

To: Nebraska Department of Roads	
From: HDR	Project: US-75 Plattsmouth to Bellevue Fairview Road Interchange
CC: File	
Date: December 15, 2009	Job No: NH-75-2(155), CN 21849

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RE: Avoidance, Minimization, and Mitigation of Select Locations on the US-75 – Plattsmouth to Bellevue Project

The purpose of this memorandum is to discuss and summarize the alternatives analysis completed as part of the NEPA process and to analyze site specific impacts for avoidance, minimization, and mitigation strategies for the U.S. Highway 75 (US-75) Plattsmouth to Bellevue Improvements Project.

NDOR and HDR have identified four (4) locations where a site-specific review of alternatives that avoids or minimizes impacts is warranted. Those locations are:

- Stream crossing associated with the Fairview Road Interchange
- Stream crossing at Webster Blvd / Haswell Drive (Bay Road Interchange)
- Stream crossing associated with the Platteview Road Interchange
- Wetlands along the new 6th Street Connector alignment (Bay Road Interchange)

This memorandum will address the Fairview Road Interchange location only. Subsequent memorandums will be developed for each independent location requiring an avoidance, minimization, and mitigation discussion. Portions of this memorandum are anticipated for use in conjunction with Section 404 permitting when applicable.

1.0 Summary of NEPA Analysis

The original Final Environmental Impact Statement (EIS) was approved on June 6, 1979. A Final Supplemental EIS for the US-75 Project was signed on October 26, 2000. The Record of Decision for the US-75 Project was signed on May 25, 2001.

The Final Supplemental EIS identified an alternatives analysis at the corridor level at three locations along US-75: Murray (N-1) to south of Plattsmouth, through Plattsmouth, and north of Plattsmouth to Bellevue, as well as a No-Build Alternative. Four alternatives for Chicago Avenue to Webster Boulevard within Plattsmouth were analyzed, with a four-lane highway on alignment with a raised median selected as the preferred alternative. Interchange options for the three public roads located within the Platte River to Fairview Road section of US-75 were investigated. One interchange is required and a location between LaPlatte Road and Platteview Road was the preferred location. Platteview Road will be relocated south to meet the need for this new interchange. Additionally, a frontage road from the Normandy Hills subdivision is proposed to provide access to Fairview Road.

The No-Build Alternative did not meet the need for improvements, did not improve safety, and did not provide adequate capacity to meet the projected traffic volumes within the area.

The Federal Highway Administration (FHWA) and the Nebraska Department of Roads (NDOR) coordinated with resource agencies using the Nebraska Local Operating Procedures for Integrating NEPA/404 concurrence point process. Several agencies including U.S. Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service (USFWS), and Nebraska Game and Parks Commission (NGPC) were involved in the NEPA/404 Merge Process. Concurrence from the resource agencies on Purpose and Need, Alternatives Carried Forward, Selected Alternative, and Impact Minimization was met during the NEPA/404 Merge Process.

Subsequent to the Final Supplemental EIS, NDOR has performed reevaluations of the Project as design progressed. FHWA recently reviewed the Project and determined that a formal NEPA reevaluation was required (FHWA, March 16, 2009). The reevaluation will be based on the change of the impact boundary from the Final Supplemental EIS, compared to the current impact footprint and will consider past reevaluations conducted by NDOR on September 13, 2003 and November 20, 2004. The Project is currently undergoing the NEPA reevaluation, which slated for completion in January 2010.

2.0 404 (b)(1) Guidelines

The 404 (b)(1) guidelines as part of the Clean Water Act of 1977 (as amended) requires USACE to approve only the Least Environmentally Damaging Practicable* Alternative (LEDPA). Practicable is generally defined relative to the project as costs, logistics, and best available technology.

Pursuant to these guidelines, NDOR and HDR have identified four (4) locations where a site specific review of alternatives that avoids or minimizes impacts is warranted to identify the LEDPA and to supplement future 404 permitting efforts. Those locations are:

- Stream crossings associated with the Fairview Road Interchange
- Stream crossing at Webster Blvd / Haswell Drive (Bay Road Interchange)
- Stream crossing associated with the Platteview Road Interchange
- Wetlands along the new 6th Street Connector alignment (Bay Road Interchange)

3.0 Screening Criteria

Alternative roadway designs for each of the above locations were considered and evaluated in an effort to avoid or minimize the impacts to waters of the U.S. When considering alternative designs the following general criteria were applied:

- Meet NDOR highway design standards
- Minimize environmental and landowner impacts
- Cost

Evaluation and selection of alternatives are a function of each of these criteria.

4.0 Fairview Road Interchange

4.1 Avoidance

An unnamed tributary of the Papillion Creek is currently conveyed through the existing US-75/Fairview Road Interchange via a three cell box culvert. Total avoidance of impacts to this tributary is not possible due to the need to provide a safer interchange that will carry future traffic volumes efficiently and safely. Construction of the proposed US-75 entrance and exits ramps would require that increased channel length be conveyed in drainage structures.

The existing interchange at Fairview Road will be reconstructed to a more typical diamond interchange. The existing southbound off-ramp (Ramp 1200) will be used-in-place. A new southbound on-ramp (Ramp 1100) will be constructed and will replace the existing flyover. A new northbound on-ramp (Ramp 900) and northbound off-ramp (Ramp 1000) will also be constructed. Fairview Road will be reconstructed approximately 2100' east of the existing bridge over US-75. Fairview Road will also be reconstructed approximately 2000' west of the interchange by Sarpy County. Fort Crook Road will be shifted to the east to provide a greater separation from the ramp terminals and will tie-in to the existing alignment south of the bridge over the Papillion Creek. A new frontage road, Normandy Hills Connector, will provide access along the east side of US-75 to Grenoble Drive. The new frontage road is needed because the existing access off US-75 to Grenoble Drive and to Normandy Blvd. will be closed. An emergency only access will be provided at Grenoble Drive. This access will only be used at times of emergencies and a 30 ft vehicle gate and chain-link fence will be constructed.

4.2 Minimization

The diamond interchange ramps and frontage road were located such that impacts to the tributary, as a result of the culvert locations and channel alignment, were positioned to maximize the proposed channel length. The following conditions currently exist near the US-75/Fairview Road Interchange:

Existing Conditions – The existing length of open channel at the location (beginning at location point A and ending at location point B) is 2,250 ft (see Figure 1). Within this area, the channel is experiencing heavy sediment loads which have deposited in the existing channel. This aggradation effectively decreases channel/structure conveyance and requires continual maintenance to remove the silt.

- Triple 9 ft x 9 ft x 213 ft box culvert which conveys the tributary northeast beneath US-75.
- Triple 9 ft x 9 ft x 82 ft box culvert which conveys the tributary north beneath the US-75 northbound loop ramp.
- Twin 12 ft x 10 ft x 218 ft box culvert which conveys the tributary east through the intersection of Fairview Road and Fort Crook Road.

Downstream of location point B, there is an existing Triple 6 ft x 6ft x 172 ft box culvert that penetrates the levee and outlets into the Papillion Creek. The box culvert is gated to control backwater from the Papillion Creek backing into the tributary. Hydraulic analyses have been performed at this location by HDR, and the tributary is tailwater controlled by the Papillion Creek. The unnamed tributary overtops US-75, the northbound loop ramp, and the intersection of Fort Crook Rd. / Fairview Rd. during a 25-yr event (see Table 2 below).

The 100-yr flow in the Papillion Creek is estimated at 35,900 cfs, with a Water Surface Elevation (WSEL) of 979.9. The 100-yr flow is contained by the levee, therefore the tributary is not within the extents of the Papillion Creek 100-yr floodplain.

Potential for aquatic habitat within the tributary was reviewed. Fisheries do not appear to be a viable resource for this portion of the tributary. Other aquatic habitat is considered viable.

Table 1 – Summary of Existing Conditions

Open Channel (linear ft)	2,250
Existing Culverts (linear ft)	513
Total Conveyance (linear ft)	2,763
Fisheries Habitat	No
Aquatic Habitat	Yes

Table 2 – Summary of Overtopped Roadways

Roadway	*25-yr WSEL	Top of Road Exist. Elev.
US-75	985.7	983.8
Northbound On-Ramp	984.6	983.0
Fort Crook Rd. / Fairview Rd. Intersection	982.4	978.0

*25-yr Water Surface Elevation is at the upstream face of existing structure.

Alternatives

Two channel alignment/culvert location alternatives were considered in association with the Fairview Road Interchange. Alternative 1 depicts the most direct conveyance of flows through the interchange (see Figure 2). Alternative 2 was developed to maximize open channel length within the interchange and offset channel loss associated with the lengthened culvert at US-75 (see Figure 3). As the two alternatives utilize the same channel alignment and structure design on both the western and eastern channel termini, portions of plans/impacts associated with the alternatives are equivalent and shown in the *Alternatives 1 and 2* bullet below. Plans/impacts independent to each alternative are detailed in subsequent bullets:

- **Alternatives 1 and 2**

Both alternatives require that the existing Triple 9 ft x 9 ft x 82 ft box culvert, which conveys the tributary north beneath the US-75 northbound loop ramp, be removed. The box removal is necessary as a result of the new ramp configuration required for the diamond interchange.

Both alternatives require that the existing Twin 12 ft x 10 ft x 218 ft box culvert which conveys the tributary northeast through the intersection of Fairview Road and Fort Crook Road be removed. The box removal is necessary as a result of shifting the existing Fort Crook Road intersection to the east to provide for a greater separation from the ramp terminals.

Both alternatives require that the existing Triple 9 ft x 9 ft x 213 ft box culvert be increased to a Triple 9 ft x 12 ft x 408 ft box culvert in order to adequately convey the estimated 100-yr flow of 3,520 cfs. The US-75 designation as a state highway and the proximity of US-75 to Offutt Air Force Base justify the need for the US-75 structure to convey the 100-yr flow, and subsequently, allow US-75 to remain open during a 100-yr event.

Associated with the replacement of the existing box culvert under US-75 is removal of approximately 2-3 ft of silt from the channel. Sediment removal will result in the channel invert matching the existing culvert's invert elevation. Placing the new culvert at this elevation not only restores existing channel characteristics, but also improves constraints related to installing a larger box culvert.

Both alternatives require that the realigned channel be conveyed through the proposed intersection of Fairview Road and Relocated Fort Crook Road through a new Triple 9 ft x 12 ft x 247 ft box culvert. The increased structure size will convey the 25-yr flow of 2,550 cfs without overtopping the intersection.

Both alternatives meet or exceed NDOR highway design standards.

- **Alternative 1**

Alternative 1 provides the most direct alignments of the tributary through the proposed Fairview Road Interchange (see Figure 2). Included in Alternative 1 is a Triple 9 ft x 12 ft x 70 ft box culvert which would convey the tributary northwest through the proposed US-75 northbound exit ramp (Ramp 1000). The increased structure size will convey the 25-yr flow.

Ultimately, Alternative 1 would result in 1,805 ft of open channel at the location. This results in a 445 ft net loss of open channel when compared with existing conditions.

- **Alternative 2**

Alternative 2 was developed to increase the open channel length within the interchange to offset channel loss associated with the proposed culvert lengthening at US-75. From the proposed culvert outlet at US-75, the realigned channel meanders through the interchange before passing beneath Ramp 1000 via a Triple 9 ft x 12 ft x 59 ft box culvert. Similar to Alternative 1, the increased structure size will convey the 25-yr flow.

From the Ramp 1000 culvert outlet, the channel again meanders before tying into the Alternative 1 channel alignment at the inlet end of the Fairview/Relocated Fort Crook box culvert.

Ultimately, Alternative 2 would result in 2,160 ft of open channel at the location. This results in a 90 ft net loss of open channel when compared with the existing channel alignments.

- **Alternative Comparison**

Both alternatives would convey the 100-yr event through US-75 and the 25-yr event through Ramp 1000 and the intersection of Relocated Fort Crook Rd. / Fairview Rd.

Alternative 1 has 1,805 ft of open channel at the location. Alternative 2 has 2,160 ft of open channel at the location, an additional 355 ft.

An advantage associated with Alternative 1 is the ability to meet the project's purpose and need, while minimizing grading costs associated with the direct channel.

By maximizing the length of proposed open channel, Alternative 2 provides obvious advantages to the natural environment at that location. Aside from the water quality benefits the public would receive via aquatic resource preservation, Alternative 2 also provides an advantage to the driving public, as this Alternative constitutes the LEDPA and displays NDOR's conscious effort to comply with Section 404 of the *Clean Water Act*. Consequently, Alternative 2 is more likely to receive 404 permit authorization, and ultimately facilitate a needed roadway improvement that will result in increased traffic safety on US-75. Lastly, Alternative 2 provides a construction phasing advantage, as the existing Twin 12 ft x 10 ft box culvert under Fairview Road could be utilized to convey stormwater during construction.

NDOR will own the right-of-way between Normandy Hills Connector and Ramp 1100; therefore both alternatives have no impact on right-of-way costs.

Both alternatives utilize the same box culvert design at US-75 and at the proposed intersection of Fairview/Relocated Fort Crook. However, Alternative 1 would require and additional 11 ft of Triple 9 ft x 12 ft box culvert at Ramp 1000. This results in an additional construction cost of \$14,100.

Alternative 2 would require and additional 6,500 CY of excavation to construct the channel, which results in an additional cost of \$16,500.

When compared to Alternative 1, Alternative 2 would cost and additional \$2,400.

No special considerations for either alternative would be required for maintenance other than potential monitoring for establishment of the vegetative buffer and likely continued silt removal from culverts and channel.

Table 3 – Comparison of Alternatives

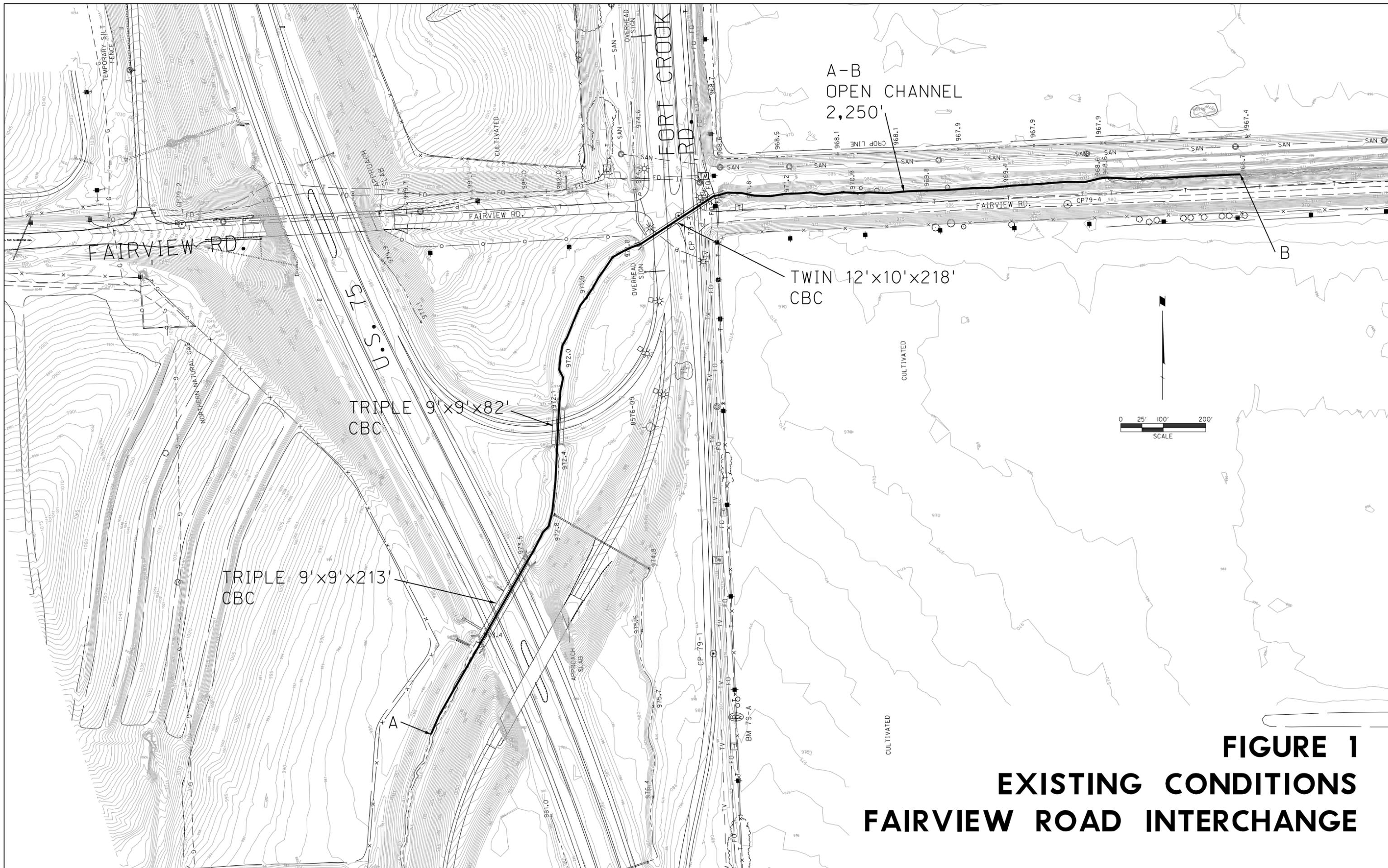
	Alternative 1	Alternative 2
New Conveyance (linear ft)	2,530	2,874
New Culverts (linear ft)	725	714
New Open Channel (linear ft)	1,805	2,160
Impacts to Existing Open Channel	2,250	2,250
Original Channel Unchanged	0	0
Change in Conveyance	-213	111
Change in Open Channel	-445	-90
New ROW Needed	N/A	N/A
Cost	\$14,100	\$16,500
Construction	More difficult	Preferred ¹
Maintenance	No Preference	
Roadway Overtopping Protection	100-yr (US-75) 25-yr (Ramp 1000) 25-yr (Fort Crook Intersection)	100-yr (US-75) 25-yr (Ramp 1000) 25-yr (Fort Crook Intersection)

¹ Alternative 2 provides a construction phasing advantage, as the existing Twin 12 ft x 10 ft box culvert under Fairview Road could be utilized to convey stormwater during construction.

4.3 Mitigation

All open channel areas within both Alternative 1 and Alternative 2 would be buffered by a 50 ft wide vegetative strip, which would act to filter sediments and nutrients from surface runoff before it reaches the tributary. Open channel areas would be lined with a biodegradable erosion control material consisting of open-weave textile to provide high strength and longevity. The potential for scour was reviewed, however due to the aggradation the channel is experiencing scour is not anticipated.

Alternative 2 makes special accommodations to lengthen the realigned channel in order to maximize the open channel length at the location. The resulting channel length, associated with Alternative 2, is 2,160 ft. These efforts effectively mirror the 2,250 ft of existing open channel at the location.



**FIGURE 1
EXISTING CONDITIONS
FAIRVIEW ROAD INTERCHANGE**

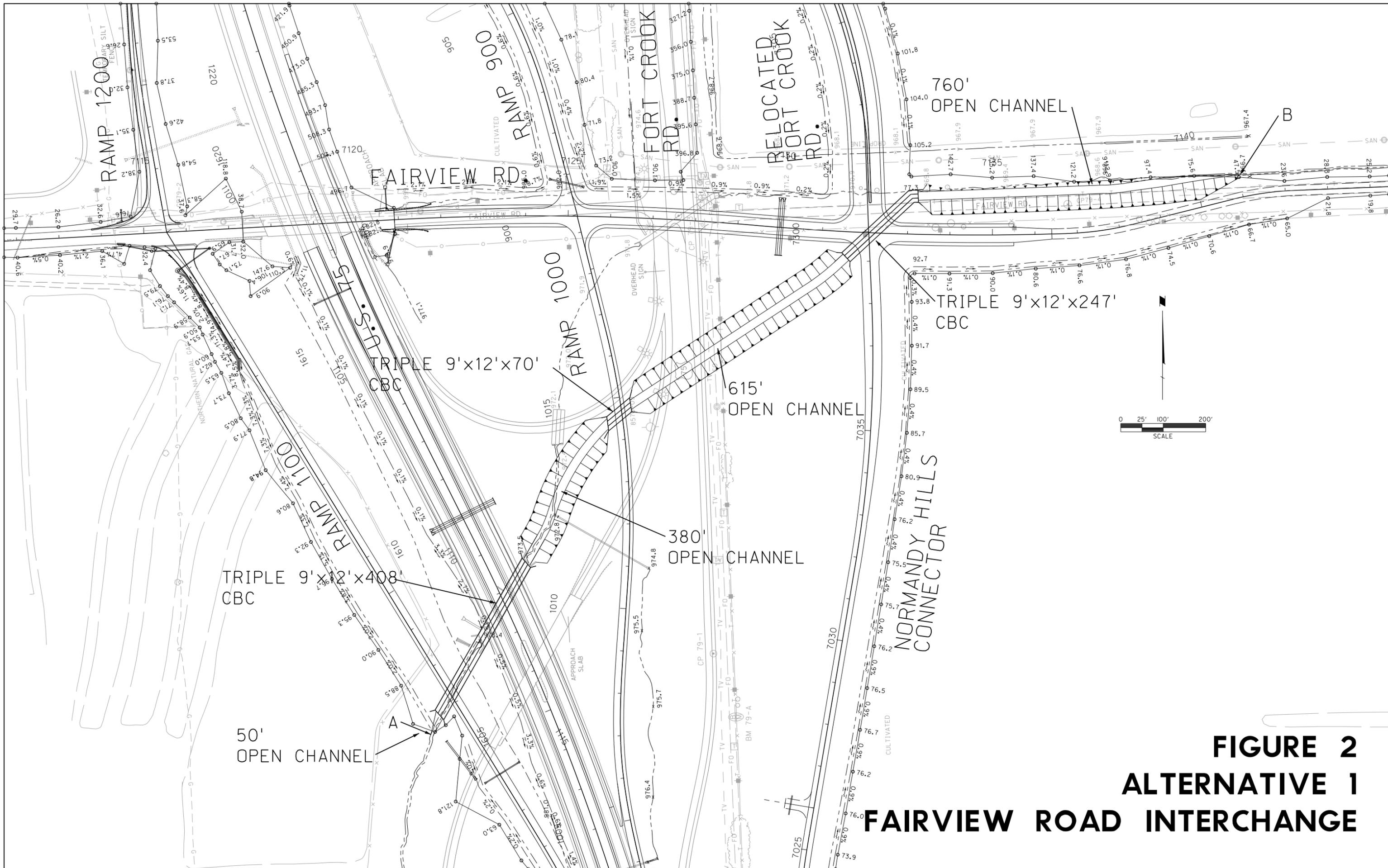


FIGURE 2
ALTERNATIVE 1
FAIRVIEW ROAD INTERCHANGE

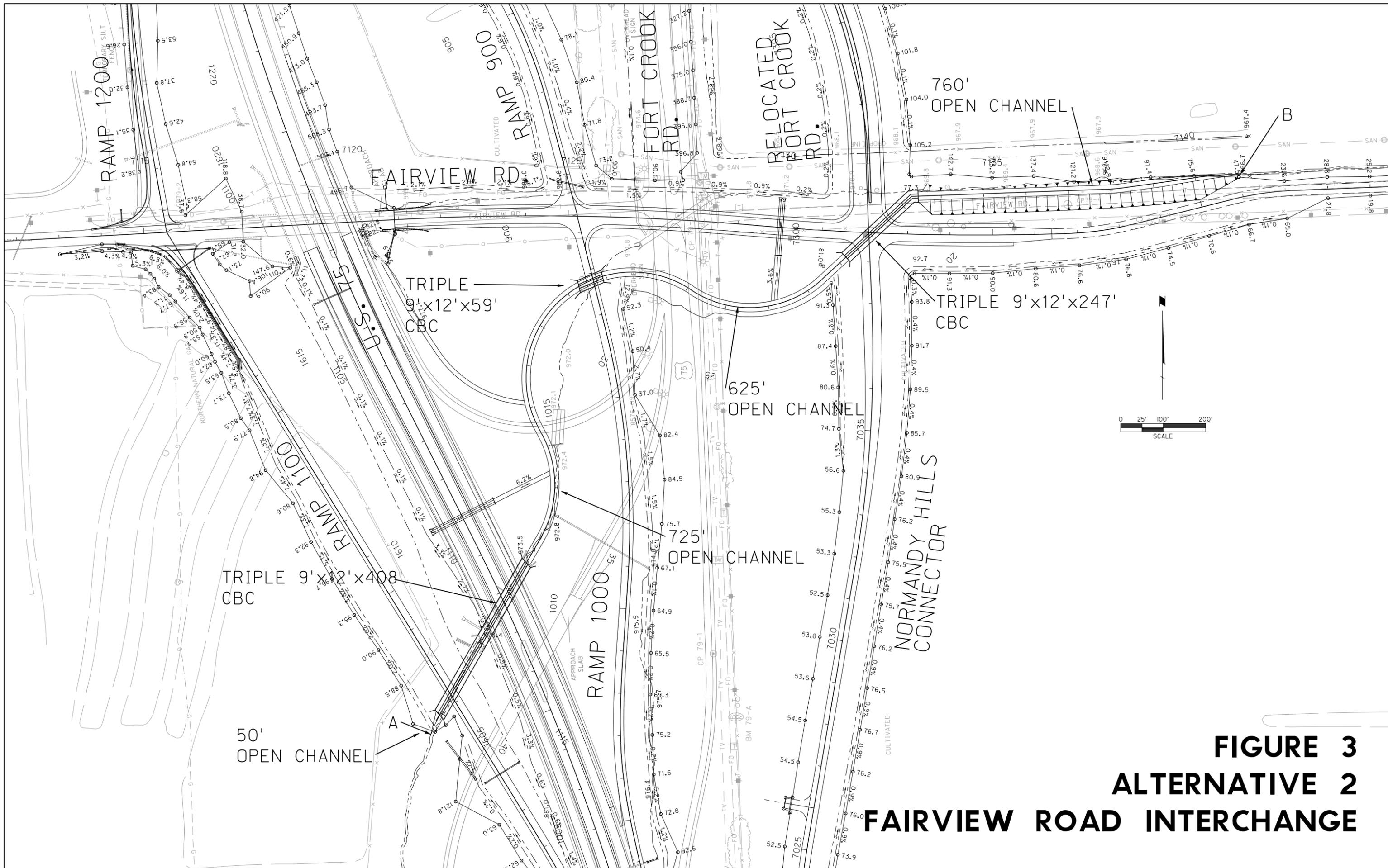


FIGURE 3
ALTERNATIVE 2
FAIRVIEW ROAD INTERCHANGE