TABLE 3-9. Source Capacities By District and Island-wide

Installed and Standard Source Capacities By District

Lana'i City, Koele & Kaumalapau	
Source	**GPM**
Well 6	550
Well 7	NIU
Well 8	850
Maunalei - Shaft 2	NIU
Tunnels	NIU
Well 3 (could serve either way)	550/OOS
Total GPM	1,400
Total GPD Wells	
Total Lana'i City, Koele & Kaumalapau	2,016,000
Largest Pump Out	792,000
Max Day Capacity*	
2/3 Installed Less Largest Pump	528,000
Average Day Capacity **	
2/3 of 2/3 installed Capacity less largest pump	352,000
Effluent	
Lana'i City WWTF - R-3	500,000
Lana'i City Auxilliary WWTF R-1	400,000
Total Koele, City and Kaumalapau	2,416,000
Total City, Koele, Kaumalapau Potable	2,016,000
Total **Potable** - Standards	352,000

Manele, Hulopo'e, Palawai, Irrigation Grid	
Source	**GPM**
Well 2/ Shaft 3*	1,200
Well 3**	"550/OOS
Well 4	900
Well 5	NIU
Total GPM	2,100
Total GPD Wells	
Total Manele and IGGP	3,024,000
Largest Pump Out	1,296,000
Max Day Capacity *	
2/3 Installed Less Largest Pump	864,000
Average Day Capacity **	
2/3 of 2/3 Installed Capacity less largest pump	576,000
Total Manele & IGGP	4,377,600
Total Manele Potable	3,024,000
Total **Potable** - Standards	576,000

Brackish - Manele, Irrigation Grid, Others	
Source	**GPM**
Well 1	340
Well 9	300
Well 12	NIU
Well 14	300
Total GPM	940
Total GPD Wells	
Total Brackish	1,353,600
Largest Pump Out	864,000
Max Day Capacity *	
2/3 Installed Less Largest Pump	576,000
Average Day Capacity ***	
2/3 of 2/3 installed Capacity less largest pump	384,000
Effluent	
Manele WWTF	140,000
Total Manele & IGGP	4,377,600
Total Manele & IGGP Brackish	1,353,600
Total **Brackish** - Standards***	384,000

Well 2/ Shaft 3 pump to be replaced with smaller pump

** *Well 3 could serve either direction. Lana'i City or Manele & IGGP. However, it is out of service & will be replaced.*

Installed Capacity

Total All Island Potable 5,040,000

Total All Island Brackish 1,353,600

Total All Island Effluent 540,000

Total All Island 6,933,600

* Statewide System Standards indicate that a system should meet max day demand (=Avg Demand x 1.5) PLUS fire flow in 16 hours pumping, with the largest pump out. Referred to as Max Day Capacity above.

** This means that 2/3 of the above should be able to meet Average Day Demand

*** Standards only apply to brackish water if people or animals depend upon them.

Reservoirs and storage should be sized to meet maximum day demand plus the highest applicable fire flow for a presumed two hour fire. A table of storage is shown in Figure 3-11.

Overall system capacities are summarized below.

Developed & Utilized Resources - System Infrastructure

TABLE 3-10. Summary of System Capacities and Use

Lana'i City, Koele and Related Areas	**MGD 2008**
Total Installed Capacity	2.416
Installed Capacity of Potable Sources	2.016
Average Potable Use	0.523 metered / 0.605 pumped
Average Non-Potable Use	0.209 to Koele Golf Course
Capacity of Non-Potable Brackish Sources in Use	0.000
Capacity of Reclaimed Water Facilities	0.400
Average Effluent Production	0.235
Potable Storage	2.786
Non Potable Storage	16.8 active / 22.8 total
Approximate Miles of Pipeline	35.59 miles

Manele, Hulopo'e and Related Areas	**MGD 2008**
Total Installed Capacity	4.518
Installed Capacity of Potable Sources in Use	3.024
Average Potable Use	0.375 metered / 0.683 pumped
Average Non-Potable Use - Brackish	0.760 metered / 0.944 pumped
Average Non-Potable Use - Reclaimed	0.073 wtf production
Capacity of Non-Potable Brackish Sources in Use	1.354
Capacity of Reclaimed Water Facilities	0.140
Average Effluent Production	0.073
Potable Storage	2.000
Non Potable Storage	17.85 active / 19.35 total
Approximate Miles of Pipeline	43.04 miles*

(*Estimate does not include roughly 14.81 miles of abandoned or out-of-use pipeline in the Palawai Irrigation Grid)

TABLE 3-11. Lana'i Tanks & Storage

Tanks and Storage

TANK NAME	TANK CAPACITY IN MG	SPILLWAY ELEVATION	GROUND ELEVATION	YEAR BUILT	TANK MATERIAL	USE	Cl2 SITE	COMMENT
Lana`i City, Koele & Kaumalapau								
Maunalei Tank	0.030		1017	1992	Steel	Potable - PWS 237	N	*Not In Use*
Koele Tank	0.734	2057	2025	1995	Bolted Steel w Glass Fused Coating	Potable - PWS 237	N	SCADA
Lana`i City - Niniw ai Tank		1878	1830	1951	Steel	Potable - PWS 237	N	*2 MG Not In Use*
New Lana`i City Tank	2.000	1980	1942	2008	Bolted Steel w Glass Fused Coating	Potable - PWS 237	N	Chlorinated at Well 6
Kaumalapau Tank	0.022		360	1992	Bolted Steel w Glass Fused Coating	Potable - PWS 237	Y	
Lanai AWWTF R-1 Reservoir	10.000		1518.5			Non-Potable - Effluent		
Koele Clubhouse Lake 1	1.900		1761			Non-Potable - Effluent		Passive
Koele Clubhouse Lake 2	0.900		1741			Non-Potable - Effluent		Passive
Koele 8th Hole Lake/Reservoir	2.000		1739			Non-Potable - Effluent		
Koele 9th Hole Lake/Reservoir	1.100		1746			Non-Potable - Effluent		
Koele 13th Hole Lake/Reservoir	0.900		1991			Non-Potable - Effluent		
Koele 2nd Hole Lake/Reservoir	1.5					Non-Potable - Effluent		
Koele 3rd Hole Lake/Reservoir - Tee	0.900					Non-Potable - Effluent		
Koele 3rd Hole Lake/Reservoir - Green	0.400					Non-Potable - Effluent		
Koele 6th Hole Lake/Reservoir	1.300					Non-Potable - Effluent		
Koele 17th Hole Lake/Reservoir	0.400		1822			Non-Potable - Effluent		
Koele 18th Hole Lake/Reservoir	1.500		1746			Non-Potable - Effluent		
Potable Storage	**2.786**							
Non Potable Storage	22.800							Including Passive
Non Potable Active Storage	**16.800**							
Manele, Hulopoe and Portions of Irrigation Grid								
Hii Reservoir	1.000	1823	1810.2		Concrete Lined		N	PE Cover
Hii Tank	0.500	1823.5	1791.5	1952	Welded Steel	Potable - PWS 238	N	
Manele Breaker Tank 1	0.100	1141	1127	1987	Bolted Steel w Glass Fused Coating	Potable - PWS 238	Y	Chlorination Site
Manele Breaker Tank 2	0.100	755.8	742	1987	Bolted Steel w Glass Fused Coating	Potable - PWS 238	N	
Manele Breaker Tank 3	0.300	341	326	1987	Bolted Steel w Glass Fused Coating	Potable - PWS 238	N	
Wells 9 & 1 Control Tank	0.050	1434.5	1420.5		Steel	Non-Potable - Brackish		Abandoned
Palaw ai Brackish Reservoir	15.000	1211	1239		Lined	Non-Potable - Brackish		

TABLE 3-12. Lana'i Pump Inventory - Source

Well / Source	Pump & Motor Description	Pump Elevation	GPM	Calibrated GPM	24 Hrs	16 Hrs	44.44%	2008 Actual MAV in GPD	Character
6	Submersible Byron Jackson 23 Stage, 1800 RPM, 2500 V with 200 HP Type H 14" Motor installed 2006	863	550		792,000	528,000	352,000	327,912	Potable Drilled 1986 Proposed Potable Drilled 1987
7								0	**Not In Use**
8	Submersible Byron Jackson 11 MQH, 20 stage, 1800 RPM with 300 HP Type H, F1 Amp 74 Motor 2300 Volts	782	850	816	1,224,000	816,000	544,000	276,890	Potable Drilled 1990 pump lowered to 783' 09/09
2	Vertical Turbine Fairbanks Morse Pomona 3 Stages, 1780 RPM with 75 HP Ingersoll Rand Booster FL Amps 90 voltage 480 Frame-L365TP	1,335	1,200	1,152	1,728,000	1,152,000	768,000	2,418	Potable Drilled 1946 ***Rarely Used Confined Space Issues***
3	Submersible Byron Jackson #781-5-1808 22 Stage 1800 RPM 23 stage w /Byron Jackson Type H 300 HP 14" Motor	866						0	Potable Drilled 1950 **Out of Service**
4	Submersible Byron Jackson #841-S-0046, 13MQH, 15 stage, 1800 RPM with Byron Jackson Type H 300 HP 14" Motor Amp 74 2300 Volts	1,253	900	864	1,296,000	864,000	576,000	683,867	Potable Drilled 1950 Out of Service
5		1,293						0	Potable Drilled 1950 **Out of Service**
1	Submersible Crown 340 GPM 9 Stage, 3,470 RPM, with Hitachi 100 HP Motor installed 2005	516	340	300	489,600	326,400	217,600	393,981	Brackish Drilled 1945
9	Submersible Byron Jackson 16 stage 600-4114-931-R-005 6 MQH 3600 RPM w Franklin Electric 100 HP Motor Installed 2005 F1-Amp-148 480 Volt	466	300		432,000	288,000	192,000	151,440	Brackish Drilled 1990
12		-5						0	Brackish Drilled 1990 **Not In Use**
14	Submersible Byron Jackson Hitachi 125 HP Motor Installed 2003	400	300		432,000	288,000	192,000	404,714	Brackish Drilled 1995
	Source Capacity		4,440		6,393,600	4,262,400	2,841,600	2,241,222	

TABLE 3-13. Lanai Pump Inventory - Boosters and Totals

Boosters

Maunalei	Byron Jackson Can Type Vertical Booster 11LQ 3600 RPM 6 Stages w ith Vertical Solid Shaft 20 HP 3600 RPM 444 VP Frame WP-1 Enclosure 225 Amp Fl	481					0	Potable Booster Quasi-Source **Out of Service**
Well 2 / Shaft 3 Booster	Ingersoll Rand Booster Pump 40 HP							Potable Source **Rarely Used**
Manele SPS A - 2 Pumps	Dual submersible pumps. 18 HP constant speed motor at 91' Total Dynamic Head (TDH). Located at Road E. Pumps to SPS B.		295 ea.		424,800	283,200	188,800	Effluent Booster
Manele SPS B - 2 Pumps	Dual submersible pumps. 120 HP at 240' TDH. Located at Manele Terrace Subdivision. Pumps to SPS #2.		490 ea.		705,600	470,400	313,600	Effluent Booster
Manele SPS # 1 - 2 Pumps	Dual dry pit pumps. 75 HP at 190' TDH. Located at Hulopo`e Park. Pumps to SPS # 2.		550 ea.		792,000	528,000	352,000	Effluent Booster
Manele SPS # 2 - 2 Pumps	Dual dry pit pumps. 75 HP at 180' TDH. Located near the entrance to Manele Resort. Pumps to SPS # 3.		550 ea.		792,000	528,000	352,000	Effluent Booster
Manele SPS #3 - 2 Pumps	Dual dry pit pumps. 75 HP at 180' TDH. Located just below the sew age treatment plant, along the access road. Pumps to the headw orks of the sew age treatment plant.		550 ea.		792,000	528,000	352,000	Effluent Booster
Koele WW - Green 4	Sim Flo 40 HP	1,992	1100	280	403,200	268,800	179,200	Effluent Booster
Koele WW - Green 17	Sim Flo 40 HP	1,748	800	280	403,200	268,800	179,200	Effluent Booster
			4,335		4,312,800	2,875,200	1,916,800	0
			8,775		**10,706,400**	**7,137,600**	**4,758,400**	**2,241,222**
	Subtotal Potable In Use		**3,500**		**5,040,000**	**3,360,000**	**2,240,000**	**1,291,087**
	Subtotal Brackish in Use		**640**		**921,600**	**614,400**	**409,600**	**545,421**
	Subtotal Wastewater In Use		**3,535**		**3,909,600**	**2,606,400**	**1,737,600**	

Lana'i City Water System - Potable

The Lana'i City Water System serves Koele, Lana'i City and Kaumalapau. The system has roughly 1,400 service connections, served by two wells, three tanks and roughly thirty-five miles of potable line. Source for this system is currently drawn from two active wells, Well 6 (aka Kaiholena Well 6 - USGS #5054-01) at 1,910' and Well 8 (USGS # 4753-01) at 1,902'. Well 3 was once an important source for this system, but has since been taken out of service. A replacement for this well is in progress as of this draft, and scheduled to be on-line in 2010.

The system is untreated with the exception of the standard required chlorination, which takes place at the sources, and again at Kaumalapau Harbor tank. Koele, Lana'i City and Kaumalapau represent three service zones on the system.

Koele is served by Wells 3 and 8, via the 734,000 gallon Koele Tank, with a spillway at 2057.5'. The low elevation limit of this pressure zone is about 1,740'. The Koele Tank primarily serves Koele Villas and lots and the Lodge at Koele, but water from this tank can drop to the City through a PRV.

Lana'i City is served primarily by Well 6. Well 6 feeds directly to the New Lanai City Tank, with a spillway elevation of 1,980 feet. Water from Wells 3 (once replaced) and 8 can also contribute source to Lana'i City via a PRV from the Koele service area. Well 6 feeds directly to the New Lana'i City 2,000,000 gallon tank, with a spillway elevation of 1980'.

Kaumalapau is fed from Lana'i City via a 2-1/4" pipe to the 22,400 gallon steel storage tank at Kaumalapau, with a spillway elevation of 375'. This tank services Kaumalapau Harbor and small surrounding developments.

Lanai City - Non Potable - Reclaimed Water

Two wastewater treatment plants serve Lana'i City. The County's Lana'i City Wastewater Treatment Facility has a capacity of about 500,000 gallons per day and treats water to R-3 quality. In calendar year 2008, the Lana'i City Wastewater Treatment Facility had an influent of about 308,412 gallons per day, and produced about 245,456 GPD of effluent.

From the Lana'i City Wastewater Treatment Facility, effluent proceeds to the Lana'i City Auxilliary Treatment Facility where it is further treated to R-1 quality water. The Auxilliary Treatment Facility has a capacity of about 400,000 GPD. In 2008, with an influent of 245,456 GPD, the Auxilliary Treatment Facility produced about 234,093 GPD of R-2 water.

The Auxilliary Treatment Facility has a storage capacity of about 10 MG, with additional storage in water features at the "Experience At Koele" Golf Course of about 13.1 MG. The non-potable system has roughly three miles of waterline. About 209,721 gallons per day were pumped to the "Experience At Koele" Golf Course from the Auxilliary Water Treatment Facility during 2008.

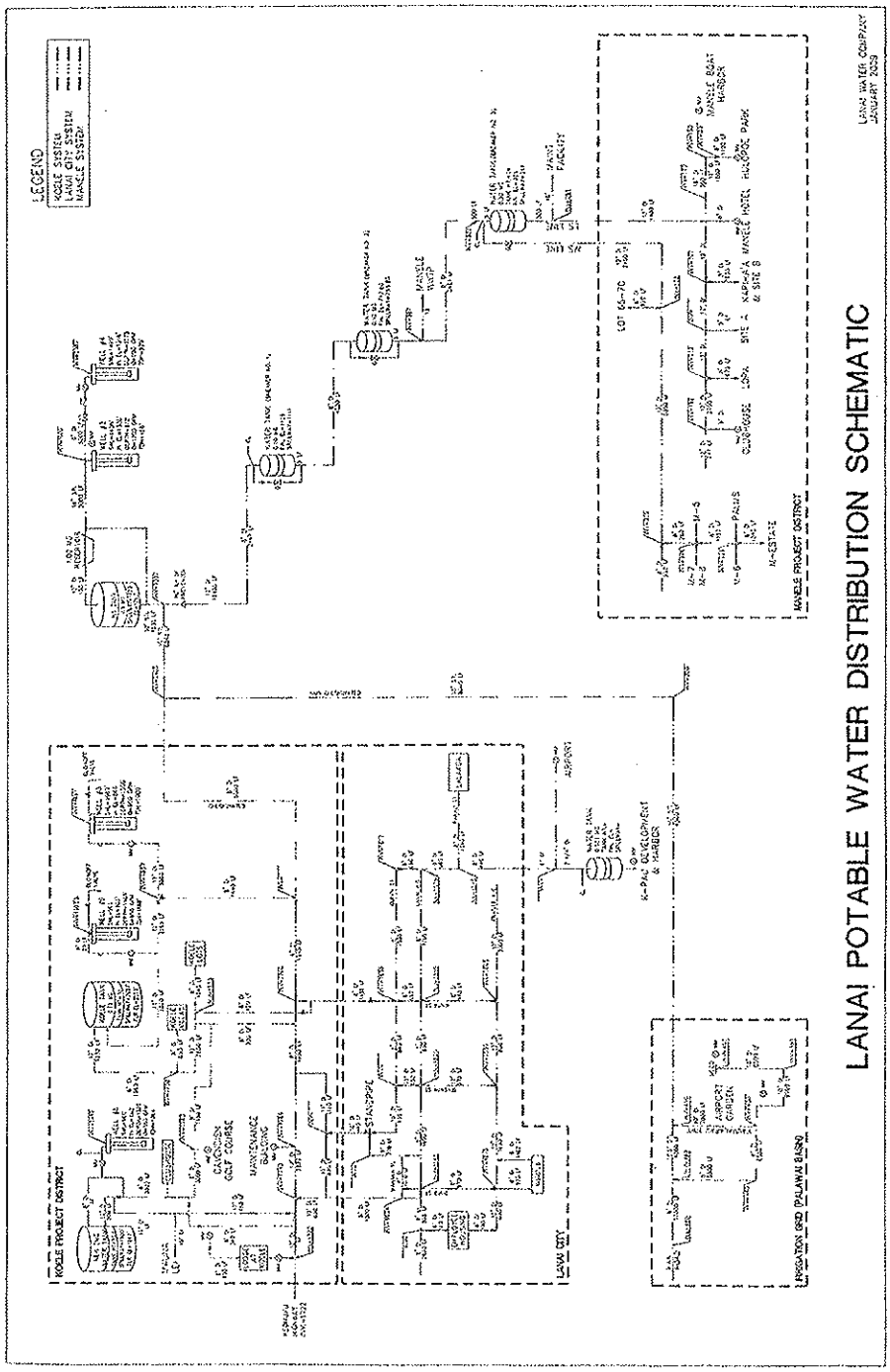
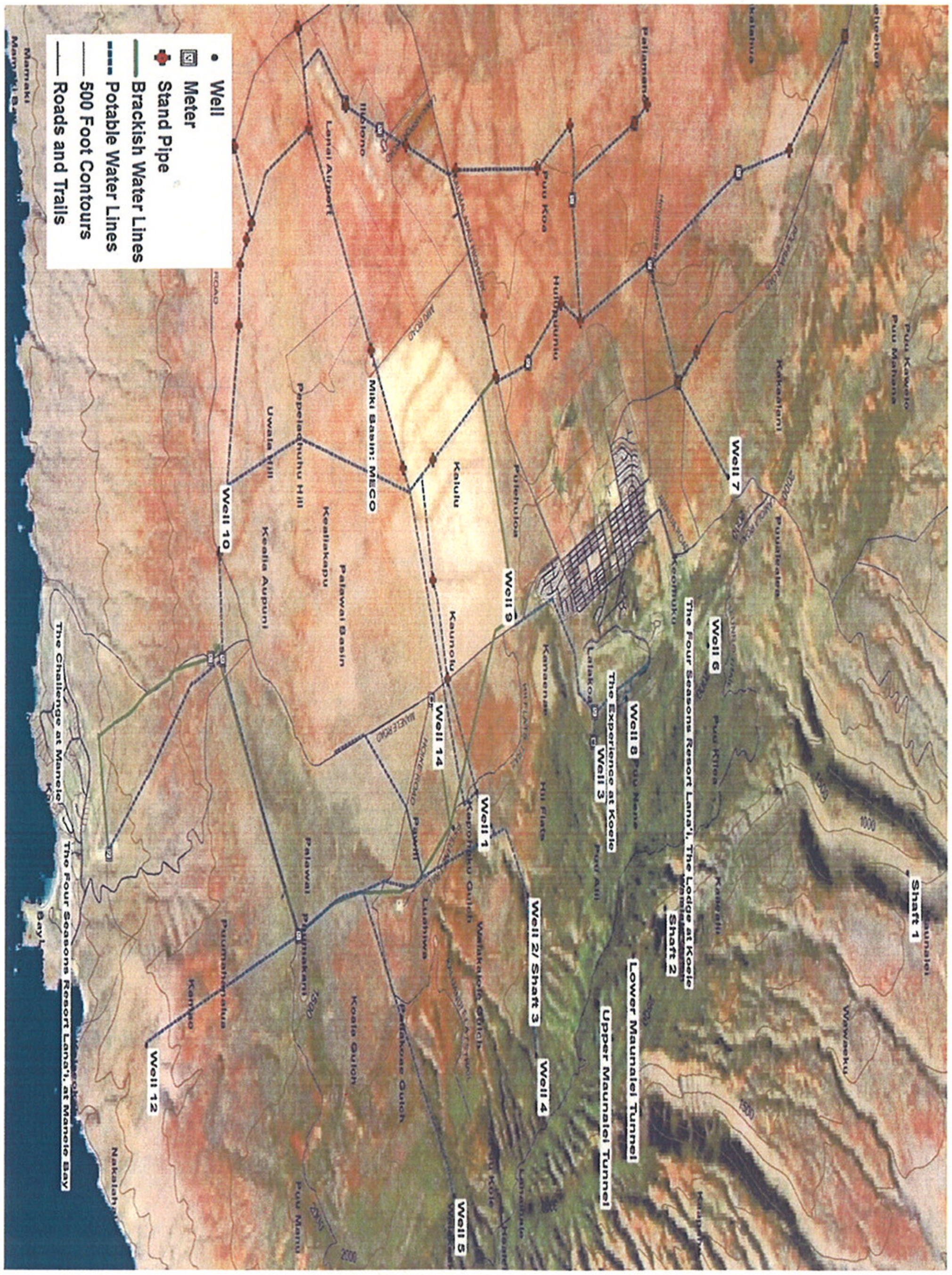


FIGURE 3-18. Lana'i Potable Water System Schematic

FIGURE 3-19. Photo Schematic of Lana'i Water Systems, Courtesy of Lana'i Water Company



Manele Water System - Potable

The Manele Water System serves Manele Resort, Hulopo'e Beach Park, and the Manele small boat harbor, as well as the Palawai Irrigation Grid. It has roughly 200 service connections and is served by two wells, five tanks and roughly thirty-five miles of potable or non-chlorinated waterlines. Water for the Manele system is drawn primarily from Well 4 (aka Soule's Bench Well, USGS #4952-02), with very occasional withdrawals from Well 2/Shaft 3 (USGS # 4953-01). From Well 4, at an elevation of about 2,327', it proceeds to the 1 MG concrete Hii Reservoir and 0.5 MG Hii Tank at 1,823'. From Hii, water is carried to Manele via three steel breaker tanks in series at spillway elevations of 1,141', 755.8' and 341' respectively. Breaker Tanks 1 and 2 have capacities of 100,000 gallons each. Breaker Tank 3 has a capacity of 300,000 gallons. Water for the Palms and multi-family estates at the west end of Manele is channeled into a line just above Breaker Tank 3. From Breaker Tank 3, water continues to the Harbor, the Beach Park and the Hotel.

Manele Water System - Non Potable

Brackish

Brackish water for landscaping at Manele comes from Wells 1 (USGS # 4853-02), 9 (USGS # 4854-01) and 14 (USGS # 4854-02) at 1,265', 1,411' and 1,193' respectively. From Well 9 water enters a 0.5 MG control tank at 1,420.5' with a spillway elevation of 1,434.5'. From this tank and the other wells, water proceeds to the 15 MG Reservoir with a spillway elevation of 1,211'. Water is then piped via two 40,000 gallon breaker tanks with spillway elevations of 1,000' and 712' toward Manele. Just above Manele, brackish water is blended with reclaimed effluent for golf course irrigation. There are roughly seven miles of brackish waterline.

Reclaimed Water

The Manele Wastewater Treatment Facility has a capacity of 140,000 GPD. During calendar year 2008, with an influent of 77,281 GPD, it produced 72,940 GPD of effluent. From the effluent reservoir, this water is pumped directly to the Manele Golf Course via roughly one mile of wastewater line.

TABLE 3-14. Wastewater Facility Capacity, Influent and Effluent on Lana'i - 2008

Name		Capacity	Average Influent	Average Production
Lana'i City WWTF	R-3	500,000	308,412	
Lana'i City Auxilliary WWTF	R-1	400,000	245,456	234,093
Manele WWTF	R-1	140,000	77,281	72,940

FIGURE 3-20. Manele Non-Potable System Schematic

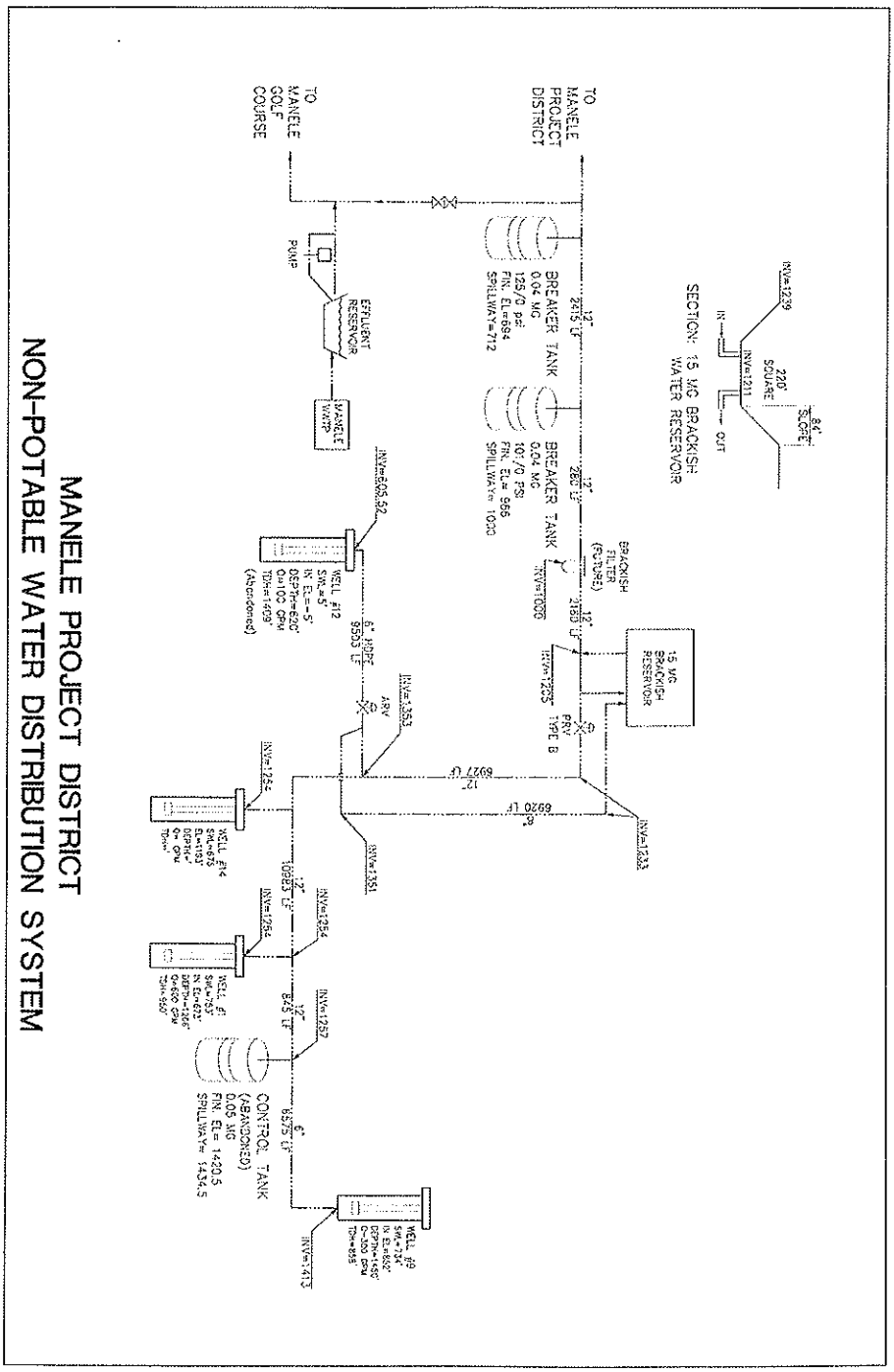
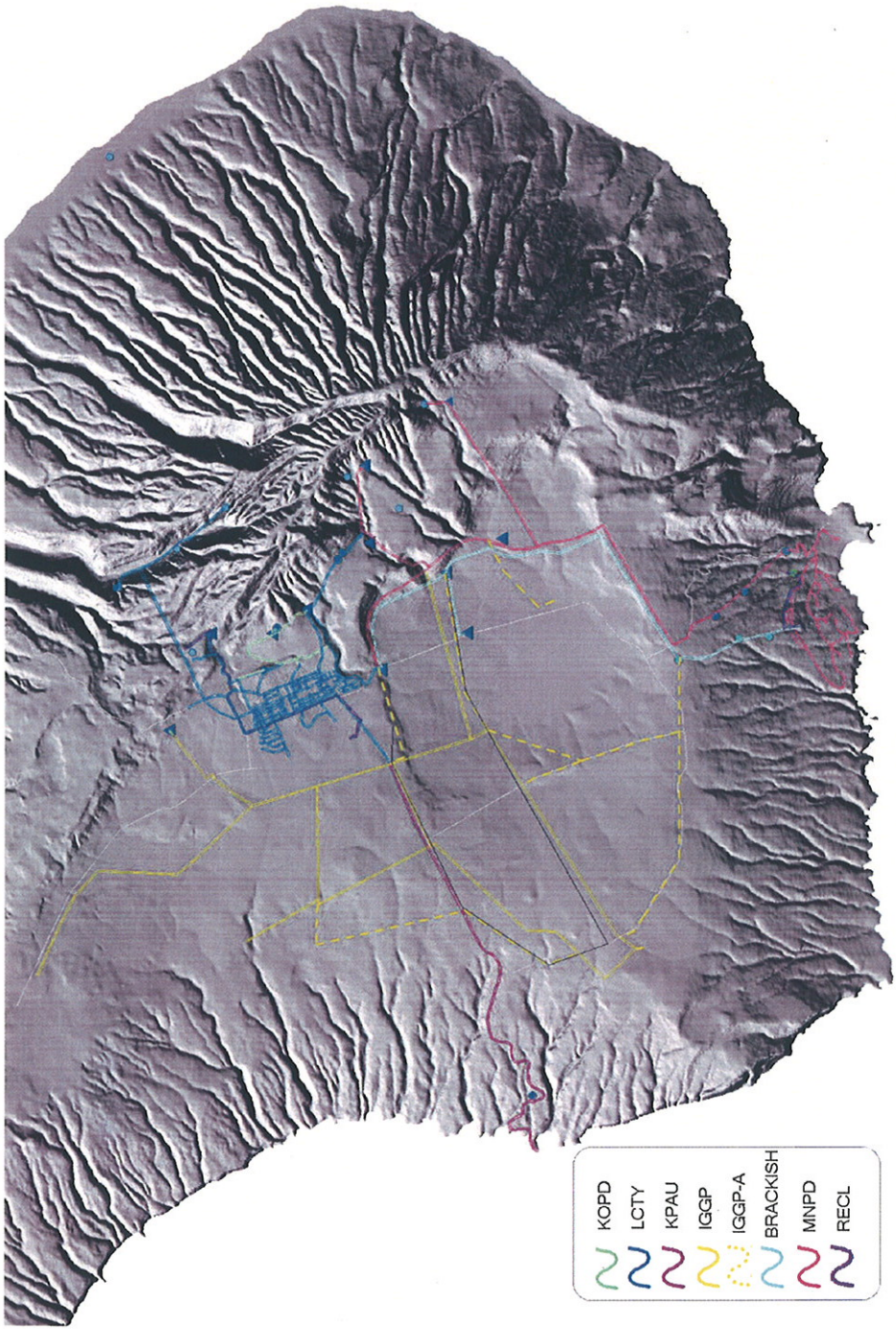


FIGURE 3-21. Lana'i Water Systems By District



Pipelines

In all, Lana'i has roughly 93.44 miles of pipeline, as measured from GIS plots. Of this, about 78.63 miles are active, and 14.81 miles are abandoned or out of use. The age and condition of some of these lines, combined with the lack of customer base to generate adequate revenues for necessary replacements, is a matter of serious concern to both Lana'i Water Company, Inc. and the community it serves. Long segments of pipe in the irrigation grid, and to the west, south and east of Lana'i City, are in need of repair, replacement or in some cases possibly abandonment. A portion of the line from Hi'i tank down to the Palawai Basin is unburied and in a fire-prone area. In addition, some lines are either made of materials or too small in diameter to satisfy system standards. These situations will be a challenge for the utility in the coming decade.

FIGURE 3-22. Palawai Grid Pipe Age Data Dotted lines in this image are abandoned.