DICK PERREAULT
JUNE '87

The Flood Control District
of
Maricopa County, Arizona

ADDENDUM TO GLENDALE – PEORIA AREA DRAINAGE MASTER PLAN

by

CAMP DRESSER & McKEE INC.

and

James M. Montgomery, Consulting Engineers, Inc.

May 1987

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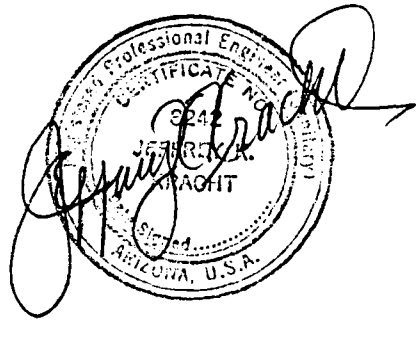

May 1987

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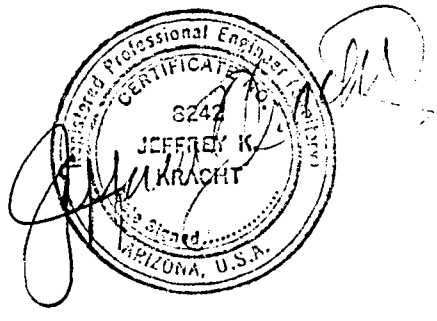

Section One

1. INTRODUCTION

BACKGROUND

Within the last few years, the Flood Control District of Maricopa County initiated an Area Drainage Master Study (ADMS) program to investigate stormwater management problems and jurisdictional constraints of watersheds without being restricted within municipal boundaries. Each ADMS has as its product an Area Drainage Master Plan (ADMP), adopted by the District's Board of Directors and any subsidiary jurisdictions, to provide guidelines for stormwater management in the interjurisdictional area. The District selected Camp Dresser & McKee Inc. (CDM) with James M. Montgomery, Consulting Engineers, Inc. (JMM) as a subconsultant to undertake an ADMS for the Glendale-Peoria area.

The Glendale-Peoria ADMS is described in detail in a separate report "Glendale-Peoria Area Drainage Master Plan", which was completed in April 1986 but dated and published in May 1987 with this addendum. The Glendale-Peoria ADMS was based on the City of Glendale Stormwater Management Plan prepared by CDM and the City of Peoria Stormwater Master Plan prepared by JMM. It also included some additional adjacent area not within either municipal boundary that was part of the area's overall watershed. In general, the Glendale-Peoria ADMP consists of facilities completely within the City of Peoria, facilities completely contained within the City of Glendale, and joint facilities determined in the ADMS which serve both Peoria and Glendale. According to the respective City drainage plans, the City of Glendale facilities carry 10-year flows while the City of Peoria facilities carry 2-year flows. The 10-year level of protection was adopted for the joint facilities based on levels of cost. The "Glendale-Peoria Area Drainage Master Plan" report contains a complete description of the selected facilities.

PURPOSE OF ADDENDUM

The purpose of this addendum to the Glendale-Peoria ADMP is to relate facility costs to storm frequency. The District requested delineation of costs for the joint facilities that would be associated with levels of protection in addition to the 10-year storm. Specifically, additional information was requested to define costs for the 2-, 5-, 25-, 50-, and 100-year storms.

The scope of work for the addendum consisted of the following tasks.

Task A-1	Determine facilities required to convey the 2-, 5-, 25-, 50- and 100-year flows in the South Peoria-Glendale subarea.
Task A-2	Prepare capital cost estimate for the 2-, 5-, 25-, 50- and 100-year facilities determined in Task A-1.
Task A-3	Prepare draft addendum describing facilities and costs.
Task A-4	Meet and review draft addendum with the District.
Task A-5	Finalize addendum.

Section Two

2. FACILITIES ANALYSIS

STUDY AREA

The entire Glendale-Peoria ADMS area is shown in Figure 1. The figure also shows the subareas addressed in the ADMS. This addendum was limited to the South Peoria-Glendale subarea which contains all the joint facilities in the Glendale-Peoria ADMP.

DETERMINATION OF FACILITIES

Stormwater modeling for this addendum used the same computer model selected and described in the "Glendale-Peoria Area Drainage Master Plan" Report. The Storm Water Management Model (SWMM) developed by the U.S. Environmental Agency was used to determine stormwater flows in the South Peoria/Glendale subarea for the 2-, 5-, 25-, 50- and 100-year storm frequencies. The 10-year event had already been modeled as the preferred alternative for the Glendale-Peoria ADMP.

Since the addendum looked at the 2-, 5-, 25-, 50- and 100-year events as well as the 10-year event, it was necessary to develop rainfall patterns for those storms. Ths SWMM model requires input of an entire rainfall pattern for a storm rather than just a peak rainfall intensity or a total precipitation amount. The same procedure described in the Glendale-Peoria ADMP report was used to develop the additional rainfall patterns for the addendum. The rainfall patterns constructed for both the ADMP and the addendum are shown in the Appendix.

The determination of flow rates and facility sizes for the addendum were based on the following constraints:

- Future land use conditions would be used for stormwater modeling.
- The alignment of pipes and the location of detention basins would be the same as the preferred alternative described in the Glendale-Peoria ADMP report.

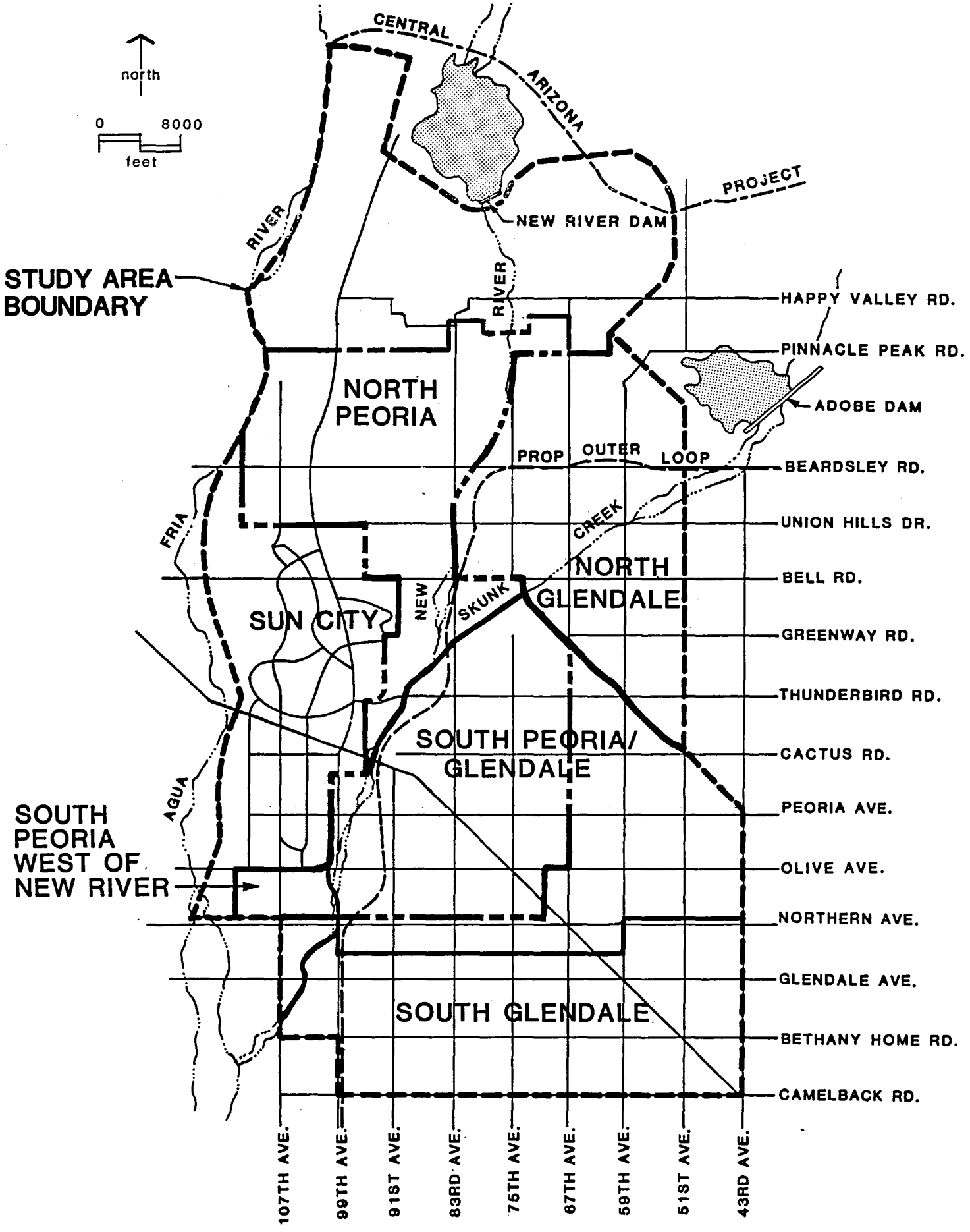

FIGURE 1
STUDY AREA

- Regional facilities would be sized to carry all flows for each event modeled; no flows of the event or smaller would be carried in streets along the regional alignments.

- Non-regional facilities would be sized to carry 2-year flows in Peoria or 10-year flows in Glendale per the respective master plans for each City. All flows to regional facilities not carried in non-regional pipes would reach a regional facility by surface flow (street flow).

The effect of on-site retention was also taken into account in the modeling performed for the addendum. As described in the "Glendale-Peoria Area Drainage Master Plan" report, it was assumed that new development in Glendale would retain on site all runoff from a 10-year storm except from roads and other areas for which retention would not be feasible. In Peoria, it was assumed that new development would retain on site the difference between the 10-year storm runoff and the 2-year storm runoff. These assumptions were also used for the addendum analysis and the 2- and 5-year events could be modeled the same way as the 10-year event in the ADMP. However, the modeling for the 25-, 50- and 100-year events had to be slightly modified since the capacity of on-site retention basins could be exceeded during those storms. This situation was handled by determining flows that would not reach the regional facilities due to on-site retention, and then subtracting these flows from the total flows that were generated for each event with no on-site retention.

Several simulations were done for each storm frequency with different combinations of pipe sizes and detention basin sizes to determine the least cost system of the trial combinations. As mentioned previously, pipe alignments and detention basin locations for all frequencies were the same as the selected alternative in the ADMP. The purpose of the addendum analysis was to provide information to compare costs of facilities to handle varying storm frequencies rather than to recommend a plan for implemention. Therefore, the cost optimizing for each frequency did not specifically consider whether enough area would be easily available at the selected detention basin locations for actual construction. The analysis, for comparison purposes, assumed that the required area could be obtained.

Based on the preceding discussion, facilities for the South Peoria/Glendale subarea were determined for the 2-, 5-, 10-, 25-, 50- and 100-year events. The pipe alignments and detention basin locations are shown on Figure 2, which is a map located in the pocket at the end of this Section. (Figure 2 is the same as Figure 7 in the "Glendale-Peoria Area Drainage Master Plan" report.) The pipe sizes and design flows for each storm frequency are shown in Table 1. The land acquisition requirements for detention basins and for pipes not located in existing public rights-of-way are shown in Table 2.

All conveyance facilities are indicated as pipes. However, for pipes larger than 7 feet in diameter, box culverts would probably be constructed. Utility crossings, special factors, and difficult areas of construction would be the same as noted for the facilities in the "Glendale-Peoria Area Drainage Master Plan" report. Due to the critical role of the regional facilities in providing outlets for stormwater from Glendale and Peoria, as well as interjurisdictional considerations, it is anticipated that regional facilities would be constructed in their entirety without interim ditches. As discussed in the "Glendale-Peoria Area Drainage Master Plan" report, regional facilities are among the highest priority items for implementation of the area's drainage system.

TABLE 1
COMPARISON OF FACILITIES
FOR SOUTH PEORIA/GLENDALE

Pipe Number	Length (ft)	Approximate Slope	2 - Year Design Flow (cfs)	2 - Year Equivalent Pipe Size (ft)	5 - Year Design Flow (cfs)	5 - Year Equivalent Pipe Size (ft)	10 - Year Design Flow (cfs)	10 - Year Equivalent Pipe Size (ft)	25 - Year Design Flow (cfs)	25 - Year Equivalent Pipe Size (ft)	50 - Year Design Flow (cfs)	50 - Year Equivalent Pipe Size (ft)	100 - Year Design Flow (cfs)	100 - Year Equivalent Pipe Size (ft)
174*	2640	.0045	80	3.5	80	3.5	140	4.5	140	4.5	140	4.5	240	5.5
178*	2640	.0025	170	5.5	280	6.5	340	7.0	370	7.5	470	8.0	580	8.5
180*	1960	.0013	390	8.5	490	9.0	630	8.5	1070	12.0	1400	13.5	1850	15.0
182*	2640	.0027	390	7.5	490	8.0	640	9.0	1110	11.0	1450	12.0	1890	13.0
184*	2640	.0019	380	8.0	490	8.5	620	9.5	990	11.0	1280	12.0	1670	13.5
185*	2640	.0038	200	5.5	210	5.5	250	6.0	410	7.0	480	7.5	610	8.0
186*	2640	.0019	190	6.0	260	7.0	360	7.5	560	9.0	740	10.0	980	11.0
188*	2640	.0064	180	5.0	240	5.5	340	6.0	490	7.0	620	7.5	850	8.5
190*	2640	.0034	170	5.0	220	6.0	320	6.5	440	7.5	520	8.0	720	9.0
192*	2640	.0023	140	5.0	190	6.0	280	7.0	310	7.0	350	7.0	500	8.5
194*	2640	.0015	120	5.0	120	5.0	180	6.0	180	6.0	180	6.0	270	7.0
196*	2640	.0034	820	9.5	1320	11.0	1610	12.0	1860	12.5	2410	14.0	2900	15.0
198*	2640	.0034	760	9.0	1260	11.0	1520	12.0	1740	12.0	2230	13.5	2650	14.5
209	2460	.0020	780	10.0	780	10.0	780	10.0	780	10.0	780	10.0	780	10.0
210	2640	.0038	780	9.0	780	9.0	780	9.0	780	9.0	780	9.0	780	9.0
212	2640	.0038	490	7.5	490	7.5	490	7.5	490	7.5	490	7.5	490	7.5
214	2640	.0045	510	7.5	510	7.5	510	7.5	510	7.5	510	7.5	510	7.5
216	2640	.0019	250	7.0	250	7.0	250	7.0	250	7.0	250	7.0	250	7.0
222	2640	.0011	220	7.0	220	7.0	220	7.0	220	7.0	220	7.0	220	7.0
224	2640	.0038	130	4.5	130	4.5	130	4.5	130	4.5	130	4.5	130	4.5
228	2640	.0027	350	7.0	350	7.0	350	7.0	350	7.0	350	7.0	350	7.0
234	2640	.0025	300	7.0	300	7.0	300	7.0	300	7.0	300	7.0	300	7.0
236	2640	.0030	240	6.0	240	6.0	240	6.0	240	6.0	240	6.0	240	6.0
240	2640	.0030	240	6.0	240	6.0	240	6.0	240	6.0	240	6.0	240	6.0
242	2640	.0030	50	3.5	50	3.5	50	3.5	50	3.5	50	3.5	50	3.5
244	2640	.0019	160	5.5	160	5.5	160	5.5	160	5.5	160	5.5	160	5.5
250	2640	.0027	300	6.5	300	6.5	300	6.5	300	6.5	300	6.5	300	6.5
252	2640	.0034	110	4.5	110	4.5	110	4.5	110	4.5	110	4.5	110	4.5
256*	2640	.0027	130	5.0	200	6.0	270	6.5	330	7.0	380	7.5	490	8.0
259*	2640	.0038	20	2.0	20	2.0	45	3.0	45	3.0	45	3.0	95	4.0

* Indicates regional facility

Table 1

TABLE 1
COMPARISON OF FACILITIES
FOR SOUTH PEORIA/GLENDALE
(CONTINUED)

Pipe Number	Length (ft)	Approximate Slope	2 - Year		5 - Year		10 - Year		25 - Year		50 - Year		100 - Year	
			Design Flow (cfs)	Equivalent Pipe Size (ft)	Design Flow (cfs)	Equivalent Pipe Size (ft)	Design Flow (cfs)	Equivalent Pipe Size (ft)	Design Flow (cfs)	Equivalent Pipe Size (ft)	Design Flow (cfs)	Equivalent Pipe Size (ft)	Design Flow (cfs)	Equivalent Pipe Size (ft)
260	2640	.0030	270	6.5	270	6.5	270	6.5	270	6.5	270	6.5	270	6.5
262*	2640	.0023	60	4.0	100	4.5	130	5.0	200	6.0	230	6.5	290	7.0
264*	2640	.0019	5	1.5	5	1.5	10	2.0	10	2.0	10	2.0	30	3.0
266	2640	.0042	120	4.5	120	4.5	120	4.5	120	4.5	120	4.5	120	4.5
270	2640	.0038	320	6.5	320	6.5	320	6.5	320	6.5	320	6.5	320	6.5
272	2640	.0023	230	6.5	230	6.5	230	6.5	230	6.5	230	6.5	230	6.5
276	2640	.0034	80	4.0	80	4.0	80	4.0	80	4.0	80	4.0	80	4.0
278	2640	.0027	15	2.5	15	2.5	15	2.5	15	2.5	15	2.5	15	2.5
280	2150	.0028	80	4.5	80	4.5	80	4.5	80	4.5	80	4.5	80	4.5
281	3700	.0008	340	9.0	340	9.0	340	9.0	340	9.0	340	9.0	340	9.0
282	2640	.0011	550	10.0	550	10.0	550	10.0	550	10.0	550	10.0	550	10.0
284	2460	.0028	150	5.0	150	5.0	150	5.0	150	5.0	150	5.0	150	5.0
288*	2460	.0028	100	4.5	150	5.0	220	6.0	270	6.5	310	7.0	420	7.5
289*	2640	.0034	30	2.5	30	2.5	60	3.5	60	3.5	60	3.5	125	4.5
290	2640	.0027	510	8.0	510	8.0	510	8.0	510	8.0	510	8.0	510	8.0
292	2460	.0028	60	3.5	60	3.5	60	3.5	60	3.5	60	3.5	60	3.5
294	2640	.0038	380	7.0	380	7.0	380	7.0	380	7.0	380	7.0	380	7.0
296	2460	.0037	70	4.0	70	4.0	70	4.0	70	4.0	70	4.0	70	4.0
298	2640	.0019	330	7.5	330	7.5	330	7.5	330	7.5	330	7.5	330	7.5
300	2460	.0045	110	4.5	110	4.5	110	4.5	110	4.5	110	4.5	110	4.5
304	2460	.0037	90	4.0	90	4.0	90	4.0	90	4.0	90	4.0	90	4.0
306	2640	.0034	270	6.0	270	6.0	270	6.0	270	6.0	270	6.0	270	6.0
308	2460	.0024	100	4.5	100	4.5	100	4.5	100	4.5	100	4.5	100	4.5
310	2640	.0034	150	5.0	150	5.0	150	5.0	150	5.0	150	5.0	150	5.0
312	2460	.0024	90	4.5	90	4.5	90	4.5	90	4.5	90	4.5	90	4.5
601	2640	.0023	70	4.0	70	4.0	70	4.0	70	4.0	70	4.0	70	4.0
602	2640	.0039	110	4.5	110	4.5	110	4.5	110	4.5	110	4.5	110	4.5
603	2640	.0034	140	5.0	140	5.0	140	5.0	140	5.0	140	5.0	140	5.0
604	1260	.0016	170	6.5	170	6.5	170	6.5	170	6.5	170	6.5	170	6.5
605	910	.0016	190	6.5	190	6.5	190	6.5	190	6.5	190	6.5	190	6.5
606	700	.0037	40	3.5	40	3.5	40	3.5	40	3.5	40	3.5	40	3.5

* Indicates regional facility

Table 1

TABLE 1
COMPARISON OF FACILITIES
FOR SOUTH PEORIA/GLENDALE
(CONTINUED)

Pipe Number	Length (ft)	Approximate Slope	2-Year Design Flow (cfs)	2-Year Equivalent Pipe Size (ft)	5-Year Design Flow (cfs)	5-Year Equivalent Pipe Size (ft)	10-Year Design Flow (cfs)	10-Year Equivalent Pipe Size (ft)	25-Year Design Flow (cfs)	25-Year Equivalent Pipe Size (ft)	50 - Year Design Flow (cfs)	50 - Year Equivalent Pipe Size (ft)	100 - Year Design Flow (cfs)	100 - Year Equivalent Pipe Size (ft)
607	1300	.0040	250	6.0	250	6.0	250	6.0	250	6.0	250	6.0	250	6.0
608	800	.0031	40	3.5	40	3.5	40	3.5	40	3.5	40	3.5	40	3.5
609	1100	.0029	280	7.0	280	7.0	280	7.0	280	7.0	280	7.0	280	7.0
610	1520	.0028	330	7.5	330	7.5	330	7.5	330	7.5	330	7.5	330	7.5
611	850	.0018	60	4.5	60	4.5	60	4.5	60	4.5	60	4.5	60	4.5
612	1700	.0035	100	4.5	100	4.5	100	4.5	100	4.5	100	4.5	100	4.5
613	1800	.0017	150	6.0	150	6.0	150	6.0	150	6.0	150	6.0	150	6.0
614	1530	.0016	50	4.0	50	4.0	50	4.0	50	4.0	50	4.0	50	4.0
621	2550	.0035	20	2.5	20	2.5	20	2.5	20	2.5	20	2.5	20	2.5
622	2640	.0021	100	4.5	100	4.5	100	4.5	100	4.5	100	4.5	100	4.5
623	1950	.0043	240	6.0	240	6.0	240	6.0	240	6.0	240	6.0	240	6.0
624	2640	.0047	70	3.5	70	3.5	70	3.5	70	3.5	70	3.5	70	3.5
625*	690	.0032	30	2.5	30	2.5	60	3.5	60	3.5	60	3.5	120	4.5
626*	1510	.0026	130	5.0	190	5.5	260	6.5	320	7.0	360	7.0	480	8.0
627*	2640	.0036	160	5.0	230	6.0	330	6.5	380	7.0	420	7.0	580	8.0
628*	1030	.0042	140	4.5	210	5.5	290	6.0	340	6.5	390	7.0	520	7.5
629*	2700	.0019	170	5.5	170	5.5	270	6.5	270	6.5	270	6.5	360	7.5
630	350	.0042	50	3.5	50	3.5	50	3.5	50	3.5	50	3.5	50	3.5
634	2000	.0019	120	5.5	120	5.5	120	5.5	120	5.5	120	5.5	120	5.5
635	3000	.0018	230	7.0	230	7.0	230	7.0	230	7.0	230	7.0	230	7.0
640	2730	.0029	100	4.5	100	4.5	100	4.5	100	4.5	100	4.5	100	4.5
641	140	.0028	70	4.0	70	4.0	70	4.0	70	4.0	70	4.0	70	4.0
650	2640	.0034	70	4.0	70	4.0	70	4.0	70	4.0	70	4.0	70	4.0
651*	2640	.0040	250	6.0	400	7.0	470	7.5	500	7.5	650	8.5	800	9.0
652	2640	.0027	70	4.0	70	4.0	70	4.0	70	4.0	70	4.0	70	4.0
653*	2640	.0036	340	6.5	510	7.5	600	8.0	680	8.5	860	9.5	1070	10.0
654	2640	.0036	70	4.0	7.0	4.0	70	4.0	70	4.4	70	4.0	70	4.0
655*	2640	.0019	440	8.0	660	9.5	780	10.0	890	10.5	1130	11.5	1380	12.5
656*	2640	.0029	470	8.0	730	9.0	860	10.0	1010	10.0	1280	11.5	1530	12.0
657*	2640	.0032	500	8.0	750	9.0	880	9.5	1070	10.0	1370	11.5	1660	12.0
658	3850	.0028	15	2.5	15	2.5	15	2.5	15	2.5	15	2.5	15	2.5

* Indicates regional facility

Table 1

TABLE 1
COMPARISON OF FACILITIES
FOR SOUTH PEORIA/GLENDALE
(CONTINUED)

Pipe Number	Length (ft)	Approximate Slope	2 - Year		5 - Year		10 - Year		25 - Year		50 - Year		100 - Year	
			Design Flow (cfs)	Equivalent Pipe Size (ft)	Design Flow (cfs)	Equivalent Pipe Size (ft)	Design Flow (cfs)	Equivalent Pipe Size (ft)	Design Flow (cfs)	Equivalent Pipe Size (ft)	Design Flow (cfs)	Equivalent Pipe Size (ft)	Design Flow (cfs)	Equivalent Pipe Size (ft)
659*	2150	.0027	590	8.5	840	10.0	970	9.5	1190	11.0	1540	12.0	1890	13.0
661	2640	.0035	30	3.0	30	3.0	30	3.0	30	3.0	30	3.0	30	3.0
662	2640	.0033	90	4.5	90	4.5	90	4.5	90	4.5	90	4.5	90	4.5
663	2640	.0033	90	4.5	90	4.5	90	4.5	90	4.5	90	4.5	90	4.5
664	5280	.0034	180	5.5	180	5.5	180	5.5	180	5.5	180	5.5	180	5.5
665	2640	.0029	110	5.0	110	5.0	110	5.0	110	5.0	110	5.0	110	5.0
666	2640	.0033	230	6.0	230	6.0	230	6.0	230	6.0	230	6.0	230	6.0
667	1510	.0081	290	5.5	290	5.5	290	5.5	290	5.5	290	5.5	290	5.5
670	4600	.0027	180	6.0	180	6.0	180	6.0	180	6.0	180	6.0	180	6.0
677	1800	.0040	30	3.0	30	3.0	30	3.0	30	3.0	30	3.0	30	3.0
678	1150	.0030	80	4.0	80	4.0	80	4.0	80	4.0	80	4.0	80	4.0
680*	2640	.0022	220	6.0	220	6.0	320	7.0	370	7.5	390	7.5	550	8.5
681*	2640	.0021	330	7.5	330	7.5	430	8.0	560	8.5	660	9.5	860	10.5
682	2640	.0038	70	4.0	70	4.0	70	4.0	70	4.0	70	4.0	70	4.0
683	2640	.0017	130	5.5	130	5.5	130	5.5	130	5.5	130	5.5	130	5.5
684*	2640	.0029	360	7.0	360	7.0	470	8.0	620	8.5	740	9.0	970	10.0
685*	2640	.0032	510	8.0	550	8.0	670	9.0	950	10.0	1150	10.5	1450	11.5
686*	2200	.0038	590	8.0	620	8.5	740	9.0	1090	10.0	1350	11.0	1680	12.0
688	2640	.0030	50	3.5	50	3.5	50	3.5	50	3.5	50	3.5	50	3.5
689	2640	.0044	160	5.0	160	5.0	160	5.0	160	5.0	160	5.0	160	5.0
692*	2640	.0009	40	3.5	40	3.5	70	4.5	70	4.5	70	4.5	110	5.5
693	3900	.0026	50	3.5	50	3.5	50	3.5	50	3.5	50	3.5	50	3.5
694*	1320	.0033	120	4.5	120	4.5	150	5.0	240	6.0	280	6.0	380	7.0
695	2640	.0032	60	4.0	60	4.0	60	4.0	60	4.0	60	4.0	60	4.0
697	2640	.0029	60	4.0	60	4.0	60	4.0	60	4.0	60	4.0	60	4.0
698	2640	.0038	90	4.0	90	4.0	90	4.0	90	4.0	90	4.0	90	4.0
699	2970	.0041	50	3.5	50	3.5	50	3.5	50	3.5	50	3.5	50	3.5
800	550	.0038	170	5.0	170	5.0	170	5.0	170	5.0	170	5.0	170	5.0
808	1590	.0042	270	6.5	270	6.5	270	6.5	270	6.5	270	6.5	270	6.5
991	2640	.0031	100	4.5	100	4.5	100	4.5	100	4.5	100	4.5	100	4.5
992	2640	.0037	200	5.5	200	5.5	200	5.5	200	5.5	200	5.5	200	5.5
993	1320	.0009	520	10.0	520	10.0	520	10.0	520	10.0	520	10.0	520	10.0
994	2640	.0048	240	5.5	240	5.5	240	5.5	240	5.5	240	5.5	240	5.5

OLIVE DRAIN

DRAINAGE WOOD

* Indicates regional facility

TABLE 2

COMPARISON OF LAND ACQUISITION REQUIREMENTS
FOR SOUTH PEORIA/GLENDALE

Location of Detention Basin or Pipe Number	Future Use	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
		Area (Acres)					
SW Corner of Olive Ave. and 51st Ave.	Medium Density Resid.	7.4	12.1	12.8	19.2	26.2	25.6
SE Corner of Olive Ave. and 59th Ave.	Industrial	3.6	5.7	7.2	11.2	14.9	19.8
59th Ave. South of Peoria Ave.	Agricultural	6.5	10.0	12.0	21.7	29.0	31.3
SE Corner of Olive Ave. and 67th Ave.	Medium Density Resid.	5.2	9.5	10.4	22.5	31.3	33.3
SW Corner of Northern Ave. and 67th Ave.	Industrial	19.4	34.1	39.2	75.9	100.8	107.1
Olive Ave. West of 75th Ave.	Industrial	7.1	9.7	13.2	24.8	48.9	44.1
Northern Ave. West of 83rd Ave.	Park	21.4	21.6	18.0	50.1	63.5	66.1
75th Ave. North of Olive Ave.	Medium Density Resid.	6.2	9.5	8.8	15.4	21.4	19.7
658	Garden Industrial	0.4	0.4	0.4	0.4	0.4	0.4
634	Garden Industrial	0.5	0.5	0.5	0.5	0.5	0.5
635	Garden Industrial	1.0	1.0	1.0	1.0	1.0	1.0
621	Manufact. Housing	0.4	0.4	0.4	0.4	0.4	0.4
677	Industrial	0.3	0.3	0.3	0.3	0.3	0.3
678	Industrial	0.3	0.3	0.3	0.3	0.3	0.3

Section Three

3. CAPITAL COST ESTIMATES

The estimated construction costs and land costs for the South Peoria/Glendale facilities for each storm frequency are shown in Tables 3, 4 and 5. The costs include 20 percent for engineering, legal and administration, plus 20 percent for contingencies including relocation of utilities.

The construction and land unit costs used for the addendum are the same as those used for the Glendale-Peoria ADMP.

TABLE 3
COMPARISON OF CAPITAL COSTS
FOR SOUTH PEORIA/GLENDALE PIPES

		2 - Year		5 - Year		10 - Year		25 - Year		50 - Year		100 - Year	
Pipe Size (ft)	Unit Price (dollars)	Total Length (ft)	Amount (dollars)	Total Length (ft)	Amount (dollars)	Total Length (ft)	Amount (dollars)	Total Length (ft)	Amount (dollars)	Total Length (ft)	Amount (dollars)	Total Length (ft)	Amount (dollars)
1.5	58	2640	153,000	2640	153,000	-	-	-	-	-	-	-	-
2.0	63	2640	166,000	2640	166,000	2640	166,000	2640	166,000	2640	166,000	-	-
2.5	71	12370	878,000	12370	878,000	9040	642,000	9040	642,000	9040	642,000	9040	642,000
3.0	84	4440	373,000	4440	373,000	7080	595,000	7080	595,000	7080	595,000	7080	595,000
3.5	100	24380	2,438,000	24380	2,438,000	22430	2,243,000	22430	2,243,000	22430	2,243,000	19100	1,910,000
4.0	120	34140	4,097,000	31500	3,780,000	31500	3,780,000	31500	3,780,000	31500	3,780,000	34140	4,097,000
4.5	140	40740	5,704,000	39890	5,585,000	41210	5,769,000	41210	5,769,000	41210	5,769,000	39260	5,496,000
5.0	160	30920	4,947,000	18670	2,987,000	17530	2,805,000	13570	2,171,000	13570	2,171,000	13570	2,171,000
5.5	185	27330	5,056,000	29870	5,526,000	19350	3,580,000	19350	3,580,000	19350	3,580,000	24630	4,557,000
6.0	210	28130	5,907,000	33410	7,016,000	31620	6,640,000	26810	5,630,000	24170	5,076,000	20210	4,244,000
6.5	235	16960	3,986,000	16960	3,986,000	26450	6,216,000	20510	4,820,000	19660	4,620,000	14320	3,365,000
7.0	260	19940	5,184,000	25220	6,557,000	25,220	6,557,000	32010	8,323,000	27580	7,171,000	23900	6,214,000
7.5	290	14720	4,269,000	14720	4,269,000	14720	4,269,000	20000	5,800,000	20000	5,800,000	15630	4,533,000
8.0	320	18040	5,773,000	7920	2,534,000	10560	3,379,000	2640	845,000	7920	2,534,000	12070	3,862,000
8.5	360	4110	1,480,000	4840	1,742,000	1960	706,000	7920	2,851,000	2640	950,000	10560	3,802,000
9.0	390	8980	3,502,000	13580	5,296,000	13820	5,390,000	8980	3,502,000	8980	3,502,000	11620	4,532,000
9.5	420	2640	1,109,000	2640	1,109,000	7430	3,121,000	-	-	5280	2,218,000	-	-
10.0	450	6420	2,889,000	8570	3,857,000	11700	5,265,000	16540	7,443,000	9060	4,077,000	11700	5,265,000
10.5	490	-	-	-	-	-	-	2640	1,294,000	2640	1,294,000	2640	1,294,000
11.0	530	-	-	5280	2,798,000	-	-	7430	3,938,000	2200	1,166,000	2640	1,399,000
11.5	560	-	-	-	-	-	-	-	-	7920	4,435,000	2640	1,478,000
12.0	600	-	-	-	-	5280	3,168,000	4600	2,760,000	7430	4,458,000	7480	4,488,000
13.0	680	-	-	-	-	-	-	2640	1,795,000	-	-	7430	5,052,000
14.0	760	-	-	-	-	-	-	-	-	7240	5,502,000	2640	2,006,000
15.0	850	-	-	-	-	-	-	-	-	-	-	7240	6,154,000
Subtotal			57,911,000		61,050,000		64,291,000		67,947,000		71,749,000		77,156,000
Engineering, legal, administration (20%)			11,582,200		12,210,000		12,858,200		13,589,400		14,349,800		15,431,200
Contingencies (20%)			11,582,200		12,210,000		12,858,200		13,589,400		14,349,800		15,431,200
TOTAL			81,075,400		85,470,000		90,007,400		95,125,800		100,448,600		108,018,400

TABLE 4

COMPARISON OF CAPITAL COSTS FOR SOUTH PEORIA/GLENDALE

DETENTION BASINS AND PIPE RIGHT-OF-WAY

Location of Detention Basin or Pipe Number	Land Purchase and Construction (dollars/acre)	2 - Year		5 - Year		10 - Year		25 - Year		50 - Year		100 - Year	
		Area (acres)	Amount (dollars)	Area (acres)	Amount (dollars)	Area (acres)	Amount (dollars)	Area (acres)	Amount (dollars)	Area (acres)	Amount (dollars)	Area (acres)	Amount (dollars)
SW Corner of Olive Ave. and 51st. Ave. (259)	90,000	7.4	666,000	12.1	1,089,000	12.8	1,152,000	19.2	1,728,000	26.2	2,358,000	25.6	2,304,000
SE Corner of Olive Ave. and 59th Ave. (289)	120,000	3.6	432,000	5.7	684,000	7.2	864,000	11.2	1,344,000	14.9	1,788,000	19.8	2,376,000
59th Ave. North of Olive Ave. (264)	48,000	6.5	312,000	10.0	480,000	12.0	576,000	21.7	1,042,000	29.0	1,392,000	31.3	1,502,000
SE Corner of Olive Ave. and 67th Ave. (174)	90,000	5.2	468,000	9.5	855,000	10.4	936,000	22.5	2,025,000	31.3	2,817,000	33.3	2,997,000
Orangewood Ave. West of 67th Ave. (194)	120,000	19.4	2,328,000	34.1	4,092,000	39.2	4,704,000	75.9	9,108,000	100.8	12,096,000	107.1	12,852,000
SW Corner of Olive Ave. and 75th Ave. (629)	120,000	7.1	852,000	9.7	1,164,000	13.2	1,584,000	24.8	2,976,000	48.9	5,868,000	44.1	5,292,000
Northern Ave. West of 83rd Ave. (692)	48,000	21.4	1,027,000	21.6	1,037,000	18.0	864,000	50.1	2,405,000	63.5	3,048,000	66.1	3,173,000
75th Ave. North of Olive Ave. (625)	90,000	6.2	558,000	9.5	855,000	8.8	792,000	15.4	1,386,000	21.4	1,926,000	19.7	1,773,000
658	100,000	0.4	40,000	0.4	40,000	0.4	40,000	0.4	40,000	0.4	40,000	0.4	40,000
634	100,000	0.5	50,000	0.5	50,000	0.5	50,000	0.5	50,000	0.5	50,000	0.5	50,000
635	100,000	1.0	100,000	1.0	100,000	1.0	100,000	1.0	100,000	1.0	100,000	1.0	100,000
621	75,000	0.4	30,000	0.4	30,000	0.4	30,000	0.4	30,000	0.4	30,000	0.4	30,000
677	100,000	0.3	30,000	0.3	30,000	0.3	30,000	0.3	30,000	0.3	30,000	0.3	30,000
678	100,000	0.3	30,000	0.3	30,000	0.3	30,000	0.3	30,000	0.3	30,000	0.3	30,000
Subtotal			6,923,000		10,536,000		11,752,000		22,294,000		31,573,000		32,549,000
Engineering, legal, administration (20%)			1,384,600		2,107,200		2,350,400		4,458,800		6,314,600		6,509,800
Contingencies (20%)			1,384,600		2,107,200		2,350,400		4,458,800		6,314,600		6,509,800
TOTAL			9,692,200		14,750,400		16,452,800		31,211,600		44,202,200		45,568,600

TABLE 5

COMPARISON OF TOTAL CAPITAL COSTS
FOR SOUTH PEORIA/GLENDALE DRAINAGE SYSTEM

	2 - Year	5 - Year	10 - Year	25 - Year	50 - Year	100 - Year
	Amount (dollars)					
Drainage Facilities	57,911,000	61,050,000	64,291,000	67,947,000	71,749,000	77,156,000
Right-of-Way Land Acquisitiion	6,923,000	10,536,000	11,752,000	22,294,000	31,573,000	32,549,000
Drainage System Subtotal	64,834,000	71,586,000	76,043,000	90,241,000	103,322,000	109,705,000
Engineering, legal administration (20%)	12,966,800	14,317,200	15,208,600	18,048,200	20,664,400	21,941,000
Contingencies (20%)	12,966,800	14,317,200	15,208,600	18,048,200	20,664,400	21,941,000
TOTAL	90,767,600	100,220,400	106,460,200	126,337,400	144,650,800	153,587,000
Cost Differential	9,452,800	6,239,800	19,877,200	18,313,400	8,936,200	

Section Four

4. CONDITIONS AND LIMITATIONS

All conditions and limitations contained in Section 13 of the "Glendale-Peoria Area Drainage Master Plan" report are also applicable to this addendum.

Appendix A

TABLE A-1

DESIGN RAINFALL

Rainfall Intensity (inches per hour)

Time (hours and minutes)	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year
0-0:15	2.0	2.85	3.25	3.80	4.25	4.80
0:15-0:30	0.70	0.95	1.15	1.40	1.76	1.92
0:30-0:45	0.40	0.56	0.72	0.80	0.90	1.14
0:45-1:00	0.24	0.38	0.48	0.60	0.70	0.66
1:00-1:15	0.14	0.22	0.32	0.40	0.64	0.55
1:15-1:30	0.11	0.18	0.22	0.32	0.48	0.45
1:30-1:45	0.10	0.15	0.18	0.24	0.30	0.36
1:45-2:00	0.084	0.12	0.17	0.20	0.26	0.30
2:00-2:15	0.080	0.11	0.15	0.18	0.24	0.24
2:15-2:30	0.080	0.10	0.14	0.17	0.19	0.20
2:30-2:45	0.080	0.10	0.13	0.17	0.18	0.18
2:45-3:00	0.076	0.096	0.12	0.16	0.16	0.16
3:00-3:15	0.076	0.092	0.12	0.16	0.16	0.15
3:15-3:30	0.072	0.088	0.12	0.16	0.14	0.15
3:30-3:45	0.068	0.084	0.11	0.15	0.13	0.14
3:45-4:00	0.064	0.080	0.10	0.14	0.12	0.14
4:00-4:15	0.060	0.080	0.10	0.13	0.12	0.13
4:15-4:30	0.060	0.076	0.10	0.12	0.10	0.13
4:30-4:45	0.056	0.072	0.096	0.12	0.08	0.13
4:45-5:00	0.052	0.068	0.092	0.08	0.06	0.13
5:00-5:15	0.048	0.064	0.092	0.08	0.05	0.12
5:15-5:30	0.048	0.060	0.088	0.06	0.04	0.12
5:30-5:45	0.044	0.056	0.084	0.04	0.04	0.12
5:45-6:00	0.044	0.056	0.080	0.02	0.04	0.12