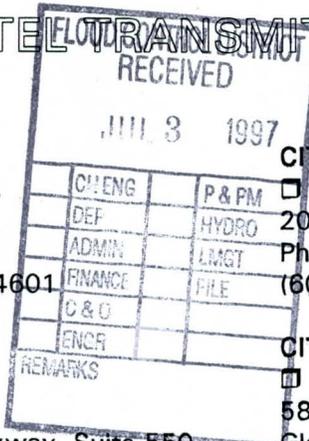


MARYVALE ADMS

WOOD/PATEL TRANSMITTAL

WP #94154
FCD #93-29



TO:

FCDMC

Russell Miracle, P.E.
2801 West Durango
Phoenix, AZ 85009
(602) 506-1501 fax: 506-4601

CITY OF PHOENIX

Raymond Acuña, P.E.
200 West Washington Street, 5th Floor
Phoenix, AZ 85003
(602) 262-4026 fax: 495-2016

CH2M HILL

Steve Walker, P.E.
 David Dust, P.E.
1620 W. Fountainhead Parkway, Suite 550
Tempe, AZ 85282-1843
(602) 966-8188 fax: 966-9450

CITY OF GLENDALE

Dan Sherwood, P.E.
5850 West Glendale Avenue
Glendale, AZ 85301
(602) 930-3630 fax: 915-2689

CITY OF PEORIA

Dan Nissen, P.E.
8401 West Monroe Street
Peoria, AZ 85345
(602) 412-7210 fax: 412-7211

FROM:

Ashok C. Patel, P.E.

DATE:

7/3/97

WE ARE SENDING YOU THE ATTACHED

- VIA FAX VIA MAIL
 VIA HAND DELIVERY

Copies	Date	Description
1	7/3/97	Flood Mitigation Study Workbook

THESE ARE TRANSMITTED as checked below:

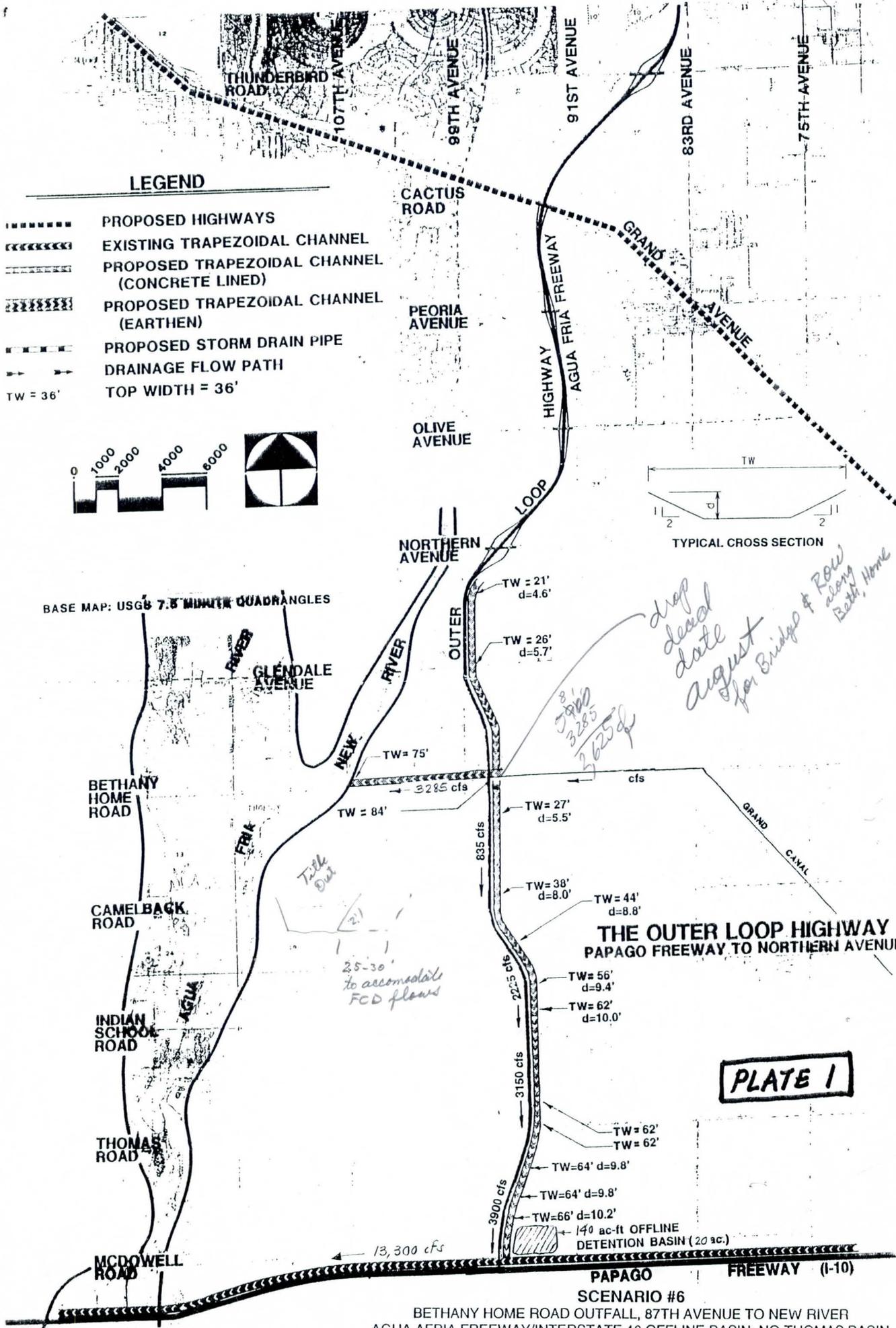
- For approval For your information/file _____
 For your use As requested For review and comment

Remarks:

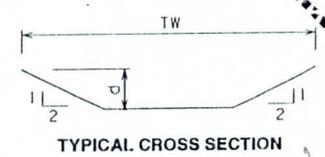
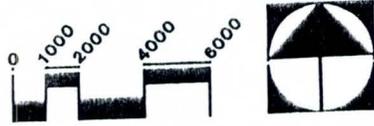
please call if you need any additional data.

thanks!

AP



- LEGEND**
- PROPOSED HIGHWAYS
 - EXISTING TRAPEZOIDAL CHANNEL
 - PROPOSED TRAPEZOIDAL CHANNEL (CONCRETE LINED)
 - PROPOSED TRAPEZOIDAL CHANNEL (EARTHEN)
 - PROPOSED STORM DRAIN PIPE
 - DRAINAGE FLOW PATH
 - TW = 36' TOP WIDTH = 36'



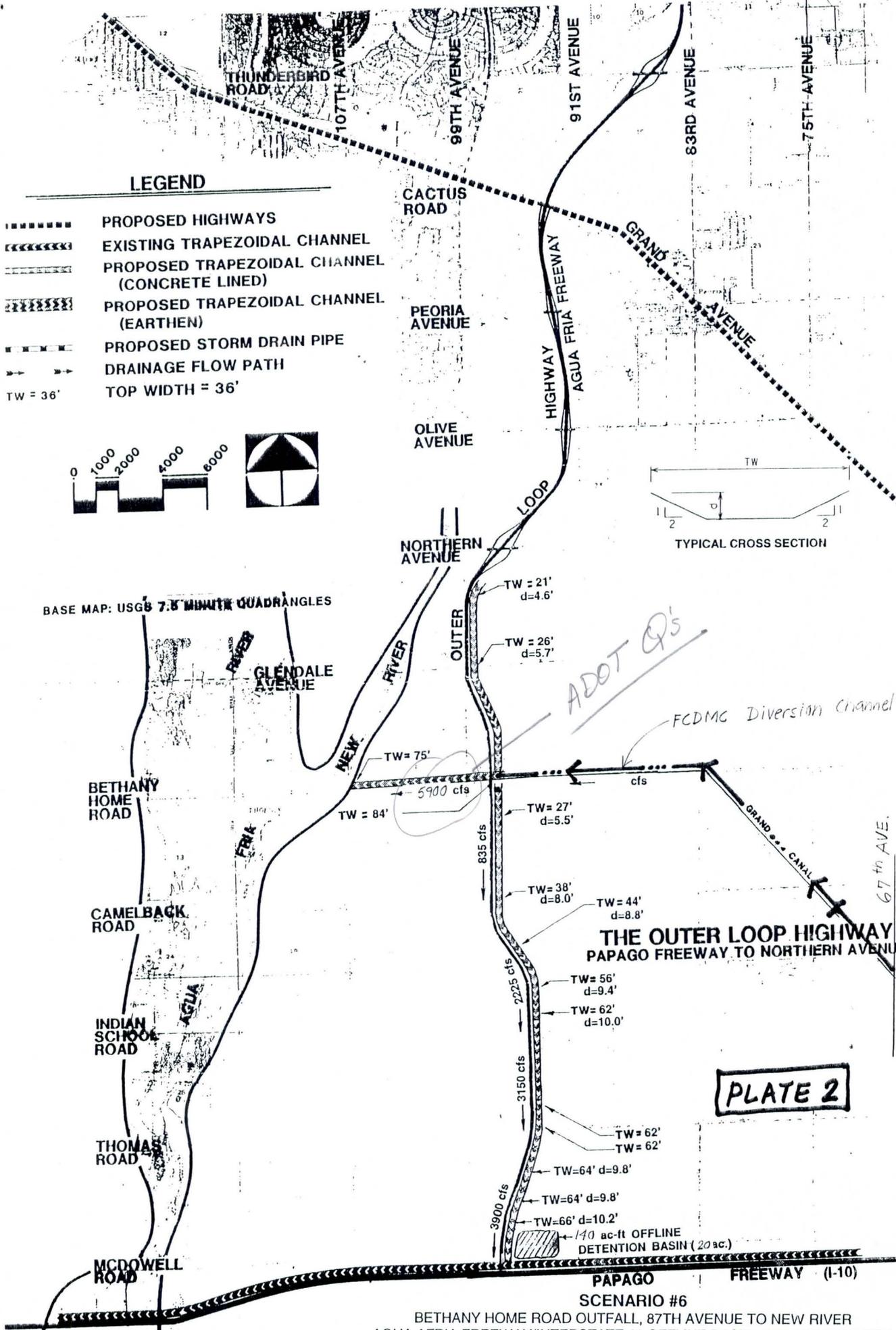
BASE MAP: USGS 7.5 MINUTE QUADRANGLES

drop elev date August for Bridge & ROW along Beth, Home

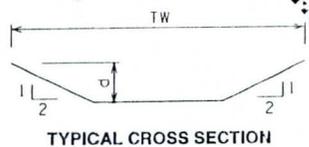
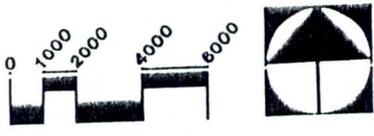
**THE OUTER LOOP HIGHWAY
PAPAGO FREEWAY TO NORTHERN AVENUE**

PLATE 1

SCENARIO #6
BETHANY HOME ROAD OFFFALL, 87TH AVENUE TO NEW RIVER
AGUA AFRIA FREEWAY/INTERSTATE 10 OFFLINE BASIN; NO THOMAS BASIN



- LEGEND**
- PROPOSED HIGHWAYS
 - EXISTING TRAPEZOIDAL CHANNEL
 - PROPOSED TRAPEZOIDAL CHANNEL (CONCRETE LINED)
 - PROPOSED TRAPEZOIDAL CHANNEL (EARTHEN)
 - PROPOSED STORM DRAIN PIPE
 - DRAINAGE FLOW PATH
 - TW = 36' TOP WIDTH = 36'



ADOT Q's

FCDMC Diversion Channel

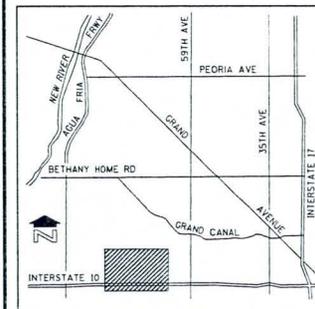
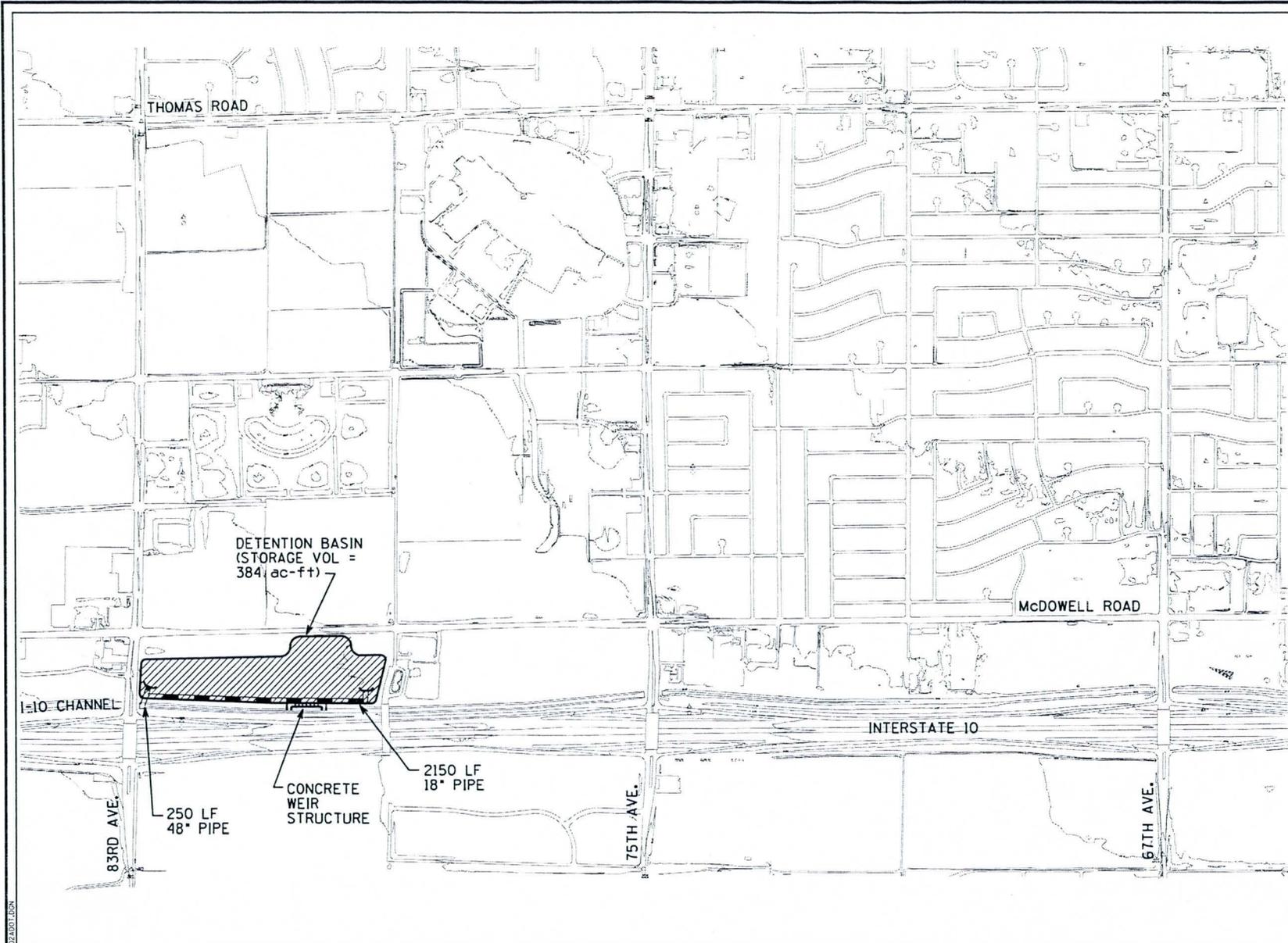
PLATE 2

PAPAGO FREEWAY (I-10)
SCENARIO #6
 BETHANY HOME ROAD OUTFALL, 87TH AVENUE TO NEW RIVER
 AGUA AFRIA FREEWAY/INTERSTATE 10 OFFLINE BASIN; NO THOMAS BASIN

ARIZONA DEPARTMENT OF
TRANSPORTATION

AGUA FRIA FREEWAY

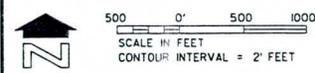
BASIN OPTIONS



LOCATION MAP

SCENARIO #5
100-YEAR FLOW

FIGURE 1

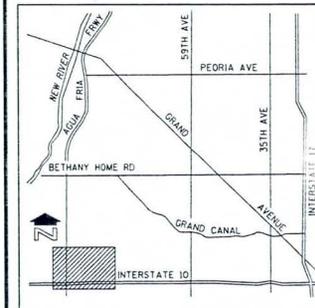
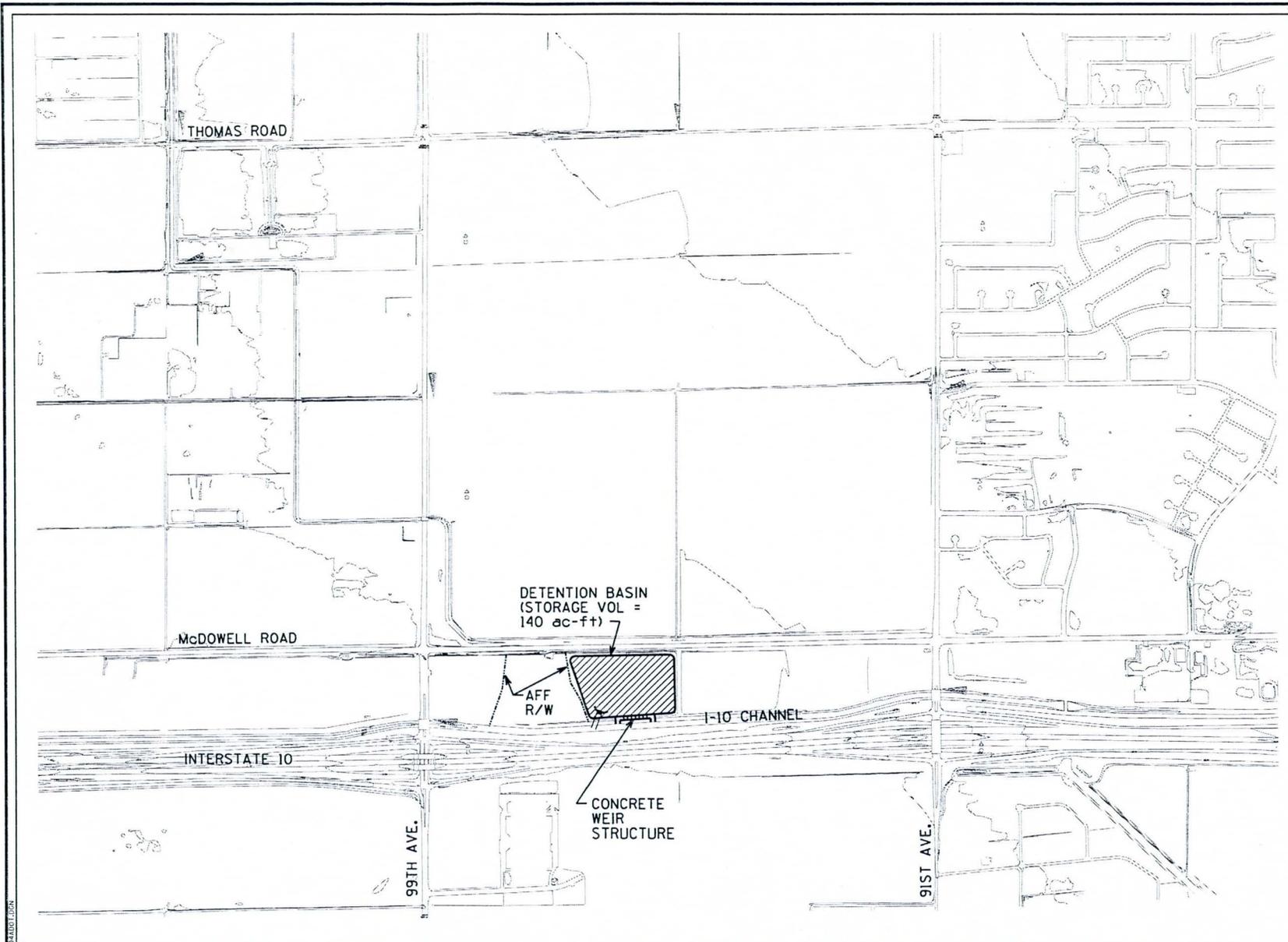


WOOD, PATEL & ASSOCIATES, INC.

DESIGN	BY	DATE
DESIGN CHK.	AR	
PLANS	PE/AL	
PLANS CHK.	AP	
SUBMITTED BY:		
	DATE:	SHEET: OF

NOTE:
THESE PLANS ARE PRELIMINARY AND ARE PROVIDED FOR PLANNING PURPOSES ONLY.
THE LOCATIONS OF ALL STRUCTURES, UTILITIES AND RIGHT-OF-WAY ARE APPROXIMATE
AND ARE BASED UPON RECORD DOCUMENTS. AERIAL TOPOGRAPHY WAS PRODUCED AT A
SCALE OF 1/4"=200 FEET WITH A 2' FOOT CONTOUR INTERVAL. MAPPING WAS PREPARED
BY KENNEY AERIAL MAPPING AND IS BASED ON GROUND CONTROL SURVEY DATA PROVIDED
BY KAMINSKI-HUBBARD ENGINEERING INC. AND PROJECT ENGINEERING CONSULTANTS, L.T.D.

PROJECT NO. 95271.06



LOCATION MAP

SCENARIO #6
100-YEAR FLOW

FIGURE 2



500 0' 500 1000

SCALE IN FEET
CONTOUR INTERVAL = 2' FEET

WOOD, PATEL & ASSOCIATES, INC.

DESIGN	BY	DATE
DESIGN CHG.	AR	
PLANS	PE/AL	
PLANS CHG.	AP	
SUBMITTED BY:	DATE:	SKETCH

NOTE:
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BY KENNEY AERIAL MAPPING AND IS BASED ON GROUND CONTROL SURVEY DATA PROVIDED
BY KAMINSKI-HUBBARD ENGINEERING INC. AND PROJECT ENGINEERING CONSULTANTS, L.P.

BETHANY HOME ROAD OUTFALL

Activity Code: P6A450

Supervisor District: 4

Township/Range: T2N R1E S14-17

Project Name: Bethany Home Road Outfall

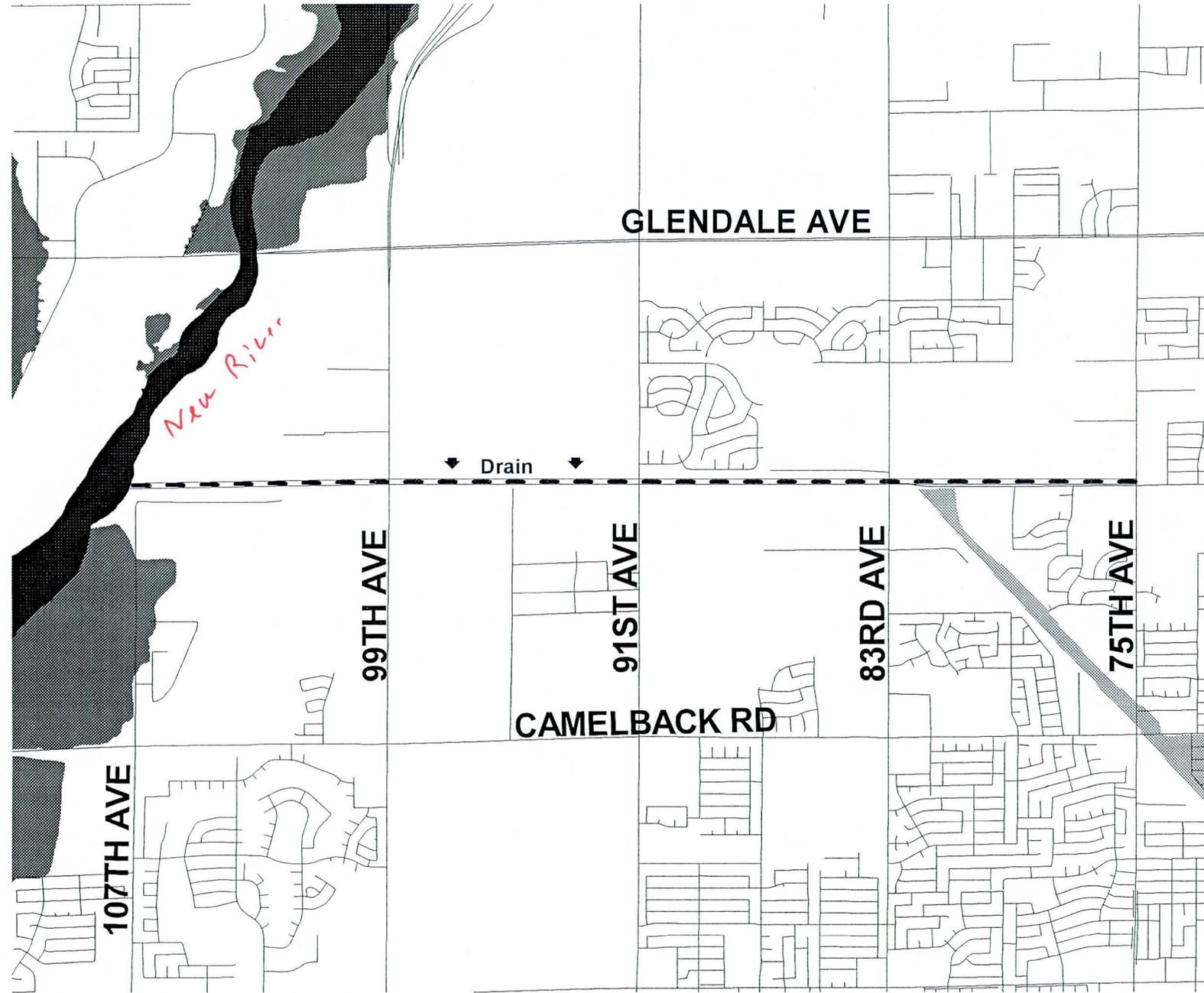
This project consists of a ten-year storm drain running west from 75th Avenue to New River, which was recommended in the Glendale-Peoria ADMP. A portion of the project area is also being restudied as part of the Maryvale ADMS. Peak flows are estimated to be 860-1230 cfs. The project will provide the only flooding relief for >5 square miles of existing and rapidly developing areas in Glendale and unincorporated Maricopa County. The project will also provide an outlet for future storm drains in a 13-square mile area between Grand Ave. and the Grand Canal.

Glendale plans to construct basins along this drainage corridor, in order to reduce the size of storm drains and provide an increased level of protection in the future. The basins will also provide water quality and recharge benefits. Cost is estimated by Glendale to be \$15.15M (75% by FCD, 25% by Glendale). The operation and maintenance for this project will be funded by the

District for 25% of the project until annexation occurs.

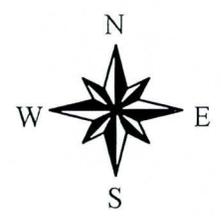
Bethany Home Rd Outfall Storm Drain

450



Streets
Floodplain

- A
- AE
- FW



LEGEND

- ▲ EXISTING SURGE BASIN
- ▲ PROPOSED SURGE/OFF-LINE BASIN
- EXISTING STORM DRAIN SYSTEM
- PROPOSED STORM DRAIN SYSTEM
- FUTURE STORM DRAIN SYSTEM
- EXISTING FLOOD CONTROL CHANNEL
- PROPOSED FLOOD CONTROL CHANNEL
- == INTERSTATE OR STATE HIGHWAY



DESIGN	J. TAILLON	4/97	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DRAWN	P. KASTLER	4/97	
CHECKED	A. PATEL	4/97	
WOOD, PATEL & ASSOCIATES, INC. 1550 EAST MISSOURI, SUITE 203 PHOENIX, ARIZONA (602)234-1344			EXISTING & PROPOSED STORM DRAIN FACILITIES
MARYVALE AREA DRAINAGE MASTER STUDY			PLATE

Maryvale Area Drainage Master Plan

Flood Mitigation Study Workbooks

1. Grand Canal: 67th Avenue to New River
2. Grand Avenue: Grand Avenue at I-17
3. Grand Avenue: Grand Canal to Bethany Home Road
4. Grand Avenue: Northern Avenue to Peoria Avenue
5. I-10: Agua Fria River to I-17
6. Alternate Option Study



CONCEPT REPORT SUMMARY
MARYVALLE AREA DRAINAGE MASTER PLAN

Grand Canal Flood Mitigation Options

(Costs include ADOT channel, 87th Avenue to New River)

*Option 1, 100-Year:	Concrete lined channel, 67th to 87th Avenues	\$ 31,761,000
Option 2, 100-Year:	Concrete lined channel, 67th to 87th Avenues, offline detention basin at 83rd Avenue	\$33,066,000
Option 3, 100-Year:	Concrete lined channel, 67th to 87th Avenues, offline detention basin south of Grand Canal at 69th Avenue	\$29,122,000
*Option 4, 100-Year:	Concrete lined channel, 67th to 87th Avenues, offline detention basin north of Grand Canal 67th to 73rd Avenues	\$28,743,000

(Costs do not include ADOT channel from 87th Avenue to New River):

*Option 1, 10-Year:	Concrete lined channel, 67th to 87th Avenues	\$14,819,000
*Option 2, 10-Year:	Concrete lined channel, 67th to 87th Avenues with Bethany Home Road storm drain	\$14,471,000
*Option 3, 10-Year:	Concrete lined channel, 67th Avenue to 87th Avenues with Camelback Road storm drain (a)	\$17,376,000
*Option 4, 10-Year:	Concrete lined channel, 67th to 87th Avenues with Bethany Home Road and Camelback Road storm drains (a)	\$16,877,000
Option 5, 10-Year:	Concrete lined channel 67th to 87th Avenues with offline detention basin at 83rd Avenue	\$16,780,000
*Option 6, 10-Year:	Concrete lined channel 71st to 87th Avenues with offline detention basin between 67th and 71st Avenues	\$13,104,000
Option 7, 10-Year	Concrete lined channel 67th to 87th Avenues with offline detention basin, south of Grand Avenue	\$14,186,000

(a) *Cost does not include Bethany Home Road storm drain; the Bethany Home Road storm drain is included as part of the Grand Avenue options and is considered here only for the benefit it provides in reducing flow south of Bethany Home Road.*

* Options selected for Level II Analysis based on input from the communities and FCDMC on May 29, 1997

Grand Canal Diversion Channel

1. Concrete channel I-17 to New River

(\$ 207,000,000)
\$153,777,000

Grand Canal Non-Structural Options

1. Acquisition of property and structures
within the floodplain

\$ 44,369,000 (b)

(b) *Based on costs developed by Wood/Patel in Maryvale ADMS, Floodplain & Property Valuation*

TABLE X

May 28, 1997

MARYVALE AREA DRAINAGE MASTER PLAN
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 1, 100-YEAR

TITLE: Concrete Lined Channel, 67th-87th Ave.

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Concrete Lined Channel, 67th-71st Ave.	\$350.00	CY	2829	\$990,150
2	Concrete Lined Channel, 71st-75th Ave.	\$350.00	CY	4285	\$1,499,750
3	2-10'x10'-450LF Box Culvert, 75th Ave.	\$350.00	CY	1205	\$421,750
4	Concrete Lined Channel, 75th-83rd Ave.	\$350.00	CY	10723	\$3,753,050
5	2-12'x10'-70LF Box Culvert, 83rd Ave.	\$350.00	CY	250	\$87,500
6	Concrete Lined Channel, 83rd-87th Ave.	\$350.00	CY	2591	\$906,850
7	Channel Excavation	\$3.00	CY	243911	\$731,733
8	Bethany Home Road relocation		LS		

SUBTOTAL \$8,390,783

CONTINGENCIES:

Construction (%)	20	\$1,678,157
Engineering (%)	7	\$587,355
Construction Admin (%)	6	\$503,447

TOTAL \$11,159,741

LAND ACQUISITION

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition	\$5.00	SF	0	\$0
2	Channel Land Acquisition	\$9.00	SF	196400	\$1,767,600
3	Residential Land Acquisition	\$85,000.00	lot	66	\$5,610,000

SUBTOTAL \$7,377,600

CONTINGENCIES:

Construction (%)	0	\$0
Engineering (%)	1.5	\$110,664
Construction Admin (%)	0	\$0

TOTAL \$7,488,264

GRAND TOTAL WITHOUT ADOT CHANNEL

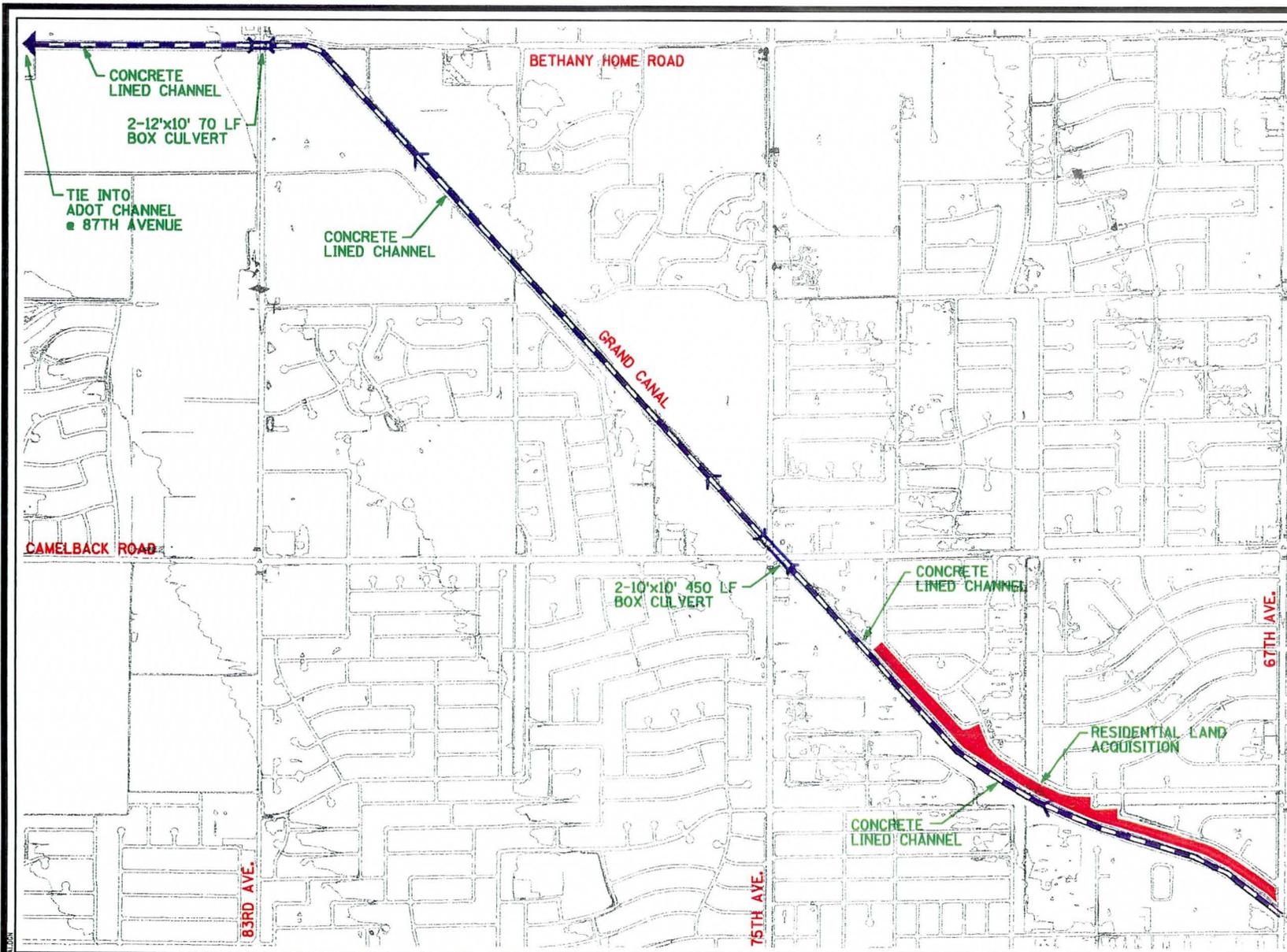
\$18,648,005

ADOT Channel, Outer Loop Channel to 87th Avenue (extended)

\$13,112,919

GRAND TOTAL WITH ADOT CHANNEL

\$31,760,924

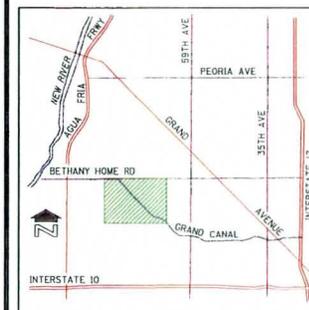


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

MARYVALE AREA DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

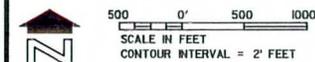
FLOOD MITIGATION OPTIONS



LOCATION MAP

RECONNAISSANCE LEVEL CONCEPT

**GRAND CANAL
OPTION 1, 100-YEAR**



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	BY JT/AR	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR		RECOMMENDED BY:
PLANS	PE/AL		APPROVED BY: DATE
PLANS CHK.	AP		DATE
SUBMITTED BY:		DATE	CHIEF ENGINEER AND GENERAL MANAGER
			SHEET OF

NOTE:
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TABLE X

June 5, 1997

MARYVALE AREA DRAINAGE MASTER PLAN
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 2, 100-YEAR

TITLE: Concrete Lined Channel, 67th-87th Ave, Offline Basin at 83rd Ave.

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Concrete Lined Channel, 67th-71st Ave.	\$350.00	CY	2829	\$990,150
2	Concrete Lined Channel, 71st-75th Ave.	\$350.00	CY	4285	\$1,499,750
3	2-10'x10'-450LF Box Culvert, 75th Ave.	\$350.00	CY	1205	\$421,750
4	Concrete Lined Channel, 75th-83rd Ave.	\$350.00	CY	10723	\$3,753,050
5	2-12'x10'-70LF Box Culvert, Bethany Home R	\$350.00	CY	388	\$135,800
6	1-12'x10'-70LF Box Culvert, 83rd Ave.	\$350.00	CY	144	\$50,400
7	Concrete Lined Channel, 83rd-87th Ave.	\$350.00	CY	1613	\$564,550
8	Channel Excavation	\$3.00	CY	229294	\$687,882
9	Basin Excavation	\$3.00	CY	397100	\$1,191,300

SUBTOTAL \$9,294,632

CONTINGENCIES:

Construction (%)	20	\$1,858,926
Engineering (%)	7	\$650,624
Construction Admin (%)	6	\$557,678

TOTAL \$12,361,861

LAND ACQUISITION

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition	\$3.50	SF	891000	\$3,118,500
2	Channel Land Acquisition	\$9.00	SF	259300	\$2,333,700
3	Residential Land Acquisition	\$85,000.00	lot	66	\$5,610,000

SUBTOTAL \$11,062,200

CONTINGENCIES:

Construction (%)	0	\$0
Engineering (%)	1.5	\$165,933
Construction Admin (%)	0	\$0

TOTAL \$11,228,133

GRAND TOTAL WITHOUT ADOT CHANNEL**\$23,589,994**

ADOT Channel, Outer Loop Channel to 87th Avenue, extended

\$8,119,295**GRAND TOTAL WITH ADOT CHANNEL****\$31,709,289**

TABLE X

June 19, 1997

MARYVALE AREA DRAINAGE MASTER PLAN
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 2, 100-YEAR

TITLE: Concrete Lined Channel, 67th-87th Ave. Offline Basin at 83rd Ave.

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Concrete Lined Channel, 67th-71st Ave.	\$350.00	CY	2829	\$990,150
2	Concrete Lined Channel, 71st-75th Ave.	\$350.00	CY	4285	\$1,499,750
3	2-10'x10'-450LF Box Culvert, 75th Ave.	\$350.00	CY	1205	\$421,750
4	Concrete Lined Channel, 75th-83rd Ave.	\$350.00	CY	10723	\$3,753,050
5	2-12'x10'-70LF Box Culvert, Bethany Home R	\$350.00	CY	388	\$135,800
6	1-12'x10'-70LF Box Culvert, 83rd Ave.	\$350.00	CY	144	\$50,400
7	Concrete Lined Channel, 83rd-87th Ave.	\$350.00	CY	1613	\$564,550
8	Channel Excavation	\$3.00	CY	229294	\$687,882
9	Basin Excavation	\$3.00	CY	397100	\$1,191,300

SUBTOTAL \$9,294,632

CONTINGENCIES:

Construction (%)	20	\$1,858,926
Engineering (%)	7	\$650,624
Construction Admin (%)	6	\$557,678

TOTAL \$12,361,861

LAND ACQUISITION

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition	\$3.50	SF	891000	\$3,118,500
2	Channel Land Acquisition	\$9.00	SF	259300	\$2,333,700
3	Residential Land Acquisition	\$85,000.00	lot	66	\$5,610,000

SUBTOTAL \$11,062,200

CONTINGENCIES:

Construction (%)	0	\$0
Engineering (%)	1.5	\$165,933
Construction Admin (%)	0	\$0

TOTAL \$11,228,133

GRAND TOTAL WITHOUT ADOT CHANNEL**\$23,589,994**

ADOT Channel, Outer Loop Channel to 87th Avenue, extended

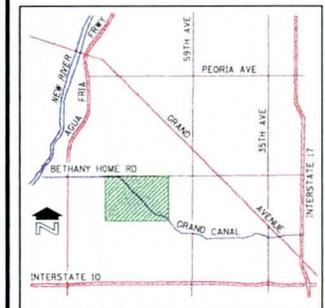
\$8,119,295**GRAND TOTAL WITH ADOT CHANNEL****\$31,709,289**

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

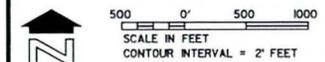
FLOOD
MITIGATION OPTIONS



LOCATION MAP

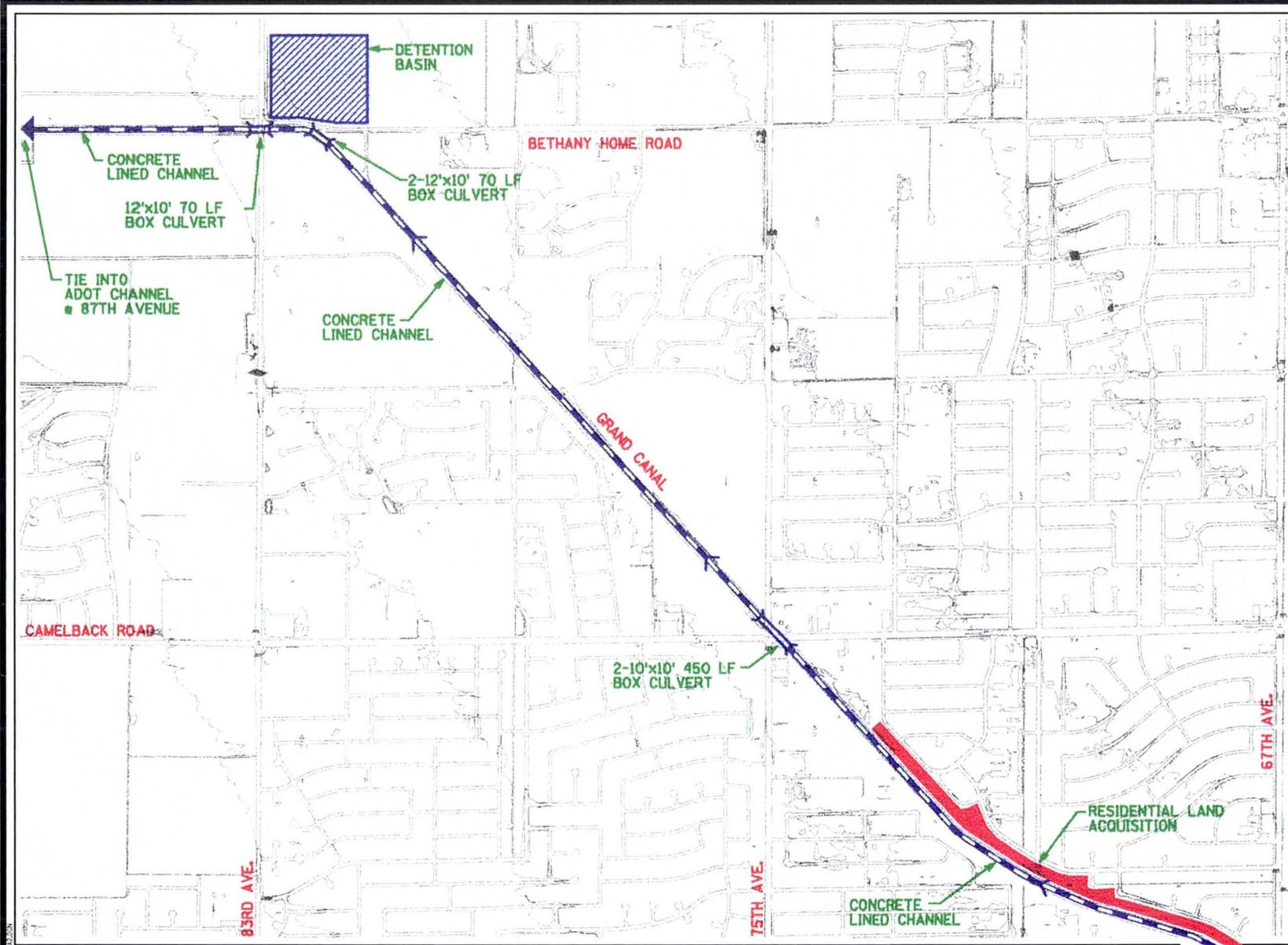
RECONNAISSANCE
LEVEL CONCEPT

GRAND CANAL
OPTION 2, 100-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	BY: JT/AR	DATE:	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR		RECOMMENDED BY:
PLANS	PE/AL		APPROVED BY: DATE:
PLANS CHK.	AP		DATE:
SUBMITTED BY:		DATE:	CHIEF ENGINEER AND GENERAL MANAGER
			SHEET OF



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BY KENNEY AERIAL MAPPING AND IS BASED ON GROUND CONTROL SURVEY DATA PROVIDED
BY KAMNSKI-HUBBARD ENGINEERING INC. AND PROJECT ENGINEERING CONSULTANTS, LTD.

PROJECT NO. 9454.00

TABLE X

June 5, 1997

MARYVALE AREA DRAINAGE MASTER PLAN
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 3, 100-YEAR

TITLE: Concrete Lined Channel 67th-87th Ave., Offline Basin South of Grand Canal

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Concrete Lined Channel, 67th-71st Ave.	\$350.00	CY	2443	\$855,050
2	2-8'x5'-110LF Box Culvert, 69th Ave.	\$350.00	CY	181	\$63,350
3	24" Pipe, 68th Ave.	\$83.00	LF	1500	\$124,500
3	Concrete Lined Channel, 71st-75th Ave.	\$350.00	CY	3853	\$1,348,550
4	2-8'x8'-450LF Box Culvert, 75th Ave.	\$350.00	CY	851	\$297,850
5	Concrete Lined Channel, 75th-83rd Ave.	\$350.00	CY	7445	\$2,605,750
6	2-10'x8'-70LF Box Culvert, 83rd Ave.	\$350.00	CY	173	\$60,550
7	Concrete Lined Channel, 83rd-87th Ave.	\$350.00	CY	3477	\$1,216,950
8	Channel Excavation	\$3.00	CY	236245	\$708,735
9	Basin Excavation	\$3.00	CY	78700	\$236,100
10	Bethany Home Road relocation		LS		

SUBTOTAL \$7,517,385

CONTINGENCIES:

Construction (%)	20	\$1,503,477
Engineering (%)	7	\$526,217
Construction Admin (%)	6	\$451,043

TOTAL \$9,998,122

LAND ACQUISITION

1	Basin Land Acquisition	\$3.50	SF	212500	\$743,750
2	Channel Land Acquisition	\$9.00	SF	142240	\$1,280,160
3	Residential Land Acquisition	\$85,000.00	lot	66	\$5,610,000

SUBTOTAL \$7,633,910

CONTINGENCIES:

Construction (%)	0	\$0
Engineering (%)	1.5	\$114,509
Construction Admin (%)	0	\$0

TOTAL \$7,748,419

GRAND TOTAL WITHOUT ADOT CHANNEL

\$17,746,541

ADOT Channel, Outer Loop Channel to 87th Avenue, extended

\$11,376,019

GRAND TOTAL WITH ADOT CHANNEL

\$29,122,560

TABLE X

June 19, 1997

MARYVALE AREA DRAINAGE MASTER PLAN
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 3, 100-YEAR

TITLE: Concrete Lined Channel 67th-87th Ave., Offline Basin South of Grand Canal

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Concrete Lined Channel, 67th-71st Ave.	\$350.00	CY	2443	\$855,050
2	2-8'x5'-110LF Box Culvert, 69th Ave.	\$350.00	CY	181	\$63,350
3	24" Pipe, 68th Ave.	\$83.00	LF	1500	\$124,500
3	Concrete Lined Channel, 71st-75th Ave.	\$350.00	CY	3853	\$1,348,550
4	2-8'x8'-450LF Box Culvert, 75th Ave.	\$350.00	CY	851	\$297,850
5	Concrete Lined Channel, 75th-83rd Ave.	\$350.00	CY	7445	\$2,605,750
6	2-10'x8'-70LF Box Culvert, 83rd Ave.	\$350.00	CY	173	\$60,550
7	Concrete Lined Channel, 83rd-87th Ave.	\$350.00	CY	3477	\$1,216,950
8	Channel Excavation	\$3.00	CY	236245	\$708,735
9	Basin Excavation	\$3.00	CY	78700	\$236,100
10	Bethany Home Road relocation		LS		

SUBTOTAL \$7,517,385

CONTINGENCIES:

Construction (%)	20	\$1,503,477
Engineering (%)	7	\$526,217
Construction Admin (%)	6	\$451,043

TOTAL \$9,998,122

LAND ACQUISITION

1	Basin Land Acquisition	\$3.50	SF	212500	\$743,750
2	Channel Land Acquisition	\$9.00	SF	142240	\$1,280,160
3	Residential Land Acquisition	\$85,000.00	lot	66	\$5,610,000

SUBTOTAL \$7,633,910

CONTINGENCIES:

Construction (%)	0	\$0
Engineering (%)	1.5	\$114,509
Construction Admin (%)	0	\$0

TOTAL \$7,748,419

GRAND TOTAL WITHOUT ADOT CHANNEL \$17,746,541

ADOT Channel, Outer Loop Channel to 87th Avenue, extended \$11,376,019

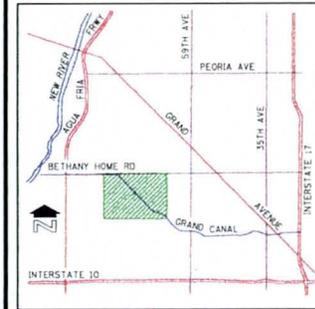
GRAND TOTAL WITH ADOT CHANNEL \$29,122,560

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

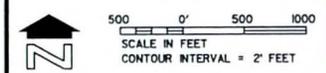
FLOOD
MITIGATION OPTIONS



LOCATION MAP

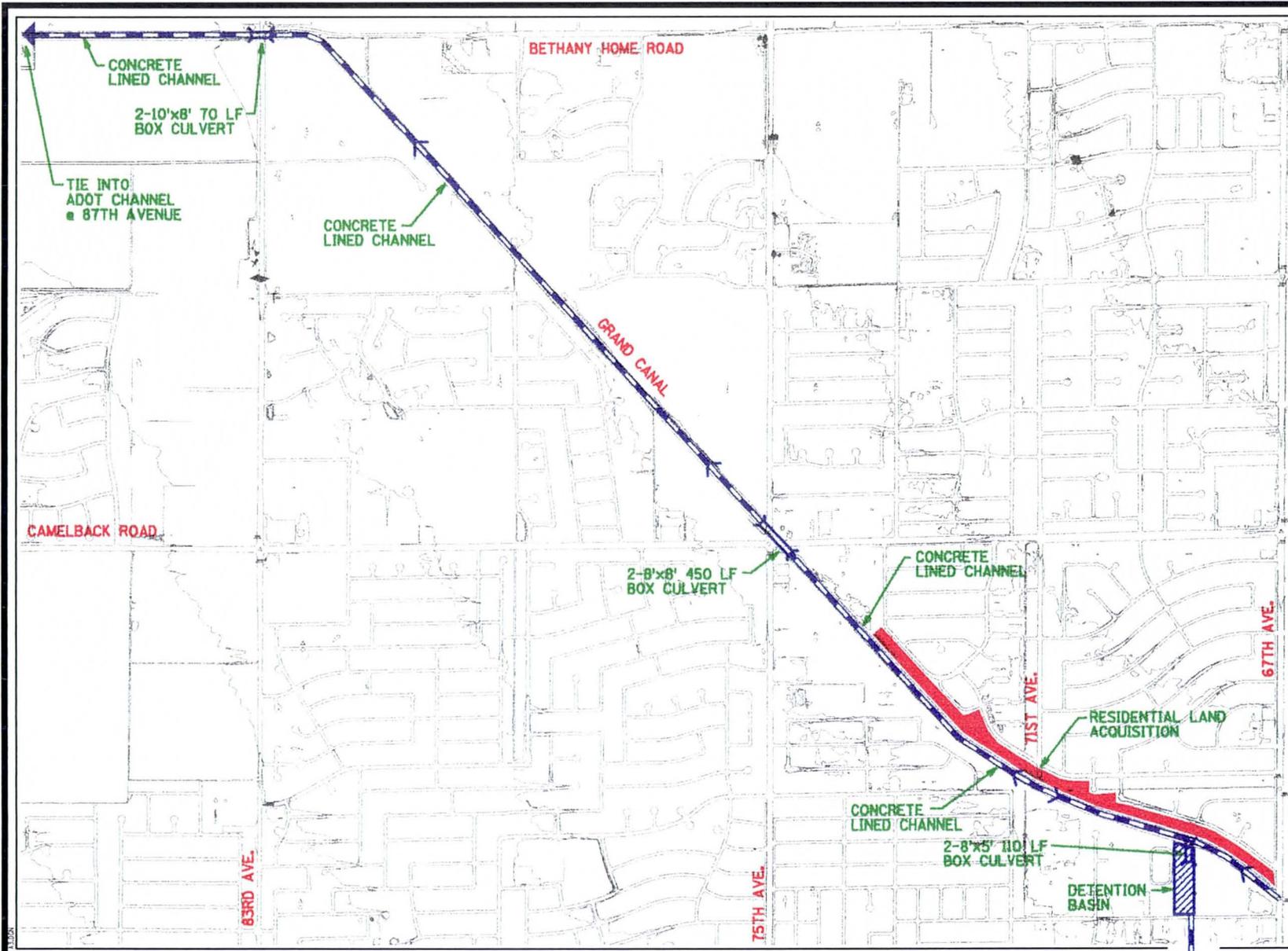
RECONNAISSANCE
LEVEL CONCEPT

GRAND CANAL
OPTION 3, 100-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	JT/AR	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR		RECOMMENDED BY:
PLANS	PE/AL		APPROVED BY: DATE
PLANS CHK.	AP		DATE
SUBMITTED BY:			CHIEF ENGINEER AND GENERAL MANAGER
			SHEET _____ OF _____



NOTES:
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AND ARE BASED UPON RECORD DOCUMENTS. AERIAL TOPOGRAPHY WAS PRODUCED AT A
SCALE OF 1/4"=200 FEET WITH A 2 FOOT CONTOUR INTERVAL. MAPPING WAS PREPARED
BY KENNEDY AERIAL MAPPING AND IS BASED ON GROUND CONTROL SURVEY DATA PROVIDED
BY KAMNSKI-HUBBARD ENGINEERING INC. AND PROJECT ENGINEERING CONSULTANTS, LTD.

PROJECT NO. 94354.00

TABLE X

May 29, 1997

MARYVALE AREA DRAINAGE MASTER PLAN
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 4, 100-YEAR

TITLE: Concrete Lined Channel 67th-87th Ave., Offline Basin 67th-73rd Ave.

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Concrete Lined Channel, 67th-73rd Avenue	\$350.00	CY	2867	\$1,003,450
2	Concrete Lined Channel, 73rd-75th Ave.	\$350.00	CY	2000	\$700,000
3	2-8'x8'-450LF Box Culvert, 75th Ave.	\$350.00	CY	851	\$297,850
4	Concrete Lined Channel, 75th-83rd Ave.	\$350.00	CY	9115	\$3,190,250
5	2-10'x8'-70LF Box Culvert, 83rd Ave.	\$350.00	CY	173	\$60,550
6	Concrete Lined Channel, 83rd-87th Ave.	\$350.00	CY	4617	\$1,615,950
7	Channel Excavation	\$3.00	CY	225931	\$677,793
8	Basin Excavation	\$3.00	CY	118519	\$355,557
9	Bethany Home Road relocation		LS		

SUBTOTAL \$6,897,950

CONTINGENCIES:

Construction (%)	20	\$1,379,590
Engineering (%)	7	\$482,857
Construction Admin (%)	6	\$413,877

TOTAL \$9,174,274

LAND ACQUISITION

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Channel Land Acquisition	\$9.00	SF	178390	\$1,605,510
2	Residential Land Acquisition	\$85,000.00	lot	66	\$5,610,000

SUBTOTAL \$7,215,510

CONTINGENCIES:

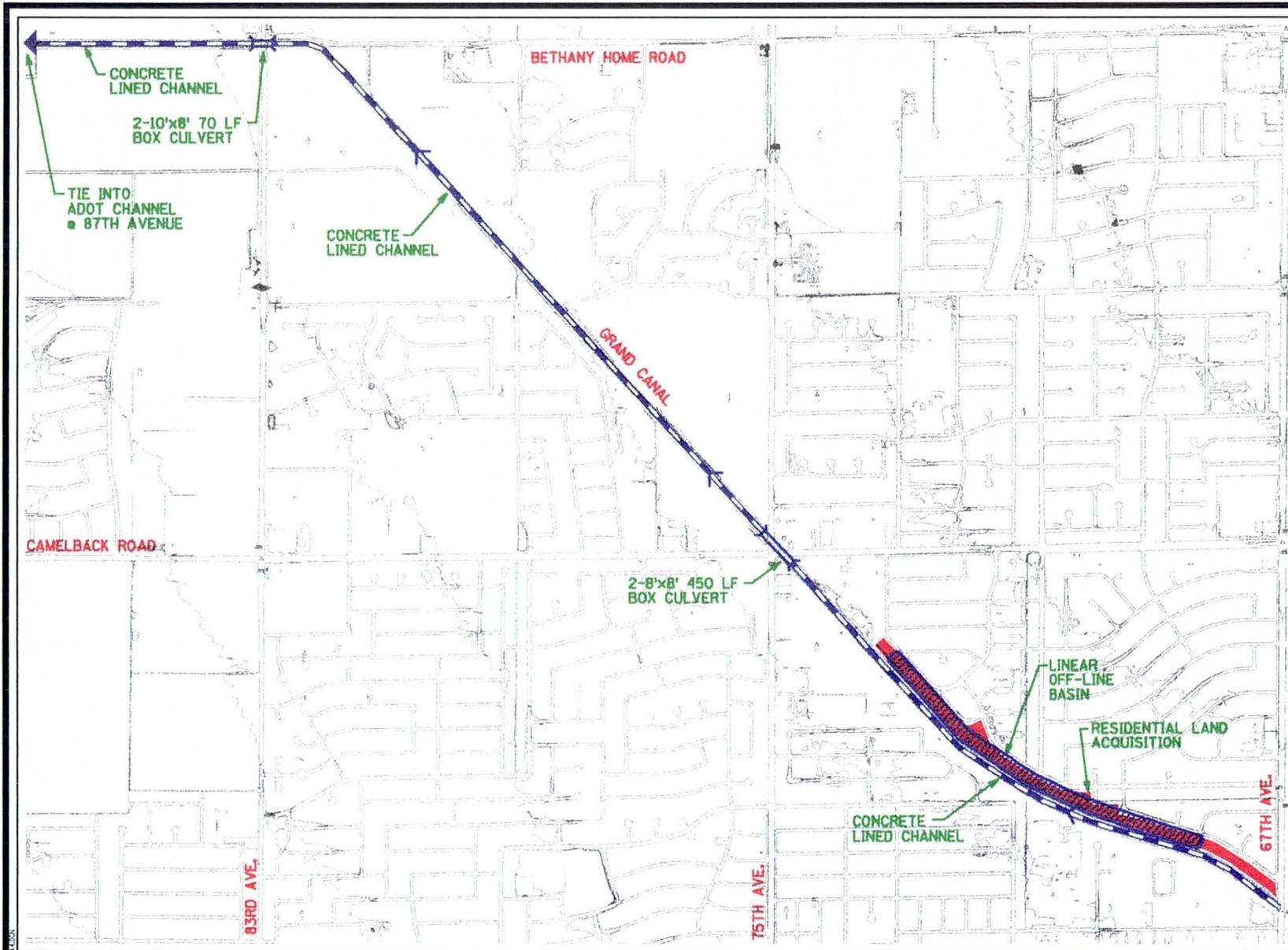
Construction (%)	0	\$0
Engineering (%)	1.5	\$108,233
Construction Admin (%)	0	\$0

TOTAL \$7,323,743

GRAND TOTAL WITHOUT ADOT CHANNEL**\$16,498,016**

ADOT Channel, Outer Loop Channel to 87th Avenue, extended

\$12,244,469**GRAND TOTAL WITH ADOT CHANNEL****\$28,742,485**

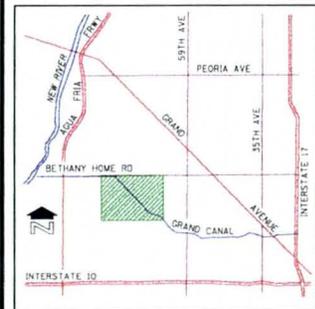


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

MARYVALE AREA DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

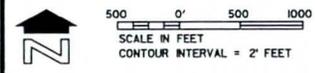
FLOOD MITIGATION OPTIONS



LOCATION MAP

RECONNAISSANCE LEVEL CONCEPT

GRAND CANAL OPTION 4, 100-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN		DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY	
DESIGN CHK.	JT/AR		RECOMMENDED BY:	DATE
PLANS	PE/AL		APPROVED BY:	DATE
PLANS CHK.	AP		CHIEF DESIGNER AND GENERAL MANAGER	DATE
SUBMITTED BY:		DATE:	SHEET	OF

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TABLE X

May 28, 1997

MARYVALE AREA DRAINAGE MASTER PLAN
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 1, 10-YEAR

TITLE: Concrete Lined Channel, 67th-87th Ave.

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Concrete Lined Channel, 67th-71st Ave.	\$350.00	CY	2366	\$828,100
2	Concrete Lined Channel, 71st-75th Ave.	\$350.00	CY	3421	\$1,197,350
3	1-10'x8'-450LF Box Culvert, 75th Ave.	\$350.00	CY	640	\$224,000
4	Concrete Lined Channel, 75th-83rd Ave.	\$350.00	CY	7276	\$2,546,600
5	2-8'x8'-70LF Box Culvert, 83rd Ave.	\$350.00	CY	126	\$44,100
6	Concrete Lined Channel, 83rd-87th Ave.	\$350.00	CY	1613	\$564,550
7	channel excavation	\$3.00	CY	175021	\$525,063
8	Bethany Home Road relocation		LS		
SUBTOTAL					\$5,929,763

CONTINGENCIES:

Construction (%)	20	\$1,185,953
Engineering (%)	6	\$355,786
Construction Admin (%)	7	\$415,083

TOTAL **\$7,886,585**

LAND ACQUISITION

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition	\$5.00	SF	0	\$0
2	Channel Land Acquisition	\$9.00	SF	135600	\$1,220,400
3	Residential Land Acquisition	\$85,000.00	lot	66	\$5,610,000
SUBTOTAL					\$6,830,400

CONTINGENCIES:

Construction (%)	0	\$0
Engineering (%)	1.5	\$102,456
Construction Admin (%)	0	\$0

TOTAL **\$6,932,856**

GRAND TOTAL

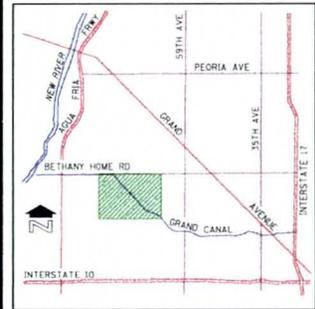
\$14,819,441

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

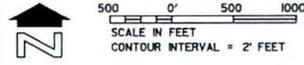
FLOOD
MITIGATION OPTIONS



LOCATION MAP

RECONNAISSANCE
LEVEL CONCEPT

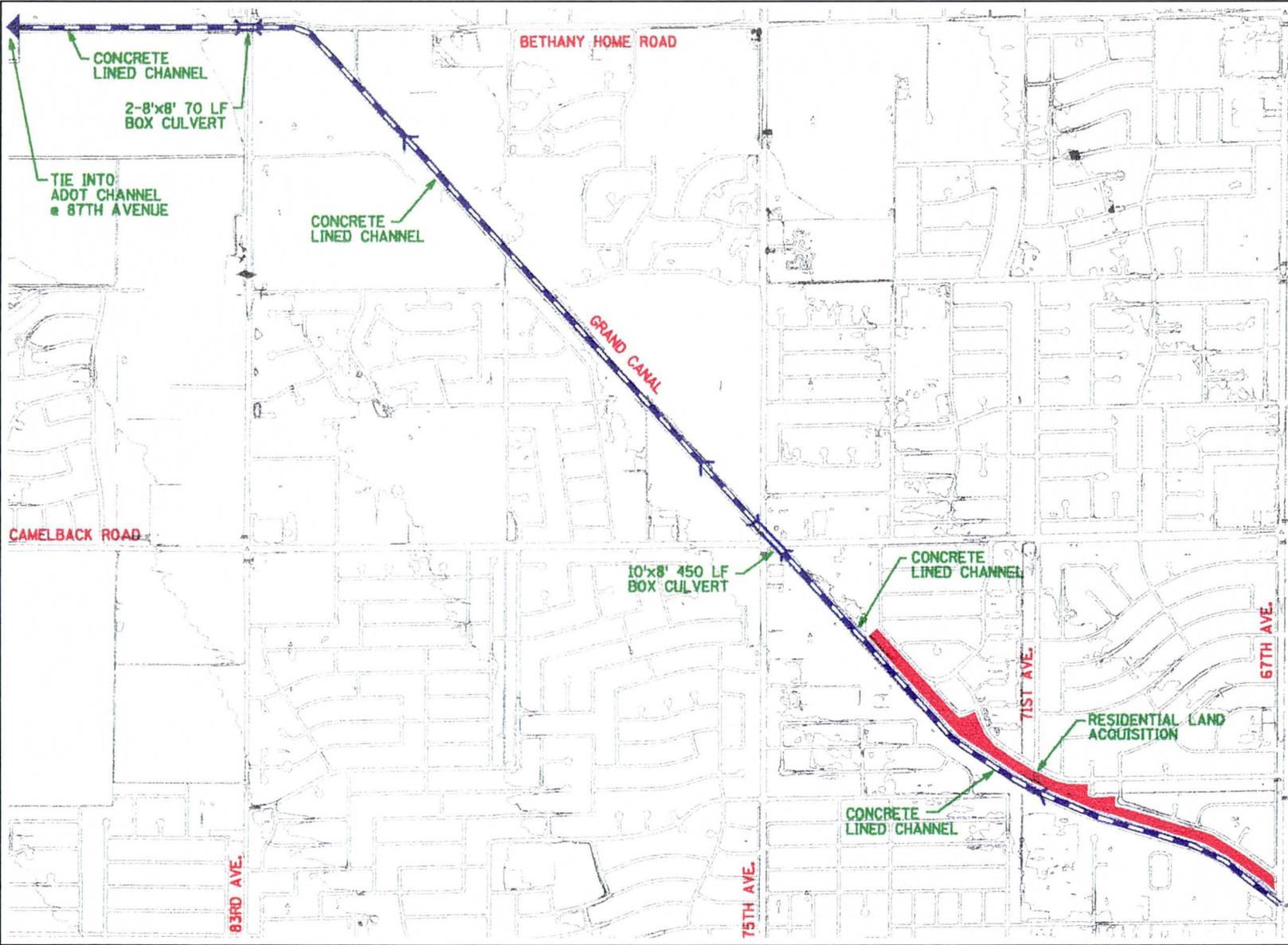
GRAND CANAL
OPTION 1, 10-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	BY	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR		RECOMMENDED BY:
PLANS	PE/AL		DATE:
PLANS CHK.	AP		APPROVED BY:
SUBMITTED BY:			DATE:
			DRY ENGINEER AND GENERAL MANAGER
			SHEET
			OF

PROJECT NO. 94054.00



NOTE:
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BY KAMINSKI-HUBBARD ENGINEERING INC. AND PROJECT ENGINEERING CONSULTANTS, L.L.C.

TABLE X

May 28, 1997

MARYVALE AREA DRAINAGE MASTER PLAN
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 2, 10-YEAR

TITLE: Concrete Lined Channel, 67th-87th Ave. with Bethany Home Storm Drain

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Concrete Lined Channel, 67th-71st Ave.	\$350.00	CY	1910	\$668,500
2	Concrete Lined Channel, 71st-75th Ave.	\$350.00	CY	3205	\$1,121,750
3	1-10'x8'-450LF Box Culvert, 75th Ave.	\$350.00	CY	531	\$185,850
4	Concrete Lined Channel, 75th-83rd Ave.	\$350.00	CY	7047	\$2,466,450
5	2-8'x8'-70LF Box Culvert, 83rd Ave.	\$350.00	CY	100	\$35,000
6	Concrete Lined Channel, 83rd-87th Ave.	\$350.00	CY	1809	\$633,150
7	channel excavation	\$3.00	CY	166129	\$498,387
8	Bethany Home Road relocation		LS		

SUBTOTAL \$5,609,087

CONTINGENCIES:

Construction (%)	20	\$1,121,817
Engineering (%)	6	\$336,545
Construction Admin (%)	7	\$392,636

TOTAL \$7,460,086

LAND ACQUISITION

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition	\$5.00	SF	0	\$0
2	Channel Land Acquisition	\$9.00	SF	144160	\$1,297,440
3	Residential Land Acquisition	\$85,000.00	lot	66	\$5,610,000

SUBTOTAL \$6,907,440

CONTINGENCIES:

Construction (%)	0	\$0
Engineering (%)	1.5	\$103,612
Construction Admin (%)	0	\$0

TOTAL \$7,011,052

GRAND TOTAL

\$14,471,137

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

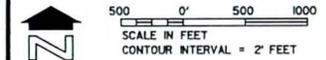
FLOOD
MITIGATION OPTIONS



LOCATION MAP

**RECONNAISSANCE
LEVEL CONCEPT**

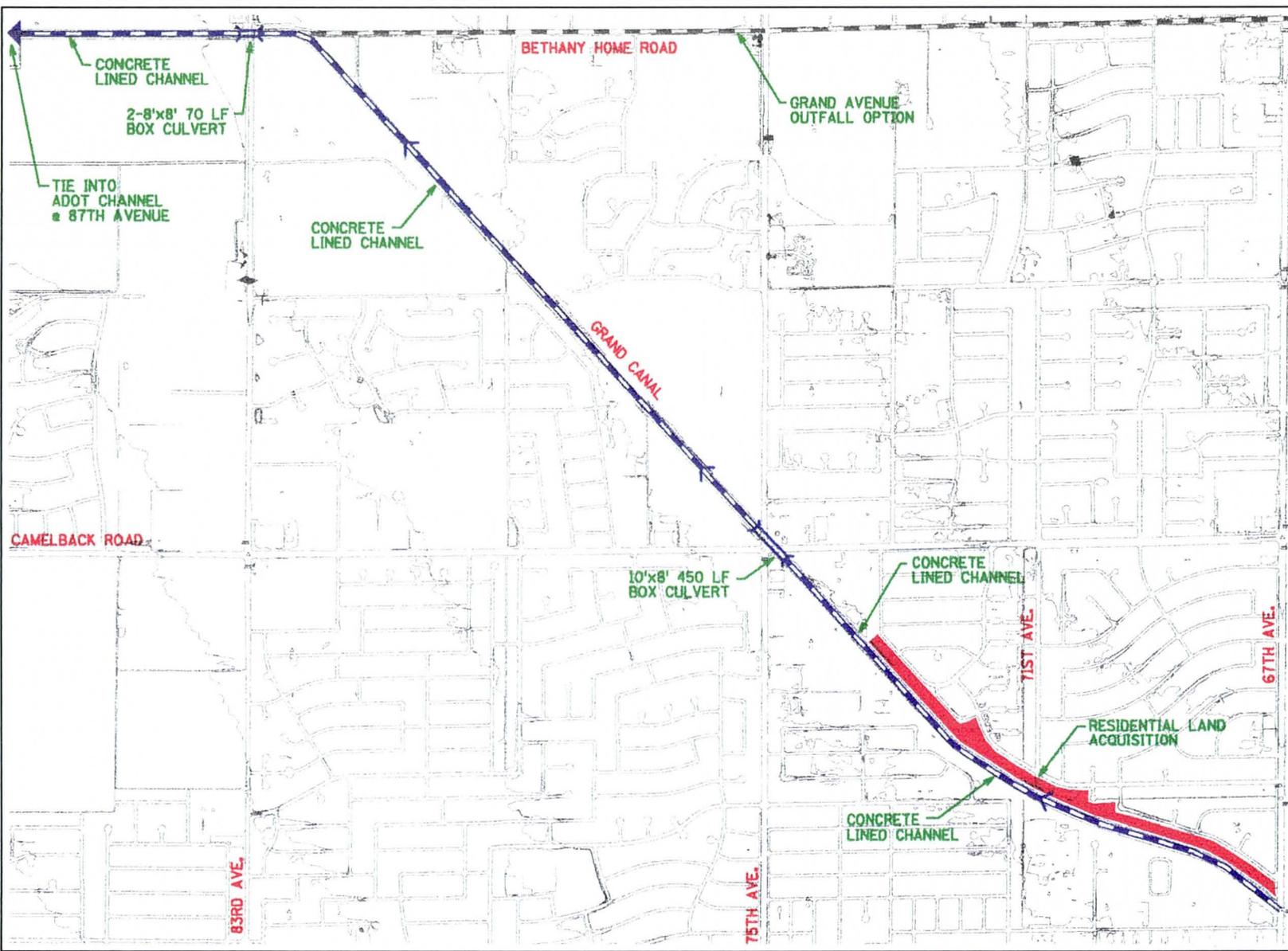
**GRAND CANAL
OPTION 2, 10-YEAR**



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	BY	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY	
DESIGN CHK.	JT/AR		RECOMMENDED BY:	DATE
PLANS	PE/AL		APPROVED BY:	DATE
PLANS CHK.	AP		DRY ENGINEER AND GENERAL MANAGER	
SUBMITTED BY:		DATE:	SHEET	OF

PROJECT NO. 9454-00



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BY KENNEY AERIAL MAPPING AND IS BASED ON GROUND CONTROL SURVEY DATA PROVIDED
BY KAMINSKI-HERRARD ENGINEERING INC. AND PROJECT ENGINEERING CONSULTANTS, LTD.

May 28, 1997

MARYVALE AREA DRAINAGE MASTER PLAN
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 3, 10-YEAR

TITLE: Concrete Lined Channel 67th-87th Avenue. with Camelback Storm Drain

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Concrete Lined Channel, 67th-71st Ave.	\$350.00	CY	972	\$340,200
2	Concrete Lined Channel, 71st-75th Ave.	\$350.00	CY	1361	\$476,350
3	2-8'x8'-450LF Box Culvert, 75th Ave.	\$350.00	CY	531	\$185,850
4	Concrete Lined Channel, 75th-83rd Ave.	\$350.00	CY	7736	\$2,707,600
5	12'x8'-70LF Box Culvert, 83rd Ave.	\$350.00	CY	126	\$44,100
6	Concrete Lined Channel, 83rd-87th Ave.	\$350.00	CY	1613	\$564,550
7	channel excavation	\$3.00	CY	141266	\$423,798
8	90" Camelback Storm Drain, 59th-67th Avenue	\$252.00	LF	5280	\$1,330,560
9	2-78" Camelback Storm Drain, 67th-71st Avenue	\$350.00	LF	2640	\$924,000
10	2-84" Camelback Storm Drain, 71st-75th Avenue	\$458.00	LF	2640	\$1,209,120
11	Bethany Home Road relocation		LS		
SUBTOTAL					\$7,865,928

CONTINGENCIES:

Construction (%)	20	\$1,573,186
Engineering (%)	6	\$471,956
Construction Admin (%)	7	\$550,615

TOTAL \$10,461,684

LAND ACQUISITION

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition	\$5.00	SF	0	\$0
2	Channel Land Acquisition	\$9.00	SF	133600	\$1,202,400
3	Residential Land Acquisition	\$85,000.00	lot	66	\$5,610,000
SUBTOTAL					\$6,812,400

CONTINGENCIES:

Construction (%)	0	\$0
Engineering (%)	1.5	\$102,186
Construction Admin (%)	0	\$0

TOTAL \$6,914,586

GRAND TOTAL

\$17,376,270

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

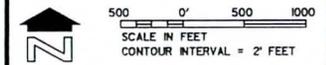
FLOOD
MITIGATION OPTIONS



LOCATION MAP

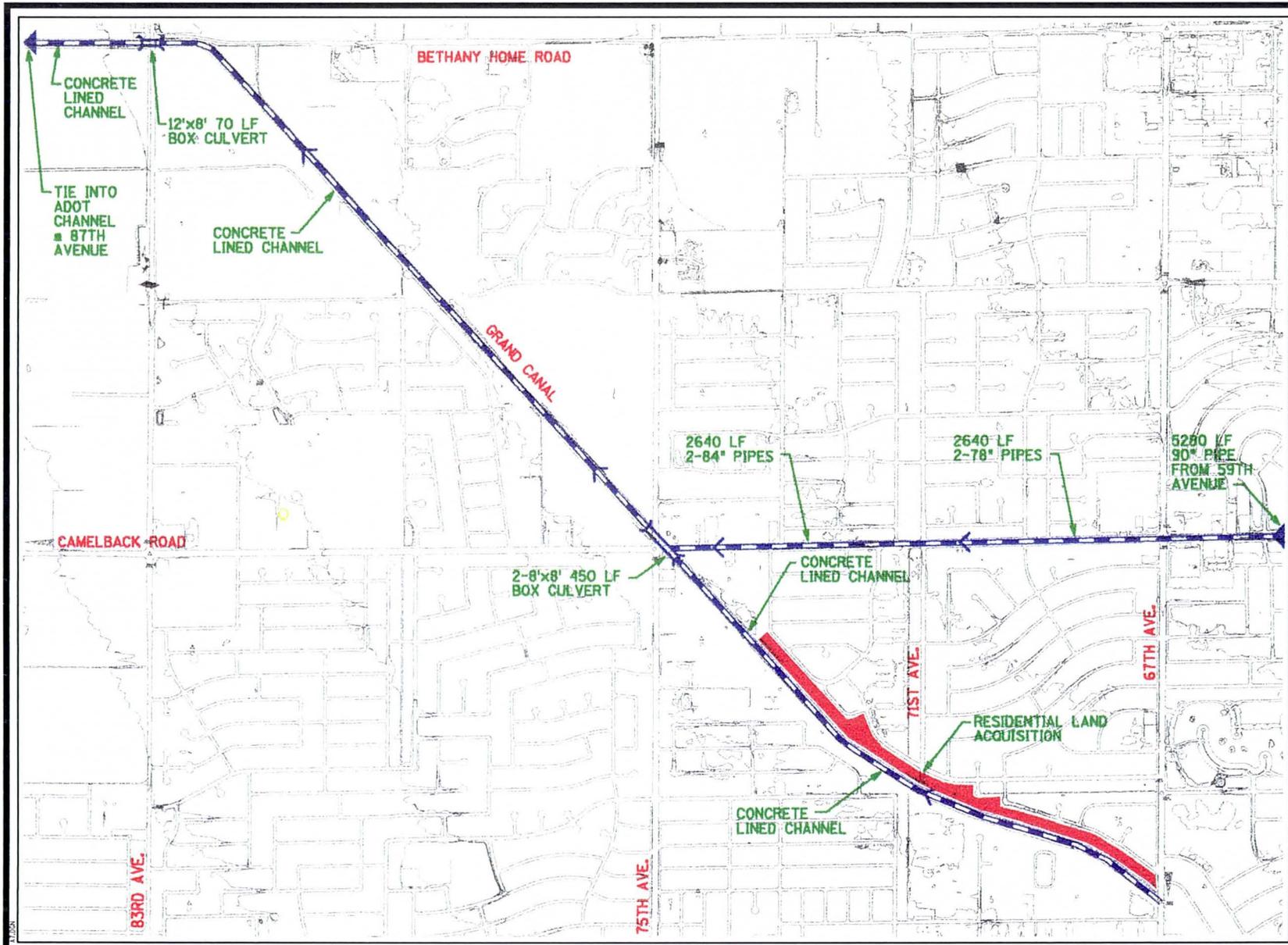
RECONNAISSANCE
LEVEL CONCEPT

GRAND CANAL
OPTION 3, 10-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	JT/AR	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR		RECOMMENDED BY:
PLANS	PE/AI		APPROVED BY: DATE
PLANS CHK.	AP		DATE
SUBMITTED BY:			CHIEF ENGINEER AND GENERAL MANAGER
			SHEET OF



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BY KAMINSKI-HUBBARD ENGINEERING INC. AND PROJECT ENGINEERING CONSULTANTS, LTD.

PROJECT NO. 9454.00

TABLE X

May 28, 1997

MARYVALE AREA DRAINAGE MASTER PLAN
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 4, 10-YEAR

TITLE: Concrete Lined Channel 67th-87th Ave., with Bethany Home and Camelback Storm Drains

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Concrete Lined Channel, 67th-71st Ave.	\$350.00	CY	972	\$340,200
2	Concrete Lined Channel, 71st-75th Ave.	\$350.00	CY	1361	\$476,350
5	2-8'x8'-450LF Box Culvert, 75th Ave.	\$350.00	CY	531	\$185,850
6	Concrete Lined Channel, 75th-83rd Ave.	\$350.00	CY	7506	\$2,627,100
7	12'x8'-70LF Box Culvert, 83rd Ave.	\$350.00	CY	126	\$44,100
8	Concrete Lined Channel, 83rd-87th Ave.	\$350.00	CY	1907	\$667,450
9	78" Camelback Storm Drain, 59th-67th Avenue	\$175.00	LF	5280	\$924,000
10	2-66" Camelback Storm Drain, 67th-71st Avenue	\$290.00	LF	2640	\$765,600
11	2-78" Camelback Storm Drain, 71st-75th Avenue	\$350.00	LF	2640	\$924,000
12	channel excavation	\$3.00	CY	142340	\$427,020
13	Bethany Home Road relocation		LS		

SUBTOTAL \$7,381,670

CONTINGENCIES:

Construction (%)	20	\$1,476,334
Engineering (%)	6	\$442,900
Construction Admin (%)	7	\$516,717

TOTAL \$9,817,621

LAND ACQUISITION

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition	\$6.00	SF		\$0
2	Channel Land Acquisition	\$9.00	SF	149400	\$1,344,600
3	Residential Land Acquisition	\$85,000.00	lot	66	\$5,610,000

SUBTOTAL \$6,954,600

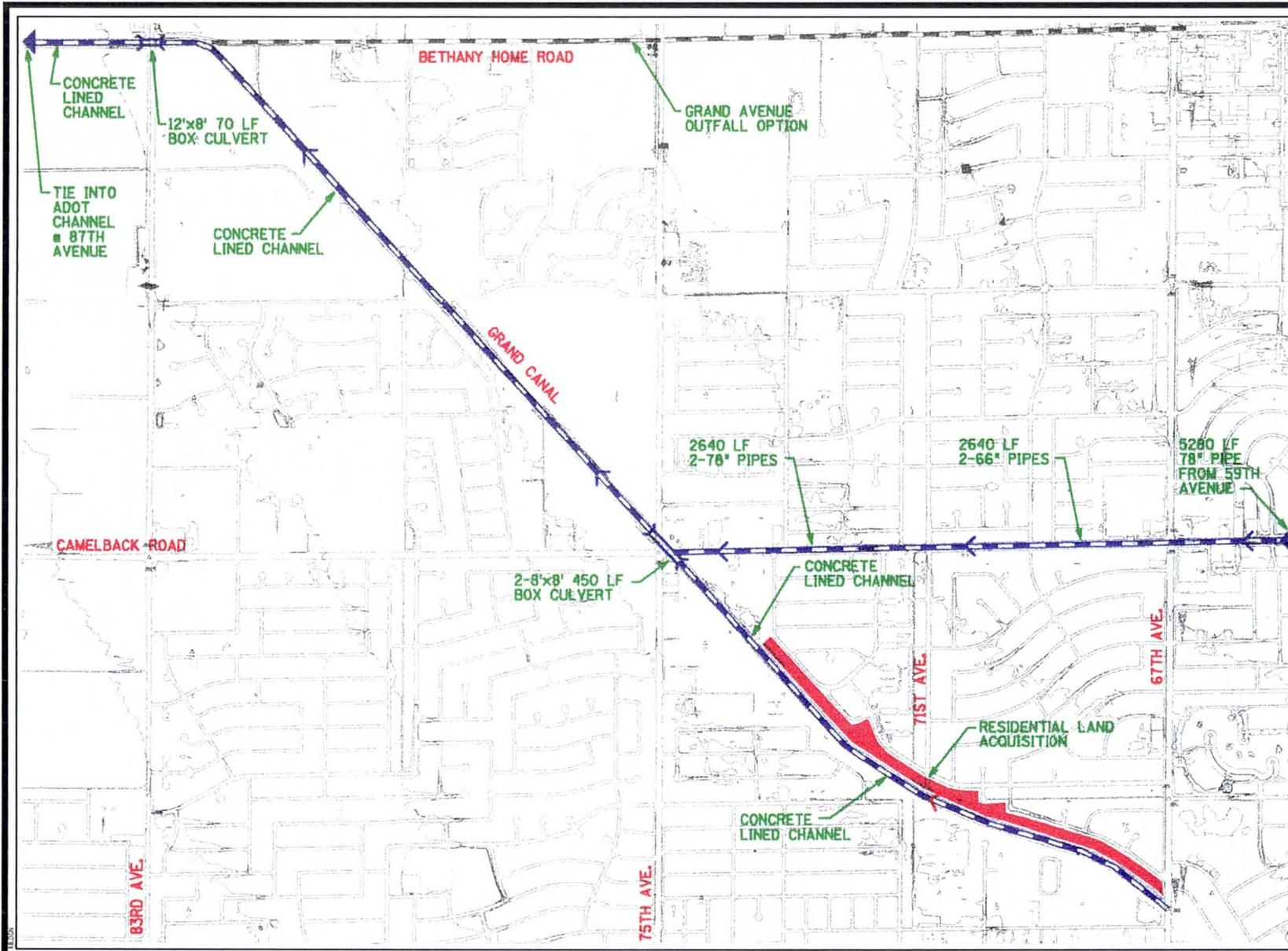
CONTINGENCIES:

Construction (%)	0	\$0
Engineering (%)	1.5	\$104,319
Construction Admin (%)	0	\$0

TOTAL \$7,058,919

GRAND TOTAL

\$16,876,540

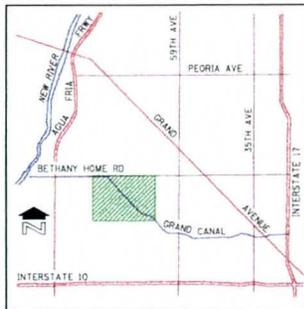


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

MARYVALE AREA DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

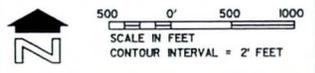
FLOOD MITIGATION OPTIONS



LOCATION MAP

RECONNAISSANCE LEVEL CONCEPT

GRAND CANAL OPTION 4, 10-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	JT/AR	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
PLANS	PE/AL	DATE	RECOMMENDED BY:
PLANS	AP	DATE	APPROVED BY:
SUBMITTED BY:		DATE:	DATE:

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PROJECT NO. 9454.00

TABLE X

May 28, 1997

MARYVALE AREA DRAINAGE MASTER PLAN
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 5, 10-YEAR

TITLE: Concrete Lined Channel 67th-87th Ave., with Offline Detention Basin at 83rd Avenue

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Concrete Lined Channel, 67th-71st Ave.	\$350.00	CY	2500	\$875,000
2	2-8'x5'-110LF Box Culvert, 69th Ave.	\$350.00	CY	181	\$63,350
3	24" Pipe, 68th Ave.	\$69.00	LF	1500	\$103,500
4	2-8'x8'-450LF Box Culvert, 75th Ave.	\$350.00	CY	851	\$297,850
5	Concrete Lined Channel, 75th-83rd Ave.	\$350.00	CY	3080	\$1,078,000
6	2-6'x6'-70LF Box Culvert, 83rd Ave.	\$350.00	CY	56	\$19,600
8	Channel Excavation	\$3.00	CY	165256	\$495,768
9	Basin Excavation	\$3.00	CY	311500	\$934,500

SUBTOTAL \$3,867,568

CONTINGENCIES:

Construction (%)	20	\$773,514
Engineering (%)	6	\$232,054
Construction Admin (%)	7	\$270,730

TOTAL \$5,143,865

LAND ACQUISITION

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition	\$6.00	SF	704000	\$4,224,000
2	Channel Land Acquisition	\$9.00	SF	30000	\$270,000
3	Residential Land Acquisition	\$85,000.00	lot	82	\$6,970,000

SUBTOTAL \$11,464,000

CONTINGENCIES:

Construction (%)	0	\$0
Engineering (%)	1.5	\$171,960
Construction Admin (%)	0	\$0

TOTAL \$11,635,960

GRAND TOTAL

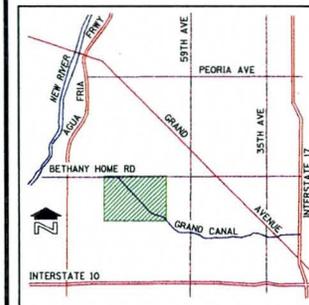
\$16,779,825

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

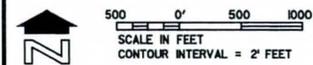
FLOOD
MITIGATION OPTIONS



LOCATION MAP

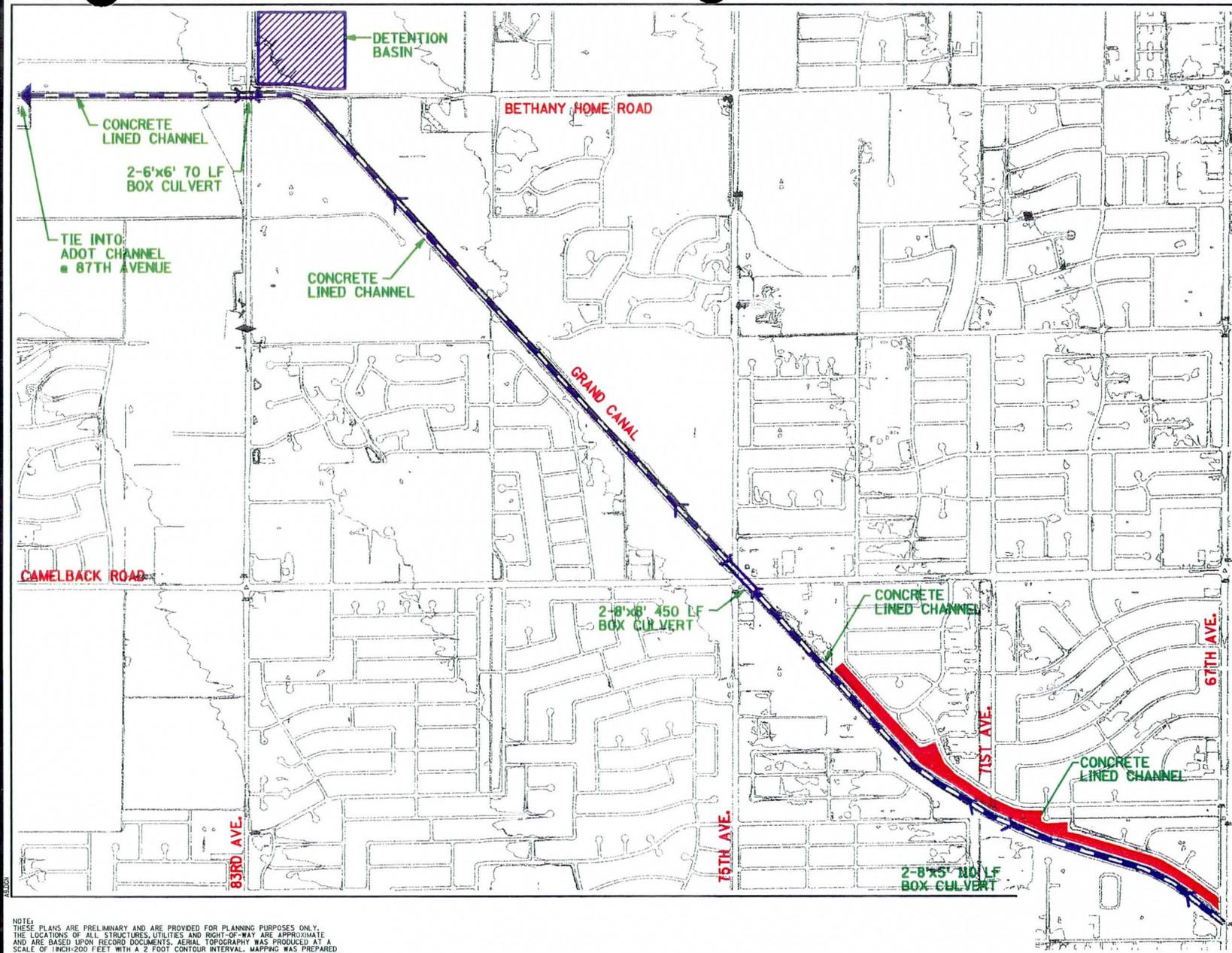
RECONNAISSANCE
LEVEL CONCEPT

GRAND CANAL
OPTION 5, 10-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	BY	DATE	FLOOD CONTROL DISTRICT
DESIGN CHK.	JT/AR		OF MARICOPA COUNTY
PLANS	PE/AL		RECOMMENDED BY: DATE
PLANS CHK.	AP		APPROVED BY: DATE
SUBMITTED BY:			CHIEF ENGINEER AND GENERAL MANAGER
			SHEET OF



NOTE:
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AND ARE BASED UPON RECORD DOCUMENTS. AERIAL TOPOGRAPHY WAS PRODUCED AT A
SCALE OF 1/4"=200 FEET WITH A 2 FOOT CONTOUR INTERVAL. MAPPING WAS PREPARED
BY KENNEDY AERIAL MAPPING AND IS BASED ON GROUND CONTROL SURVEY DATA PROVIDED
BY KAMINSKI-HUBBARD ENGINEERING INC. AND PROJECT ENGINEERING CONSULTANTS, LTD.

PROJECT NO. 84154.00

TABLE X

May 28, 1997

MARYVALE AREA DRAINAGE MASTER PLAN
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 6, 10-YEAR

TITLE: Concrete Lined Channel 71st-87th Ave., with Offline Detention Basin between 67th and 71st Avenues

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Concrete Lined Channel, 67th-73rd Ave.	\$350.00	CY	1514	\$529,900
2	Concrete Lined Channel, 73rd-75th Ave.	\$350.00	CY	1251	\$437,850
3	8'x8'-450LF Box Culvert, 75th Ave.	\$350.00	CY	531	\$185,850
4	Concrete Lined Channel, 75th-83rd Ave.	\$350.00	CY	6817	\$2,385,950
5	8'x8'-70LF Box Culvert, 83rd Ave.	\$350.00	CY	83	\$29,050
6	Concrete Lined Channel, 83rd-87th Ave.	\$350.00	CY	1418	\$496,300
7	channel excavation	\$3.00	CY	131750	\$395,250
8	basin excavation	\$3.00	CY	118519	\$355,557
9	Bethany Home Road relocation		LS		
SUBTOTAL					\$4,815,707

CONTINGENCIES:

Construction (%)	20	\$963,141
Engineering (%)	6	\$288,942
Construction Admin (%)	7	\$337,099

TOTAL **\$6,404,890**

LAND ACQUISITION

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition	\$6.00	SF		\$0
2	Channel Land Acquisition	\$9.00	SF	110000	\$990,000
3	Residential Land Acquisition	\$85,000.00	lot	66	\$5,610,000
SUBTOTAL					\$6,600,000

CONTINGENCIES:

Construction (%)	0	\$0
Engineering (%)	1.5	\$99,000
Construction Admin (%)	0	\$0

TOTAL **\$6,699,000**

GRAND TOTAL**\$13,103,890**

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

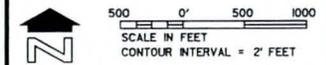
FLOOD
MITIGATION OPTIONS



LOCATION MAP

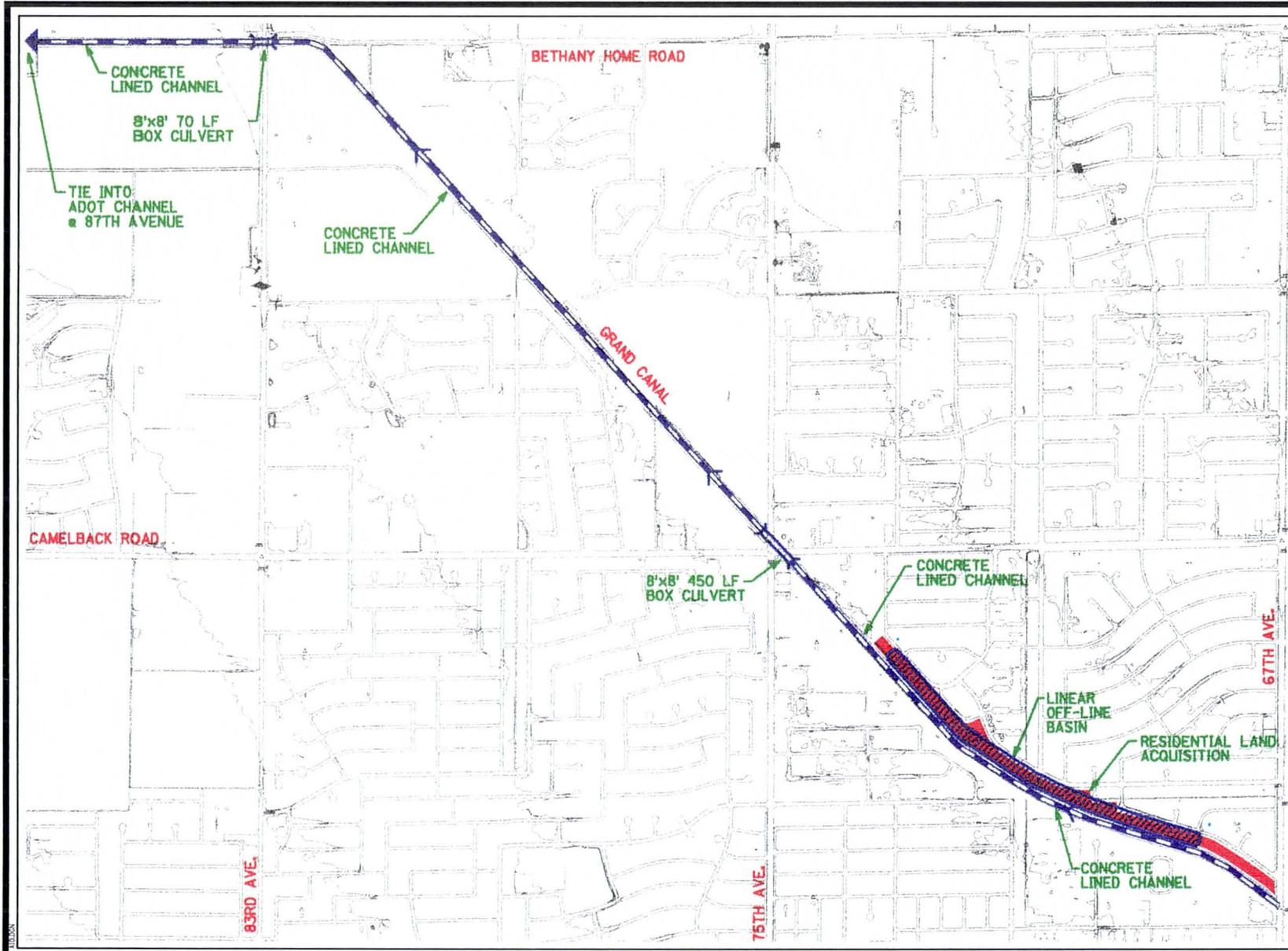
RECONNAISSANCE
LEVEL CONCEPT

GRAND CANAL
OPTION 6, 10-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	JT/AR	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR		RECOMMENDED BY:
PLANS	PE/AL		DATE
PLANS CHK.	AP		APPROVED BY:
			DATE
SUBMITTED BY:			CHIEF ENGINEER AND GENERAL MANAGER
			SHEET
			OF



NOTE:
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SCALE OF 1/4"=200 FEET WITH A 2 FOOT CONTOUR INTERVAL. MAPPING WAS PREPARED
BY KENNEY AERIAL MAPPING AND IS BASED ON GROUND CONTROL SURVEY DATA PROVIDED
BY KAMENSKI-HUBBARD ENGINEERING INC. AND PROJECT ENGINEERING CONSULTANTS, LTD.

PROJECT NO. 94154.00

TABLE X

June 5, 1997

MARYVALE AREA DRAINAGE MASTER PLAN
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 7, 10-YEAR

TITLE: Concrete Lined Channel 67th-87th Ave., with Offline Detention Basin south of Grand Canal

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Concrete Lined Channel, 67th-71st Ave.	\$350.00	CY	1514	\$529,900
2	2-8'x5'-110LF Box Culvert, 69th Ave.	\$350.00	CY	181	\$63,350
3	24" Pipe, 68th Ave.	\$69.00	LF	1500	\$103,500
4	8'x8'-450LF Box Culvert, 75th Ave.	\$350.00	CY	531	\$185,850
5	Concrete Lined Channel, 75th-83rd Ave.	\$350.00	CY	6817	\$2,385,950
6	8'x8'-70LF Box Culvert, 83rd Ave.	\$350.00	CY	83	\$29,050
7	Concrete Lined Channel, 83rd-87th Ave.	\$350.00	CY	1418	\$496,300
8	channel excavation	\$3.00	CY	131750	\$395,250
9	basin excavation	\$3.00	CY	78700	\$236,100
10	Bethany Home Road relocation		LS		

SUBTOTAL \$4,425,250

CONTINGENCIES:

Construction (%)	20	\$885,050
Engineering (%)	6	\$265,515
Construction Admin (%)	7	\$309,768

TOTAL \$5,885,583

LAND ACQUISITION

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition	\$3.50	SF	212500	\$743,750
2	Channel Land Acquisition	\$9.00	SF	202680	\$1,824,120
3	Residential Land Acquisition	\$85,000.00	lot	66	\$5,610,000

SUBTOTAL \$8,177,870

CONTINGENCIES:

Construction (%)	0	\$0
Engineering (%)	1.5	\$122,668
Construction Admin (%)	0	\$0

TOTAL \$8,300,538

GRAND TOTAL

\$14,186,121

TABLE X

June 19, 1997

MARYVALE AREA DRAINAGE MASTER PLAN
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 7, 10-YEAR

TITLE: Concrete Lined Channel 67th-87th Ave., with Offline Detention Basin south of Grand Canal

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Concrete Lined Channel, 67th-71st Ave.	\$350.00	CY	1514	\$529,900
2	2-8'x5'-110LF Box Culvert, 69th Ave.	\$350.00	CY	181	\$63,350
3	24" Pipe, 68th Ave.	\$69.00	LF	1500	\$103,500
4	8'x8'-450LF Box Culvert, 75th Ave.	\$350.00	CY	531	\$185,850
5	Concrete Lined Channel, 75th-83rd Ave.	\$350.00	CY	6817	\$2,385,950
6	8'x8'-70LF Box Culvert, 83rd Ave.	\$350.00	CY	83	\$29,050
7	Concrete Lined Channel, 83rd-87th Ave.	\$350.00	CY	1418	\$496,300
8	channel excavation	\$3.00	CY	131750	\$395,250
9	basin excavation	\$3.00	CY	78700	\$236,100
10	Bethany Home Road relocation		LS		
				SUBTOTAL	\$4,425,250

CONTINGENCIES:

Construction (%)	20	\$885,050
Engineering (%)	6	\$265,515
Construction Admin (%)	7	\$309,768

TOTAL **\$5,885,583**

LAND ACQUISITION

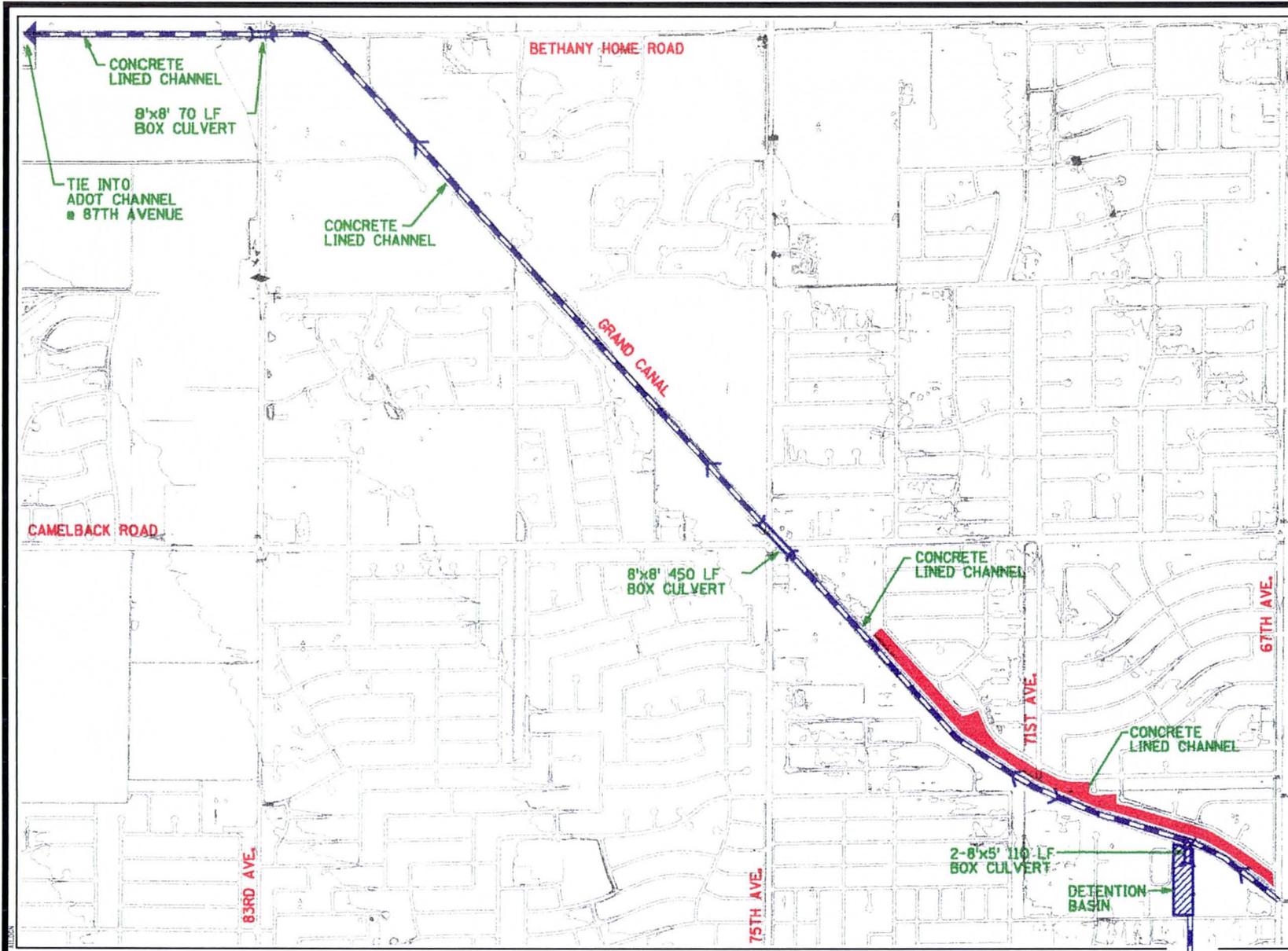
ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition	\$3.50	SF	212500	\$743,750
2	Channel Land Acquisition	\$9.00	SF	202680	\$1,824,120
3	Residential Land Acquisition	\$85,000.00	lot	66	\$5,610,000
				SUBTOTAL	\$8,177,870

CONTINGENCIES:

Construction (%)	0	\$0
Engineering (%)	1.5	\$122,668
Construction Admin (%)	0	\$0

TOTAL **\$8,300,538**

GRAND TOTAL**\$14,186,121**



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

MARYVALE AREA DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

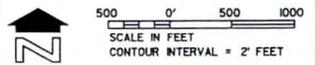
FLOOD MITIGATION OPTIONS



LOCATION MAP

RECONNAISSANCE LEVEL CONCEPT

GRAND CANAL OPTION 7, 10-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	JT/AR	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR		RECOMMENDED BY:
PLANS	PE/AL		APPROVED BY:
PLANS CHK.	AP		DATE
SUBMITTED BY:		DATE	CHIEF ENGINEER AND GENERAL MANAGER
			SHEET OF

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PROJECT NO. 9454.00

TABLE XX

06/06/97

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION XX

TITLE: GRAND CANAL DIVERSION CHANNEL

Preliminary Estimate

TOTAL COST (ADOT & FCDMC)

MAJOR ELEMENTS:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT PRICE</u>	<u>UNIT</u>	<u>QUANTITY</u>	<u>AMOUNT</u>
1	Concrete Lining	\$350.00	CY	165,660	\$57,981,000
2	Channel Excavation	\$8.00	CY	2,794,262	\$22,354,096
3	Bridge Structures	\$70.00	SF	267,240	\$18,706,800
4	Utility Relocations	\$3,500.00	LF	2,335	\$8,172,500
Sub-Total					\$107,214,396
<i><u>CONTINGENCIES:</u></i>					
				25	\$26,803,599
				7	\$7,505,008
				6	\$6,432,864
TOTAL					\$147,955,866

LAND ACQUISITION

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT PRICE</u>	<u>UNIT</u>	<u>QUANTITY</u>	<u>AMOUNT</u>
1	Channel Land Acquisition	\$300,000.00	AC	194	\$58,200,000
Sub-Total					\$58,200,000
<i><u>CONTINGENCIES:</u></i>					
				0	\$0
				1.5	\$873,000
				0	\$0
TOTAL					\$59,073,000

GRAND TOTAL **\$207,028,866**

POTENTIAL COST DISTRIBUTION:

TOTAL COST (ADOT) **\$59,108,540**
TOTAL COST (FCDMC) **\$147,920,326**

TABLE xx

06/06/97

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS

Non-Structural Option

for ponding areas as delineated by the ADMS

TITLE: GRAND CANAL TOTAL

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>AMOUNT</u>
1	Value of Land	\$11,836,175.00
2	Value of Improvements	\$32,528,557.00
	TOTAL	\$44,364,732.00

Note: Valuations based on data provided by Engineering Mapping Solutions.

q:\mvdmp\cost\grand canal\value.wb2

TABLE xx

06/06/97

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS

Non-Structural Option

for ponding areas as delineated by the ADMS

TITLE: MARYVALE ADMP TOTAL

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>AMOUNT</u>
1	Value of Land	\$26,924,668.00
2	Value of Improvements	\$49,868,445.00
	TOTAL	\$76,793,113.00

Note: Valuations based on data provided by Engineering Mapping Solutions.

q:\mvdmp\cost\grand canal\value.wb2

TABLE xx

06/06/97

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS

Non-Structural Option

for Zone A regions of this study area as delineated on FEMA FIRM maps

TITLE: ZONE A TOTAL

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>AMOUNT</u>
1	Value of Land	\$38,810,800.00
2	Value of Improvements	\$73,534,926.00
	<i>TOTAL</i>	<i>\$112,345,726.00</i>

Note: Valuations based on data provided by Engineering Mapping Solutions.

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CONCEPT REPORT SUMMARY

MARYVALLE AREA DRAINAGE MASTER PLAN

Updated May 8, 1997

Grand Avenue

Peoria Avenue at 79th Avenue (RES26N)

Option 1, 100-year:	Two interconnected basins outfall into Peoria Avenue storm drain at 83rd Avenue	\$14,781,000
*Option 1, 10-year:	Single basin west of 79th Avenue outfall into Peoria Avenue storm drain at 83rd Avenue	\$ 7,827,000

Mountain View Road North of Olive (RES26S)

*Option 1, 100-Year:	Two interconnected basins outfall into Olive Avenue storm drain	\$13,092,000
*Option 1, 10-Year:	Single basin outfall into Olive Avenue storm drain	\$ 7,709,000

75th Avenue & Olive Avenue (RES36)

*Option 1, 100-Year:	Basin at northeast corner of 71st Avenue and Alice Avenue outfall into Olive Avenue storm drain	\$ 3,267,000
*Option 1, 10-Year:	Downsize basin described above	\$ 2,569,000

67th Avenue & Northern Avenue (RES6)

*Option 1, 100-Year:	Increase basin storage from 10-year to 100-year Deeper basin will require pump station. Incremental cost over 10-year design	\$3,942,000
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* Options selected for Level II Analysis based on input from the communities and FCDMC on May 29, 1997

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 1, 100-YEAR

TITLE: South Side of Peoria at 79th Avenue (RES26N)

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	36" Storm Drain	\$120.00	LF	1,400	\$168,000
2	Inlet Headwall	\$2,000.00	Each	1	\$2,000
3	10x4 Box Culvert	\$350.00	CY	200	\$70,000
4	CBC Headwall	\$2,000.00	Each	2	\$4,000
5	Detention Basin Excavation	\$4.00	CY	425,439	\$1,701,756
SUBTOTAL					\$1,945,756
CONTINGENCIES:					
Construction (%)				20	\$389,151
Engineering (%)				7	\$136,203
Construction Admin (%)				6	\$116,745
TOTAL					\$2,587,855
LAND ACQUISITION:					
ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition (38.8 Acres)	\$7.00	SF	1,690,128	\$11,830,896
2	Storm Drain Easement (0.6 Acres)	\$7.00	SF	26,136	\$182,952
SUBTOTAL					\$12,013,848
CONTINGENCIES:					
Engineering, Legal & Administration (%)				1.5	\$180,208
TOTAL					\$12,194,056
GRAND TOTAL					\$14,781,911

MARYVALE AREA DRAINAGE MASTER STUDY

Flood Control District of Maricopa County

Contract FCD 93-29

W/P # 94154.00

FLOOD MITIGATION OPTIONSCOST ANALYSIS, OPTION 1, 10-YEARTITLE: South Side of Peoria at 79th Avenue (RES26N)MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	36" Storm Drain	\$120.00	LF	1,400	\$168,000
2	Inlet Headwall	\$2,000.00	Each	1	\$2,000
3	Detention Basin Excavation	\$4.00	CY	201,283	\$805,132
				SUBTOTAL	\$975,132
CONTINGENCIES:					
Construction (%)				20	\$195,026
Engineering (%)				7	\$68,259
Construction Admin (%)				6	\$58,508
				TOTAL	\$1,296,926
LAND ACQUISITION:					
ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition (20.5 Acres)	\$7.00	SF	892,980	\$6,250,860
2	Storm Drain Easement (0.6 Acres)	\$7.00	SF	26,136	\$182,952
				SUBTOTAL	\$6,433,812
CONTINGENCIES:					
Engineering, Legal & Administration (%)				1.5	\$96,507
				TOTAL	\$6,530,319
				GRAND TOTAL	\$7,827,245

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

FLOOD
MITIGATION OPTIONS

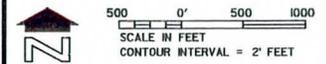


LOCATION MAP

RECONNAISSANCE
LEVEL CONCEPT

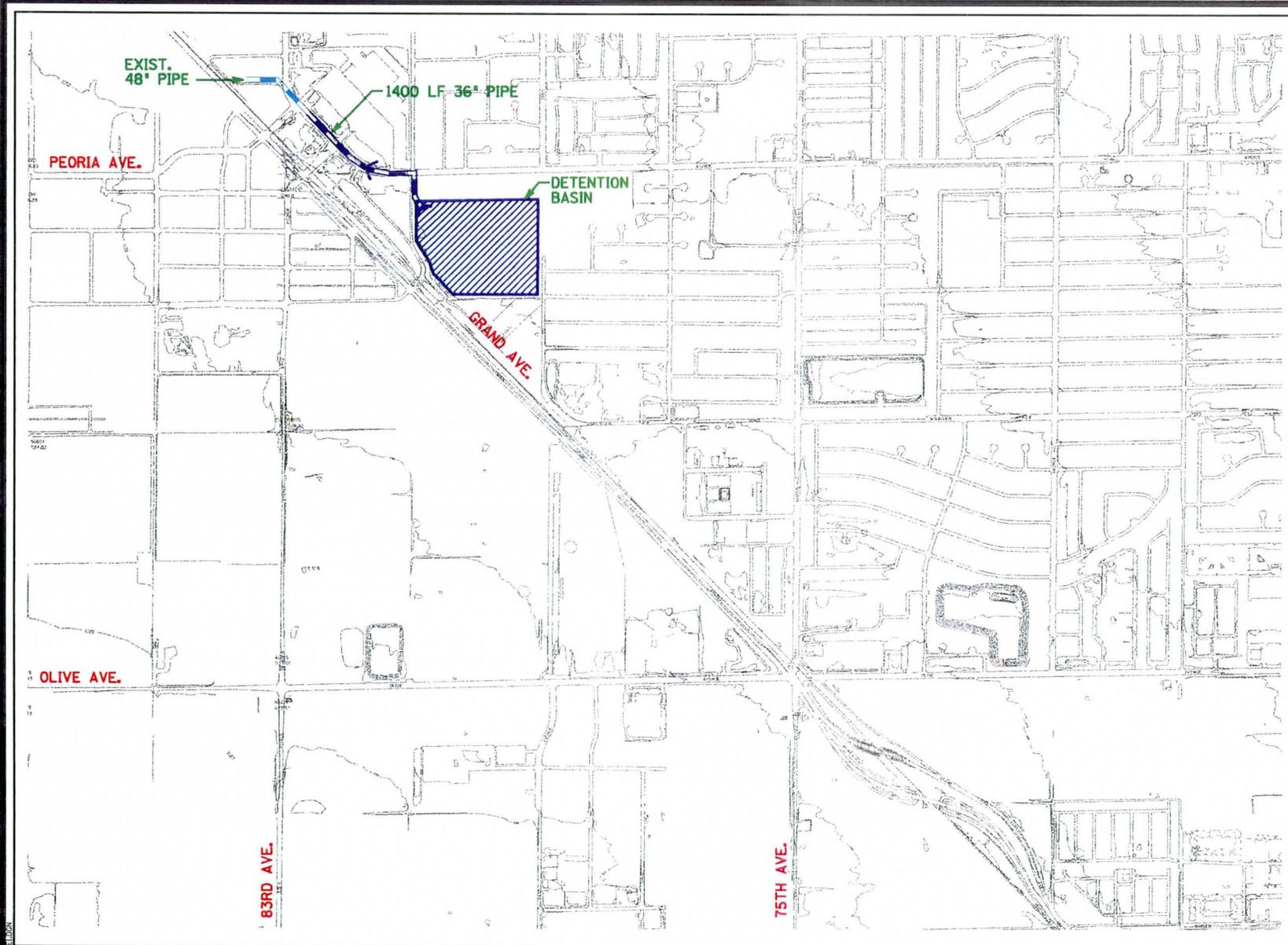
GRAND AVENUE
PEORIA AT
79TH AVENUE

OPTION 1, 10-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	BY	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY	
DESIGN CHK.	JT/AR		RECOMMENDED BY:	DATE
PLANS	PE/AL		APPROVED BY:	DATE
PLANS CHK.	JAP		CHEF ENGINEER AND GENERAL MANAGER	
SUBMITTED BY:		DATE:	SHEET	OF



NOTE:
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PROJECT NO. 9454.00

MARYVALE AREA DRAINAGE MASTER STUDY

Flood Control District of Maricopa County

Contract FCD 93-29

W/P # 94154.00

FLOOD MITIGATION OPTIONSCOST ANALYSIS, OPTION 1, 100-YEARTITLE: Mounain View & Grand Avenue, North of Olive (RES26S)MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	42" Storm Drain	\$120.00	LF	1,000	\$120,000
2	24" Storm Drain	\$90.00	LF	250	\$22,500
3	Inlet Headwall	\$2,000.00	EACH	2	\$4,000
4	10x4 Box Culvert	\$350.00	CY	200	\$70,000
5	CBC Headwall	\$2,000.00	EACH	2	\$4,000
6	Detention Basin Excavation	\$4.00	CY	515,098	\$2,060,392
SUBTOTAL					\$2,280,892
CONTINGENCIES:					
Construction (%)				20	\$456,178
Engineering (%)				7	\$159,662
Construction Admin (%)				6	\$136,854
TOTAL					\$3,033,586
LAND ACQUISITION:					
ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	North Basin Land Acquisition 17.2 Acres)	\$7.00	SF	749,232	\$5,244,624
2	South Basin Land Acquisition 12.9 Acres)	\$7.00	SF	561,924	\$3,933,468
3	Small Basin Land Acquisition 1.8 Acres)	\$7.00	SF	78,408	\$548,856
4	Storm Drain Easement 0.6 Acres)	\$7.00	SF	26,136	\$182,952
SUBTOTAL					\$9,909,900
CONTINGENCIES:					
Engineering, Legal & Administration (%)				1.5	\$148,649
TOTAL					\$10,058,549
GRAND TOTAL					\$13,092,135

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 1, 10-YEAR

TITLE: Mounain View & Grand Avenue, North of Olive (RES26S)

MAJOR ELEMENTS:

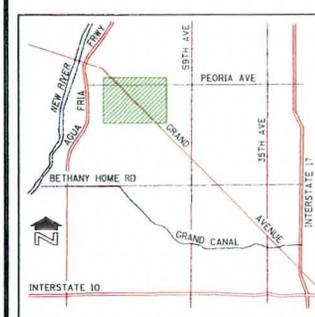
ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	42" Storm Drain	\$120.00	LF	1,800	\$216,000
2	Inlet Headwall	\$2,000.00	EACH	1	\$2,000
3	Detention Basin Excavation	\$4.00	CY	347,349	\$1,389,396
SUBTOTAL					\$1,607,396
CONTINGENCIES:					
Construction (%)				20	\$321,479
Engineering (%)				7	\$112,518
Construction Admin (%)				6	\$96,444
TOTAL					\$2,137,837
LAND ACQUISITION:					
ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	North Basin Land Acquisition 17.2 Acres)	\$7.00	SF	749,232	\$5,244,624
4	Storm Drain Easement 0.8 Acres)	\$7.00	SF	34,848	\$243,936
SUBTOTAL					\$5,488,560
CONTINGENCIES:					
Engineering, Legal & Administration (%)				1.5	\$82,328
TOTAL					\$5,570,888
GRAND TOTAL					\$7,708,725

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

FLOOD
MITIGATION OPTIONS

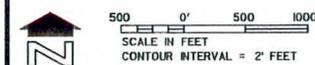


LOCATION MAP

RECONNAISSANCE
LEVEL CONCEPT

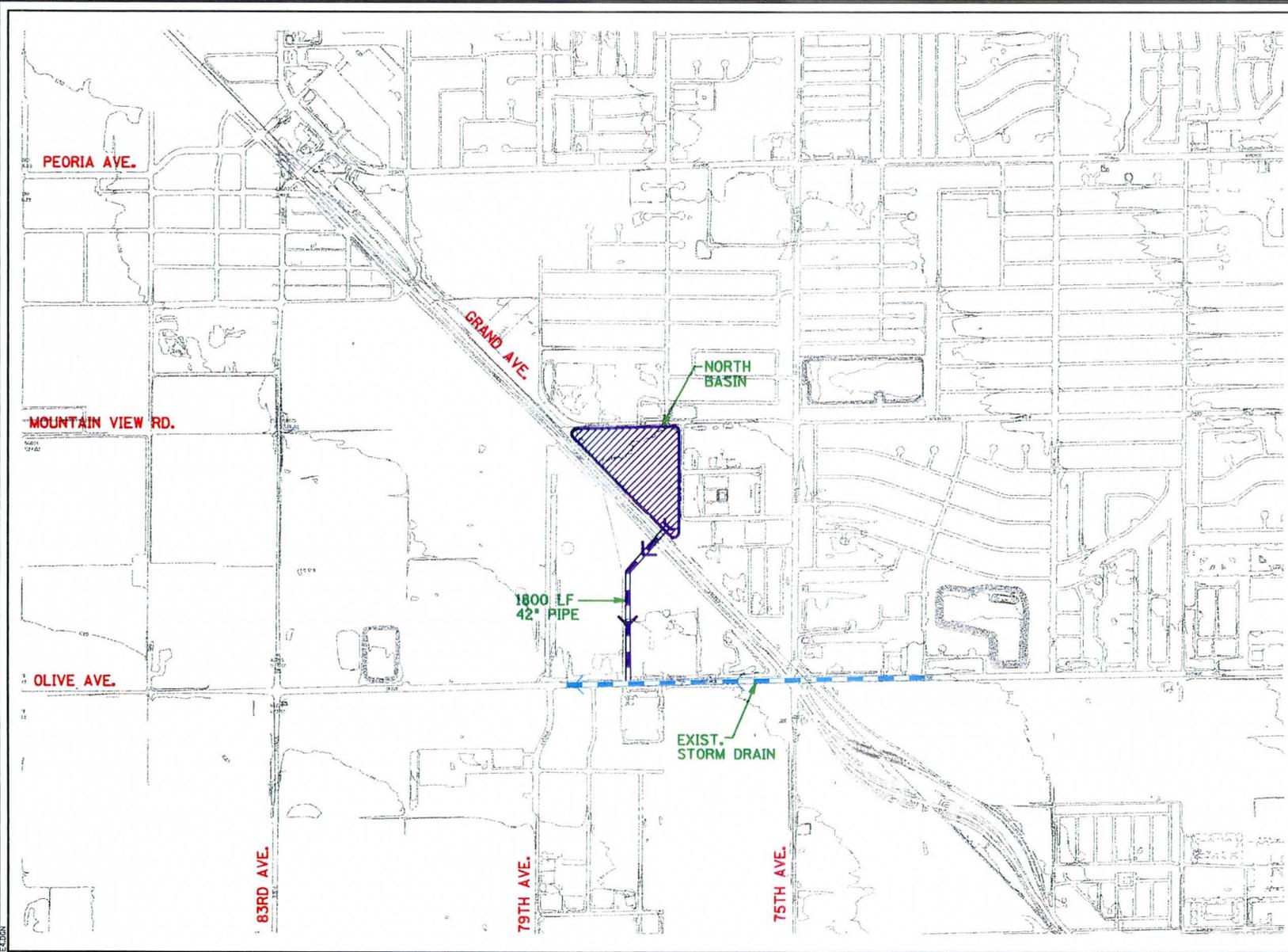
GRAND AVENUE
MOUNTAIN VIEW ROAD
NORTH OF
OLIVE AVENUE

OPTION 1, 10-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	JT/AR	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR	RECOMMENDED BY:	
PLANS	PE/AL	DATE	
PLANS CHK.	AP	APPROVED BY:	
		DATE	
SUBMITTED BY:		DATE	CHEF ENGINEER AND GENERAL MANAGER
			SHEET OF



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BY KENNEY AERIAL MAPPING AND IS BASED ON GROUND CONTROL SURVEY DATA PROVIDED
BY KAMINSKI-HUBBARD ENGINEERING INC. AND PROJECT ENGINEERING CONSULTANTS, LTD.

MARYVALE AREA DRAINAGE MASTER STUDY

Flood Control District of Maricopa County

Contract FCD 93-29

W/P # 94154.00

FLOOD MITIGATION OPTIONSCOST ANALYSIS, OPTION 1, 100-YEARTITLE: SE Corner of 75th Avenue & Olive Avenue (RES36)MAJOR ELEMENTS:

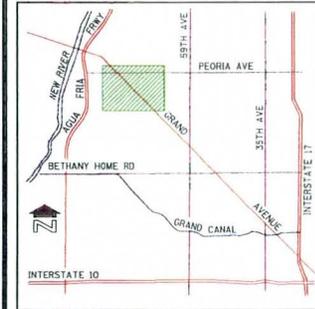
ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	42" Storm Drain	\$120.00	LF	500	\$60,000
2	Inlet Headwall	\$2,000.00	EACH	1	\$2,000
3	Detention Basin Excavation	\$4.00	CY	127,292	\$509,168
				SUBTOTAL	\$571,168
CONTINGENCIES:					
Construction (%)				20	\$114,234
Engineering (%)				7	\$39,982
Construction Admin (%)				6	\$34,270
				TOTAL	\$759,653
LAND ACQUISITION:					
ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	North Basin Land Acquisition 7.9 Acres)	\$7.00	SF	344,124	\$2,408,868
4	Storm Drain Easement 0.2 Acres)	\$7.00	SF	8,712	\$60,984
				SUBTOTAL	\$2,469,852
CONTINGENCIES:					
Engineering, Legal & Administration (%)				1.5	\$37,048
				TOTAL	\$2,506,900
				GRAND TOTAL	\$3,266,553

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

FLOOD
MITIGATION OPTIONS

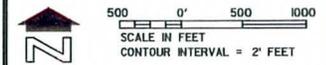


LOCATION MAP

RECONNAISSANCE
LEVEL CONCEPT

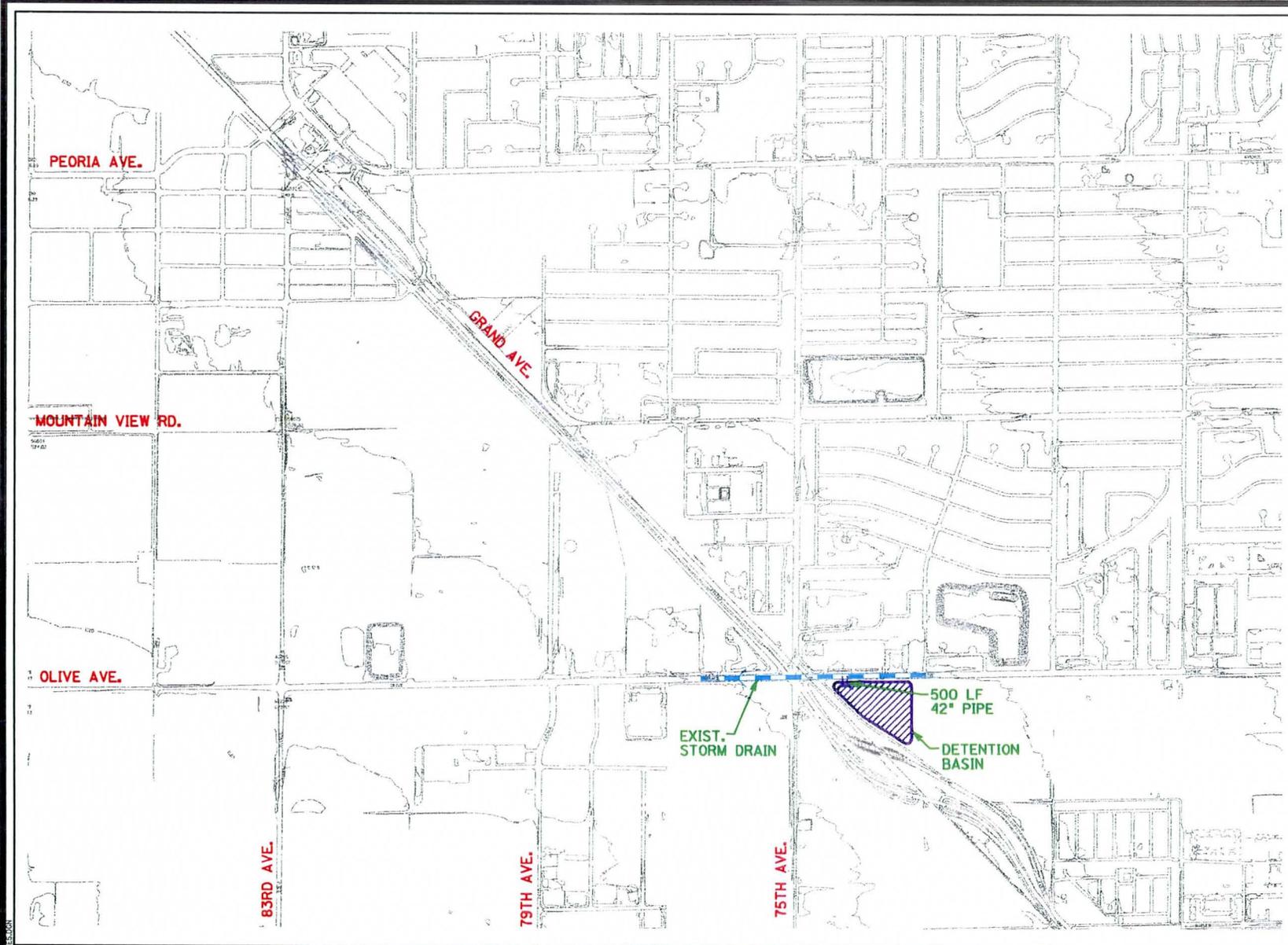
GRAND AVENUE
75TH AVENUE AT
OLIVE AVENUE

OPTION 1, 100-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	JT/AR	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR		RECOMMENDED BY:
PLANS	PE/AL		APPROVED BY: DATE
PLANS CHK.	AP		DATE
SUBMITTED BY:		DATE:	CHIEF ENGINEER AND GENERAL MANAGER
			SHEET OF



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BY KENNEY AERIAL MAPPING AND IS BASED ON GROUND CONTROL SURVEY DATA PROVIDED
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PROJECT NO. 94154.00

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 1, 10-YEAR

TITLE: SE Corner of 75th Avenue & Olive Avenue (RES36)

MAJOR ELEMENTS:

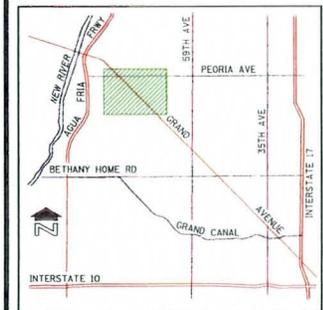
ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	42" Storm Drain	\$120.00	LF	700	\$84,000
2	Inlet Headwall	\$2,000.00	EACH	1	\$2,000
3	Detention Basin Excavation	\$4.00	CY	94,864	\$379,456
SUBTOTAL					\$465,456
CONTINGENCIES:					
				20	\$93,091
				7	\$32,582
				6	\$27,927
TOTAL					\$619,056
LAND ACQUISITION:					
ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition (6 Acres)	\$7.00	SF	261,360	\$1,829,520
4	Storm Drain Easement (0.3 Acres)	\$7.00	SF	13,068	\$91,476
SUBTOTAL					\$1,920,996
CONTINGENCIES:					
				1.5	\$28,815
TOTAL					\$1,949,811
GRAND TOTAL					\$2,568,867

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

FLOOD
MITIGATION OPTIONS

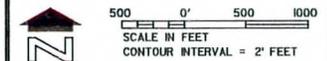


LOCATION MAP

RECONNAISSANCE
LEVEL CONCEPT

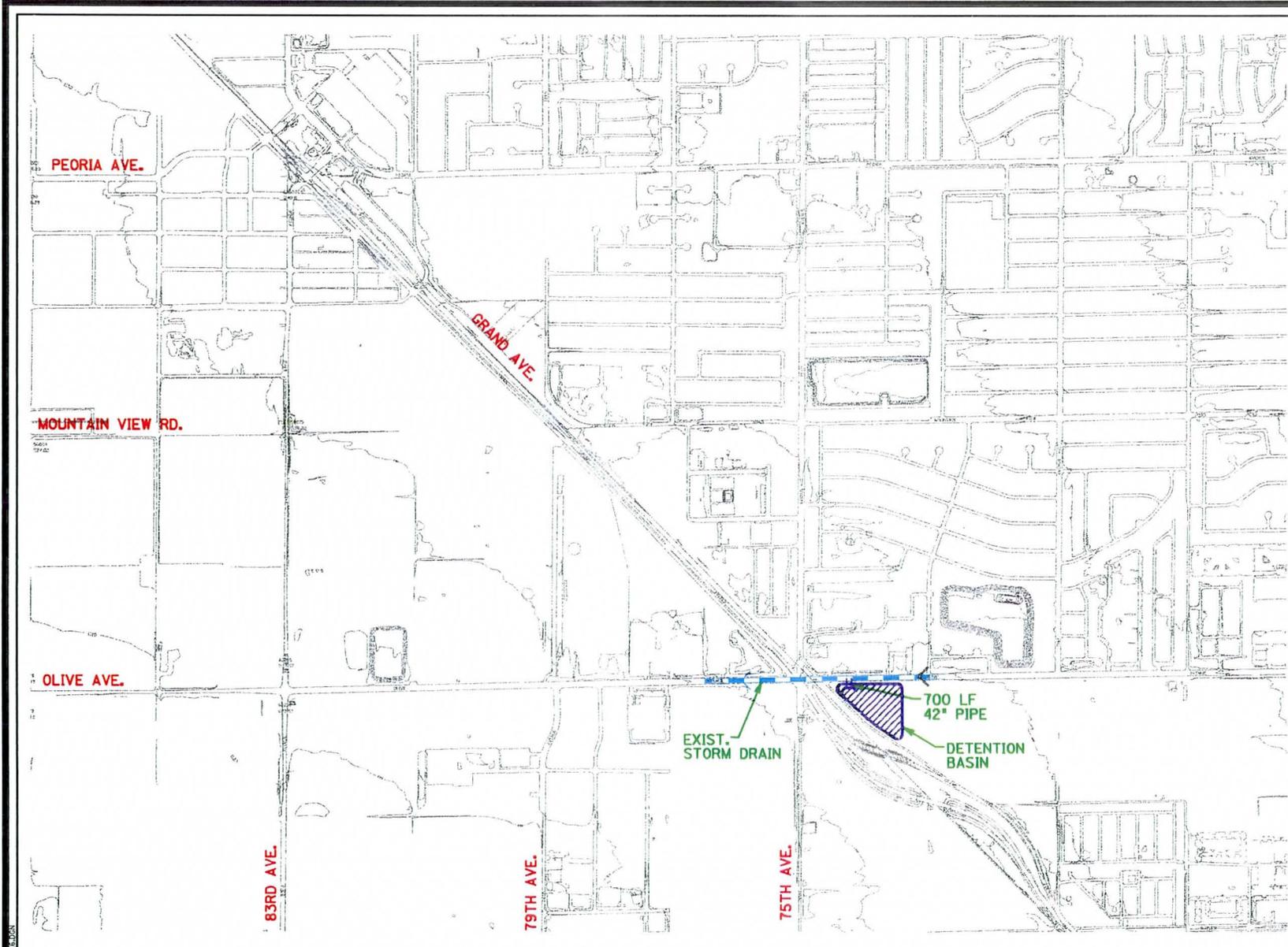
GRAND AVENUE
75TH AVENUE AT
OLIVE AVENUE

OPTION 1, 10-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	BY	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHR.	JT/AR		
PLANS	PE/AL		RECOMMENDED BY:
PLANS CHR.	JP		APPROVED BY:
SUBMITTED BY:			DATE
			DATE
			SHEET
			OF



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PROJECT NO. 94154.00

TABLE xx

May 28, 1997

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 1, 100-YEAR

TITLE: Northern/Orangewood 100-Year Basin (RES6)

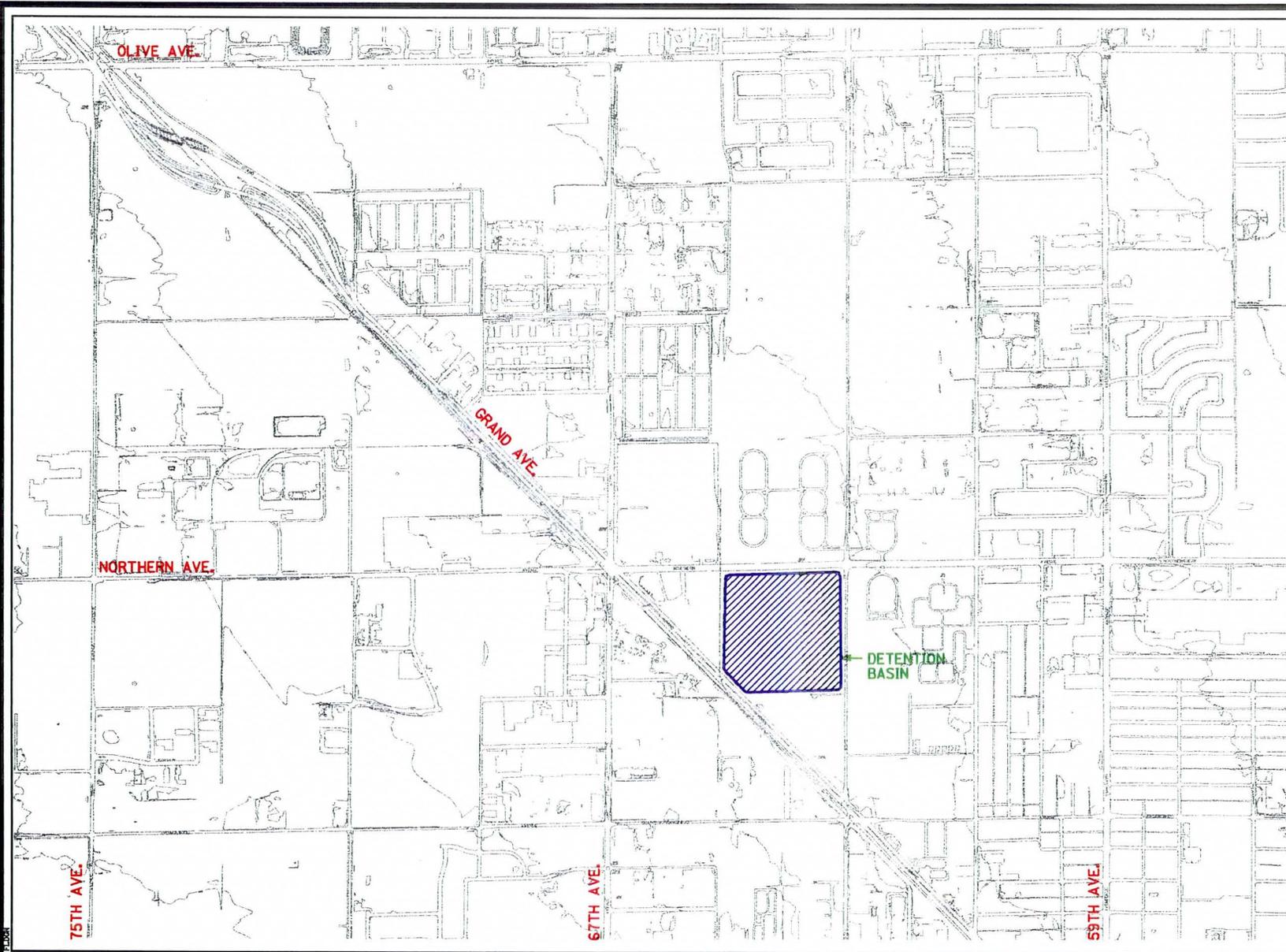
MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Detention Basin Excavation	\$ 4.00	CY	383,500	\$1,534,000
2	Pumping Facility	\$ 150,000.00	EA	1	\$150,000
SUBTOTAL					\$1,684,000
<u>CONTINGENCIES:</u>					
	Construction (%)			20	\$336,800
	Engineering (%)			7	\$117,880
	Construction Admin (%)			6	\$101,040
TOTAL					\$2,239,720

LAND ACQUISITION:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition (5.5 Acres)	\$7.00	SF	239,580	\$1,677,060
SUBTOTAL					\$1,677,060
<u>CONTINGENCIES:</u>					
	Engineering , Legal & Administration (%)			1.5	\$25,156
TOTAL					\$1,702,216
<u>GRAND TOTAL</u>					<u>\$3,941,936</u>

Note: Cost is incremental addition to cost of 10-year basin
as proposed in the Northern/Orangewood Storm Drain Study

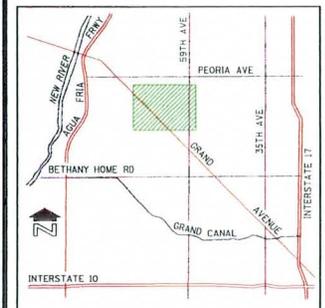


**FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY**

**MARYVALE AREA
DRAINAGE MASTER STUDY**

CONTRACT NO. FCD 93-29

**FLOOD
MITIGATION OPTIONS**

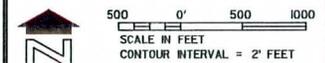


LOCATION MAP

**RECONNAISSANCE
LEVEL CONCEPT**

**GRAND AVENUE
67TH AVENUE &
NORTHERN AVENUE**

OPTION 1, 100-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	BY	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY	
DESIGN CHK.	JT/AR		RECOMMENDED BY:	DATE
PLANS	PE/AL		APPROVED BY:	DATE
PLANS CHK.	AP		CHIEF ENGINEER AND GENERAL MANAGER	
SUBMITTED BY:		DATE:	SHEET:	OF:

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PROJECT NO. 94154.00



CONCEPT REPORT SUMMARY
MARYVALLE AREA DRAINAGE MASTER PLAN

Grand Avenue at I-17 Flood Mitigation Options

Grand Avenue at Interstate 17 Mitigation Options: (RES26E)

Option 1, 100-Year:	Combination of an offline detention basin and conveyance in a 144-inch storm drain to the ADOT channel	\$29,199,000
*Option 2, 100-Year:	Detention basin for full 100-year volume with pumped bleed off to existing 66-inch storm drain in 27th Avenue	\$32,402,500
Option 1, 10-Year:	Combination of an offline detention basin and conveyance in a 120-inch storm drain to the ADOT channel	\$16,375,000
*Option 2, 10-Year:	Detention basin for full 10-year volume with pumped bleed off to existing 66-inch storm drain in 27th Avenue	\$17,562,500
*Option 1, 5-Year:	Retention basin for 5-year volume with gravity bleed off to existing 66-inch storm drain in 27th Avenue	\$ 7,952,000
Option 1, 2-Year:	Detention basin for 2-year volume with gravity bleed off to existing 66-inch storm drain in 27th Avenue	\$ 6,914,600

* Options selected for Level II Analysis based on input from the communities and FCDMC on May 29, 1997

TABLE xx

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

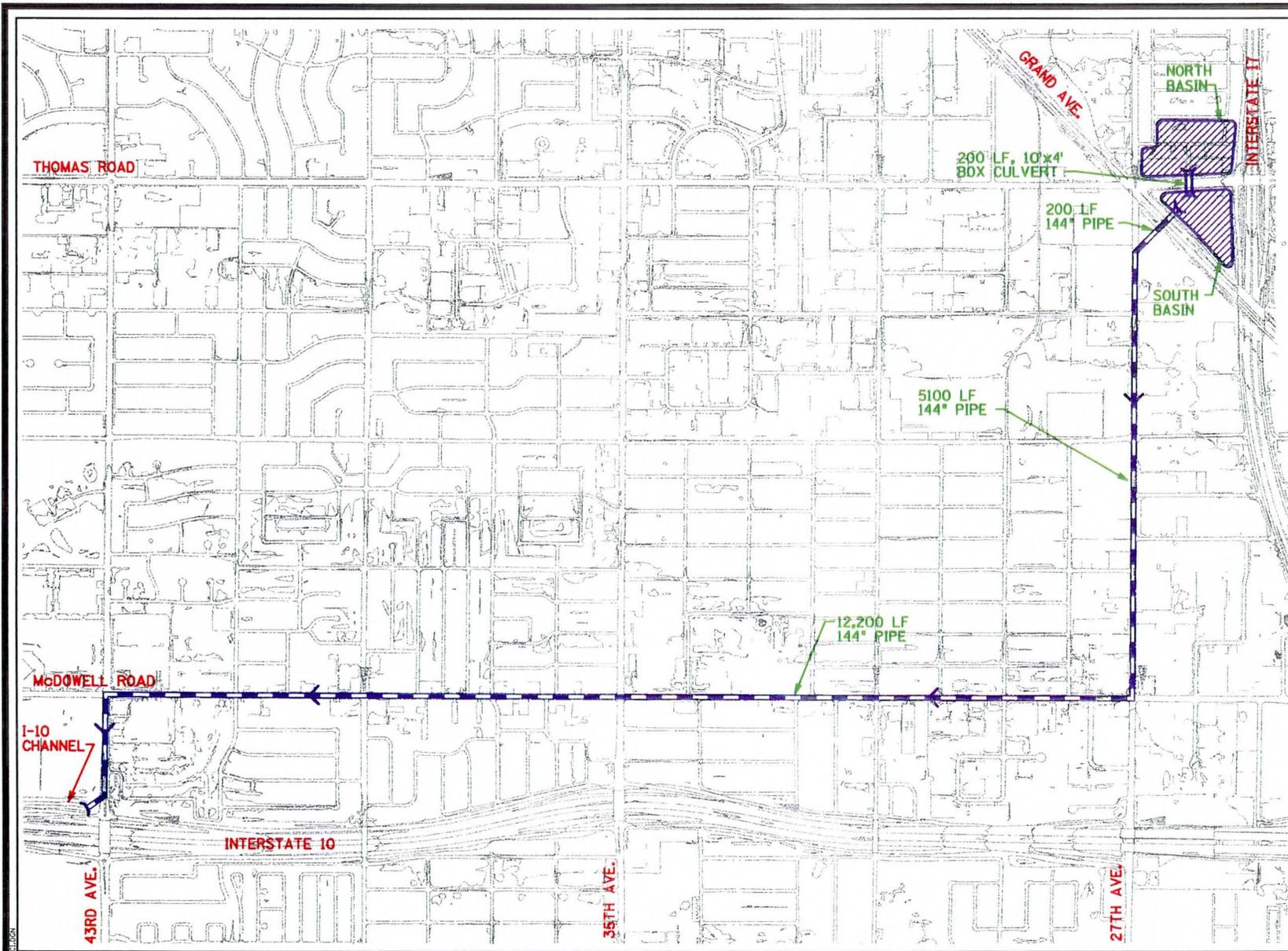
Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 1, 100-YEAR

TITLE: GRAND AVENUE AT I-17

MAJOR ELEMENTS:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT PRICE</u>	<u>UNIT</u>	<u>QUANTITY</u>	<u>AMOUNT</u>
1	144" Storm Drain	\$2,000.00	LF	200	\$400,000
2	144" Storm Drain	\$500.00	LF	5,100	\$2,550,000
3	144" Storm Drain	\$500.00	LF	12,200	\$6,100,000
4	10' x 4' Box Culvert	\$350	CY	200	\$70,000
5	Off-Line Detention Basin	\$4.00	CY	500,000	\$2,000,000
6	Pumping Facility	\$150,000.00	EA	1	\$150,000
SUBTOTAL					\$11,270,000
<u>CONTINGENCIES:</u>					
Construction (%)				20	\$2,254,000
Engineering (%)				7	\$788,900
Construction Admin (%)				6	\$676,200
TOTAL					\$14,989,100
<u>LAND ACQUISITION</u>					
<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT PRICE</u>	<u>UNIT</u>	<u>QUANTITY</u>	<u>AMOUNT</u>
1	Basin Land Acquisition	\$12.00	SF	500,000	\$6,000,000
2	Basin Land Acquisition	\$16.00	SF	500,000	\$8,000,000
SUBTOTAL					\$14,000,000
<u>CONTINGENCIES:</u>					
Construction (%)				0	\$0
Engineering (%)				1.5	\$210,000
Construction Admin (%)				0	\$0
TOTAL					\$14,210,000
<u>GRAND TOTAL</u>					<u>\$29,199,100</u>

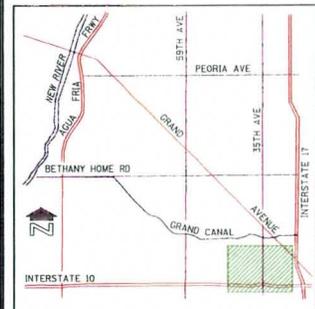


FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

MARYVALE AREA DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

FLOOD MITIGATION OPTIONS

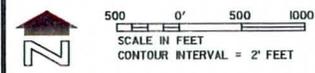


LOCATION MAP

RECONNAISSANCE LEVEL CONCEPT

GRAND AVENUE & INTERSTATE 17

OPTION 1, 100-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	BY	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY	
DESIGN CHK.	JT/AR		RECOMMENDED BY:	
PLANS	PE/AL		APPROVED BY:	DATE
PLANS CHK.	AP			DATE
SUBMITTED BY:	DATE		CHIEF ENGINEER AND GENERAL MANAGER	SHEET
				OF

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TABLE xx

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 2, 100-YEAR

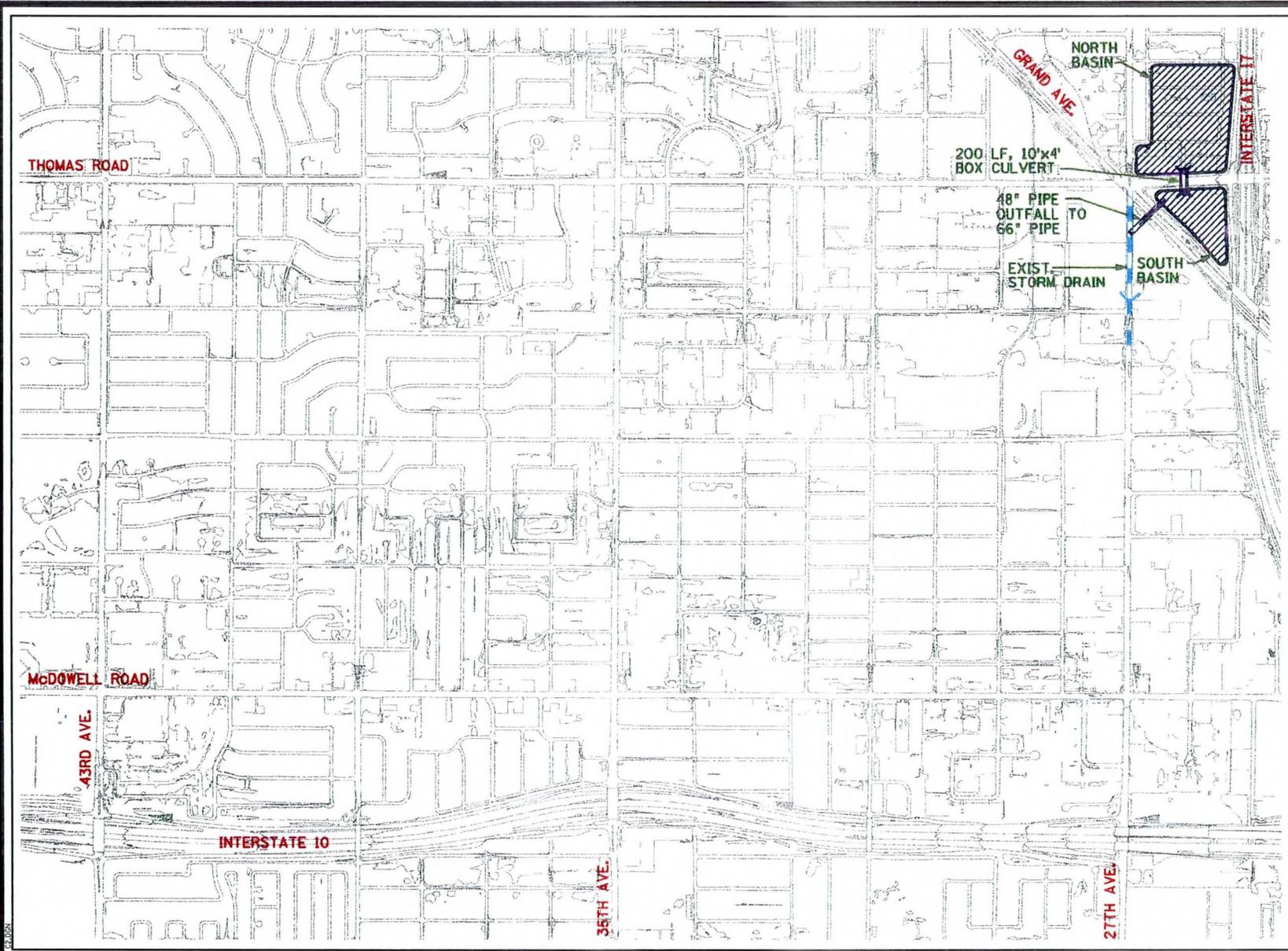
TITLE: GRAND AVENUE AT I-17

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Bleedoff to Exist 66" Pipe	\$1,500	LF	200	\$300,000
2	Detention Basin	\$4	CY	1,000,000	\$4,000,000
3	10' x 4' Box Culvert	\$350	CY	200	\$70,000
4	Pumping Facility	\$150,000	EA	1	\$150,000
SUBTOTAL					\$4,520,000
CONTINGENCIES:					
	Construction (%)			20	\$904,000
	Engineering (%)			7	\$316,400
	Construction Admin (%)			6	\$271,200
TOTAL					\$6,011,600

LAND ACQUISITION

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition	\$12.00	SF	500,000	\$6,000,000
2	Basin Land Acquisition	\$16.00	SF	1,250,000	\$20,000,000
SUBTOTAL					\$26,000,000
CONTINGENCIES:					
	Construction (%)			0	\$0
	Engineering (%)			1.5	\$390,000
	Construction Admin (%)			0	\$0
TOTAL					\$26,390,000
GRAND TOTAL					\$32,401,600

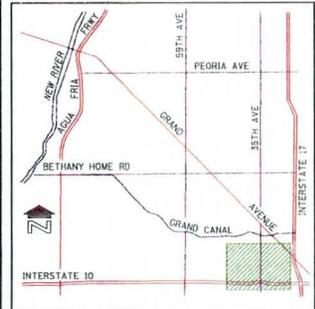


**FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY**

**MARYVALE AREA
DRAINAGE MASTER STUDY**

CONTRACT NO. FCD 93-29

**FLOOD
MITIGATION OPTIONS**

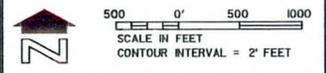


LOCATION MAP

**RECONNAISSANCE
LEVEL CONCEPT**

**GRAND AVENUE &
INTERSTATE 17**

OPTION 2, 100-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	BY	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY	
DESIGN CHK.	JT/AR		RECOMMENDED BY:	DATE
PLANS	PE/AL		APPROVED BY:	DATE
PLANS CHK.	AP		CUST. ENGINEER AND GENERAL MANAGER	
SUBMITTED BY:		DATE:	SHEET	OF

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TABLE xx

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 1, 10-YEAR

TITLE: GRAND AVENUE AT I-17

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	120" Storm Drain	\$1,500.00	LF	200	\$300,000
2	120" Storm Drain	\$384.00	LF	5,100	\$1,958,400
3	120" Storm Drain	\$384.00	LF	12,200	\$4,684,800
4	Off-Line Detention Basin	\$4.00	CY	160,000	\$640,000
5	Pumping Facility	\$150,000.00	EA	1	\$150,000
SUBTOTAL					\$7,733,200

CONTINGENCIES:

Construction (%)	20	\$1,546,640
Engineering (%)	7	\$541,324
Construction Admin (%)	6	\$463,992

TOTAL **\$10,285,156**

LAND ACQUISITION

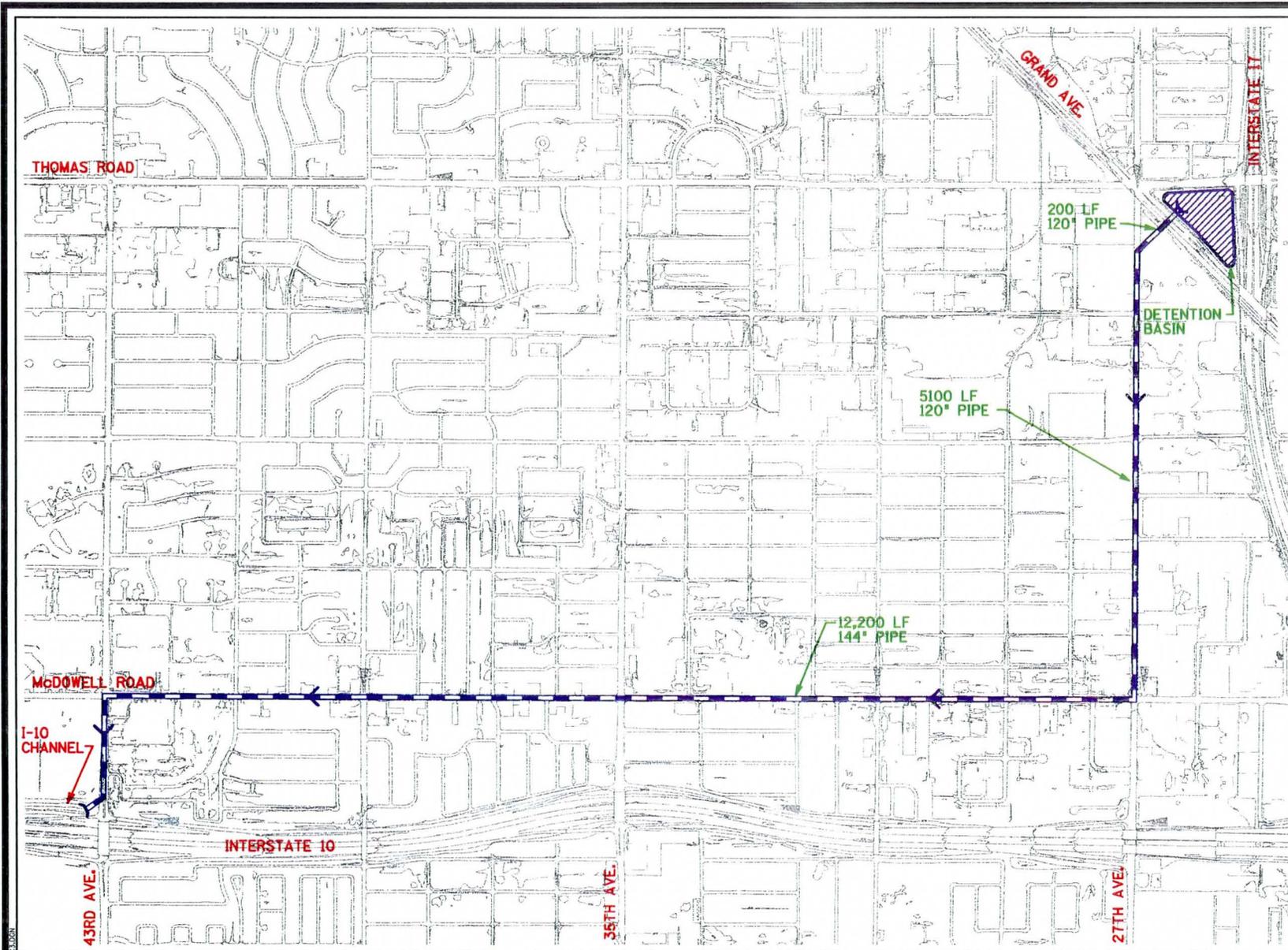
ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition	\$12.00	SF	500,000	\$6,000,000
SUBTOTAL					\$6,000,000

CONTINGENCIES:

Construction (%)	0	\$0
Engineering (%)	1.5	\$90,000
Construction Admin (%)	0	\$0

TOTAL **\$6,090,000**

GRAND TOTAL **\$16,375,156**



FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

FLOOD
MITIGATION OPTIONS



LOCATION MAP

RECONNAISSANCE
LEVEL CONCEPT

GRAND AVENUE &
INTERSTATE 17

OPTION 1, 10-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	BY	DATE	FLOOD CONTROL DISTRICT
DESIGN CHK.	JT/AR		OF MARICOPA COUNTY
PLANS	PE/AL		RECOMMENDED BY:
PLANS CHK.	AP		APPROVED BY:
SUBMITTED BY:			DATE
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PROJECT NO. 9451.00

TABLE xx

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 2, 10-YEAR

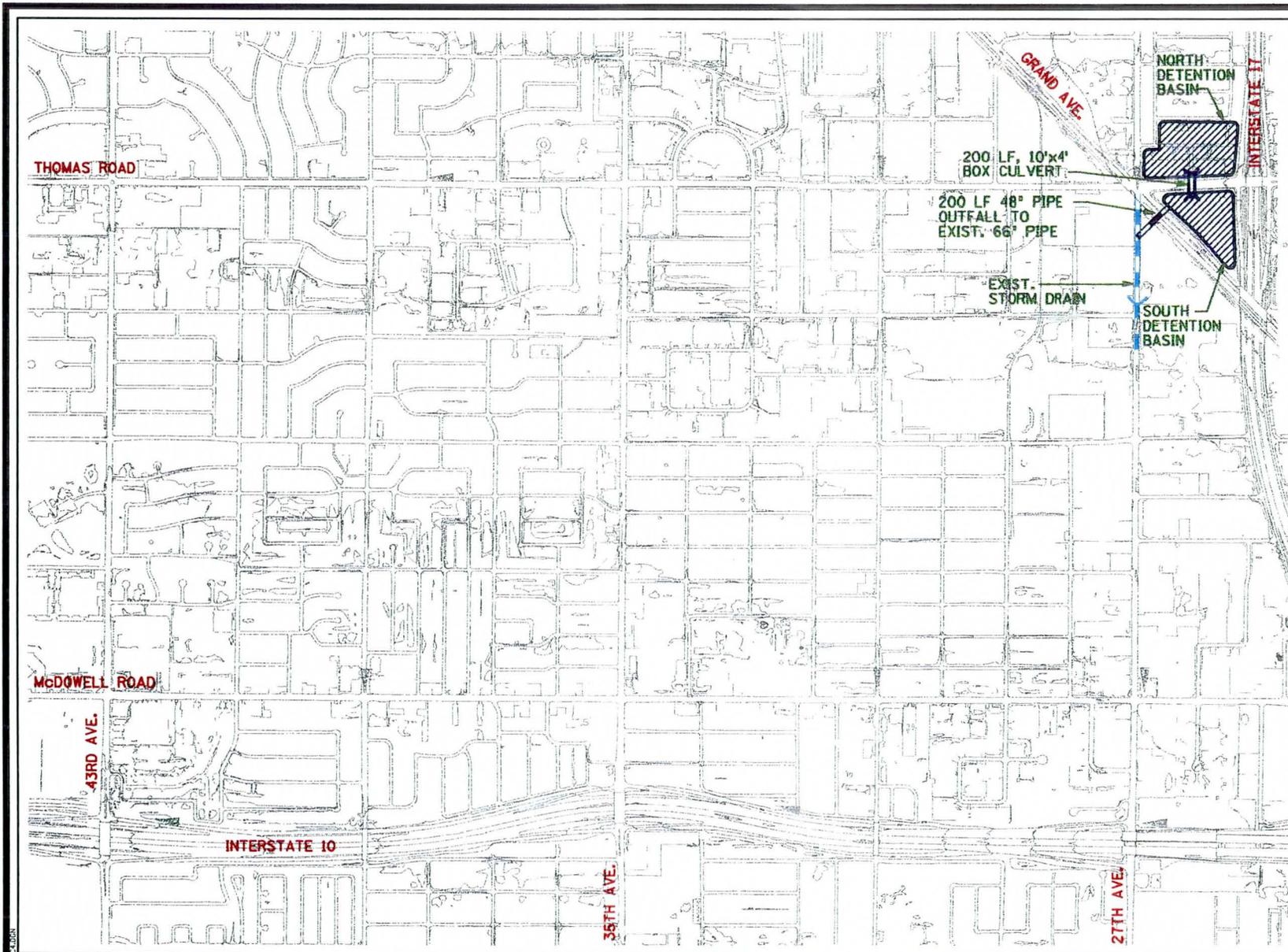
TITLE: GRAND AVENUE AT I-17

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Bleedoff to Exist 66" Pipe	\$1,500	LF	200	\$300,000
2	Detention Basin	\$4	CY	500,000	\$2,000,000
3	10' x 4' Box Culvert	\$350	CY	200	\$70,000
4	Pumping Facility	\$150,000	EA	1	\$150,000
SUBTOTAL					\$2,520,000
<u>CONTINGENCIES:</u>					
				20	\$504,000
				7	\$176,400
				6	\$151,200
TOTAL					\$3,351,600

LAND ACQUISITION

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition	\$12.00	SF	500,000	\$6,000,000
2	Basin Land Acquisition	\$16.00	SF	500,000	\$8,000,000
SUBTOTAL					\$14,000,000
<u>CONTINGENCIES:</u>					
				0	\$0
				1.5	\$210,000
				0	\$0
TOTAL					\$14,210,000
<u>GRAND TOTAL</u>					<u>\$17,561,600</u>

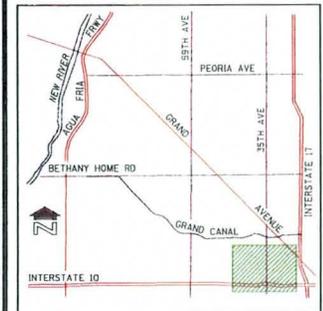


**FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY**

**MARYVALE AREA
DRAINAGE MASTER STUDY**

CONTRACT NO. FCD 93-29

**FLOOD
MITIGATION OPTIONS**

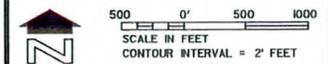


LOCATION MAP

**RECONNAISSANCE
LEVEL CONCEPT**

**GRAND AVENUE &
INTERSTATE 17**

OPTION 2, 10-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	JT/AR	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR		RECOMMENDED BY:
PLANS	PE/AL		DATE:
PLANS CHK.	AP		APPROVED BY:
SUBMITTED BY:			DATE:
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			OF

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BY KAMINSKI-HUBBARD ENGINEERING INC. AND PROJECT ENGINEERING CONSULTANTS, LTD.

PROJECT NO. 9454.00

TABLE xx

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 1, 5-YEAR

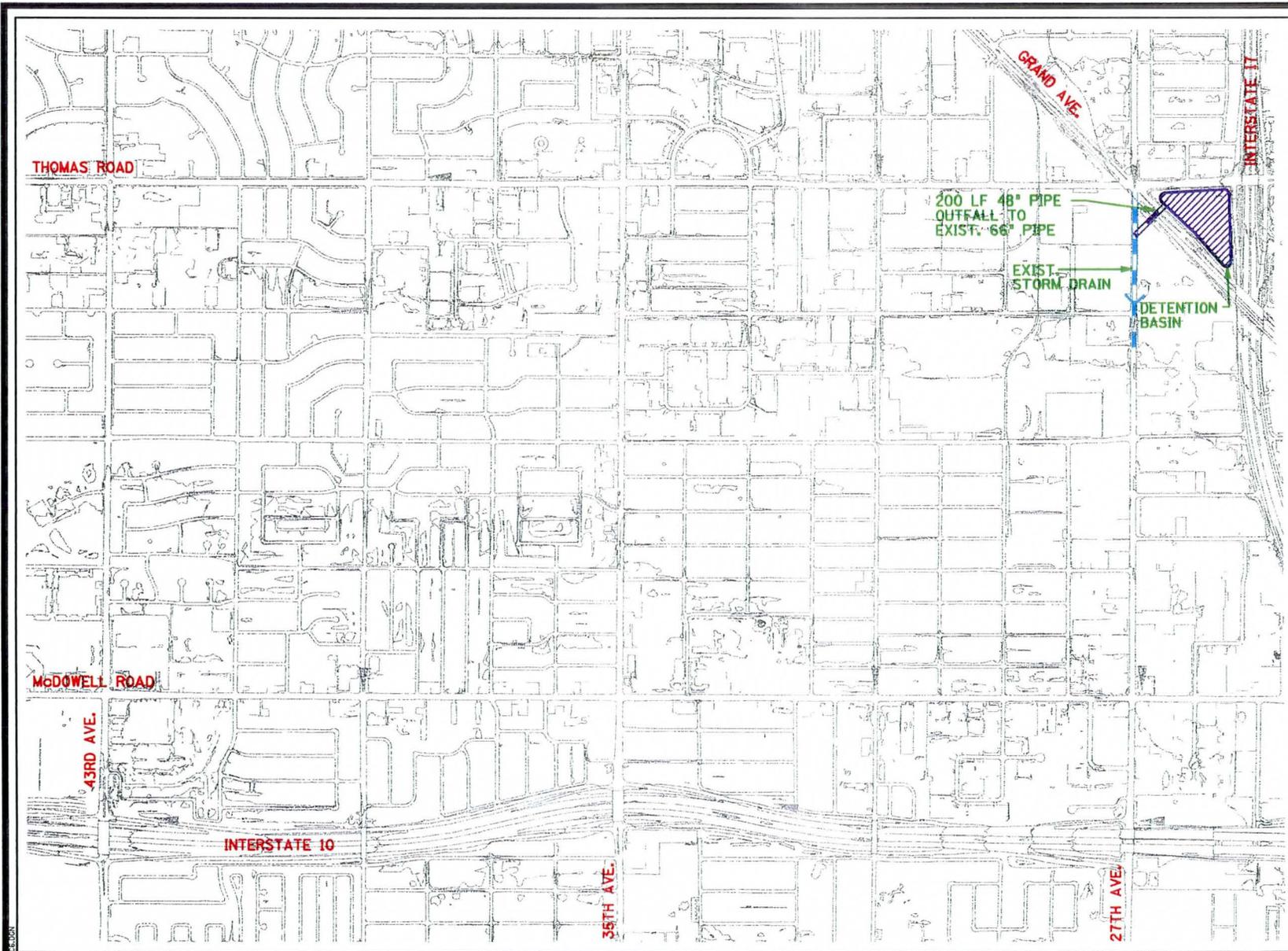
TITLE: GRAND AVENUE AT I-17

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Bleedoff to Exist 66" Pipe	\$1,000	LF	200	\$200,000
2	Detention Basin	\$4	CY	300,000	\$1,200,000
SUBTOTAL					\$1,400,000
<u>CONTINGENCIES:</u>					
	Construction (%)			20	\$280,000
	Engineering (%)			7	\$98,000
	Construction Admin (%)			6	\$84,000
TOTAL					\$1,862,000

LAND ACQUISITION

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition	\$12.00	SF	500,000	\$6,000,000
SUBTOTAL					\$6,000,000
<u>CONTINGENCIES:</u>					
	Construction (%)			0	\$0
	Engineering (%)			1.5	\$90,000
	Construction Admin (%)			0	\$0
TOTAL					\$6,090,000
<u>GRAND TOTAL</u>					<u>\$7,952,000</u>

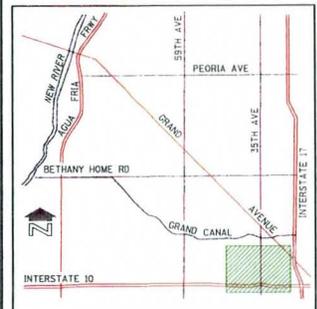


**FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY**

**MARYVALE AREA
DRAINAGE MASTER STUDY**

CONTRACT NO. FCD 93-29

**FLOOD
MITIGATION OPTIONS**



LOCATION MAP

**RECONNAISSANCE
LEVEL CONCEPT**

**GRAND AVENUE &
INTERSTATE 17**

OPTION 1, 5-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	BY	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY RECOMMENDED BY: _____ DATE: _____ APPROVED BY: _____ DATE: _____ CHIEF ENGINEER AND GENERAL MANAGER SUBMITTED BY: _____ DATE: _____ SHEET _____ OF _____
DESIGN CHK.	JT/AR		
PLANS	PE/AL		
PLANS CHK.	AP		
SUBMITTED BY:			

NOTE:
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SCALE OF 1/4"=200 FEET WITH A 2' FOOT CONTOUR INTERVAL. MAPPING WAS PREPARED
BY KENNEY AERIAL MAPPING AND IS BASED ON GROUND CONTROL SURVEY DATA PROVIDED
BY KAMINSKI-HUBBARD ENGINEERING INC. AND PROJECT ENGINEERING CONSULTANTS, LTD.

PROJECT NO. 94154.00

TABLE xx

MARYVALE AREA DRAINAGE MASTER STUDY
 Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 1, 2-YEAR

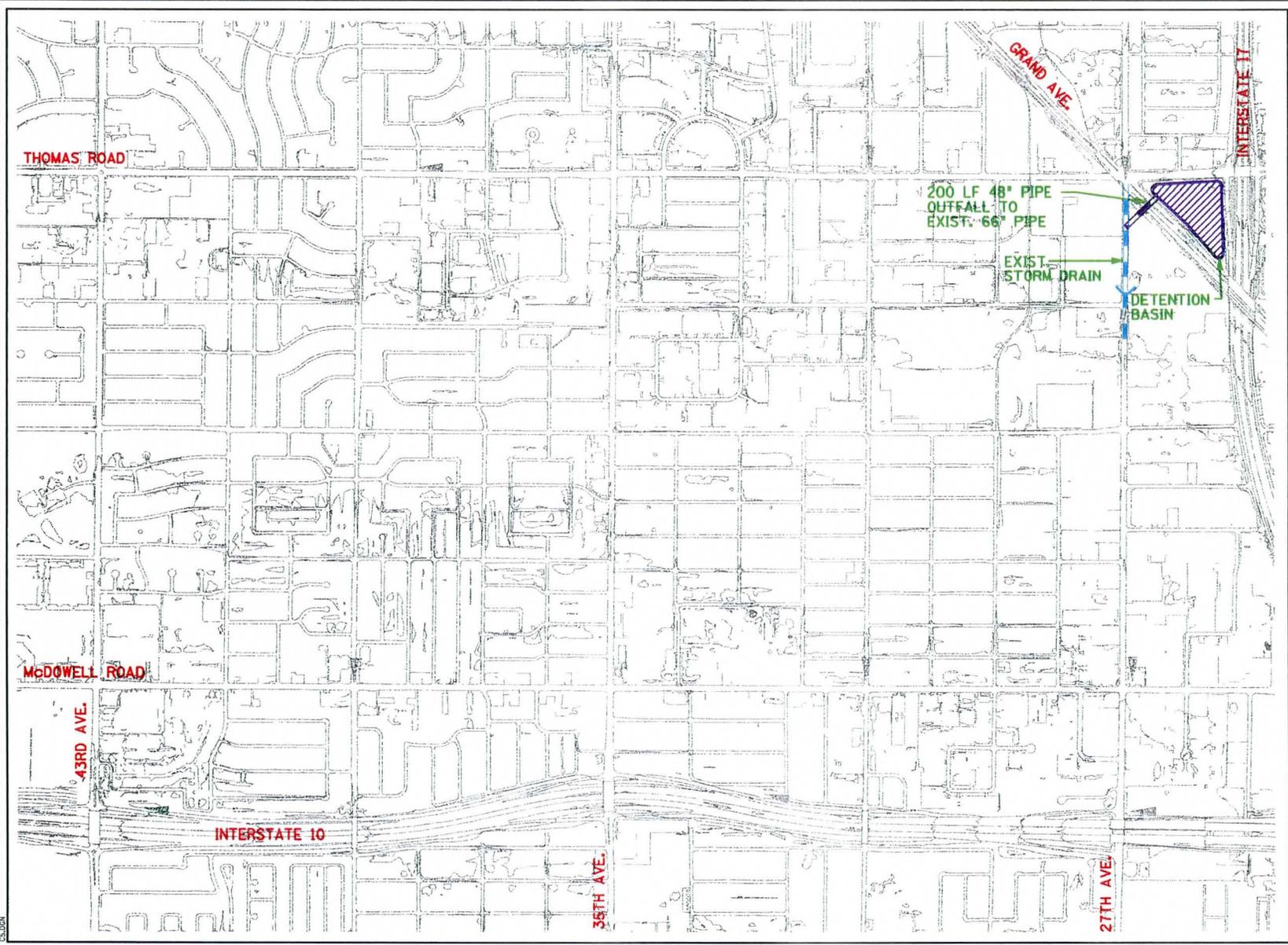
TITLE: GRAND AVENUE AT I-17

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Bleedoff to Exist 66" Pipe	\$1,000	LF	200	\$200,000
2	Detention Basin	\$4	CY	105,000	\$420,000
SUBTOTAL					\$620,000
<u>CONTINGENCIES:</u>					
Construction (%)				20	\$124,000
Engineering (%)				7	\$43,400
Construction Admin (%)				6	\$37,200
TOTAL					\$824,600

LAND ACQUISITION

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition	\$12.00	SF	500,000	\$6,000,000
SUBTOTAL					\$6,000,000
<u>CONTINGENCIES:</u>					
Construction (%)				0	\$0
Engineering (%)				1.5	\$90,000
Construction Admin (%)				0	\$0
TOTAL					\$6,090,000
<u>GRAND TOTAL</u>					<u>\$6,914,600</u>

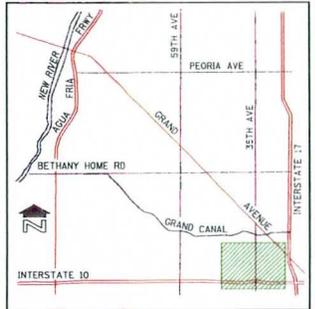


**FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY**

**MARYVALE AREA
DRAINAGE MASTER STUDY**

CONTRACT NO. FCD 93-29

**FLOOD
MITIGATION OPTIONS**



LOCATION MAP

**RECONNAISSANCE
LEVEL CONCEPT**

**GRAND AVENUE &
INTERSTATE 17**

OPTION 1, 2-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	BY JT/AR	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR	RECOMMENDED BY:	
PLANS	PE/AL	APPROVED BY:	
PLANS CHK.	AP	DATE	
SUBMITTED BY:	DATE	DIST. ENGINEER AND GENERAL MANAGER	
		SHEET	OF

NOTE:
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BY KAMINSKI-HUBBARD ENGINEERING INC. AND PROJECT ENGINEERING CONSULTANTS, LTD.



CONCEPT REPORT SUMMARY
MARYVALLE AREA DRAINAGE MASTER PLAN

Grand Avenue Flood Mitigation Options

Grand Avenue at 51st Avenue Flood Mitigation Options (RES8)

Option 1, 100-Year:	Triangular basin east of Grand Avenue with outfall to 43rd Avenue	\$ 9,603,000
Option 1, 10-Year:	Triangular basin east of Grand Avenue with outfall to 43rd Avenue	\$ 8,433,000
Option 2, 10-Year:	Rectangular basin west of Grand Avenue with outfall to east Indian School Road storm drain	\$11,994,000

Storm Drain System Upstream (East of 55th Avenue)

*Option 3, 10-Year:	Storm drain system to improve drainage	\$ 6,014,000
*Option 4, 10-Year:	Same as Option 3 above, but basin added	\$14,767,000
*Option 5, 10-Year:	Minimal storm drain, no basin	\$ 3,170,000
*Option 6, 10-Year:	Same as Option 5 above, but with basin	\$ 7,915,000

Storm Drain System Downstream (West of 55th Avenue)

*Option 7, 10-Year:	Grand Canal at 83rd Avenue outfall in conjunction with Options 3 through 6	\$ 8,144,000
*Option 8, 10-Year:	Reduced pipe with basin in conjunction with Option 4 or 6	\$ 6,245,000
*Option 9, 10-Year:	Reduced pipe with basin in conjunction with Option 4 or 6	\$17,452,000
Option 10, 10-Year:	Outfall to I-10 channel in conjunction with Option 3 through 6	\$ 8,116,000
Option 11, 10-Year:	Outfall to I-10 channel in conjunction with Options 3 through 6	\$15,488,000

* Options selected for Level II Analysis based on input from the communities and FCDMC on May 29, 1997

Combined Storm Drain System Options

Option 7 and Option 5	\$11,314,000
Option 8 and Option 6	\$14,160,000
Option 9 and Option 6	\$25,367,000
Option 10 and Option 5	\$11,286,000
Option 11 and Option 5	\$18,658,000

* Options selected for Level II Analysis based on input from the communities and FCDMC on May 29, 1997

Grand Avenue Non-Structural Option

1. Acquisition of property and structures within the floodplain \$32,371,000 (b)
 - (b) Based upon costs developed by Wood/Patel in Maryvale ADMS, Floodplain and Property Valuation

* Options selected for Level II Analysis based on input from the communities and FCDMC on May 29, 1997

TABLE xx

May 23, 1997

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 1, 100-Year

TITLE: 51st AVENUE AND BHR AT GRAND AVE

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	36" Storm Drain	\$100.00	LF	5,400	\$540,000
2	96" Storm Drain	\$276.00	LF	2,500	\$690,000
3	120" Storm Drain	\$384.00	LF	2,800	\$1,075,200
4	144" Storm Drain	\$488.00	LF	700	\$341,600
5	Storm Drain Manholes	\$2,500.00	EA	10	\$25,000
6	Structures	\$25,000.00	LS	1	\$25,000
7	On-Line Detention Basin	\$4.00	CY	200,000	\$800,000
SUBTOTAL					\$3,496,800

CONTINGENCIES:

Construction (%)	20	\$699,360
Engineering (%)	7	\$244,776
Construction Admin (%)	6	\$209,808

TOTAL **\$4,650,744**

LAND ACQUISITION:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition (16 Acres)	\$7.00	SF	696,960	\$4,878,720
SUBTOTAL					\$4,878,720

CONTINGENCIES:

Engineering, Legal & Administration (%)	1.5	\$73,181
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TOTAL **\$4,951,901**

GRAND TOTAL **\$9,602,645**

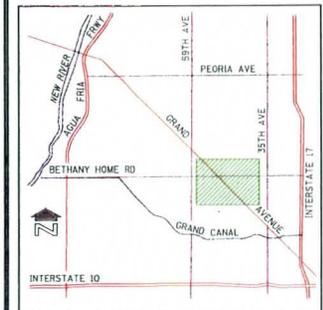
NOTE: 100-year collection and storage system

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

FLOOD
MITIGATION OPTIONS



LOCATION MAP

RECONNAISSANCE
LEVEL CONCEPT

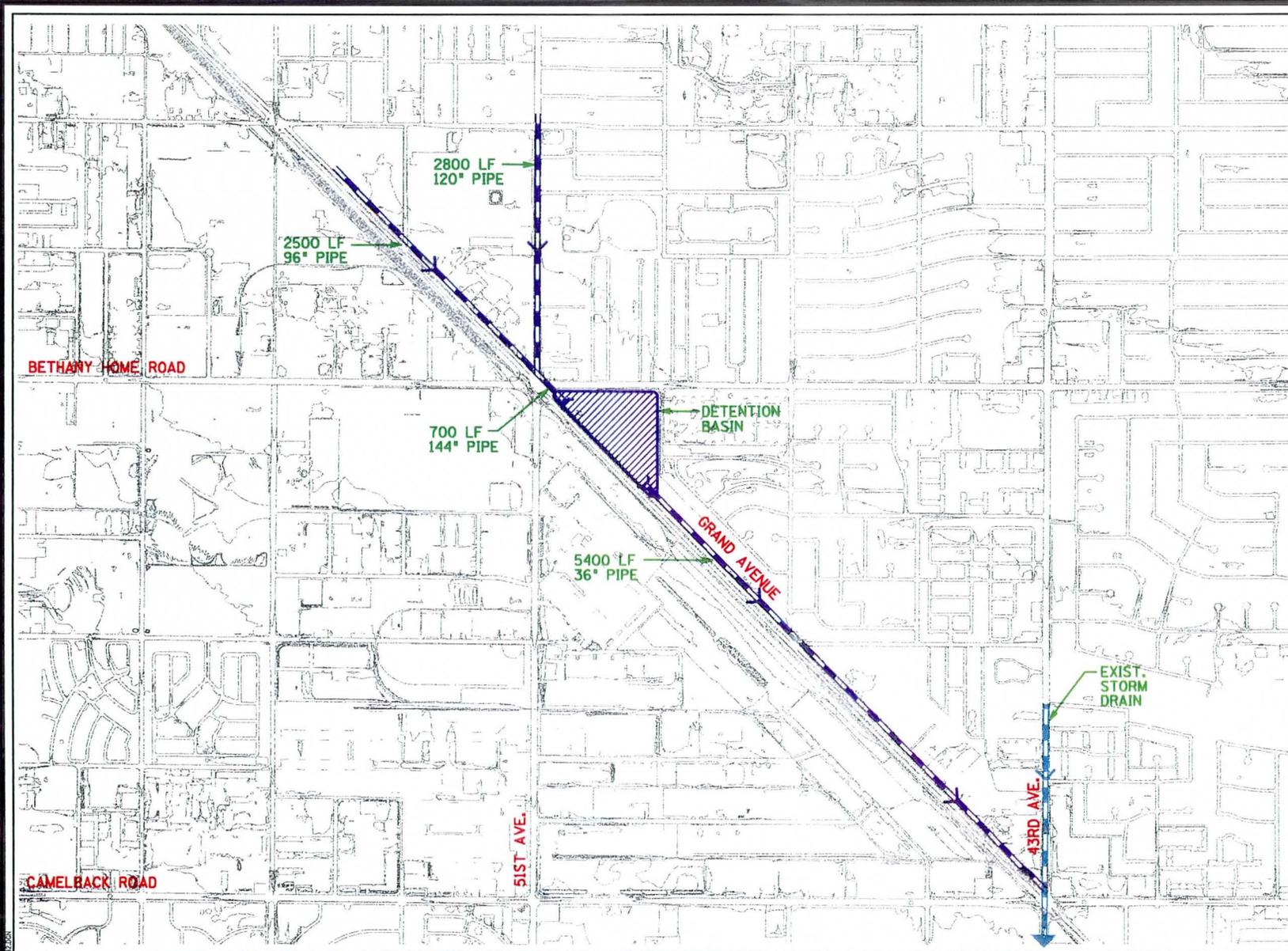
GRAND AVENUE AT
51ST AVENUE

OPTION 1, 100-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	BY JT/AR	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR		RECOMMENDED BY:
PLANS	PE/AL		DATE:
PLANS CHK.	AP		APPROVED BY:
SUBMITTED BY:			DATE:
			CHIEF ENGINEER AND GENERAL MANAGER
			SHEET
			OF



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BY KENNEY AERIAL MAPPING AND IS BASED ON GROUND CONTROL SURVEY DATA PROVIDED
BY KAMINSKI-HUBBARD ENGINEERING INC. AND PROJECT ENGINEERING CONSULTANTS, LTD.

PROJECT NO. 94154.00

TABLE xx

May 23, 1997

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 1, 10-YEAR

TITLE: 51st AVENUE AND BHR AT GRAND AVE

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	36" Storm Drain	\$100.00	LF	5,400	\$540,000
2	72" Storm Drain	\$157.00	LF	2,500	\$392,500
3	84" Storm Drain	\$229.00	LF	2,800	\$641,200
4	96" Storm Drain	\$276.00	LF	700	\$193,200
5	Storm Drain Manholes	\$2,500.00	EA	10	\$25,000
6	Structures	\$25,000.00	LS	1	\$25,000
7	On-Line Detention Basin	\$4.00	CY	200,000	\$800,000
SUBTOTAL					\$2,616,900

CONTINGENCIES:

Construction (%)	20	\$523,380
Engineering (%)	7	\$183,183
Construction Admin (%)	6	\$157,014

TOTAL **\$3,480,477**

LAND ACQUISITION:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition (16 Acres)	\$7.00	SF	696,960	\$4,878,720
SUBTOTAL					\$4,878,720

CONTINGENCIES:

Engineering, Legal & Administration (%)	1.5	\$73,181
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TOTAL **\$4,951,901**

GRAND TOTAL **\$8,432,378**

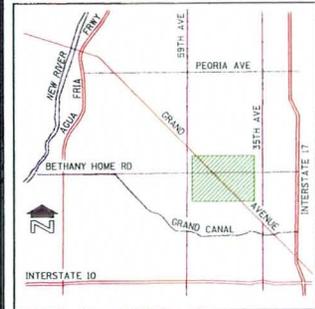
*Drain Ponding Area to Vacant Parcel, SE Corner BHR/51st Ave. Meter Outlet to Exist 43rd Ave S.D.

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

FLOOD
MITIGATION OPTIONS

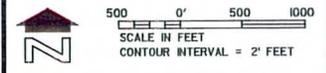


LOCATION MAP

RECONNAISSANCE
LEVEL CONCEPT

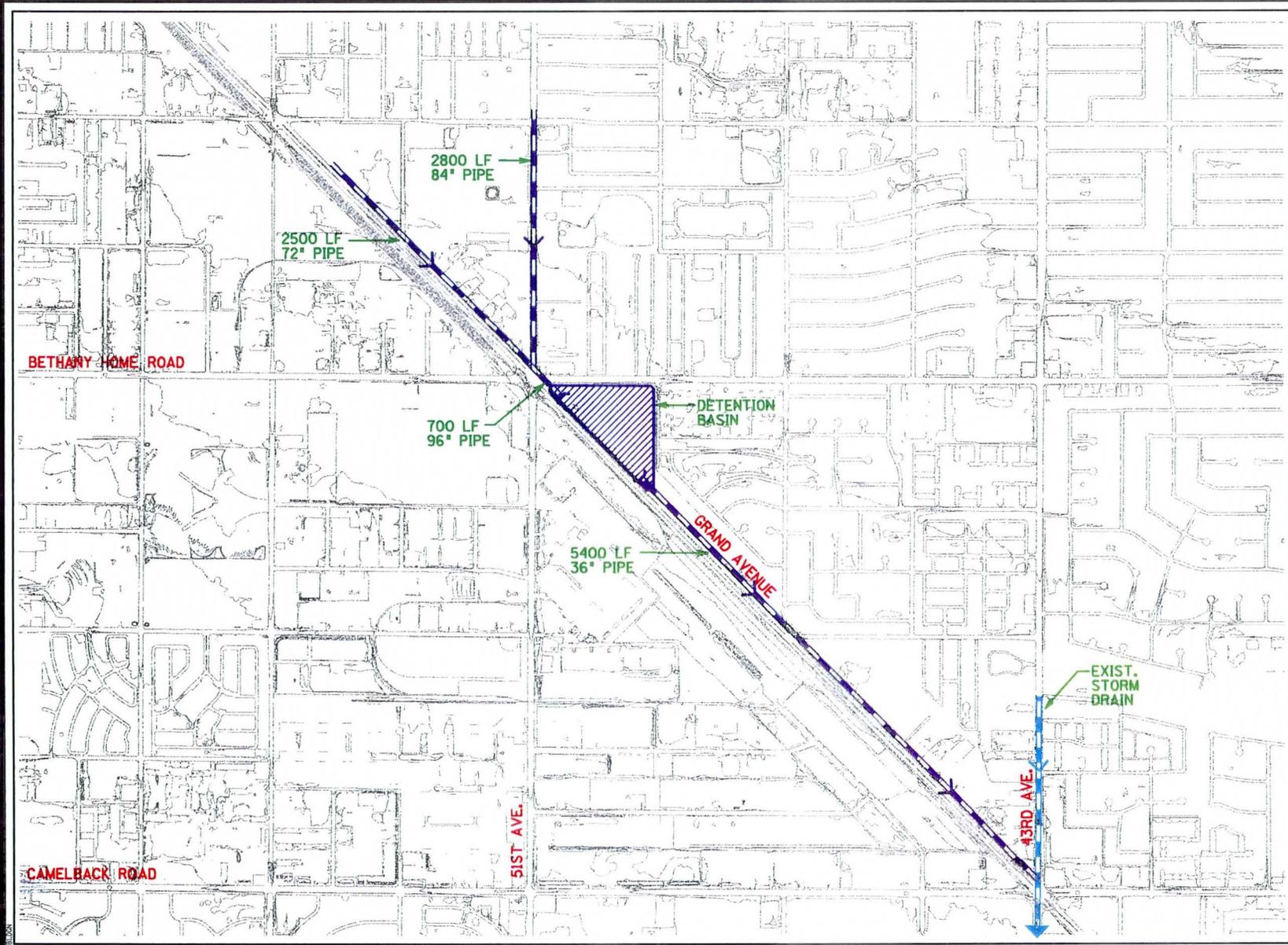
GRAND AVENUE AT
51ST AVENUE

OPTION 1, 10-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	JT/AR	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR	RECOMMENDED BY:	
PLANS	PE/AL	APPROVED BY:	
PLANS CHK.	AP	DATE	
SUBMITTED BY:		DATE	



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PROJECT NO. 9454.02

TABLE xx

May 23, 1997

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 2, 10-YEAR

TITLE: 51st AVENUE AND BHR AT GRAND AVE.

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	36" Storm Drain	\$100.00	LF	10,000	\$1,000,000
2	48" Storm Drain	\$110.00	LF	300	\$33,000
3	72" Storm Drain	\$157.00	LF	2,500	\$392,500
4	84" Storm Drain	\$229.00	LF	2,800	\$641,200
5	96" Storm Drain	\$276.00	LF	1,100	\$303,600
6	Storm Drain Manholes	\$2,500.00	EA	8	\$20,000
7	Structures	\$10,000.00	LS	1	\$10,000
8	On-Line Detention Basin	\$4.00	CY	200,000	\$800,000
SUBTOTAL					\$3,200,300

CONTINGENCIES:

Construction (%)	20	\$640,060
Engineering (%)	7	\$224,021
Construction Admin (%)	6	\$192,018

TOTAL \$4,256,399

LAND ACQUISITION:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition (25 Acres)	\$7.00	SF	1,089,000	\$7,623,000
SUBTOTAL					\$7,623,000

CONTINGENCIES:

Engineering, Legal & Administration (%)	1.5	\$114,345
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TOTAL \$7,737,345

GRAND TOTAL \$11,993,744

TABLE xx

May 23, 1997

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 3, 10-YEAR

TITLE: 51st AVENUE AND BHR AT GRAND AVE

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	72" Storm Drain	\$157.00	LF	2,600	\$408,200
2	96" Storm Drain	\$276.00	LF	7,800	\$2,152,800
3	108" Storm Drain	\$312.00	LF	2,500	\$780,000
4	120" Storm Drain	\$384.00	LF	2,900	\$1,113,600
5	Storm Drain Manholes	\$2,500.00	EA	15	\$37,500
6	Structures	\$30,000.00	LS	1	\$30,000
SUBTOTAL					\$4,522,100

CONTINGENCIES:

Construction (%)	20	\$904,420
Engineering (%)	7	\$316,547
Construction Admin (%)	6	\$271,326

TOTAL \$6,014,393

LAND ACQUISITION:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
SUBTOTAL					\$0
<u>CONTINGENCIES:</u>					
Engineering, Legal & Administration (%)	1.5	\$0			
TOTAL					\$0
<u>GRAND TOTAL</u>					<u>\$6,014,393</u>

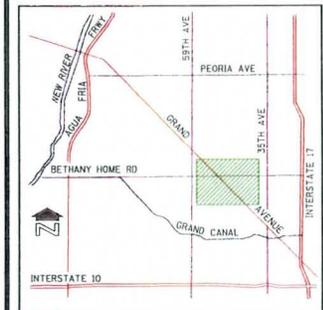
* No Surge Basins - Full Sized Pipes. Outlet Option Not Included in These Costs

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

FLOOD
MITIGATION OPTIONS



LOCATION MAP

RECONNAISSANCE
LEVEL CONCEPT

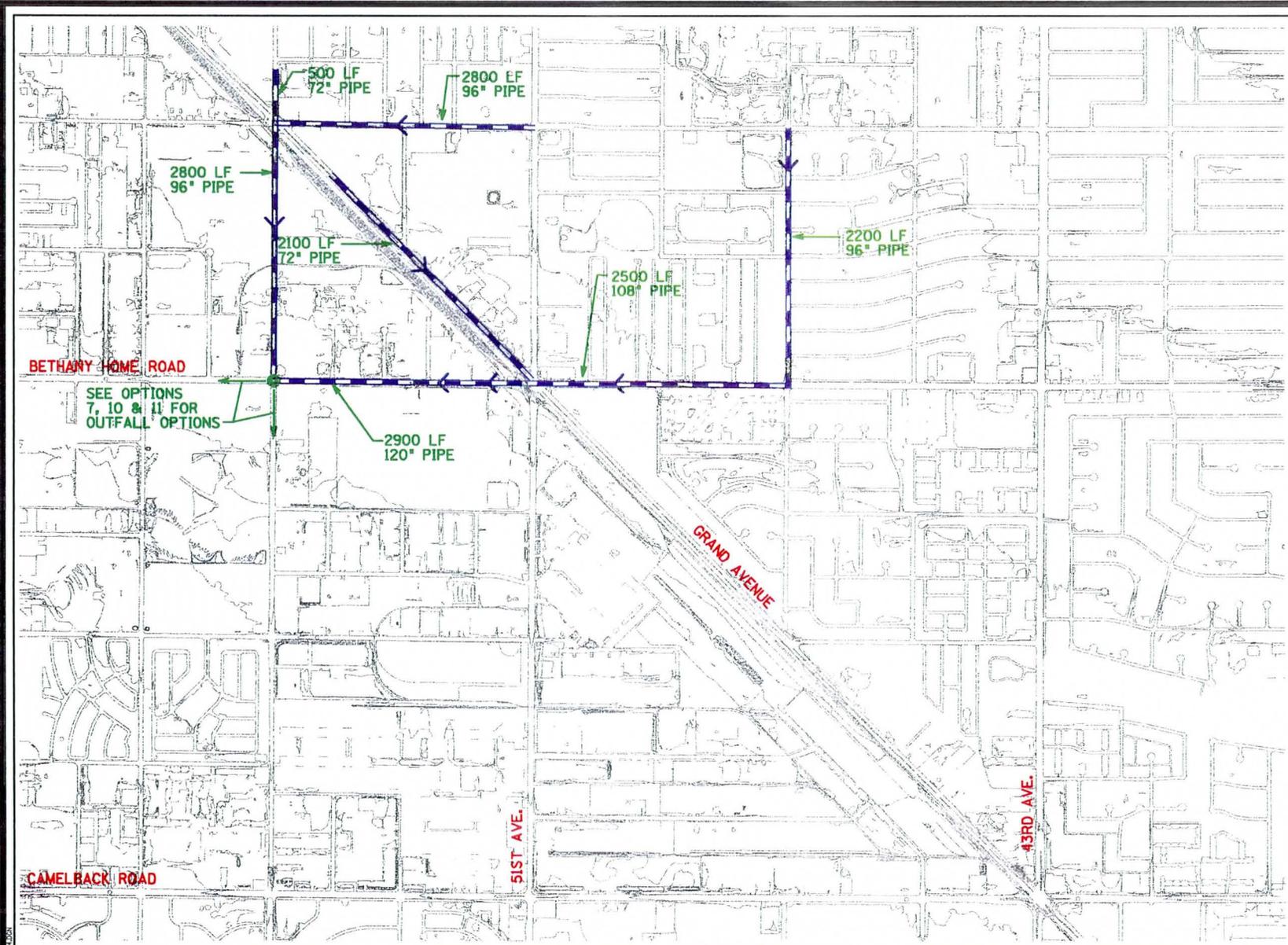
GRAND AVENUE AT
51ST AVENUE

OPTION 3, 10-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	JT/AR	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR		RECOMMENDED BY:
PLANS	PE/AL		APPROVED BY: DATE
PLANS CHK.	AP		DATE
SUBMITTED BY:		DATE	DIST. ENGINEER AND GENERAL MANAGER
			SHEET OF



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BY KAMINSKI-HUBBARD ENGINEERING INC. AND PROJECT ENGINEERING CONSULTANTS, LTD.

PROJECT NO. 9454.00

TABLE xx

May 23, 1997

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 4, 10-YEAR

TITLE: 51st AVENUE AND BHR AT GRAND AVE

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	60" Storm Drain	\$132.00	LF	2,200	\$290,400
2	72" Storm Drain	\$157.00	LF	5,500	\$863,500
3	96" Storm Drain	\$276.00	LF	5,600	\$1,545,600
4	108" Storm Drain	\$312.00	LF	2,500	\$780,000
5	Storm Drain Manholes	\$2,500.00	EA	15	\$37,500
6	Structures	\$30,000.00	LS	1	\$30,000
7	Off-Line Detention Basins	\$4.00	CY	260,000	\$1,040,000
SUBTOTAL					\$4,587,000

CONTINGENCIES:

Construction (%)	20	\$917,400
Engineering (%)	7	\$321,090
Construction Admin (%)	6	\$275,220

TOTAL **\$6,100,710**

LAND ACQUISITION:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition (16 Acres)	\$7.00	SF	696,960	\$4,878,720
2	Basin Land Acquisition (12 Acres)	\$7.00	SF	522,720	\$3,659,040
SUBTOTAL					\$8,537,760

CONTINGENCIES:

Engineering, Legal & Administration (%)	1.5	\$128,066
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TOTAL **\$8,665,826**

GRAND TOTAL **\$14,766,536**

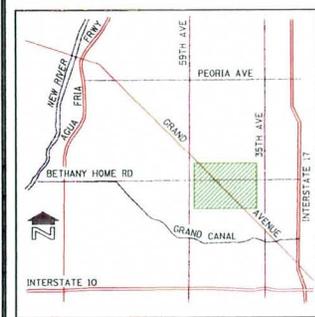
* 2 - Surge Basins - Reduced Sized Pipes. Outlet Option Not Included in These Costs

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

FLOOD
MITIGATION OPTIONS

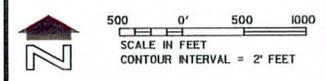


LOCATION MAP

RECONNAISSANCE
LEVEL CONCEPT

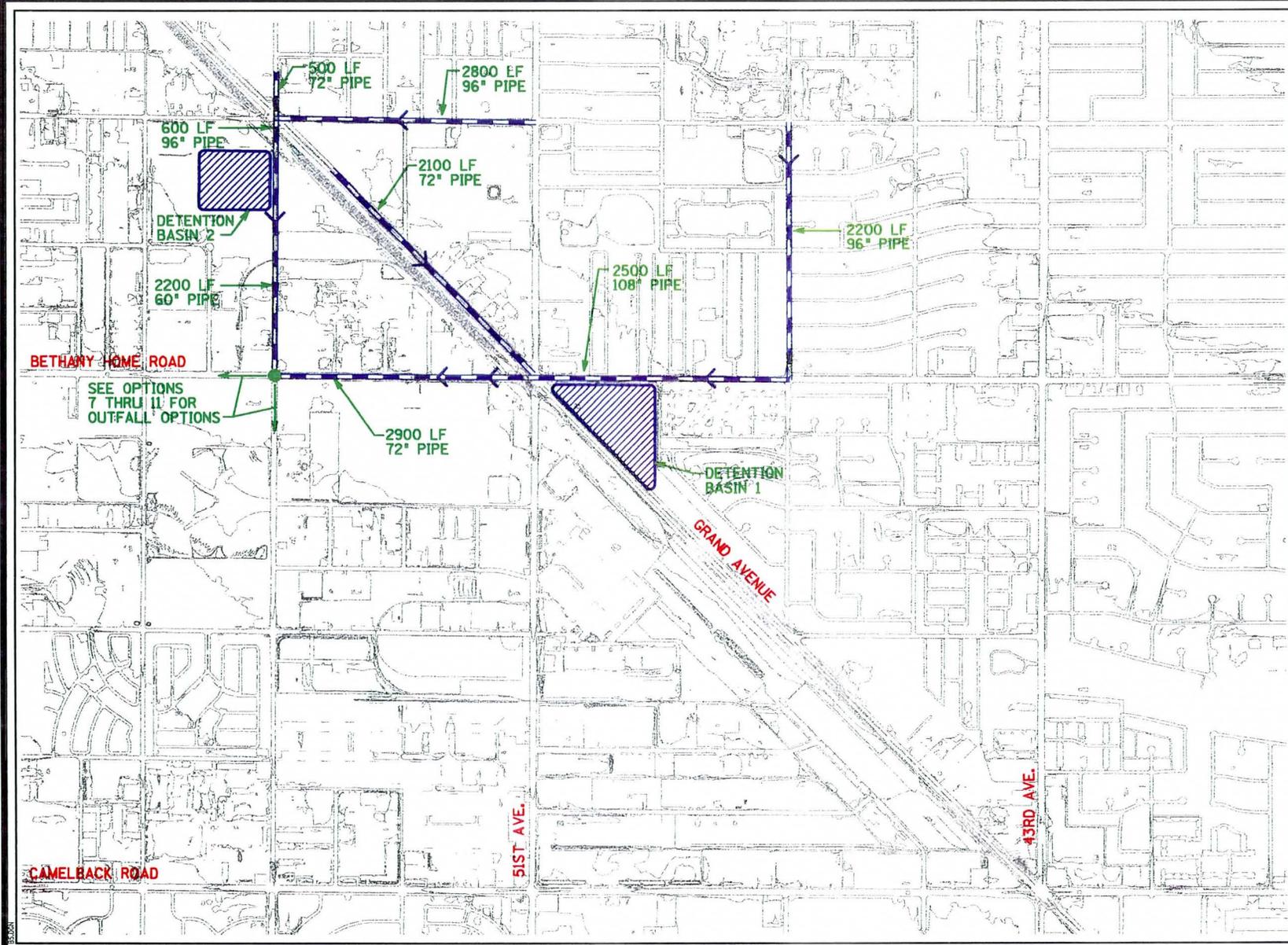
GRAND AVENUE AT
51ST AVENUE

OPTION 4, 10-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	BY JT/AR	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR		RECOMMENDED BY:
PLANS	PE/AL		DATE:
PLANS CHK.	AP		APPROVED BY:
			DATE:
SUBMITTED BY:			CUST. ENGINEER AND GENERAL MANAGER
			SHEET
			OF



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BY KAMINSKI-HUBBARD ENGINEERING, INC. AND PROJECT ENGINEERING CONSULTANTS, LTD.

PROJECT NO. 94154.00

TABLE xx

May 23, 1997

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 5, 10-YEAR

TITLE: 51st AVENUE AND BHR AT GRAND AVE

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	48" Storm Drain	\$110.00	LF	300	\$33,000
2	72" Storm Drain	\$157.00	LF	3,900	\$612,300
3	84" Storm Drain	\$229.00	LF	3,000	\$687,000
4	96" Storm Drain	\$276.00	LF	3,700	\$1,021,200
5	Storm Drain Manholes	\$2,500.00	EA	8	\$20,000
6	Structures	\$10,000.00	LS	1	\$10,000
SUBTOTAL					\$2,383,500
<u>CONTINGENCIES:</u>					
Construction (%)				20	\$476,700
Engineering (%)				7	\$166,845
Construction Admin (%)				6	\$143,010
TOTAL					\$3,170,055

LAND ACQUISITION:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
SUBTOTAL					\$0
<u>CONTINGENCIES:</u>					
Engineering, Legal & Administration (%)				1.5	\$0
TOTAL					\$0
GRAND TOTAL					\$3,170,055

* No Surge Basins - Full Sized Pipes. Outlet Option Not Included in These Costs

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

FLOOD
MITIGATION OPTIONS

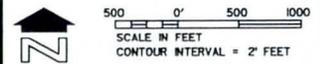


LOCATION MAP

RECONNAISSANCE
LEVEL CONCEPT

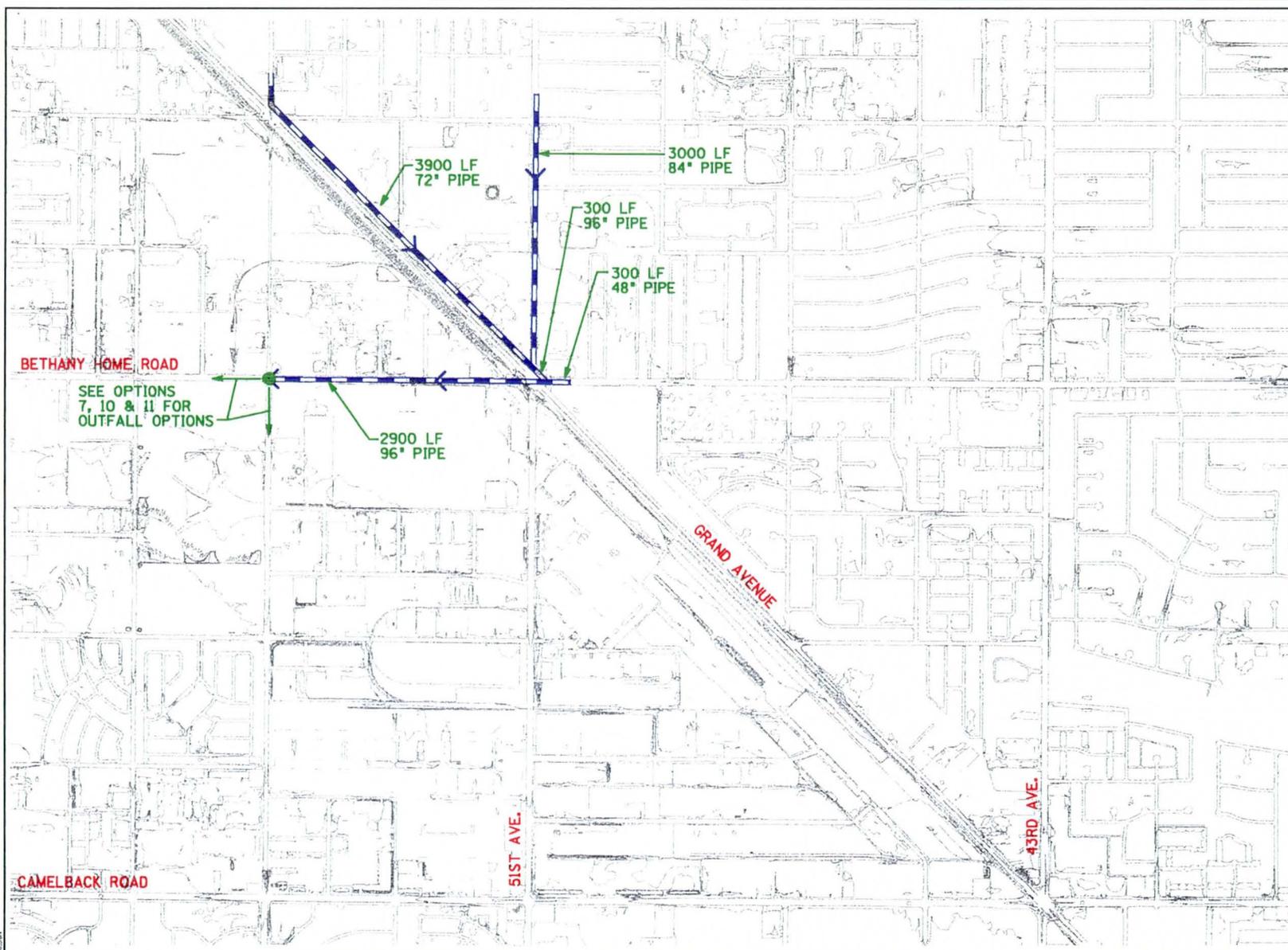
GRAND AVENUE AT
51ST AVENUE

OPTION 5, 10-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	JT/AR	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR		RECOMMENDED BY:
PLANS	PE/AL		DATE
PLANS CHK.	AP		APPROVED BY:
			DATE
SUBMITTED BY:			CHIEF ENGINEER AND GENERAL MANAGER
			SHEET



NOTE:
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AND ARE BASED UPON RECORD DOCUMENTS. AERIAL TOPOGRAPHY WAS PRODUCED AT A
SCALE OF 1/4"=200' FEET WITH A 2' FOOT CONTOUR INTERVAL. MAPPING WAS PREPARED
BY KENNEY-AERIAL MAPPING AND IS BASED ON GROUND CONTROL SURVEY DATA PROVIDED
BY KAMINSKI-HUBBARD ENGINEERING INC. AND PROJECT ENGINEERING CONSULTANTS, LTD.

PROJECT NO. 9454-00

TABLE xx

May 23, 1997

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 6, 10-YEAR

TITLE: 51st AVENUE AND BHR AT GRAND AVE

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	48" Storm Drain	\$110.00	LF	300	\$33,000
2	60" Storm Drain	\$132.00	LF	2,900	\$382,800
3	72" Storm Drain	\$157.00	LF	3,900	\$612,300
4	84" Storm Drain	\$229.00	LF	3,000	\$687,000
5	96" Storm Drain	\$276.00	LF	300	\$82,800
6	Storm Drain Manholes	\$2,500.00	EA	8	\$20,000
7	Structures	\$10,000.00	LS	1	\$10,000
8	Off-Line Detention Basins	\$4.00	CY	100,000	\$400,000
SUBTOTAL					\$2,227,900

CONTINGENCIES:

Construction (%)	20	\$445,580
Engineering (%)	7	\$155,953
Construction Admin (%)	6	\$133,674

TOTAL \$2,963,107

LAND ACQUISITION:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition (16 Acres)	\$7.00	SF	696,960	\$4,878,720
SUBTOTAL					\$4,878,720

CONTINGENCIES:

Engineering, Legal & Administration (%)	1.5	\$73,181
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TOTAL \$4,951,901

GRAND TOTAL \$7,915,008

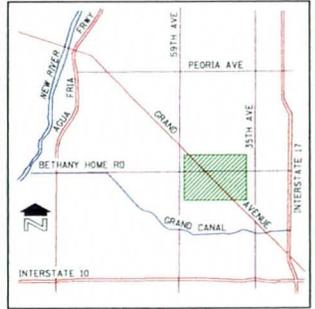
* Surge Basin - Reduced Sized Pipes. Outlet Option Not Included in These Costs

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

MARYVALE AREA DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

FLOOD MITIGATION OPTIONS



LOCATION MAP

RECONNAISSANCE LEVEL CONCEPT

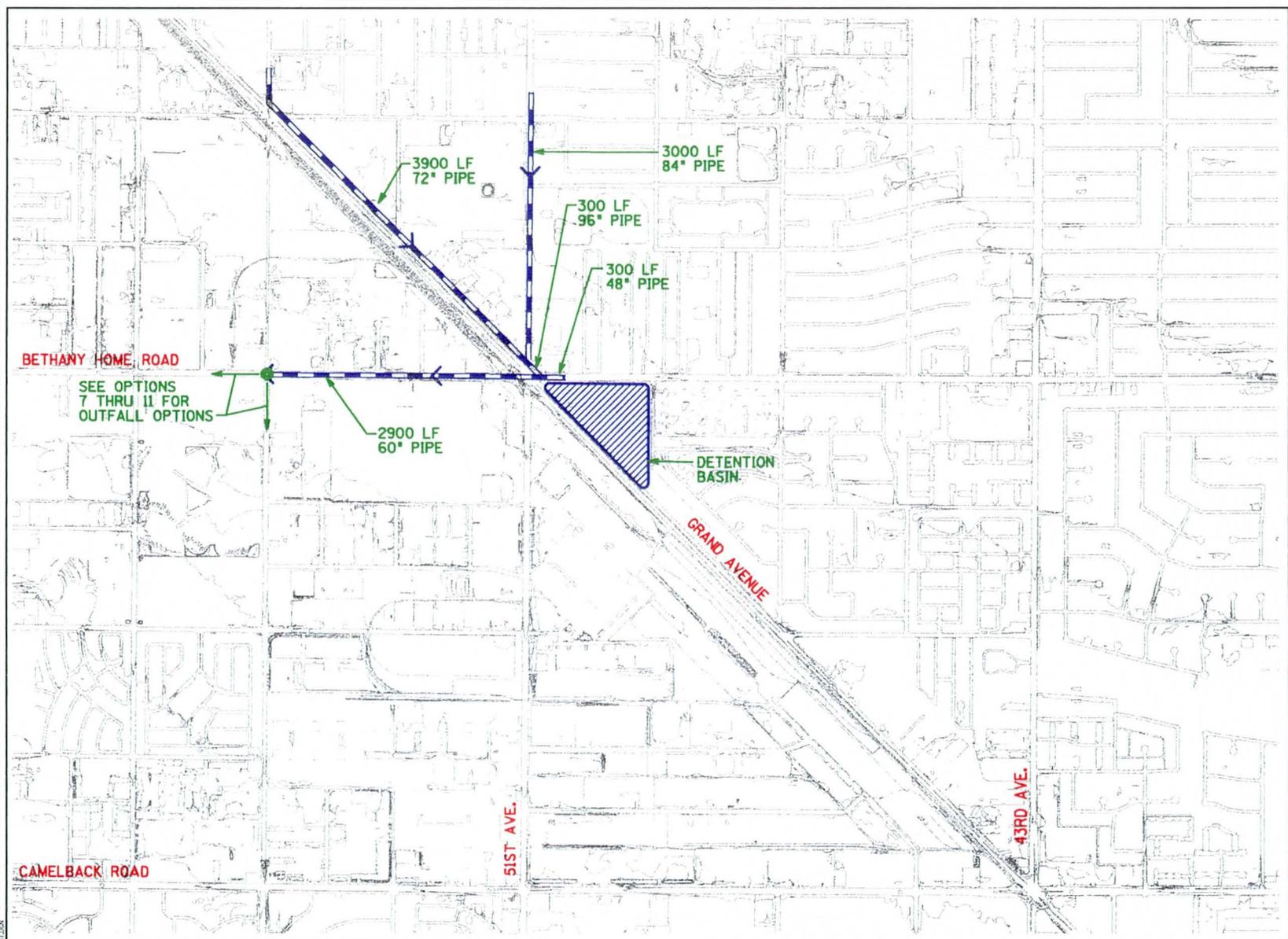
GRAND AVENUE AT 51ST AVENUE

OPTION 6, 10-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	JT/AR	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR		RECOMMENDED BY:
PLANS	PE/AL	DATE	APPROVED BY:
PLANS CHK.	AP	DATE	CHEF ENGINEER AND GENERAL MANAGER
SUBMITTED BY:		DATE	SHEET



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TABLE xx

May 23, 1997

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OUTFALL OPTION 7, 10-YEAR

TITLE: 51st AVENUE AND BHR AT GRAND AVE

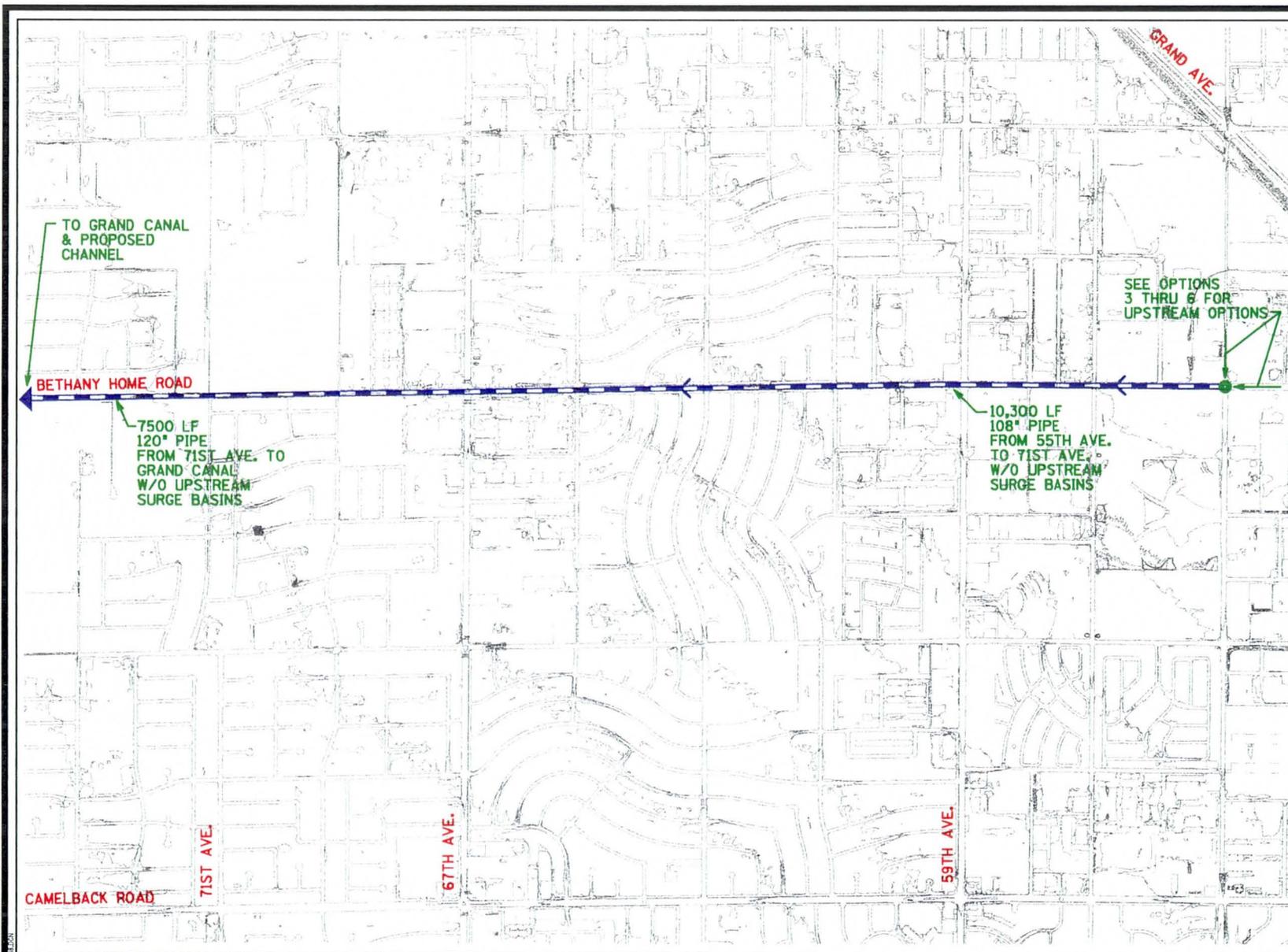
MAJOR ELEMENTS:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT PRICE</u>	<u>UNIT</u>	<u>QUANTITY</u>	<u>AMOUNT</u>
1	108" Storm Drain	\$312.00	LF	10,300	\$3,213,600
2	120" Storm Drain	\$384.00	LF	7,500	\$2,880,000
3	Storm Drain Manholes	\$2,500.00	EA	12	\$30,000
SUBTOTAL					\$6,123,600
<u>CONTINGENCIES:</u>					
Construction (%)				20	\$1,224,720
Engineering (%)				7	\$428,652
Construction Admin (%)				6	\$367,416
TOTAL					\$8,144,388

LAND ACQUISITION:

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>UNIT PRICE</u>	<u>UNIT</u>	<u>QUANTITY</u>	<u>AMOUNT</u>
SUBTOTAL					\$0
<u>CONTINGENCIES:</u>					
Engineering, Legal & Administration (%)				1.5	\$0
TOTAL					\$0
<u>GRAND TOTAL</u>					<u>\$8,144,388</u>

* No Surge Basins - Full Sized Pipes. Outlet Option



FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

FLOOD
MITIGATION OPTIONS

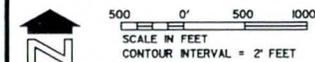


LOCATION MAP

RECONNAISSANCE
LEVEL CONCEPT

GRAND AVENUE AT
51ST AVENUE

OPTION 7, 10-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	JT/AR	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR		
PLANS	PE/AL	DATE	RECOMMENDED BY:
PLANS CHK.	AP	DATE	APPROVED BY:
SUBMITTED BY:		DATE	CHIEF ENGINEER AND GENERAL MANAGER
			SHEET OF

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BY KENNEY AERIAL MAPPING AND IS BASED ON GROUND CONTROL SURVEY DATA PROVIDED
BY KAMINSKI-HUBBARD ENGINEERING INC. AND PROJECT ENGINEERING CONSULTANTS, LTD.

PROJECT NO. 9454.00

TABLE xx

May 23, 1997

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OUTFALL OPTION 8, 10-YEAR

TITLE: 51st AVENUE AND BHR AT GRAND AVE

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	90" Storm Drain	\$252.00	LF	10,300	\$2,595,600
2	96" Storm Drain	\$276.00	LF	7,500	\$2,070,000
3	Storm Drain Manholes	\$2,500.00	EA	12	\$30,000

SUBTOTAL \$4,695,600

CONTINGENCIES:

Construction (%)	20	\$939,120
Engineering (%)	7	\$328,692
Construction Admin (%)	6	\$281,736

TOTAL \$6,245,148

LAND ACQUISITION:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
------	-------------	------------	------	----------	--------

SUBTOTAL \$0

CONTINGENCIES:

Engineering, Legal & Administration (%)	1.5	\$0
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TOTAL \$0

GRAND TOTAL \$6,245,148

* Surge Basin E/o Grand Ave Only - Partially Reduced Sized Pipes. Outlet Option

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

FLOOD
MITIGATION OPTIONS



LOCATION MAP

RECONNAISSANCE
LEVEL CONCEPT

GRAND AVENUE AT
51ST AVENUE

OPTION 8, 10-YEAR

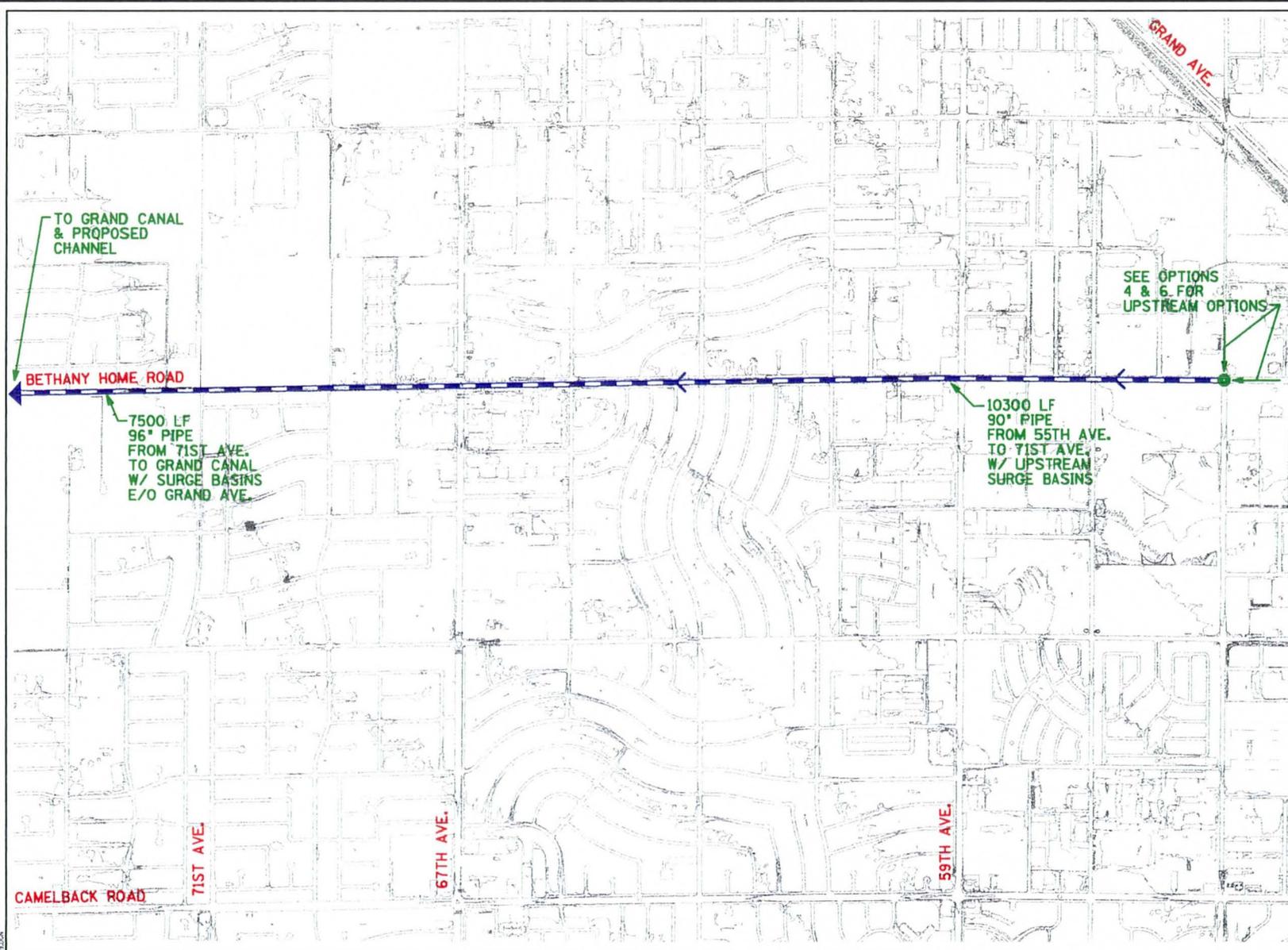


500 0' 500 1000
SCALE IN FEET
CONTOUR INTERVAL = 2' FEET

WOOD, PATEL & ASSOCIATES, INC.

DESIGN	JT/AR	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR		
PLANS	PE/AL		RECOMMENDED BY: DATE
PLANS CHK.	AP		APPROVED BY: DATE
SUBMITTED BY:			DRY INCHER AND GENERAL MANAGER
			SHEET OF

PROJECT NO. 9454.00



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TABLE xx

May 23, 1997

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OUTFALL OPTION 9, 10-YEAR

TITLE: 51st AVENUE AND BHR AT GRAND AVE

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	84" Storm Drain	\$229.00	LF	7,500	\$1,717,500
2	90" Storm Drain	\$252.00	LF	10,300	\$2,595,600
3	Storm Drain Manholes	\$2,500.00	EA	12	\$30,000
4	Structures	\$30,000.00	LS	1	\$30,000
5	Off-Line Detention Basins	\$4.00	CY	500,000	\$2,000,000
SUBTOTAL					\$6,373,100
<u>CONTINGENCIES:</u>					
Construction (%)				20	\$1,274,620
Engineering (%)				7	\$446,117
Construction Admin (%)				6	\$382,386
TOTAL					\$8,476,223

LAND ACQUISITION:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition (29 Acres)	\$7.00	SF	1,263,240	\$8,842,680
SUBTOTAL					\$8,842,680
<u>CONTINGENCIES:</u>					
Engineering, Legal & Administration (%)				1.5	\$132,640
TOTAL					\$8,975,320
<u>GRAND TOTAL</u>					<u>\$17,451,543</u>

* Surge Basin E/o Grand Ave & at 71st Ave/BHR - Reduced Sized Pipes. Outlet Option

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

FLOOD
MITIGATION OPTIONS

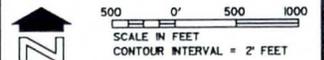


LOCATION MAP

RECONNAISSANCE
LEVEL CONCEPT

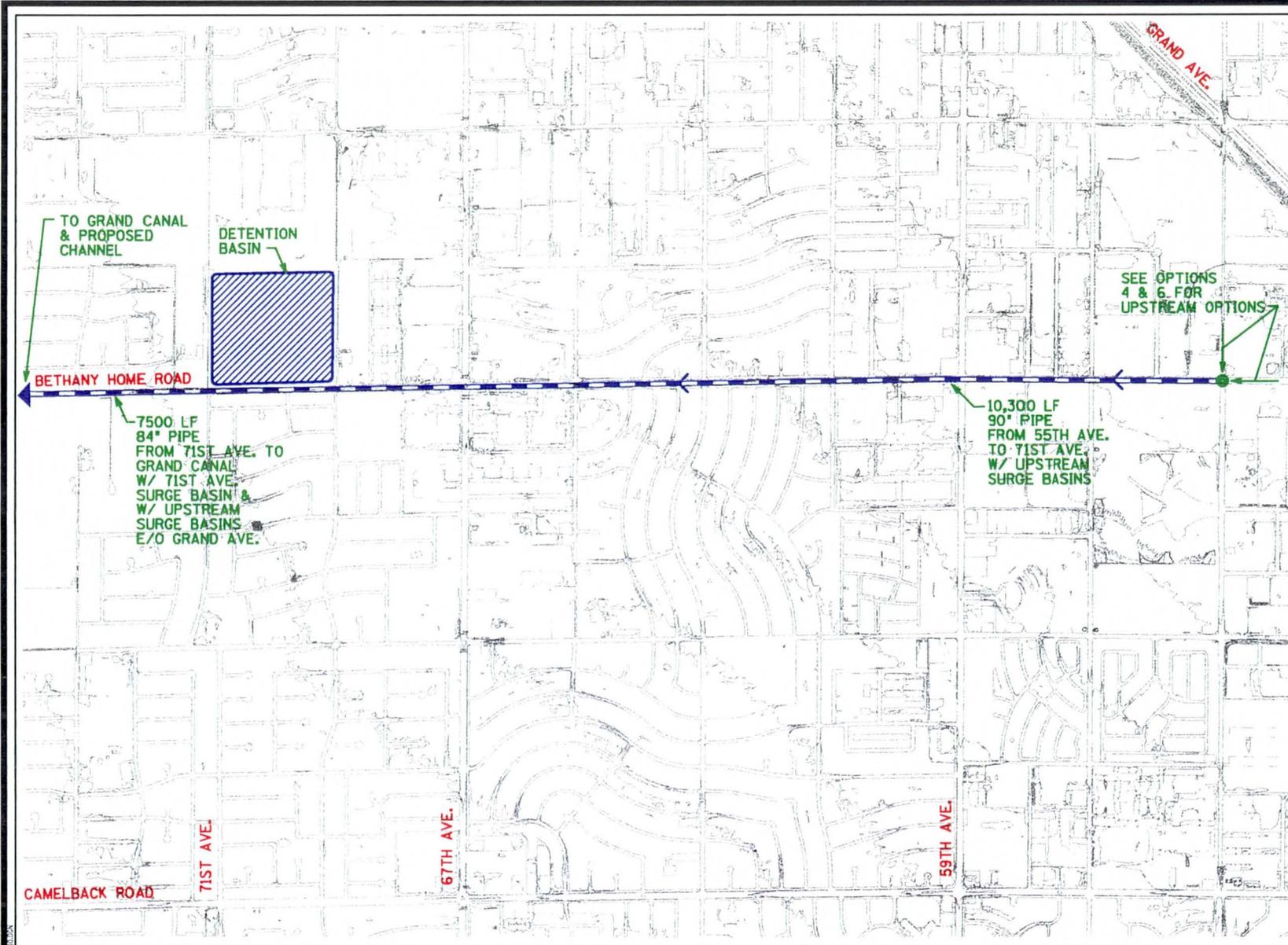
GRAND AVENUE AT
51ST AVENUE

OPTION 9, 10-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	JT/AR	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR		RECOMMENDED BY:
PLANS	PE/AL		DATE:
PLANS CHK.	AP		APPROVED BY:
			DATE:
SUBMITTED BY:			CHEF ENGINEER AND GENERAL MANAGER
			SHEET



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PROJECT NO. 9454.00

TABLE xx

May 23, 1997

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OUTFALL OPTION 10, 10-YEAR

TITLE: 51st AVENUE AND BHR AT GRAND AVE

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	96" Storm Drain	\$276.00	LF	22,000	\$6,072,000
2	Storm Drain Manholes	\$2,500.00	EA	12	\$30,000

SUBTOTAL \$6,102,000

CONTINGENCIES:

Construction (%)	20	\$1,220,400
Engineering (%)	7	\$427,140
Construction Admin (%)	6	\$366,120

TOTAL \$8,115,660

LAND ACQUISITION:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
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SUBTOTAL \$0

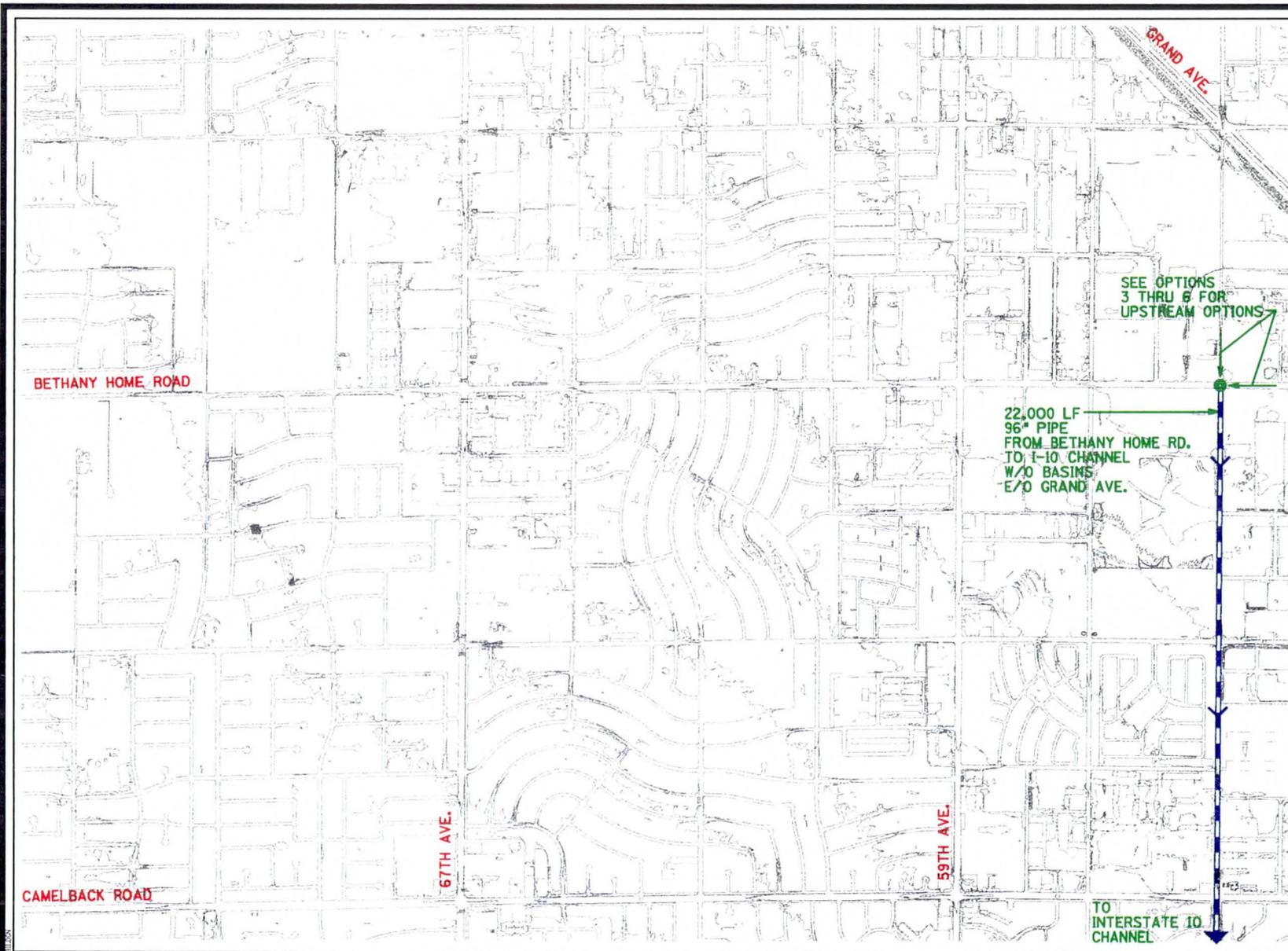
CONTINGENCIES:

Engineering, Legal & Administration (%)	1.5	\$0
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TOTAL \$0

GRAND TOTAL \$8,115,660

* No Surge Basins - Full Sized Pipes. Outlet Option



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

MARYVALE AREA DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

FLOOD MITIGATION OPTIONS

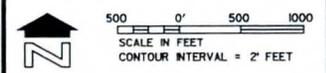


LOCATION MAP

RECONNAISSANCE LEVEL CONCEPT

GRAND AVENUE AT 51ST AVENUE

OPTION 10, 10-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	BY: JT/AR	DATE:	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR		RECOMMENDED BY:
PLANS	PE/AL		DATE:
PLANS CHK.	AP		APPROVED BY:
SUBMITTED BY:			DATE:
			SHEET
			OF

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TABLE xx

May 23, 1997

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION OUTFALL OPTION 11, 10-YEAR

TITLE: 51st AVENUE AND BHR AT GRAND AVE

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	90" Storm Drain	\$252.00	LF	19,200	\$4,838,400
2	96" Storm Drain	\$276.00	LF	2,800	\$772,800
3	Storm Drain Manholes	\$2,500.00	EA	12	\$30,000
4	Structures	\$30,000.00	LS	1	\$30,000
5	Off-Line Detention Basins	\$4.00	CY	330,000	\$1,320,000

SUBTOTAL \$6,991,200

CONTINGENCIES:

Construction (%)	20	\$1,398,240
Engineering (%)	7	\$489,384
Construction Admin (%)	6	\$419,472

TOTAL \$9,298,296

LAND ACQUISITION:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition (20 Acres)	\$7.00	SF	871,200	\$6,098,400

SUBTOTAL \$6,098,400

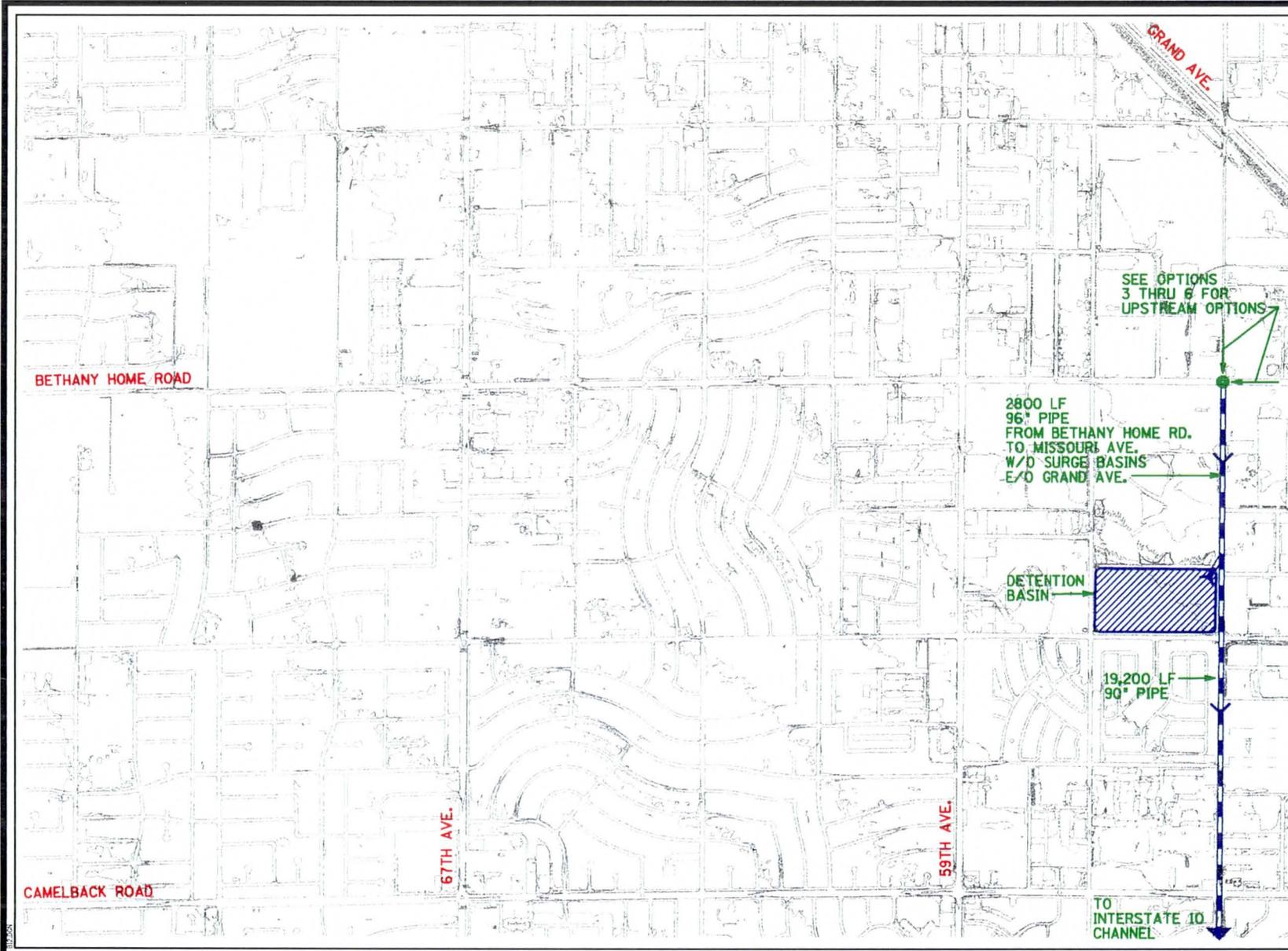
CONTINGENCIES:

Engineering, Legal & Administration (%)	1.5	\$91,476
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TOTAL \$6,189,876

GRAND TOTAL \$15,488,172

* Surge Basins - Reduced Pipes Sizes. Outlet Option



FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

MARYVALE AREA DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

FLOOD MITIGATION OPTIONS

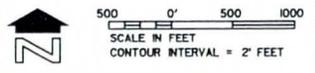


LOCATION MAP

RECONNAISSANCE LEVEL CONCEPT

GRAND AVENUE AT 51ST AVENUE

OPTION II, 10-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	JT/AR	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR		RECOMMENDED BY:
PLANS	PE/AL		APPROVED BY:
PLANS CHK.	AP		DATE
SUBMITTED BY:			DEPT. ENGINEER AND GENERAL MANAGER
			SHEET

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TABLE xx

06/06/97

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS

Non-Structural Option

for ponding areas as delineated by the ADMS

TITLE: GRAND AVENUE TOTAL

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>AMOUNT</u>
1	Value of Land	\$15,000,601.00
2	Value of Improvements	\$17,369,888.00
	TOTAL	<u>\$32,370,489.00</u>

Note: Valuations based on data provided by Engineering Mapping Solutions.

q:\m\vadmp\cost\grand canal\value.wb2



CONCEPT REPORT SUMMARY
MARYVALE AREA DRAINAGE MASTER PLAN

Grand Avenue Flood Mitigation Options

43rd Avenue and Camelback Road @ Grand Avenue

100-Year, 6-Hour Event:

Option 1	190 acre-foot off-line detention basin, 430 cfs flows to improved storm drains along 39th Ave and 43rd Ave.	\$13,742,000
Option 1a	310 acre-foot off-line detention basin, 89 cfs flows to existing storm drain along 43rd Ave.	\$15,380,000
Option 1b	276 acre-foot off-line detention basin, 165 cfs flows to improved storm drain along 43rd Ave.	\$15,149,000
Option 1c	212 acre-foot off-line detention basin, 355 cfs flows to existing storm drains along 39th Ave and 43rd Ave.	\$12,632,000

10-Year, 6-Hour Event:

Option 1	34 acre-foot off-line detention basin, 430 cfs flows to improved storm drains along 39th Ave and 43rd Ave.	\$6,454,000
Option 1a	134 acre-foot off-line detention basin, 89 cfs flows to existing storm drain along 43rd Ave.	\$7,379,000
Option 1b	104 acre-foot off-line detention basin, 165 cfs flows to improved storm drain along 43rd Ave.	\$7,776,000
Option 1c	50 acre-foot off-line detention basin, 355 cfs flows to existing storm drains along 39th Ave and 43rd Ave.	\$5,302,000

TABLE xx

June 13, 1997

SAMPLE COST TABLE
MARYVALE AREA DRAINAGE MASTER STUDY
 Flood Control District of Maricopa County

Contract FCD 93-29
 W/P # 94154.00

FLOOD MITIGATION OPTIONS
 COST ANALYSIS, OPTION 1c, 100-Year, 6-Hour Event

TITLE: 43rd Avenue and Camelback Road @ Grand Avenue

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	84" Storm Drain	\$229.00	LF	6,700	\$1,534,300
2	144" Storm Drain	\$488.00	LF	3,100	\$1,512,800
3	2-10x8 Box Culvert	\$554.00	LF	200	\$110,800
4	Inlet & Outlet Wings	\$7,480.00	EA	1	\$7,480
5	Junction Structures	\$50,000.00	EA	2	\$100,000
6	Pipe Jacking under Railroad	\$100,000.00	EA	1	\$100,000
7	Off-Line Detention Basin	\$4.00	CY	369,460	\$1,477,840
SUBTOTAL					\$4,843,220

CONTINGENCIES:

Construction (%)	20	\$968,644
Engineering (%)	7	\$339,025
Construction Admin (%)	6	\$290,593

TOTAL \$6,441,483

LAND ACQUISITION:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition (20 Acres)	\$7.00	SF	871,200	\$6,098,400
SUBTOTAL					\$6,098,400

CONTINGENCIES:

Engineering, Legal & Administration (%)	1.5	\$91,476
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TOTAL \$6,189,876

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GRAND TOTAL **\$12,631,359**

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

FLOOD
MITIGATION OPTIONS

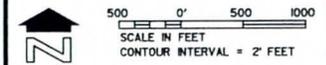


LOCATION MAP

RECONNAISSANCE
LEVEL CONCEPT

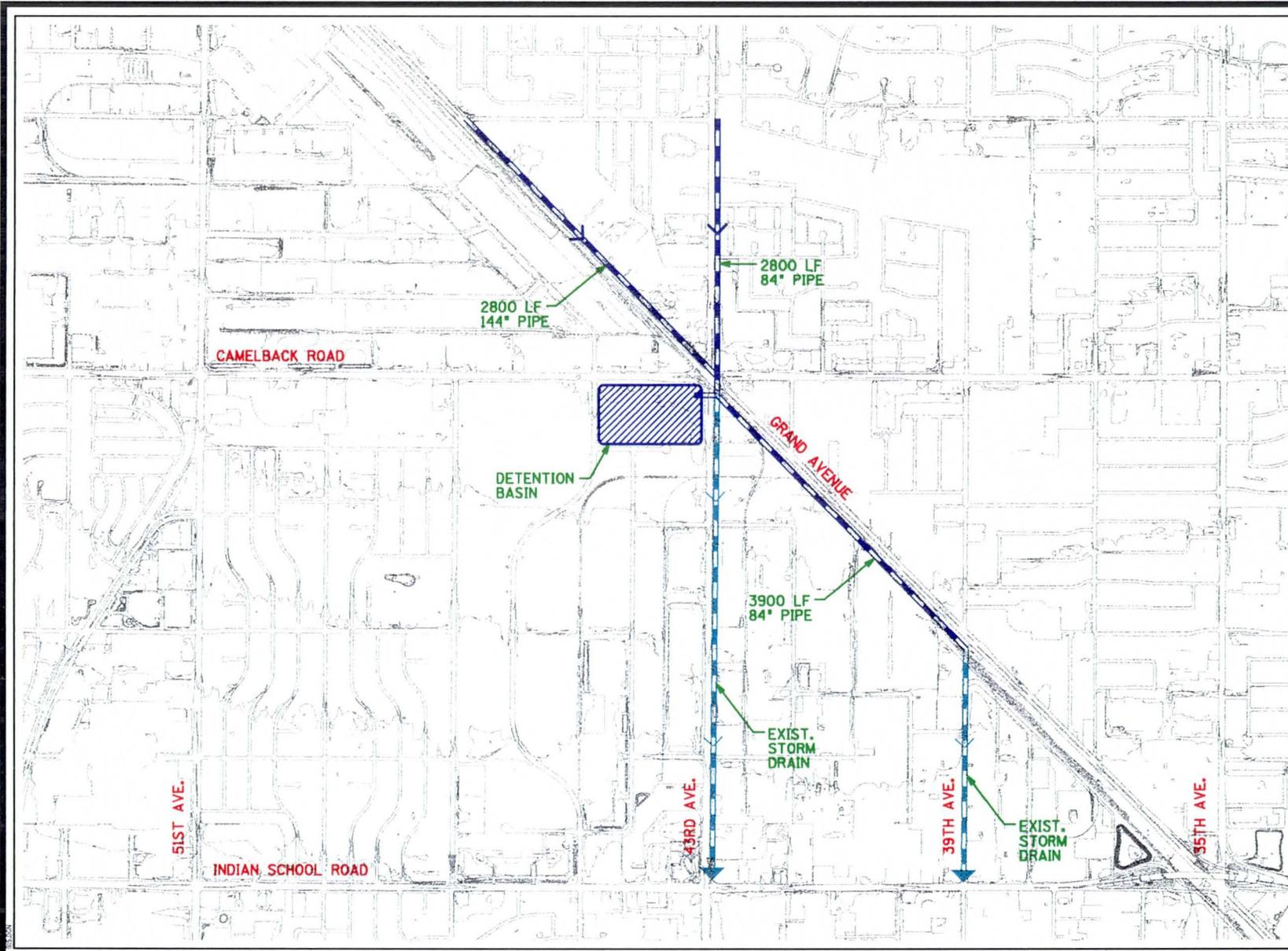
GRAND AVENUE
CAMELBACK ROAD
AT 43RD AVENUE

OPTION 1c, 100-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	JT/AR	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR		
PLANS	PE/AL		RECOMMENDED BY: DATE
PLANS CHK.	AP		APPROVED BY: DATE
SUBMITTED BY:			CHIEF ENGINEER AND GENERAL MANAGER
			SHEET OF



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BY KAMINSKI-HUBBARD ENGINEERING INC. AND PROJECT ENGINEERING CONSULTANTS, LTD.

PROJECT NO. 9454.00

TABLE xx

June 13, 1997

SAMPLE COST TABLE
MARYVALE AREA DRAINAGE MASTER STUDY
 Flood Control District of Maricopa County

Contract FCD 93-29
 W/P # 94154.00

FLOOD MITIGATION OPTIONS
 COST ANALYSIS, OPTION 1c, 10-Year, 6-Hour Event

TITLE: 43rd Avenue and Camelback Road @ Grand Avenue

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	72" Storm Drain	\$157.00	LF	2,800	\$439,600
2	84" Storm Drain	\$229.00	LF	3,900	\$893,100
3	96" Storm Drain	\$276.00	LF	2,800	\$772,800
4	108" Storm Drain	\$312.00	LF	300	\$93,600
5	10x8 Box Culvert	\$308.00	LF	200	\$61,600
6	Inlet & Outlet Wings	\$6,720.00	EA	1	\$6,720
7	Junction Structures	\$50,000.00	EA	2	\$100,000
8	Pipe Jacking under Railroad	\$100,000.00	EA	1	\$100,000
9	Off-Line Detention Basin	\$4.00	CY	88,740	\$354,960
SUBTOTAL					\$2,822,380

CONTINGENCIES:

Construction (%)	20	\$564,476
Engineering (%)	7	\$197,567
Construction Admin (%)	6	\$169,343

TOTAL \$3,753,765

LAND ACQUISITION:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition (5 Acres)	\$7.00	SF	217,800	\$1,524,600
SUBTOTAL					\$1,524,600

CONTINGENCIES:

Engineering, Legal & Administration (%)	1.5	\$22,869
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TOTAL \$1,547,469

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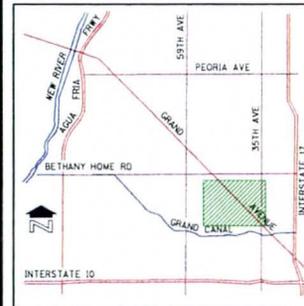
GRAND TOTAL **\$5,301,234**

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

FLOOD
MITIGATION OPTIONS



LOCATION MAP

RECONNAISSANCE
LEVEL CONCEPT

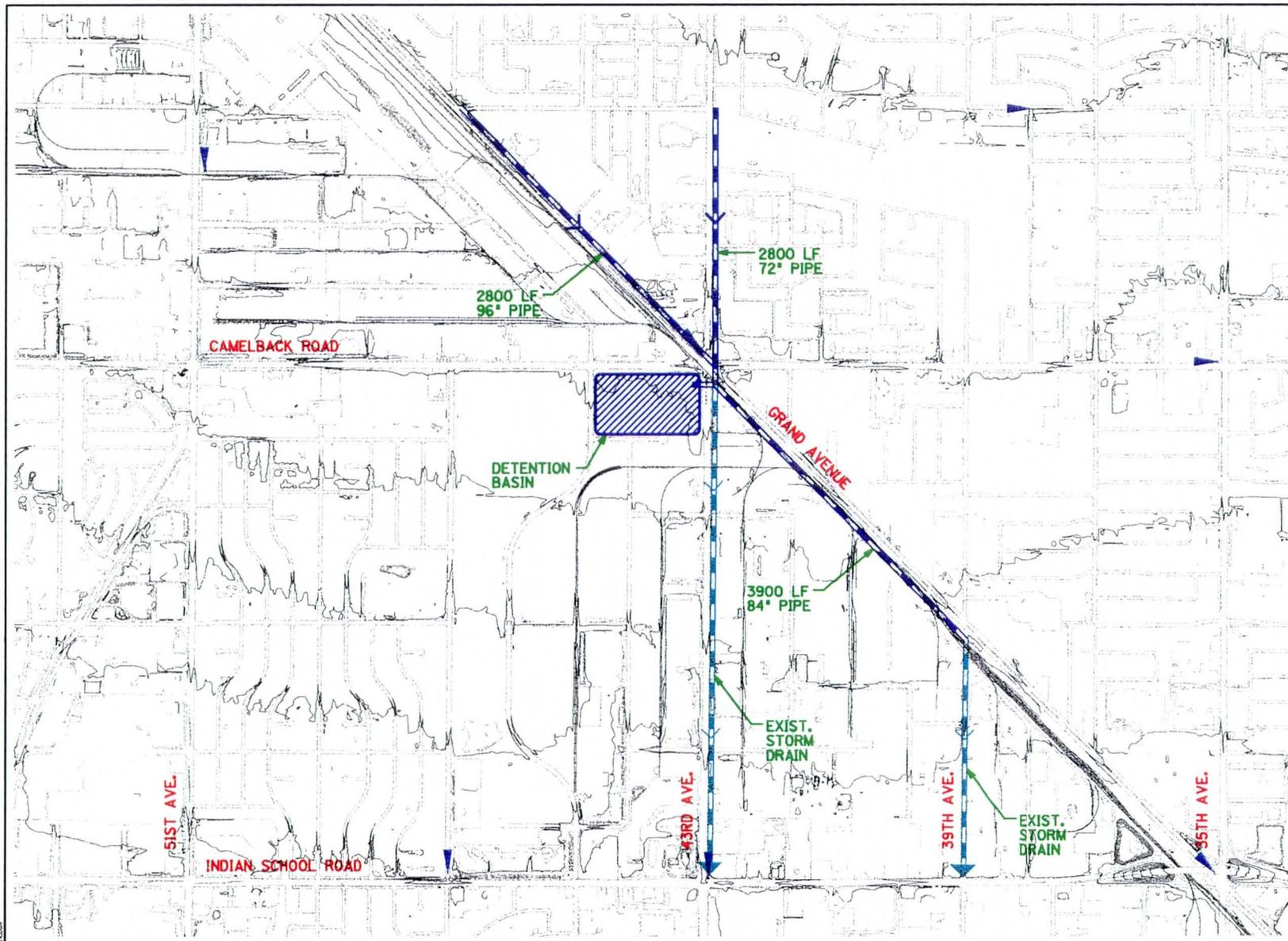
GRAND AVENUE
CAMELBACK ROAD
AT 43RD AVENUE

OPTION 1c, 10-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	BY	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR		
PLANS	PE/AL	DATE	
PLANS CHK.	AP	DATE	
SUBMITTED BY:		DATE	
			DESIGNER AND GENERAL MANAGER
			SHEET
			OF



NOTE:
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SCALE OF 1/4"=200 FEET WITH A 2 FOOT CONTOUR INTERVAL. MAPPING WAS PREPARED
BY KENNETH AERIAL MAPPING AND IS BASED ON GROUND CONTROL SURVEY DATA PROVIDED
BY KAMINSKI-HUBBARD ENGINEERING, INC. AND PROJECT ENGINEERING CONSULTANTS, LTD.

PROJECT NO. 94154.00



Grand Canal and Grand Avenue near 31st Avenue

100-Year, 6-Hour Event:

Option 1	300 acre-foot detention basin, 1,000 cfs flows to improved storm drains along 31th Ave, 35th Ave, 39th Ave and 43rd Ave.	\$18,829,000
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10-Year, 6-Hour Event:

Option 1	93 acre-foot detention basin, 750 cfs flows to improved storm drains along 31th Ave, 35th Ave, 39th Ave and 43rd Ave.	\$6,901,000
Option 1a	236 acre-foot detention basin, 250 cfs flows to existing storm drain along 31th Ave.	\$11,290,000
Option 1b	112 acre-foot detention basin, 660 cfs flows to improved storm drains along 31th Ave, 35th Ave, and 39th Ave.	\$6,785,000
Option 1c	210 acre-foot detention basin, 325 cfs flows to improved storm drains along 31th Ave, and 35th Ave.	\$11,270,000

TABLE xx

June 13, 1997

SAMPLE COST TABLE
MARYVALE AREA DRAINAGE MASTER STUDY
 Flood Control District of Maricopa County

Contract FCD 93-29
 W/P # 94154.00

FLOOD MITIGATION OPTIONS
 COST ANALYSIS, OPTION 1b, 10-Year, 6-Hour Event

TITLE: Grand Canal and Grand Avenue near 31st Avenue

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	90" Storm Drain	\$252.00	LF	5,300	\$1,335,600
2	102" Storm Drain	\$294.00	LF	700	\$205,800
3	Junction Structures	\$50,000.00	EA	2	\$100,000
4	Pipe Jacking under Railroad	\$100,000.00	EA	1	\$100,000
5	Detention Basin	\$4.00	CY	200,100	\$800,400
SUBTOTAL					\$2,541,800
<u>CONTINGENCIES:</u>					
				Construction (%)	20 \$508,360
				Engineering (%)	7 \$177,926
				Construction Admin (%)	6 \$152,508
TOTAL					\$3,380,594

LAND ACQUISITION:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition (11 Acres)	\$7.00	SF	479,160	\$3,354,120
SUBTOTAL					\$3,354,120
<u>CONTINGENCIES:</u>					
				Engineering, Legal & Administration (%)	1.5 \$50,312
TOTAL					\$3,404,432
<u>GRAND TOTAL</u>					<u>\$6,785,026</u>

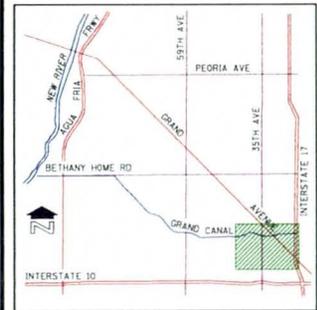
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FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

FLOOD
MITIGATION OPTIONS



LOCATION MAP

RECONNAISSANCE
LEVEL CONCEPT

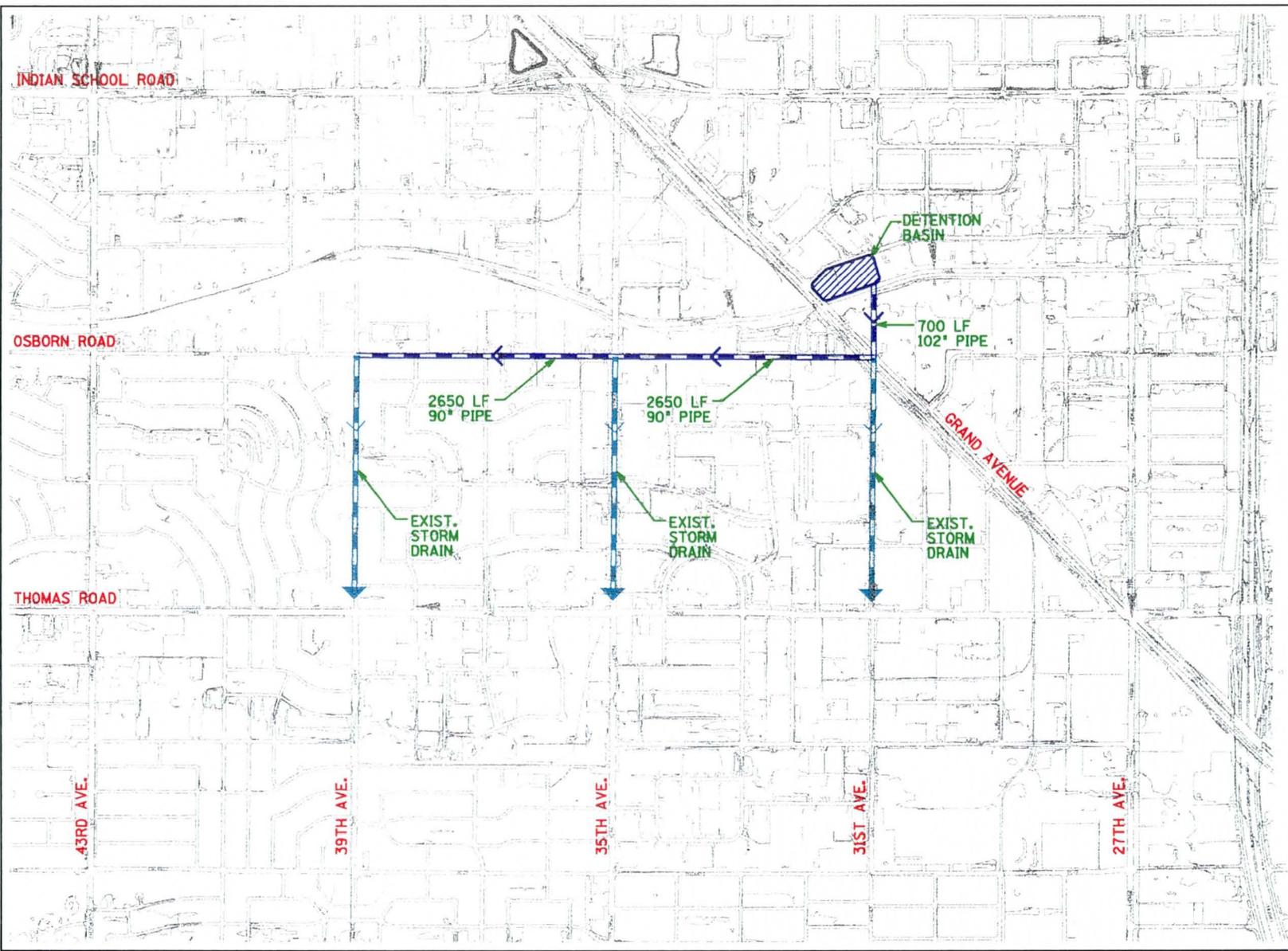
GRAND AVENUE AT
31ST AVENUE

OPTION 1b, 10-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	BY	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY	
DESIGN CHK.	JT/AR		RECOMMENDED BY:	DATE
PLANS	PE/AL		APPROVED BY:	DATE
PLANS CHK.	AP		DIST. ENGINEER AND GENERAL MANAGER	DATE
SUBMITTED BY:		DATE:	SHEET:	OF



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BY KENNEY AERIAL MAPPING AND IS BASED ON GROUND CONTROL SURVEY DATA PROVIDED
BY KAMNSKI-HUBBARD ENGINEERING INC. AND PROJECT ENGINEERING CONSULTANTS, LTD.



CONCEPT REPORT SUMMARY
MARYVALLE AREA DRAINAGE MASTER PLAN

I-10 Flood Mitigation Options

I-10 Channel Flood Mitigation Options

Option 1, 100-Year:	Offline basin southwest corner of 83rd Avenue and McDowell Road (designed to remove 2,600 cfs from peak of hydrograph to prevent overtopping of channel west of 83rd Avenue)	\$18,482,000
*Option 2, 100-Year:	Offline basin southeast corner of future AFF interchange and I-10. Designed to remove peak of hydrograph to allow for flow downstream of the interchange to be comparable to flows in the ADOT Thomas Road basin design	\$7,348,000
Option 1, 10-Year:	Offline basin northwest corner of 67th Avenue and McDowell Road (not designed for particular return event, but to reduce flows contributing to I-10 channel)	\$ 7,219,000
Option 2, 10-Year:	Offline basin southwest corner of 75th Avenue and McDowell Road (remove peak of hydrograph does not have capacity for removing 2,600 cfs from peak)	\$16,150,000

GENCOR\94154.M08

* Options selected for Level II Analysis based on input from the communities and FCDMC on May 29, 1997

TABLE xx

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 1, 100-YEAR

TITLE: 83rd AVENUE & I-10 ADOT BASIN

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	48" Storm Drain	\$110.00	LF	250	\$27,500
2	18" Storm Drain	\$70.00	LF	2,150	\$150,500
3	Storm Drain Manholes	\$2,000.00	EA	5	\$10,000
4	Headwall/Outlet Structures	\$5,000.00	EA	1	\$5,000
5	Concrete Weir Structure	\$50,000.00	EA	1	\$50,000
6	Off-Line Detention Basin Excavation	\$4.00	CY	1,051,500	\$4,206,000
				SUBTOTAL	\$4,449,000

CONTINGENCIES:

Construction (%)	20	\$889,800
Engineering (%)	7	\$311,430
Construction Admin (%)	6	\$266,940

TOTAL **\$5,917,170**

LAND ACQUISITION

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition	\$7.00	SF	1,768,500	\$12,379,500
				SUBTOTAL	\$12,379,500

CONTINGENCIES:

Engineering, Legal & Administrative (%)	1.5	\$185,693
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TOTAL **\$12,565,193**

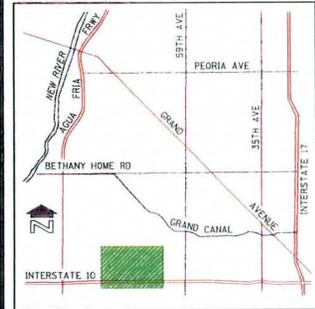
GRAND TOTAL **\$18,482,363**

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

FLOOD
MITIGATION OPTIONS



LOCATION MAP

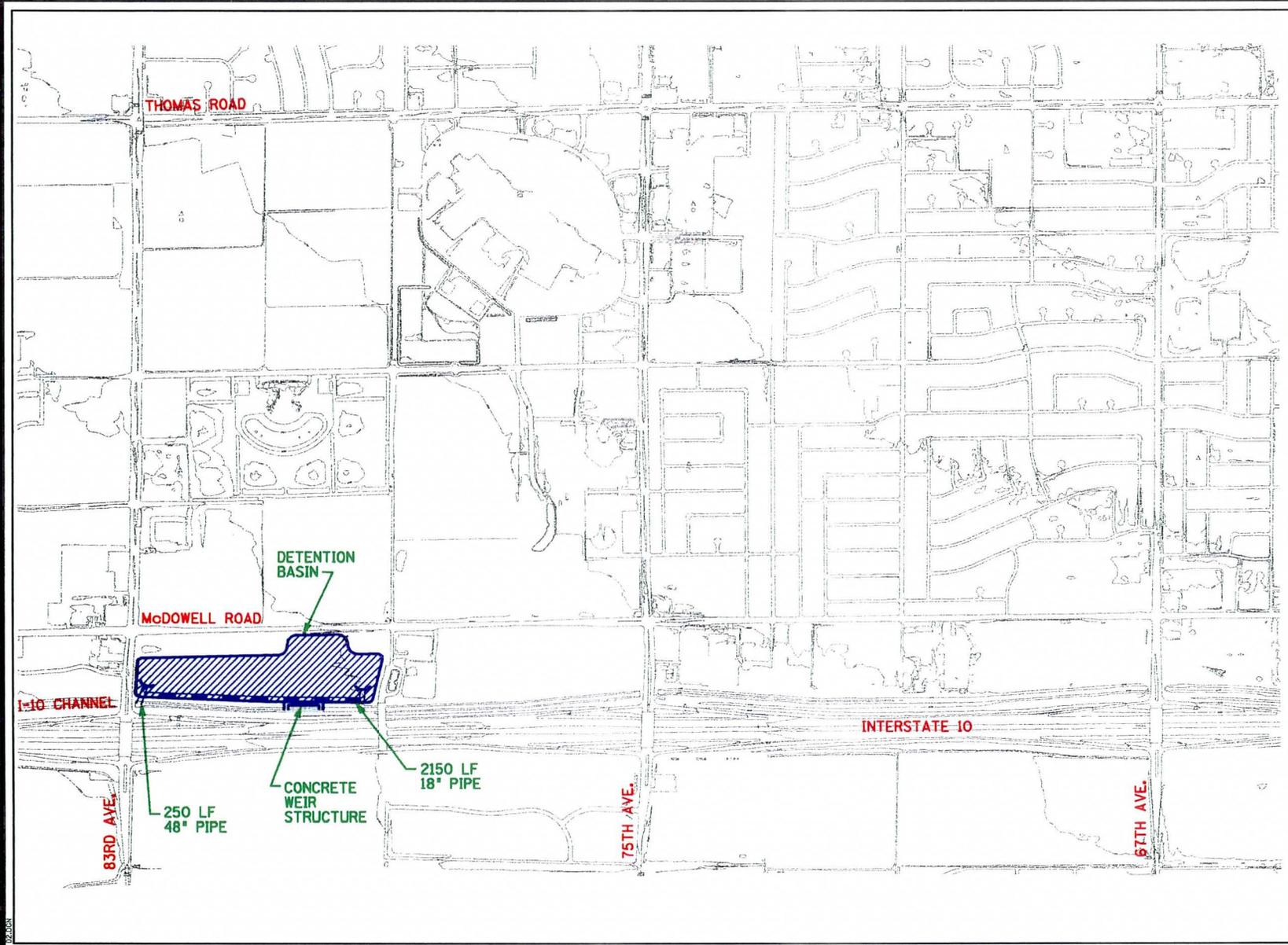
RECONNAISSANCE
LEVEL CONCEPT

INTERSTATE 10
OPTION 1, 100-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	JT/AR	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR		RECOMMENDED BY:
PLANS	PE/AL		APPROVED BY:
PLANS CHK.	AP		DATE
SUBMITTED BY:		DATE	CHIEF ENGINEER AND GENERAL MANAGER
			SHEET OF



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PROJECT NO. 94154.00

TABLE xx

MARYVALE AREA DRAINAGE MASTER STUDY
 Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 2, 100-YEAR

TITLE: Detention Basin at the future AFF Interchange and I-10

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	48" Storm Drain	\$110.00	LF	150	\$16,500
4	Headwall/Outlet Structures	\$5,000.00	EA	1	\$5,000
5	Concrete Weir Structure	\$50,000.00	EA	1	\$50,000
6	Off-Line Detention Basin Excavation	\$4.00	CY	365,000	\$1,460,000
SUBTOTAL					\$1,531,500
<u>CONTINGENCIES:</u>					
				20	\$306,300
				7	\$107,205
				6	\$91,890
TOTAL					\$2,036,895

LAND ACQUISITION

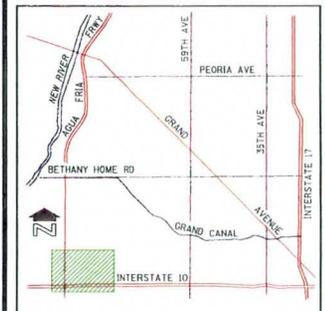
ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition	\$7.00	SF	747,500	\$5,232,500
SUBTOTAL					\$5,232,500
<u>CONTINGENCIES:</u>					
				1.5	\$78,488
TOTAL					\$5,310,988
<u>GRAND TOTAL</u>					<u>\$7,347,883</u>

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

FLOOD
MITIGATION OPTIONS

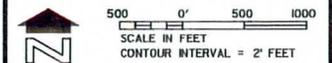


LOCATION MAP

RECONNAISSANCE
LEVEL CONCEPT

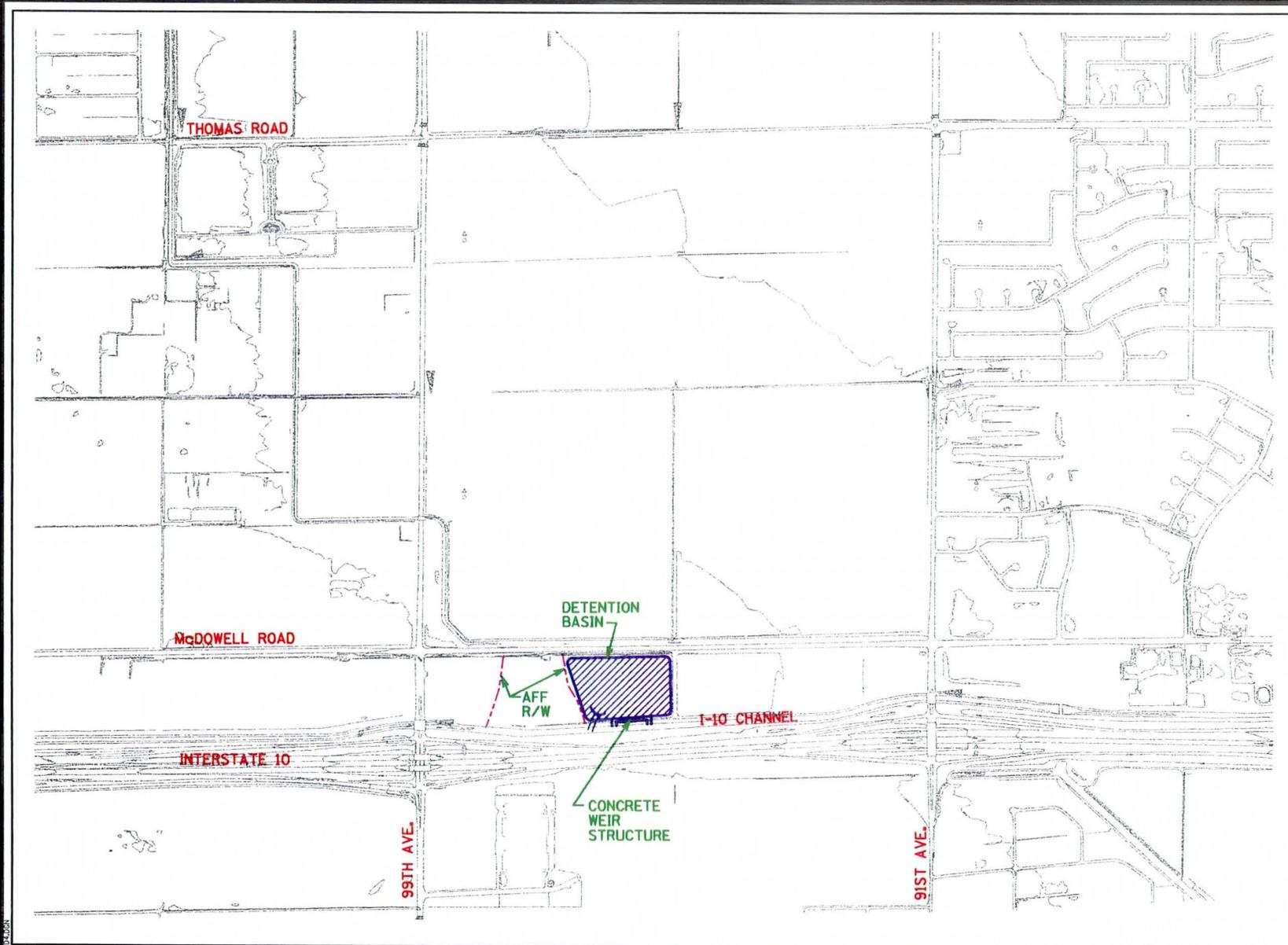
INTERSTATE 10 &
FUTURE
AGUA FRIA FREEWAY

OPTION 2, 100-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	JT/AR	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR		RECOMMENDED BY:
PLANS	PE/AL	DATE	APPROVED BY:
PLANS CHK.	AP	DATE	DATE
SUBMITTED BY:		DATE	DATE
			CHIEF ENGINEER AND GENERAL MANAGER
			SHEET
			OF



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PROJECT NO. 9454.00

TABLE xx

May 28, 1997

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 1, 10-YEAR

TITLE: 67th Avenue and McDowell Road Detention Basin

MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	42" Storm Drain	\$ 105.00	LF	300	\$31,500
2	Inlet/Outlet Headwalls	\$ 2,000.00	EA	2	\$4,000
3	Off-Line Detention Basin Ex	\$ 4.00	CY	330,000	\$1,320,000
SUBTOTAL					\$1,355,500
<u>CONTINGENCIES:</u>					
	Construction (%)			20	\$271,100
	Engineering (%)			7	\$94,885
	Construction Admin (%)			6	\$81,330
TOTAL					\$1,802,815

LAND ACQUISITION:

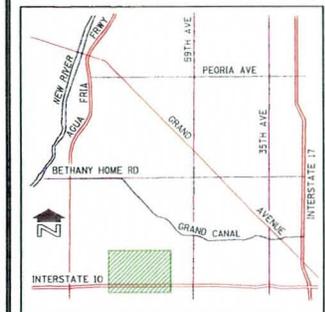
ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	North Basin Land Acquisition (17.5 Acres)	\$7.00	SF	762,300	\$5,336,100
SUBTOTAL					\$5,336,100
<u>CONTINGENCIES:</u>					
	Engineering, Legal & Administration (%)			1.5	\$80,042
TOTAL					\$5,416,142
<u>GRAND TOTAL</u>					<u>\$7,218,957</u>

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

FLOOD
MITIGATION OPTIONS



LOCATION MAP

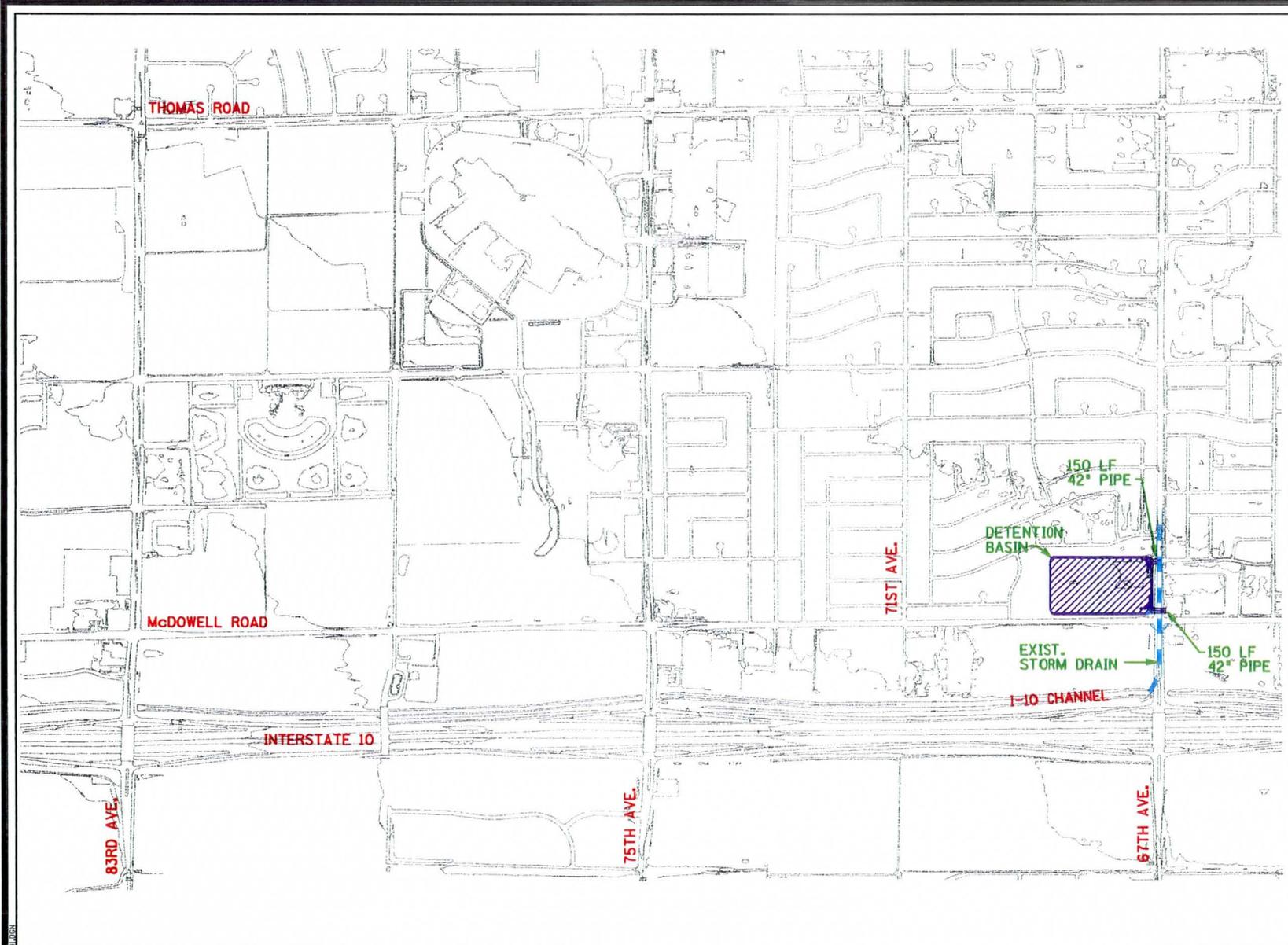
RECONNAISSANCE
LEVEL CONCEPT

INTERSTATE 10
OPTION 1, 10-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	JT/AR	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHK.	JT/AR		RECOMMENDED BY:
PLANS	PE/AL	DATE	APPROVED BY:
PLANS CHK.	AP	DATE	DATE
SUBMITTED BY:		DATE:	CHEF ENGINEER AND GENERAL MANAGER
			SHEET



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PROJECT NO. 94154.00

TABLE XX

MARYVALE AREA DRAINAGE MASTER STUDY
Flood Control District of Maricopa County

June 19, 1997

Contract FCD 93-29
W/P # 94154.00

FLOOD MITIGATION OPTIONS
COST ANALYSIS, OPTION 2, 10-YEAR

TITLE: 75th AVENUE AND I-10 BASIN

BASIN MAJOR ELEMENTS:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	48" Storm Drain	\$110.00	LF	250	\$27,500
2	Headwall/Outlet Structures	\$5,000.00	EA	1	\$5,000
3	Concrete Weir Structure	\$50,000.00	EA	1	\$50,000
4	Off-Line Detention Basin Excavation	\$4.00	CY	1,037,000	\$4,148,000
SUBTOTAL					\$4,230,500
<u>CONTINGENCIES:</u>					
	Construction (%)			20	\$846,100
	Engineering (%)			7	\$296,135
	Construction Admin (%)			6	\$253,830
TOTAL					\$5,626,565

LAND ACQUISITION:

ITEM	DESCRIPTION	UNIT PRICE	UNIT	QUANTITY	AMOUNT
1	Basin Land Acquisition (34 Acres)	\$7.00	SF	1,481,040	\$10,367,280
SUBTOTAL					\$10,367,280
<u>CONTINGENCIES:</u>					
	Engineering, Legal & Administration (%)			1.5	\$155,509
TOTAL					\$10,522,789
<u>GRAND TOTAL</u>					<u>\$16,149,354</u>

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

MARYVALE AREA
DRAINAGE MASTER STUDY

CONTRACT NO. FCD 93-29

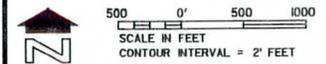
FLOOD
MITIGATION OPTIONS



LOCATION MAP

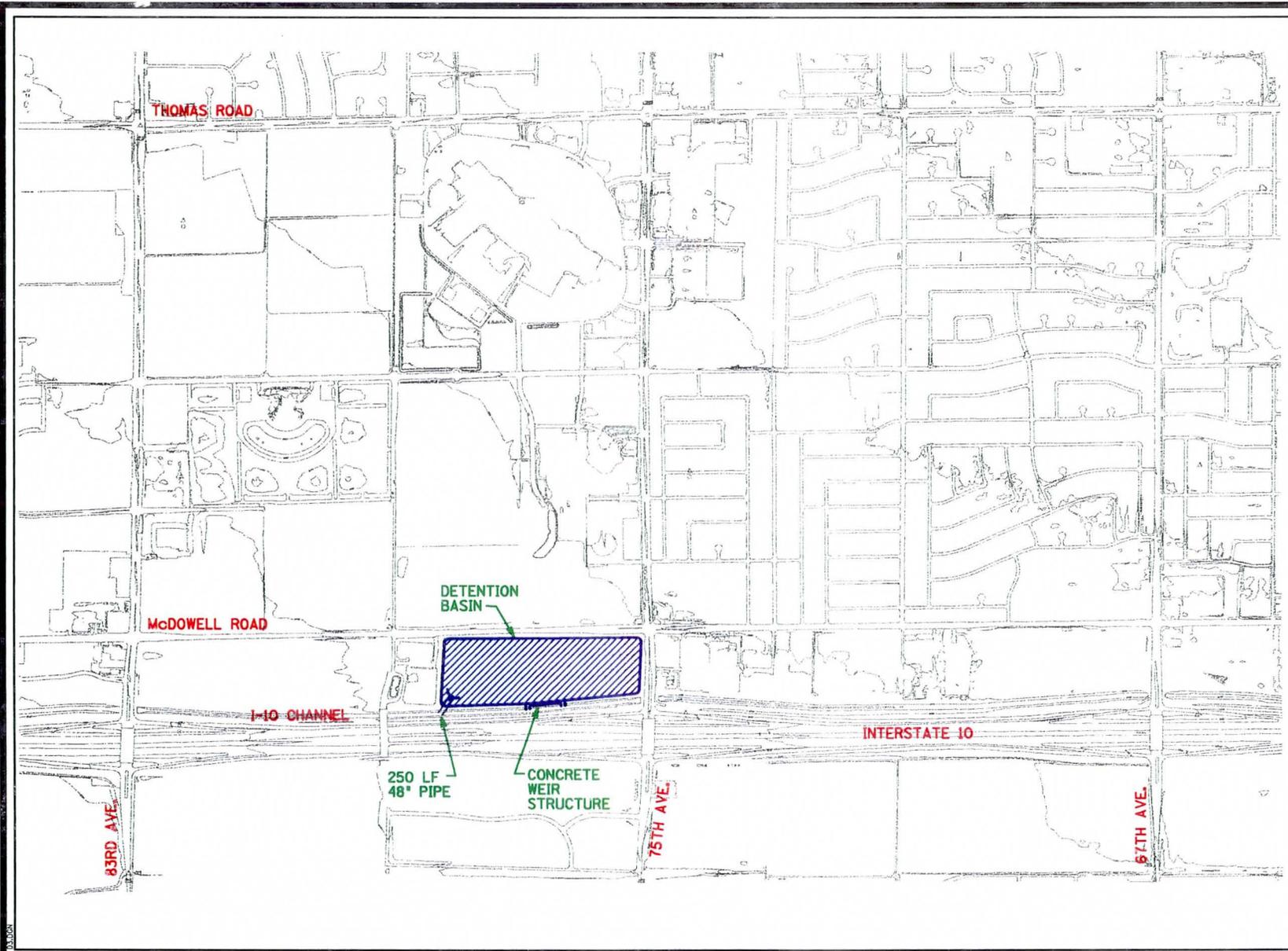
RECONNAISSANCE
LEVEL CONCEPT

INTERSTATE 10
OPTION 2, 10-YEAR



WOOD, PATEL & ASSOCIATES, INC.

DESIGN	BY	DATE	FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
DESIGN CHR.	JT/AR		
PLANS	PE/AL		RECOMMENDED BY: DATE
PLANS CHR.	AP		APPROVED BY: DATE
SUBMITTED BY:			CHIEF ENGINEER AND GENERAL MANAGER
			SHEET OF



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SCALE OF 1/4\"/>