GRAND AVENUE CORRIDOR STUDY

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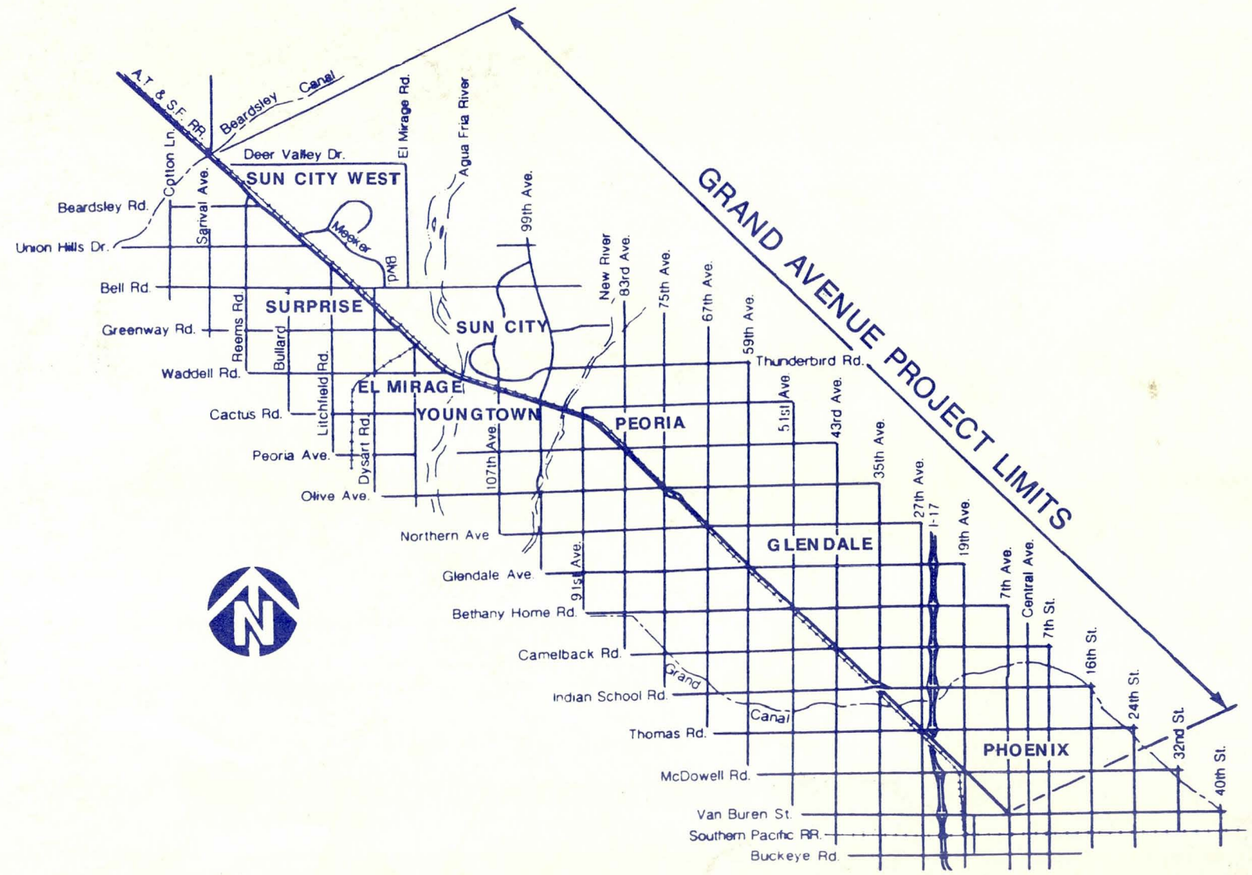
FINAL REPORT

EXHIBITS OF RECOMMENDED EXPRESSWAY FIRST STAGE IMPROVEMENTS



Prepared for:
Arizona Department of Transportation
Transportation Planning Division

Prepared by:
Parsons Brinckerhoff Quade and Douglas, Inc.

FINAL REPORT

EXHIBITS OF RECOMMENDED EXPRESSWAY AND FIRST STAGE IMPROVEMENTS

A. INTRODUCTION

This final report supplement includes two groups of exhibits. The first group illustrates the recommended expressway; the second group illustrates recommended first stage improvements. Each group provides typical roadway cross sections and plan sheets.

Typical roadway cross sections were prepared to illustrate cross sectional views of the roadway. The vertical vs. horizontal scale is exaggerated to offer an effective visual perception.

Roadway plan sheets were prepared on aerial photographs. They illustrate design concepts for the recommended expressway and first stage improvements. The original plan sheets were drafted on overlays of aerial photographs, at a horizontal scale of 1" = 200'. Composite reproducible plan sheets were then produced and are now on file with the Arizona Department of Transportation. The plan sheets in this report are reduced versions of the originals.

B. RECOMMENDED EXPRESSWAY

The typical roadway sections show the minimum basic pavement and right-of-way widths recommended for six-lane and eight-lane expressways.

The typical elevated section and depressed section show recommended cross sections utilizing 3:1 maximum side slopes. This will offer effective landscaping opportunities where the expressway grade would be above or below normal ground elevation. In areas where full side slopes are not feasible, 3:1 side slopes combined with retaining walls should be considered.

Typical overpass structures are shown as two separate parallel structures. Because the overpasses often cross at skewed angles to the arterial streets, each of the two parallel structures will have different pier locations and overall lengths.

A special typical section is provided for the Sun City location, from 99th Avenue to 111th Avenue. It shows a depressed expressway utilizing vertical retaining walls. The depressed expressway and parallel frontage roads or ramps would occupy all of the existing 138 feet of highway right-of-way plus 50 feet of the existing 100 feet of railroad right-of-way. This would require moving the railroad tracks 25 feet north of their present location.

A special typical section is also provided for the Indian School Road location. It shows a potential concept to depress Grand Avenue under the existing Indian School Road overpass and under 35th Avenue. A more detailed structural and geotechnical examination will be needed to fully evaluate the feasibility of this concept. It appears likely that the Indian School overpass structure will have to be reconstructed in order to provide adequate space for the full expressway cross section between the footings.

The 23 plan sheets for the recommended expressway illustrate the design concepts described in Chapter VI of the Final Report. The plan sheets cover 26 miles from Beardsley Canal to Van Buren Street.

C. FIRST STAGE IMPROVEMENTS

Typical sections are shown for Stage 1 widening of existing Grand Avenue from the Agua Fria River to Beardsley Canal. They illustrate a possible concept to accomplish the widening within existing highway right-of-way.

The eleven plan sheets for the recommended first stage improvements illustrate the design concepts described in Chapter VII of the Final Report. The plan sheets include:

- Four plan sheets illustrating first stage overpasses at the following intersections:
  - Bethany Home Road - 51st Avenue
  - Camelback Road - 43rd Avenue
  - Thomas Road - 27th Avenue
  - McDowell Road - 19th Avenue
- Seven plan sheets showing first stage widening of existing Grand Avenue from the Agua Fria River to Beardsley Canal.

GRAND AVENUE CORRIDOR STUDY

FINAL REPORT

EXHIBITS OF
RECOMMENDED EXPRESSWAY
AND
FIRST STAGE IMPROVEMENTS

September, 1986

Registered Professional Engineer (Civil) CERTIFICATE NO. 8221 DAVID K. FRENCH Date Signed 10/31/86 ARIZONA, U.S.A.

Registered Professional Engineer (Civil) CERTIFICATE NO. 9932 HOWARD L. PILKINGTON Date Signed 9-30-86 Arizona U.S.A.

Prepared for

ARIZONA DEPARTMENT OF TRANSPORTATION

TRANSPORTATION PLANNING DIVISION

Prepared by

PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC.

GRAND AVENUE CORRIDOR STUDY

RECOMMENDED EXPRESSWAY

LEGEND:

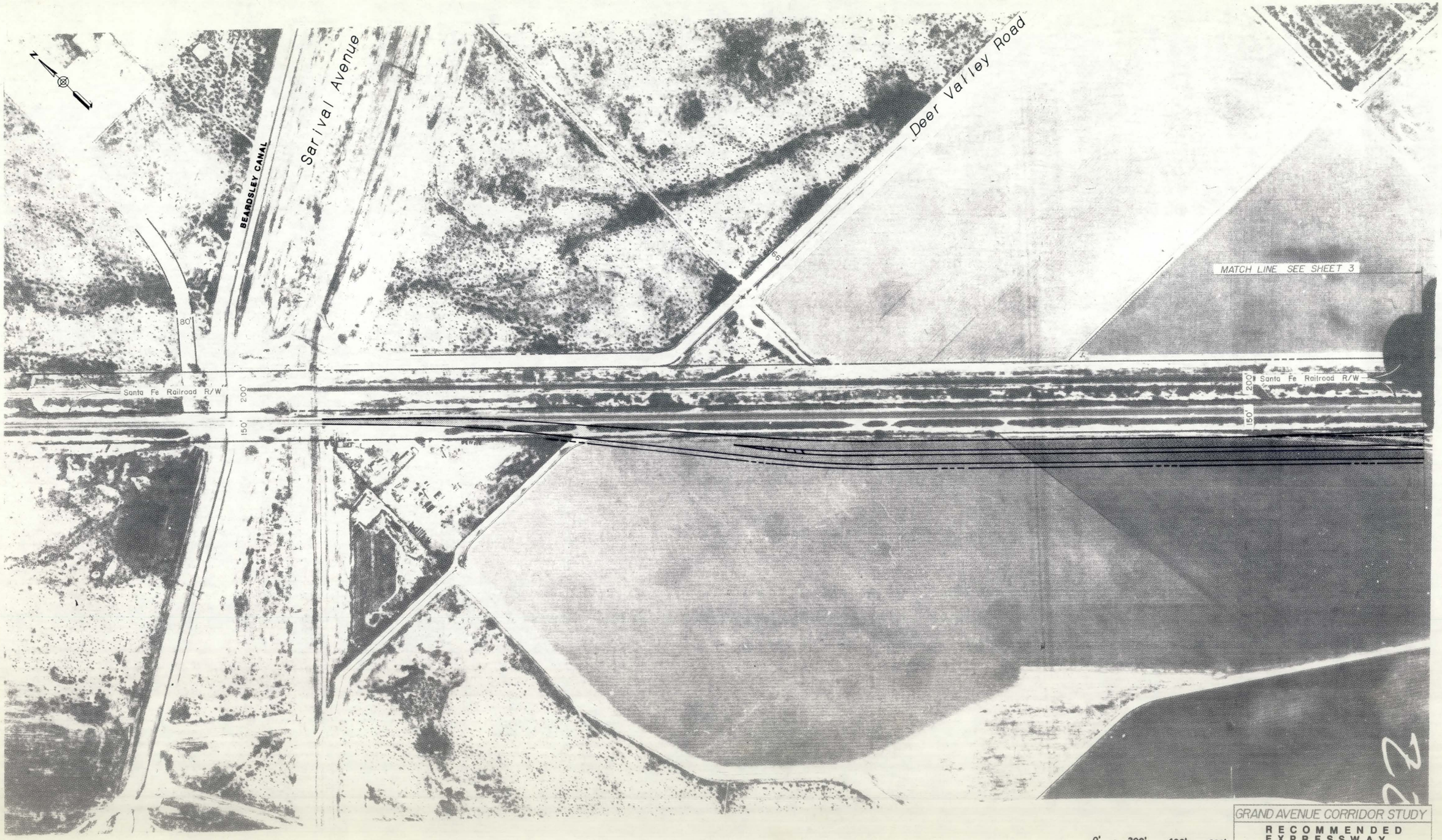
- EXPRESSWAY
- CUT SLOPE
- FILL SLOPE
- BRIDGE
- RETAINING WALLS
- TRAFFIC DIRECTION
- RAILROAD RELOCATION
- EXISTING ROADWAY TO REMAIN
- (H) HISTORIC BUILDING
- NEW RIGHT OF WAY LIMIT
- NEW LOCAL STREET CONSTRUCTION

SHEET INDEX MAP

(2) = SHEET NO.

AERIAL PHOTOGRAPHY: FEB. 1985

PARSONS BRINCKERHOFF



GRAND AVENUE CORRIDOR STUDY

RECOMMENDED EXPRESSWAY

DRAWN BY: S. OBERTELLO DATE: SEPT. 5, 1986

CHECKED BY: H.L.P.

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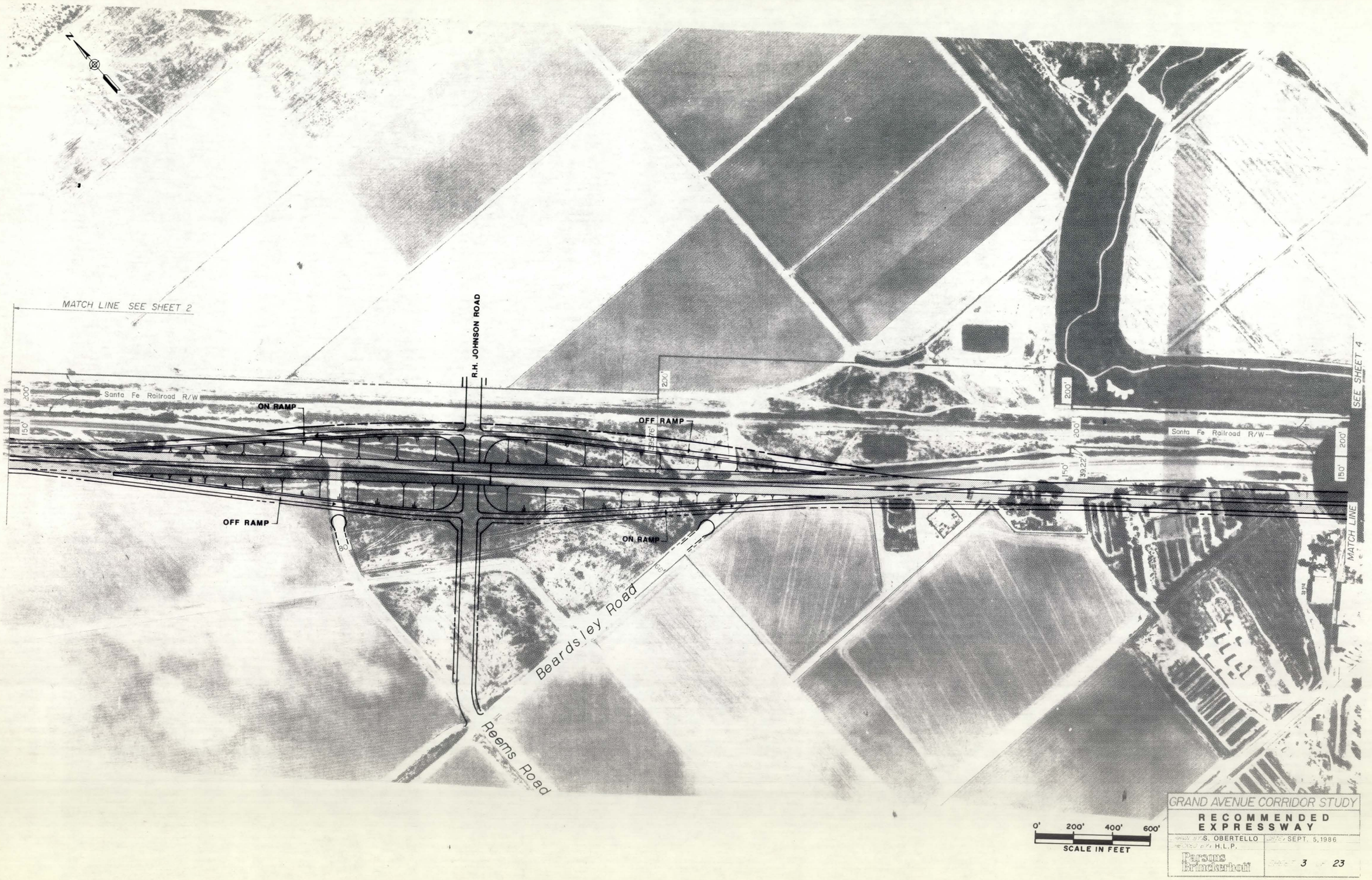
SHEET 2 OF 23

22



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RECOMMENDED EXPRESSWAY

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DESIGNED BY H.L.P.

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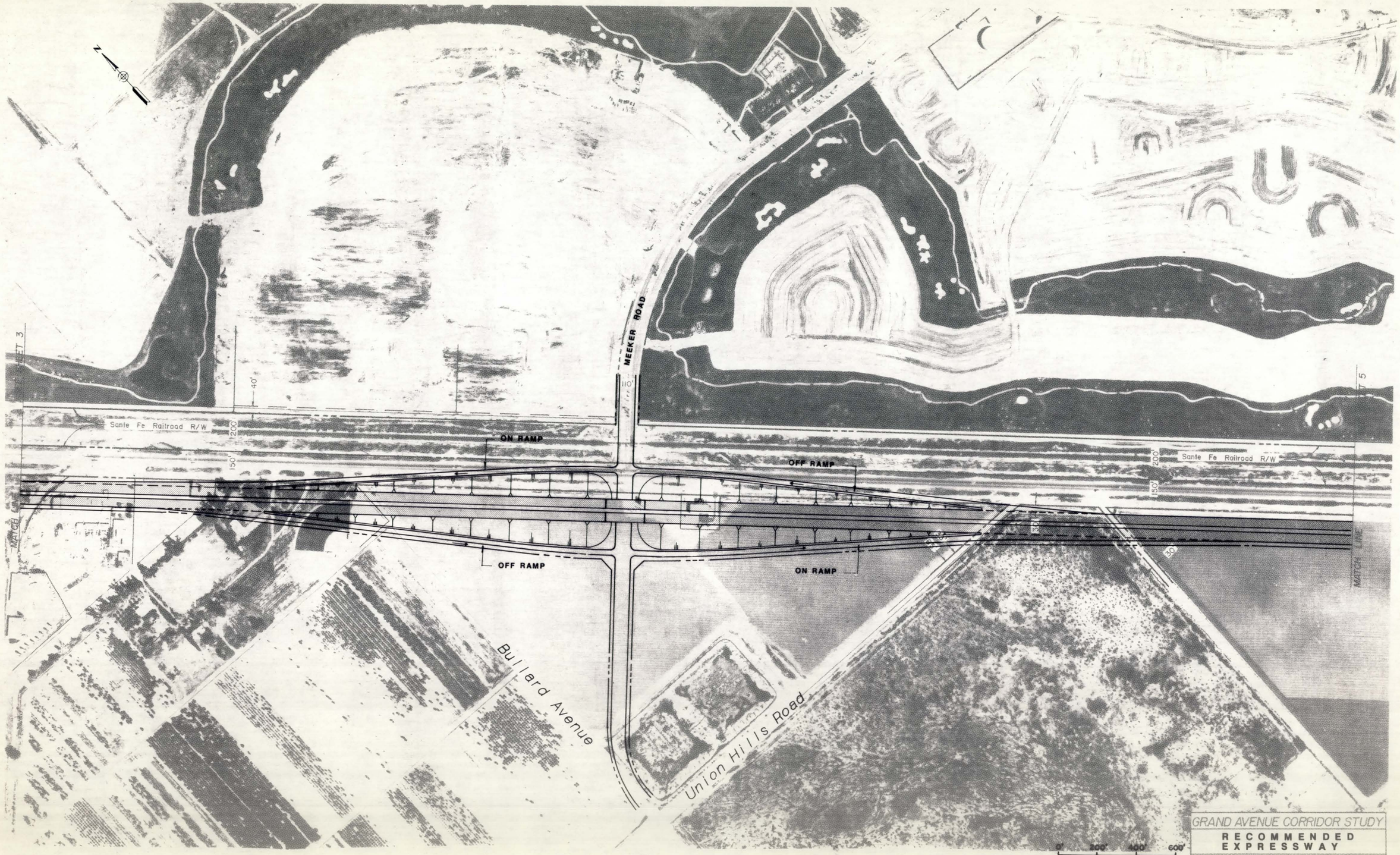
SHEET 3 OF 23



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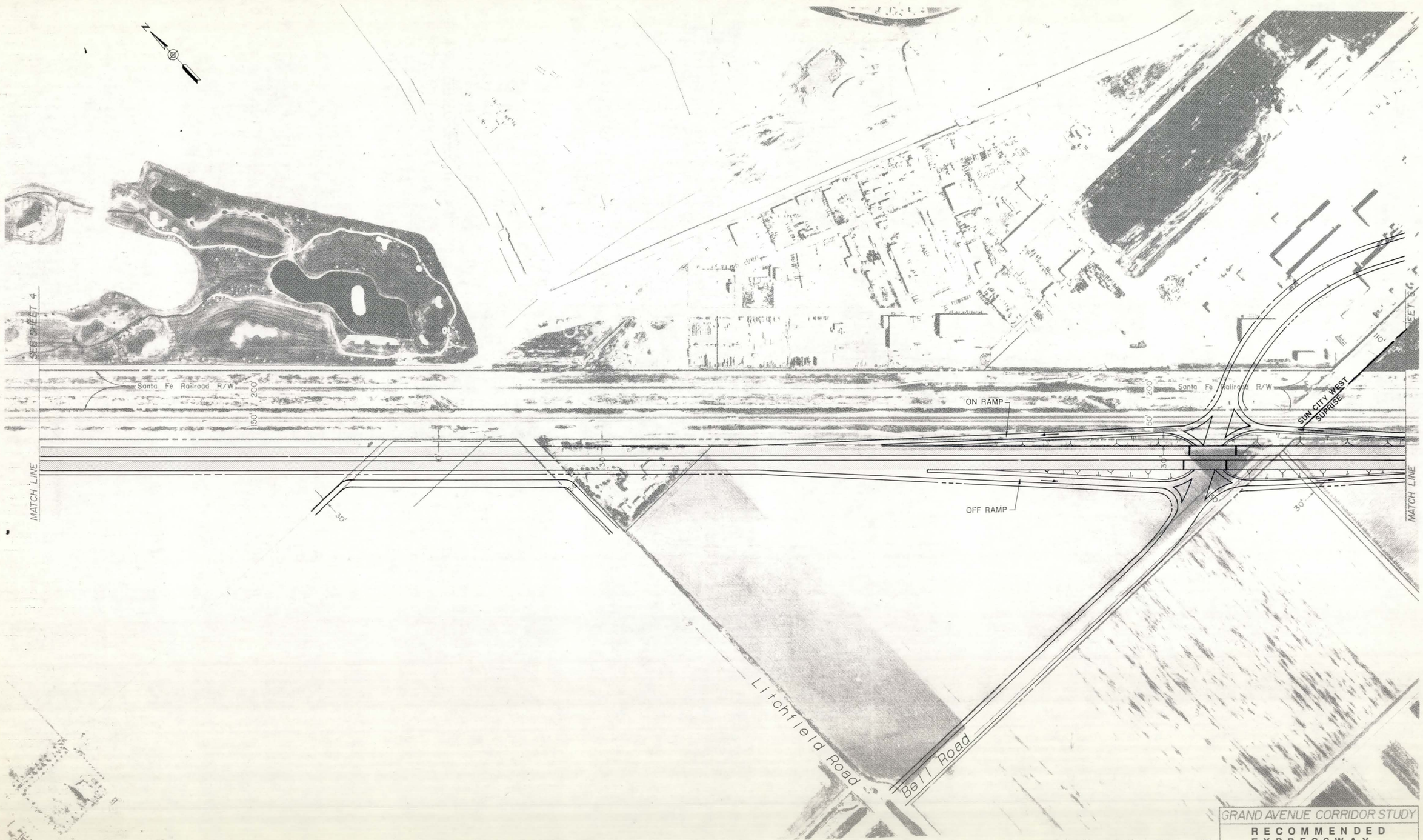
SHEET 4 OF 23



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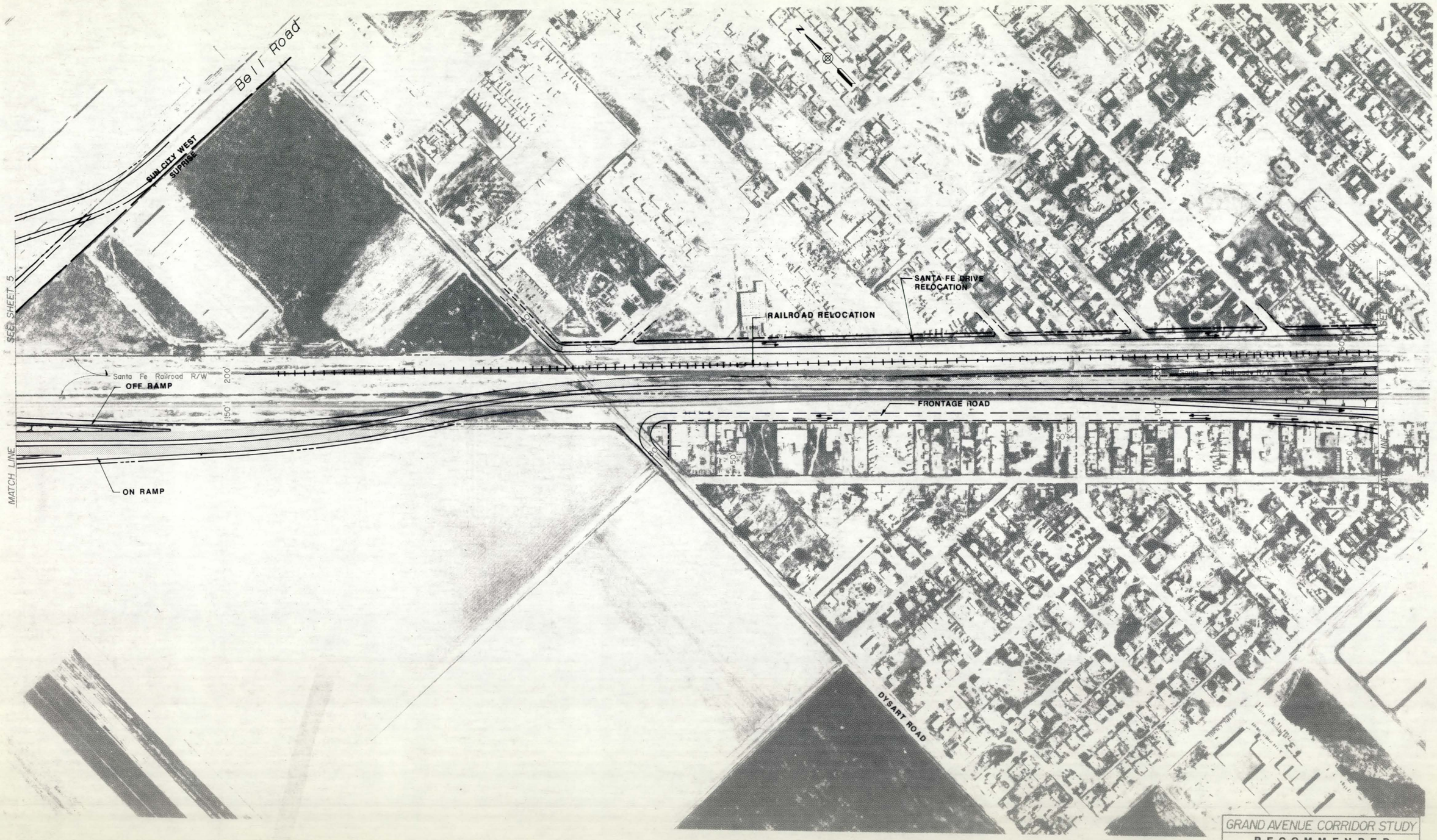

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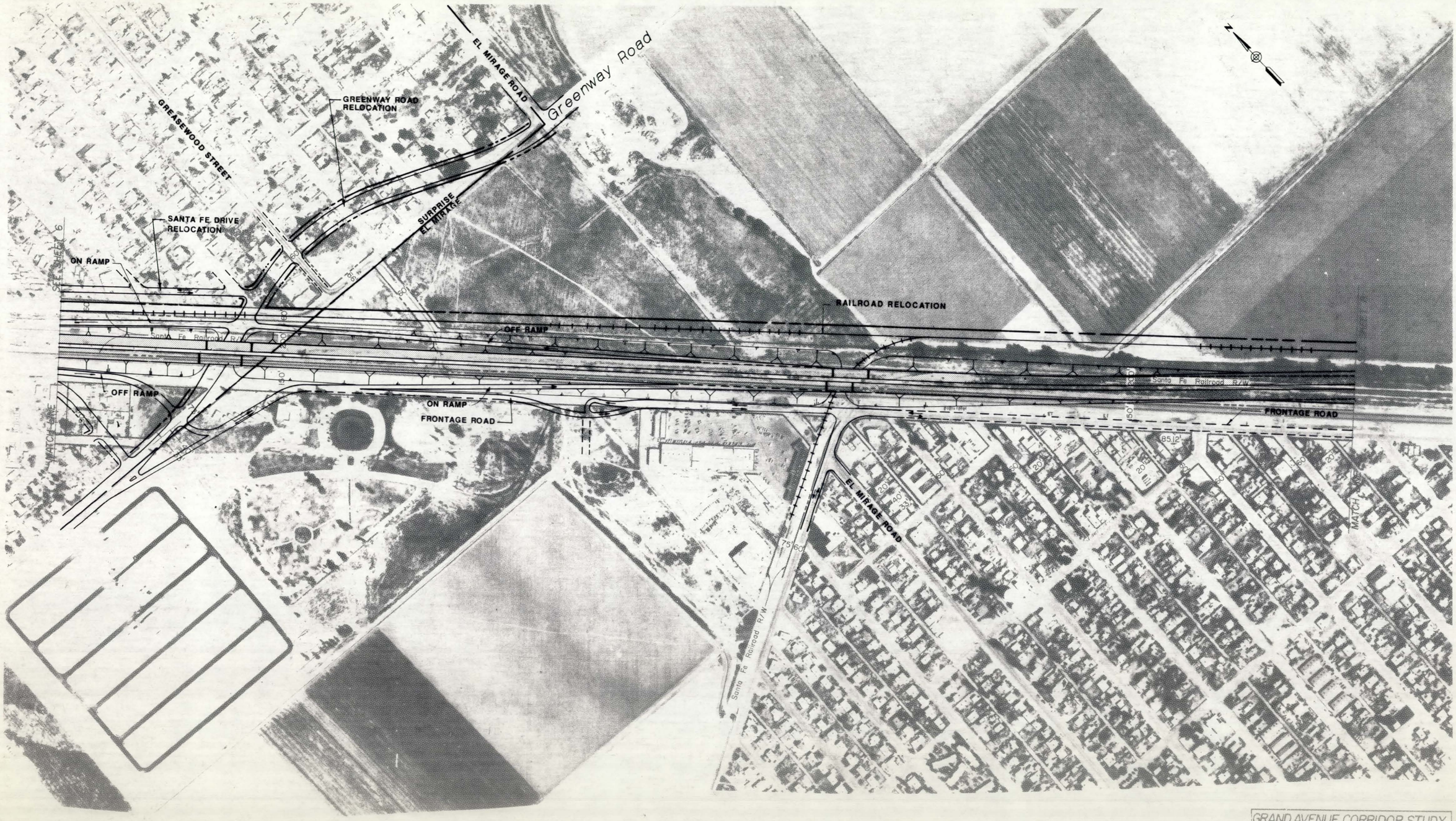

0' 200' 400' 600'
SCALE IN FEET

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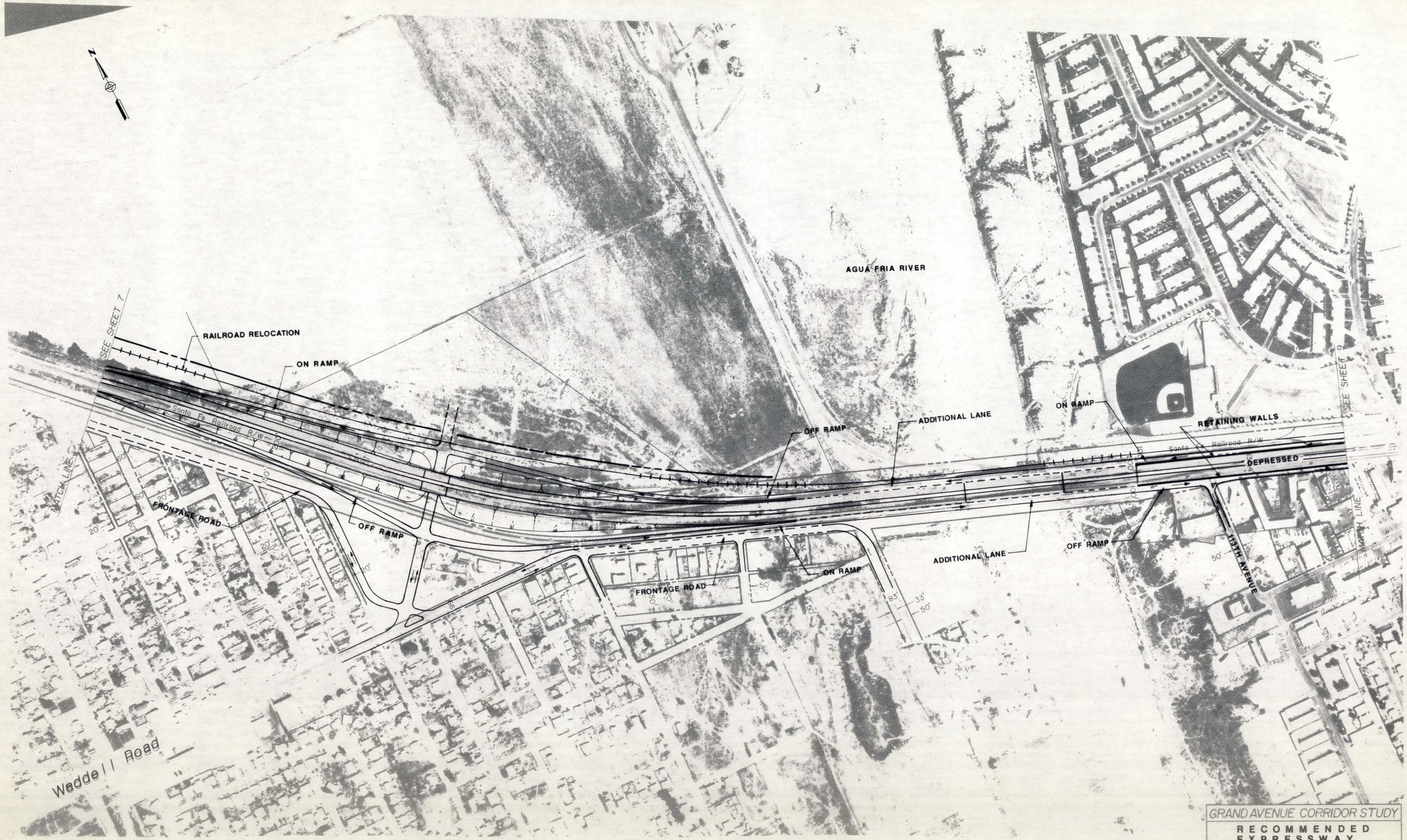
PAGE 7 OF 23



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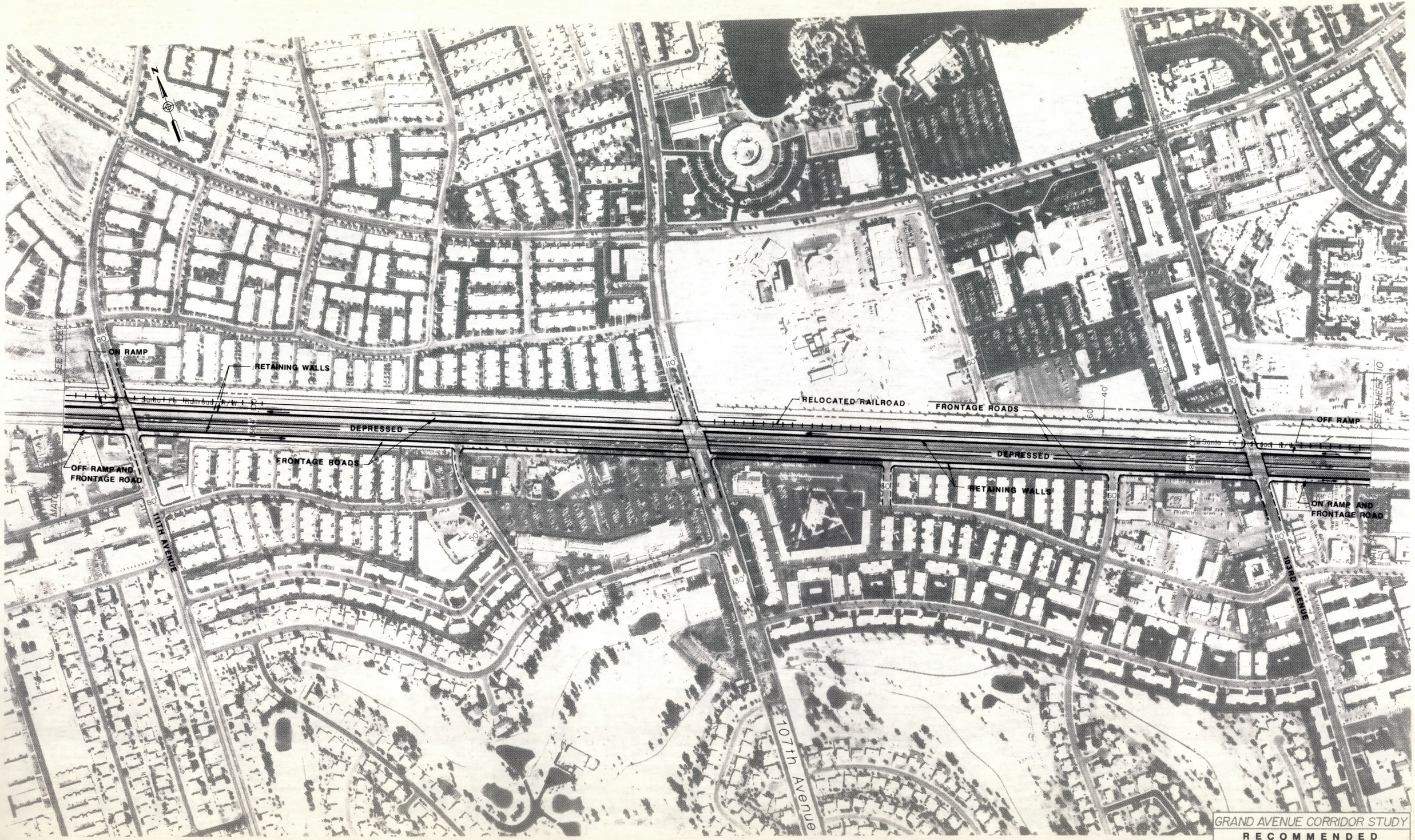

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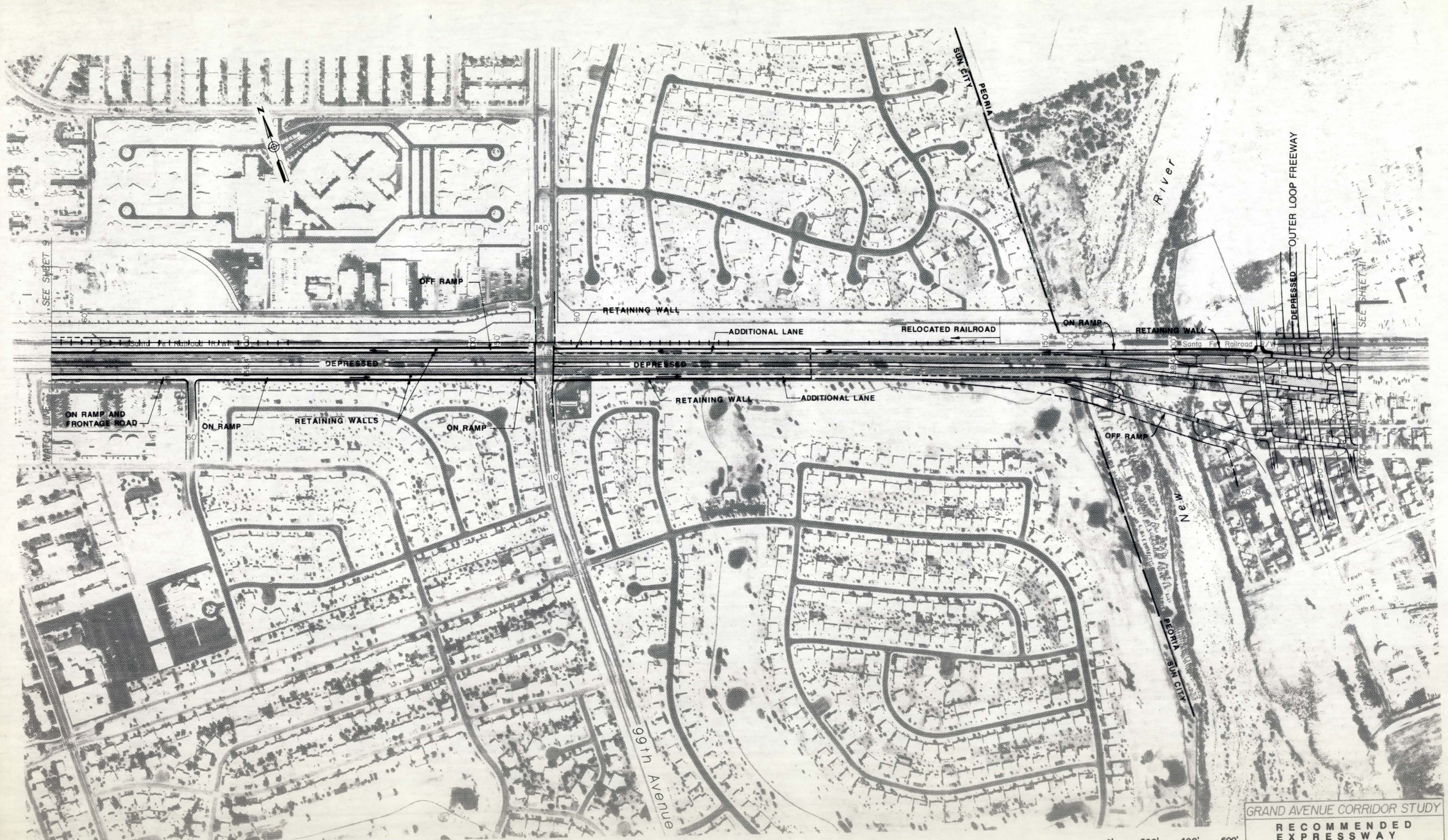

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SEPT. 5, 1986

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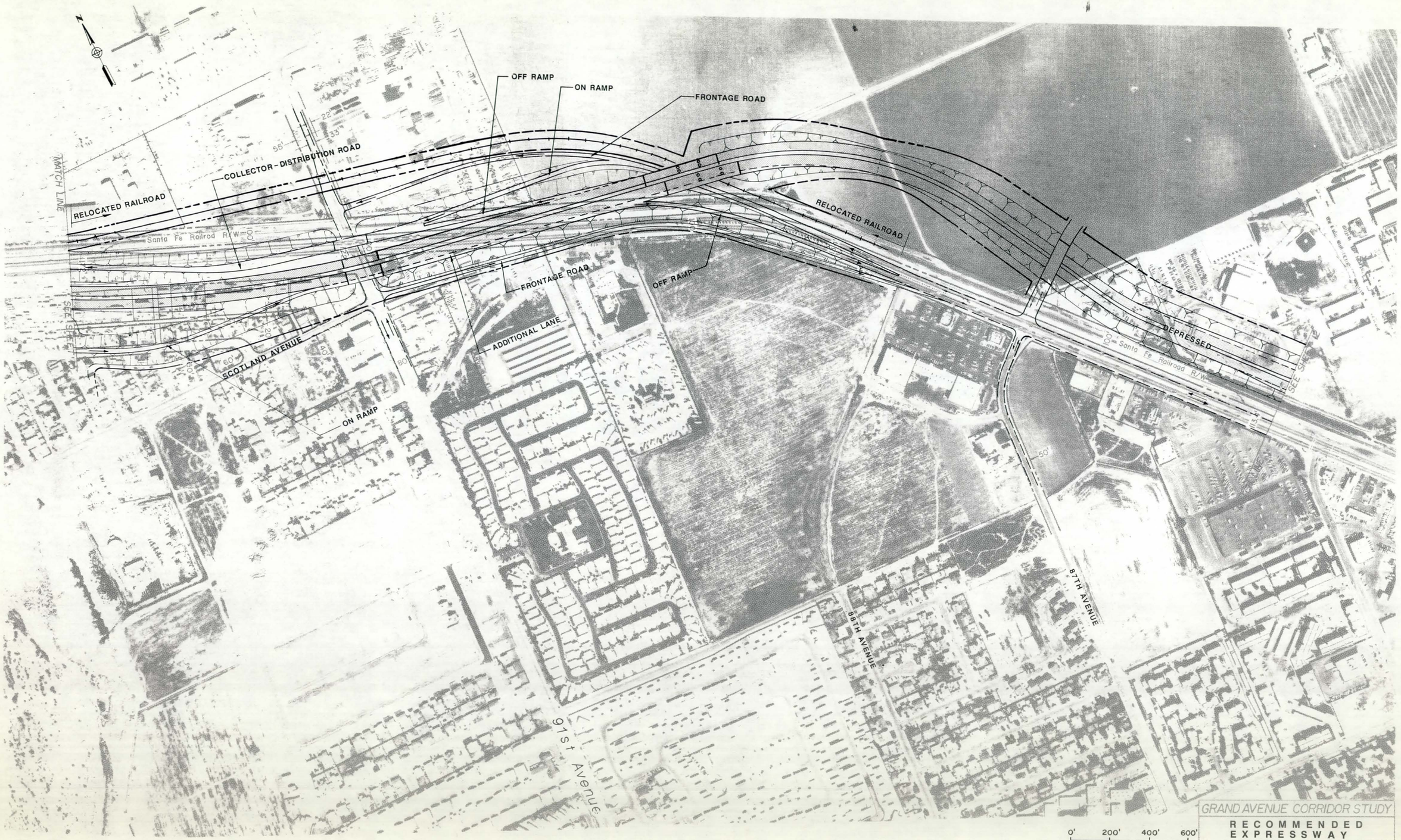

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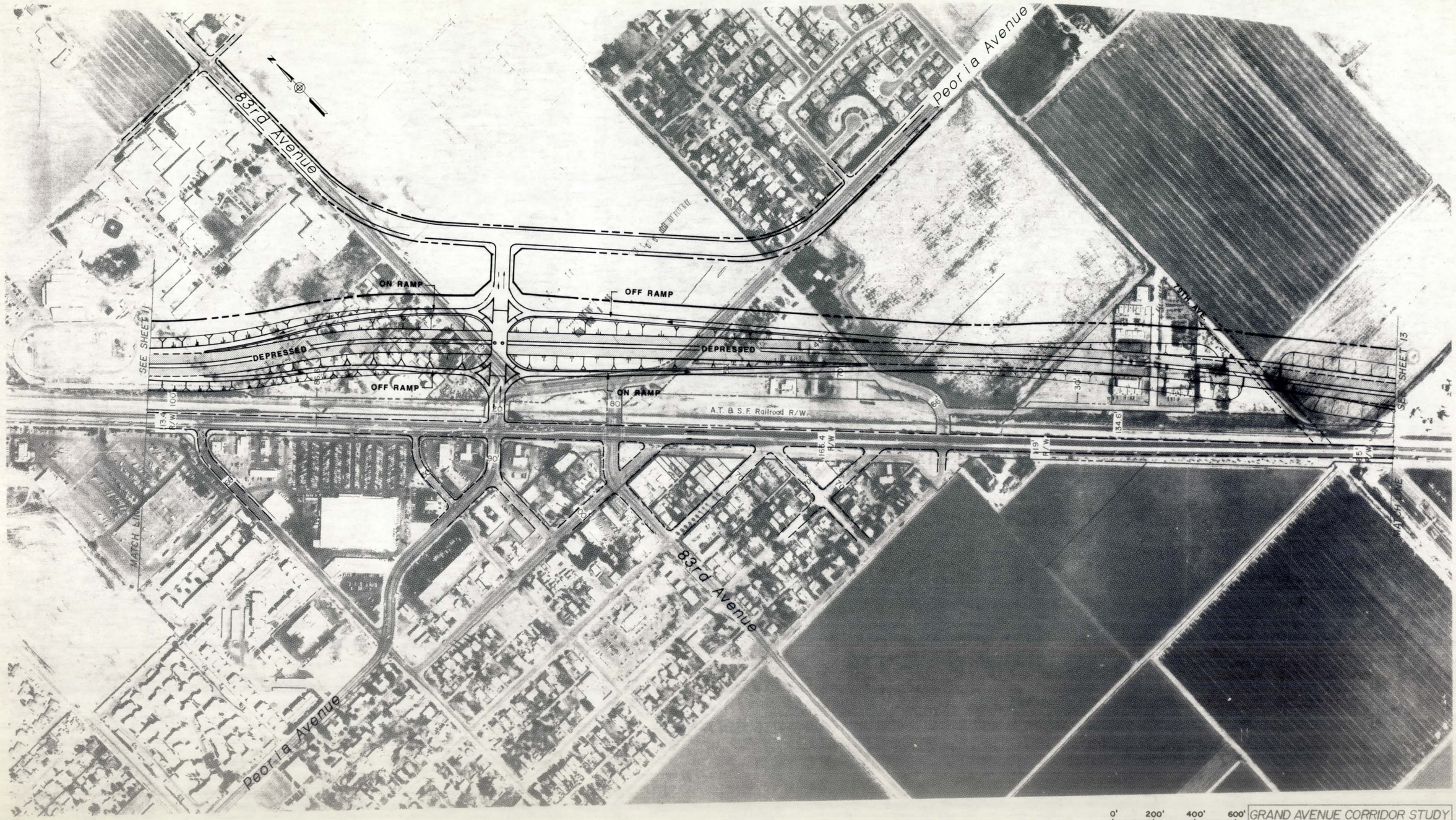

0' 200' 400' 600'
SCALE IN FEET

GRAND AVENUE CORRIDOR STUDY

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REVIEW BY: H.L.P.

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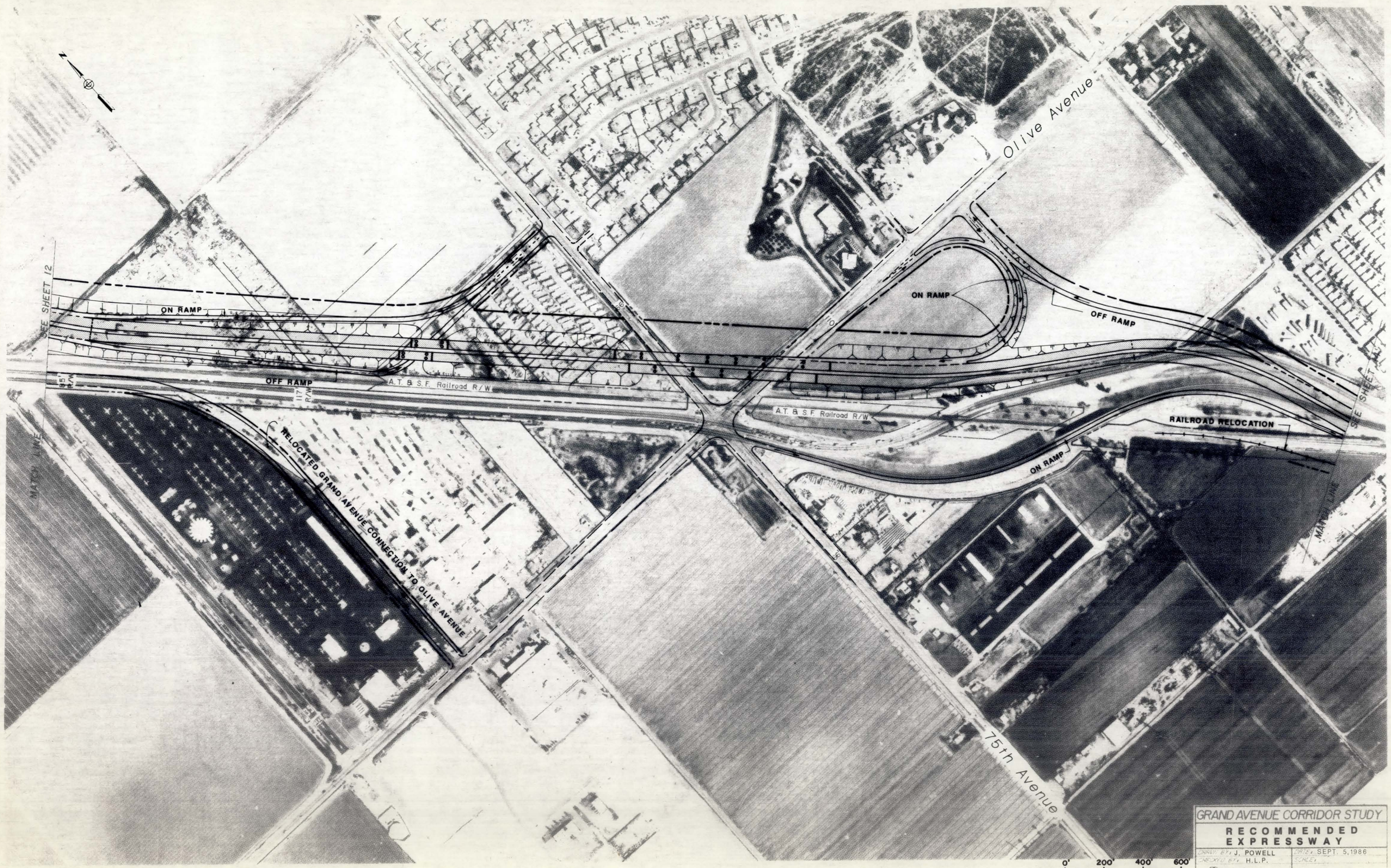
SHEET 12 OF 23



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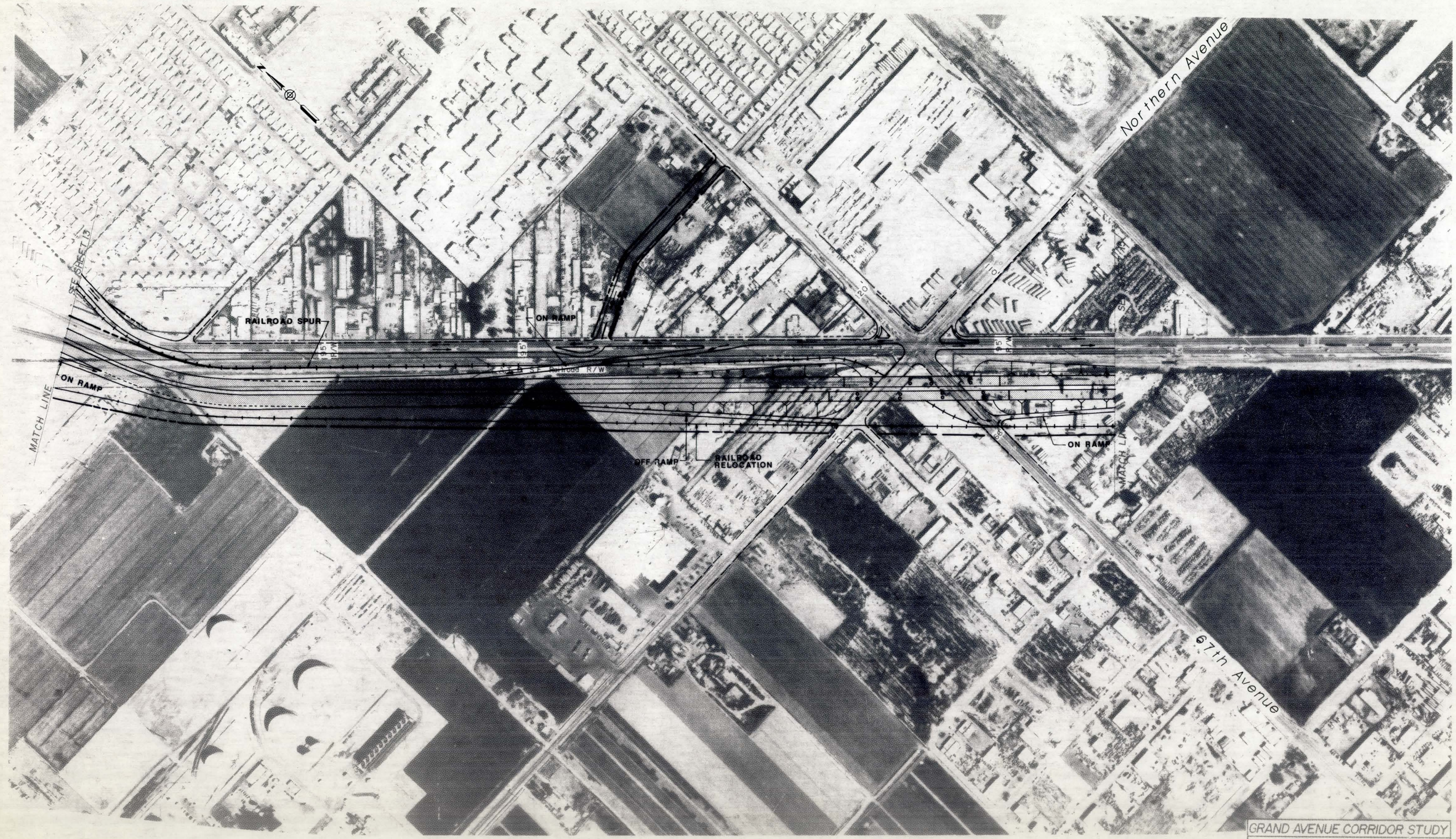
SHEET 13 OF 23



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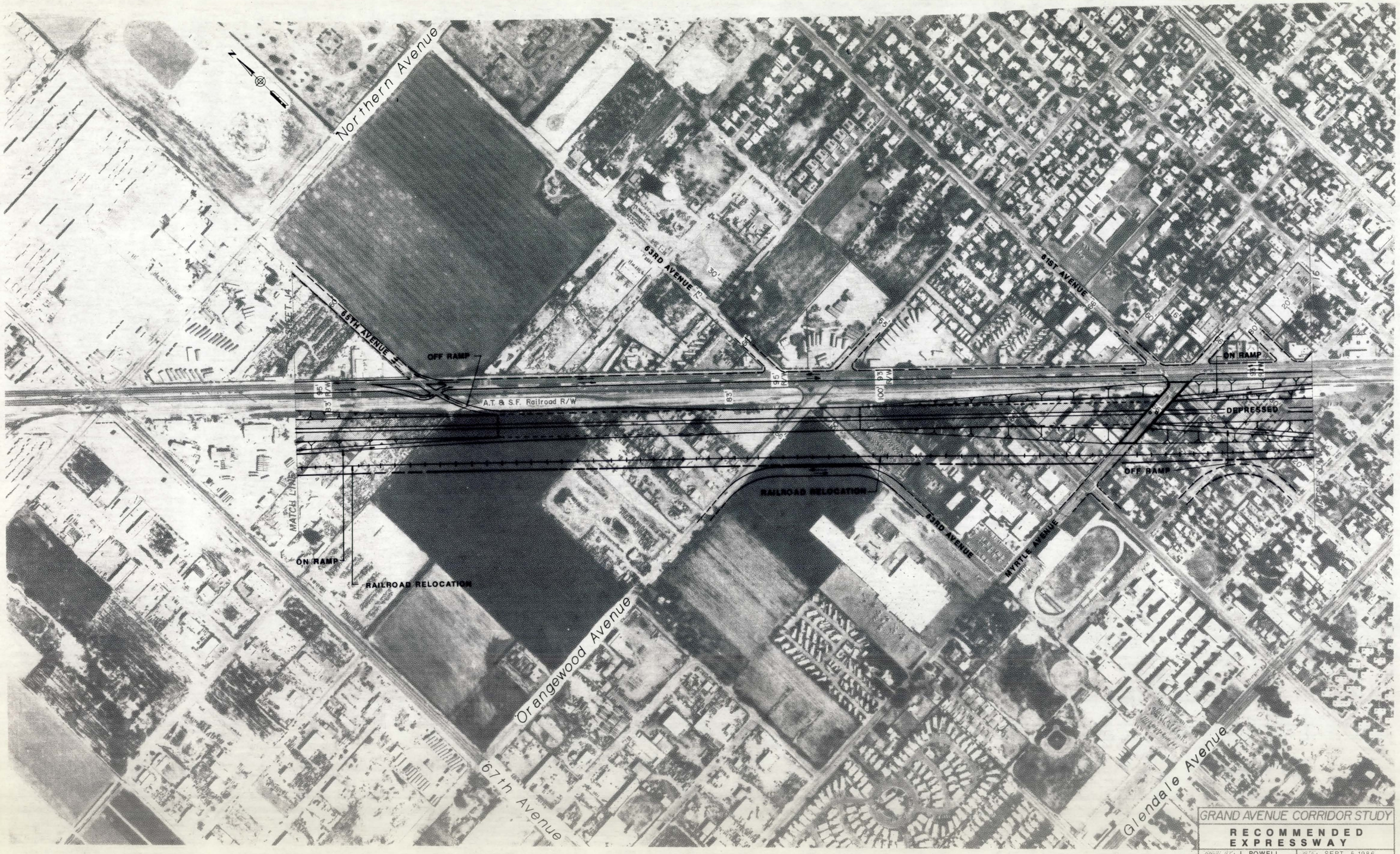

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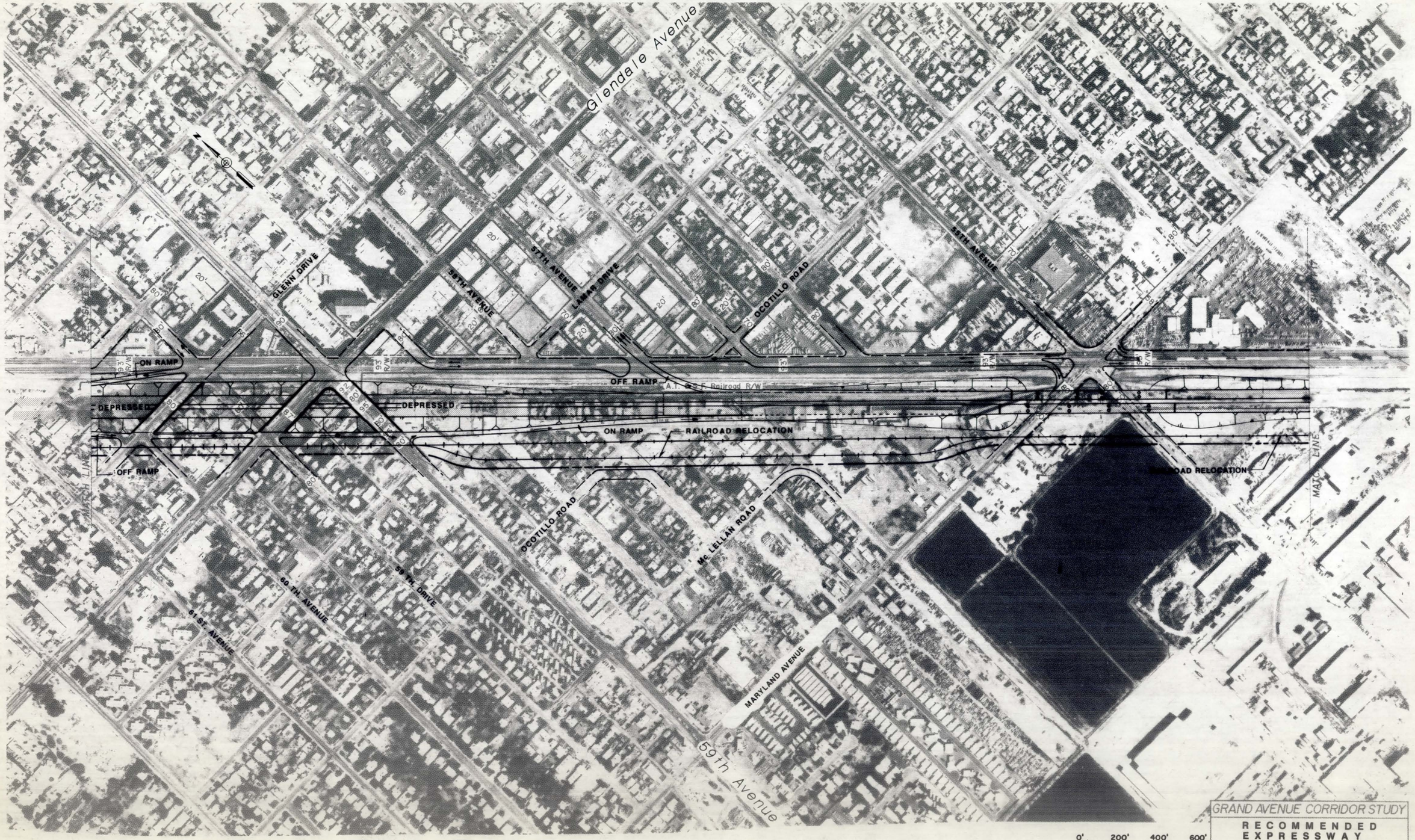
SHEET 15 OF 23



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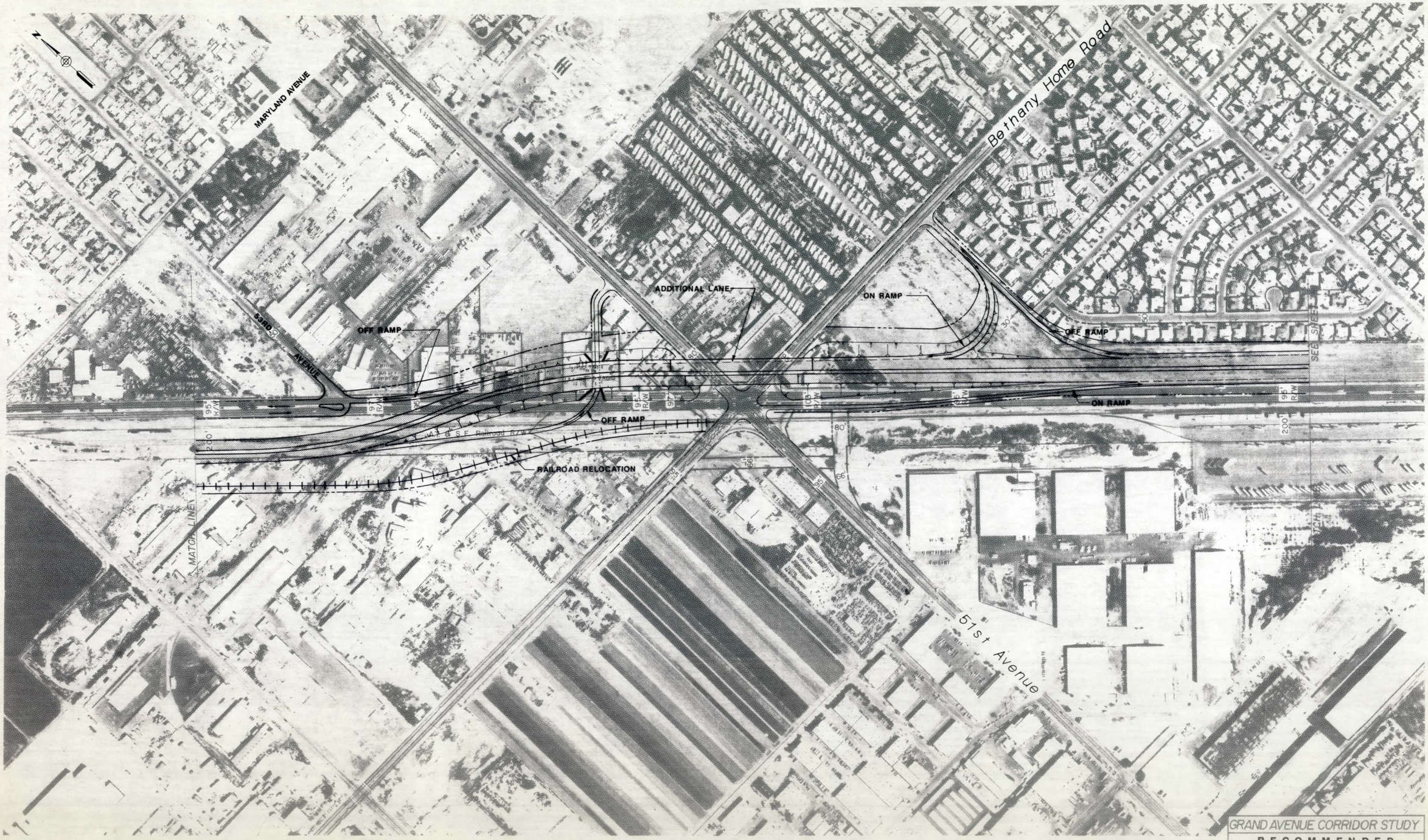
SHEET 16 OF 23



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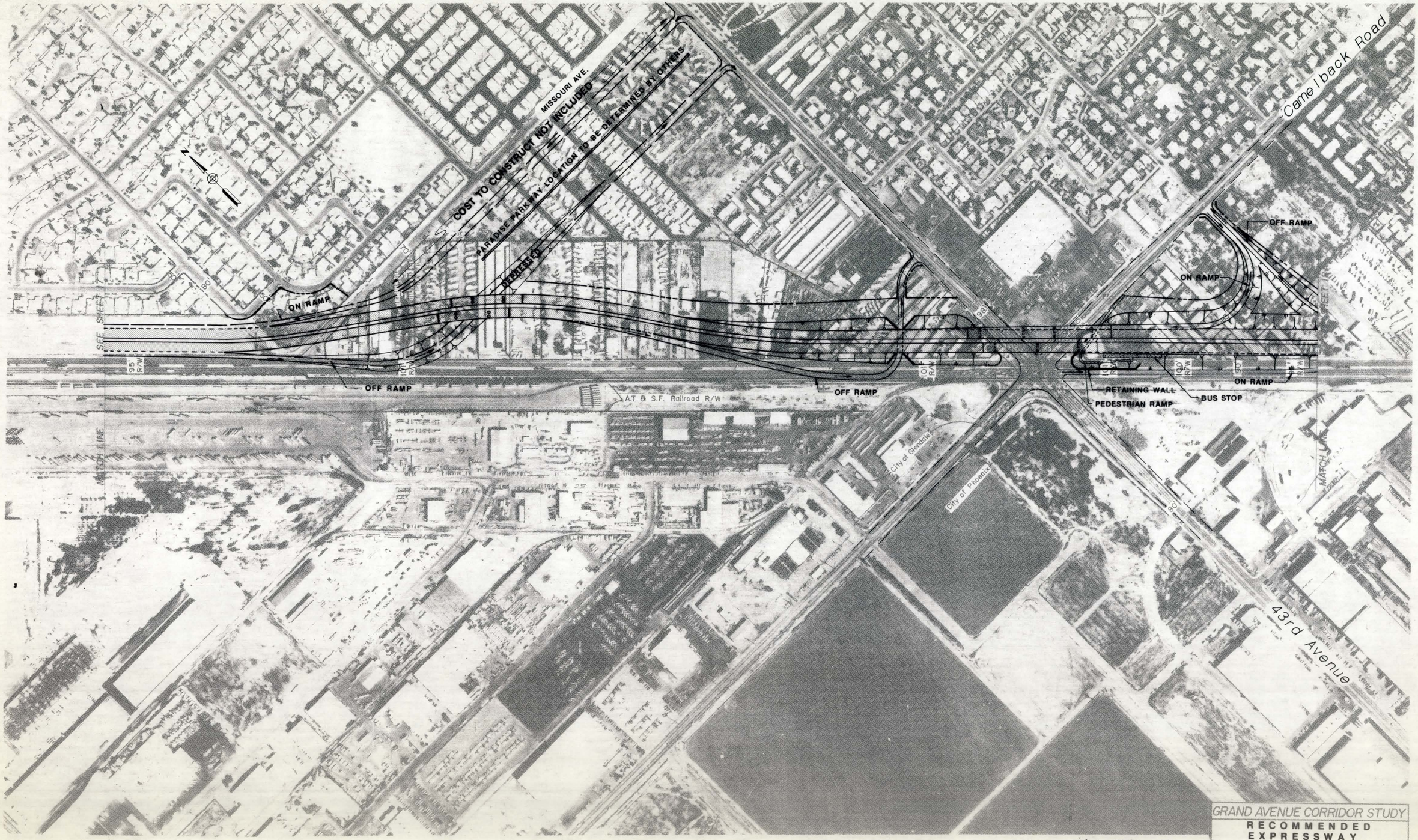

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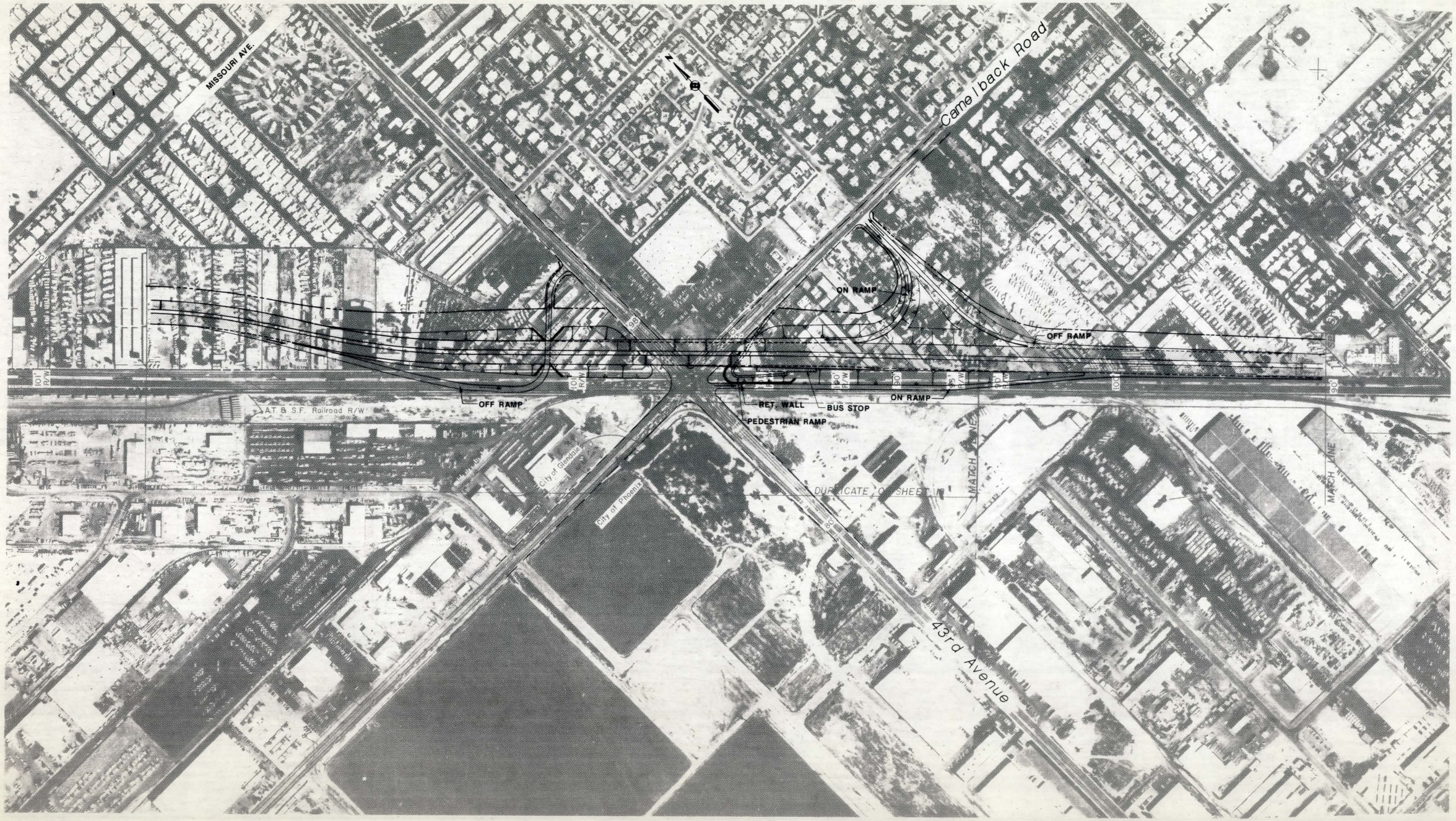

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SCALE IN FEET

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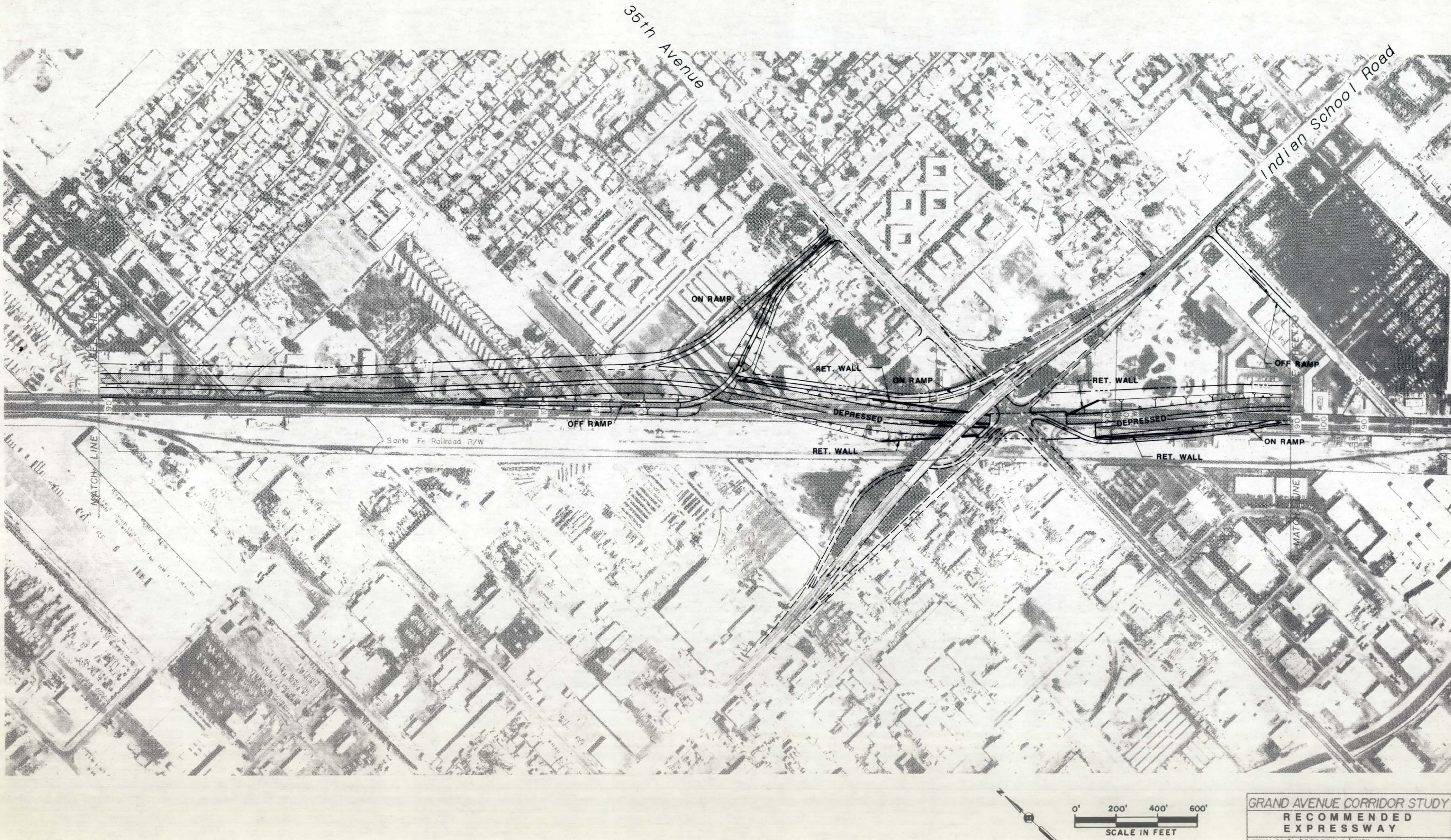
SHEET 18A OF 23



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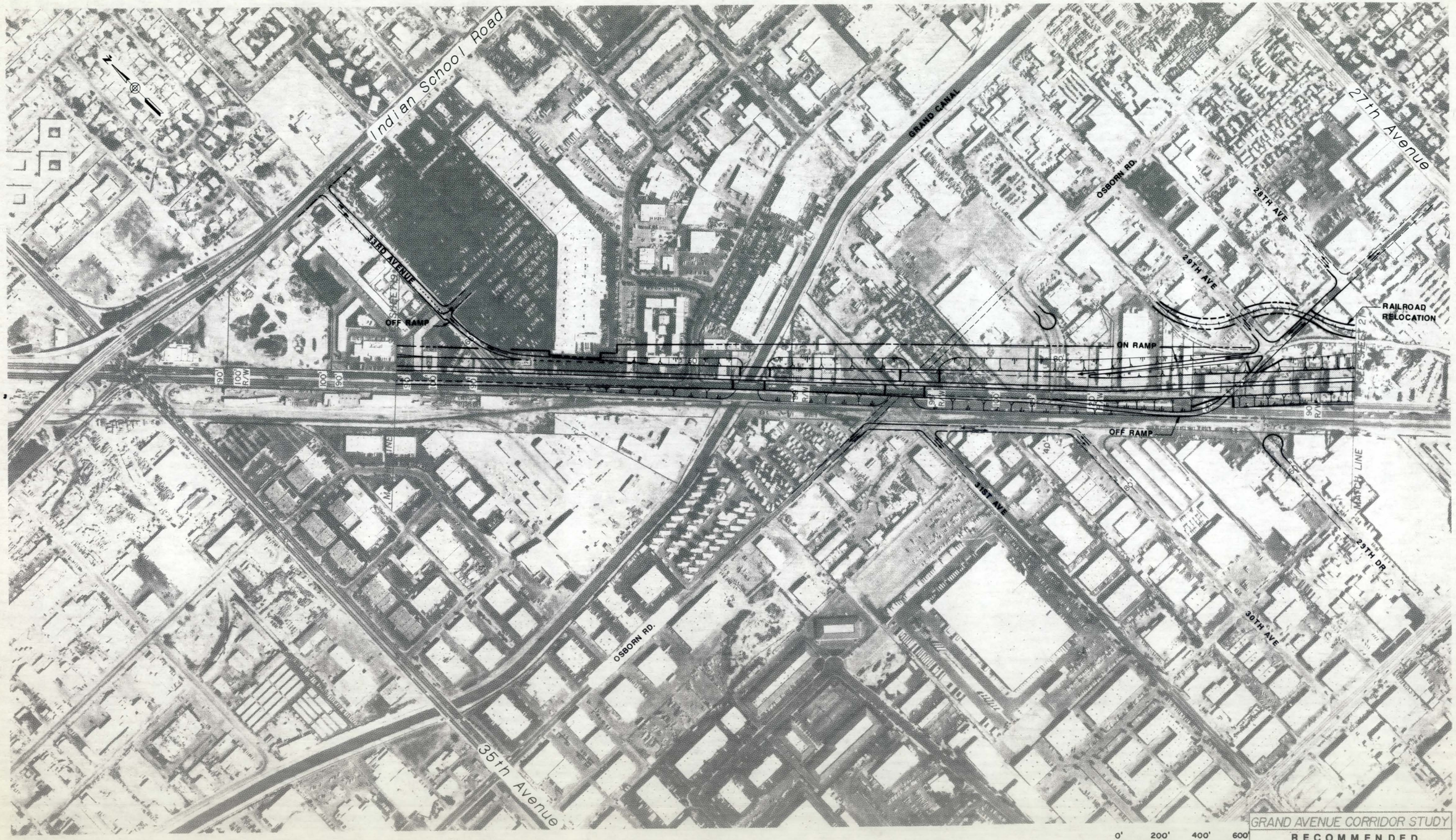

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SHEET 20 OF 23

GRAND AVENUE CORRIDOR STUDY

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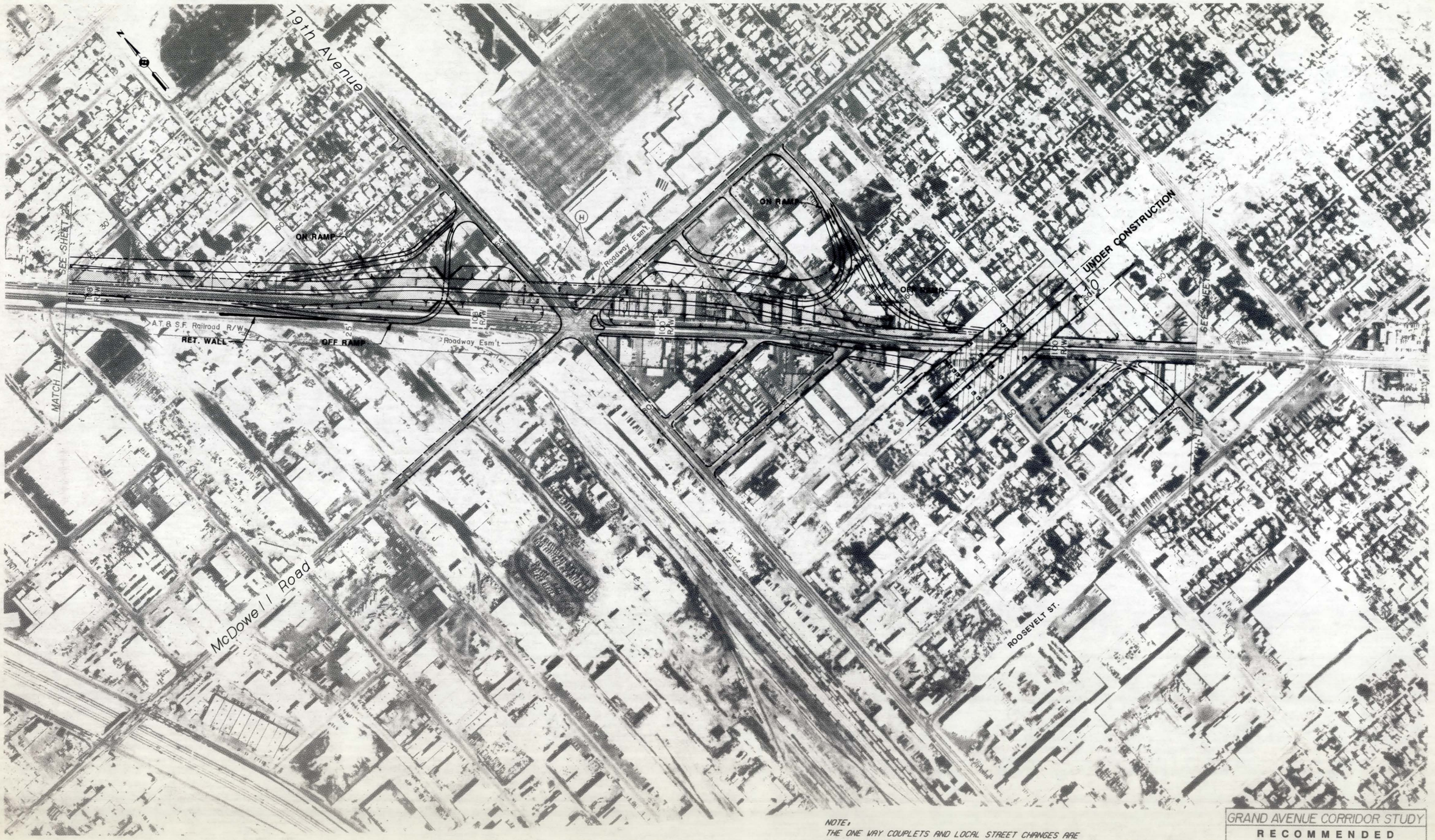
DATE: SEPT. 5, 1986
SCALE: 1" = 200'

Parsons Brinckerhoff

SHEET 21 OF 23



NOTE:
THE ONE WAY COUPLETS AND LOCAL STREET CHANGES ARE CONCEPTUAL ONLY AND HAVE NOT BEEN APPROVED BY THE CITY OF PHOENIX

0' 200' 400' 600'
SCALE IN FEET

GRAND AVENUE CORRIDOR STUDY

RECOMMENDED EXPRESSWAY

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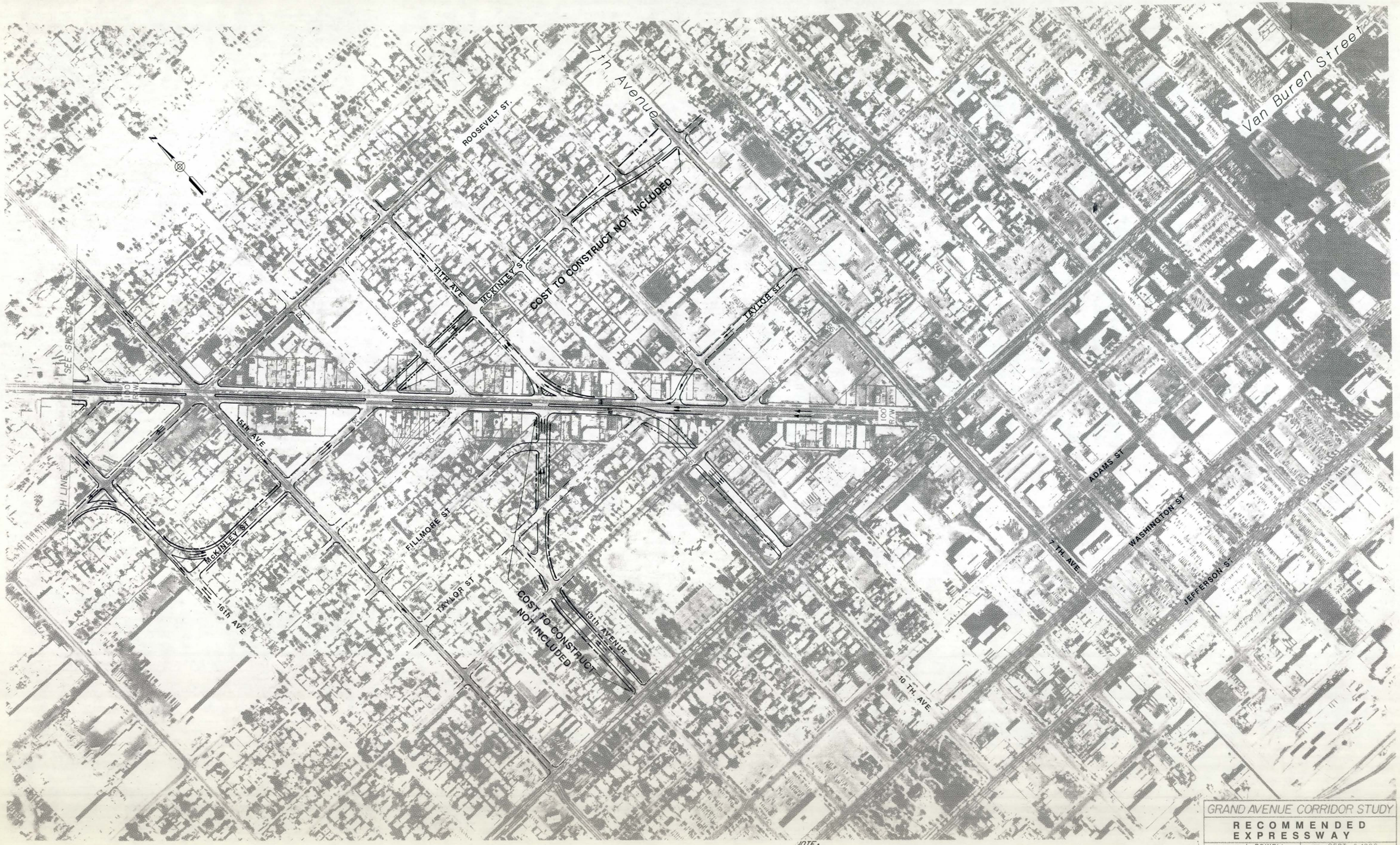
DATE: SEPT. 5, 1986
REVIEWED BY: H.L.P.
SCALE:

Parsons Brinckerhoff

SHEET 22 OF 23



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GRAND AVENUE CORRIDOR STUDY

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J. POWELL
H.L.P.

SEPT. 5, 1986

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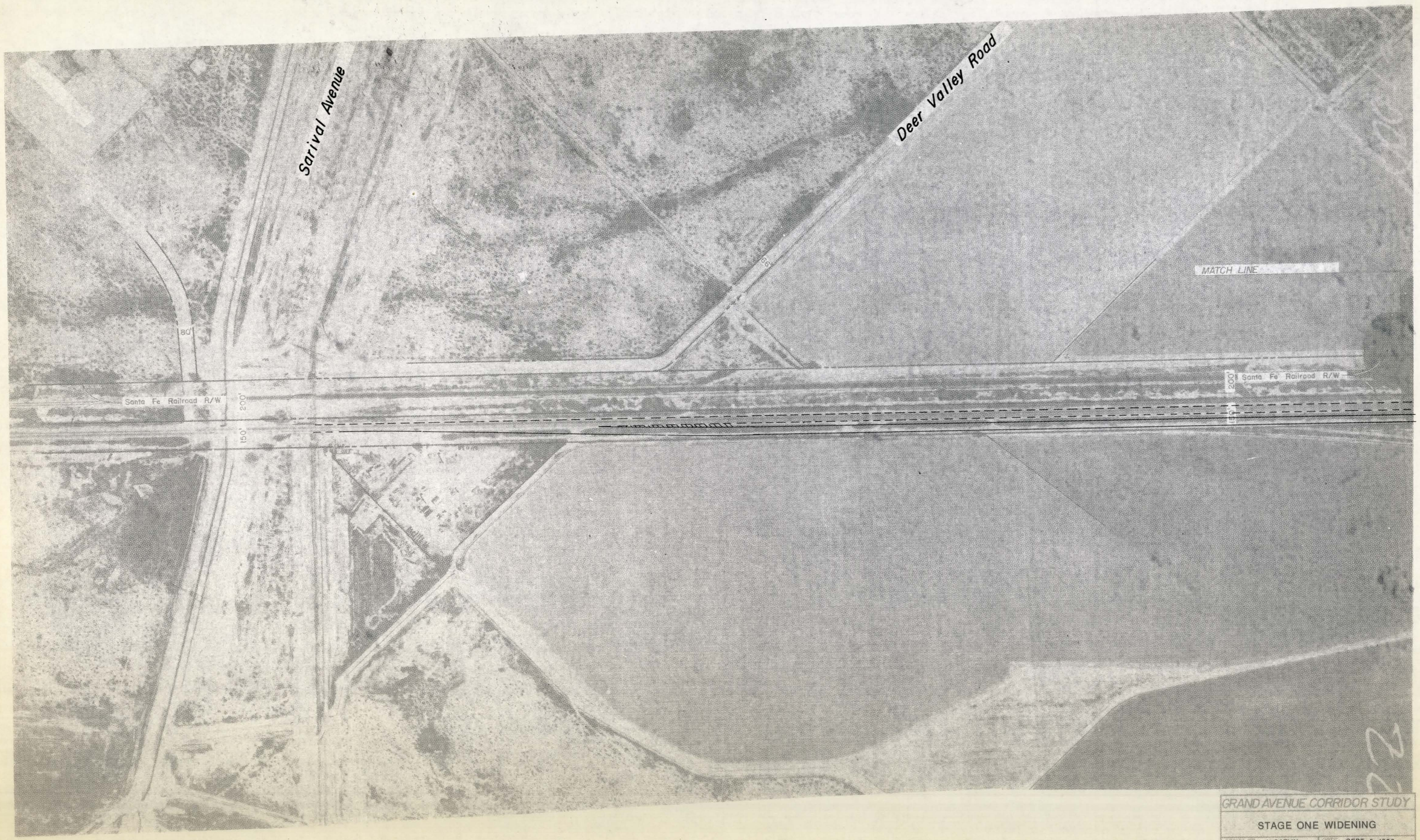

GRAND AVENUE CORRIDOR STUDY

STAGE ONE WIDENING

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DATE: SEPT. 5. 1986

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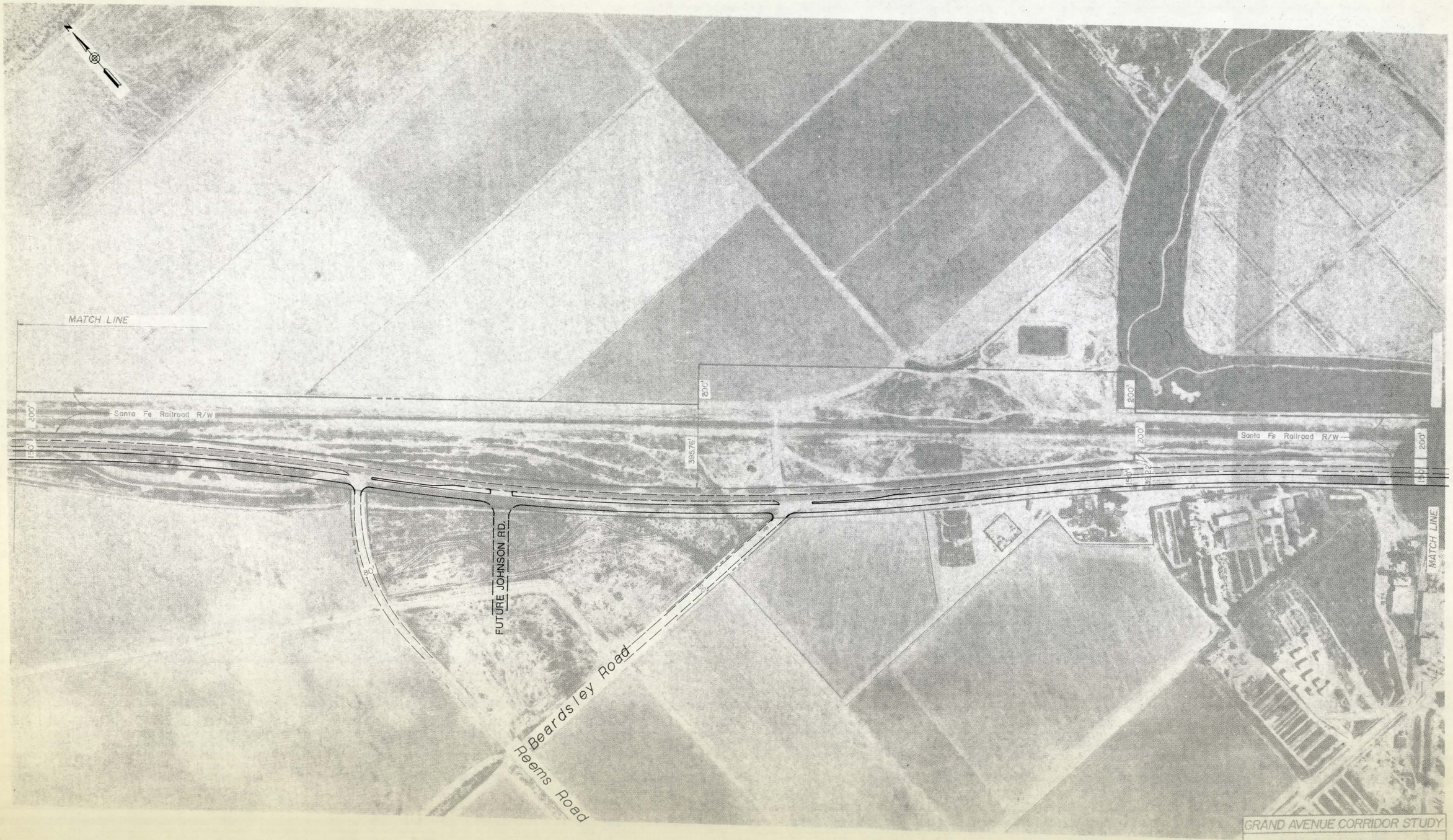
SHEET 2



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STAGE ONE WIDENING

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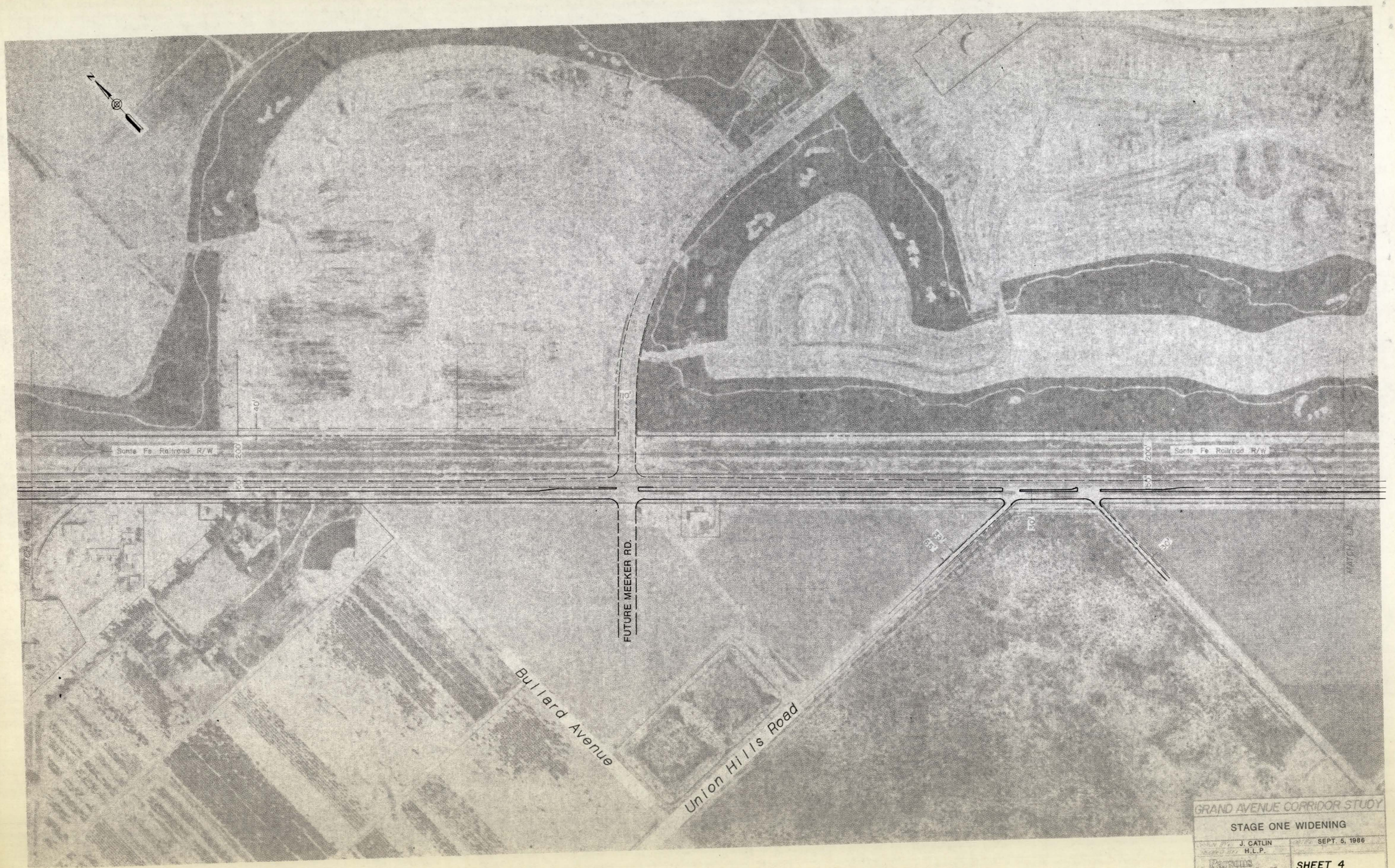
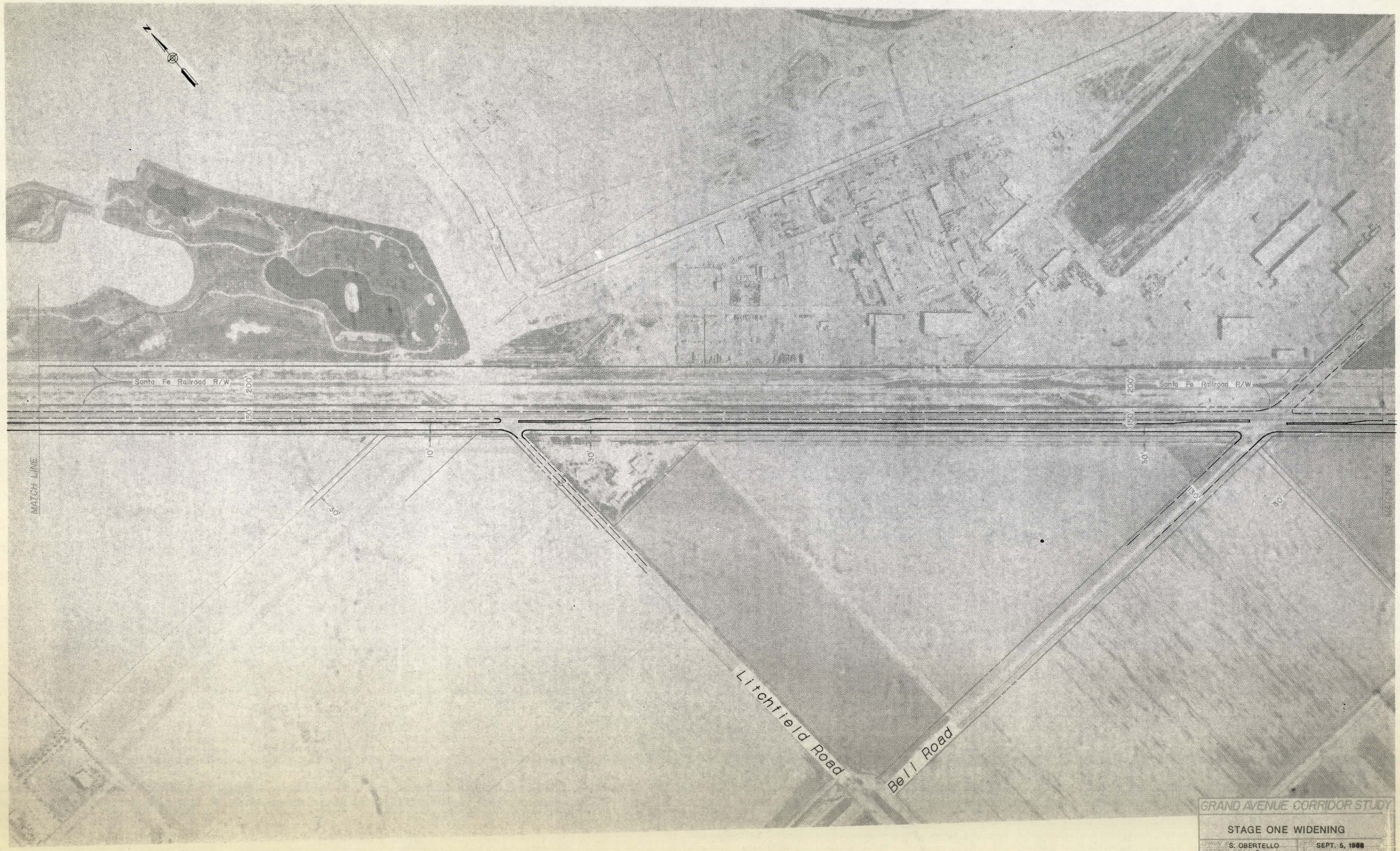
SHEET 3



GRAND AVENUE CORRIDOR STUDY

STAGE ONE WIDENING

J. CATLIN H.L.P.	SEPT. 5, 1986
Parsons Brinckerhoff	SHEET 4



GRAND AVENUE CORRIDOR STUDY

STAGE ONE WIDENING

S. OBERTELLO
H.L.P.

SEPT. 5, 1988

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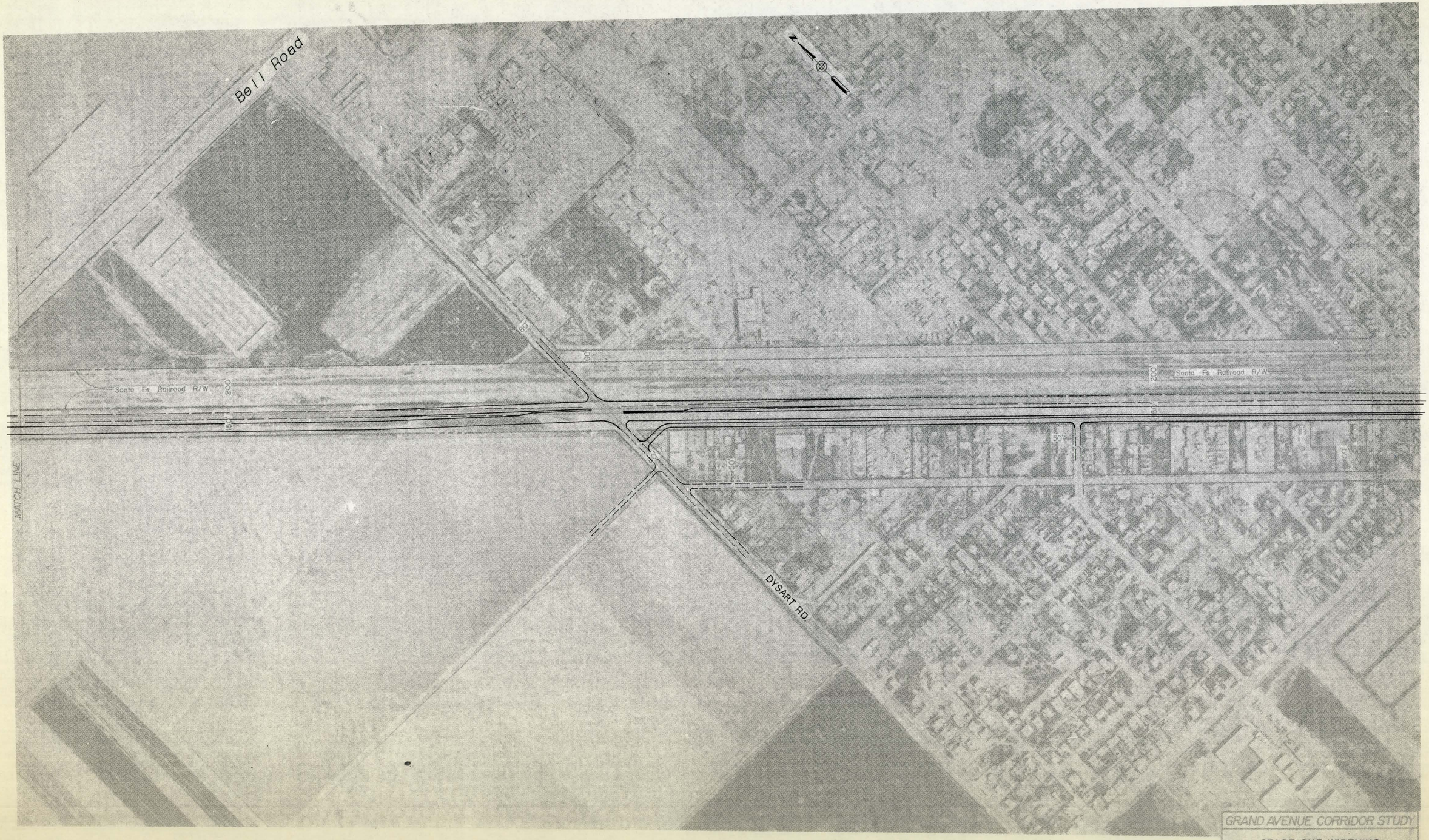
SHEET 5



GRAND AVENUE CORRIDOR STUDY

STAGE ONE WIDENING

DRAWN BY: J. CATLIN
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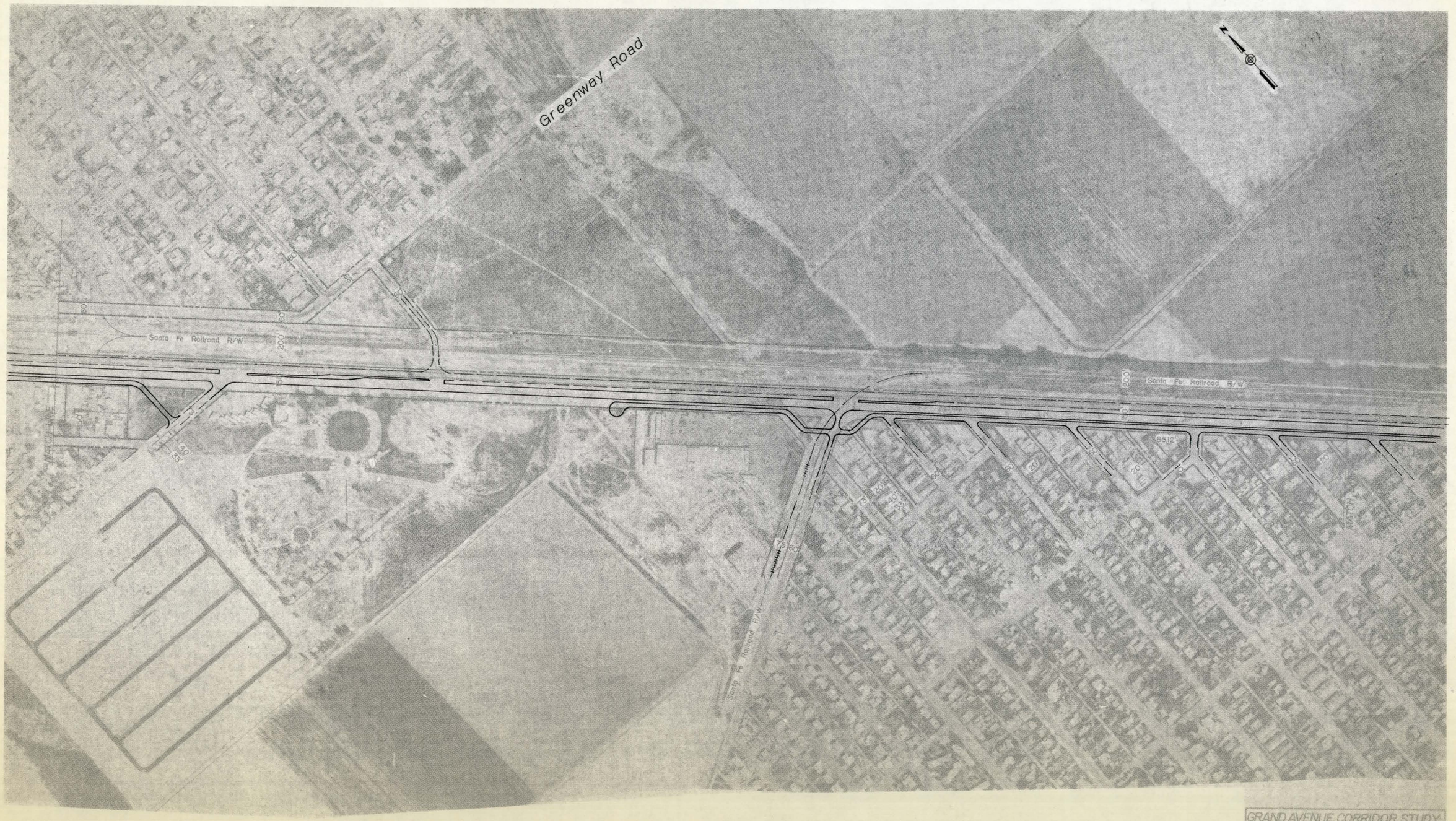
Parsons Brinckerhoff

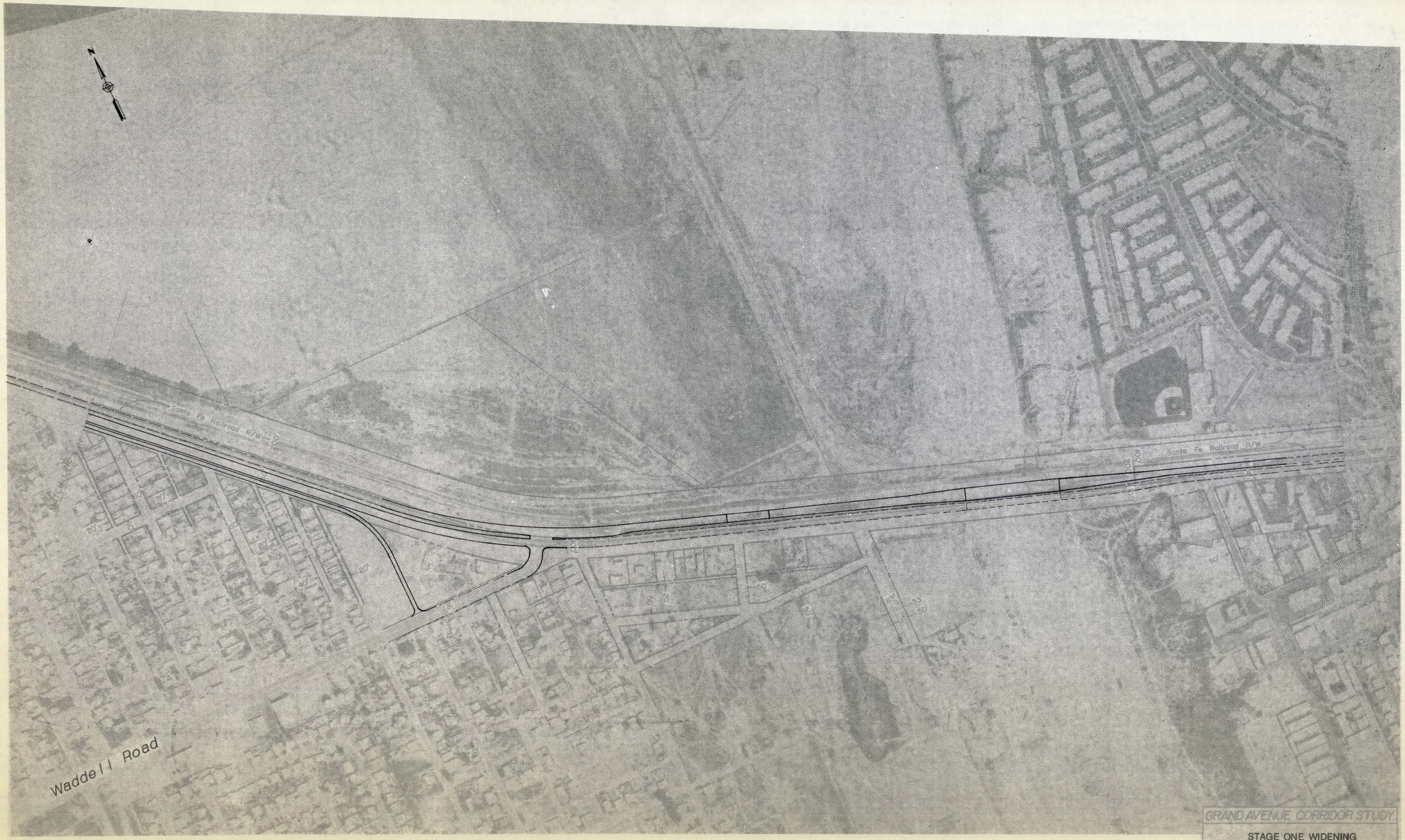
SHEET 6



GRAND AVENUE CORRIDOR STUDY

STAGE ONE WIDENING

J. CATLIN H.L.P.	SEPT. 5, 1986
Parsons Brinckerhoff	SHEET 7

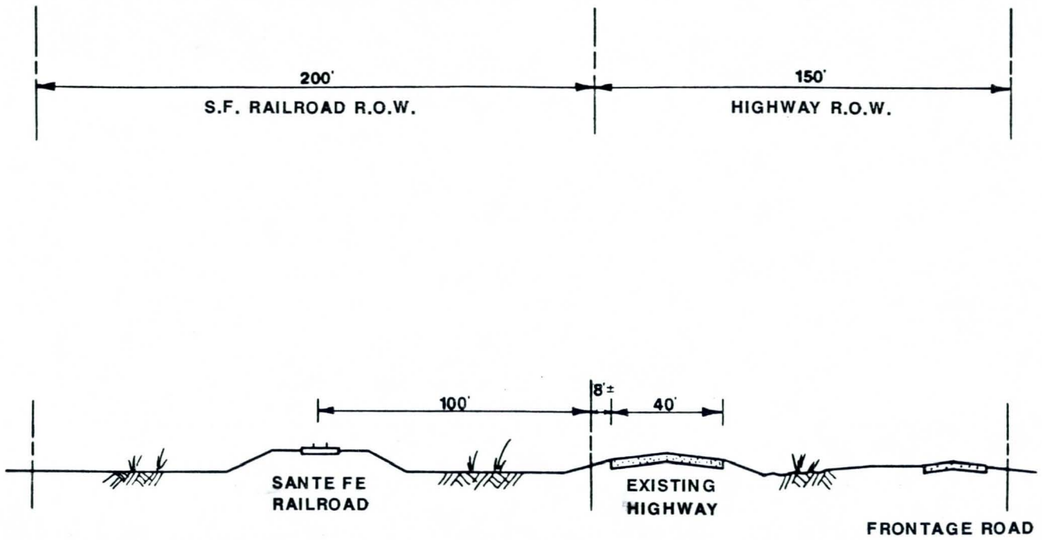


GRAND AVENUE CORRIDOR STUDY

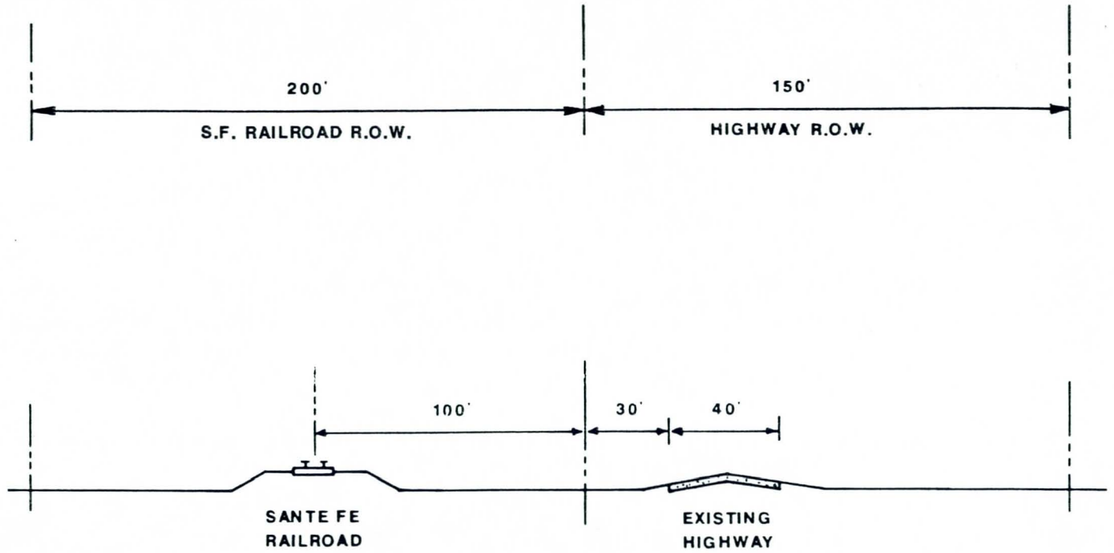
STAGE ONE WIDENING

S. OBERTELLO H.L.P.	SEPT. 5, 1986
Parsons Brinckerhoff	SHEET 8

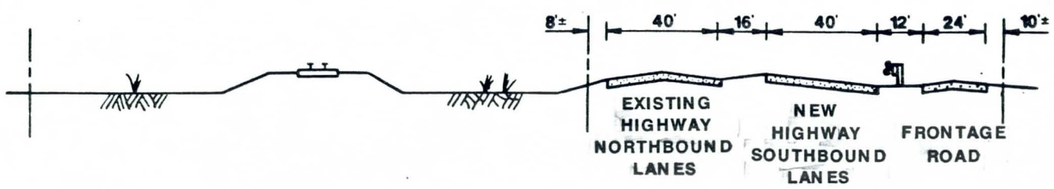
GRAND AVENUE EXPRESSWAY



EXISTING HIGHWAY

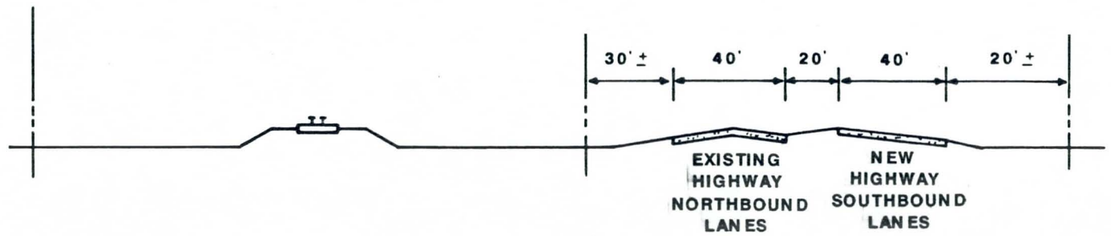


EXISTING HIGHWAY



STAGE I WIDENING

TYPICAL SECTION- WADDELL RD. TO DYSART RD.



STAGE I WIDENING

TYPICAL SECTION-DYSART RD. TO BEARDSLEY CANAL

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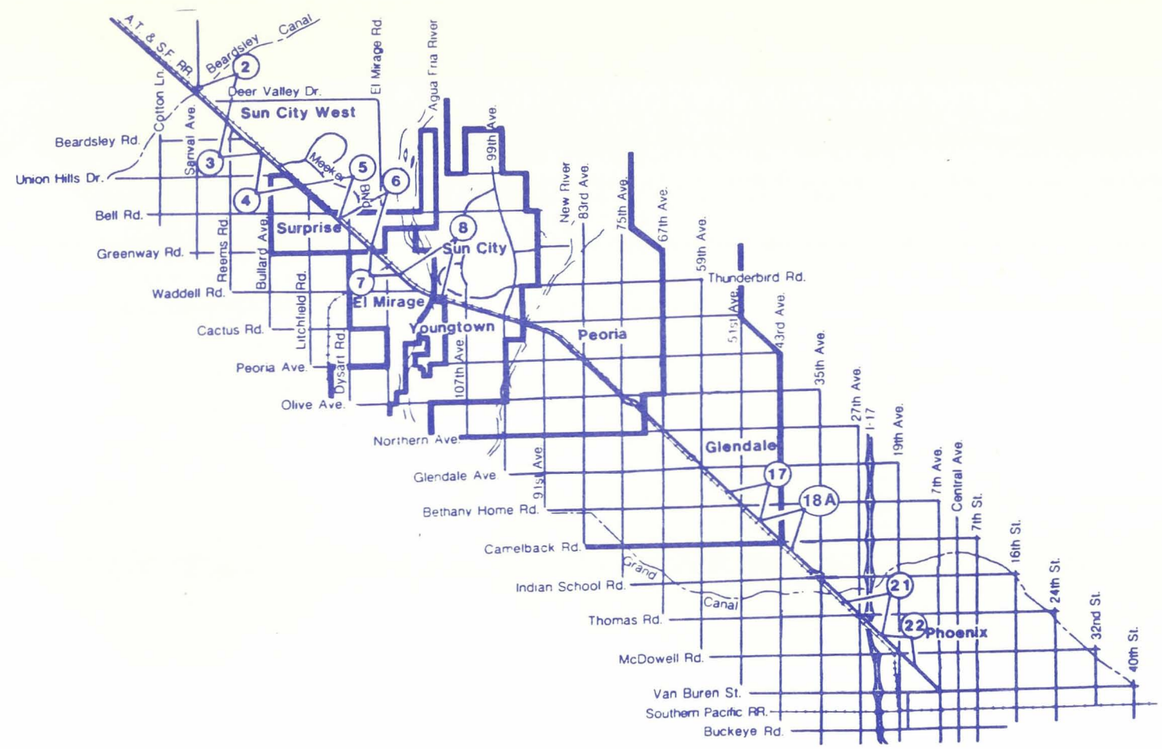
BRINCKERHOFF

GRAND AVENUE CORRIDOR STUDY

LEGEND:

- EXPRESSWAY
- CUT SLOPE
- FILL SLOPE
- BRIDGE
- RETAINING WALLS
- TRAFFIC DIRECTION
- RAILROAD RELOCATION
- EXISTING ROADWAY TO REMAIN
- (H) HISTORIC BUILDING
- NEW RIGHT OF WAY LIMIT
- NEW LOCAL STREET CONSTRUCTION



SHEET INDEX MAP

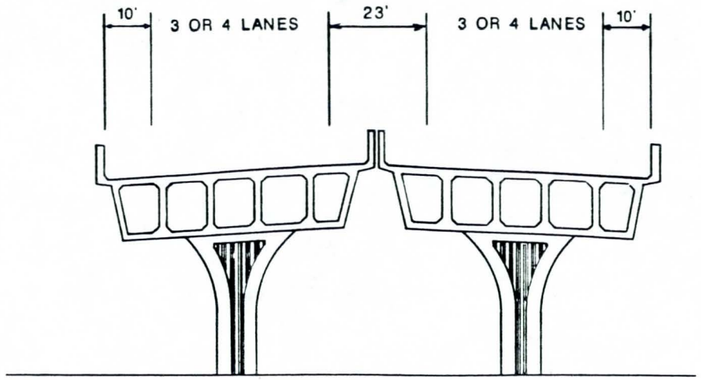
(2) = SHEET NO.

AERIAL PHOTOGRAPHY: FEB. 1985

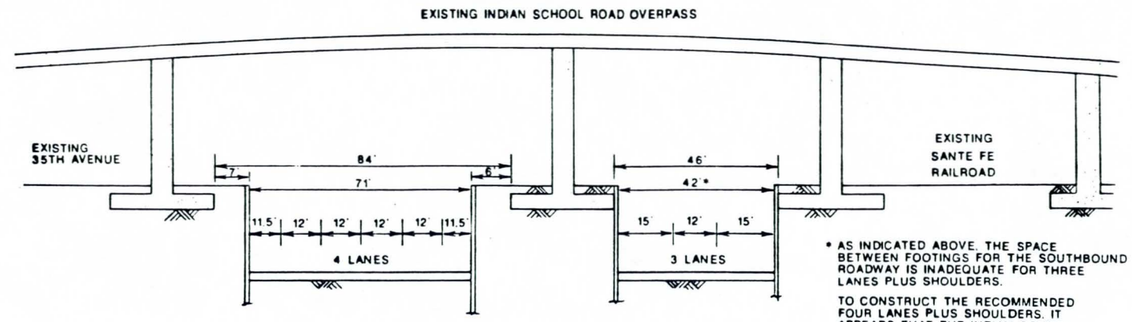
PARSONS BRINCKERHOFF

FIRST STAGE IMPROVEMENTS

GRAND AVENUE EXPRESSWAY



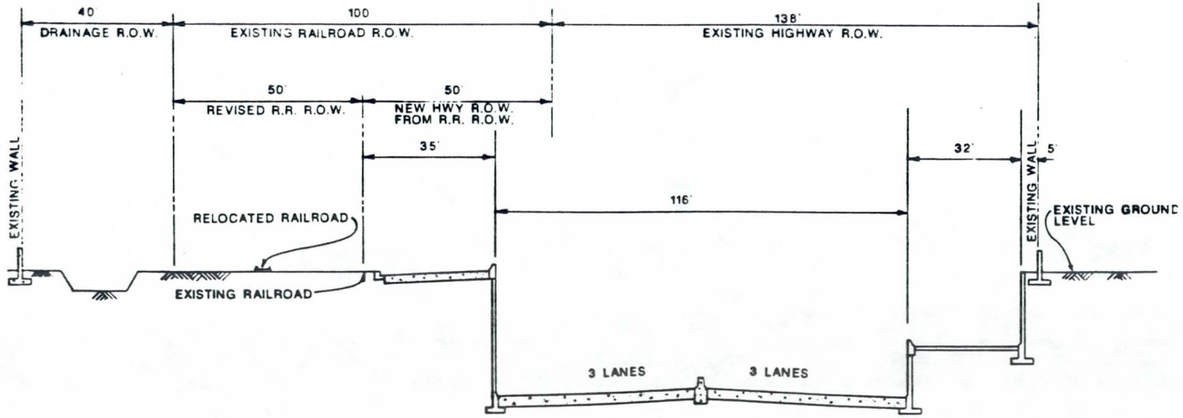
TYPICAL OVERPASS STRUCTURES



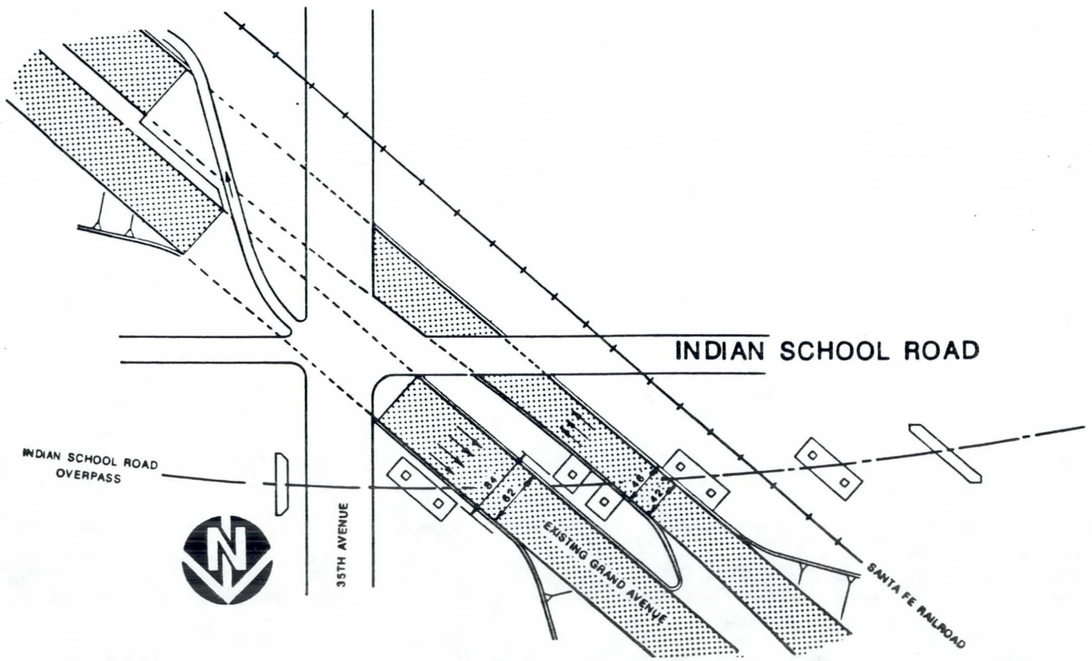
* AS INDICATED ABOVE, THE SPACE BETWEEN FOOTINGS FOR THE SOUTHBOUND ROADWAY IS INADEQUATE FOR THREE LANES PLUS SHOULDERS.

TO CONSTRUCT THE RECOMMENDED FOUR LANES PLUS SHOULDERS, IT APPEARS THAT THE INDIAN SCHOOL ROAD OVERPASS WILL HAVE TO BE RECONSTRUCTED.

INDIAN SCHOOL RD. AND 35TH AVE.
(LOOKING SOUTHEAST)



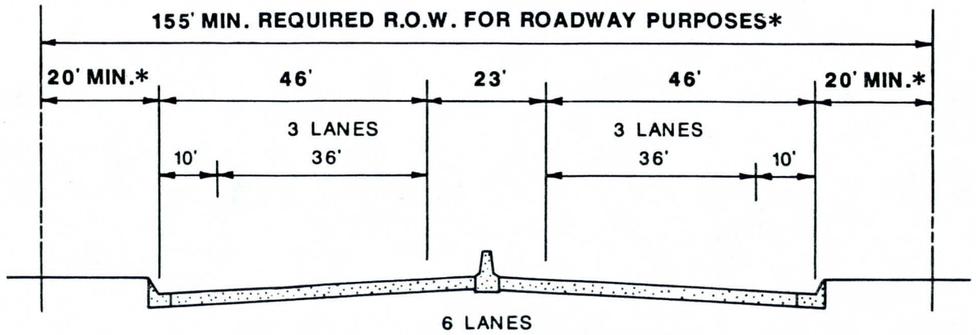
DEPRESSED SECTION
AT SUN CITY-99TH AVE. TO 111TH AVE.
(LOOKING SOUTHEAST)



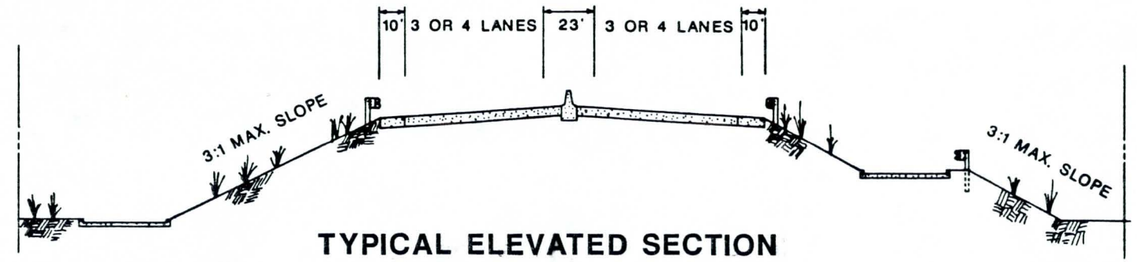
DEPRESSED SECTION AT
INDIAN SCHOOL RD. AND 35TH AVE.

PARSONS BRINCKERHOFF

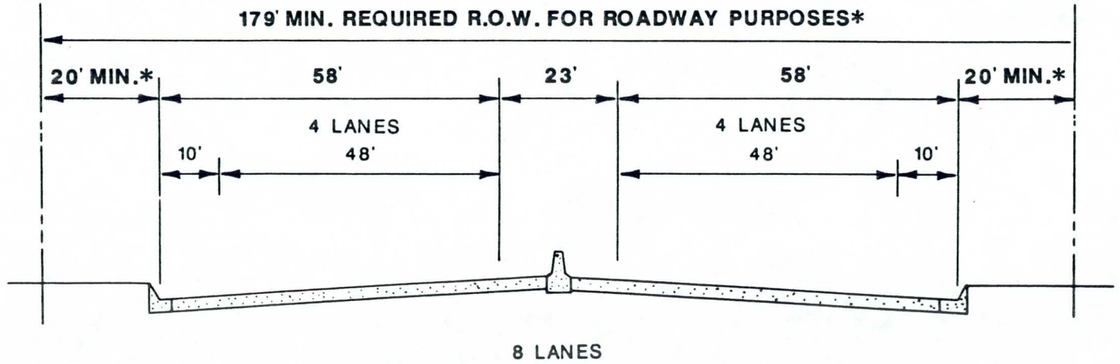
GRAND AVENUE EXPRESSWAY



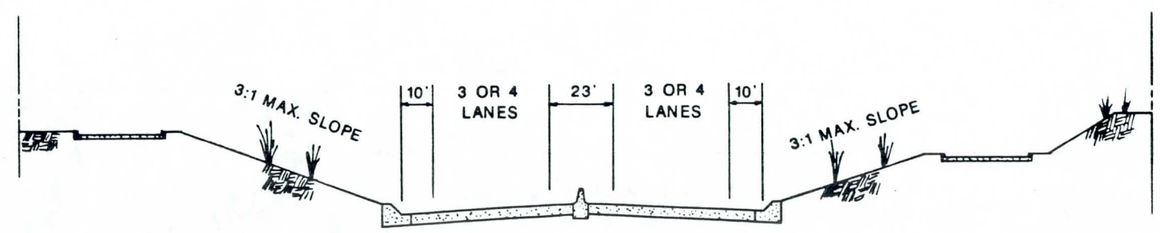
TYPICAL ROADWAY SECTION



TYPICAL ELEVATED SECTION



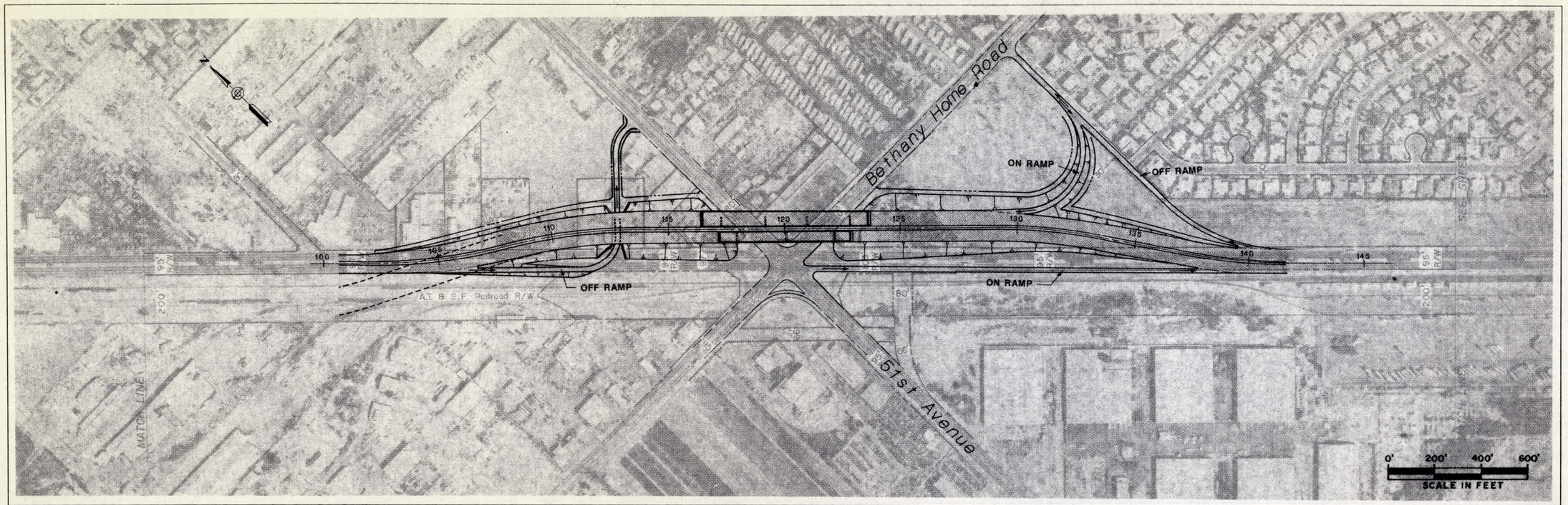
TYPICAL ROADWAY SECTION

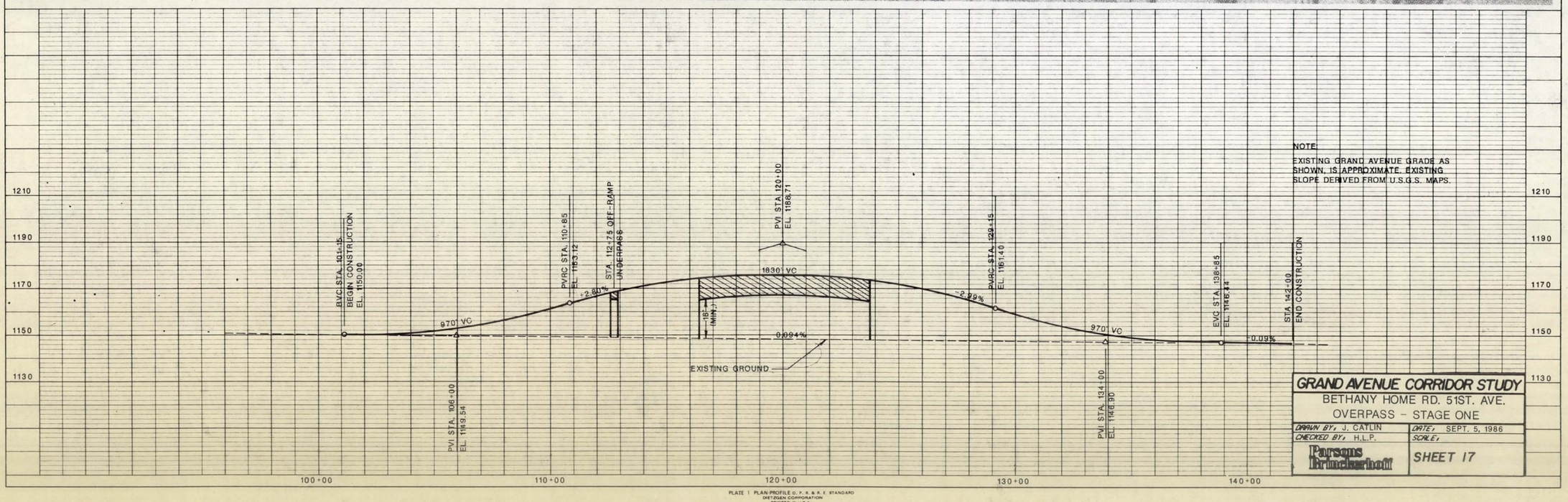


TYPICAL DEPRESSED SECTION

* ADDITIONAL WIDTHS MAY BE REQUIRED FOR DRAINAGE FACILITIES, UTILITIES, LANDSCAPING AND OTHER FEATURES.

PARSONS BRINCKERHOFF





GRAND AVENUE CORRIDOR STUDY

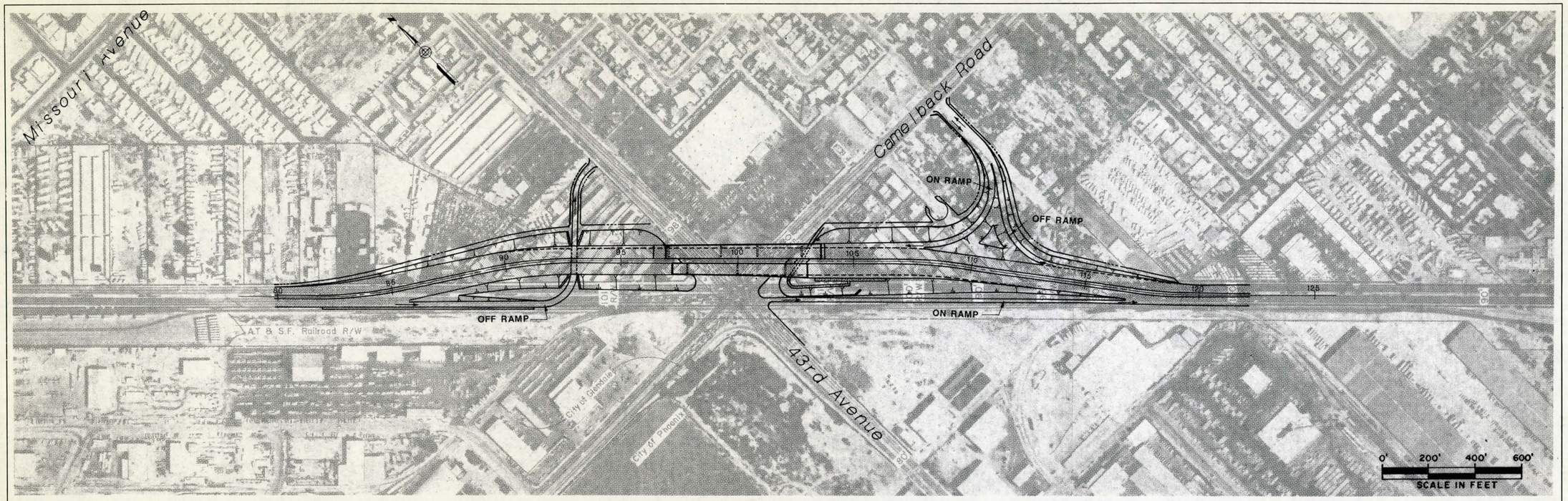
BETHANY HOME RD. 51ST. AVE.
OVERPASS - STAGE ONE

DRAWN BY: J. CATLIN	DATE: SEPT. 5, 1986
CHECKED BY: H.L.P.	SCALE:
Parsons Brinckerhoff	SHEET 17

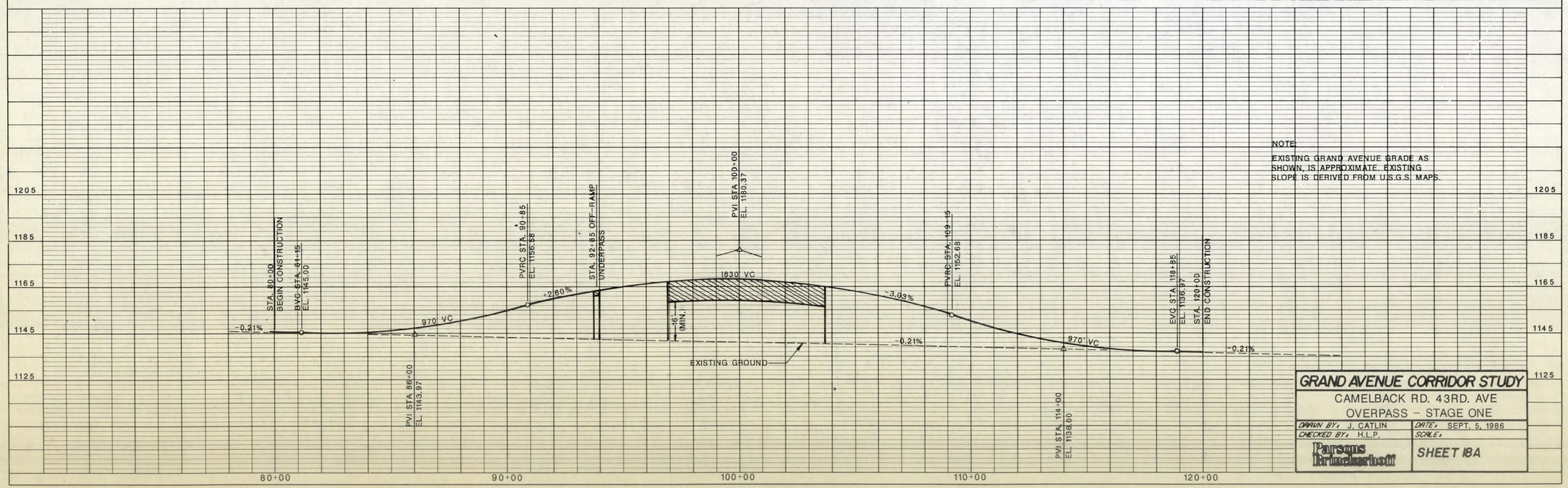
PLATE 1 PLAN-PROFILE O. P. R. & R. E. STANDARD
DIETZGEN CORPORATION
PRINTED IN U.S.A.

PLAN — SURVEYED / PLOTTED / ALIGNMENT CHECKED / P. & P. CHECKED / NOTE BOOK / No. / BY / DATE

PROFILE — SURVEYED / PLOTTED / GRADES CHECKED / STRUCTURE NOTATIONS CHECKED / NOTE BOOK / No. / BY / DATE



PLAN		
NOTE BOOK	SURVEYED	DATE
No.	PLOTTED	BY
	H.L.P. CHECKED	
	H.L.P. CHECKED	
	STRUCTURE MAINTENCE CHIEF	



NOTE:
EXISTING GRAND AVENUE GRADE AS SHOWN, IS APPROXIMATE. EXISTING SLOPE IS DERIVED FROM U.S.G.S. MAPS.

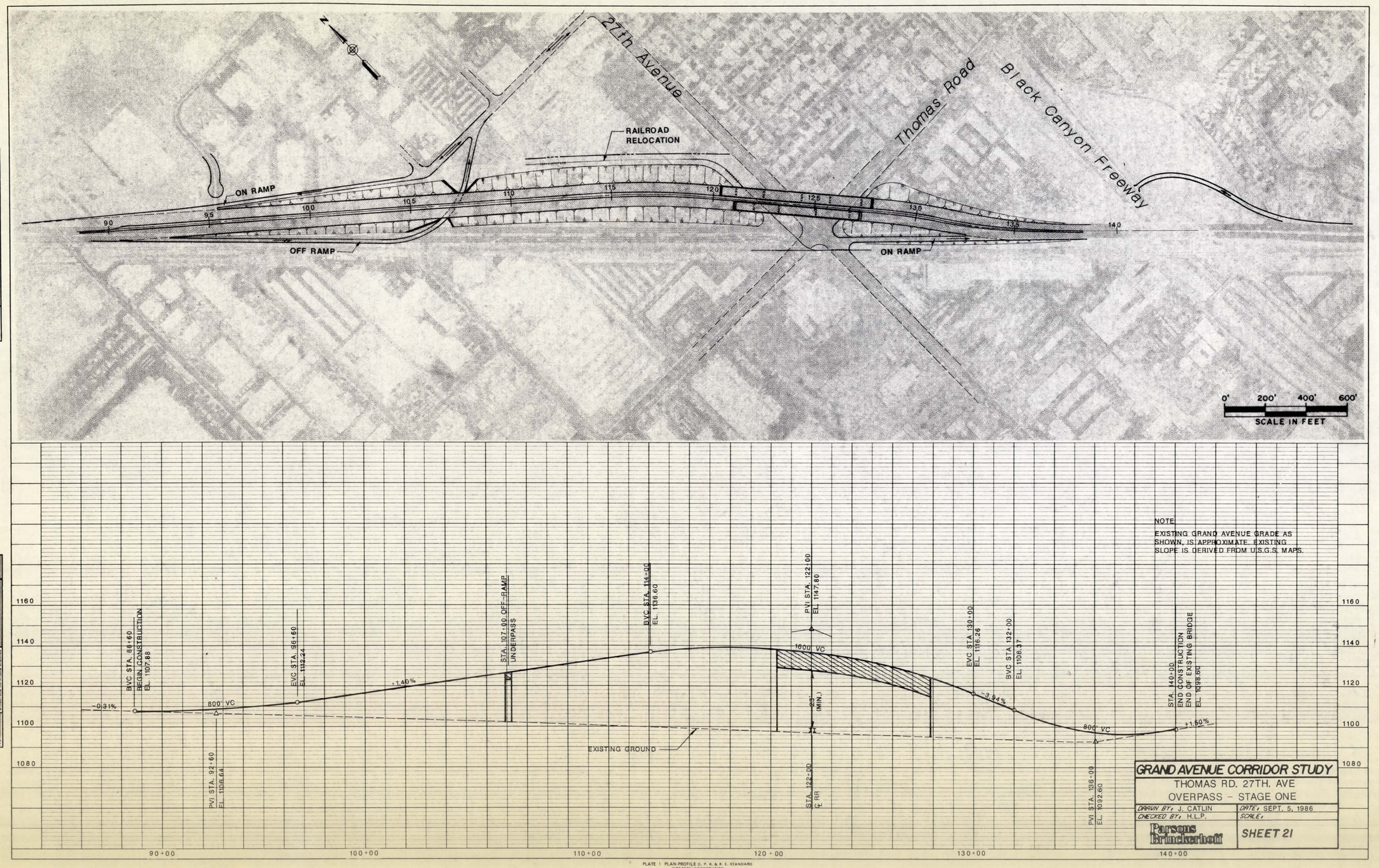
PROFILE		
NOTE BOOK	SURVEYED	DATE
No.	PLOTTED	BY
	GRADES CHECKED	
	H.L.P. CHECKED	
	STRUCTURE MAINTENCE CHIEF	

GRAND AVENUE CORRIDOR STUDY

CAMELBACK RD. 43RD. AVE
OVERPASS - STAGE ONE

DRAWN BY: J. CATLIN	DATE: SEPT. 5, 1986
CHECKED BY: H.L.P.	SCALE:
Parsons Brinckerhoff	SHEET 18A

PLATE 1 PLAN-PROFILE O. P. & R. E. STANDARD
DIETZGEN CORPORATION
PRINTED IN U.S.A.



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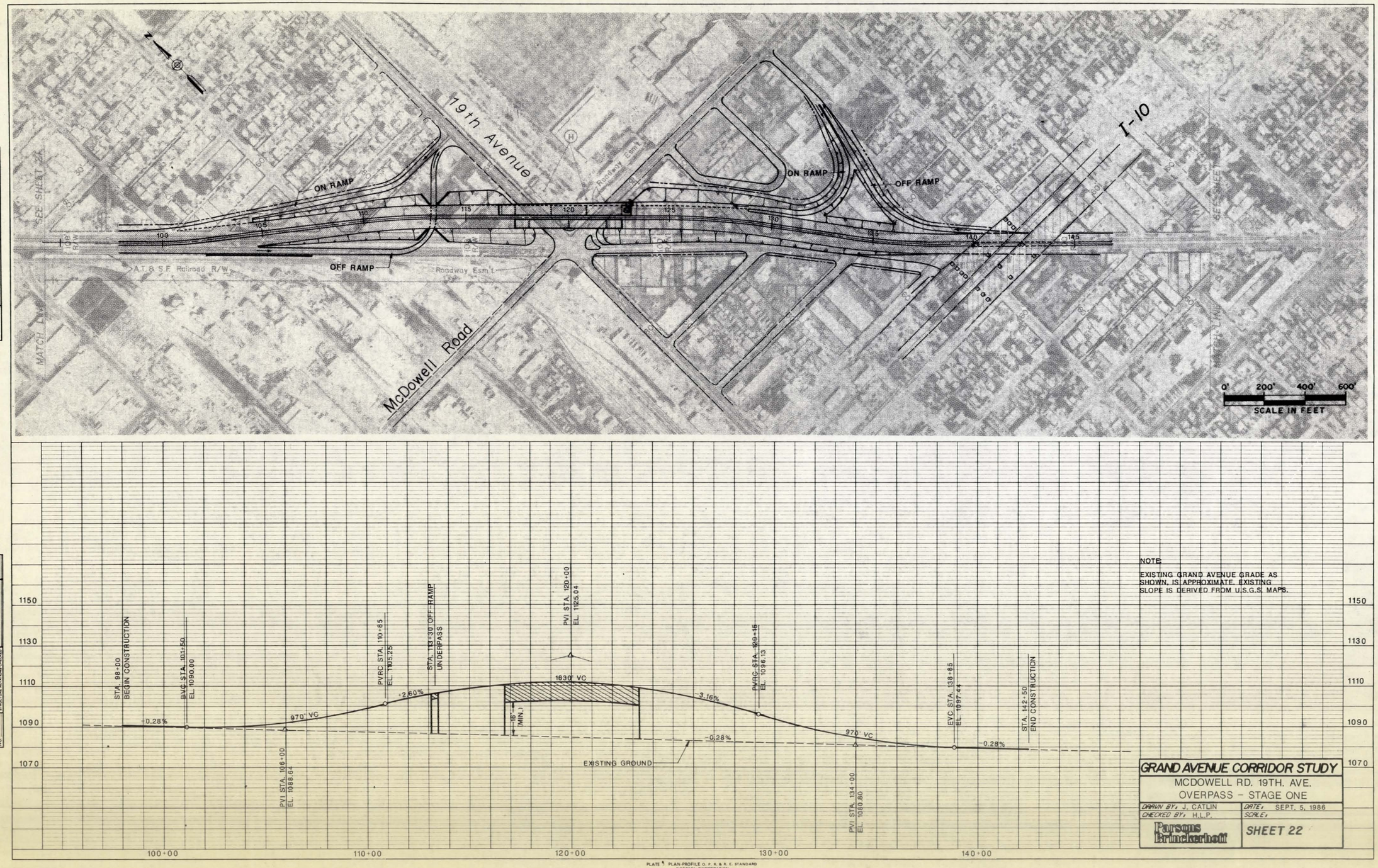
DIETZGEN CORPORATION
PRINTED IN U.S.A.


19th Avenue
McDowell Road
I-10
ON RAMP
OFF RAMP
ON RAMP
OFF RAMP
A.T.&S.F. Railroad R/W
Roadway Esm't
SEE SHEET 21
SEE SHEET 23
MATCH LINE
0' 200' 400' 600'
SCALE IN FEET
STA. 98+00 BEGIN CONSTRUCTION
BVC STA. 101+50 EL. 1090.00
PVI STA. 106+00 EL. 1088.64
PVRC STA. 110+85 EL. 1095.25
STA. 113+30 OFF-RAMP UNDERPASS
PVI STA. 120+00 EL. 1125.04
1830' VC
970' VC
+0.28%
+2.60%
-3.16%
-0.28%
-0.28%
(18' MIN.)
EXISTING GROUND
PVRC STA. 129+15 EL. 1096.13
970' VC
PVI STA. 134+00 EL. 1080.80
EVC STA. 138+65 EL. 1097.44
STA. 142+50 END CONSTRUCTION
1150
1130
1110
1090
1070
100+00
110+00
120+00
130+00
140+00
NOTE:
EXISTING GRAND AVENUE GRADE AS SHOWN, IS APPROXIMATE. EXISTING SLOPE IS DERIVED FROM U.S.G.S. MAPS.
GRAND AVENUE CORRIDOR STUDY
MCDOWELL RD. 19TH. AVE.
OVERPASS - STAGE ONE
DRAWN BY: J. CATLIN
DATE: SEPT. 5, 1986
CHECKED BY: H.L.P.
SCALE:
Parsons Brinckerhoff
SHEET 22
PLAN
SURVEYED
PLOTTED
ALIGNMENT CHECKED
BY CP AND STATIONS
NOTE BOOK
NO.
DATE
BY
PROFILE
SURVEYED
PLOTTED
GRADES CHECKED
B.M. & NOTES
STRUCTURE LOCATIONS CHECKED
NOTE BOOK
NO.
DATE
BY
PLATE 1 PLAN-PROFILE O. P. R. & R. E. STANDARD
DIETZGEN CORPORATION
PRINTED IN U.S.A.

27 AUG 86

SUMMARY

The WLB Group Inc.

PRESENTATION ON THE OUTER LOOP

DRAINAGE CONCEPT

(Papago Freeway to Northern Avenue)

I. INTRODUCTION (DeLeuw, Cather & Company)

A. ADOT is planning construction of 231 miles of freeway in the Metropolitan Phoenix Area. Included in the freeway construction are significant drainage facilities.

B. ADOT has retained DeLeuw, Cather & Company as the management consultant to provide support staff for the development of the Outer Loop Highway. DeLeuw, Cather & Company has retained The WLB Group to develop concept drainage plans for the Outer Loop between I-10 and Northern Avenue.

C. The WLB Group's study considered the Grand Avenue Expressway, the Paradise Corridor, and the Flood Control District's Glendale/Peoria ADMS.

D. There could be significant cost savings to both ADOT and the Flood Control District with proper coordination and cooperation between the two agencies.

II. HYDROLOGY (The WLB Group, Inc.)

A. Case I

Case I shows the existing flow patterns in the drainage area without the effects from the proposed Paradise Corridor and Grand Avenue Expressway. The drainage boundaries are I-17 on the east, I-10 on the south, ACDC on the north, and the Outer Loop Freeway on the west. The study developed hydrology for the 50 and 100-year storm events. The drainage facilities will be designed for the 50-year storm without impacting adjacent areas from the 100-year event.

B. Case II

Case II studies the Paradise Corridor as a high useage facility and includes an interceptor channel along the north side of the corridor. The Grand Avenue Expressway is assumed to be a low useage facility which does not effect existing drainage patterns or the existing level of protection from flooding.

C. Case III:

Case III assumes that both the Paradise Corridor and Grand Avenue Expressway are high useage facilities and provide protection from flooding. A decision has been made to construct Grand Avenue as a high level expressway, but due to limited funding the current plan is to construct Grand Avenue at some future date. At this time a small number of high level intersections will be provided at a few major crossings and at the bridges. At some time in the future the Grand Avenue Expressway will be upgraded. Consideration was given to upgrade the Olive and Orangewood Avenue storm drains in the Glendale/Peoria ADMS to the 50-year level. However, due to the inavailability of funding and the distant time frame for Grand Avenue construction, these storm drains would not be upgraded until the high level facility was built.

III. DRAINAGE CONCEPT PLANS (The WLB Group, Inc.)

A. Alternative 1:

This alternative considers a number of trapezoidal channels along the Outer Loop Freeway and adjoining areas to help collect flows and convey them to the New River and the Agua Fria River. Major outlets would be along the north side of the Grand Canal between 83rd Avenue and the New River and along the south side of Thomas Road between the Outer Loop Freeway and the Agua Fria River. Trapezoidal channels will collect flows along the Outer Loop and convey them to these two major outfalls.

B. Alternative 2:

This alternative basically follows the same alignment as alternative number 1 with the addition of detention basins along the north side of Grand Canal and a detention basin on the Outer Loop between Thomas Road and Indian School Road. This alternative eliminates a concrete lined trapazoidal channel on both the Grand Canal and Thomas Road west of the Outer Loop Freeway. Instead, concrete pipe will be used to convey flows out of the detention basins along the Outer Loop to each respective outfall in the New River and the Agua Fria River.

C. Recommended Plan:

This is a combination of both Alternative Number 1 and 2. The section of drainage facilities north above the Grand Canal, will essentially be trapezoidal channels without detention basins. This is used because there is a relatively short run to the New River from the Outer Loop, and detention basins at this area would be too large and expensive to detain the flows collected along the Paradise Corridor. The lower section of the drainage facility below Grand Canal will have a detention basin between Thomas Road and Indian School Road. This will enable a concrete pipe to be run out to the ~~New~~ AGUA FRIA River in Thomas Road, thus precluding the need of a trapezoidal channel in that stretch.

IV. CONTINUED COORDINATION

ADOT will continue coordinating their activities with the Flood Control District and the local juristictions. As we have indicated, ADOT will not participate in the upgrading of the Orangewood or Olive Avenue drains at this time. A cooperative effort along the Paradise Corridor may prove beneficial to both the Flood Control District and ADOT. This will be studied further and may be presented to the board again at a future date.

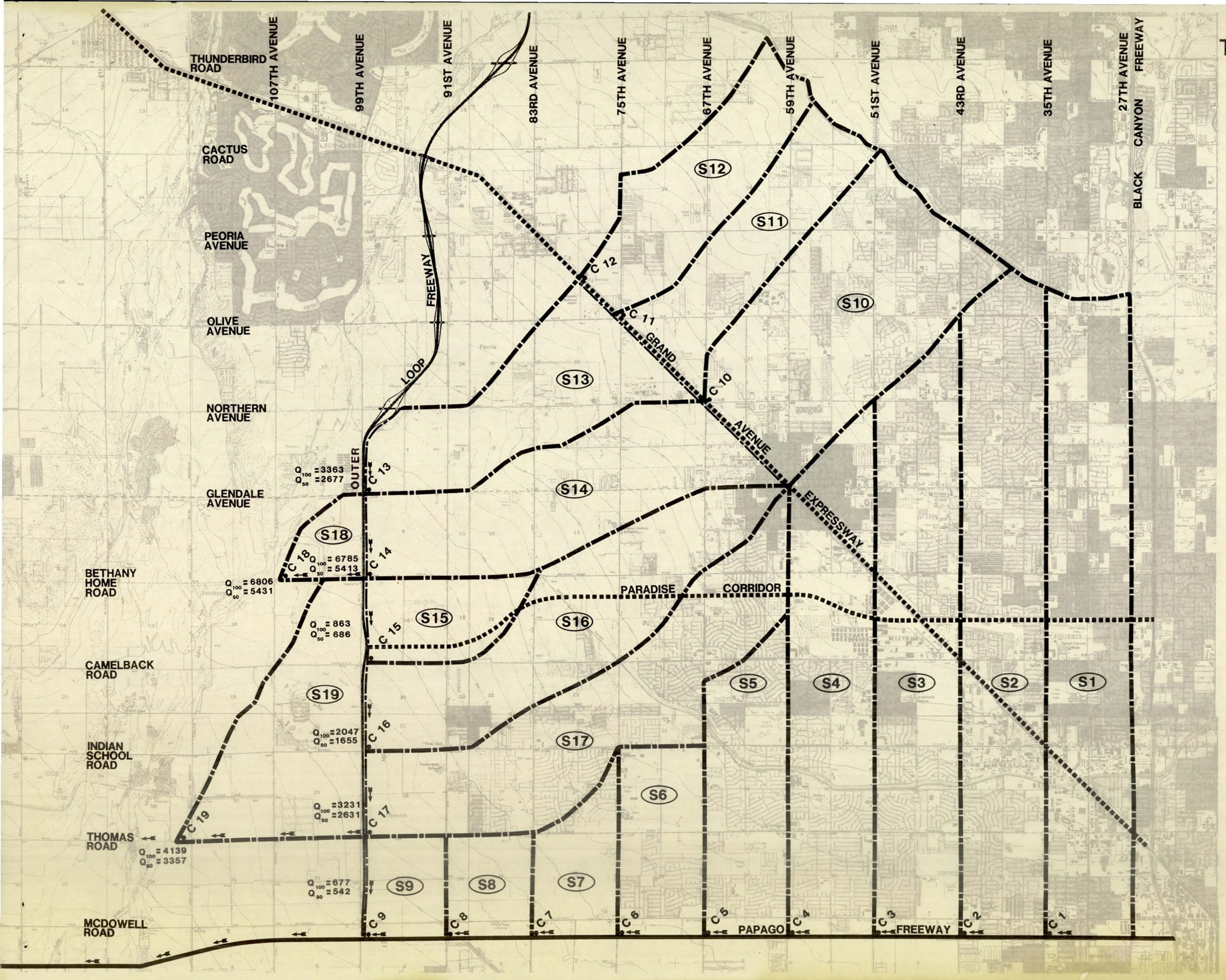
THE OUTER LOOP FREEWAY

PAPAGO FREEWAY TO NORTHERN AVENUE

OFF-SITE HYDROLOGY

CASE I

EXISTING FLOW PATTERN WITHOUT THE EFFECTS FROM THE PROPOSED PARADISE CORRIDOR AND GRAND AVENUE EXPRESSWAY.



LEGEND

(S1)	SUBWATERSHED DESIGNATION
•C1	CONCENTRATION POINT
	DRAINAGE AREA DELINEATIONS
	PROPOSED FREEWAYS
	MAJOR DRAINAGE PATHS
	STORM DRAIN PIPE
Q_{100} =	100 - YEAR PEAK DISCHARGE
Q_{50} =	50 - YEAR PEAK DISCHARGE

0 3000 6000 12000 18000

The WLB Group INC. WLB

BASE MAP: USGS 7.5 MINUTE QUADRANGLES

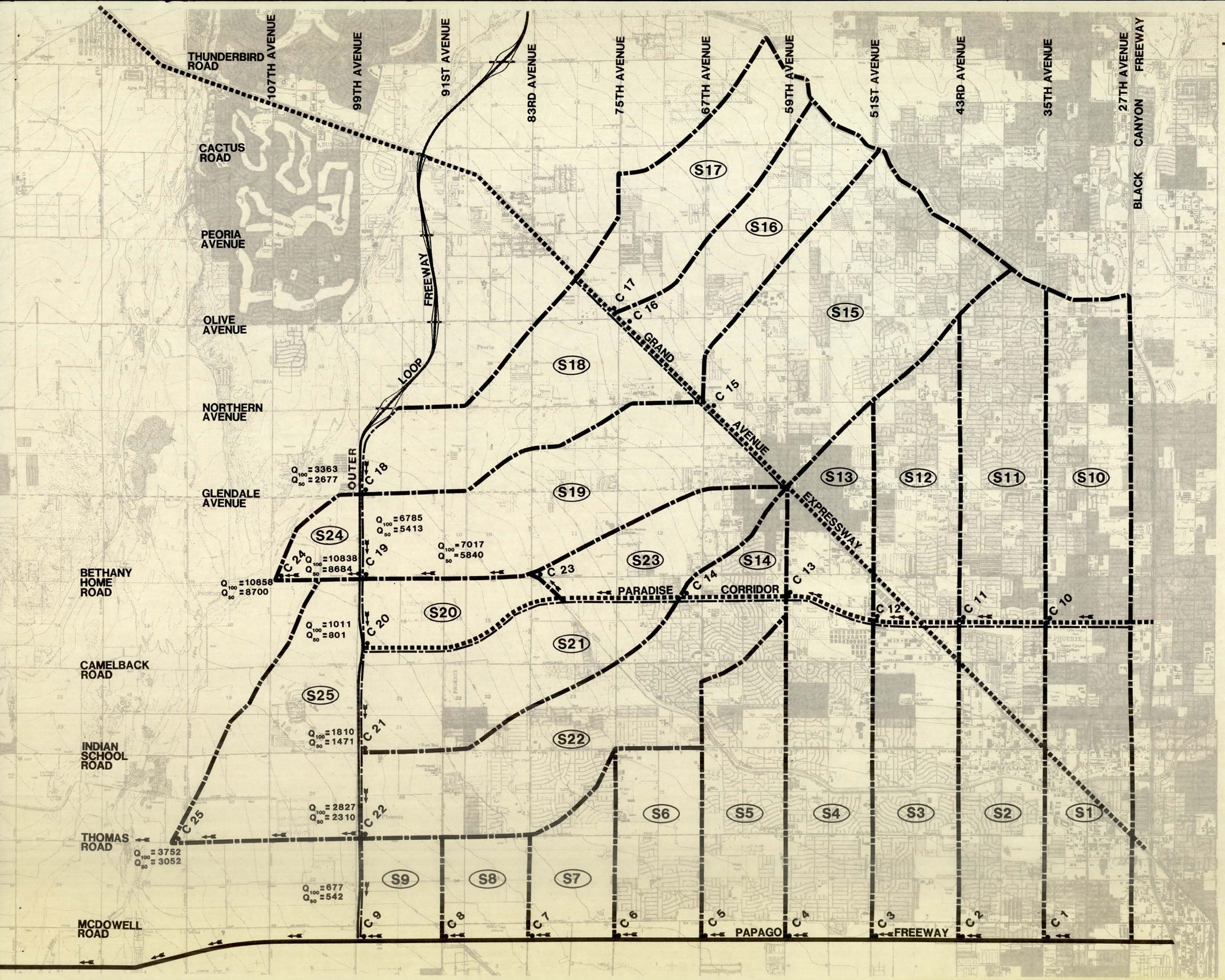
THE OUTER LOOP FREEWAY

PAPAGO FREEWAY TO NORTHERN AVENUE

OFF-SITE HYDROLOGY

CASE II

INTERCEPTOR CHANNEL ALONG THE NORTH SIDE OF THE PARADISE CORRIDOR AND THE GRAND AVENUE EXPRESSWAY AS A LOW LEVEL FACILITY.



LEGEND

(S1)	SUBWATERSHED DESIGNATION
•C1	CONCENTRATION POINT
-·-·-	DRAINAGE AREA DELINEATIONS
·····	PROPOSED FREEWAYS
← ←	MAJOR DRAINAGE PATHS
▭▭▭	STORM DRAIN PIPE
Q_{100} =	100 - YEAR PEAK DISCHARGE
Q_{50} =	50 - YEAR PEAK DISCHARGE

0 3000 6000 12000 18000

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BASE MAP: USGS 7.5 MINUTE QUADRANGLES

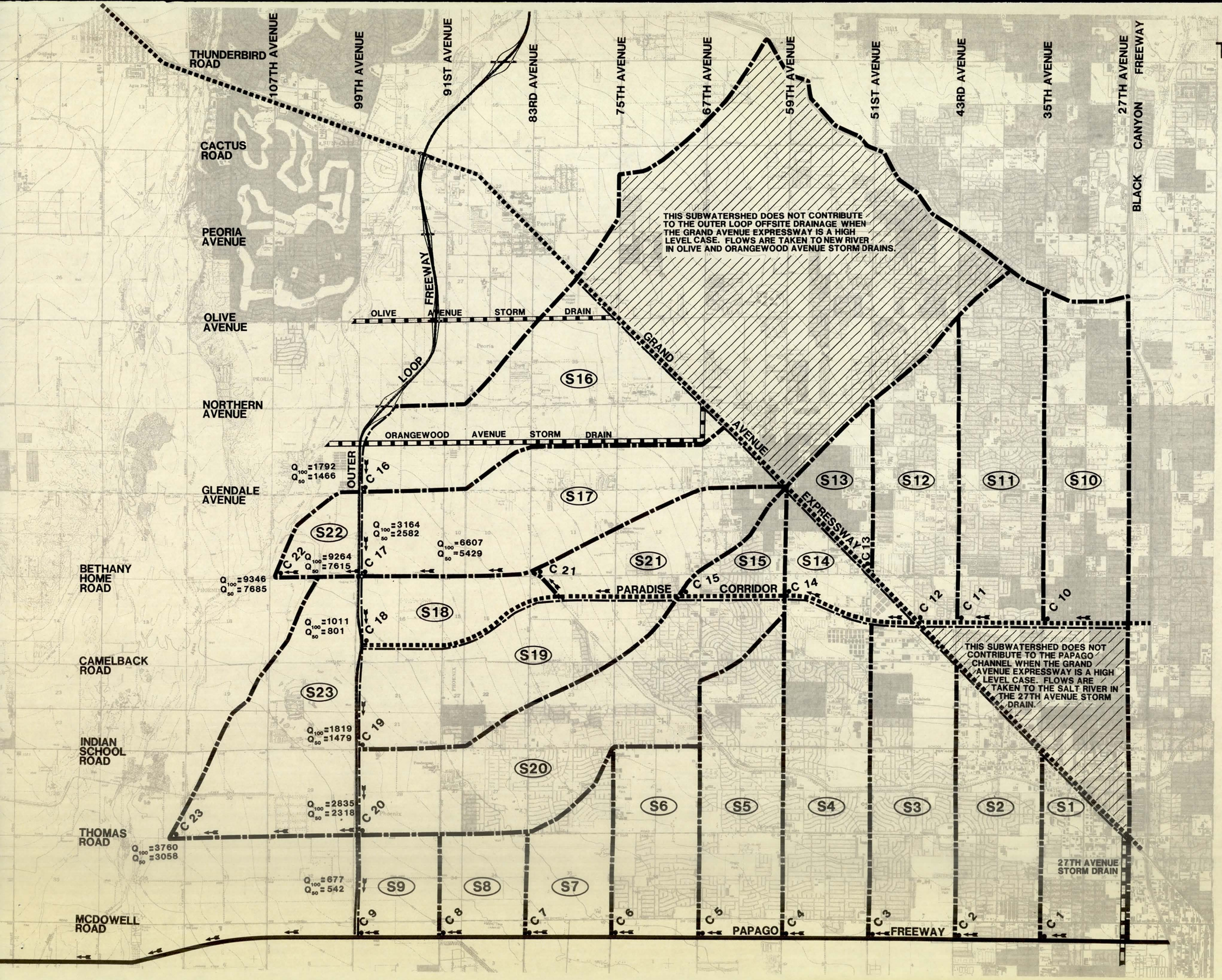
THE OUTER LOOP FREEWAY

PAPAGO FREEWAY TO NORTHERN AVENUE

OFF-SITE HYDROLOGY

CASE III

INTERCEPTOR CHANNEL ALONG THE NORTH SIDE OF THE PARADISE CORRIDOR AND THE GRAND AVENUE EXPRESSWAY AS A HIGH LEVEL FACILITY.



LEGEND

(S1)	SUBWATERSHED DESIGNATION
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	DRAINAGE AREA DELINEATIONS
	PROPOSED FREEWAYS
	MAJOR DRAINAGE PATHS
	STORM DRAIN PIPE
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0 3000 6000 12000 18000

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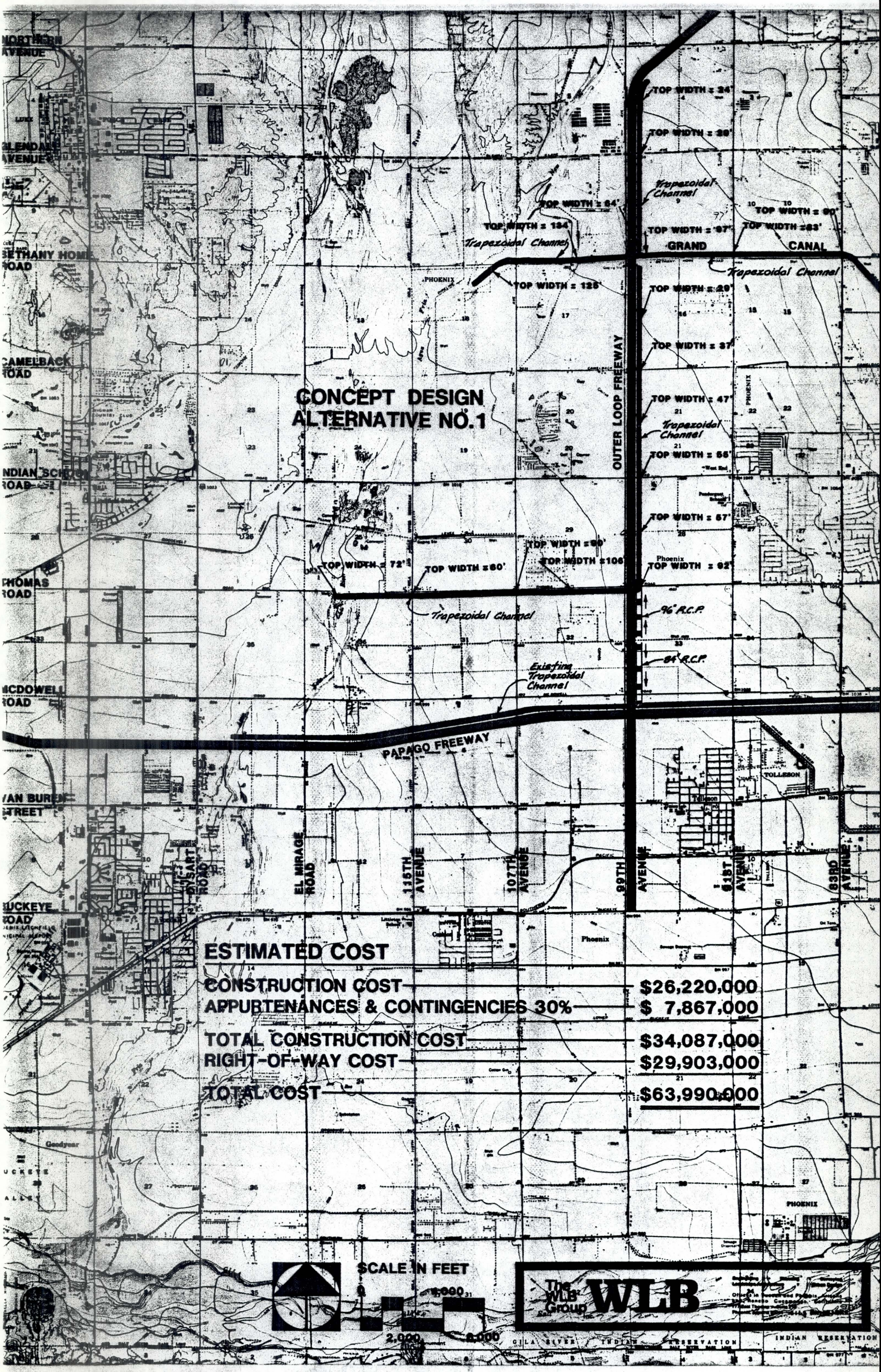
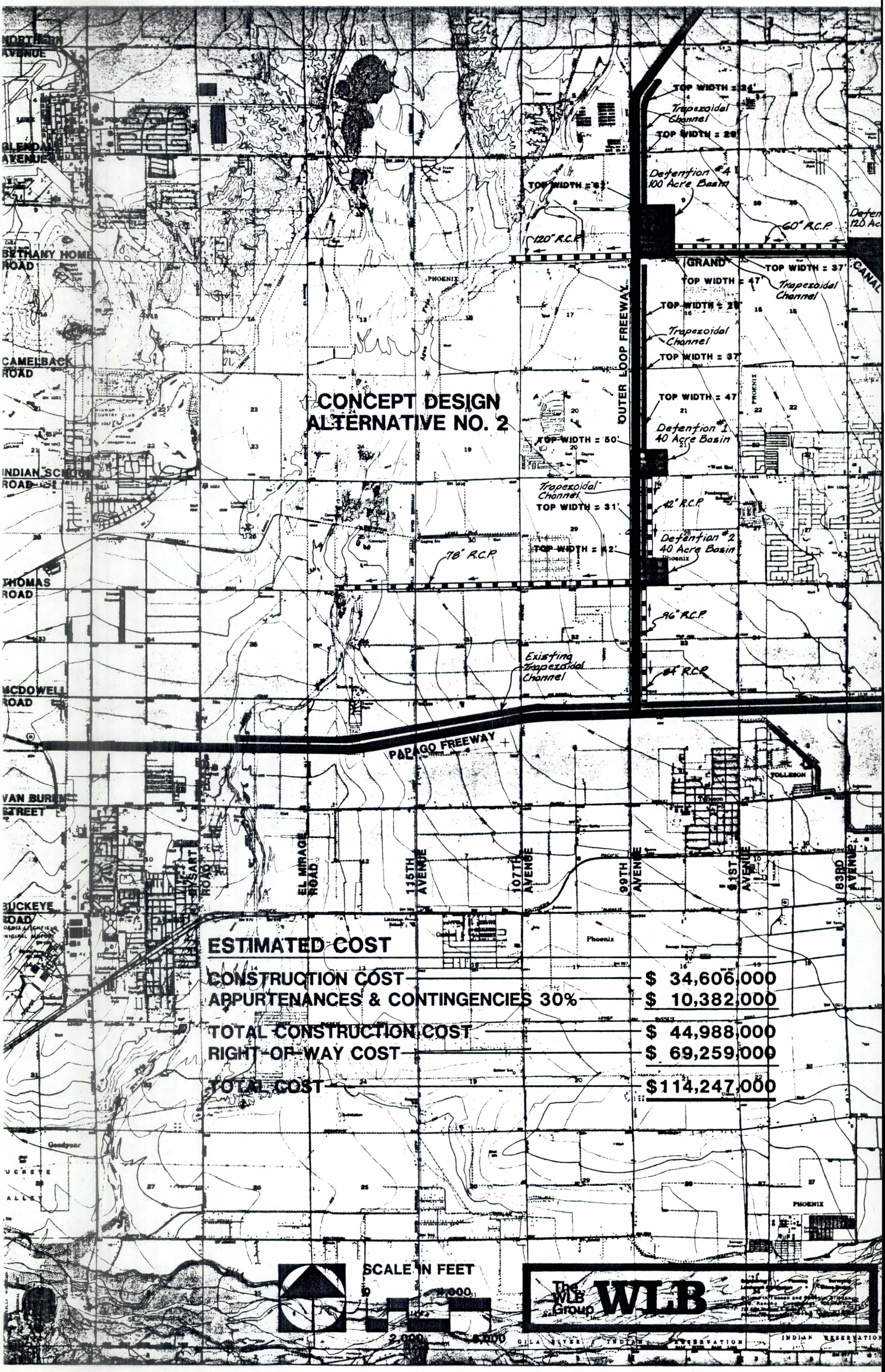
111 East Thomas • Suite 200
Phoenix, Arizona 85014

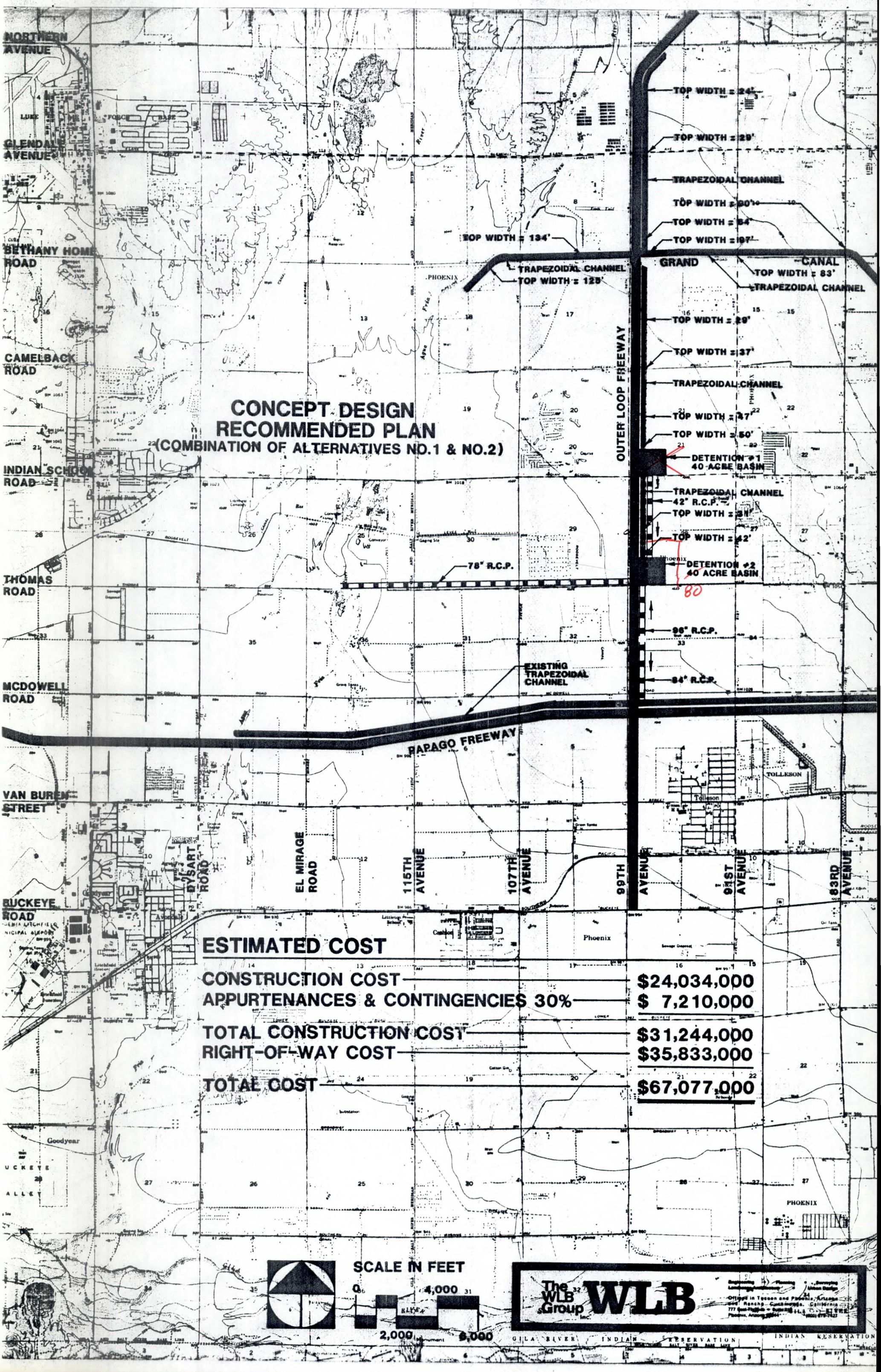
BASE MAP: USGS 7.5 MINUTE QUADRANGLES



ESTIMATED COST

CONSTRUCTION COST	$26,220,000
APPURTENANCES & CONTINGENCIES 30%	$ 7,867,000
TOTAL CONSTRUCTION COST	$34,087,000
RIGHT-OF-WAY COST	$29,903,000
TOTAL COST	$63,990,000


CONCEPT DESIGN
ALTERNATIVE NO. 2
NORTHERN AVENUE
GLENDALE AVENUE
BETHANY HOME ROAD
CAMELBACK ROAD
INDIAN SCHOOL ROAD
THOMAS ROAD
MCDOWELL ROAD
VAN BUREN STREET
BUCKEYE ROAD
PAPAGO FREEWAY
OUTER LOOP FREEWAY
GRAND CANAL
EL MIRAGE ROAD
115TH AVENUE
107TH AVENUE
99TH AVENUE
91ST AVENUE
83RD AVENUE
TOP WIDTH = 24'
Trapezoidal Channel
TOP WIDTH = 29'
Detention #4
100 Acre Basin
TOP WIDTH = 62'
60" R.C.P.
120" R.C.P.
TOP WIDTH = 37'
TOP WIDTH = 47'
Trapezoidal Channel
TOP WIDTH = 29'
Trapezoidal Channel
TOP WIDTH = 37'
TOP WIDTH = 47'
Detention #1
40 Acre Basin
TOP WIDTH = 50'
Trapezoidal Channel
TOP WIDTH = 31'
42" R.C.P.
Detention #2
40 Acre Basin
TOP WIDTH = 42'
78" R.C.P.
96" R.C.P.
Existing Trapezoidal Channel
84" R.C.P.
ESTIMATED COST
CONSTRUCTION COST $ 34,606,000
APPURTENANCES & CONTINGENCIES 30% $ 10,382,000
TOTAL CONSTRUCTION COST $ 44,988,000
RIGHT-OF-WAY COST $ 69,259,000
TOTAL COST $114,247,000
SCALE IN FEET
0
2,000
4,000
The WLB Group Inc.
WLB



CONCEPT DESIGN
RECOMMENDED PLAN
(COMBINATION OF ALTERNATIVES NO.1 & NO.2)

ESTIMATED COST

CONSTRUCTION COST	$24,034,000
APPURTENANCES & CONTINGENCIES 30%	$ 7,210,000
TOTAL CONSTRUCTION COST	$31,244,000
RIGHT-OF-WAY COST	$35,833,000
TOTAL COST	$67,077,000

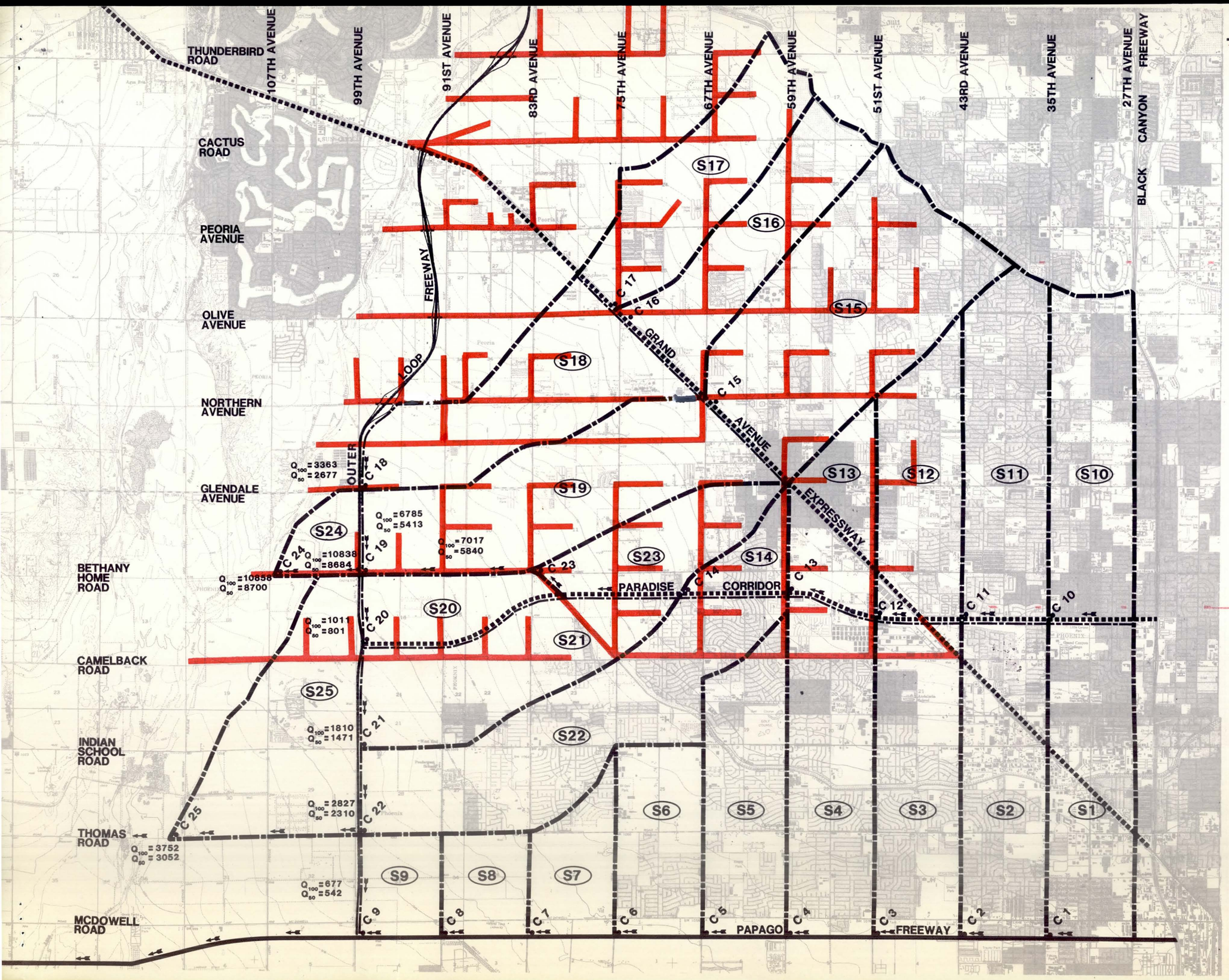
THE OUTER LOOP FREEWAY

PAPAGO FREEWAY TO NORTHERN AVENUE

OFF-SITE HYDROLOGY

CASE II

INTERCEPTOR CHANNEL ALONG THE NORTH SIDE OF THE PARADISE CORRIDOR AND THE GRAND AVENUE EXPRESSWAY AS A LOW LEVEL FACILITY.



LEGEND

(S1)	SUBWATERSHED DESIGNATION
•C1	CONCENTRATION POINT
	DRAINAGE AREA DELINEATIONS
	PROPOSED FREEWAYS
	MAJOR DRAINAGE PATHS
	STORM DRAIN PIPE
Q_{100} =	100 - YEAR PEAK DISCHARGE
Q_{50} =	50 - YEAR PEAK DISCHARGE

0 3000 6000 12000 18000

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Phoenix Arizona 85014 (602) 279-7421

BASE MAP: USGS 7.5 MINUTE QUADRANGLES

The WLB Group Inc.

AGENDA

PRESENTATION ON THE OUTER LOOP

DRAINAGE CONCEPT

(Papago Freeway to Northern Avenue)

Time: 1:00 p.m.

Place: FCD Office

Purpose: To present the Drainage Concept for the Outer Loop, from the Papago Freeway to Northern Avenue, and discuss joint use facilities between ADOT and the Flood Control District of Maricopa County and the local communities.

I. Introduction - DeLeuw, Cather & Company

II. Presentation - The WLB Group, Inc.
   A. Hydrology
   B. Drainage Concepts and Estimated Costs
   C. Joint Use Facilities

III. Discussion

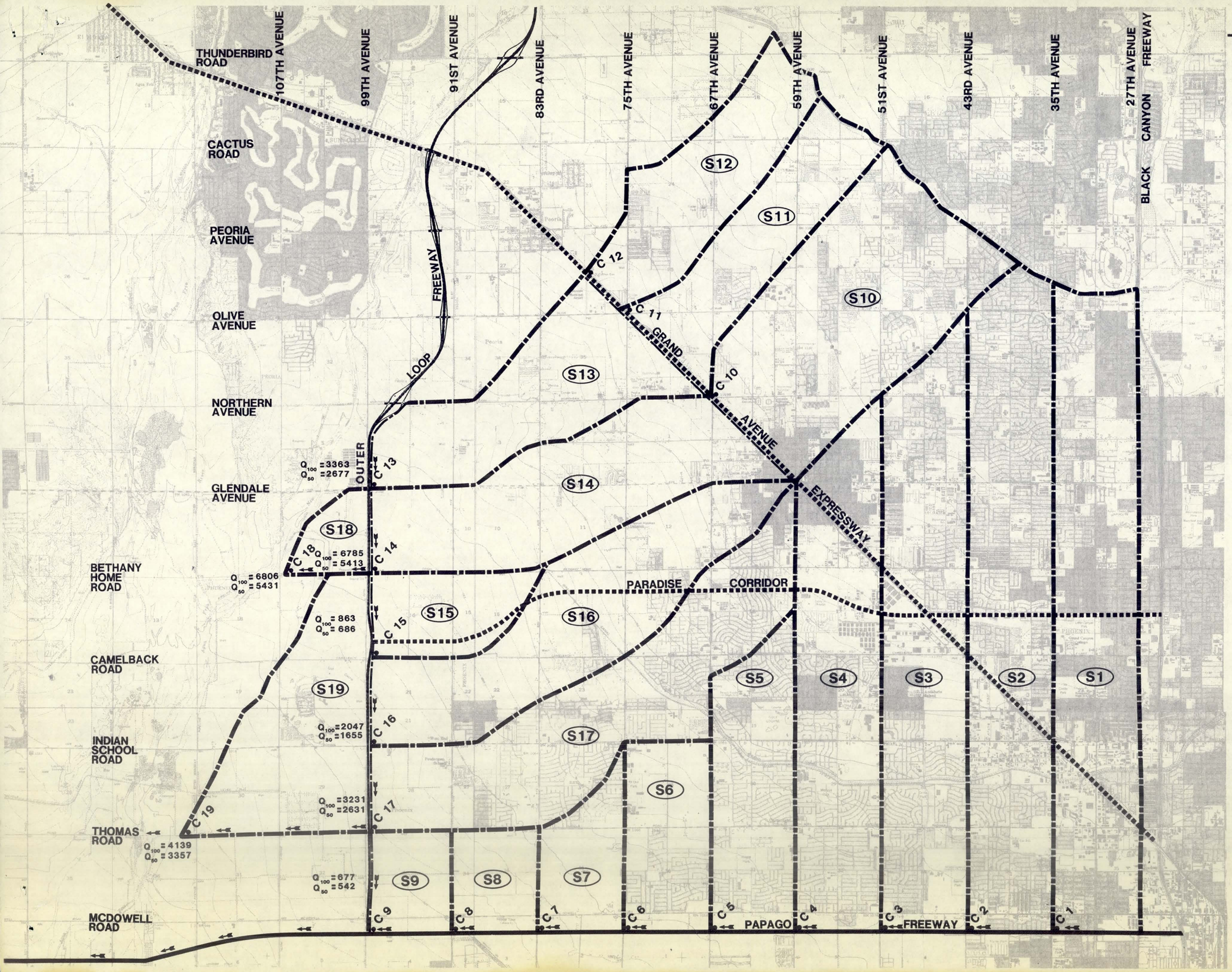
THE OUTER LOOP FREEWAY

PAPAGO FREEWAY TO NORTHERN AVENUE

OFF-SITE HYDROLOGY

CASE I

EXISTING FLOW PATTERN WITHOUT THE EFFECTS FROM THE PROPOSED PARADISE CORRIDOR AND GRAND AVENUE EXPRESSWAY.



LEGEND

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0 3000 6000 12000 18000

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Phoenix, Arizona 85014 (602) 279-1421

BASE MAP: USGS 7.5 MINUTE QUADRANGLES

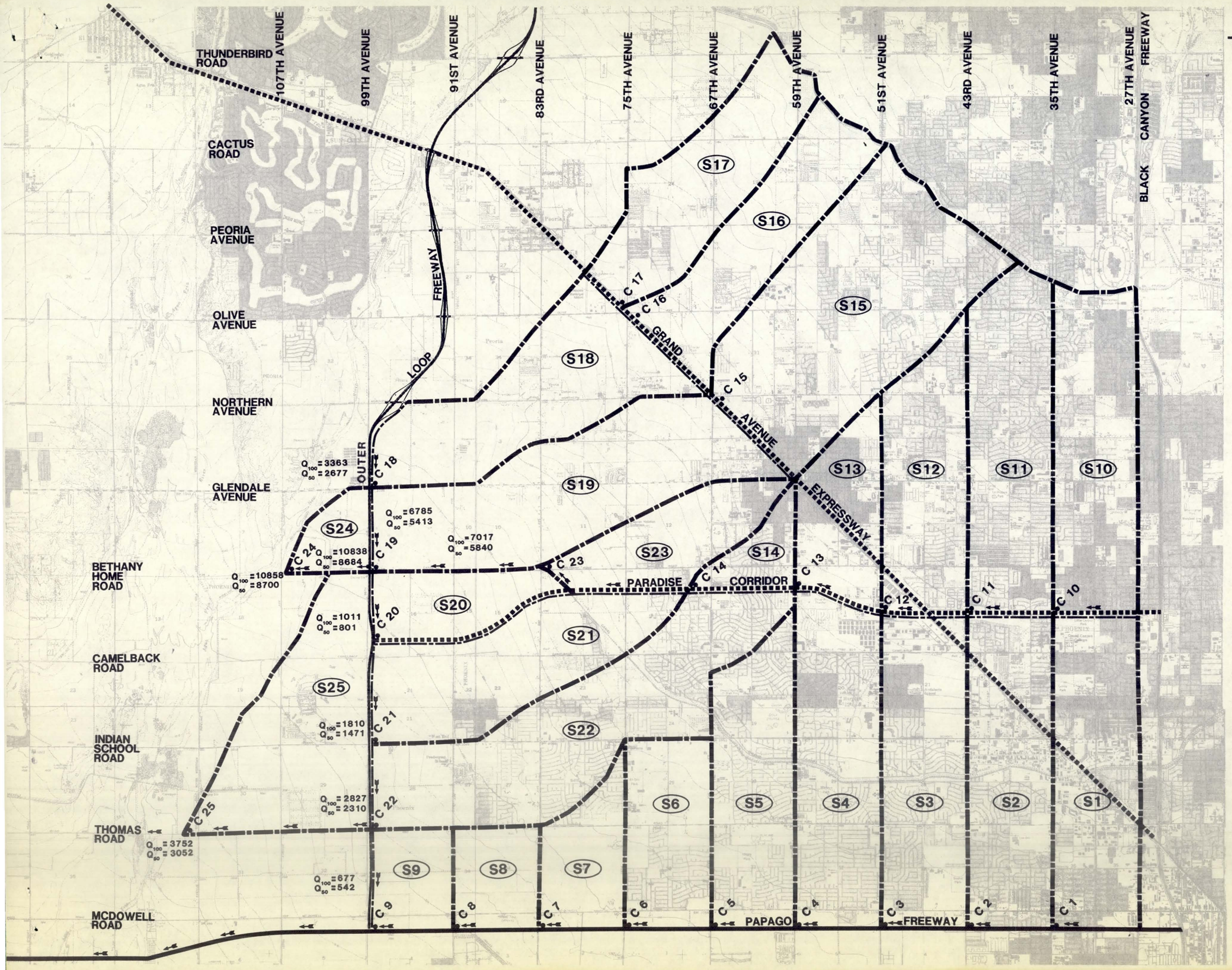
THE OUTER LOOP FREEWAY

PAPAGO FREEWAY TO NORTHERN AVENUE

OFF-SITE HYDROLOGY

CASE II

INTERCEPTOR CHANNEL ALONG THE NORTH SIDE OF THE PARADISE CORRIDOR AND THE GRAND AVENUE EXPRESSWAY AS A LOW LEVEL FACILITY.



LEGEND

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Q_{50} =	50 - YEAR PEAK DISCHARGE

DRAFT

0 3000 6000 12000 18000

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BASE MAP: USGS 7.5 MINUTE QUADRANGLES

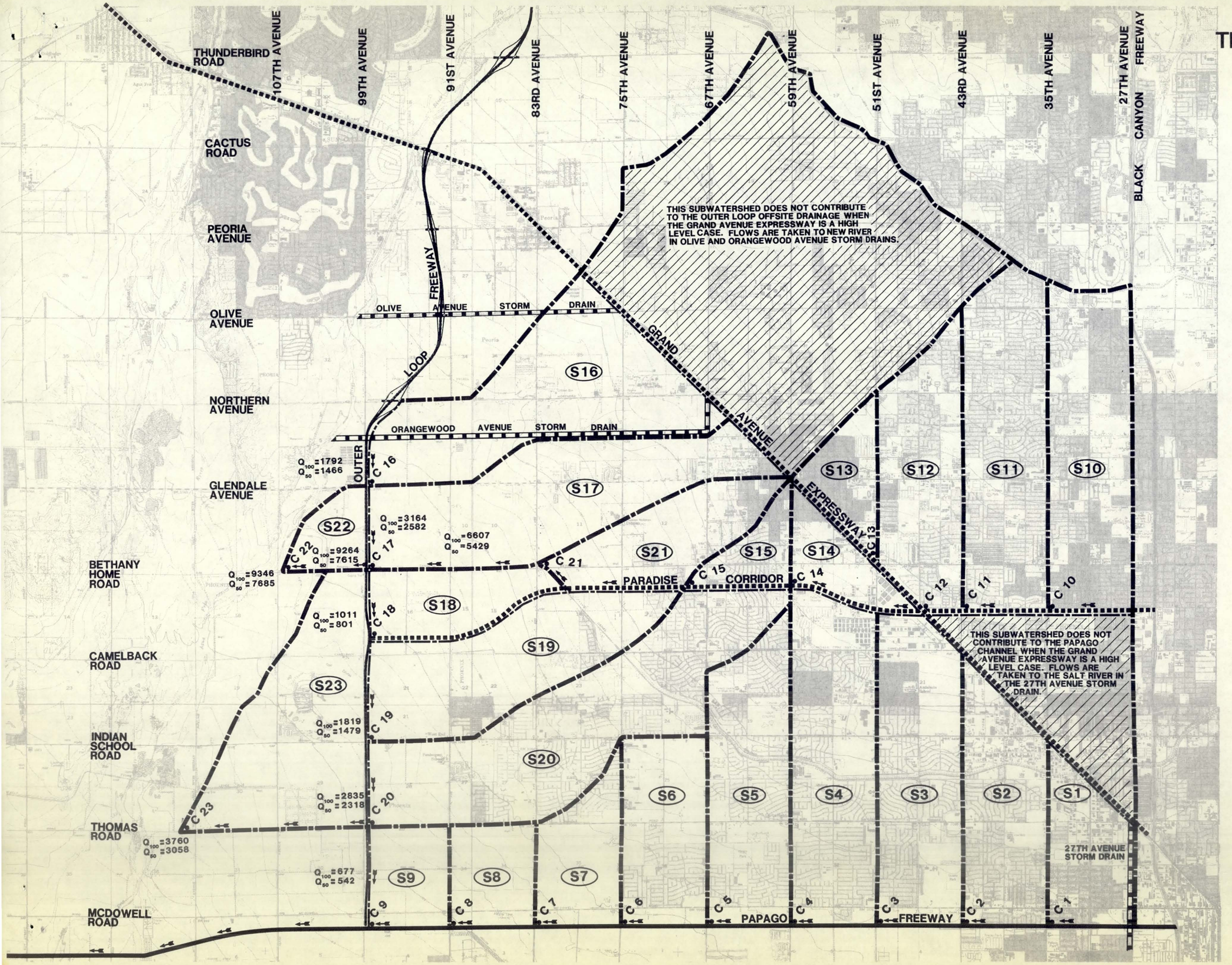
THE OUTER LOOP FREEWAY

PAPAGO FREEWAY TO NORTHERN AVENUE

OFF-SITE HYDROLOGY

CASE III

INTERCEPTOR CHANNEL ALONG THE NORTH SIDE OF THE PARADISE CORRIDOR AND THE GRAND AVENUE EXPRESSWAY AS A HIGH LEVEL FACILITY.



LEGEND

(S1)	SUBWATERSHED DESIGNATION
•C1	CONCENTRATION POINT
	DRAINAGE AREA DELINEATIONS
	PROPOSED FREEWAYS
	MAJOR DRAINAGE PATHS
	STORM DRAIN PIPE
Q_{100}=	100 - YEAR PEAK DISCHARGE
Q_{50}=	50 - YEAR PEAK DISCHARGE

DRAFT

0 3000 6000 12000 18000

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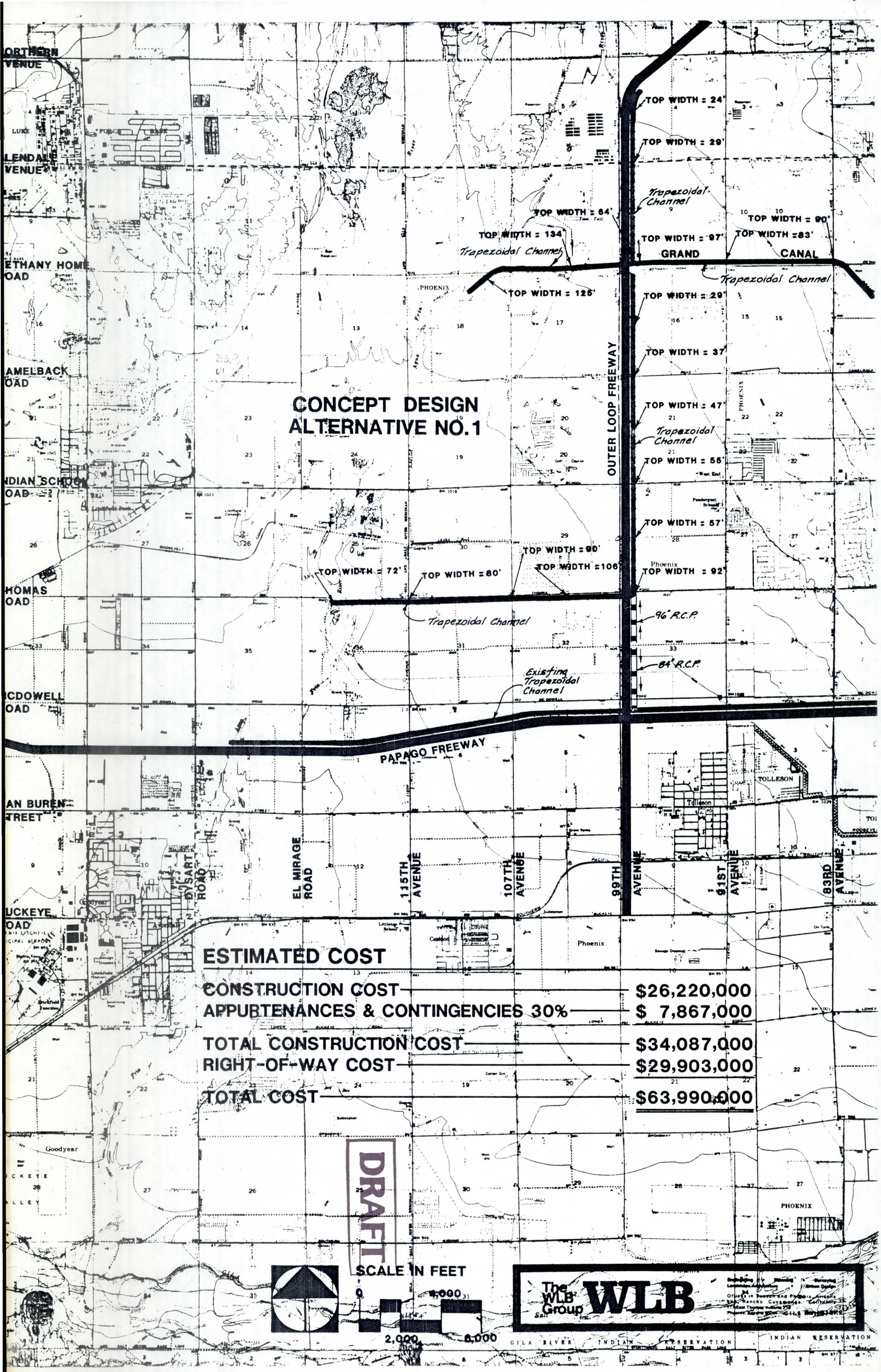
BASE MAP: USGS 7.5 MINUTE QUADRANGLES


CONCEPT DESIGN
ALTERNATIVE NO.1
TOP WIDTH = 24'
TOP WIDTH = 29'
Trapezoidal Channel
TOP WIDTH = 64'
TOP WIDTH = 90'
TOP WIDTH = 134'
TOP WIDTH = 97'
TOP WIDTH = 83'
GRAND CANAL
Trapezoidal Channel
TOP WIDTH = 125'
TOP WIDTH = 29'
TOP WIDTH = 37'
TOP WIDTH = 47'
Trapezoidal Channel
TOP WIDTH = 55'
TOP WIDTH = 57'
TOP WIDTH = 90'
TOP WIDTH = 106'
TOP WIDTH = 72'
TOP WIDTH = 80'
TOP WIDTH = 92'
Trapezoidal Channel
96" R.C.P.
84" R.C.P.
Existing Trapezoidal Channel
OUTER LOOP FREEWAY
PAPAGO FREEWAY
EL MIRAGE ROAD
115TH AVENUE
107TH AVENUE
99TH AVENUE
91ST AVENUE
83RD AVENUE
ESTIMATED COST
CONSTRUCTION COST $26,220,000
APPURTENANCES & CONTINGENCIES 30% $ 7,867,000
TOTAL CONSTRUCTION COST $34,087,000
RIGHT-OF-WAY COST $29,903,000
TOTAL COST $63,990,000
DRAFT
SCALE IN FEET
0
2,000
4,000
6,000
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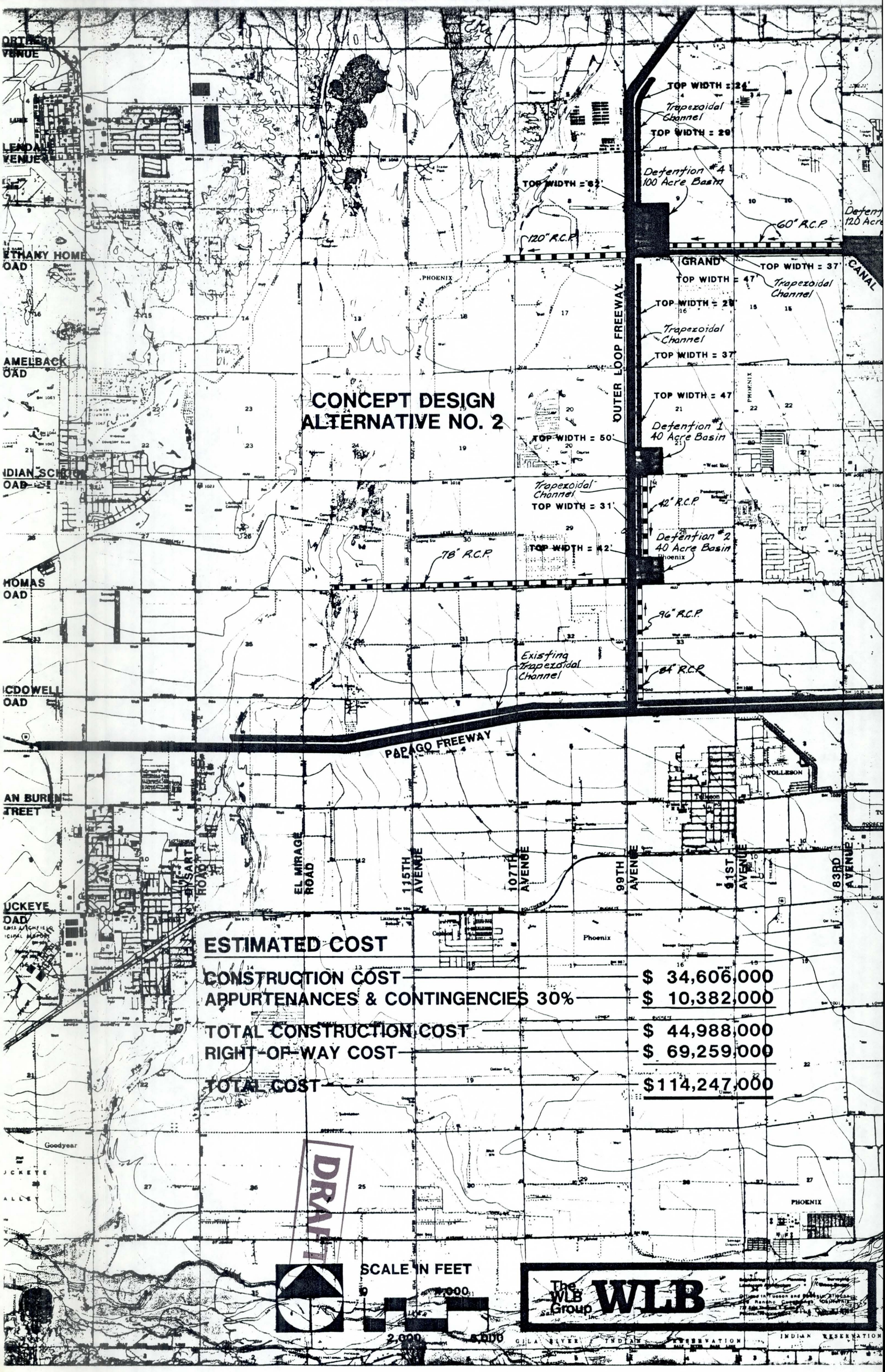
WLB
GILA RIVER INDIAN RESERVATION


CONCEPT DESIGN
ALTERNATIVE NO. 2
TOP WIDTH = 24'
Trapezoidal Channel
TOP WIDTH = 29'
Detention #4
100 Acre Basin
TOP WIDTH = 62'
60" R.C.P.
120" R.C.P.
GRAND
TOP WIDTH = 37'
TOP WIDTH = 47'
Trapezoidal Channel
TOP WIDTH = 29'
Trapezoidal Channel
TOP WIDTH = 37'
CANAL
OUTER LOOP FREEWAY
TOP WIDTH = 47'
Detention #1
40 Acre Basin
TOP WIDTH = 50'
Trapezoidal Channel
TOP WIDTH = 31'
42" R.C.P.
Detention #2
40 Acre Basin
TOP WIDTH = 42'
78" R.C.P.
96" R.C.P.
Existing Trapezoidal Channel
84" R.C.P.
PAPAGO FREEWAY
PHOENIX
TOLLESON
EL MIRAGE ROAD
115TH AVENUE
107TH AVENUE
99TH AVENUE
91ST AVENUE
83RD AVENUE
Phoenix
Goodyear
PHOENIX
ESTIMATED COST
CONSTRUCTION COST $ 34,606,000
APPURTENANCES & CONTINGENCIES 30% $ 10,382,000
TOTAL CONSTRUCTION COST $ 44,988,000
RIGHT-OF-WAY COST $ 69,259,000
TOTAL COST $114,247,000
DRAFT
SCALE IN FEET
2,000
5,000
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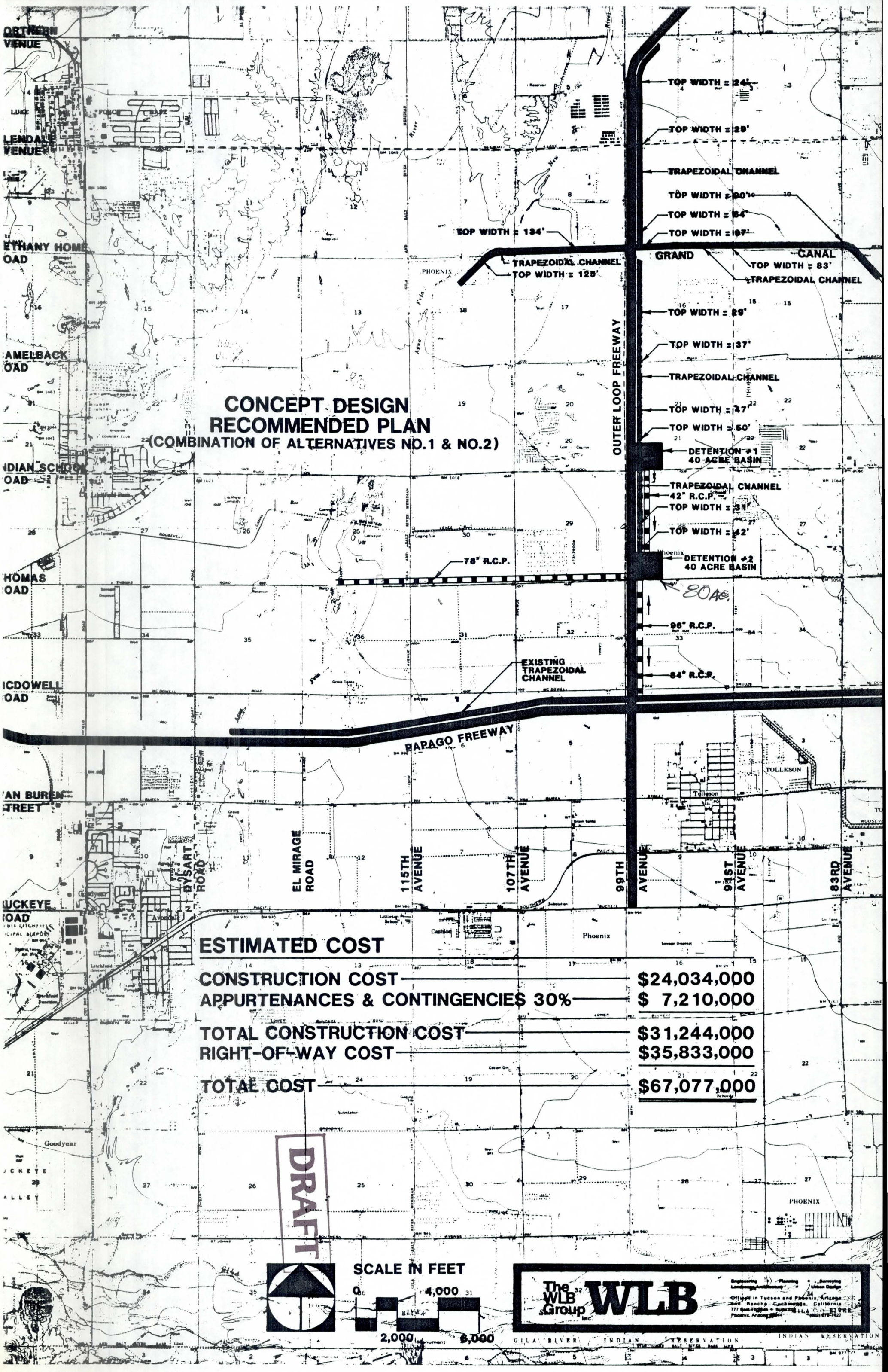
WLB
INDIAN RESERVATION



CONCEPT DESIGN
RECOMMENDED PLAN
(COMBINATION OF ALTERNATIVES NO.1 & NO.2)

ESTIMATED COST

CONSTRUCTION COST	$24,034,000
APPURTENANCES & CONTINGENCIES 30%	$ 7,210,000
TOTAL CONSTRUCTION COST	$31,244,000
RIGHT-OF-WAY COST	$35,833,000
TOTAL COST	$67,077,000

THE OUTER LOOP FREEWAY

PAPAGO FREEWAY TO NORTHERN AVENUE

OFF-SITE HYDROLOGY

CASE II

INTERCEPTOR CHANNEL ALONG THE NORTH SIDE OF THE PARADISE CORRIDOR AND THE GRAND AVENUE EXPRESSWAY AS A LOW LEVEL FACILITY.

LEGEND

S1	SUBWATERSHED DESIGNATION
•C1	CONCENTRATION POINT
	DRAINAGE AREA DELINEATIONS
	PROPOSED FREEWAYS
	MAJOR DRAINAGE PATHS
	STORM DRAIN PIPE
Q_{100} =	100 - YEAR PEAK DISCHARGE
Q_{50} =	50 - YEAR PEAK DISCHARGE

0 3000 6000 12000 18000

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Landscape Architecture • Urban Design

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BASE MAP: USGS 7.5 MINUTE QUADRANGLES