

YAO STREAM FLOW SUMMARIES

EXHIBIT 2

**Yao Stream Flow
(1910-1915)
USGS Station # 16604000**

Yao Stream Flow for 1910-1915 as measured
by the USGS gage located above all diversions^d

		1910												For the Year
in millions of gallons per day		Jan.	Feb.	Mar.	Apr.	May (25 days)	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	
Yao Stream	Max	--	--	--	--	118.00	65.00	89.00	288.00	251.00	260.00	198.00	499.00	--
	Min	--	--	--	--	15.00	17.00	16.00	19.00	16.00	10.00	14.00	24.00	--
	Mean	--	--	--	--	31.20	34.80	42.80	83.50	56.90	50.70	32.10	82.70	--

		1911												For the Year
in millions of gallons per day		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	
Yao Stream	Max	359.00	403.00	92.00	143.00	165.00	165.00	65.00	129.00	209.00	94.00	83.00	43.00	403.00
	Min	35.00	61.00	21.00	19.00	35.00	32.00	28.00	32.00	38.00	21.00	21.00	18.00	18.00
	Mean	82.70	123.00	31.20	57.30	65.90	76.90	41.90	57.30	82.10	37.10	32.30	25.30	58.90

		1912												For the Year
in millions of gallons per day		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	
Yao Stream	Max	28.00	136.00	152.00	195.00	46.00	32.00	68.00	46.00	37.00	53.00	105.00	45.00	195.00
	Min	13.00	16.00	29.00	27.00	18.00	14.00	14.00	13.00	12.00	15.00	15.00	19.00	12.00
	Mean	15.80	47.10	62.40	62.80	27.90	23.10	24.90	20.90	17.40	24.80	33.10	28.40	32.30

**ʻĪao Stream Flow
(1910-1915)
USGS Station # 16604000**

ʻĪao Stream Flow for 1910-1915 as measured
by the USGS gage located above all diversions⁴

		1913												For the Year
in millions of gallons per day		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug. (21 days)	Sept.	Oct.	Nov. (4 days)	Dec. (9 days)	
ʻĪao Stream	Max	101.00	158.00	85.00	218.00	187.00	164.00	66.00	145.00	33.00	37.00	358.00	375.00	375.00
	Min	12.00	8.00	14.00	14.00	25.00	32.00	8.00	7.00	7.00	5.00	6.00	19.00	5.00
	Mean	29.90	50.10	33.70	86.60	68.50	55.10	21.40	27.60	12.40	8.77	69.40	55.20	40.90

		1914												For the Year
in millions of gallons per day		Jan.	Feb.	Mar.	Apr.	May	Jun. (9 days)	Jul. (10 days)	Aug. (21 days)	Sept.	Oct.	Nov. (4 days)	Dec. (9 days)	
ʻĪao Stream	Max	212.00	26.00	135.00	265.00	445.00	200.00	135.00	30.00	250.00	320.00	422.00	139.00	445.00
	Min	22.00	8.00	6.50	12.00	19.00	46.00	42.00	46.00	61.00	51.00	59.00	40.00	6.50
	Mean	61.10	12.10	16.20	47.20	108.00	87.70	84.00	11.00	426.00	74.60	169.00	71.90	71.20

		1915												For the Year
in millions of gallons per day		Jan.	Feb.	Mar. (13 days)	Apr. (25 days)	May (11 days)	Jun. (12 days)	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	
ʻĪao Stream	Max	38.00	320.00	94.00	245.00	159.00	139.00	--	--	--	--	--	--	--
	Min	17.00	17.00	33.00	17.00	19.00	15.00	--	--	--	--	--	--	--
	Mean	32.60	80.00	51.60	85.00	54.20	104.00	--	--	--	--	--	--	--

⁴ Territorial Planning Board data, Surface Water Resources of the Territory of Hawai'i 1901-1938 (1939) at 215. Data originally collected by USGS station called "ʻĪao Stream Near Waituku, Maui" (see, e.g., W. Martin & C. Pierce, USGS, Water Resources of Hawai'i 1909-1911 (1913) ("Martin & Pierce") at 218) and identified as Station No. 16604000 in Fontaine, USGS, Evaluation of the Surface-Water Quantity, Surface-Water Quality, and Rainfall Data-Collection Programs in Hawai'i, 1994 (1996) at 94.

According to Martin & Pierce at 218, "[t]he discharge at this point gives the total flow above all diversions."

**Yao Stream Flow
(1910-1915)
USGS Station # 16604000**

Approximate baseflow
of Yao Stream for 1910-1915

in millions of gallons per day	<u>Q90</u>	<u>Q75</u>	<u>Q50</u>
1910 (239 days)	15 to 20	20 to 25	30 to 40
1911	20 to 25	25 to 30	40 to 50
1912	15	15 to 20	20 to 25
1913 (325 days)	8 to 10	10 to 15	25 to 30
1914 (265 days)	10	20 to 25	50 to 60
1915 (120 days)	15 to 20	25	50
Total (1680 days)	10 to 15	20 to 25	30 to 40

Data from Surface Water Resources at 218-19; see note 4.

000010

**ʻĀao Stream Flow
(1983-2002)
USGS Station # 16604500**

ʻĀao Stream Monthly Mean Flow for 1983-2002⁵

in millions of gallons per day	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
1983	--	--	--	--	41.67	27.46	24.61	22.87	34.56	66.54	41.86	32.24
1984	45.09	36.50	23.06	35.72	18.02	16.15	16.28	16.80	10.21	7.69	13.24	11.82
1985	16.4	2.12	65.89	41.34	43.22	15.76	29.01	33.01	21.83	53.88	49.81	50.45
1986	24.68	25.45	109.17	111.11	67.83	60.66	44.70	40.38	19.96	46.77	56.85	47.42
1987	55.69	53.10	19.64	59.43	87.86	64.41	50.39	25.26	25.78	35.59	85.27	62.99
1988	96.25	43.41	47.16	58.01	57.88	32.17	37.27	27.84	14.86	15.89	37.79	49.03
1989	36.50	4.34	55.88	148.58	61.37	47.16	67.83	40.89	31.52	42.12	17.70	21.83
1990	56.40	46.51	64.02	23.13	53.55	42.57	38.57	45.93	36.69	42.56	56.78	50.13
1991	34.04	42.70	82.04	38.24	28.75	37.73	42.38	59.63	39.15	28.23	19.70	45.28
1992	21.32	38.82	22.61	13.44	19.57	16.93	56.91	56.78	85.92	34.82	46.77	57.04
1993	51.74	20.74	33.59	57.88	47.80	32.24	70.41	62.66	25.58	43.15	48.51	43.35
1994	63.95	69.77	113.70	65.25	24.87	61.11	88.50	50.71	50.78	20.16	42.51	33.98
1995	49.61	26.29	31.59	40.25	23.13	26.62	63.44	55.88	23.13	32.04	30.75	21.38
1996	28.88	39.99	41.86	62.92	34.24	35.34	30.69	23.90	16.15	8.27	47.87	66.54
1997	56.46	24.10	54.72	34.75	39.60	56.01	64.41	32.95	31.78	21.64	85.27	52.46
1998	23.97	15.89	15.25	71.06	53.17	71.06	34.95	31.14	45.09	43.15	30.00	30.62
1999	39.99	60.92	63.24	32.17	15.12	16.99	28.49	32.88	18.86	18.60	23.71	40.38
2000	71.71	15.50	20.74	36.43	15.83	19.25	28.94	41.21	36.50	34.37	56.20	16.86
2001	15.13	26.29	21.96	37.40	31.40	36.24	29.20	54.65	25.97	40.44	52.58	41.73
2002	59.63	48.39	47.61	24.16	47.55	23.77	49.42	29.85	29.33	--	--	--
Median Monthly Mean Flows	45.09	38.82	47.16	40.25	40.63	33.79	40.47	36.69	27.65	34.82	47.87	43.35

⁵ Surface Water Data for USA: Monthly Streamflow Statistics available at http://nwis.waterdata.usgs.gov/hi/nwis/monthly/?site_no=16604500&agency_cd=USGS

Data originally collected by USGS station called "ʻĀao Stream at Kepaniwai Pak Near Wailuku, Maui" and identified as Station No. 16604500. The station is located 780 feet above sea level and is used to measure the surface water in the ʻĀao Stream. Information available at http://nwis.waterdata.usgs.gov/hi/nwis/monthly/?site_no=16604500&agency_cd=USGS.

**ʻĪao Stream Flow
(1983-2002)
USGS Station # 16604500**

Approximate baseflow
of ʻĪao Stream for 1983-2002

in millions of gallons per day	Q90	Q75	Q70	Q50
1983 (245 days)	13.57	18.09	19.38	27.13
1984	8.40	10.34	11.63	14.86
1985	10.98	16.15	18.09	23.90
1986	15.50	20.67	21.96	32.95
1987	16.15	20.01	21.96	34.88
1988	13.57	19.38	21.32	29.07
1989	15.50	19.38	21.32	31.01
1990	18.73	21.96	23.26	32.30
1991	16.80	20.67	21.96	26.49
1992	12.27	14.86	16.15	21.96
1993	18.73	17.44	18.73	29.72
1994	24.55	22.61	24.55	37.47
1995	12.92	14.86	16.15	20.03
1996	8.40	14.21	16.15	25.19
1997	16.15	20.67	21.96	29.72
1998	11.63	18.09	20.03	28.42
1999	12.92	14.86	15.50	18.73
2000	11.63	13.57	14.21	18.73
2001	12.27	16.15	18.09	25.19
2002 (275 days)	15.50	19.38	20.67	27.13
Overall 1983-2002 (7093 days)	12.92	16.80	18.73	25.84

Data represents the durational flow curve of the ʻĪao Stream based on the daily mean streamflow measured at the “ʻĪao Stream at Kepaniwai Near Wailuku, Maui” gage Station No. 16604500.

Data from Surface Water Data for USA, see note 5.

000012