measures for the floodplains have been identified based on these reviews. As individual construction projects within the I-25 corridor are designed in the future, final hydrologic and hydraulic analyses that comply with 23 CFR 650.117 will be done at that time.

4.0 Impacts of No-Build Alternative

The no-build alternative would not impact any FEMA floodplains because there would be no construction, excavation, or fill in the drainageway areas. There would also be no beneficial impacts to the floodplain areas, drainageway capacities, or channel stability.

5.0 Direct Impacts of Proposed Action

Direct impacts to floodplains would occur due to construction related to widened roadway embankments; new and replacement bridges; extended, enlarged, or replaced culverts; and channel stabilization improvements. Likely impacts to the each of the floodplains within the corridor have been identified based upon the concept design for the Proposed Action. In general, potential direct impacts include disturbance to riparian and wetland vegetation within areas of floodplain disturbance and changes to channel banks, BFEs, floodplain boundaries, and flow velocities when these are specifically permitted by the Regional Flood Plain Administrator. Floodplain encroachments and associated increase in the BFE and floodplain boundary will not occur unless they are allowed by FEMA floodplain management regulations. When required by the regulations, a Conditional Letter of Map Revision (CLOMR) must be obtained from FEMA before construction within a floodplain is initiated. After the project is completed, a Letter of Map Revision (LOMR) must be obtained from FEMA to finish the revision of the FIRM. At some locations, BFEs and associated floodplain boundaries will likely be decreased because the planned drainage improvements will have greater hydraulic capacity than the existing structures. In these cases, a CLOMR and LOMR may be required and must be obtained from FEMA as well.

Most floodplain encroachments and impacts that will result from the Proposed Action will occur at highway crossings of streams. There will also be a few longitudinal floodplain encroachments and impacts where the highway is parallel to and directly adjacent to streams. All of the planned improvements will not support incompatible floodplain development. Direct impacts to existing floodplain areas for the reaches of I-25 included in the Proposed Action will total approximately 52 acres.

A discussion of the expected floodplain impacts for the main channels of Monument Creek and Fountain Creek are described below, followed by a description of the impacts to the tributaries to these two major streams.

5.1 Monument Creek

The improvements at the Rockrimmon Boulevard and North Nevada Street interchanges will encroach into the floodway fringe and the floodway. The 100-year discharge currently passes below the existing I-25 mainline bridges. The project will include replacing these mainline bridges, and construction of two new ramp bridges over Monument Creek. There will also be some longitudinal encroachment due to the embankment and bridge of the new Corporate Drive/Nevada Avenue roadway connection. Scour protection improvements will be provided in the vicinity of the new bridges and the new roadway embankment. Additionally, grade control structures are to be constructed as part of a sanitary sewer crossing protection project by Colorado Springs Utilities. It is expected that the improvements as shown in the concept design will not raise the BFE by more than one foot. The I-25 improvement project will impact approximately 5 acres of existing floodplain area at this location.

I-25 is immediately adjacent to Monument Creek from Cimarron Street to just north of Bijou Street. The improvements at the Cimarron Street/Bijou Street interchange will encroach into the floodway fringe and the floodway. The 100-year discharge currently passes below the existing Bijou Street Bridge. The project will include replacing this bridge. The alignment of I-25 between Cimarron Street and Bijou Street will be shifted to the west to minimize longitudinal encroachment into Monument Creek. New retaining walls will be located at the edge of the floodway. Scour protection improvements will be provided in the vicinity of the new bridge and retaining walls. The City of Colorado Springs Department of Public Works has an ongoing program of constructing channel stability improvements in this reach. It is expected that the improvements as shown in the concept design will not raise the BFE by more than one foot. The I-25 improvement project will impact approximately 4 acres of existing floodplain area at this location.

5.2 Fountain Creek

The Cimarron Street/Bijou Street interchange improvements will include replacing the I-25 mainline and northeast ramp bridges, and construction of a new northwest ramp bridge over Fountain Creek. The channel of Fountain Creek under and between these bridges will also be enlarged. These new bridges and channel improvements will eliminate the existing overflow during a 100-year event into a roadside ditch which then discharges into Bear Creek just upstream of the highway. I-25 south of Cimarron Street will be realigned to the west to minimize longitudinal encroachment into Fountain Creek. New retaining walls will be located at the edge of the floodway. Scour protection improvements will be provided in the vicinity of the new bridges, channel, and retaining walls. It is expected that the improvements as shown in the concept design will not raise the BFE by more than one foot. The I-25 improvement project will impact approximately 14 acres of existing floodplain area at this location.

I-25 between the Cimarron Street interchange and the Martin Luther King, Jr. Bypass interchange is immediately adjacent to the Fountain Creek floodplain. The Nevada Street Bridge over Fountain Creek was recently replaced and new retaining walls were located at the edge of the floodway. Scour protection improvements were provided in the vicinity of

the new bridge and retaining walls. A floodplain development permit was obtained for this construction project. The Proposed Action at this location will not impact the existing floodplain.

About 1,000 feet of existing I-25 is within the floodway fringe of Fountain Creek just north of the Fort Carson railroad spur overpass about 5,400 feet north of the South Academy Boulevard interchange. The highway will be widened and raised above the BFEs in this area. Since the floodplain in this area appears to be a backwater caused by the railroad spur bridge over Fountain Creek, the highway improvements are not expected to raise the BFEs. The I-25 improvement project will impact approximately 2 acres of existing floodplain at this location.

5.3 Crystal Creek

The existing floodplain for Crystal Creek overflows along the east side of the I-25 roadway toward the south to Dirty Woman Creek. The existing crossing is a 14-foot wide by 10-foot high concrete box culvert. There are no additional I-25 improvements planned at this location, and no further floodplain impact.

5.4 Dirty Woman Creek

The 100-year discharge for Dirty Woman Creek overtops I-25. The existing crossing is 8 feet wide by 8 feet high concrete box culvert. The State Highway 105 interchange safety improvement project is currently under construction. The culvert crossing of mainline I-25 will be extended upstream and downstream, and enlarged to a triple 8-foot wide by 8-foot high concrete box culvert. Some of the improvements will encroach into the floodway fringe and the floodway. The existing bridge for Dirty Woman Creek at State Highway 105 will be replaced, and a new bridge will be constructed at the southwest ramp of the interchange. Erosion protection improvements will be provided upstream and downstream of the culverts, and scour protection improvements will be provided for the new bridges within CDOT right-of-way. A floodplain development permit has been obtained for this construction project. The enlarged culvert currently under construction at the Dirty Woman Creek crossing at I-25 will allow the 100-year discharge to pass under I-25. There are no additional I-25 improvements planned at this location, and no further floodplain impact.

5.5 Teachout Creek

Detailed hydrologic and hydraulic information is not available for Teachout Creek, because it was studied with approximate methods by FEMA. It is probable the 100-year discharge is contained in the existing double 10-foot wide by 10-foot high concrete box culvert under I-25. It is anticipated the culvert crossing will be extended upstream and downstream a short distance. Erosion protection improvements will be provided upstream and downstream of the culvert within CDOT right-of-way. It is expected that the improvements as shown in the concept design will not raise the BFE by more than one foot. The I-25 improvement project will impact approximately 2 acres of existing floodplain at this location.

5.6 Jackson Creek

Detailed hydrologic and hydraulic information is not available for Jackson Creek because it was studied with approximate methods by FEMA. It is probable the 100-year discharge is contained in the existing 30-foot wide by 17-foot high concrete box culvert under I-25. As part of the proposed Baptist Road interchange improvements, it is anticipated that the culvert crossing will be a bridge. The existing bridge for Jackson Creek at Baptist Road will also be replaced. Erosion protection improvements will be provided upstream and channel stabilization improvements will be provided downstream of the culvert within CDOT right-of-way, and scour protection improvements will be provided for the new bridge. It is expected that the improvements as shown in the concept design will not raise the BFE by more than one foot. The I-25 improvement project will impact approximately 4 acres of existing floodplain at this location.

5.7 Black Forest Creek

The existing 100-year discharge for Black Forest Creek is contained in the existing double 10-foot wide by 10-foot high concrete box culverts under the I-25 mainlines. The proposed roadway widening will encroach into the floodway fringe and the floodway. It is anticipated the culverts will be extended upstream and downstream a short distance. Erosion protection improvements will be provided upstream and downstream of the crossings within CDOT right-of-way. Since this crossing is within the Air Force Academy, concurrence with final design of the improvements will be obtained from the Academy. It is expected that the improvements as shown in the concept design will not raise the BFE by more than one foot. The I-25 improvement project will impact approximately 1 acre of existing floodplain at this location.

5.8 Black Forest Creek – Middle Tributary

The existing 100-year discharge for Black Forest Creek-Middle Tributary is contained in the existing 8-foot wide by 6-foot high concrete box culverts under the I-25 mainlines. The proposed roadway widening will encroach into the floodway fringe and the floodway. It is anticipated the culverts will be extended upstream and downstream a short distance. Erosion protection improvements will be provided upstream and downstream of the crossings within CDOT right-of-way. Since this crossing is located within the Air Force Academy, concurrence with final design of the improvements will be obtained from the Academy. It is expected that the improvements as shown in the concept design will not raise the BFE by more than one foot. The I-25 improvement project will impact approximately 2 acres of existing floodplain at this location.

5.9 Smith Creek

Detailed hydrologic and hydraulic information is not available for Smith Creek because it was studied with approximate methods by FEMA. It is probable the 100-year discharge is contained within the existing double 10-foot wide by 10-foot high concrete box culverts under the I-25 mainlines. As part of the proposed Northgate Boulevard/Powers Boulevard

interchange improvements, it is anticipated that the mainline culverts will be extended upstream and downstream. New culverts will also be constructed under the proposed southeast and southwest ramps. Erosion protection improvements will be provided upstream and downstream of the culverts within CDOT right-of-way. Since this crossing is located within the Air Force Academy, concurrence with final design of the improvements will be obtained from the Academy. It is expected that the improvements as shown in the concept design will not raise the BFE by more than one foot. The I-25 improvement project will impact approximately 5 acres of existing floodplain at this location.

5.10 Black Squirrel Creek

Detailed hydrologic and hydraulic information is not available for Black Squirrel Creek, because it was studied with approximate methods by FEMA. It is probable the 100-year discharge passes below the existing I-25 bridges. These existing bridges will be replaced. Scour protection improvements will be provided in the vicinity of the new bridges, and channel stabilization and erosion protection improvements will be provided downstream of the crossing within CDOT right-of-way. Since this crossing is located within the Air Force Academy, concurrence with final design of the improvements will be obtained from the Academy. It is expected that the improvements as shown in the concept design will not raise the BFE by more than one foot. The I-25 improvement project will impact approximately 3 acres of existing floodplain at this location.

5.11 Kettle Creek

The existing 100-year discharge for Kettle Creek is contained in the existing detention reservoir and the 108-inch diameter reinforced concrete pipe outlet conduit under I-25. The proposed widening of I-25 at this location will not extend beyond the ends of the existing outlet conduit crossing. There are no floodplain impacts at this location.

5.12 Pine Creek

The main channel of Pine Creek parallels the easterly side of I-25 for about 4,000 feet north of the North Academy Boulevard interchange. The proposed roadway will be widened toward this concrete lined channel, but it is expected that there will be no longitudinal encroachment into the existing floodplain. Since this crossing is located within the Air Force Academy, concurrence with the design of the improvements will be obtained from the Academy.

Improvements in the 1990s of the North Academy Boulevard interchange replaced the culvert crossing for Academy Boulevard at Pine Creek. The new culvert crossing is a 36-foot wide by 10-foot high concrete box culvert with channel stabilization improvements upstream and downstream. A floodplain development permit and a LOMR were obtained for this project.

The 100-year discharge for Pine Creek passes below the existing I-25 mainline bridges. The Woodmen Road interchange safety improvements currently under construction encroach into the floodway fringe and the floodway. The project includes replacing these I-25

mainline bridges. Scour protection improvements will be provided in the vicinity of the new bridges, and channel stabilization improvements will be provided downstream within CDOT right-of way. A floodplain development permit has been obtained for this construction project. The additional improvements to be included in the I-25 improvement project at this location will not further impact the existing floodplain.

5.13 Cottonwood Creek

The 100-year discharge for Cottonwood Creek passes below the existing I-25 mainline bridges. The Woodmen Road interchange safety improvements currently under construction encroach into the floodway fringe and the floodway. The project includes replacing these I-25 mainline bridges. Scour protection improvements will be provided in the vicinity of the new bridges. A floodplain development permit has been obtained for this construction project. The additional improvements to be included in the I-25 improvement project at this location will not further impact the existing floodplain.

5.14 Rockrimmon Basin

The existing 100-year discharge for Rockrimmon Basin is contained within the existing 10-foot wide by 10-foot high concrete box culvert. The proposed roadway widening will encroach into the floodway fringe and the floodway. It is anticipated the culvert will be realigned and extended upstream and downstream a short distance. It is expected that the improvements as shown in the concept design will not raise the BFE by more than one foot. The I-25 improvement project will impact approximately 1 acre of existing floodplain at this location.

5.15 Douglas Creek North

The existing 100-year discharge for Douglas Creek North is contained within the existing 14-foot wide by 12-foot high concrete box culvert. The proposed roadway widening will encroach into the floodway fringe and the floodway. It is anticipated the culvert will be extended upstream a short distance. Channel stabilization and erosion protection improvements will be provided downstream of the crossing within CDOT right-of-way. It is expected that the improvements as shown in the concept design will not raise the BFE by more than one foot. The I-25 improvement project will impact approximately 1 acre of existing floodplain at this location.

5.16 Douglas Creek South

Most of the existing 100-year discharge for Douglas Creek South is contained within the existing 14-foot wide by 12-foot high concrete box culvert, with some minor overflow under the I-25 Bridge over Ellston Street just to the north. The proposed roadway widening will encroach into the floodway fringe and the floodway. It is anticipated the culvert will be extended upstream a short distance. Channel stabilization and erosion protection improvements will be provided upstream and downstream of the crossing within CDOT right-of-way. It is expected that the improvements as shown in the concept design will not

raise the BFE by more than one foot. The I-25 improvement project will impact approximately 1 acre of existing floodplain at this location.

5.17 Mesa Basin

The existing 100-year discharge for Mesa Basin is contained within the existing 14-foot wide by 10-foot high concrete box culvert. The existing culvert crossing of the I-25 mainline was extended upstream and downstream a short distance, and an improved inlet was constructed in the 1990s. Erosion protection improvements were also constructed at the entrance to the culvert crossing. A floodplain development permit was obtained for these improvements. The additional improvements to be included in the I-25 improvement project at this location will not further impact the existing floodplain.

5.18 Bear Creek

The existing floodplain for Bear Creek overflows along the west side of I-25 toward the south to Cheyenne Creek. The existing crossing is a double 14-foot wide by 10-foot high concrete box culvert. The proposed Cimarron Street/Bijou Street interchange improvements will encroach into the floodway fringe and the floodway. A new bridge will be constructed to pass the 100-year discharge. Channel stabilization and erosion protection improvements will be provided upstream and downstream of the crossing within CDOT right-of-way. It is expected that the improvements as shown in the concept design will not raise the BFE by more than one foot. The I-25 improvement project will impact approximately 2 acres of existing floodplain at this location.

5.19 Cheyenne Creek

About 1,900 feet of existing I-25 just south of South Nevada Avenue is adjacent to the floodplain of Cheyenne Creek. This is due to an upstream overflow condition caused by limited existing channel capacity. The recently completed South Nevada Street/Tejon Street interchange safety improvements included new bridges for the I-25 mainline and ramps, and Arvada Street over Cheyenne Creek. These new bridges replaced the existing concrete box culverts. The I-25 mainline bridges also span over Nevada Avenue and Tejon Street. The channel of Cheyenne Creek between these bridges was also enlarged. The overflow of I-25 was eliminated. Scour protection improvements have been constructed in the vicinity of the new bridges and channel. A floodplain development permit was obtained for this construction project. The additional improvements to be included in the I-25 improvement project at this location will not further impact the existing floodplain.

5.20 Spring Run

The existing floodplain for Spring Run is immediately adjacent to the west side of I-25. The 100-year discharge is contained within the existing 10-foot wide by 6-foot high concrete box culvert that has an improved inlet. This culvert crossing was constructed in the 1980s. There is no further widening of I-25 planned in this reach, and no floodplain impact.

5.21 Fishers Canyon

The 100-year discharge for Fishers Canyon overtops I-25. The existing crossing is a triple 10-foot wide by 8-foot high concrete box culvert. The proposed roadway widening will encroach into the floodway fringe and the floodway. It is anticipated the culvert will be extended upstream and downstream a short distance, and enlarged or an improved inlet constructed to pass the 100-year discharge. Channel stabilization and erosion protection improvements will be provided upstream and downstream of the culvert within CDOT right-of-way. It is expected that the improvements as shown in the concept design will not raise the BFE by more than one foot. The I-25 improvement project will impact approximately 5 acres of existing floodplain at this location.

5.22 Unnamed Streams

There are several unnamed streams in the study area that do not currently have FEMA or other mapped floodplains. Floodplain impacts at these locations will be identified during final design of the I-25 improvement project.

6.0 Indirect Impacts of Proposed Action

Construction of the highway improvements included in the Proposed Action within floodplain areas will have some potential indirect impacts. The Proposed Action will increase runoff generated from the highway right-of-way. This increase will have only small impacts to the peak runoff discharges of the overall drainage basins, considering that the right-of-way and impervious areas of the highway are small relative to those of the overall drainage basins.

Some of the existing stream crossings of I-25 have small unintended detention areas upstream because existing culverts and bridges do not contain or pass the 100-year discharge. When these crossings are enlarged, the detention areas will be reduced in volume, resulting in small increases in the peak discharges downstream. However, the existing detention volumes are small relative to the peak discharges of the overall drainage basins of floodplains, and the impacts of the discharge increases will also be small.

Many floodplain areas are also wetlands and riparian areas. Construction activities in the floodplain areas may temporarily and permanently impact these wetlands and riparian areas. Some of the floodplain areas are also threatened or endangered wildlife species habitat areas, particularly for the Preble's meadow jumping mouse. Construction activities in the floodplain areas may temporarily and permanently impact these habitat areas. This is addressed in the Programmatic Biological Opinion issued by the U.S. Fish and Wildlife Service. Water quality may also be impacted temporarily by construction activities in floodplain areas, particularly by sedimentation.

7.0 Mitigation

Final design of the corridor improvements will be based on avoidance and minimization of impacts to the floodplains, such as rises in BFEs or increases in floodplain boundaries, increases in flow velocities, increases in peak discharges, and disturbance of other environmentally sensitive areas within or adjacent to the floodplains. Final design of the corridor will also eliminate or minimize negative drainage-related impacts to any existing public or private improvements or structures. When improvements result in a decrease in BFEs or floodplain boundaries, an LOMR will be obtained to revise the FIRM, following completion of the project. Improvements constructed in floodplain areas will result in maintained or increased capacities of the drainageways wherever practical. The final design of corridor improvements will comply with 23 CFR 650.115. This design approach will mitigate direct and indirect impacts.

Final design of corridor improvements in floodplain areas will comply with FEMA floodplain management regulations and City and County floodplain ordinances. The project will be designed to limit increases in BFEs to no more than 1.0 feet or the floodway elevation where established. Floodplain encroachments will be designed to minimize or mitigate hazardous flow velocities. All floodplain encroachments will be coordinated through the Floodplain Administrator for issuance of a floodplain development permit. If construction is proposed in the floodway portion of the floodplain, and BFEs or floodplain boundaries are increased, a CLOMR and LOMR will be processed through the Floodplain Administrator for approval by FEMA. Local agency and FEMA coordination will follow the procedures included in the agreement between the Federal Highway Administration (FHWA) and FEMA regarding highway improvement and construction in floodplains.

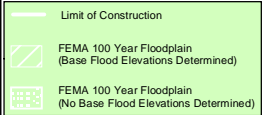
Detention basins will be constructed to reduce peak discharges where feasible, in open areas of interchanges or other large open areas to limit runoff increases from the highway. During final design of the drainage crossings to be enlarged that have existing small unintended detention areas upstream, the impact of reducing the volumes of these unintended detention areas will be verified and mitigated as needed. Final design of all project improvements will assure that floodplain BFE and boundary increases do not extend outside the highway right-of-way by increasing the hydraulic capacity of the crossing structures as needed. Disturbed wetland, riparian, and habitat areas within floodplains will be revegetated, and floodplain erosion control and channel stabilization improvements will be included at all locations. Other water quality best management practices (BMPs) in accordance with the CDOT Municipal Separate Storm Sewer System (MS-4) permit will also be provided at appropriate locations. These measures will mitigate direct as well as indirect impacts.

8.0 Attachment

Floodplain Reference Maps

ATTACHMENT

Floodplain Reference Maps

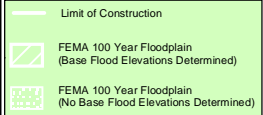
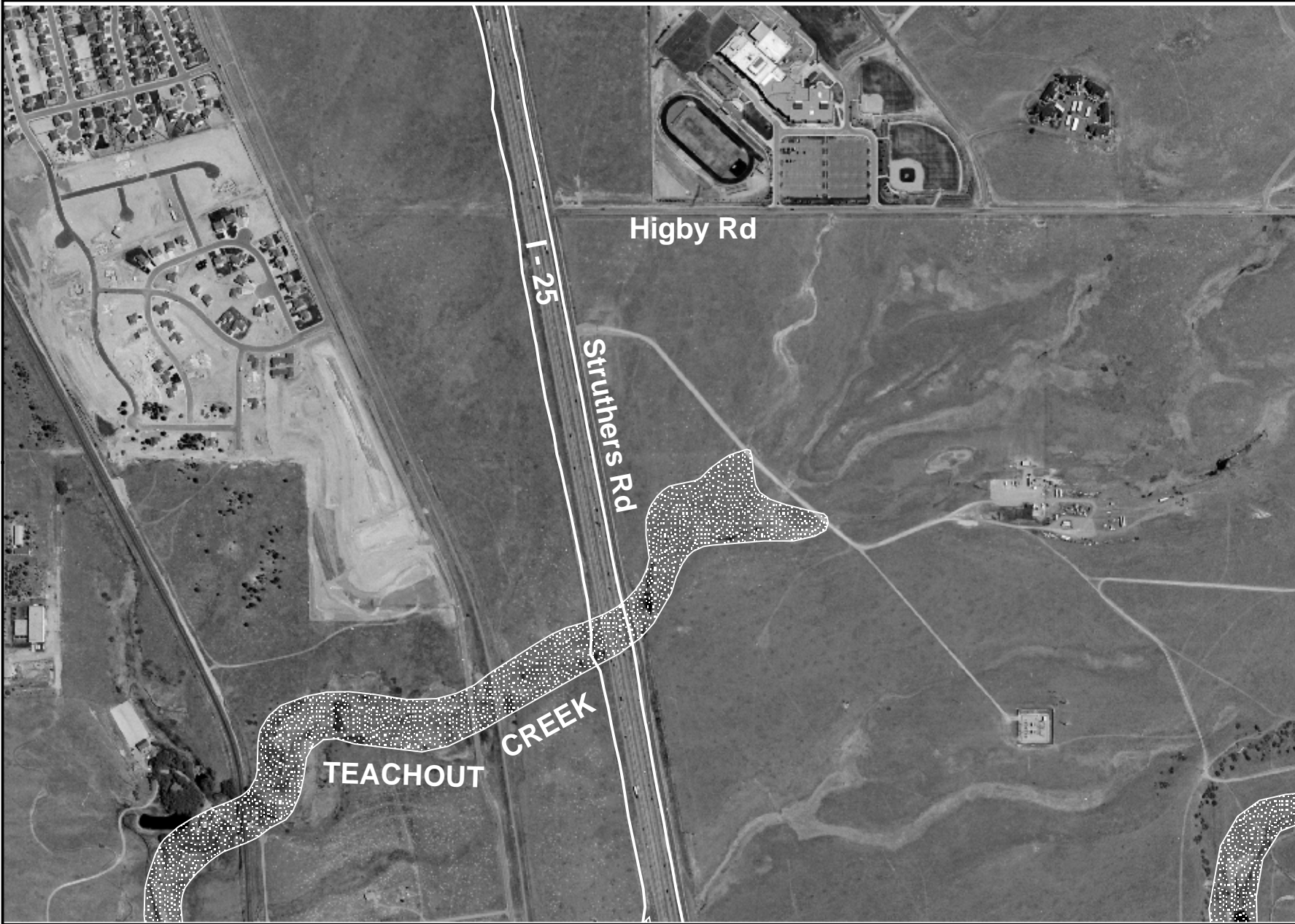




2

- Limit of Construction
- ▨ FEMA 100 Year Floodplain (Base Flood Elevations Determined)
- ▤ FEMA 100 Year Floodplain (No Base Flood Elevations Determined)







4

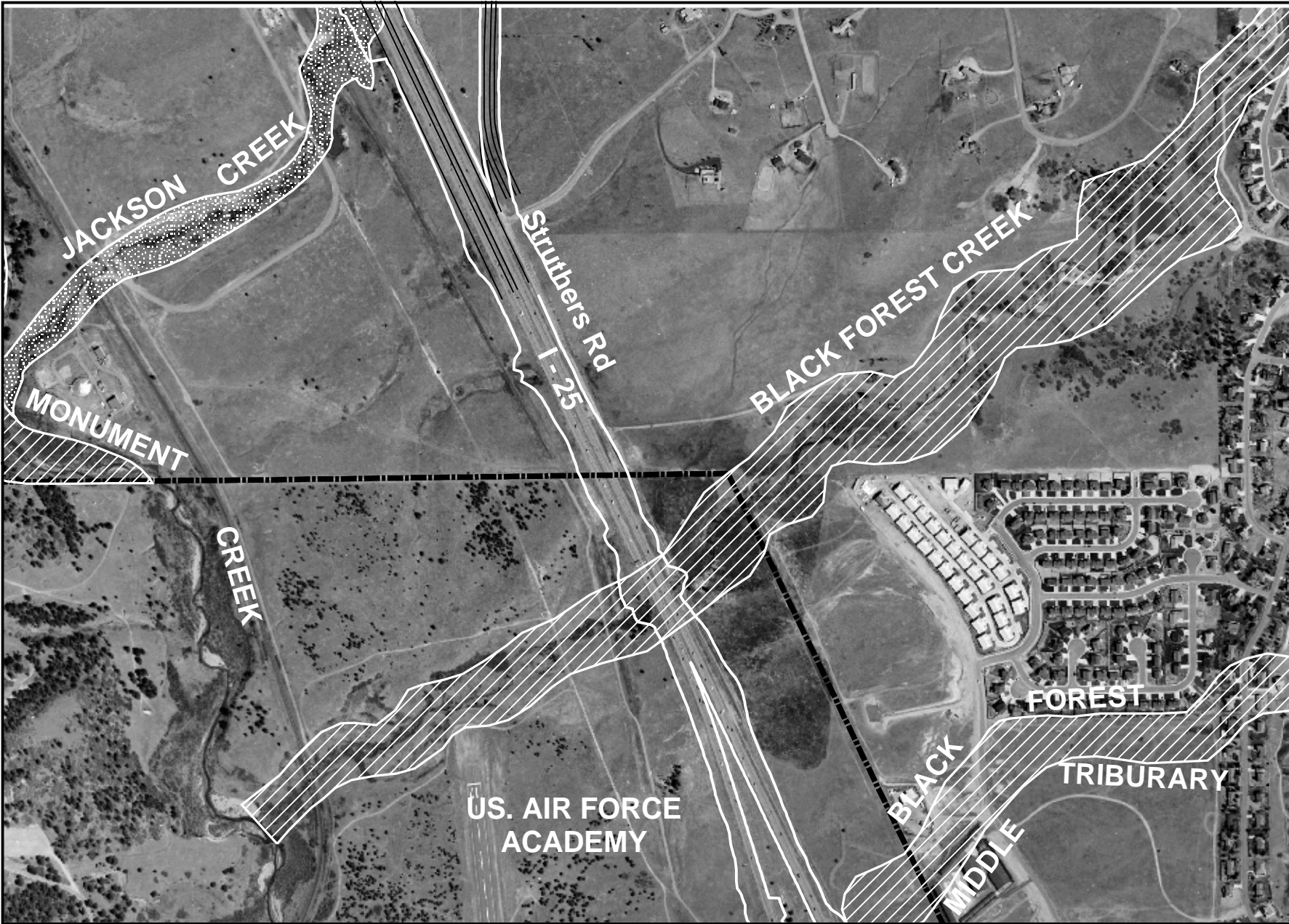
- Limit of Construction
- Proposed Baptist Rd
- ▨ FEMA 100 Year Floodplain (Base Flood Elevations Determined)
- ⋯ FEMA 100 Year Floodplain (No Base Flood Elevations Determined)





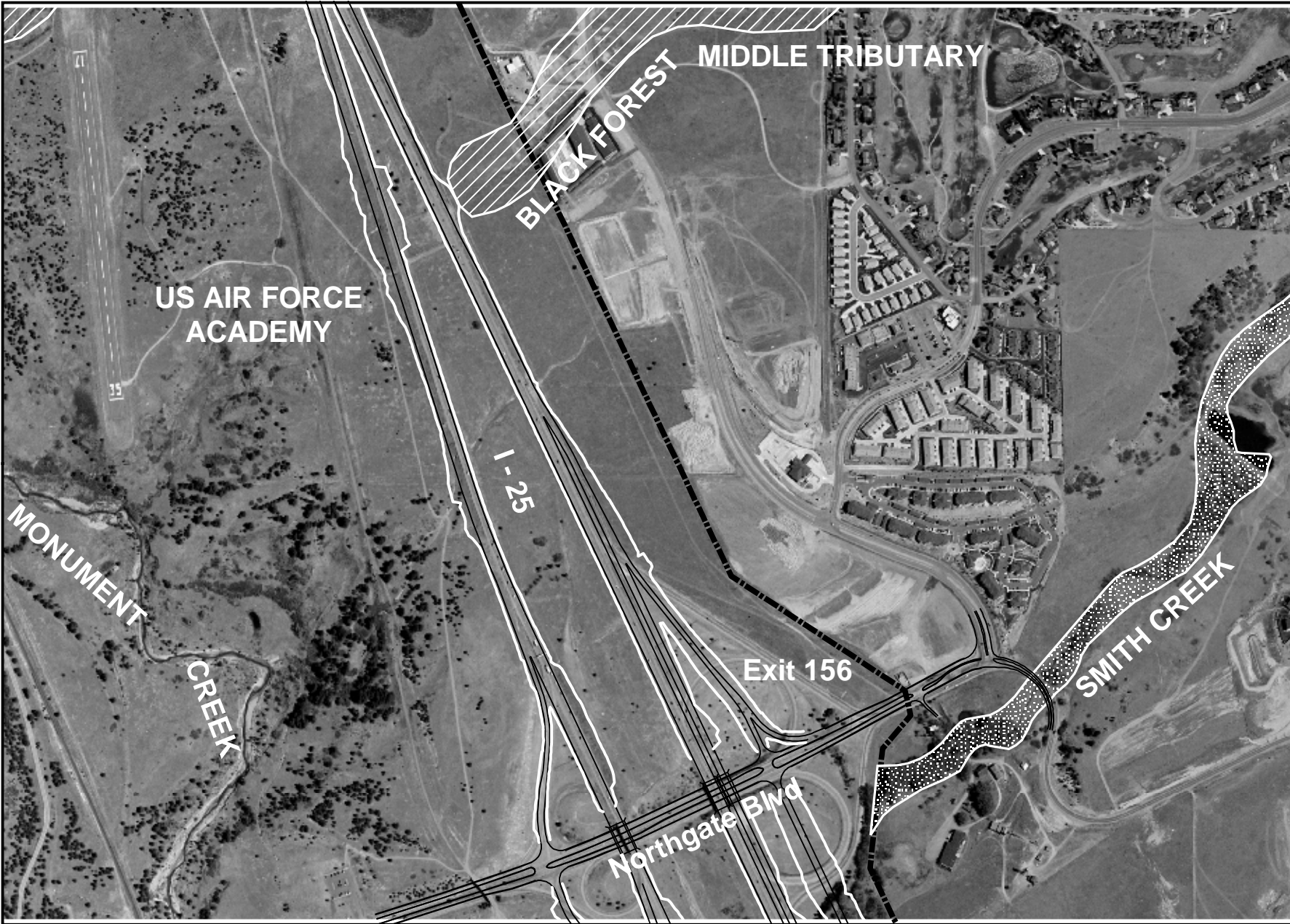
- Limit of Construction
- Proposed Baptist Rd
- ▨ FEMA 100 Year Floodplain (Base Flood Elevations Determined)
- ⋯ FEMA 100 Year Floodplain (No Base Flood Elevations Determined)

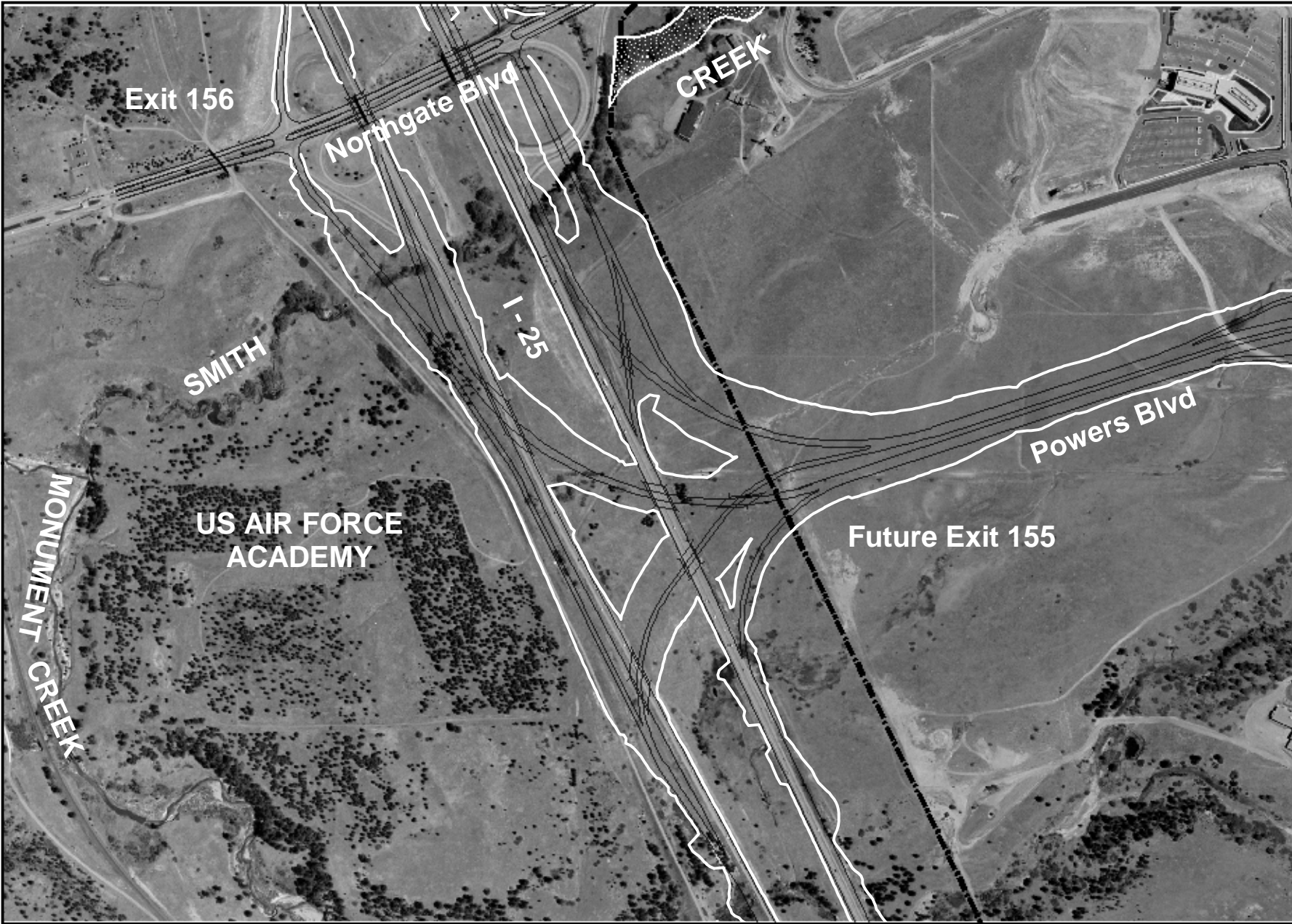




- Limit of Construction
- - - Proposed Baptist Rd
- ▨ FEMA 100 Year Floodplain (Base Flood Elevations Determined)
- ▨ FEMA 100 Year Floodplain (No Base Flood Elevations Determined)
- US AIR FORCE ACADEMY



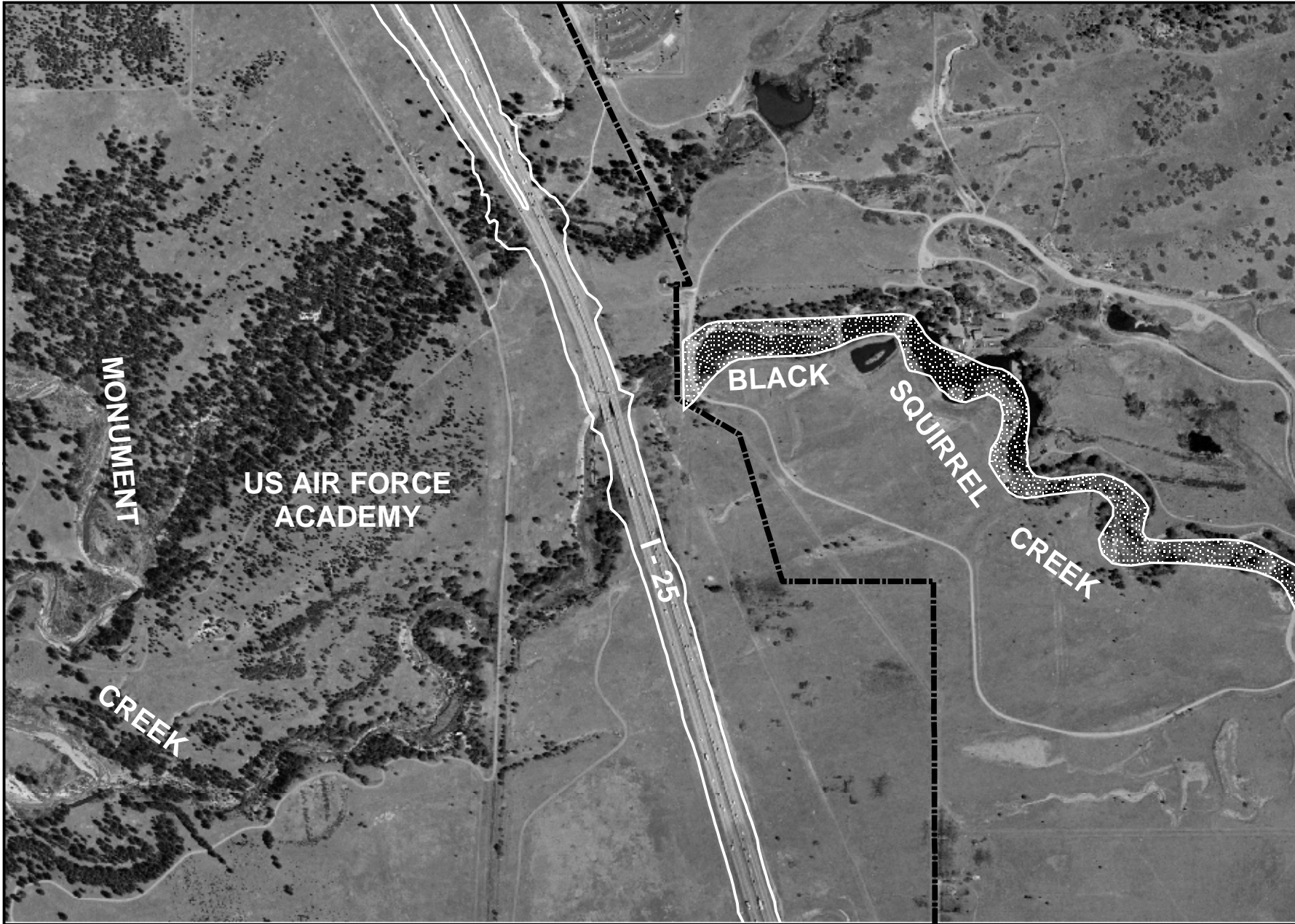






	Limit of Construction
	Proposed Northgate/Powers
	FEMA 100 Year Floodplain (Base Flood Elevations Determined)
	FEMA 100 Year Floodplain (No Base Flood Elevations Determined)
	US AIR FORCE ACADEMY





	Limit of Construction
	FEMA 100 Year Floodplain (Base Flood Elevations Determined)
	FEMA 100 Year Floodplain (No Base Flood Elevations Determined)
	US AIR FORCE ACADEMY



BLACK SQUIRREL CREEK

Exit 153

Interquest Pkwy

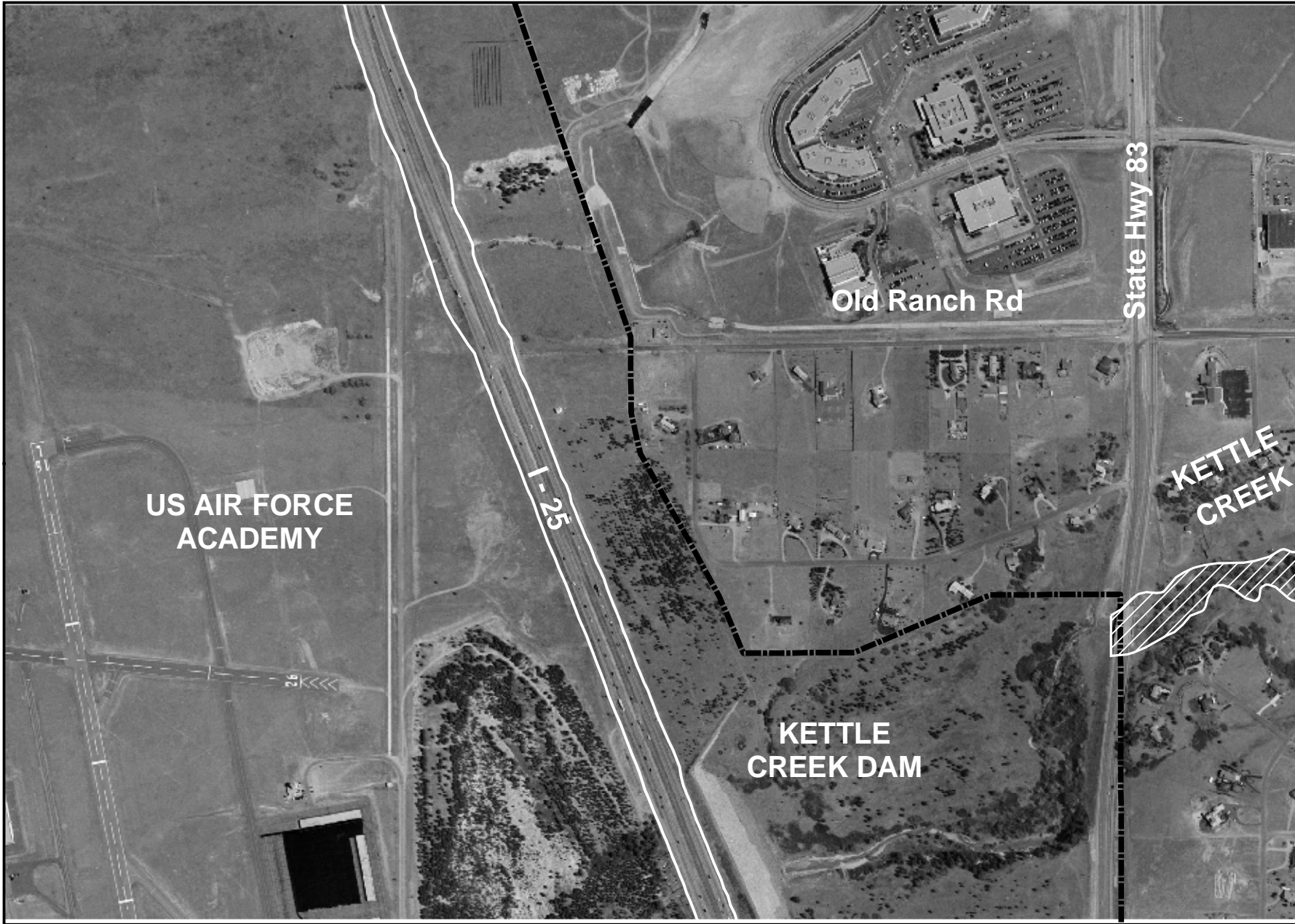
US AIR FORCE
ACADEMY

I-25

11

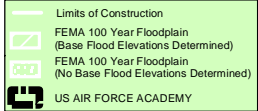
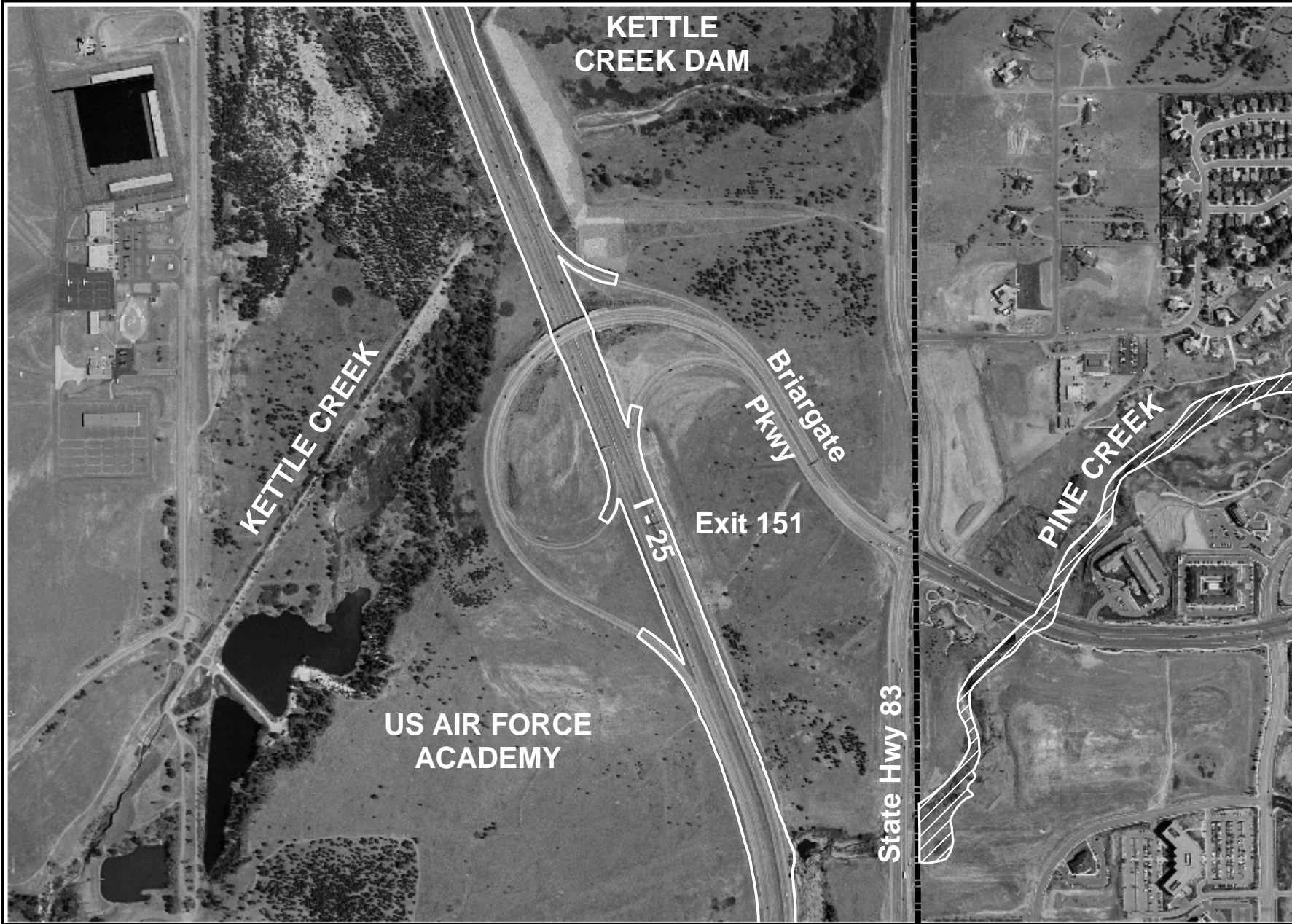
- Limits of Construction
- ▨ FEMA 100 Year Floodplain (Base Flood Elevations Determined)
- ▨ FEMA 100 Year Floodplain (No Base Flood Elevations Determined)
- US AIR FORCE ACADEMY

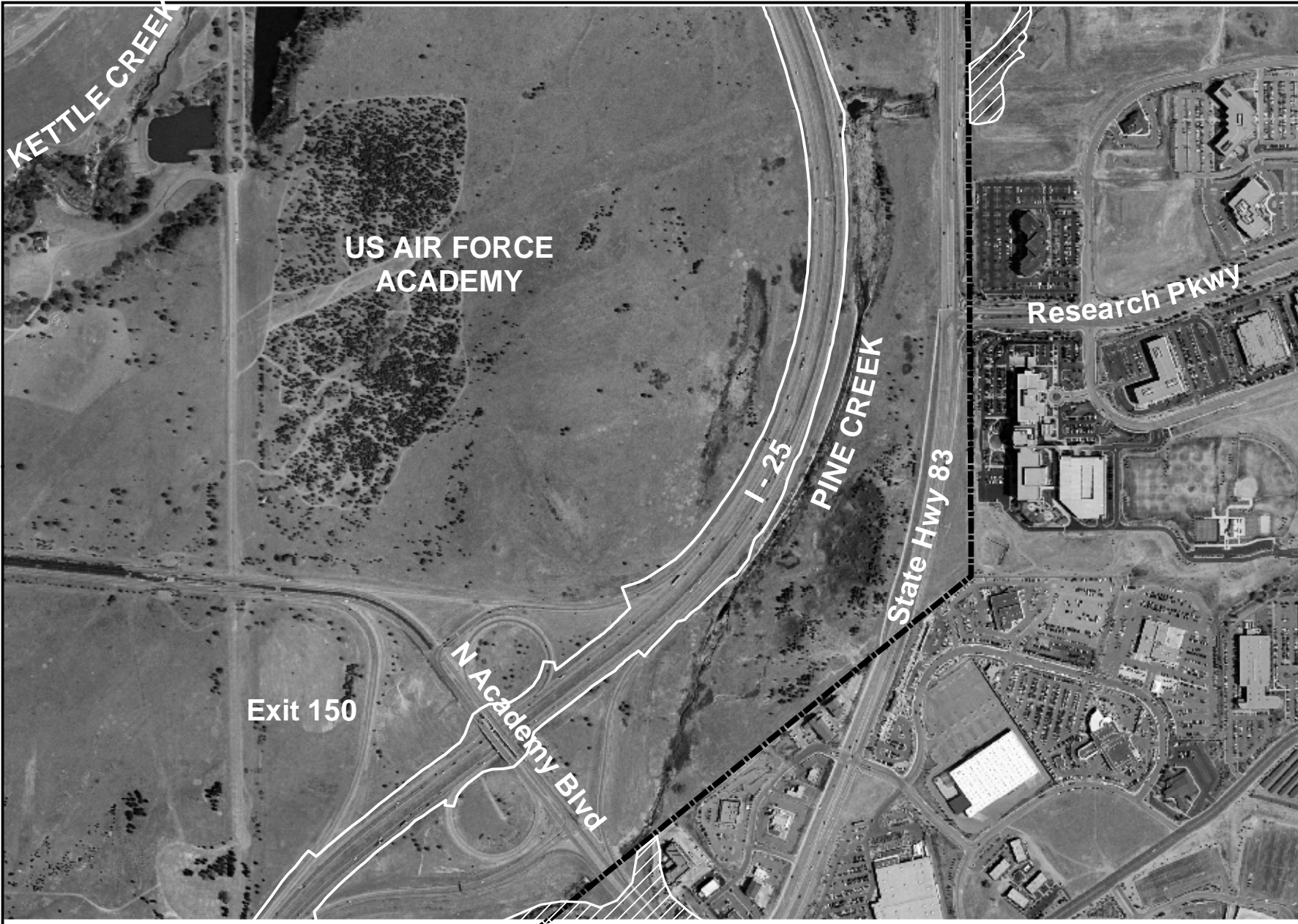




- Limits of Construction
- ▨ FEMA 100 Year Floodplain (Base Flood Elevations Determined)
- - - FEMA 100 Year Floodplain (No Base Flood Elevations Determined)
- ⊞ US AIR FORCE ACADEMY







14

- Limits of Construction
- ▨ FEMA 100 Year Floodplain (Base Flood Elevations Determined)
- ⋯ FEMA 100 Year Floodplain (No Base Flood Elevations Determined)
- Ⓜ US AIR FORCE ACADEMY



US AIR FORCE
ACADEMY

Exit 150

N Academy Blvd

I-25

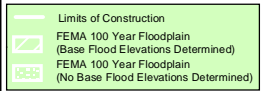
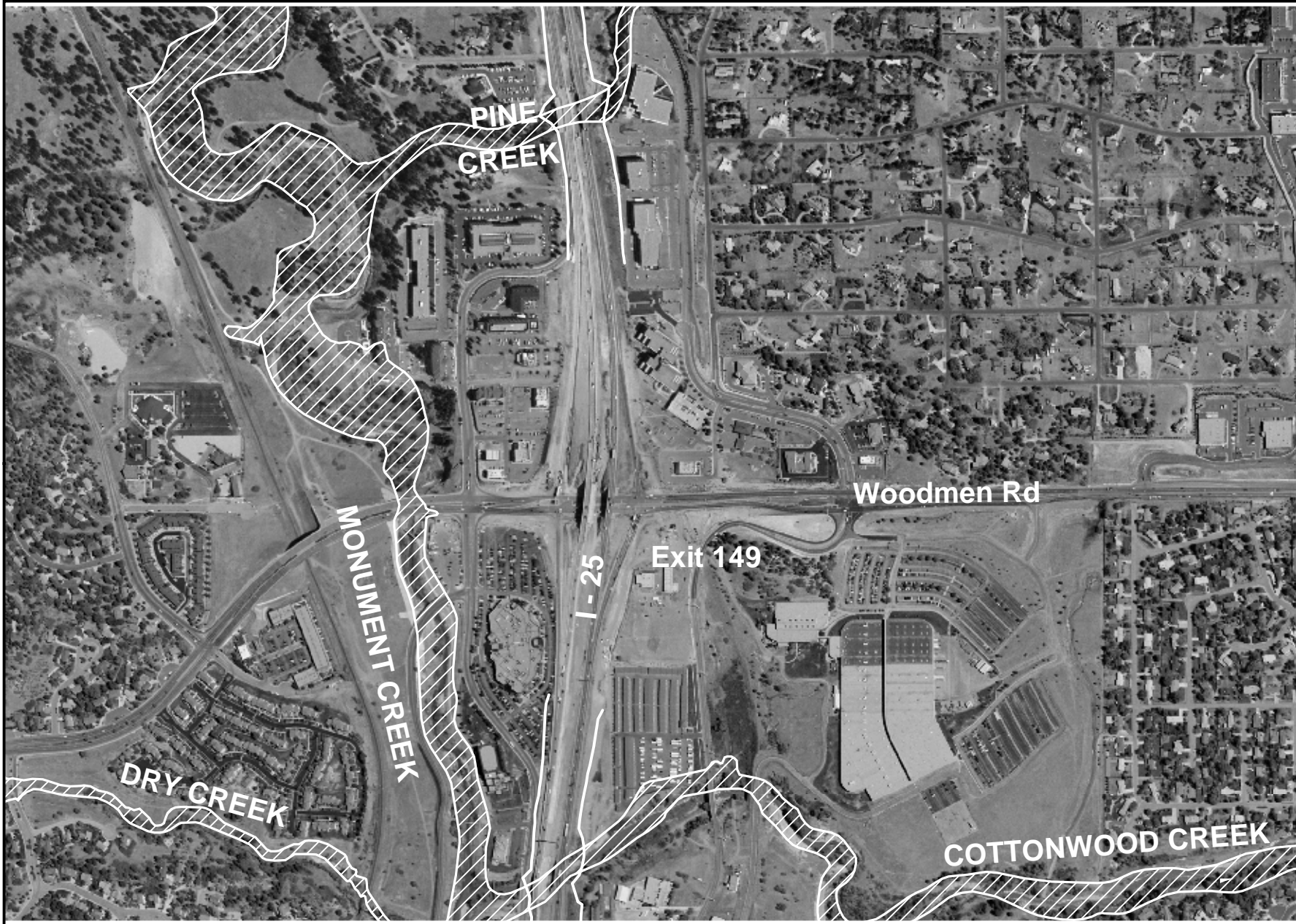
PINE CREEK

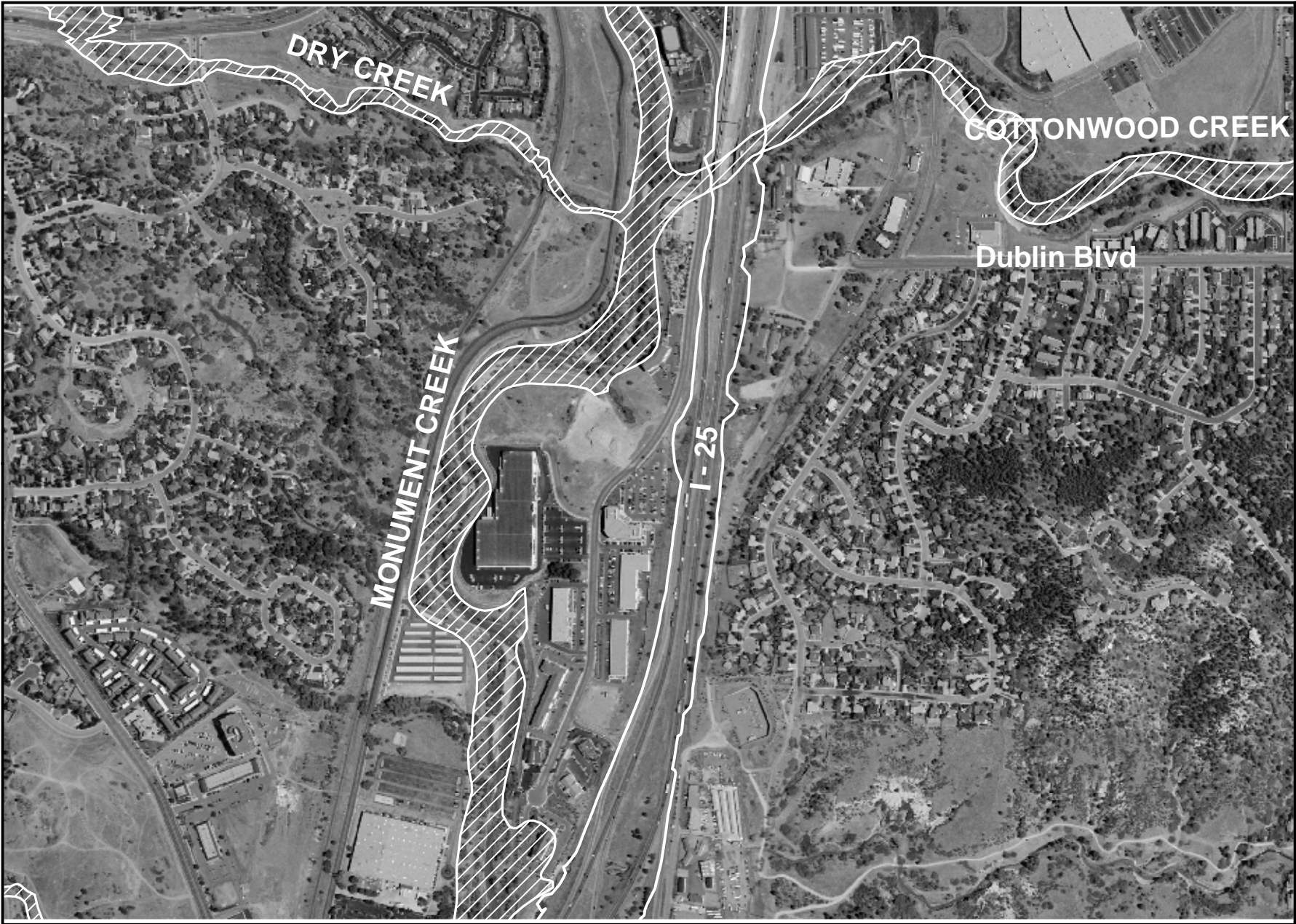
MONUMENT CREEK

15

- Limits of Construction
- ▨ FEMA 100 Year Floodplain (Base Flood Elevations Determined)
- ▨ FEMA 100 Year Floodplain (No Base Flood Elevations Determined)
- US AIR FORCE ACADEMY







- Limits of Construction
- ▨ FEMA 100 Year Floodplain (Base Flood Elevations Determined)
- ▩ FEMA 100 Year Floodplain (No Base Flood Elevations Determined)

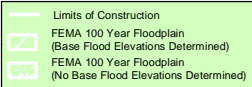






- Limits of Construction
- ▨ FEMA 100 Year Floodplain (Base Flood Elevations Determined)
- ▨ FEMA 100 Year Floodplain (No Base Flood Elevations Determined)







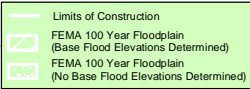
- Limits of Construction
- Proposed Fillmore St
- ▨ FEMA 100 Year Floodplain (Base Flood Elevations Determined)
- ▨ FEMA 100 Year Floodplain (No Base Flood Elevations Determined)

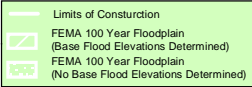




- Limits of Construction
- Proposed Fillmore St
- ▨ FEMA 100 Year Floodplain (Base Flood Elevations Determined)
- ▨ FEMA 100 Year Floodplain (No Base Flood Elevations Determined)









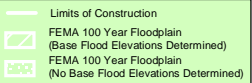
- Limits of Construction
- Proposed Cimarron/Bijou St.
- ▨ FEMA 100 Year Floodplain (Base Flood Elevations Determined)
- ▨ FEMA 100 Year Floodplain (No Base Flood Elevations Determined)

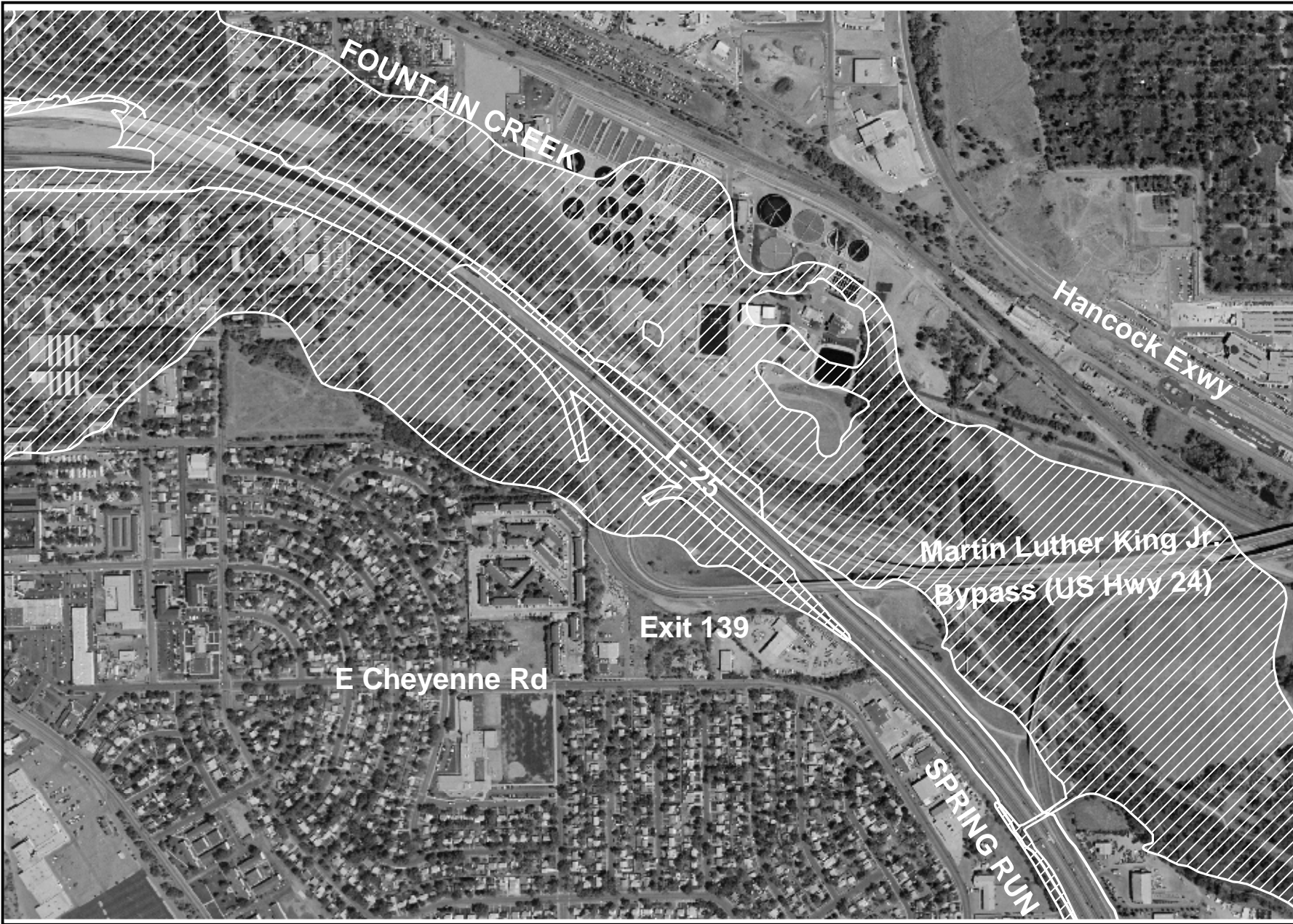




- Limits of Construction
- Proposed Cimarron/Bijou St.
- ▨ FEMA 100 Year Floodplain (Base Flood Elevations Determined)
- ▩ FEMA 100 Year Floodplain (No Base Flood Elevations Determined)







- Limits of Construction
- ▨ FEMA 100 Year Floodplain (Base Flood Elevations Determined)
- ▨ FEMA 100 Year Floodplain (No Base Flood Elevations Determined)





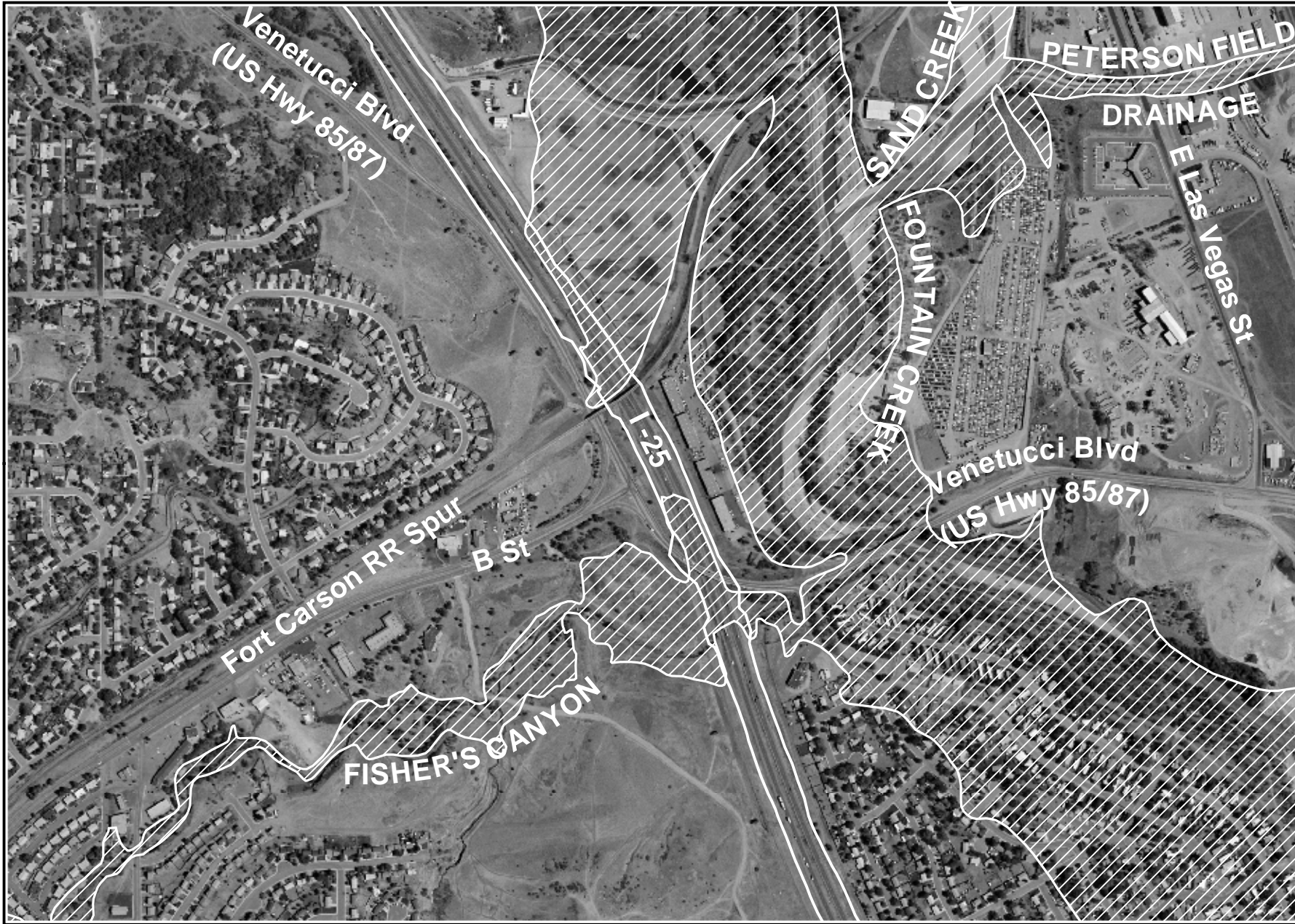
- Limits of Construction
- ▨ FEMA 100 Year Floodplain (Base Flood Elevations Determined)
- ▩ FEMA 100 Year Floodplain (No Base Flood Elevations Determined)








- Limits of Consturction
- FEMA 100 Year Floodplain (Base Flood Elevations Determined)
- FEMA 100 Year Floodplain (No Base Flood Elevations Determined)





31

-  Limits of Construction
-  FEMA 100 Year Floodplain
(Base Flood Elevations Determined)
-  FEMA 100 Year Floodplain
(No Base Flood Elevations Determined)





- Limits of Construction
- ▨ FEMA 100 Year Floodplain (Base Flood Elevations Determined)
- ▩ FEMA 100 Year Floodplain (No Base Flood Elevations Determined)
- FORT CARSON



FORT CARSON