

RED MOUNTAIN FREEWAY

Lindsay Road to Baseline Road

DESIGN CONCEPT REPORT

OCTOBER 1988

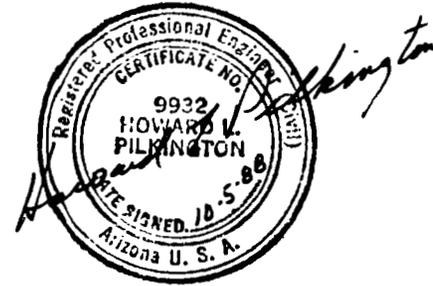


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BRINCKERHOFF**

**RED MOUNTAIN FREEWAY
LINDSAY ROAD TO BASELINE ROAD
DESIGN CONCEPT REPORT**

October 1988



Prepared for

**ARIZONA DEPARTMENT OF TRANSPORTATION
HIGHWAY DIVISION**

Prepared by

PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC.

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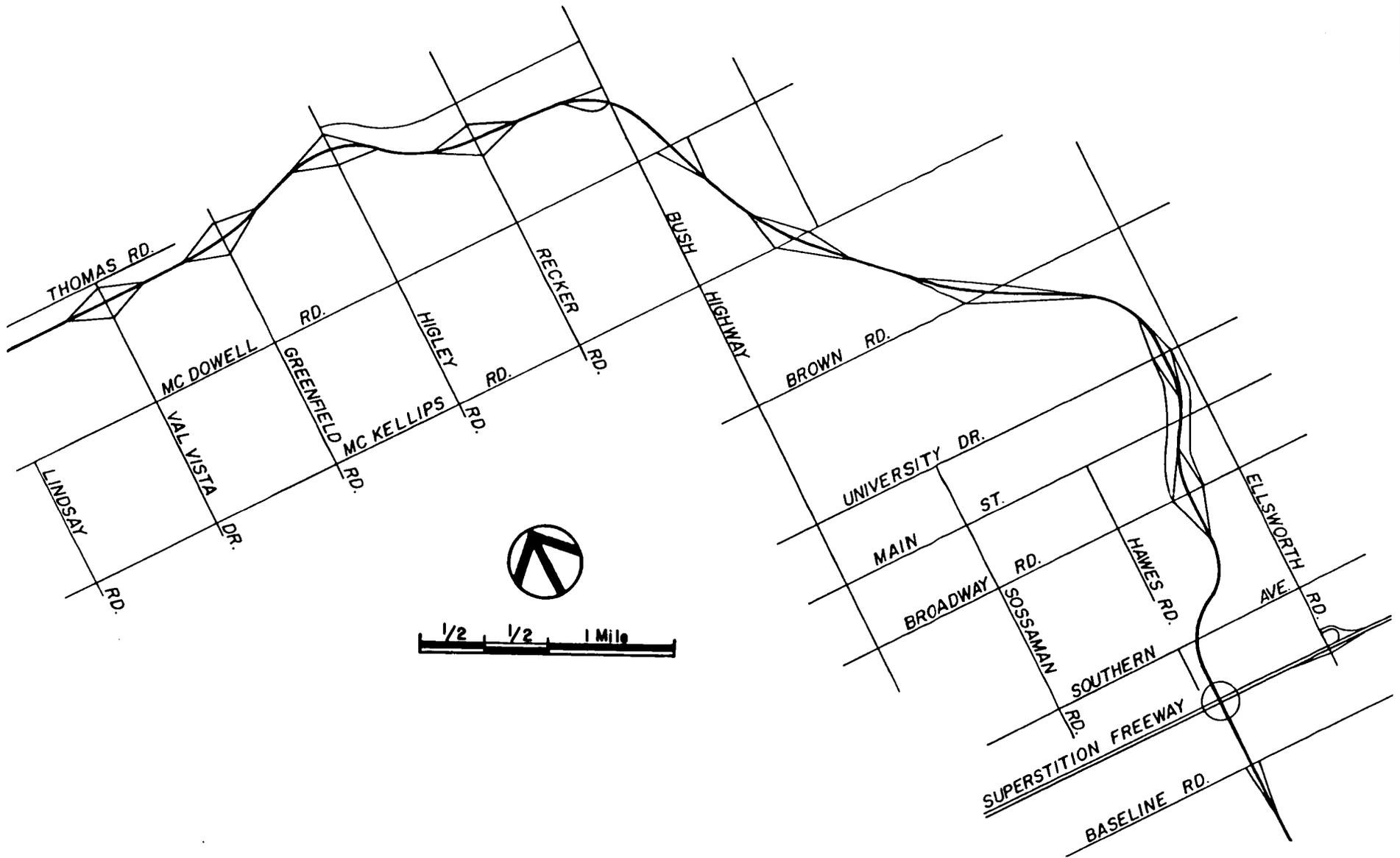
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I. INTRODUCTION

The purpose of this Design Concept Report is to document the development of design concept plans for the section of the Red Mountain Freeway from Lindsay Road to Baseline Road, a distance of 12.7 miles. A subsequent Design Concept Report will be published for the section of the Red Mountain Freeway from Dobson Road to Lindsay Road.

Two previous documents were published. The Red Mountain Freeway - Preliminary Engineering Draft Final Report, August 27, 1985, addresses the section from Price Road to Bush Highway. The Red Mountain Freeway - Bush Highway to Baseline Road - Location Study - Working Paper, January, 1987, addresses the location of the section from Bush Highway to Baseline Road.

The location for the section of Red Mountain Freeway from Price Road to Bush Highway was adopted by the Mesa City Council on February 21, 1984. The location for the section from Lindsay Road to Baseline Road, which includes part of the Price Road to Bush Highway Section, was adopted by the Arizona Transportation Board on August 21, 1987. The location for that section is illustrated in Figure I-1. A design public hearing, was held on February 3, 1988 to present design concepts for that section.



ADOPTED LOCATION
Arizona Department of Transportation

RED MOUNTAIN FREEWAY

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FIGURE No. 1-1	
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II. HISTORY

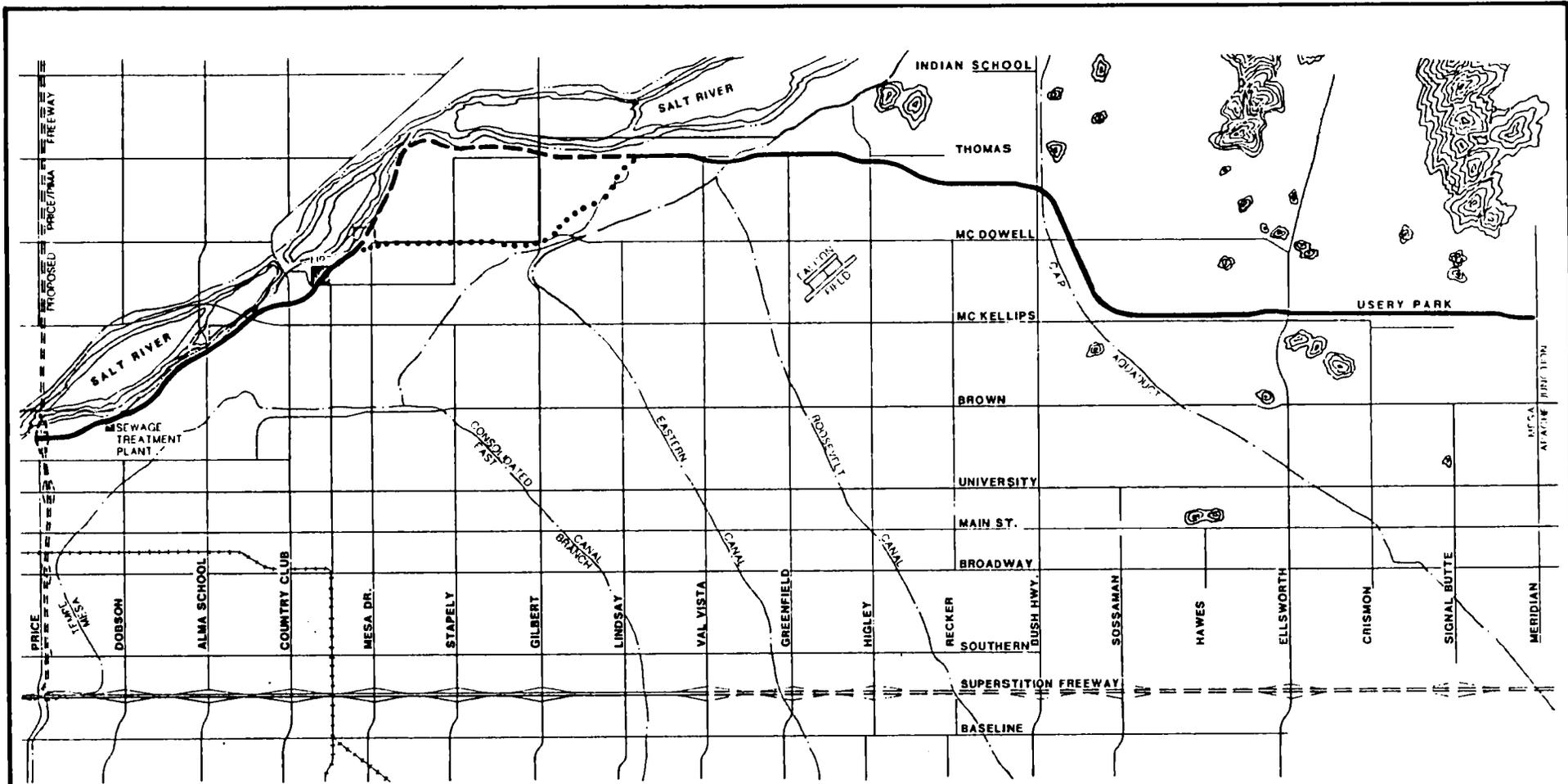
In 1982, the City of Mesa contracted with Parsons Brinckerhoff, consulting engineers, to prepare the **MESA TRANSPORTATION STUDY**. This study included a forecast of street and highway needs in the Mesa Planning Area for the year 2005. The population at that time is expected to reach 360,000.

The study resulted in recommendations for an east-west parkway along the north side of the City of Mesa as shown in Figure II-1. The parkway would extend northeasterly from the planned Outer Loop Freeway near Price Road to the vicinity of Thomas Road and Lindsay Road, then eastward along Thomas Road to Bush Highway and then eastward along McKellips Road to the county line.

The purpose of the parkway would be to:

1. Provide needed east-west highway capacity. Traffic analysis indicated that McKellips Road, Brown Road, University Drive and other east-west arterials, even with improvement, will not be adequate to meet traffic demands associated with forecast population and development growth in the area.
2. Provide relief to increasing congestion on the Superstition Freeway.
3. Provide a direct connection from the north part of Mesa to the planned East Papago and Outer Loop Freeways.
4. Provide improved access to the rapidly developing industrial area in the vicinity of Falcon Airfield.
5. Provide a more direct route for recreational traffic to the rivers and lakes located east of Mesa.

The City of Mesa accepted the parkway concept and named it the Red Mountain Parkway.



PARKWAY CONCEPT

- RIGHT OF WAY 250 FEET
- SIX LANE, DIVIDED ROADWAY
- NO ACCESS EXCEPT AT INTERSECTIONS
- INTERSECTIONS WILL HAVE TRAFFIC SIGNALS

LEGEND

- ALIGNMENT ADOPTED BY CITY COUNCIL
- - - PREFERRED ALIGNMENT
- ALTERNATIVE ALIGNMENT



ADOPTED PARKWAY LOCATION
Arizona Department of Transportation

RED MOUNTAIN FREEWAY

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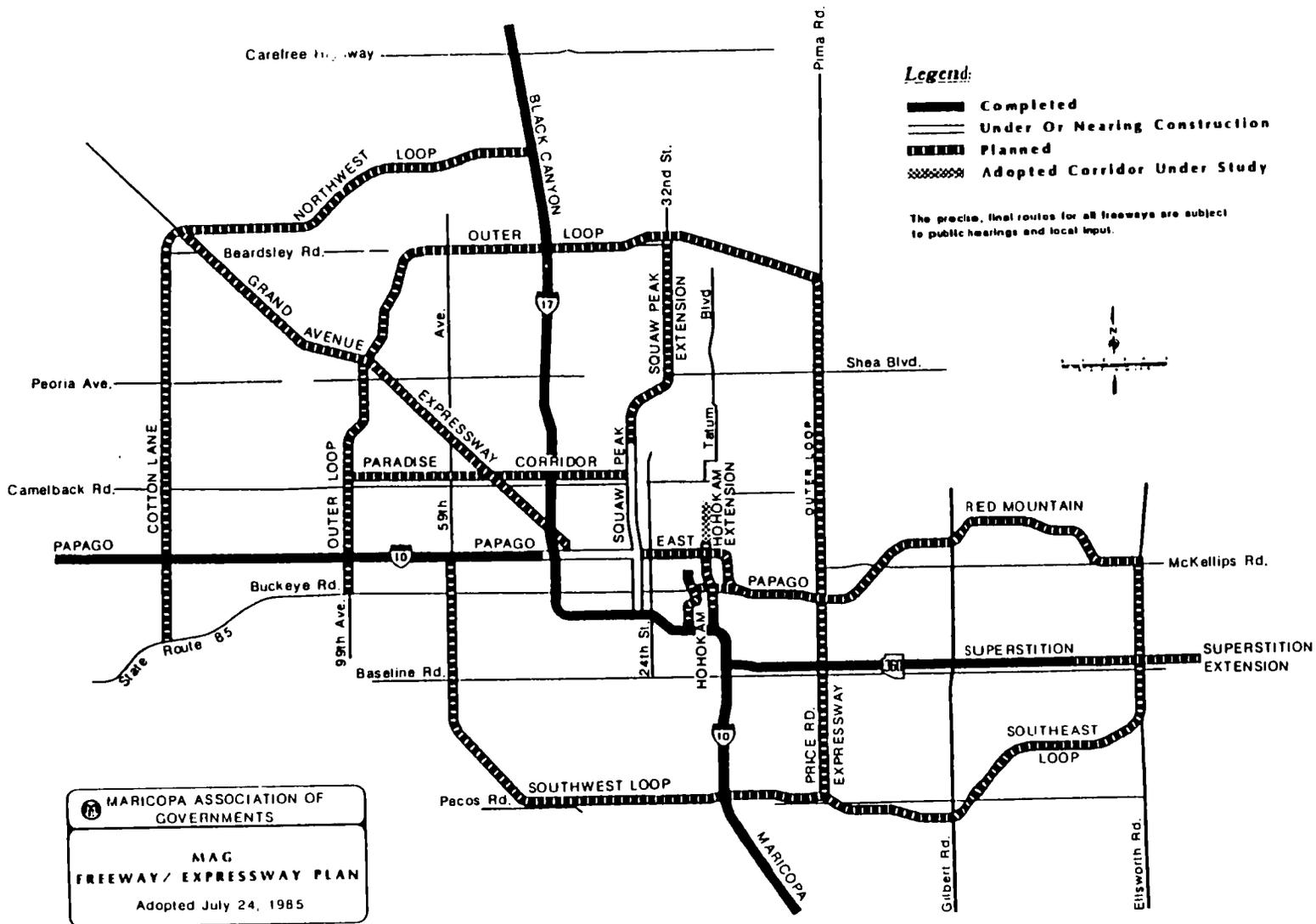
FIGURE No. 11-2	
DATE: OCT 1988	PAGE 4

In April 1983, the City of Mesa contracted with Parsons Brinckerhoff to prepare a location study and design concept plans for the parkway from Price Road to Meridian Road (the Maricopa/Pinal County boundary). At the conclusion of the location study, in December, 1983 a location public hearing was held by the City of Mesa. After review of public hearing testimony, the Mesa City Council, on February 21, 1984, adopted the parkway location shown in Figure II-1. The City then directed Parsons Brinckerhoff to proceed with preparation of design concept plans for the parkway utilizing rectified aerial photography at a scale of 1" = 200'. The design concept plans were completed and delivered to the City of Mesa in August 1985.

The Maricopa Association of Governments (MAG), in 1984, conducted the **EASTSIDE TRANSPORTATION ANALYSIS**. This study, prepared for MAG by Parsons Brinckerhoff, examined transportation needs of the entire east valley of Maricopa County for the year 2015. It was based on a forecast population increase from 440,000 in 1985 to over 1 million in 2015. It was evident from this analysis that the anticipated population growth in the east valley would require an expanded freeway system.

The recommended freeway system that emerged from the **EASTSIDE TRANSPORTATION ANALYSIS** was a freeway "loop" which included the Red Mountain Parkway from Price Road east to Ellsworth Road on the north side of the east valley, a Southeast Loop Freeway which would circle the south part of the east valley to serve the cities of Tempe, Chandler and Gilbert, and a north-south route near Ellsworth Road to inter-connect the Red Mountain Freeway, Southeast Loop Freeway and Superstition Freeway. This overall freeway system was then adopted by the cities and was accepted into the MAG Regional Highway System Plan on March 27, 1985. It was accepted into the State Highway System on April 26, 1985 as shown in Figure II-2. The previously adopted parkway segment from Ellsworth Road east to Meridian Road was deleted from further consideration as part of the freeway system.

As a result of the expanded freeway system, and the longer term look at future needs (2015 versus 2005 as used in the initial study), the City of Mesa, MAG, and ADOT determined that the Red Mountain Parkway should be designed as a full freeway. The City then requested Parsons Brinckerhoff to revise the parkway concept to reflect a six-lane freeway from Price Road to Ellsworth Road. The City also contracted with Parsons Brinckerhoff to prepare general concept plans for the Ellsworth Road section from McKellips Road to Guadalupe Road.



This general location was shown on the MAG Freeway/Expressway Plan published in 1985. The specific location has subsequently been modified as shown in Figure VI-1, page 16.

MAG FREEWAY / EXPRESSWAY PLAN
Arizona Department of Transportation

RED MOUNTAIN FREEWAY

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FIGURE No. 11-2

DATE:
 OCT 1988

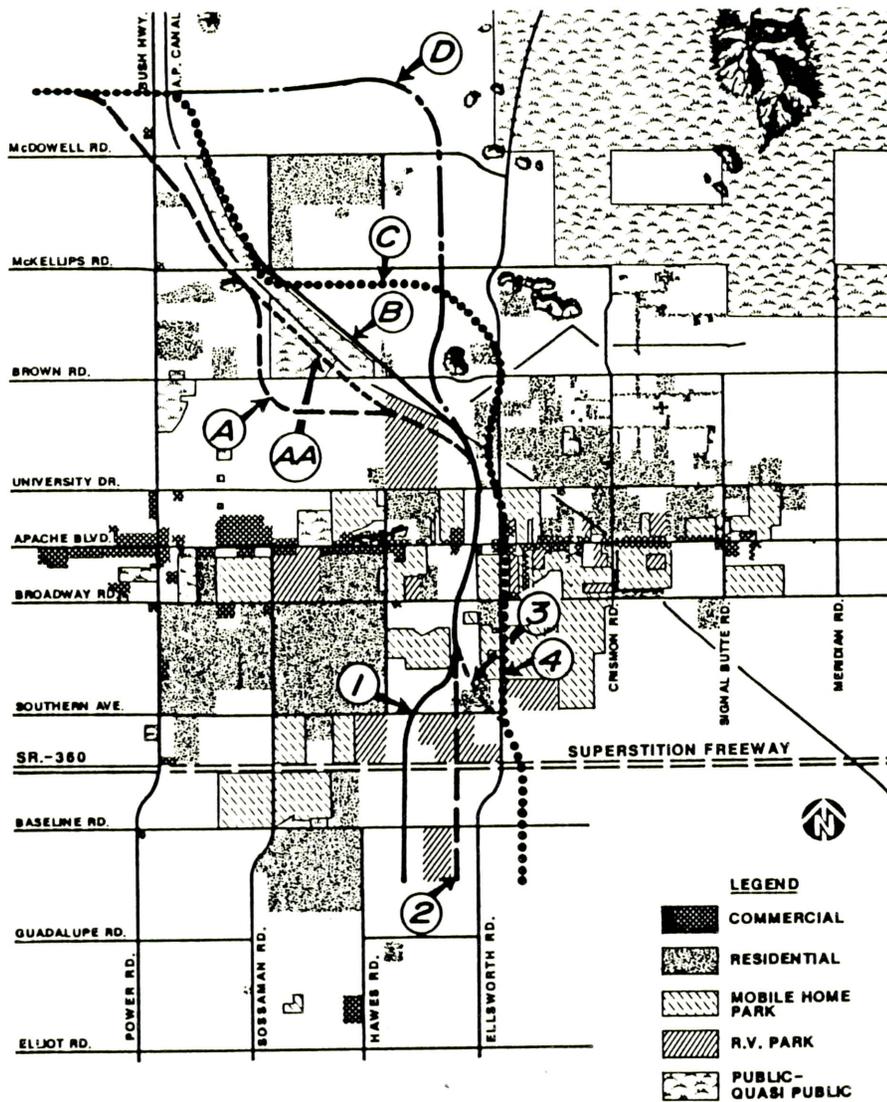
PAGE
 6

In April, 1986 the City of Mesa, funded by the Arizona Department of Transportation through an inter-governmental agreement, contracted with Parsons Brinckerhoff to provide a new location study for that portion of the Red Mountain Freeway and Ellsworth Road Connection from Bush Highway to Baseline Road and to prepare concept plans for the entire 20.5 mile Red Mountain Freeway from Price Road to Baseline Road (near Ellsworth Road), including a freeway-to-freeway interchange at the Superstition Freeway. The alternative locations studied are shown in Figure II-3.

The results of the location study were presented to the public at a location public hearing on September 17, 1986. After the public hearing, the location study was completed in January of 1987, and a report published titled the Red Mountain Freeway - Bush Highway to Baseline Road - Location Study - Working Paper.

Following the public hearing, and as a result of a suggestion made by one of the attendees, a modified alignment of Alternative B (see Figure II-3) was examined and determined feasible. Alternative B is a route from Bush Highway to south of Brown Road which parallels the CAP Canal and Spook Hill Dam along the upstream (northeast) side of the flood detention area. Alternative B-Modified would move the alignment about 700 feet southwest to the upstream side of the Spook Hill Dam, inside the flood area. It would be flood protected by raising the grade above the 100-year flood level or by building a new Spook Hill Dam on the upstream side of the freeway.

Alternative B - Modified was then presented to the local area homeowners and City of Mesa in a series of public meetings. These groups requested that visual and noise impacts on the Spook Hill Regional Park and existing residences be mitigated by construction of a new dam or earth berms on the upstream side of the freeway.



- LEGEND**
-  COMMERCIAL
 -  RESIDENTIAL
 -  MOBILE HOME PARK
 -  R.V. PARK
 -  PUBLIC-QUASI PUBLIC

ALTERNATE ROUTE LOCATIONS
Arizona Department of Transportation

RED MOUNTAIN FREEWAY

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FIGURE No. II-3	
DATE: OCT 1988	PAGE 8

III. PUBLIC AND AGENCY INVOLVEMENT

The City of Mesa, in addition to numerous meetings with property owners and citizens group, held a formal location public hearing in December, 1983 for the Red Mountain Parkway from Price Road to Meridian Road (east county boundary).

After acceptance of the freeway onto the state highway system and following the new location study, the Arizona Department of Transportation (ADOT), in conjunction with the City of Mesa, held a location public hearing for the portion of the Red Mountain Freeway from Bush Highway to Baseline Road on September 17, 1986. The hearing was well attended with an estimated 400 or more people in the audience. Following this location public hearing, subsequent studies of citizen recommendations, several group meetings and many one-on-one meetings with interested citizens, the Arizona Transportation Board, on August 21, 1987, adopted a location for the freeway from Lindsay Road to Baseline Road.

The Arizona Department of Transportation held a design public hearing on February 3, 1988. Design concepts for the adopted location were presented for the portion of the Red Mountain Freeway from Lindsay Road to Baseline Road. The audience at this meeting was in excess of 200 people.

Approximately 81 Technical Advisory Committee (TAC), governmental agency and ADOT meetings were held after the initiation of the new location study in 1986. The Technical Advisory Committee (TAC) has participated in every phase of the development of the concept plans. This committee has included representatives of the Arizona Department of Transportation and the City of Mesa.

The following agencies have continuously participated in coordination efforts of this project:

- Flood Control District of Maricopa County (FCDMC)
- Soil Conservation Service (SCS)
- Arizona Department of Water Resources (ADWR)
- Maricopa County
- Mesa Parks Department Citizen Committee
- Spook Hill Homeowners Association

Scheduled meetings held in 1986 - 1988 included the following:

02/12/86 - TAC	08/11/86 - ADOT Management
03/21/86 - ADOT, DeLeuw Cather	08/12/86 - TAC
03/27/86 - City of Mesa	08/26/86 - TAC
05/08/86 - URS (Superstition Interchange)	09/02/86 - TAC
05/20/86 - TAC	09/08/86 - ADOT Management
06/17/86 - TAC	09/17/86 - Location Public Hearing
06/25/86 - URS	10/02/86 - TAC
07/15/86 - ADOT, TAC	10/29/86 - TAC
07/22/86 - ADOT	10/30/86 - Deleuw Cather
07/23/96 - TAMS	11/03/86 - FCDMC, SCS, ADOT
11/17/86 - City of Mesa	07/26/87 - TAC
11/18/86 - Mesa Chamber of Commerce	09/30/87 - TAC
11/26/86 - Mesa Parks Citizen Committee	10/19/87 - ADOT
12/17/86 - City of Mesa, Falcon Field	10/28/87 - TAC
12/29/86 - ADOT Management	11/05/87 - Mesa Parks Citizen Committee
01/06/87 - TAC	11/10/87 - FCDMC, SCS, ADWR, ADOT
01/21/87 - City of Mesa	11/25/87 - TAC
01/21/87 - ADOT	12/07/87 - City of Mesa
01/29/87 - Mesa Parks Department	12/07/87 - ADOT
02/20/87 - Mesa City Council, Study Session	12/10/87 - ADOT Management
03/04/87 - TAC	12/15/87 - TAC
03/06/87 - Mesa City Council, Study Session	12/17/87 - Mesa Parks Citizen Committee
03/09/87 - Mesa City Council	01/08/88 - City of Mesa
03/13/87 - ADOT	01/15/88 - TAC
03/16/87 - ADOT	01/20/88 - City of Mesa

03/19/87 - ADOT	01/20/88 - ADOT Environmental Planning
03/27/87 - DeLeuw Cather	01/27/88 - TAC
03/31/87 - ADOT Management	01/29/88 - Mesa City Council, Study Session
04/13/87 - ADOT Management	02/02/88 - Mesa Chamber of Commerce
04/22/87 - FCDMC, SCS, ADWR, ADOT	02/03/88 - Design Public Hearing
05/04/87 - Coe & Van Loo	02/04/88 - Mesa Parks Citizen Committee
05/07/87 - Sverdrup Corporation	02/16/88 - Mesa City Council, Study Session
05/15/87 - ADOT	02/19/88 - Mesa City Council, Study Session
05/21/87 - ADOT	02/22/88 - Spook Hill Homeowners Association
06/24/87 - TAC	02/24/88 - ADOT
07/01/87 - SRP	02/29/88 - FCDMC, SCS, ADWR, ADOT
07/22/87 - TAC	03/02/88 - TAC
07/31/87 - ADOT Environmental Planning	03/07/88 - DeLeuw Cather
07/20/87 - ADOT	03/30/88 - TAC
07/21/87 - Arizona Transportation Board	04/13/88 - ADOT Environmental Planning
	06/03/88 - TAC

IV. DESIGN CRITERIA

The design criteria utilized for the Red Mountain Freeway Design Concept Plan is shown in Table 1 and is based on the following:

"Guide for Highway Geometric Design", ADOT, Jan. 1982

"A Policy on Geometric Design of Highways and Streets", AASHTO, 1984

"Urban Highway Design Procedures Manual", ADOT, March, 1988

**TABLE 1
DESIGN CRITERIA**

DESCRIPTION	DESIGN CRITERIA	REMARKS
Design Speed	65 MPH 50 MPH 30 MPH	Freeway Ramps Loop Ramps
Control of Access	Full	
Maximum Degree of Curve	3°-30' 8°	Freeway Ramps
Minimum Radius	1637' (3.5°) 400' 230' 1432' (4.0°)	Freeway Ramp Terminus Loop Ramps Cross Roads
Maximum Grade	3% 6%	Freeway Ramps
Minimum Grade	0.25%	
Minimum Sight Distance	65 MPH 50 MPH 45 MPH	Freeway Ramps at Gore Cross Roads

TABLE 1
DESIGN CRITERIA
(Continued)

DESCRIPTION	DESIGN CRITERIA	REMARKS
Lane Width	12' 12'	Freeway Ramps
Number of Lanes (Freeway)	6	3 Westbound 3 Eastbound
Median Width (Freeway)	46' Including 8' Paved Shoulders	
Shoulder Width (Freeway)	10' Paved, Right 8' Paved, Left (Median)	
Shoulder Widths (Ramp)	8' Paved, Right 2' Paved, Left	
Vertical Clearance	16'-6" Freeway Minimum 16'-6" Cross Roads Minimum	
Right-of-Way Width	350' Minimum	

V. TYPICAL SECTIONS

FREEWAY

The typical roadway section used for the freeway mainline includes three travel lanes (36 feet) in each direction separated by a 46 foot wide median (including median shoulders). On the outside of the traveled lanes 10 foot wide paved shoulders were used and on the inside 8 foot wide paved shoulders were used. The roadway cut and fill slopes correspond with ADOT standard slopes C-02.10. It is intended, in areas of low fills and shallow cuts, to retain as much of the natural terrain as possible.

RAMPS

Ramp typical sections include one 12 foot travel lane with a 2 foot left paved shoulder and an 8 foot right shoulder as shown on ADOT Standard Drawing C-8.20.

CROSS ROADS

The design for the cross roadway sections, through interchange areas, will be based on the Design Year Traffic and in consideration for existing or proposed street improvements by local jurisdiction.

VL SEGMENT DESCRIPTIONS

INTRODUCTION

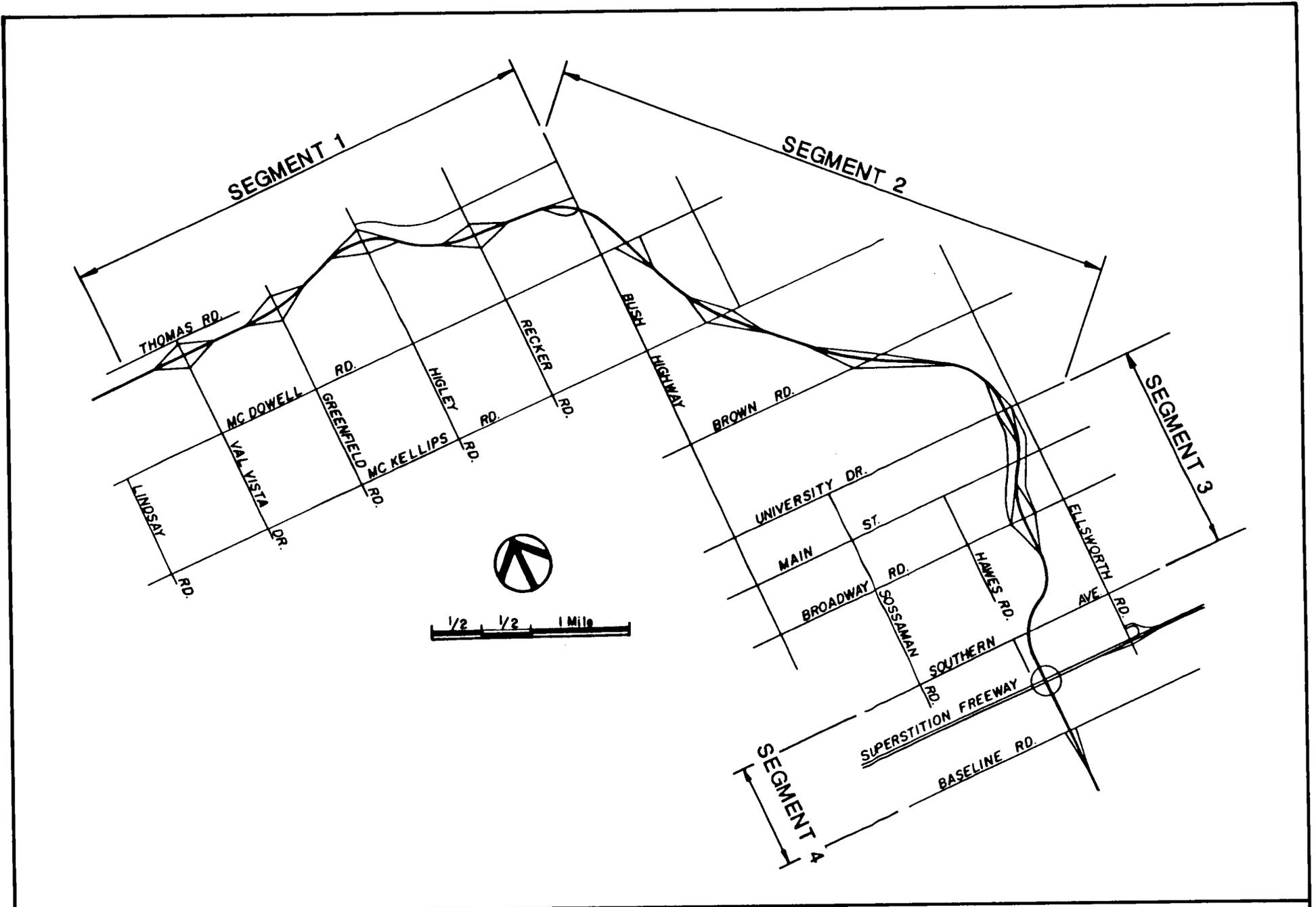
The location for the Red Mountain Freeway, from Lindsay Road to Baseline Road as shown in the design concept plans, was adopted by the Arizona Transportation Board on August 21, 1987.

Design concept plans were prepared, after location approval to define the freeway horizontal and vertical alignment, interchanges, drainage concepts, bridges, cross roads, frontage roads, major utility conflicts and estimated right-of-way requirements. The plans were prepared at an original horizontal scale of 1" = 200' on topographical mapping prepared specifically for this project. Field surveys were run to control the aerial photography used for mapping purposes. State Plane Coordinates were determined for section and quarter section corners located along the freeway route and for the freeway centerline and the centerline intersects with section and quarter section lines. Copies of the design concept plans, in reduced size, are included as Chapter XII of this report.

The purpose of this chapter is to describe the basic features of the adopted freeway location and the design concepts which have since been defined. The freeway section covered by this report has been divided into four segments. Segment 1 is from Lindsay Road to Bush Highway; Segment 2 is from Bush Highway to University Drive; Segment 3 is from University Drive to Southern Avenue; and Segment 4 is from Southern Avenue to Baseline Road, including the system interchange at the Superstition Freeway. The location of the freeway route and identification of the four segments are shown in Figure VI-1.

Segment 1: Lindsay Road to Bush Highway

The horizontal alignment for this portion of the freeway generally follows the location established by the City of Mesa in 1983, with the exception of the section immediately west of Bush Highway. Beginning at Lindsay Road and moving east



SEGMENT LOCATIONS
Arizona Department of Transportation

RED MOUNTAIN FREEWAY



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FIGURE No. VI-1	
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the alignment is located along the southside of Thomas Road from Lindsay Road to east of Greenfield Road where it crosses to the northside of Thomas Road and then re-crosses Thomas Road near Higley Road and then traverses, in a southeasterly direction to Bush Highway.

From Lindsay Road to east of Greenfield Road the alignment was located to avoid splitting the large land parcels south of Thomas Road. The alignment follows a land use division between potential residential areas south of Thomas Road and gravel extraction areas on the north. In the vicinity of the intersection of Thomas Road and Val Vista Drive the alignment was shifted far enough south of Thomas Road to avoid the need to relocate Thomas Road and thus provide adequate traffic storage capacity on Val Vista Drive north of the Val Vista interchange.

Just east of the Southern Canal the alignment bisects the Roosevelt Water Conservation District water well field. Although no wells will be directly impacted, the well interconnect piping system will require protection or replacement. Access for well maintenance north of the freeway, will be needed. This access can be provided by lengthening the freeway bridge over the Southern Canal to provide room for vehicular traffic below or by building a separate equipment underpass in another location. The design concept plans utilize the former option.

From east of Greenfield Road to about 1400 feet east of Higley Road, the alignment was shifted to north of Thomas Road to avoid crossing a gravel extraction pit south of Thomas Road just west of Higley Road. An alignment through the gravel pit would have required a fill in excess of 90 feet. This northerly shift in the alignment also minimizes the impact to the Sunshine Acres Children's Home which is located southeast of the Thomas Road/Higley Road intersection. To provide adequate distance between the Thomas - Higley intersection and the interchange ramps at Higley Road, Thomas Road is shown relocated approximately 650 feet to the north of its present intersection with Higley Road.

The profile grade is generally elevated from Lindsay Road eastward over Val Vista Drive and the Southern Canal. It then varies to fit terrain characteristics. From west of Higley Road to east of Recker Road, including the area adjacent to the Sunshine Acres Children's Home, the vertical profile is depressed approximately 10 feet. Testimony at the design public

hearing by the director of the Children's Home requested that noise mitigation measures be provided in this area. The partial depression will meet some of this request. However, more effective noise mitigation can be accomplished by lowering the grade line further or by constructing earth berms. Sufficient right-of-way is provided on the concept plans to allow for either of these concepts.

Right-of-way for the original Parkway Concept from Recker Road to Bush Highway was dedicated to the City of Mesa by a local owner/developer as part of a rezoning agreement. The dedicated width is 250 feet. The freeway alignment utilizes this 250 feet but will require additional right-of-way width, as shown, to accommodate the freeway concept.

Traffic forecasts for the year 2015 for this segment of the freeway range from 100,000 vehicles per day near Val Vista Drive to 75,000 vehicles per day near Bush Highway (see Chapter VII, Traffic Service).

Estimated earthwork quantities for this segment of the freeway, with shrinkage allowance, are 1,377,000 C.Y. of excavation and 1,486,000 C.Y. of embankment. Local borrow of 275,000 C.Y. will be required or the profile grade could be lowered to balance the earthwork.

Segment 2 Bush Highway to University Drive

From Bush Highway southeast to approximately 1000 feet north of University Drive the freeway alignment first crosses over the CAP Canal and then traverses generally parallel with, and on the upstream side of, the Spook Hill Flood Retarding Structure (Spook Hill Dam). It is entirely within the flood retention area of the Spook Hill Dam. The Spook Hill District Regional Park also occupies the flood retention area. Approximately 5,000 feet south of Brown Road the alignment crosses over the CAP Canal again, to University Drive.

After reviews with the City of Mesa and meetings with the Spook Hill Homeowners Association, ADOT responded to the City, in a letter dated February 18, 1988, on possible methods to minimize sound and visual impacts on adjacent (planned) park and residential areas. A copy of the letter is included in the Appendix.

The vertical profile between the elevated crossings of the C.A.P. canal is slightly rolling above the 100-year flood level but below the maximum flood level. (See Chapter X, Drainage).

McDowell Road, McKellips Road and Brown Road are elevated to cross over the freeway. Large box culverts or bridges to meet the Flood Control District drainage requirements will be provided. These box culverts will also serve as passageways for Flood Control District and Spook Hill Park maintenance vehicles.

Traffic forecasts for the year 2015 for this segment range from 60,000 vehicles per day to 68,000 vehicles per day.

Earthwork quantities for this segment of the freeway are unbalanced. The entire segment is embankment, requiring approximately 1,895,000 C.Y. of borrow. The borrow material will be obtained from the adjacent flood detention area to maintain the capacity of the detention area.

The Flood Control District of Maricopa County, in a letter to ADOT dated January 20, 1987, stated that "District right-of-way will be transferred to ADOT, for the freeway structure and interchange ramps." A copy of the letter is included in the Appendix.

Segment 3 University Drive to Southern Avenue

From University Drive south to Southern Avenue the horizontal alignment gently curves between developed properties to utilize vacant land as much as possible. Between University Drive and Main Street it passes over an active earth subsidence fissure at approximate Sta 1023+00 to 1029+00. The depth and extent of this fissure is not known. Other fissures in this general area are known to exist, but it is believed the foregoing is the only one having direct conflict with the proposed alignment. Additional geotechnical analysis will be needed in the final design of the project.

To minimize impact on adjacent developed areas, the vertical profile grade is depressed from north of University Drive to north of Southern Avenue. The freeway will be elevated over Southern Avenue, Superstition Freeway and Baseline Road. The depressed section will drain by gravity to the drainage channel at Southern Avenue. The University Drive overpass will be slightly elevated. The Main Street and Broadway Road overpasses will be at-grade. Southern Avenue will remain at-grade.

Diamond traffic interchanges will be provided at University Drive and Broadway Road. They will be connected by parallel one-way frontage roads which will intersect Main Street. Grade separations will be provided at Main Street and Southern Avenue.

Traffic forecasts for the year 2015 for this segment are lower than Segment 1 or Segment 2, and are in the range of 55,000 vehicles per day.

Earthwork quantities for this segment combined with Segment 4 are nearly in balance, requiring 1,676,000 C.Y. of embankment and 2,351,000 C.Y. of excavation. The excess material will be needed for construction of the elevated interchange ramps at the system interchange connecting Red Mountain Freeway to Superstition Freeway.

Segment 4 Southern Avenue to Baseline Road

This segment of the route includes one-mile of mainline freeway and a system interchange connecting the Red Mountain Freeway to the Superstition Freeway (S.R. 360). Several types of system interchanges were examined. These included a four-level stack directional interchange, a two-level rotary interchange, a three-level diamond interchange and a three-level directional interchange with two loops. A detailed study of these alternative system interchange types resulted in the selection of two for further evaluation, the three-level diamond interchange and the three-level directional interchange with two loops. It was concluded that because the three-level diamond interchange would require an added directional (fourth level) ramp within the design life of the interchange, the three level directional interchange with two loops would be the most advantageous. The recommended system interchange is illustrated in Figure VI-2.

As shown in Figure VI-2, the recommended interchange would have three levels with directional ramps for the major traffic movements. Two semi-direct loop ramps would be provided for the minor movements. The lower level will be the Superstition Freeway which will be depressed approximately 10 feet below existing ground. The second level will be the Red Mountain Freeway which will be elevated approximately 15 feet above existing ground. The third and final level, which will be approximately 25 feet above the Red Mountain Freeway (40 feet above existing ground), will include two directional ramps for the major traffic movements. These movements are west to south and east to north. The semi-direct loop ramps, for the minor traffic movements, will be for north to west and south to east traffic.

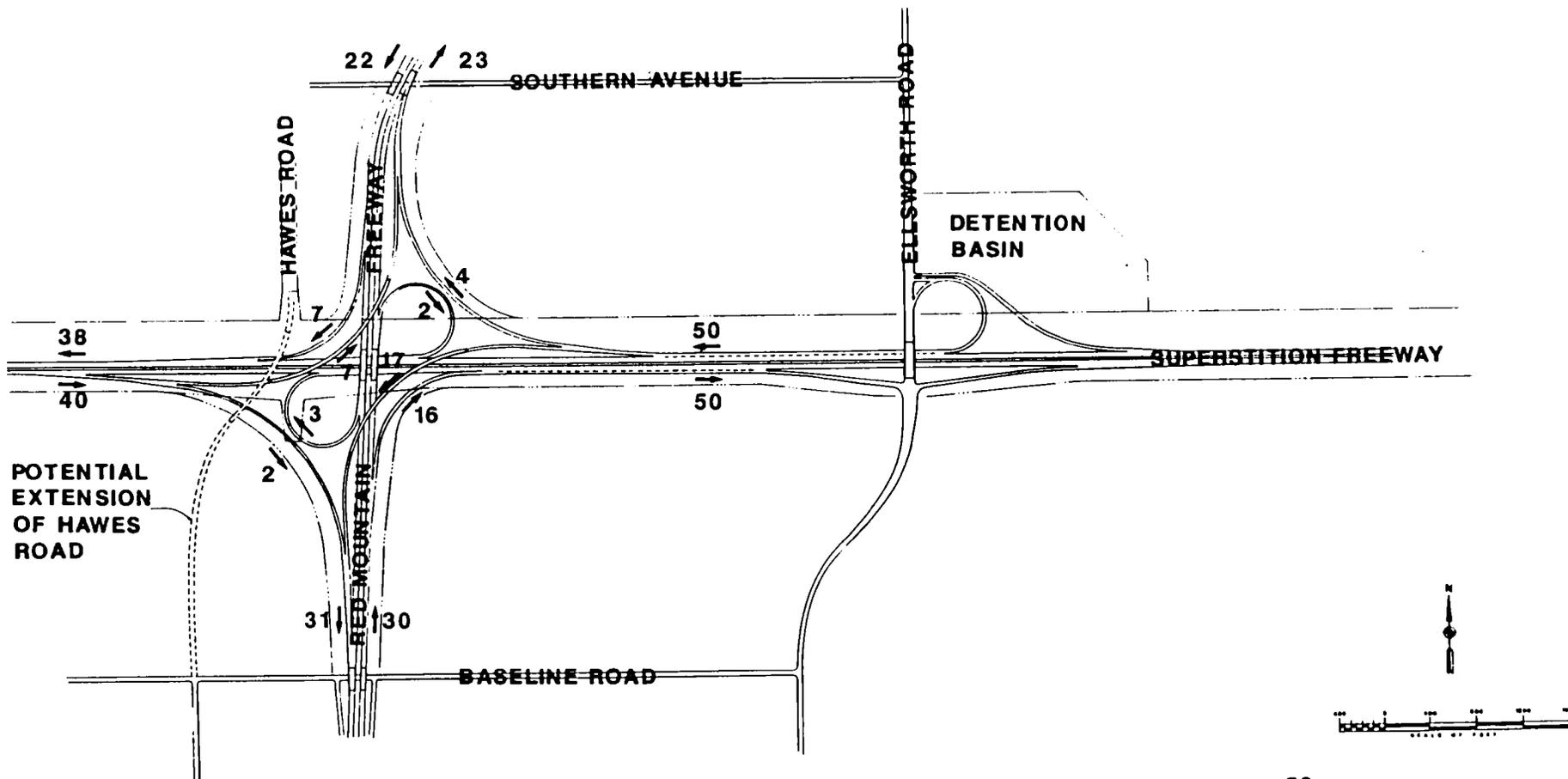
The Superstition Freeway, in the vicinity of the system interchange, is being designed with interchanges at Sossaman Road and Ellsworth Road. The Ellsworth Road interchange will be impacted by construction of the system interchange with the Red Mountain Freeway. As shown in Figure VI-2, it is recommended that the planned diamond interchange at Ellsworth Road be modified to replace the westbound on-ramp with a loop ramp in the northeast quadrant. This configuration will provide adequate distance between ramps on the Ellsworth interchange and the system interchange.

EARTHWORK SUMMARY

The following table summarizes the grading quantities for the entire 12.7 miles of this project. The major need for borrow occurs in Segment 2 (Bush Highway to University Drive). This section requires approximately 1,895,000 c.y. of local borrow, all of which should be available immediately adjacent to the proposed alignment within the Spook Hill Flood Retention Basin.

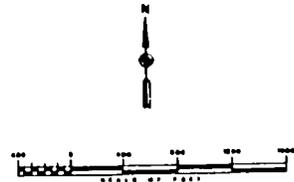
EARTHWORK SUMMARY TABLE

SEGMENT	DESCRIPTION	(Estimated Shrinkage = 12%)			
		EXCAVATION C.Y.	EMBANKMENT C.Y.	BORROW C.Y.	WASTE C.Y.
1	Lindsay Road to Bush Highway	1,377,000	1,486,000	275,000	0
2	Bush Highway to University Drive	79,000	1,964,000	1,895,000	0
3 & 4	University Drive to Southern Avenue				
	Southern Avenue to Baseline Road	<u>2,351,000</u>	<u>1,676,000</u>	<u>0</u>	<u>393,000</u>
		3,807,000	5,126,000	2,170,000	393,000



POTENTIAL
EXTENSION
OF HAWES
ROAD

DETENTION
BASIN



50
←

Traffic Forecast—Year 2015
Thousands of Vehicles Per Day

RECOMMENDED INTERCHANGE
Arizona Department of Transportation

RED MOUNTAIN FREEWAY

PARSONS
BRINCKERHOFF

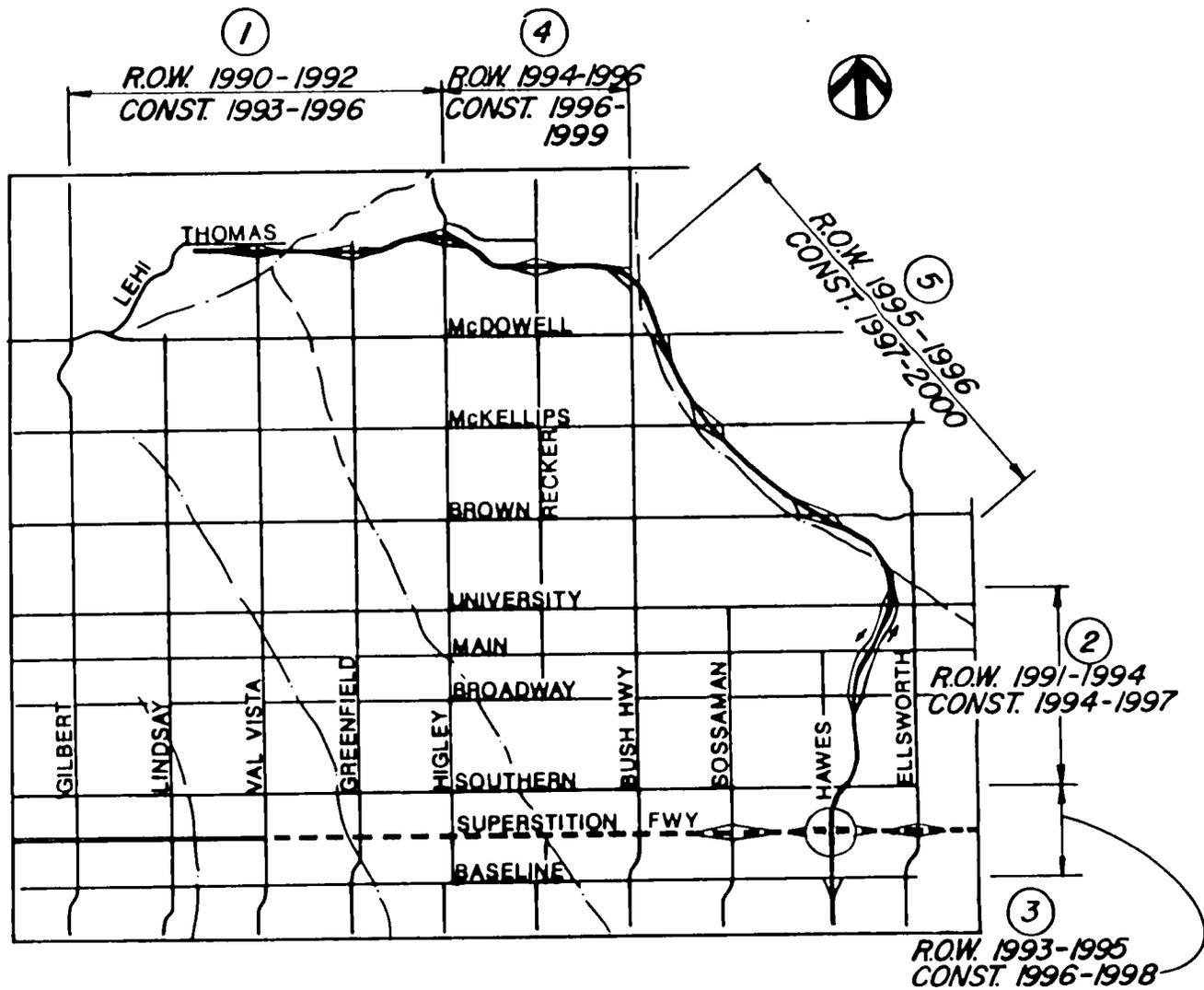
FIGURE No. VI-2	
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Cross-sections, with existing ground and roadway templates, have been plotted at 200 foot intervals for the entire freeway route. These cross sections are available in project files at ADOT and the Parsons Brinckerhoff Tempe, Arizona office.

CONSTRUCTION SEQUENCE

The recommended construction sequence for the Red Mountain Freeway, from Lindsay Road to Baseline Road, is illustrated in Figure VI-3. It is based on current MAG priorities and on the assumption that the western portion of the freeway, from the Pima Parkway (Price Road) to Lindsay Road, will be constructed prior to the Lindsay Road to Baseline Road section. The west portion is planned for a sequence of projects beginning at the Pima Parkway and progressing easterly to Lindsay Road.

The suggested construction sequence would begin east of Lindsay Road and continue east to Bush Highway. Then, construction would begin at the Superstition Freeway system interchange and Segment 3, University Drive to Southern Avenue, which are mutually dependent on one-another for earthwork balance. The final segment would be Segment 2, Bush Highway to University Drive.



POTENTIAL PROJECT SCHEDULE
Arizona Department of Transportation

RED MOUNTAIN FREEWAY

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FIGURE No. VI-3	
DATE: OCT 1988	PAGE 24

VII. TRAFFIC SERVICE

INTERCHANGES AND GRADE SEPARATIONS

The following interchanges and grade separations have been included in the design concept plans. Not all of the interchanges will necessarily be provided with the initial construction of the freeway.

The following list provides recommendations for initial and the ultimate scheduling of construction of grade separations and interchanges. Ultimate scheduling of construction for the various traffic interchanges will depend upon priorities based on traffic demand and available funding.

<u>Location</u>	<u>Initial Construction</u>	<u>Ultimate Construction</u>
Val Vista Road	Grade Separation	Add Interchange Ramps
Greenfield Road	Grade Separation	Add Interchange Ramps
Higley Road	Diamond Interchange	
Recker Road	Grade Separation	Add Interchange Ramps
Bush Highway	1/2 Diamond Interchange with ramps to West	
McDowell Road	1/2 Diamond Interchange with ramps to South	
McKellips Road	Grade Separation	Add Interchange Ramps
Brown Road	Grade Separation	Add Interchange Ramps
* University Drive	1/2 Diamond Interchange with ramps to North	Add Interchange Ramps to South
* Main Street	Grade Separation	
* Broadway Road	1/2 Diamond Interchange with ramps to South	Add Interchange Ramps to North
Southern Avenue	Grade Separation	
Superstition Freeway	System Interchange	

* University Drive, Main Street and Broadway Road will be connected by one-way frontage roads with signalized intersections in the initial and ultimate stages.

TRAFFIC FORECAST

The initial traffic forecast was made for the Red Mountain Parkway in the **MESA TRANSPORTATION STUDY, 1982**, by Parsons Brinckerhoff for the City of Mesa. This forecast was related to construction of a parkway from the Outer Loop Highway to Bush Highway and was for the year 2005.

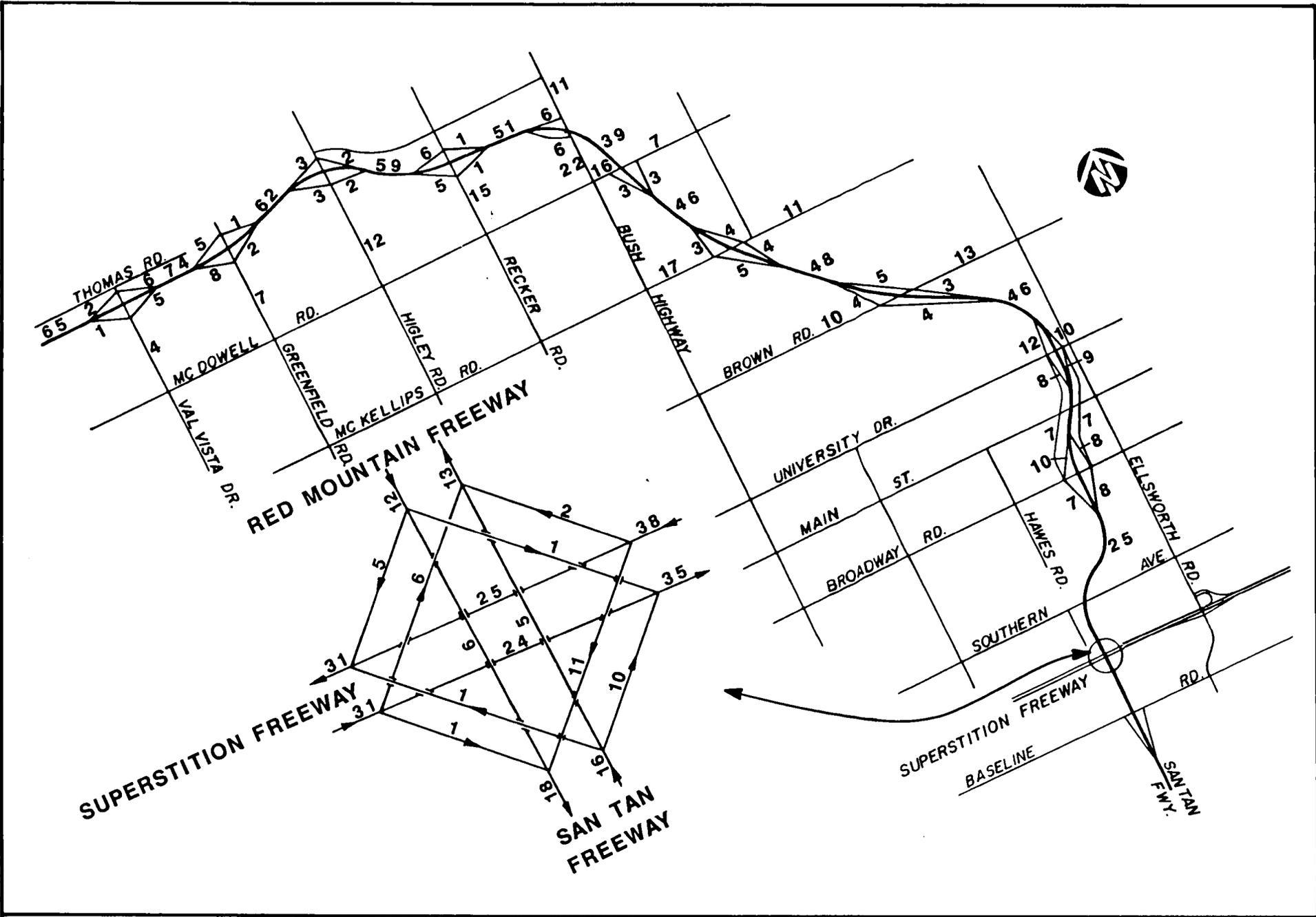
The **EASTSIDE TRANSPORTATION ANALYSIS, 1984**, Maricopa Association of Governments, Transportation Planning Office (MAGTPO), also provided traffic forecasts for the parkway. This forecast provided data for a parkway from the Outer Loop Highway to Meridian Road (Maricopa County Line) and was prepared for the year 2015. Included in this analysis was a study of upgrading the parkway to a freeway from the Outer Loop Highway to Country Club Drive.

The **RED MOUNTAIN FREEWAY, PRELIMINARY ENGINEERING FINAL REPORT**, dated August 27, 1985, by Parsons Brinckerhoff provided a traffic forecast for the Red Mountain Freeway, and the Ellsworth Freeway. This forecast was prepared for the year 2005 and was based on MAGTPO computer run 2005-33, dated July 25, 1985. The forecast indicated significantly higher traffic volumes than previous forecast because of increases in estimated land use densities, planned regional freeway system expansions and expected industrial development in the vicinity of Falcon Field. Traffic volume forecasts were based on the population and employment data prepared by the Maricopa Association of Governments, Transportation Planning Office (MAGTPO) in cooperation with the City of Mesa, Maricopa County and other local jurisdictions.

The most recent traffic volume forecasts, shown on Figure VII-1 and VII-2, are based on MAGTPO computer runs 2005-1 with trend dated June 18, 1987 and 2015-1 with trend dated June 19, 1987 using the current recommended location for Red Mountain Freeway. The forecast traffic volumes shown in Figure VII-1 and VII-2 are summarized as follows:

**TRAFFIC VOLUME FORECAST
 AVERAGE DAILY TWO-WAY TRAFFIC
 ON RED MOUNTAIN FREEWAY
 (Thousands of Vehicles Per Day)**

SEGMENT	SEGMENT LIMITS	YEAR 2005	YEAR 2015
1	Lindsay Road to Bush Highway	51 - 74	75 - 100
2	Bush Highway to University Drive	39 - 48	60 - 68
3	University Drive to Southern Avenue	25 - 36	55

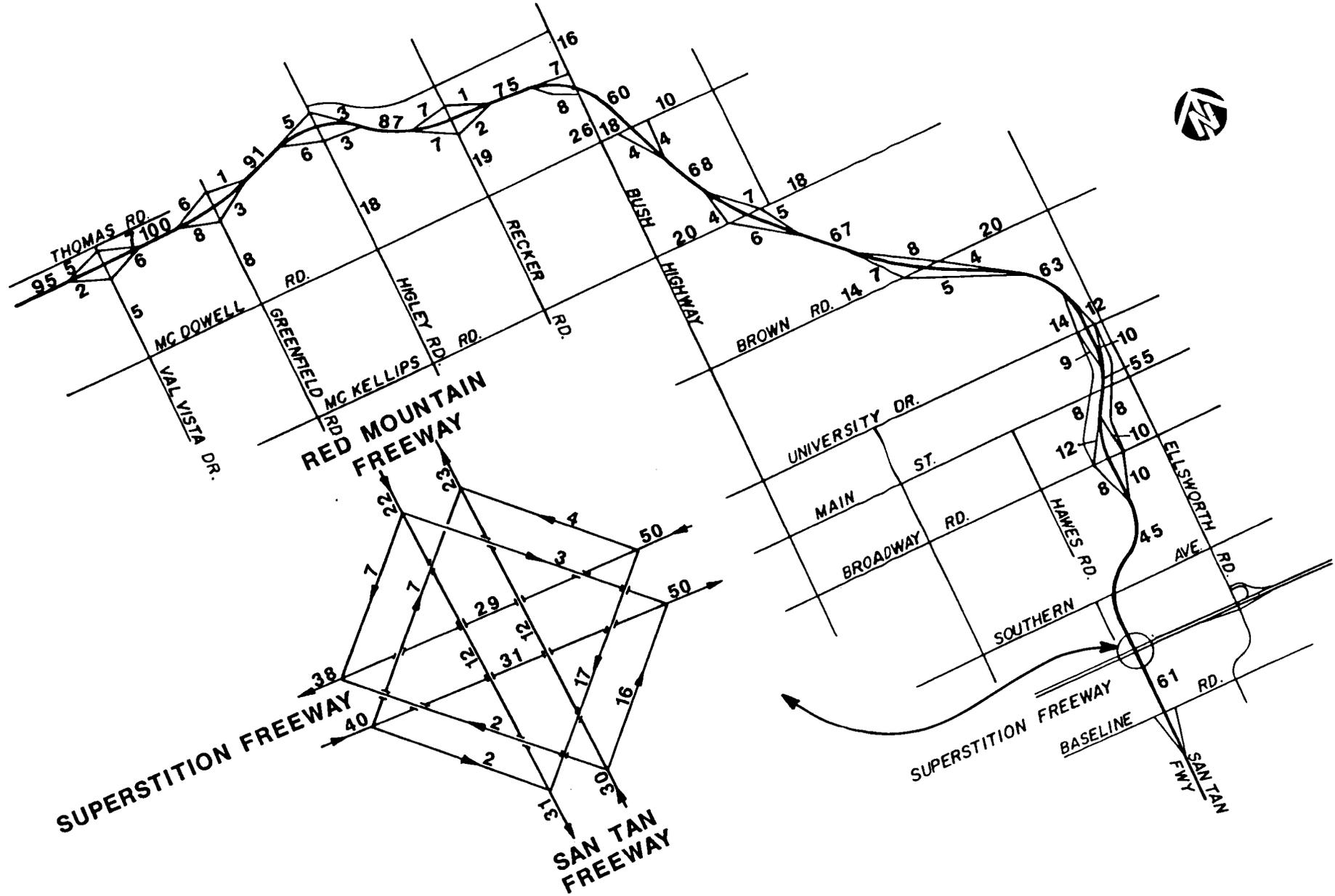


TRAFFIC FORECAST - YEAR 2005
 (THOUSANDS OF VEHICLES PER DAY)
Arizona Department of Transportation

RED MOUNTAIN FREEWAY



FIGURE No. VII-1	
DATE: OCT 1988	PAGE 28



TRAFFIC FORECAST - YEAR 2015
 (THOUSANDS OF VEHICLES PER DAY)
Arizona Department of Transportation

RED MOUNTAIN FREEWAY

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FIGURE No. VII-2	
DATE: OCT 1988	PAGE 29

VIII. RIGHT-OF-WAY

Freeway

During the early design of the parkway, under the direction of the City of Mesa, it was determined that the basic minimum right-of-way width would be 250'. This width was deemed adequate for an at-grade parkway with signalized intersections.

In November, 1984, the City of Mesa instructed Parsons Brinckerhoff to upgrade the facility to a freeway from the Outer Loop to the proposed Ellsworth Freeway. With this change in concept it was no longer possible to contain the facility within the 250' right-of-way. Therefore, the basic right-of-way width was revised to a minimum of 350'.

Based on the earlier parkway concept a one-mile section of right-of-way, 250' wide from Recker Road to Bush Highway, was dedicated to the City of Mesa by a local owner/developer. Additional right-of-way will now be required along the northside of this section.

As noted in Chapter VI, Segment Descriptions, the Flood Control District of Maricopa County has agreed, in concept, to make the necessary right-of-way for the freeway through the Spook Hill flood reservoir area available to ADOT at no cost, subject to conditions to be worked out during final design. The length of this segment is approximately 3.8 miles. New right-of-way and/or easements will need to be acquired from approximately 80 private land owners and from the following governmental agencies:

United States Department of the Interior

Bureau of Land Management

Bureau of Reclamation

United States Department of Energy

Western Area Power Administration

State of Arizona, Land Department

Flood Control District of Maricopa County

Maricopa County, Highway Department

City of Mesa

Roosevelt Water Conservation District

The total new right-of-way required for the entire route between Lindsay Road and Baseline Road is estimated at 760 acres of land.

The estimated number of buildings which will be displaced is:

Business Buildings	1
Residences	15
Mobile Homes	5

IX. UTILITIES

All public and private utility companies which have facilities in the vicinity of the project have been contacted. The list of the utility companies is as follows:

Dimension Cable	
Flood Control District of Maricopa County	American Cable
Arizona Public Service Company	Storer Cable
Arizona Water Company	El Paso Natural Gas Company
Roosevelt Water Conservation District	U.S. Department of Energy
Mountain Bell	Western Area Power Administration
Salt River Project	Desert Sage Water Company
American Telephone and Telegraph	Bureau of Reclamation
Golden Hills Cablevision	City of Mesa

The utility companies have provided data on the approximate location of their facilities. Major utilities are shown on the design concept plans. The exact location of the utility facilities will be determined during final design.

Several known major utility conflicts occur throughout the project limits. The following denotes the utility involved and the location where the conflicts occur.

1. AT&T

Underground transcontinental fiber optic telephone cables. These cables are located along the north bank of the Southern Canal at approximately Station 554+00.

2. Roosevelt Water Conservation District

Water well field located south of the Southern Canal at approximate Stations 555+00 to 570+00. Several wells are located in this area and are interconnected by underground piping.

3. Talley Defense Systems

Although not a utility, a possible conflict may occur with the operations of Talley Defense Systems. The manufacturing plant (test lab) north of Thomas Road, approximate Stations 595+00 to 610+00, currently experiments with explosive propellant fuels. This may require providing a certain area be set aside for a clear zone.

4. Western Area Power Association and Bureau of Reclamation

High voltage transmission lines cross the proposed alignment at approximate Stations 965+00 and 1007+00. Direct conflict with support towers or poles will occur at both locations. Relocation of towers will be required.

Along the proposed alignment there are numerous locations where utilities (overhead power and telephone, water, gas, sanitary sewers, storm drains and other facilities) will require relocation or adjustment. During final design relocation methods and routes will have to be determined in cooperation with the owners of the effected utility.

X. DRAINAGE

Overview

The selected Red Mountain Freeway alignment takes advantage of local natural and man-made drainage features in a manner which minimizes freeway drainage and right-of-way requirements.

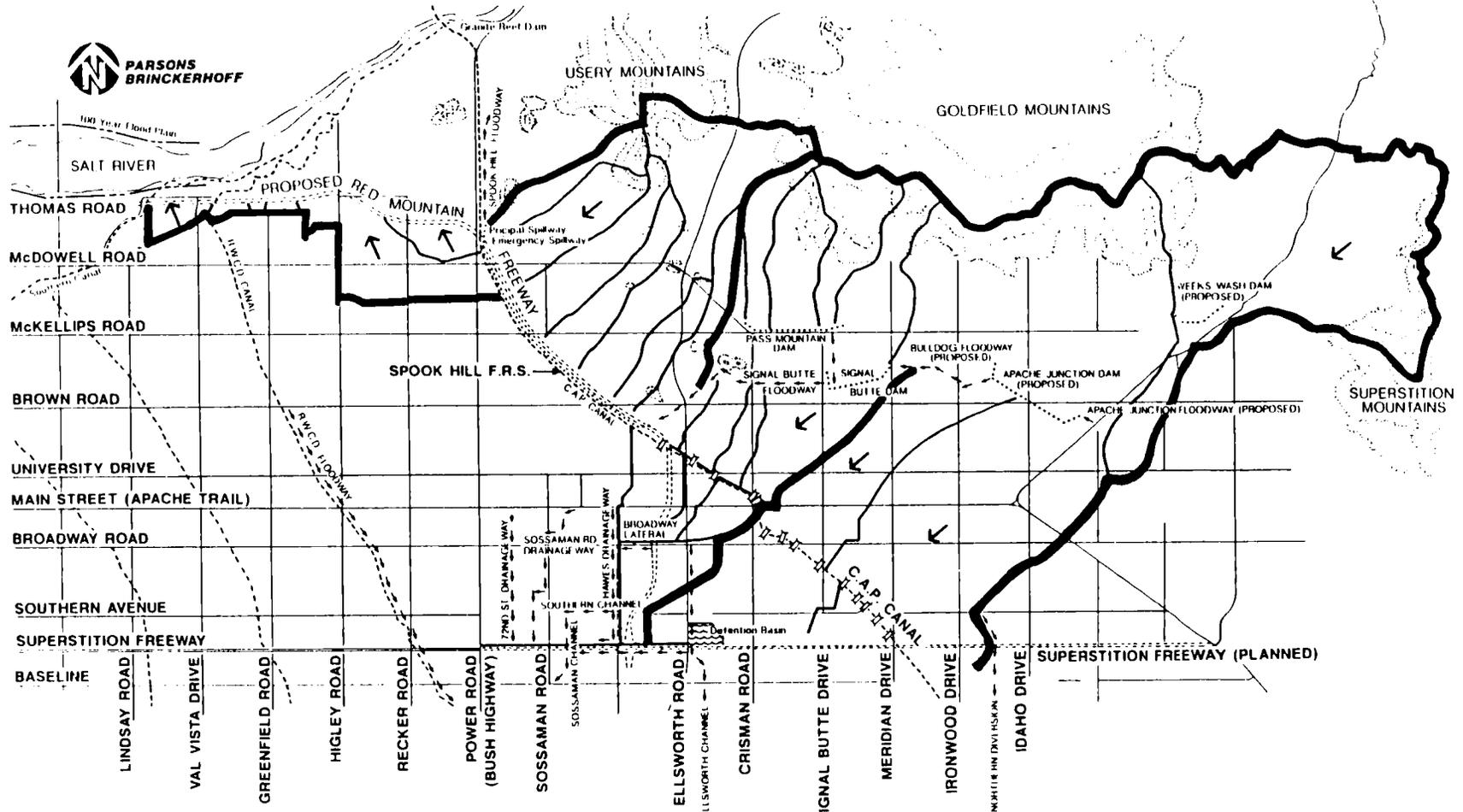
The freeway corridor traverses two regional watersheds: the northwesterly sloping Salt River Basin and the vast southwesterly sloping Gila River Basin. The two basins form an alluvial fan with headwaters in the Utery, Goldfield, and Superstition Mountains. The watershed divide between the two basins has largely been redefined by regional irrigation and flood-control projects; most significant among these is the Buckhorn-Mesa Watershed Protection Project.

The selected freeway alignment closely follows this watershed divide, staying within a quarter of a mile of the ridgeline separating the two basins between Lindsay Road and Bush Highway, then actually straddling the divide for the next four miles to University Drive. South of University Drive, the freeway's drainage area is again limited by the CAP canal and the Buckhorn-Mesa structures. (See Figure X-1.)

System Design

All drainage aspects related to the freeway were analyzed to the extent necessary to establish a workable drainage concept, determine project cost, and define right-of-way needs. Modifications to existing and proposed drainage systems, necessitated by the freeway design, were studied and conceptually designed. Hydrologic studies were performed, system design concepts were prepared, alternative drainage schemes were examined and drainage channel and structure locations were established and sized. These facilities have been included on the design concept plans. The following summarizes the results of the drainage design and highlights important considerations and conclusions.

The drainage systems associated with Red Mountain Freeway are identified as either on-site or off-site systems based on whether the flows they intercept originate from within or from without the freeway's right-of-way.



LEGEND

- Watershed Boundary
- Subwatershed Boundary
- Dam
- Flood Control Channel
- C.A.P. Canal/Canals
- Overchute
- 100 Year Flood Plain
- River

DRAINAGE AREA BOUNDARY MAP

Arizona Department of Transportation

RED MOUNTAIN FREEWAY

PARSONS BRINCKERHOFF



FIGURE No. X-1

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Off-site drainage systems were designed to protect the freeway from a 50-year design storm with the contributing areas assumed to be in their existing condition. Drainage ordinances currently in effect in these areas require that runoff from a 50-year, 24-hour rainfall be retained on all future development. Since many of the contributing areas are rapidly developing, "existing conditions" represent a worst-case scenario and therefore produce a conservative estimate of drainage requirements. Moreover, freeboard provisions were made so that runoff from a 100-year event intercepted by the Red Mountain Freeway will be contained within freeway right-of-way.

On-site drainage system design was based on a 10-year storm except in depressed sections where a 50-year design was used.

Each point at which flow will be discharged from the freeway was analyzed to determine whether the 100-year discharge would cause adverse impacts on downstream properties attributable to freeway drainage. Modifications were made to the outfall facility and/or outfall right-of-way to alleviate such adverse impacts where they would have occurred.

In locations where the freeway will encroach on a regulatory floodplain, the encroachment was designed to minimize its effects on the floodplain. Where freeway construction will alter the floodplain, floodplain revisions will be prepared during final design and submitted for acceptance by FEMA.

Several proposed projects will have an impact on Red Mountain Freeway drainage requirements. Two of these projects, the Spook Hill Area Drainage Master Plan (ADMP) and the Eastern Maricopa County ADMP, were not adopted at the time of this study and thus were not assumed to have been built by the time Red Mountain Freeway is constructed. An implementation schedule has, however, been adopted for the following projects which were assumed to have been built at the time Red Mountain Freeway construction begins: The Superstition Freeway extension from Power Road to US 60 in Apache Junction, the North Higley Road Drainage Improvements, and the completion of the Buckhorn-Mesa Watershed Protection Project.

Although no deliberate attempt was made to alleviate local drainage problems not related to the freeway construction, the freeway drainage system will improve the drainage conditions in several areas along its route.

The Red Mountain Freeway drainage system, from Lindsay Road to Baseline Road is divided into four major segments that are separate and independent from each other. These segments correspond to the freeway segments identified in Chapter VI. Tables 1 and 2 present a concise, segment by segment, summary of the drainage requirements of the freeway and the associated arterial cross roads.

Following is a discussion of drainage requirements and design for each of the four freeway segments:

- o **Segment 1: Lindsay Road to Bush Highway**

This segment of the freeway lies entirely within the narrow Salt River Basin, the headwaters of which have been diverted by the Spook Hill FRS and Floodway to a point on the Salt River near Granite Reef Dam. The freeway will intercept several relatively small drainage courses. The drainage will be conveyed, south to north, under the freeway via culverts and discharged into existing channels on the north side of the freeway. The culvert outlets are designed so that discharge rates and velocities match existing conditions.

Flows intercepted by the freeway west of the Southern Canal will be conveyed along the freeway in an unlined channel on the south side of the roadway and discharged to the Salt River. The latest floodplain delineation (Simons, Li & Assoc. 1987) indicates that this section of the freeway is outside the Salt River's 100-year floodplain.

- o **Segment 2: Bush Highway to University Drive**

This segment of the selected freeway alignment runs parallel and directly adjacent to the Spook Hill FRS. In as much as the dam forms a watershed divide and is constructed on public right-of-way, significant drainage and right-of-way problems in this area have been eliminated.

TABLE 1

**DESIGN VALUES FOR OFF-SITE FLOWS INTERCEPTED
BY RED MOUNTAIN FREEWAY
AT MAJOR
CONCENTRATION POINTS**

FREEWAY SEGMENT	CONCENTRATION POINT					DESIGN DISCHARGE		REMARKS
	NO.	FREEWAY STATION (approx.)	LOCATION	STRUCTURE	DRAINAGE AREA	50-YEAR (cfs)	100-YEAR (cfs)	
I	1	555+00	Just east of Southern Canal	Equipment pass.	49 acres	97	113	Due to the short time of concentration of these watersheds, the peak discharges given include freeway pavement drainage.
	2	565+00	Approximately 1/2 mile west of Greenfield Road	2 - 42" RCP culvert	44 acres	89	102	
	3	585+00	Approximately 850 feet west of Greenfield Road	1 - 48" RCP culvert	30 acres	61	71	
	4	610+00	Approximately 1650 feet east of Greenfield Road	2 - 48" RCP culvert	61 acres	121	138	
	5	625+00	Gravel pit between Greenfield and Higley roads	3 - 10' x 4' RCB culvert	728 acres	510	800	These values ignore the attenuating effect of the gravel pit.
	6	640+00	Approximately 500 feet west of Higley Road	2 - 42" RCP culvert	88 acres	103	120	
II	7	765+00	Just east of Bush Highway	Bridge over Emergency Spillway	42.5 sq. miles	0	0	The emergency spillway will discharge 21,000 cfs before the Spook Hill FRS is breached.
III	8	985+00	Between Brown Road and University Drive (CAP overchute)	Equipment pass.	0.35 sq. miles	230	263	
	9	1120+00	Just north of Southern Avenue	3 - 12' x 8' RCB culvert	4.45 sq. miles	1664	2303	
IV	10	1127+00	Approximately 600 feet south of Southern Avenue	1 - 30" RCP culvert				

TABLE 2
DESIGN VALUES FOR OFF-SITE FLOWS INTERCEPTED
BY RED MOUNTAIN FREEWAY CROSSROADS
AT MAJOR
CONCENTRATION POINTS

FREEWAY SEGMENT	CONCENTRATION POINT				DESIGN DISCHARGE		REMARKS
	NO.	LOCATION	STRUCTURE	DRAINAGE AREA	50-YEAR (cfs)	100-YEAR (cfs)	
I	1	Val Vista Drive, just north of RMF just south of RMF	36" RCP culvert 42" RCP culvert	18 acres 25 acres	34 49	41 57	
	2	Greenfield Drive, just north of RMF	2 - 48" RCP culvert	83 acres	132	163	
	3	Higley Road, just north of RMF just south of RMF	2 - 48" RCP 1 - 36" RCP culverts	124 acres 27 acres	147 32	168 37	
II	4	Spook Hill principal spillway (between Bush and McDowell)	Modified principal spillway	42.5 sq. miles	undetermined	47,300	These values represent the total runoff generated from the respective watersheds. They do not reflect the attenuating effect of the four reservoirs separating these structures. The principal spillway 100-year discharge of approximately 1000 cfs and the maximum combined emergency and principal spillway discharge of approximately 20,000 cfs were used in analyzing the adequacy of the proposed structures.
	5	McDowell Road	Freeway overpass & equipment pass.	40.7 sq. miles	undetermined	37,700	
	6	McKellips Road	Freeway overpass & equipment pass.	38.8 sq. miles	undetermined	28,400	
	7	Brown Road	Freeway overpass & equipment pass.	33.4 sq. miles	undetermined	8,000	
III	8	University Drive	1 - 6' x 4' RCB culvert	33 acres	83	110	
	9	Main Street	1 - 8' x 4' RCB culvert	85 acres	132	160	
	10	Broadway Road	3 - 12' x 8' RCB culvert	3.85 sq. miles	1473	1981	

The Spook Hill FRS is an approximately 4-mile long dam and reservoir which forms a downstream element of the regional Buckhorn-Mesa Watershed Project. The dam and reservoir control runoff from a 16.5-square mile drainage area in addition to receiving the outflow of upstream Buckhorn-Mesa WPP structures. Principal spillway outflow is discharged to the Spook Hill Floodway and ultimately to the Salt River. The structure was designed and built by the U.S. Soil Conservation Service, but is currently owned and operated by the Flood Control District of Maricopa County. Due to the provisions of the Arizona Revised Statutes, Title 45 - Waters, Chapter 3, Article I, the structure is under the jurisdiction of the Arizona Department of Water Resources, and since the reservoir is a designated zone A Floodplain, it is also under the jurisdiction of the Federal Emergency Management Agency. All of the above agencies, except for FEMA, participated in the development of the current design concept. FEMA will primarily be concerned with 100-year flood elevation and extent, and, due to the proposed reshaping of the reservoir, those are expected to be lower than existing.

Since the downstream side of the dam is occupied by the CAP's Salt-Gila Aquaduct, the freeway will be constructed on the upstream side with a profile that is elevated above the 50- or 100-year water surface elevation in the reservoir. Material necessary for freeway construction will be excavated from the reservoir to restore existing storage and performance characteristics of the flood retarding structure. Future watersurface elevations in the reservoir will be a function of the combined effect of freeway profile grade, reservoir shape, principal spillway modifications, crossroad structure sizes, and desired noise and visual shields.

During the design phase of the project, the level of noise and flood protection desired can be evaluated in terms of:

1. Environmental and multiple-use aspects of the reservoir: Increased levels of noise and flood protection in this area translate directly into increased embankment size. Since any embankment constructed in this area will have to be borrowed from the reservoir in order to restore storage capacity, the benefits of increased protection must be weighed against the cost of increasing the area of the reservoir to be disturbed from its natural state, of increasing cut slopes possibly to the point where slope protection becomes required, and of increasing the area of the reservoir susceptible to flooding by high frequency storms.

2. **Total Project Cost:** Several factors contribute in determining the increase to project cost in response to increased levels of flood and noise protection. The increased embankment size, increased enacuation rate, and the lowered permissible water surface elevation will lead to additional costs for excavation and fill, slope protection, extra right-of-way, modification of principal spillway, larger structures under the crossroads, and more crossroad reconstruction.

The three overpasses, at McDowell, McKellips, and Brown roads, represent something of a constraint to the freeway profile. However, since ramps at these overpasses will be constructed on embankment that stands between the freeway and the floodwaters in the reservoir, it is possible to increase the level of flood protection to the freeway without increasing freeway elevation at these locations.

- o **Segment 3: University Drive to Southern Avenue**

This segment of the freeway will intercept runoff from a 5-square mile watershed which is currently a tributary to the Hawes Road Drainageway. The area is a part of the Gila River Basin, the headwaters of which have been diverted by the Buckhorn-Mesa Project. Thus the drainage area boundary is drawn by the existing Signal Butte Dam and Floodway and by the proposed Bulldog Floodway. (See Figure X-1.)

The Hawes Road Drainageway is a north-to-south stormwater collector that receives inflows from the east by the discharge of several laterals and delivers these flows to the Sossaman Road Channel via east-to-west channels along Southern Avenue and the Superstition Freeway. Flows reaching the Sossaman Road Channel are conveyed to the RWCD Floodway and ultimately to the Gila River.

The Hawes Road Drainageway laterals intercept southwesterly directed sheet flow at Broadway Road, Pueblo Way, and Southern Avenue. Since the freeway profile is depressed between the CAP Canal and Southern Avenue, the laterals will be intercepted, along with any overload flow, by a lined channel along the east side of the freeway and diverted south to Southern Avenue. On the northside of Southern Avenue these flows will pass through a culvert under the freeway to a channel along Southern Avenue discharging to the Hawes Road drainageway where these flows currently concentrate.

Pavement drainage will be collected in a storm drain and discharged to the Hawes Road Drainageway without adding to existing peaks.

- o **Segment 4: Southern Avenue to Baseline Road**

South of Southern Avenue, drainage requirements are mostly met by drainage systems designed for the Superstition Freeway. The most significant of these systems is a regional detention basin at Ellsworth Road and a series of channels and detention basins along the Superstition Freeway west of Ellsworth local runoff will be conveyed along existing drainage courses to the Hawes Road Drainageway.

BIBLIOGRAPHY

The following studies provide specific and significant information directly relevant to each of the systems discussed.

Segment 1

1. Arizona Department of Transportation, "East Papago and Hohokam Freeways Technical Memorandum No. 11, Floodplain East of Outer Loop: Salt River Hydraulic Information Report," Simons, Li & Associates, Inc., Tempe, Arizona, June 1987.
2. The City of Mesa, "East Side Stormwater Drainage Study," Yost and Gardner Engineers, Phoenix, Arizona, May 1981.
3. The City of Mesa, "Drainage Study for the Northern Portion of Higley Road from 2800 Feet North of McKellips Road to Thomas Road: Volumes 1 and 2," Greiner Engineering Sciences, Inc., Phoenix, Arizona, October 1984.
4. Flood Control District of Maricopa County, "Spook Hill Flood Retarding Structure: Spillway Inundation Area Study," Lowry & Associates Consulting Engineers, Phoenix, Arizona, August 1985.
5. The City of Mesa, "Drainage Report for Ridgeview Subdivision."

Segment 2

1. Flood Control District of Maricopa County, "Spook Hill Area Drainage Master Study," Parsons Brinckerhoff Quade & Douglas, Inc., Tempe, Arizona, February 1987.
2. United States Department of Agriculture, Soil Conservation Service, "Buckhorn-Mesa Watershed Protection Project - Spook Hill Floodwater Retarding Structure: Final Design Report" Arizona State Office, Phoenix, Arizona, December 1976.

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4. United States Department of Agriculture, Soil Conservation Service, "Buckhorn-Mesa Watershed Protection Project: Final Environmental Impact Statement," Phoenix, Arizona, June 1976.
5. United States Department of Agriculture, Soil Conservation Service, "Hydrology - Buckhorn-Mesa Watershed - Spook Hill Reservoir," Portland, Oregon, May 1975.
6. United States Department of Agriculture, "Plans for the Construction of Spook Hill Floodwater Retarding Structure: As-Built Drawings," Soil Conservation Service, Phoenix, Arizona April 1980.

Segment 3 and 4

1. Flood Control District of Maricopa County, "Eastern Maricopa County Area Drainage Master Study," A-N West, Inc., Phoenix, Arizona, January 1987.
2. Arizona Department of Transportation, "Superstition Freeway Comprehensive Offsite Drainage Plan," A-N West, Inc., Phoenix, Arizona, February 1987.
3. Arizona Department of Transportation, "Preliminary Drainage Report for Superstition Freeway: Power Road to Ellsworth Road," URS Corporation, Phoenix, Arizona, November 1987.
4. Arizona Department of Transportation, "Final Drainage Design Report for Superstition Freeway (SR 360) Ellsworth Road to Ironwood Drive," Coe & Van Loo Consulting Engineers, Inc., Phoenix, Arizona, October 1987.

XL. COST ESTIMATE

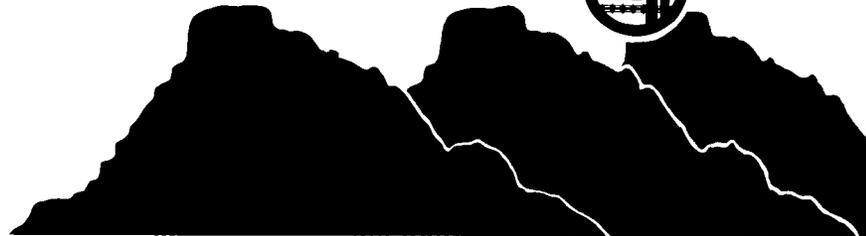
**RED MOUNTAIN FREEWAY
LINDSAY ROAD TO BASELINE ROAD
SELECTED ALIGNMENT
(Cost in Thousands)**

	SEGMENT				TOTALS
	1	2	3	4	
1. Concrete Pavement	\$ 7,116	\$ 6,805	\$ 3,174	\$ 1,457	\$ 18,552
2. Shoulders, Crossroads, Ramps	2,537	3,073	3,150	1,739	10,499
3. Roadway Grading	3,569	2,527	4,526	1,261	11,883
4. Drainage	3,402	3,290	3,165	700	8,932
5. Utility Relocation	1,944	1,880	2,090	400	6,314
6. Lighting, Signing, Striping, Signals	4,131	3,995	1,870	850	10,846
7. Fence, Guardrail Curbs, Miscellaneous Earth	1,701	1,645	770	350	4,466
8. Retaining Walls	117	0	781	96	994
9. Bridges	4,728	9,084	3,328	10,162	27,302
10. Landscaping	3,402	3,290	1,540	700	8,932
Subtotal (Items 1 thru 10)	\$32,647	\$35,589	\$24,394	\$17,715	\$108,720
Other Items @ 15%	4,897	5,338	3,659	2,657	16,307
Subtotal	\$37,544	\$40,927	\$28,053	\$20,372	\$125,027
Contingencies and Engineering @ 17%	6,382	6,958	4,769	3,464	21,255
TOTAL CONSTRUCTION	\$43,926	\$47,885	\$32,822	\$23,836	\$146,282
Right-of-Way	17,000	9,100	8,500	5,300	39,900
TOTAL ESTIMATED COSTS	\$60,926	\$56,985	\$41,322	\$29,136	\$186,182

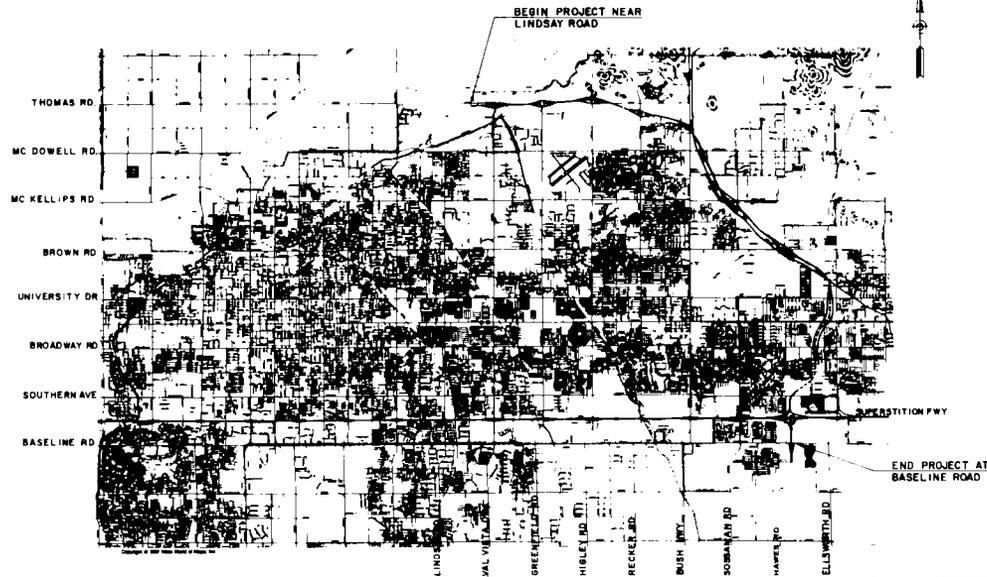
XII. DESIGN CONCEPT PLANS

RED MOUNTAIN FREEWAY

Arizona Department of Transportation



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BRINCKERHOFF



DESIGN CONCEPT PLANS - INDEX

SHEET NO.	TITLE
1	TITLE SHEET
2-5	TYPICAL SECTIONS
6-9	PROJECT CONTROL DIAGRAM
10	PLAN & PROFILE SHEET INDEX
11-20	PLAN & PROFILE
21	RED MTN. / SUPERSTITION TRAFFIC INTERCHANGE
22-24	TRAFFIC INTERCHANGE RAMP PROFILES
25-27	CROSS ROAD PROFILES
28	REPRESENTATIVE CROSS-SECTIONS THRU SPOOK HILL FRS

AUGUST 1988

DESIGN CONCEPT PLANS

Arizona Department of Transportation

RED MOUNTAIN FREEWAY

PARSONS
BRINCKERHOFF



DATE:
OCT 1988

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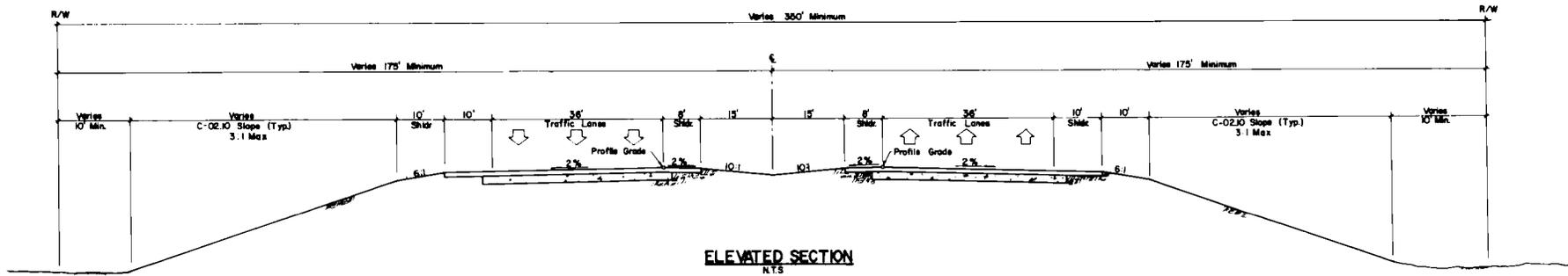
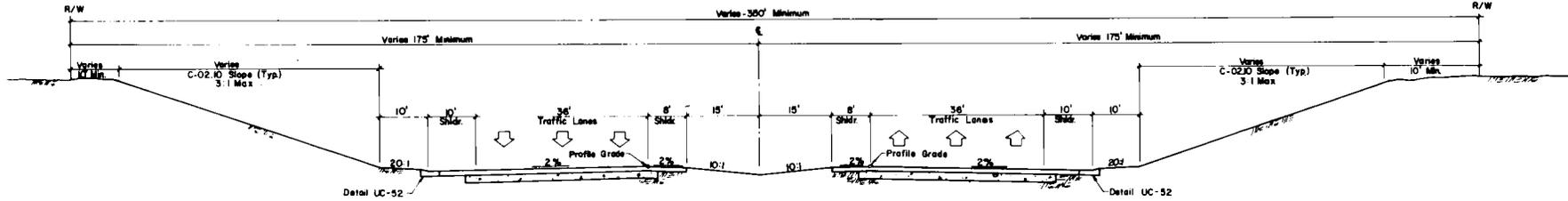
RED MOUNTAIN FREEWAY
MARICOPA COUNTY



F.H.D.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	SOB. SA. HOV3SOB	2	28	

Parsons Brinckerhoff Quade & Douglas, Inc.

FOR THE CONSULTING ENGINEER		
DATE	DESIGN D.W.R.	CHECKED D.W.R.
	DRAWN T.A.	



Note
The Typical Sections Shown On This Plan Are Conceptual Only And Subject To Refinement During Final Design.

RED MOUNTAIN FREEWAY
MAINLINE TYPICAL SECTIONS

DESIGN CONCEPT PLANS
Arizona Department of Transportation

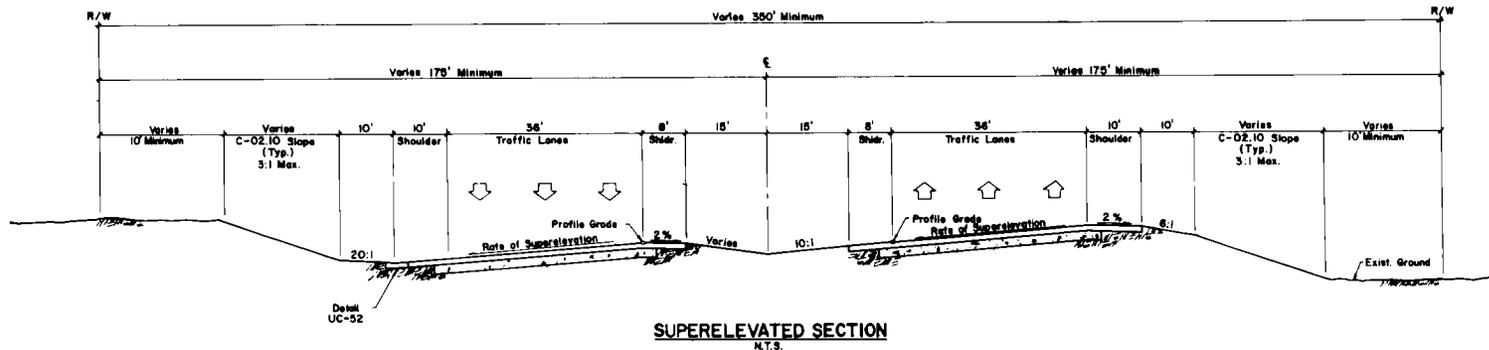
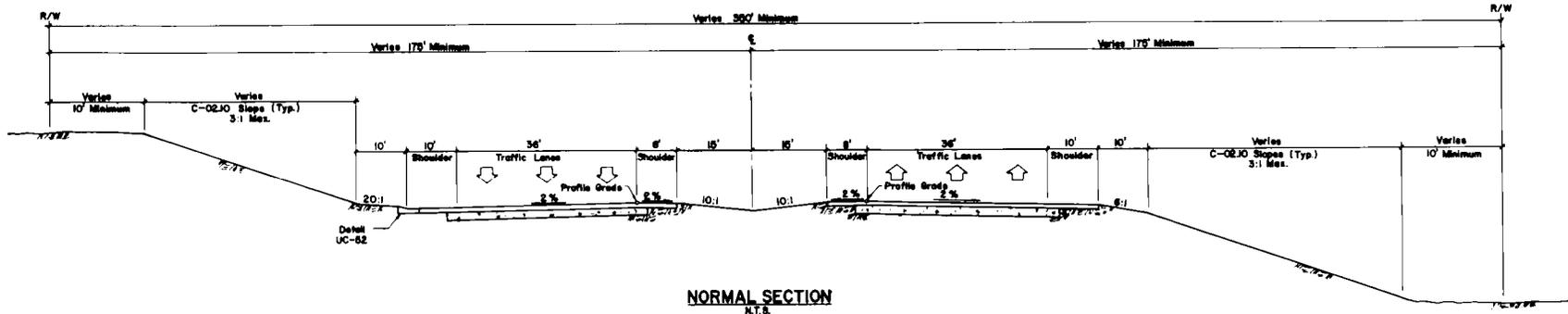
RED MOUNTAIN FREEWAY

PARSONS
BRINCKERHOFF

DATE: OCT 1988
PAGE 47

RED MOUNTAIN FREEWAY
MARICOPA COUNTY

	STATE	PROJECT NO.	SHEET TOTAL	AS BUILT
	ARIZ.	SOB. HA 1087500	3	28
Parsons Brinckerhoff Quade & Douglas, Inc.				
DATE		FOR THE CONSULTING ENGINEER		
CEHEN D.W.R.	BAHNS M.A.T.	CHECKED D.W.R.		



Note
The Typical Sections Shown On This Plan Are Conceptual Only And Subject To Refinement During Final Design.

RED MOUNTAIN FREEWAY
MAINLINE TYPICAL SECTIONS

DESIGN CONCEPT PLANS

Arizona Department of Transportation

RED MOUNTAIN FREEWAY

PARSONS
BRINCKERHOFF

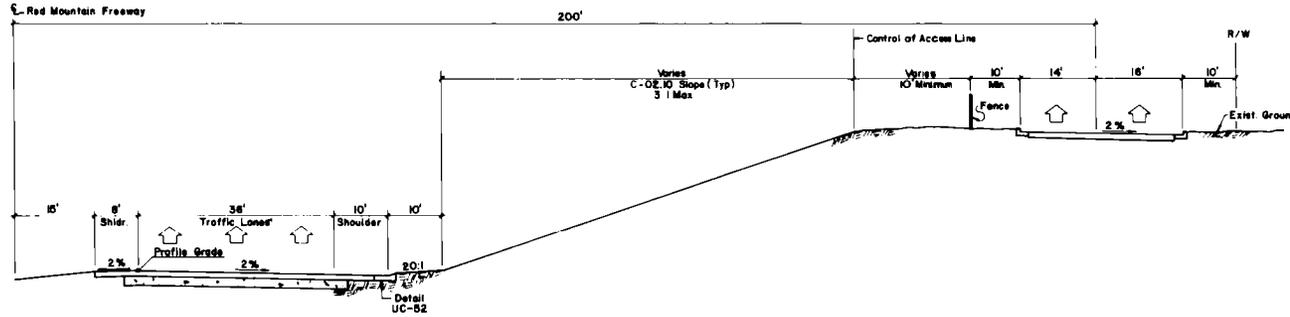


DATE:
OCT 1988

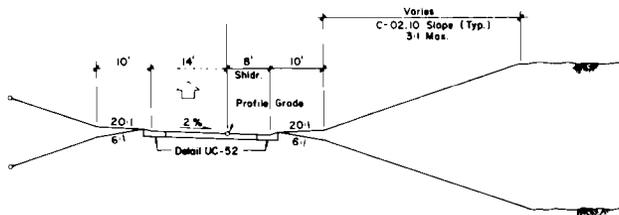
PAGE
48

RED MOUNTAIN FREEWAY
MARICOPA COUNTY

	F.H.W.A. NO.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
	6	ARIZ.	ROEL. MA. HOVTSOIC	4	28	
Parsons Brinckerhoff Quade & Douglas, Inc.						
DATE _____ FOR THE CONSULTING ENGINEER						
DRAWN: D.W.R.		CHECKED: M.A.T.		CHECKED: D.W.R.		



**SOUTHBOUND
HALF SECTION WITH FRONTAGE ROAD
BETWEEN
UNIVERSITY DRIVE & BROADWAY ROAD**
NORTHBOUND IS SYMMETRICAL



TYPICAL RAMP SECTION

Note
The Typical Sections Shown On This Plan Are Conceptual Only And Subject To Refinement During Final Design.

RED MOUNTAIN FREEWAY
RAMP & FR. RD. TYPICAL SECTIONS

DESIGN CONCEPT PLANS

Arizona Department of Transportation

RED MOUNTAIN FREEWAY

PARSONS
BRINCKERHOFF

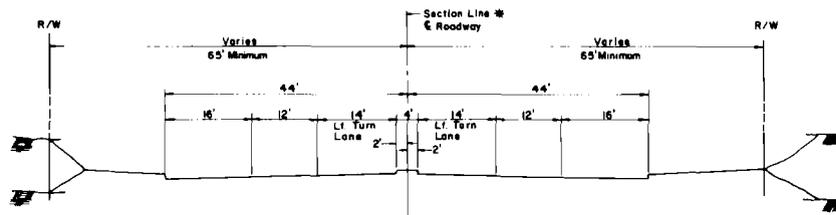


DATE:
OCT 1988

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RED MOUNTAIN FREEWAY
MARICOPA COUNTY

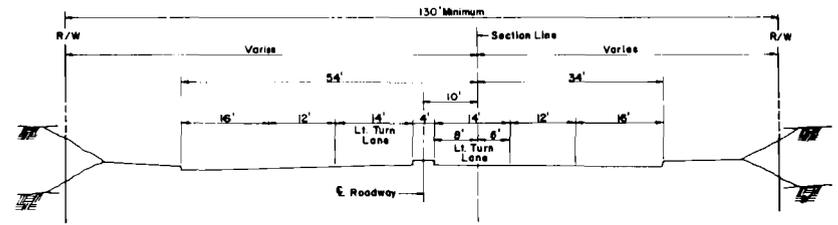
	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
	9	5	28	
Parsons Brinckerhoff Quade & Douglas, Inc. DATE FOR THE CONSULTING ENGINEER DESIGN D.W.R. DRAWN S.B.S. CHECKED D.W.R.				



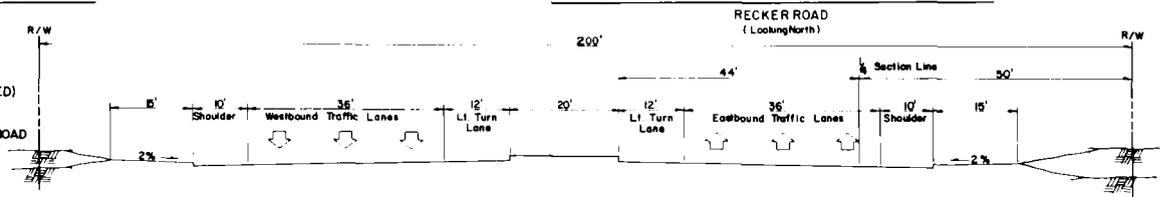
TYPICAL SECTION THRU INTERCHANGE AREA

VAL VISTA DRIVE
GREENFIELD ROAD
BROADWAY ROAD
UNIVERSITY DRIVE
MC KEL LIPS ROAD
THOMAS ROAD (RELOCATED)
BROWN ROAD

* Does Not Apply To THOMAS ROAD

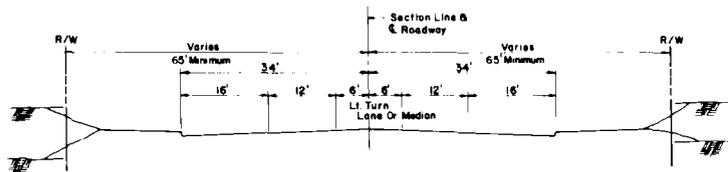


TYPICAL SECTION THRU INTERCHANGE AREA



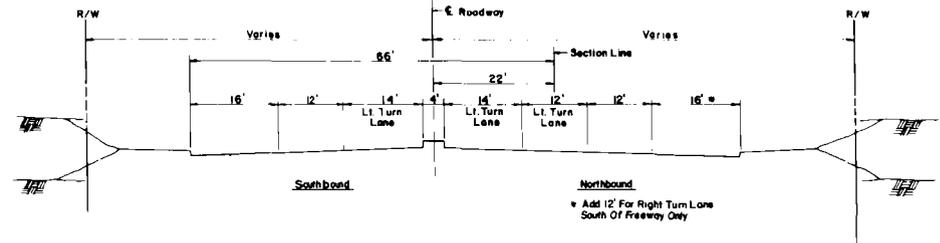
TYPICAL SECTION THRU OVERPASS AREA

MAIN STREET (APACHE TRAIL)
(Looking East)



TYPICAL SECTION THRU INTERCHANGE AREA

SOUTHERN AVENUE
MCDOWELL ROAD



TYPICAL SECTION SOUTH OF INTERCHANGE AREA

HIGLEY ROAD
(Looking North)

Note

The Typical Sections Shown On This Plan Are Conceptual Only And Subject To Refinement During Final Design.

RED MOUNTAIN FREEWAY
CROSSROADS TYPICAL SECTIONS

DESIGN CONCEPT PLANS

Arizona Department of Transportation

RED MOUNTAIN FREEWAY

PARSONS
BRINCKERHOFF

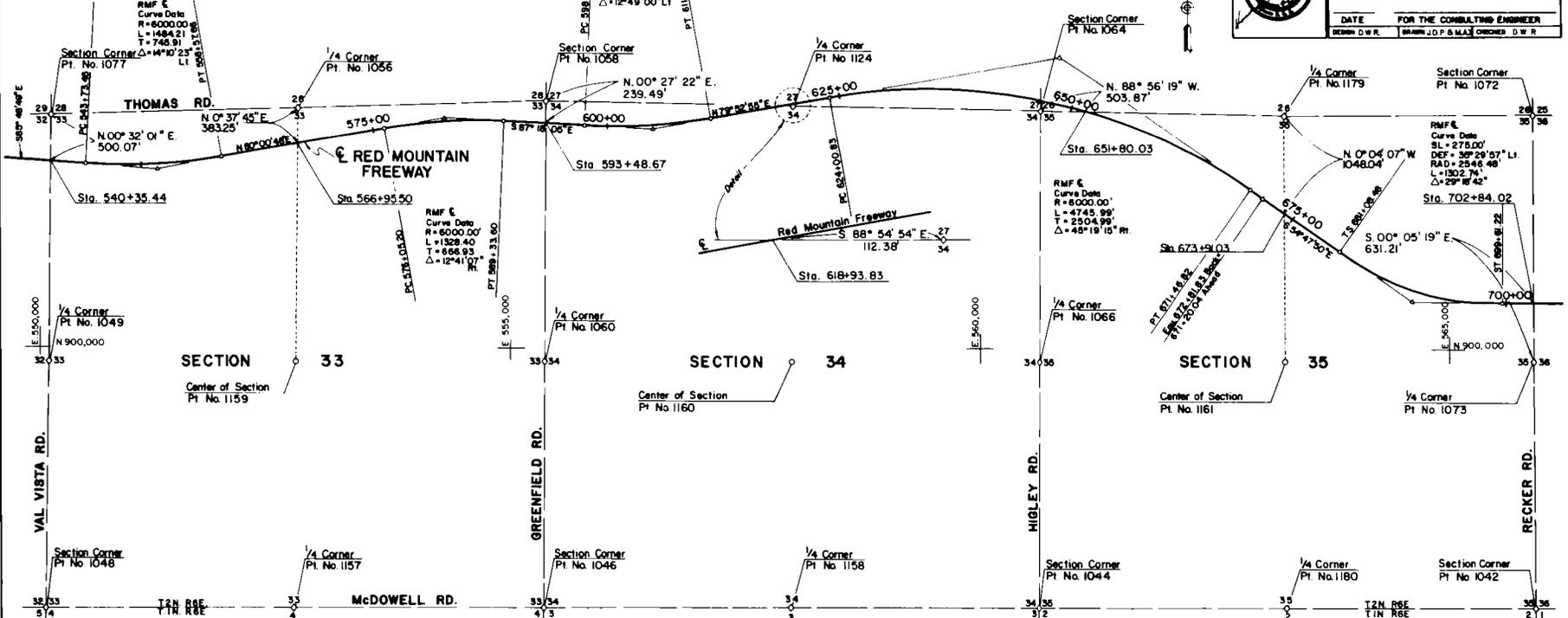


DATE:
OCT 1988

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RED MOUNTAIN FREEWAY
MARICOPA COUNTY

	F.H.S.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
	9	ARIZ.	2021-MA-NORFRED	8	28	
Parsons Brinckerhoff Quade & Douglas, Inc.			DATE FOR THE CONSULTING ENGINEER			
DESIGN D.W.R.			DRAWN J.O.P. & M.A.J.		CHECKED D.W.R.	



Arizona State Plane Coordinates

PT.	NORTHING	EASTING
1042	907259.418091	546209.540829
1044	907259.682238	546211.977728
1046	907215.797253	546226.732729
1048	907200.254971	546048.234173
1050	906948.734237	546008.721406
1052	902507.697741	542750.622259
1054	902648.674061	546331.904880
1056	900063.197797	546230.640230
1058	902648.698417	546051.284158
1060	900065.189744	546025.282260
1072	905093.730644	546008.909250
1074	900063.226400	546008.240656
1076	902600.187308	546119.230641
1124	902600.611723	546020.124307
1127	907215.151130	546209.970642
1134	907217.876400	547077.207150
1136	900060.846204	542726.240001
1140	900064.266200	547008.223200
1161	900068.832050	542354.180750
1170	902607.941006	542351.623853
1190	907217.721711	542357.262200

NOTES

- All Centerline Control Ties Shown Hereon Have Been Computed From Information Provided By A Control Survey Performed 8-1987 By Standage And Truitt Engineering, LTD. Copies Of The Survey Field Notes Are Available From The Arizona Department Of Transportation.
- All Coordinates Shown Are Arizona State Plane Coordinates.
- Average Grid Factor = 0.99983506

NOTE: THE DESIGN CONCEPTS AND PART OF WHAT SHOWN ON THIS PLAN ARE APPROXIMATE ONLY AND ARE SUBJECT TO REFINEMENT DURING FINAL DESIGN.

**RED MOUNTAIN FREEWAY
PROJECT CONTROL DIAGRAM**

DESIGN CONCEPT PLANS
Arizona Department of Transportation

RED MOUNTAIN FREEWAY



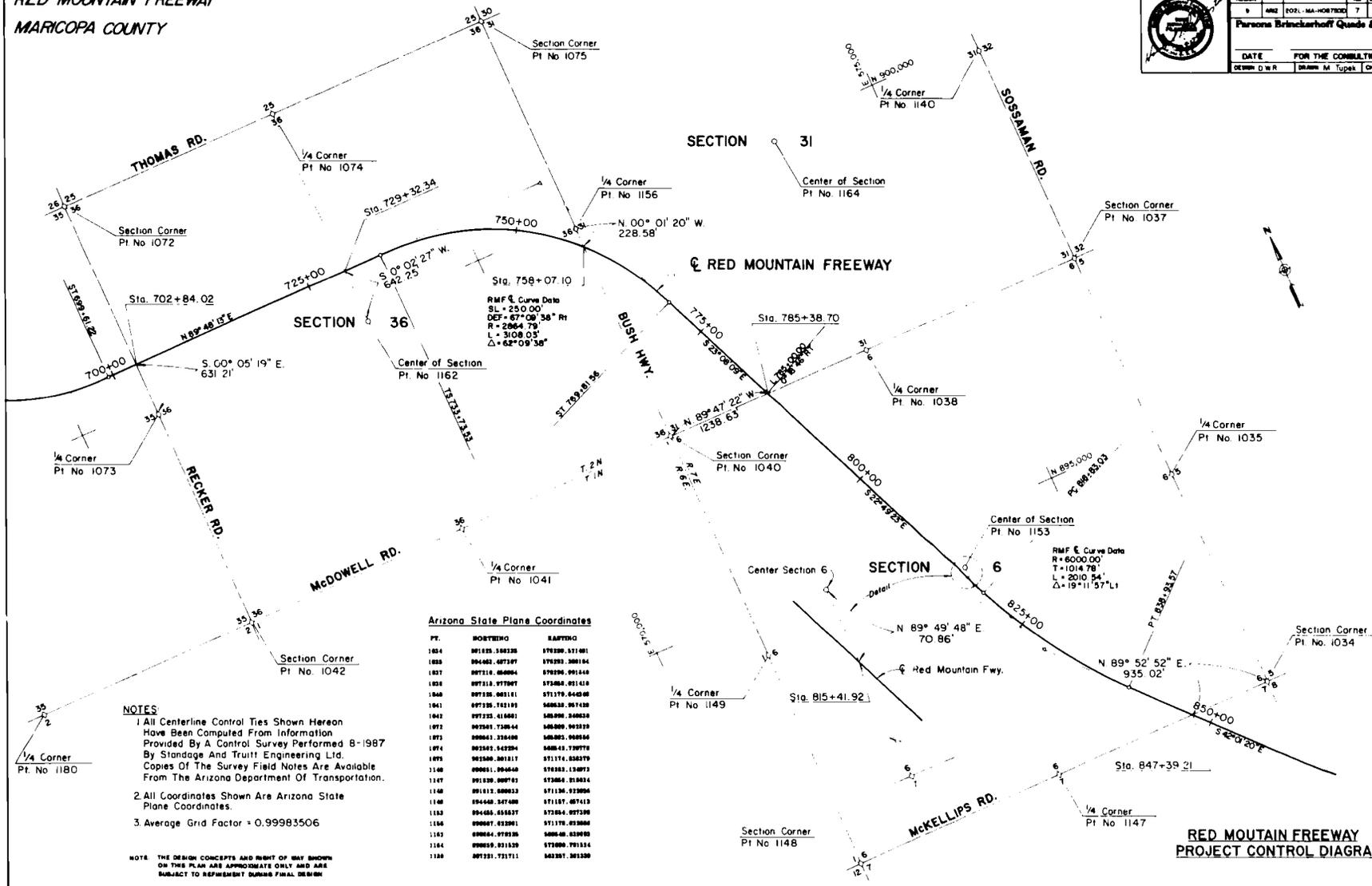
PARSONS
BRINCKERHOFF

DATE: OCT 1988

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RED MOUNTAIN FREEWAY
MARICOPA COUNTY

	FED. AID	STATE	PROJECT NO.	SHEET TOTAL	AS BUILT
	9	ARIZ	EXPL-MA-H087303	7 28	
Parsons Brinckerhoff Quade & Douglas, Inc.					
DATE		FOR THE CONSULTING ENGINEER			
OCT 1988		BRAND M. Tupak CHECKED D.W.R.			



Arizona State Plane Coordinates

PT.	NORTHING	EASTING
1034	001825.580326	070200.571001
1035	004402.407307	070291.300164
1037	007118.000064	070296.991648
1038	007318.977047	073404.051438
1040	007330.003181	071379.044000
1041	007330.102199	040020.001020
1042	007325.414001	040000.240020
1072	007041.730044	040000.000000
1073	006641.320400	040000.000000
1074	003542.542904	040043.730770
1075	003540.001817	071374.050270
1140	000051.004040	070000.130070
1141	001430.000703	073004.010024
1142	001112.000033	071134.020004
1143	004440.347400	071107.007413
1144	004440.050037	070204.007300
1146	000047.032001	071379.030004
1147	000044.979200	040040.030000
1148	000040.001000	070000.701004
1149	007321.707111	040207.001000

- NOTES:
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 - All Coordinates Shown Are Arizona State Plane Coordinates.
 - Average Grid Factor = 0.99983506

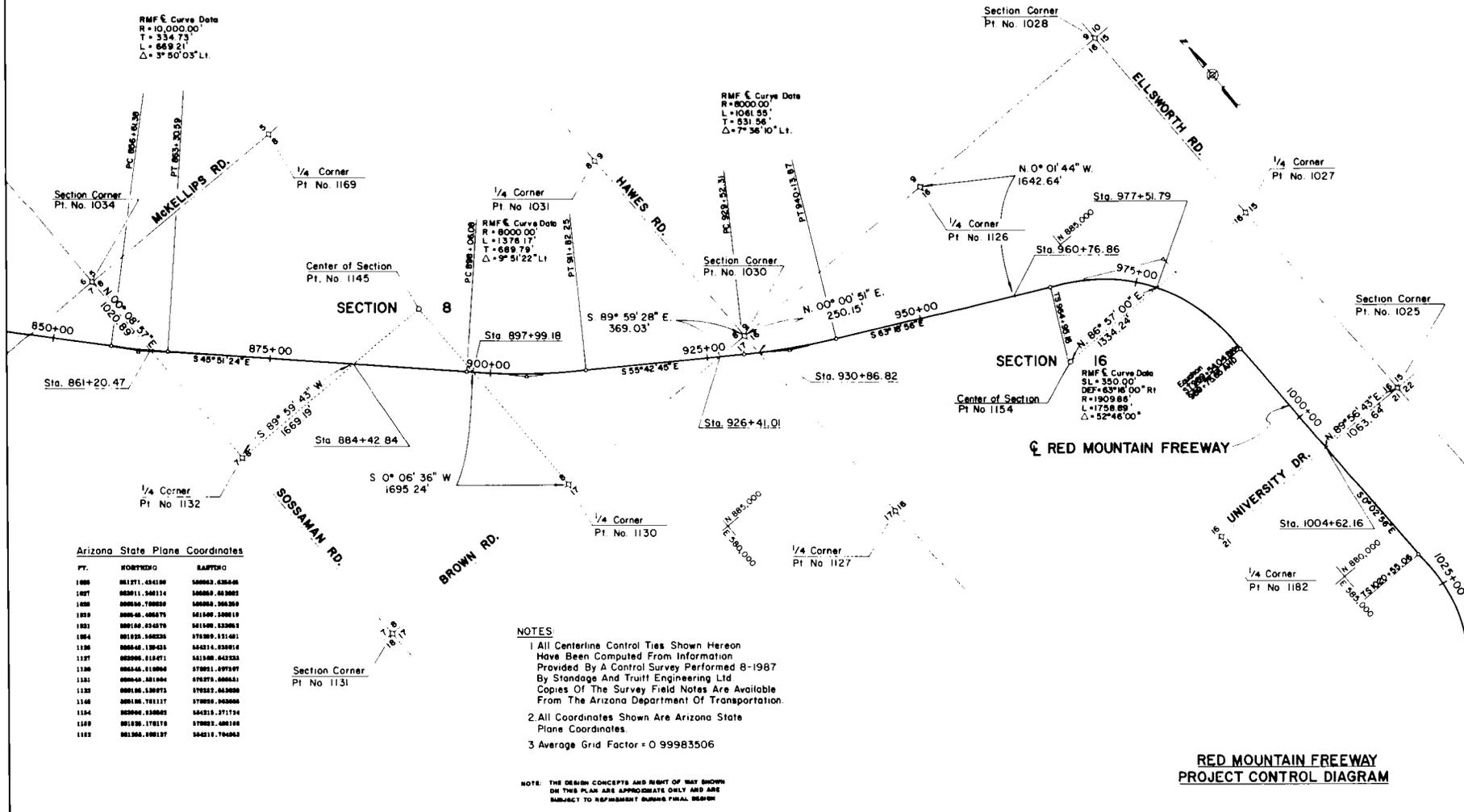
NOTE: THE DESIGN CONCEPTS AND RIGHT OF WAY SHOWN ON THIS PLAN ARE APPROXIMATE ONLY AND ARE SUBJECT TO REVISION DURING FINAL DESIGN

RED MOUNTAIN FREEWAY
PROJECT CONTROL DIAGRAM

<p>DESIGN CONCEPT PLANS</p> <p>Arizona Department of Transportation</p>	<p>RED MOUNTAIN FREEWAY</p>  <p>PARSONS BRINCKERHOFF</p>	<table border="1" style="width: 100%;"> <tr> <td>DATE:</td> <td>PAGE</td> </tr> <tr> <td>OCT 1988</td> <td>52</td> </tr> </table>	DATE:	PAGE	OCT 1988	52
DATE:	PAGE					
OCT 1988	52					

RED MOUNTAIN FREEWAY
MARICOPA COUNTY

	FEDERAL AID	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
	9	ARIZ.	DOE-L-66-H07P00-D	8	28	
Parsons Brinckerhoff Quade & Douglas, Inc.						
DATE			FOR THE CONSULTING ENGINEER			
OCTOBER 2, 1988		DRAWMAN M. Tupak		CHECKED C. W. R.		



DESIGN CONCEPT PLANS

Arizona Department of Transportation

RED MOUNTAIN FREEWAY

PARSONS
BRINCKERHOFF

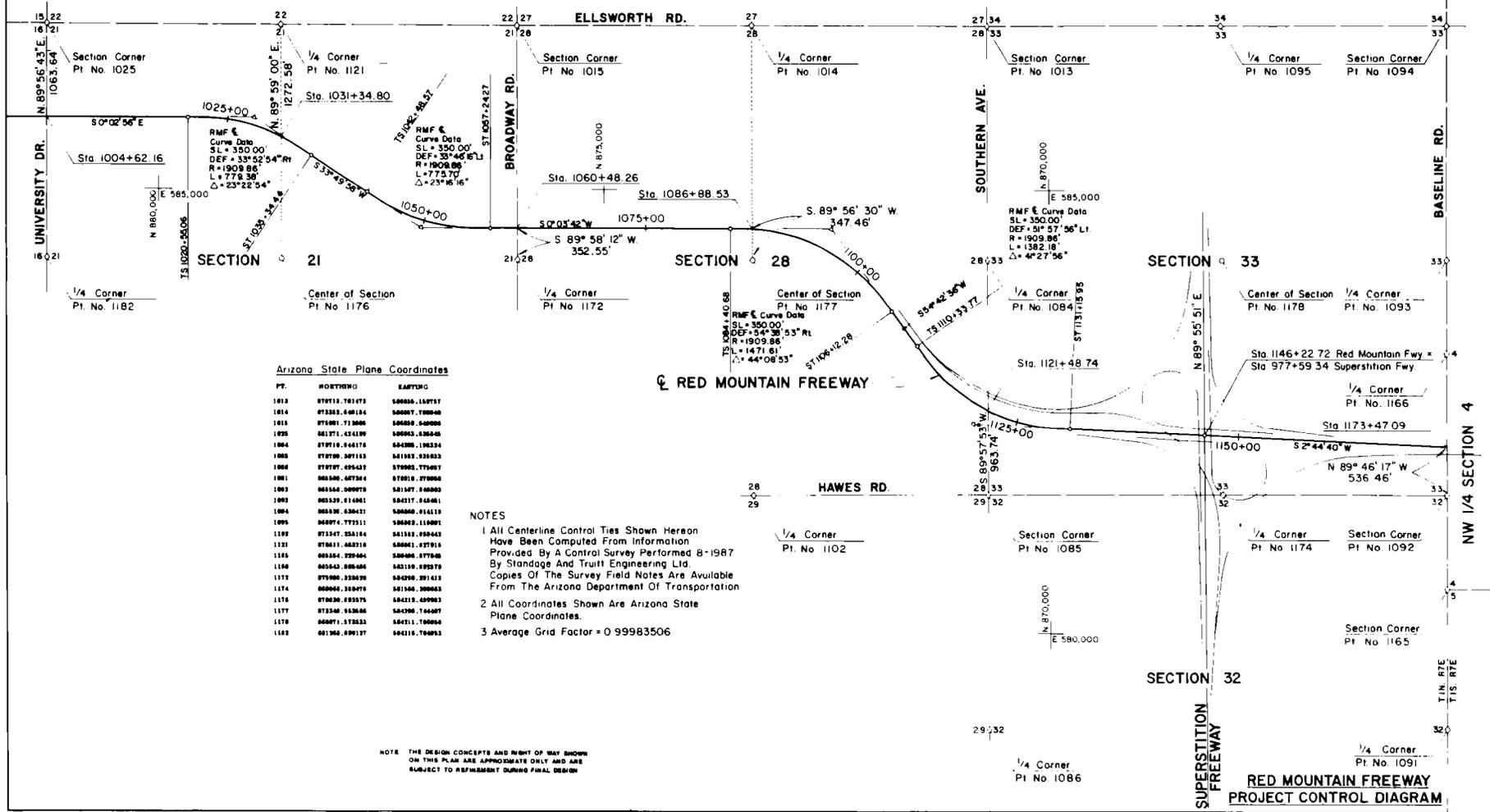


DATE:
OCT 1988

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RED MOUNTAIN FREEWAY
MARICOPA COUNTY

	PROJECT NO.	1098	SHEET NO.	28	TOTAL SHEETS	28
	DATE	FOR THE CONSULTING ENGINEER				
DESIGN D.W.R.	DRAWN M.A.T.	CHECKED D.W.R.				



Arizona State Plane Coordinates

PT.	NORTHING	EASTING
1013	979713.761773	506836.138773
1014	979233.648134	506907.728848
1015	979081.713606	506863.548806
1025	981271.424190	506863.538848
1064	979719.546176	504286.198334
1065	979790.347153	504383.338834
1066	979797.495427	579895.779897
1067	980546.487364	579819.879896
1068	980546.509970	581547.848883
1069	980529.814861	584217.848861
1064	980838.638631	580860.814119
1095	980874.773511	580863.118081
1099	973347.558164	581583.898463
1121	979613.682918	580661.277918
1163	982544.292464	580406.877246
1164	985543.886464	581519.893759
1172	979790.338830	584290.391413
1174	980860.338476	581566.308863
1176	979830.893576	584218.499837
1177	979340.913646	584296.744897
1178	980071.578233	584211.788846
1182	981968.499137	584116.768853

- NOTES
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 - All Coordinates Shown Are Arizona State Plane Coordinates.
 - Average Grid Factor = 0.99983506

NOTE: THE DESIGN CONCEPTS AND RIGHT OF WAY SHOWN ON THIS PLAN ARE APPROXIMATE ONLY AND ARE SUBJECT TO REFINEMENT DURING FINAL DESIGN

DESIGN CONCEPT PLANS
Arizona Department of Transportation

RED MOUNTAIN FREEWAY



PARSONS BRINCKERHOFF

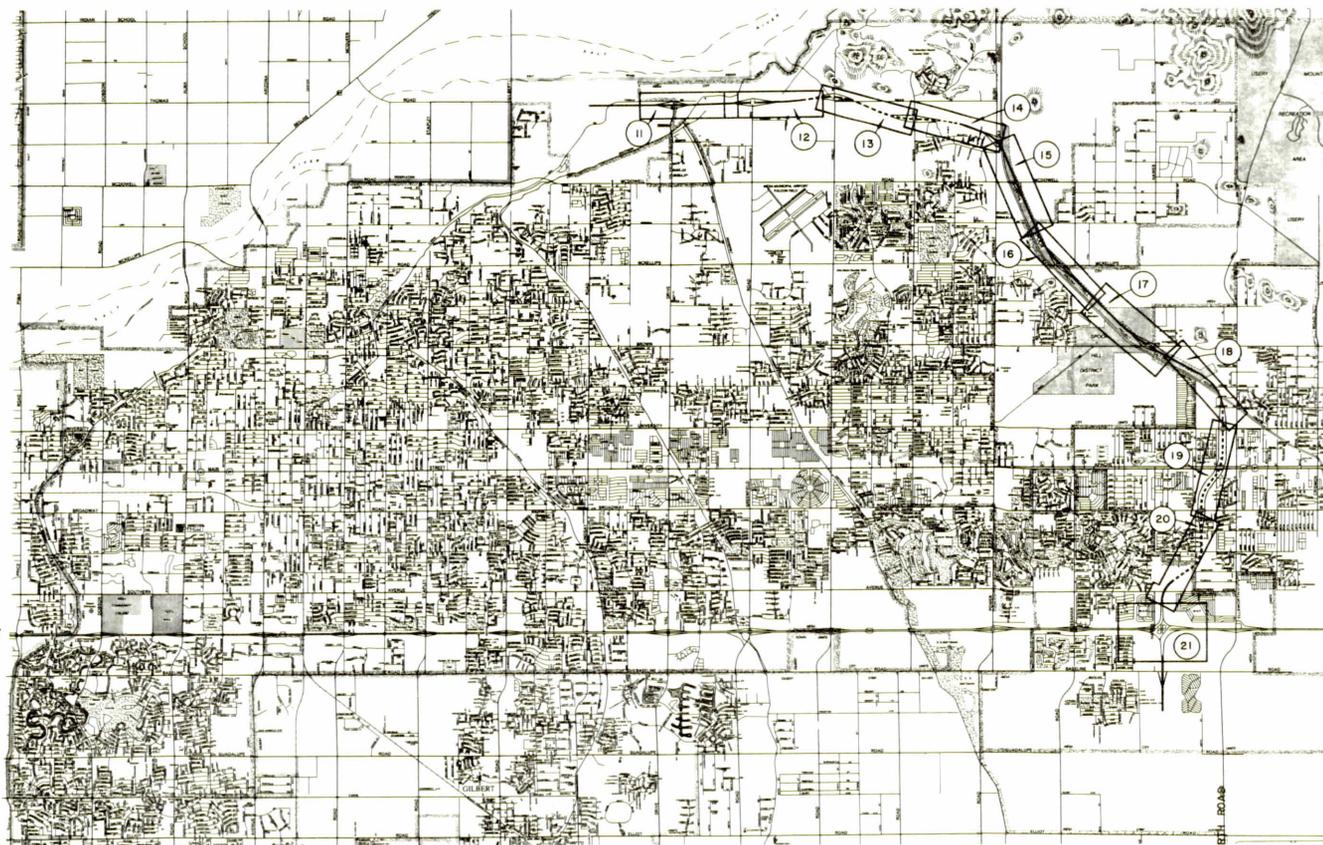
DATE: OCT 1988

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RED MOUNTAIN FREEWAY
MARICOPA COUNTY

	F.H.W.A. REGION	STATE	PROJECT NO.	SHEET TOTAL	AS BUILT
	9	ARIZ.	202L MA H07500D	10	28
Parsons Brinckerhoff Quade & Douglas, Inc.					
DATE				FOR THE CONSULTING ENGINEER	
DESIGN: D.W.R.		DRAWN: M.A.T.		CHECKED: D.W.R.	

THOMAS ROAD
MC DOWELL ROAD
MC KELLIPS ROAD
BROWN ROAD
UNIVERSITY DRIVE
BROADWAY ROAD
SOUTHERN AVENUE
SUPERSTITION FREEWAY
BASELINE ROAD



LEGEND
Sheet Number - 20

RED MOUNTAIN FREEWAY
PLAN AND PROFILE SHEET INDEX

DESIGN CONCEPT PLANS

Arizona Department of Transportation

RED MOUNTAIN FREEWAY

PARSONS
BRINCKERHOFF



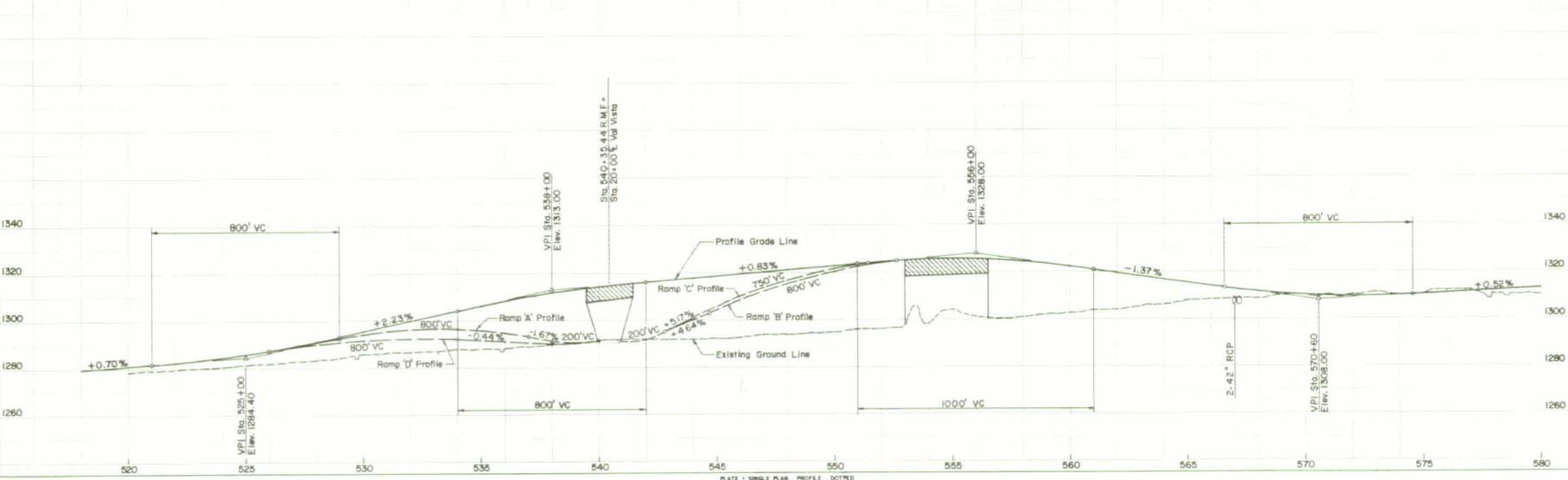
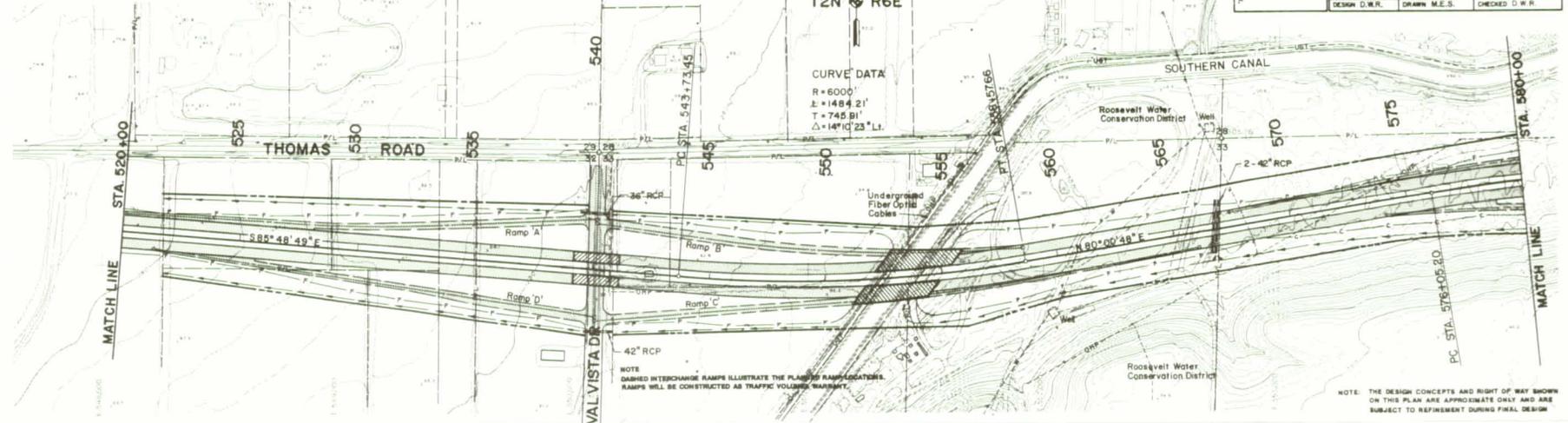
DATE:
OCT 1988

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RED MOUNTAIN FREEWAY
MARICOPA COUNTY



PROJECT NO.	202L MA-HORT500	SHEET NO.	11	TOTAL SHEETS	28	AS BUILT
DATE	FOR THE CONSULTING ENGINEER					
DESIGN D.W.R.	DRAWN M.E.S.	CHECKED D.W.H.				



PLAN

DATE	
BY	
CHECKED	
IN CHARGE	

PROFILE

DATE	
BY	
CHECKED	
IN CHARGE	

DESIGN CONCEPT PLANS
Arizona Department of Transportation

RED MOUNTAIN FREEWAY

PARSONS
BRINCKERHOFF

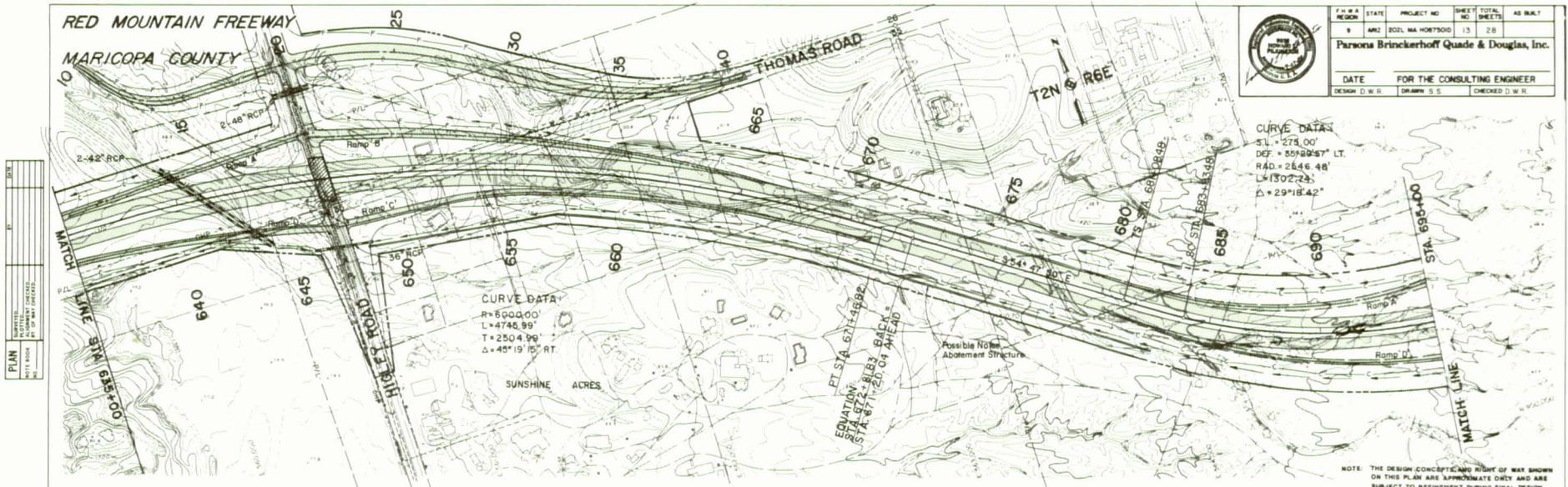
DATE: OCT 1988	PAGE 56
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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET TOTAL	AS BUILT
8	ARIZ	RDJL MA HWY7500	13	28

Parsons Brinckerhoff Quade & Douglas, Inc.

DATE	FOR THE CONSULTING ENGINEER
DESIGN D.W.R.	DRAWN S.S.
	CHECKED D.W.R.



NOTE: THE DESIGN CONCEPTS AND RIGHT OF WAY SHOWN ON THIS PLAN ARE APPROXIMATE ONLY AND ARE SUBJECT TO REFINEMENT DURING FINAL DESIGN.

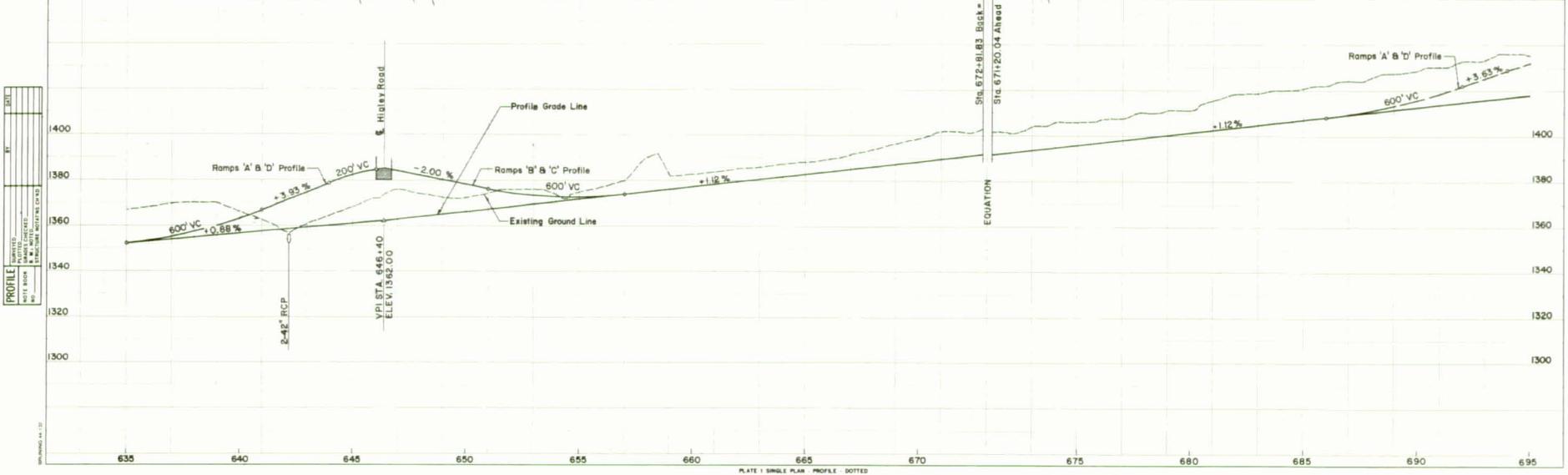


PLATE 1 SINGLE PLAN PROFILE DOTTED
 (SHEET 13 OF 28)
 MADE IN U.S.A.

DESIGN CONCEPT PLANS

Arizona Department of Transportation

RED MOUNTAIN FREEWAY

PARSONS
BRINCKERHOFF



DATE:
OCT 1988

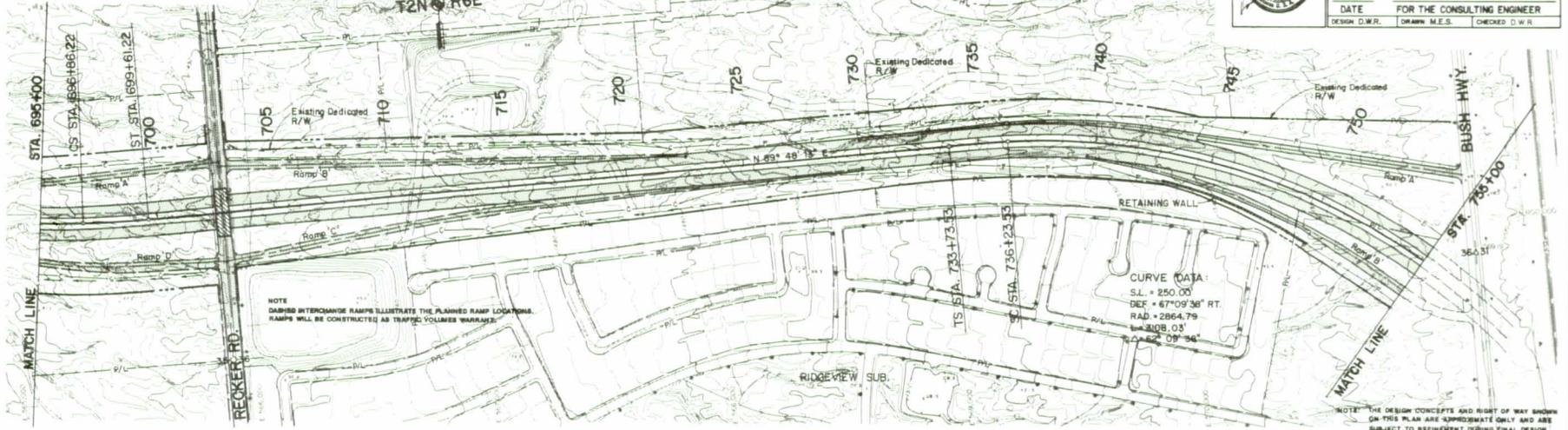
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RED MOUNTAIN FREEWAY
MARICOPA COUNTY



P.F. NO.	STATE	PROJECT NO.	SHEET TOTAL	AS BUILT
9	ARIZ	202L MA HORT500	14	28
Parsons Brinckerhoff Quade & Douglas, Inc.				
DATE		FOR THE CONSULTING ENGINEER		
DESIGN D.W.R.		DRAWN M.E.S.		CHECKED D.W.R.

PLAN	DATE	BY
REVISIONS		
1. AS SHOWN		
2. AS SHOWN		
3. AS SHOWN		



PROFILE	DATE	BY
REVISIONS		
1. AS SHOWN		
2. AS SHOWN		
3. AS SHOWN		

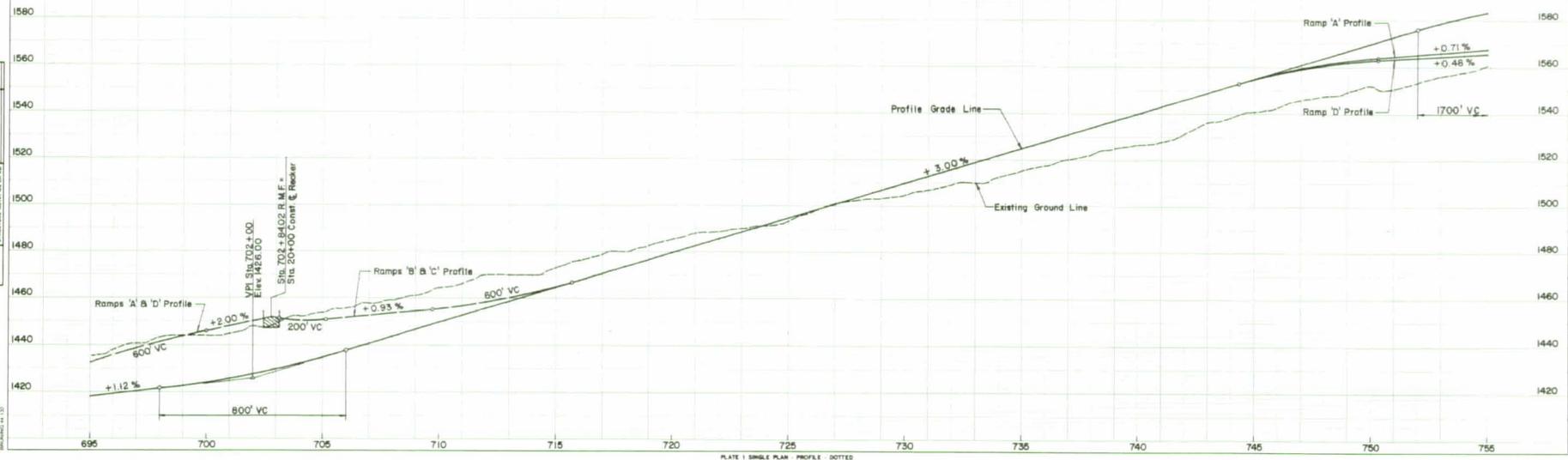


PLATE 1 SINGLE PLAN - PROFILE - DOTTED
CHARLES BRINCKERHOFF COMPANY
MADE IN U.S.A.

DESIGN CONCEPT PLANS
Arizona Department of Transportation

RED MOUNTAIN FREEWAY

PARSONS
BRINCKERHOFF

DATE: OCT 1988

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RED MOUNTAIN FREEWAY
MARICOPA COUNTY

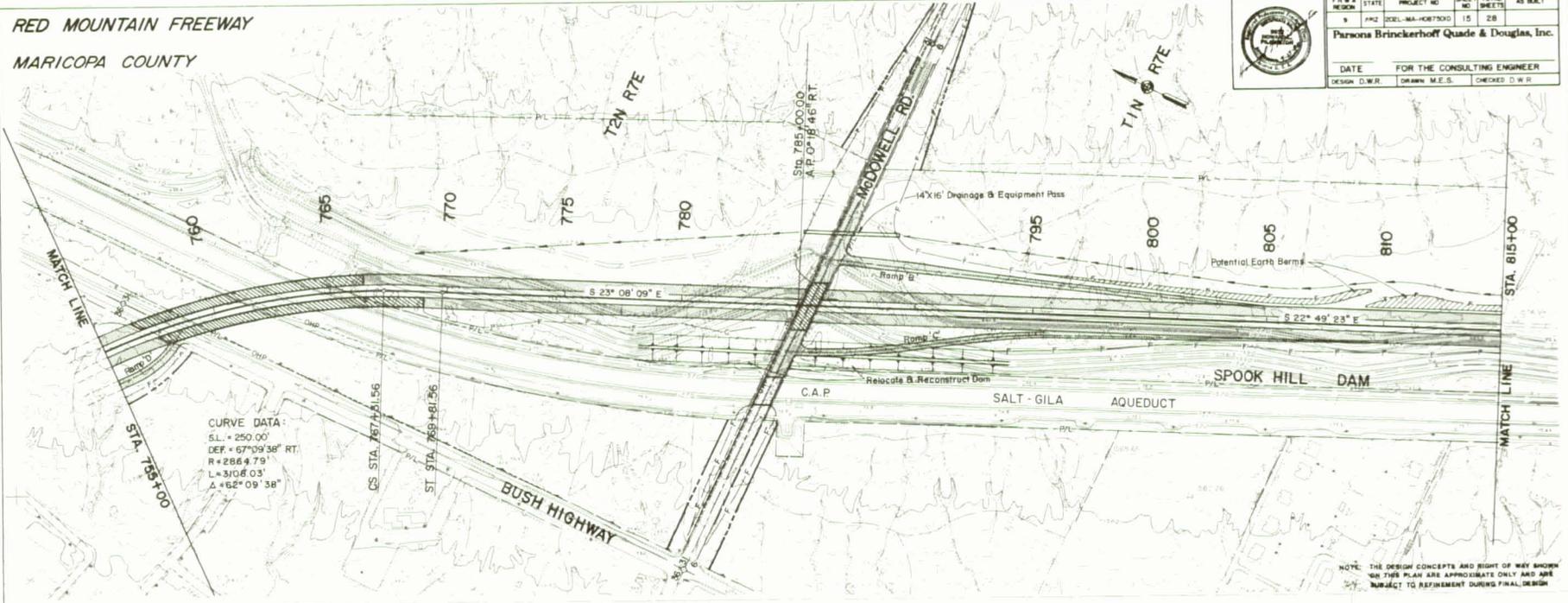


F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	PHZ	202L-MA-H071000	18	28	

Parsons Brinckerhoff Quade & Douglas, Inc.

DATE	FOR THE CONSULTING ENGINEER
DESIGN D.W.R.	DRAWN M.E.S.
	CHECKED D.W.R.

PLAN	SCALE
VERTICAL CURVES	1" = 20'
GRADES	1" = 20'
RIGHT OF WAY	1" = 20'
ADJUSTED	1" = 20'
AS SHOWN	1" = 20'



NOTE: THE DESIGN CONCEPTS AND RIGHT OF WAY SHOWN ON THIS PLAN ARE APPROXIMATE ONLY AND ARE SUBJECT TO REFINEMENT DURING FINAL DESIGN.

PROFILE	SCALE
VERTICAL CURVES	1" = 20'
GRADES	1" = 20'
RIGHT OF WAY	1" = 20'
ADJUSTED	1" = 20'
AS SHOWN	1" = 20'

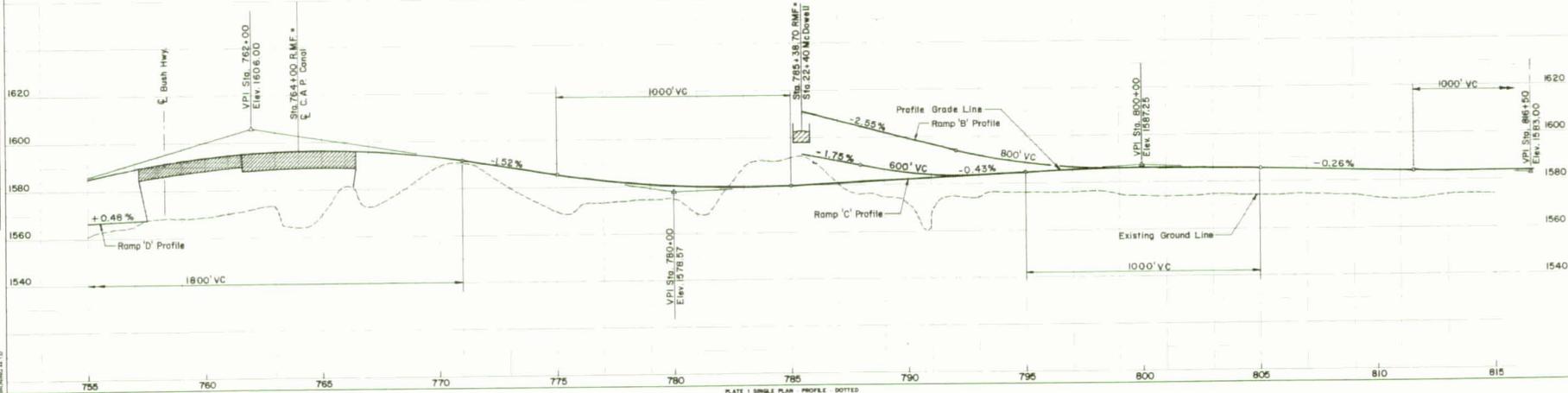


PLATE 1 SINGLE PLAN PROFILE (DOTTED)
CHARLES ENGINEERING COMPANY
SCALE 1" = 10'

DESIGN CONCEPT PLANS
Arizona Department of Transportation

RED MOUNTAIN FREEWAY

PARSONS BRINCKERHOFF

DATE: OCT 1988
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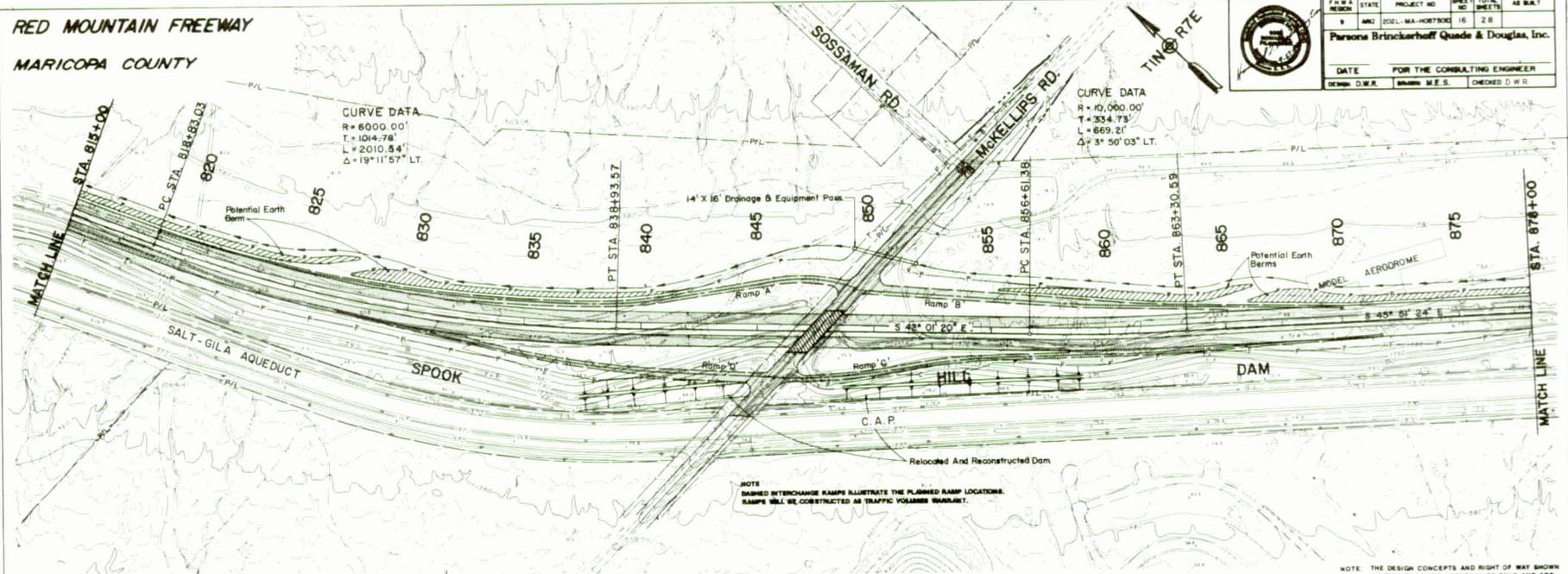
RED MOUNTAIN FREEWAY
MARICOPA COUNTY



F.H.W.A. REGION	STATE	PROJECT NO.	SHEET TOTAL	AS BUILT
9	AZ	202L-MA-HOR700E	16	28
Parsons Brinckerhoff Quade & Douglas, Inc.				
DATE FOR THE CONSULTING ENGINEER				
DESIGN D.W.R.	DESIGN M.E.S.	CHECKED D.W.R.		

DATE	BY	REVISION

DATE	BY	REVISION



NOTE
DASHED INTERCHANGE RAMPS ILLUSTRATE THE PLANNED RAMP LOCATIONS.
RAMPS WILL BE CONSTRUCTED AS TRAFFIC VOLUMES WARRANT.

NOTE: THE DESIGN CONCEPTS AND RIGHT OF WAY SHOWN ON THIS PLAN ARE APPROXIMATE ONLY AND ARE SUBJECT TO REFINEMENT DURING FINAL DESIGN

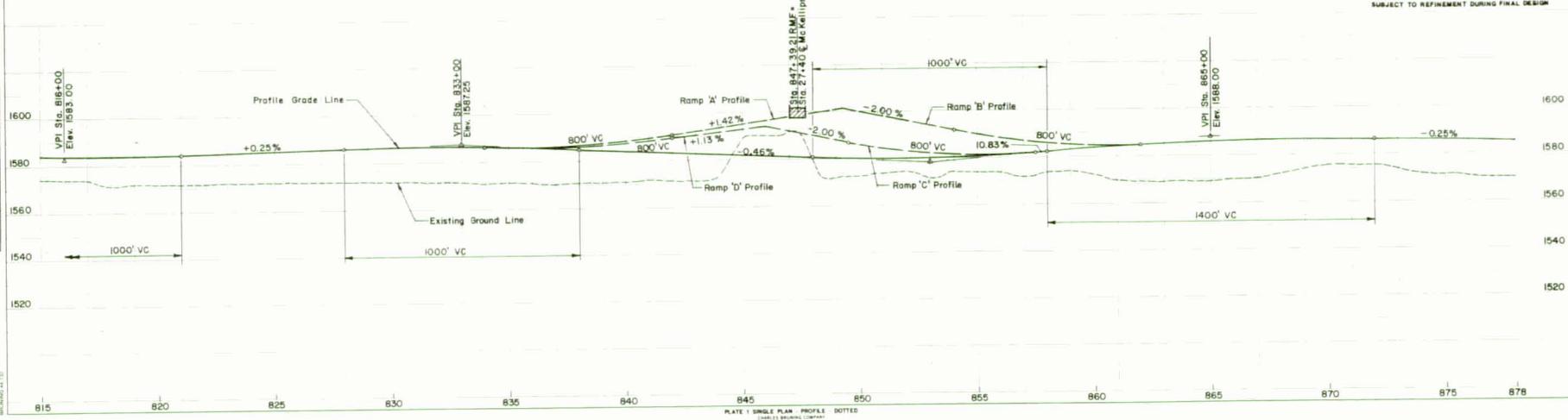


PLATE 1 SINGLE PLAN PROFILE DOTTED
 (SCALE: 1" = 40' HORIZONTAL, 1" = 10' VERTICAL)
 MADE BY: P.E.

DESIGN CONCEPT PLANS
Arizona Department of Transportation

RED MOUNTAIN FREEWAY

PARSONS
BRINCKERHOFF

DATE:
OCT 1988

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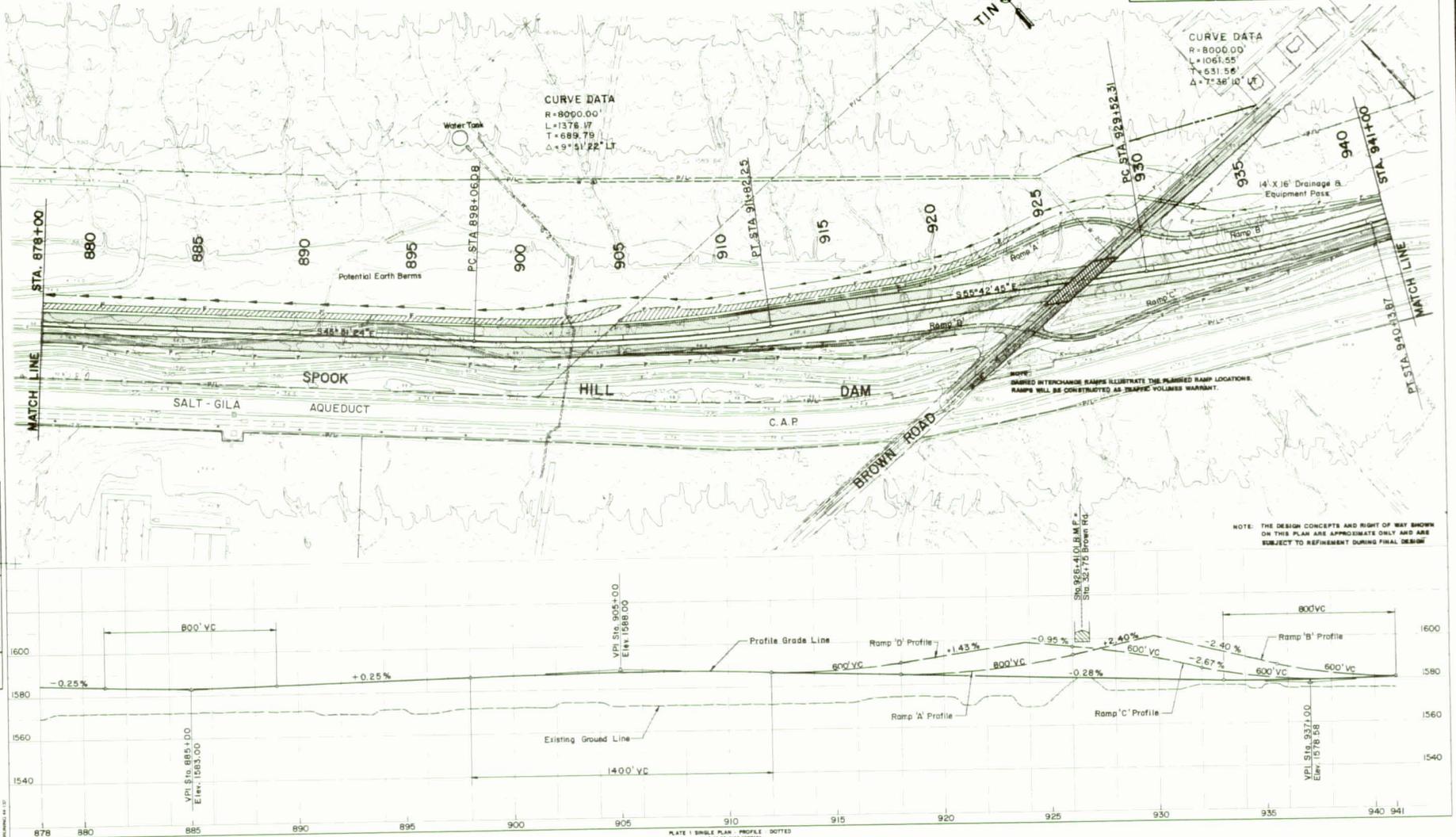
RED MOUNTAIN FREEWAY

MARICOPA COUNTY

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	202L-MA-HORTS00	17	28	
Parsons Brinckerhoff Quade & Douglas, Inc.					
DATE		FOR THE CONSULTING ENGINEER			
DESIGN D.W.R.		DRANN M.E.S.		CHECKED D.W.R.	

PLAN	DATE	BY

PROFILE	DATE	BY



NOTE: THE DESIGN CONCEPTS AND RIGHT OF WAY SHOWN ON THIS PLAN ARE APPROXIMATE ONLY AND ARE SUBJECT TO REFINEMENT DURING FINAL DESIGN

PLATE 1 SINGLE PLAN - PROFILE - DOTTED
CHARLES BRINCKERHOFF COMPANY
MADE IN U.S.A.

DESIGN CONCEPT PLANS
Arizona Department of Transportation

RED MOUNTAIN FREEWAY

PARSONS BRINCKERHOFF

DATE: OCT 1988

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RED MOUNTAIN FREEWAY
MARICOPA COUNTY

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	9011	18	23	
Parsons Brinckerhoff Quade & Douglas, Inc.					
DATE FOR THE CONSULTING ENGINEER					
DESIGN C.M.R.	DRAWING M.E.S.	CHECKED C.W.H.			

PLAN	DATE
REVISED	
NOT BOOK	
BY	
DATE	

PROFILE	DATE
REVISED	
NOT BOOK	
BY	
DATE	

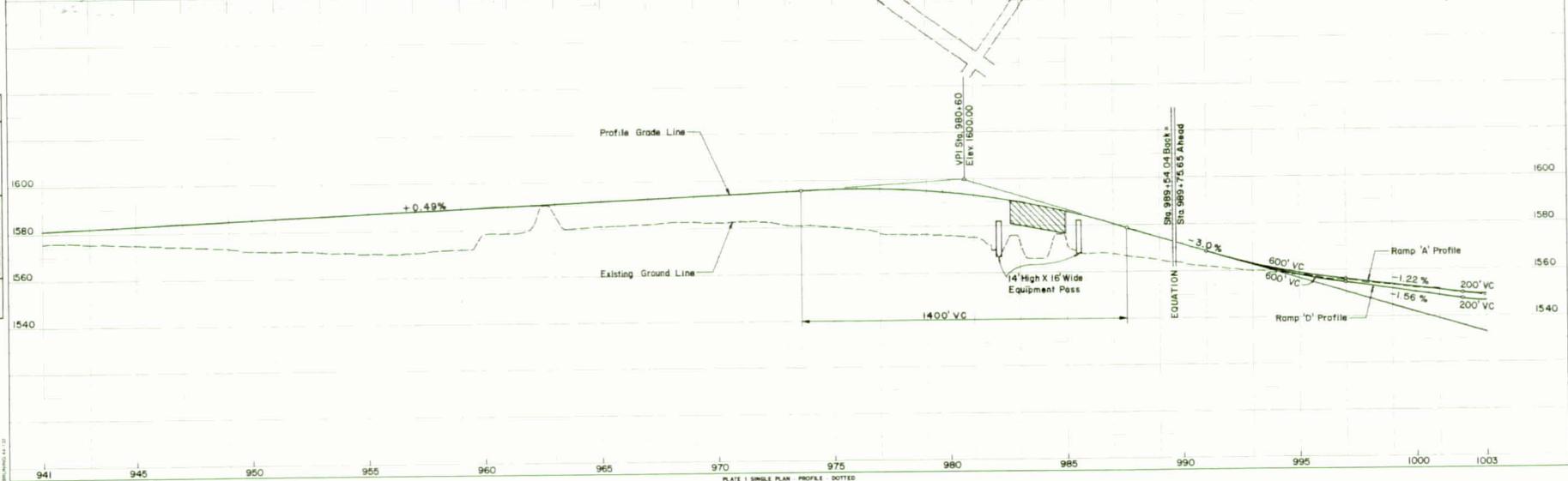
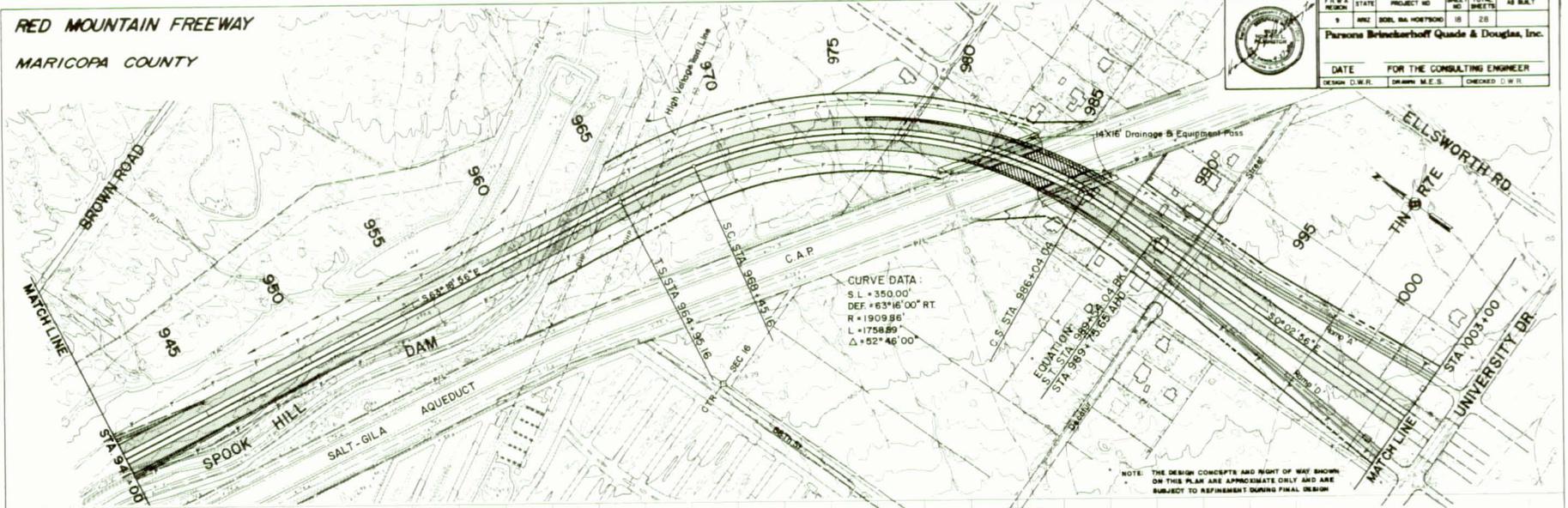


PLATE 1 SINGLE PLAN PROFILE DOTTED

DESIGN CONCEPT PLANS
Arizona Department of Transportation

RED MOUNTAIN FREEWAY

PARSONS
BRINCKERHOFF

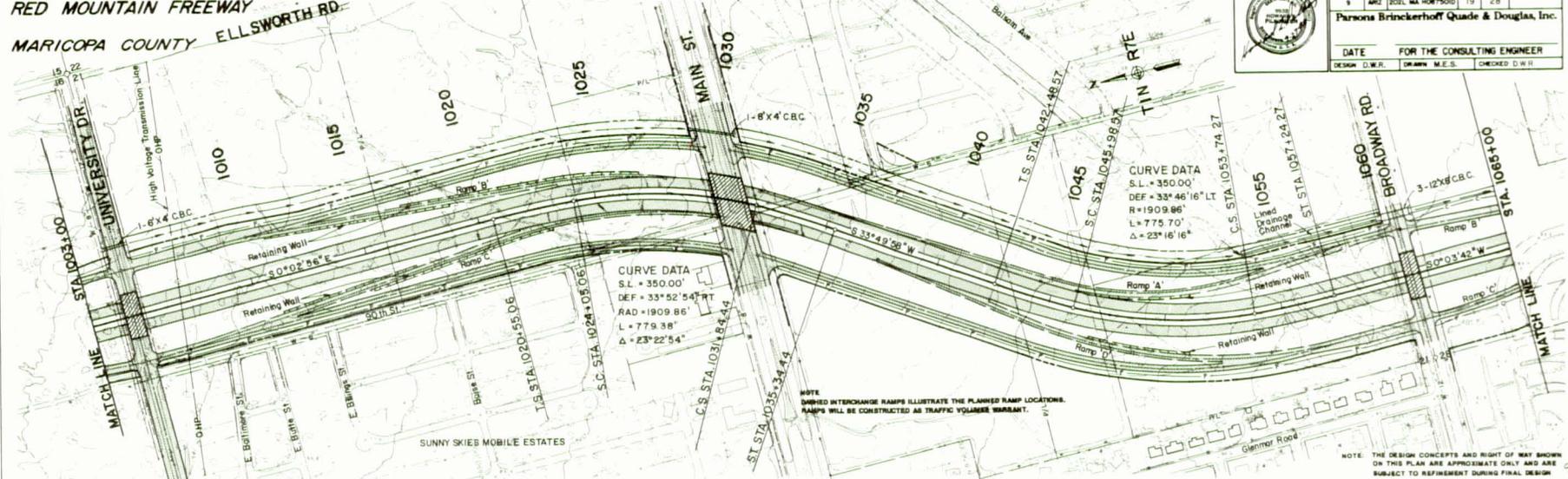
DATE: OCT 1988	PAGE 63
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RED MOUNTAIN FREEWAY
MARICOPA COUNTY ELLSWORTH RD.

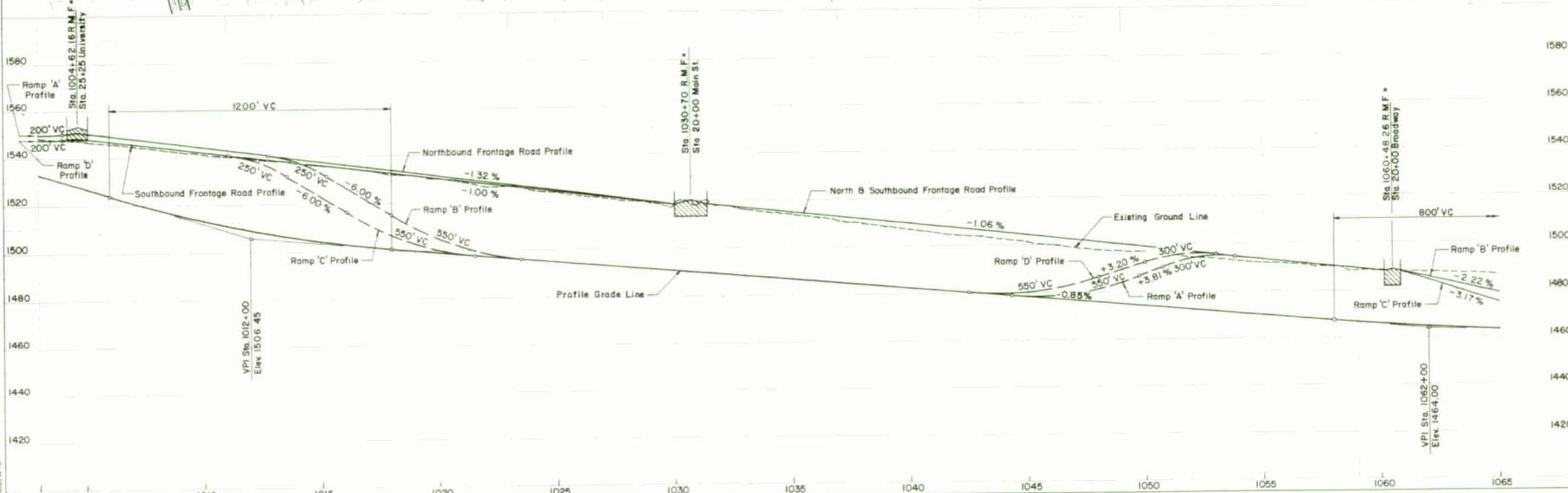


F.W. #	STATE	PROJECT NO.	SHEET TOTAL	AS BUILT
9	ARIZ	2021 MA-H07500	19	28
Parsons Brinckerhoff Quade & Douglas, Inc.				
DATE FOR THE CONSULTING ENGINEER				
DESIGN D.W.R.	DRAWN M.E.S.	CHECKED D.W.R.		

PLAN	NO. 1	DATE	
NO. 2			
NO. 3			
NO. 4			
NO. 5			
NO. 6			
NO. 7			
NO. 8			
NO. 9			
NO. 10			



PROFILE	NO. 1	DATE	
NO. 2			
NO. 3			
NO. 4			
NO. 5			
NO. 6			
NO. 7			
NO. 8			
NO. 9			
NO. 10			



DESIGN CONCEPT PLANS

Arizona Department of Transportation

RED MOUNTAIN FREEWAY



PARSONS
BRINCKERHOFF

DATE:
OCT 1988

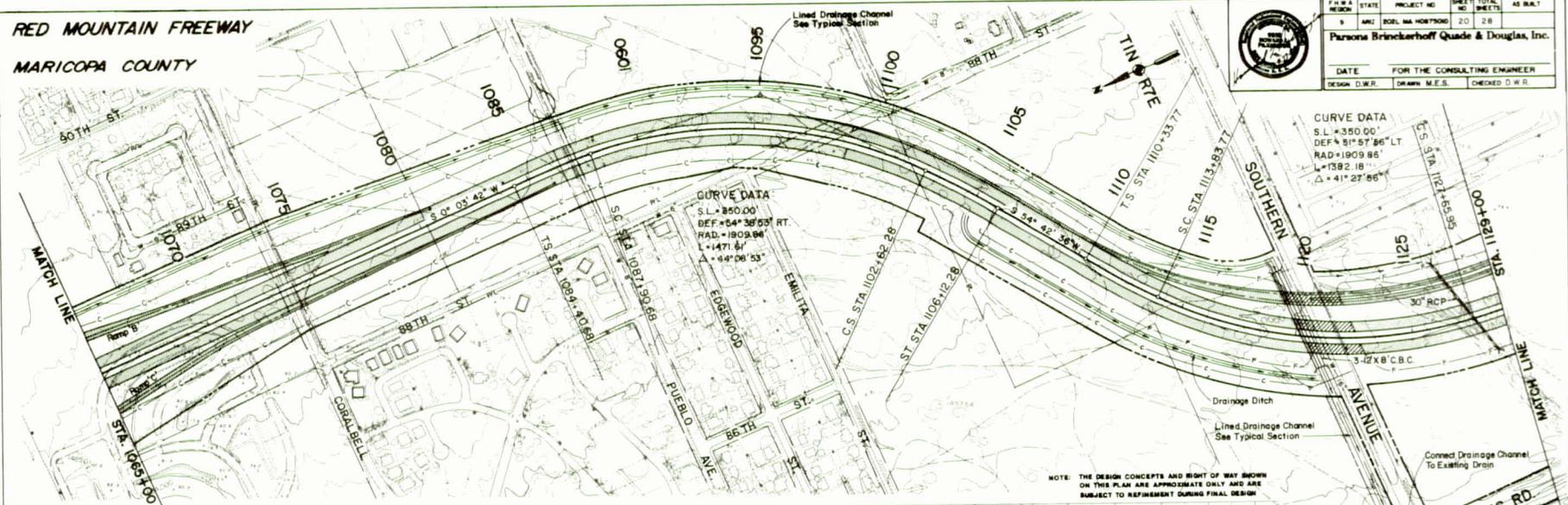
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RED MOUNTAIN FREEWAY
MARICOPA COUNTY



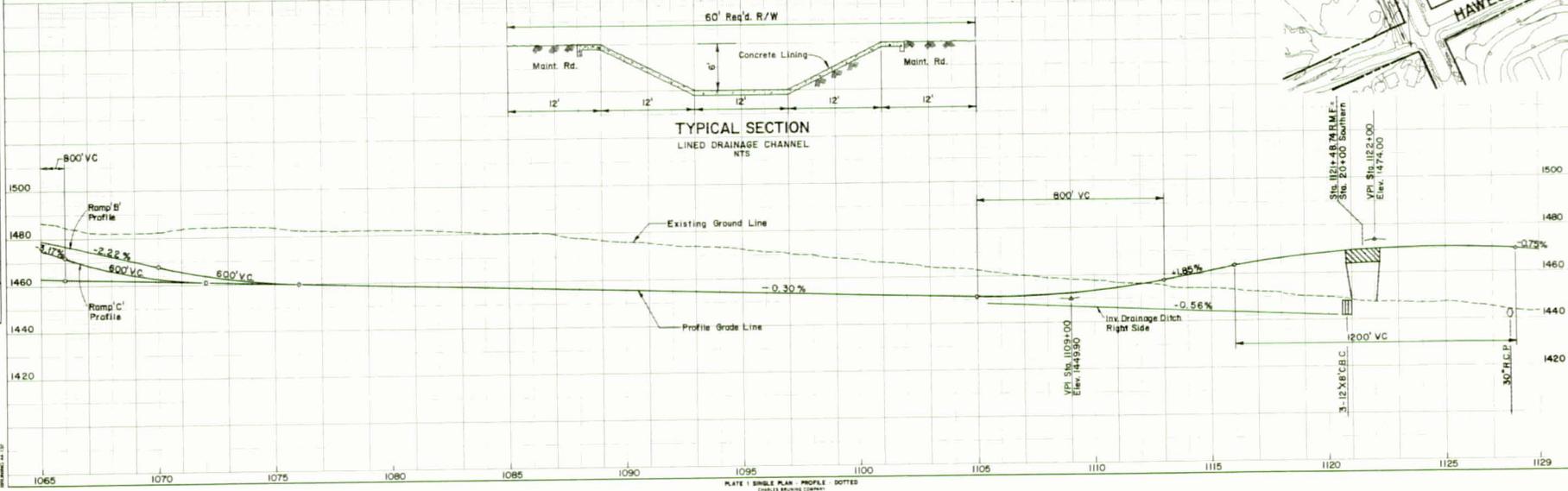
F.H.W.A. NO.	STATE	PROJECT NO.	SHEET TOTAL	AS BUILT
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Parsons Brinckerhoff Quade & Douglas, Inc.				
DATE		FOR THE CONSULTING ENGINEER		
DESIGN D.W.R.	DRAWN M.E.S.	CHECKED D.W.R.		

PLAN	DATE	BY
REVISIONS		
NO.	DESCRIPTION	DATE
1	AS SHOWN	



NOTE: THE DESIGN CONCEPTS AND RIGHT OF WAY SHOWN ON THIS PLAN ARE APPROXIMATE ONLY AND ARE SUBJECT TO REFINEMENT DURING FINAL DESIGN.

PROFILE	DATE	BY
REVISIONS		
NO.	DESCRIPTION	DATE
1	AS SHOWN	



DESIGN CONCEPT PLANS
 Arizona Department of Transportation

RED MOUNTAIN FREEWAY

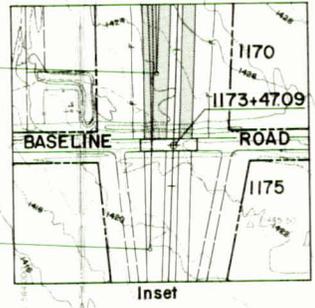
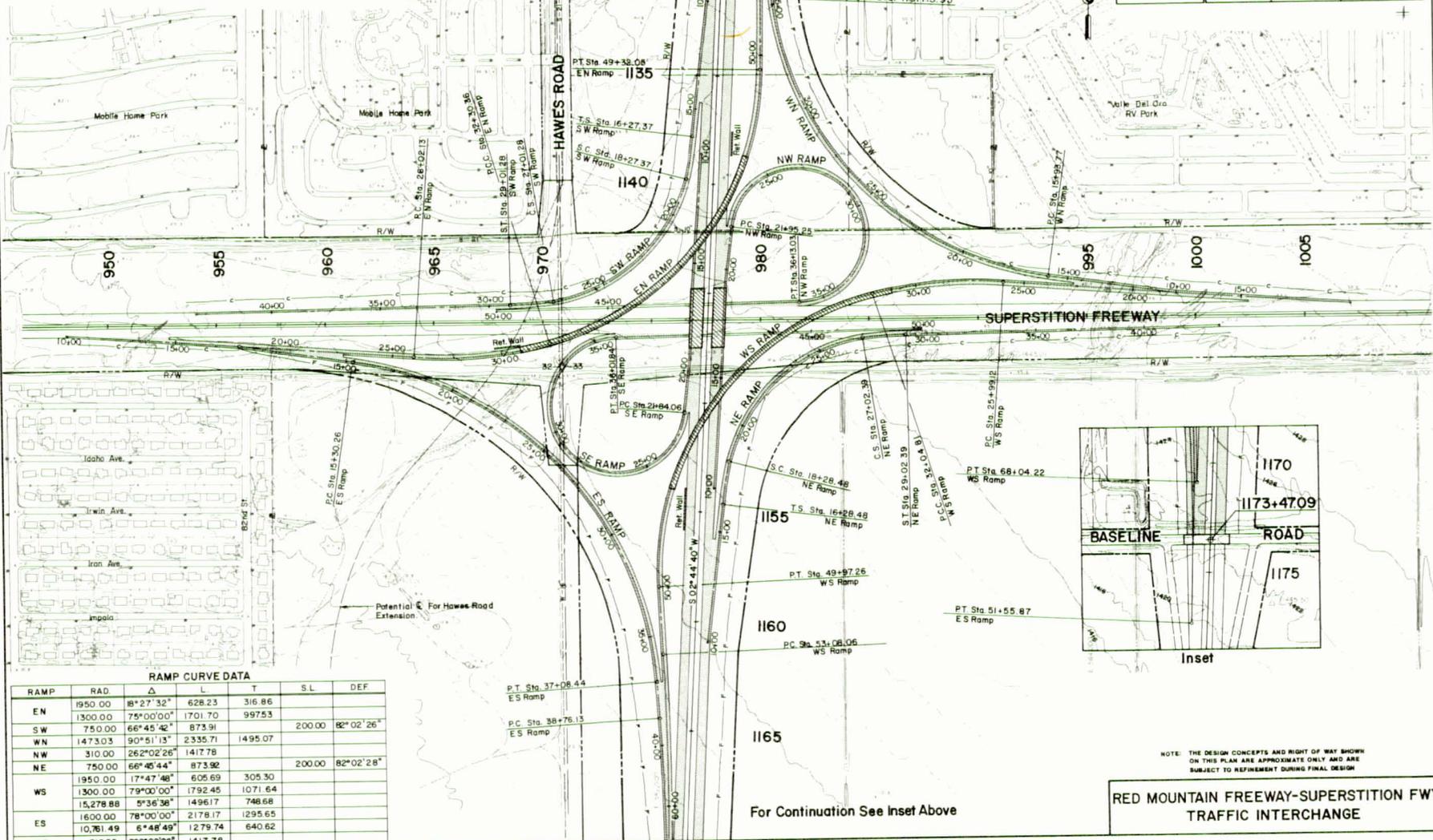
PARSONS
 BRINCKERHOFF

DATE:
 OCT 1988

PAGE
 65

RED MOUNTAIN FREEWAY
MARICOPA COUNTY

AREA	STATE	PROJECT NO.	SHEET TOTAL	AS BUILT
9	ARIZ	2021-MA-HORTON	21 28	
Parsons Brinckerhoff Quade & Douglas, Inc.				
DATE FOR THE CONSULTING ENGINEER				
DESIGN D.W.R. DRAWN T.W./MAT CHECKED D.W.R.				



NOTE: THE DESIGN CONCEPTS AND RIGHT OF WAY BOUNDARIES ON THIS PLAN ARE APPROXIMATE ONLY AND ARE SUBJECT TO REFINEMENT DURING FINAL DESIGN.

RED MOUNTAIN FREEWAY-SUPERSTITION FWY.
TRAFFIC INTERCHANGE

For Continuation See Inset Above

RAMP CURVE DATA

RAMP	RAD.	Δ	L	T	S.L.	DEF.
EN	1950.00	8°27'32"	628.23	316.86		
	1300.00	75°00'00"	1701.70	997.53		
SW	750.00	66°45'42"	873.91		200.00	82°02'26"
WN	1473.03	90°51'13"	2335.71	1495.07		
NW	310.00	262°02'26"	1417.78			
NE	750.00	66°45'44"	873.92		200.00	82°02'28"
	1950.00	17°47'48"	605.69	305.30		
WS	1300.00	79°00'00"	1792.45	1071.64		
	15,278.88	5°36'38"	1496.17	746.68		
ES	1600.00	78°00'00"	2178.17	1295.65		
	10,761.49	6°48'49"	1279.74	640.62		
SE	310.00	262°02'26"	1417.78			

DESIGN CONCEPT PLANS
Arizona Department of Transportation

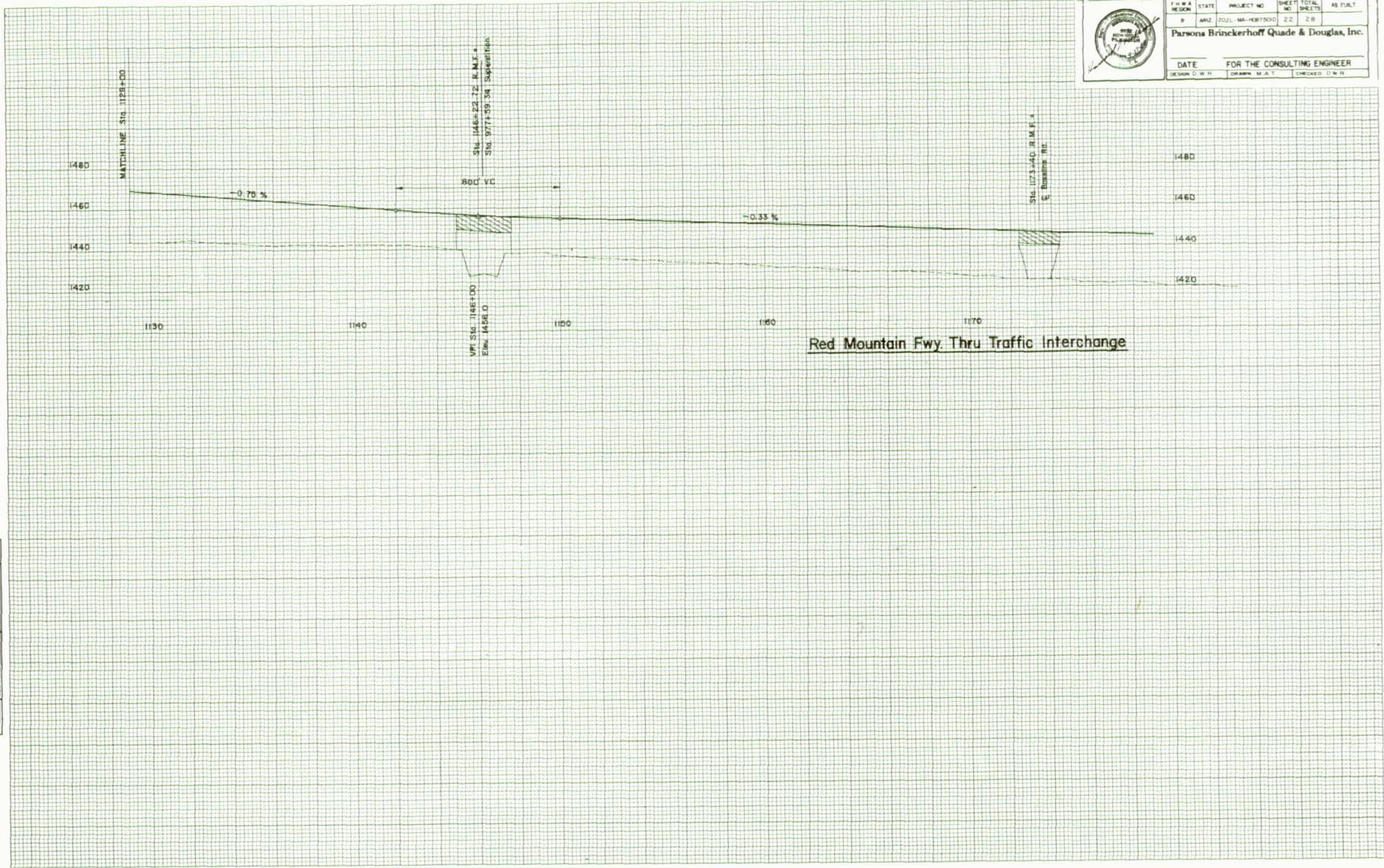
RED MOUNTAIN FREEWAY

PARSONS
BRINCKERHOFF

DATE: OCT 1988
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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	202L MA-NR7500	22	26	
Parsons Brinckerhoff Quade & Douglas, Inc.					
DATE FOR THE CONSULTING ENGINEER					
DESIGN: C.W.R.	DRAWN: M.A.T.	CHECKED: C.W.R.			



DESIGN	C.W.R.
DRAWN	M.A.T.
CHECKED	C.W.R.
DATE	

DESIGN	C.W.R.
DRAWN	M.A.T.
CHECKED	C.W.R.
DATE	

PLATE 3 CROSS SECTION - 1148+00 & 1173+40
NOT TO SCALE

DESIGN CONCEPT PLANS
Arizona Department of Transportation

RED MOUNTAIN FREEWAY

PARSONS
BRINCKERHOFF

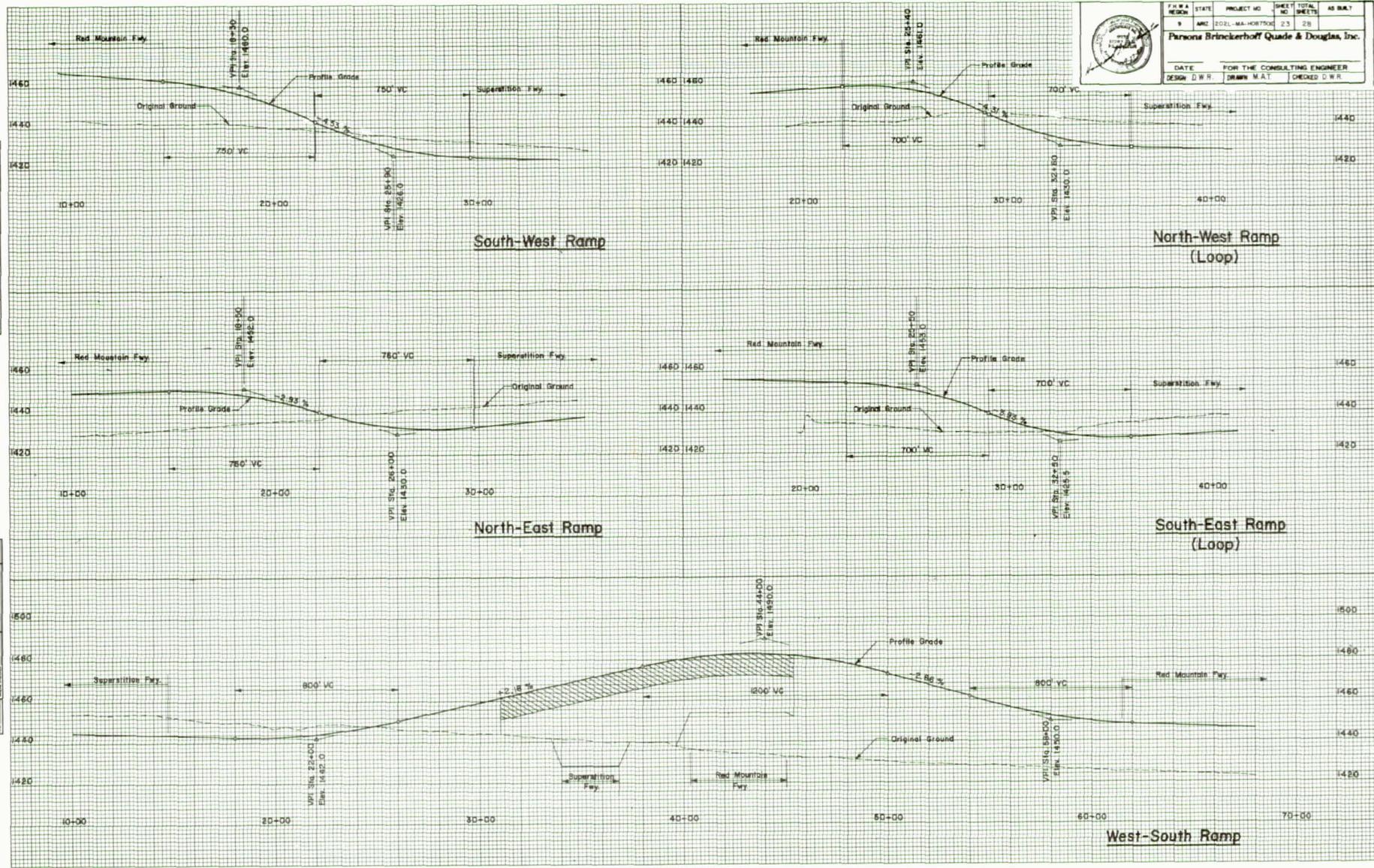
DATE: OCT 1988	PAGE 67
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F.W.D.	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.	2021-MA-H087500	23	28	

Parsons Brinckerhoff Quade & Douglas, Inc.

DATE	FOR THE CONSULTING ENGINEER
DESIGN D.W.R.	DRAWN M.A.T.
	CHECKED D.W.R.



NO.	REVISION
1	FINAL SURVEY
2	NOTE BOOK
3	
4	

NO.	REVISION
1	ORIGINAL SURVEY
2	NOTE BOOK
3	
4	

PLATE 5 CROSS SECTION - P.P.A. & STAFFORD
 DESIGN CONSULTANTS

DESIGN CONCEPT PLANS
Arizona Department of Transportation

RED MOUNTAIN FREEWAY

PARSONS
BRINCKERHOFF

DATE: OCT 1988	PAGE 68
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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	AZ	202L-NA-H017000	24	28	
Parsons Brinckerhoff Quade & Douglas, Inc.					
DATE FOR THE CONSULTING ENGINEER					
DESIGN D.W.R.	DRAWING M.A.T.	CHECKED D.W.R.			

DATE	
BY	
CHECKED	
APPROVED	

DATE	
BY	
CHECKED	
APPROVED	

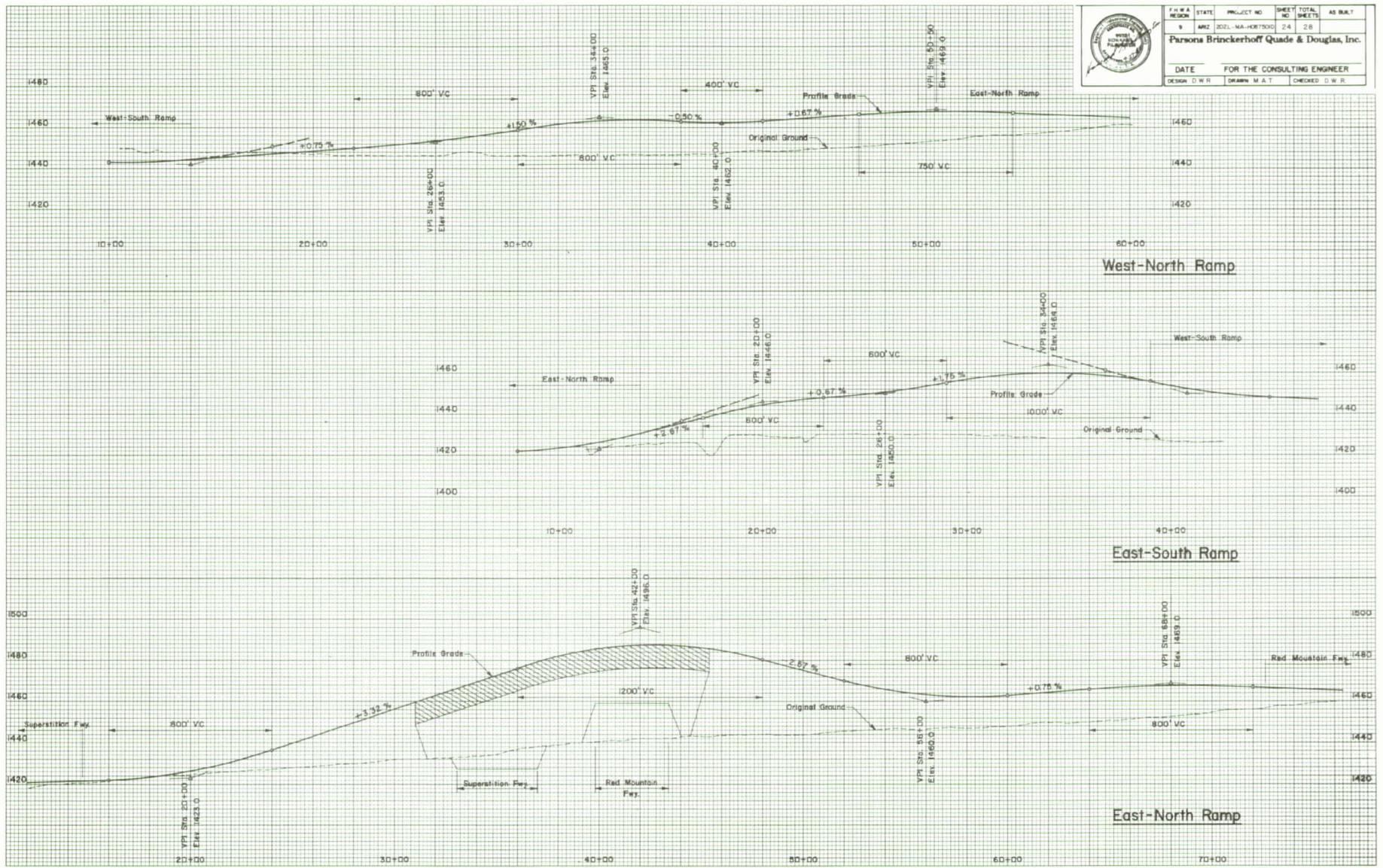


PLATE 3 CROSS SECTION 0 + + + + + 9140000
 and Station Continuation

DESIGN CONCEPT PLANS
Arizona Department of Transportation

RED MOUNTAIN FREEWAY

PARSONS
BRINCKERHOFF

DATE: OCT 1988	PAGE 69
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F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	AZ	202L-MA-HORTSDC	25	28	

Parsons Brinckerhoff Quade & Douglas, Inc.

DATE	FOR THE CONSULTING ENGINEER
DESIGN: D. W. R.	DRAWN: M. A. T.
	CHECKED: D. W. R.

NO.	REVISION

NO.	REVISION

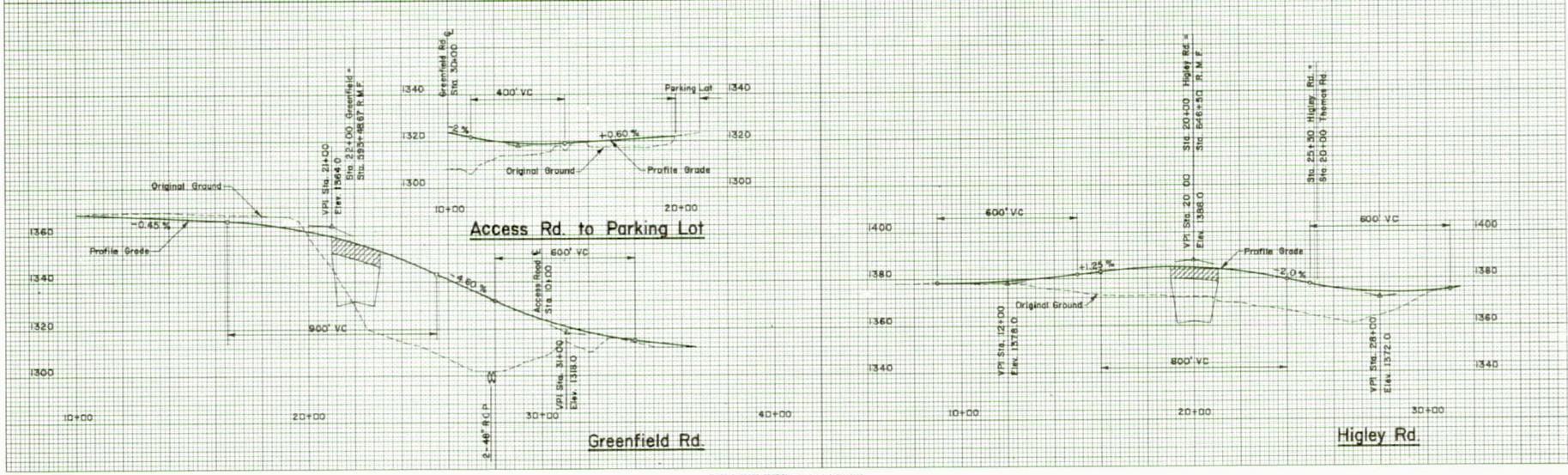
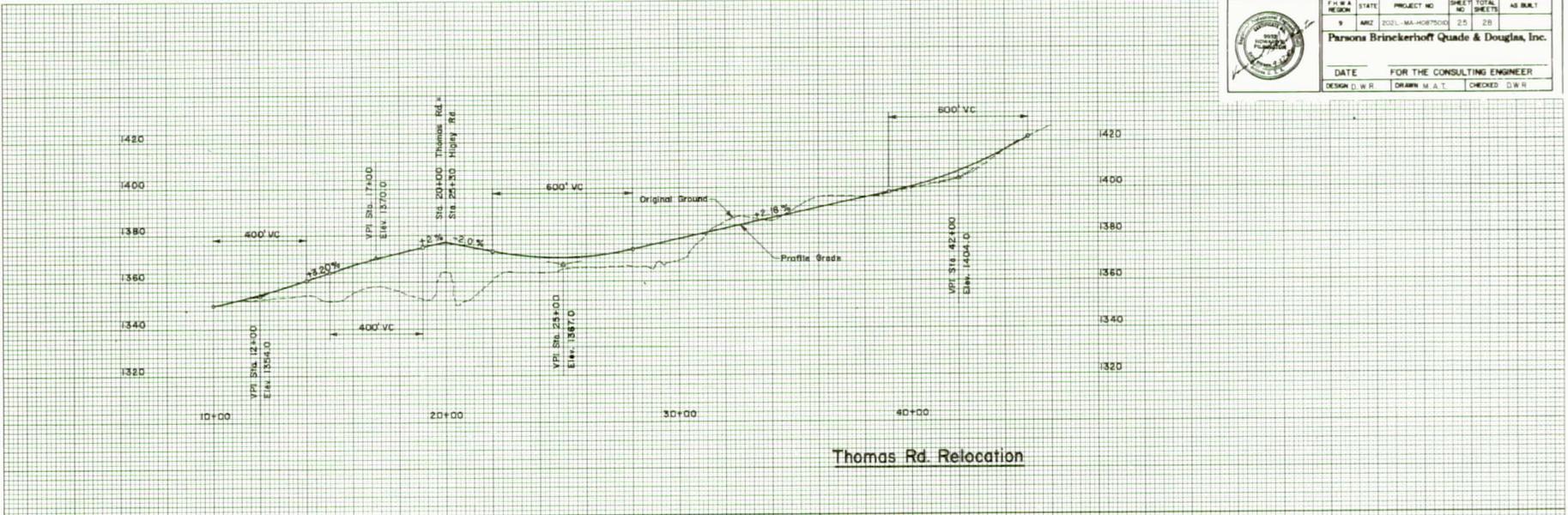


PLATE 3 CROSS SECTION - - - - - STANDARD
DATE: 12/31/88

DESIGN CONCEPT PLANS
Arizona Department of Transportation

RED MOUNTAIN FREEWAY

PARSONS BRINCKERHOFF

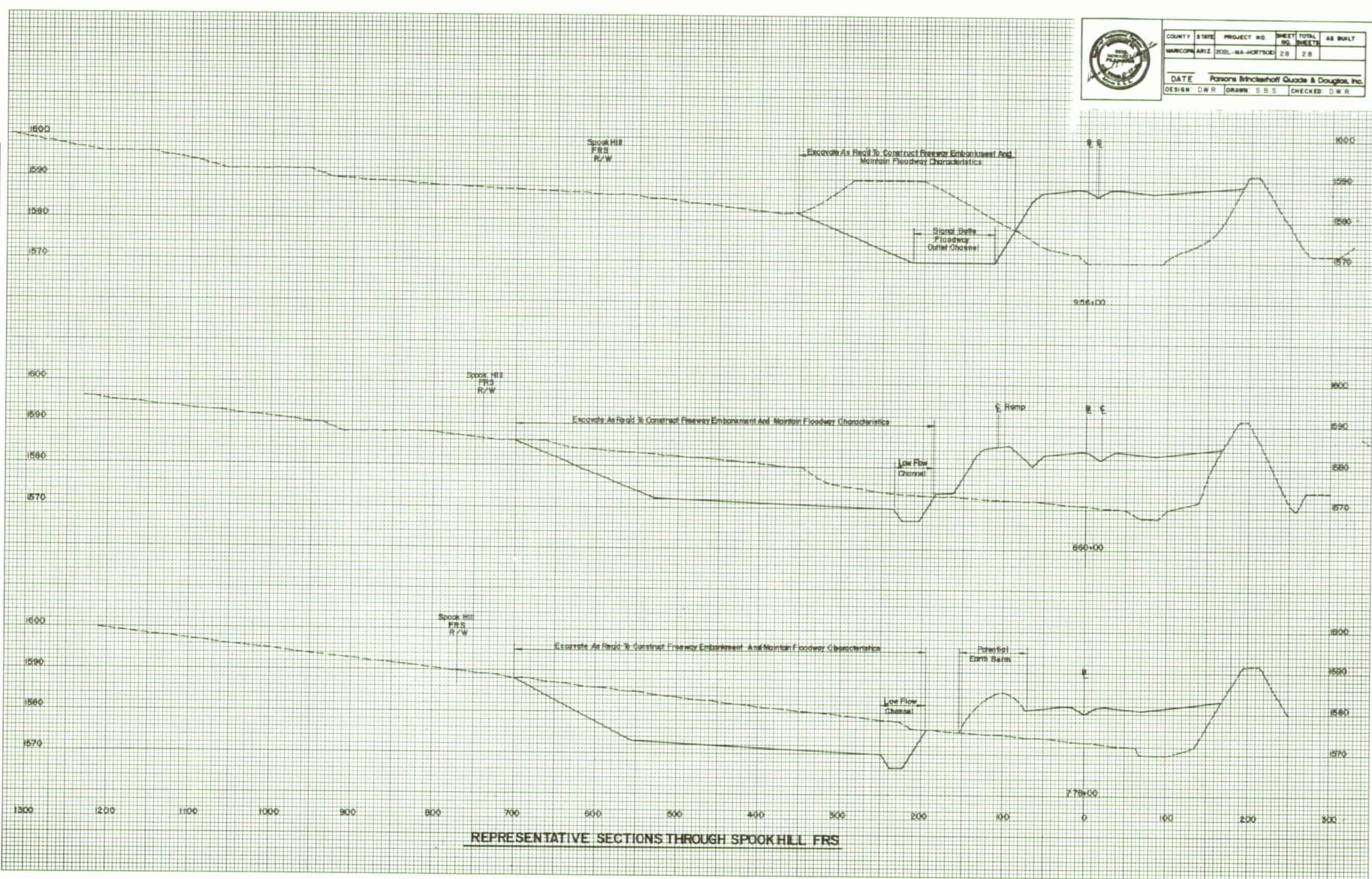
DATE: OCT 1988	PAGE 70
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COUNTY	STATE	PROJECT NO.	SHEET TOTAL	AS BUILT
MARICOPA	ARIZ.	202L-MA-HORT30E	28	28
DATE: Parsons Brinckerhoff Quade & Douglas, Inc.				
DESIGN: DWR		DRAWN: SBS		CHECKED: DWR

DATE	BY	CHECKED

DATE	BY	CHECKED



REPRESENTATIVE SECTIONS THROUGH SPOOK HILL FRS

PLATE 3 CROSS SECTION - - - - - STANDARD
NOT TO SCALE

DESIGN CONCEPT PLANS
Arizona Department of Transportation

RED MOUNTAIN FREEWAY

PARSONS
BRINCKERHOFF

DATE: OCT 1988	PAGE 73
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APPENDIX

LETTER FROM ADOT TO CITY OF MESA
REGARDING NOISE AND VISUAL ATTENUATION



ARIZONA DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

206 South Seventeenth Avenue Phoenix, Arizona 85007

EVAN MECHAM
Governor
CHARLES L. MILLER
Director

W O FORD
State Engineer

February 18, 1988

The Honorable Sumner "Al" Brooks
February 18, 1988
Page 2

Recognizing the time frame involved with this section, and the other entities involved who have a vested interest in the final design, we concur in Item #1 of your Council's Proposed Position Statement of February 12, 1988 (copy attached), and request a favorable resolution for ADOT from your Council.

Very truly yours

W. O. FORD
State Engineer

The Honorable Sumner "Al" Brooks
Mayor
55 North Center Street
Mesa, AZ 85201

Dear Al:

In meetings with Department representatives earlier this week, the City Council of Mesa requested that the Arizona Department of Transportation commit to specific design considerations in the Spook Hill Dam area of the Red Mountain Freeway.

The Department is amenable to positively pursuing effective sound and visual attenuation through the development of Corridor Alternate 2b in the Spook Hill Dam reach of the Red Mountain, based on the conditions that increased berm construction can result in additional flood detention, rights-of-way on the park side can be held to a minimum/optimum, and that landscaping construction and maintenance on the park side of the Red Mountain can be a joint Department - City of Mesa effort, with pro-rata participation. Conversely, the Department does not believe it is feasible to commit to firm design features at this time, based on the current schedule for this section, and the design coordination and agreement that is required with our mutual working partner, Flood Control District of Maricopa County (FCDMC).

The Department assures you that this concept (Alternate 2b) will be reviewed with you prior to the design startup. Based on mutual agreement between ADOT, FCDMC, and City of Mesa, ADOT would then hold a design review hearing with the City of Mesa. If then-existing features continue to render the concept cost-effective and feasible, the freeway would be designed with the berms and landscaping providing attenuation to the residences to the north.

WOF/jac

cc: FCDMC

Revised 2/12/88

Proposed Position Statement Concerning the Freeway Between Lindsay Road and Baseline Road.

1. The Red Mountain Freeway along the C.A.P. Canal/Spook Hill Dam must be designed to provide positive sound and visual attenuation for the residents and proposed parks activities located adjacent to the proposed freeway. This requirement to be satisfied by utilizing the two-dam concept or through the use of berms or other sources that would be at least as effective as the two-dam concept in providing sound and visual attenuation.
2. The Red Mountain Freeway is to be designed so that the realignment of Brown Road will not be required but at the same time the integrity of the park will be maintained.
3. The Red Mountain Freeway west of Higley Road should be designed to avoid the large existing gravel pit.
4. The proposed design concept plan provides for a half diamond interchange at University and at Broadway with connecting frontage roads to provide access to Main Street. The projected future traffic volumes are relatively high for these ramp roads. The second half of these diamond interchanges must be constructed when the traffic volumes warrant.
5. The freeway to freeway interchange at the intersection of the Red Mountain Freeway and the Superstition Freeway is to be a free flow interchange with two loops.
6. A half diamond interchange is to be provided at Baseline Road with ramps to the south.
7. A half diamond interchange is to be provided at Southern Avenue with ramps to the north.



FLOOD CONTROL LETTER



FLOOD CONTROL DISTRICT

of

Maricopa County

3335 West Durango Street • Phoenix, Arizona 85009
Telephone (602) 262-1501

D. E. Sagramoso, P.E., Chief Engineer and General Manager

BOARD OF DIRECTORS

George L. Campbell, Chairman
Carl C. Lamberter
Tom Freestone
Frank Koenig, Jr.
Dorothy

JAN 20 1987

Mr. W. O. Ford, P.E.
State Engineer
Arizona Department of Transportation
Highways Division
206 South 17th Avenue
Phoenix, Arizona 85007

Subject: Red Mountain Freeway/Spook Hill Flood Retarding Structure (F.R.S.)

Dear Mr. Ford:

The Flood Control District of Maricopa County (District) has been requested by your engineering consultant for the Red Mountain Freeway location study to review the possible relocation of Spook Hill F.R.S. This would involve the construction of a new Spook Hill F.R.S., approximately 200 feet northeast of the existing dam to make room for a freeway location between the existing dam and new dam. The freeway route is known as Red Mountain Freeway Alternative B-Modified.

Dialogue has been held among the District, the City of Mesa, Arizona Department of Transportation, and Parsons Brinckerhoff. Soil Conservation Service (SCS) indicates that the new dam should meet current SCS standards, and SCS would need to review the plans. Also, the new dam would have to be approved by the State Department of Water Resources. Subject to approval by its Board of Directors the District does not object to the construction of a new Spook Hill Dam upstream from the existing dam if the following conditions are met:

1. ADOT will provide funding for costs of all administration, project management, any necessary permits, investigations, studies, engineering, design, required right-of-way, utility relocations, and construction of the new dam and the attendant impoundment area. Also, if there are any costs due to federal requirements, ADOT will pay these.
2. The impoundment area behind the new dam will be excavated and necessary right-of-way acquired so that flood detention will be no less than that now available upstream from the existing dam.

Letter to Mr. W. O. Ford, P.E.
Page two

3. District right-of-way will be transferred to ADOT, for the freeway structure and interchange ramps. The District will retain ownership of the remaining existing right-of-way and ADOT will transfer to the District any new right-of-way required for the new dam and impoundment area. A joint-use agreement will be prepared to permit ADOT to construct and maintain landscaping and fencing on the freeway side of the existing and new dams.
4. The District will prepare or cause to be prepared all investigations, studies, and design of the new dam and impoundment area. The District will contract for construction of the new dam and detention basin.
5. The District will be responsible for operations and maintenance of the new dam and impoundment area. ADOT will be responsible for maintenance of the freeway and associated interchanges.

We hope this letter will assist you in your decision-making regarding the final routing of the Red Mountain Freeway. If you are interested in pursuing this course of action, please let us know as soon as possible, and we will begin drafting intergovernmental agreements.

If you have any questions, please call me or Ms. Kebba Buckley of my staff.

Sincerely,

D. E. Sagramoso, P. E.