# FINAL REPORT

# DRAINAGE CHANNEL RIGHT-OF-WAY REQUIREMENT STUDY FOR WEST HALF OF ESTRELLA FREEWAY LOOP 303 FROM I-10 TO BELL ROAD

## Work Order No. 80505

*Prepared for*

## MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION

**March 1997**

***Prepared by***

Entellus™

2255 N. 44th St., Suite 330
Phoenix, AZ 85008
Phone (602)244-2566
Fax (602)244-8947

Entellus Job No. 300.96-1

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Registered Professional Engineer (Civil)
CERTIFICATE NO.
10283
SAMUEL E.
KAO
Date Signed 3/19/97
ARIZONA, U.S.A.

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**Work Order No. 80505**

## EXECUTIVE SUMMARY

In January 1997, the Maricopa County Department of Transportation (MCDOT) retained Entellus, Inc. to prepare a drainage channel right-of-way requirement study along the west side of Estrella Freeway Loop 303, from Interstate Highway 10 (I-10) to Bell Road. The scope of work is to evaluate and document the additional right-of-way requirements resulting from the proposed drainage channel to be constructed along the west side of the freeway in the future.

A typical freeway section showing the minimum distance between the freeway centerline and the required west right-of-way limit is presented in **Figure 1**. The typical freeway section at each cross road is also shown in **Figure 1**. The estimated right-of-way widths that are required to accommodate the proposed drainage channel are graphically presented on **Plate 1** at the end of this report. The approximate ranges of additional right-of-way width and area between each pair of cross roads are summarized in **Table 1**, and detailed in **Table 2** of this report.

The study was performed on a conceptual level of effort. Refinement on channel alignment, location, and dimensions, as well as right-of-way offset dimensions, will be required during the design phase of this project. Therefore, results of this study shall not be used for right-of-way acquisition or condemnation.

**TABLE 1**

**SUMMARY OF ADDITIONAL RIGHT-OF-WAY REQUIREMENTS**

**ALONG WEST-HALF OF ESTRELLA FREEWAY**

| FROM | TO | APPROX. RANGE OF ADD'L WIDTH (ft) | APPROX. ADD'L AREA (S.F.) |
|---|---|---|---|
| I-10/McDowell | Thomas Road | 70-104 | 350,400 |
| Thomas Road | Indian School Road | 89-123 | 504,500 |
| Indian School Road | Camelback Road | 85-111 | 429,200 |
| Camelback Road | Bethany Home Road | 90-128 | 495,100 |
| Bethany Home Road | Glendale Avenue | 91-131 | 514,900 |
| Glendale Avenue | Northern Avenue | 66-101 | 390,800 |
| Northern Avenue | Olive Avenue | 57-90 | 318,800 |
| Olive Avenue | Peoria Avenue | 38-71 | 228,400 |
| Peoria Avenue | Cactus Road | 29-63 | 179,900 |
| Cactus Road | Waddell Road | 13-48 | 110,300 |
| Waddell Road | Greenway Road | 3-35 | 35,400 |
| Greenway Road | Bell Road | 3-40 | 44,100 |
| Bell Road | Union Hills Drive | 8-11 | 47,400 |
| | | **TOTAL** | **3,649,200 S.F.** |
| | | | **84 AC** |

NOTE: Evaluation of additional right-of-way requirements between I-10 and Sta. 338+00 (near McDowell Road) was not performed due to the lack of information on freeway ramp configurations at the interchange.

## A. GENERAL

The preliminary alignment and profile for Estrella Freeway Loop 303 were designed by the Arizona Department of Transportation (ADOT) in 1991. At that time, the offsite storm runoff was planned to be intercepted by a drainage ditch along the west side of the freeway and discharged to a number of detention basins located on the east side of the freeway at each section line road. The existing right-of-way was determined by ADOT based on this drainage concept.

In 1994, however, the Flood Control District of Maricopa County (FCDMC) proposed a drainage channel along the west side of Estrella Freeway as their regional drainage solution for this area. Because this drainage channel was planned to intercept storm runoff and route it from Union Hill Drive all the way to the Salt River without any detention basins, the required channel width would be much greater than what was designed by ADOT in 1991. As a result, a much wider right-of-way would be required to accommodate this newly proposed channel configuration.

To this end, the Maricopa County Department of Transportation (MCDOT) retained Entellus, Inc. in January 1997, to prepare a drainage channel right-of-way requirement study along the west side of Estrella Freeway Loop 303, from Interstate Highway 10 (I-10) to Bell Road. The scope of work is to evaluate and document the additional right-of-way requirements resulting from the proposed drainage channel to be constructed along the west side of the freeway in the future.

The study was performed on a conceptual level of effort. Refinement on channel alignment, location, and dimensions, as well as right-of-way offset dimensions, will be required during

the design phase of this project. Therefore, results of this study shall not be used for right-of-way acquisition or condemnation.

## B. ROADWAY ALIGNMENT AND RIGHT-OF-WAY INFORMATION

Information on roadway alignment, geometry and stationing used in this study was obtained from the Preliminary Location Plan and Profile for Estrella Freeway (AZM-600-9-301), prepared by ADOT in November 1991. The location and offset dimensions of the existing right-of-way were also obtained from the same document. The portion of the said document that is relevant to this study is included in **Appendix A** of this report.

## C. HYDROLOGY AND DRAINAGE CHANNEL DESIGN

The 100-year peak discharges at various concentration points within the project area were estimated by the Flood Control District of Maricopa County (FCDMC) and documented in the White Tanks/Aqua Fria Area Drainage Master Study (ADMS) report, dated December 1994. A conceptual design including cross-sectional dimensions and longitudinal grades of the Estrella Freeway Channel, was also presented in the White Tanks/Aqua Fria ADMS. The conceptual design of the drainage channel was adopted for this study project without any modification or revision. The profile and cross sections of the proposed drainage channel are included in **Appendix B** of this report.

## C. EVALUATION OF RIGHT-OF-WAY REQUIREMENTS

### 1. Typical Freeway Section

As shown in **Appendix A**, the profile grade line (PGL) and axis of rotation for the south bound lane of Estrella Freeway is 27' + 8' = 35' west of the construction centerline. The traffic lane width is 24', with a 10' shoulder. As decided by MCDOT during the project kick-off meeting, a minimum clear zone of 35' needs to be maintained between the west edge of the shoulder and the east bank of the proposed drainage channel. Therefore, as shown in **Figure 1**, the minimum distance between the freeway centerline and the east edge of the channel bank is
35' + 24' + 10' + 35' = 104'.

The catchpoints of the roadway side slope were verified by multiplying the maximum depth of fill appeared on each of the roadway plan and profile sheets by the reciprocal of the side slope. According to ADOT Standard Drawing C-02.10, a 6:1 side slope was used in the computation. As shown in **Appendix A** , all the catchpoints would be within the 35' wide clear zone. At one location (near Station 565+00), the computed distance for the catchpoint is greater than 35'. However, it was disregarded because the location is in a local depression which would most likely be filled during the freeway construction.

### 2. Typical Freeway Section at Cross Road

In order to generalize the right-of-way evaluation, it was decided by MCDOT that a

distance of 226' from the intersection of the freeway centerline to the outermost ramp curb be used for this study (See **Figure 1**). This distance was adjusted when the cross road intersects the freeway at a skewed angle.

The distances of taper for both entrance and exit ramps were determined from the ramp geometrics as shown on ADOT Standard Drawing C-08.10. A copy of the drawing is included in **Appendix C** of this report.

### 3. Drainage Channel Width

As shown in **Appendix B**, the typical section of the proposed drainage channel consists of a trapezoidal channel with side slopes of 2 horizontal to 1 vertical. The bottom width for each channel reach is also indicated on the drawings. In this study, the top width for each channel reach was computed based on the channel geometry and the maximum channel depth scaled from the profiles. The computed top width for each channel reach between two major cross roads is presented on **Figure 1**.

### 4. Maintenance Road Width

It was decided by MCDOT that a width of 15' be reserved for the construction of a maintenance road along the west side of the channel in the future.

### 5. Required Right-of-way Width

The required right-of-way width is equal to the sum of the roadway width, channel top width and maintenance road width. The required right-of-way width for each

roadway segment is tabulated in **Table 2** and illustrated on **Figure 1**. The evaluation of additional right-of-way requirements between I-10 and Sta. 338+00 (near McDowell Road) was not performed due to the lack of information on freeway ramp configurations at the interchange.

## D. ADDITIONAL RIGHT-OF-WAY REQUIREMENTS

The estimated right-of-way widths that are required to accommodate the proposed drainage channel are graphically presented on **Plate 1** at the end of this report. In addition, the square footage of the additional right-of-way is also shown on **Plate 1**. As the study was performed at a conceptual level based on a number of generalized assumptions, the results of this study should only be considered as general guidelines. Information on right-of-way station, offset dimensions, and square footage shall not be used for any right-of-way acquisition or condemnation.

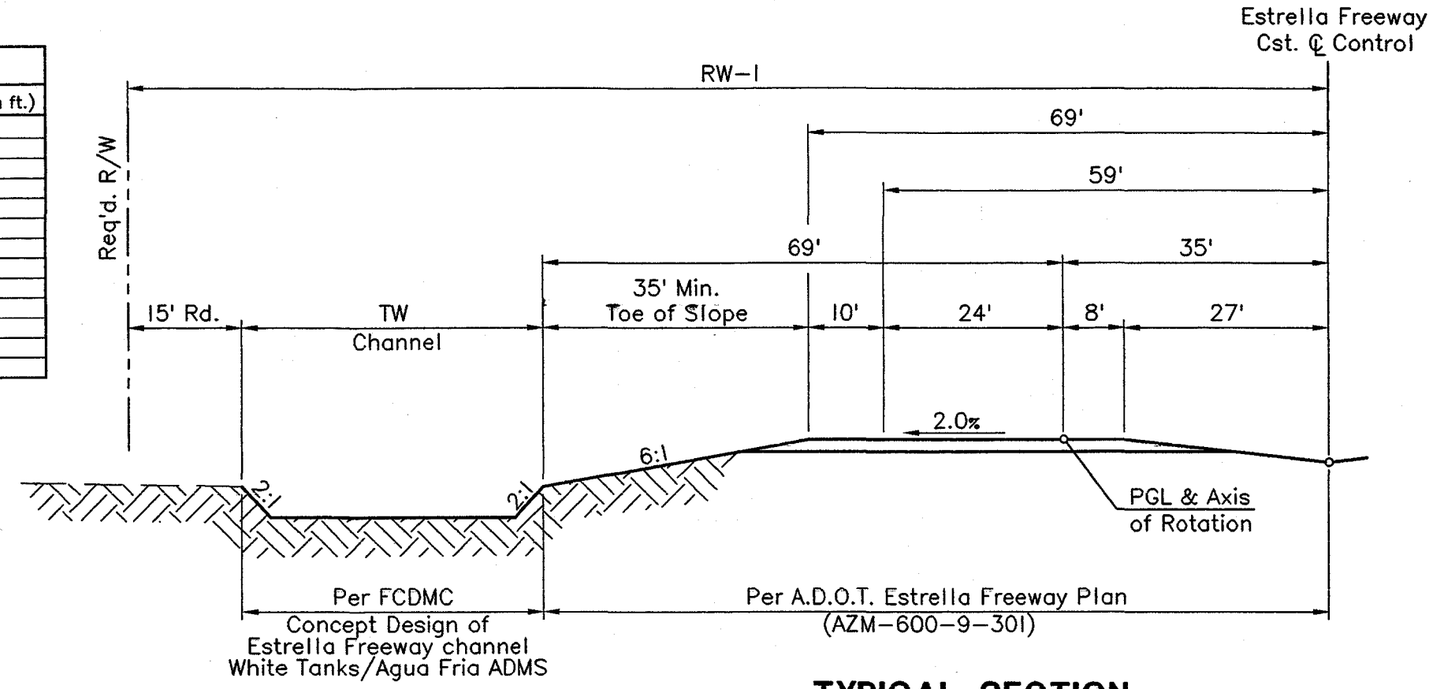
| TABLE 2<br>Approximate Offset Distance and Area for<br>Right-of-Way Along WEST-HALF of<br>Estrella Freeway | | | | | |
|---|---|---|---|---|---|
| CROSS ROAD NAME | STATION | APPROX. OFFSET DISTANCE FOR ORIGINAL R.O.W. (ft.) | OFFSET DISTANCE FOR PROPOSED R.O.W. (ft.) | ADD'L. R.O.W. WIDTH (ft.) | ADD'L. R.O.W. AREA (S.F.) |
| I-10/MCDOWELL | 350+37.66 | 194.00 | 264.00 | 70.00 | |
| to | 371+38.45 | 194.00 | 297.78 | 103.78 | **350,325** |
| | 381+26.71 | 315.61 | 416.00 | 100.39 | |
| THOMAS | 384+54.51 | 315.61 | 416.00 | 100.39 | |
| | 385+66.04 | 315.61 | 416.00 | 100.39 | |
| THOMAS | 389+26.71 | 315.61 | 416.00 | 100.39 | |
| | 404+01.53 | 170.00 | 259.00 | 89.00 | |
| to | 413+10.63 | 170.00 | 259.00 | 89.00 | **504,438** |
| INDIAN SCHOOL | 424+97.90 | 170.00 | 292.79 | 122.79 | |
| | 434+85.90 | 315.48 | 411.00 | 95.52 | |
| | 434+14.12 | 315.49 | 411.00 | 95.51 | |
| | 439+25.69 | 315.49 | 411.00 | 95.51 | |
| | 442+85.90 | 315.49 | 411.00 | 95.51 | |
| INDIAN SCHOOL | 457+61.88 | 170.00 | 255.00 | 85.00 | |
| to | 465+67.29 | 170.00 | 255.00 | 85.00 | **429,143** |
| | 471+18.52 | 170.00 | 255.00 | 85.00 | |
| CAMELBACK | 477+37.30 | 170.00 | 280.93 | 110.93 | |
| | 488+40.68 | 318.27 | 407.00 | 88.73 | |
| | 491+83.02 | 318.00 | 407.00 | 89.00 | |
| | 493+04.02 | 317.86 | 407.00 | 89.14 | |
| CAMELBACK | 496+40.68 | 317.34 | 407.00 | 89.66 | |
| | 510.45.66 | 165.25 | 256.00 | 90.75 | |
| to | 519+45.78 | 165.25 | 256.00 | 90.75 | **495,104** |
| | 531+26.19 | 162.47 | 289.83 | 127.36 | |
| BETHANY HOME | 541+34.12 | 310.38 | 408.00 | 97.62 | |
| | 544+79.56 | 309.84 | 408.00 | 98.16 | |

| TABLE 2<br>Approximate Offset Distance and Area for<br>Right-of-Way Along WEST-HALF of<br>Estrella Freeway | | | | | |
|---|---|---|---|---|---|
| CROSS ROAD NAME | STATION | APPROX. OFFSET DISTANCE FOR ORIGINAL R.O.W. (ft.) | OFFSET DISTANCE FOR PROPOSED R.O.W. (ft.) | ADD'L. R.O.W. WIDTH (ft.) | ADD'L. R.O.W. AREA (S.F.) |
| BETHANY HOME to GLENDALE | 545+89.56 | 309.81 | 408.00 | 98.19 | **514,842** |
| | 549+34.15 | 310.15 | 408.00 | 97.85 | |
| | 562+51.42 | 145.64 | 249.00 | 103.36 | |
| | 566+13.26 | 145.64 | 249.00 | 103.36 | |
| | 570+99.27 | 147.69 | 249.00 | 101.31 | |
| | 583+92.35 | 152.00 | 282.46 | 130.46 | |
| | 594+06.23 | 308.43 | 401.00 | 92.57 | |
| | 597+51.66 | 310.08 | 401.00 | 90.92 | |
| GLENDALE to NORTHERN | 598+61.65 | 310.44 | 401.00 | 90.56 | **390,736** |
| | 602+06.23 | 311.07 | 401.00 | 89.93 | |
| | 616+13.06 | 163.57 | 234.00 | 70.43 | |
| | 625+00.07 | 163.57 | 234.00 | 70.43 | |
| | 636+80.77 | 166.81 | 267.85 | 101.04 | |
| | 646+85.29 | 319.27 | 386.00 | 66.73 | |
| | 650.30.52 | 319.90 | 386.00 | 66.10 | |
| NORTHERN to OLIVE | 651+41.12 | 320.03 | 386.00 | 65.97 | **318,804** |
| | 654+85.89 | 320.21 | 386.00 | 65.79 | |
| | 668+90.79 | 170.94 | 228.00 | 57.06 | |
| | 677+90.32 | 170.94 | 228.00 | 57.06 | |
| | 689+70.55 | 171.90 | 261.85 | 89.95 | |
| | 699+78.63 | 322.63 | 380.00 | 57.37 | |
| | 703+23.88 | 322.81 | 380.00 | 57.19 | |

| TABLE 2<br>Approximate Offset Distance and Area for<br>Right-of-Way Along WEST-HALF of<br>Estrella Freeway | | | | | |
|---|---|---|---|---|---|
| CROSS ROAD NAME | STATION | APPROX. OFFSET DISTANCE FOR ORIGINAL R.O.W. (ft.) | OFFSET DISTANCE FOR PROPOSED R.O.W. (ft.) | ADD'L. R.O.W. WIDTH (ft.) | ADD'L. R.O.W. AREA (S.F.) |
| OLIVE to PEORIA | 704+11.88 | 322.86 | 380.00 | 57.14 | **228,367** |
| | 707+78.63 | 323.03 | 380.00 | 56.97 | |
| | 721+81.61 | 173.68 | 211.00 | 37.32 | |
| | 730+73.18 | 173.68 | 211.00 | 37.32 | |
| | 742+53.44 | 174.53 | 244.97 | 70.44 | |
| | 752+54.51 | 325.17 | 363.00 | 37.83 | |
| | 755+99.64 | 325.34 | 363.00 | 37.66 | |
| PEORIA to CACTUS | 757+09.64 | 325.31 | 363.00 | 37.69 | **179,831** |
| | 760+54.51 | 324.96 | 363.00 | 38.04 | |
| | 774+57.93 | 173.59 | 202.00 | 28.41 | |
| | 783+50.37 | 173.59 | 202.00 | 28.41 | |
| | 795+31.51 | 173.59 | 235.89 | 62.30 | |
| | 805+35.23 | 320.41 | 354.00 | 33.59 | |
| | 808+80.36 | 320.06 | 354.00 | 33.94 | |
| CACTUS to WADDELL | 809+89.26 | 320.08 | 354.00 | 33.92 | **110,227** |
| | 813+34.13 | 320.59 | 354.00 | 33.41 | |
| | 827+37.79 | 172.60 | 189.00 | 16.40 | |
| | 836+32.55 | 172.60 | 189.00 | 16.40 | |
| | 848+10.99 | 175.25 | 222.91 | 47.66 | |
| | 858+13.31 | 327.25 | 341.00 | 13.75 | |
| | 861+58.34 | 327.77 | 341.00 | 13.23 | |

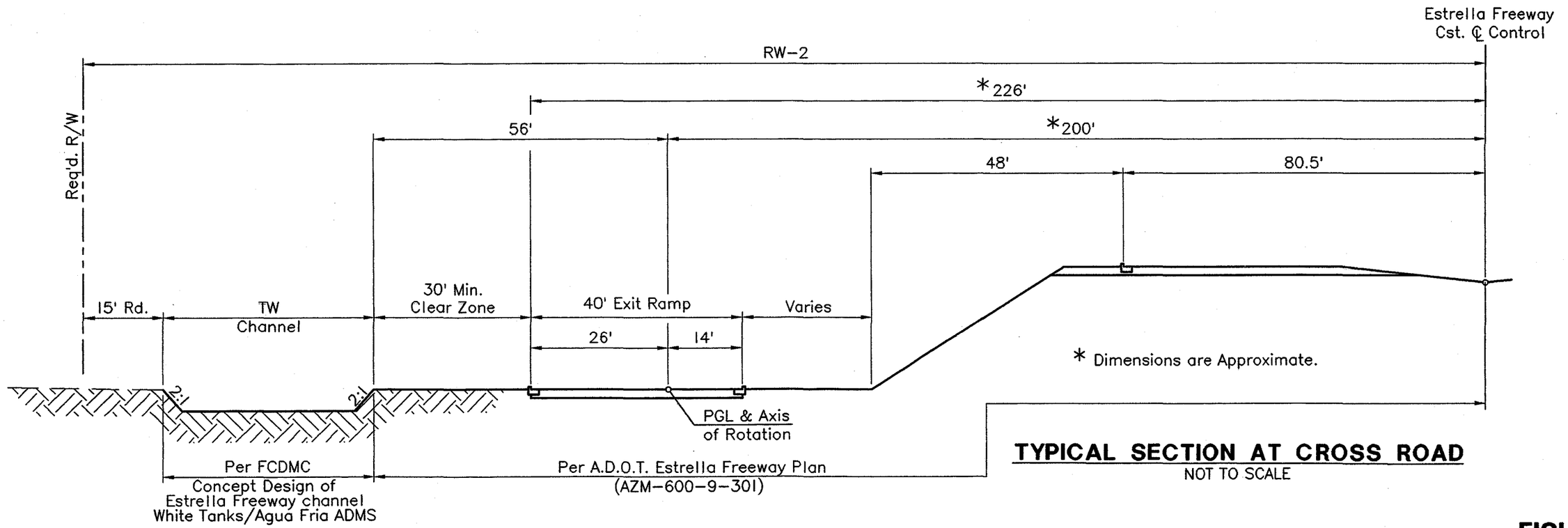
| TABLE 2<br>Approximate Offset Distance and Area for<br>Right-of-Way Along WEST-HALF of<br>Estrella Freeway | | | | | |
|---|---|---|---|---|---|
| CROSS ROAD NAME | STATION | APPROX. OFFSET DISTANCE FOR ORIGINAL R.O.W. (ft.) | OFFSET DISTANCE FOR PROPOSED R.O.W. (ft.) | ADD'L. R.O.W. WIDTH (ft.) | ADD'L. R.O.W. AREA (S.F.) |
| WADDLELL to GREENWAY | 862+68.35 | 327.85 | 341.00 | 13.15 | 35,383 |
| | 866+13.31 | 327.88 | 341.00 | 13.12 | |
| | 880+16.35 | 177.97 | 179.00 | 1.03 | |
| | 889+09.03 | 177.97 | 179.00 | 1.03 | |
| | 900+93.26 | 178.10 | 212.98 | 34.88 | |
| | 910.92.78 | 328.20 | 331.00 | 2.80 | |
| | 914+37.79 | 328.22 | 331.00 | 2.78 | |
| GREENWAY to BELL | 915+47.79 | 328.14 | 331.00 | 2.86 | 44,024 |
| | 918+92.77 | 327.60 | 331.00 | 3.40 | |
| | 932+96.00 | 175.51 | 179.00 | 3.49 | |
| | 942+15.39 | 175.51 | 179.00 | 3.49 | |
| | 953+97.72 | 172.71 | 212.92 | 40.21 | |
| | 964+00.87 | 320.62 | 331.00 | 10.38 | |
| | 967+35.91 | 320.10 | 331.00 | 10.90 | |
| BELL to UNION HILLS | 968+66.96 | 320.04 | 331.00 | 10.96 | 47,322 |
| | 972+01.91 | 320.25 | 331.00 | 10.75 | |
| | 986+05.63 | 171.13 | 179.00 | 7.87 | |
| | 1020+63.69 | 171.13 | 179.00 | 7.87 | |

| REQUIRED RIGHT-OF-WAY "OFFSETS" | | | | |
|---|---|---|---|---|
| FROM | TO | TW (in ft.) | RW-1 (in ft.) | RW-2 (in ft.) |
| I-10 / McDOWELL ROAD | THOMAS ROAD | 145 | 264 | 416 |
| THOMAS ROAD | INDIAN SCHOOL ROAD | 140 | 259 | 411 |
| INDIAN SCHOOL ROAD | CAMELBACK ROAD | 136 | 255 | 407 |
| CAMELBACK ROAD | BETHANY HOME ROAD | 137 | 256 | 408 |
| BETHANY HOME ROAD | GLENDALE AVENUE | 130 | 249 | 401 |
| GLENDALE AVENUE | NORTHERN AVENUE | 115 | 234 | 386 |
| NORTHERN AVENUE | OLIVE AVENUE | 109 | 228 | 380 |
| OLIVE AVENUE | PEORIA AVENUE | 92 | 211 | 363 |
| PEORIA AVENUE | CACTUS ROAD | 83 | 202 | 354 |
| CACTUS ROAD | WADDELL ROAD | 70 | 189 | 341 |
| WADDELL ROAD | GREENWAY ROAD | 60 | 179 | 331 |
| GREENWAY ROAD | BELL ROAD | 60 | 179 | 331 |
| BELL ROAD | UNION HILLS DRIVE | 60 | 179 | 331 |




**TYPICAL SECTION**

ESTRELLA FREEWAY – (Between Cross Roads)
NOT TO SCALE



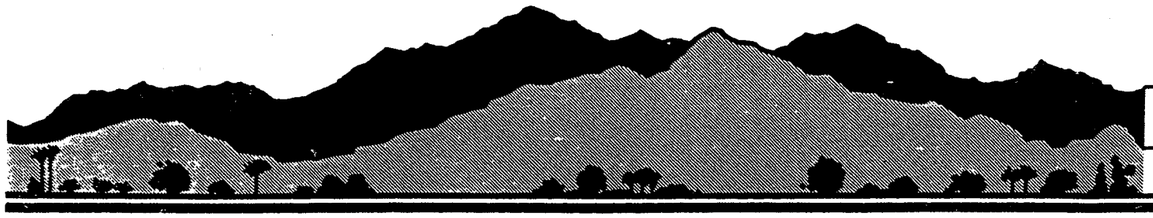

**TYPICAL SECTION AT CROSS ROAD**

NOT TO SCALE

**FIGURE 1**

# APPENDIX A

## PRELIMINARY LOCATION PLAN & PROFILE FOR ESTRELLA FREEWAY



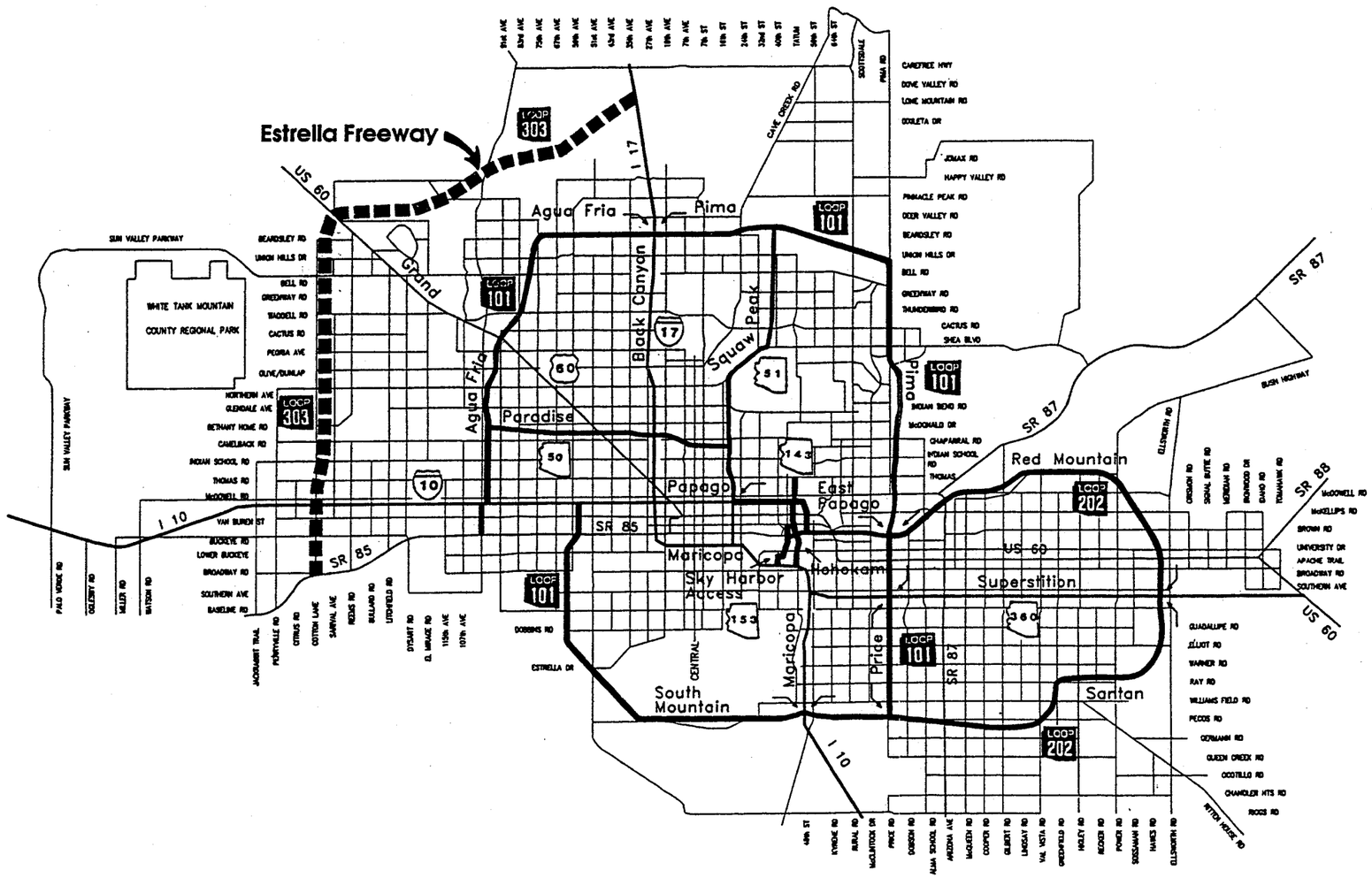
# ESTRELLA FREEWAY

## STATE ROUTE 303L

S.R. 85 to INTERSTATE 17

## PRELIMINARY LOCATION PLAN & PROFILE

NOVEMBER, 1991



**ARIZONA DEPARTMENT OF TRANSPORTATION**

URBAN HIGHWAY SECTION

PREPARED BY

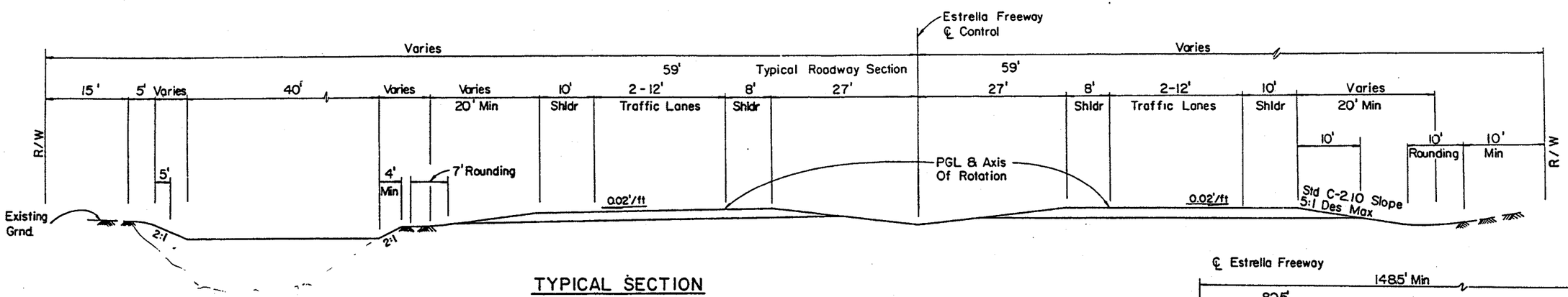
CELLA BARR ASSOCIATES

In Association With:

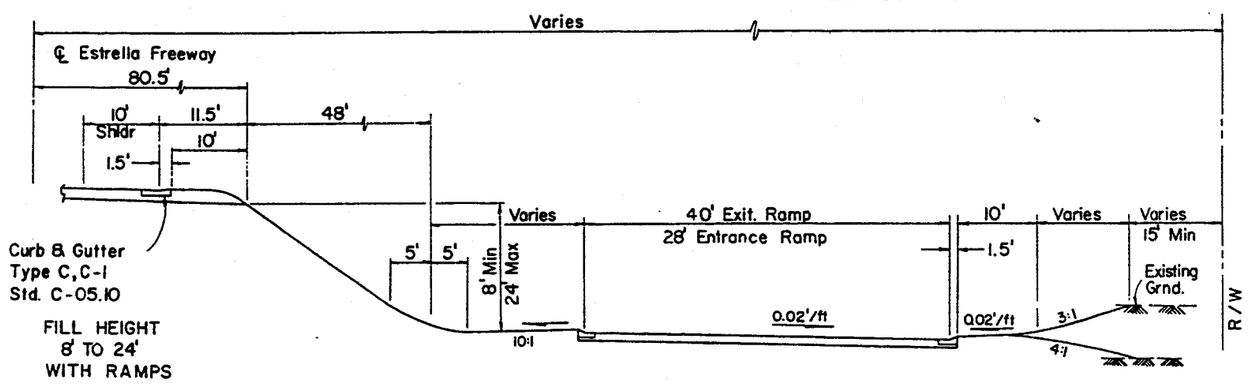
Kimley-Horn

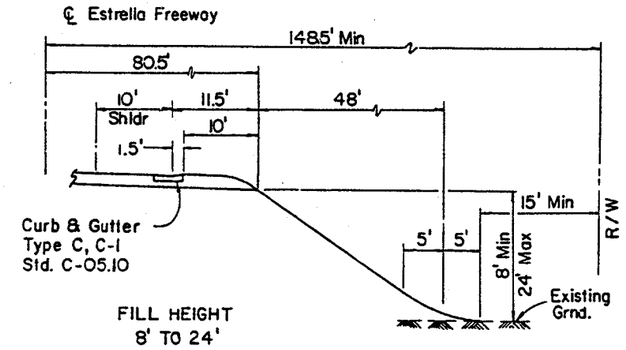
# ESTRELLA FREEWAY

## TYPICAL SECTION AND DESIGN CRITERIA




TYPICAL SECTION
FILL HEIGHT = 8'




| | |
|---|---|
| DESIGN YEAR: | 2015 |
| DESIGN SPEED: | 65 MPH-MAINLINE<br>50 MPH-RAMPS<br>CROSSROADS |
| LANE WIDTH: | 12 FEET |
| SHOULDER WIDTH: | MEDIAN-8 FEET<br>OUTSIDE-10 FEET |
| MEDIAN WIDTH: | 70 FEET (INCLUDING MEDIAN SHOLDER) |
| MAXIMUM GRADIENT: | 3% MAINLINE<br>4% CROSSROADS<br>5% RAMPS |

| | |
|---|---|
| NUMBER OF LANES: | 4 |
| HORIZONTAL CURVATURE: | 3° 30' MAINLANE (MAX.)<br>8° RAMPS (MAX.)<br>CROSSROADS |
| RIGHT OF WAY WIDTH: | 300 FEET (MIN.) |
| ACCESS CONTROL: | FULL |
| VERTICAL CLEARANCES: | 16'-6" STANDARD<br>23'-0" OVER A.T.& S.F. RR. |

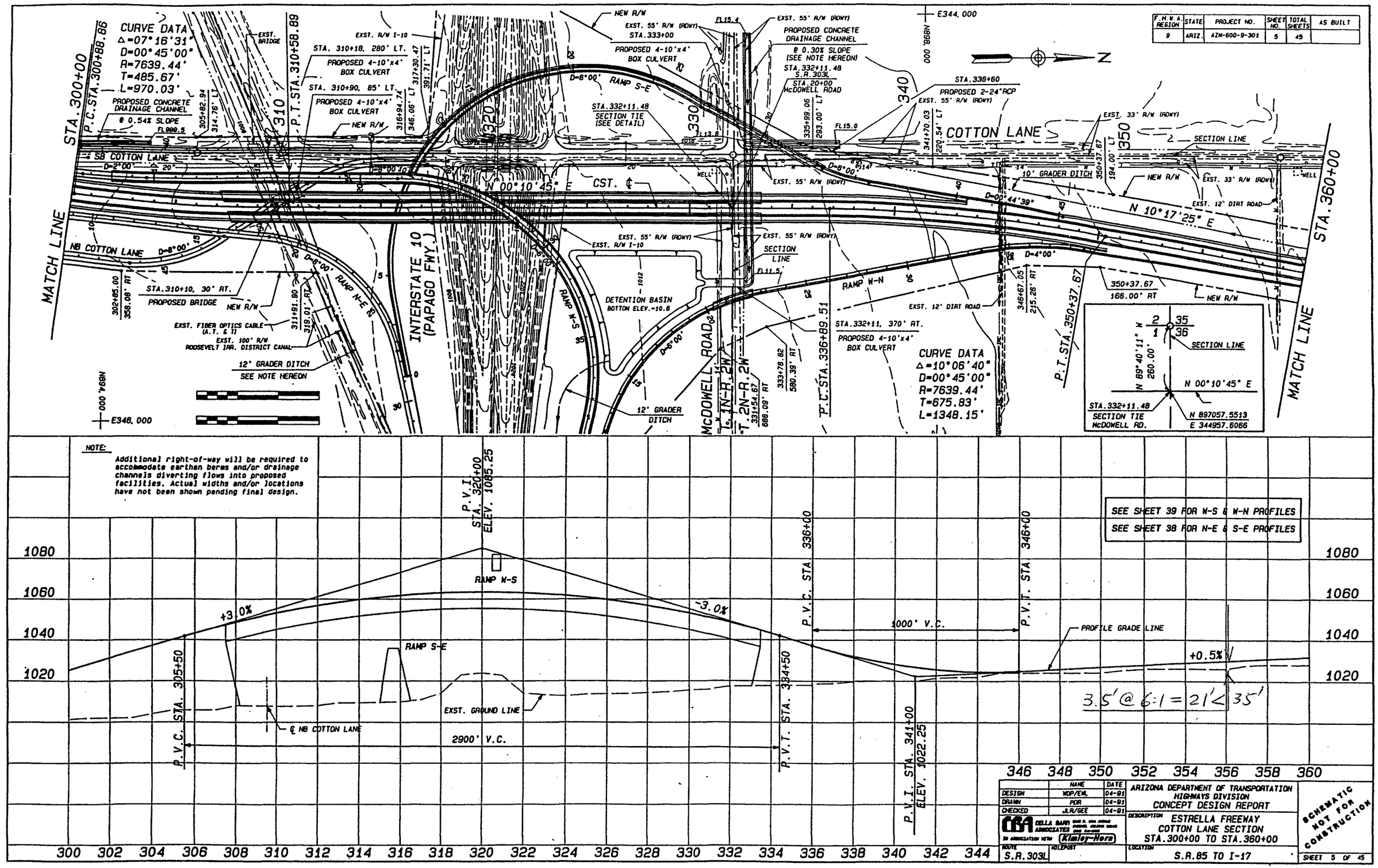
| | |
|---|---|
| DRAINAGE: | PAVEMENT: 10 YEAR<br>DEPRESSED AREA: 50 YEAR<br>CROSS-DRAINAGE: 50 YEAR |

NOTES:

1. ALL COORDINATES SHOWN ARE MODIFIED GRID.
2. THE DRAINAGE DESIGN FOR THIS PROJECT PROVIDES FOR A BOX CULVERT MINIMUM HEIGHT OF 4'-0". THIS MINIMUM HEIGHT SHOULD BE EVALUATED DURING FINAL DESIGN TO ACCOMODATE CURRENT MAINTENANCE AND OTHER REQUIREMENTS.

**FIGURE 2**

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| 9 | ARIZ. | AZM-600-9-301 | 5 | 45 | |




NOTE:
Additional right-of-way will be required to accommodate earthen berms and/or drainage channels diverting flows into proposed facilities. Actual widths and/or locations have not been shown pending final design.




| | NAME | DATE |
|---|---|---|
| DESIGN | WDP/EWL | 04-91 |
| DRAWN | PDR | 04-91 |
| CHECKED | JLR/GEE | 04-91 |

CBA CELLA BARR ASSOCIATES IN ASSOCIATION WITH Klasley-Hora

ROUTE S.R.303L MILEPOST

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
CONCEPT DESIGN REPORT

DESCRIPTION ESTRELLA FREEWAY
COTTON LANE SECTION
STA.300+00 TO STA.360+00

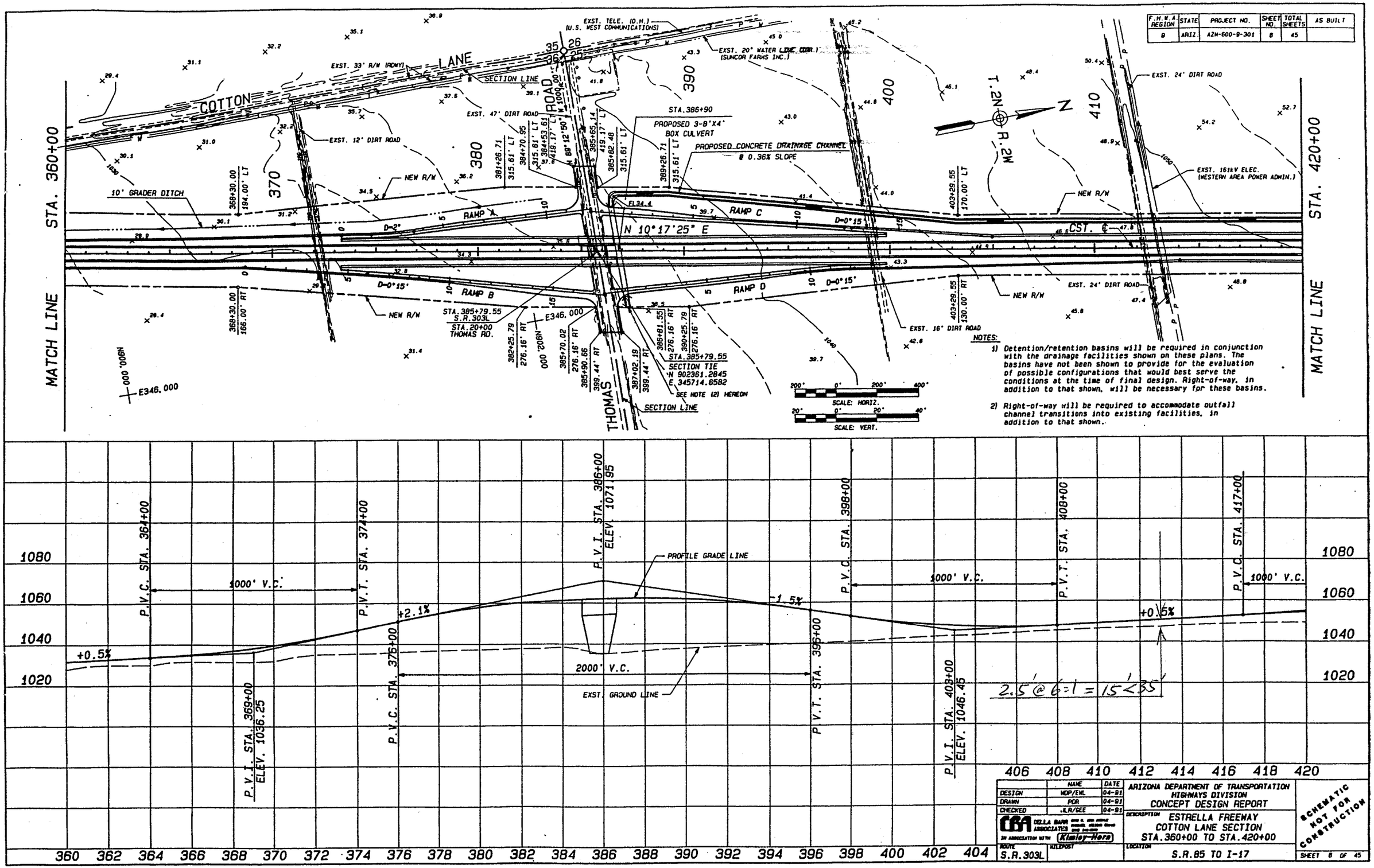
LOCATION S.R.85 TO I-17

SCHEMATIC NOT FOR CONSTRUCTION

SHEET 5 OF 45

CTN.PP.06

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| 9 | ARIZ. | AZM-600-9-301 | 8 | 45 | |




NOTES:

1) Detention/retention basins will be required in conjunction with the drainage facilities shown on these plans. The basins have not been shown to provide for the evaluation of possible configurations that would best serve the conditions at the time of final design. Right-of-way, in addition to that shown, will be necessary for these basins.

2) Right-of-way will be required to accommodate outfall channel transitions into existing facilities, in addition to that shown.

| | NAME | DATE |
|---|---|---|
| DESIGN | WOP/EML | 04-91 |
| DRAWN | POR | 04-91 |
| CHECKED | ILR/GEE | 04-91 |

CBA DELLA BARR ASSOCIATES
IN ASSOCIATION WITH Kimley-Horn

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
CONCEPT DESIGN REPORT

DESCRIPTION: ESTRELLA FREEWAY
COTTON LANE SECTION
STA.360+00 TO STA.420+00

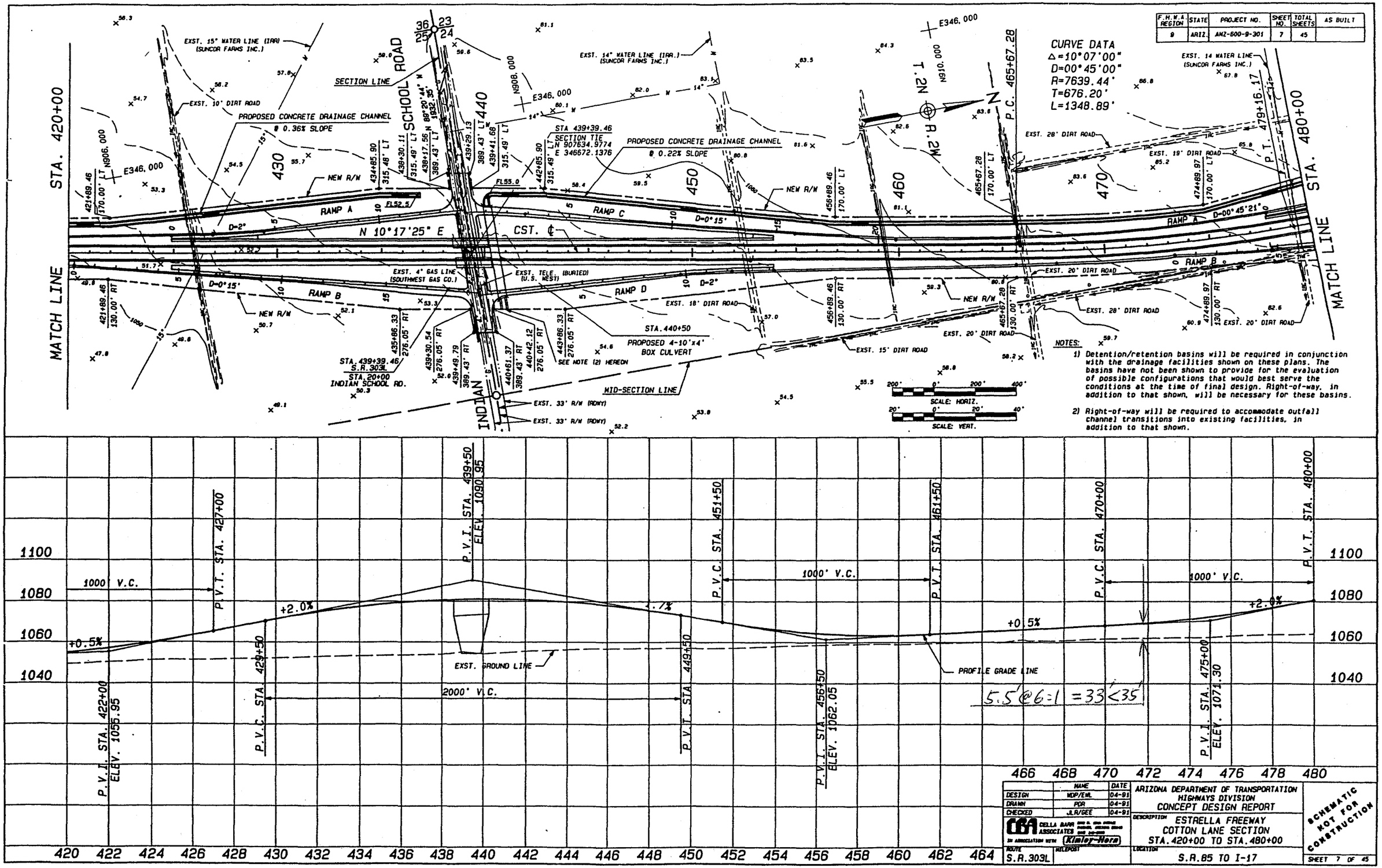
ROUTE: S.R.303L
MILEPOST:
LOCATION: S.R.85 TO I-17

SCHEMATIC NOT FOR CONSTRUCTION

SHEET 8 OF 45

CTN.PP.08.REV

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| 9 | ARIZ. | ANZ-600-9-301 | 7 | 45 | |




| | NAME | DATE |
|---|---|---|
| DESIGN | WDP/EWL | 04-91 |
| DRAWN | PDR | 04-91 |
| CHECKED | JLR/GEE | 04-91 |

CBA CELLA BARR ASSOCIATES IN ASSOCIATION WITH Kimley-Horn

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
CONCEPT DESIGN REPORT

DESCRIPTION: ESTRELLA FREEWAY
COTTON LANE SECTION
STA. 420+00 TO STA. 480+00

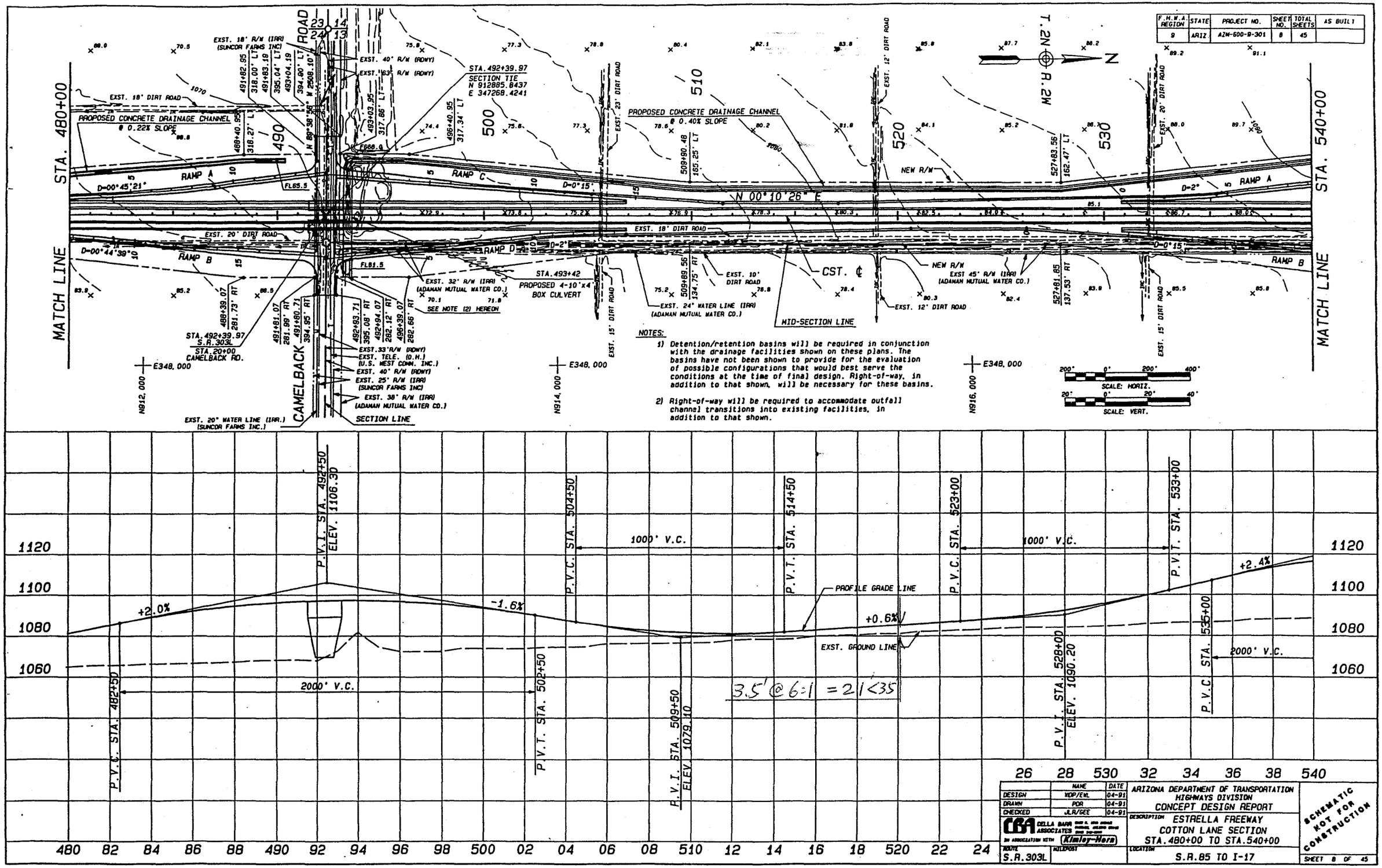
ROUTE: S.R.303L
MILEPOST:
LOCATION: S.R.85 TO I-17

SCHEMATIC NOT FOR CONSTRUCTION

SHEET 7 OF 45

CTW.PP.07

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| 9 | ARIZ | AZM-600-B-301 | 8 | 45 | |




NOTES:

1) Detention/retention basins will be required in conjunction with the drainage facilities shown on these plans. The basins have not been shown to provide for the evaluation of possible configurations that would best serve the conditions at the time of final design. Right-of-way, in addition to that shown, will be necessary for these basins.

2) Right-of-way will be required to accommodate outfall channel transitions into existing facilities, in addition to that shown.

| | NAME | DATE |
|---|---|---|
| DESIGN | MOP/EWL | 04-91 |
| DRAWN | PDR | 04-91 |
| CHECKED | JLR/GEE | 04-91 |

CBA CELLA BARR ASSOCIATES IN ASSOCIATION WITH Kimley-Horn

ROUTE S.R.303L MILEPOST

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
CONCEPT DESIGN REPORT

DESCRIPTION ESTRELLA FREEWAY
COTTON LANE SECTION
STA.480+00 TO STA.540+00

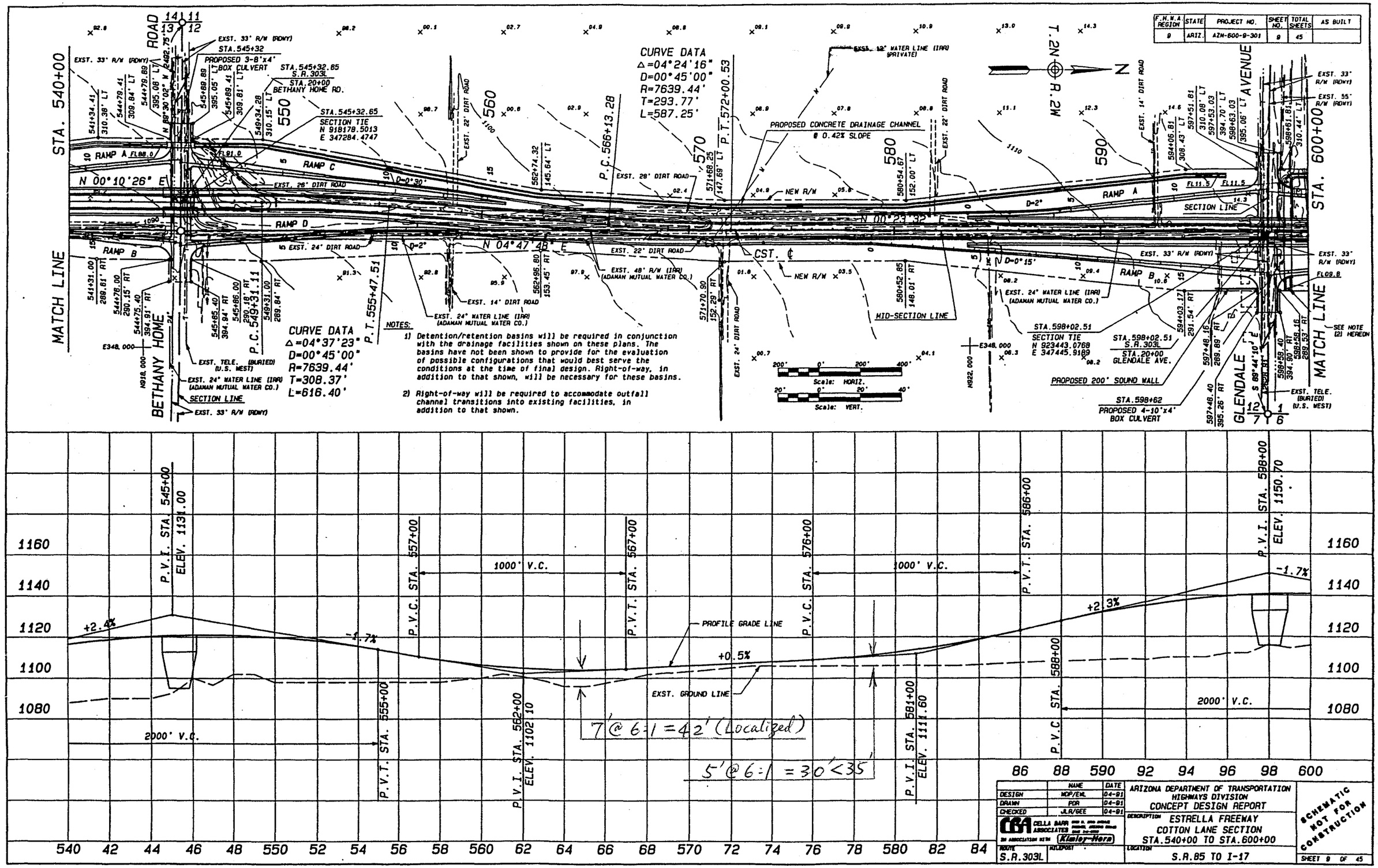
LOCATION S.R.85 TO I-17

SCHEMATIC NOT FOR CONSTRUCTION

SHEET 8 OF 45

CTN.PP.08

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| 9 | ARIZ. | AZN-600-9-301 | 9 | 45 | |

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2) Right-of-way will be required to accommodate outfall channel transitions into existing facilities, in addition to that shown.

| | NAME | DATE |
|---|---|---|
| DESIGN | WOP/EML | 04-91 |
| DRAWN | PDR | 04-91 |
| CHECKED | JLR/GEE | 04-91 |

CBA CELLA BARR ASSOCIATES IN ASSOCIATION WITH Kimley-Horn

ROUTE S.R.303L

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
CONCEPT DESIGN REPORT

DESCRIPTION ESTRELLA FREEWAY
COTTON LANE SECTION
STA.540+00 TO STA.600+00

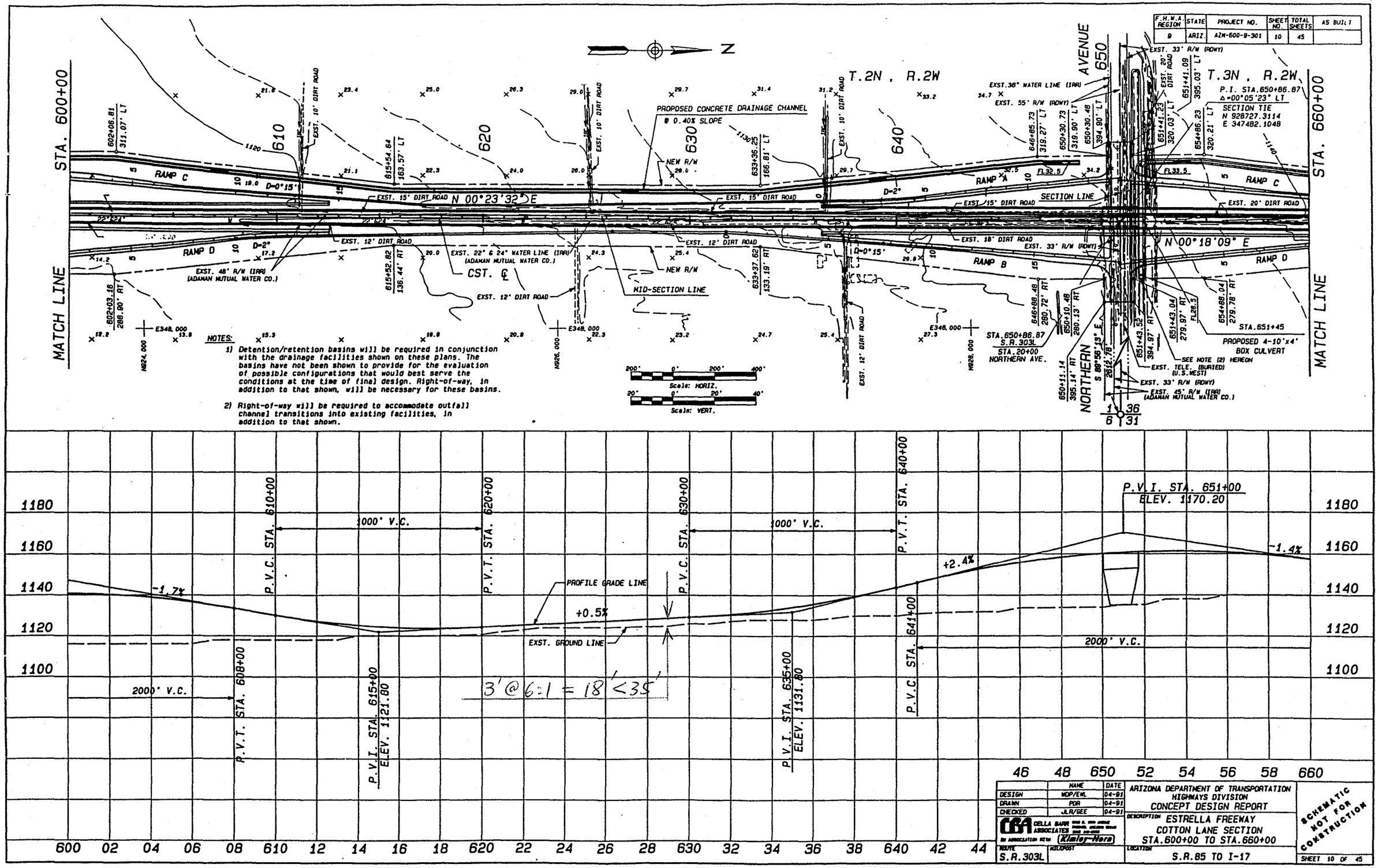
LOCATION S.R.85 TO I-17

SCHEMATIC NOT FOR CONSTRUCTION

SHEET 9 OF 45

CTN.PP.08

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| 9 | ARIZ. | AZM-600-9-301 | 10 | 45 | |




NOTES:

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2) Right-of-way will be required to accommodate outfall channel transitions into existing facilities, in addition to that shown.

| | NAME | DATE |
|---|---|---|
| DESIGN | WOP/EWL | 04-91 |
| DRAWN | PDR | 04-91 |
| CHECKED | JLR/GEE | 04-91 |

CBA DELLA BARR ASSOCIATES IN ASSOCIATION WITH Kimley-Horn

ROUTE S.R.303L

HIGHPOST

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
CONCEPT DESIGN REPORT

DESCRIPTION ESTRELLA FREEWAY
COTTON LANE SECTION
STA.600+00 TO STA.660+00

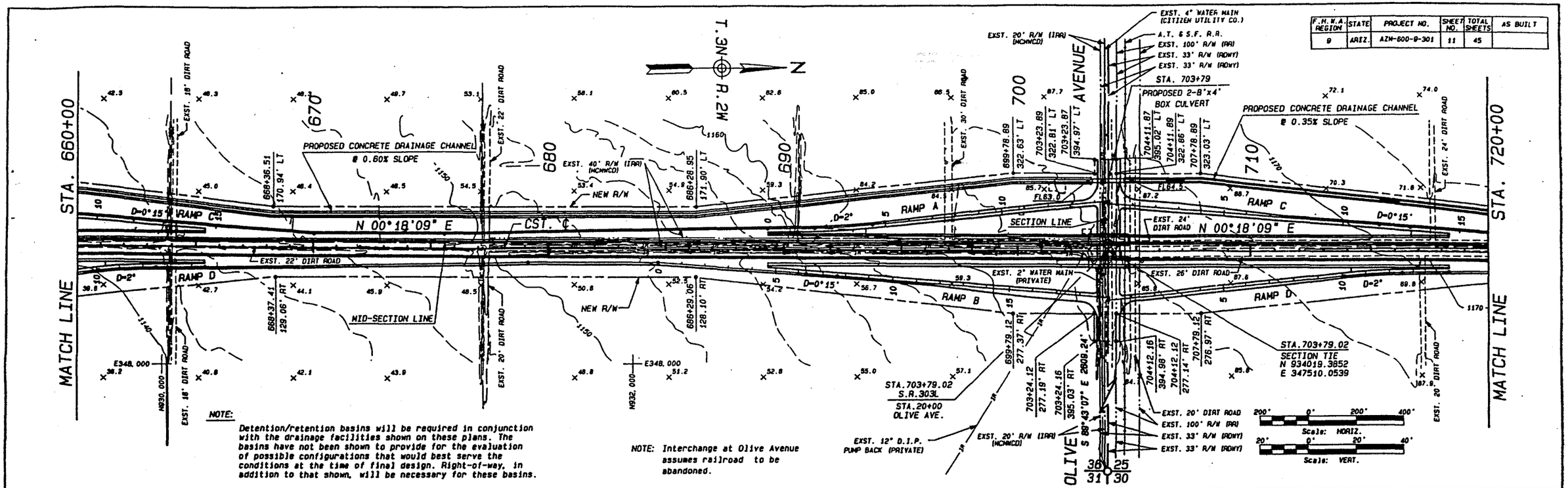
LOCATION S.R.85 TO I-17

SCHEMATIC NOT FOR CONSTRUCTION

SHEET 10 OF 45

CTN.PP.10

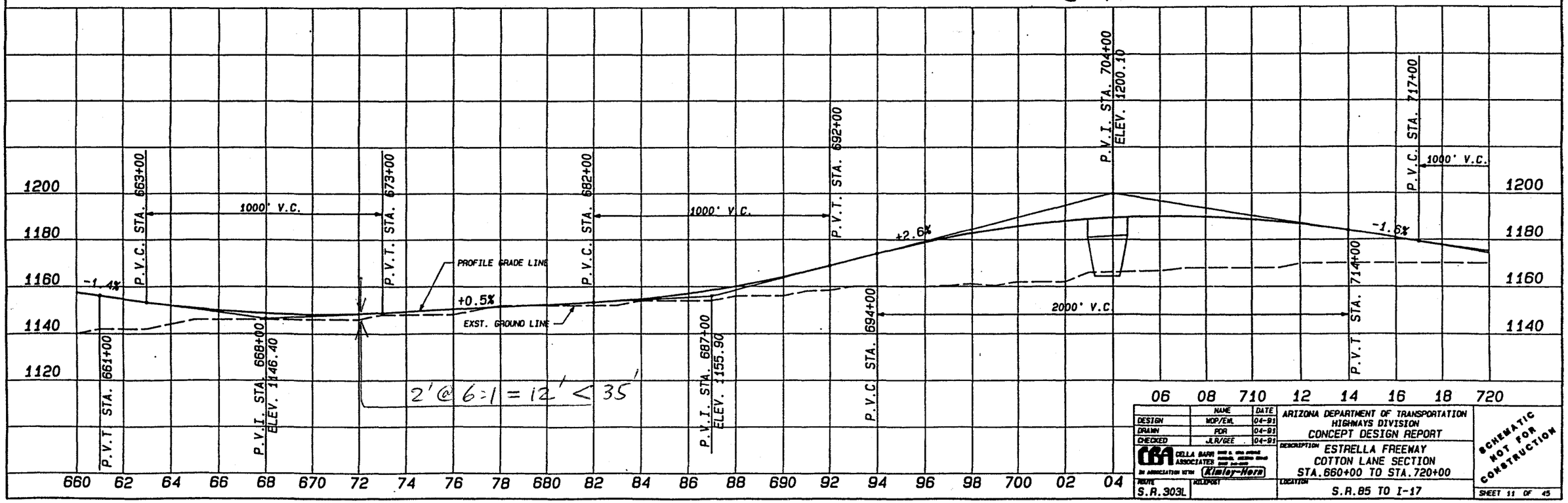
| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| 9 | ARIZ. | AZM-600-9-301 | 11 | 45 | |




NOTE:

Detention/retention basins will be required in conjunction with the drainage facilities shown on these plans. The basins have not been shown to provide for the evaluation of possible configurations that would best serve the conditions at the time of final design. Right-of-way, in addition to that shown, will be necessary for these basins.

NOTE: Interchange at Olive Avenue assumes railroad to be abandoned.




| | NAME | DATE |
|---|---|---|
| DESIGN | WOP/EML | 04-91 |
| DRAWN | PDR | 04-91 |
| CHECKED | JLR/GEE | 04-91 |

CBA CELLA BARR ASSOCIATES IN ASSOCIATION WITH Kimley-Horn

ROUTE S.R.303L

ROUTEPORT

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
CONCEPT DESIGN REPORT

DESCRIPTION ESTRELLA FREEWAY
COTTON LANE SECTION
STA.660+00 TO STA.720+00

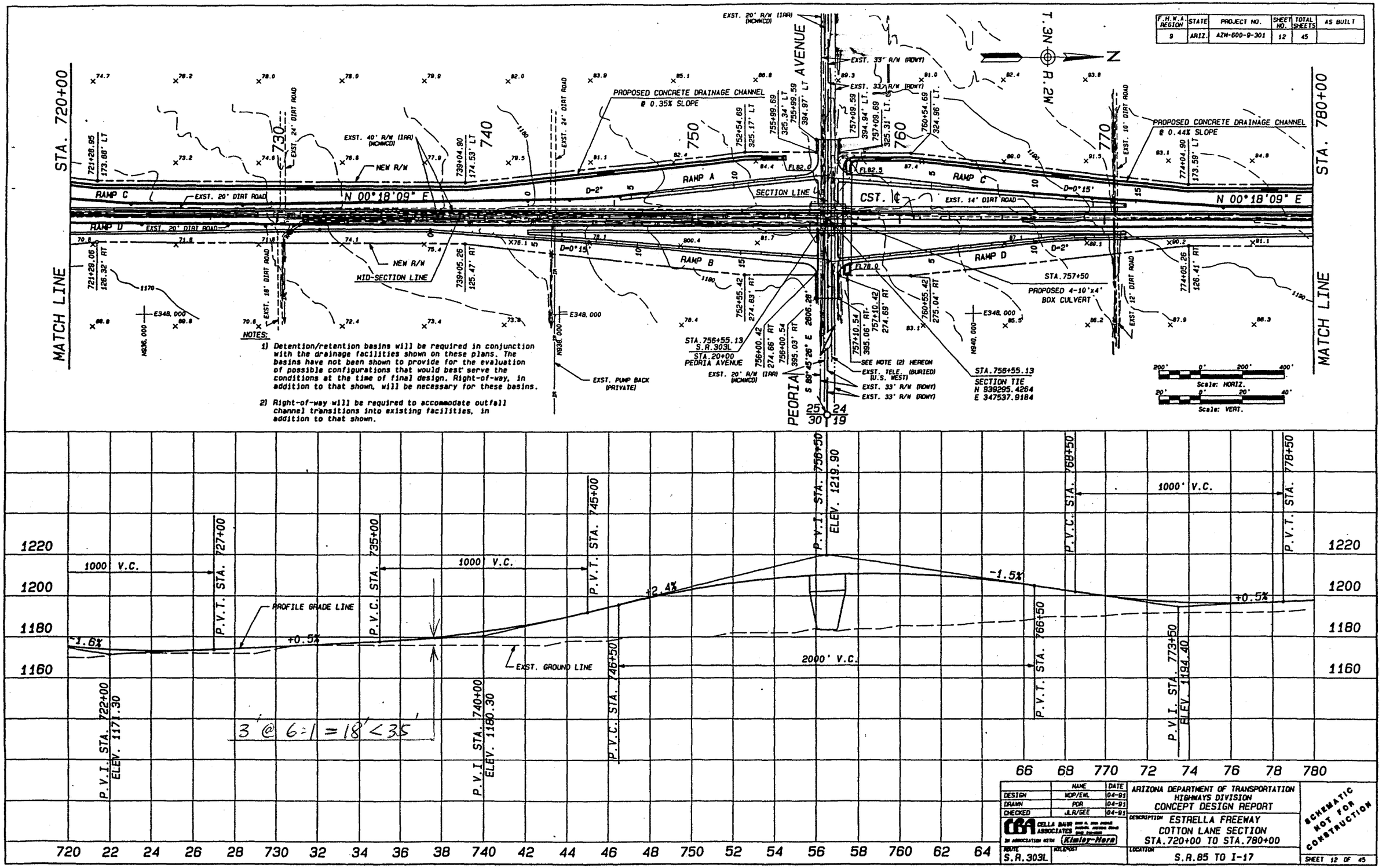
LOCATION S.R.85 TO I-17

SCHEMATIC NOT FOR CONSTRUCTION

SHEET 11 OF 45

CTN.PP.11

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| 9 | ARIZ. | AZM-600-9-301 | 12 | 45 | |

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2) Right-of-way will be required to accommodate outfall channel transitions into existing facilities, in addition to that shown.




| | NAME | DATE |
|---|---|---|
| DESIGN | MOP/EML | 04-91 |
| DRAWN | POR | 04-91 |
| CHECKED | J.R/GEE | 04-91 |

CBA CELLA BAUR ASSOCIATES
IN ASSOCIATION WITH Kimley-Horn

ROUTE S.R.303L
ROLEPOST

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
CONCEPT DESIGN REPORT

DESCRIPTION ESTRELLA FREEWAY
COTTON LANE SECTION
STA.720+00 TO STA.780+00

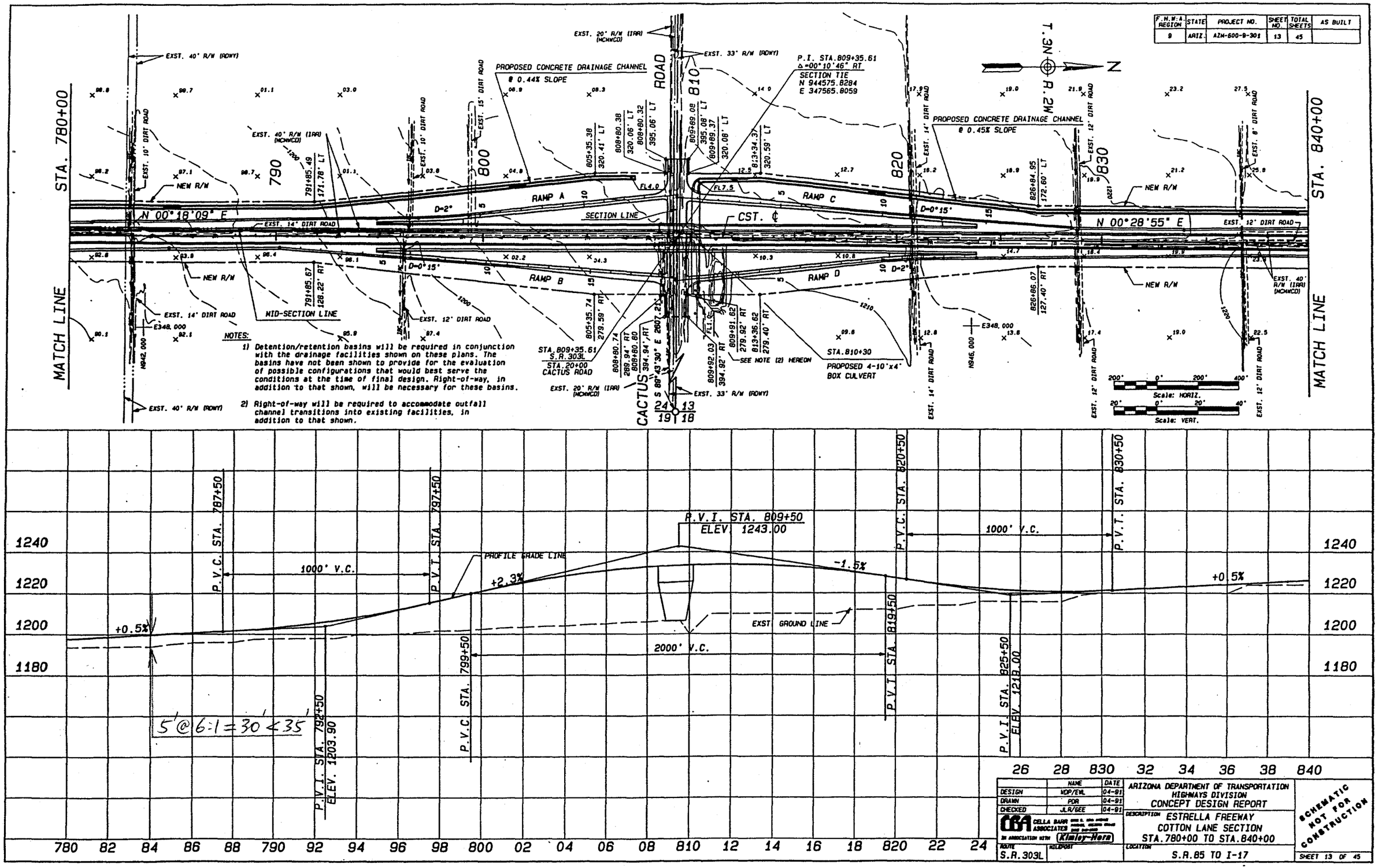
LOCATION S.R.85 TO I-17

SCHEMATIC NOT FOR CONSTRUCTION

SHEET 12 OF 45

CTN.PP.12

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| 9 | ARIZ. | ACM-600-9-301 | 13 | 45 | |




| | NAME | DATE |
|---|---|---|
| DESIGN | WDP/EWL | 04-91 |
| DRAWN | PDR | 04-91 |
| CHECKED | JLR/GEE | 04-91 |

CBA CELLA BARR ASSOCIATES IN ASSOCIATION WITH Kimley-Horn

ROUTE S.R.303L

MILEPOST

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
CONCEPT DESIGN REPORT

DESCRIPTION ESTRELLA FREEWAY
COTTON LANE SECTION
STA.780+00 TO STA.840+00

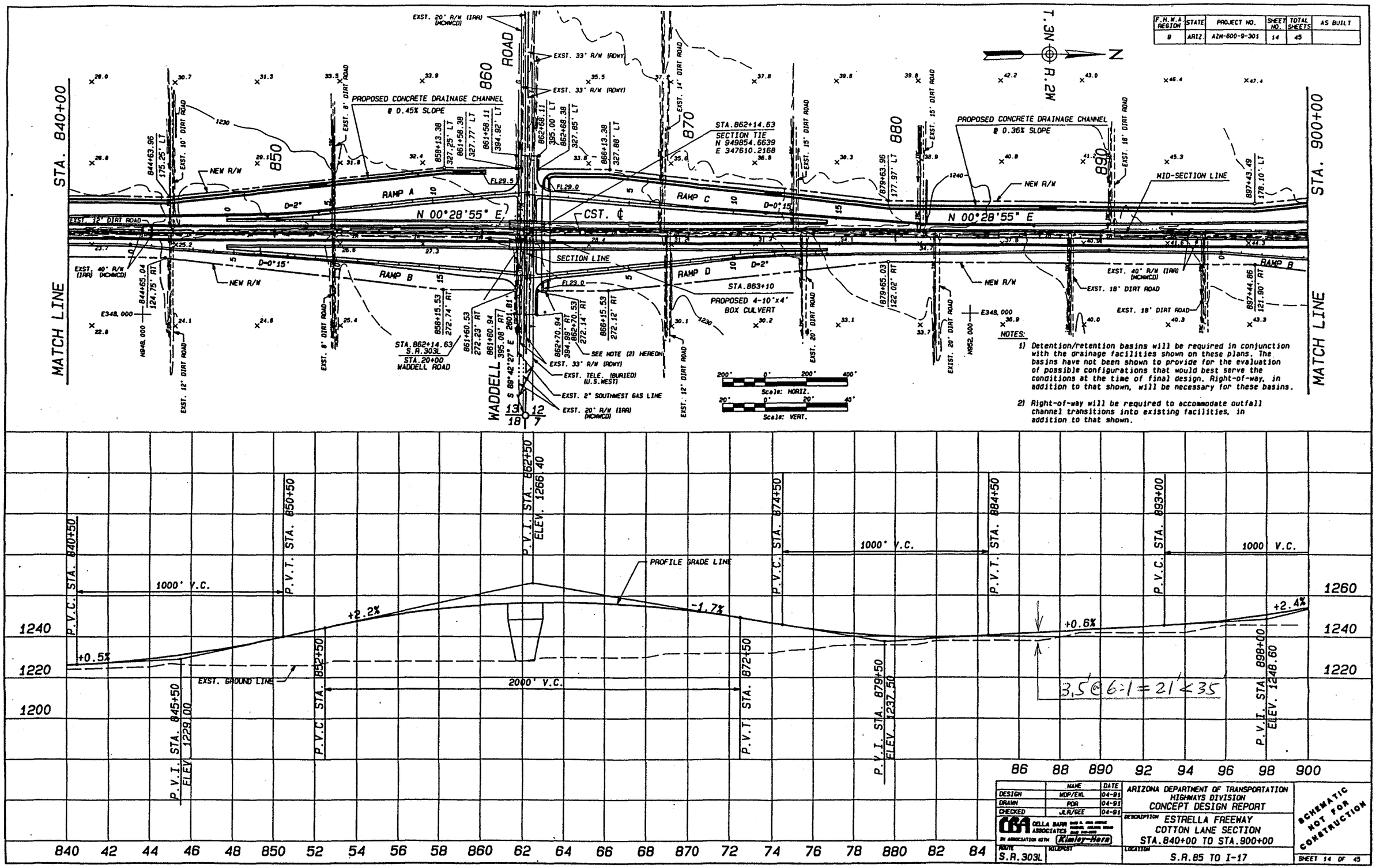
LOCATION S.R.85 TO I-17

SCHEMATIC NOT FOR CONSTRUCTION

SHEET 13 OF 45

CTN.PP.13

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| 9 | ARIZ. | A2H-600-9-301 | 14 | 45 | |




| | NAME | DATE |
|---|---|---|
| DESIGN | MDP/EWL | 04-91 |
| DRAWN | PDR | 04-91 |
| CHECKED | JLR/GEE | 04-91 |

CBA CELLA BARR ASSOCIATES IN ASSOCIATION WITH Rimler-Hora

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
CONCEPT DESIGN REPORT

DESCRIPTION ESTRELLA FREEWAY
COTTON LANE SECTION
STA.840+00 TO STA.900+00

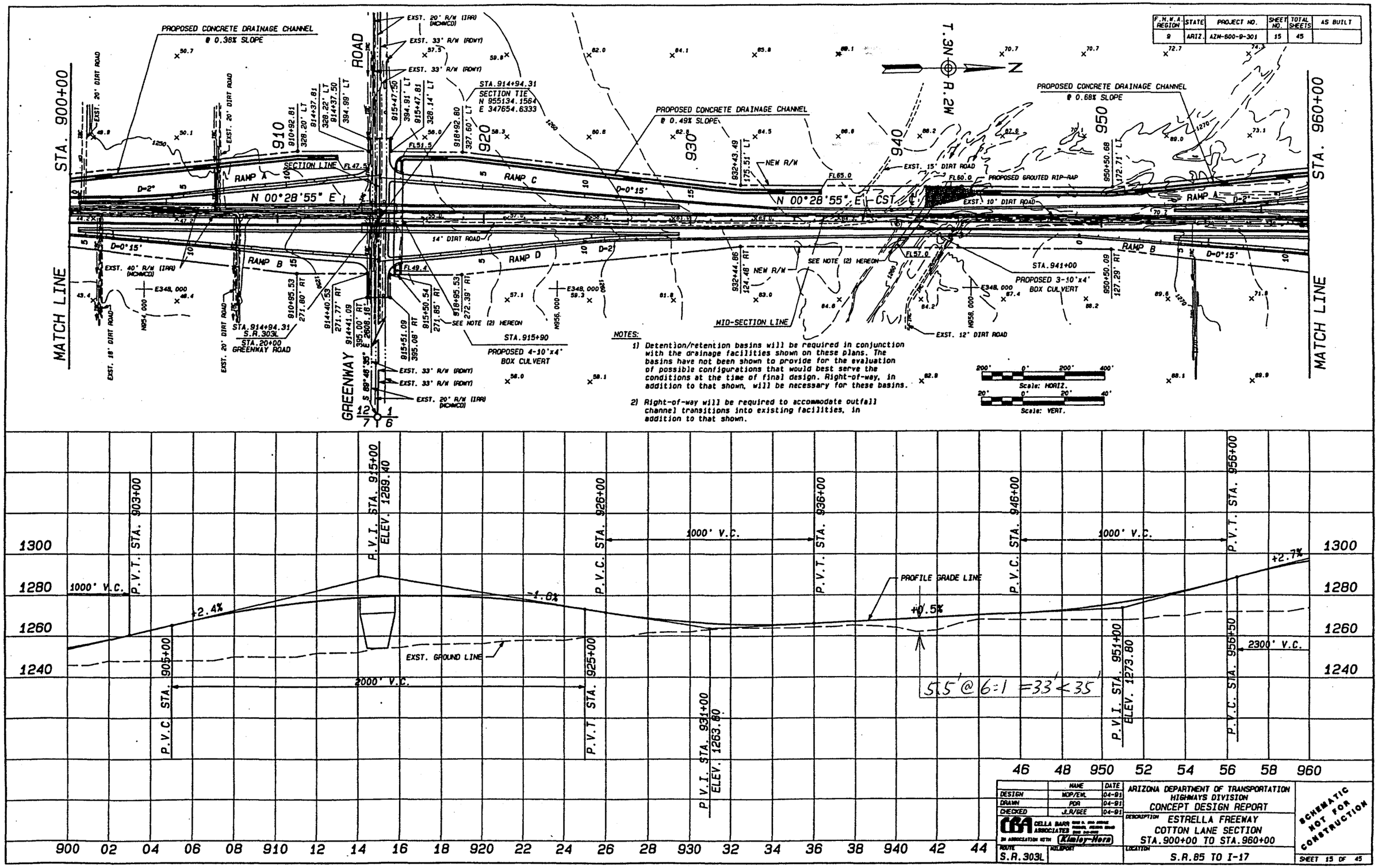
ROUTE S.R.303L
MILEPOST
LOCATION S.R.85 TO I-17

SCHEMATIC NOT FOR CONSTRUCTION

SHEET 14 OF 45

CTN.PP.14

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| 9 | ARIZ. | ACN-600-9-303 | 15 | 45 | |

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2) Right-of-way will be required to accommodate outfall channel transitions into existing facilities, in addition to that shown.




| | NAME | DATE |
|---|---|---|
| DESIGN | MOP/EWL | 04-91 |
| DRAWN | PDA | 04-91 |
| CHECKED | J.R/GEE | 04-91 |

CBA CELLA BARR ASSOCIATES IN ASSOCIATION WITH Kimley-Horn

ROUTE S.R.303L

MILEPOST

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
CONCEPT DESIGN REPORT

DESCRIPTION ESTRELLA FREEWAY
COTTON LANE SECTION
STA.900+00 TO STA.960+00

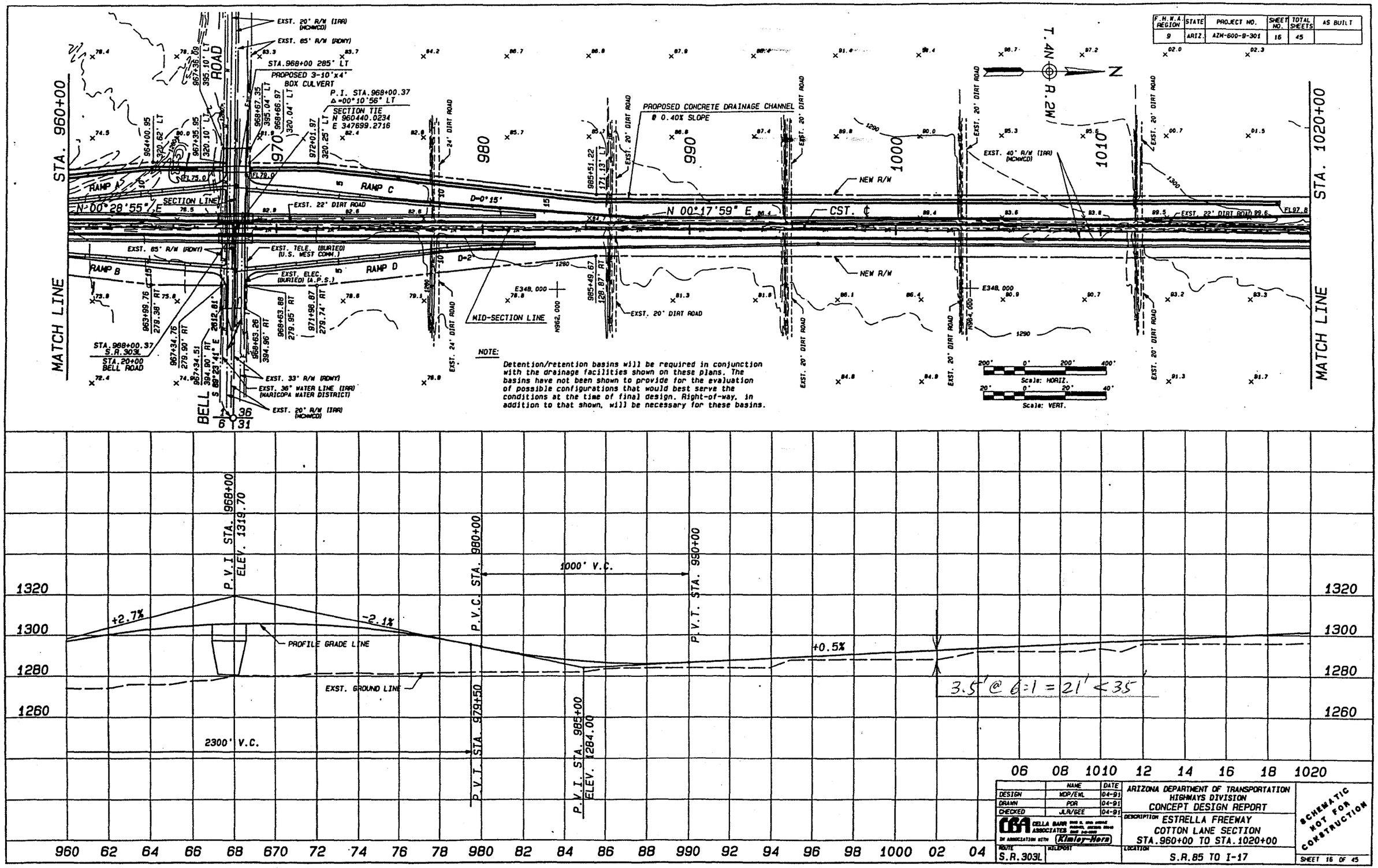
LOCATION S.R.85 TO I-17

SCHEMATIC NOT FOR CONSTRUCTION

SHEET 15 OF 45

CTN.PP.15

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| 9 | ARIZ. | AZM-600-9-301 | 16 | 45 | |




| | NAME | DATE |
|---|---|---|
| DESIGN | MDP/EML | 04-91 |
| DRAWN | POR | 04-91 |
| CHECKED | JLR/GEE | 04-91 |

CBA CELLA BARR ASSOCIATES
IN ASSOCIATION WITH Kimley-Horn

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
CONCEPT DESIGN REPORT

DESCRIPTION ESTRELLA FREEWAY
COTTON LANE SECTION
STA.960+00 TO STA.1020+00

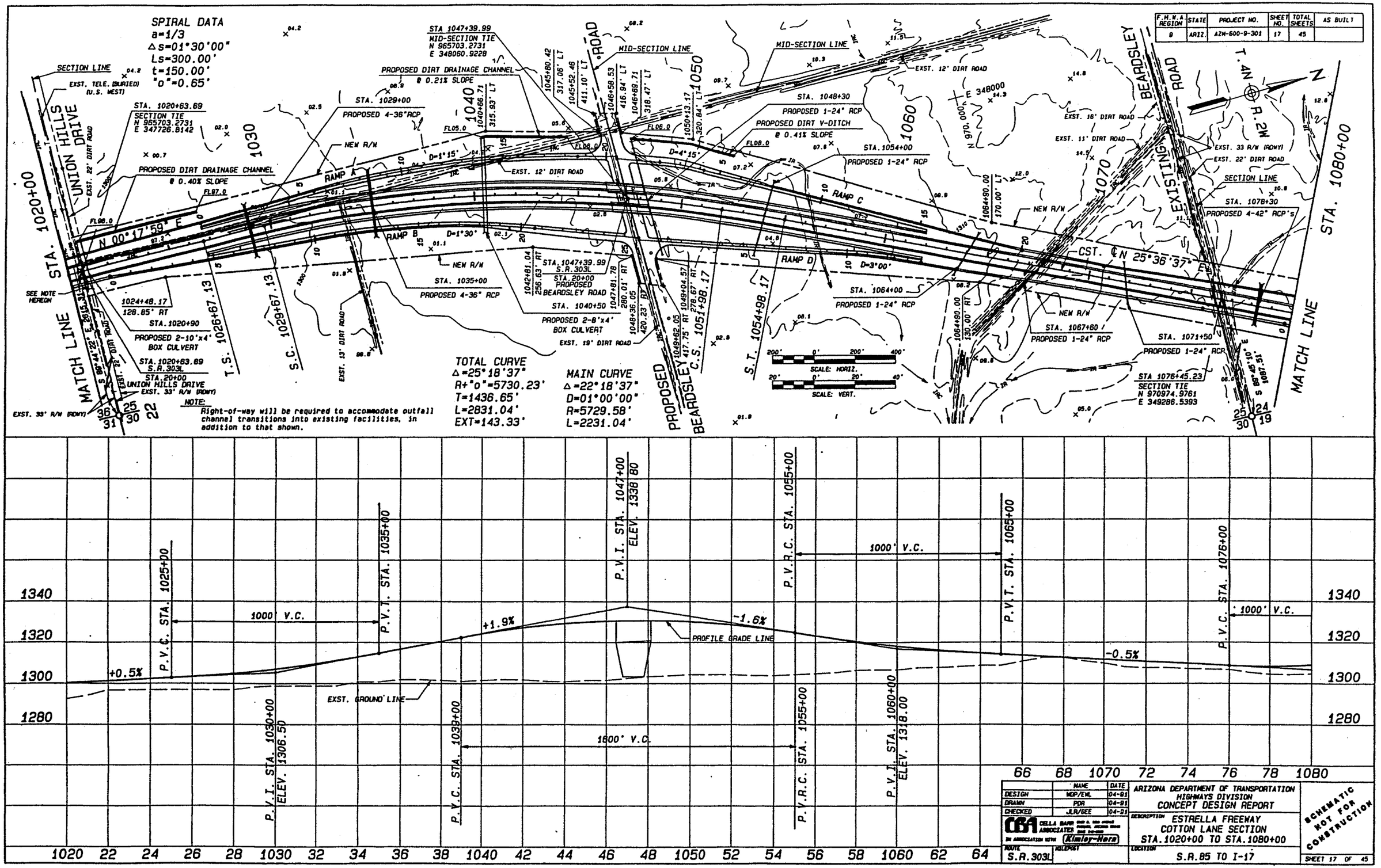
ROUTE S.R.303L
MILEPOST
LOCATION S.R.85 TO I-17

SCHEMATIC NOT FOR CONSTRUCTION

SHEET 16 OF 45

CTN.PP.16

| F.H.W.A. REGION | STATE | PROJECT NO. | SHEET NO. | TOTAL SHEETS | AS BUILT |
|---|---|---|---|---|---|
| 9 | ARIZ. | AZM-600-9-301 | 17 | 45 | |




| | NAME | DATE |
|---|---|---|
| DESIGN | MOP/EWL | 04-91 |
| DRAWN | POR | 04-91 |
| CHECKED | JLR/GEE | 04-91 |

CBA CELLA BARR ASSOCIATES
IN ASSOCIATION WITH Kimley-Horn

ROUTE S.R.303L

MILEPOST

ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
CONCEPT DESIGN REPORT

DESCRIPTION ESTRELLA FREEWAY
COTTON LANE SECTION
STA.1020+00 TO STA.1080+00

LOCATION S.R.85 TO I-17

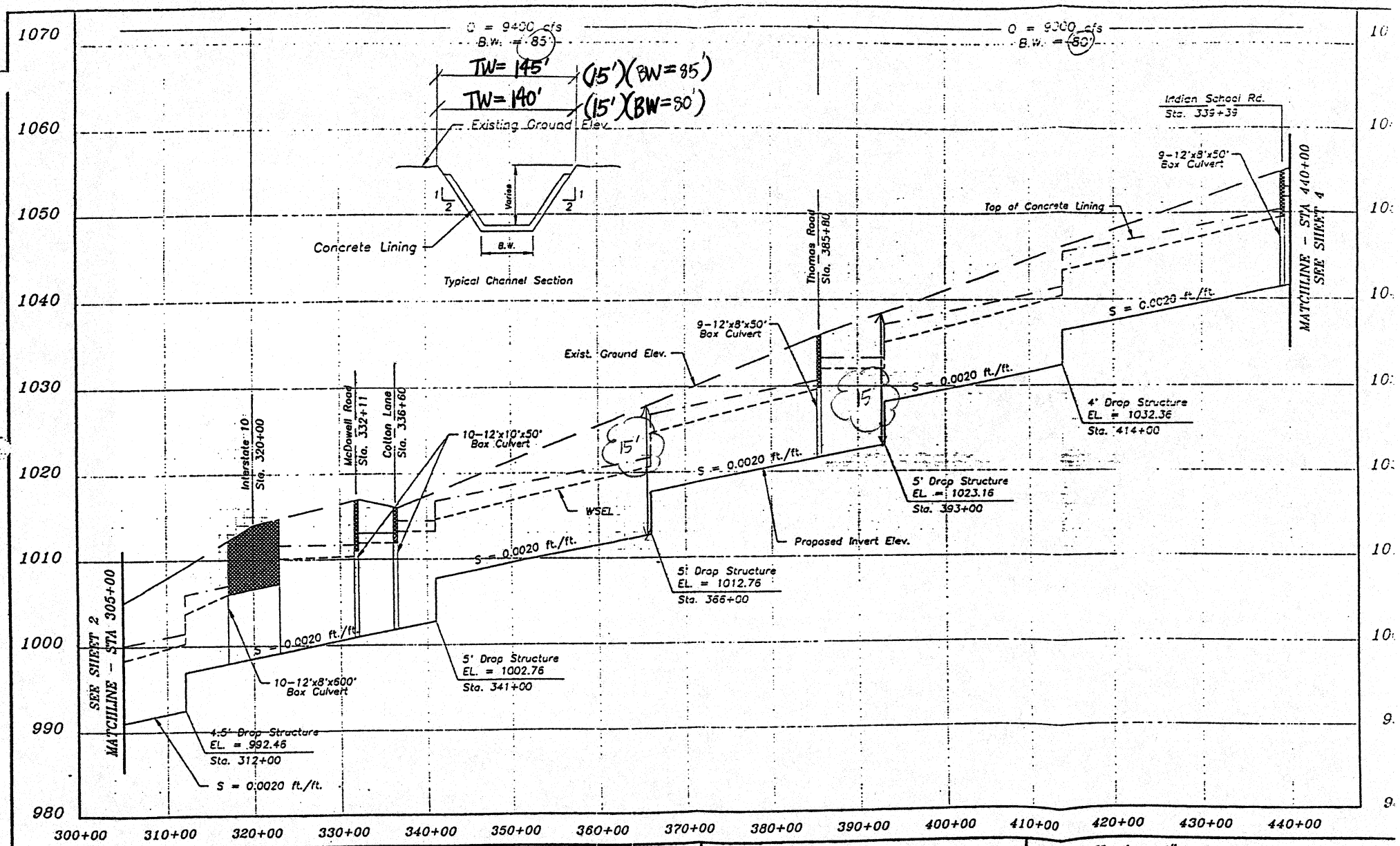
SCHEMATIC NOT FOR CONSTRUCTION

SHEET 17 OF 45

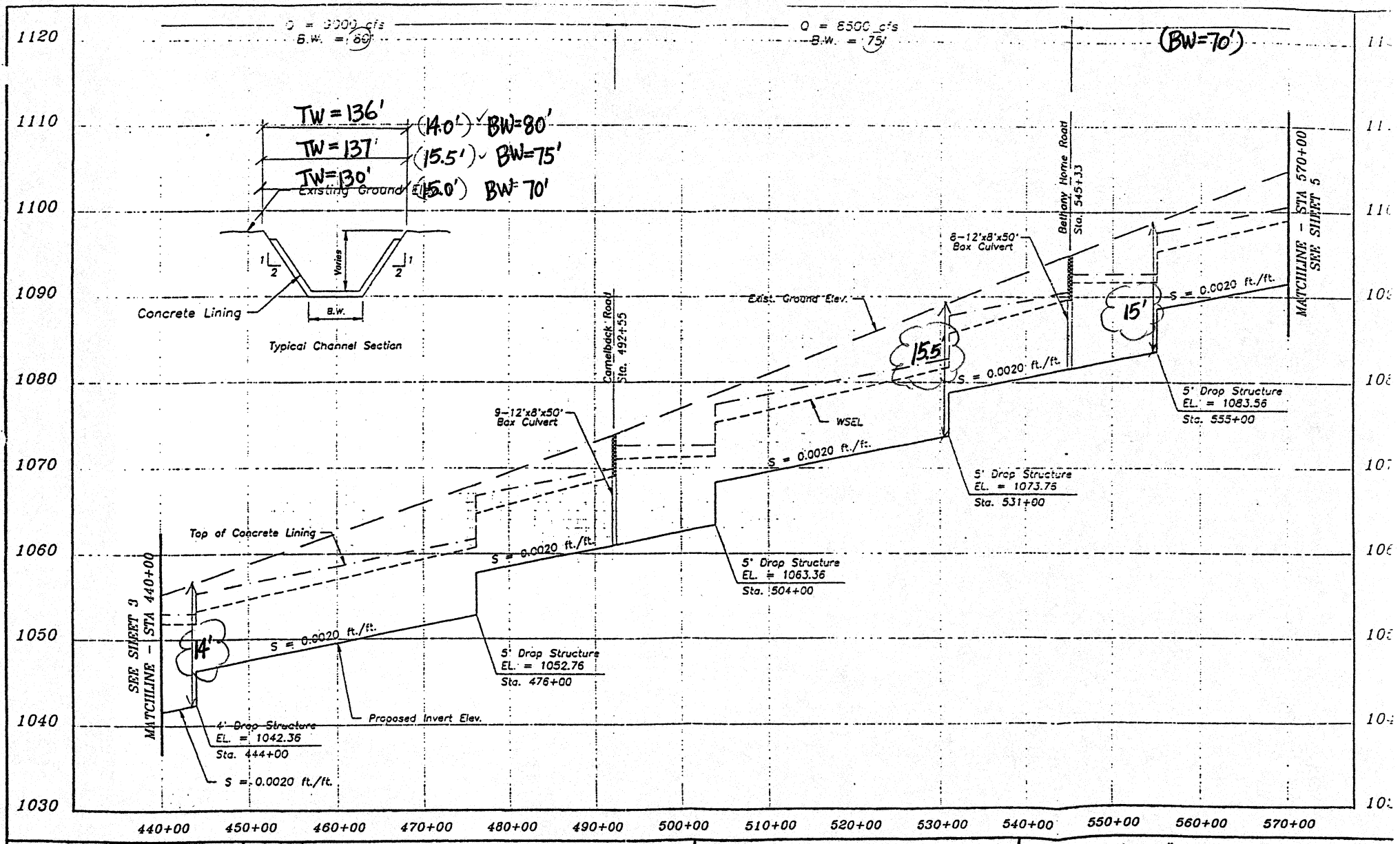
CTN.PP.17

# APPENDIX B

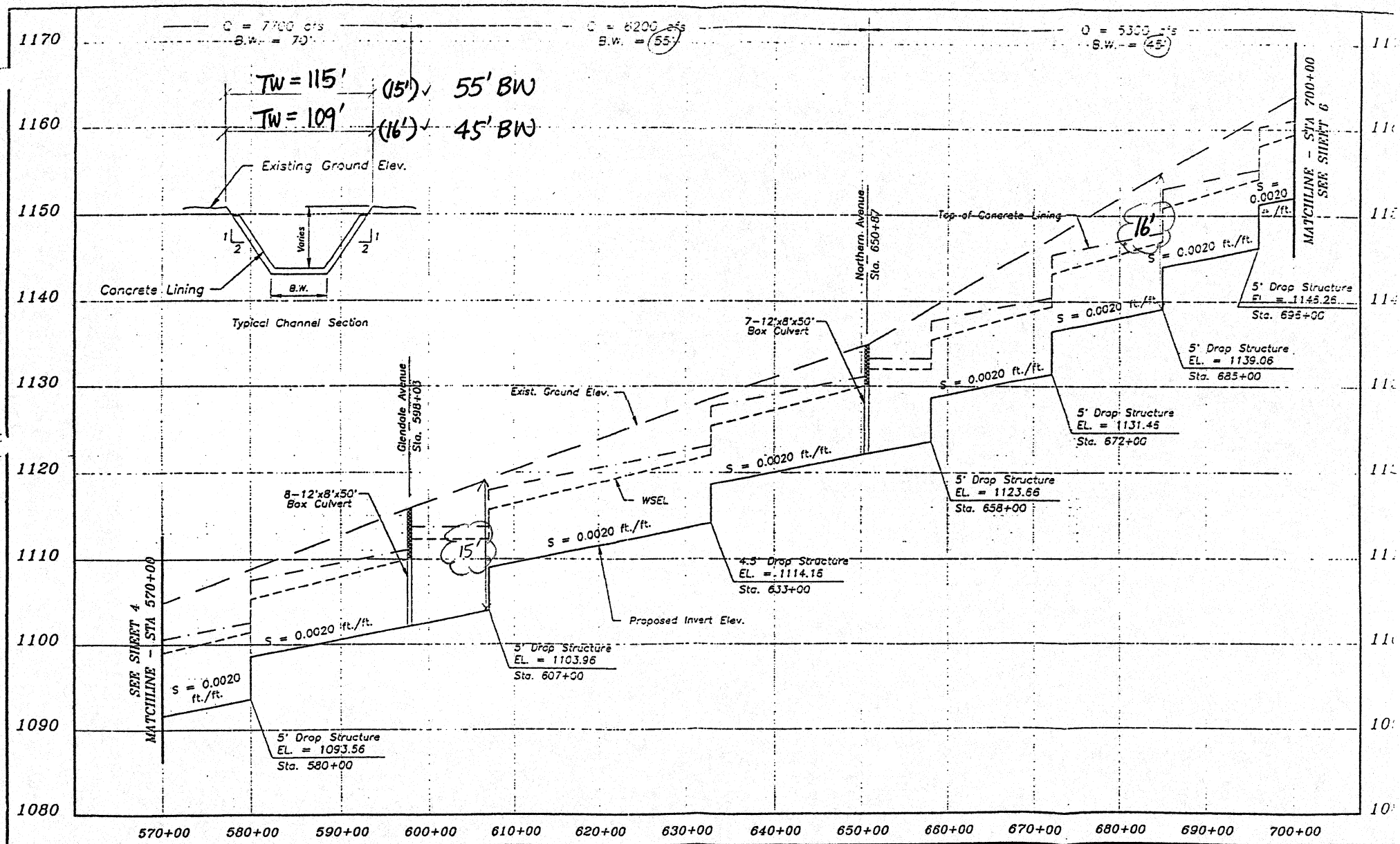
# CONCEPT DESIGN FOR ESTRELLA FREEWAY CHANNEL



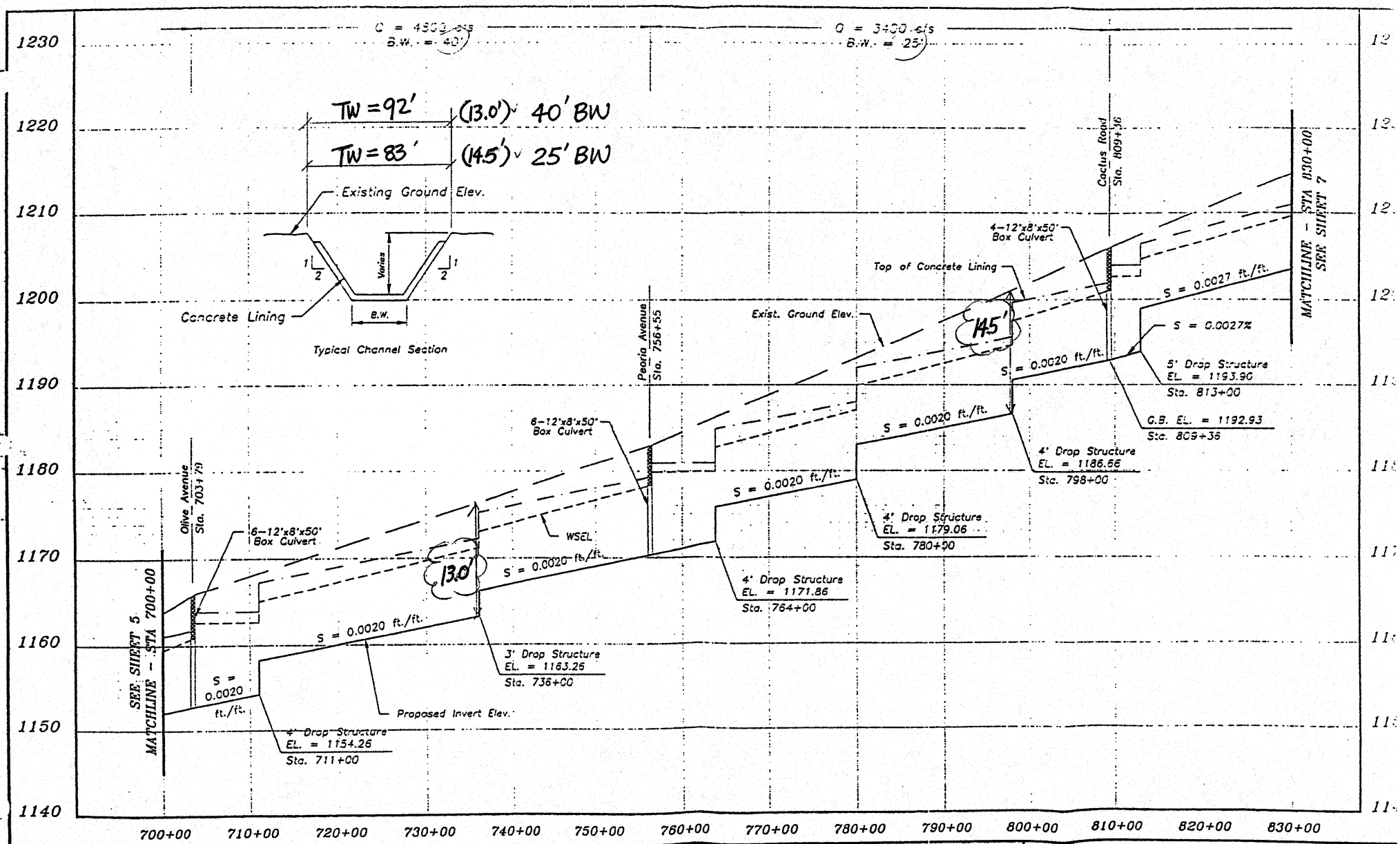

| | | | |
|---|---|---|---|
| The WLB Group **WLB** | *White Tanks / Agua Fria ADMS*<br>*Flood Control District of Maricopa County* | *Concept Design*<br>*Estrella Freeway Channel* | *Scale: Horiz.: 1"=1000'*<br>*Vert.: 1"=10'*<br>*Checked By: G.M.A.*<br>*Job No.: 289036*<br>*Date: Dec. 19*<br>*Sheet: 3 of 7* |



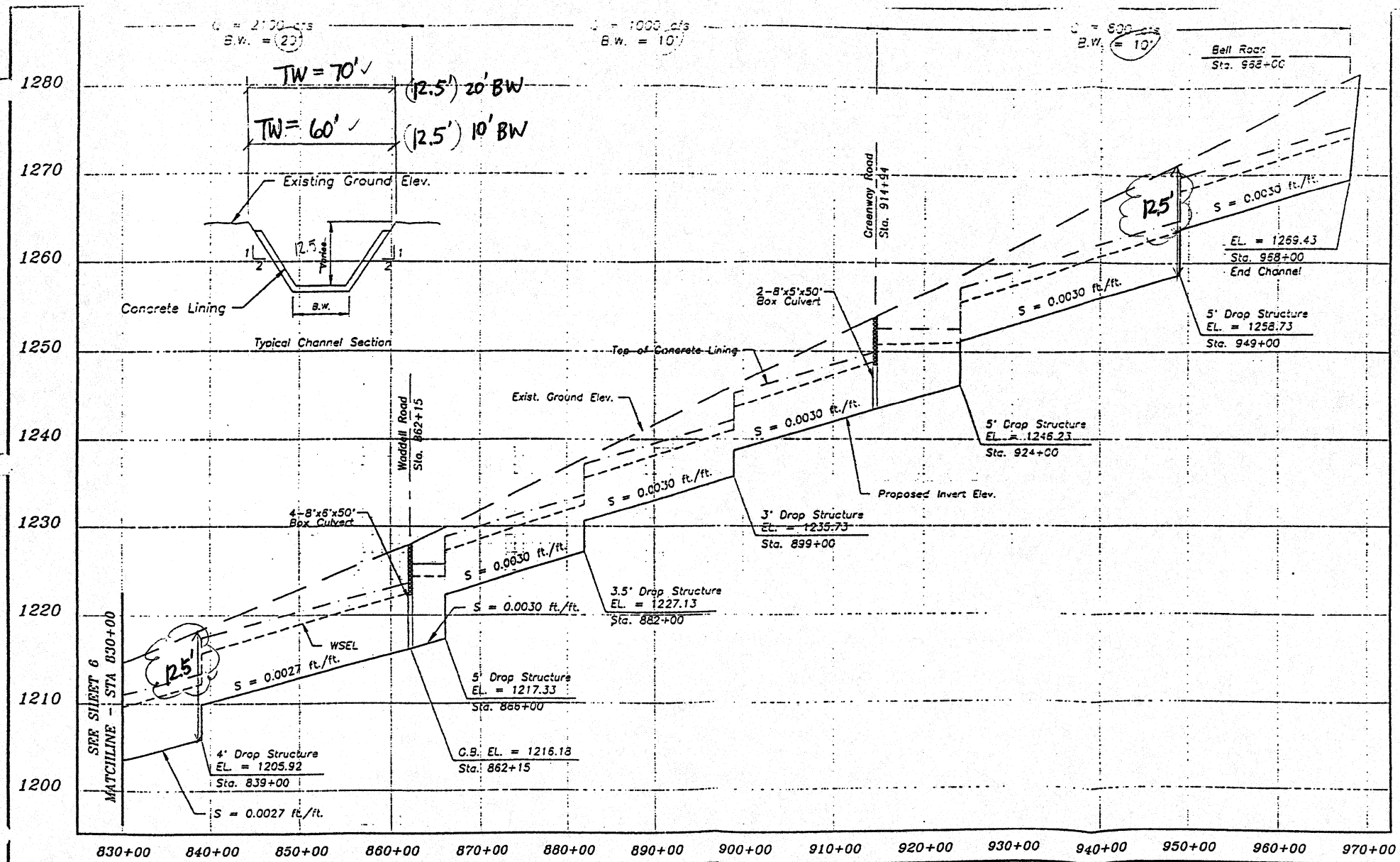

| | | | |
|---|---|---|---|
| The WLB Group **WLB** | *White Tanks / Agua Fria ADMS*<br>*Flood Control District of Maricopa County* | *Concept Design*<br>*Estrella Freeway Channel* | *Scale: Horiz.: 1"=1000'*<br>*Vert.: 1"=10'*<br>*Checked By: G.M.A.*<br>*Job No.: 289036*<br>*Date: Dec. 199*<br>*Sheet: 4 of 7* |




| | | | |
|---|---|---|---|
| The WLB Group **WLB** | *White Tanks / Agua Fria ADMS*<br>*Flood Control District of Maricopa County* | *Concept Design*<br>*Estrella Freeway Channel* | *Scale: Horiz.: 1"=1000'* *Job No.: 289036*<br>*Vert.: 1"=10'* *Date: Dec. 19*<br>*Checked By: G.M.A.* *Sheet: 5 of 7* |




| | | | |
|---|---|---|---|
| The WLB Group **WLB** | *White Tanks / Agua Fria ADMS*<br>*Flood Control District of Maricopa County* | *Concept Design*<br>*Estrella Freeway Channel* | *Scale: Horiz.: 1"=1000'*<br>*Vert.: 1"=10'*<br>*Checked By: G.M.A.*<br>*Job No.: 289036*<br>*Date: Dec. 19*<br>*Sheet: 6 of 7* |



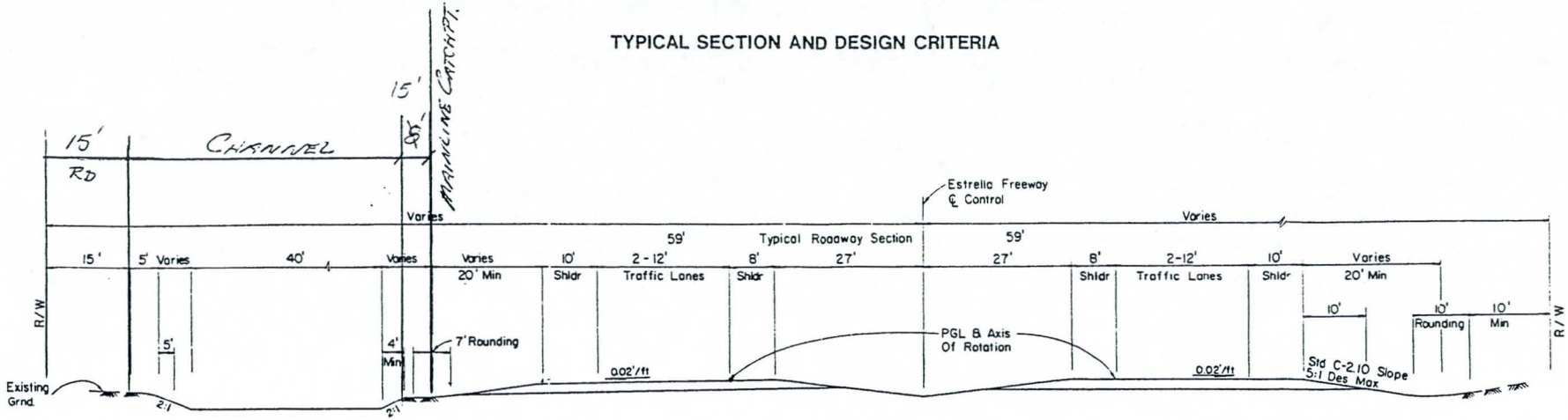

| | | | |
|---|---|---|---|
| The WLB Group **WLB** | *White Tanks / Agua Fria ADMS*<br>*Flood Control District of Maricopa County* | *Concept Design*<br>*Estrella Freeway Channel* | *Scale: Horiz.: 1"=1000'* *Job No.: 289036*<br>*Vert.: 1"=10'* *Date: Dec. 199*<br>*Checked By: G.M.A.* *Sheet: 7 of 7* |

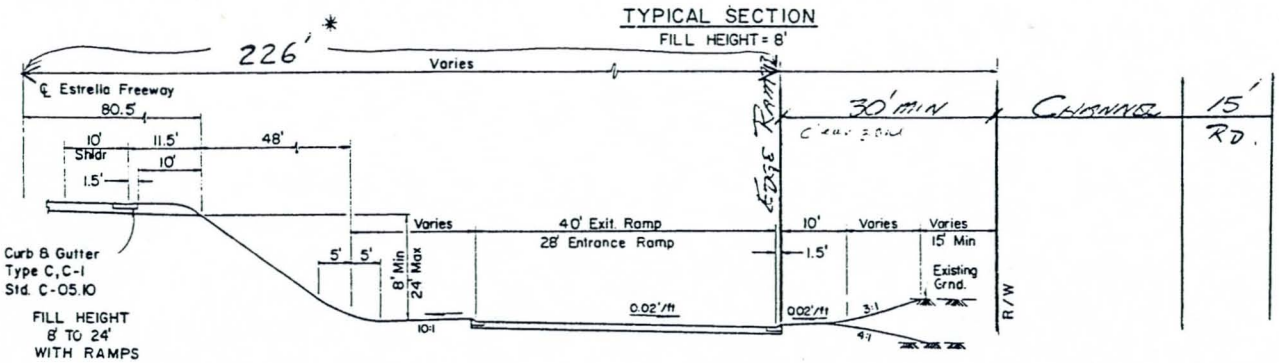
# APPENDIX C

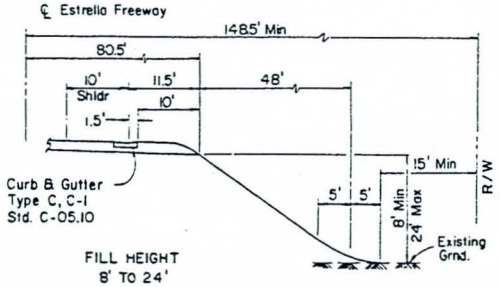
# ADOT SECTIONS AND DETAILS

# ESTRELLA FREEWAY

## TYPICAL SECTION AND DESIGN CRITERIA




* Per MCDOT Letter of Transmittal dated 1/23/97

| | |
|---|---|
| DESIGN YEAR: | 2015 |
| DESIGN SPEED: | 65 MPH-MAINLINE<br>50 MPH-RAMPS<br>CROSSROADS |
| LANE WIDTH: | 12 FEET |
| SHOULDER WIDTH: | MEDIAN-8 FEET<br>OUTSIDE-10 FEET |
| MEDIAN WIDTH: | 70 FEET (INCLUDING MEDIAN SHOLDER) |
| MAXIMUM GRADIENT: | 3% MAINLINE<br>4% CROSSROADS<br>5% RAMPS |

| | |
|---|---|
| NUMBER OF LANES: | 4 |
| HORIZONTAL CURVATURE: | 3° 30' MAINLANE (MAX.)<br>9° RAMPS (MAX.)<br>CROSSROADS |
| RIGHT OF WAY WIDTH: | 300 FEET (MIN.) |
| ACCESS CONTROL: | FULL |
| VERTICAL CLEARANCES: | 6'-6" STANDARD<br>23'-0" OVER A.T.&S.F. RR |

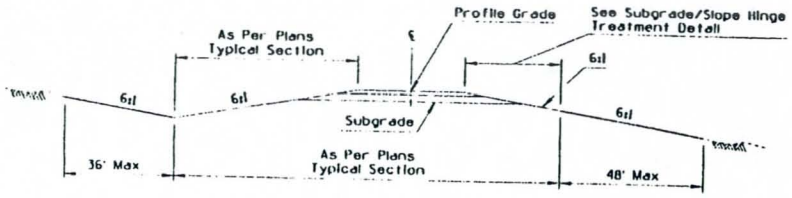
C 2.10 SIDESLOPE
C 8.10-.20 GORE

DRAINAGE: PAVEMENT: 10 YEAR
DEPRESSED AREA: 50 YEAR
CROSS-DRAINAGE: 50 YEAR

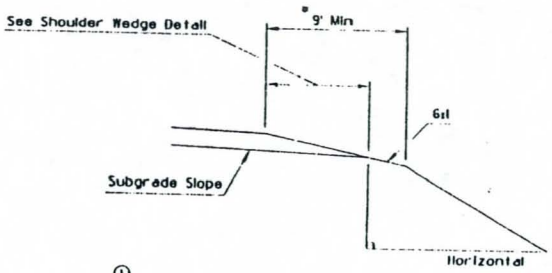
NOTES:

1. ALL COORDINATES SHOWN ARE MODIFIED GRID.
2. THE DRAINAGE DESIGN FOR THIS PROJECT PROVIDES FOR A BOX CULVERT MINIMUM HEIGHT OF 4'-0". THIS MINIMUM HEIGHT SHOULD BE EVALUATED DURING FINAL DESIGN TO ACCOMODATE CURRENT MAINTENANCE AND OTHER REQUIREMENTS.

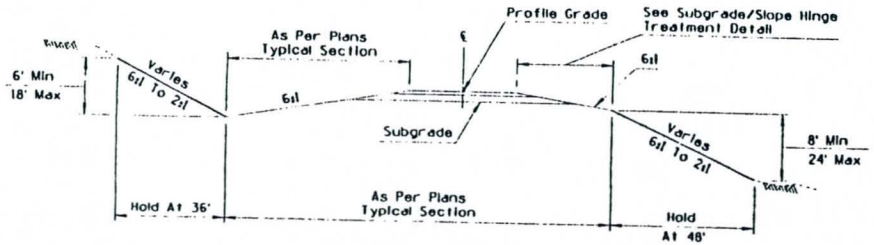
**FIGURE 2**



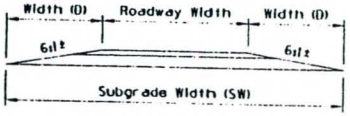

MINIMUM SLOPES




① SUBGRADE/SLOPE HINGE TREATMENT DETAIL

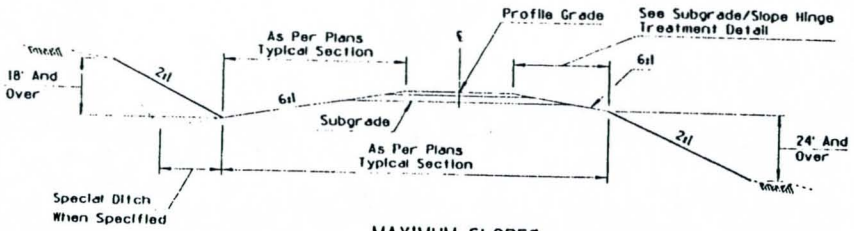



INTERMEDIATE SLOPES

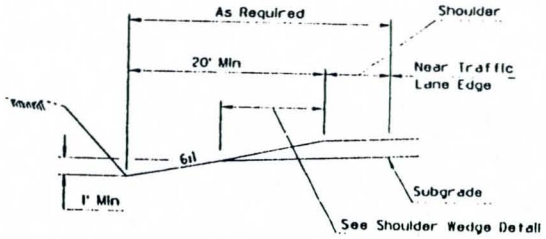



D = Str Sec Depth (ft) x Slope (6:1)
SW = 2 x D + Roadway Width

② SHOULDER WEDGE DETAIL




MAXIMUM SLOPES



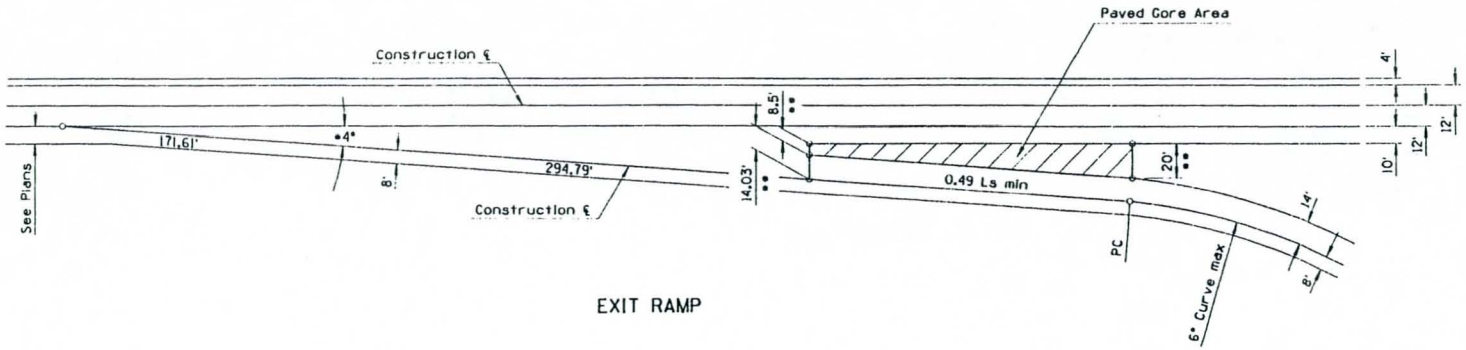

MINIMUM DITCH CONDITIONS

## GENERAL NOTES

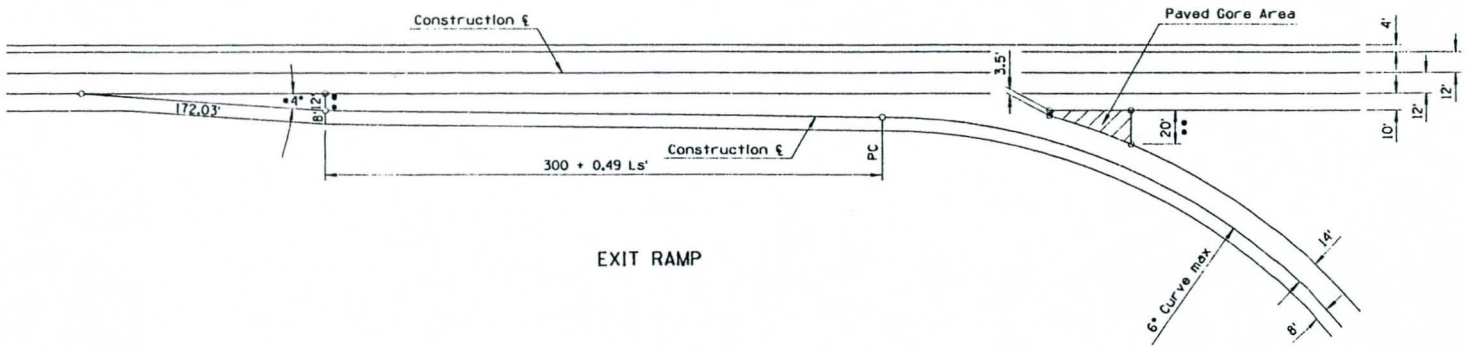
1. Roadway width, cut ditch width, cross slope, and pavement structure section will be shown on project plans.
2. For cuts up to 6', use 5' semi-tangents for slope rounding. For each additional foot of cut add 1' to semi-tangent to 11' maximum.
3. Design highwater should not be located above the subgrade in unpaved ditch.
4. ③ Pavement structure slope is nominal. Actual slope is controlled by (D). See Shoulder Wedge Detail.
5. Slopes beyond the pavement structure, such as embankment and cut slopes, are relative to horizontal.
6. For slope controls within interchange areas, see project plans.
7. When median slopes intersect, see project plans for controls.
8. ③ These slopes are intended to be used with new or reconstructed roadways.

③ • The 9' min is required when guard rail is utilized on the project. Treatment shall be uniform throughout the project length. The 9' requirement may be waived with concurrence from Highway Plans Services under special conditions where guard rail is not utilized. The 9' min shall not be waived when the thickness of structure section has not been finalized.

| | | |
|---|---|---|
| DESIGN APPROVED: Jerry W. Hale<br>APPROVED FOR DISTRIBUTION: Eugene F. Moore | STATE OF ARIZONA<br>DEPARTMENT OF TRANSPORTATION<br>DIVISION OF HIGHWAYS<br>STANDARD DRAWINGS | REV. 1/91 |
| | SLOPES<br>INTERSTATE | DRAWING NO. C-02.10 |




EXIT RAMP



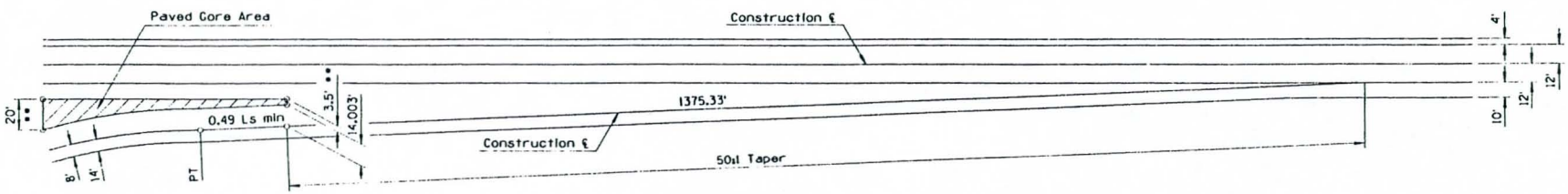

EXIT RAMP

## GENERAL NOTES

1. For paved gore area details, see Std C-08.20.
2. Parallel deceleration is to be used only under special conditions necessitating ramp curvature ahead of nose.
3. The 50:1 taper and corresponding offsets shall also apply when the main roadway has curvature or combined tangent and curvature.

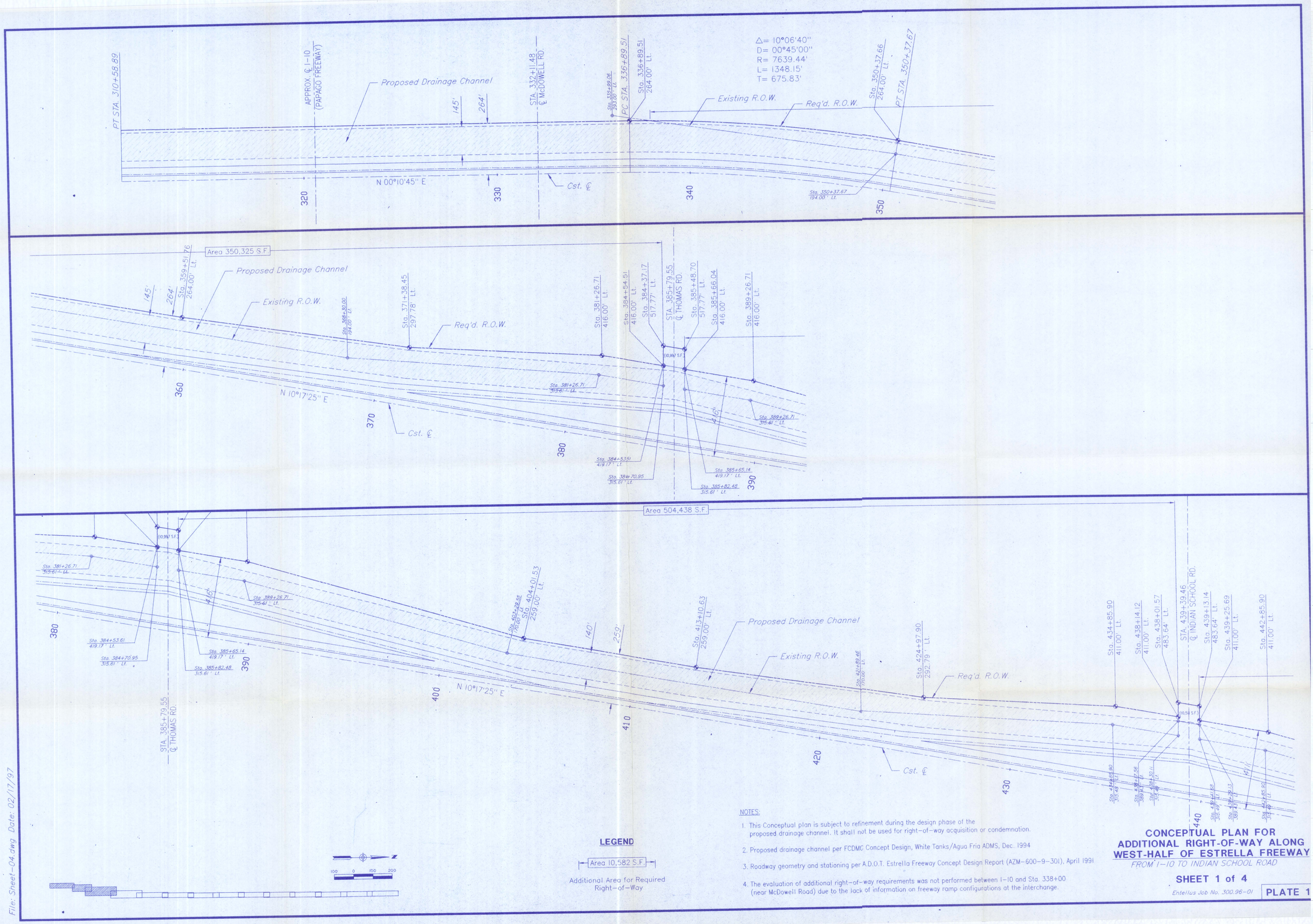
• Normal to ramp.

•• Distance normal to main roadway construction centerline.




ENTRANCE RAMP

| | | |
|---|---|---|
| DESIGN APPROVED George R. Hale | STATE OF ARIZONA<br>DEPARTMENT OF TRANSPORTATION<br>DIVISION OF HIGHWAYS<br>STANDARD DRAWINGS | REV. 8/89 |
| APPROVED FOR DISTRIBUTION | RAMP GEOMETRICS | DRAWING NO. C-08.10 |




**LEGEND**

Area 10,582 S.F.

Additional Area for Required Right-of-Way

NOTES:

1. This Conceptual plan is subject to refinement during the design phase of the proposed drainage channel. It shall not be used for right-of-way acquisition or condemnation.
2. Proposed drainage channel per FCDMC Concept Design, White Tanks/Agua Fria ADMS, Dec. 1994
3. Roadway geometry and stationing per A.D.O.T. Estrella Freeway Concept Design Report (AZM-600-9-301), April 1991
4. The evaluation of additional right-of-way requirements was not performed between I-10 and Sta. 338+00 (near McDowell Road) due to the lack of information on freeway ramp configurations at the interchange.

# CONCEPTUAL PLAN FOR ADDITIONAL RIGHT-OF-WAY ALONG WEST-HALF OF ESTRELLA FREEWAY

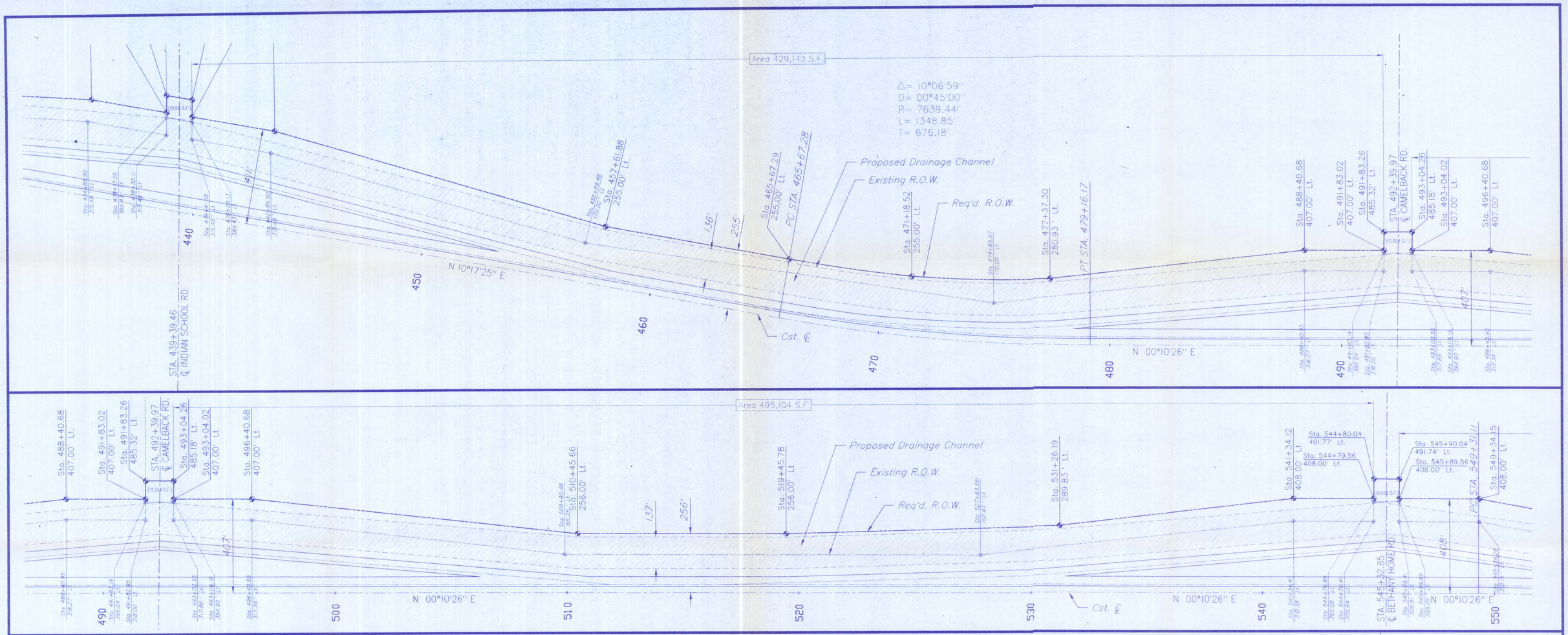
FROM I-10 TO INDIAN SCHOOL ROAD

**SHEET 1 of 4**

Entellus Job No. 300.96-01

**PLATE 1**

File: Sheet-04.dwg Date: 02/17/97




File: Sheet-03.dwg Date: 02/17/97

**LEGEND**

Area 10,582 S.F.

Additional Area for Required Right-of-Way

NOTES:

1. This Conceptual plan is subject to refinement during the design phase of the proposed drainage channel. It shall not be used for right-of-way acquisition or condemnation.
2. Proposed drainage channel per FCDMC Concept Design, White Tanks/Agua Fria ADMS, Dec. 1994
3. Roadway geometry and stationing per A.D.O.T. Estrella Freeway Concept Design Report (AZM-600-9-301), April 1991

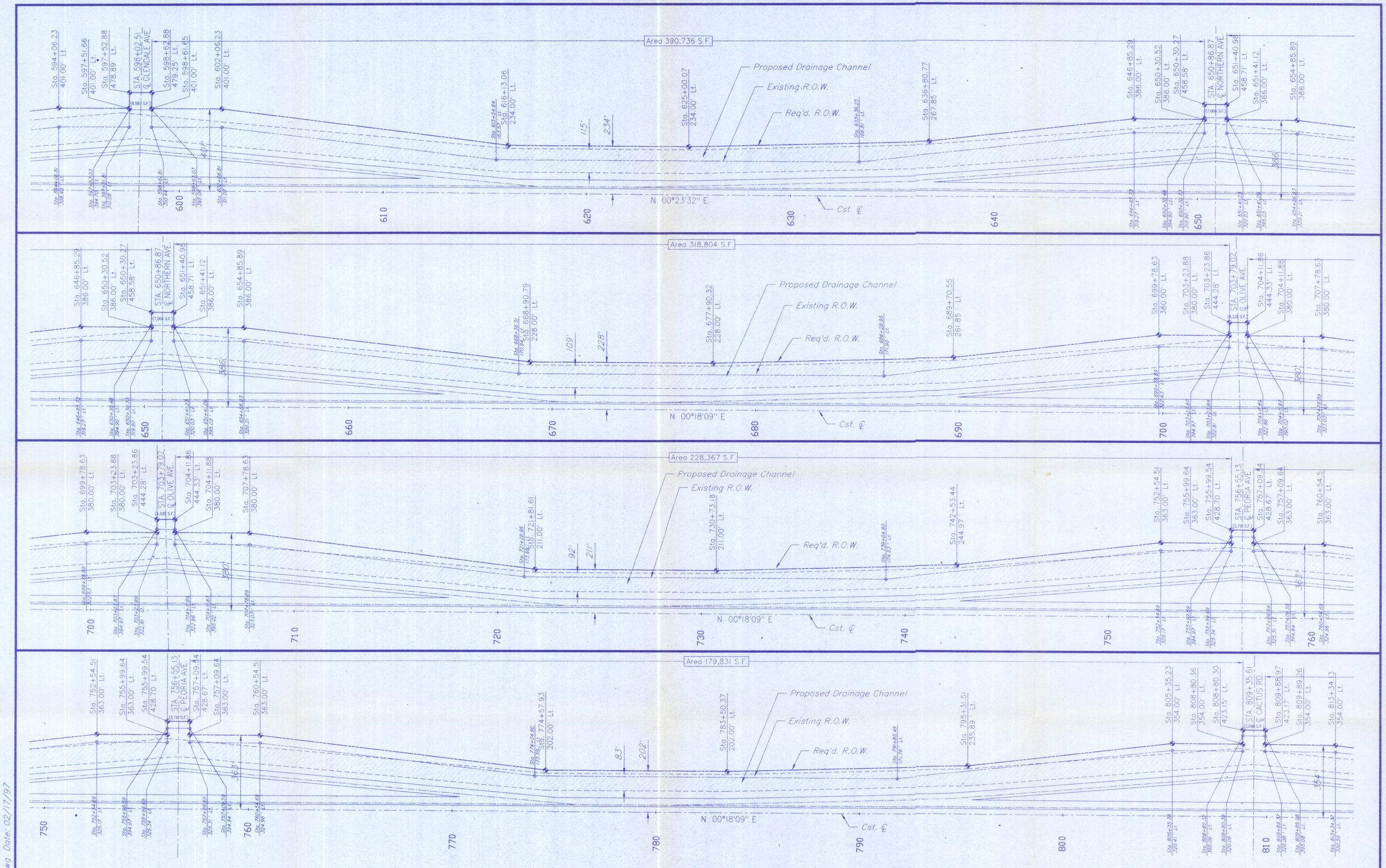
**CONCEPTUAL PLAN FOR ADDITIONAL RIGHT-OF-WAY ALONG WEST-HALF OF ESTRELLA FREEWAY**

*FROM INDIAN SCHOOL ROAD TO GLENDALE AVENUE*

**SHEET 2 of 4**

*Entellus Job No. 300.96-01*

**PLATE 1**




**LEGEND**

Area 10,582 S.F.

Additional Area for Required Right-of-Way

NOTES:

1. This Conceptual plan is subject to refinement during the design phase of the proposed drainage channel. It shall not be used for right-of-way acquisition or condemnation.
2. Proposed drainage channel per FCDMC Concept Design, White Tanks/Agua Fria ADMS, Dec. 1994
3. Roadway geometry and stationing per A.D.O.T. Estrella Freeway Concept Design Report (AZM-600-9-301), April 1991

# CONCEPTUAL PLAN FOR ADDITIONAL RIGHT-OF-WAY ALONG WEST-HALF OF ESTRELLA FREEWAY

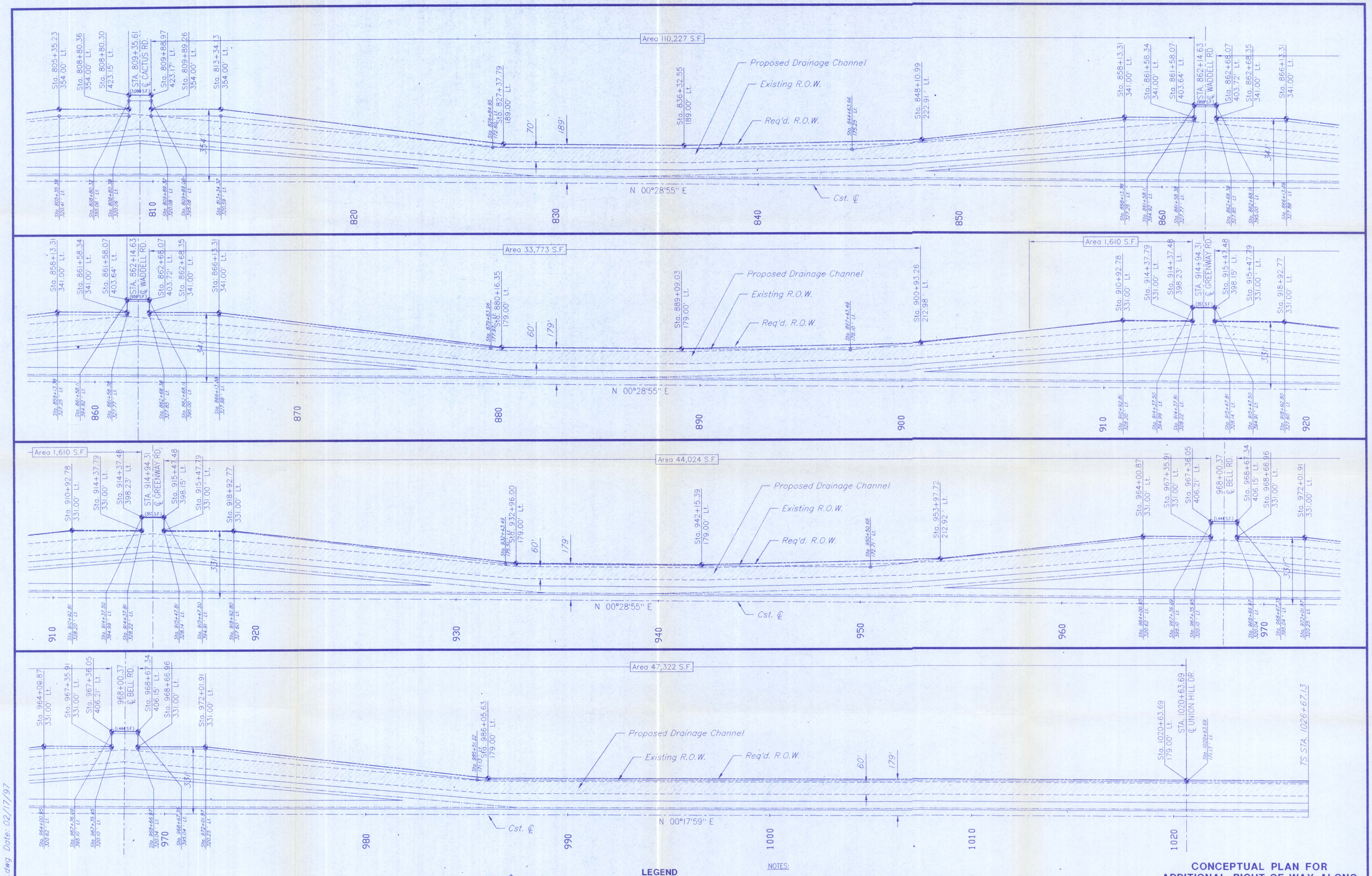
*FROM GLENDALE AVENUE TO CACTUS ROAD*

**SHEET 3 of 4**

*Entellus Job No. 300.96-01*

**PLATE 1**

File: Sheet-02.dwg Date: 02/17/97




**LEGEND**

Area 10,582 S.F.

Additional Area for Required Right-of-Way

NOTES:

1. This Conceptual plan is subject to refinement during the design phase of the proposed drainage channel. It shall not be used for right-of-way acquisition or condemnation.
2. Proposed drainage channel per FCDMC Concept Design, White Tanks/Agua Fria ADMS, Dec. 1994
3. Roadway geometry and stationing per A.D.O.T. Estrella Freeway Concept Design Report (AZM-600-9-301), April 1991

# CONCEPTUAL PLAN FOR ADDITIONAL RIGHT-OF-WAY ALONG WEST-HALF OF ESTRELLA FREEWAY

*FROM CACTUS ROAD TO UNION HILLS DRIVE*

**SHEET 4 of 4**

*Entellus Job No. 300.96-01*

**PLATE 1**

File: Sheet-01.dwg Date: 02/17/97