APPENDIX A

HEC-1 Storm Comparison Flow Summary

		6-hour Storm						24-hr-storm							Design Control		
type	hec1id	q2	q5	q10	q25	q50	q100	q2	q5	q10	q25	q50	q100	sort	hec1id	Storm	Flow
Hydrograph	SUBWD	139	243	323	431	514	595	87	170	228	309	371	432	10	SUBWD	6	595
Routed	RTWDXA	114	212	291	396	476	551	67	143	198	280	339	399	20	RTWDXA	6	551
Hydrograph	SUBXA	194	292	357	445	513	580	135	210	258	324	375	425	30	SUBXA	6	580
Combined	CPXA1	192	298	386	513	622	740	138	222	283	374	448	525	40	CPXA1	6	740
Diversion	DIZZ1	0	0	0	0	0	0	0	0	0	0	0	0	50	DIZZ1	6	0
Hydrograph	DIXAO	192	298	386	513	622	740	138	222	283	374	448	525	60	DIXAO	6	740
Routed	RTXAWC	146	256	349	484	596	705	97	179	246	347	424	505	70	RTXAWC	6	705
Hydrograph	SUBWB	362	563	696	877	1017	1154	261	422	525	665	773	880	80	SUBWB	6	1154
Routed	RTWBWC	327	522	650	821	955	1092	228	385	485	618	722	823	90	RTWBWC	6	1092
Hydrograph	SUBWC	296	455	561	703	814	922	204	326	404	511	593	674	100	SUBWC	6	922
Combined	CPWC	472	794	1026	1357	1639	1937	372	651	829	1083	1299	1526	110	CPWC	6	1937
Diversion	DIQE	0	0	0	0	0	0	0	0	0	0	0	0	120	DIQE	6	0
Hydrograph	DIWCWA	472	794	1026	1357	1639	1937	372	651	829	1083	1299	1526	130	DIWCWA	6	1937
Routed	RTWCWA	163	293	381	585	747	946	133	222	308	406	562	708	140	RTWCWA	6	946
Hydrograph	SUBWA	406	606	740	919	1059	1196	279	434	532	666	769	872	150	SUBWA	6	1196
Combined	CPWA1	294	446	545	668	743	939	282	439	538	674	779	883	160	CPWA1	6	939
Hydrograph	SUBVD	372	581	719	907	1053	1195	271	438	546	693	806	917	170	SUBVD	6	1195
Routed	RTVDWA	234	409	527	687	817	941	154	289	378	504	600	695	180	RTVDWA	6	941
Combined	CPWA2	294	474	624	834	998	1159	308	490	608	782	924	1076	190	CPWA2	6	1159
Diversion	DIQD	19	103	225	401	553	707	23	116	212	355	484	627	200	DIQD	6	707
Hydrograph	DIWAVC	272	371	399	433	445	452	286	374	396	427	440	448	210	DIWAVC	6	452
Routed	RTWAVC	145	218	268	321	350	374	127	195	239	302	333	359	220	RTWAVC	6	374
Hydrograph	SUBVC	390	589	723	902	1041	1177	266	417	516	650	754	857	230	SUBVC	6	1177
Combined	CPVC1	239	376	467	589	684	776	271	424	525	662	767	872	240	CPVC1	24	872
Hydrograph	SUBVB	543	826	1014	1265	1460	1651	406	639	788	990	1145	1299	250	SUBVB	6	1651
Routed	RTVBVC	293	503	644	844	1001	1152	193	355	462	611	729	850	260	RTVBVC	6	1152
Combined	~CPVC2	313	571	751	992	1181	1368	310	518	678	913	1102	1292	270	~CPVC2	6	1368
Routed	MCVC47	308	564	742	986	1177	1363	290	499	657	889	1075	1261	280	MCVC47	6	1363
Hydrograph	SUBQA2	48	83	108	140	165	189	33	61	79	104	123	142	290	SUBQA2	6	189
Combined	CPQA2	334	617	813	1080	1290	1493	312	551	726	981	1184	1387	300	CPQA2	6	1493
Routed	BSN47	331	568	693	835	924	993	304	514	638	775	866	940	310	BSN47	6	993
Routed	MC47QB	327	562	690	833	922	992	294	511	635	773	863	938	320	MC47QB	6	992
Hydrograph	SUBQB	263	412	513	647	751	852	187	305	379	478	554	629	330	SUBQB	6	852
Combined	~CPQB	481	801	990	1209	1365	1502	475	786	962	1171	1323	1464	340	~CPQB	6	1502
Hydrograph	SUBQD	218	314	379	466	534	600	154	227	274	339	389	439	350	SUBQD	6	600
Hydrograph	DRQD	19	103	225	401	553	707	23	116	212	355	484	627	360	DRQD	6	707
Routed	RTDIQD	2	32	101	242	374	511	1	17	52	143	243	353	370	RTDIQD	6	511
Combined	@CPQD	218	314	379	537	572	604	154	227	274	339	389	439	380	@CPQD	6	604
Routed	RSQD	124	193	237	295	378	525	122	197	241	299	344	390	390	RSQD	6	525
Diversion	DIQC	105	161	196	242	309	394	104	164	199	246	282	318	400	DIQC	6	394
Hydrograph	DIQDQC	18	32	41	52	69	132	18	33	42	53	62	73	410	DIQDQC	6	132
Routed	RTQDQB	3	9	14	33	53	90	2	7	11	21	34	53	420	RTQDQB	6	90
Combined	@CPQB	500	826	1017	1242	1402	1542	477	789	965	1175	1328	1472	430	@CPQB	6	1542
Routed	MCQBJK	482	811	1003	1229	1386	1526	434	747	928	1143	1296	1436	440	MCQBJK	6	1526
Hydrograph	SUBJK	214	358	455	584	683	779	147	263	336	434	508	581	450	SUBJK	6	779
Combined	~CPJK	582	1000	1265	1580	1806	2022	539	943	1193	1504	1726	1935	460	~CPJK	6	2022
Routed	MCJKJL	539	959	1224	1540	1771	1982	478	877	1124	1428	1648	1851	470	MCJKJL	6	1982
Hydrograph	SUBJL	214	358	455	584	683	779	147	263	336	434	508	581	480	SUBJL	6	779
Combined	~CPJL1	588	1084	1414	1821	2122	2400	524	987	1293	1672	1961	2230	490	~CPJL1	6	2400
Hydrograph	SUBQE	573	845	1028	1275	1467	1654	441	669	815	1016	1170	1324	500	SUBQE	6	1654
Hydrograph	DRQE	0	0	0	0	0	0	0	0	0	0	0	0	510	DRQE	6	0
Routed	RTDIQE	0	0	0	0	0	0	0	0	0	0	0	0	520	RTDIQE	6	0
Combined	CPQE	573	845	1028	1275	1467	1654	441	669	815	1016	1170	1324	530	CPQE	6	1654
Routed	RSQE	409	701	897	1172	1377	1575	316	539	688	893	1041	1198	540	RSQE	6	1575
Routed	RTQEQC	367	639	836	1075	1283	1479	277	497	636	829	969	1107	550	RTQEQC	6	1479
Hydrograph	SUBQC	368	571	705	884	1024	1160	263	426	528	667	772	878	560	SUBQC	6	1160
Hydrograph	DRDIQC	105	161	196	242	309	394	104	164	199	246	282	318	570	DRDIQC	6	394
Routed	RTDIQC	45	83	112	181	276	358	37	73	99	133	191	271	580	RTDIQC	6	358
Combined	CPQC	461	887	1194	1590	1903	2220	355	719	957	1281	1525	1773	590	CPQC	6	2220
Diversion	DISR1	369	709	955	1272	1523	1776	284	575	766	1025	1220	1419	600	DISR1	6	1776
Hydrograph	DIQCR	92	177	239	318	381	444	71	144	191	256	305	355	610	DIQCR	6	444
Routed	RTQCJL	61	120	166	238	294	349	48	97	132	190	234	278	620	RTQCJL	6	349
Combined	CPJL2	589	1105	1456	1903	2243	2558	544	1038	1362	1793	2109	2422	630	CPJL2	6	2558
Hydrograph	SUBQA1	158	266	338	434	508	579	110	196	251	324	379	433	640	SUBQA1	6	579
Routed	RSQA	116	245	318	411	483	547	61	172	233	306	360	413	650	RSQA	6	547
Diversion	DIPF	58	109	138	175	204	230	35	80	104	134	155	176	660	DIPF	6	230
Hydrograph	DIQAPF	58	136	179	236	279	317	27	92	128	172	205	236	670	DIQAPF	6	317
Routed	RTQAJH	37	94	137	191	233	274	23	57	90	134	166	198	680	RTQAJH	6	274
Hydrograph	SUBJH	244	367	448	556	640	723	172	267	326	407	469	531	690	SUBJH	6	723
Combined	CPJH	230	347	424	527	607	686	171	266	325	406	468	530	700	CPJH	6	686
Routed	RTJHJI	113	201	262	345	409	472	76	144	190	254	298	349	710	RTJHJI	6	472
Hydrograph	SUBJI	190	299	370	463	535	604	134	218	271	340	394	447	720	SUBJI	6	604
Combined	CPJI	165	262	326	409	473	535	134	219	272	342	396	452	730	CPJI	6	535
Combined	CPJISR	617	1207	1606	2124	2509	2884	563	1108	1479	1980	2350	2717	740	CPJISR	6	2884
Hydrograph	SUBPF	420	642	791	992	1147	1297	285	454	565	716	832	947	750	SUBPF	6	1297
Diversion	RETPF	55	29	23	21	21	19	7	7	8	8	9	10	760	RETPF	6	19
Hydrograph	RETPF	420	642	791	992	1147	1297	285	454	565	716	832	947	770	RETPF	6	1297
Hydrograph	DRPF	58	109	138	175	204	230	35	80	104	134	155	176	780	DRPF	6	230
Routed	RTDIPF	46	86	114	150	180	207	32	62	83	111	133	153	790	RTDIPF	6	207
Combined	CPPF	422	643	793	995	1150	1300	286	456	567	719	836	952	800	CPPF	6	1300
Routed	RSPF	0	46	95	211	358	524	0	24	69	120	217	342	810	RSPF	6	524
Diversion	DIPE	0	0	0	0	0	0	0	0	0	0	0	0	820	DIPE	6	0
Hydrograph	DIPFPE	0	46	95	211	358	524	0	24	69	120	217	342	830	DIPFPE	6	524
Routed	RTPFJF	0	43	92	167	292	422	0	23	67	117	183	288	840	RTPFJF	6	422
Hydrograph	SUBUD	284	486	624	808	950	1087	210	375	483	629	741	851	850	SUBUD	6	1087
Diversion	DIUA	70	119	152	196	230	263	52	92	118	153	180	206	860	DIUA	6	263
Hydrograph	DIUDUA	214	367	472	612	720	824	158	283	365	476	561	645	870	DIUDUA	6	824
Routed	RTUDVA	120	244	333	453	547	637	81	175	243	336	409	483	880	RTUDVA	6	637
Hydrograph	SUBVA	408	607	740	919	1059	1195	280	430	528	663	766	869	890	SUBVA	6	1195
Combined	CPVA1	332	502	618	774	900	1024	283	436	538	678	786	898	900	CPVA1	6	1024
Diversion	DIUC	330	473	546	626	669	701	282	425	502	590	647	685	910	DIUC	6	701
Hydrograph	DIVAPE	3	29	72	148	231	323	1	11	37	88	139	213	920	DIVAPE	6	323
Routed	RTVAPE	0	3	10	32	65	109	0	1	3	11	25	47	930	RTVAPE	6	109
Hydrograph	SUBPE	406	630	781	987	1147	1303	266	439	551	705	824	944	940	SUBPE	6	1303
Hydrograph	DRPE	0	0	0	0	0	0	0	0	0	0	0	0	950	DRPE	6	0
Routed	RTDIPE	0	0	0	0	0	0	0	0	0	0	0	0	960	RTDIPE	6	0
Combined	CPPE	406	630	781	987	1147	1303	266	439	551	705	824	944	970	CPPE	6	1303
Routed	RSPE	9	145	309	520	664	820	8	126	289	491	631	835	980	RSPE	24	835
Diversion	DIPD	0	0	0	0	0	1	0	0	0	0	0	1	990	DIPD	6	1
Hydrograph	DIPEPD	9	145	309	520	663	819	8	126	289	491	631	835	1000	DIPEPD	24	835
Routed	RTPEJF	6	57	126	252	361	469	7	44	102	209	308	408	1010	RTPEJF	6	469
Hydrograph	SUBJF	515	765	934	1161	1337	1509	349	540	664	835	967	1097	1020	SUBJF	6	1509
Combined	CPJF	274	426	527	662	767	871	342	531	653	821	952	1082	1030	CPJF	24	1082
Routed	RTJFJG	88	164	236	360	513	693	68	126	183	289	420	580	1040	RTJFJG	6	693
Hydrograph	SUBJG	617	941	1159	1450	1676	1897	483	759	938	1183	1371	1558	1050	SUBJG	6	1897
Combined	CPJG	423	670	835	1060	1237	1412	483	761	943	1192	1384	1576	1060	CPJG	24	1576
Combined	CPJGSR	681	1350	1835	2496	3014	3517	714	1269	1708	2329	2813	3310	1070	CPJGSR	6	3517
Hydrograph	DRUC	330	473	546	626	669	701	282	425	502	590	647	685	1080	DRUC	6	701
Routed	RTVAUC	130	206	325	446	531	596	101	171	221	346	423	492	1090	RTVAUC	6	596
Routed	MCUCUC	129	205	321	444	529	594	101	170	219	344	421	490	1100	MCUCUC	6	594
Hydrograph	SUBUC	280	446	557	703	817	927	192	321	403	514	598	682	1110	SUBUC	6	927
Combined	@CPUC	218	359	451	574	671	763	199	332	416	531	618	704	1120	@CPUC	6	763
Hydrograph	SUBUA	253	414	522	666	777	886	177	304	386	498	583	666	1130	SUBUA	6	886
Hydrograph	DRUA	70	119	152	196	230	263	52	92	118	153	180	206	1140	DRUA	6	263
Routed	RTDIUA	19	37	52	74	91	114	14	28	39	55	70	83	1150	RTDIUA	6	114
Combined	@CPUA	253	414	522	666	777	886	177	304	386	498	583	666	1160	@CPUA	6	886

		6-hour Storm						24-hr-storm							Design Control		
type	hec1id	q2	q5	q10	q25	q50	q100	q2	q5	q10	q25	q50	q100	sort	hec1id	Storm	Flow
Diversion	DITB	42	71	91	117	137	156	35	60	77	99	116	133	1170	DITB	6	156
Hydrograph	DIUAUC	169	286	364	467	546	624	140	241	307	396	464	531	1180	DIUAUC	6	624
Routed	RTUAUC	91	188	255	348	418	489	68	143	196	271	332	389	1190	RTUAUC	6	489
Combined	~CPUC2	218	359	451	643	822	980	204	345	436	563	665	773	1200	~CPUC2	6	980
Diversion	DIUB	197	337	433	643	822	980	204	345	436	563	665	773	1210	DIUB	6	980
Hydrograph	DIUCPC	0	0	0	0	0	0	0	0	0	0	0	0	1220	DIUCPC	6	0
Routed	RTUCPC	0	0	0	0	0	0	0	0	0	0	0	0	1230	RTUCPC	6	0
Hydrograph	SUBPC	317	473	578	717	826	932	218	339	417	522	603	684	1240	SUBPC	6	932
Combined	CPPC	162	253	313	392	455	515	212	331	407	510	589	668	1250	CPPC	24	668
Routed	RSPC	5	5	5	5	21	60	5	5	5	5	5	17	1260	RSPC	6	60
Routed	RTPCNB	5	5	5	5	13	31	5	5	5	5	5	12	1270	RTPCNB	6	31
Hydrograph	SUBNB	289	447	554	697	808	917	195	314	392	499	582	664	1280	SUBNB	6	917
Combined	CPNB1	179	291	365	464	541	616	195	312	388	494	574	655	1290	CPNB1	24	655
Diversion	DINA	117	188	236	299	348	396	127	201	251	318	369	421	1300	DINA	24	421
Hydrograph	DINBNA	63	103	129	165	193	220	68	110	138	176	205	234	1310	DINBNA	24	234
Routed	RTNBJD	25	43	58	78	95	114	21	36	46	63	76	90	1320	RTNBJD	6	114
Hydrograph	SUBPD	362	568	707	892	1035	1174	240	398	502	643	750	856	1330	SUBPD	6	1174
Hydrograph	DRPD	0	0	0	0	0	1	0	0	0	0	0	1	1340	DRPD	6	1
Combined	CPPD2	362	568	707	892	1035	1175	240	398	502	643	750	856	1350	CPPD2	6	1175
Routed	RSPD	0	0	2	13	51	94	0	0	1	3	8	33	1360	RSPD	6	94
Routed	RTPDNC	0	0	2	12	43	82	0	0	1	3	8	30	1370	RTPDNC	6	82
Hydrograph	SUBNC	175	311	404	524	620	714	112	212	281	373	447	520	1380	SUBNC	6	714
Combined	CPNC	157	275	360	472	560	647	111	209	278	369	442	515	1390	CPNC	6	647
Routed	RTNCJE	93	172	240	328	400	470	58	117	168	236	293	351	1400	RTNCJE	6	470
Hydrograph	SUBJE1	225	354	440	554	644	732	144	244	308	395	461	528	1410	SUBJE1	6	732
Combined	CPJE1	179	290	363	461	538	612	147	249	313	401	469	538	1420	CPJE1	6	612
Routed	RTJEJD	141	236	305	394	473	548	105	192	247	330	392	459	1430	RTJEJD	6	548
Hydrograph	SUBJD	226	377	481	619	727	831	151	268	345	448	528	607	1440	SUBJD	6	831
Combined	CPJD	216	389	510	672	793	915	253	440	566	746	880	1014	1450	CPJD	24	1014
Diversion	DIJC2	80	142	186	244	288	331	93	160	206	271	319	367	1460	DIJC2	24	367
Hydrograph	DIJDJC	136	247	324	428	506	584	160	280	360	475	561	647	1470	DIJDJC	24	647
Routed	RTJDFC	84	165	234	332	413	495	81	153	213	297	366	435	1480	RTJDFC	6	495
Hydrograph	SUBJE2	259	381	462	573	658	742	181	275	335	417	481	544	1490	SUBJE2	6	742
Diversion	RETJE	151	145	133	128	139	123	109	84	58	23	20	15	1500	RETJE	6	123
Hydrograph	RETJE2	259	381	462	573	658	742	181	275	335	417	481	544	1510	RETJE2	6	742
Routed	RTJEFC	111	229	318	430	517	595	71	165	227	301	369	427	1520	RTJEFC	6	595
Hydrograph	SUBFC	297	452	557	697	805	910	202	322	399	505	586	666	1530	SUBFC	6	910
Combined	CPFC	179	379	528	729	891	1052	212	362	493	707	866	1030	1540	CPFC	6	1052
Combined	CPFCSR	760	1513	2073	2855	3465	4072	902	1495	1946	2668	3241	3817	1550	CPFCSR	6	4072
Hydrograph	SUBJC2	73	157	224	316	387	457	56	123	174	247	302	358	1560	SUBJC2	6	457
Diversion	RETJC2	68	105	115	136	141	133	53	85	94	92	87	81	1570	RETJC2	6	133
Hydrograph	RETJC2	64	157	224	316	387	457	56	123	174	247	302	358	1580	RETJC2	6	457
Hydrograph	DRJC2	80	142	186	244	288	331	93	160	206	271	319	367	1590	DRJC2	24	367
Routed	RTDIJC	39	72	101	150	192	236	35	65	89	124	161	196	1600	RTDIJC	6	236
Combined	@CPJC2	71	183	277	423	541	660	77	166	238	349	445	539	1610	@CPJC2	6	660
Diversion	DIJB2	33	84	127	195	249	303	36	76	109	160	205	248	1620	DIJB2	6	303
Hydrograph	DIJCJB	38	99	149	229	292	356	41	90	128	188	240	291	1630	DIJCJB	6	356
Routed	RTJCFB	25	76	121	195	254	314	28	70	105	160	207	255	1640	RTJCFB	6	314
Hydrograph	SUBFB	104	234	326	464	572	675	65	170	242	350	433	515	1650	SUBFB	6	675
Combined	CPFB	31	140	225	344	433	521	62	166	237	343	426	507	1660	CPFB	6	521
Combined	CPFBSR	760	1513	2115	2974	3656	4316	916	1556	2065	2870	3497	4143	1670	CPFBSR	6	4316
Hydrograph	SUBJB2	16	57	84	124	159	195	5	38	58	90	117	144	1680	SUBJB2	6	195
Hydrograph	DRJB2	33	84	127	195	249	303	36	76	109	160	205	248	1690	DRJB2	6	303
Routed	RTDIJB	19	58	91	150	199	248	21	54	80	125	162	202	1700	RTDIJB	6	248
Combined	@CPJB2	18	57	97	175	243	313	21	53	89	153	200	258	1710	@CPJB2	6	313
Diversion	DIEE	7	20	35	63	87	113	8	19	32	55	72	93	1720	DIEE	6	113
Hydrograph	DIJBEE	12	35	62	112	155	200	14	34	57	98	128	165	1730	DIJBEE	6	200
Routed	RTJBFA	7	25	45	80	119	159	9	27	43	70	101	132	1740	RTJBFA	6	159
Hydrograph	SUBFA	134	235	314	420	503	586	96	177	232	309	369	428	1750	SUBFA	6	586
Combined	CPFA	83	178	247	340	415	489	94	172	227	302	361	420	1760	CPFA	6	489
Combined	CPSRFA	762	1578	2219	3128	3848	4553	932	1656	2251	3120	3799	4491	1770	CPSRFA	6	4553
Hydrograph	DRUCUB	197	337	433	643	822	980	204	345	436	563	665	773	1780	DRUCUB	6	980
Routed	MCUCUB	194	334	431	643	821	982	197	337	428	553	655	765	1790	MCUCUB	6	982
Hydrograph	SUBUB	70	119	151	195	228	260	48	86	110	143	168	193	1800	SUBUB	6	260
Combined	~@CPUB	236	411	530	694	833	995	229	395	503	654	773	897	1810	~@CPUB	6	995
Diversion	DIUE	0	0	0	0	0	0	0	0	0	0	0	0	1820	DIUE	6	0
Hydrograph	DIUBSF	236	411	530	694	833	995	229	395	503	654	773	897	1830	DIUBSF	6	995
Diversion	D-B71	0	12	120	284	423	585	0	2	93	244	363	487	1840	D-B71	6	585
Hydrograph	71PASS	236	400	410	410	410	410	229	392	410	410	410	410	1850	71PASS	6	410
Diversion	BSN71	236	400	410	410	410	410	229	392	410	410	410	410	1860	BSN71	6	410
Hydrograph	DBSN71	0	0	0	0	0	0	0	0	0	0	0	0	1870	DBSN71	6	0
Combined	CLEAR	762	1578	2219	3128	3848	4553	932	1657	2251	3120	3799	4491	1880	CLEAR	6	4553
Hydrograph	SUBTB	269	460	591	767	904	1037	201	354	457	596	704	811	1890	SUBTB	6	1037
Hydrograph	DRTB	42	71	91	117	137	156	35	60	77	99	116	133	1900	DRTB	6	156
Routed	RTDITB	27	52	68	90	111	129	21	40	54	72	86	103	1910	RTDITB	6	129
Combined	CPTB	270	461	593	772	913	1051	202	356	459	600	710	822	1920	CPTB	6	1051
Diversion	DITA	67	113	144	187	221	254	50	87	112	146	172	199	1930	DITA	6	254
Hydrograph	DITBTA	203	349	449	585	692	797	151	269	347	454	538	623	1940	DITBTA	6	797
Routed	RTTBSF	133	261	350	475	575	671	93	189	258	355	433	512	1950	RTTBSF	6	671
Hydrograph	SUBSF	53	126	175	244	298	349	36	92	134	190	231	272	1960	SUBSF	6	349
Combined	CPSF	154	340	471	655	799	939	115	258	364	511	628	745	1970	CPSF	6	939
Diversion	DIRJ1	46	102	141	196	240	282	34	77	109	153	188	223	1980	DIRJ1	6	282
Hydrograph	DISFRJ	108	238	330	458	559	657	80	181	255	358	440	521	1990	DISFRJ	6	657
Routed	RTSFSH	102	231	322	447	549	646	77	175	247	349	429	511	2000	RTSFSH	6	646
Hydrograph	SUBSH	98	149	183	228	263	298	68	108	133	168	194	220	2010	SUBSH	6	298
Combined	CPSH	101	231	322	447	549	646	78	178	251	353	436	520	2020	CPSH	6	646
Routed	RSSH	10	84	146	311	448	580	7	61	108	213	323	439	2030	RSSH	6	580
Diversion	DIRJ2	6	54	96	235	352	467	4	39	69	152	246	344	2040	DIRJ2	6	467
Hydrograph	DISHRJ	4	30	50	76	96	113	2	22	39	61	77	95	2050	DISHRJ	6	113
Routed	RTSHSG	3	29	47	71	88	104	2	21	38	58	73	88	2060	RTSHSG	6	104
Hydrograph	SUBTA	26	72	103	149	186	222	14	51	75	112	140	168	2070	SUBTA	6	222
Hydrograph	DRTA	67	113	144	187	221	254	50	87	112	146	172	199	2080	DRTA	6	254
Routed	RTDITA	55	98	131	172	206	239	40	74	98	133	158	184	2090	RTDITA	6	239
Combined	@CPTA	60	132	192	270	333	396	44	100	143	208	255	306	2100	@CPTA	6	396
Routed	RTTASG	55	124	182	261	324	389	41	96	134	198	247	297	2110	RTTASG	6	389
Hydrograph	SUBSG	72	116	146	186	217	247	50	84	106	136	160	183	2120	SUBSG	6	247
Combined	CPSG	55	124	182	262	330	403	50	100	141	214	268	324	2130	CPSG	6	403
Routed	RSSG	1	88	169	261	328	403	4	76	134	212	267	323	2140	RSSG	6	403
Diversion	DIRJ4	0	53	114	188	242	302	0	45	86	149	193	238	2150	DIRJ4	6	302
Hydrograph	DISGRJ	1	35	55	73	86	101	4	31	48	63	74	85	2160	DISGRJ	6	101
Routed	RTSGSE	1	33	51	71	84	99	4	29	45	61	72	84	2170	RTSGSE	6	99
Hydrograph	SUBSC	27	91	136	192	240	294	10	55	89	132	172	212	2180	SUBSC	6	294
Diversion	DISD	15	49	73	104	130	159	6	30	48	72	93	115	2190	DISD	6	159
Hydrograph	DISCSD	12	42	62	88	111	135	5	25	41	61	79	98	2200	DISCSD	6	135
Routed	RTSCSE	8	31	49	71	91	113	3	18	31	48	63	80	2210	RTSCSE	6	113
Hydrograph	SUBSE	122	196	245	310	360	409	77	135	172	221	259	297	2220	SUBSE	6	409
Combined	CPSE	50	90	117	153	182	210	74	131	167	215	253	291	2230	CPSE	24	291
Routed	RSSE	3	7	36	102	147	186	3	10	36	91	136	169	2240	RSSE	6	186
Diversion	DIRJ5	3	7	36	102	147	186	3	10	36	91	136	169	2250	DIRJ5	6	186
Hydrograph	DISERJ	0	0	0	0	0	0	0	0	0	0	0	0	2260	DISERJ	6	0
Routed	RTSERI	0	0	0	0	0	0	0	0	0	0	0	0	2270	RTSERI	6	0
Hydrograph	SUBRJ	50	86	113	151	179	207	33	61	82	110	131	152	2280	SUBRJ	6	207
Hydrograph	CPRJ1	46	102	141	196	240	282	34	77	109	153	188	223	2290	CPRJ1	6	282
Routed	RTSFRJ	39	90	127	179	221	261	30	68	96	139	172	206	2300	RTSFRJ	6	261
Hydrograph	CPRJ2	6	54	96	235	352	467	4	39	69	152	246	344	2310	CPRJ2	6	467
Routed	RTSHRJ	6	53	92	222	337	452	4	38	68	142	235	334	2320	RTSHRJ	6	452

		24-hr-storm								6-hour Storm								Design Control	
type	hec1id	q2	q5	q10	q25	q50	q100	sort	hec1id	q2	q5	q10	q25	q50	q100	sort	hec1id	Storm	Flow
Combined	@CPRJ3	30	73	133	242	385	525	2330	@CPRJ3	30	73	133	242	385	525	2330	@CPRJ3	6	669
Routed	RTRJ3	26	71	128	232	362	498	2340	RTRJ3	26	71	128	232	362	498	2340	RTRJ3	6	637
Hydrograph	CPRJ4A	0	45	86	149	193	238	2350	CPRJ4A	0	45	86	149	193	238	2350	CPRJ4A	6	302
Combined	CPRJ4B	26	88	165	295	448	623	2360	CPRJ4B	26	88	165	295	448	623	2360	CPRJ4B	6	796
Routed	RTSGRJ	26	88	164	292	441	613	2370	RTSGRJ	26	88	164	292	441	613	2370	RTSGRJ	6	788
Hydrograph	CPRJ5	3	10	36	91	136	169	2380	CPRJ5	3	10	36	91	136	169	2380	CPRJ5	6	186
Routed	RTSERJ	3	10	33	79	124	165	2390	RTSERJ	3	10	33	79	124	165	2390	RTSERJ	6	181
Combined	@CPRJ6	35	91	184	356	526	723	2400	@CPRJ6	35	91	184	356	526	723	2400	@CPRJ6	6	871
Routed	RSRJ	23	86	178	329	452	616	2410	RSRJ	23	86	178	329	452	616	2410	RSRJ	6	762
Diversion	DIPA2	0	0	1	3	5	46	2420	DIPA2	0	0	1	3	5	46	2420	DIPA2	6	99
Hydrograph	DIRJPA	23	86	177	325	447	570	2430	DIRJPA	23	86	177	325	447	570	2430	DIRJPA	6	663
Routed	RTRJRI	22	85	175	321	443	565	2440	RTRJRI	22	85	175	321	443	565	2440	RTRJRI	6	655
Routed	RTRIRI	22	85	174	319	442	563	2450	RTRIRI	22	85	174	319	442	563	2450	RTRIRI	6	653
Hydrograph	SUBRI	100	128	170	226	268	310	2460	SUBRI	100	128	170	226	268	310	2460	SUBRI	6	420
Hydrograph	SUBSB	36	63	90	124	149	174	2470	SUBSB	36	63	90	124	149	174	2470	SUBSB	6	226
Routed	RSSB	4	26	48	75	98	131	2480	RSSB	4	26	48	75	98	131	2480	RSSB	6	184
Hydrograph	SUBSD	29	58	85	125	158	190	2490	SUBSD	29	58	85	125	158	190	2490	SUBSD	6	253
Hydrograph	DRSD	15	30	48	72	93	115	2500	DRSD	15	30	48	72	93	115	2500	DRSD	6	159
Combined	@CPSD	29	73	119	190	248	310	2510	@CPSD	29	73	119	190	248	310	2510	@CPSD	6	431
Routed	RSSD	30	73	118	190	248	310	2520	RSSD	30	73	118	190	248	310	2520	RSSD	6	433
Routed	RTSDRI	21	63	113	180	238	305	2530	RTSDRI	21	63	113	180	238	305	2530	RTSDRI	6	418
Combined	~@CPRI	100	136	188	325	452	583	2540	~@CPRI	100	136	188	325	452	583	2540	~@CPRI	6	664
Routed	MCRIRH	42	51	122	177	323	450	2550	MCRIRH	42	51	122	177	323	450	2550	MCRIRH	6	658
Hydrograph	SUBUE	38	49	63	81	94	107	2560	SUBUE	38	49	63	81	94	107	2560	SUBUE	6	143
Hydrograph	DRUE	0	0	0	0	0	0	2570	DRUE	0	0	0	0	0	0	2570	DRUE	6	0
Combined	CPUE	38	49	63	81	94	107	2580	CPUE	38	49	63	81	94	107	2580	CPUE	6	143
Routed	RSUE	0	0	0	0	0	1	2590	RSUE	0	0	0	0	0	1	2590	RSUE	6	1
Routed	RTUEPB	0	0	0	0	0	1	2600	RTUEPB	0	0	0	0	0	1	2600	RTUEPB	6	1
Hydrograph	DRB71	236	392	410	410	410	410	2610	DRB71	236	392	410	410	410	410	2610	DRB71	6	410
Routed	MC71PB	214	360	405	410	410	410	2620	MC71PB	214	360	405	410	410	410	2620	MC71PB	6	410
Hydrograph	SUBPB2	107	135	176	230	272	313	2630	SUBPB2	107	135	176	230	272	313	2630	SUBPB2	6	422
Combined	~CPPB2	381	490	562	625	669	715	2640	~CPPB2	381	490	562	625	669	715	2640	~CPPB2	6	828
Routed	MCPB73	374	481	557	621	666	711	2650	MCPB73	374	481	557	621	666	711	2650	MCPB73	6	821
Diversion	D-B73	0	31	107	171	216	261	2660	D-B73	0	31	107	171	216	261	2660	D-B73	6	371
Hydrograph	73PASS	374	450	450	450	450	450	2670	73PASS	374	450	450	450	450	450	2670	73PASS	6	450
Routed	MC73NA	354	442	450	450	450	450	2680	MC73NA	354	442	450	450	450	450	2680	MC73NA	6	450
Hydrograph	SUBNA2	59	101	145	207	255	303	2690	SUBNA2	59	101	145	207	255	303	2690	SUBNA2	6	386
Hydrograph	DRNA	117	201	251	318	369	421	2700	DRNA	117	201	251	318	369	421	2700	DRNA	24	421
Routed	RTDINA	46	66	87	124	153	185	2710	RTDINA	46	66	87	124	153	185	2710	RTDINA	6	230
Combined	~@CPNA	351	524	605	766	852	934	2720	~@CPNA	351	524	605	766	852	934	2720	~@CPNA	6	1053
Routed	MCNAJC	297	507	597	763	849	931	2730	MCNAJC	297	507	597	763	849	931	2730	MCNAJC	6	1048
Hydrograph	SUBPB1	56	69	89	116	137	158	2740	SUBPB1	56	69	89	116	137	158	2740	SUBPB1	6	212
Diversion	DIPA1	11	13	17	22	26	30	2750	DIPA1	11	13	17	22	26	30	2750	DIPA1	6	40
Hydrograph	DIPBPA	45	56	73	94	111	127	2760	DIPBPA	45	56	73	94	111	127	2760	DIPBPA	6	172
Routed	RTPBNA	12	18	24	35	43	52	2770	RTPBNA	12	18	24	35	43	52	2770	RTPBNA	6	69
Hydrograph	SUBNA1	18	34	51	75	93	112	2780	SUBNA1	18	34	51	75	93	112	2780	SUBNA1	6	145
Combined	CPNA1	19	35	51	76	95	115	2790	CPNA1	19	35	51	76	95	115	2790	CPNA1	6	148
Routed	RTNAJC	18	33	49	74	93	113	2800	RTNAJC	18	33	49	74	93	113	2800	RTNAJC	6	146
Hydrograph	SUBJC1	2	8	15	23	31	39	2810	SUBJC1	2	8	15	23	31	39	2810	SUBJC1	6	52
Combined	~CPJC1	296	539	646	832	938	1041	2820	~CPJC1	296	539	646	832	938	1041	2820	~CPJC1	6	1173
Routed	MCJCJB	266	499	633	821	928	1030	2830	MCJCJB	266	499	633	821	928	1030	2830	MCJCJB	6	1162
Hydrograph	SUBPA	139	173	231	313	374	435	2840	SUBPA	139	173	231	313	374	435	2840	SUBPA	6	593
Hydrograph	DRPA	11	13	17	22	26	30	2850	DRPA	11	13	17	22	26	30	2850	DRPA	6	40
Routed	RTDIPA	2	3	4	6	7	9	2860	RTDIPA	2	3	4	6	7	9	2860	RTDIPA	6	11
Hydrograph	DRPA2	0	0	1	3	5	46	2870	DRPA2	0	0	1	3	5	46	2870	DRPA2	6	99
Routed	RTRJPA	0	0	1	2	3	19	2880	RTRJPA	0	0	1	2	3	19	2880	RTRJPA	6	57
Combined	CPPA	139	173	231	313	375	435	2890	CPPA	139	242	322	430	512	593	2890	CPPA	6	593
Diversion	DIOE	25	31	42	56	67	78	2900	DIOE	25	44	58	77	92	107	2900	DIOE	6	107
Hydrograph	DIPAOE	114	142	190	257	307	357	2910	DIPAOE	114	199	264	352	420	487	2910	DIPAOE	6	487
Routed	RTPAMH	56	74	111	165	208	250	2920	RTPAMH	56	115	166	238	296	351	2920	RTPAMH	6	351
Hydrograph	SUBMH	49	86	124	175	211	248	2930	SUBMH	49	117	163	228	277	325	2930	SUBMH	6	325
Combined	CPMH	56	88	128	187	243	301	2940	CPMH	56	117	178	266	337	412	2940	CPMH	6	412
Routed	RTMHMD	41	67	104	165	216	271	2950	RTMHMD	41	97	152	233	300	367	2950	RTMHMD	6	367
Hydrograph	SUBMD	115	129	161	205	240	274	2960	SUBMD	115	181	225	285	331	376	2960	SUBMD	6	376
Diversion	RETMD	115	129	161	205	240	274	2970	RETMD	115	181	225	285	331	376	2970	RETMD	6	376
Hydrograph	RETMD	0	0	1	52	141	218	2980	RETMD	0	0	43	184	253	319	2980	RETMD	6	319
Combined	CPMD	41	67	104	180	241	305	2990	CPMD	41	97	156	245	320	396	2990	CPMD	6	396
Diversion	DIJB1	7	14	22	38	50	63	3000	DIJB1	7	19	33	51	66	81	3000	DIJB1	6	81
Hydrograph	DIMDJB	30	52	82	142	191	242	3010	DIMDJB	30	72	123	194	254	315	3010	DIMDJB	6	315
Diversion	DIMFX	30	52	82	142	191	242	3020	DIMFX	30	72	123	194	254	315	3020	DIMFX	6	315
Hydrograph	DIMDMF	0	0	0	0	0	0	3030	DIMDMF	0	0	0	0	0	0	3030	DIMDMF	6	0
Hydrograph	SUBMI	204	204	273	365	435	503	3040	SUBMI	204	285	376	498	591	681	3040	SUBMI	6	681
Diversion	RETMI	204	204	273	334	394	362	3050	RETMI	204	285	368	440	474	483	3050	RETMI	6	483
Hydrograph	RETMI	0	50	215	343	435	503	3060	RETMI	0	197	357	498	591	681	3060	RETMI	6	681
Diversion	RETMG	38	67	86	111	131	150	3070	RETMG	38	93	118	151	177	202	3070	RETMG	6	202
Hydrograph	RETMG	38	67	86	111	131	150	3080	RETMG	38	93	118	151	177	183	3080	RETMG	6	183
Combined	CPMG	0	0	1	37	89	118	3090	CPMG	0	0	27	86	142	200	3090	CPMG	6	200
Routed	RTMGJB	0	50	215	377	505	616	3100	RTMGJB	0	197	357	583	726	836	3100	RTMGJB	6	836
Hydrograph	SUBJB1	0	18	75	189	294	398	3110	SUBJB1	0	62	156	331	461	590	3110	SUBJB1	6	590
Hydrograph	DRJB	0	22	43	69	92	117	3120	DRJB	0	40	68	102	129	160	3120	DRJB	6	160
Routed	RDIJB1	6	14	22	38	50	63	3130	RDIJB1	6	19	33	51	66	81	3130	RDIJB1	6	81
Combined	~CPJB1	5	12	18	32	44	56	3140	~CPJB1	5	16	27	44	58	73	3140	~CPJB1	6	73
Diversion	DIED	245	516	738	968	1113	1267	3150	DIED	245	562	795	1040	1217	1393	3150	DIED	6	1393
Hydrograph	DIED	242	516	738	968	1113	1267	3160	DIED	242	536	795	1040	1217	1393	3160	DIED	6	1393
Routed	DIED	0	0	0	0	0	0	3170	DIED	0	0	0	0	0	0	3170	DIED	6	0
Hydrograph	SUBSA	170	282	352	448	521	594	3180	SUBSA	170	247	487	615	715	811	3180	SUBSA	6	811
Routed	MCSARH	154	263	334	428	502	566	3190	MCSARH	154	391	466	594	693	781	3190	MCSARH	6	781
Diversion	D-B91A	154	263	334	428	502	566	3200	D-B91A	154	373	466	594	693	781	3200	D-B91A	6	781
Hydrograph	BAS91A	0	0	0	0	0	0	3210	BAS91A	0	0	0	0	0	0	3210	BAS91A	6	0
Hydrograph	SUBRH	28	74	108	153	186	218	3220	SUBRH	28	102	142	198	243	285	3220	SUBRH	6	285
Combined	TEMP	25	69	102	147	179	211	3230	TEMP	25	97	143	178	211	251	3230	TEMP	6	211
Combined	~@CPRH	75	189	275	414	531	652	3240	~@CPRH	75	256	402	531	662	75	3240	~@CPRH	6	662
Diversion	D-B91B	0	0	0	1	81	202	3250	D-B91B	0	0	0	86	212	0	3250	D-B91B	6	212
Hydrograph	91PASS	75	189	275	413	450	450	3260	91PASS	75	256	402	448	450	75	3260	91PASS	6	450
Routed	MCRHOG	55	161	245	385	445	450	3270	MCRHOG	55	143	234	384	446	450	3270	MCRHOG	6	450
Hydrograph	SUBRG	99	144	173	214	245	276	3280	SUBRG	99	165	239	293	335	376	3280	SUBRG	6	376
Diversion	RETRG	99	116	87	63	36	23	3290	RETRG	99	134	191	143	119	134	3290	RETRG	6	134
Hydrograph	CPRG	10	133	173	214	245	276	3300	CPRG	10	236	236	293	335	376	3300	CPRG	6	376
Routed	RTRGRF	4	17	28	47	63	81	3310	RTRGRF	4	55	34	55	74	93	3310	RTRGRF	6	93
Hydrograph	SUBRF	116	212	277	365	433	500	3320	SUBRF	116	366	479	566	652	652	3320	SUBRF	6	652
Combined	~CPRF	115	219	295	404	490	577	3330	~CPRF	115	384	518	626	730	730	3330	~CPRF	6	730
Routed	MCRFOG	111	213	290	397	483	569	3340	MCRFOG	111	379	512	618	723	723	3340	MCRFOG	6	723
Hydrograph	SUBOG	136	234	296	382	448	513	3350	SUBOG	136	409	523	612	699	699	3350	SUBOG	6	699
Combined	CPOG1	215	394	523	702	844	987	3360	CPOG1	215	655	871	1043	1214	1214	3360	CPOG1	6	1214
Diversion	D-B99A	36	215	344	523	665	808	3370	D-B99A	36	476	692	864	1035	1035	3370	D-B99A	6	1035
Hydrograph	BAS99A	179	179	179	179	179	179	3380	BAS99A	179	179	179	179	179	179	3380	BAS99A	6	179
Combined	~CPOG	198	339	423	563	624	628	3390	~CPOG	198	404	548	615	628	628	3390	~CPOG	6	628
Routed	MCOGOF	191	330	413	545	614	625	3400	MCOGOF	191	316	395	536	608	626	3400	MCOGOF	6	626
Hydrograph	SUBOF	144	221	271	340	393	445	3410	SUBOF	144	308	377	468	539	608	3410	SUBOF	6	608
Hydrograph	SUBRE	60	111	140	180	211	242	3420	SUBRE	60	141	183	241	286	329	3420	SUBRE	6	329
Routed	RTREOF	53	105	133	172	203	233	3430	RTREOF	53	133	175	231	275	318	3430	RTREOF	6	318
Combined	~CPOF	219	439	550	721	826	875	3440	~CPOF	219	417	541	730	846	905	3440	~CPOF	6	905
Routed	MCOFOB	215	425	540	709	814	871	3450	MCOFOB	215	407	533	719	839	902	3450	MCOFOB	6	902
Hydrograph	SUBOB	224	348	428	541	629	716	3460	SUBOB	224	495	605	756	874	990	3460	SUBOB	6	990
Combined	~CPOB	280	466	589	765	907	1013	3470	~CPOB	280	433	555	750	877	966	3470	~CPOB	24	1013
Hydrograph	SUBRD	58	108	137	178	211	245	3480	SUBRD	58	148	194	257	305	351	3480	SUBRD	6	351

		6-hour Storm						24-hr-storm							Design Control		
type	hec1id	q2	q5	q10	q25	q50	q100	q2	q5	q10	q25	q50	q100	sort	hec1id	Storm	Flow
Diversion	DIOB	32	59	78	103	122	141	23	43	55	71	85	98	3490	DIOB	6	141
Hydrograph	DIRDOB	48	89	117	154	183	211	35	65	82	107	127	147	3500	DIRDOB	6	211
Routed	RTRDRC	19	40	56	82	101	121	12	27	37	51	64	79	3510	RTRDRC	6	121
Hydrograph	SUBRC	26	107	166	248	323	397	8	78	122	189	245	303	3520	SUBRC	6	397
Combined	CPRC	18	88	146	229	302	374	12	77	121	188	244	301	3530	CPRC	6	374
Routed	RTRCRB	12	49	90	154	223	291	9	41	70	119	162	217	3540	RTRCRB	6	291
Hydrograph	SUBRB	19	103	166	246	315	391	1	64	112	174	231	288	3550	SUBRB	6	391
Combined	CPRB	11	48	104	184	251	323	9	61	109	171	227	284	3560	CPRB	6	323
Diversion	DIKA3	5	24	52	92	126	162	5	31	55	85	113	142	3570	DIKA3	6	162
Hydrograph	DIRBKA	5	24	52	92	126	162	4	30	55	85	113	142	3580	DIRBKA	6	162
Routed	RTRBRA	3	15	34	70	105	145	3	18	32	58	83	112	3590	RTRBRA	6	145
Hydrograph	SUBRA	4	36	63	96	121	149	0	19	40	65	85	109	3600	SUBRA	6	149
Combined	CPRA	3	15	33	68	104	145	3	18	37	62	83	113	3610	CPRA	6	145
Diversion	DIKA4	0	4	13	44	80	119	0	3	16	38	61	90	3620	DIKA4	6	119
Hydrograph	DIRAKA	2	12	20	25	25	25	2	15	22	25	25	25	3630	DIRAKA	6	25
Diversion	DIAFX	2	12	20	25	25	25	2	15	22	25	25	25	3640	DIAFX	6	25
Hydrograph	DIKAAF	0	0	0	0	0	0	0	0	0	0	0	0	3650	DIKAAF	6	0
Hydrograph	CPOB2	32	59	78	103	122	141	23	43	55	71	85	98	3660	CPOB2	6	141
Routed	RTDIOB	8	18	26	37	47	56	5	12	16	24	29	36	3670	RTDIOB	6	56
Combined	@CPOB	270	431	553	750	876	961	280	466	589	765	907	1013	3680	@CPOB	24	1013
Routed	MCOBLE	260	421	547	742	871	937	255	439	562	739	866	940	3690	MCOBLE	24	940
Hydrograph	SUBLE	18	65	102	147	183	223	7	38	66	100	130	162	3700	SUBLE	6	223
Combined	~CPLE	266	432	563	766	923	1047	262	468	614	816	983	1093	3710	~CPLE	24	1093
Diversion	D-B111	0	0	0	73	223	347	0	0	0	116	283	393	3720	D-B111	24	393
Hydrograph	111PAS	266	432	563	698	700	700	262	468	614	700	700	700	3730	111PAS	6	700
Routed	MCLEKD	258	421	553	695	700	700	244	441	587	700	700	700	3740	MCLEKD	6	700
Hydrograph	SUBKD	14	74	127	196	254	316	4	48	91	144	190	241	3750	SUBKD	6	316
Combined	~CPKD	259	425	571	754	828	894	247	476	654	805	864	920	3760	~CPKD	24	920
Routed	MCKDKA	249	408	549	741	822	890	226	443	614	781	846	908	3770	MCKDKA	24	908
Hydrograph	SUBKA	51	92	119	161	195	229	30	62	82	114	139	164	3780	SUBKA	6	229
Diversion	RETKA	51	92	119	161	195	229	30	62	82	114	139	164	3790	RETKA	6	229
Hydrograph	RETKA	0	0	0	77	145	201	0	0	0	13	54	108	3800	RETKA	6	201
Hydrograph	CPKA3	5	24	52	92	126	162	5	31	55	85	113	142	3810	CPKA3	6	162
Routed	RTDIKA	5	19	37	72	112	153	4	20	34	60	87	118	3820	RTDIKA	6	153
Hydrograph	CPKA4	0	4	13	44	80	119	0	3	16	38	61	90	3830	CPKA4	6	119
Combined	~CPKA	249	406	548	752	843	982	226	445	624	809	887	1044	3840	~CPKA	24	1044
Combined	CPKAAF	885	1770	2470	3501	4305	5061	997	1982	2735	3803	4545	5283	3850	CPKAAF	24	5283
Hydrograph	SUBLC	85	145	184	238	279	319	51	98	128	168	200	231	3860	SUBLC	6	319
Diversion	RETLC	85	145	184	238	279	319	51	98	128	168	200	231	3870	RETLC	6	319
Hydrograph	RETLC	0	0	0	0	0	43	0	0	0	0	1	6	3880	RETLC	6	43
Routed	RTLCLA	0	0	0	0	0	5	0	0	0	0	1	2	3890	RTLCLA	6	5
Hydrograph	SUBLA	85	183	248	336	411	490	44	119	167	234	293	351	3900	SUBLA	6	490
Diversion	RETLA	85	183	248	336	411	490	44	119	167	234	293	351	3910	RETLA	6	490
Hydrograph	RETLA	0	0	0	163	309	441	0	0	0	25	125	255	3920	RETLA	6	441
Combined	CPLA	0	0	0	143	271	387	0	0	0	23	124	254	3930	CPLA	6	387
Routed	RTLAKB	0	0	0	41	94	160	0	0	0	8	43	87	3940	RTLAKB	6	160
Hydrograph	SUBKB	51	159	231	326	409	495	18	98	152	226	292	357	3950	SUBKB	6	495
Combined	CPKB	35	111	178	270	346	424	17	95	149	223	288	353	3960	CPKB	6	424
Combined	CPAFKB	885	1769	2471	3525	4351	5151	997	1996	2763	3860	4620	5397	3970	CPAFKB	24	5397
Hydrograph	SUBGA	55	136	188	255	306	356	21	86	125	177	216	255	3980	SUBGA	6	356
Combined	CPAFGA	884	1767	2471	3525	4352	5153	997	1996	2764	3860	4620	5397	3990	CPAFGA	24	5397
Hydrograph	SUBEC	1	6	10	15	19	24	0	3	7	11	14	18	4000	SUBEC	6	24
Combined	CPECSR	884	1767	2471	3526	4356	5160	997	1998	2768	3868	4631	5411	4010	CPECSR	24	5411
Hydrograph	SUBOE	132	233	300	400	481	560	81	160	210	286	345	405	4020	SUBOE	6	560
Diversion	RETOE	102	103	93	87	78	88	51	20	12	10	10	10	4030	RETOE	6	88
Hydrograph	RETOE	132	233	300	400	481	560	81	160	210	286	345	405	4040	RETOE	6	560
Hydrograph	CPOE1	25	44	58	77	92	107	17	31	42	56	67	78	4050	CPOE1	6	107
Routed	RTDIOE	6	11	16	23	29	35	4	8	12	17	21	26	4060	RTDIOE	6	35
Combined	@CPOE	132	233	300	400	481	560	81	160	211	287	346	406	4070	@CPOE	6	560
Diversion	DIOD	23	39	50	66	79	92	13	28	36	48	57	67	4080	DIOD	6	92
Hydrograph	DIOEOD	109	194	250	334	402	468	68	133	175	239	288	339	4090	DIOEOD	6	468
Routed	RTOEMF	28	68	97	154	204	256	19	50	74	111	149	186	4100	RTOEMF	6	256
Hydrograph	SUBMF	69	193	283	408	506	600	54	153	229	333	411	488	4110	SUBMF	6	600
Hydrograph	CPMF	30	72	123	194	254	315	22	52	82	142	191	242	4120	CPMF	6	315
Routed	RTMDMF	20	49	79	145	201	259	16	38	58	99	146	194	4130	RTMDMF	6	259
Combined	CPMF1	69	193	283	407	541	685	54	153	229	337	445	568	4140	CPMF1	6	685
Diversion	DIEB	27	85	125	187	251	317	24	72	107	157	207	263	4150	DIEB	6	317
Hydrograph	DIMFEB	31	95	143	215	290	368	29	80	121	180	238	304	4160	DIMFEB	6	368
Routed	RTMFMC	14	59	99	176	243	311	14	49	81	140	193	250	4170	RTMFMC	6	311
Hydrograph	SUBOD	186	309	394	507	596	681	128	225	288	373	439	504	4180	SUBOD	6	681
Diversion	RETOD	38	27	20	15	13	13	5	4	5	5	6	6	4190	RETOD	6	13
Hydrograph	RETOD	186	309	394	507	596	681	128	225	288	373	439	504	4200	RETOD	6	681
Hydrograph	DROD	23	39	50	66	79	92	13	28	36	48	57	67	4210	DROD	6	92
Routed	RTDIOD	7	17	23	34	43	53	5	13	18	26	33	40	4220	RTDIOD	6	53
Combined	CPOD	186	309	394	507	596	681	128	225	288	373	439	504	4230	CPOD	6	681
Diversion	DIOC	34	56	71	91	107	123	23	41	52	67	79	91	4240	DIOC	6	123
Hydrograph	DIODOC	153	253	323	416	488	558	105	185	236	306	360	414	4250	DIODOC	6	558
Routed	RTODMC	56	112	164	235	293	351	41	85	116	172	215	262	4260	RTODMC	6	351
Hydrograph	SUBMC	100	238	337	474	579	683	79	189	272	384	469	555	4270	SUBMC	6	683
Combined	CPMC1	67	199	314	508	666	819	77	190	278	419	549	682	4280	CPMC1	6	819
Diversion	DIMB	26	78	121	195	255	313	30	74	108	161	211	261	4290	DIMB	6	313
Hydrograph	DIMCMB	41	122	193	313	411	506	47	116	170	258	339	421	4300	DIMCMB	6	506
Routed	RTMCIE	34	113	186	298	389	479	37	102	159	246	320	398	4310	RTMCIE	6	479
Hydrograph	DREB	27	85	125	187	251	317	24	72	107	157	207	263	4320	DREB	6	317
Hydrograph	SUBEB	13	46	67	97	124	149	5	31	47	72	92	112	4330	SUBEB	6	149
Combined	CPEB	48	125	178	255	317	377	29	91	136	197	244	293	4340	CPEB	6	377
Hydrograph	RDIED	240	536	795	1040	1217	1393	242	516	738	968	1113	1267	4350	RDIED	6	1393
Routed	MCJBED	215	514	776	1030	1206	1381	217	483	708	960	1104	1253	4360	MCJBED	6	1381
Hydrograph	SUBED1	10	53	85	124	160	198	1	33	56	88	116	145	4370	SUBED1	6	198
Hydrograph	SUBED2	3	16	25	37	48	59	0	10	17	27	35	44	4380	SUBED2	6	59
Combined	~CPED1	338	736	997	1255	1465	1681	227	518	758	1022	1183	1350	4390	~CPED1	6	1681
Combined	~CPED2	336	772	1075	1418	1694	1967	237	561	831	1150	1368	1582	4400	~CPED2	6	1967
Routed	MCED95	325	757	1065	1405	1686	1962	232	551	820	1141	1359	1575	4410	MCED95	6	1962
Diversion	D-B95	0	0	39	355	636	912	0	0	0	91	309	525	4420	D-B95	6	912
Hydrograph	95PASS	325	757	1030	1050	1050	1050	232	551	820	1050	1050	1050	4430	95PASS	6	1050
Routed	MC95ID	318	747	1028	1050	1050	1050	228	544	811	1050	1050	1050	4440	MC95ID	6	1050
Hydrograph	SUBID1	23	58	82	116	143	169	15	42	62	90	110	131	4450	SUBID1	6	169
Hydrograph	SUBID2	11	60	98	144	183	226	1	34	63	99	131	164	4460	SUBID2	6	226
Combined	~CPID1	317	739	1027	1088	1130	1175	228	545	815	1075	1106	1143	4470	~CPID1	6	1175
Hydrograph	SUBIE	36	88	124	174	213	250	23	64	94	134	165	195	4480	SUBIE	6	250
Combined	CPID2	341	746	1021	1364	1536	1697	252	622	944	1326	1470	1614	4490	CPID2	6	1697
Routed	MCIDIB	239	627	1003	1354	1517	1676	247	609	930	1315	1450	1595	4500	MCIDIB	6	1676
Hydrograph	SUBIB	46	119	170	243	302	357	27	84	125	184	229	272	4510	SUBIB	6	357
Hydrograph	SUBIC	10	59	97	143	182	227	0	35	63	98	131	165	4520	SUBIC	6	227
Combined	~CPIB1	238	622	994	1396	1622	1849	247	616	952	1371	1558	1770	4530	~CPIB1	6	1849
Hydrograph	SUBOC	204	308	377	470	543	613	142	221	272	342	395	449	4540	SUBOC	6	613
Hydrograph	DROC	34	56	71	91	107	123	23	41	52	67	79	91	4550	DROC	6	123
Routed	RTDIOC	9	17	24	33	41	50	6	13	18	26	33	39	4560	RTDIOC	6	50
Combined	CPOC	204	308	377	470	543	613	142	221	272	342	396	449	4570	CPOC	6	613
Routed	RTOCMB	69	118	155	218	265	316	48	83	109	146	184	221	4580	RTOCMB	6	316
Hydrograph	SUBMB	86	227	329	469	578	684	68	181	266	382	469	556	4590	SUBMB	6	684
Hydrograph	DRMB	26	78	121	195	255	313	30	74	108	161	211	261	4600	DRMB	6	313
Routed	RTDIMB	19	60	97	161	213	269	20	53	83	130	174	220	4610	RTDIMB	6	269
Combined	@CPMB	85	240	363	546	691	830	93	226	329	484	608	740	4620	@CPMB	6	830
Routed	RTMBIB	65	204	317	484	618	749	72	193	287	427	541	659	4630	RTMBIB	6	749
Combined	@CPIB2	274	741	1212	1783	2170	2552	298	752	1165	1722	2053	2405	4640	@CPIB2	6	2552

		6-hour Storm						24-hr-storm							Design Control		
type	hec1id	q2	q5	q10	q25	q50	q100	q2	q5	q10	q25	q50	q100	sort	hec1id	Storm	Flow
Routed	MCIBIA	265	719	1180	1756	2138	2518	290	733	1138	1693	2018	2373	4650	MCIBIA	6	2518
Hydrograph	SUBME	20	79	122	176	220	268	6	46	79	119	155	193	4660	SUBME	6	268
Routed	RTMEIA	7	36	60	95	124	163	2	19	36	59	82	109	4670	RTMEIA	6	163
Hydrograph	SUBIA	46	117	163	231	290	347	20	77	112	167	210	254	4680	SUBIA	6	347
Combined	~CPIA	265	716	1175	1773	2175	2578	292	743	1158	1733	2081	2457	4690	~CPIA	6	2578
Routed	MCIAHB	256	696	1151	1754	2152	2554	286	731	1140	1715	2062	2435	4700	MCIAHB	6	2554
Hydrograph	SUBHB	34	113	166	235	295	358	11	68	109	162	210	258	4710	SUBHB	6	358
Hydrograph	SUBDA	53	113	156	220	270	318	32	79	112	161	198	235	4720	SUBDA	6	318
Combined	~CPHB1	255	693	1146	1747	2146	2555	286	732	1141	1720	2074	2456	4730	~CPHB1	6	2555
Hydrograph	SUBLD	106	191	247	329	395	460	60	127	168	232	281	329	4740	SUBLD	6	460
Routed	RTLDMA	87	163	215	297	361	423	47	104	142	202	247	296	4750	RTLDMA	6	423
Hydrograph	SUBMA	3	42	76	119	151	185	0	20	47	79	104	132	4760	SUBMA	6	185
Combined	CPMA	89	201	285	407	502	597	47	123	187	276	345	422	4770	CPMA	6	597
Routed	RTMAHB	36	91	140	215	285	354	19	54	87	139	181	234	4780	RTMAHB	6	354
Combined	~CPHB2	253	687	1141	1770	2194	2628	291	745	1164	1762	2139	2549	4790	~CPHB2	6	2628
Hydrograph	SUBLB	4	41	72	111	141	173	0	21	45	75	98	125	4800	SUBLB	6	173
Routed	RTLBHA	2	27	53	85	114	145	0	12	31	55	75	98	4810	RTLBHA	6	145
Hydrograph	SUBHA	10	42	65	95	119	145	3	25	43	65	85	106	4820	SUBHA	6	145
Combined	CPHA	253	686	1138	1780	2220	2670	291	750	1176	1789	2182	2615	4830	CPHA	6	2670
Routed	MCHACB	245	669	1119	1765	2200	2636	286	740	1163	1774	2168	2590	4840	MCHACB	6	2636
Hydrograph	SUBEE	19	88	152	238	314	395	5	74	123	189	250	311	4850	SUBEE	6	395
Hydrograph	CPEE1	7	20	35	63	87	113	8	19	32	55	72	93	4860	CPEE1	6	113
Routed	RTDIEE	6	19	31	58	81	105	7	18	29	50	68	87	4870	RTDIEE	6	105
Combined	CPEE	19	88	152	238	315	396	8	74	123	189	250	311	4880	CPEE	6	396
Routed	RTEEEA	8	38	65	91	120	191	5	32	53	81	97	130	4890	RTEEEA	6	191
Hydrograph	SUBEA	13	92	186	317	429	549	1	97	175	273	364	458	4900	SUBEA	6	549
Combined	CPEA	15	94	173	271	382	499	5	95	173	271	361	454	4910	CPEA	6	499
Routed	MCEADC	4	19	74	189	290	486	5	49	105	189	267	440	4920	MCEADC	6	486
Hydrograph	SUBDC	31	136	222	337	441	546	9	107	172	265	346	427	4930	SUBDC	6	546
Combined	~CPDC	5	52	129	245	343	712	8	102	168	258	339	650	4940	~CPDC	6	712
Routed	MCDCCC	3	18	58	151	254	698	4	41	86	165	246	636	4950	MCDCCC	6	698
Hydrograph	SUBDD	5	37	61	91	116	142	0	21	40	63	83	104	4960	SUBDD	6	142
Routed	RTDDCC	2	20	36	59	77	98	0	10	22	38	53	70	4970	RTDDCC	6	98
Hydrograph	SUBCC	87	240	348	515	651	780	60	195	278	411	516	621	4980	SUBCC	6	780
Combined	~CPCC	27	141	245	398	521	1012	56	190	271	403	508	940	4990	~CPCC	6	1012
Routed	MCCCCB	11	67	137	269	382	1008	22	92	153	260	351	930	5000	MCCCCB	6	1008
Hydrograph	SUBCB	42	107	153	217	267	315	31	82	121	175	217	260	5010	SUBCB	6	315
Combined	~CPCB1	244	662	1145	1935	2511	3153	288	800	1273	2023	2570	3278	5020	~CPCB1	24	3278
Hydrograph	SUBGD	668	976	1186	1469	1689	1903	516	775	944	1179	1359	1540	5030	SUBGD	6	1903
Hydrograph	SUBKC	4	47	83	129	163	199	0	23	51	86	113	143	5040	SUBKC	6	199
Routed	RTKCGD	1	17	34	59	78	102	0	7	19	36	50	69	5050	RTKCGD	6	102
Hydrograph	SUBGC	64	132	175	239	292	343	33	87	119	170	208	247	5060	SUBGC	6	343
Routed	RTGCGD	47	103	140	202	254	302	24	65	91	136	172	211	5070	RTGCGD	6	302
Combined	CPGD1	668	976	1186	1469	1689	1903	525	802	982	1245	1449	1654	5080	CPGD1	6	1903
Routed	RTGDCB	312	508	654	856	1022	1184	224	386	493	657	782	913	5090	RTGDCB	6	1184
Combined	~CPCB2	258	673	1186	2017	2650	3336	309	848	1339	2135	2741	3522	5100	~CPCB2	24	3522
Routed	MCCBCA	233	596	1009	1800	2428	3074	302	769	1200	1973	2540	3201	5110	MCCBCA	24	3201
Hydrograph	SUBCA	69	190	278	399	493	584	54	151	225	327	402	479	5120	SUBCA	6	584
Combined	~CPCA1	236	595	1005	1794	2429	3085	302	769	1197	1971	2552	3224	5130	~CPCA1	24	3224
Hydrograph	SUBGB	55	117	157	214	261	309	27	75	105	149	185	220	5140	SUBGB	6	309
Routed	RTGBCA	33	77	108	154	197	240	16	48	68	103	131	162	5150	RTGBCA	6	240
Combined	~CPCA2	240	594	1004	1793	2428	3084	301	769	1196	1969	2553	3225	5160	~CPCA2	24	3225
Routed	MCCABC	226	583	992	1776	2415	34	296	761	1187	1954	2541	34	5190	MCCABC	6	34
Hydrograph	SUBBC	97	188	256	345	418	496	62	132	184	252	311	371	5200	SUBBC	6	496
Combined	~CPBC	227	583	992	1779	2419	340	297	762	1188	1957	2545	381	5210	~CPBC	24	381
Combined	CPAFBC	883	1763	2464	3517	4352	5210	1016	2049	2869	4049	4899	5595	5220	CPAFBC	24	5595
Hydrograph	SUBAD	55	119	166	233	284	334	36	85	119	166	201	236	5230	SUBAD	6	334
Routed	BSNAD	7	8	9	9	9	10	7	8	8	9	9	9	5240	BSNAD	6	10
Hydrograph	SUBAC	56	117	164	231	282	332	35	82	116	163	199	235	5250	SUBAC	6	332
Combined	CPAC	50	110	156	221	270	319	41	88	123	169	206	241	5260	CPAC	6	319
Routed	BSNAC	4	4	7	40	100	179	4	4	5	8	23	56	5270	BSNAC	6	179
Hydrograph	SUBAB	59	124	168	240	295	349	33	83	119	170	210	250	5280	SUBAB	6	349
Combined	CPAB	44	94	139	206	259	314	32	82	117	167	207	248	5290	CPAB	6	314
Routed	BSNAB	1	2	4	8	42	135	1	1	4	4	8	11	5300	BSNAB	6	135
Hydrograph	SUBAA	27	65	90	131	165	198	13	43	62	93	115	139	5310	SUBAA	6	198
Combined	CPAA	10	43	69	108	140	266	13	43	62	92	114	137	5320	CPAA	6	266
Hydrograph	SUBBB	42	89	122	167	201	234	30	67	93	127	153	179	5330	SUBBB	6	234
Routed	RTBBBA	17	43	64	96	119	150	11	30	46	70	90	108	5340	RTBBBA	6	150
Hydrograph	SUBBA	38	79	108	154	190	224	21	53	76	109	135	161	5350	SUBBA	6	224
Combined	CPBA	35	76	105	150	186	220	21	53	76	108	134	160	5360	CPBA	6	220
Combined	HCTR1	17	80	132	207	266	436	31	87	124	182	226	271	5370	HCTR1	6	436
Routed	BSNAA	1	1	1	4	17	256	1	1	1	2	4	10	5380	BSNAA	6	256
Hydrograph	SUBWT1	394	630	789	1008	1180	1347	261	449	568	739	870	1000	5390	SUBWT1	6	1347
Hydrograph	SUBWT2	127	203	253	320	372	423	81	140	177	228	267	306	5400	SUBWT2	6	423
Combined	DUR	884	1763	2460	3534	4404	5230	1216	2160	2899	4091	4948	5666	5410	DUR	24	5666
Diversion	B-DRCC	0	0	0	0	0	3047	0	0	0	0	0	3191	5170	B-DRCC	24	3191
Hydrograph	P-DRCC	0	0	0	0	0	34	0	0	0	0	0	34	5180	P-DRCC	6	34

APPENDIX B

Build-Out Conditions Retention Calculations

	Existing			Future			Retention Calcs				
Sub-Basin	Landuse Code	Area (sm)	Developable Area (sm)	Landuse Code	Area (sm)	Developed Area (sm)	C	D (in)	A (ac)	V (ac-ft)	Effective V (ac-ft)
SUBAA	1	0.25	0.25								
			0.00	12	0.25	0.25	0.35	2.8	160.0	13.07	
			0.25			**0.25**				**13.07**	**10.45**
SUBAB	1	0.30	0.30								
			0.00	3	0.01	0.01	0.6	2.8	4.2	0.59	
			0.00	12	0.30	0.30	0.35	2.8	192.0	15.68	
			0.30			**0.31**				**16.27**	**13.02**
SUBAC	1	0.29	0.29								
			0.00	3	0.01	0.01	0.6	2.8	4.0	0.56	
			0.00	12	0.29	0.29	0.35	2.8	185.6	15.16	
			0.29			**0.30**				**15.72**	**12.58**
SUBAD	1	0.27	0.27								
			0.00	12	0.28	0.28	0.35	2.8	182.0	14.86	
	22	0.02	0.02			0.00				**14.86**	**11.89**
			0.28			**0.28**					
SUBBA	1	0.14	0.14								
	2	0.02	0.00								
	12	0.17	0.00	12	0.33	0.16	0.35	2.8	100.4	8.20	
			0.14			**0.16**				**8.20**	**6.56**
SUBBB	1	0.20	0.20								
				3	0.01	0.01	0.6	2.8	4.5	0.64	
	12	0.00	0.00	12	0.24	0.24	0.35	2.8	152.1	12.42	
	22	0.04	0.04							**13.05**	**10.44**
			0.24			**0.24**					
SUBBC1	1	0.01	0.01								
	9	0.07	0.00								
				11	0.05	0.05	0.35	2.8	32.0	2.61	
	12	0.02	0.00	12	0.02	0.00	0.35	2.8	0.0	0.00	
	22	0.04	0.04	22	0.04	0.00	0.35	2.8	0.0	0.00	
			0.05			**0.05**				**2.61**	**2.09**
SUBBC2	1	0.46	0.46								
	9	0.03	0.00	9	0.03	0.00	0.7	2.8	0.0	0.00	
			0.00	11	0.13	0.13	0.6	2.8	86.2	12.07	
			0.00	12	0.33	0.33	0.35	2.8	209.0	17.07	
			0.46			**0.46**				**29.14**	**23.31**
SUBCA1	1	0.14	0.14								
				11	0.03	0.03	0.6	2.8	19.5	2.73	
				12	0.00	0.00	0.35	2.8	2.9	0.24	
				13	0.11	0.11	0.5	2.8	68.9	8.03	
			0.14			**0.14**				**11.00**	**8.80**
SUBCA2	1	0.84	0.84								
				3	0.02	0.02	0.6	2.8	10.0	1.40	
				11	0.04	0.04	0.6	2.8	24.8	3.48	
				12	0.67	0.67	0.35	2.8	428.0	34.96	
				13	0.12	0.12	0.5	2.8	75.3	8.79	
			0.84			**0.84**				**48.62**	**38.89**
SUBCB	1	0.74	0.74								
				3	0.01	0.01	0.6	2.8	7.5	1.05	
				12	0.73	0.73	0.35	2.8	465.6	38.02	
			0.74			**0.74**				**39.07**	**31.26**
SUBCC	1	0.44	0.44								
			0.00	3	0.02	0.02	0.6	2.8	11.6	1.63	
	12	0.31	0.00	12	0.91	0.60	0.35	2.8	383.7	31.34	
	13	0.04	0.00	13	0.05	0.01	0.5	2.8	5.3	0.62	
	22	0.08	0.08							**33.59**	**26.87**
	25	0.11	0.11								
			0.63			**0.63**					
SUBDA	1	0.22	0.22								
			0.00	3	0.01	0.01	0.6	2.8	8.0	1.12	
	12	0.12	0.00	12	0.17	0.05	0.35	2.8	32.4	2.65	
			0.00	13	0.16	0.16	0.5	2.8	102.2	11.92	
	25	0.00	0.00							**15.69**	**12.56**
			0.22			**0.22**					
SUBDC	1	0.77	0.77								
	12	0.06	0.00	12	0.71	0.65	0.35	2.8	415.0	33.89	
			0.00	13	0.12	0.12	0.5	2.8	74.9	8.74	
			0.77			**0.77**				**42.63**	**34.11**

	Existing			Future			Retention Calcs				
Sub-Basin	Landuse Code	Area (sm)	Developable Area (sm)	Landuse Code	Area (sm)	Developed Area (sm)	C	D (in)	A (ac)	V (ac-ft)	Effective V (ac-ft)
SUBDD	1	0.10	0.10								
			0.00	12	0.02	0.02	0.35	2.8	13.1	1.07	
			0.00	13	0.11	0.11	0.5	2.8	72.0	8.40	
	25	0.03	0.03							**9.47**	**7.57**
			0.13			**0.13**					
SUBEA	1	1.23	1.23								
			0.00	12	1.18	1.18	0.35	2.8	756.9	61.81	
			0.00	13	0.13	0.13	0.5	2.8	82.0	9.57	
	25	0.08	0.08							**71.38**	**57.11**
			1.31			**1.31**					
SUBEB	1	0.14	0.14								
			0.00	13	0.14	0.14	0.5	2.8	88.8	10.36	
			0.14			**0.14**				**10.36**	**8.29**
SUBEC	1	0.04	0.04								
	9	0.00	0.00	9	0.04	0.04	0.7	2.8	26.6	4.35	
			0.04			**0.04**				**4.35**	**3.48**
SUBED1	1	0.38	0.38								
	12	0.00	0.00	12	0.01	0.01	0.35	2.8	3.2	0.26	
				13	0.37	0.37	0.5	2.8	239.6	27.95	
			0.38			**0.38**				**28.21**	**22.57**
SUBED2	1	0.11	0.11								
				12	0.11	0.11	0.35	2.8	72.7	5.94	
			0.11			**0.11**				**5.94**	**4.75**
SUBEE	1	0.56	0.56								
	9	0.01	0.00	9	0.01	0.00	0.7	2.8	0.0	0.00	
	12	0.04	0.00	12	0.95	0.90	0.35	2.8	576.6	47.09	
			0.00	13	0.00	0.00	0.5	2.8	0.7	0.08	
	22	0.02	0.02							**47.17**	**37.74**
	25	0.33	0.33								
			0.90			**0.90**					
SUBFA	1	0.50	0.50								
	9	0.26	0.00	9	0.26	0.00	0.7	2.8	0.0	0.00	
			0.00	12	0.50	0.50	0.35	2.8	321.4	26.25	
			0.50			**0.50**				**26.25**	**21.00**
SUBFB	1	0.24	0.24								
	12	0.26	0.00	12	0.40	0.14	0.35	2.8	89.0	7.27	
	22	0.06	0.06	22	0.31	0.25	0.35	2.8	160.4	13.10	
	25	0.09	0.09							**20.37**	**16.29**
			0.39			**0.39**					
SUBFC	1	0.33	0.33								
				13	0.33	0.33	0.5	2.8	211.8	24.71	
	22	0.03	0.03	22	0.05	0.02	0.35	2.8	15.4	1.26	
			0.36			**0.36**				**25.97**	**20.78**
SUBGA	12	0.08	0.00	12	0.14	0.06	0.35	2.8	39.8	3.25	
	22	0.06	0.06	22	0.06	0.00	0.35	2.8	0.0	0.00	
			0.06			**0.06**				**3.25**	**2.60**
SUBGB	1	0.03	0.03								
				11	0.01	0.01	0.6	2.8	4.3	0.60	
	12	0.13	0.00	12	0.13	0.00	0.35	2.8	0.0	0.00	
	13	0.06	0.00	13	0.08	0.03	0.5	2.8	17.7	2.06	
			0.03			**0.03**				**2.66**	**2.13**
SUBGC	1	0.01	0.01								
				3	0.04	0.04	0.6	2.8	25.9	3.63	
	12	0.12	0.00	12	0.13	0.01	0.35	2.8	7.7	0.63	
	13	0.05	0.00	13	0.05	0.00	0.5	2.8	0.0	0.00	
	22	0.02	0.02							**4.26**	**3.41**
	25	0.02	0.02								
			0.04			**0.05**					
SUBGD1	1	0.49	0.49								
			0.00	3	0.02	0.02	0.6	2.8	12.5	1.76	
			0.00	6	0.00	0.00	0.65	2.8	0.3	0.05	
			0.00	12	0.04	0.04	0.35	2.8	23.4	1.91	
			0.00	13	0.57	0.57	0.5	2.8	366.5	42.75	
	24	0.02	0.00							**46.47**	**37.17**
	25	0.12	0.12								
			0.61			**0.63**					

	Existing			Future			Retention Calcs				
Sub-Basin	Landuse Code	Area (sm)	Developable Area (sm)	Landuse Code	Area (sm)	Developed Area (sm)	C	D (in)	A (ac)	V (ac-ft)	Effective V (ac-ft)
SUBGD2	1	0.21	0.21								
				3	0.01	0.01	0.6	2.8	9.1	1.27	
				12	0.00	0.00	0.35	2.8	0.8	0.06	
				13	0.19	0.19	0.5	2.8	123.9	14.46	
			0.21			**0.21**				**15.79**	**12.63**
SUBHA	1	0.13	0.13								
	6	0.02	0.00	6	0.02	0.00	0.65	2.8	0.5	0.08	
				13	0.13	0.13	0.5	2.8	82.9	9.68	
			0.13			**0.13**				**9.75**	**7.80**
SUBHB	1	0.21	0.21								
				3	0.01	0.01	0.6	2.8	3.6	0.51	
	12	0.12	0.00	12	0.12	0.00	0.35	2.8	0.0	0.00	
				13	0.21	0.21	0.5	2.8	134.4	15.68	
			0.21			**0.22**				**16.19**	**12.95**
SUBIA	1	0.18	0.18								
				3	0.00	0.00	0.6	2.8	3.0	0.42	
	12	0.13	0.00	12	0.13	0.00	0.35	2.8	2.8	0.22	
				13	0.17	0.17	0.5	2.8	108.8	12.69	
			0.18			**0.18**				**13.34**	**10.67**
SUBIB	1	0.53	0.53								
				3	0.00	0.00	0.6	2.8	0.1	0.01	
				13	0.53	0.53	0.5	2.8	340.7	39.75	
			0.53			**0.53**				**39.76**	**31.81**
SUBIC	1	0.41	0.41								
				12	0.00	0.00	0.35	2.8	0.1	0.01	
				13	0.46	0.46	0.5	2.8	294.9	34.41	
	25	0.05	0.05							**34.42**	**27.53**
			0.46			**0.46**					
SUBID1	1	0.13	0.13								
				13	0.21	0.21	0.5	2.8	135.0	15.75	
	25	0.08	0.08							**15.75**	**12.60**
			0.21			**0.21**					
SUBID2	1	0.28	0.28								
	6	0.01	0.00	6	0.01	0.00	0.65	2.8	0.0	0.00	
				13	0.34	0.34	0.5	2.8	217.5	25.38	
	25	0.06	0.06							**25.38**	**20.30**
			0.34			**0.34**					
SUBIE	1	0.30	0.30								
				13	0.30	0.30	0.5	2.8	193.2	22.54	
			0.30			**0.30**				**22.54**	**18.03**
SUBJB1	1	0.49	0.49								
				13	0.49	0.49	0.5	2.8	316.3	36.90	
			0.49			**0.49**				**36.90**	**29.52**
SUBJB2	1	0.49	0.49								
				12	0.45	0.45	0.35	2.8	286.3	23.38	
				13	0.05	0.05	0.5	2.8	29.3	3.42	
			0.49			**0.49**				**26.80**	**21.44**
SUBJC1	1	0.06	0.06								
				13	0.06	0.06	0.5	2.8	37.2	4.35	
			0.06			**0.06**				**4.35**	**3.48**
SUBJC2	1	0.63	0.63								
	12	0.10	0.00	12	0.10	0.00	0.35	2.8	0.0	0.00	
	13	0.19	0.00	13	0.83	0.63	0.5	2.8	406.3	47.41	
			0.63			**0.63**				**47.41**	**37.92**
SUBJD	1	0.12	0.12								
	12	0.13	0.00	12	0.13	0.00	0.35	2.8	0.0	0.00	
	13	0.19	0.00	13	0.37	0.18	0.5	2.8	117.2	13.67	
	22	0.07	0.07							**13.67**	**10.94**
			0.18			**0.18**					
SUBJE1	1	0.22	0.22								
				7	0.22	0.22	0.55	2.8	142.7	18.32	
	9	0.02	0.00	9	0.02	0.00	0.7	2.8	0.0	0.00	
	13	0.00	0.00	13	0.00	0.00	0.5	2.8	0.5	0.06	
	22	0.00	0.00							**18.38**	**14.70**
			0.22			**0.22**					

	Existing			Future			Retention Calcs				
Sub-Basin	Landuse Code	Area (sm)	Developable Area (sm)	Landuse Code	Area (sm)	Developed Area (sm)	C	D (in)	A (ac)	V (ac-ft)	Effective V (ac-ft)
SUBJE2	1	0.15	0.15								
				7	0.00	0.00	0.55	2.8	0.8	0.11	
	12	0.01	0.00	12	0.01	0.00	0.35	2.8	0.0	0.00	
	13	0.09	0.00	13	0.24	0.15	0.5	2.8	94.7	11.05	
			0.15			**0.15**				**11.16**	**8.93**
SUBJF	1	0.41	0.41								
				7	0.00	0.00	0.55	2.8	0.3	0.03	
	9	0.10	0.00	9	0.19	0.10	0.7	2.8	61.6	10.07	
				14	0.31	0.31	0.6	2.8	197.4	27.64	
			0.41			**0.41**				**37.74**	**30.19**
SUBJG	1	0.75	0.75								
				7	0.39	0.39	0.55	2.8	252.7	32.43	
	9	0.07	0.00	9	0.10	0.03	0.7	2.8	16.3	2.66	
	12	0.01	0.00	12	0.01	0.00	0.35	2.8	0.0	0.00	
				13	0.36	0.36	0.5	2.8	230.9	26.94	
	22	0.03	0.03	22	0.04	0.01	0.35	2.8	9.2	0.75	
	22	0.03	0.03							**62.77**	**50.22**
			0.81			**0.80**					
SUBJH	1	0.08	0.08								
	3	0.00	0.00	3	0.00	0.00	0.6	2.8	0.0	0.00	
	9	0.11	0.00	9	0.26	0.15	0.7	2.8	94.7	15.47	
	22	0.05	0.05							**15.47**	**12.38**
	23	0.03	0.00								
			0.13			**0.15**					
SUBJI	1	0.05	0.05								
	3	0.05	0.00	3	0.05	0.00	0.6	2.8	0.0	0.00	
	9	0.02	0.00	9	0.17	0.16	0.7	2.8	100.6	16.43	
				13	0.00	0.00	0.5	2.8	0.3	0.03	
	22	0.02	0.02							**16.46**	**13.17**
	25	0.09	0.09								
			0.16			**0.16**					
SUBJK	1	0.24	0.24								
	9	0.00	0.00	9	0.25	0.25	0.7	2.8	157.9	25.79	
	22	0.01	0.01							**25.79**	**20.63**
			0.25			**0.25**					
SUBJL	1	0.08	0.08								
	3	0.00	0.00	3	0.00	0.00	0.6	2.8	0.0	0.00	
				9	0.08	0.08	0.7	2.8	49.9	8.14	
			0.08			**0.08**				**8.14**	**6.51**
SUBKA	6	0.02	0.00	6	0.02	0.00	0.65	2.8	0.0	0.00	
	13	1.04	0.00	13	1.04	0.00	0.5	2.8	0.0	0.00	
	17	0.29	0.00	17	0.29	0.00	0.45	2.8	0.0	0.00	
			0.00			**0.00**				**0.00**	**0.00**
SUBKB	1	0.18	0.18	1	0.18	0.00	0.25	2.8	0.0	0.00	
	9	0.02	0.00	9	0.02	0.00	0.7	2.8	0.0	0.00	
	12	0.04	0.00	12	0.04	0.00	0.35	2.8	0.3	0.02	
	13	0.03	0.00	13	0.36	0.33	0.5	2.8	209.8	24.48	
	17	0.00	0.00	17	0.00	0.00				0.00	
	22	0.07	0.07	22	0.07	0.00	0.35	2.8	0.0	0.00	
	25	0.07	0.07	25	0.07	0.00	0.35	2.8	0.0	0.00	
			0.32			**0.33**				**24.50**	**19.60**
SUBKC	1	0.26	0.26								
				3	0.03	0.03	0.6	2.8	16.2	2.27	
				12	0.06	0.06	0.35	2.8	38.8	3.17	
				13	0.18	0.18	0.5	2.8	113.5	13.25	
			0.26			**0.26**				**18.69**	**14.95**
SUBKD	1	0.67	0.67								
	9	0.03	0.00	3	0.03	0.00	0.6	2.8	1.9	0.26	
				7	0.00	0.00	0.55	2.8	0.1	0.01	
				13	0.43	0.43	0.5	2.8	275.4	32.13	
				23	0.24	0.24	0.75	2.8	151.9	26.59	
			0.67			**0.67**				**58.99**	**47.19**
SUBLA	1	0.21	0.21								
	3	0.02	0.00	3	0.02	0.00	0.6	2.8	0.0	0.00	
	6	0.04	0.00	6	0.04	0.00	0.65	2.8	0.0	0.00	
	12	0.00	0.00	12	0.21	0.21	0.35	2.8	135.6	11.08	
	13	0.24	0.00	13	0.25	0.00	0.5	2.8	1.5	0.17	
	17	0.00	0.00							**11.25**	**9.00**
			0.21			**0.21**					

	Existing			Future			Retention Calcs				
Sub-Basin	Landuse Code	Area (sm)	Developable Area (sm)	Landuse Code	Area (sm)	Developed Area (sm)	C	D (in)	A (ac)	V (ac-ft)	Effective V (ac-ft)
SUBLB	1	0.25	0.25								
				3	0.01	0.01	0.6	2.8	9.2	1.29	
			0.00	6	0.00	0.00	0.65	2.8	0.7	0.11	
			0.00	12	0.23	0.23	0.35	2.8	148.5	12.13	
			0.00	13	0.00	0.00	0.5	2.8	0.7	0.08	
			0.25			**0.25**				**13.61**	**10.88**
SUBLC	1	0.00	0.00								
	3	0.03	0.00	3	0.03	0.00	0.6	2.8	0.0	0.00	
										0.00	
	13	0.09	0.00	13	0.09	0.00	0.5	2.8	2.8	0.32	
			0.00			**0.00**				**0.32**	**0.26**
SUBLD	1	0.00	0.00								
	3	0.00	0.00	3	0.00	0.00	0.6	2.8	0.0	0.00	
				12	0.14	0.14	0.35	2.8	89.6	7.32	
	13	0.26	0.00	13	0.26	0.00	0.5	2.8	0.0	0.00	
	22	0.01	0.01							0.00	
				23	0.00	0.00	0.75	2.8	0.3	0.04	
			0.01			**0.00**				**7.36**	**5.89**
SUBLE	1	0.22	0.22								
	9	0.03	0.00								
				23	0.22	0.22	0.75	2.8	140.8	24.64	
			0.22			**0.22**				**24.64**	**19.71**
SUBMA	1	0.25	0.25								
				3	0.01	0.01	0.6	2.8	4.6	0.65	
	12	0.00	0.00	12	0.24	0.24	0.35	2.8	153.5	12.53	
			0.25			**0.25**				**13.18**	**10.54**
SUBMB	1	0.96	0.96								
			0.00	3	0.25	0.25	0.6	2.8	161.9	22.67	
			0.00	7	0.28	0.28	0.55	2.8	177.0	22.71	
	9	0.04	0.00	9	0.04	0.00	0.7	2.8	0.0	0.00	
			0.00	12	0.00	0.00	0.35	2.8	0.3	0.03	
			0.00	13	0.43	0.43	0.5	2.8	276.4	32.25	
	22	0.00	0.00								
			0.96			**0.96**				**77.65**	**62.12**
SUBMC	1	0.92	0.92								
				3	0.00	0.00	0.6	2.8	1.7	0.24	
				7	0.24	0.24	0.55	2.8	153.7	19.73	
	8	0.00	0.00	8	0.00	0.00	0.65	2.8	0.0	0.00	
	9	0.08	0.00	9	0.08	0.00	0.7	2.8	0.0	0.00	
				11	0.10	0.10	0.6	2.8	64.5	9.03	
				13	0.22	0.22	0.5	2.8	142.4	16.61	
				14	0.36	0.36	0.6	2.8	230.4	32.26	
				23	0.00	0.00	0.75	2.8	0.3	0.04	
			0.92			**0.93**				**77.92**	
SUBMD	1	0.00	0.00								
	13	0.25	0.00	13	0.25	0.00	0.5	2.8	0.3	0.04	
			0.00			**0.00**				**0.04**	**0.03**
SUBME	1	0.23	0.23								
				3	0.00	0.00	0.6	2.8	2.4	0.33	
	6	0.01	0.00	6	0.01	0.00	0.65	2.8	0.0	0.00	
				12	0.23	0.23	0.35	2.8	147.0	12.01	
	13	0.03	0.00	13	0.06	0.03	0.5	2.8	19.2	2.24	
	17	0.01	0.00	17	0.01	0.00	0.45	2.8	0.0	0.00	
	22	0.03	0.03							0.00	
				23	0.00	0.00	0.75	2.8	0.2	0.03	
			0.26			**0.26**				**14.61**	**11.69**
SUBMF	1	0.97	0.97								
				9	0.00	0.00	0.7	2.8	0.3	0.05	
				13	0.97	0.97	0.5	2.8	621.2	72.47	
			0.97			**0.97**				**72.52**	**58.02**
SUBMG	1	0.03	0.03								
	9	0.05	0.00	9	0.05	0.00	0.7	2.8	0.0	0.00	
				13	0.03	0.03	0.5	2.8	21.9	2.55	
			0.03			**0.03**				**2.55**	**2.04**
SUBMH	1	0.24	0.24								
				13	0.24	0.24	0.5	2.8	153.0	17.85	
			0.24			**0.24**				**17.85**	**14.28**
SUBMI	1	0.29	0.29								
	9	0.12	0.00	9	0.12	0.00	0.7	2.8	0.3	0.04	
				13	0.29	0.29	0.5	2.8	183.7	21.44	
			0.29			**0.29**				**21.48**	**17.18**

	Existing			Future			Retention Calcs				
Sub-Basin	Landuse Code	Area (sm)	Developable Area (sm)	Landuse Code	Area (sm)	Developed Area (sm)	C	D (in)	A (ac)	V (ac-ft)	Effective V (ac-ft)
SUBNA1	1	0.22	0.22								
				9	0.14	0.14	0.7	2.8	86.5	14.12	
				13	0.09	0.09	0.5	2.8	59.5	6.94	
	25	0.00	0.00							**21.06**	**16.85**
			0.23			**0.23**					
SUBNA2	1	0.61	0.61								
				9	0.41	0.41	0.7	2.8	260.2	42.50	
	12	0.00	0.00			0.00				0.00	
	13	0.12	0.00	13	0.34	0.22	0.5	2.8	139.9	16.32	
	25	0.01	0.01							**58.83**	**47.06**
			0.62			**0.63**					
SUBNB	1	0.21	0.21								
	7	0.13	0.00	7	0.13	0.00	0.55	2.8	0.0	0.00	
				9	0.00	0.00	0.7	2.8	1.3	0.22	
	12	0.01	0.00			0.00				0.00	
	13	0.09	0.00	13	0.31	0.22	0.5	2.8	139.3	16.25	
			0.21			**0.22**				**16.47**	**13.18**
SUBNC	1	0.28	0.28								
				7	0.00	0.00	0.55	2.8	0.2	0.02	
				13	0.15	0.15	0.5	2.8	97.2	11.34	
				14	0.15	0.15	0.6	2.8	98.5	13.79	
	25	0.02	0.02							**25.16**	**20.12**
			0.31			**0.31**					
SUBOB	1	0.06	0.06								
				3	0.04	0.04	0.6	3.1	23.5	3.64	
				9	0.02	0.02	0.7	3.1	12.8	2.31	
				13	0.00	0.00	0.5	3.1	0.4	0.05	
	23	0.38	0.00	23	0.38	0.00	0.75	3.1	0.0	0.00	
			0.06			**0.06**				**6.00**	**4.80**
SUBOC	1	0.10	0.10								
	9	0.01	0.00	9	0.12	0.11	0.7	3.1	68.5	12.38	
	23	0.19	0.00	23	0.19	0.00	0.75	3.1	0.0	0.00	
			0.10			**0.11**				**12.38**	**9.91**
SUBOD	1	0.28	0.28								
	9	0.11	0.00	9	0.39	0.28	0.7	3.1	179.3	32.42	
	23	0.11	0.00	23	0.11	0.00	0.75	3.1	0.0	0.00	
			0.28			**0.28**				**32.42**	**25.93**
SUBOE	1	0.25	0.25								
	9	0.09	0.00	9	0.35	0.26	0.7	3.1	166.9	30.18	
	23	0.12	0.00	23	0.12	0.00	0.75	3.1	0.0	0.00	
	25	0.01	0.01							**30.18**	**24.15**
			0.26			**0.26**					
SUBOF	1	0.08	0.08								
				3	0.02	0.02	0.6	3.1	9.9	1.53	
				9	0.06	0.06	0.7	3.1	38.4	6.94	
	23	0.17	0.00							**8.47**	**6.78**
			0.08			**0.08**					
SUBOG	1	0.12	0.12								
	6	0.03	0.00	6	0.03	0.00	0.65	3.1	0.0	0.00	
	9	0.11	0.00	9	0.21	0.10	0.7	3.1	65.6	11.86	
	11	0.02	0.00	11	0.02	0.00	0.6	3.1	0.0	0.00	
	13	0.16	0.00	13	0.16	0.00	0.5	3.1	0.0	0.00	
	14	0.02	0.00	14	0.02	0.00	0.6	3.1	0.0	0.00	
	17	0.04	0.00	17	0.06	0.01	0.45	3.1	8.7	1.01	
			0.12			**0.12**				**12.87**	**10.30**
SUBPA	1	0.24	0.24								
	9	0.18	0.00	9	0.48	0.30	0.7	3.1	190.6	34.47	
				13	0.00	0.00	0.5	3.1	0.6	0.07	
	22	0.06	0.06							**34.54**	**27.63**
			0.30			**0.30**					
SUBPB1	1	0.08	0.08								
	9	0.02	0.00	9	0.09	0.07	0.7	2.8	44.0	7.18	
	22	0.01	0.01							**7.18**	**5.75**
	23	0.03	0.00								
			0.09			**0.07**					
SUBPB2	1	0.14	0.14								
	9	0.11	0.00	9	0.29	0.18	0.7	2.8	113.9	18.61	
	22	0.04	0.04							**18.61**	**14.89**
			0.18			**0.18**					
SUBPC	1	0.07	0.07								
				7	0.00	0.00	0.55	2.8	0.4	0.06	

	Existing			Future			Retention Calcs				
Sub-Basin	Landuse Code	Area (sm)	Developable Area (sm)	Landuse Code	Area (sm)	Developed Area (sm)	C	D (in)	A (ac)	V (ac-ft)	Effective V (ac-ft)
SUBPC	9	0.06	0.00	9	0.07	0.01	0.7	2.8	3.4	0.55	
				13	0.17	0.17	0.5	2.8	107.8	12.57	
				14	0.00	0.00	0.6	2.8	0.2	0.03	
SUBPC	22	0.11	0.11			0.00				0.00	
	23	0.06	0.00	23	0.06	0.00	0.75	2.8	0.0	0.00	
			0.17			**0.17**				**13.21**	**10.57**
SUBPD	1	0.37	0.37								
				7	0.21	0.21	0.55	2.8	132.0	16.94	
	9	0.01	0.00	9	0.06	0.06	0.7	2.8	36.3	5.93	
				14	0.17	0.17	0.6	2.8	111.4	15.59	
	22	0.07	0.07							**38.46**	**30.77**
			0.44			**0.44**					
SUBPE	1	0.18	0.18								
				7	0.00	0.00	0.55	2.8	0.1	0.01	
	9	0.10	0.00	9	0.17	0.08	0.7	2.8	48.3	7.89	
				14	0.19	0.19	0.6	2.8	119.7	16.76	
	22	0.08	0.08			0.00				0.00	
	23	0.14	0.00	23	0.14	0.00	0.75	2.8	0.1	0.01	
			0.26			**0.26**				**24.68**	**19.74**
SUBPF	1	0.03	0.03								
	9	0.14	0.00	9	0.14	0.00	0.7	2.8	0.0	0.00	
				14	0.16	0.16	0.6	2.8	102.7	14.37	
	22	0.13	0.13			0.00				0.00	
	23	0.20	0.00	23	0.20	0.00	0.75	2.8	0.0	0.00	
			0.16			**0.16**				**14.37**	**11.50**
SUBQA1	1	0.18	0.18								
	9	0.13	0.00	9	0.36	0.23	0.7	2.8	150.2	24.53	
	22	0.05	0.05							**24.53**	**19.63**
			0.23			**0.23**					
SUBQA2	1	0.06	0.06								
	9	0.04	0.00	9	0.12	0.08	0.7	2.8	49.9	8.14	
	22	0.02	0.02							**8.14**	**6.51**
			0.08			**0.08**					
SUBQB	1	0.23	0.23								
	9	0.24	0.00	9	0.50	0.26	0.7	2.8	167.6	27.37	
	22	0.04	0.04							**27.37**	**21.89**
			0.26			**0.26**					
SUBQC	1	0.10	0.10								
	9	0.31	0.00	9	0.58	0.27	0.7	2.8	173.6	28.35	
	22	0.17	0.17							**28.35**	**22.68**
	23	0.03	0.00								
			0.27			**0.27**					
SUBQD	9	0.13	0.00	9	0.20	0.07	0.7	2.8	47.0	7.68	
	22	0.03	0.03							**7.68**	**6.15**
	23	0.06	0.00								
	25	0.03	0.03								
			0.06			**0.07**					
SUBQE	1	0.10	0.10								
	3	0.01	0.00	3	0.03	0.02	0.6	2.8	10.2	1.42	
	7	0.06	0.00	7	0.17	0.12	0.55	2.8	75.3	9.66	
	9	0.30	0.00	9	0.32	0.02	0.7	2.8	10.0	1.64	
	13	0.06	0.00			0.00				0.00	
	17	0.01	0.00	17	0.01	0.00	0.45	2.8	0.0	0.00	
	22	0.05	0.05							**12.72**	**10.18**
	23	0.32	0.00								
			0.15			**0.15**					
SUBRA	1	0.22	0.22								
				3	0.02	0.02	0.6	2.8	14.5	2.03	
				7	0.08	0.08	0.55	2.8	53.3	6.84	
				14	0.12	0.12	0.6	2.8	74.1	10.38	
			0.22			**0.22**				**19.25**	**15.40**
SUBRB	1	0.44	0.44								
				3	0.02	0.02	0.6	2.8	15.5	2.17	
				7	0.11	0.11	0.55	2.8	70.5	9.04	
				14	0.41	0.41	0.6	2.8	265.3	37.14	
SUBRB	22	0.11	0.11							**48.35**	**38.68**
			0.55			**0.55**					

	Existing			Future			Retention Calcs				
Sub-Basin	Landuse Code	Area (sm)	Developable Area (sm)	Landuse Code	Area (sm)	Developed Area (sm)	C	D (in)	A (ac)	V (ac-ft)	Effective V (ac-ft)
SUBRC	1	0.68	0.68								
				3	0.01	0.01	0.6	2.8	8.5	1.19	
				7	0.21	0.21	0.55	2.8	133.1	17.08	
				14	0.46	0.46	0.6	2.8	295.1	41.31	
			0.68			**0.68**				**59.58**	**47.67**
SUBRD	1	0.37	0.37								
				3	0.03	0.03	0.6	2.8	16.9	2.37	
				7	0.18	0.18	0.55	2.8	112.1	14.38	
				9	0.00	0.00	0.7	2.8	0.1	0.01	
				14	0.16	0.16	0.6	2.8	105.2	14.73	
			0.37			**0.37**				**31.49**	**25.19**
SUBRE	1	0.37	0.37								
				3	0.01	0.01	0.6	2.8	9.0	1.26	
				7	0.24	0.24	0.55	2.8	152.3	19.54	
				9	0.00	0.00	0.7	2.8	0.1	0.02	
				14	0.12	0.12	0.6	2.8	78.0	10.91	
			0.37			**0.37**				**31.74**	**25.39**
SUBRF	1	0.31	0.31								
				3	0.17	0.17	0.6	3.1	109.2	16.92	
	7	0.19	0.00	7	0.19	0.00	0.55	3.1	0.0	0.00	
	9	0.03	0.00	9	0.18	0.15	0.7	3.1	98.6	17.82	
	11	0.02	0.00	11	0.02	0.00	0.6	3.1	0.0	0.00	
	13	0.01	0.00	13	0.02	0.01	0.5	3.1	4.5	0.59	
	14	0.04	0.00	14	0.04	0.00	0.6	3.1	0.0	0.00	
	17	0.01	0.00	17	0.01	0.00	0.45	3.1	0.1	0.01	
	22	0.02	0.02							**35.34**	**28.27**
			0.33			**0.33**					
SUBRG	1	0.00	0.00								
				9	0.00	0.00	0.7	3.1	0.1	0.01	
	23	0.11	0.00	23	0.11	0.00	0.75	3.1	0.0	0.00	
			0.00			**0.00**				**0.01**	**0.01**
SUBRH	1	0.24	0.24								
				3	0.06	0.06	0.6	3.1	39.7	6.16	
				9	0.10	0.10	0.7	3.1	64.8	11.71	
				12	0.00	0.00	0.35	3.1	0.1	0.01	
				13	0.08	0.08	0.5	3.1	51.6	6.67	
				14	0.00	0.00	0.6	3.1	0.1	0.02	
			0.24			**0.24**				**24.58**	**19.66**
SUBRI	1	0.17	0.17								
				3	0.01	0.01	0.6	3.1	8.3	1.28	
				9	0.15	0.15	0.7	3.1	95.6	17.28	
				13	0.01	0.01	0.5	3.1	5.6	0.73	
	23	0.06	0.00	23	0.06	0.00	0.75	3.1	0.0	0.00	
			0.17			**0.17**				**19.29**	**15.43**
SUBRJ	1	0.09	0.09								
	9	0.07	0.00	9	0.16	0.09	0.7	3.1	56.5	10.22	
			0.09			**0.09**				**10.22**	**8.18**
SUBSA	12	0.15	0.00	12	0.15	0.01	0.35	3.1	3.2	0.29	
	13	0.27	0.00	13	0.27	0.00	0.5	3.1	0.0	0.00	
			0.00			**0.01**				**0.29**	**0.23**
SUBSB	1	0.17	0.17								
				3	0.05	0.05	0.6	3.1	34.8	5.40	
				9	0.11	0.11	0.7	3.1	72.4	13.10	
			0.17			**0.17**				**18.50**	**14.80**
SUBSC	1	0.35	0.35								
				3	0.05	0.05	0.6	2.8	31.5	4.41	
	9	0.06	0.00	9	0.40	0.35	0.7	2.8	223.0	36.42	
	22	0.05	0.05							**40.83**	**32.66**
			0.40			**0.40**					
SUBSD	1	0.09	0.09								
				3	0.02	0.02	0.6	3.1	14.5	2.25	
				9	0.15	0.15	0.7	3.1	92.9	16.80	
	22	0.08	0.08							**19.06**	**15.25**
			0.17			**0.17**					
				3	0.02	0.02	0.6	3.1	15.0	2.32	
SUBSE	9	0.13	0.00	9	0.13	0.00	0.7	3.1	0.0	0.00	
										2.32	**1.86**
			0.00			**0.02**					

	Existing			Future			Retention Calcs				
Sub-Basin	Landuse Code	Area (sm)	Developable Area (sm)	Landuse Code	Area (sm)	Developed Area (sm)	C	D (in)	A (ac)	V (ac-ft)	Effective V (ac-ft)
SUBSF	1	0.35	0.35								
				9	0.37	0.37	0.7	2.8	239.8	39.17	
				13	0.00	0.00	0.5	2.8	0.4	0.04	
	22	0.02	0.02							**39.21**	**31.37**
			0.38			**0.38**					
SUBSG	1	0.05	0.05								
	9	0.09	0.00	9	0.14	0.05	0.7	3.1	31.6	5.72	
			0.05			**0.05**				**5.72**	**4.57**
SUBSH	1	0.01	0.01								
	9	0.08	0.00	9	0.10	0.03	0.7	3.1	18.0	3.25	
	22	0.01	0.01							**3.25**	**2.60**
			0.03			**0.03**					
SUBTA	1	0.24	0.24								
				9	0.24	0.24	0.7	2.8	154.4	25.21	
			0.24			**0.24**				**25.21**	**20.17**
SUBTB	1	0.16	0.16								
				3	0.01	0.01	0.6	2.8	8.1	1.13	
	6	0.01	0.00	6	0.01	0.00	0.65	2.8	0.0	0.00	
	7	0.25	0.00	7	0.25	0.00				0.00	
	9	0.12	0.00	9	0.35	0.23	0.7	2.8	147.6	24.11	
	13	0.02	0.00	13	0.17	0.15	0.5	2.8	98.1	11.45	
	17	0.01	0.00	17	0.01	0.00	0.45	2.8	0.0	0.00	
	22	0.24	0.24							0.00	
	23	0.08	0.00							0.00	
			0.40			**0.40**				**36.68**	**29.34**
SUBUA	1	0.09	0.09								
	4	0.06	0.00	4	0.06	0.00					
	7	0.07	0.00	7	0.07	0.00					
	12	0.08	0.00	12	0.14	0.06					
	13	0.17	0.00	13	0.26	0.09	0.5	2.8	60.2	7.03	
	17	0.03	0.00	17	0.03	0.00	0.45	2.8	0.0	0.00	
	22	0.06	0.06			0.00				**7.03**	**5.62**
			0.15			**0.15**					
SUBUB	12	0.10	0.00	12	0.10	0.00					
				13	0.03	0.03	0.5	2.8	19.2	2.24	
	22	0.03	0.03			0.00				**2.24**	**1.79**
			0.03			**0.03**					
SUBUC	1	0.09	0.09								
				7	0.09	0.09	0.55	2.8	57.6	7.39	
	9	0.21	0.00	9	0.21	0.00	0.7	2.8	0.0	0.00	
	12	0.12	0.00	12	0.12	0.00				0.00	
				13	0.06	0.06	0.5	2.8	38.4	4.48	
	22	0.05	0.05			0.00				**11.87**	**9.50**
			0.15			**0.15**					
SUBUD	1	0.35	0.35								
	9	0.30	0.00	9	0.70	0.40	0.7	2.8	258.7	42.25	
	13	0.03	0.00	13	0.03	0.00				0.00	
	14	0.03	0.00	14	0.03	0.00	0.6	2.8	0.0	0.00	
	22	0.06	0.06			0.00				**42.25**	**33.80**
			0.41			**0.40**					
SUBUE	1	0.05	0.05								
	9	0.02	0.00	9	0.02	0.00	0.7	2.8	0.8	0.14	
				13	0.05	0.05	0.5	2.8	29.1	3.39	
			0.05			**0.05**				**3.53**	**2.82**
SUBVA	9	0.44	0.00	9	0.44	0.00	0.7	2.8	0.0	0.00	
	23	0.05	0.00	23	0.05	0.00	0.75	2.8	0.0	0.00	
			0.00			**0.00**				**0.00**	**0.00**
SUBVB	9	0.59	0.00	9	0.72	0.13	0.7	2.8	85.1	13.89	
	22	0.13	0.13							**13.89**	**11.11**
			0.13			**0.13**					
SUBVC	9	0.45	0.00	9	0.49	0.04	0.7	2.8	27.4	4.47	
	22	0.04	0.04							**4.47**	**3.58**
			0.04			**0.04**					

	Existing			Future			Retention Calcs				
Sub-Basin	Landuse Code	Area (sm)	Developable Area (sm)	Landuse Code	Area (sm)	Developed Area (sm)	C	D (in)	A (ac)	V (ac-ft)	Effective V (ac-ft)
SUBVD				3	0.04	0.04	0.6	2.8	24.8	3.47	
	4	0.14	0.00	4	0.14	0.00				0.00	
	6	0.02	0.00	6	0.02	0.00	0.65	2.8	0.0	0.00	
	7	0.01	0.00	7	0.01	0.00	0.55	2.8	0.1	0.01	
	12	0.01	0.00	12	0.02	0.01	0.35	2.8	5.8	0.47	
	13	0.40	0.00	13	0.40	0.00	0.5	2.8	0.0	0.00	
	14	0.06	0.00	14	0.06	0.00				0.00	
	17	0.01	0.00	17	0.01	0.00	0.45	2.8	0.0	0.00	
	22	0.05	0.05							**3.95**	**3.16**
			0.05			**0.05**					
SUBWA	9	0.39	0.00	9	0.49	0.11	0.7	2.8	67.7	11.06	
	22	0.11	0.11							**11.06**	**8.85**
			0.11			**0.11**					
SUBWB	3	0.01	0.00	3	0.01	0.00	0.6	2.8	0.0	0.00	
	6	0.05	0.00	6	0.06	0.00	0.65	2.8	2.7	0.41	
	7	0.02	0.00	7	0.02	0.00	0.55	2.8	0.0	0.00	
	11	0.01	0.00	11	0.01	0.00	0.6	2.8	0.0	0.00	
	13	0.44	0.00	13	0.44	0.00	0.5	2.8	0.0	0.00	
	14	0.07	0.00			0.00				0.00	
	17	0.06	0.00	17	0.06	0.00	0.45	2.8	0.1	0.01	
	22	0.00	0.00							**0.42**	**0.34**
			0.00			**0.00**					
SUBWC				3	0.04	0.04	0.6	2.8	25.6	3.58	
	4	0.01	0.00	4	0.01	0.00	0.6	2.8	0.0	0.00	
	6	0.01	0.00	6	0.01	0.00	0.65	2.8	0.0	0.00	
	9	0.08	0.00	9	0.08	0.00	0.7	2.8	0.0	0.00	
	13	0.22	0.00	13	0.22	0.00	0.5	2.8	0.0	0.00	
	14	0.08	0.00							**3.58**	**2.87**
	17	0.02	0.00								
	22	0.04	0.04								
			0.04			**0.04**					
SUBWD	3	0.02	0.00	3	0.04	0.03	0.6	2.8	17.7	2.47	
	13	0.05	0.00	13	0.05	0.00	0.5	2.8	0.0	0.00	
	14	0.01	0.00			0.00				0.00	
	17	0.26	0.00	17	0.30	0.04	0.45	2.8	27.1	2.84	
	22	0.05	0.05			0.00				0.00	
	23	0.01	0.00	23	0.01	0.00	0.75	2.8	0.1	0.01	
			0.05			**0.07**				**5.33**	**4.26**
SUBWT1	9	0.58	0.00	9	0.58	0.00	0.7	2.8	0.0	0.00	
			0.00			**0.00**				**0.00**	**0.00**
SUBWT2	9	0.14	0.00	9	0.14	0.00	0.7	2.8	0.0	0.00	
			0.00			**0.00**					
				3	0.05	0.05	0.6	2.8	32.8	4.60	
SUBXA	4	0.02	0.00							0.00	
	9	0.07	0.00	9	0.07	0.00	0.7	2.8	0.0	0.00	
	13	0.14	0.00	13	0.14	0.00	0.5	2.8	0.0	0.00	
	14	0.00	0.00							**4.60**	**3.68**
	23	0.02	0.00								
			0.00			**0.00**					

	Existing Conditions		Future Conditions Without Retention			Future Conditions With Retention	
	6-hr	24-hr	6-hr	24-hr		6-hr	24-hr
SUBWD	601	436	562	407	SUBWD	562	407
					FLOWWD	562	407
RTWDXA	557	404	524	378	RTWDXA	523	378
SUBXA	580	425	601	440	SUBXA	601	440
					FLOWXA	601	440
CPXA1	749	527	680	496	CPXA1	584	451
DIZZ1	0	0	0	0	DIZZ1	0	0
DIXAO	749	527	680	496	DIXAO	584	451
RTXAWC	713	509	639	444	RTXAWC	567	422
SUBWB	1154	880	1154	880	SUBWB	1155	880
					FLOWWB	1155	880
RTWBWC	1092	823	1092	823	RTWBWC	1093	824
SUBWC	922	674	947	692	SUBWC	959	700
					FLOWWC	959	700
CPWC	1944	1527	1953	1553	CPWC	1832	1497
DIQE	0	0	0	0	DIQE	0	0
DIWCWA	1944	1527	1953	1553	DIWCWA	1832	1497
RTWCWA	951	710	954	716	RTWCWA	875	691
SUBWA	1196	872	1191	867	SUBWA	1191	867
					FLOWWA	1191	867
CPWA1	944	883	950	881	CPWA1	869	872
SUBVD	1195	917	1147	880	SUBVD	1147	880
					FLOWVD	1147	880
RTVDWA	941	695	908	675	RTVDWA	906	675
CPWA2	1159	1076	1122	1041	CPWA2	1113	1033
DIQD	707	627	671	594	DIQD	663	586
DIWAVC	452	448	450	447	DIWAVC	450	446
RTWAVC	375	359	380	364	RTWAVC	371	359
SUBVC	1177	857	1168	850	SUBVC	1168	850
					FLOWVC	1168	850
CPVC1	776	872	776	869	CPVC1	769	844
SUBVB	1651	1299	1627	1271	SUBVB	1633	1276
					FLOWVB	1633	1276
RTVBVC	1152	850	1156	847	RTVBVC	1131	853
~CPVC2	1368	1292	1386	1302	~CPVC2	1345	1284
MCVC47	1363	1261	1382	1275	MCVC47	1332	1257
SUBQA2	189	142	298	220	SUBQA2	299	221
					FLWQA2	299	221
CPQA2	1493	1387	1504	1414	CPQA2	1451	1396
BSN47	993	940	1000	944	BSN47	979	932
MC47QB	992	938	999	941	MC47QB	978	930
SUBQB	852	629	1278	934	SUBQB	1278	934
					FLOWQB	1278	934
~CPQB	1502	1464	1460	1496	~CPQB	1381	1439
SUBQD	600	439	656	480	SUBQD	656	480
					FLOWQD	656	480
DRQD	707	627	671	594	DRQD	663	586
RTDIQD	511	353	496	342	RTDIQD	486	334
@CPQD	604	439	663	480	@CPQD	666	480
RSQD	525	390	507	432	RSQD	497	428
DIQC	394	318	383	342	DIQC	377	340
DIQDQC	132	73	124	90	DIQDQC	120	89
RTQDQB	90	53	84	50	RTQDQB	79	48
@CPQB	1542	1472	1496	1500	@CPQB	1415	1444
MCQBJK	1526	1436	1468	1414	MCQBJK	1386	1362
SUBJK	417	317	804	588	SUBJK	804	588
					FLOWJK	715	487
~CPJK	1759	1657	1692	1533	~CPJK	1582	1466
MCJKJL	1725	1602	1643	1469	MCJKJL	1489	1367
SUBJL	171	128	286	210	SUBJL	286	210
					FLOWJL	249	195
~CPJL1	1763	1628	1676	1489	~CPJL1	1511	1384
SUBQE	1646	1319	1734	1394	SUBQE	1734	1394
					FLOWQE	1734	1394
DRQE	0	0	0	0	DRQE	0	0
RTDIQE	0	0	0	0	RTDIQE	0	0
CPQE	1646	1319	1734	1394	CPQE	1734	1394
RSQE	1565	1192	1645	1247	RSQE	1622	1243
RTQEQC	1468	1100	1525	1156	RTQEQC	1477	1152
SUBQC	1150	871	1358	1023	SUBQC	1358	1023
					FLOWQC	1358	1023
DRDIQC	394	318	383	342	DRDIQC	377	340
RTDIQC	358	271	346	261	RTDIQC	339	255
CPQC	2200	1758	2201	1720	CPQC	2052	1659
DISR1	1760	1407	1761	1376	DISR1	1641	1327
DIQCR	440	352	440	344	DIQCR	410	332
RTQCJL	345	274	351	277	RTQCJL	303	253
CPJL2	1982	1852	1787	1609	CPJL2	1605	1480
SUBQA1	579	433	918	672	SUBQA1	918	672
					FLWQA1	918	672
RSQA	547	413	825	604	RSQA	752	567
DIPF	230	176	341	252	DIPF	312	238
DIQAPF	317	236	484	351	DIQAPF	441	330
RTQAJH	274	198	393	273	RTQAJH	281	203
SUBJH	723	531	888	649	SUBJH	888	649
					FLOWJH	888	649

	Existing Conditions		Future Conditions Without Retention			Future Conditions With Retention	
	6-hr	24-hr	6-hr	24-hr		6-hr	24-hr
CPJH	686	530	839	655	CPJH	833	644
RTJHJI	472	349	529	385	RTJHJI	395	314
SUBJI	572	424	810	592	SUBJI	810	592
					FLOWJI	810	592
CPJI	511	430	698	609	CPJI	687	585
CPJISR	2339	2207	2163	1933	CPJISR	1855	1747
SUBPF	1289	940	1482	1082	SUBPF	1482	1082
					FLOWPF	1482	1082
RETPF	19	10	29	12	RETPF	309	35
RETPF	1289	940	1482	1082	RETPF	1482	1082
DRPF	230	176	341	252	DRPF	312	238
RTDIPF	207	153	300	209	RTDIPF	216	161
CPPF	1293	945	1496	1104	CPPF	1482	1082
RSPF	498	332	803	622	RSPF	430	292
DIPE	0	0	0	0	DIPE	0	0
DIPFPE	498	332	803	622	DIPFPE	430	292
RTPFJF	409	278	641	507	RTPFJF	351	240
SUBUD	1087	851	1697	1341	SUBUD	1704	1346
					FLOWUD	1704	1346
DIUA	263	206	409	324	DIUA	411	325
DIUDUA	824	645	1288	1017	DIUDUA	1293	1021
RTUDVA	637	483	895	660	RTUDVA	697	549
SUBVA	1195	869	1195	869	SUBVA	1195	869
					FLOWVA	1195	869
CPVA1	1024	898	1437	1130	CPVA1	1011	898
DIUC	701	685	752	730	DIUC	703	685
DIVAPE	323	213	684	400	DIVAPE	312	213
RTVAPE	109	47	427	182	RTVAPE	175	83
SUBPE	829	600	1410	1028	SUBPE	1412	1030
					FLOWPE	1412	1030
DRPE	0	0	0	0	DRPE	0	0
RTDIPE	0	0	0	0	RTDIPE	0	0
CPPE	829	600	1410	1028	CPPE	1412	1030
RSPE	577	475	945	940	RSPE	643	616
DIPD	0	0	1	1	DIPD	0	0
DIPEPD	577	475	944	939	DIPEPD	643	616
RTPEJF	373	275	585	526	RTPEJF	344	272
SUBJF	754	558	1601	1167	SUBJF	1602	1169
					FLOWJF	1602	1169
CPJF	815	658	1174	1167	CPJF	921	1150
RTJFJG	646	511	980	848	RTJFJG	555	468
SUBJG	806	645	1458	1157	SUBJG	1468	1165
CPJG	837	694	1390	1271	CPJG	1163	1156
					FLOWJG	1145	1103
CPJGSR	2925	2853	3195	2908	CPJGSR	2401	2327
DRUC	701	685	752	730	DRUC	703	685
RTVAUC	596	492	688	620	RTVAUC	638	550
MCUCUC	594	490	683	615	MCUCUC	631	542
SUBUC	915	672	1014	740	SUBUC	1019	744
					FLOWUC	1019	744
@CPUC	752	694	821	771	@CPUC	821	757
SUBUA	882	663	944	703	SUBUA	944	703
					FLOWUA	944	678
DRUA	263	206	409	324	DRUA	411	325
RTDIUA	114	83	148	106	RTDIUA	88	73
@CPUA	882	663	944	704	@CPUA	944	672
DITB	155	132	166	141	DITB	165	134
DIUAUC	620	527	662	563	DIUAUC	661	538
RTUAUC	485	385	515	411	RTUAUC	321	224
~CPUC2	974	761	1109	946	~CPUC2	930	776
DIUB	974	761	1109	946	DIUB	930	776
DIUCPC	0	0	0	0	DIUCPC	0	0
RTUCPC	0	0	0	0	RTUCPC	0	0
SUBPC	704	518	743	545	SUBPC	743	545
					FLOWPC	475	533
CPPC	448	506	475	533			
RSPC	33	6	67	20	RSPC	67	20
RTPCNB	18	6	35	15	RTPCNB	35	15
SUBNB	551	402	760	550	SUBNB	764	554
					FLOWNB	764	554
CPNB1	415	397	542	543	CPNB1	546	547
DINA	268	256	349	350	DINA	351	352
DINBNA	147	141	193	194	DINBNA	194	195
RTNBJD	80	67	101	81	RTNBJD	77	64
SUBPD	535	403	1097	802	SUBPD	1100	804
DRPD	0	0	1	1	DRPD	0	0
CPPD2	535	403	1099	803	CPPD2	1100	804
RSPD	25	3	308	106	RSPD	315	110
RTPDNC	23	3	198	92	RTPDNC	204	95
SUBNC	265	194	755	549	SUBNC	755	549
					FLOWNC	746	538
CPNC	247	191	687	544	CPNC	672	534
RTNCJE	206	152	516	380	RTNCJE	276	204
SUBJE1	305	223	572	412	SUBJE1	579	418
					FLWJE1	571	348
CPJE1	263	218	551	431	CPJE1	423	342
RTJEJD	243	197	530	394	RTJEJD	289	217

	Existing Conditions		Future Conditions Without Retention			Future Conditions With Retention	
	6-hr	24-hr	6-hr	24-hr		6-hr	24-hr
SUBJD	669	491	784	571	SUBJD	784	571
					FLOWJD	784	571
CPJD	652	669	905	940	CPJD	1430	1325
DIJC2	237	243	328	341	DIJC2	517	479
DIJDJC	415	426	577	600	DIJDJC	913	846
RTJDFC	326	301	525	442	RTJDFC	736	607
SUBJE2	468	349	625	458	SUBJE2	625	458
					FLWJE2	625	458
RETJE	180	132	158	32	RETJE	477	359
RETJE2	468	349	625	458	RETJE2	625	458
RTJEFC	405	288	527	384	RTJEFC	404	265
SUBFC	350	265	692	505	SUBFC	692	505
					FLOWFC	659	419
CPFC	789	751	1040	1001	CPFC	1310	1102
CPFCSR	3438	3441	3922	3759	CPFCSR	1143	1088
SUBJC2	457	358	825	635	SUBJC2	825	635
					FLWJC2	825	635
RETJC2	133	81	72	12	RETJC2	434	433
RETJC2	457	358	825	635	RETJC2	824	634
DRJC2	237	243	328	341	DRJC2	517	479
RTDIJC	132	114	244	203	RTDIJC	300	231
@CPJC2	529	430	825	669	@CPJC2	903	731
DIJB2	243	198	367	308	DIJB2	415	336
DIJCJB	286	232	431	361	DIJCJB	488	395
RTJCFB	255	207	392	316	RTJCFB	351	270
SUBFB	675	515	1130	866	SUBFB	1120	858
					FLOWFB	1120	858
CPFB	521	504	767	863	CPFB	757	842
CPFBSR	3636	3741	4218	4300	CPFBSR	1520	1588
SUBJB2	195	144	461	334	SUBJB2	461	334
					FLWJB2	449	309
DRJB2	243	198	367	308	DRJB2	415	336
RTDIJB	203	163	312	251	RTDIJB	257	198
@CPJB2	260	210	462	334	@CPJB2	711	309
DIEE	93	76	131	120	DIEE	122	109
DIJBEE	166	134	233	214	DIJBEE	217	193
RTJBFA	134	111	195	162	RTJBFA	131	103
SUBFA	483	365	885	669	SUBFA	890	674
					FLOWFA	890	674
CPFA	378	357	668	656	CPFA	674	659
CPSRFA	3792	4034	4574	4869	CPSRFA	1978	2182
DRUCUB	974	761	1109	946	DRUCUB	930	776
MCUCUB	975	751	1108	942	MCUCUB	931	774
SUBUB	262	194	247	182	SUBUB	247	182
					FLOWUB	247	182
~@CPUB	989	886	1127	993	~@CPUB	951	917
DIUE	0	0	0	0	DIUE	0	0
DIUBSF	989	886	1127	993	DIUBSF	951	917
D-B71	579	476	717	583	D-B71	541	507
71PASS	410	410	410	410	71PASS	410	410
BSN71	410	410	410	410	BSN71	410	410
DBSN71	0	0	0	0	DBSN71	0	0
CLEAR	3792	4034	4574	4869	CLEAR	1988	2182
SUBTB	1037	811	1147	888	SUBTB	1155	895
					FLOWTB	1155	895
DRTB	155	132	166	141	DRTB	165	134
RTDITB	128	102	137	108	RTDITB	86	63
CPTB	1050	821	1159	900	CPTB	1155	895
DITA	254	199	280	218	DITA	279	217
DITBTA	796	622	879	682	DITBTA	876	678
RTTBSF	671	511	740	561	RTTBSF	717	544
SUBSF	349	272	908	662	SUBSF	911	665
					FLOWSF	831	484
CPSF	939	744	867	740	CPSF	816	651
DIRJ1	282	223	260	222	DIRJ1	245	195
DISFRJ	657	521	607	518	DISFRJ	571	456
RTSFSH	645	511	585	475	RTSFSH	562	435
SUBSH	298	220	315	232	SUBSH	316	233
					FLOWSH	316	233
CPSH	646	520	620	504	CPSH	573	447
RSSH	579	438	571	445	RSSH	459	350
DIRJ2	466	344	459	349	DIRJ2	362	269
DISHRJ	113	94	112	95	DISHRJ	97	81
RTSHSG	104	87	109	94	RTSHSG	89	76
SUBTA	222	168	614	450	SUBTA	616	451
					FLOWTA	495	316
DRTA	254	199	280	218	DRTA	279	217
RTDITA	238	184	262	202	RTDITA	259	199
@CPTA	396	306	614	455	@CPTA	493	313
RTTASG	389	297	484	414	RTTASG	289	229
SUBSG	247	183	353	260	SUBSG	354	261
					FLOWSG	354	261
CPSG	403	324	599	614	CPSG	360	269
RSSG	402	323	599	618	RSSG	348	246
DIRJ4	302	238	460	476	DIRJ4	258	176
DISGRJ	101	85	139	143	DISGRJ	90	70
RTSGSE	99	84	128	129	RTSGSE	84	69

	Existing Conditions		Future Conditions Without Retention			Future Conditions With Retention	
	6-hr	24-hr	6-hr	24-hr		6-hr	24-hr
SUBSC	294	212	907	650	SUBSC	912	653
					FLOWSC	811	577
DISD	159	115	490	351	DISD	438	312
DISCSD	135	98	417	299	DISCSD	373	265
RTSCSE	113	80	327	226	RTSCSE	169	107
SUBSE	407	294	424	308	SUBSE	426	309
					FLOWSE	426	309
CPSE	208	288	440	391	CPSE	213	299
RSSE	186	169	421	367	RSSE	179	147
DIRJ5	186	169	421	367	DIRJ5	179	147
DISERJ	0	0	0	0	DISERJ	0	0
RTSERI	0	0	0	0	RTSERI	0	0
SUBRJ	207	152	386	283	SUBRJ	387	283
					FLOWRJ	387	283
CPRJ1	282	223	260	222	CPRJ1	245	195
RTSFRJ	260	206	242	185	RTSFRJ	231	179
CPRJ2	466	344	459	349	CPRJ2	362	269
RTSHRJ	451	333	456	346	RTSHRJ	349	257
@CPRJ3	668	524	683	527	@CPRJ3	541	413
RTRJ3	636	497	671	521	RTRJ3	507	389
CPRJ4A	302	238	460	476	CPRJ4A	258	176
CPRJ4B	795	622	883	692	CPRJ4B	643	497
RTSGRJ	788	612	876	689	RTSGRJ	634	492
CPRJ5	186	169	421	367	CPRJ5	179	147
RTSERJ	181	165	405	356	RTSERJ	169	138
@CPRJ6	870	722	995	825	@CPRJ6	686	581
RSRJ	760	615	928	779	RSRJ	587	494
DIPA2	99	46	164	105	DIPA2	39	10
DIRJPA	662	570	764	673	DIRJPA	547	485
RTRJRI	655	564	759	670	RTRJRI	542	483
RTRIRI	652	563	757	668	RTRIRI	539	481
SUBRI	420	310	736	539	SUBRI	737	540
					FLOWRI	715	530
SUBSB	226	174	525	385	SUBSB	525	385
					FLOWSB	426	275
RSSB	184	131	414	297	RSSB	135	70
SUBSD	253	190	480	352	SUBSD	482	353
					FLOWSD	297	213
DRSD	159	115	490	351	DRSD	438	312
@CPSD	431	310	1193	939	@CPSD	681	505
RSSD	433	310	1123	913	RSSD	653	502
RTSDRI	418	305	1065	841	RTSDRI	514	348
~@CPRI	663	582	1006	967	~@CPRI	842	526
MCRIRH	657	578	991	951	MCRIRH	534	514
SUBUE	143	107	194	143	SUBUE	194	143
					FLOWUE	194	143
DRUE	0	0	0	0	DRUE	0	0
CPUE	143	107	194	143	CPUE	194	143
RSUE	1	1	1	1	RSUE	0	0
RTUEPB	1	1	1	1	RTUEPB	0	0
DRB71	410	410	410	410	DRB71	410	410
MC71PB	410	410	410	410	MC71PB	410	410
SUBPB2	422	313	711	520	SUBPB2	714	522
					FLWPB2	714	522
~CPPB2	827	713	1064	838	~CPPB2	890	806
MCPB73	820	710	1038	827	MCPB73	863	798
D-B73	370	260	588	377	D-B73	413	348
73PASS	450	450	450	450	73PASS	450	450
MC73NA	450	450	450	450	MC73NA	450	450
SUBNA2	386	303	952	721	SUBNA2	952	721
					FLWNA2	898	683
DRNA	268	256	349	350	DRNA	351	352
RTDINA	161	131	205	164	RTDINA	152	124
~@CPNA	957	849	1300	1175	~@CPNA	1259	1124
MCNAJC	953	846	1290	1159	MCNAJC	1169	1033
SUBPB1	212	158	367	270	SUBPB1	368	271
					FLWPB1	368	271
DIPA1	40	30	68	51	DIPA1	68	51
DIPBPA	172	127	299	219	DIPBPA	300	220
RTPBNA	69	52	88	64	RTPBNA	60	50
SUBNA1	145	112	395	288	SUBNA1	397	290
					FLWNA1	341	220
CPNA1	148	115	396	291	CPNA1	341	219
RTNAJC	146	113	369	269	RTNAJC	248	155
SUBJC1	52	39	116	85	SUBJC1	116	85
					FLWJC1	94	62
~CPJC1	1075	949	1572	1418	~CPJC1	1343	1167
MCJCJB	1066	943	1538	1370	MCJCJB	1215	1054
SUBPA	588	431	1099	799	SUBPA	1102	801
					FLOWPA	1102	801
DRPA	40	30	68	51	DRPA	68	51
RTDIPA	11	9	13	10	RTDIPA	9	8
DRPA2	99	46	164	105	DRPA2	39	10
RTRJPA	56	19	123	74	RTRJPA	15	5
CPPA	589	431	1099	800	CPPA	1102	801
DIOE	106	78	198	144	DIOE	198	144
DIPAOE	483	354	902	656	DIPAOE	904	657

	Existing Conditions		Future Conditions Without Retention			Future Conditions With Retention	
	6-hr	24-hr	6-hr	24-hr		6-hr	24-hr
RTPAMH	348	247	541	372	RTPAMH	324	227
SUBMH	325	248	569	418	SUBMH	569	418
					FLOWMH	558	379
CPMH	408	297	608	455	CPMH	493	375
RTMHMD	363	268	545	393	RTMHMD	285	213
SUBMD	367	267	367	267	SUBMD	367	267
RETMD	367	267	367	267	RETMD	367	267
RETMD	311	183	311	183	RETMD	311	183
CPMD	391	298	673	488	CPMD	327	246
DIJB1	80	62	137	100	DIJB1	67	51
DIMDJB	311	236	537	388	DIMDJB	259	195
DIMFX	311	236	537	388	DIMFX	259	195
DIMDMF	0	0	0	0	DIMDMF	0	0
SUBMI	681	503	1042	764	SUBMI	1042	764
					FLOWMI	1042	764
RETMI	483	362	402	195			
RETMI	681	503	1042	764			
SUBMG	202	150	249	183	SUBMG	249	183
					FLOWMG	249	183
RETMG	183	150	179	134	RETMG	242	181
RETMG	200	118	249	183	RETMG	178	110
CPMG	836	616	1290	943	CPMG	1206	841
RTMGJB	590	398	875	631	RTMGJB	755	506
SUBJB1	160	117	443	317	SUBJB1	443	317
					FLWJB1	393	245
DRJB	80	62	137	100	DRJB	67	51
RDIJB1	72	55	111	82	RDIJB1	58	43
~CPJB1	1262	1151	2321	2130	~CPJB1	1574	1399
DIED	1262	1151	2321	2130	DIED	1574	1399
DIED	0	0	0	0	DIED	0	0
SUBSA	811	594	894	654	SUBSA	894	654
					FLOWSA	894	654
MCSARH	789	574	867	633	MCSARH	862	631
D-B91A	789	574	867	633	D-B91A	862	631
BAS91A	0	0	0	0	BAS91A	0	0
SUBRH	285	218	666	489	SUBRH	666	489
					FLOWRH	630	362
TEMP	211	211	380	475	TEMP	296	349
~@CPRH	662	652	1255	1249	~@CPRH	558	645
D-B91B	212	202	805	799	D-B91B	108	195
91PASS	450	450	450	450	91PASS	450	450
MCRHOG	450	450	450	450	MCRHOG	450	450
SUBRG	376	276	376	276	SUBRG	376	276
					FLOWRG	376	276
RETRG	134	23	134	23	RETRG	134	23
CPRG	376	276	376	276	CPRG	376	276
RTRGRF	93	81	93	81	RTRGRF	93	81
SUBRF	652	500	1175	884	SUBRF	1181	888
					FLOWRF	1181	888
~CPRF	730	577	1163	905	~CPRF	1168	909
MCRFOG	723	569	1143	888	MCRFOG	1148	891
SUBOG	699	513	880	642	SUBOG	887	646
					FLOWOG	887	646
CPOG1	1214	987	1810	1514	CPOG1	1808	1521
D-B99A	1035	808	1631	1335	D-B99A	1629	1342
BAS99A	179	179	179	179	BAS99A	179	179
~CPOG	628	628	629	629	~CPOG	567	530
MCOGOF	626	625	629	629	MCOGOF	559	524
SUBOF	608	445	750	549	SUBOF	752	550
					FLOWOF	752	550
SUBRE	268	203	708	514	SUBRE	710	516
					FLOWRE	701	508
RTREOF	257	194	633	451	RTREOF	439	308
~CPOF	838	836	1127	1098	~CPOF	833	796
MCOFOB	834	831	1115	1074	MCOFOB	808	769
SUBOB	990	716	1260	916	SUBOB	977	916
					FLOWOB	977	916
~CPOB	965	1013	1258	1461	~CPOB	850	1097
SUBRD	233	170	778	565	SUBRD	782	568
					FLOWRD	767	554
DIOB	93	68	311	226	DIOB	307	221
DIRDOB	140	102	467	339	DIRDOB	460	332
RTRDRC	70	48	189	127	RTRDRC	78	60
SUBRC	392	299	1409	1081	SUBRC	1409	1081
					FLOWRC	1383	1055
CPRC	369	297	1295	1087	CPRC	1271	1050
RTRCRB	279	211	831	631	RTRCRB	417	342
SUBRB	391	288	1346	991	SUBRB	1347	993
					FLOWRB	1347	993
CPRB	323	284	1145	1073	CPRB	1038	983
DIKA3	162	142	573	536	DIKA3	519	491
DIRBKA	162	142	573	536	DIRBKA	519	491
RTRBRA	140	109	443	345	RTRBRA	198	175
SUBRA	150	110	540	391	SUBRA	541	392
					FLOWRA	541	392
CPRA	139	110	451	414	CPRA	355	384

	Existing Conditions		Future Conditions Without Retention			Future Conditions With Retention	
	6-hr	24-hr	6-hr	24-hr		6-hr	24-hr
DIKA4	114	87	420	383	DIKA4	325	354
DIRAKA	25	25	31	31	DIRAKA	29	30
DIAFX	25	25	31	31	DIAFX	29	30
DIKAAF	0	0	0	0	DIKAAF	0	0
CPOB2	93	68	311	226	CPOB2	307	221
RTDIOB	32	22	80	59	RTDIOB	33	27
@CPOB	965	1013	1257	1464	@CPOB	846	1097
MCOBLE	925	940	1245	1321	MCOBLE	807	981
SUBLE	223	162	800	584	SUBLE	800	584
					FLOWLE	776	584
~CPLE	1047	1093	1424	1448	~CPLE	937	1079
D-B111	347	393	724	748	D-B111	237	379
111PAS	700	700	700	700	111PAS	700	700
MCLEKD	700	700	700	700	MCLEKD	700	700
SUBKD	316	241	1052	792	SUBKD	1055	795
					FLOWKD	895	697
~CPKD	892	920	1390	1471	~CPKD	1257	1379
MCKDKA	885	908	1369	1424	MCKDKA	1141	1198
SUBKA	227	162	227	162	SUBKA	220	162
RETKA	227	162	227	162	RETKA	220	162
RETKA	198	107	198	107	RETKA	182	107
CPKA3	162	142	573	536	CPKA3	519	491
RTDIKA	148	115	497	387	RTDIKA	220	188
CPKA4	114	87	420	383	CPKA4	325	354
~CPKA	963	1042	1559	1597	~CPKA	1181	1221
CPKAAF	4350	4848	5683	6257	CPKAAF	2387	2740
SUBLC	324	235	324	235	SUBLC	316	236
					FLOWLC	316	236
RETLC	324	235	324	235	RETLC	316	236
RETLC	68	7	68	7	RETLC	5	5
RTLCLA	6	3	6	3	RTLCLA	1	2
SUBLA	490	351	704	503	SUBLA	704	503
					FLOWLA	704	503
RETLA	490	351	704	503	RETLA	704	503
RETLA	441	255	650	413	RETLA	490	232
CPLA	387	254	613	410	CPLA	429	231
RTLAKB	160	87	248	142	RTLAKB	149	64
SUBKB	503	364	672	482	SUBKB	672	482
					FLOWKB	647	368
CPKB	432	359	574	476	CPKB	481	354
CPAFKB	4410	4941	5863	6601	CPAFKB	2487	3030
SUBGA	356	255	356	255	SUBGA	355	253
					FLOWGA	355	253
CPAFGA	4411	4942	5878	6620	CPAFGA	2495	3040
SUBEC	24	18	93	68	SUBEC	94	68
					FLOWEC	67	42
CPECSR	4418	4955	5898	6650	CPECSR	2508	3063
SUBOE	560	405	1123	812	SUBOE	1126	814
					FLOWOE	1126	814
RETOE	88	10	28	12	RETOE	549	485
RETOE	560	405	1123	812	RETOE	1126	814
CPOE1	106	78	198	144	CPOE1	198	144
RTDIOE	35	26	49	36	RTDIOE	25	19
@CPOE	560	406	1123	815	@CPOE	1126	814
DIOD	92	67	182	132	DIOD	182	132
DIOEOD	468	339	942	683	DIOEOD	943	682
RTOEMF	256	186	402	288	RTOEMF	204	149
SUBMF	590	479	1264	995	SUBMF	1264	995
					FLOWMF	1175	903
CPMF	311	236	537	388	CPMF	259	195
RTMDMF	253	188	383	284	RTMDMF	194	138
CPMF1	676	557	1263	1036	CPMF1	1141	900
DIEB	313	258	561	479	DIEB	512	416
DIMFEB	363	299	654	558	DIMFEB	597	484
RTMFMC	305	243	499	403	RTMFMC	243	176
SUBOD	681	504	1229	898	SUBOD	1234	901
					FLOWOD	1234	901
RETOD	13	6	20	9	RETOD	165	290
RETOD	681	504	1229	898	RETOD	1234	901
DROD	92	67	182	132	DROD	182	132
RTDIOD	53	40	80	58	RTDIOD	43	34
CPOD	681	504	1229	902	CPOD	1234	901
DIOC	123	91	221	162	DIOC	222	162
DIODOC	558	414	1008	740	DIODOC	1012	739
RTODMC	351	262	487	347	RTODMC	286	212
SUBMC	683	555	1688	1362	SUBMC	1690	1364
					FLOWMC	1685	1356
CPMC1	819	682	1400	1384	CPMC1	1388	1342
DIMB	313	261	534	528	DIMB	529	512
DIMCMB	506	421	866	856	DIMCMB	859	830
RTMCIE	479	398	775	705	RTMCIE	551	486
DREB	313	258	561	479	DREB	512	416
SUBEB	149	112	304	223	SUBEB	304	223
					FLOWEB	287	169
CPEB	373	289	821	615	CPEB	689	472
RDIED	1262	1151	2321	2130	RDIED	1574	1399
MCJBED	1256	1146	2232	2019	MCJBED	1431	1270

	Existing Conditions		Future Conditions Without Retention			Future Conditions With Retention	
	6-hr	24-hr	6-hr	24-hr		6-hr	24-hr
SUBED1	198	145	498	359	SUBED1	498	359
					FLWED1	462	275
SUBED2	59	44	141	103	SUBED2	141	103
					FLWED2	139	89
~CPED1	1535	1262	2886	2211	~CPED1	1734	1370
~CPED2	1856	1505	3283	2541	~CPED2	1874	1510
MCED95	1833	1492	3224	2497	MCED95	1831	1471
D-B95	783	442	2174	1447	D-B95	781	421
95PASS	1050	1050	1050	1050	95PASS	1050	1050
MC95ID	1050	1050	1050	1050	MC95ID	1050	1050
SUBID1	169	131	344	252	SUBID1	344	252
					FLWID1	333	221
SUBID2	226	164	542	387	SUBID2	542	387
					FLWID2	463	281
~CPID1	1174	1138	1712	1564	~CPID1	1085	1082
SUBIE	250	195	518	379	SUBIE	518	379
					FLOWIE	501	337
CPID2	1691	1607	2602	2557	CPID2	1535	1321
MCIDIB	1669	1588	2564	2489	MCIDIB	1485	1310
SUBIB	357	272	753	548	SUBIB	753	548
					FLOWIB	713	420
SUBIC	227	165	575	412	SUBIC	575	412
					FLOWIC	503	322
~CPIB1	1839	1754	3324	3243	~CPIB1	1829	1531
SUBOC	613	449	785	574	SUBOC	788	576
					FLOWOC	788	576
DROC	123	91	221	162	DROC	222	162
RTDIOC	50	39	64	49	RTDIOC	36	30
CPOC	613	449	785	577	CPOC	788	576
RTOCMB	316	221	342	238	RTOCMB	260	202
SUBMB	674	546	1552	1244	SUBMB	1552	1244
					FLOWMB	1515	1205
DRMB	313	261	534	528	DRMB	529	512
RTDIMB	268	219	399	326	RTDIMB	208	174
@CPMB	819	729	1552	1293	@CPMB	1865	1205
RTMBIB	738	648	1151	1031	RTMBIB	727	633
@CPIB2	2526	2378	4311	4142	@CPIB2	2475	2098
MCIBIA	2496	2342	4225	4017	MCIBIA	2361	2023
SUBME	268	193	492	352	SUBME	489	349
					FLOWME	489	346
RTMEIA	163	109	279	179	RTMEIA	157	89
SUBIA	347	254	578	419	SUBIA	578	419
					FLOWIA	578	419
~CPIA	2554	2426	4450	4240	~CPIA	2427	2121
MCIAHB	2529	2407	4383	4155	MCIAHB	2322	2040
SUBHB	358	258	627	447	SUBHB	627	447
					FLOWHB	627	447
SUBDA	318	235	539	392	SUBDA	539	392
					FLOWDA	539	392
~CPHB1	2530	2427	4488	4266	~CPHB1	2326	2077
SUBLD	465	333	431	309	SUBLD	431	309
					FLOWLD	431	309
RTLDMA	428	300	403	279	RTLDMA	383	263
SUBMA	185	132	430	305	SUBMA	430	305
					FLOWMA	425	265
CPMA	601	426	703	475	CPMA	613	418
RTMAHB	358	236	437	284	RTMAHB	287	169
~CPHB2	2600	2516	4720	4521	~CPHB2	2432	2211
SUBLB	171	124	417	297	SUBLB	417	297
					FLOWLB	385	231
RTLBHA	144	97	314	211	RTLBHA	171	84
SUBHA	143	104	296	214	SUBHA	295	213
					FLOWHA	285	174
CPHA	2641	2583	4896	4733	CPHA	2469	2289
MCHACB	2608	2559	4775	4566	MCHACB	2278	2131
SUBEE	385	304	866	670	SUBEE	866	670
					FLOWEE	803	607
CPEE1	93	76	131	120	CPEE1	122	109
RTDIEE	87	71	120	99	RTDIEE	87	69
CPEE	386	304	868	672	CPEE	803	607
RTEEEA	179	117	341	217	RTEEEA	106	83
SUBEA	541	453	1322	1086	SUBEA	1322	1086
					FLOWEA	1213	961
CPEA	491	449	1200	1085	CPEA	1123	954
MCEADC	478	435	1134	1008	MCEADC	794	600
SUBDC	546	427	1135	890	SUBDC	1135	890
					FLOWDC	1107	789
~CPDC	703	645	1538	1318	~CPDC	874	762
MCDCCC	689	630	1505	1282	MCDCCC	797	590
SUBDD	142	104	293	210	SUBDD	293	210
					FLOWDD	244	153
RTDDCC	98	70	185	126	RTDDCC	80	41
SUBCC	780	621	1213	964	SUBCC	1213	964
					FLOWCC	1213	964
~CPCC	1007	939	2096	1830	~CPCC	1149	948
MCCCCB	1004	929	2054	1794	MCCCCB	1083	879
SUBCB	315	260	686	530	SUBCB	686	530

	Existing Conditions		Future Conditions Without Retention			Future Conditions With Retention	
	6-hr	24-hr	6-hr	24-hr		6-hr	24-hr
					FLOWCB	686	529
~CPCB1	3113	3242	6349	6229	~CPCB1	2764	2686
SUBGD	657	521	1340	1048	SUBGD	1340	1048
					FLOWGD	1340	1048
SUBKC	199	143	488	348	SUBKC	488	348
					FLOWKC	431	257
RTKCGD	102	69	229	146	RTKCGD	88	49
SUBGC	339	243	408	294	SUBGC	408	294
					FLOWGC	408	294
RTGCGD	298	207	359	249	RTGCGD	350	249
CPGD1	796	659	1573	1318	CPGD1	1522	1286
RTGDCB	627	496	1107	846	RTGDCB	727	542
~CPCB2	3402	3606	7078	6978	~CPCB2	3061	2961
MCCBCA	3065	3192	5266	5096	MCCBCA	2355	2309
SUBCA	584	479	1271	1006	SUBCA	1272	1007
					FLOWCA	1272	1007
~CPCA1	3068	3210	5265	5119	~CPCA1	2348	2306
SUBGB	309	220	364	259	SUBGB	365	261
					FLOWGB	365	261
RTGBCA	240	162	198	126	RTGBCA	208	142
~CPCA2	3067	3211	5277	5145	~CPCA2	2348	2315
B-DRCC	2965	3111	5177	5045	B-DRCC	2240	2216
P-DRCC	100	100	100	100	P-DRCC	100	99
MCCABC	100	100	100	100	MCCABC	99	99
SUBBC	327	244	829	610	SUBBC	851	626
					FLOWBC	851	626
~CPBC	285	326	576	675	~CPBC	562	671
CPAFBC	4413	5104	5995	7083	CPAFBC	2616	3487
SUBAD	176	129	388	281	SUBAD	388	281
					FLOWAD	384	248
BSNAD	9	8	9	9	BSNAD	8	8
SUBAC	290	209	567	408	SUBAC	567	408
					FLOWAC	567	400
CPAC	285	215	546	413	CPAC	544	400
BSNAC	58	8	213	59	BSNAC	14	6
SUBAB	346	250	621	448	SUBAB	621	448
					FLOWAB	621	448
CPAB	306	247	540	445	CPAB	538	443
BSNAB	12	4	173	16	BSNAB	5	4
SUBAA	198	139	198	139	SUBAA	198	139
					FLOWAA	198	139
CPAA	174	138	284	138	CPAA	174	138
SUBBB	209	159	375	276	SUBBB	375	276
					FLOWBB	375	261
RTBBBA	128	93	129	93	RTBBBA	73	48
SUBBA	221	159	353	251	SUBBA	353	251
					FLOWBA	353	251
CPBA	215	158	345	251	CPBA	345	250
HCTR1	305	257	369	309	HCTR1	280	246
BSNAA	26	4	173	40	BSNAA	4	2
SUBWT1	1347	1000	1347	1000	SUBWT1	1354	1005
SUBWT2	423	306	423	306	SUBWT2	425	308
DUR	4453	5165	6332	7658	DUR	2841	3768

Recommended Plan, Sheet 1 (Future Conditions)

Channel Cost

ID	Excavated Volume (cy)	Unit Cost ($/cy)	Excavation Cost	Concrete Volume (cy)	Unit Cost ($/cy)	Concrete Cost	Utility Relocation Cost	Channel Length (ft)	Left Access Road Width (ft)	Right Access Road Width (ft)	6" ABC Access Road Unit Cost ($/sf)	Access Road Cost	Total Corridor Width-Channel+Access Rd (ft)	Existing Right-of-Way Width (ft.)	New Right-of-Way Width Required (ft.)	Landscape Unit Cost ($/sf)	Total Landscape Cost	Required Land Acquisition (Ac.)	Zoning	Land Acquisition Cost	Total Construction Cost	Total Contingencies Cost	Total Construction, Land, Landscape, and Contingencies Costs
DROC01	80979	$6	$485,877	0	n/a	n/a	$0	2689.7	16	16	$0.65	$55,946	203.8	0	230	$1.80	$1,113,536	14.2	Res / Ag	$612,445	$541,822	162,547	**$2,430,350**
DROC02	17933	$6	$107,597	0	n/a	n/a	$45,000	920.5	16	16	$0.65	$19,146	157.1	0	180	$1.80	$298,242	3.8	Res / Ag	$164,033	$171,744	51,523	**$685,542**
DROC03a	18166	$6	$108,996	0	n/a	n/a	$0	1559.8	16	16	$0.65	$32,444	125.7	0	140	$1.80	$393,070	5.0	Res / Ag	$216,188	$141,440	42,432	**$793,129**
DROC03b	65748	$6	$394,487	0	n/a	n/a	$0	2501.3	16	16	$0.65	$52,027	187.7	0	210	$1.80	$945,491	12.1	Res / Ag	$520,020	$446,514	133,954	**$2,045,980**
DROC04	58096	$6	$348,576	0	n/a	n/a	$4,000	2176.8	16	16	$0.65	$45,277	188.6	0	210	$1.80	$822,830	10.5	Res / Ag	$452,557	$397,854	119,356	**$1,792,597**
DROC05a	14948	$6	$89,689	0	n/a	n/a	$26,000	1166	16	16	$0.65	$24,253	126.5	0	140	$1.80	$293,832	3.7	Res / Ag	$161,608	$139,942	41,982	**$637,364**
DROC05b	36629	$4	$146,517	0	n/a	n/a	$22,000	2857.2	16	16	$0.65	$59,430	126.5	0	140	$1.80	$720,014	9.2	Res / Ag	$396,008	$227,947	68,384	**$1,412,354**
DROC06a	60386	$6	$362,313	0	n/a	n/a	$51,000	2558	16	16	$0.65	$53,206	174.1	0	200	$1.80	$920,880	11.7	Res / Ag	$506,484	$466,520	139,956	**$2,033,840**
DROC06b	22657	$4	$90,627	2836	310	879082	$53,000	2664	16	16	$0.65	$55,411	72.0	0	80	$1.80	$191,808	4.9	Res / Ag	$210,989	$1,078,120	323,436	**$1,804,353**
#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	**#REF!**
DROC07	35538	$6	$213,227	0	n/a	n/a	$33,000	2482.4	16	16	$0.65	$51,634	132.9	0	150	$1.80	$670,248	8.5	Res / Ag	$368,636	$297,861	89,358	**$1,426,103**
99LTa	20470	$6	$122,822	0	n/a	n/a	$0	1572.9	16	16	$0.65	$32,716	127.2	0	140	$1.80	$396,371	5.1	Res / Ag	$218,004	$155,538	46,661	**$816,574**
99LTb	7253	$4	$29,012	0	n/a	n/a	$9,000	557.3	16	16	$0.65	$11,592	127.2	0	140	$1.80	$140,440	1.8	Res / Ag	$77,242	$49,603	14,881	**$282,166**
91LT	19211	$6	$115,266	0	n/a	n/a	$16,000	1105.6	16	16	$0.65	$22,996	147.3	0	170	$1.80	$338,314	4.3	Res / Ag	$186,072	$154,262	46,279	**$724,927**
47CH01a	28550	$4	$114,200	0	n/a	n/a	$0	1302.2	16	16	$0.65	$27,086	167.8	0	190	$1.80	$445,352	5.7	Res / Ag	$244,944	$141,286	42,386	**$873,968**
47CH01b	55421	$4	$221,682	0	n/a	n/a	$48,250	2527.8	16	16	$0.65	$52,578	167.8	0	190	$1.80	$864,508	11.0	Res / Ag	$475,479	$322,510	96,753	**$1,759,250**
47CH02	56167	$4	$224,668	0	n/a	n/a	$18,875	2476.2	16	16	$0.65	$51,505	180.1	0	200	$1.80	$891,432	11.4	Res / Ag	$490,288	$295,048	88,514	**$1,765,282**
47CH03	31295	$4	$125,180	3594	310	1114186	$0	2678	16	16	$0.65	$55,702	87.0	0	100	$1.80	$482,040	6.1	Res / Ag	$265,122	$1,295,068	388,521	**$2,430,751**
47CH04	21577	$4	$86,308	0	n/a	n/a	$130,000	1175.3	16	16	$0.65	$24,446	152.0	0	170	$1.80	$359,642	4.6	Res / Ag	$197,803	$240,754	72,226	**$870,425**

Culvert Cost

Location	ID	Length (ft.)	Number of Barrels	Culvert Dia./ Height	Unit	Width ft)	Length of Pipe/ Box Culvert (ft.)	Unit Cost ($/ft.)	Pipe/Box Culvert Cost	Inlet Headwall	Unit Cost ($/Ea.)	Inlet Headwall Cost	Outlet Headwall	Unit Cost ($/Ea.)	Outlet Headwall Cost	Required Land Acquisition (Ac.)	Zoning	Unit Cost ($/sf)	Culvert Land Acquisition Cost	Culvert Materials Cost	Culvert Contingencies Cost	Total Land, Construction, and Contingencies Costs
DROC / 115th Ave	DROC-C1	130	4	5	ft.	10	130	$2,100	$273,000	1	$5,700	$5,700	1	$9,900	$9,900	0.0	N/A	$0.00	$0	$288,600	$86,580	**$375,180**
DROC / 107th Ave	DROC-C2	110	4	5	ft.	8	110	$1,600	$176,000	1	$6,050	$6,050	1	$10,500	$10,500	0.0	N/A	$0.00	$0	$192,550	$57,765	**$250,315**
DROC / 103rd Ave RR Spur	DROC-C3	242.4	3	5	ft.	8	242.4	$1,200	$290,880	1	$4,800	$4,800	1	$8,300	$8,300	0.0	N/A	$0.00	$0	$303,980	$91,194	**$395,174**
DROC / 99th Ave	DROC-C4	110	2	5	ft.	8	110	$800	$88,000	1	$4,950	$4,950	1	$8,600	$8,600	0.0	N/A	$0.00	$0	$101,550	$30,465	**$132,015**
DROC / 91st Ave	DROC-C5	150	2	5	ft.	10	150	$1,050	$157,500	1	$4,700	$4,700	1	$8,100	$8,100	0.0	N/A	$0.00	$0	$170,300	$51,090	**$221,390**
99th Ave Lateral / 1/8 mile S. of Van Buren	99LT-C1	100	3	5	ft.	10	100	$1,575	$157,500	1	$5,500	$5,500	1	$9,500	$9,500	0.0	N/A	$0.00	$0	$172,500	$51,750	**$224,250**
99th Ave Lateral / Van Buren St	99LT-C2	110	4	4	ft.	10	110	$2,100	$231,000	1	$6,200	$6,200	1	$10,700	$10,700	0.0	N/A	$0.00	$0	$247,900	$74,370	**$322,270**
91st Ave Lateral / Van Buren St	91LT-C1	185	3	4	ft.	10	185	$1,575	$291,375	1	$4,800	$4,800	1	$8,300	$8,300	0.0	N/A	$0.00	$0	$304,475	$91,343	**$395,818**
47th Ave Channel / 1/2 mile S. of Lower B	47CH-C1	111	5	5	ft.	10	111	$2,625	$291,375	1	$8,300	$8,300	1	$14,400	$14,400	0.0	N/A	$0.00	$0	$314,075	$94,223	**$408,298**
47th Ave Channel / Lower Buckeye Rd	47CH-C2	110	6	5	ft.	10	110	$3,150	$346,500	1	$8,300	$8,300	1	$14,400	$14,400	0.0	N/A	$0.00	$0	$369,200	$110,760	**$479,960**
47th Ave Channel / Buckeye Rd	47CH-C3	323	3	5	ft.	8	323	$1,200	$387,600	1	$4,800	$4,800	1	$8,300	$8,300	0.0	N/A	$0.00	$0	$400,700	$120,210	**$520,910**
47th Ave Channel / Det. Basin Entrance	47CH-C4	427	4	5	ft.	10	427	$2,100	$896,700	1	$6,500	$6,500	1	$11,200	$11,200	0.0	N/A	$0.00	$0	$914,400	$274,320	**$1,188,720**

Detention Basin Cost

I.D.	Basin Excavation Volume (cy)	Unit Cost ($/cy)	Detention Basin Excavation Cost	Length of Drain Pipe/ Box Culvert (ft.)	Unit Cost ($/ft.)	Pipe/Box Culvert Cost	# Of Manholes	Manhole Unit Cost ($)	Manhole Total Cost ($)	Headwall	Unit Cost ($/Ea.)	Headwall Cost	Inflow Spillway Area (ft^2)	Inflow Spillway Unit Cost ($/sf)	Inflow Spillway Cost	Basin Top Area (ac)	Required Land Acquisition (Ac.)	Unit Cost ($/sf)	Total Land Acquisition Cost	Landscape Restoration (sf)	Landscape Unit Cost ($/sf)	Total Landscape Cost	Total Construction Cost	Detention Basin Contingincies Cost	Total Construction, Land, and Landscape Costs
DRO Basin #1 - 111th Ave	279,897	$4.00	$1,119,588	156	$55	$8,580	1	$4,500	$4,500	1	$1,100	$1,100	3450.319	$5	$17,252	18	37	$0.99	$1,595,603	1611720	$1.80	$2,901,096	$1,151,020	$345,306	**$5,993,024**
DRO Basin #2 - 99th Ave	231,400	$4.00	$925,600	155	$55	$8,525	1	$4,500	$4,500	1	$1,100	$1,100	8933.477	$5	$44,667	28	34	$0.99	$1,466,230	1481040	$1.80	$2,665,872	$1,003,552	$301,066	**$5,436,720**
DRO Basin #3a - 91st Ave	184,000	$4.00	$736,000	2280	$55	$125,400	6	$4,500	$27,000	1	$1,100	$1,100	0	$5	$0	21	24	$0.99	$1,034,986	1045440	$1.80	$1,881,792	$889,500	$266,850	**$4,073,128**
DRO Basin #3b - 91st Ave	39,800	$4.00	$159,200	91	$55	$5,005	1	$4,500	$4,500	2	$1,100	$2,200	5889.458	$5	$29,447	7	7	$0.99	$301,871	304920	$1.80	$548,856	$200,352	$60,106	**$1,111,185**
47th Ave Basin	260,633	$4.00	$1,042,532	0	$55	$0	0	$4,500	$0	0	$1,100	$0	19153	$5	$95,767	35.1	43.875	$0.99	$1,892,083	1911195	$1.80	$3,440,151	$1,157,847	$347,354	**$6,837,435**

* Contingencies are based on 30% of total construction cost and include design and construction administration costs

Recommended Plan, Sheet 2 (Future Conditions)

Channel Cost

ID	Excavated Volume (cy)	Unit Cost ($/cy)	Excavation Cost	Concrete Volume (cy)	Unit Cost ($/cy)	Concrete Cost	Utility Relocation Cost	Channel Length (ft)	Left Access Road Width (ft)	Right Access Road Width (ft)	6" ABC Access Road Unit Cost ($/sf)	Access Road Cost	Total Corridor Width-Channel+Access Rd (ft)	Existing Right-of-Way Width (ft.)	New Right-of-Way Width Required (ft.)	Landscape Unit Cost ($/sf)	Total Landscape Cost	Required Land Acquisition (Ac.)	Zoning	Land Acquisition Cost	Total Construction Cost	Total Contingencies Cost	Total Construction, Land, Landscape, and Contingencies Costs
DRCC01a	2591	$6	$15,546	1431	310	443611	$0	4229.6	16	16	$0.65	$87,976	36.0	0	40	$1.80	$304,531	3.9	Res / Ag	$167,492	$547,133	164,140	**$1,183,296**
DRCC02a	83233	$6	$499,398	0	n/a	n/a	$0	2512.7	16	16	$0.65	$52,264	218.3	0	250	$1.80	$1,130,715	14.4	Res / Ag	$621,893	$551,662	165,499	**$2,469,769**
DRCC02b	83236	$4	$332,945	0	n/a	n/a	$0	2512.8	16	16	$0.65	$52,266	218.3	0	250	$1.80	$1,130,760	14.4	Res / Ag	$621,918	$385,211	115,563	**$2,253,453**
DRCC03a	118749	$6	$712,492	0	n/a	n/a	$0	3376.8	16	16	$0.65	$70,237	228.0	0	260	$1.80	$1,580,342	20.2	Res / Ag	$869,188	$782,729	234,819	**$3,467,079**
DRCC03b	88974	$4	$355,894	0	n/a	n/a	$0	2530.1	16	16	$0.65	$52,626	228.0	0	260	$1.80	$1,184,087	15.1	Res / Ag	$651,248	$408,520	122,556	**$2,366,411**
DRCC04	135542	$6	$813,254	0	n/a	n/a	$401,200	2645.9	16	16	$0.65	$55,035	298.9	0	330	$1.80	$1,571,665	20.0	Res / Ag	$864,416	$1,269,489	380,847	**$4,086,415**
DRCC05	133626	$6	$801,753	0	n/a	n/a	$405,150	2492.6	16	16	$0.65	$51,846	312.8	0	350	$1.80	$1,570,338	20.0	Res / Ag	$863,686	$1,258,749	377,625	**$4,070,398**
DRCC06a	53279	$6	$319,676	0	n/a	n/a	$280,950	2724.6	16	16	$0.65	$56,672	157.3	0	180	$1.80	$882,770	11.3	Res / Ag	$485,524	$657,297	197,189	**$2,222,780**
DRCC06b	47524	$4	$190,097	0	n/a	n/a	$280,800	2430.3	16	16	$0.65	$50,550	157.3	0	180	$1.80	$787,417	10.0	Res / Ag	$433,079	$521,447	156,434	**$1,898,378**
DRCC07	38872	$6	$233,233	0	n/a	n/a	$2,000	2778.2	16	16	$0.65	$57,787	131.8	0	150	$1.80	$750,114	9.6	Res / Ag	$412,563	$293,019	87,906	**$1,543,602**
DRCC08a	16589	$6	$99,537	0	n/a	n/a	$0	1079.1	16	16	$0.65	$22,445	146.0	0	170	$1.80	$330,205	4.2	Res / Ag	$181,613	$121,982	36,595	**$670,394**
DRCC08b	39611	$6	$237,667	0	n/a	n/a	$0	1250.2	16	16	$0.65	$26,004	212.6	0	240	$1.80	$540,086	6.9	Res / Ag	$297,048	$263,671	79,101	**$1,179,906**
DRCC09a	85313	$6	$511,879	0	n/a	n/a	$2,000	2484.3	16	16	$0.65	$51,673	223.4	0	250	$1.80	$1,117,935	14.3	Res / Ag	$614,864	$565,552	169,666	**$2,468,017**
DRCC09b	86999	$4	$347,997	0	n/a	n/a	$20,000	2533.4	16	16	$0.65	$52,695	223.4	0	250	$1.80	$1,140,030	14.5	Res / Ag	$627,017	$420,692	126,208	**$2,313,946**
DRCC10a	59491	$6	$356,944	0	n/a	n/a	$0	2564.6	16	16	$0.65	$53,344	173.2	0	200	$1.80	$923,256	11.8	Res / Ag	$507,791	$410,288	123,086	**$1,964,421**
DRCC10b	73636	$4	$294,545	0	n/a	n/a	$41,250	3174.4	16	16	$0.65	$66,028	173.2	0	200	$1.80	$1,142,784	14.6	Res / Ag	$628,531	$401,822	120,547	**$2,293,684**
DRCC11	44328	$6	$265,967	0	n/a	n/a	$15,000	2417.2	16	16	$0.65	$50,278	151.9	0	170	$1.80	$739,663	9.4	Res / Ag	$406,815	$331,244	99,373	**$1,577,096**
DRCC12	48123	$6	$288,740	0	n/a	n/a	$12,500	3037.1	16	16	$0.65	$63,172	139.2	0	160	$1.80	$874,685	11.2	Res / Ag	$481,077	$364,412	109,323	**$1,829,496**
DRCC13a	6581	$6	$39,488	0	n/a	n/a	$0	815.3	16	16	$0.65	$16,958	104.4	0	120	$1.80	$176,105	2.2	Res / Ag	$96,858	$56,447	16,934	**$346,343**
DRCC13b	13369	$6	$80,212	0	n/a	n/a	$0	1287.7	16	16	$0.65	$26,784	114.9	0	130	$1.80	$301,322	3.8	Res / Ag	$165,727	$106,997	32,099	**$606,144**
DRCC14	43585	$6	$261,507	0	n/a	n/a	$46,000	2421.5	16	16	$0.65	$50,367	149.0	0	170	$1.80	$740,979	9.5	Res / Ag	$407,538	$357,875	107,362	**$1,613,754**
DRCC15	18661	$6	$111,964	0	n/a	n/a	$30,000	2441	16	16	$0.65	$50,773	102.5	0	120	$1.80	$527,256	6.7	Res / Ag	$289,991	$192,737	57,821	**$1,067,805**
DRCC16	8243	$6	$49,457	1213	310	375930	$0	1287	16	16	$0.65	$26,770	67.0	0	80	$1.80	$185,328	2.4	Res / Ag	$101,930	$483,045	144,913	**$915,217**
DRCC17	13722	$6	$82,329	2119	310	656906	$10,000	2492.5	16	16	$0.65	$51,844	62.0	0	70	$1.80	$314,055	4.0	Res / Ag	$172,730	$860,900	258,270	**$1,605,955**
SUN01	69873	$6	$419,239	0	n/a	n/a	$0	3027.4	16	16	$0.65	$62,970	172.9	0	200	$1.80	$1,089,864	13.9	Res / Ag	$599,425	$482,209	144,663	**$2,316,161**
SUN02a	21814	$6	$130,882	0	n/a	n/a	$0	1388.5	16	16	$0.65	$28,881	138.8	0	160	$1.80	$399,888	5.1	Res / Ag	$219,938	$159,763	47,929	**$827,518**
SUN02b	18903	$6	$113,415	0	n/a	n/a	$0	1203.2	16	16	$0.65	$25,027	138.8	0	160	$1.80	$346,522	4.4	Res / Ag	$190,587	$138,442	41,533	**$717,083**
SUN02c	39448	$6	$236,690	0	n/a	n/a	$0	2511	16	16	$0.65	$52,229	138.8	0	160	$1.80	$723,168	9.2	Res / Ag	$397,742	$288,919	86,676	**$1,496,505**
SUN03a	48336	$6	$290,015	0	n/a	n/a	$0	2469.7	16	16	$0.65	$51,370	157.3	0	180	$1.80	$800,183	10.2	Res / Ag	$440,101	$341,384	102,415	**$1,684,083**
SUN03b	48549	$6	$291,295	0	n/a	n/a	$0	2480.6	16	16	$0.65	$51,596	157.3	0	180	$1.80	$803,714	10.3	Res / Ag	$442,043	$342,891	102,867	**$1,691,516**

Culvert Cost

Location	ID	Length (ft.)	Number of Barrels	Culvert Dia./ Height	Unit	Width ft)	Length of Pipe/ Box Culvert (ft.)	Unit Cost ($/ft.)	Pipe/Box Culvert Cost	Inlet Headwall	Unit Cost ($/Ea.)	Inlet Headwall Cost	Outlet Headwall	Unit Cost ($/Ea.)	Outlet Headwall Cost	Required Land Acquisition (Ac.)	Zoning	Unit Cost ($/sf)	Culvert Land Acquisition Cost	Culvert Materials Cost	Culvert Contingencies Cost	Total Land, Construction, and Contingencies Costs
DRCC / Dysart Rd	DRCC-C1a	110	7	5	ft.	10	110	$3,675	$404,250	1	$8,900	$8,900	1	$15,400	$15,400	0.0	N/A	$0.00	$0	$428,550	$128,565	**$557,115**
DRCC / 1/2 mile W. of El Mirage Rd	DRCC-C1b	110	7	5	ft.	10	110	$3,675	$404,250	1	$9,300	$9,300	1	$16,100	$16,100	0.0	N/A	$0.00	$0	$429,650	$128,895	**$558,545**
DRCC / 1/2 mile S. of Broadway Rd	DRCC-C3	110	8	5	ft.	10	110	$4,200	$462,000	1	$8,900	$8,900	1	$15,400	$15,400	0.0	N/A	$0.00	$0	$486,300	$145,890	**$632,190**
DRCC / Broadway Rd	DRCC-C4	110	8	5	ft.	10	110	$4,200	$462,000	1	$8,300	$8,300	1	$14,400	$14,400	0.0	N/A	$0.00	$0	$484,700	$145,410	**$630,110**
DRCC / 115th Ave	DRCC-C5	151	7	5	ft.	10	151	$3,675	$554,925	1	$8,300	$8,300	1	$14,400	$14,400	0.0	N/A	$0.00	$0	$577,625	$173,288	**$750,913**
DRCC / 111th Ave	DRCC-C6	110	8	5	ft.	10	110	$4,200	$462,000	1	$6,400	$6,400	1	$11,100	$11,100	0.0	N/A	$0.00	$0	$479,500	$143,850	**$623,350**
DRCC / 107th Ave	DRCC-C7	110	6	5	ft.	10	110	$3,150	$346,500	1	$6,400	$6,400	1	$11,100	$11,100	0.0	N/A	$0.00	$0	$364,000	$109,200	**$473,200**
DRCC / 103rd Ave	DRCC-C8	110	5	5	ft.	10	110	$2,625	$288,750	1	$6,700	$6,700	1	$11,600	$11,600	0.0	N/A	$0.00	$0	$307,050	$92,115	**$399,165**
DRCC / 99th Ave	DRCC-C9	110	4	5	ft.	8	110	$1,600	$176,000	1	$6,050	$6,050	1	$10,500	$10,500	0.0	N/A	$0.00	$0	$192,550	$57,765	**$250,315**
DRCC / 95th Ave	DRCC-C10	140	8	4	ft.	10	140	$4,200	$588,000	1	$6,200	$6,200	1	$10,700	$10,700	0.0	N/A	$0.00	$0	$604,900	$181,470	**$786,370**
DRCC / 91st Ave	DRCC-C11	110	5	5	ft.	10	110	$2,625	$288,750	1	$8,300	$8,300	1	$14,400	$14,400	0.0	N/A	$0.00	$0	$311,450	$93,435	**$404,885**
DRCC / 87th Ave	DRCC-C12	110.4	5	5	ft.	10	110.4	$2,625	$289,800	1	$8,300	$8,300	1	$14,400	$14,400	0.0	N/A	$0.00	$0	$312,500	$93,750	**$406,250**
DRCC / 83rd Ave	DRCC-C13	110.5	5	5	ft.	10	110.5	$2,625	$290,063	1	$6,500	$6,500	1	$11,200	$11,200	0.0	N/A	$0.00	$0	$307,763	$92,329	**$400,091**
DRCC / 79th Ave	DRCC-C14	220	5	5	ft.	10	220	$2,625	$577,500	1	$6,500	$6,500	1	$11,200	$11,200	0.0	N/A	$0.00	$0	$595,200	$178,560	**$773,760**
DRCC / 75th Ave	DRCC-C15	146	4	5	ft.	10	146	$2,100	$306,600	1	$6,050	$6,050	1	$10,500	$10,500	0.0	N/A	$0.00	$0	$323,150	$96,945	**$420,095**
DRCC / Lower Buckeye Rd	DRCC-C16	110.2	4	5	ft.	10	110.2	$2,100	$231,420	1	$4,800	$4,800	1	$8,300	$8,300	0.0	N/A	$0.00	$0	$244,520	$73,356	**$317,876**
DRCC / Buckeye Rd	DRCC-C17	110	3	5	ft.	8	110	$1,200	$132,000	1	$4,800	$4,800	1	$8,300	$8,300	0.0	N/A	$0.00	$0	$145,100	$43,530	**$188,630**
DRCC / Railroad	DRCC-C18	380.5	2	4	ft.	10	380.5	$1,050	$399,525	1	$3,900	$3,900	1	$6,700	$6,700	0.0	N/A	$0.00	$0	$410,125	$123,038	**$533,163**
DRCC / 67th Ave	DRCC-C19	110	4	4	ft.	10	110	$2,100	$231,000	1	$5,300	$5,300	1	$9,200	$9,200	0.0	N/A	$0.00	$0	$245,500	$73,650	**$319,150**
SAC / 111th Ave	SUN-C1	110	3	5	ft.	10	110	$1,575	$173,250	1	$5,300	$5,300	1	$9,200	$9,200	0.0	N/A	$0.00	$0	$187,750	$56,325	**$244,075**
SAC / 107th Ave	SUN-C2	110	3	5	ft.	10	110	$1,575	$173,250	1	$5,300	$5,300	1	$9,200	$9,200	0.0	N/A	$0.00	$0	$187,750	$56,325	**$244,075**
SAC / 103rd Ave	SUN-C3	110	3	5	ft.	8	110	$1,200	$132,000	1	$5,300	$5,300	1	$9,200	$9,200	0.0	N/A	$0.00	$0	$146,500	$43,950	**$190,450**
SAC / 99th Ave	SUN-C4	110	3	5	ft.	10	110	$1,575	$173,250	1	$5,300	$5,300	1	$9,200	$9,200	0.0	N/A	$0.00	$0	$187,750	$56,325	**$244,075**

Detention Basin Cost

I.D.	Basin Excavation Volume (cy)	Unit Cost ($/cy)	Detention Basin Excavation Cost	Length of Drain Pipe/ Box Culvert (ft.)	Unit Cost ($/ft.)	Pipe/Box Culvert Cost	# Of Manholes	Manhole Unit Cost ($)	Manhole Total Cost ($)	Headwall	Unit Cost ($/Ea.)	Headwall Cost	Inflow Spillway Area (ft^2)	Inflow Spillway Unit Cost ($/sf)	Inflow Spillway Cost	Basin Top Area (ac)	Required Land Acquisition (Ac.)	Unit Cost ($/sf)	Total Land Acquisition Cost	Landscape Restoration (sf)	Landscape Unit Cost ($/sf)	Total Landscape Cost	Total Construction Cost	Detention Basin Contingincies Cost	Total Construction, Land, and Landscape Costs
DRC Basin #1 - Dysart Rd	0	$4.00	$0	500	$55	$27,500	2	$4,500	$9,000	1	$1,100	$1,100	253571.9	$5	$1,267,859	137	150	$0.99	$6,468,660	6534000	$1.80	$11,761,200	$1,305,459	$391,638	**$19,926,957**
DRC Basin #2 - 95th Ave	202,900	$4.00	$811,600	221	$55	$12,155	1	$4,500	$4,500	1	$1,100	$1,100	4407.338	$5	$22,037	30	48	$0.99	$2,069,971	2090880	$1.80	$3,763,584	$851,392	$255,418	**$6,940,364**
DRC Basin #3 - 73rd Ave	79,000	$4.00	$316,000	200	$55	$11,000	1	$4,500	$4,500	1	$1,100	$1,100	2129.961	$5	$10,650	9.1	16.53	$0.99	$712,846	720046.8	$1.80	$1,296,084	$356,826	$107,048	**$2,472,804**
DRC Basin #4 - 71st Ave	180,000	$4.00	$720,000	1161	$55	$63,855	3	$4,500	$13,500	1	$1,100	$1,100	6748.109	$5	$33,741	16	29.25	$0.99	$1,261,389	1274130	$1.80	$2,293,434	$850,448	$255,134	**$4,660,405**

* Contingencies are based on 30% of total construction cost and include design and construction administration costs

APPENDIX C

Southwest Area Re-Study

DURANGO AREA DRAINAGE MASTER PLAN

Contract FCD# 99-41

SOUTHWEST AREA RE-STUDY

Prepared for:

Flood Control District of Maricopa County

Prepared by:

DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
Since 1962

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Durango ADMP Southwest Area Alternatives Analysis

A brainstorming meeting was held December 12, 2001 to identify new alternatives for the southwest area of the Durango Area Drainage Master Plan. This area of the Plan is being re-evaluated due to analysis of the residual floodplains that proved the Recommended Plan specified in a Draft of the Recommended Design Report was inadequate to alleviate the majority of flooding issues along the Buckeye Feeder Canal.

The southwest portion of the Master Plan consists of three main areas. The first area, denoted with the letter 'A', is between 91st Avenue and 99th Avenue, ½ mile south of Broadway Road. The second area, denoted with the letter 'B', is along 115th Avenue centered around the Buckeye Feeder Canal. The third area, denoted with the letter 'C', is the outfall to the Agua Fria River, either north or south of the Avondale Wastewater Treatment Plant. Each area has multiple alternatives of which one will be identified then combined with the chosen alternatives of the other areas to form an overall preferred alternative.

Several seed alternatives were presented at the meeting and are identified as alternatives A1, A2, A3, B1, B2a, B2b, C1, C2, and C3. An additional alternative and a couple variations were identified at the brainstorming meeting and are denoted with the letter 'D'. A common feature in all of the alternatives is a channel along the Sunland Avenue alignment to provide conveyance and flood relief between 91st Avenue and 115th Avenue. Therefore all of the alternatives shown here include a channel along this alignment, however one possible variation is a non-structural option along Sunland Avenue, instead regulating the floodplain in the area. This would effectively eliminate Alternative A2.

The alternatives are described herein including the advantages and disadvantages of each alternative, incorporating the effectiveness of reducing the residual floodplain, the feasibility of implementation, and the impact on the Durango ADMP. Based on this analysis, one alternative will be selected for further evaluation.

91st Avenue Alternatives

Alternative A1

Description:
Alternative A1 consists of a channel along the west side of 91st Avenue from ¼ mile south of Broadway Road to the Salt River. The intent of the channel is to capture runoff generated east of 91st Avenue and convey it south to the Salt River, thus reducing the runoff contributing to the Sunland Avenue floodplain and the Buckeye Feeder Canal. This alternative is consistent with the original Recommended Plan as specified in the Draft of the Recommended Design Report.

Advantages:
Reduces peak flows immediately west of 91st Avenue from between 500 and 550 cfs to between 0 and 550 cfs.
Protects the proposed Tres Rios Regulating Wetland from stormwater runoff originating east of 91st Avenue.

Disadvantages:
Peak flows return to existing values approximately ¾ mile west of 91st Avenue, only slightly reducing the residual floodplain along Sunland Avenue.
No benefit to the Buckeye Feeder Canal.

Effect on Residual Floodplain:
Alternative A1 would only slightly reduce the existing floodplain just west of 91st Avenue. There is very little benefit nearing 99th Avenue and further west. The local runoff within each drainage subarea is large enough to create a floodplain in low-lying areas such as the Sunland Avenue alignment without adequate conveyance along the main flow path. The greatest benefit is to the proposed Tres Rios Regulating Wetland, which would then have less offsite runoff to handle.

Feasibility of Implementation:
Alternative A1 is consistent with the original Recommended Plan and can be implemented fairly easily. The major challenges are the crossing of the 114" ANPP effluent water pipe and the coordination (logistic and financial) with the U.S. Army Corps of Engineers for issues regarding the proposed Tres Rios project.

Impact on the Durango ADMP:
Since Alternative A1 is consistent with the original intent and objectives of the ADMP as specified in the Draft of the Recommended Design Report, the impact on the overall Master Plan will be negligible.

Alternative A2

Description:
Alternative A2 consists of a channel along the Sunland Avenue alignment, approximately ¼ mile north of Southern Avenue, between 91st Avenue and 99th Avenue. The intent of the channel is to capture runoff generated east of 91st and north of the channel and convey it west to eventually outfall into the Agua Fria River.

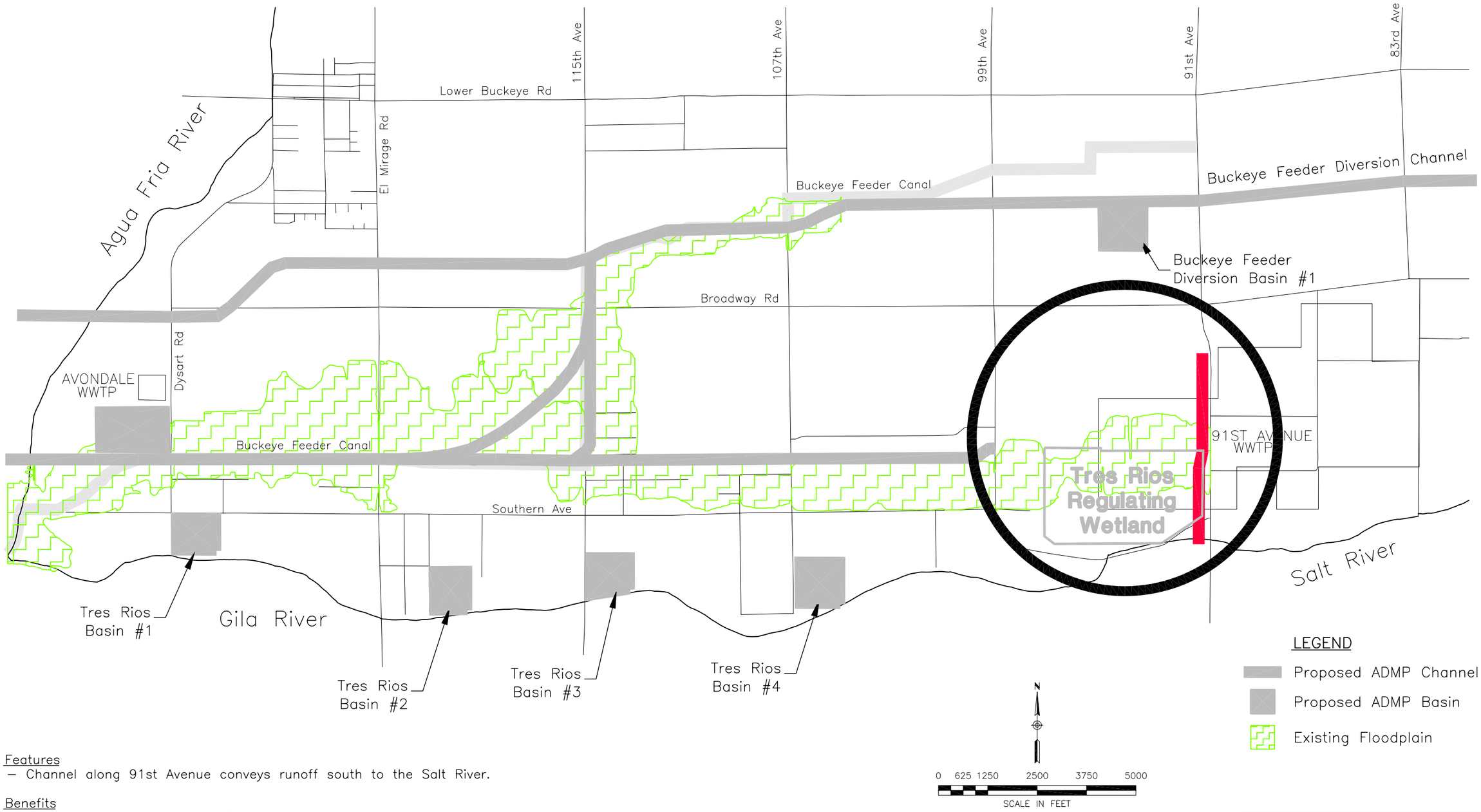
Advantages:
Efficiently conveys runoff to the west.
Fully protects the proposed Tres Rios Regulating Wetland from stormwater runoff.
Eliminates the Sunland Avenue floodplain between 91st Avenue and 99th Avenue.
Avoids potential conflict with 114" ANPP effluent line.

Disadvantages:
Higher cost than "Do-Nothing" Alternative

Effect on Residual Floodplain:
Alternative A2 eliminates the Sunland Avenue floodplain between 91st Avenue and 99th Avenue. In conjunction with a channel along the Sunland Avenue alignment to 115th Avenue, the Sunland Avenue tributary floodplain will be fully contained from 91st Avenue to 115th Avenue. This portion of the channel between 91st Avenue and 99th Avenue would remove approximately 9 homes from the floodplain.

Feasibility of Implementation:
Alternative A2 can be simply integrated into the Recommended Plan. This alternative ties into the upstream end of the Sunland Avenue channel. The major challenge of this alternative is the coordination (logistic and financial) with the U.S. Army Corps of Engineers for issues regarding the proposed Tres Rios project.

Impact on the Durango ADMP:
Alternative A2 is anticipated to be consistent with the original intent and objectives of the ADMP as specified in the Draft of the Recommended Design Report with respect to design criteria and multi-use considerations. The only deviation is the east-west alignment, which does not allow access to the Salt River versus a north-south alignment, which would allow access to the river.



Features
- Channel along 91st Avenue conveys runoff south to the Salt River.

Benefits
- Reduces peak flows west of 91st Avenue
- Slightly reduces floodplain between 91st Avenue and 99th Avenue
- Helps protect Tres Rios Regulating Wetland from stormwater runoff

OPTION SW–A1

PROJECT TITLE:
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PROJECT NO. FCD 99–41

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Agua Fria River

Lower Buckeye Rd

El Mirage Rd

115th Ave

107th Ave

99th Ave

91st Ave

83rd Ave

Buckeye Feeder Canal

Buckeye Feeder Diversion Channel

Buckeye Feeder Diversion Basin #1

Broadway Rd

Dysart Rd

AVONDALE WWTP

Buckeye Feeder Canal

91ST AVENUE WWTP

Tres Rios Regulating Wetland

Southern Ave

Salt River

Tres Rios Basin #1

Gila River

Tres Rios Basin #2

Tres Rios Basin #3

Tres Rios Basin #4

LEGEND

Proposed ADMP Channel

Proposed ADMP Basin

Existing Floodplain

N

0 625 1250 2500 3750 5000

SCALE IN FEET

Features

– Channel north of Tres Rios Regulating Wetland conveys runoff west to the Agua Fria River.

Benefits

– Eliminates floodplain between 91st Avenue and 99th Avenue

– Protects Tres Rios Regulating Wetland from stormwater runoff

OPTION SW–A2

PROJECT TITLE:
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Alternative A3

Description:
Alternative A3 is a "Do-Nothing" alternative for this portion of the study area. The 91st Avenue Channel as specified in the Draft of the Recommended Design Report would be removed from the exhibits and the preliminary design plans.

Advantages:
No cost to ADMP project.

Disadvantages:
USACE and Tres Rios Regulating Wetland have to consider local runoff.
Approximately 9 homes would still be prone to flooding.

Effect on Residual Floodplain:
Alternative A3 would have no effect on reducing the residual floodplain between 91st Avenue and 99th Avenue.

Feasibility of Implementation:
Alternative A3 is an easy alternative to implement, as there would be no construction project.
Approximately 9 homes may still be prone to flooding and would have to be handled on a regulatory basis.
The U.S. Army Corps of Engineers would have to consider the local runoff between 91st Avenue and 99th Avenue during the planning and design of the Tres Rios Regulating Wetland.

Impact on the Durango ADMP:
Impact on the ADMP would be minimal. The only change from the original intent and objectives of the ADMP is regarding providing access to the Salt River, which would no longer be available.

Agua Fria River

Lower Buckeye Rd

El Mirage Rd

115th Ave

107th Ave

99th Ave

91st Ave

83rd Ave

Buckeye Feeder Canal

Buckeye Feeder Diversion Channel

Buckeye Feeder Diversion Basin #1

Broadway Rd

Dysart Rd

AVONDALE WWTP

Buckeye Feeder Canal

91ST AVENUE WWTP

Tres Rios Regulating Wetland

Southern Ave

Salt River

Tres Rios Basin #1

Gila River

Tres Rios Basin #2

Tres Rios Basin #3

Tres Rios Basin #4

N

0 625 1250 2500 3750 5000

SCALE IN FEET

LEGEND

Proposed ADMP Channel

Proposed ADMP Basin

Existing Floodplain

Features

- Tres Rios Regulating Wetland accepts local stormwater runoff
- No channel between 91st Avenue and 99th Avenue

Benefits

- Lower cost

OPTION SW–A3

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12/12/01

115th Avenue Alternatives

Alternative B1

Description:
Alternative B1 consists of constructing a set of parallel channels from 115th Avenue to the outfall at the Agua Fria River. The north channel is consistent with the Recommended Plan as specified in the Draft of the Recommended Design Report. The south channel is required to convey flow west from the Sunland Avenue channel. The proposed alignment would replace the Buckeye Feeder Canal and put irrigation flows in a pipe.

Advantages:
Eliminates the floodplain along the Buckeye Feeder Canal.
Smaller channel size because of parallel system.
Provides multiple facilities for regional drainage for developers.

Disadvantages:
Multiple channels typically more costly because of land acquisition cost.
Berms would be required along channel banks, depending on outfall solution, which would create an interior drainage issue.
Multiple outfalls into Agua Fria River.

Effect on Residual Floodplain:
Alternative B1 would eliminate the floodplain along the Buckeye Feeder Canal from 115th Avenue to the Agua Fria River. The residual floodplain would be significantly reduced along 115th Avenue.

Feasibility of Implementation:
Alternative B1 may require berms along the channel banks to prevent flooding from the backwater effect of the Agua Fria River. The need for berms is discussed in detail in the outfall alternatives descriptions.

This alternative may not be the most efficient solution in terms of cost effectiveness due to the high expense of acquiring land.

Impact on the Durango ADMP:
Alternative B1 would be consistent with the original intent and objective of the ADMP as specified in the Draft of the Recommended Design Report with respect to design criteria and multi-use considerations.

Alternative B2a

Description:
Alternative B2a consists of modifying the original channel of the Recommended Plan as specified in the Draft of the Recommended Design Report to turn south along the east side of 115th Avenue, and then follow the Buckeye Feeder Canal alignment west to the Agua Fria River. Irrigation flows would be tiled. The proposed Sunland Avenue channel would connect to the proposed main channel at 115th Avenue, ¼ mile north of Southern Avenue. The intent of the channel is to provide a single conveyance facility to efficiently provide flood relief.

Advantages:
Efficient conveyance of stormwater from throughout the region.
Eliminates floodplain along 115th Avenue.
Eliminates floodplain along Buckeye Feeder Canal.
Lower overall cost compared to parallel system.

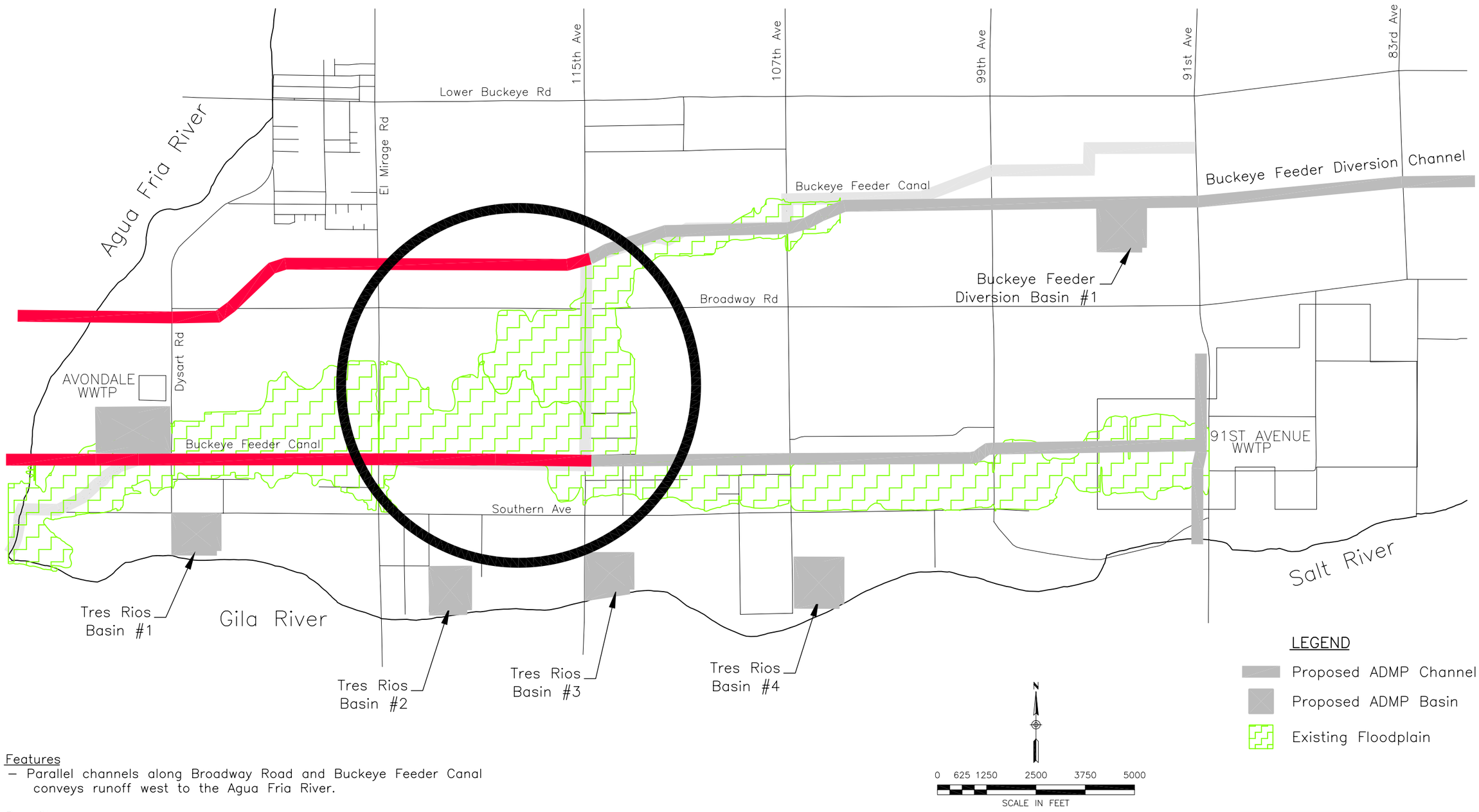
Disadvantages:
Berms may be required along channel banks, depending on outfall solution (Same as Alternative B1).
Steep slope along 115th Avenue may require hard channel lining.
May impact some homes and businesses along 115th Avenue depending on size of channel.

Effect on Residual Floodplain:
Alternative B2a would eliminate the floodplain along 115th Avenue and along the Buckeye Feeder Canal from 115th Avenue to the Agua Fria River.

Feasibility of Implementation:
Alternative B2a will require a more detailed investigation regarding constructing a channel along 115th Avenue. Topographically, the ideal alignment is along the east side of the road, however there are a number of homes as well as a dairy operation that may require modifications.

This alternative is efficient, considering the need for a channel along the Sunland Avenue alignment which could easily connect at the corner of the alignment.

Impact on the Durango ADMP:
Alternative B2a would be a significant modification to the original intent and objective of the ADMP as specified in the Draft of the Recommended Design Report with respect to design criteria and multi-use considerations. The likely need for a hard channel lining is inconsistent with providing a more kind and gentle facility for use in conjunction with other activities. However, a trail could still be built along the channel, though the aesthetic value of a hard-lined channel is low.



LEGEND

- Proposed ADMP Channel
- Proposed ADMP Basin
- Existing Floodplain

Features

- Parallel channels along Broadway Road and Buckeye Feeder Canal conveys runoff west to the Agua Fria River.

Benefits

- Eliminates floodplain along Buckeye Feeder Canal
- Smaller channel size because of parallel system

OPTION SW–B1

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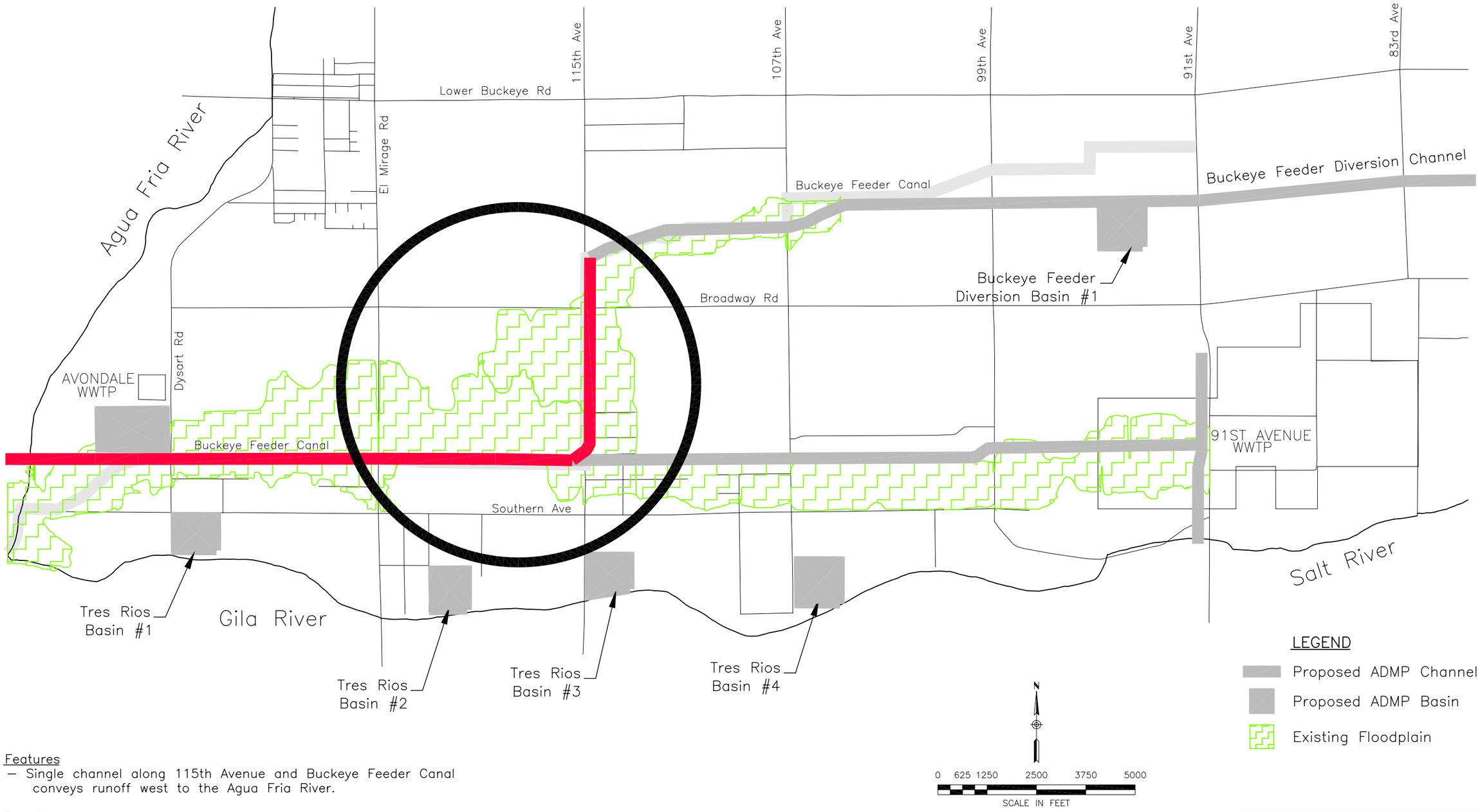

Features
- Single channel along 115th Avenue and Buckeye Feeder Canal conveys runoff west to the Agua Fria River.

Benefits
- Eliminates floodplain along 115th Avenue and along Buckeye Feeder Canal
- Lower overall cost compared to parallel system

OPTION SW–B2a

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Alternative B2b

Description:
Alternative B2b is identical to Alternative B2a with the exception that the channel would deviate from 115th Avenue in a curvilinear alignment and get back to the Buckeye Feeder Canal alignment just east of El Mirage Road. Irrigation flows would still need to be tiled. The proposed Sunland Avenue channel would connect to the proposed main channel approximately ¼ mile east of El Mirage Road, ¼ mile north of Southern Avenue. The intent of the channel is to provide a single conveyance facility to efficiently provide flood relief.

Advantages:
Kinder and gentler curvilinear alignment.
May not require hard channel lining.
Eliminates floodplain along 115th Avenue.
Eliminates floodplain along Buckeye Feeder Canal.
Lower overall cost compared to parallel system.

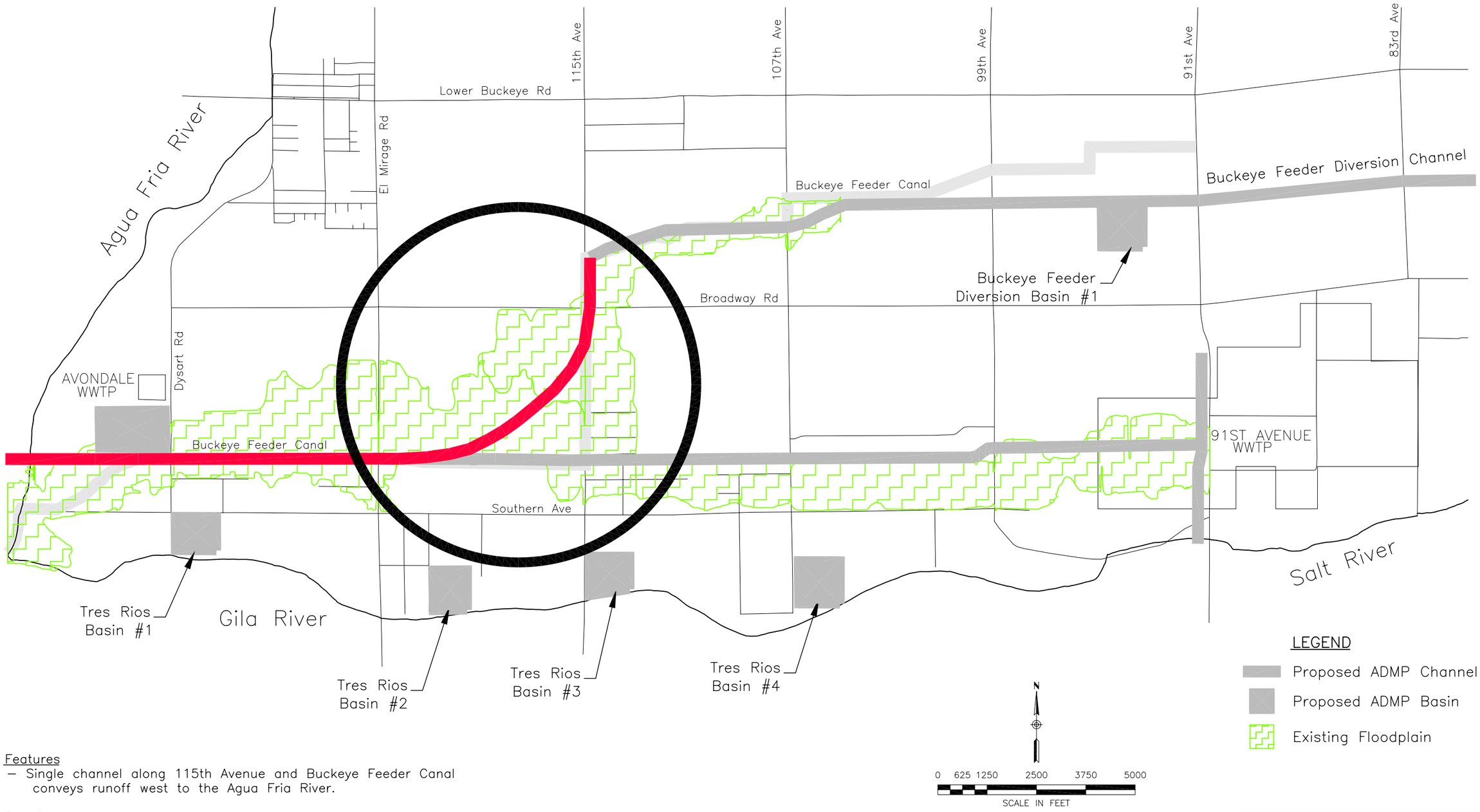
Disadvantages:
Berms may be required along channel banks, depending on outfall solution.

Effect on Residual Floodplain:
Alternative B2b would eliminate the floodplain along 115th Avenue and along the Buckeye Feeder Canal from 115th Avenue to the Agua Fria River.

Feasibility of Implementation:
Alternative B2b will require a more detailed investigation regarding constructing a channel along 115th Avenue and curvilinear through the existing farm field. There are a number of homes as well as a dairy operation that may require modifications.

This alternative is efficient in conveying runoff from the region to the outfall in the Agua Fria River.

Impact on the Durango ADMP:
Assuming a hard channel lining would not be required, Alternative B2b would be consistent with the original intent and objective of the ADMP as specified in the Draft of the Recommended Design Report with respect to design criteria and multi-use considerations.



Features
- Single channel along 115th Avenue and Buckeye Feeder Canal conveys runoff west to the Agua Fria River.

Benefits
- Eliminates floodplain along 115th Avenue and along Buckeye Feeder Canal
- Lower overall cost compared to parallel system
- Curvilinear alignment

OPTION SW–B2b

PROJECT TITLE:
DURANGO AREA DRAINAGE MASTER PLAN
PROJECT NO. FCD 99–41

CONSULTANT:
DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
Since 1962

EXHIBIT TITLE:
SOUTHWEST AREA ALTERNATIVES
12/12/01

Outfall Alternatives

Alternative C1

Description:
Alternative C1 can be constructed in conjunction with any of the other alternatives and consists of an outfall(s) discharging directly into the Agua Fria River. The channel alignment(s) would be along Broadway Road and along the Buckeye Feeder Canal, or only along the Buckeye Feeder Canal. If Alternative B1 is selected, parallel outfalls to the Agua Fria River are required. If Alternative B2a or B2b is selected, only a single outfall is required. No retention near the outfall is intended as part of this alternative.

Advantages:
Lower land cost without retention.
Simple coordination

Disadvantages:
Berms required along channel banks.

Effect on Residual Floodplain:
This alternative, as well as Alternative C2 and Alternative C3 provide an outfall solution for Alternatives B1, B2a, and B2b. The residual floodplain is directly affected by the selection of Alternative B1, B2a, or B2b. As such, this alternative has no independent effect on the residual floodplain. However, because of the berms required on the channels, a small floodplain may still exist due to ponding along the channels and would need to be delineated and regulated.

Feasibility of Implementation:
Alternative C1 would require berms along the channel banks to prevent flooding from the backwater effect of the Agua Fria River. The berms would extend back to 115th Avenue on the south channel (Alt B1, B2a, or B2b) and back to El Mirage Road on the north channel (Alt B1). When berms are constructed, additional consideration needs to be given to handling local drainage behind the berms.

Impact on the Durango ADMP:
Alternative C1 would be consistent with the original intent and objective of the ADMP as specified in the Draft of the Recommended Design Report with respect to design criteria and multi-use considerations.

Alternative C2

Description:
Alternative C2 can be constructed in conjunction with either Alternative B2a or B2b and consists of an outfall which discharges directly into the Agua Fria River along with a retention basin to handle local drainage. The channel alignment would be along the Buckeye Feeder Canal while the retention basin would be west of Dysart Road in conjunction with a local sand and gravel pit. The purpose of the retention basin is to handle all of the local flow that would pond behind the berms of the proposed channel.

Advantages:
Provides a solution to handle local drainage behind berms.

Disadvantages:
Coordination / timing of the use of the retention basin with the sand and gravel operation.

Effect on Residual Floodplain:
This alternative, as well as Alternative C1 and Alternative C3 provide an outfall solution for Alternatives B1, B2a, and B2b. The residual floodplain is directly affected by the selection of Alternative B1, B2a, or B2b. As such, this alternative has no independent effect on the residual floodplain. However, because the retention basin handles local drainage and ponding caused by the berms no flooding due to ponding is anticipated.

Feasibility of Implementation:
Alternative C2 would still require berms along the channel banks to prevent flooding from the backwater effect of the Agua Fria River. The berms would extend back to 115th Avenue on the channel. When berms are constructed, additional consideration needs to be given to handling local drainage behind the berms. It is intended that a small swale or side channel north of the main proposed channel be constructed to convey local drainage to the retention basin.

Coordination with the owners of the sand and gravel operation will be required. Based on the excavation already completed in the sand and gravel pit, adequate storage volume currently exists.

Impact on the Durango ADMP:
Alternative C2 would be consistent with the original intent and objective of the ADMP as specified in the Draft of the Recommended Design Report with respect to design criteria and multi-use considerations.

Agua Fria River

Lower Buckeye Rd

El Mirage Rd

115th Ave

107th Ave

99th Ave

91st Ave

83rd Ave

Buckeye Feeder Canal

Buckeye Feeder Diversion Channel

Buckeye Feeder Diversion Basin #1

Broadway Rd

Dysart Rd

AVONDALE WWTP

Buckeye Feeder Canal

91ST AVENUE WWTP

Southern Ave

Salt River

Tres Rios Basin #1

Gila River

Tres Rios Basin #2

Tres Rios Basin #3

Tres Rios Basin #4

LEGEND

Proposed ADMP Channel

Proposed ADMP Basin

Existing Floodplain

N

0 625 1250 2500 3750 5000

SCALE IN FEET

Features

- Single or parallel channels convey runoff west to the Agua Fria River without use of retention for local runoff (to reduce ponding due to channel berming)

Benefits

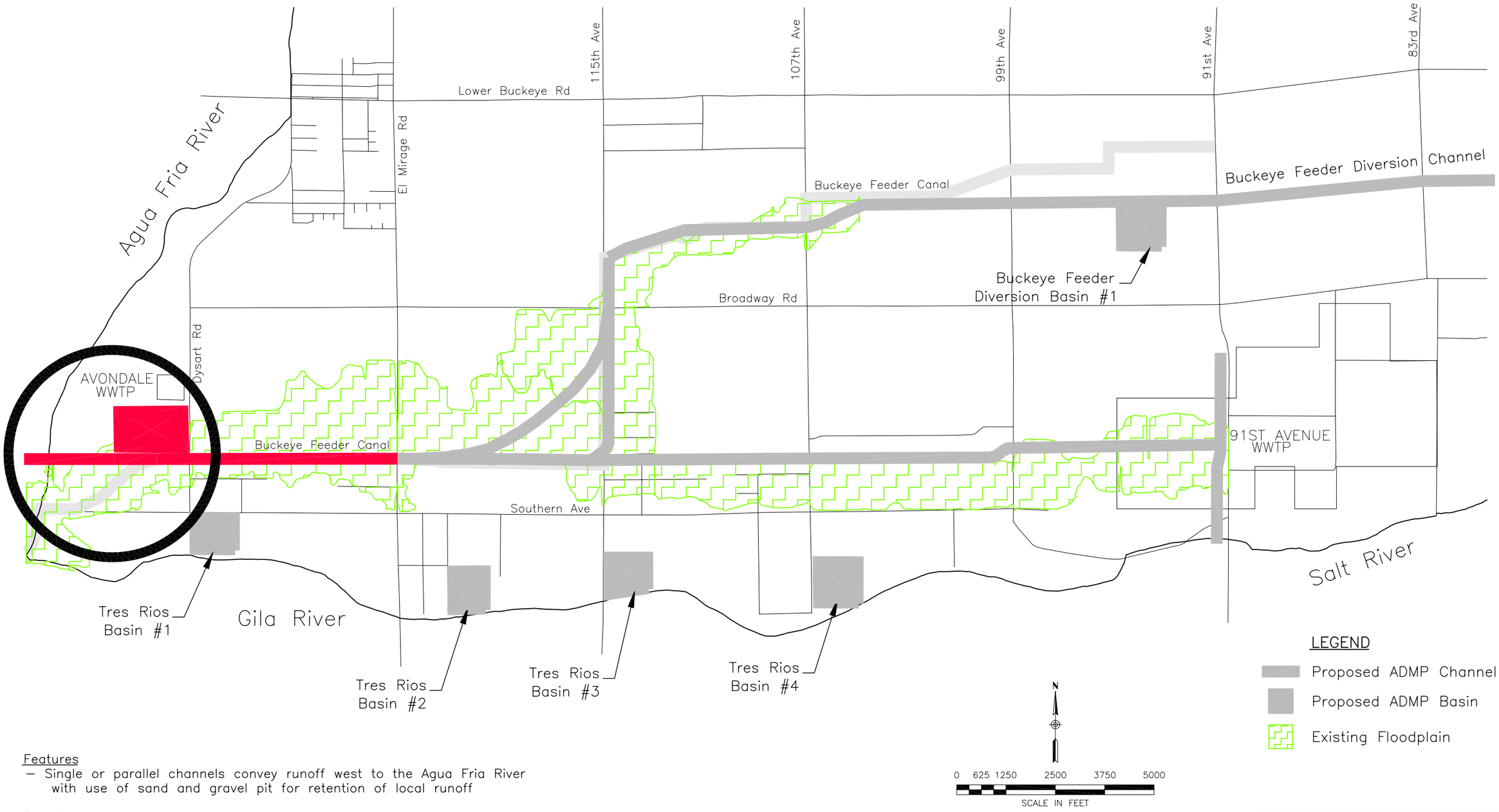
- Eliminates floodplain
- No major coordination with sand and gravel pit

OPTION SW–C1

PROJECT TITLE:
DURANGO AREA DRAINAGE MASTER PLAN
PROJECT NO. FCD 99–41

CONSULTANT:
DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
Since 1962

EXHIBIT TITLE:
SOUTHWEST AREA ALTERNATIVES
12/12/01



LEGEND

- Proposed ADMP Channel
- Proposed ADMP Basin
- Existing Floodplain

Features

- Single or parallel channels convey runoff west to the Agua Fria River with use of sand and gravel pit for retention of local runoff

Benefits

- Eliminates floodplain
- Eliminates local runoff ponding due to berming of outfall channel

OPTION SW–C2

PROJECT TITLE:
DURANGO AREA DRAINAGE MASTER PLAN
PROJECT NO. FCD 99–41

CONSULTANT:
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EXHIBIT TITLE:
SOUTHWEST AREA ALTERNATIVES
12/12/01

Alternative C3

Description:
Alternative C3 can be constructed in conjunction with either Alternative B2a or B2b and consists of a channel that would outfall directly into a retention basin while also handling local drainage. The channel alignment would be along the Buckeye Feeder Canal while the retention basin would be west of Dysart Road in conjunction with a local sand and gravel pit. The purpose of the retention basin is to handle all of the flow that would reach it from the conveyance channel and then slowly release the runoff over a period of time.

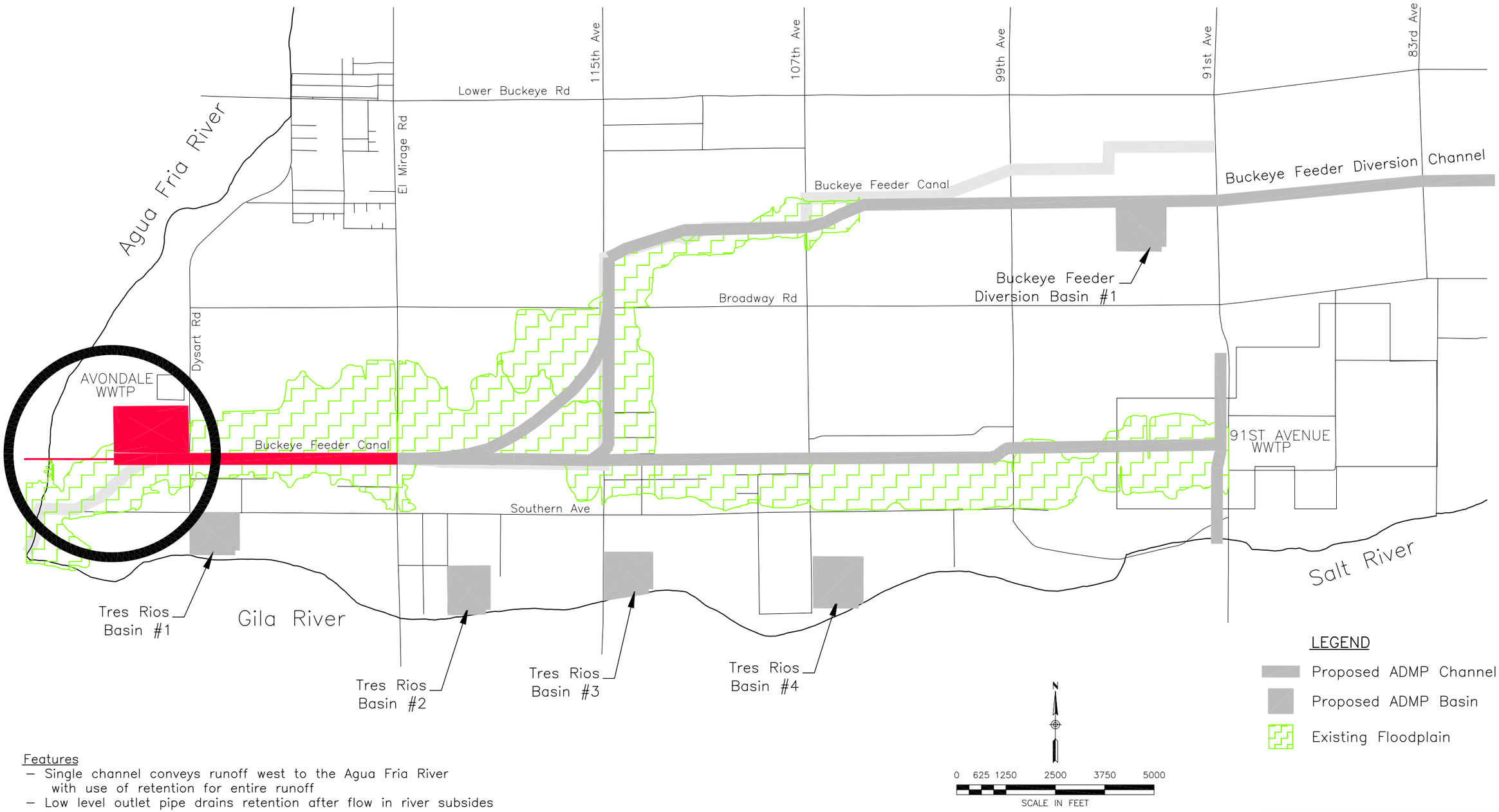
Advantages:
No berms required along channel banks.

Disadvantages:
Coordination / timing of the use of the retention basin with the sand and gravel operation.
Pumping may be required to fully drain the retention basin.

Effect on Residual Floodplain:
This alternative, as well as Alternative C1 and Alternative C2 provide an outfall solution for Alternatives B1, B2a, and B2b. The residual floodplain is directly affected by the selection of Alternative B1, B2a, or B2b. As such, this alternative has no independent effect on the residual floodplain. However, because no berms are required on the channels, no flooding due to ponding is anticipated.

Feasibility of Implementation:
Alternative C2 would not require berms along the channel banks and would be easily constructed. Only a small pipe outlet would be required to drain the retention basin, possibly with the help of a pump. Based on the excavation already completed in the sand and gravel pit, adequate storage volume may not currently exist. However the ultimate excavation volume planned for the sand and gravel pit is far greater than the volume anticipated to store the stormwater runoff from the drainage area. Therefore coordination with the owner and analysis to determine when the pit will have adequate storage volume, will be required.

Impact on the Durango ADMP:
Alternative C3 would be consistent with the original intent and objective of the ADMP as specified in the Draft of the Recommended Design Report with respect to design criteria and multi-use considerations. The only change is in regard to an access point to the Agua Fria River, which would be eliminated with this option, however a trail could still be built for access to the river.



Features
- Single channel conveys runoff west to the Agua Fria River with use of retention for entire runoff
- Low level outlet pipe drains retention after flow in river subsides

Benefits
- Eliminates floodplain
- No berming of outfall channel required. No backwater effect from river.

OPTION SW–C3

PROJECT TITLE:
DURANGO AREA DRAINAGE MASTER PLAN
PROJECT NO. FCD 99–41

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EXHIBIT TITLE:
SOUTHWEST AREA ALTERNATIVES
12/12/01

Brainstorming Meeting Alternatives

The following alternative consists of a combination of some of the previous "seed" alternatives as well as some new concepts as discussed at the brainstorming meeting. This alternative is designated with a 'D' and is described more as a complete drainage system (solution), rather than an analysis on an area-by-area basis.

Alternative D1

Description:
Alternative D1 consists of a single main channel mostly following the Buckeye Feeder Canal alignment with a small deviation west of 115th Ave to allow for property frontage by developers along 115th Avenue. Near the outfall at the Agua Fria River, the channel bends north into a proposed retention basin immediately west of the Avondale Wastewater Treatment Plant.

This alternative also includes a channel or storm drain along the Sunland Avenue alignment from 91st Avenue to El Mirage Road but instead with the capacity for a 10-year runoff event rather than a 100-year event. There is a small 10-acre piece of property owned by MCDOT at the northwest corner of 99th Avenue and Southern Avenue, which could possibly be used to retain a portion of the runoff along the Sunland Avenue alignment.

This alternative is similar in nature to Alternatives A2, B2b, and C3.

Advantages:
Efficiently conveys runoff to the west.
Fully protects the proposed Tres Rios Regulating Wetland from stormwater runoff.
Eliminates the Sunland Avenue floodplain between 91st Avenue and 99th Avenue.
Kinder and gentler curvilinear alignment.
May not require hard channel lining.
Eliminates floodplain along 115th Avenue.
Eliminates floodplain along Buckeye Feeder Canal.
Lower overall cost compared to parallel system.
No berms required along channel banks.

Disadvantages:
Turning channel north near outfall may be against the grade of the land.
May not fully eliminate Sunland Avenue floodplain.

Effect on Residual Floodplain:
Alternative D1 would eliminate the floodplain along the Buckeye Feeder Canal from 115th Avenue to the Agua Fria River. It would reduce the floodplain along 115th Avenue. The floodplain along the Sunland Avenue alignment would be significantly reduced.

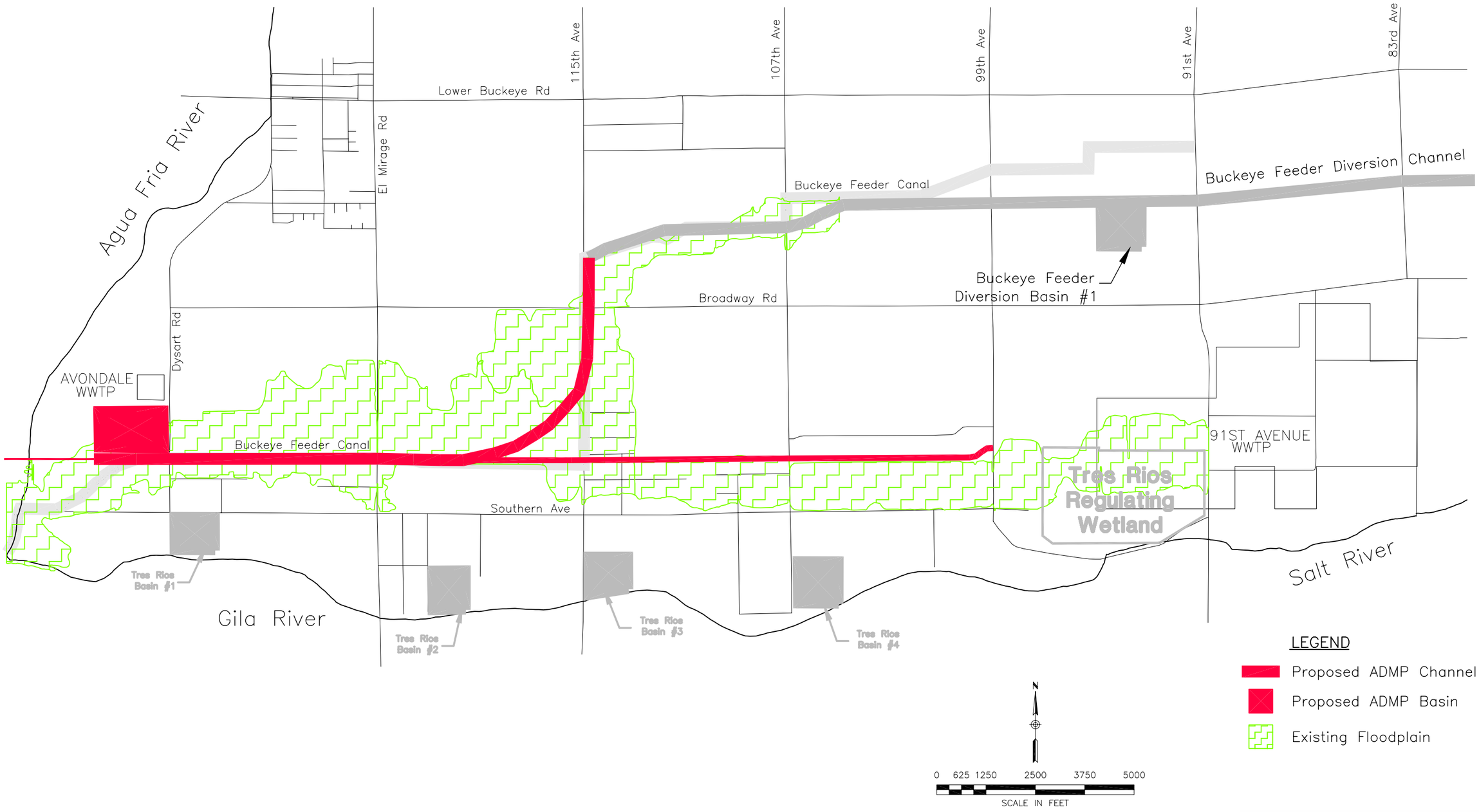
Feasibility of Implementation:
Alternative D1 will require a more detailed analysis regarding constructing a channel along 115th Avenue and curvilinear through the existing farm field. Alternative D1 would not require berms along the channel banks and would be easily constructed. Only a small pipe outlet would be required to drain the retention basin.

Impact on the Durango ADMP:
Impact on the ADMP would include the addition of plans for the retention basin, the Sunland Avenue system, and modifications to the existing plans due to the new channel location.

Additional Variations of Alternatives

1) Reconstruct 115th Avenue further to the west to allow room for a new channel on the east side of the roadway.

2) Variation of Alternative B2a consisting of a single main channel mostly following the Buckeye Feeder Canal alignment with a small deviation at the 111th Avenue alignment north of Broadway, to bring the channel approximately 1/3 mile south of Broadway Road and then west to cross 115th Avenue. This variation basically has the same advantages, disadvantages, residual floodplain issues, feasibility of implementation, and impact on the ADMP as Alternative B2a.



OPTION SW–D1

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DURANGO AREA DRAINAGE MASTER PLAN
PROJECT NO. FCD 99–41

CONSULTANT:
DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
Since 1962

EXHIBIT TITLE:
SOUTHWEST AREA ALTERNATIVES
02/05/02

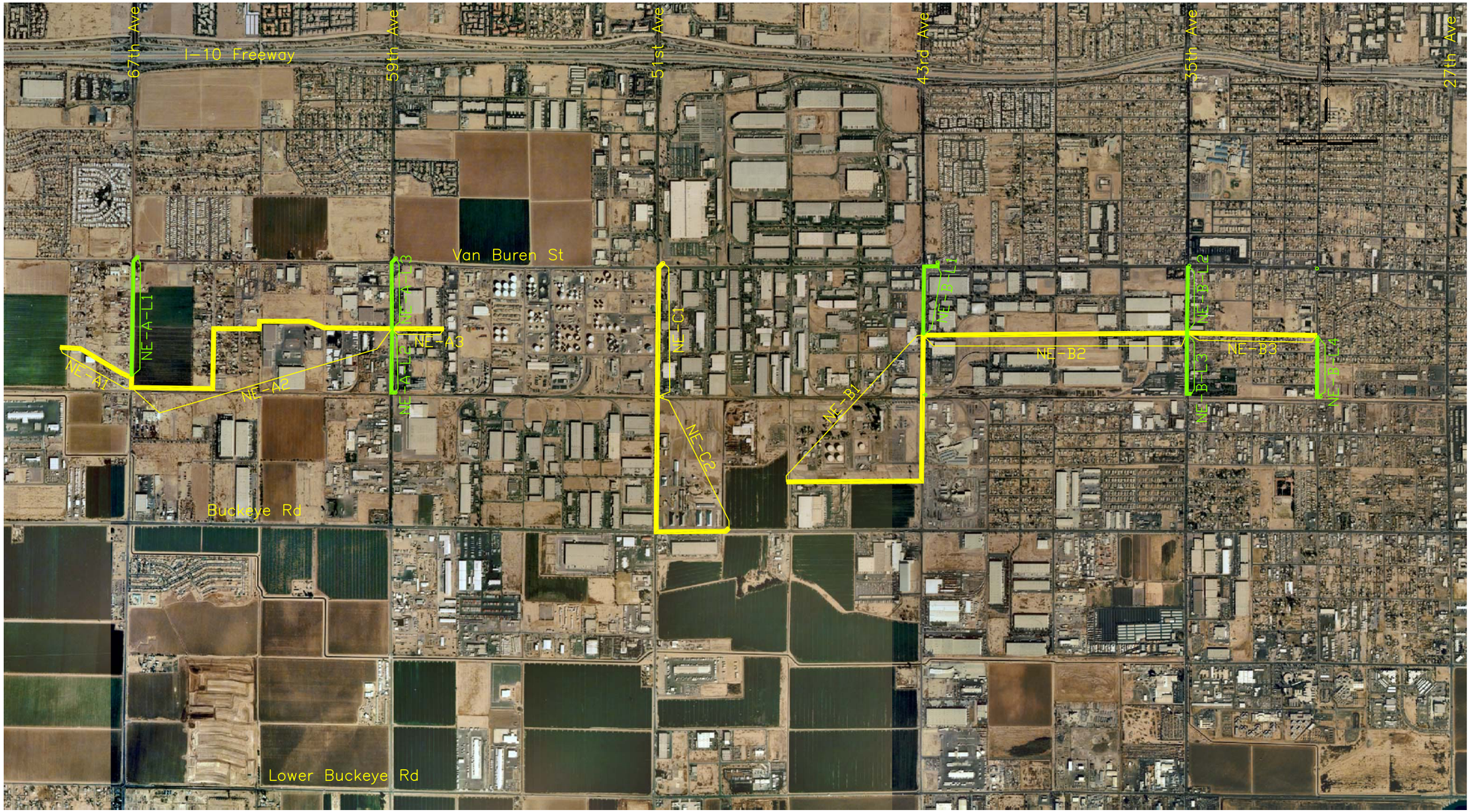
Results & Recommendations

The Review Committee chose a combination of the previously described alternatives for implementation into the overall Recommended Plan. The results can be seen on Figure V-1 of the Recommended Design Report. The following alternatives were selected and incorporated into the ADMP.

Area A	Alternative A3 – Do Nothing
Area B	Alternative B2b – With a slightly refined s-shape alignment
Area C	Alternative C3 – with a low level bypass

APPENDIX D

Northeast Area Alternatives Analysis



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PROJECT NO. FCD 99-41

CONSULTANT:
DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
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EXHIBIT TITLE:
NE AREA ALIGNMENTS
04/25/01

NorthEast Area Solution (10 Year Storm)

CHANNEL (BOX CULVERT STORM DRAIN) CAPACITIES AND COSTS

I.D.	Design Q (cfs)	Q (cfs)	Downstream Ground Elevation	Upstream Ground Elevation	Length (ft.)	Ground Slope (ft./ft.)	Design Invert Slope (ft./ft.)	Total Vertical Drop Difference(ft.)	No. of Drop Structures	Vertical Drop (ft.)	Material Type	Manning's "n" Value	Bottom Width (ft.)	Depth of Flow (ft.)	Sideslope (H:1)	Area of Flow (sf.)	Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Top Width (ft)	Proposed R/W Width (ft)
NE-A1	954	1005	1035.75	1039	1805	0.00180	0.00180	0.00	0	0.00	C	0.014	20	5.0	0	100.0	30.0	0.79	Sub	10.0	0.0	5.0	20	0
NE-A2	1029	1275	1039	1046	6540	0.00107	0.00110	-0.19	0	0.00	C	0.014	30	5.0	0	150.0	40.0	0.67	Sub	8.5	0.0	5.0	30	0
NE-A3	787	934	1046	1047	1040	0.00096	0.00100	-0.04	0	0.00	C	0.014	24	5.0	0	120.0	34.0	0.61	Sub	7.8	0.0	5.0	24	0
NE-A-L1	522	542	1037.5	1042	2415	0.00186	0.00190	-0.09	0	0.00	C	0.014	12	5.0	0	60.0	22.0	0.71	Sub	9.0	0.0	5.0	12	0
NE-A-L2	740	749	1046	1042	1360	-0.00294	0.00100	-5.36	0	0.00	C	0.014	20	5.0	0	100.0	30.0	0.59	Sub	7.5	0.0	5.0	20	0
NE-A-L3	476	672	1046	1048	1440	0.00139	0.00140	-0.02	0	0.00	C	0.014	16	5.0	0	80.0	26.0	0.66	Sub	8.4	0.0	5.0	16	0
NE-B1	1815	2206	1044	1053.5	5600	0.00170	0.00170	-0.02	0	0.00	C	0.014	40	5.0	0	200.0	50.0	0.87	Trans	11.0	0.0	5.0	40	0
NE-B2	1310	1310	1053.5	1058.8	5260	0.00101	0.00100	0.04	0	0.00	C	0.014	32	5.0	0	160.0	42.0	0.65	Sub	8.2	0.0	5.0	32	0
NE-B3	1065	1331	1058.8	1062	2580	0.00124	0.00120	0.10	0	0.00	C	0.014	30	5.0	0	150.0	40.0	0.70	Sub	8.9	0.0	5.0	30	0
NE-B-L1	717	862	1053.5	1057.5	1720	0.00233	0.00230	0.04	0	0.00	C	0.014	16	5.0	0	80.0	26.0	0.85	Trans	10.8	0.0	5.0	16	0
NE-B-L2	695	898	1058.8	1062.1	1345	0.00245	0.00250	-0.06	0	0.00	C	0.014	16	5.0	0	80.0	26.0	0.88	Trans	11.2	0.0	5.0	16	0
NE-B-L3	267	309	1058.8	1056	1305	-0.00215	0.00100	-4.10	0	0.00	C	0.014	10	5.0	0	50.0	20.0	0.49	Sub	6.2	0.0	5.0	10	0
NE-B-L4	1065	1215	1062	1060	1300	-0.00154	0.00100	-3.30	0	0.00	C	0.014	30	5.0	0	150.0	40.0	0.64	Sub	8.1	0.0	5.0	30	0
NE-C1	696	898	1053	1057	2705	0.00148	0.00250	-2.76	0	0.00	C	0.014	16	5.0	0	80.0	26.0	0.88	Trans	11.2	0.0	5.0	16	0
NE-C2	1108	1184	1040	1053	4180	0.00311	0.00250	2.55	0	0.00	C	0.014	20	5.0	0	100.0	30.0	0.93	Trans	11.8	0.0	5.0	20	0

I.D.	Excavated Volume (cy)	Unit Cost ($/cy)	Excavation Cost	Length (ft.)	Unit Cost ($/ft)	Storm Drain Cost	Fence Length (ft.)	Unit Cost ($/ft)	Fence Cost	Riprap Volume (cy)	Unit Cost ($/cy)	Riprap Cost	Landscape Restoration (sf)	Unit Cost ($/sf)	Landscape Cost
NE-A1	8925	$3	$26,774	1805	$1,050	$1,895,250	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-A2	46870	$3	$140,610	6540	$1,500	$9,810,000	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-A3	6067	$3	$18,200	1040	$1,400	$1,456,000	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-A-L1	7648	$3	$22,943	2415	$650	$1,569,750	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-A-L2	6724	$3	$20,173	1360	$1,050	$1,428,000	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-A-L3	5840	$3	$17,520	1440	$800	$1,152,000	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-B1	52578	$3	$157,733	5600	$1,900	$10,640,000	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-B2	40034	$3	$120,103	5260	$1,600	$8,416,000	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-B3	18490	$3	$55,470	2580	$1,500	$3,870,000	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-B-L1	6976	$3	$20,927	1720	$800	$1,376,000	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-B-L2	5455	$3	$16,364	1345	$800	$1,076,000	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-B-L3	3553	$3	$10,658	1305	$650	$848,250	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-B-L4	9317	$3	$27,950	1300	$1,500	$1,950,000	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-C1	10970	$3	$32,911	2705	$800	$2,164,000	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-C2	20668	$3	$62,003	4180	$1,050	$4,389,000	0	$0	$0	0	$0	$0	0	$0.00	$0

I.D.	Required Land Acquisition (Ac.)	Zoning	Unit Cost ($/sf)	Land Acquisition Cost	Total Construction Cost	Landscape Cost	Subtotal Const. Land Acq. Landscape Costs	30% Const. Contingency	Total
NE-A1	0.0	Public Street	$0.00	$0	$1,922,024	$0	$1,922,024	$576,607	$2,498,631
NE-A2	0.0	Public Street	$0.00	$0	$9,950,610	$0	$9,950,610	$2,985,183	$12,935,793
NE-A3	0.0	Public Street	$0.00	$0	$1,474,200	$0	$1,474,200	$442,260	$1,916,460
NE-A-L1	0.0	Public Street	$0.00	$0	$1,592,693	$0	$1,592,693	$477,808	$2,070,500
NE-A-L2	0.0	Public Street	$0.00	$0	$1,448,173	$0	$1,448,173	$434,452	$1,882,625
NE-A-L3	0.0	Public Street	$0.00	$0	$1,169,520	$0	$1,169,520	$350,856	$1,520,376
NE-B1	0.0	Public Street	$0.00	$0	$10,797,733	$0	$10,797,733	$3,239,320	$14,037,053
NE-B2	0.0	Public Street	$0.00	$0	$8,536,103	$0	$8,536,103	$2,560,831	$11,096,934
NE-B3	0.0	Public Street	$0.00	$0	$3,925,470	$0	$3,925,470	$1,177,641	$5,103,111
NE-B-L1	0.0	Public Street	$0.00	$0	$1,396,927	$0	$1,396,927	$419,078	$1,816,005
NE-B-L2	0.0	Public Street	$0.00	$0	$1,092,364	$0	$1,092,364	$327,709	$1,420,073
NE-B-L3	0.0	Public Street	$0.00	$0	$858,908	$0	$858,908	$257,672	$1,116,580
NE-B-L4	0.0	Public Street	$0.00	$0	$1,977,950	$0	$1,977,950	$593,385	$2,571,335
NE-C1	0.0	Public Street	$0.00	$0	$2,196,911	$0	$2,196,911	$659,073	$2,855,984
NE-C2	0.0	Public Street	$0.00	$0	$4,451,003	$0	$4,451,003	$1,335,301	$5,786,304

TOTALS (Not Including Contingencies)	**0.0**	**$0**	**$52,790,589**	**$0**	**$52,790,589**	
TOTAL CONTINGENCIES						**$15,837,177**
GRAND TOTAL (NE Area - 10 yr)						**$68,627,766**

* NOTE: 30% Contingency is only applied to the Total Construction Cost

NorthEast Area Solution (50 Year Storm)

CHANNEL (BOX CULVERT STORM DRAIN) CAPACITIES AND COSTS

I.D.	Design Q (cfs)	Q (cfs)	Downstream Ground Elevation	Upstream Ground Elevation	Length (ft.)	Ground Slope (ft./ft.)	Design Invert Slope (ft./ft.)	Total Vertical Drop Difference(ft.)	No. of Drop Structures	Vertical Drop (ft.)	Material Type	Manning's "n" Value	Bottom Width (ft.)	Depth of Flow (ft.)	Sideslope (H:1)	Area of Flow (sf.)	Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Top Width (ft)	Proposed R/W Width (ft)
NE-A1	1079	1253	1035.75	1039	1805	0.00180	0.00180	0.00	0	0.00	C	0.014	24	5.0	0	120.0	34.0	0.82	Trans	10.4	0.0	5.0	24	0
NE-A2	1322	1374	1039	1046	6540	0.00107	0.00110	-0.19	0	0.00	C	0.014	32	5.0	0	160.0	42.0	0.68	Sub	8.6	0.0	5.0	32	0
NE-A3	1185	1215	1046	1047	1040	0.00096	0.00100	-0.04	0	0.00	C	0.014	30	5.0	0	150.0	40.0	0.64	Sub	8.1	0.0	5.0	30	0
NE-A-L1	777	783	1037.5	1042	2415	0.00186	0.00190	-0.09	0	0.00	C	0.014	16	5.0	0	80.0	26.0	0.77	Sub	9.8	0.0	5.0	16	0
NE-A-L2	1059	1215	1046	1042	1360	-0.00294	0.00100	-5.36	0	0.00	C	0.014	30	5.0	0	150.0	40.0	0.64	Sub	8.1	0.0	5.0	30	0
NE-A-L3	739	778	1046	1048	1440	0.00139	0.00140	-0.02	0	0.00	C	0.014	18	5.0	0	90.0	28.0	0.68	Sub	8.6	0.0	5.0	18	0
NE-B1	2730	2833	1044	1053.5	5600	0.00170	0.00170	-0.02	0	0.00	C	0.014	50	5.0	0	250.0	60.0	0.89	Trans	11.3	0.0	5.0	50	0
NE-B2	1978	2173	1053.5	1058.8	5260	0.00101	0.00100	0.04	0	0.00	C	0.014	50	5.0	0	250.0	60.0	0.68	Sub	8.7	0.0	5.0	50	0
NE-B3	1623	1853	1058.8	1062	2580	0.00124	0.00120	0.10	0	0.00	C	0.014	40	5.0	0	200.0	50.0	0.73	Sub	9.3	0.0	5.0	40	0
NE-B-L1	1047	1136	1053.5	1057.5	1720	0.00233	0.00230	0.04	0	0.00	C	0.014	20	5.0	0	100.0	30.0	0.90	Trans	11.4	0.0	5.0	20	0
NE-B-L2	1013	1040	1058.8	1062.1	1345	0.00245	0.00250	-0.06	0	0.00	C	0.014	18	5.0	0	90.0	28.0	0.91	Trans	11.6	0.0	5.0	18	0
NE-B-L3	406	568	1058.8	1056	1305	-0.00215	0.00100	-4.10	0	0.00	C	0.014	16	5.0	0	80.0	26.0	0.56	Sub	7.1	0.0	5.0	16	0
NE-B-L4	1623	1692	1062	1060	1300	-0.00154	0.00100	-3.30	0	0.00	C	0.014	40	5.0	0	200.0	50.0	0.67	Sub	8.5	0.0	5.0	40	0
NE-C1	1029	1040	1053	1057	2705	0.00148	0.00250	-2.76	0	0.00	C	0.014	18	5.0	0	90.0	28.0	0.91	Trans	11.6	0.0	5.0	18	0
NE-C2	1653	1921	1040	1053	4180	0.00311	0.00250	2.55	0	0.00	C	0.014	30	5.0	0	150.0	40.0	1.01	Trans	12.8	0.0	5.0	30	0

I.D.	Excavated Volume (cy)	Unit Cost ($/cy)	Excavation Cost	Length (ft.)	Unit Cost ($/ft)	Storm Drain Cost	Fence Length (ft.)	Unit Cost ($/lf)	Fence Cost	Riprap Volume (cy)	Unit Cost ($/cy)	Riprap Cost	Landscape Restoration (sf)	Unit Cost ($/sf)	Landscape Cost	Required Land Acquisition (Ac.)	Zoning	Unit Cost ($/sf)	Land Acquisition Cost	Total Construction Cost	Landscape Cost	Subtotal Const. Land Acq. Landscape Costs	30% Const. Contingency	Total
NE-A1	10529	$3	$31,588	1805	$1,400	$2,527,000	0	$0	$0	0	$0	$0	0	$0.00	$0	0.0	Public Street	$0.00	$0	$2,558,588	$0	$2,558,588	$767,576	$3,326,164
NE-A2	49777	$3	$149,330	6540	$1,600	$10,464,000	0	$0	$0	0	$0	$0	0	$0.00	$0	0.0	Public Street	$0.00	$0	$10,613,330	$0	$10,613,330	$3,183,999	$13,797,329
NE-A3	7453	$3	$22,360	1040	$1,500	$1,560,000	0	$0	$0	0	$0	$0	0	$0.00	$0	0.0	Public Street	$0.00	$0	$1,582,360	$0	$1,582,360	$474,708	$2,057,068
NE-A-L1	9794	$3	$29,383	2415	$800	$1,932,000	0	$0	$0	0	$0	$0	0	$0.00	$0	0.0	Public Street	$0.00	$0	$1,961,383	$0	$1,961,383	$588,415	$2,549,797
NE-A-L2	9747	$3	$29,240	1360	$1,500	$2,040,000	0	$0	$0	0	$0	$0	0	$0.00	$0	0.0	Public Street	$0.00	$0	$2,069,240	$0	$2,069,240	$620,772	$2,690,012
NE-A-L3	6480	$3	$19,440	1440	$950	$1,368,000	0	$0	$0	0	$0	$0	0	$0.00	$0	0.0	Public Street	$0.00	$0	$1,387,440	$0	$1,387,440	$416,232	$1,803,672
NE-B1	65022	$3	$195,067	5600	$2,400	$13,440,000	0	$0	$0	0	$0	$0	0	$0.00	$0	0.0	Public Street	$0.00	$0	$13,635,067	$0	$13,635,067	$4,090,520	$17,725,587
NE-B2	61074	$3	$183,223	5260	$2,400	$12,624,000	0	$0	$0	0	$0	$0	0	$0.00	$0	0.0	Public Street	$0.00	$0	$12,807,223	$0	$12,807,223	$3,842,167	$16,649,390
NE-B3	24223	$3	$72,670	2580	$1,900	$4,902,000	0	$0	$0	0	$0	$0	0	$0.00	$0	0.0	Public Street	$0.00	$0	$4,974,670	$0	$4,974,670	$1,492,401	$6,467,071
NE-B-L1	8504	$3	$25,513	1720	$1,050	$1,806,000	0	$0	$0	0	$0	$0	0	$0.00	$0	0.0	Public Street	$0.00	$0	$1,831,513	$0	$1,831,513	$549,454	$2,380,967
NE-B-L2	6053	$3	$18,158	1345	$950	$1,277,750	0	$0	$0	0	$0	$0	0	$0.00	$0	0.0	Public Street	$0.00	$0	$1,295,908	$0	$1,295,908	$388,772	$1,684,680
NE-B-L3	5293	$3	$15,878	1305	$800	$1,044,000	0	$0	$0	0	$0	$0	0	$0.00	$0	0.0	Public Street	$0.00	$0	$1,059,878	$0	$1,059,878	$317,963	$1,377,841
NE-B-L4	12206	$3	$36,617	1300	$1,900	$2,470,000	0	$0	$0	0	$0	$0	0	$0.00	$0	0.0	Public Street	$0.00	$0	$2,506,617	$0	$2,506,617	$751,985	$3,258,602
NE-C1	12173	$3	$36,518	2705	$950	$2,569,750	0	$0	$0	0	$0	$0	0	$0.00	$0	0.0	Public Street	$0.00	$0	$2,606,268	$0	$2,606,268	$781,880	$3,388,148
NE-C2	29957	$3	$89,870	4180	$1,500	$6,270,000	0	$0	$0	0	$0	$0	0	$0.00	$0	0.0	Public Street	$0.00	$0	$6,359,870	$0	$6,359,870	$1,907,961	$8,267,831

TOTALS (Not Including Contingencies)	**0.0**	**$0**	**$67,249,353**	**$0**	**$67,249,353**	
TOTAL CONTINGENCIES						**$20,174,806**
GRAND TOTAL (NE Area - 50 yr)						**$87,424,158**

* NOTE: 30% Contingency is only applied to the Total Construction Cost

NorthEast Area Solution (100 Year Storm)

CHANNEL (BOX CULVERT STORM DRAIN) CAPACITIES AND COSTS

I.D.	Design Q (cfs)	Q (cfs)	Downstream Ground Elevation	Upstream Ground Elevation	Length (ft.)	Ground Slope (ft./ft.)	Design Invert Slope (ft./ft.)	Total Vertical Drop Difference(ft.)	No. of Drop Structures	Vertical Drop (ft.)	Material Type	Manning's "n" Value	Bottom Width (ft.)	Depth of Flow (ft.)	Sideslope (H:1)	Area of Flow (sf.)	Perimeter (ft.)	Froude Number	Type of Flow	Velocity (fps)	Freeboard (ft.)	Design Depth (ft)	Top Width (ft)	Proposed R/W Width (ft)
NE-A1	1129	1253	1035.75	1039	1805	0.00180	0.00180	0.00	0	0.00	C	0.014	24	5.0	0	120.0	34.0	0.82	Trans	10.4	0.0	5.0	24	0
NE-A2	1418	1774	1039	1046	6540	0.00107	0.00110	-0.19	0	0.00	C	0.014	40	5.0	0	200.0	50.0	0.70	Sub	8.9	0.0	5.0	40	0
NE-A3	1362	1692	1046	1047	1040	0.00096	0.00100	-0.04	0	0.00	C	0.014	40	5.0	0	200.0	50.0	0.67	Sub	8.5	0.0	5.0	40	0
NE-A-L1	886	907	1037.5	1042	2415	0.00186	0.00190	-0.09	0	0.00	C	0.014	18	5.0	0	90.0	28.0	0.79	Sub	10.1	0.0	5.0	18	0
NE-A-L2	1195	1215	1046	1042	1360	-0.00294	0.00100	-5.36	0	0.00	C	0.014	30	5.0	0	150.0	40.0	0.64	Sub	8.1	0.0	5.0	30	0
NE-A-L3	863	886	1046	1048	1440	0.00139	0.00140	-0.02	0	0.00	C	0.014	20	5.0	0	100.0	30.0	0.70	Sub	8.9	0.0	5.0	20	0
NE-B1	3127	3211	1044	1053.5	5600	0.00170	0.00170	-0.02	0	0.00	C	0.014	56	5.0	0	280.0	66.0	0.90	Trans	11.5	0.0	5.0	56	0
NE-B2	2273	2463	1053.5	1058.8	5260	0.00101	0.00100	0.04	0	0.00	C	0.014	56	5.0	0	280.0	66.0	0.69	Sub	8.8	0.0	5.0	56	0
NE-B3	1877	2380	1058.8	1062	2580	0.00124	0.00120	0.10	0	0.00	C	0.014	50	5.0	0	250.0	60.0	0.75	Sub	9.5	0.0	5.0	50	0
NE-B-L1	1189	1416	1053.5	1057.5	1720	0.00233	0.00230	0.04	0	0.00	C	0.014	24	5.0	0	120.0	34.0	0.93	Trans	11.8	0.0	5.0	24	0
NE-B-L2	1148	1184	1058.8	1062.1	1345	0.00245	0.00250	-0.06	0	0.00	C	0.014	20	5.0	0	100.0	30.0	0.93	Trans	11.8	0.0	5.0	20	0
NE-B-L3	470	568	1058.8	1056	1305	-0.00215	0.00100	-4.10	0	0.00	C	0.014	16	5.0	0	80.0	26.0	0.56	Sub	7.1	0.0	5.0	16	0
NE-B-L4	1877	2173	1062	1060	1300	-0.00154	0.00100	-3.30	0	0.00	C	0.014	50	5.0	0	250.0	60.0	0.68	Sub	8.7	0.0	5.0	50	0
NE-C1	1180	1184	1053	1057	2705	0.00148	0.00250	-2.76	0	0.00	C	0.014	20	5.0	0	100.0	30.0	0.93	Trans	11.8	0.0	5.0	20	0
NE-C2	1892	1921	1040	1053	4180	0.00311	0.00250	2.55	0	0.00	C	0.014	30	5.0	0	150.0	40.0	1.01	Trans	12.8	0.0	5.0	30	0

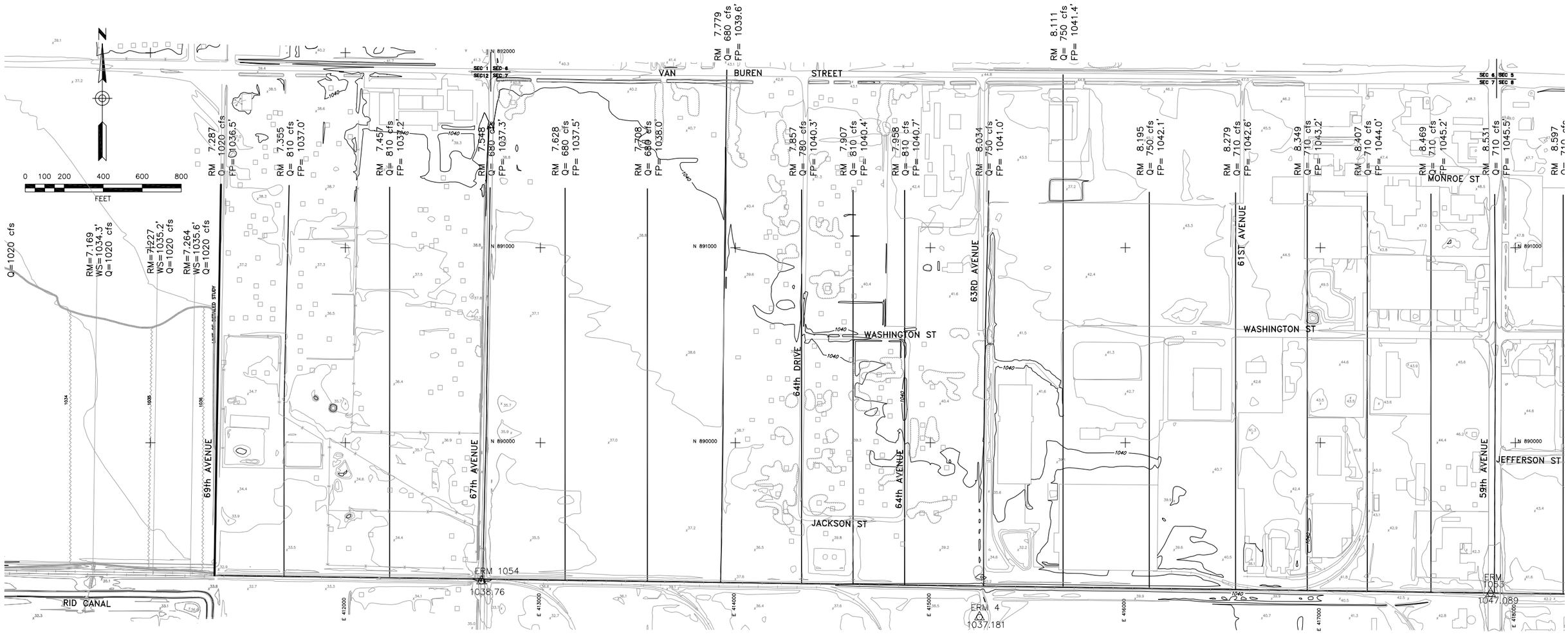
I.D.	Excavated Volume (cy)	Unit Cost ($/cy)	Excavation Cost	Length (ft.)	Unit Cost ($/ft)	Storm Drain Cost	Fence Length (ft.)	Unit Cost ($/lf)	Fence Cost	Riprap Volume (cy)	Unit Cost ($/cy)	Riprap Cost	Landscape Restoration (sf)	Unit Cost ($/sf)	Landscape Cost
NE-A1	10529	$3	$31,588	1805	$1,400	$2,527,000	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-A2	61403	$3	$184,210	6540	$1,900	$12,426,000	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-A3	9764	$3	$29,293	1040	$1,900	$1,976,000	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-A-L1	10868	$3	$32,603	2415	$950	$2,294,250	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-A-L2	9747	$3	$29,240	1360	$1,500	$2,040,000	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-A-L3	7120	$3	$21,360	1440	$1,050	$1,512,000	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-B1	72489	$3	$217,467	5600	$2,700	$15,120,000	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-B2	68088	$3	$204,263	5260	$2,700	$14,202,000	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-B3	29957	$3	$89,870	2580	$2,400	$6,192,000	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-B-L1	10033	$3	$30,100	1720	$1,400	$2,408,000	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-B-L2	6650	$3	$19,951	1345	$1,050	$1,412,250	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-B-L3	5293	$3	$15,878	1305	$800	$1,044,000	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-B-L4	15094	$3	$45,283	1300	$2,400	$3,120,000	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-C1	13375	$3	$40,124	2705	$1,050	$2,840,250	0	$0	$0	0	$0	$0	0	$0.00	$0
NE-C2	29957	$3	$89,870	4180	$1,500	$6,270,000	0	$0	$0	0	$0	$0	0	$0.00	$0

I.D.	Required Land Acquisition (Ac.)	Zoning	Unit Cost ($/sf)	Land Acquisition Cost	Total Construction Cost	Landscape Cost	Subtotal Const, Land Acq, Landscape Cost	30% Const. Contingency	Total
NE-A1	0.0	Public Street	$0.00	$0	$2,558,588	$0	$2,558,588	$767,576	$3,326,164
NE-A2	0.0	Public Street	$0.00	$0	$12,610,210	$0	$12,610,210	$3,783,063	$16,393,273
NE-A3	0.0	Public Street	$0.00	$0	$2,005,293	$0	$2,005,293	$601,588	$2,606,881
NE-A-L1	0.0	Public Street	$0.00	$0	$2,326,853	$0	$2,326,853	$698,056	$3,024,908
NE-A-L2	0.0	Public Street	$0.00	$0	$2,069,240	$0	$2,069,240	$620,772	$2,690,012
NE-A-L3	0.0	Public Street	$0.00	$0	$1,533,360	$0	$1,533,360	$460,008	$1,993,368
NE-B1	0.0	Public Street	$0.00	$0	$15,337,467	$0	$15,337,467	$4,601,240	$19,938,707
NE-B2	0.0	Public Street	$0.00	$0	$14,406,263	$0	$14,406,263	$4,321,879	$18,728,142
NE-B3	0.0	Public Street	$0.00	$0	$6,281,870	$0	$6,281,870	$1,884,561	$8,166,431
NE-B-L1	0.0	Public Street	$0.00	$0	$2,438,100	$0	$2,438,100	$731,430	$3,169,530
NE-B-L2	0.0	Public Street	$0.00	$0	$1,432,201	$0	$1,432,201	$429,660	$1,861,861
NE-B-L3	0.0	Public Street	$0.00	$0	$1,059,878	$0	$1,059,878	$317,963	$1,377,841
NE-B-L4	0.0	Public Street	$0.00	$0	$3,165,283	$0	$3,165,283	$949,585	$4,114,868
NE-C1	0.0	Public Street	$0.00	$0	$2,880,374	$0	$2,880,374	$864,112	$3,744,486
NE-C2	0.0	Public Street	$0.00	$0	$6,359,870	$0	$6,359,870	$1,907,961	$8,267,831
TOTALS (Not Including Contingencies)	**0.0**			**$0**	**$76,464,849**	**$0**	**$76,464,849**		
TOTAL CONTINGENCIES								**$22,939,455**	
GRAND TOTAL (NE Area - 100 yr)									**$99,404,304**

* NOTE: 30% Contingency is only applied to the Total Construction Cost

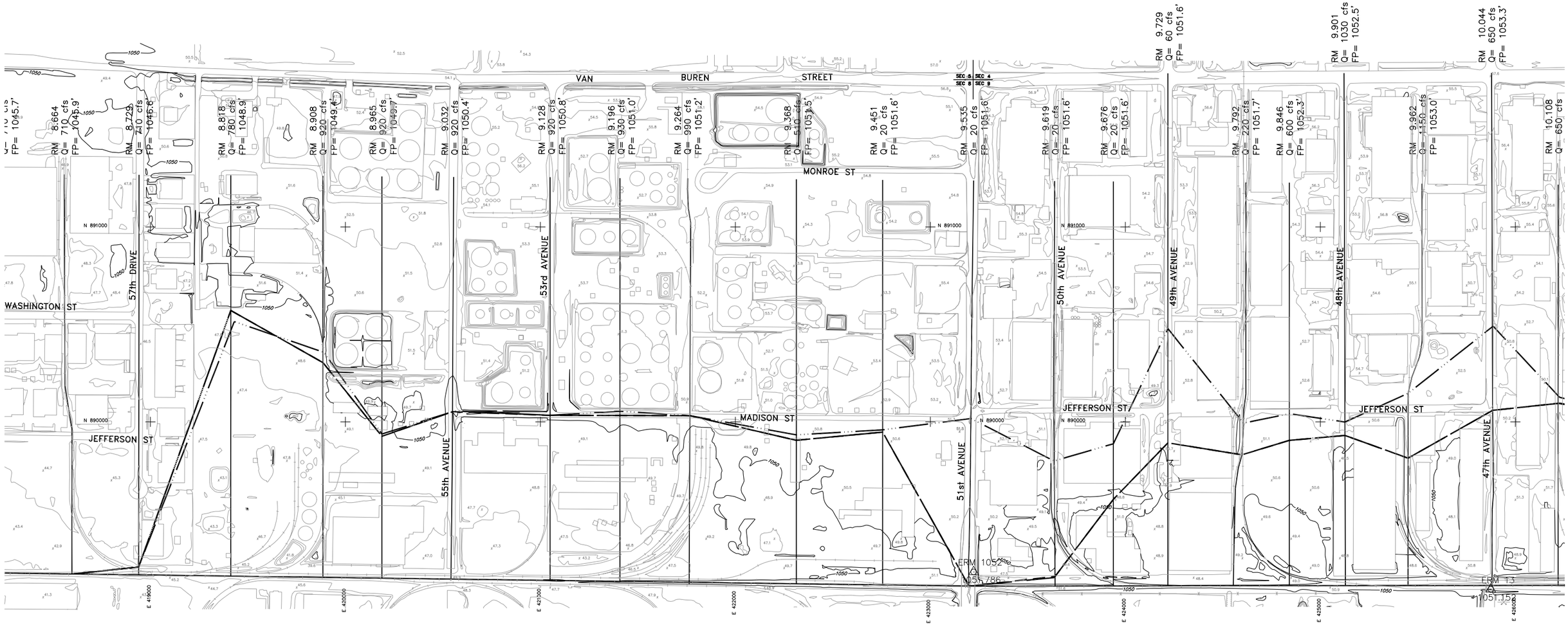
KEY

100 YR UNIMPROVED FLOODPLAIN
IMPROVED FLOODPLAIN – 100 YEAR DESIGN
IMPROVED FLOODPLAIN – 50 YEAR DESIGN
IMPROVED FLOODPLAIN – 10 YEAR DESIGN



KEY

100 YR UNIMPROVED FLOODPLAIN
IMPROVED FLOODPLAIN – 100 YEAR DESIGN
IMPROVED FLOODPLAIN – 50 YEAR DESIGN
IMPROVED FLOODPLAIN – 10 YEAR DESIGN



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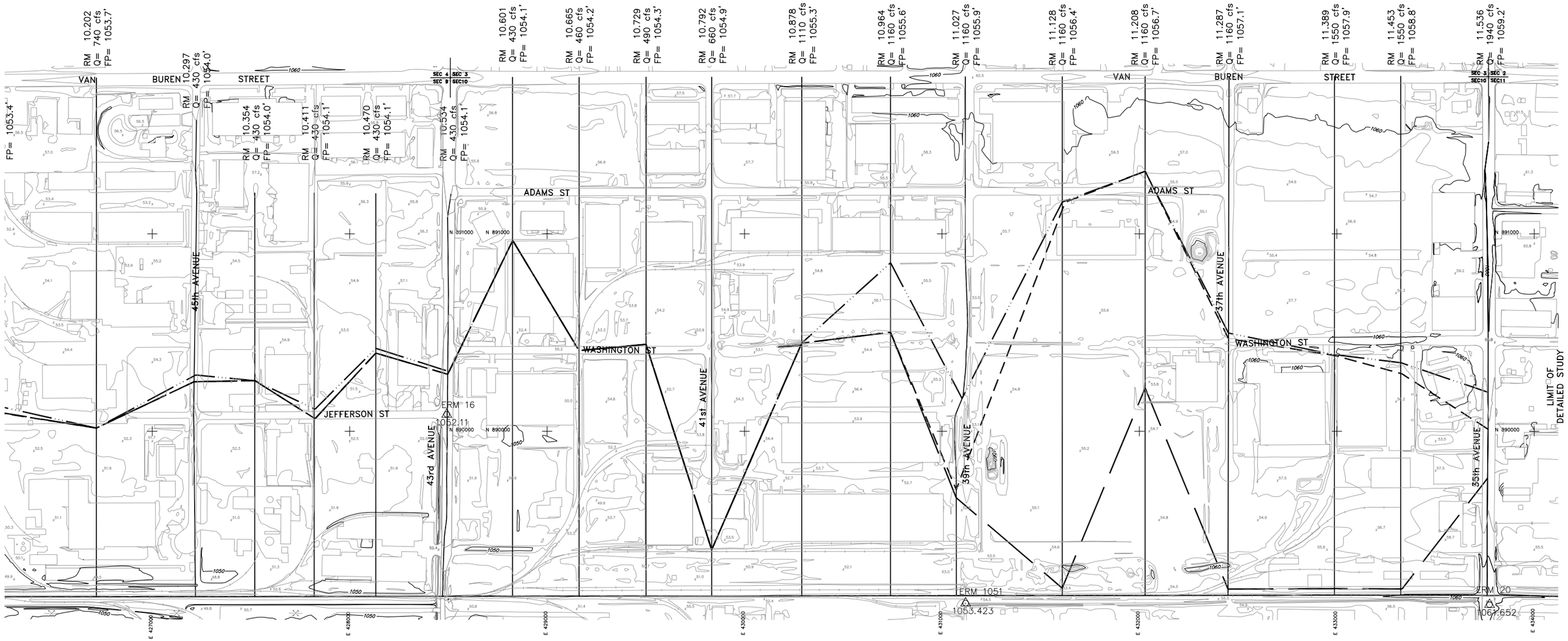
KEY

100 YR UNIMPROVED FLOODPLAIN
IMPROVED FLOODPLAIN – 100 YEAR DESIGN
IMPROVED FLOODPLAIN – 50 YEAR DESIGN
IMPROVED FLOODPLAIN – 10 YEAR DESIGN



DURANGO ADMP
FCD NO. 99–41

FLOODPLAIN DELINEATION OF THE UNION PACIFIC RAILROAD

DIBBLE & ASSOCIATES
FEBRUARY 2001

APPENDIX E

Tres Rios Interior Drainage Study

DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
Since 1962

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CIVIL ENGINEERING ■ Transportation ■ Airports ■ Drainage/Flood Control ■ Water Resources ■ Land Development ■ Surveying

MEMORANDUM

Date: October 2, 2000

To: Greg Jones, P.E., FCDMC

From: Brian Fry, P.E.

Subject: Durango ADMP
Tres Rios Interior Drainage

At the request of the Flood Control District of Maricopa County, Dibble & Associates has analyzed the interior drainage of the Durango ADMP study area as a result of the proposed Tres Rios levee by the US Army Corps of Engineers. The purpose of this mini-study is to determine the approximate size, location, and cost of retention basins to capture runoff from the 100 yr-24 hr design storm that would tend to pond and cause local flooding along the north side of the proposed levee, assuming that the recommended alternative of the Durango ADMP is not constructed. The results of this study will be incorporated into the recommended plan for the Durango ADMP.

Two options are evaluated for this study. The first option is a single retention basin at the west end of the proposed levee which will retain flow from all contributing drainage areas until it is safe to release them into the Gila River **(See Figure 1)**. This option also includes several concrete box culverts under the major roadways and are needed to convey runoff to the single retention basin. A single levee penetration will be required to drain the retention basin after the flood has passed. The second option is a series of four separate retention basins along the north side of the proposed levee which would retain flow from each of their individual contributing drainage areas **(See Figure 2)**. Culverts are not required for this option, however a levee penetration will be required at each location to drain the retention basin after the flood has passed. The drainage sub-basins for the Durango ADMP study area are shown on **Figure 3**.

Most of the natural runoff north of Southern Ave flows to the west via the Buckeye Feeder Canal alignment. As such, the only drainage areas that contribute to ponding behind the proposed levee, are AA, BA, BB, AB, AC, and AD. Therefore the recommended alternative from the Durango ADMP will have no effect in relieving any interior drainage issues associated with the proposed Tres Rios levee.

The approximate cost of the two options is summarized in the table below. The full cost analysis is included at the back of this memorandum.

	Land Acq. Cost	Construction Cost	Landscape Cost	Subtotal	30% Contingency	Total Cost
Option 1	$1,924,262	$2,041,640	$3,498,657	$7,464,559	$612,492	**$8,383,136**
Option 2	$1,599,780	$2,125,677	$2,908,690	$6,634,147	$637,703	**$7,271,850**

One issue that is associated with the proposed Tres Rios levee is the possibility of flood water from both the Agua Fria and Gila River flanking the end of the levee. Based on the FEMA floodplain for the Agua

Fria River it was determined that the end of the levee was outside of the existing floodplain. On the Gila River, the floodplain elevation near the end of levee is approximately equal to the existing ground elevation and no flanking would be expected. However, the flood water could potentially back up into the existing Buckeye Feeder Canal. If this scenario were to happen at the same time as a flood in the Durango ADMP study area, the natural runoff from the study area would not be able to outfall, and flooding would occur when the capacity of the existing Buckeye Feeder Canal was exceeded.

LEGEND

- New Detention Basin
- XXX-B# New Detention Basin Identifier
- New Concrete Box Culvert
- XXX-C# New Concrete Box Culvert Identifier

FIGURE 1

PROJECT TITLE:
DURANGO AREA DRAINAGE MASTER PLAN
PROJECT NO. FCD 99-41

CONSULTANT:
DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
Since 1962

EXHIBIT TITLE:
Tres Rios Interior Drainage
Option 1

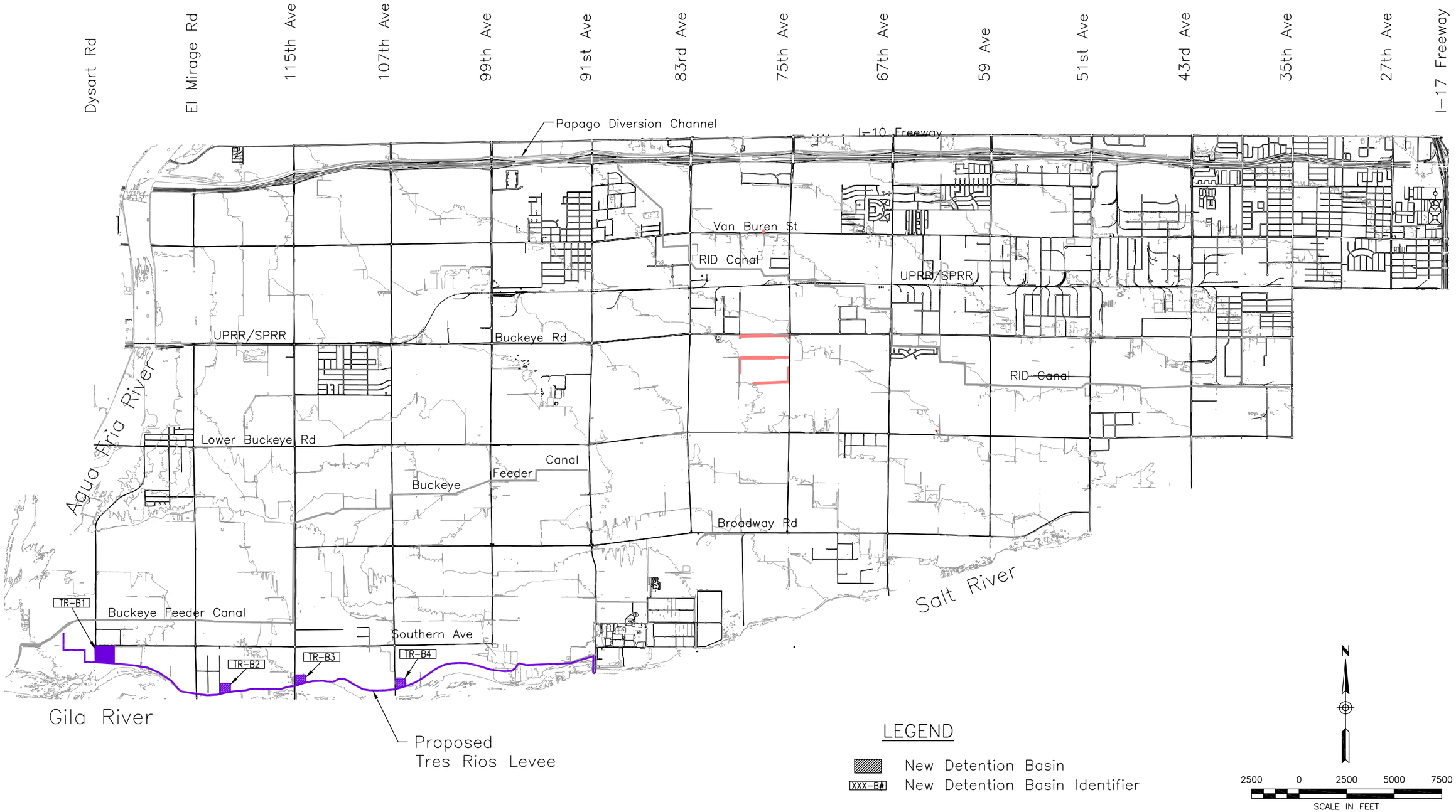


FIGURE 2

PROJECT TITLE:
DURANGO AREA DRAINAGE MASTER PLAN
PROJECT NO. FCD 99-41

CONSULTANT:
DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
Since 1962

EXHIBIT TITLE:
Tres Rios Interior Drainage
Option 2

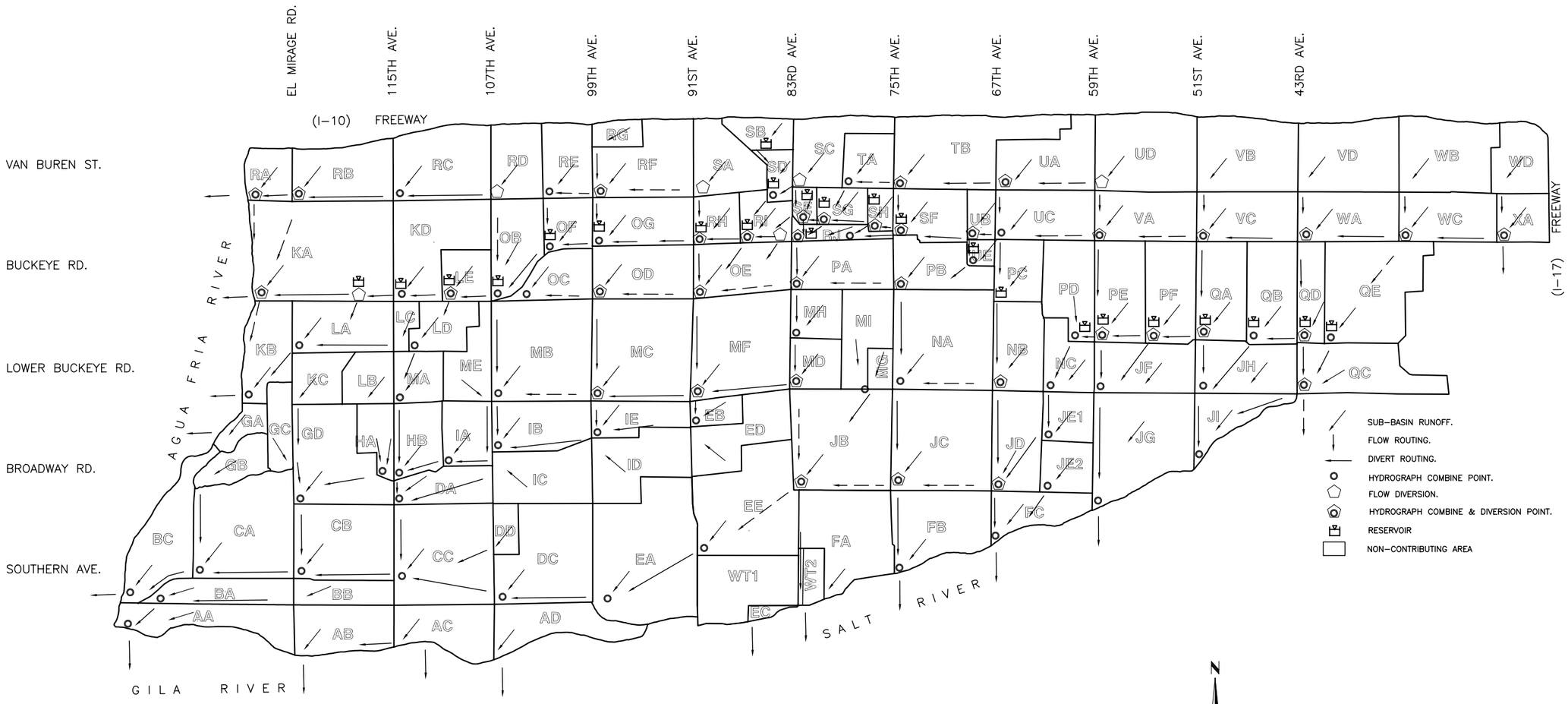


FIGURE 3

PROJECT TITLE:
DURANGO AREA DRAINAGE MASTER PLAN
PROJECT NO. FCD 99-41

CONSULTANT:
DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
Since 1962

EXHIBIT TITLE:
DRAINAGE SUB-BASINS

APPENDIX F

Public Involvement Documentation

The Location:

The Durango Area Drainage Master Plan will identify flood-prone areas in a 68-square mile area that includes the cities of Avondale, Tolleson and Phoenix, as well as unincorporated areas of Maricopa County. The study area is bounded by I-10 on the north, I-17 on the east, the Salt and Gila Rivers on the south, and the Agua Fria River on the west. The outcome of this study will be the development of cost-effective solutions for a storm water collection and disposal system.

What's Next?

After receiving your input, the proposed alternatives will be further developed. A future public meeting will be held to present the revised alternatives. Upon completion of the Durango Area Drainage Master Plan, the Flood Control District will work towards

FOR MORE INFORMATION
Please Contact:

DIBBLE & ASSOCIATES
CONSULTING ENGINEERS

Brian Fry, P.E.,
Consultant Project Manager
Dibble & Associates
Consulting Engineers
2633 East Indian School Road,
Suite 401
Phoenix, Arizona 85016
(602) 957-1155
email: bfry@dibblecorp.com

Flood Control District
Of Maricopa County
2801 W. Durango Street
Phoenix, Arizona 85009

Important information about your community inside...

DEAR NEIGHBOR:

The Flood Control District of Maricopa County invites you to help solve flooding issues in the Southwest Valley. Two public meetings, one on **Tuesday, April 11th** and the other on **Thursday, April 13th**, will provide you and your neighbors with information on the Durango Area Drainage Master Plan and allow you to contribute your opinion.

An Area Drainage Master Plan identifies where the regional (backbone) stormwater drainage facilities should be located in the study area. It also suggests the type(s) of stormwater facilities that should be used. Your comments will provide the Flood Control District and its consultant with important information about the kinds of flood protection that you would like to see in your neighborhood. Your contributions are vital to the success of this project.

OPEN HOUSE

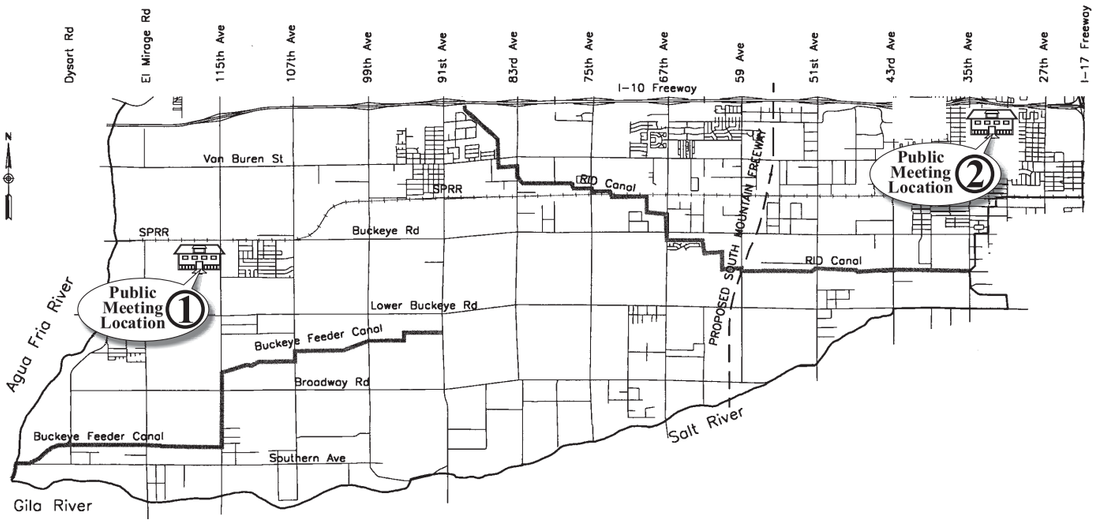
PUBLIC INFORMATION MEETING

PUBLIC MEETING #1
Tuesday
April 11, 2000
5:00 pm to 7:30 pm

Littleton Elementary School Cafetorium
1252 South 115th Avenue
Cashion, Arizona 85329
(SW corner of 115th Ave & Buckeye Rd.)

PUBLIC MEETING #2
Thursday
April 13, 2000
5:00 pm to 7:30 pm

Carl Hayden High School Cafeteria
3333 W. Roosevelt Street
Phoenix, Arizona 85009
(SE corner of Roosevelt & 35th Ave.)



DURANGO AREA DRAINAGE MASTER PLAN

A sign language interpreter will be made available upon request with 72 hours notice. Alternative format materials or FM or Infra Red Listening Devices are also available upon request with 72 hours notice. Additional reasonable accommodations will be made available to the extent possible within the time frame of the request. Please contact David Brozovsky, Flood Control District ADA Coordinator, at 602-506-1501, if any of these services are required. For specific questions related to the project, call Brian Fry, P.E., Dibble & Associates at 602-957-1155.

DURANGO AREA DRAINAGE MASTER PLAN

A sign language interpreter will be made available upon request with 72 hours notice. Alternative format materials or FM or Infra Red Listening Devices are also available upon request with 72 hours notice. Additional reasonable accommodations will be made available to the extent possible within the time frame of the request. Please contact David Brozovsky, Flood Control District ADA Coordinator, at 602-506-1501, if any of these services are required. For specific questions related to the project, call Greg Jones, P.E., at the Flood Control District of Maricopa County at 602-506-5537.

FOR MORE INFORMATION
Please Contact:

DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
Since 1962

Brian Fry, P.E.
Consultant Project Manager
Dibble & Associates
Consulting Engineers
2633 East Indian School Road, Suite 401
Phoenix, Arizona 85016
(602) 957-1155
email: bfry@dibblecorp.com

Flood Control District Of Maricopa County 2801 W. Durango Street Phoenix, Arizona 85009

Important information about your community inside...

DURANGO AREA DRAINAGE MASTER PLAN

OPEN HOUSE

PUBLIC MEETING

PUBLIC MEETING #1
Tuesday
August 15, 2000
6:00 pm to 8:00 pm

City of Phoenix
Fire Station #34
50 North 51st Avenue

PUBLIC MEETING #2
Thursday
August 17, 2000
6:00 pm to 8:00 pm

Littleton Elementary School
Cafetorium
1252 South 115th Avenue

DURANGO AREA DRAINAGE MASTER PLAN

The Flood Control District of Maricopa County invites you to share your ideas about the Durango Area Drainage Master Plan (ADMP). Your insight can:

- help solve flooding issues in the southwest Valley
- plan for future flood control projects to prevent flooding from new developments
- define concepts for community parks and trails

Two public open house meetings are planned to provide you and your neighbors with information on the Durango ADMP and allow you to give your opinion on the recommended plan.

WHAT AREA IS BEING STUDIED?
The Durango Area Drainage Master Plan area covers a 53 square mile area that includes the cities of Avondale, Tolleson, and Phoenix as well as unincorporated areas of Maricopa County.

The study area is bounded by Interstate 10 on the north, Interstate 17 on the east, the Salt and Gila Rivers on the south and the Agua Fria River on the west.

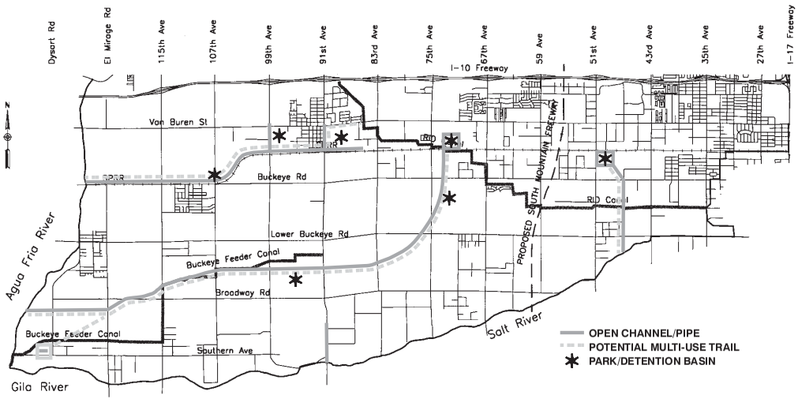
WHY IS THE STUDY BEING DONE?
Existing Flooding Problems: One purpose of the study is to identify flood control alternatives and select a preferred plan to alleviate existing flooding problems within the study area. Flooding

problems have been identified along the Southern Pacific Railroad, the Buckeye Feeder Canal, and the Roosevelt Irrigation District (RID) canal.
New Developments: New development is taking place at a rapid pace. As land is converted from agriculture to subdivisions, the drainage patterns are changed. As there are no natural washes or streams, a coordinated plan is needed to allow new developments to handle runoff in a responsible manner.

Parks and Trails: The Flood Control District is committed to cooperating with local communities to encourage flood control facilities to have many uses that can benefit your neighborhood. Channels and basins can be developed as parks and trails. Natural areas can be preserved for native plant and wildlife habitat.

WHY SHOULD I COME TO THE OPEN HOUSE?
A recommended flood control plan will be presented at the open house. The plan will include locations for basins and channels as well as plans for parks and trails, complete with proposed landscape themes and planting treatments. Your input and that of your neighbors is needed to finalize the plan.

WHAT WILL HAPPEN NEXT?
Following the open house, the consultant team will proceed with preliminary design of the proposed flood control plan. Specific projects will be identified with estimated channel and basin sizes and costs. Project partners will be identified to share in the implementation. Construction of some portions may begin as early as fiscal year 2001-2002.



Durango Area Drainage Master Plan

We want your input.Please join us for our OPEN HOUSE.

Thursday
February 28, 2002
5:00 pm to 7:00 pm

Littleton Elementary School
1252 South 115th Ave.
Avondale, Arizona

The Flood Control District of Maricopa County invites you to share your ideas about the Durango Area Drainage Master Plan and its recommended solutions. A public meeting is being held to provide you and your neighbors with the opportunity to give your opinion.

The Durango Area Drainage Master Plan was started in order to:

- Provide a solution to identified flooding problems
- Identify a regional drainage system for fast growing private development
- Identify existing floodplains along the Union Pacific Railroad and the Buckeye Feeder Canal.

A sign language interpreter will be made available upon request with 72 hours notice. Alternative format materials or FM or Infra Red Listening Devices are also available upon request with 72 hours notice.

Additional reasonable accommodations will be made available to the extent possible within the time frame of the request.

Please Contact:
David Brozovsky,
Flood Control District ADA Coordinator,
at 602-506-1501,
if any of these services are required.

For specific questions related to the project, call
Brian Fry, P.E.,
Dibble & Associates
at 602-957-1155.

DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
Since 1962

Flood Control District
of Maricopa County
2801 W. Durango Street
Phoenix, Arizona 85009

Flood Control District of Maricopa County

Durango Area Drainage Master Plan

FINAL RECOMMENDED PLAN AND FLOODPLAIN DELINEATIONS

Public Meeting OPEN HOUSE

Thursday
February 28, 2002
5:00 pm to 7:00 pm

Littleton Elementary School
1252 South 115th Ave.
Avondale, Arizona

OPEN HOUSE

Public Information Meeting

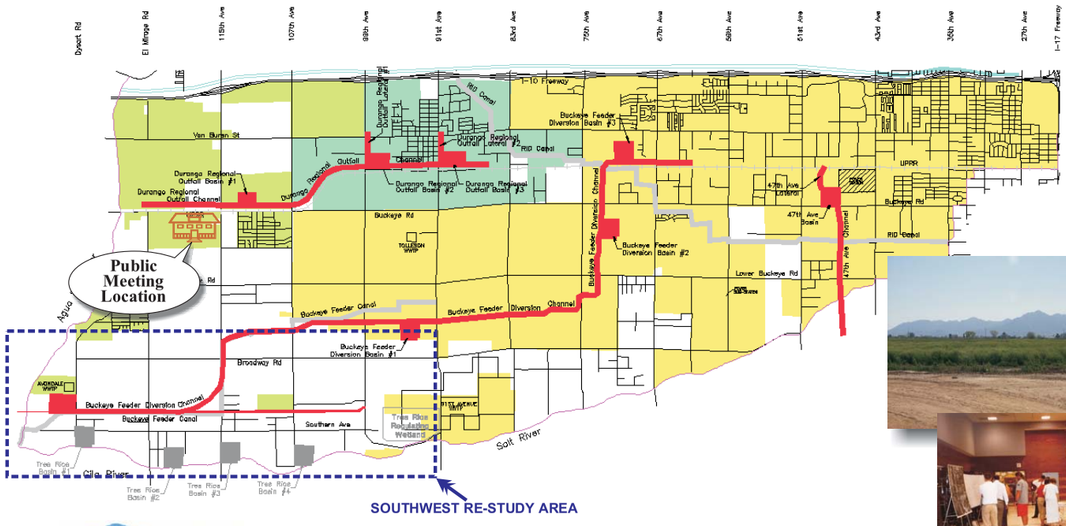
The Flood Control District of Maricopa County, working in conjunction with the cities of Phoenix, Tolleson, and Avondale, is currently finalizing the Durango Area Drainage Master Plan (ADMP) for the southwest valley.

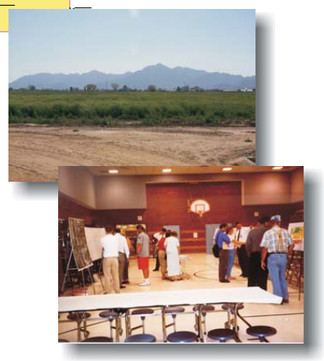
After months of study and identification of problems, the Durango ADMP planning team is now recommending a solution to the community. This is the final stage of public input. In addition, the planning team has also specifically re-adressed the southwest corner of the study area and is recommending a new solution. Also, the team will be presenting the final floodplain delineations.

Over the course of this planning process, the community has been given the opportunity to provide feedback on the existing flooding problems, the different solution alternatives, and the floodplain delineation. Now the planning team would like feedback on the final alternative and the final results of the floodplain analysis.

A team of engineers, hydrologists, and planning experts will be on hand at the Durango ADMP Open House to discuss the final recommendations and floodplain delineation and to answer any questions.

Should you have any immediate concerns, please call Joe Munoz at (602) 506-1501.





Durango Area Drainage Master Plan

Community Questionnaire 1

1. Do you live, work, or have financial interest in the study area? Check all answers that apply.

Live	4
Work	2
Have Financial Interest	10
None of these	2
Where?	
Phoenix	3
Avondale	8
Tolleson	1
County	7

2. Have you experienced flooding problems? Check one.

Yes	2
No	8
Not applicable	3

Explain: An explanation for a not applicable answer was "We do engineering/development in this area".

3. Are there any particular valued landscape or natural features which you feel should be preserved or protected? Explain.

Railroad (1), Gila River (1), Agua Fria River (1), mature trees (2), wetland along river (1), bird nesting sites in the wetland (1), horse trails (1), agriculture (3), and the river bottom-area south of Southern (1).

4. Are there any particular negative features which you feel should be improved or enhanced? Explain.

"Utilize overhead power corridors to extent possible."
"Auto access to river to prevent dumping. Need recreational parking areas."
"River bottom should have horse trails or hiking with controlled vehicular access for emergencies."

5. Which of the following recreational activities do you participate in? (Check all that apply)

Walking	12
Soccer	2
Jogging/Running	5
Softball/Baseball	4
Bicycling	9
Basketball	4
Roller or In-line Skating	2
Equestrian	4
Other:	3 (Fishing-1, Dog Walks-1, ATV-1)

6. What do you feel would be the greatest benefit of a multi-use pathway? (Check all that apply)

Recreation	9
Exercise	9
Employment Commute	2
School Commute	5
Shopping Access	2
Regional Access	3
Other	0

7. Do you feel there are any drawbacks to combining a multi-use trail with an overhead power Line corridor?

Yes	1
No	9
No Opinion	1

Explain: For the yes answer the explanation was, "I've heard of health risks, but I'm not sure if they are real or not."
For one of the no answers the explanation was, "Both exist for the benefit of the community."

8. Which landscape theme(s) do you prefer? (Check all that apply)

Park-like theme	7
Natural theme	7
Modified Sonoran theme	3
Agricultural Heritage	7
Formal Promenade	3
Historic Canal	3
Railroad	6
Native American	3
Other	0

9. In the evaluation and selection of flood control facilities, which criteria do you feel should be given the greatest consideration in determining the ultimate location and design? Number in order of priority (1=highest priority, 6=lowest priority)

Environmental	(4-#2, 3-#3, 1-#4, 3-#5)	Avg. = 3.27	Overall ranking = 3
Recreational	(1-#2, 4-#3, 3-#4, 3-#5)	Avg. = 3.73	Overall ranking = 4
Cost	(2-#2, 1-#3, 4-#4, 4-#5)	Avg. = 3.91	Overall ranking = 5
Flood Control Effectiveness	(11-#1, 1-#2, 1-#3)	Avg. = 1.23	Overall ranking = 1
Visual Appearance	(2-#1, 2-#2, 2-#3, 3-#4, 1-#5)	Avg. = 2.75	Overall ranking = 2
Other	(1-#1, 11-#6)	Avg. = 6.08	Overall ranking = 6

For the category of other being ranked highest priority the explanation given was, "Most effective use of water."
Two reasons why the category of other was ranked lowest priority was, "Project property values," and, "$ should not be prohibitive but use what is needed for future generations. It must be effective, preserve the environment, and give open space to a populating arc."

10. Please rank the alternatives in order of preference (1=most preferred, 3=least preferred)

Alternative 1	(6-#1, 1-#2, 2-#3)	Avg. = 1.56	Overall ranking = 1
Alternative 2	(3-#1, 4-#2, 3-#3)	Avg. = 2.00	Overall ranking = 2
Alternative 3	(2-#1, 3-#2, 3-#3)	Avg. = 2.13	Overall ranking = 3

A vote of most preferred for Alternative 2 had the stipulation, "(except 117th Ave. drop to river feature)".

11. Other comments:
"#6 A transportation corridor for bikes, electric cars, pedestrians, etc."
"Tailwater discharge-both north and south side require return to Buckeye feeder ditch, along the entire feeder ditch."
"Major focus should be on impacts on existing and planned (zoned) development and effective flood control at post development condition (do not oversize facility)."
"Retain excess water to raise local aquifer. Divert and return water that was diverted from Pima use in the 1930's."
"The sooner this starts taking place the cost will be minimized; however, cost should not be the determining factor in initiation a park like theme which would improve land values and economy."
"Use of flood water for replenishing underground aquifers."
"Your alternatives look really good. I really like the softer design and think all of these themes will be better than traditional flood control channel."
"Modify 2 with north to south drainage ways."

Community Questionnaire 2

1. Do you live, work, or have financial interest in the study area? Check all answers that apply.

Live	8
Work	6
Have Financial Interest	7
None of these	0
Where?	
Phoenix	4
Avondale	4
Tolleson	1
County	4

2. Have you experienced flooding problems? Check one.

Yes	2
No	7
Not applicable	1

Explain: The explanation for the not applicable answer was "Only been here one year."
Explanations for the yes answers were, "Have been flooded 1987," and "Flooded several times Buckeye Feeder."
An explanation for a no answer was, "Previous owners have possibly."
One comment made without an answer chosen was, "Before we moved there only."

3. Are there any particular valued landscape or natural features related to the selected flood control alternative which you feel should be preserved or protected? Explain.

"No."
"Sonoran landscape this is a desert."
"River bottom; cottonwood, greenery, wildlife."
"Cottonwood trees should be preserved-alfalfa fields."
"Do not build."
"Tall trees, greenery, wildlife-no more housing."
"No more homes-enjoy current features."
"The whole area is beautiful-I ride in the desert everyday-we moved in the area to enjoy the trees by the river."

4. Are there any particular negative features related to the selected flood control alternative which you feel should be improved or enhanced? Explain.

"Beautiful just the way it is."
"Underbrush needs to be cleared out-salt cedars need to be thinned-not cleared."
"We enjoy the current features."
"We don't want our property taken."
"If they take flood away more houses will be built."

5. Which of the following recreational activities do you participate in? (Check all that apply)

Walking	6
Soccer	0
Jogging/Running	3
Softball/Baseball	1
Bicycling	2
Basketball	0
Roller or In-line Skating	0
Equestrian	7
Other:	Off-road vehicles

6. What landscape and/or recreational amenities would you like to see accommodated in the design for the selected alternative (please list).

"Parks in retention areas."
"Equestrian; more trails access for off-road vehicle."
"More open trails for riding horses."
"Equestrian trails, and keep trees and shrubs so our horse trails can remain beautiful."

7. Do you feel there are any drawbacks to combining a multi-use trail with an overhead power line corridor?

Yes	4
No	3
No Opinion	0

Explain: Comments for some of the yes answers were, "Any tract will interfere with the irrigation of the land." "If it means putting more power line corridor there is enough already." "Horses are afraid of ATV riders who have no regard for safety. They (the ATV drivers go too fast around blind corners)." "No flood plain means housing developments."
For one of the no answers the explanation was "Good use of land."
A comment without choosing an answer was, "Does it matter. Development doesn't stop."

8. Do you feel that the landscape themes proposed for the selected flood control alternative are appropriate for and will enhance the area in which the occur? Explain.

"Will nicely enhance our eastern property line."
"No."
"Park-like theme."
"As long as horses are included. Riding trails are very important to us in this area."

9. Other comments:

"Jon Humphreys with Building Products Co. located at 4850 W. Buckeye Rd. This project may interfere with our clay pipe manufacturing facility. Would like to have detailed plans showing property lines of existing plans. Would like to be contacted before proceeding into more definite plans. Mailing address, 4850 W. Buckeye, 85043."

"Long overdue, have been saying this since 1978 that this matter needs to be addressed."

"It does not matter what I write or my opinion you have already made up your minds and have made plans. You're not concerned about where I live or if I have to move or that you destroy the land I use. Thank you and I hope some day this happens to you. Brenda A. Jundquist, 13038 W. Hidalgo Ave."

"So why did I fill this out? You don't care what I have to say. NO! STOP!"

"I do not want this project to go through. I would rather be in a flood plain than have it all developed."

"My concern is the possible loss of the neighborhqood. I do not want the land value to go down. We moved into this area because of the low public volume. I do not want the fields developed or our trail areas destroyed."

"We like the openness and quietness of the area."

"This is the West, don't take the open range away from horse riders."

APPENDIX G

Retention Basin Aesthetics and Multi-Use Evaluation

DURANGO ADMP
RETENTION BASIN AESTHETICS & MULTI-USE EVALUATION
FCD 99-41

Prepared for:

Flood Control District of Maricopa County

Prepared by:

DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
Since 1962

June, 2002

The purpose of this evaluation is to determine the additional land area required to enhance an "engineered" basin by incorporating aesthetic and multi-use features to create a "kinder and gentler" basin design that, with additional enhancements, can be utilized as a public park.

Approach

A baseline grading concept was developed for 3 retention basins proposed in the Durango ADMP to establish the land area requirements based on engineering requirements only. A second grading and landscape concept was developed incorporating aesthetic and multi-use design features using input from the District Landscape Architect. The two grading plans were compared to determine the additional land area required for aesthetics and multi-use. The basins evaluated are the Cashion Station Basin, Jean Station Basin, and the Buckeye Feeder Diversion (BFD) Basin #1.

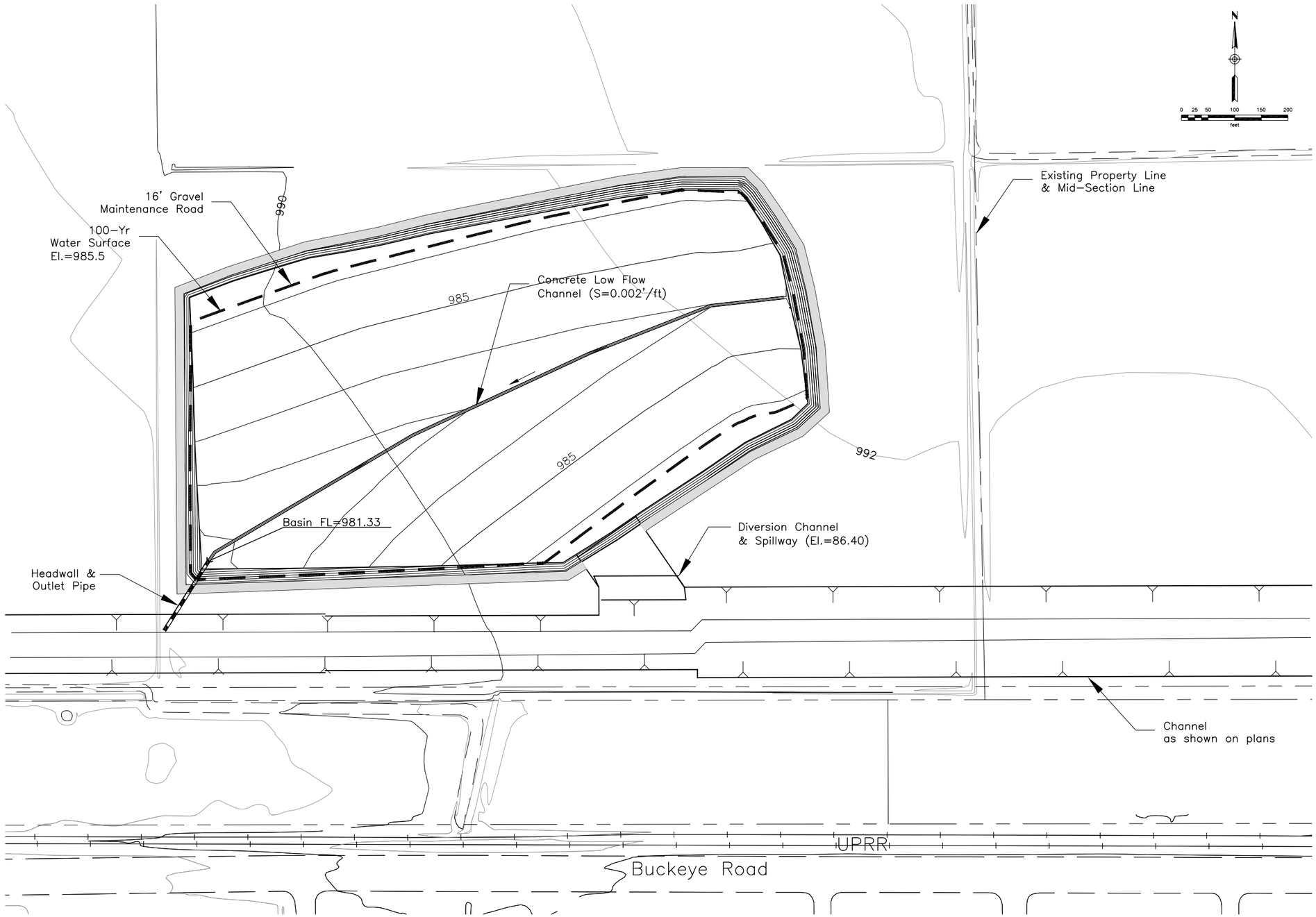
Design Charettes were conducted for each basin with the governing jurisdictional agency. The Cashion Station Basin is within the City of Avondale, the Jean Station Basin is within the City of Tolleson, and the Buckeye Feeder Diversion Basin #1 is within the City of Phoenix. At the Charettes, the site constraints and recreation objectives were reviewed and discussed with agency representatives. Several concepts were identified and marked on blueprints of the engineered basin plan. Following the Charettes, the consultant team evaluated the alternatives and developed an aesthetic and multi-use grading plan based on the input received at the Charette. The Landscape Architect then developed a landscape and multi-use plan for the enhanced grading plan.

Results

The baseline and enhanced grading plans and the landscape and multi-use plans are contained in the Appendix for the three basin sites. The pertinent basin design data are summarized in the following table:

		Required Land Area (acres)		Additional Area Req'd	
Basin	**Storage Volume (Ac-Ft)**	**Engineered Basin**	**Multi-Use Basin**	**(Acres)**	**(%)**
Cashion Sta.	25	18	37	19	51
Jean Sta.	79	28	31	3	10
BFD Basin #1	60	30	48	18	38

The Cashion Station Basin required the largest increase in land area, requiring an additional 19 acres (51%) to provide mounding, area out of the 100-year ponding limits, and terraced athletic fields. The Jean Station Basin required only 3 acres (10%) additional land area, the least increase in land area of all the basins. This is due to the limitation on available land due to other planned projects adjacent to the site. The average increase in land area for the three basins is 33 percent.



NOTE:
Contours are for preliminary design calculations only.

Final design should incorp varied side slopes and other aesthetic features.

Contour Intervals:
Existing – 2 ft
Proposed – 1 ft

BASIN DATA
Basin Area: 18.0 Ac
Water Depth: 4.2 Ft
Excavation Depth: 10.7 Ft
Storage Volume: 25 Ac-Ft
Total Inflow: 1158 cfs
Flow By: 700 cfs
Diversion: 458 cfs

CASHION STATION BASIN
(111th Ave. Basin)

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

DURANGO AREA DRAINAGE MASTER PLAN
PROJECT NO. 99-41

PRELIMINARY NOT FOR CONSTRUCTION

	BY	DATE
DESIGNED	D. Frank	6/02
DRAWN	D. Frank	6/02
CHECKED	B. Fry	6/02

DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
Since 1962

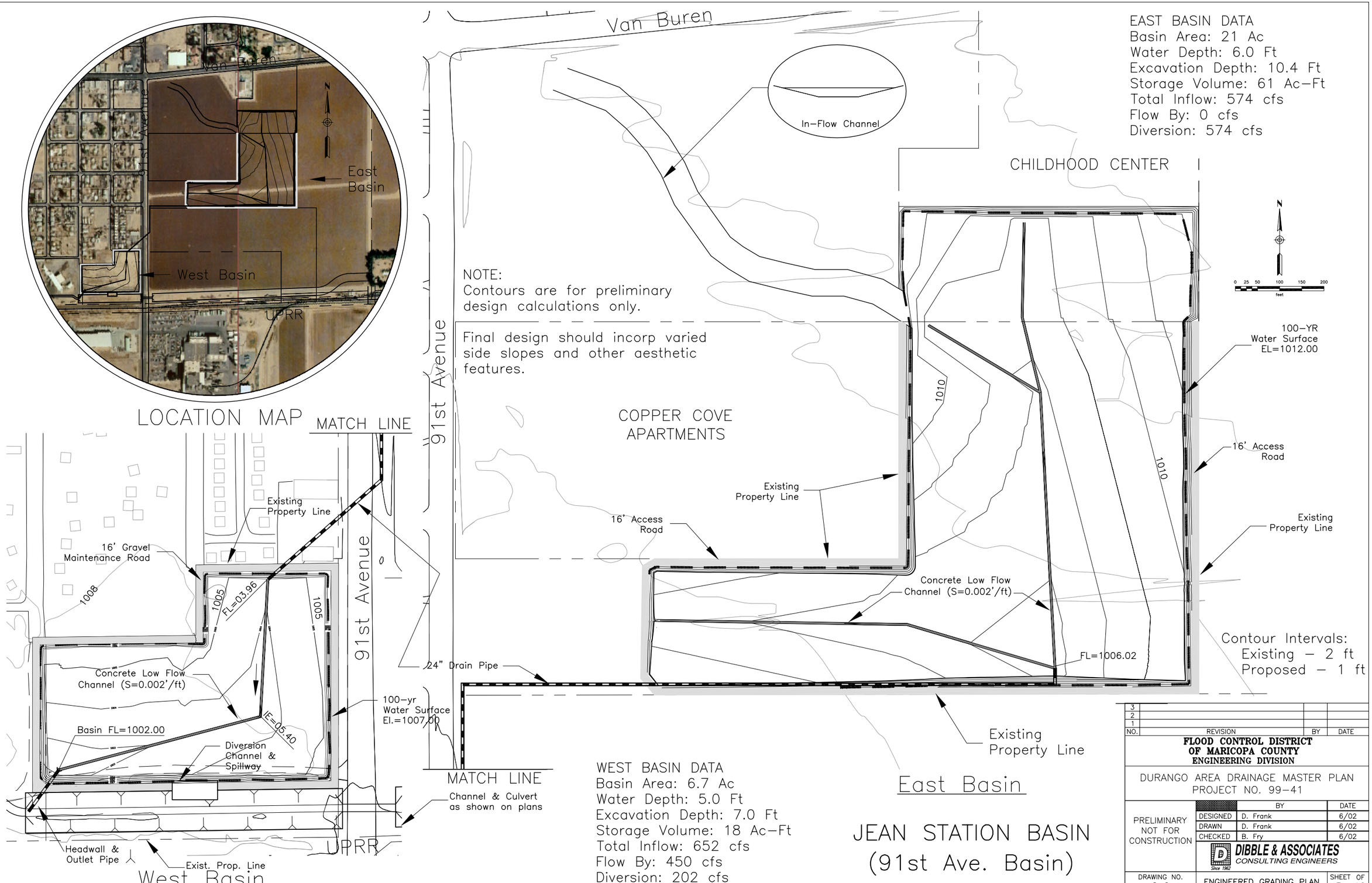
DRAWING NO. C-1

ENGINEERED GRADING PLAN

SHEET 2 OF 10

LOCATION MAP

EAST BASIN DATA
Basin Area: 21 Ac
Water Depth: 6.0 Ft
Excavation Depth: 10.4 Ft
Storage Volume: 61 Ac–Ft
Total Inflow: 574 cfs
Flow By: 0 cfs
Diversion: 574 cfs



WEST BASIN DATA
Basin Area: 6.7 Ac
Water Depth: 5.0 Ft
Excavation Depth: 7.0 Ft
Storage Volume: 18 Ac–Ft
Total Inflow: 652 cfs
Flow By: 450 cfs
Diversion: 202 cfs

JEAN STATION BASIN
(91st Ave. Basin)

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

DURANGO AREA DRAINAGE MASTER PLAN
PROJECT NO. 99–41

PRELIMINARY NOT FOR CONSTRUCTION

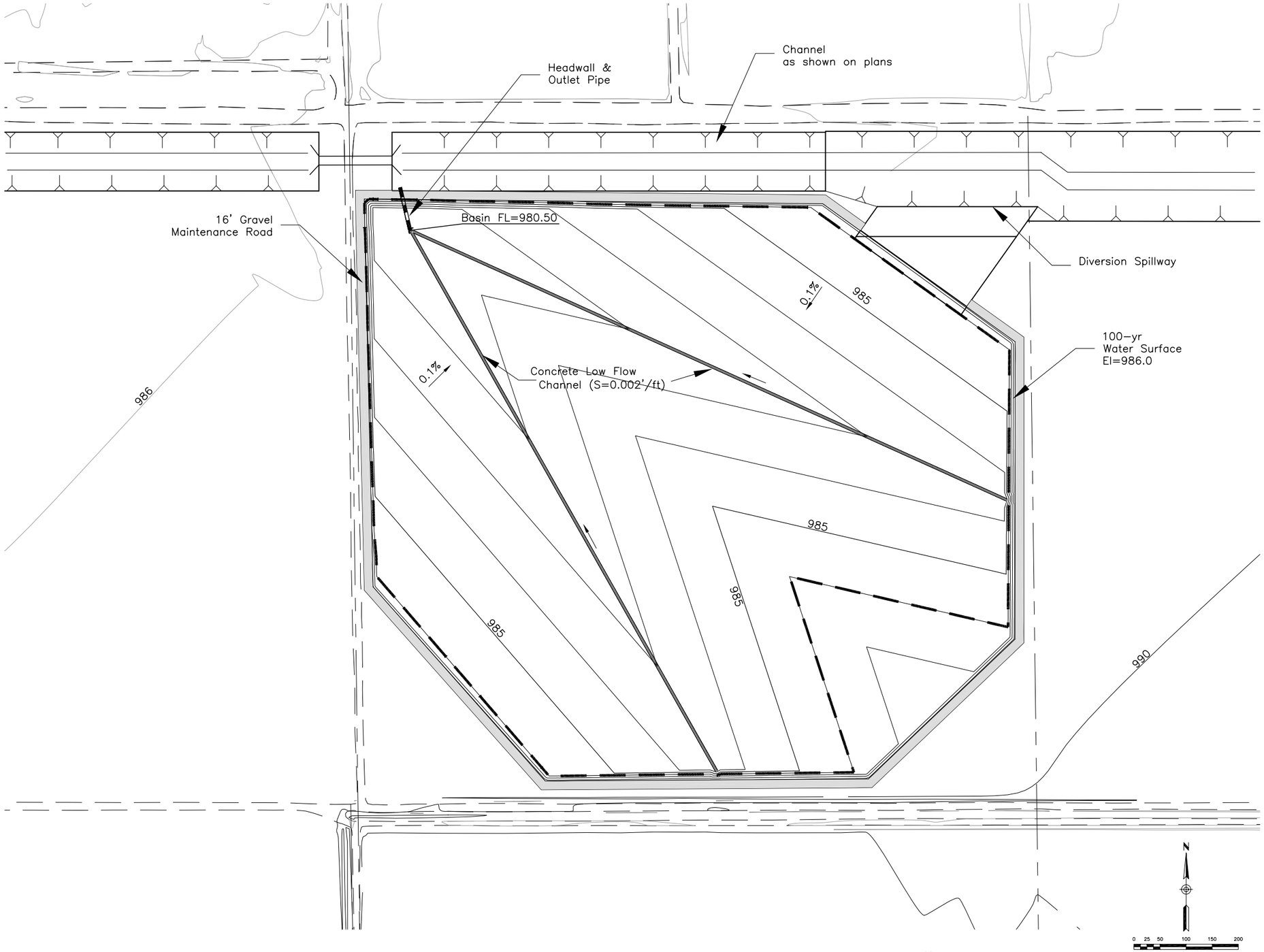
	BY	DATE
DESIGNED	D. Frank	6/02
DRAWN	D. Frank	6/02
CHECKED	B. Fry	6/02

DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
Since 1962

DRAWING NO. C–2

ENGINEERED GRADING PLAN

SHEET OF 3 10



NOTE:
Contours are for preliminary design calculations only.

Final design should incorp varied side slopes and other aesthetic features.

Contour Intervals:
Existing – 2 ft
Proposed – 1 ft

BASIN DATA
Basin Area: 30.0 Ac
Water Depth: 5.5 Ft
Excavation Depth: 8.8 Ft
Storage Volume: 60 Ac–Ft
Total Inflow: 1585 cfs
Flow By: 1050 cfs
Diversion: 535 cfs

BUCKEYE FEEDER DIVERSION BASIN #1
(95th Ave. Basin)

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

DURANGO AREA DRAINAGE MASTER PLAN
PROJECT NO. 99–41

PRELIMINARY NOT FOR CONSTRUCTION

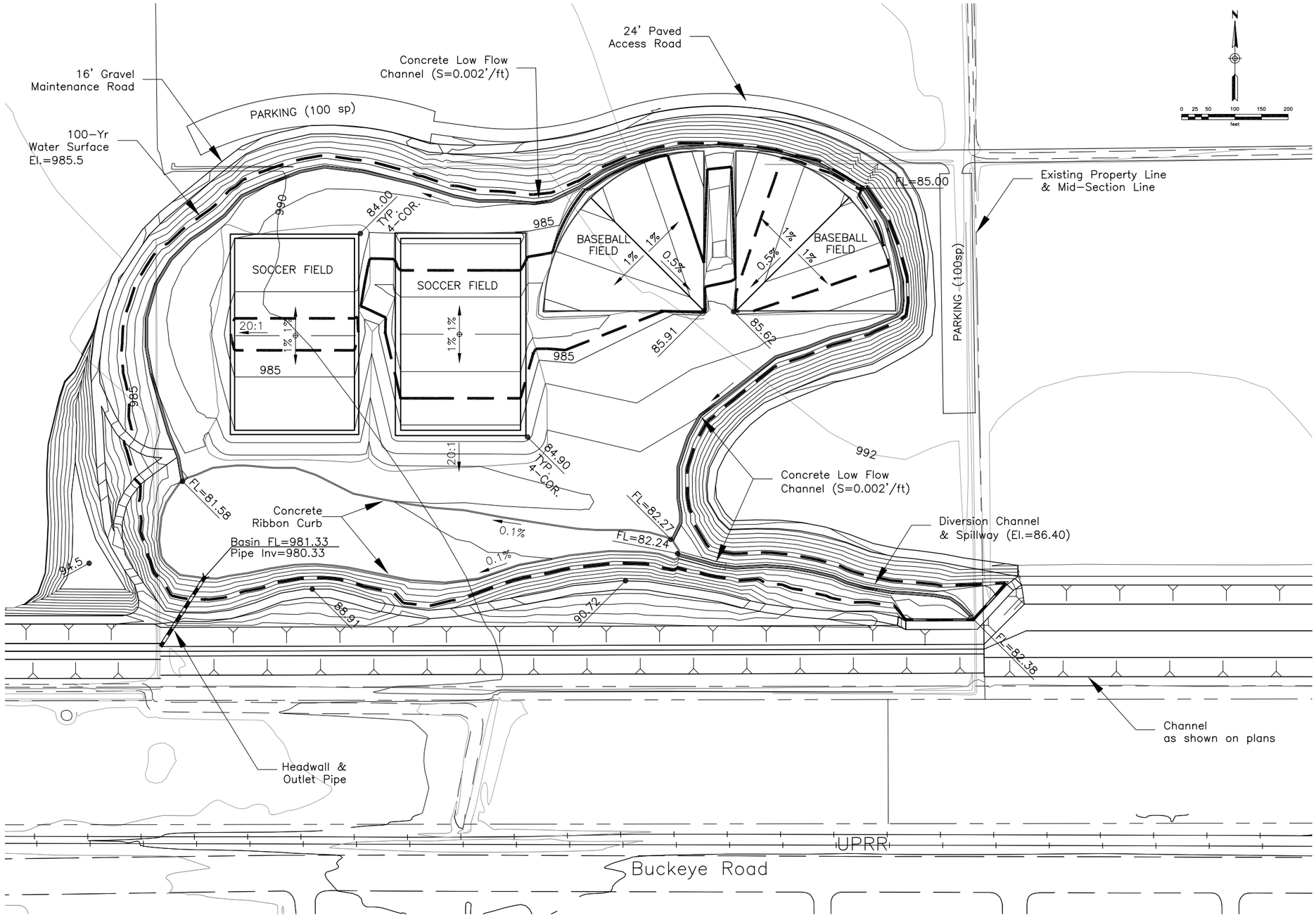
	BY	DATE
DESIGNED	D. Frank	6/02
DRAWN	D. Frank	6/02
CHECKED	B. Fry	6/02

DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
Since 1962

DRAWING NO. C–3

ENGINEERED GRADING PLAN

SHEET 4 OF 10



BASIN DATA
Basin Area: 37 Ac
Water Depth: 4.2 Ft
Excavation Depth: 11.6 Ft
Storage Volume: 31 Ac-Ft
Total Inflow: 1158 cfs
Flow By: 700 cfs
Diversion: 458 cfs

Contour Intervals:
Existing – 2 ft
Proposed – 1 ft

CASHION STATION BASIN
(111th Ave. Basin)

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

DURANGO AREA DRAINAGE MASTER PLAN
PROJECT NO. 99-41

PRELIMINARY NOT FOR CONSTRUCTION

	BY	DATE
DESIGNED	D. Frank	6/02
DRAWN	D. Frank	6/02
CHECKED	B. Fry	6/02

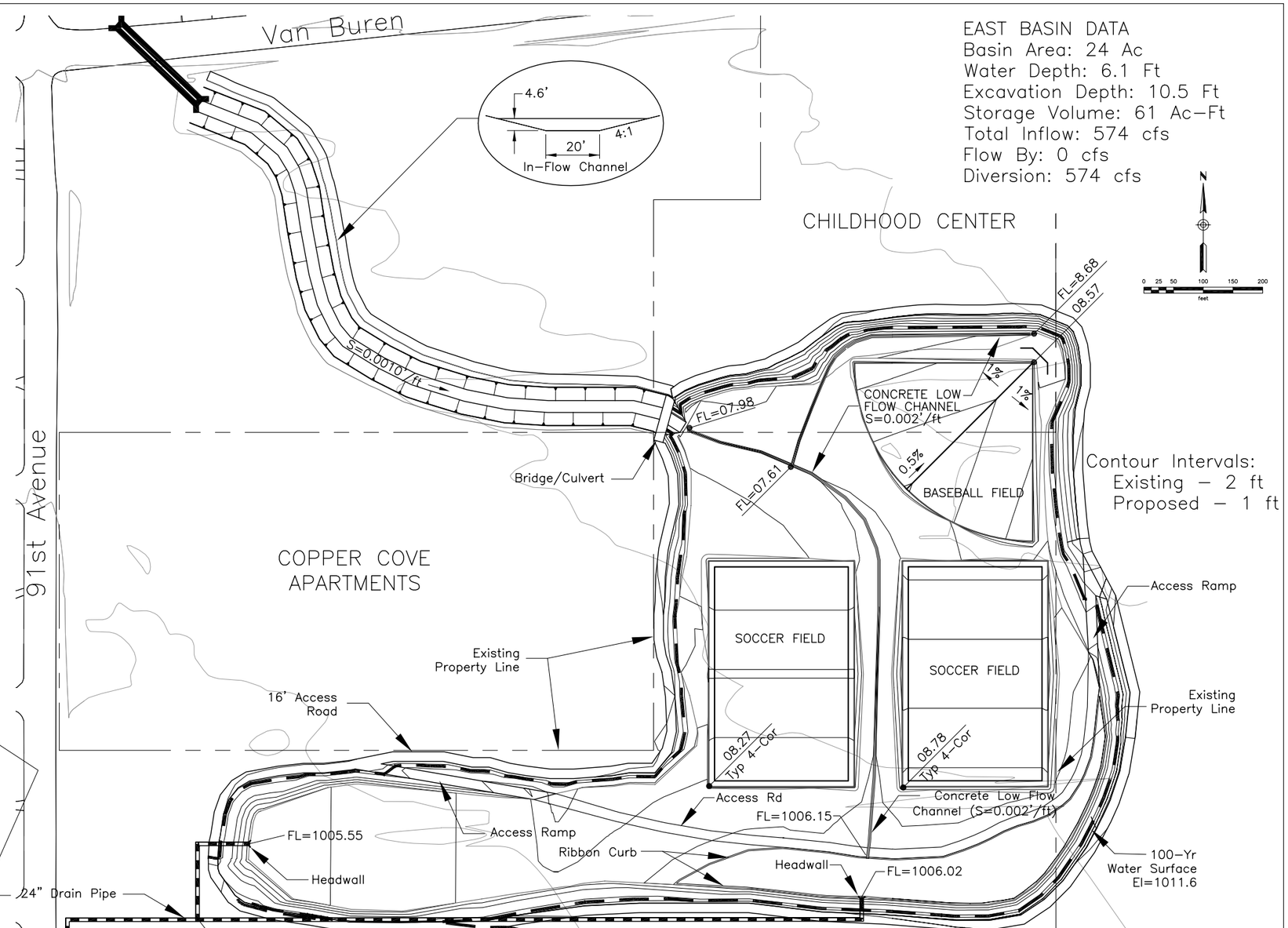
DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
Since 1962

DRAWING NO. C-4

AESTHETIC GRADING PLAN

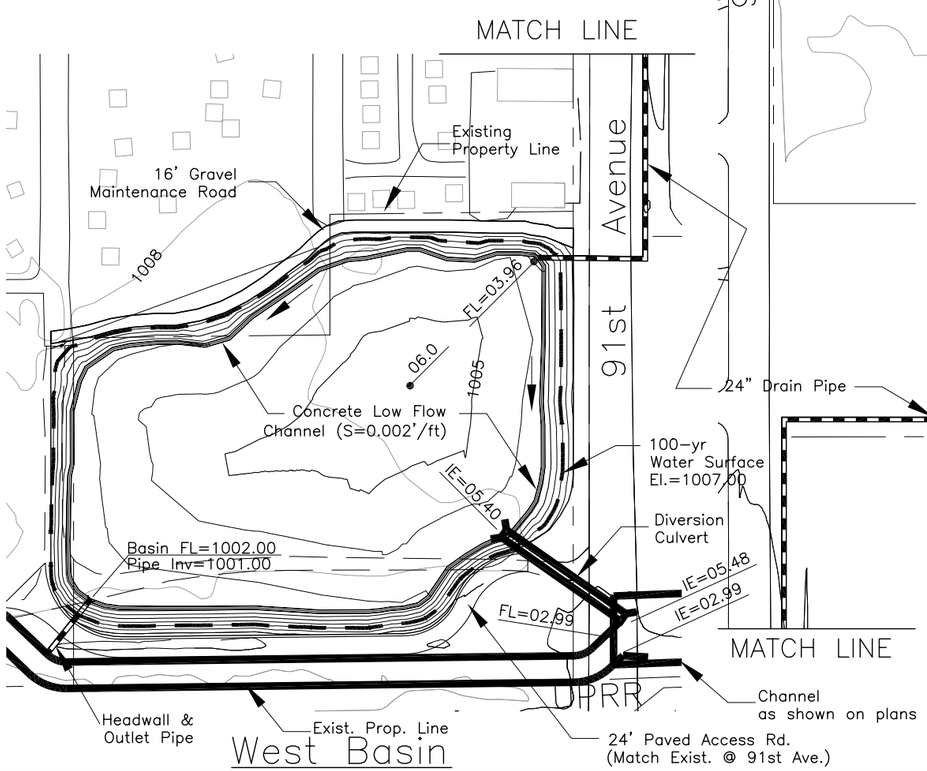
SHEET 5 OF 10

LOCATION MAP



EAST BASIN DATA
Basin Area: 24 Ac
Water Depth: 6.1 Ft
Excavation Depth: 10.5 Ft
Storage Volume: 61 Ac-Ft
Total Inflow: 574 cfs
Flow By: 0 cfs
Diversion: 574 cfs

Contour Intervals:
Existing – 2 ft
Proposed – 1 ft



WEST BASIN DATA
Basin Area: 7.4 Ac
Water Depth: 5.0 Ft
Excavation Depth: 7.0 Ft
Storage Volume: 18 Ac-Ft
Total Inflow: 652 cfs
Flow By: 450 cfs
Diversion: 202 cfs

JEAN STATION BASIN
(91st Ave. Basin)

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

DURANGO AREA DRAINAGE MASTER PLAN
PROJECT NO. 99-41

PRELIMINARY NOT FOR CONSTRUCTION

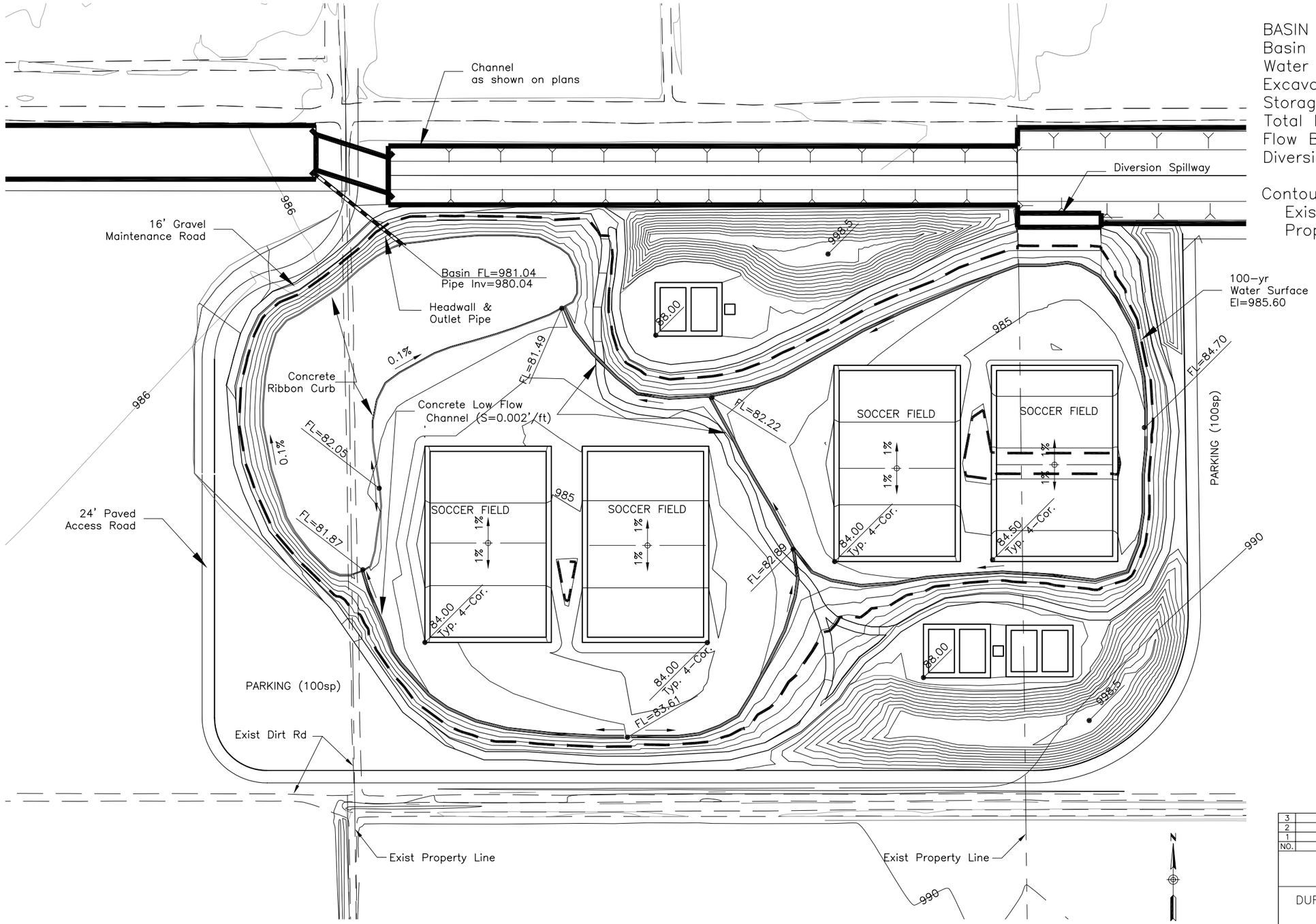
	BY	DATE
DESIGNED	D. Frank	6/02
DRAWN	D. Frank	6/02
CHECKED	B. Fry	6/02

DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
Since 1962

DRAWING NO. C-5
AESTHETIC GRADING PLAN
SHEET 6 OF 10

BASIN DATA
Basin Area: 48 Ac
Water Depth: 4.6 Ft
Excavation Depth: 9.0 Ft
Storage Volume: 61 Ac–Ft
Total Inflow: 1585 cfs
Flow By: 1050 cfs
Diversion: 535 cfs

Contour Intervals:
Existing – 2 ft
Proposed – 1 ft



BUCKEYE FEEDER DIVERSION BASIN #1
(95th Ave. Basin)

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

DURANGO AREA DRAINAGE MASTER PLAN
PROJECT NO. 99–41

PRELIMINARY NOT FOR CONSTRUCTION

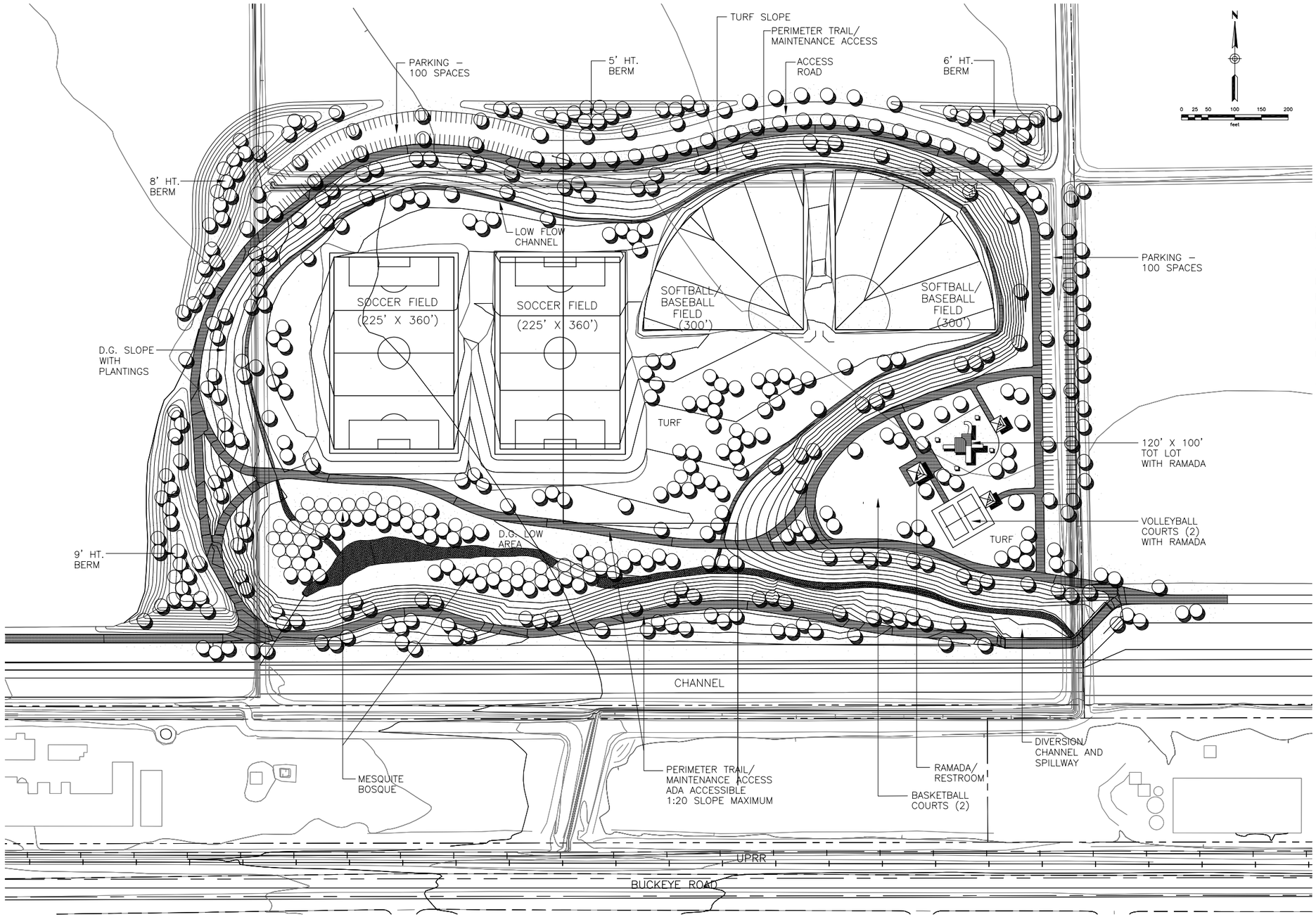
	BY	DATE
DESIGNED	D. Frank	6/02
DRAWN	D. Frank	6/02
CHECKED	B. Fry	6/02

DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
Since 1962

DRAWING NO. C–6

AESTHETIC GRADING PLAN

SHEET 7 OF 10



CASHION STATION BASIN
(111th Ave. Basin)

PRELIMINARY PLANT LIST

BOTANICAL NAME	COMMON NAME
TREES	
ACACIA SP.	ACACIA
DALBERGIA SISSOO	SISSOO
FRAXINUS SP.	ASH
PISTACIA CHINENSIS	PISTACHE
PROSOPIS SP.	MESQUITE
QUERCUS VIRGINIANA "HERITAGE'	OAK
ULMUS PARVIFLORA	EVERGREEN ELM
SHRUBS, GROUND COVERS, AND ACCENTS	
ACACIA REDOLENS 'DESERT CARPET'	DESERT CARPET
BACCHARIS 'CENTENNIAL'	CENTENNIAL BACCHARIS
CAESALPINIA SP.	BIRD–OF–PARADISE
CALLIANDRA CALIFORNICA	BAJA RED FAIRY DUSTER
CHRYSACTINIA MEXICANA	DAMIANITA
CONVOLVULUS CNEORUM	BUSH MORNING GLORY
DALEA SP.	DALEA
DASYLIRION WHEELERI	DESERT SPOON
HESPERALOE PARVIFLORA	HESPERALOE
HYMENOXYS ACAULIS	ANGELITA DAISY
MUHLENBERGIA SP.	MUHLY
LANTANA SP.	LANTANA
LEUCOPHYLLUM SP.	SAGE
RUELLIA SP.	RUELLIA
SIMMONDSIA CHINENSIS	JOJOBA
SOPHORA SECUNDIFLORA	TEXAS MOUNTAIN LAUREL

TURF – SEED, BERMUDA TRIANGLE OR PRIMA VERA
DECOMPOSED GRANITE

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

DURANGO AREA DRAINAGE MASTER PLAN
PROJECT NO. 99–41

PRELIMINARY NOT FOR CONSTRUCTION

	BY	DATE
DESIGNED	DCM	12/01
DRAWN	HH	04/02
CHECKED	DCM	04/02

McCloskey ♦ Peltz, Inc.
LANDSCAPE ARCHITECTS

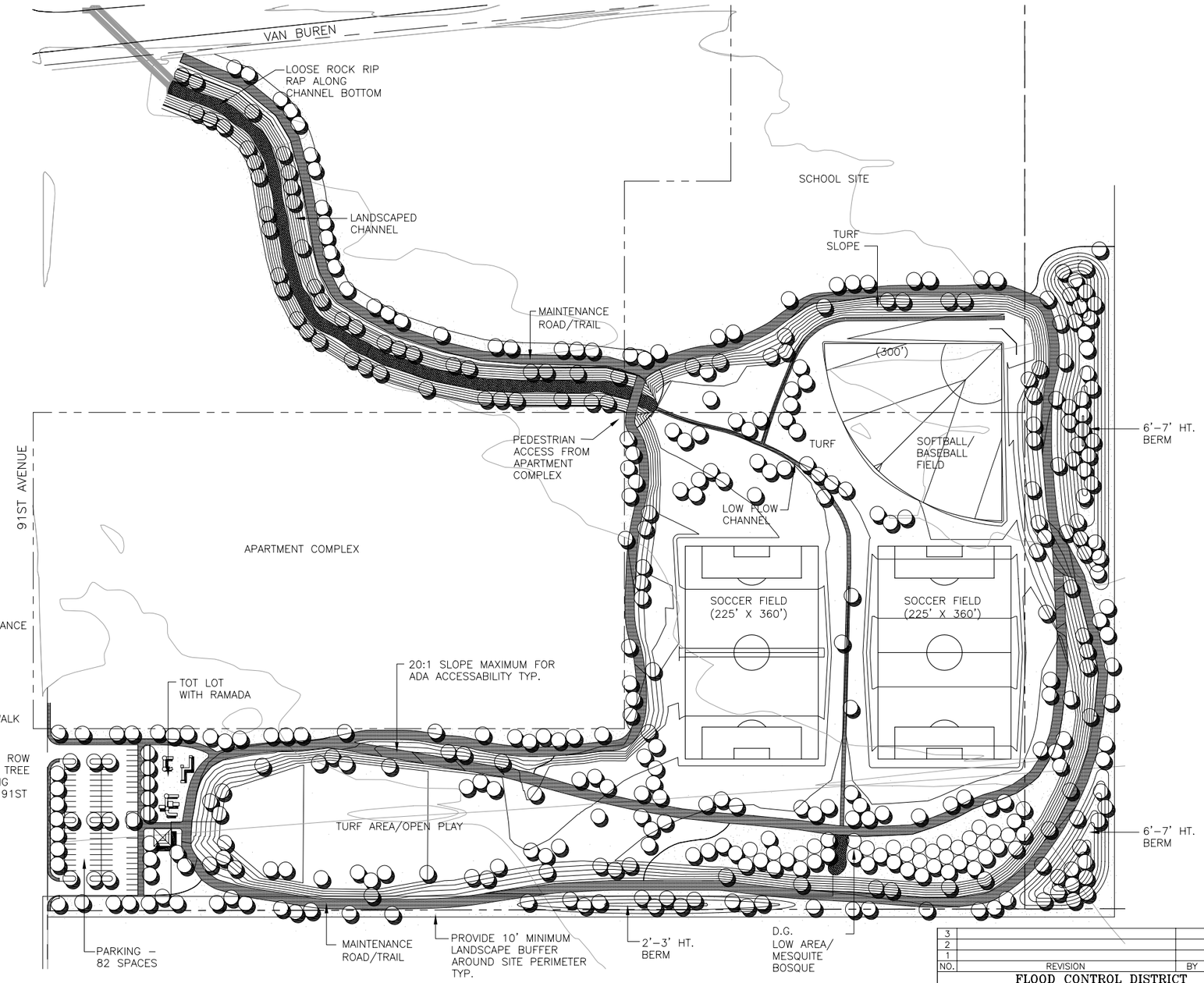
DRAWING NO.	PRELIMINARY LANDSCAPE CONCEPT	SHEET OF
L – 1		8 10

PRELIMINARY PLANT LIST

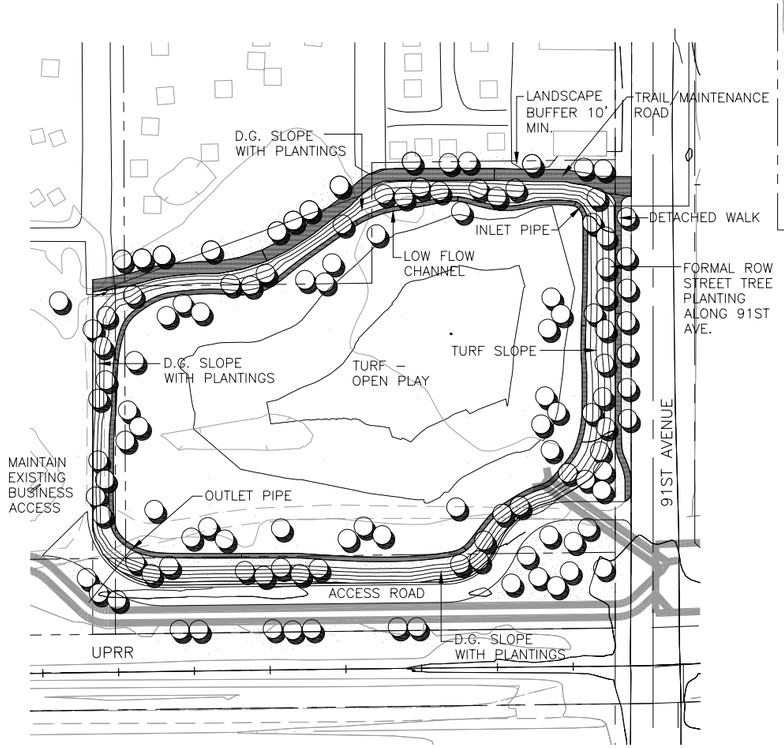
BOTANICAL NAME	COMMON NAME
TREES	
ACACIA SP.	ACACIA
DALBERGIA SISSOO	SISSOO
FRAXINUS SP.	ASH
PISTACIA CHINENSIS	PISTACHE
PROSOPIS SP.	MESQUITE
QUERCUS VIRGINIANA "HERITAGE'	OAK
ULMUS PARVIFLORA	EVERGREEN ELM
SHRUBS, GROUND COVERS, AND ACCENTS	
ACACIA REDOLENS 'DESERT CARPET'	DESERT CARPET
BACCHARIS 'CENTENNIAL'	CENTENNIAL BACCHARIS
CAESALPINIA SP.	BIRD-OF-PARADISE
CALLIANDRA CALIFORNICA	BAJA RED FAIRY DUSTER
CHRYSACTINIA MEXICANA	DAMIANITA
CONVOLVULUS CNEORUM	BUSH MORNING GLORY
DALEA SP.	DALEA
DASYLIRION WHEELERI	DESERT SPOON
HESPERALOE PARVIFLORA	HESPERALOE
HYMENOXYS ACAULIS	ANGELITA DAISY
MUHLENBERGIA SP.	MUHLY
LANTANA SP.	LANTANA
LEUCOPHYLLUM SP.	SAGE
RUELLIA SP.	RUELLIA
SIMMONDSIA CHINENSIS	JOJOBA
SOPHORA SECUNDIFLORA	TEXAS MOUNTAIN LAUREL

TURF – SEED, BERMUDA TRIANGLE OR PRIMA VERA

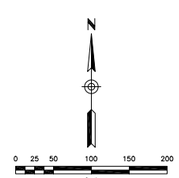
DECOMPOSED GRANITE



EAST BASIN



WEST BASIN



JEAN STATION
(91st Ave. Basin)

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
ENGINEERING DIVISION

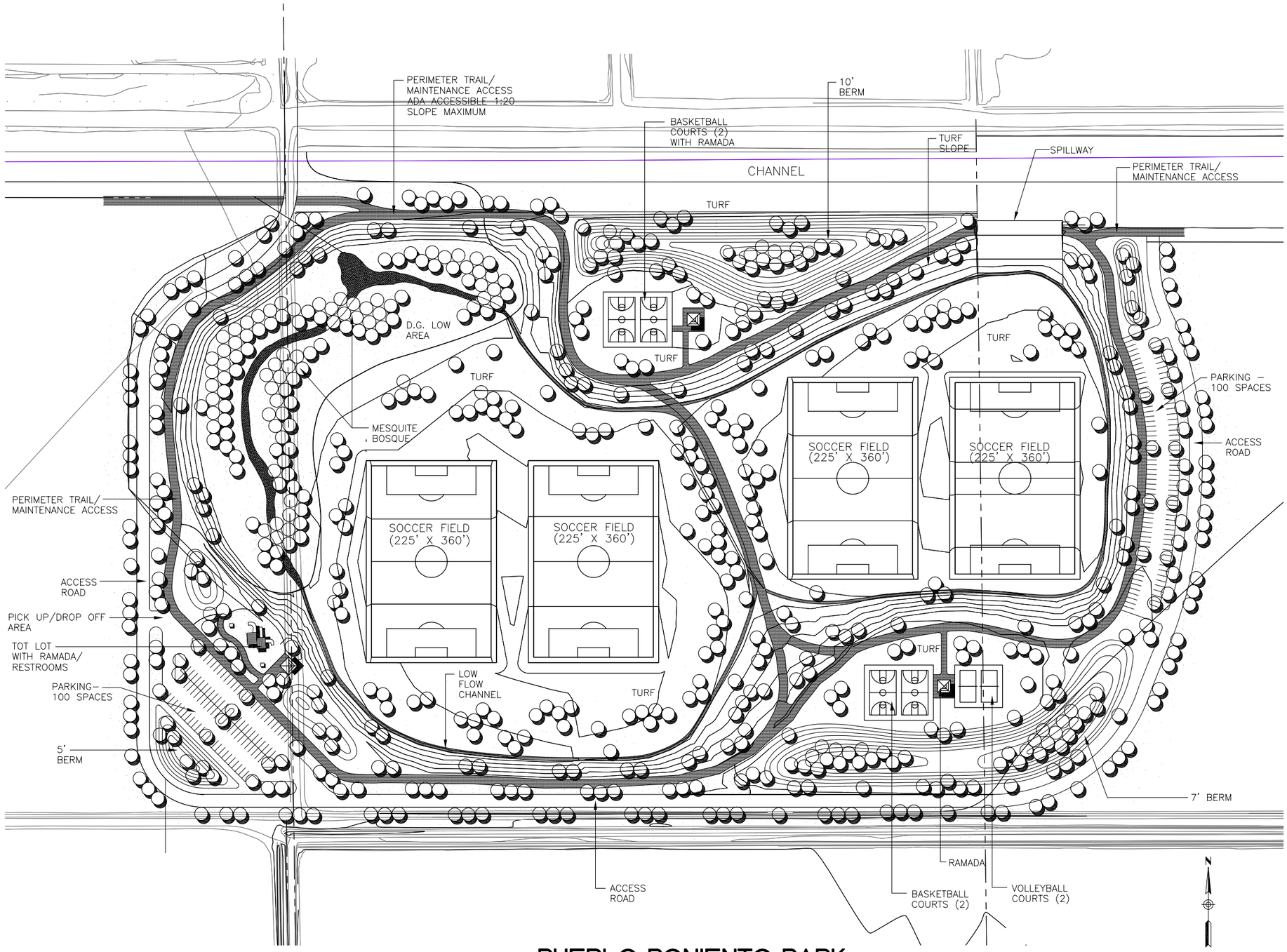
DURANGO AREA DRAINAGE MASTER PLAN
PROJECT NO. 99-41

PRELIMINARY NOT FOR CONSTRUCTION

	BY	DATE
DESIGNED	DCM	12/01
DRAWN	HH	04/02
CHECKED	DCM	04/02

McCloskey • Peltz, Inc.
LANDSCAPE ARCHITECTS

DRAWING NO.	PRELIMINARY LANDSCAPE CONCEPT	SHEET OF
L-2		9 10



PUEBLO PONIENTO PARK
BUCKEYE FEEDER DIVERSION BASIN #1
(95th Ave. Basin)

PRELIMINARY PLANT LIST

BOTANICAL NAME	COMMON NAME
TREES	
ACACIA SP.	ACACIA
DALBERGIA SISSOO	SISSOO
FRAXINUS SP.	ASH
PISTACIA CHINENSIS	PISTACHE
PROSOPIS SP.	MESQUITE
QUERCUS VIRGINIANA "HERITAGE'	OAK
ULMUS PARVIFLORA	EVERGREEN ELM
SHRUBS, GROUND COVERS, AND ACCENTS	
ACACIA REDOLENS 'DESERT CARPET'	DESERT CARPET
BACCHARIS 'CENTENNIAL'	CENTENNIAL BACCHARIS
CAESALPINIA SP.	BIRD–OF–PARADISE
CALLIANDRA CALIFORNICA	BAJA RED FAIRY DUSTER
CHRYSACTINIA MEXICANA	DAMIANITA
CONVOLVULUS CNEORUM	BUSH MORNING GLORY
DALEA SP.	DALEA
DASYLIRION WHEELERI	DESERT SPOON
HESPERALOE PARVIFLORA	HESPERALOE
HYMENOXYS ACAULIS	ANGELITA DAISY
MUHLENBERGIA SP.	MUHLY
LANTANA SP.	LANTANA
LEUCOPHYLLUM SP.	SAGE
RUELLIA SP.	RUELLIA
SIMMONDSIA CHINENSIS	JOJOBA
SOPHORA SECUNDIFLORA	TEXAS MOUNTAIN LAUREL

TURF – SEED, BERMUDA TRIANGLE OR PRIMA VERA

DECOMPOSED GRANITE

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY
ENGINEERING DIVISION

DURANGO AREA DRAINAGE MASTER PLAN
PROJECT NO. 99–41

PRELIMINARY
NOT FOR
CONSTRUCTION

	BY	DATE
DESIGNED	DCM	12/01
DRAWN	HH	04/02
CHECKED	DCM	04/02

McCloskey ♦ Peltz, Inc.
LANDSCAPE ARCHITECTS

DRAWING NO.	PRELIMINARY LANDSCAPE CONCEPT	SHEET OF
L – 3		10 10

APPENDIX H

75th Avenue Preliminary Storm Drain Study

DURANGO ADMP
75TH AVENUE PRELIMINARY STORM DRAIN STUDY
FCD 99-41

Prepared for:

Flood Control District of Maricopa County

Prepared by:

DIBBLE & ASSOCIATES
CONSULTING ENGINEERS
Since 1962

June, 2002

Durango ADMP
75th Avenue Preliminary Storm Drain Study
FCD 99-41

The purpose of this study is to develop an interim drainage concept that beneficially utilizes the proposed City of Phoenix 75th Avenue storm drain to allow implementation of certain features of the Durango ADMP prior to completion of the ultimate system outfall at the Agua Fria River. The Durango ADMP Recommended Plan and the proposed City of Phoenix 75th Avenue storm drain alignment are shown on **Figure 1**.

Storm Drain Profile
The preliminary 75th Avenue storm drain profile extends from Roosevelt Street, just south of Interstate 10, to the Salt River, a distance of approximately 4.3 miles. Pipe sizes considered for this analysis are as presented by the City of Phoenix in their preliminary sizing analysis for a 2-year event.

The outfall of this network is the Salt River, which provides an ultimate outfall invert elevation of 970.0 feet. This outfall location also sets the hydraulic grade line (HGL) as the water surface in the Salt River. The 10-year water surface elevation was taken from the Maricopa County FIS study. This starting water surface elevation is 982.75'.

The minimum pipe cover for the design was set at 3 feet. Known utilities were avoided wherever possible. Utility information was obtained from as-builts, quarter section maps, pothole information, and information obtained directly from private utility companies. The exact locations of many of the utilities shown are not known, and elevations have been placed based on typical depths of cover.

Hydraulic computations were performed to determine the capacity of the preliminary profile, the results of which are shown in the **Appendix**.

Drainage Concept
The selected drainage concept consists of constructing a lateral to the proposed 72-inch storm drain from 75th Avenue, along the Harrison Street alignment approximately 4000-feet to the 71st Avenue Basin (Basin 3). This concept would reduce the cost of implementing the ADMP by approximately $1.8 million dollars due to the elimination of several ADMP elements. The proposed concept is shown on **Figure 2** and the estimated cost savings are summarized in **Table 1**.

Item	Quantity	Unit	Unit Cost	Total
Add'l Basin Excavation	108093	CY	$4	$432,373
72" Storm Drain	4053	LF	$180	$729,540
BUC-15 Chan credit	1	LS	-$891,117	-$891,117
BUC-14 Chan credit	1	LS	-$1,391,386	-$1,391,386
BUC-C18 Culv credit	1	LS	-$607,360	-$607,360
BUC-C17 Culv credit (50%)	1	LS	-$94,315	-$94,315
				-$1,822,265

Table-1 Estimated Cost Savings

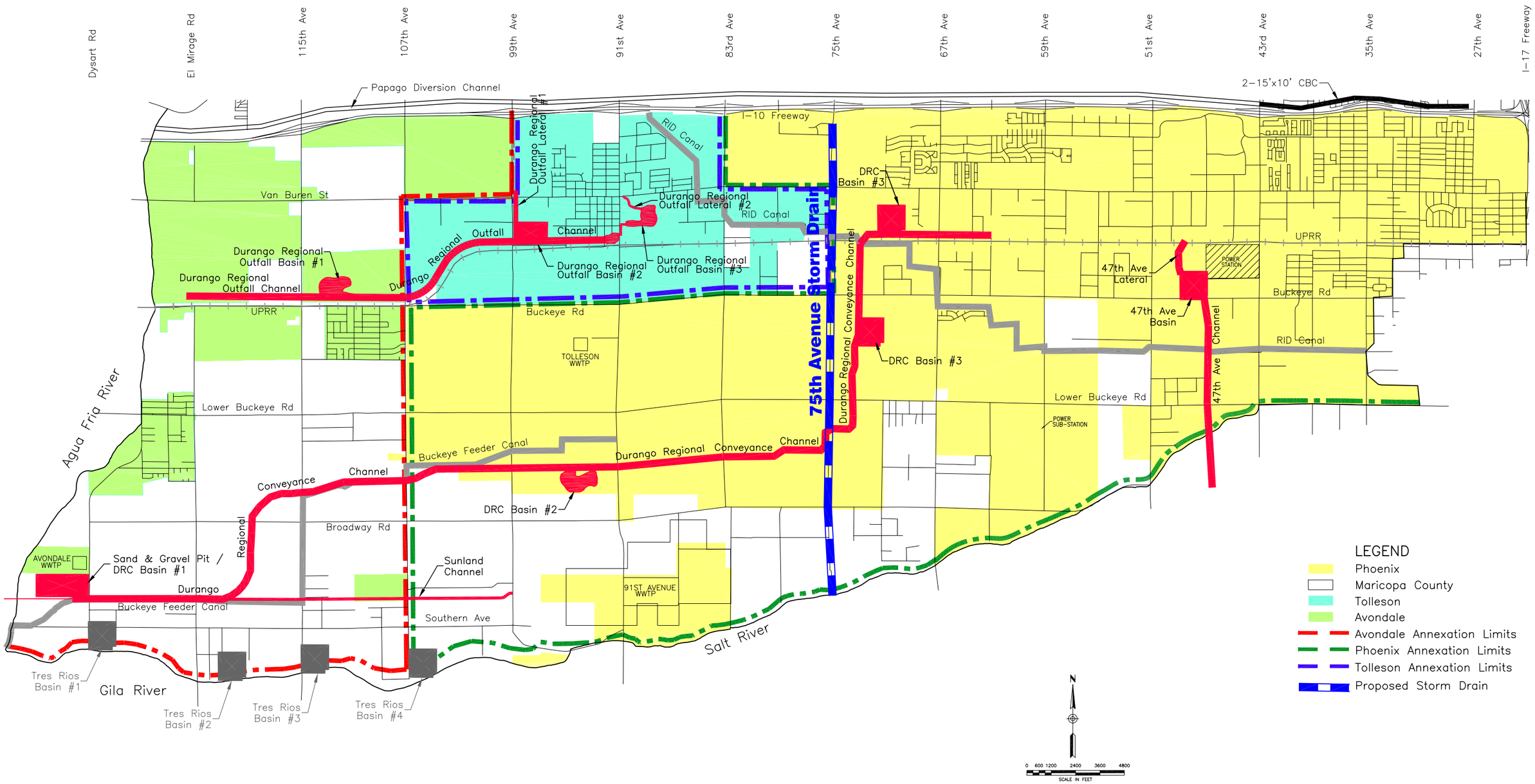


FIGURE – 1

PROJECT TITLE: DURANGO AREA DRAINAGE MASTER PLAN
PROJECT NO. FCD 99-41

CONSULTANT: DIBBLE & ASSOCIATES CONSULTING ENGINEERS

CHART TITLE: RECOMMENDED PLAN
06/19/02

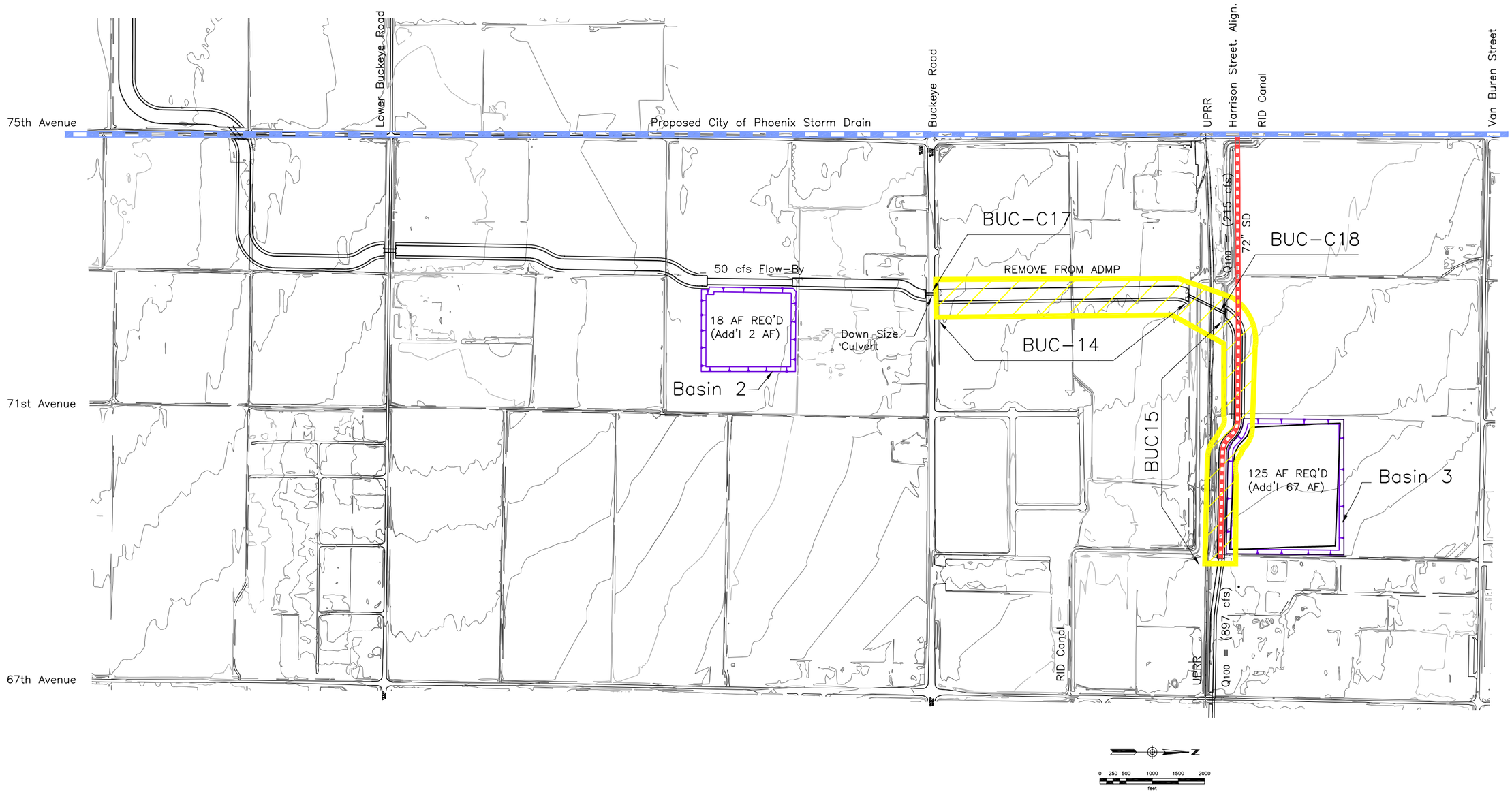


FIGURE – 2

PROJECT TITLE:
DURANGO AREA DRAINAGE MASTER PLAN
PROJECT NO. FCD 99-41

CONSULTANT:
DIBBLE & ASSOCIATES
CONSULTING ENGINEERS

EXHIBIT TITLE:
RECOMMENDED CONCEPT

Results and Recommendations

The preliminary storm drain profile is shown on **Figure 3**. The natural ground slope along 75th Avenue is fairly gradual and consistent, lending itself to an efficient storm drain design. Storm drain slopes vary from 0.20% to 0.31%, providing a flowing velocity adequate to prevent sedimentation. At Broadway Road, there are two 90" sanitary sewer lines. It is likely that these lines cannot be avoided without the use of an inverted siphon. The proposed siphon is shown in the preliminary storm drain profile, and the appropriate losses are incorporated into the hydraulic computations.

The capacity of the storm drain system at each half-mile of the system is shown with the calculations in the **Appendix**. At the downstream end, the system has a capacity of 465 cfs. At the upstream end, the capacity is 110 cfs. At the Harrison Street alignment, the storm drain capacity is 215 cfs.

According to the Durango ADMP, the basin at 71st Avenue and the Harrison Street alignment (Basin 3) is programmed for a capacity of 58 acre-feet with a by-pass flow of 410 cfs. With the new concept, the bypass flow is set equal to the capacity of the storm drain system (215 cfs). This will require the basin to be up-sized to 125 acre-feet. This can be accomplished due to the extra depth available to drain the basin via the proposed storm drain.

Nearly $1.8 million in ADMP cost can be saved due to the elimination of several ADMP features. These features extend from Buckeye Road to Basin 3 and include BUC14, BUC-C18, BUC15 and a 50% reduction is size for culvert BUC-C17. Furthermore, the channel cost downstream from Buckeye Road will be reduced because of the reduced flows. The reduction in flows is summarized in **Table-2**.

HEC-1 ID	Location	ADMP	w/75th Ave.
~@CPNA	¼-mi. east of 75th Ave on Low. Buckeye Rd.	934	534
~CPJC1	¼-mi south of Low. Buckeye Rd. on 75th Ave.	1041	639
CPJB1	½-mi south of Low. Buckeye Rd. on 83rd Ave.	1268	847
CPED1	½-mi south of Low. Buckeye Rd. on 91st Ave.	1353	916
CPID1	½-mi south of Low. Buckeye Rd. on 99th Ave.	1147	1082
CPIB1	½-mi south of Low. Buckeye Rd. on 107th Ave.	1785	1593
CPIA	½-mi south of Low. Buckeye & ½-mi east of 115th Ave.	2479	2232

Table 2- HEC-1 Summary

Considering the cost savings for the various elements from Buckeye Road to Basin 3 ($1.8 million) as well as the potential to down-size all of the channel elements further downstream, it is recommended that the following combination of elements be constructed as part of the interim and ultimate drainage solution:

1) Obtain the entire required ROW for the channels and basins from the crossing at 75th Avenue south of Lower Buckeye Road up to Buckeye Road and the ROW for Basin 3 and the channel east of Basin 3 to 63rd Avenue. This way, the opportunity will not be lost to complete this part of the system due to land development ($3,270,556). This cost may be reduced due to the reduction in channel size realized by implementing this concept and should be evaluated further before ROW acquisition.

2) Design and construct Basin 3 to have 125 acre-feet capacity and construct the channel east to 63rd Avenue. This would relieve the identified flooding along the north side of the railroad ($2,875,400).

3) Provide a connection to the 75th Avenue storm drain from Basin 3 with capacity for the full capacity of the 75th Avenue storm drain (215 cfs). The basin connection would function as the flow-by system thus making the downstream ADMP features independent from the features north of the UPRR ($734,050).

4) Construct landscaping up to the remaining budget or the District policy landscape level ($1,236,447).

The total budget for the project is $15 million. It is assumed, based on information provided by the City of Phoenix, that the 75th Avenue storm drain project will cost $7,500,000. The items identified above total $8,116,540, which exceeds the remaining $7,500,000 budget by $616,540. The total project cost may be reduced due to the lesser ROW requirement resulting from the reduction in channel size realized by implementing this concept. Additional savings could also be realized during detailed design.

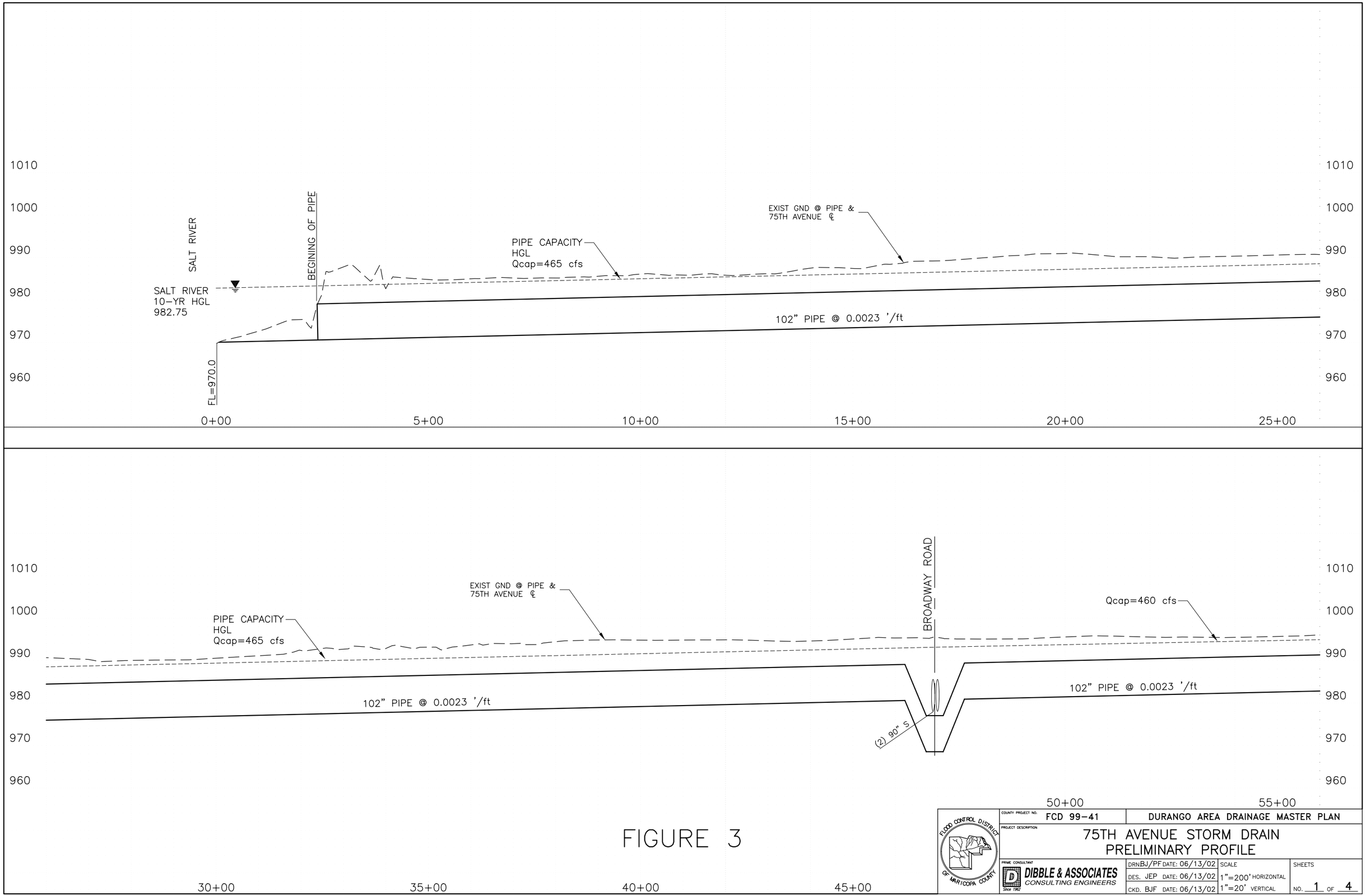


FIGURE 3

COUNTY PROJECT NO. FCD 99-41	DURANGO AREA DRAINAGE MASTER PLAN	
PROJECT DESCRIPTION 75TH AVENUE STORM DRAIN PRELIMINARY PROFILE		
PRIME CONSULTANT DIBBLE & ASSOCIATES CONSULTING ENGINEERS	DRN BJ/PF DATE: 06/13/02	SCALE
	DES. JEP DATE: 06/13/02	1"=200' HORIZONTAL
	CKD. BJF DATE: 06/13/02	1"=20' VERTICAL
		SHEETS NO. 1 OF 4

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

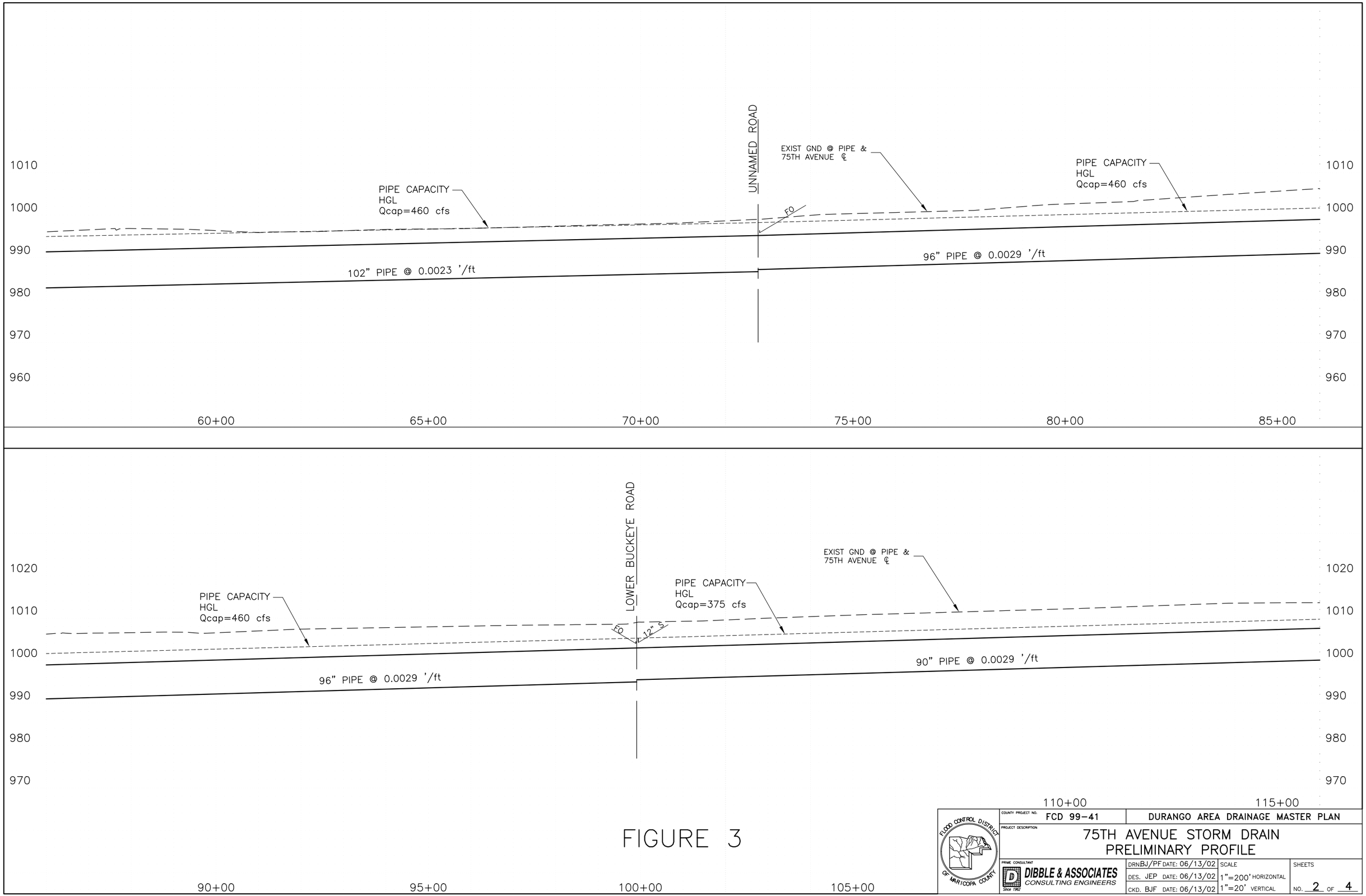


FIGURE 3

COUNTY PROJECT NO. FCD 99-41	DURANGO AREA DRAINAGE MASTER PLAN	
PROJECT DESCRIPTION 75TH AVENUE STORM DRAIN PRELIMINARY PROFILE		
PRIME CONSULTANT DIBBLE & ASSOCIATES CONSULTING ENGINEERS	DRN BJ/PF DATE: 06/13/02	SCALE
	DES. JEP DATE: 06/13/02	1"=200' HORIZONTAL
	CKD. BJF DATE: 06/13/02	1"=20' VERTICAL
		SHEETS NO. 2 OF 4

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

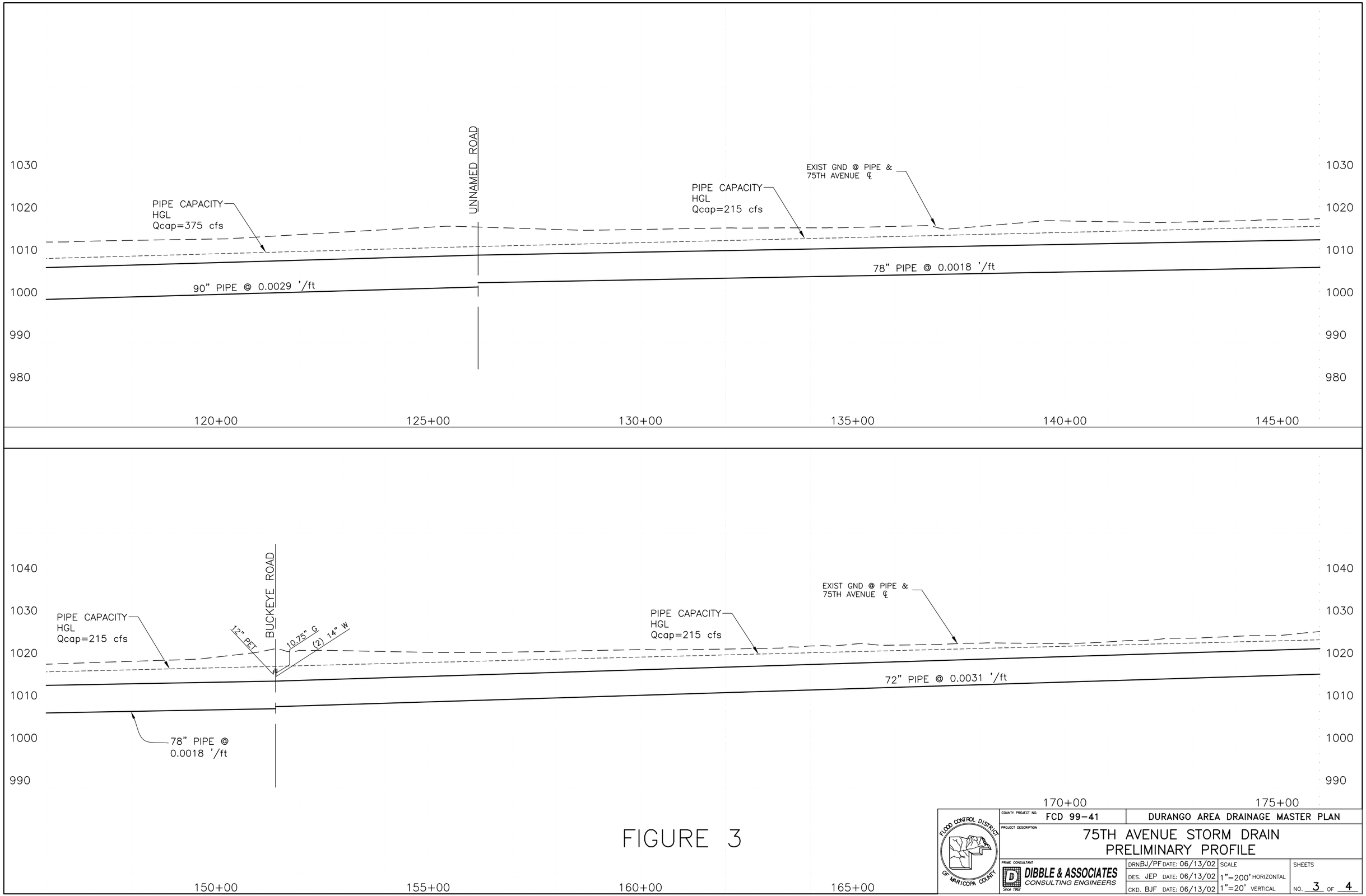


FIGURE 3

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

COUNTY PROJECT NO. FCD 99-41	DURANGO AREA DRAINAGE MASTER PLAN	
PROJECT DESCRIPTION 75TH AVENUE STORM DRAIN PRELIMINARY PROFILE		
PRIME CONSULTANT DIBBLE & ASSOCIATES CONSULTING ENGINEERS Since 1962	DRN BJ/PF DATE: 06/13/02	SCALE
	DES. JEP DATE: 06/13/02	1"=200' HORIZONTAL
	CKD. BJF DATE: 06/13/02	1"=20' VERTICAL
		SHEETS NO. 3 OF 4

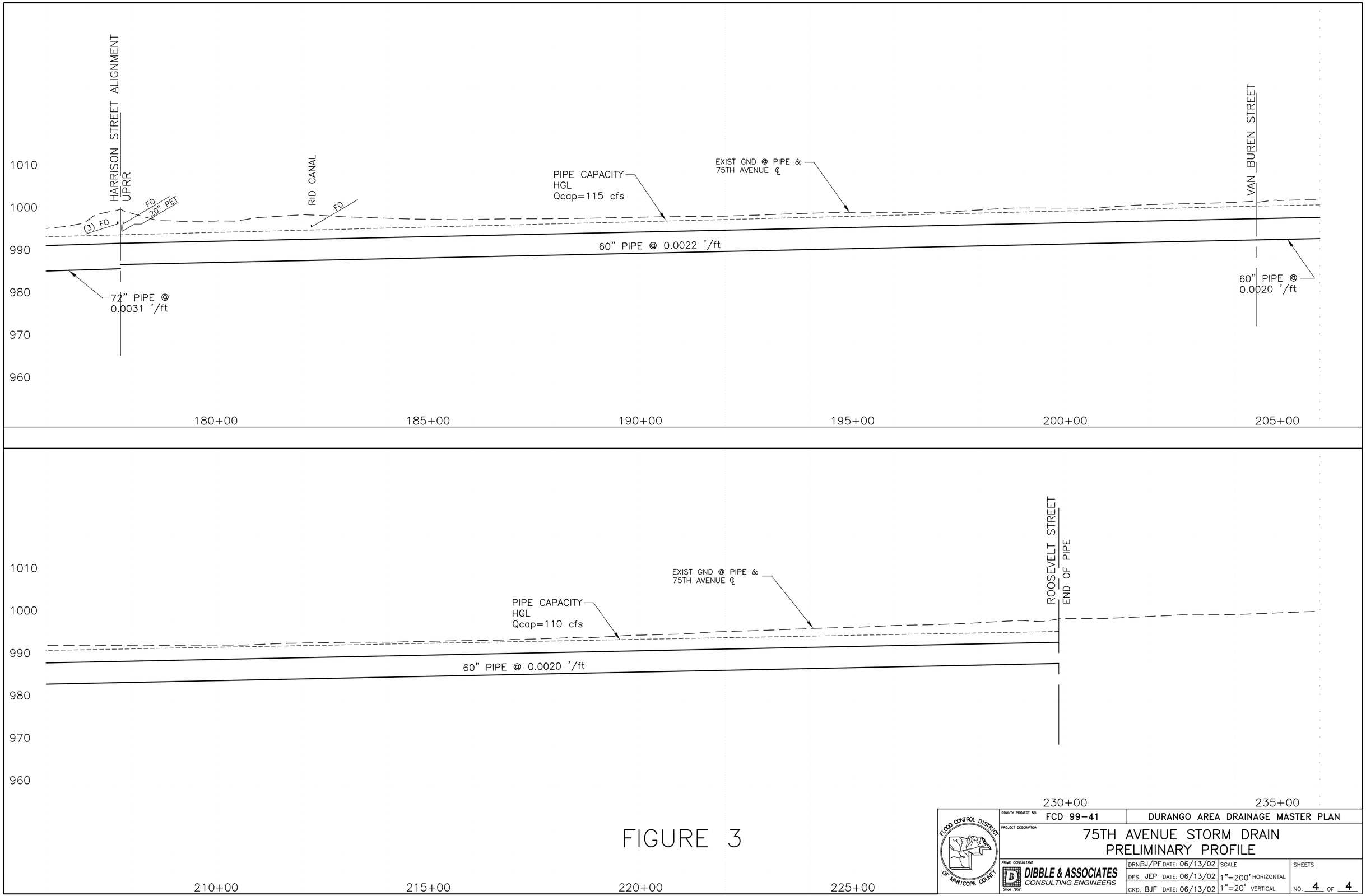


FIGURE 3

COUNTY PROJECT NO. FCD 99-41	DURANGO AREA DRAINAGE MASTER PLAN	
PROJECT DESCRIPTION 75TH AVENUE STORM DRAIN PRELIMINARY PROFILE		
PRIME CONSULTANT DIBBLE & ASSOCIATES CONSULTING ENGINEERS	DRN BJ/PF DATE: 06/13/02	SCALE
	DES. JEP DATE: 06/13/02	1"=200' HORIZONTAL
	CKD. BJF DATE: 06/13/02	1"=20' VERTICAL
		SHEETS NO. 4 OF 4

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

STORM DRAIN SIZING/HGL CALCULATIONS:

MANNING'S n = 0.013

	Station From -	To	|----------Main St. Drain----------| CA	T_c (Min.)	I (in/hr)	Q (cfs)	Slope (ft/ft)	Size (in)	Velocity (fps)	Length (ft)	Delta T_c2 (min)	HGL S_f (ft/ft)	HGL H_f (ft)	Losses # of MH	*1 h_{mh} (ft)	*2 h_j (ft)	angle (degrees)	loss coeff k_b	*3 h_b (ft)	HGL Elev (ft)	(m)
PIPE	22984.6	20450.0				110.00	0.0020	60	5.9	2535	7	0.00178	4.52	5.000	0.14		0.000	0.00	0.00	1036.84	316.03
JCT.	20450.0															0.10				1032.19	314.61
PIPE	20450.0	17774.7				115.00	0.0022	60	6.2	2675	7	0.00195	5.22	5.000	0.15		0.000	0.00	0.00	1032.09	314.58
JCT.	17774.7															1.40				1026.72	312.94
PIPE	17774.7	15139.0				215.00	0.0031	72	8.3	2636	5	0.00258	6.79	5.000	0.27		0.000	0.00	0.00	1025.32	312.52
JCT.	15139.0															-0.36				1018.26	310.37
PIPE	15139.0	12618.1				215.00	0.0018	78	6.7	2521	6	0.00168	4.24	5.000	0.17		0.000	0.00	0.00	1018.62	310.47
JCT.	12618.1															1.66				1014.20	309.13
PIPE	12618.1	9987.3				375.00	0.0029	90	9.4	2631	5	0.00238	6.27	5.000	0.34		0.000	0.00	0.00	1012.54	308.62
JCT.	9987.3															0.66				1005.93	306.61
PIPE	9987.3	7274.3				460.00	0.0029	96	9.8	2713	5	0.00254	6.90	5.000	0.37		0.000	0.00	0.00	1005.26	306.40
JCT.	7274.3															-0.20				997.99	304.19
PIPE	7274.3	4691.4				460.00	0.0023	102	9.1	2583	5	0.00184	4.75	5.000	0.32		0.000	0.00	0.00	998.19	304.25
JCT.	4691.4															0.00				993.12	302.70
PIPE	4691.4	0.0				465.00	0.0023	102	9.1	4691	9	0.00188	8.83	9.000	0.57		60.000	0.76	0.97	993.12	302.70
JCT.	0	@ SALT RIVER														Starting HGL (Salt River 10 year depth)=				982.75	

NOTES:
1. Manhole losses computed as 0.05(V^2/2g)*no. of manholes.
*2. Junction losses per City of Los Angeles Thompson equation.
3. Bend losses computed as k_b(V^2/2g)

APPENDIX I

Summary of Utility Pothole Results

TESTHOLE SUMMARY REPORT

Legend
- Pothole on Hold for RR Permit
- Deleted Pothole

Azurix North America
2527 S. 16th Avenue
Phoenix, Arizona 85007
(602) 254-7344
Prepared by: CLYDE LUNSFORD

Date: 5/22/2001
PROJECT NAME: Durango ADMP
PROJECT NUMBER: 565-02-31
CONTRACT NUMBER:
AZURIX JOB # 02 260900

Data in Feet

UTILITY LOCATION REQUESTS					ACTUAL FIELD RECORDS						
TH#	Street	Northing/ Station (actual)	Easting/ Offset -Lt/+Rt (actual)	Anticipated Utility	Date	Ground Elevation	Top Elevation	Bottom Elevation	Material Type Outside Diameter	Depth of Cover	Calibration Region
1	103RD AVE	#N/A	#N/A	12" WATERLINE	01/00/00	#N/A	#N/A		0	0	II-A
2	99TH AVE	889193.81	391642.77	12" WATERLINE	2/9/2001	999.08	995.25		12" ACP WATERLINE	3.88	II-B
3	91ST AVE	889456.38	396989.7	16" WATERLINE	2/9/2001	1009.57	1003.79		12" ACP WATERLINE	5.78	II-C
4	L. BUCKEYE	881512.98	408423.38	12" WATERLINE	2/5/2001	1009.88	1006.12		12" ACP WATER LINE	3.75	III
5	BUCKEYE RD	886524.03	425777.61	12" WATERLINE	2/5/2001	1041.04	1036.55		12" ACP WATERLINE	4.49	IV
6	DYSART RD	874347.13	370854.92	36" SEWER	1/29/2001	931.63	918.51		48"RCP SEWER	13.12	V-A
7	DYSART RD	875237.83	370857.54	36" SEWER	1/29/2001	933.17	919.64		48" RCP SEWER	13.52	V-A
8	BROADWAY RD	875486.54	372431.18	36" SEWER	1/30/2001	933.24	922.29		48" RCP SEWERLINE	10.95	VA
9A	103RD AVE	886843.66	387967.6	15" SEWER	4/17/2001	995.7	0	979.1	NORTH MANHOLE 15" SEWER	0	II-A
9B	-	886843.66	387967.6	15" SEWER	4/17/2001	990.73	0	977.71	SOUTH MANHOLE 15" SEWER	0	II-A
10	99TH AVE	889194.41	391715.57	60" SEWER	2/12/2001	1001.71	997.96		60" RCP SEWERLINE	3.76	II-B
11A	99TH AVE	889194.06	391670.38	42" SEWER	2/12/2001	1001	998.14		42"RCP SEWER	2.86	II-B
11B	99TH AVE	889194.42	391705.34	SEWER	2/12/2001	1001.89	993.07		60" RCP SEWERLINE	8.8	II-B
12 MH	94TH AVE	889133.95	394339.01	60" SEWER	2/13/2001	1003.6	990.87	985.71	NO UTILITY FOUND (DIPPED MH)	12.73	II-B
13	94TH AVE	889286.6	394332.96	42" SEWER	2/12/2001	1003.88	997.55		12" VCP SEWERLINE	6.36	II-B
14A	91ST AVE	889458.07	396953.19	24" SEWER	2/8/2001	1009.37	1001.32		24" VCP SEWERLINE	8.06	II-C
14B	UPRR	889456.32	396932.92	24" SEWERLINE	2/8/2001	1009.45	1002.56		18" VCP SEWERLINE	6.89	II-C
15	91ST AVE	878114.27	396878.2	72" SEWER	2/8/2001	989.83	982.94		72" RCP SEWERLINE	6.88	VI-A
16	83RD AVE	878874.53	402048.72	30" SEWER	1/30/2001	999.03	985.26		36" ACP SEWER LINE	13.77	VI-B
17	75TH AVE	878824.98	407259.63	42" SEWER	1/31/2001	1000.09	992.77		36" ACP SEWERLINE	7.32	V-B
18	L. BUCKEYE	886648.05	408785.24	12" SEWER	2/5/2001	1026.49	1017.71		18" CLAY SEWERLINE	8.78	III
19A	UPRR	889192.86	424432.33	18" SEWER	4/17/2001	1049.36	0	1038.54	WEST MANHOLE 18" ACP SEWER	0	IV
19B	-	889193.23	424842.72	18" SEWER	4/17/2001	1049.79	0	1039.72	EAST MANHOLE 18" ACP SEWER	0	IV
20	L. BUCKEYE	881235.44	425852.06	87" SEWER	2/6/2001	1026.39	1016.23		87" ACP SEWERLINE	10.18	IV
21	47TH AVE	884041.42	425891.97	66" SEWER	2/13/2001	1032.2	1019.46		66" ACP SEWERLINE	12.72	IV
22	UPRR	0	0	FIBER OPTIC (MCI)	01/00/00	#N/A	#N/A		0	0	III
23	RID CANAL	0	0	FIBER OPTIC (ATT)	01/00/00	#N/A	#N/A		0	0	III
24	L. BUCKEYE	881479.24	408422.5	FIBER OPTIC (SPRINT)	1/30/2001	1009.78	1005.27		4" BLACK IRON PIPE	4.52	III
25	73RD AVE	0	0	FIBER OPTIC (MCI)	01/00/00	#N/A	#N/A		0	0	VI
26	RID CANAL	884082.18	425824.87	FIBER OPTIC (ATT)	2/1/2001	1034.22	1028.51		1 - 3/4" DIRECT BURIAL &	5.7	IV
27	L. BUCKEYE	881215.56	425800.44	FIBER OPTIC (SPRINT)	1/30/2001	1026	1021		4" BLACK IRON PIPE SPRINT FO	5	IV
28	91ST AVE	871529.91	397023.89	114" EFFLUENT	2/14/2001	967.82	962.8		36" RCP EFFLLUENT LINE	5.03	VI-A
29	UPRR	0	0	20" PETROLEUM	01/00/00	#N/A	#N/A		0	0	II-B
30	UPRR	0	0	20" PETROLEUM	01/00/00	#N/A	#N/A		0	0	II-C
31	UPRR	0	0	20" PETROLEUM	01/00/00	#N/A	#N/A		0	0	III
32	UPRR	889472.81	409114.67	6" PETRO	4/16/2001	1034.05	1028.75		7.5" MASTIC COATED STEEL	5.34	III
33	UPRR	889310.51	408881.6	20" PETROLEUM	4/16/2001	1029.7	1026.59		22" PLASTIC COATED STEEL	3.06	III
34	UPRR	0	0	12" PETROLEUM	01/00/00	#N/A	#N/A		0	0	III

TESTHOLE SUMMARY REPORT

Legend
- Pothole on Hold for RR Permit
- Deleted Pothole

Azurix North America
2527 S. 16th Avenue
Phoenix, Arizona 85007
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Prepared by: CLYDE LUNSFORD

Date: 5/22/2001
PROJECT NAME: Durango ADMP
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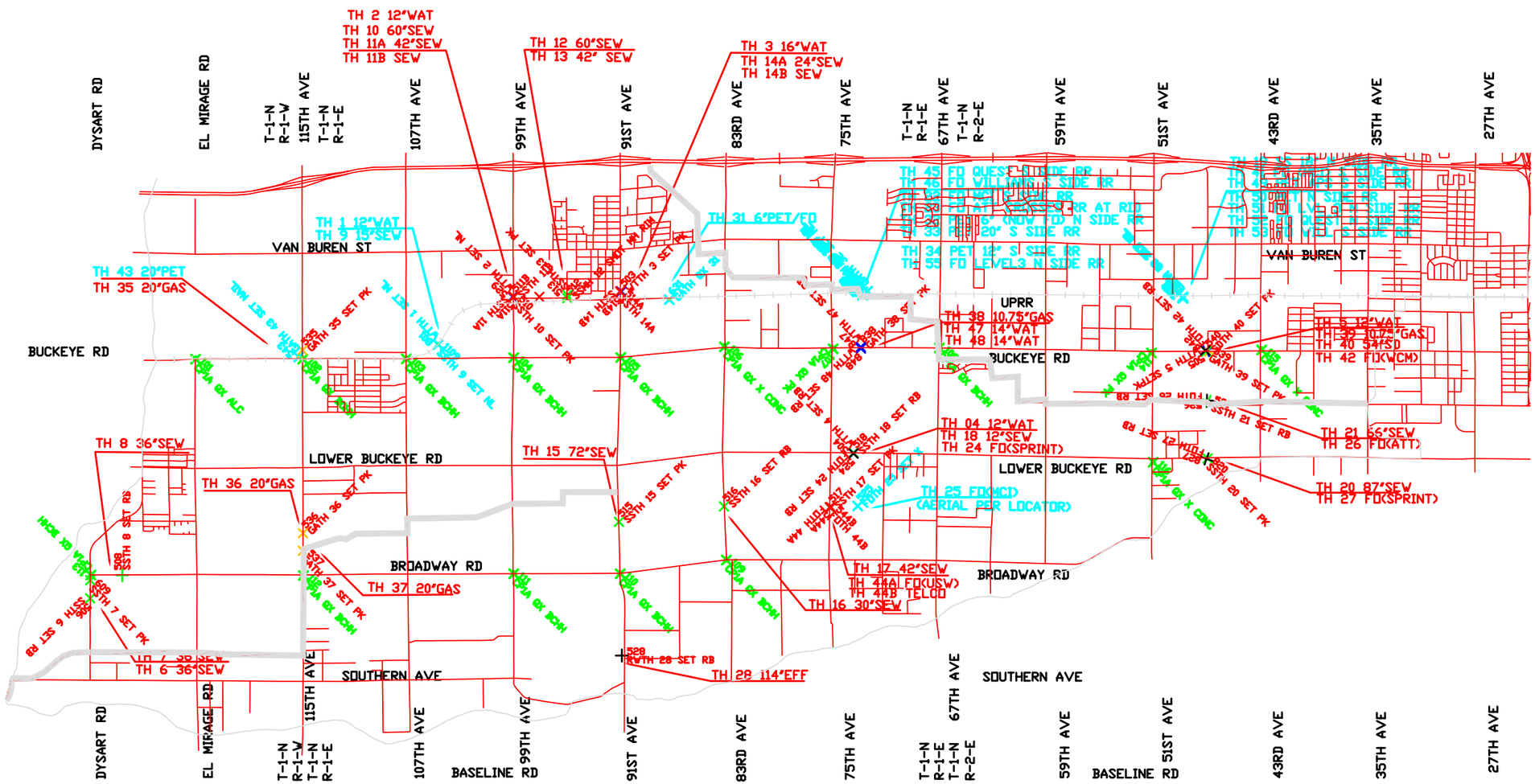
Data in Feet

UTILITY LOCATION REQUESTS					ACTUAL FIELD RECORDS						
TH#	Street	Northing/ Station (actual)	Easting/ Offset -Lt/+Rt (actual)	Anticipated Utility	Date	Ground Elevation	Top Elevation	Bottom Elevation	Material Type Outside Diameter	Depth of Cover	Calibration Region
35	115TH AVE	886565.13	381301.92	20" GAS	1/31/2001	983.31	978.08		20" MASTIC COATED STEEL	5.24	I
36	115TH AVE	877554.98	381323.14	20" GAS	1/31/2001	962.41	957.58		20" MASTIC COATED STEEL	4.86	V-B
37	115TH AVE	876689.64	381325.23	20" GAS	1/31/2001	955.63	945.89		20" MASTIC COATED STEEL	9.77	V-B
38	BUCKEYE RD	886698.32	408788.93	10.75" GAS	2/1/2001	1026.55	1021.13		10.75" MASTIC COATED	5.42	III
39	BUCKEYE RD	886533.74	425867.16	10.75" GAS	1/31/2001	1040.4	1036.82		10.75" MASTIC COATED STEEL	3.58	IV
40	BUCKEYE RD	886504.07	425791.47	54" STORM DRAIN	2/5/2001	1041.3	1034.47		54" RCP STORM DRAIN	6.84	IV
41	UPRR	#N/A	#N/A	FIBER OPTIC (MCI)	01/00/00	#N/A	#N/A		0	0	IV
42	BUCKEYE RD	886548.2	425744.43	FO (LDDS WORLDCOM)	2/9/2001	1041.06	1036.97		4" STEEL CONDUIT	4.14	IV
43	UPRR	0	0	20" PETROLEUM	01/00/00	#N/A	#N/A		0	0	I
44A	75TH AVE	878836.38	407317.4	FIBER OPTIC (US WEST)	2/8/2001	1000.33	996.9		2 - 4.5" PVC CONDUITS	3.42	VI-B
44B	POWER ESMT	878834.24	407249.89	US WEST TELCOM	2/7/2001	1000.98	997.79		1.5" DIRECT BURIAL TELCOM	3.2	VI-B
45	UPRR	0	0	FIBER OPTIC (QWEST)	01/00/00	#N/A	#N/A		0	0	III
46	UPRR	0	0	FIBER OPTIC (WILLIAMS)	01/00/00	#N/A	#N/A		0	0	III
47	BUCKEYE RD	886723.25	408786.37	12" WATERLINE	2/1/2001	1025.42	1020.85		14" ACP WATERLINE	4.58	III
48	BUCKEYE RD	886648.05	408785.24	12" WATERLINE	1/30/2001	1026.49	1021.87		14" ACP WATERLINE	4.64	III
49	UPRR	0	0	PETROLEUM APS	01/00/00	#N/A	#N/A		0	0	IV
50	UPRR	889193.93	424636.22	PETROLEUM	5/22/2001	1049.69	1044.38		11" COATED STEEL	5.33	IV
51	UPRR	0	0	FIBER OPTIC (LEVEL 3)	01/00/00	#N/A	#N/A		0	0	IV
52	UPRR	0	0	FIBER OPTIC (QWEST)	01/00/00	#N/A	#N/A		0	0	IV
53	UPRR	0	0	FIBER OPTIC (WILLIAMS)	01/00/00	#N/A	#N/A		0	0	IV
55	UPRR	0	0	0	01/00/00	#N/A	#N/A		0	0	III

DURANGO ADMP

POTHOLE LOCATIONS AS EXCAVATED



LEGEND

- CONTROL POINTS AT COORDINATES PROVIDED
- TEST HOLES COMPLETE, CALIBRATED BY REGION
- TEST HOLES NOT YET EXCAVATED, CALIBRATED BY REGION

N

1"=6000'

Azurix
UNDERGROUND INFRASTRUCTURE
2527 S. 16TH AVE.
PHOENIX, AZ 85007
PH 602-254-7344
FX 602-254-7412
azurixmap@aol.com

REV.	DESCRIPTION	BY	DATE

JOB NAME: DURANGO ADMP	DRAWN BY: CL	CHECKED BY: DP
LOCATION: 47TH AVE TO 115TH AVE, MARICOPA CO., PHOENIX, TOLLESON, AZ	SCALE: 1"=2500'	
	DATE: 03-01-01	
SHEET NAME: PHLOC	JOB NUMBER: 02 260900	SHEET: __ OF __

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