

Technical Memorandum

Conceptual Alternatives for the Elliot Basins

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SECTION 1.0 INTRODUCTION

1.1 Purpose of Study

The purpose of this study is to evaluate other conceptual alternatives for the East Mesa Area Drainage Master Plan, since the Elliot Basins may not be constructed.

1.2 Study Area

The study area includes that portion of the City of Mesa within the bounds of Ellsworth Road to the west, the Superstition Freeway (I-60) to the north, Meridian Road to the east, and Elliot Road to the south; and, Pinal County east of Meridian Road, north of the Elliot Road alignment, and southwest of the Central Arizona Project (CAP) canal.

The study limits are defined by watershed boundaries identified under the East Mesa Area Drainage Master Plan (ADMP) prepared by the Flood Control District of Maricopa County, October 1998. The watershed sub-basins comprising the geographical study area are 61A, 61B, 65A, 65AW, 65B, 66A, 66B, 66C, 66D, 67A, 67B, 67C, 67D, and 67E. Flows north of the Superstition Freeway and northeast of the CAP impact sub-basins within the study area and were considered in the analyses.

1.3 Modeling

All hydrologic analyses were performed using the USACE's HEC-1, version 4.1, dated June 1998. The existing conditions model (MIDCURR.DAT) results are presented in this memorandum for comparison with future development conditions. All other HEC-1 models presented in this report reflect future conditions land use. Future conditions assumes 80% capture of the 100-year 2-hour runoff volume for development within the City of Mesa. (See *East Mesa Area Drainage Master Plan, Hydrologic Analysis, Volume 1 of 2, Section 4.4.5 Retention Values* prepared by the Flood Control District of Maricopa County, October 1998 for a more detailed discussion of how retention volumes were determined.) The portion of the watershed within Pinal County was considered existing conditions for both existing and future conditions modeling. This assumption is based on Pinal County's stormwater management criteria that post development runoff peak discharges may not exceed existing runoff peak discharges.

Both existing and future conditions models include the Elliot Drain. There are three (3) inflow points to the Elliot Drain east of the Crismon Road Alignment. Starting from the east and moving westward, they are: a 78" pipe at approximately 104th St; 3-42" diam. pipes on the south side of a dip crossing over Elliot Road; and, 2-48" diam. pipes on the south side of a second dip crossing over Elliot Road. The inlet capacity's for the three locations are 500 cfs, 250 cfs, and 250 cfs respectively.

A fourth inlet to the Elliot Drain is present at the northeast corner of Ellsworth and Elliot Roads. This 82" diam. pipe stub has been modeled in the HEC-1 with a capacity of 100 cfs based on an overall 1100 cfs capacity for Elliot Drain. The inlet may be capable of accepting flows of 300 cfs if the Elliot Drain is not otherwise full. Recent analyses indicate that the pipe may be able to accept approximately 350 cfs when timing of hydrographs is considered.

SECTION 2.0 HYDROLOGIC ANALYSES

2.1 Existing Conditions vs. Future Conditions Land Use

2.1.1 Description

Three HEC-1 models were prepared to compare land use conditions as they exist today (existing conditions) to land use conditions under future development. Future land uses were those determined under the East Mesa ADMP.

The three HEC-1 models used in the analyses were:

MIDCURR.DAT:	Existing land use model
FMIDCURR.DAT:	Future land use model
FMIDCUR0.DAT:	Future land use model with sub-basin 65A subdivided into 2 independent sub-basins. Divide between the 2 sub-basins begins at Meridian Road at approximately the Guadalupe Road alignment and extends northeastward to the CAP.

2.1.2 Modeling Assumptions

Land Use: Both future conditions models assume that 100-yr, 2-hr retention will be provided for all future development within the City of Mesa. Existing land use conditions were assumed for sub-basin 65A, within Pinal County, since Pinal County regulations require that pre-development discharges are not exceeded under post-development conditions.

Routing: Routing for the future conditions models assumes the same flow paths as those used to model the existing conditions.

For FMIDCUR0.DAT, sub-basin 65A1, the northern sub-basin split from 65A, was routed to concentration point CP65B via a natural channel in sub-basin 65B. Flows from CAP pipe overchutes CAP1A and CAP1B, which drain sub-basin 58 located north of the CAP and northeast of sub-basin 65A, were routed through sub-basin 65A and 65A1 and combined with sub-basin 65AW for all three flow scenarios. Each of these pipe overchutes discharges a peak flow of 217 cfs.

FMIDCUR0.DAT was prepared to see if the splitting of sub-basin 65A into two separate sub-basins yielded significant differences in the downstream runoff values. As the model yielded similar results at CP65B as FMIDCURR.DAT, it was not used for any further modeling or comparisons.

2.1.3 Comparison of Flows

The following table (Table 1) summarizes the peak flows determined under the modeling scenarios:

Table 1

Concentration Point	Descriptive Location	Peak Discharge (cfs)		
		Existing Conditions (MIDCURR)	Future Conditions (FMIDCURR)	Future Conditions (FMIDCUR0)
C65A1	Approx Intersection of Guadalupe & Meridian	434 ⁽¹⁾	434 ⁽¹⁾	1062
65AWTB or C65A1W ⁽²⁾	At CP65B ⁽²⁾	515 ⁽²⁾	454 ⁽²⁾	797 ⁽²⁾
65A or 65A2	Approx 1000 ft N of Elliot Rd on Meridian	1298	1298	912
CP65B	NE Corner of Crismon Rd Align & Elliot Rd - To Elliot Drain	1920	1586	1504
CP66	NE Corner Ellsworth & Elliot Roads	828	513	468
CP67E	Approx 1500 ft N of Elliot on Ellsworth	1285	710	710

- (1) Flow based on summation of CAP1A and CAP1B hydrographs. No concentration point exists in model.
- (2) Discharges for MIDCURR and FMIDCURR = CAP1A + CAP1B + 65AW routed to CP65B (before the addition of flows from 65A and 65B). Discharge for FMIDCUR0 = (CAP1A + CAP1B + 65A1 routed to CP65B) + (65AW routed to CP65B).

2.2 Future Land Use with Siphon Draw Basin and Sunland Springs Channel in Place

2.2.1 Description

The future land use HEC-1 model, FMIDCURR.DAT, was modified to include Sunland Springs Channel and Siphon Draw Basin. The design presented in the East Mesa ADMP, prepared by Dibble & Associates, July 1998 (Reference), was used for modeling the channel and basin.

The models used in the analyses were:

MIDCURR.DAT: Existing land use model
 FMIDCURR.DAT: Future land use model
 FMIDCUR1.DAT: Future land use model with Siphon Draw Basin and Sunland Springs Channel in place

2.2.2 Modeling Assumptions

Land Use: Both future land use models assume that 100-yr, 2-hr retention will be provided for all future development within the City of Mesa. Existing land use conditions were assumed for sub-basin 65A, within Pinal County, since Pinal County regulations require that pre-development discharges are not exceeded under post-development conditions.

Routing: Routing for the future conditions model, FMIDCURR, assumes the same flow paths as those used to model the existing conditions.

For the channel and basin model, FMIDCUR1, flow paths have been left the same as the existing conditions model with the exception of routings from the CAP overchutes above 65A through CP65B in sub-basin 65B. In FMIDCUR1, both CAP1A and CAP1B are routed through sub-basin 65A in the Sunland Springs Channel. Sunland Springs Channel is assumed to end approximately 1100 ft north of Elliot rather than continuing to Elliot as in the original ADMP design. The channel routing then continues across Meridian Road and through the Meridian Point subdivision. The channel through this subdivision has been observed with relatively dense vegetation. For this analysis, however, the channel has been assumed to have been cleared of most of the vegetation. A Manning's 'n' value of 0.030 was used for the channel and overbank areas. Flows were then routed south along Mountain Road to Elliot in a concrete channel. This concrete channel was assumed to have the same shape, slope, and 'n' values as the channel designed in the original ADMP to take flows from the Siphon Draw Diversion Structure to the basin outlet at Elliot. From Mountain Road and Elliot, flows were routed through an earthen channel along Elliot using the same configuration presented in ADMP prepared by Dibble & Associates. The channel ends approximately 0.6 miles east of the Crismon Road Alignment. It was assumed that the earthen channel would direct flows to the Elliot Drain.

2.2.3 Comparison of Flows

The following table (Table 2) summarizes the peak flows determined under the modeling scenarios:

Table 2

Concentration Point	Descriptive Location	Peak Discharge (cfs)		
		Existing Conditions (MIDCURR)	Future Conditions (FMIDCURR)	Future Conditions w/ Sunland Springs Channel & Siphon Draw Basin (FMIDCUR1)
C65A1	Approx Intersection of Guadalupe & Meridian	434 ⁽¹⁾	434 ⁽¹⁾	0 ⁽²⁾
65AWTB ⁽³⁾	At CP65B ⁽³⁾	515 ⁽³⁾	454 ⁽³⁾	16 ⁽⁴⁾
65A or C65A2	Approx 1000 ft N of Elliot Rd on Meridian	1298	1298	513
D65B or R65B	Sub-basin 65B	753	669	669
CP65B	NE Corner of Crismon Rd Align & Elliot Rd - To Elliot Drain	1920	1586	998
CP66	NE Corner Ellsworth & Elliot Roads	828	513	334
CP67E	Approx 1500 ft N of Elliot on Ellsworth	1285	710	710

- (1) Flow based on summation of CAP1A and CAP1B hydrographs. No concentration point exists in model.
- (2) Flows from CAP1A and CAP1B diverted south through Sunland Springs Channel
- (3) Discharges for MIDCURR and FMIDCURR = CAP1A + CAP1B + 65AW routed to CP65B (before the addition of flows from 65A and 65B).
- (4) Discharge for FMIDCUR1 = 65AW routed to CP65B.

2.3 Future Land Use with Siphon Draw Basin and Sunland Springs Channel in Place and Crismon Channel extended south to Elliot Road, then west to Ellsworth Road along north side of Elliot

2.3.1 Description

The model FMIDCUR1 was modified to include an extension of Crismon Channel from its present termination, approximately 0.5 miles north of Elliot, south to Elliot Road.

The purpose of this model was to develop baseline conditions for evaluation of placement of a detention basin on the property located on the northeast corner of Ellsworth and Elliot Roads and on the General Motors Property to the south of Elliot Road.

2.3.2 *Modeling Assumptions*

Land Use: Both future land use models assume that 100-yr, 2 -hr retention will be provided for all future development within the City of Mesa. Existing land use conditions were assumed for sub-basin 65A, within Pinal County, since Pinal County regulations require that pre-development discharges are not exceeded under post-development conditions.

Routing: Routing for the future conditions model, FMIDCUR2, assumes the same flow paths as those described in section 2.2.2 for FMIDCUR1 except for the extension of Crismon Channel. Currently, Crismon Channel terminates approximately 0.5 miles south of Guadalupe Road along the Crismon Road Alignment. Sub-basins 66A, 66B, 67A, 67B, 67C, and 67D, all upstream of the channel, are diverted into sub-basin 67E at the channel terminus. Under model FMIDCUR2, these sub-basins, along with 66C, are diverted south along the same alignment to Elliot Road. From there, flows are routed west to CP66 at the intersection of Ellsworth and Elliot Roads. An earthen channel with 'n' values of 0.032 was used for the routing of both reaches in the modeling. The channel configuration for both reaches matches that of the Crismon Channel design plans.

2.3.3 *Comparison of Flows*

The following table (Table 3) summarizes the peak flows determined under the modeling scenarios:

Table 3

Concentration Point	Descriptive Location	Peak Discharge (cfs)			
		Existing Conditions (MIDCURR)	Future Conditions (FMIDCURR)	Future Conditions w/ Sunland Springs Channel & Siphon Draw Basin (FMIDCUR1)	Future Conditions w/ Sunland Springs Channel, Siphon Draw Basin, & Crismon Channel Extended (FMIDCUR2)
C65A1	Approx Intersection of Guadalupe & Meridian	434 ⁽¹⁾	434 ⁽¹⁾	0 ⁽²⁾	0 ⁽²⁾
65AWTB ⁽³⁾	At CP65B ⁽³⁾	515 ⁽³⁾	454 ⁽³⁾	16 ⁽⁴⁾	16 ⁽⁴⁾
65A or C65A2	Approx 1000 ft N of Elliot Rd on Meridian	1298	1298	513 ⁽⁵⁾	513 ⁽⁵⁾
D65B or R65B	Sub-basin 65B	753	669	669	669
CP65B	NE Corner of Crismon Rd Align & Elliot Rd – To Elliot Drain	1920	1586	998	998
D66C or CP66C	At Outlet of Sub-basin 66C	385	257	257	713
CP66CB	Crismon Channel at Elliot Rd	N/A	N/A	N/A	710
CP66D	Sub-basin 66D	223	350	350	350
CP66 or C66D	NE Corner Ellsworth & Elliot Roads	828	513	349	720
CP67E or R67E	Approx 1500 ft N of Elliot on Ellsworth	1285	710	710	268

(1) Flow based on summation of CAP1A and CAP1B hydrographs. No concentration point exists in model.

(2) Flows from CAP1A and CAP1B diverted south through Sunland Springs Channel

(3) Discharges for MIDCURR and FMIDCURR = CAP1A + CAP1B + 65AW routed to CP65B (before the addition of flows from 65A and 65B).

(4) Discharge for FMIDCUR1 = 65AW routed to CP65B.

(5) Downstream of Siphon Draw Basin

SECTION 3.0 CONCEPTUAL ALTERNATIVES ANALYSES

3.1 Enlargement of Siphon Draw Basin

Discussion: The watershed above the CAP, which drains through two pipe overchutes into sub-basin 65A, generates approximately 129 ac-ft of runoff. Sub-basin 65A generates approximately 123 ac-ft of runoff. Total runoff volume for the watershed upstream of Siphon Draw Basin, therefore, is approximately 252 ac-ft. The proposed Siphon Draw Basin will provide approximately 92 ac-ft of storage at the design high water elevation, leaving approximately 160 ac-ft uncollected.

The degree of proposed enlargement of the basin is dependent on the desired result. At best, 160 ac-ft of additional storage should capture all runoff from the entire upstream watershed. As can be seen in Table 2, with the ADMP proposed basin, 513 cfs crosses Meridian Road from sub-basin 65A. When this flow is combined with flows from sub-basins 65AW and 65B at CP65B, the net peak runoff is 998 cfs. The peak flow generated by sub-basin 65B (see Table 3) alone is 669 cfs. If the basin were enlarged to capture the entire upstream flow, the peak at CP65B would be 669 cfs. The reduction of the 513 cfs to zero at Meridian Road would result in a 329 cfs decrease in flow at CP65B. CP65B essentially represents the flows into the Elliot Drain. The capacity of Elliot Drain has been determined under other studies (not part of this technical memorandum study) as approximately 1100 cfs.

The property immediately downstream of the proposed basin, on the west side of Meridian Road, is the subdivision, Meridian Point. From the design engineer's calculations for this development, it appears that the existing channel through the subdivision was designed to convey flows of approximately 700 cfs. The remaining properties along the flow path to the Elliot Drain are undeveloped.

Summary: The channel within the Meridian Point subdivision, per the design engineer's report, should be capable of carrying the 513 cfs under the currently proposed Siphon Draw Basin design. Benefits to the existing subdivision for expanding the storage capacity of the basin would be additional freeboard in the channel, capacity above the 100-yr, 24-hr flows, and/or allowance for increased vegetation within the channel.

The undeveloped properties between the existing subdivision and the Elliot Drain inflow points will likely have to deal with existing flows until such time that Siphon Draw Basin is constructed. Therefore, it is likely if development occurs in the near future on these properties that on-site channels will be sized for flows greater than 513 cfs. Therefore, reductions in flow below 513 cfs will have no benefit other than those listed for the existing subdivision.

Elliot Drain is capable of carrying 1100 cfs. Under future conditions, with the Siphon Draw Basin and the Sunland Springs Channel in place, the peak flow to Elliot Drain is 998 cfs. Therefore, the pipes are capable of carrying the future conditions peak flows. The reduction of flow to Elliot Drain through enlargement of the Siphon Draw Basin is not likely to greatly benefit properties to the east of the Crismon Road Alignment but may allow for entrance of flows from another location further downstream along the pipe.

3.2 Construction of Basin on Property West of Meridian Point Subdivision and South of SRP Sub-station

Discussion: Placement of a basin on the property west of the Meridian Point subdivision and south of the SRP sub-station would basically result in a capturing of flows from sub-basin 65A. The Meridian Point subdivision would be the majority of that portion of sub-basin 65B which potentially could be captured by the basin. As 100-yr, 2-hr retention is already being provided for the subdivision, runoff volumes and peaks from the 100-yr, 24-hr storm would be expected to be relatively low. Therefore, any basin proposed for this location would essentially produce the same results described under section 3.1 *Enlargement of Siphon Draw Basin*. Again, the size of the basin would be determined by the desired result. If full capture is desired, a basin with a storage capacity of approximately 160 ac-ft would be required. Reductions in peak flows would be the same as those described in Section 3.1 (above).

Summary: Considering the best case, where a basin with a storage capacity of approximately 160 ac-ft was provided, reductions in peak flows would be the same as those described in Section 3.1 (above). The benefits would be the same as those described in Section 3.1 with the exception that there would be no drainage benefits to the Meridian Point subdivision.

For the property west of the Meridian Point subdivision, a significant portion of the property would be lost to the basin. For example, the estimated land area needed for the proposed Siphon Draw Basin, which is to provide approximately 92 ac-ft of storage, is 55 acres. This equates to approximately half of the property to the west of the Meridian Point subdivision.

3.3 Construction of Basin on General Motors Property at Southwest Corner of Elliot and Signal Butte Roads

Discussion: Placement of a basin at this location to capture flows from sub-basin 65A may be possible. A channel would need to be constructed on the property downstream of the Meridian Point subdivision to direct flows to the intersection of Elliot and Signal Butte Roads. From there, a culvert(s) would need to be constructed to convey flows across the intersection. The design, again, would need to be based on the desired result. The best result, again, being as described in Section 3.1 with a full capture of approximately 160 ac-ft, thereby reducing the peak flow at Elliot Drain by 329 cfs. This may allow for additional flows to be added at other locations along Elliot Drain. The required rights-of-ways, easements, and/or land acquisitions would be necessary to make this a viable option.

Summary: Considering the best case, where a basin with a storage capacity of approximately 160 ac-ft was provided, reductions in peak flows would be the same as those described in Section 3.1. The benefits would be the same as those described in Section 3.1 with the exception that there would be no drainage benefits to the Meridian Point subdivision or to the property immediately to the west of the Meridian Point subdivision.

Appropriate rights-of way, easements, and/or land acquisition from General Motors would be needed for this option.

3.4 Construction of Basin South of Elliot Road on General Motors Proving Ground Property in Vicinity of Crismon Road or Ellsworth Road

Discussion: For analyses of placement of a detention basin on the GM Property in the vicinity of Crismon Road or Ellsworth Road, it was assumed that Crismon Channel would be extended to Elliot Road. As can be seen in Table 3, the peak flow at concentration point CP66CB is 710 cfs. As there is no capacity remaining in Elliot Drain, regardless of whether Siphon Draw Basin and Sunland Springs Channel are constructed, essentially all flows would need to be captured; or, detained for release at such a time that there was capacity in Elliot Drain. The volume of runoff at concentration point CP66CB is approximately 635 ac-ft. For volume comparison, the Elliot Basin proposed in the ADMP prepared by Dibble & Associates had a design high water storage capacity of approximately 325 ac-ft and required approximately 74 acres (approx. $1/8$ mi²) of land area.

If gravity flow is used to transfer flow from the north side of Elliot to the GM Property, pipes will need to be installed under the existing 9.5 ft diam. Elliot Drain pipe. There is approximately 3 ft of cover over the existing Elliot Drain at the pipe centerline. Clearance will need to be provided between Elliot Drain and any proposed pipe crossing. (Clearance requirements were not investigated at this time.) Basin depth, therefore, will be expected to be a minimum 15 – 20 ft below the existing ground over the centerline of the Elliot Drain just to allow for pipes to cross under the Elliot Drain pipe. Obtaining gravity outfall for a basin of this depth may not be possible. Pumps may be needed to empty the basin into the Elliot Drain after the storm. Discharge velocities for the pipes entering the basin may need to be controlled to prevent erosion. The basin inlet pipes must be capable of passing essentially the entire discharge – allowing build-up of head only to that point which can be contained within the Crismon Channel.

If an inverted siphon is used, there will still be an issue with crossing Elliot Drain. Per FCDMC design criteria, the velocity in the siphon may not exceed 5 fps. Using $Q = AV$, assuming a pipe diam. = 48", twelve (12) pipes would be needed to convey 710 cfs across to a basin on the GM Property. Maintenance and sediment accumulation within the siphon will be issues to be dealt with in the design. Public safety, also, would need to be addressed, particularly with residential areas located within one mile of the projected crossing.

Summary: A basin with a storage capacity of approximately 635 ac-ft would be needed to retain flows from an extended Crismon Channel. There are many issues with conveying flows to the south of Elliot Road and Elliot Drain.

Appropriate rights-of way, easements, and/or land acquisition from General Motors would be needed for this option.

If a basin were constructed on the GM Property to retain these flows, the peak discharge at the northeast intersection of Ellsworth and Elliot Roads would be approximately 300 cfs (see Table 3, concentration point 66D). The existing pipe at the northeast corner of Ellsworth and Elliot Roads is considered to have a capacity of 100 cfs at this location in the HEC-1 modeling since the pipe will already be carrying 998 cfs from the three inlet locations further to the east.

3.5 Construction of Basin on Property Located on Northeast Corner of Ellsworth and Elliot Roads

Discussion: The construction of a basin on the property on the northeast corner of Ellsworth and Elliot Roads was analyzed under the assumption that Crismon Channel would be continued westward along Elliot Road to the property. The 100-yr 24-hr flow in the channel at the intersection of Ellsworth and Elliot Roads, including flow from sub-basin 66D, was determined to be 720 cfs from HEC-1 model FMIDCUR2. The volume of runoff at this point, also based on this HEC-1 model, is approximately 652 ac-ft. Two diversion scenarios were modeled to determine the approximate volume of runoff to be diverted to an off-line basin and, thereby, to determine a rough approximation of the basin size needed.

The first scenario assumed a 100 cfs flow rate to be maintained in the by-pass channel for discharge into the Elliot Drain. This flow rate corresponds to the remaining capacity in Elliot Drain at this location. Under this scenario, the results of the modeling showed 487 ac-ft of runoff being diverted out of the system.

The second scenario assumed a 300 cfs flow rate to be maintained in the by-pass channel for discharge into the Elliot Drain. This flow rate corresponds to the inlet capacity of the pipe stub at this location if the Elliot Drain capacity does not exceed 800 cfs. Under this scenario, the results of the modeling showed 229 ac-ft of runoff being diverted out of the system.

Summary: The size of the basin needed at this location depends on the capacity of Elliot Drain at the time of discharge to the pipe system. Based on the results of the modeling, the range is from 229 ac-ft to 487 ac-ft. For comparison, the Elliot Basin in the ADMP prepared by Dibble & Associates had a design high water storage capacity of approximately 297 ac-ft and required a land area of approximately 74 acres (approximately $1/8$ mi²). This is approximately the size of the entire parcel (parcel #304-02-001D) on the northeast corner of Ellsworth and Elliot Roads.

SECTION 4.0 RESULTS/CONCLUSIONS

4.1 Existing Conditions vs. Future Conditions

Future conditions land use with 100-yr, 2-hr on-site retention generally results in a decrease in flow from the existing conditions. With much of the area included in this analysis being undeveloped, it appears that new development will have to address existing conditions flow rates, thereby, sizing channels more than adequately for the future conditions discharges.

4.2 Siphon Draw Basin and Sunland Springs Channel

The construction of Siphon Draw Basin and Sunland Springs Channel will provide a 588 cfs reduction in flows at CP65B over that attributable to future development with 100-yr, 2-hr retention (see Table 3). The three Elliot Drain inlet locations west of the Crismon Road alignment, collectively, should be capable of carrying this reduced flow.

4.3 Various Basin Locations Scenarios

The various basin locations discussed in the *Analyses* portion of this memorandum will cause reductions in flow. Basically, the determining factor is whether the reductions are significant enough to justify the expense to construct the basins. In the cases discussed herein, the limiting criteria are the capacity of Elliot Drain and the capacity of the box culvert on Ellsworth Road approximately 1500 ft north of Elliot.

In the case of the box culvert on Ellsworth, north of Elliot, MCDOT, FCDMC, and the City of Mesa are currently partnering on the design of this box culvert.

For Elliot Drain, the existing pipes will be adequate to carry flows provided that Siphon Draw Basin and Sunland Springs Channel are constructed; and, Crismon Channel is not extended to Elliot. If Crismon Channel is extended to Elliot, there will be an additional 710 cfs directed toward Elliot Road. Basins would be needed to handle this additional flow. Construction of a basin on the property west of the Meridian Point subdivision, on the GM Property at the southwest corner of Mountain and Elliot Roads, or an enlargement of Siphon Draw Basin could result in a reduction of flows of approximately 329 cfs. However, this alone would not offset the additional flows from Crismon Channel. An additional basin would be needed. One located on the northeast corner of Ellsworth and Elliot may be possible but the size of the basin, on such a commercially desirable property, would likely render this alternative unfeasible.

Routing flows from Crismon Channel into a basin would be a more realistic approach. However, crossing over Elliot Road and under the existing Elliot Drain to outlet flows into a basin on the GM Property will likely be cost prohibitive. Acquisition of Rights-of-Way will be needed to extend Crismon Channel to Elliot. Land will be required for the basin on the GM Property. There will be significant construction expenses, including pipe costs, tunneling under Elliot Drain, and the basin excavation. Construction of a basin on the GM Property to handle the Crismon Channel flows does not appear to be cost effective alternative.

At the northeast corner of Ellsworth and Elliot Roads, under recent analyses, the existing pipe may be able to carry flows of 350 cfs. A flow rate of 349 cfs at this point is the

future flow rate with Siphon Draw Basin and Sunland Springs Channel constructed. Therefore, this pipe may be adequate with no changes. Additional analyses should be made in this area to confirm that the pipe will actually be capable of carrying 350cfs.

4.4 Final Conclusion

Considering the future conditions flows, if the pipe at Ellsworth and Elliot is adequate for a future conditions flow of 349 cfs, it appears that the drainage concerns for the area will be addressed without construction of an additional basin provided that:

- Siphon Draw Basin and Sunland Springs Channel are constructed;
- Requirements for 100-yr, 2-hr retention are continued for future development within the area;
- New development continues to address both on-site and off-site transfer of flows through or around their property; and,
- Crismon Channel is not extended to Elliot Road.

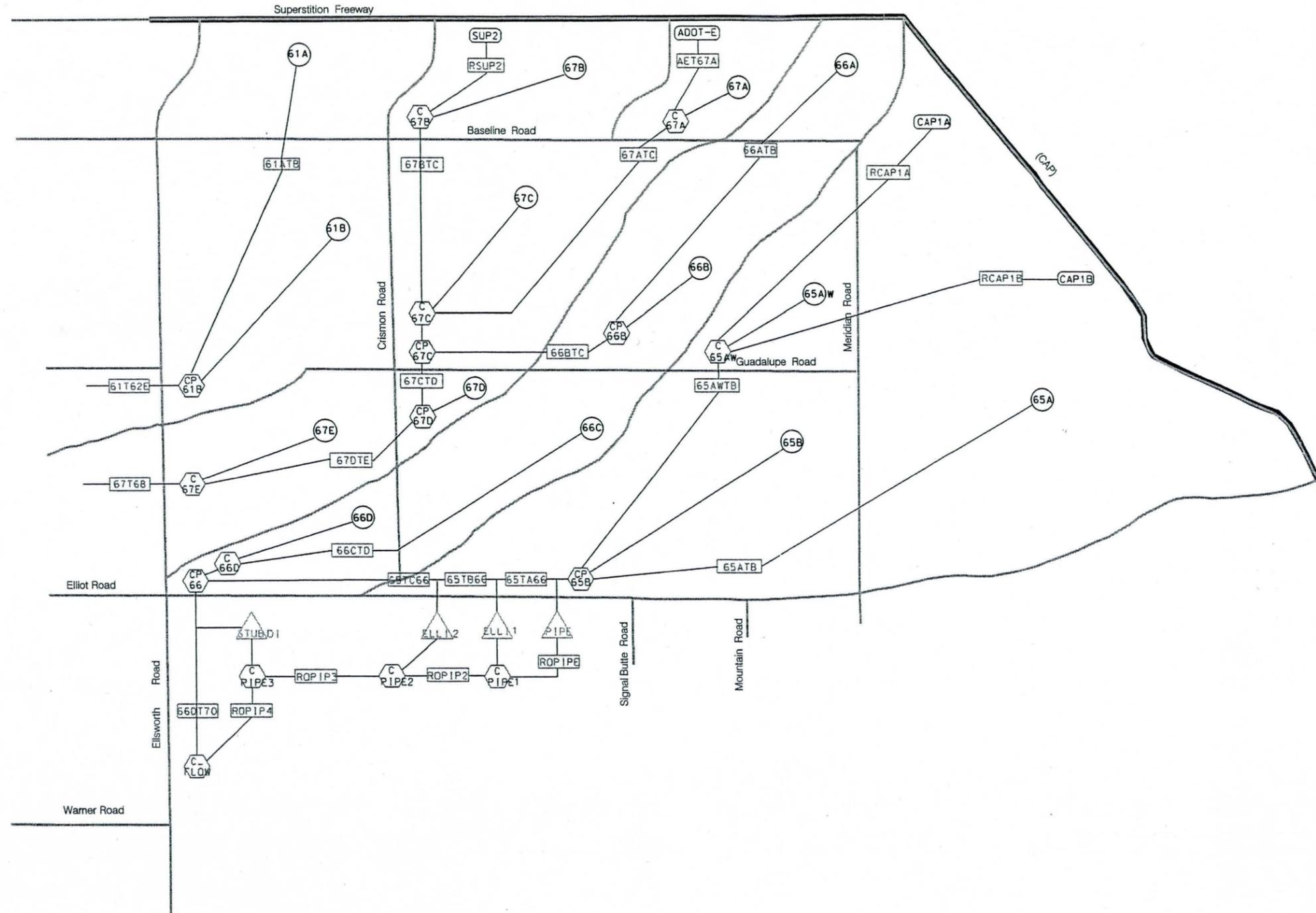
HEC-1
SCHEMATICS

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

Conceptual Alternatives
for the Elliot Basins

LEGEND

SUB-BASIN BOUNDARY	
DIVERT HYDROGRAPH	
SUB-BASIN RUNOFF	
ROUTE HYDROGRAPH	
COMBINE HYDROGRAPH	
OUTFLOW FROM STUDY AREA	
DETENTION BASIN	



NOTE:
SCHEMATIC IS NOT TO SCALE AND DOES
NOT NECESSARILY REFLECT THE ACTUAL
FLOW PATHS, LENGTHS, OR LOCATIONS.

File: MIDCURR

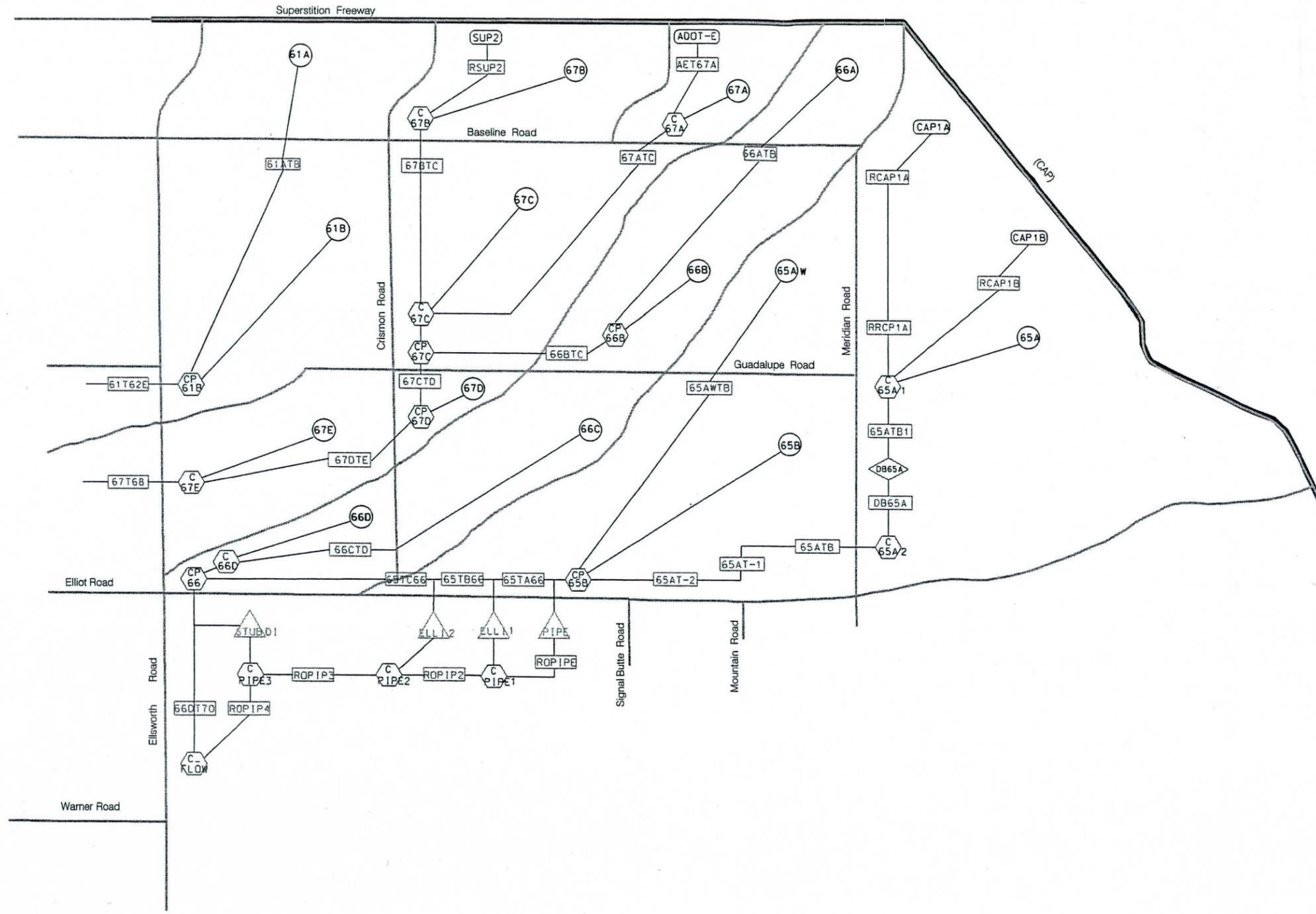
HEC-1 SCHEMATIC
SOUTH OF
SUPERSTITION FREEWAY

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

Conceptual Alternatives
for the Elliot Basins

LEGEND

- SUB-BASIN BOUNDARY ---
- DIVERT HYDROGRAPH △
DT
TRW
- SUB-BASIN RUNOFF (90A)
- ROUTE HYDROGRAPH [5AT7E]
- COMBINE HYDROGRAPH (CP
90A)
- OUTFLOW FROM STUDY AREA (CAP5)
- DETENTION BASIN ◇
ADDT
-W



NOTE:
SCHEMATIC IS NOT TO SCALE AND DOES
NOT NECESSARILY REFLECT THE ACTUAL
FLOW PATHS, LENGTHS, OR LOCATIONS.

File: FMIDCUR1

HEC-1 SCHEMATIC
SOUTH OF
SUPERSTITION FREEWAY

