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To: Nebraska Department of Roads	
From: Andy Wiest	Project: US 75 Plattsmouth to Bellevue Platteview Interchange
CC:	
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 alignment (Bay Road Interchange)

This memorandum will address the Platteview 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 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 in September 13, 2003 and November 20, 2004. The Project is currently undergoing the NEPA reevaluation, 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 Platteview Road Interchange

4.1 Avoidance

As discussed in the 2000 Final Supplemental EIS and given the constraints of the Platte River, development south of La Platte Road, and the rolling profile of existing ground, a location between La Platte Road and Platteview Road was selected as the preferred interchange location. The original location of this interchange as described in the 1998 US 75 Corridor Study – Nebraska City to Bellevue, the interchange resulted in an impact to an unnamed tributary of Papillion Creek.

The Platteview Road Interchange location was reviewed in an effort to avoid or minimize impacts to this tributary. The following were considered:

- **Shift interchange to the north -** The original Platteview Road Interchange location as described in the Corridor Study would have had a significant impact by filling in the unnamed tributary as a result of the proposed alignment of Platteview Road. To minimize impacts to the tributary, Platteview Road Interchange was shifted 1100 feet to the north. The interchange was not shifted more than 1,100 feet due to right-of-way impacts south of existing Platteview Road and due to a minimum interchange spacing of one mile with the Fairview Road Interchange.

- **Shift interchange to the south -** A shift of the Platteview Road Interchange to the south was investigated and is not feasible due to right-of-way impacts to the south of La Platte Road and constraints with the Platte River.

- **Location of northbound off ramp -** The terminus of the US 75 north-bound off-ramp (Ramp 200) at Platteview Road was positioned 1,200 feet from the south-bound on-ramp (Ramp 300). This ramp terminal spacing is desirable to provide adequate separation between the ramp terminals which will allow the traffic signals to function properly when the ramp terminals are signalized.

Total avoidance of impacts to this tributary are not possible due to right-of-way constraints between Laplatte Road and existing Platteview Road, interchange spacing requirements, and constraints with the Platte River.

4.2 Minimization

With the location and alignment of Platteview Road and the ramps adjusted to the greatest extent possible to minimize impacts, alternatives for culvert location and channel alterations were considered for both west and east of US 75. The following existing conditions are present:

Existing Conditions – The existing open channel west of US 75 beginning at the western most limits of construction to the inlet of the existing 8 ft x 4 ft x 250 ft concrete box culvert under US 75 is approximately 575 feet long. See Figure 1 and termini A to B. Parts of the channel are within a wooded area.

In addition, other existing open channels west of US 75 were identified that are potentially jurisdictional. The first open channel it located north of the existing culvert inlet in the ditch of US 75. This open channel/US 75 ditch drains approximately 14.4 acres from the north, has a 25-year flow of 40 cfs, and is 55 ft in length. There is also a tributary leading to this ditch from the west that drains approximately 23.8 acres from the north and has a 25-year flow of 60 cfs. See Figure 1, termini D to E and C to B.

East of US 75, the outlet of the existing box culvert is exhibiting scour. The existing open channel length beginning at the outlet of the culvert to termini G, east of the limits of construction of Ramp 200, is 425 feet (see Figure 1). The existing channel continues 1,178 feet east to the proposed culvert at Allied Road (see Figure 4; G-I, I-K, and J-H). The new structure beneath US 75 will be designed to reduce the scour potential at the outlet as discussed in Alternatives, East of US 75. The new structure beneath Allied Road will be located in the existing channel bed therefore was not considered an impact to waters of the US.

Potential for aquatic habitat was reviewed for the channel both west and east of US 75. Fisheries do not appear to be a viable resource for this portion of the tributary. The 100-year floodplain elevations of Papillion Creek were reviewed relative to the open channel east of US 75. The channel at this location is not within the extents of the Papillion Creek 100-year floodplain. Other aquatic habitat is considered viable.

See Table 1 for a summary of existing conditions.

Table 1 – Summary of Existing Conditions

	West of US 75	East of US 75
Open Channel	815	*425 / **1330
Existing Culverts	0	250
Total Conveyance	815	*675 / **1580
Fisheries Habitat	No	No
Aquatic Habitat	Yes	Yes

* See Figure 1 (F-G)

** See Figure 4 (F-G, G-I)

Alternatives

Alternatives were considered for culvert location and channel design for both west of east of US 75. The alternatives can be used interchangeably for the west and east sides of US 75. For example Alternative A1-West can be used with Alternative A2-East. All alternatives considered meet or exceed NDOR highway design standards.

- **West of US 75**
    - Alternative 1W (A1-W) – This alternative would consist of an 8 ft x 6 ft x 70 ft box culvert under 10th Street on a slightly shifted channel alignment. A new 175 foot open channel with 50 foot vegetative buffers from top of bank (where achievable) would be created to the inlet of an 8 ft x 6 ft x 135 ft box culvert under Ramp 300 and lined with a turf reinforcement mat. The outlet of this culvert would then directed into the inlet of a new culvert configuration for conveyance under US 75 (the culvert under US 75 is discussed in east of US 75 alternatives below) with 45 feet of channel lined with articulated concrete block. See Figure 2.

      The approximate cost of this alternative is $106,100.

      Alternative 2W (A2-W) – This alternative would consist of an 8 ft x 6 ft x 92 ft box culvert under 10th Street on the existing channel alignment. The existing channel alignment would be followed in areas within the limits of construction where grading is necessary with 50 foot vegetative buffers (where

achievable) until the existing open channel is met. At this point, the existing channel would be used to the point where the limits of construction are encountered for Ramp 300. The length of existing open channel being utilized would be 205 feet. At this point the channel would be directed into an 8 ft x 6 ft x 153 ft box culvert under Ramp 300. The outlet of this culvert would then be directed into the inlet of a new culvert configuration with 60 feet of open channel line with articulated concrete block for conveyance under US 75 (the culvert under US 75 is discussed in East of US 75 alternatives below). See Figure 3.

The approximate cost of this alternative is $124,800.

- Box Culvert Alternatives considered but not viable

  An alternative that was reviewed but not considered viable was to align the Ramp 300 box culvert so that it would outlet into the existing open channel west of US 75, at approximate Station 314+00. The intent of this alternative was to maximize the use of existing open channel as possible. However, this alternative was not considered viable because the grading required to meet state standards for the roadway embankment of south bound US 75 results in filling in the existing channel at this location.

  Another alternative that was considered was to construct a culvert under Ramp 300 to allow for conveyance to the north of the exiting culvert under US 75 (indicated by termini C to E on Figure 1). Again, the intent of this alternative was to maximize the use of existing open channel. However, this alternative was not considered viable because the majority of the natural channel will be filled in at this location due to the grading required for Ramp 300.

- Channel Alternatives considered but not viable

  In an effort to maximize open channel length in Alternative 2, the existing open channel west of US 75 and north of the culvert inlet under US 75 (Figure 3, termini D to E) was considered to be shifted to the west. The length of this channel as shown in Figure 3 is 450 ft. The 25-year flow in this channel is 35 cfs. No additional right-of-way would be required, and the ditch would drain approximately 8.4 acres from the north. The existing open channel/US 75 ditch currently drains approximately 14.4 acres and has a 25-year flow of 40 cfs. Although the ditch would drain a comparable 25-year flow, it was not considered viable as a benefit to the existing tributary due to relative steep gradient.

  Another channel alternative that was reviewed was to replace the existing open channel west of US 75 and north of the culvert inlet under US 75 (Figure 3, termini C to B) The 190 ft re-directed channel would tie the 10th Street and Ramp 300 ditches into one open channel. This merged open channel would drain approximately 17.8 acres from the north, and would have a 25-year flow of 48 cfs. Although this is comparable to the existing drainage area of 23.8 acres and 25-year flow of 60 cfs, it was also not considered a viable option due to the relative steep gradient and tree removal that would be required for construction.

The 450 ft and 190 ft open channels that are now considered viable alternatives are not included in **Table 2-Comparison of West US 75 Alternatives** detailed below.

- Comparison of A1-W and A2-W

  No special considerations for either alternative would be required for maintenance other than the potential for monitoring for establishment of the vegetative buffer.

  The advantages of A1-W are that it would be easier to construct due to the more desirable skew angles for box culverts. This allows for shorter box culvert lengths resulting in shorter construction times and lower cost. This alternative also aligns the box culverts better from hydraulic stance by aligning the outlet end of the 10th Street culvert with the inlet end of the Ramp 300 culvert.

  The advantage of A2-W is that it utilizes as much of the existing stream channel as possible, thereby leaving existing natural environments in-tact to the greatest extent possible. The disadvantages of A2-W are longer construction period, higher costs, and poor hydraulics when compared with Alternative 1.

  See Table 2 for a comparison of the West of US 75 Alternatives.

Table 2 – Comparison of West of US 75 Alternatives

	A1-W	A2-W
New Conveyance	425	510
New Culverts	205	245
New Open Channel	220	265
Impacts to Existing Open Channel	815	610
Original channel unchanged	0	205
Change in conveyance	-390	-305
Change in Open Channel	-595	-550
New ROW Needed	N/A	N/A
Cost	$106,100	$124,800
Construction	[1]Preferrable	More difficult
Maintenance	No advantage	No advantage

[1]Alternative 1 would be easier to construct due to the more desirable skew angles.

- **East of US 75**

  - Alternative 1E- (A1-E) – The US 75 / Ramp 200 box culvert for this alternative at Sta. 1525+90 would consist of an 8 ft x 6 ft x 190 ft box, 10 ft vertical drop, 8 ft x 8 ft x 82 ft box, 10 ft vertical drop, 8 ft x 8 ft x 64 ft box for a total box length of 356 ft (see Figure 2). Vents and widened barrel sections are proposed to maintain open channel flow throughout the entire box. The outlet barrel would be sloped at 0.10% which would reduce the outlet velocity to less than 7 fps. No energy dissipation would be necessary at the outlet end of the box culvert.

    The US 75 / Ramp 200 box would result in relocating the existing channel on the east side of US 75. A new 310 ft channel would be constructed from the outlet end of the box to the return to the existing channel. Channel grading

would include 3:1 side slopes and the existing channel would be filled where no longer required. The new channel would be graded at 1.00% to help control the erosion in the channel. A 50 foot vegetative buffer would be established from top of bank on both sides of the new channel. Open weave textile blankets consisting of coir will line the new channel.

The approximate cost of this alternative is $249,800.

Alternative 2E (A2-E) - The US 75 / Ramp 200 box culvert for this alternative at Sta. 1525+90 would consist of an 8 ft x 6 ft x 205 ft box, 10 ft vertical drop, 8 ft x 8 ft x 154 ft box, 10 ft vertical drop, 8 ft x 8 ft x 69 ft box for a total box length of 448 ft (see Figure 3). Vents and widened barrel sections are proposed to maintain open channel flow throughout the entire box. The outlet barrel would be sloped at 0.10% which would reduce the outlet velocity to less than 7 fps. The US 75 box would outlet into the existing channel, therefore channel improvements are not proposed on the east side of US 75.

The approximate cost of this alternative is $259,900.

- Alternative 3E- (A3-E) – This channel mitigation site alternative utilizes A1-E as previously described and extends the 310 ft channel an additional 945 ft to the east to achieve a new total channel length of 1,255 ft. The proposed channel would meander through NDOR owned property (Tract 112) and return back to the existing channel at termini I.

  Between the outlet of the existing culvert (termini F) and the return to the existing channel (termini G), the channel would be filled where no longer required. A gabion inlet structure would be provided at termini G, where the proposed channel bifurcates from the existing channel. At termini I, the proposed channel would return back to existing. The 905 ft section of existing channel would convey approximately half of the existing channel flow at termini G and runoff draining from the north. No grading is proposed on the north bank of the existing channel, however NDOR would acquire right-of-way on the north side of the channel to minimize erosion and provide a 50 ft vegetative buffer. The existing channel would then eventually outlet into a new 10 ft x 8 ft x 90 ft box culvert beneath the new Allied Road alignment.

  The 1,255 ft channel would be graded at 1.4% to help control erosion, would include a 5 ft wide and 2.5’ deep flat bottom, and would have 2:1 side slopes. As shown in Figure 4, substantial grading is proposed that would create adjacent floodplain depressional areas. An approximate 132,050 CY of excavation would be required to construct the channel mitigation site. As an added benefit this material could be used as roadway embankment for the Platteview Road Interchange. Along the south side of Tract 112 and parallel to the property line, a 50 foot vegetative buffer would be established from top of the cut slope.

  The south bank of the existing channel would be lowered to about 2 ft above the existing flow line. This will stabilize the existing channel bank by allowing water to spill out of the existing channel into the adjacent floodplain depressions and new parallel channel. This will also help mitigate the scour that is being exhibited on the north bank by diverting the energy during larger storm events.

At Station 108+00, there is an existing tree root system that is providing vertical grade control. At this location in the existing channel, there is a 7 ft vertical drop over 50 feet. In order to protect this, additional riffles are proposed upstream and downstream to create a riffle-pool complex. Riffle-pools are also proposed along the new channel bends to help reduce water velocity during lower flows, and ultimately erosion potential. Newbury Riffles, Rock Cross Vanes, and V-Log Drops are proposed to allow the water to pool upstream, spill over the rock or timber structures and ultimately improve water quality.

This alternative requires purchasing entire Tract No. 112 (9.3 acres) and approximately 2.4 acres north of the existing channel, for a total of 11.7 acres. The approximate cost of this alternative is $554,700.

- Comparison of A1-E, A2-E, and A3-E

Alternative A1-E would be the easiest to construct due to the shorter culvert length and the horizontal bend under US 75. This bend is desirable from a construction phasing stance and allows the new box culvert to be constructed in phases. In comparison, A2-E would be more difficult to construct due to the alignment of the box culvert located in the existing channel bed. This does not allow the box culvert to be constructed in phases as easily as alternative A1-E. Alternative A3-E utilizes the same culvert design as A1-E, however would require substantially more excavation to construct the mitigation site.

For alternatives 1 and 3, no special considerations would be required for maintenance other than the potential for monitoring for establishment of the vegetative buffer. Alternative 3 would require additional maintenance to ensure the new channel and riffle-pool complex is functioning as designed. All alternatives would reduce the outlet velocity of the box culvert to less than 7 fps, thereby reducing the exiting scour that is occurring. Alternative 3 would incorporate floodplain despressional areas and riffle pools, both of which will improve water quality and existing riparian habitat.

Alternative A1-E impacts 425 ft of existing open channel, but establishes 310 ft of new open channel for a total reduction in open channel of 115 ft. In comparison, A2-E will impact 240 ft of existing open channel but utilize 185 ft of existing open channel for a total reduction in open channel of 240 ft.

Alternative A3-E impacts 425 ft of existing channel but includes 1,255 ft of new open channel and utilizes 905 ft of existing open channel for a total increase in open channel length of 830 ft.

See Table 3 for a comparison of East of US 75 Alternatives.

Table 3 – Comparison of East of US 75 Alternatives

	A1-E	A2-E	A3-E
New Conveyance	666	633	1,611
New Culverts	356	448	356
New Open Channel	310	0	1,255
Impacts to Existing Open Channel	425	240	425
Original channel unchanged	0	185	905
Change in conveyance	-9	-42	31
Change in Open Channel	-115	-240	830[1]
New ROW Needed	1.29 Acres	0.96 Acres	11.7 Acres
Cost	$249,800	$259,900	$554,700
Construction	Preferrable[2]	More difficult	Preferrable[2]
Maintenance	No advantage	No advantage	No advantage

[1] The 830 feet includes the 1,255 linear feet of new open channel and the 905 linear feet of original channel unchanged.
[2] A1-E would be easier to construct due to the shorter culvert length and the horizontal bend under US 75. The horizontal bend is desirable for construction phasing and allows the new culvert to be built in phases. A3-E would also be easier to construct due to using the same culvert design as A1-E, however requires substantial excavation for the mitigation site.

4.3 Mitigation

The following mitigation strategies are proposed for each alternative:

- **Alternatives West of US 75**
    - A1-W - The 175 feet of new open channel (Figure 2) and associated 50 foot vegetative buffer is proposed to mitigate for the 575 foot loss of existing open channel (Figure 1, A to B). Channel velocities at the outlet end of the Ramp 300 box require articulated concrete block in the channel bottom to prevent erosion.
    - A2-W – The 205 feet of existing open channel (Figure 3) and associated 50 foot vegetative buffer is proposed to mitigate for the 370 foot loss of the 575 feet of existing open channel (Figure 1). Existing open channel between 10th Street and Ramp 300 would be protected from future encroachments. Channel velocities at the outlet end of the Ramp 300 box require articulated concrete block in the channel bottom to prevent erosion.
- **Alternatives East of US 75**
    - A1-E – The horizontal alignment of the proposed box culvert on the east side of US 75 at Sta. 1525+90 would result in 310 ft of new channel. Open weave textile blankets consisting of coir will line the new channel. Grading at a 3:1 side slopes is anticipated for each side of the channel. The approximate width of this side slope grading is 30 ft. It is proposed to provide an upland buffer on the south side of the channel within existing agricultural land for a distance of 50 ft from top of bank, resulting in a total buffer distance of 80 ft. This buffer would parallel both sides of the new channel for a length of 310 ft. Additional upland buffer would be placed upstream within the new right-of-

way ditch along Ramp 200. On the north side of the new channel, upland buffer is proposed between the top of the new channel and the existing riparian area, with a maximum width of 50 ft.

- A2-E – The outlet of the proposed box culvert would located in the existing open channel, therefore no additional upland buffers are anticipated. No mitigation is proposed for the loss of open channel conveyance as the channel velocities at the outlet ends of the new box culvert would be less than 7 fps and would help mitigate the existing scour problem.

- A3-E – Similar to A1-E, the horizontal alignment of the culvert would result in 310 ft of new channel from the outlet end of the culvert to the return to the existing channel. At the return, the channel would bifurcate into a new 945 ft open channel and 905 ft segment of existing channel. The parallel channels would converge back into one channel at termini I (Figure 4). The channel mitigation site would incorporate adjacent floodplain depressional areas, riffle-pool complex, and upland vegetative buffers all in an effort to improve existing water quality and riparian habitat. Erosion control BMPs will be provided as required by NDOR. The proposed Tract 112 site would be purchased by NDOR, including additional right-of-way on the north bank, thus providing buffer distances exceeding requirements. Alternative 3 would serve to mitigate existing channel impacts to the watershed on both east and west sides of US 75.

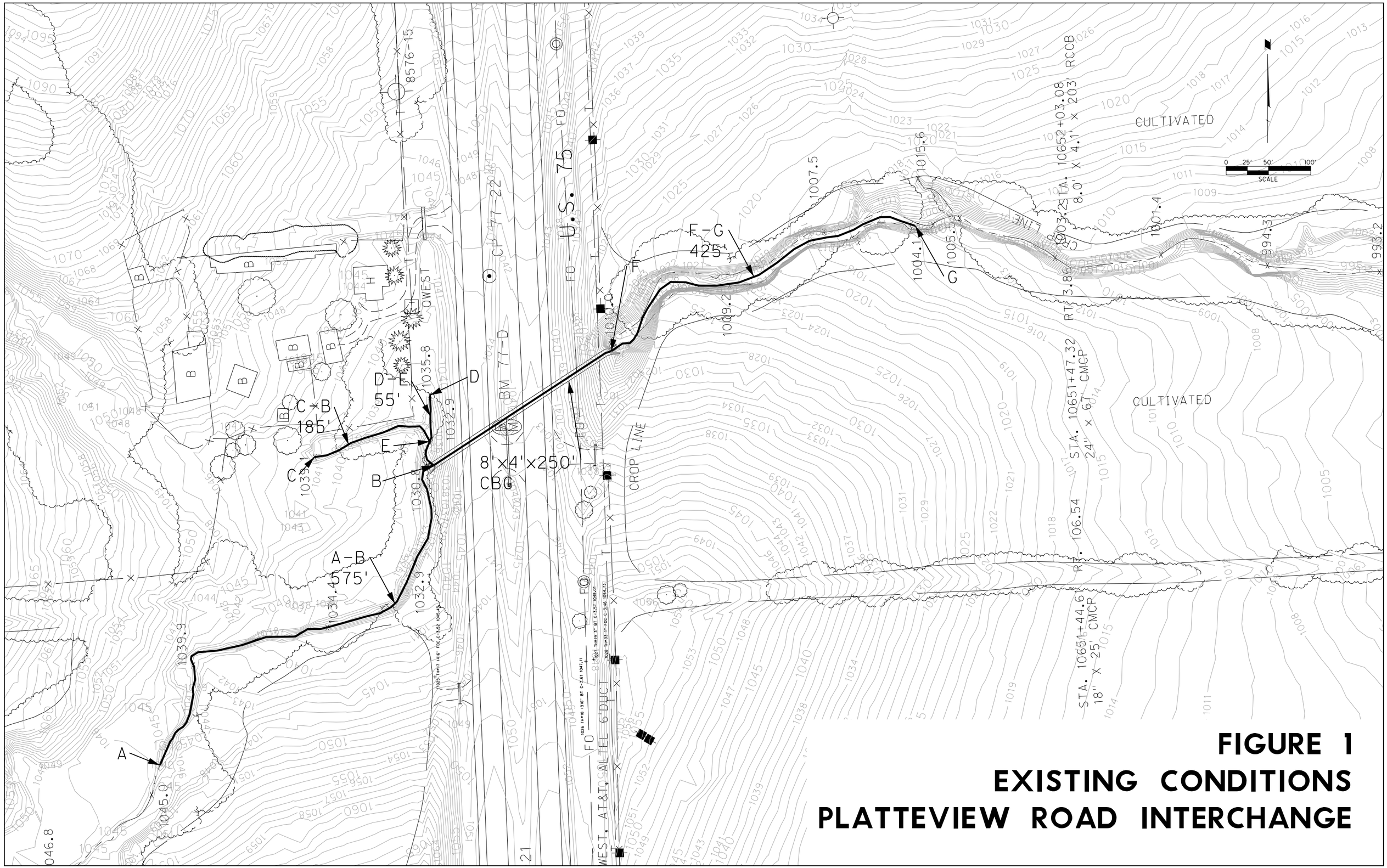


FIGURE 1
EXISTING CONDITIONS
PLATTEVIEW ROAD INTERCHANGE

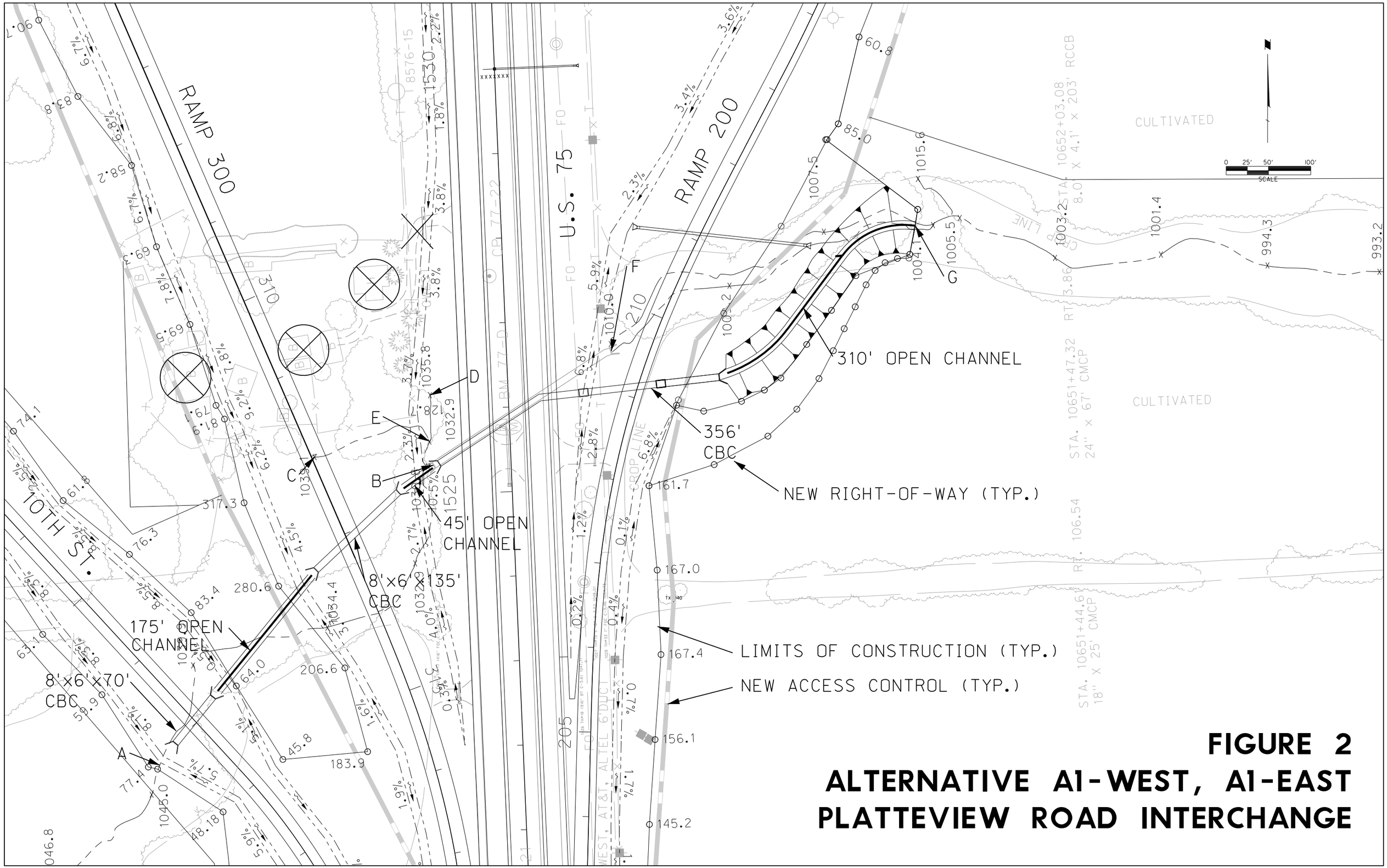


FIGURE 2
ALTERNATIVE A1-WEST, A1-EAST
PLATTEVIEW ROAD INTERCHANGE

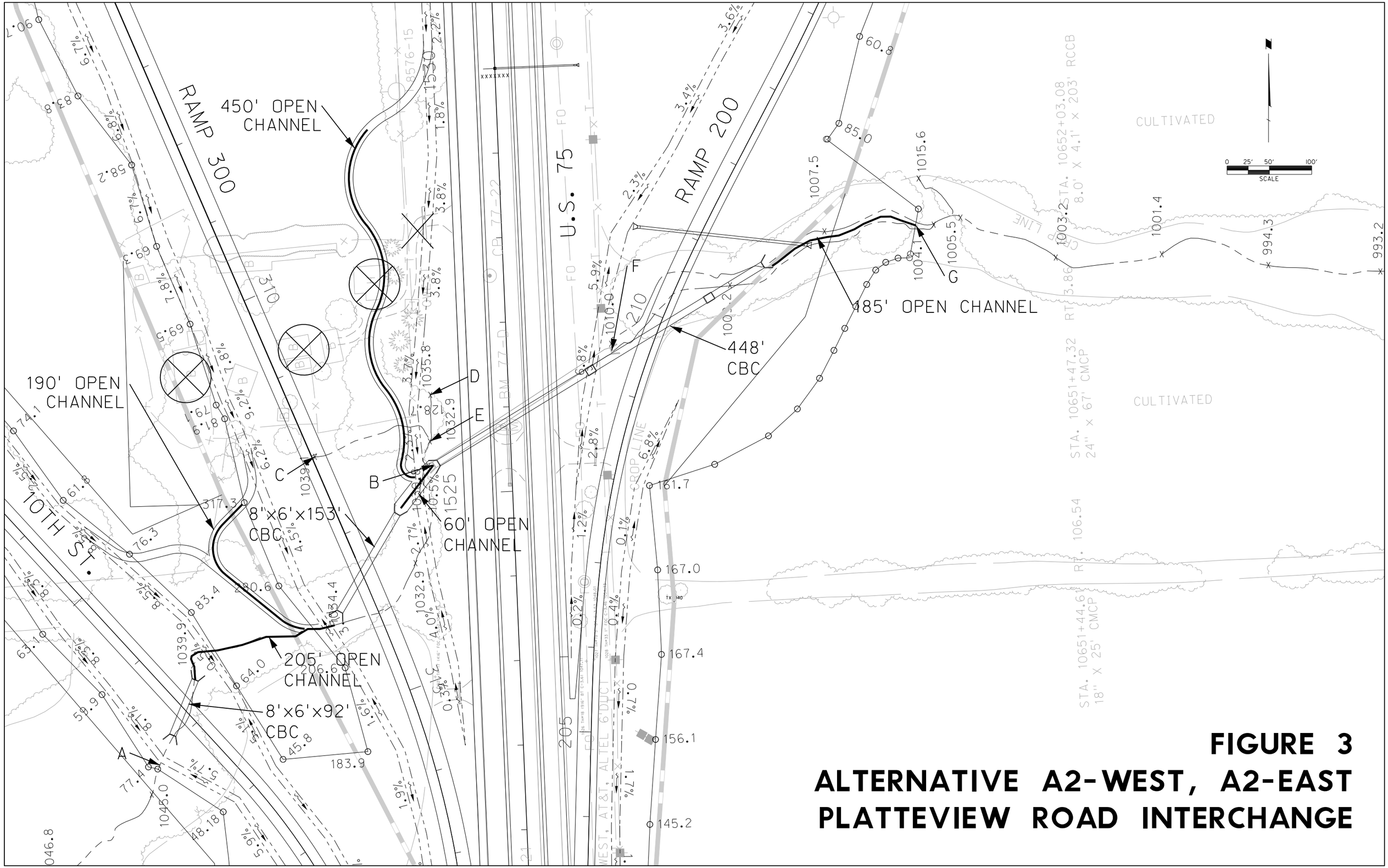
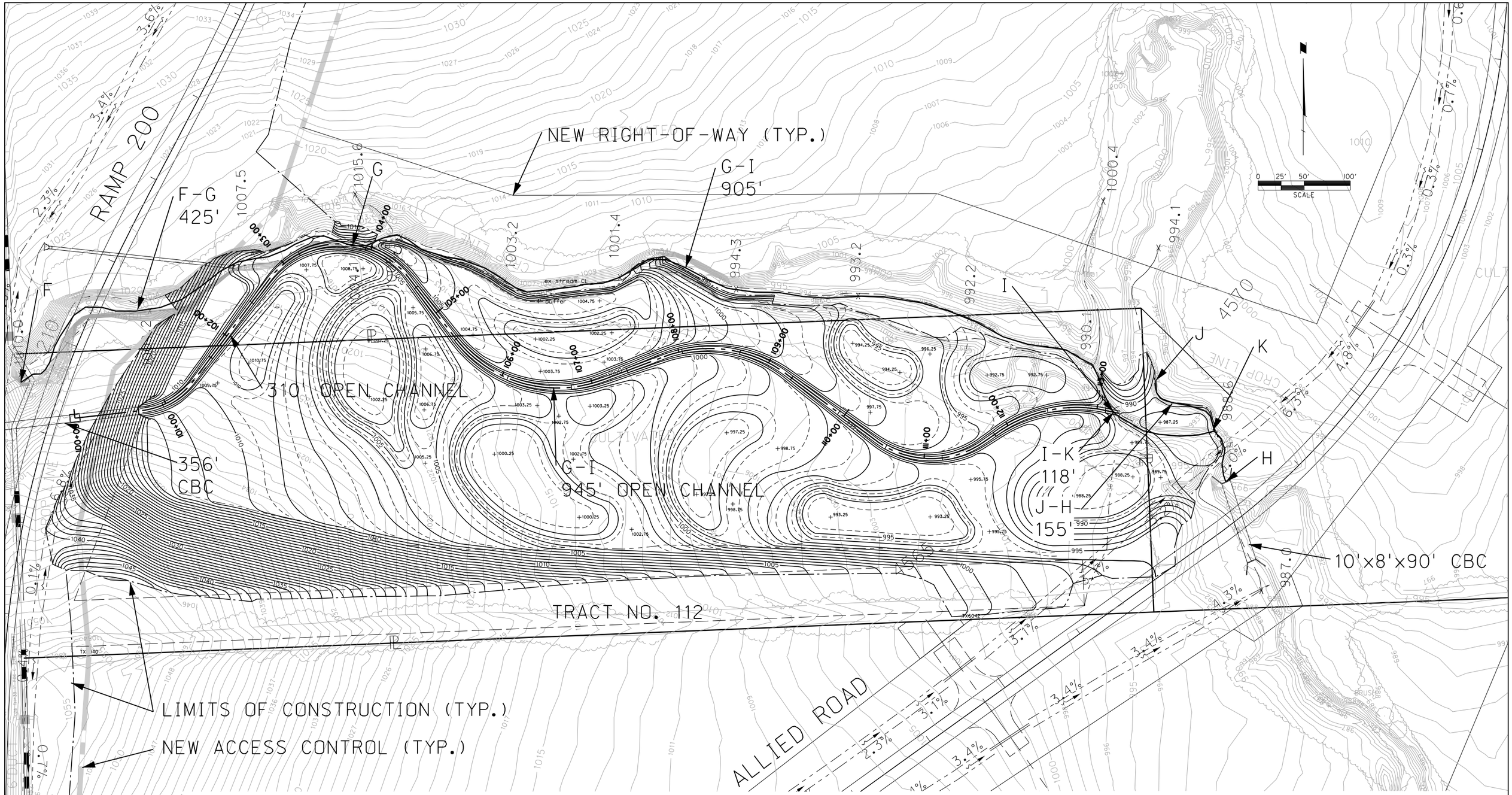


FIGURE 3
ALTERNATIVE A2-WEST, A2-EAST PLATTEVIEW ROAD INTERCHANGE



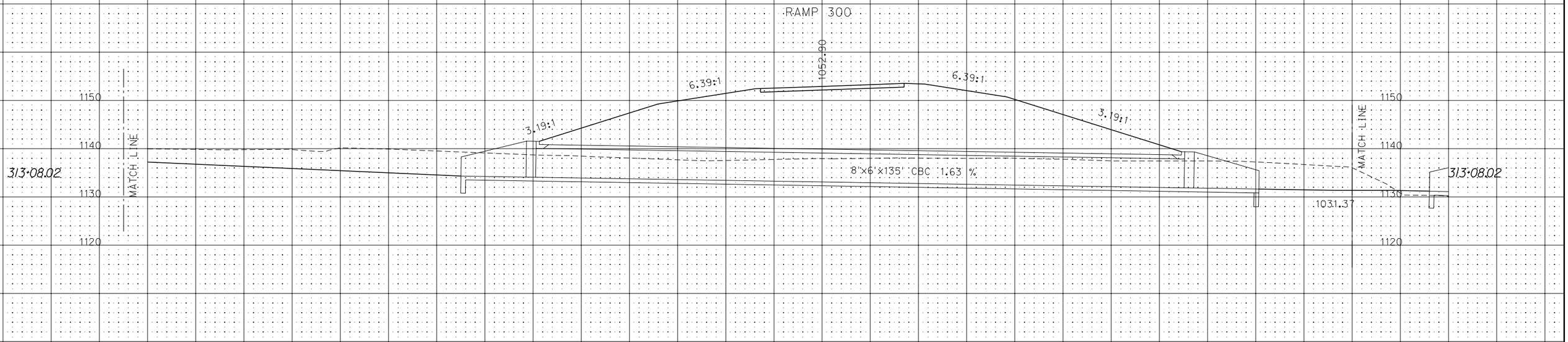
EXISTING CHANNEL REHABILITATION TYPICAL SECTION

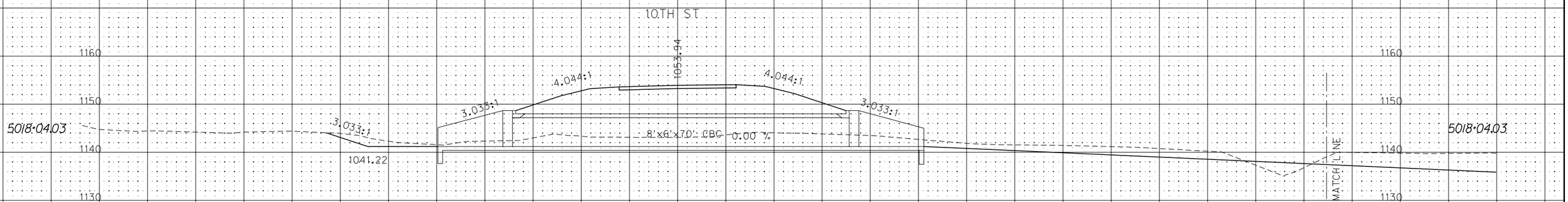
CHANNEL GRADING TYPICAL SECTION

FIGURE 4
ALTERNATIVE A3-EAST
PLATTEVIEW ROAD INTERCHANGE

PROJECT NO.	SHEET NO.
NH-75-2(155)	

Horizontal Scale	20:1
Vertical Scale	20:1



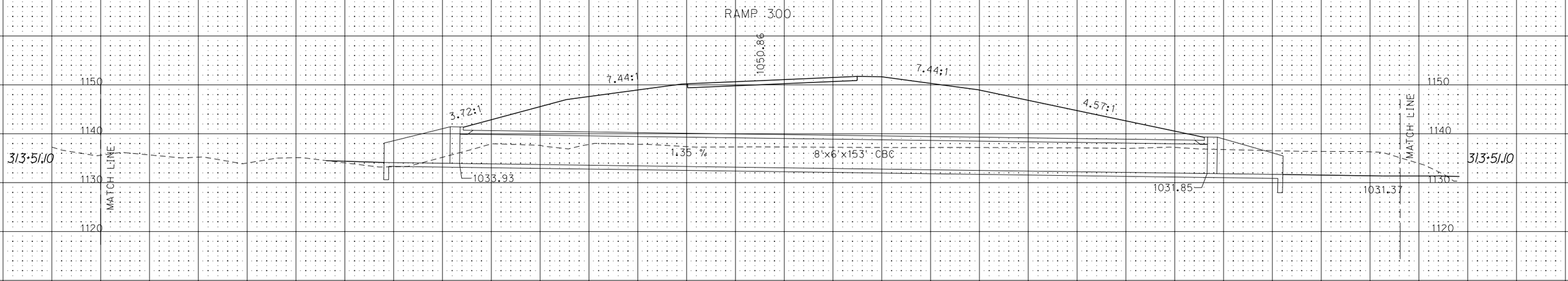


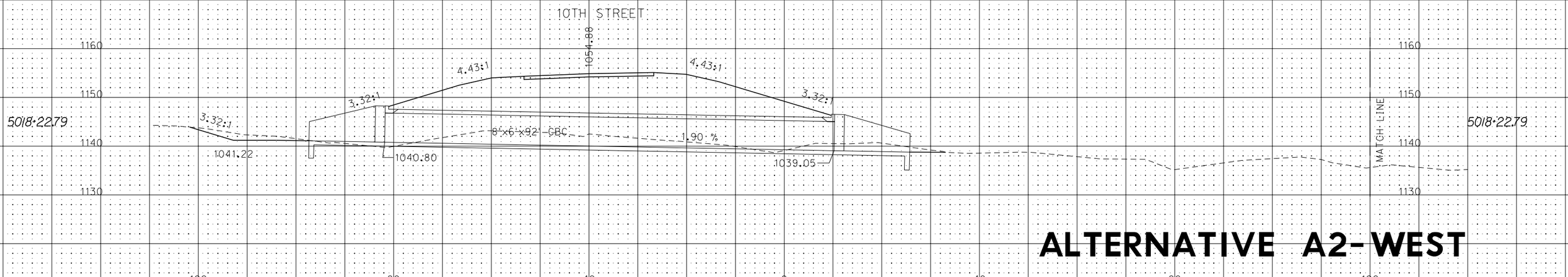
ALTERNATIVE A1-WEST

Filename: ...\2184900\XPS_OPT.DGN

PROJECT NO.	SHEET NO.
NH-75-2(155)	

Horizontal Scale	20:1
Vertical Scale	20:1





ALTERNATIVE A2-WEST

Filename: ...\218490\CAPS_OPT.DGN

PROJECT NO.	SHEET NO.
NH-75-2(155)	

Horizontal Scale 20:1
Vertical Scale 20:1

RAMP 200

MATCH LINE

1042.56

6.56:1

6.57:1

VENT FROM BOX

8'x8'x82' CBC

1016.38

1008.37

0.10 %

8'x16'x10' CBC

3.29:1

8'x8'x64' CBC

1.00 %

1008.31

1008.28

82'

10'

64'

1525.87.69

1525.87.69

US 75

26.75° HORIZ.BEND: (R.H.B.)

1044.43

1044.44

1042.45

6.99:1

6.99:1

6.99:1

6.02:1

3.01:1

4.37:1

3.49:1

VENT FROM BOX

8'x16'x10' CBC

8'x6'x190' CBC

2.25 %

1031.37

1030.86

1026.47

0.10 %

1016.46

190'

282'

356'

10'

MATCH LINE

1525.87.69

1525.87.69

Filename: ...\21849\DGN\PS_OPT.DGN

ALTERNATIVE A1-EAST

PROJECT NO.	SHEET NO.
NH-75-2(155)	

Horizontal Scale	20:1
Vertical Scale	20:1

RAMP 200

1042.00

9.69:1

6.46:1

9.93:1

VENT FROM BOX

4.97:1

MATCH LINE

8'x8'x154' CBC

0.10 %

1016.17

8'x16'x10' CBC

0.10 %

8'x8'x69' CBC

1008.15

154'

10'

69'

1008.10

1525.84.77

1525.84.77

120 80 40 0 40 80 120

120 160 200 240 280 320 360

US 75

1044.42

1044.43

6.86:1

6.86:1

6.86:1

6.86:1

3.43:1

3.43:1

VENT FROM BOX

1042.44

MATCH LINE

MATCH LINE

8'x6'x205' CBC

2.21 %

1031.37

1030.87

1026.34

8'x16'x10' CBC

1016.33

205'

369'

448'

10'

1525.84.77

1525.84.77

ALTERNATIVE A2-EAST

Filename: ...\2184900\CAD\S_OPT.DGN