Appendix G

Recycled Water

Antelope Valley Area of Adjudication

APPENDIX G – RECYCLED WATER

Recycled Water Supplies

The primary recycled water plants within the designated Antelope Valley groundwater basin adjudication boundary are the Lancaster Water Reclamation Plant (LWRP) and the Palmdale Water Reclamation Plant (PWRP). Other recycled water facilities in the basin include Rosamond Community Services District and at the Edwards Air Force Base (EAFB). The locations of these recycled water facilities are shown in Figure G-1. This appendix provides a discussion of the facilities as well as historic recycled water amounts and methods of recycled water discharge for each plant.

Lancaster Water Reclamation Plant

The LWRP facilities were built in 1959 and are operated by County Sanitation District No. 14 of Los Angeles County (District No. 14). Historically, the vast majority of recycled water produced at LWRP has received secondary treatment, with a small amount of tertiary treated water (up to 0.5 MGD) being generated since 1969. Existing facilities include the treatment plant with adjacent oxidation ponds and storage reservoirs. Primary treatment is provided via sedimentation and secondary treatment is via biological stabilization in oxidation ponds. Tertiary treatment has been provided at the Antelope Valley Tertiary Treatment Plant (AVTTP) since 1969 by coagulation, secondary sedimentation, dual-media gravity filtration, phosphorus removal, and chlorination (ESA, 2004a). In addition, a new membrane bioreactor (MBR) tertiary treatment plant began operations in 2007 with a recycled water production capacity of approximately 1.0 MGD. The locations of the treatment facilities are shown in Figure G-2. The LWRP currently has a permitted capacity of 16 million gallons per day (mgd).

Available data for the annual amounts of influent received and effluent produced by LWRP date back to 1975. The amount of recycled water generated by the facility has increased from 1.4 million gallons per day (MGD) or 1,600 acre-feet per year (AFY) in 1976 to approximately 12.4 MGD (13,900 AFY) in 2005 and 2006, before slightly declining to about 11.7 MGD (13,100 AFY) by 2009 (Figure G-3). Recycled water from LWRP has been discharged to Paiute Ponds, Nebeker Ranch, Apollo Lakes and Park, and via evaporation from treatment ponds and storage reservoirs (Figure G-2). Since 2006, increasing amounts of recycled water have been utilized at the Eastern Agricultural Site. Historic estimates of the annual amounts of recycled water discharged by these methods are presented in Table G-1. In the five years from 2001 to 2005, Paiute Ponds has received 60 to 70 percent (7,300 to 9,700 AFY) of the total recycled water produced at LWRP, Nebeker Ranch received 30 to 35 percent of the total (3,900 to 4,500 AFY), and Apollo Lakes received about 1.5 percent of the total (about 200 AFY). Since then, the Paiute Ponds received gradually less recycled water (6,700 AF or 51 percent of the total in 2009) and Nebeker Ranch received slightly more (almost 4,900 AF or 37 percent in 2009).

The four existing 30 to 35 acre storage reservoirs have a total capacity of 470 million gallons or 1,440 acre-feet (RWQCB, November 2006). The current operation of the storage reservoirs is based on an agreement between District No. 14 and EAFB to generate overflows only during winter months and not year-round. Discharges to Paiute Ponds occur year round; however, during the summer months, only sufficient water to replenish evaporation losses is discharged to Paiute Ponds. Due to the low seasonal demand of recycled water for agricultural reuse and low evaporation rates for recycled water during the winter months, the reservoirs typically fill up by late fall. After the storage reservoirs become full, recycled water in excess of daily demand flows to Paiute Ponds, and ultimately begins to overflow into Rosamond Dry Lake (which is property of Edward's Air Force Base) during winter months. These overflows typically stop by April as seasonal recycled water demands for agricultural reuse and evaporation rates begin to increase again. The overflows may be considered a nuisance condition by EAFB because the Rosamond Dry Lake bed has been designated by EAFB as an emergency aircraft landing area (ESA, 2004a); subsequently, District No. 14 has been ordered by the Regional Water Quality Control Board (RWQCB) to maintain Paiute Ponds but minimize the overflows to Rosamond Dry Lake.

Palmdale Water Reclamation Plant

The Palmdale Water Reclamation Plant (PWRP) began operations in 1953, and is operated by County Sanitation District No. 20 of Los Angeles County (District No. 20). Historically, the recycled water produced at PWRP has received secondary treatment. Existing facilities include the treatment plant and oxidation ponds. Primary treatment is provided via sedimentation, and secondary treatment is via biological stabilization in oxidation ponds. The effluent has been disinfected since 2005. As the amount of influent to the facility has increased, the oxidation pond facilities have expanded over time. The expansion of the oxidation pond area over time is shown in Table G-2. The original pond area of 21 acres and associated capacity of 100 acre-feet in 1953 was expanded in 1958, 1972, 1980, and 1988. Through 2005, the oxidation pond area and capacity were 148 acres and 592 acre-feet, respectively.

The amount of influent to the facility has increased from 0.22 MGD (or 250 AFY) in 1954 to 1.6 MGD (1,800 AFY) in 1976 and more recently to 9.7 MGD (10,900 AFY) since 2005 (Figure G-4). Recycled water produced at PWRP has always received secondary treatment. Prior to 1980 recycled water was discharged via pond evaporation, pond percolation, and agricultural reuse operations. In accordance with a contract agreement between District No. 20 and Los Angeles World Airports (LAWA), discharge operations were directed by LAWA between 1981 and 2002. Recycled water from PWRP was discharged by LAWA primarily via land application with a small amount being used for agricultural reuse operations. Since 2002 recycled water from PWRP has been increasingly discharged via agricultural reuse operations under the direction of District No. 20. The locations of treatment and effluent management areas are shown in Figure G-5.

Historic recycled water discharge practices involving land application and agricultural reuse above agronomic rates contributed to elevated nitrate concentrations in the upper 150 feet of the water table below the effluent management area. In 2000, District No. 20 and LAWA were ordered to take action to mitigate suspected elevated nitrate concentrations in groundwater by the RWQCB. Among other actions, District No. 20 renegotiated its agreement with LAWA in 2002 to regain control of recycled water discharge practices. Recycled water discharge practices involving land application and agricultural irrigation above agronomic rates have gradually been phased out since 2002 by District No 20 such that strict land application had ceased by the end of 2005 and land application with crop practices (resulting in some irrigation application above agronomic rates) has almost completely ceased by the end of 2009.

Rosamond CSD Plant

Rosamond Community Services District (RCSD) operates a single wastewater treatment facility that is designed for a treatment capacity of 2.0 MGD. The average daily recycled water flow rate as of 2000 was estimated at 1.05 MGD. Recycled water is discharged to a series of 17 clay-lined oxidation/evaporation ponds. The pond capacity is designed to handle the winter season flows without need for other discharge facilities (RWQCB, May 2000).

According to the Integrated Regional Water Management Plan (Kennedy/Jenks, 2007), the RCSD wastewater treatment facility has a permitted capacity of 1.3 MGD. In 2005 an average flow of 1.1 MGD was treated to secondary standards that could be made available for reuse.

EAFB Plant

The EAFB Main Base Wastewater Treatment Plant consists of tertiary treatment facilities that discharge recycled water to evaporation ponds and reclamation sites. As of 2001, the facility was permitted for treating a design average daily flow of 2.5 MGD and for a design peak daily flow of 4.0 MGD (RWQCB, 2001).

Prior to 1985, recycled water was discharged to bermed depressions referred to as Ponds 1 and 2 that were located at the edge of Rogers Lake playa. In 1986, recycled water was discharged to five 50-acre evaporation ponds located on the edge of the playa, and Ponds 1 and 2 were no longer used. During warmer months, tertiary treated recycled water is used for landscape irrigation. The recycled water irrigation system capacity is 2.5 MGD, the majority of which is used for golf course irrigation. The main water table is considered suitable for domestic water supplies and is located approximately 90 to 120 feet below the evaporation ponds and golf course. During cooler months when irrigation demands are low, EAFB is authorized to discharge secondary treated recycled water to the evaporation ponds (RWQCB, 2001).

Based on data obtained from EAFB for the years from 2000 to 2006, the amount of recycled water produced by the facility ranged from 0.79 MGD in 2001 and 2003 (880 AFY) to 1.46 MGD in 2005 (1,630 AFY). In 2005, 720 AF was applied for irrigation and the remaining 910 AF was discharged to the evaporation ponds.

Deep Percolation of Recycled Water

Water balances for the LWRP and PWRP were constructed based upon available data and reports. The estimated annual amounts of deep percolation for LWRP and PWRP were determined from the water balances for each facility. The following paragraphs provide a description of the data sources and reports used in compiling each water balance, and subsequent modifications that were made to improve the balance between measured influent and measured effluent (i.e., adjustments to pond percolation).

Lancaster Water Reclamation Plant

The annual amounts of deep percolation of recycled water generated at LWRP have been estimated based upon various studies conducted for LWRP on Paiute Ponds and the LWRP treatment ponds and storage reservoirs. For the purposes of this discussion, deep percolation is defined as recycled water that percolates below the root zone, in the case of agricultural operations, or that percolates through the bottom of an impoundment (e.g., storage reservoirs or Paiute Ponds). Deep percolation is different than groundwater recharge or return flows since a portion of the percolate may not reach the main aquifer due to shallow lateral flow, or because percolate may not reach the main aquifer until several years or decades after initial deep percolation. Deep percolation for Nebeker Ranch is included in the section of this report on agricultural irrigation deep percolation (Appendix D).

Paiute Ponds are located adjacent to Rosamond Dry Lake and the Edwards Air Force Base boundary. Subsurface investigations in this area indicate that relatively thick clay layers are present beneath the ponds, which is consistent with their location adjacent to the dry lakebed (CH2MHill, 2005a and 2005b). Migration of deep percolate from Paiute Ponds to the regional aquifer is expected to be minimal due to the presence of these thick clay layers. Various groundwater investigations indicate that recharge from Paiute Ponds to the regional aquifer (i.e., groundwater recharge or return flow) is likely limited to no more than 20 AFY (CH2M Hill, 2006a**;** GTC, 2006).

The LWRP has utilized oxidation ponds since 1959 and four storage reservoirs since 1988. As of 2006, the LWRP had 270 acres of oxidation ponds and 140 acres of storage reservoirs with a capacity of 1,440 AF (RWQCB, November 2006). A study conducted by CH2MHill (2006b) estimated that the total percolation from the oxidation pond and storage reservoirs is approximately 200 AFY. This leakage estimate was proportionately reduced (according to acreage) to 125 AFY for the time period prior to 1988 when the storage reservoirs did not exist. It was assumed that a spike in pond percolation occurred upon installation and use of the storage reservoirs immediately after 1988 due to the fact that initial percolation rates are typically quite high and then decline over time to a more or less constant rate.

The overall annual water balance for LWRP and estimates of deep percolation are shown in Table G-1. Influent and effluent have been metered since 1975. Net reservoir/pond evaporation represents the wetted area for that year times average annual evaporation minus average annual precipitation. As described above, an estimate of pond percolation (200 AFY) for recent years was obtained from a previous study. This pond percolation value was reduced to 125 AFY prior to 1989 to account for the lack of storage reservoirs during this time. A spike in pond percolation was added for 1989 to 1991 to account for initial high percolation rates that would be expected upon installation and use of the storage reservoirs at the site. The amount of pond percolation between 1989 and 1991 was calculated so that a zero difference was achieved between the measured effluent and the quantity of measured influent minus evaporation minus pond percolation. A comparison of the annual metered effluent volumes to the influent less evaporation and percolation indicates significant differences in some years. Most of these differences could not be reconciled by making reasonable adjustments to evaporation and/or percolation on a yearly basis. Based on review of available data, including comparison of metered influent and effluent flow volumes, it appears that there may be some errors in the flow measurements that account for the differences. Since effluent flow readings are likely more accurate than influent flow readings, it was assumed for this study that effluent measurements are correct.

Total deep percolation was calculated as the sum of Paiute Pond and LWRP pond/storage reservoir deep percolation. Annual amounts of deep percolation were calculated to be less than 500 AFY for most years (Table G-1).

Palmdale Water Reclamation Plant

The amounts of deep percolation of recycled water generated at PWRP have been estimated based upon available data and various studies conducted for PWRP.

PWRP operations between 1953 and 1980 resulted in minor deep percolation (less than 1,000 AFY) due to the relatively small volumes of annual influent (generally less than 2,000 AFY), and the ability to discharge recycled water via pond evaporation and agricultural reuse. Effluent management operations were modified in the early 1980's when District No. 20 and Los Angeles World Airports (LAWA) reached an agreement whereby LAWA was to receive and distribute the treated effluent for agricultural reuse. However, agricultural reuse operations did not pan out as expected and most of the recycled water was discharged via land application between the early 1980's and 2002. Thus, estimated deep percolation ranged up to a maximum of about 7,600 AFY by 2001 (Table G-2).

District No. 20 reached a new agreement with LAWA in 2002 that returned recycled water management back to District No. 20. Since 2002, agricultural reuse of recycled water had been increasing while land application of recycled water was being reduced. Land application without crops had ceased by the end of 2005, and land application with crops has been almost completely eliminated by the end of 2009. Accordingly, the estimated amount of deep percolation has decreased from about 7,600 AFY in 2001 to less than 3,000 AFY in 2005, and to less than 500 AFY currently.

The overall annual water balance for PWRP and estimates of deep percolation are shown in Table G-2. Influent and effluent have been metered since 1979. Prior to 1979, the amounts of influent, effluent, and pond percolation were estimated by Geomatrix and District No. 20 based upon the design capacity of the facility over time and other available historic data.

Beginning in 1979, data are available for measured influent and effluent. The calculation of influent less net pond evaporation less pond percolation typically has a residual error on a yearly basis since it does not equal the metered effluent. These differences are likely due to influent flow measurement errors, lack of accounting for deviations from annual averages for evaporation and precipitation, and/or errors in pond percolation estimates. It is expected that pond percolation increased significantly in the years immediately following construction and use of new ponds. Thus, the annual differences were balanced out over the period of record by adjusting pond percolation upward to account for temporary spikes in pond percolation after new ponds were brought into service.

Total deep percolation was calculated as 100% of pond percolation plus 80% of land applied recycled water (Sanitation Districts of Los Angeles County, 1999). Deep percolation related to agricultural reuse operations are accounted for under the section of this report describing agricultural irrigation deep percolation (Appendix D). The annual amounts of deep percolation were calculated to be less than 1,000 AFY until 1980. From 1980 until 2001 the annual amounts of deep percolation increased from 1,300 AFY to 7,600 AFY. The increases in deep percolation between 1980 and 2001 were due to increasing amounts of influent and because the primary discharge method during this time was land application of recycled water. The amount of deep percolation has decreased since 2002 through 2009 because of increasing agricultural reuse operations and decreasing land application (with and without crops) of recycled water.

List of Tables

List of Figures

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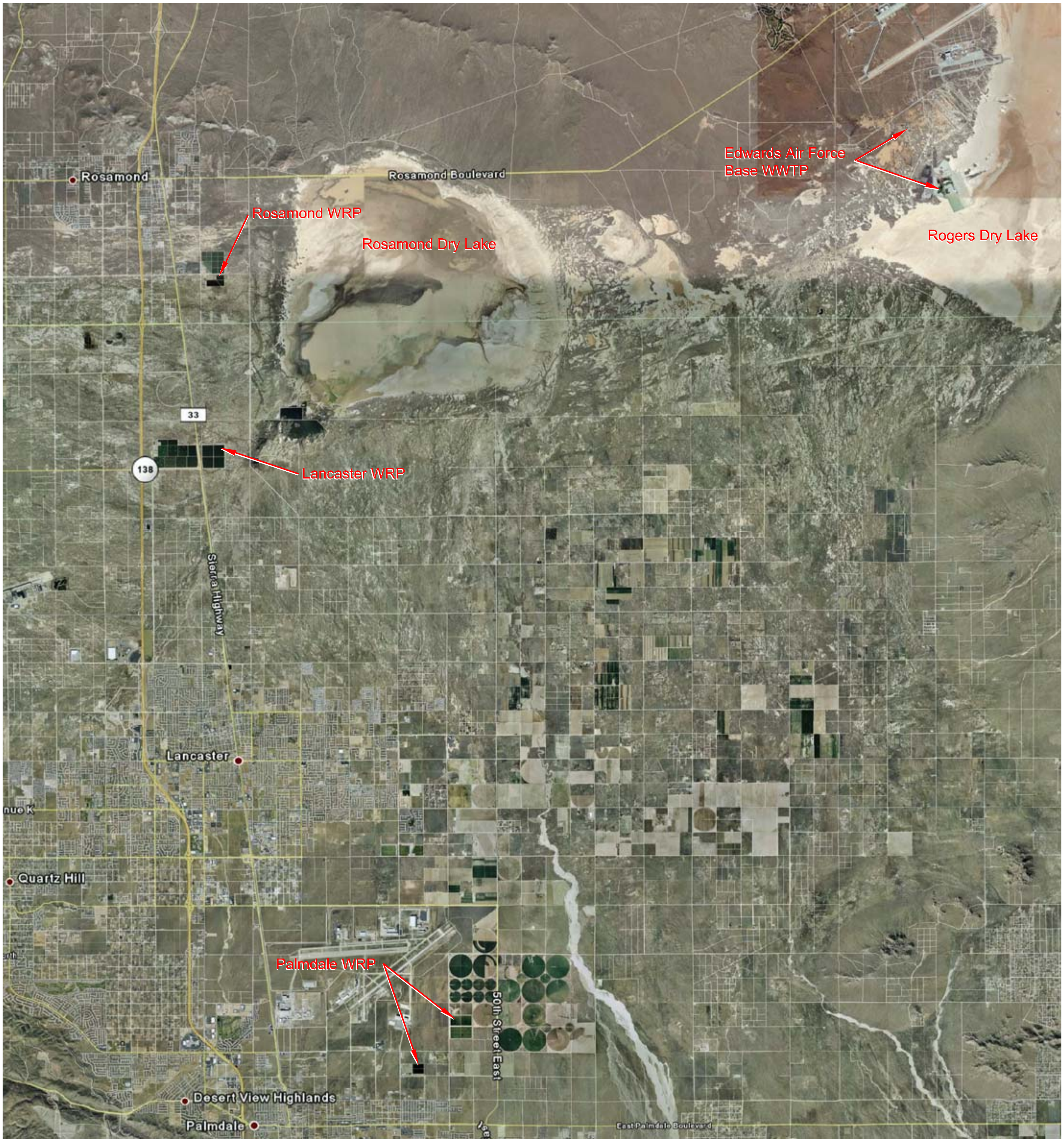
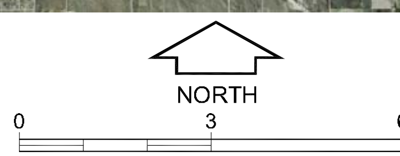


SOURCE: Google Earth Image.



WATER RECLAMATION PLANT LOCATION MAP
Antelope Valley, California

FIGURE G-1

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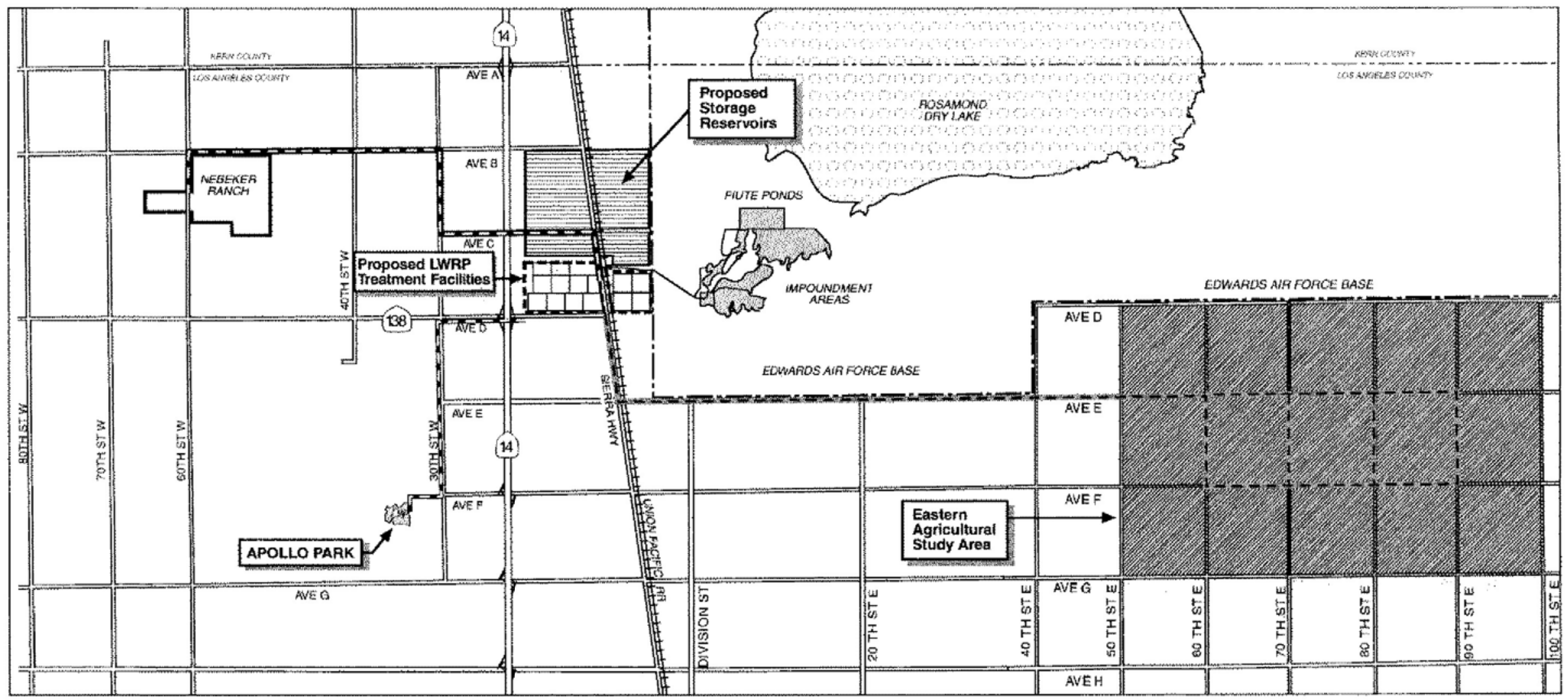
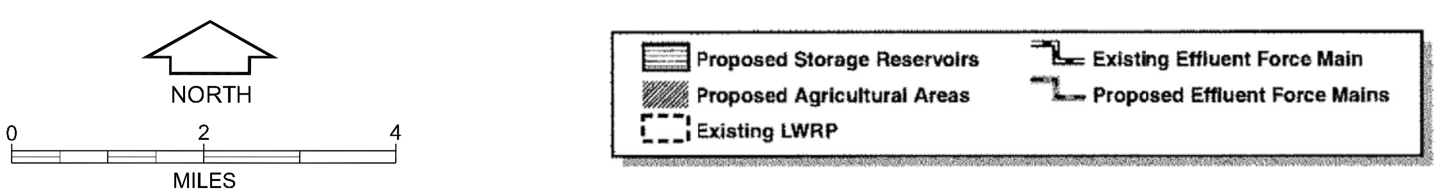


BASE MAP SOURCE: Environmental Science Associates (2004)



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LANCASTER WATER RECLAMATION PLANT FACILITIES
Antelope Valley, California

FIGURE G-2

Figure G-3
Recycled Water Volumes, 1975 - 2009

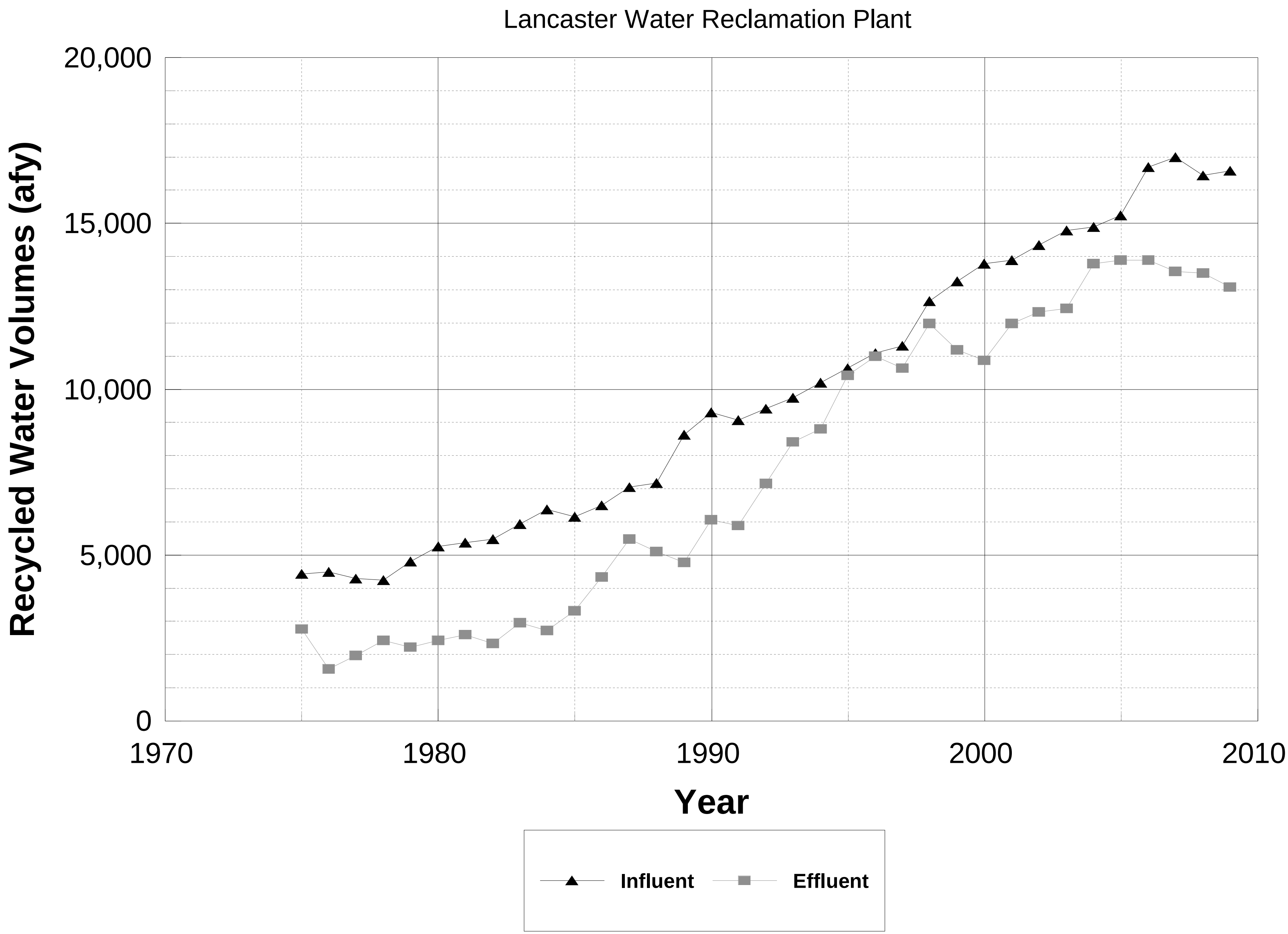
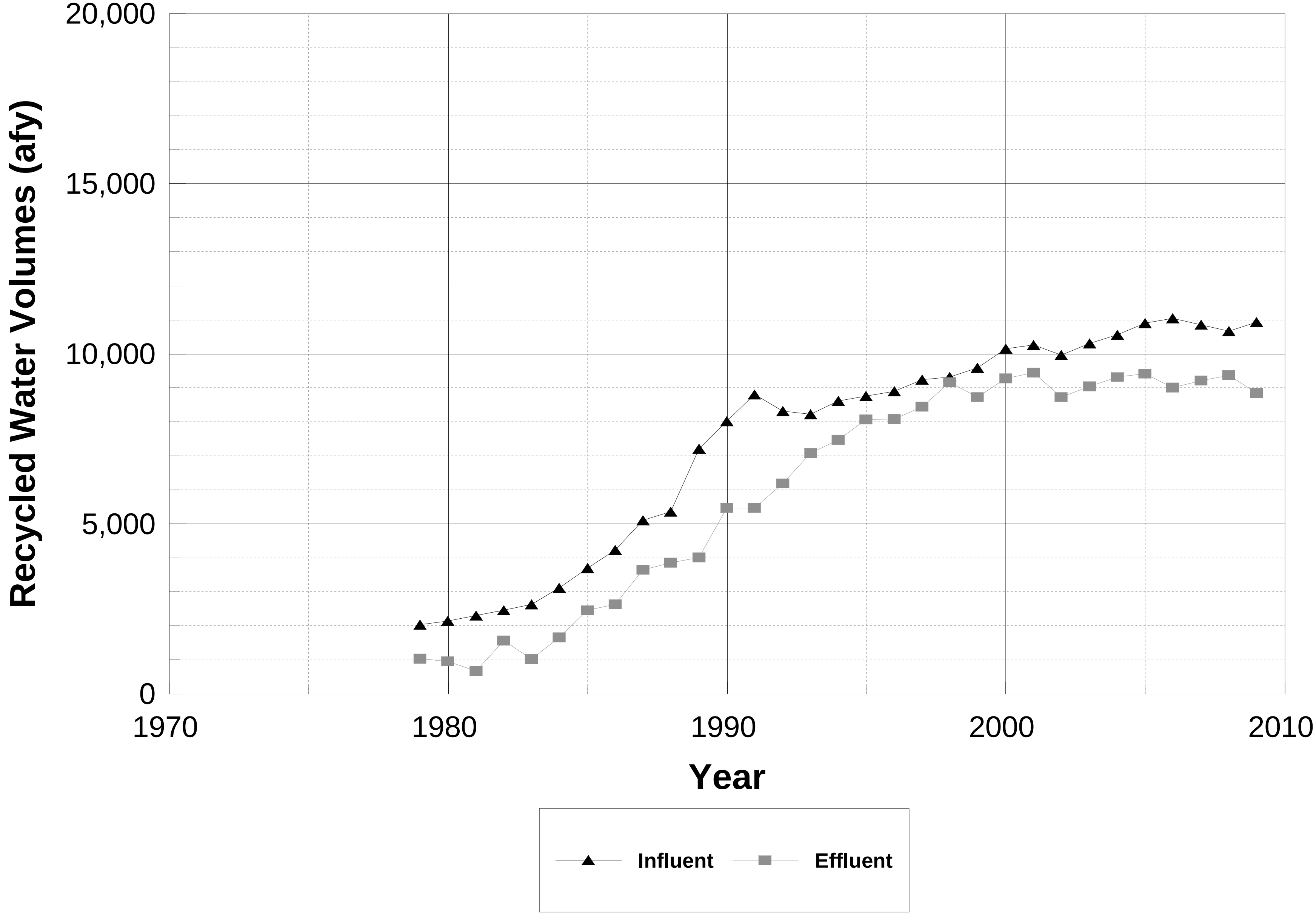


Figure G-4
Recycled Water Volumes, 1979 - 2009
Palmdale Water Reclamation Plant



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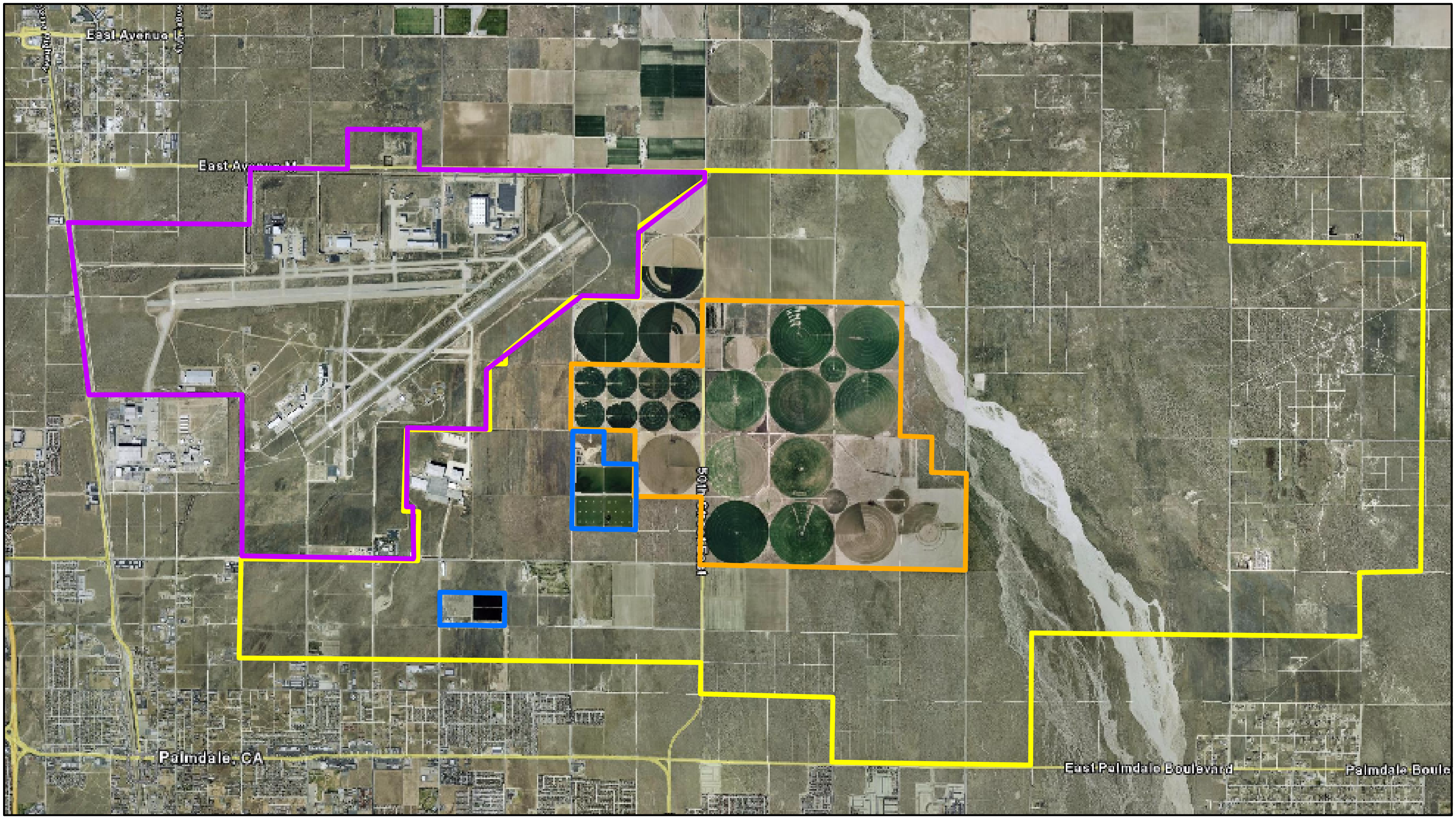

SOURCE: Environmental Science Associates (2005) and Google Earth Image.

Legend

- District-Owned Property
- USAF Plant 42
- LAWA Boundary
- Effluent Management Site

Meters
0 375 750 1,500 2,250 3,000

PALMALE WATER RECLAMATION PLANT FACILITIES
Antelope Valley, California

FIGURE G-5

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Table G-1. Estimated Historic Annual Water Balance for Lancaster Water Reclamation Plant (Values in Acre-Feet per Year)

Year	Metered Influent	Net Pond and Reservoir Evaporation	Pond and Reservoir Percolation	Influent less Evaporation and Percolation	Metered Effluent	Difference between (Influent less Evap and Perc) and Metered Effluent	Discharge to Paiute Ponds	Estimated Paiute Pond Deep Percolation	Discharge to Nebeker Ranch	Discharge to Apollo Lakes	District Uses	Sum of Paiute, Nebeker, and Apollo Discharges	Effluent minus Sum of Discharges	Total Deep Percolation
1975	4,439	1,800	125	2,514	2,780	-266	840	20	0	87	0	927	1,853	145
1976	4,506	1,800	125	2,581	1,581	1,000	1,277	20	0	282	0	1,559	22	145
1977	4,305	1,800	125	2,380	1,984	396	1,699	20	0	279	0	1,978	6	145
1978	4,260	1,800	125	2,335	2,433	-98	2,159	20	0	297	0	2,456	-23	145
1979	4,820	1,800	125	2,895	2,231	664	1,982	20	0	244	0	2,226	5	145
1980	5,269	1,800	125	3,344	2,433	911	2,172	20	0	270	0	2,442	-9	145
1981	5,381	1,800	125	3,456	2,601	855	2,323	20	0	278	0	2,601	0	145
1982	5,493	1,800	125	3,568	2,343	1,225	2,125	20	0	211	0	2,336	7	145
1983	5,941	1,800	125	4,016	2,971	1,045	2,767	20	0	191	0	2,958	13	145
1984	6,390	1,800	125	4,465	2,735	1,730	2,588	20	0	167	0	2,755	-20	145
1985	6,165	1,800	125	4,240	3,329	911	3,086	20	0	172	0	3,258	71	145
1986	6,502	1,800	125	4,577	4,349	228	4,210	20	0	146	0	4,356	-7	145
1987	7,062	2,800	125	4,137	5,493	-1,356	5,139	20	0	132	0	5,271	222	145
1988	7,174	2,800	125	4,249	5,112	-863	3,664	20	1,904	113	0	5,681	-569	145
1989	8,632	2,800	1,045	4,787	4,787	0	2,009	20	2,688	125	0	4,822	-35	1065
1990	9,304	2,800	428	6,076	6,076	0	2,266	20	3,809	185	0	6,260	-184	448
1991	9,080	2,800	384	5,896	5,896	0	2,413	20	3,921	154	0	6,488	-592	404
1992	9,416	2,800	200	6,416	7,163	-747	3,399	20	3,640	121	0	7,160	3	220
1993	9,753	2,800	200	6,753	8,419	-1,666	5,151	20	2,997	128	0	8,276	143	220
1994	10,201	2,800	200	7,201	8,811	-1,610	4,979	20	3,711	130	0	8,820	-9	220
1995	10,649	2,800	200	7,649	10,425	-2,776	7,003	20	3,226	138	0	10,367	58	220
1996	11,098	2,800	200	8,098	11,008	-2,910	7,402	20	3,528	99	0	11,029	-21	220
1997	11,322	2,800	200	8,322	10,638	-2,316	6,743	20	3,754	134	0	10,631	7	220
1998	12,667	2,800	200	9,667	11,995	-2,328	8,587	20	3,324	119	0	12,030	-35	220
1999	13,250	2,800	200	10,250	11,188	-938	7,448	20	3,549	190	0	11,187	1	220
2000	13,788	2,800	200	10,788	10,874	-86	6,960	20	3,793	160	0	10,913	-39	220
2001	13,900	2,800	200	10,900	11,995	-1,095	7,344	20	4,346	206	0	11,896	99	220
2002	14,349	2,800	200	11,349	12,331	-982	7,655	20	4,493	184	0	12,332	-1	220
2003	14,797	2,800	200	11,797	12,443	-646	8,224	20	4,188	158	0	12,570	-127	220
2004	14,909	2,800	200	11,909	13,788	-1,879	9,033	20	4,511	206	0	13,750	38	220
2005	15,245	2,800	200	12,245	13,900	-1,655	9,738	20	3,863	219	16	13,820	80	220
2006	16,703	2,800	200	13,703	13,900	-198	9,440	20	4,189	170	0	13,799	101	220
2007	17,008	2,800	200	14,008	13,554	454	7,550	20	4,932	180	0	12,661	893	220
2008	16,449	2,800	200	13,449	13,508	-59	7,815	20	4,079	210	0	12,103	1,404	220
2009	16,589	2,800	200	13,589	13,084	505	6,683	20	4,860	219	0	11,761	1,323	220

Table G-2. Estimated Historic Annual Water Balance for Palmdale Water Reclamation Plant (Values in Acre-Feet per Year, except as noted)

Year	Estimated or Metered Influent	Precipitation (Inches)	Pond Area (acres)	Net Pond Evaporation	Pond Percolation	Influent less Evaporation and Percolation	Estimated or Metered Effluent	Difference between (Influent - evap perc) and Effluent	Flows to Ag Reuse	Flows to Land Application	Flows to Land Application with Crop	Land Applied (with and w/out Crop) Percolation	Total Deep Percolation
1953	247	1.96	21	124	116	7	7	0	0	0	0	0	116
1954	246	10.35	21	123	109	14	14	0	0	0	0	0	109
1955	276	5.11	21	123	142	11	11	0	0	0	0	0	142
1956	362	4.99	21	124	185	53	53	0	0	0	0	0	185
1957	414	9.87	21/49	166	171	77	77	0	0	0	0	0	171
1958	500	11.04	49/58	252	70	178	178	0	0	0	0	0	70
1959	620	4.54	58	256	42	322	322	0	83	0	0	0	42
1960	672	4.89	58	351	26	295	295	0	83	0	0	0	26
1961	706	3.69	58	352	23	331	331	0	83	0	0	0	23
1962	762	7.54	58	352	41	369	369	0	97	0	0	0	41
1963	706	7.34	58	352	37	317	317	0	97	0	0	0	37
1964	807	4.48	58	352	56	399	399	0	135	0	0	0	56
1965	919	10.35	58	353	92	474	474	0	224	0	0	0	92
1966	952	5.15	58	352	103	497	497	0	224	0	0	0	103
1967	1,143	8.26	58	353	124	666	665	1	424	0	0	0	124
1968	1,177	4.16	58	354	145	678	678	0	424	0	0	0	145
1969	1,233	10.08	58	354	154	725	725	0	512	0	0	0	154
1970	1,289	6.63	58	354	152	783	783	0	509	0	0	0	152
1971	1,457	5.23	58	354	150	953	952	1	700	0	0	0	150
1972	1,513	2.29	58/68	368	148	997	996	1	704	0	0	0	148
1973	1,793	6.89	68	412	145	1,236	1,235	1	891	0	0	0	145
1974	1,681	7.70	68	412	143	1,126	1,125	1	806	0	0	0	143
1975	1,737	3.12	68	411	142	1,184	1,183	1	891	0	0	0	142
1976	1,793	5.11	68	411	140	1,242	1,241	1	891	0	0	0	140
1977	1,793	9.75	68	411	138	1,244	1,243	1	941	0	0	0	138
1978	1,883	13.23	68	411	136	1,336	1,334	2	996	0	0	0	136
1979	2,039	9.04	68	411	134	1,494	1,036	458	1,036	0	0	0	134
1980	2,151	13.60	68/95	448	745	958	958	0	958	0	0	0	745
1981	2,305	6.18	95	572	1,049	684	684	0	548	136	0	109	1,158
1982	2,465	11.29	95	572	1,019	874	1,567	-693	0	1,567	0	1,254	2,273
1983	2,633	15.54	95	572	1,034	1,027	1,027	0	88	937	0	750	1,784
1984	3,123	6.91	95	572	879	1,672	1,672	0	404	1,277	0	1,022	1,901
1985	3,698		95	572	439	2,687	2,471	216	399	2,069	0	1,655	2,094
1986	4,238	5.17	95	572	261	3,405	2,644	761	52	2,585	0	2,068	2,329
1987	5,116	7.27	95	572	225	4,319	3,656	663	64	3,589	0	2,871	3,096
1988	5,370	5.81	105/86	562	210	4,598	3,866	732	129	3,743	0	2,994	3,204
1989	7,217	2.63	86/148	763	2,186	4,268	4,025	243	37	3,982	0	3,186	5,372
1990	8,031	2.45	148	887	2,072	5,072	5,468	-396	15	5,448	0	4,358	6,430
1991	8,808	9.12	148	887	1,956	5,965	5,475	490	90	5,371	0	4,297	6,253
1992	8,328	13.89	148	887	1,149	6,292	6,200	92	21	6,174	0	4,939	6,088
1993	8,234	14.44	148	887	647	6,700	7,088	-388	130	6,957	0	5,566	6,213
1994	8,628	3.84	148	887	267	7,474	7,486	-12	51	7,427	0	5,942	6,209
1995	8,765	9.05	148	887	255	7,623	8,068	-445	68	8,003	0	6,402	6,657
1996	8,910	5.73	148	887	253	7,770	8,085	-315	74	8,007	0	6,406	6,659
1997	9,245	5.77	148	887	251	8,107	8,447	-340	84	8,365	0	6,692	6,943
1998	9,325	12.28	148	887	249	8,189	9,169	-980	90	9,075	0	7,260	7,509
1999	9,599	2.26	148	887	247	8,465	8,739	-274	129	8,612	0	6,890	7,137
2000	10,155	4.07	148	887	245	9,023	9,280	-257	588	8,690	0	6,952	7,197
2001	10,273	7.14	148	887	243	9,143	9,459	-316	251	9,201	0	7,361	7,604
2002	9,974	2.67	148	887	241	8,846	8,729	117	2,135	6,578	0	5,262	5,503
2003	10,310	8.61	148	887	239	9,184	9,043	141	3,313	5,718	0	4,574	4,813
2004	10,562	11.83	148	887	237	9,438	9,326	112	3,631	5,693	0	4,554	4,791
2005	10,916	14.54	148	887	235	9,794	9,413	381	6,135	3,269	0	2,615	2,850
2006	11,057	- - -	148	887	235	9,935	9,008	927	7,573	0	1,436	1,149	1,384
2007	10,866	- - -	148	887	235	9,744	9,211	533	7,404	0	1,807	1,445	1,680
2008	10,670	- - -	148	887	235	9,548	9,379	169	7,731	0	1,648	1,319	1,554
2009	10,934	- - -	148	887	235	9,812	8,850	962	8,586	0	265	212	447