Table ES 4. Projected Influent Waste Loadings

Contaminants	2010 Concentration (mg/L)	2010 Waste Load Without Imported Sludge (lbs/day)[3]	2010 Waste Load Coefficient (lbs/capita/day)[4]	2035 Waste Load (lbs/day)[5]	2050 Waste Load (lbs/day)[6]
BOD	368[1]	73,425	0.225	101,911	113,454
TSS	381[1]	76,178	0.234	105,987	117,992
TKN	37[2]	7,424	0.023	10,418	11,597
NH3	27[2]	5,374	0.016	7,247	8,068
TP	4.3[2]	858	0.0026	1,178	1,311

(1) From CCH ENV Monitoring and Compliance

(2) From *Wastewater and Process Sampling Analysis for Work Task 12.D Hydraulic Analysis, Process Modeling, and Optimization* (AECOM, 2012)

(3) 2010 Waste Load Without Imported Sludge = 2010 Concentration (mg/L) × 2010 average influent flow (25.39 mgd) × 8.34 (conversion factor) x 94%. (Imported sludge accounts for ~6% of the influent waste load, hence 94%.)

(4) 2010 Waste Load Coefficient = 2010 Waste Load Without Imported Sludge (lbs/day) / 2010 equivalent population (325,976)

(5) 2035 Waste Load (lbs/day) = 2010 Waste Load Coefficient (lbs/capita/day) × 2035 equivalent population (452,938)

(6) 2050 Waste Load (lbs/day) = 2010 Waste Load Coefficient (lbs/capita/day) × 2050 equivalent population (504,239)

If an intermediate design year is desired, such as year 2030, the flow and load projections can be extrapolated from the second order polynomial curves, shown in **Figure ES 2** and **Figure ES 3**.

Figure ES 2. Honouliuli WWTP Flow Projections (with 2030 extrapolation)

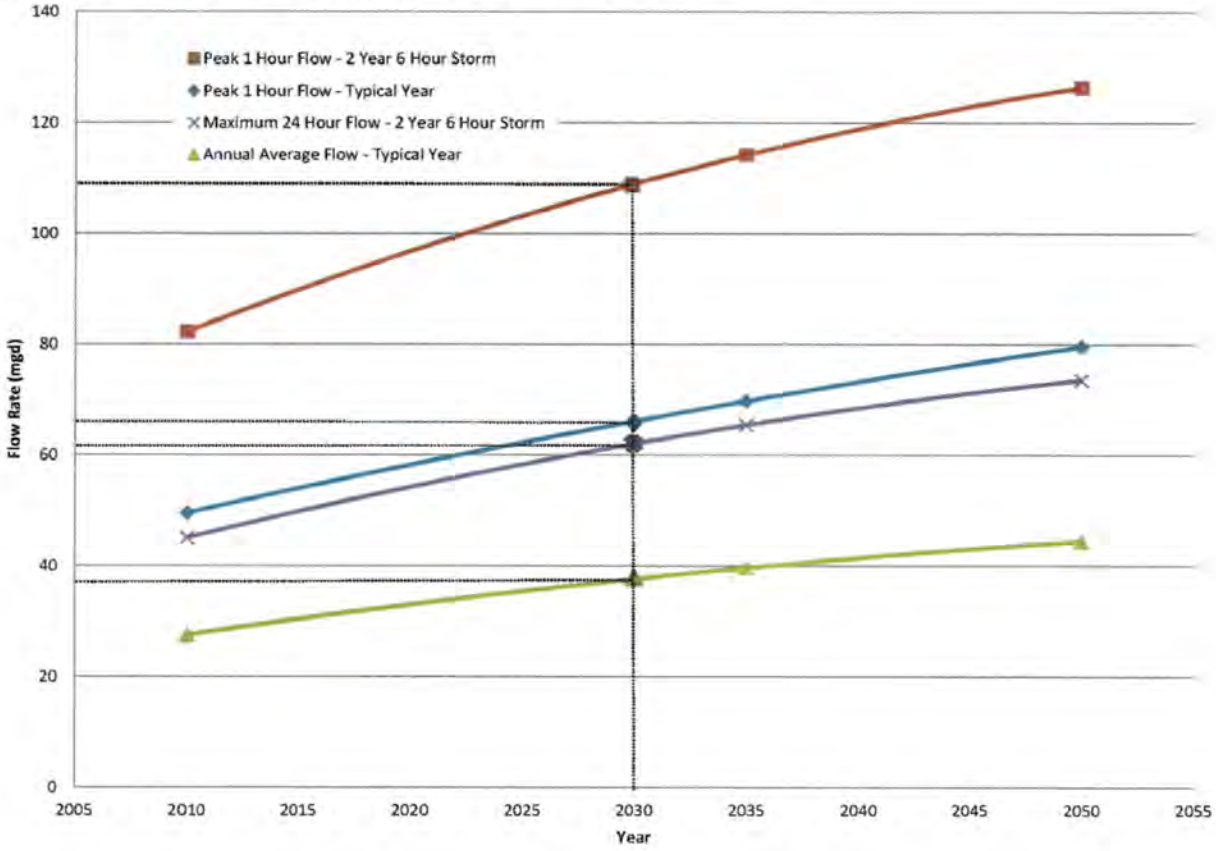
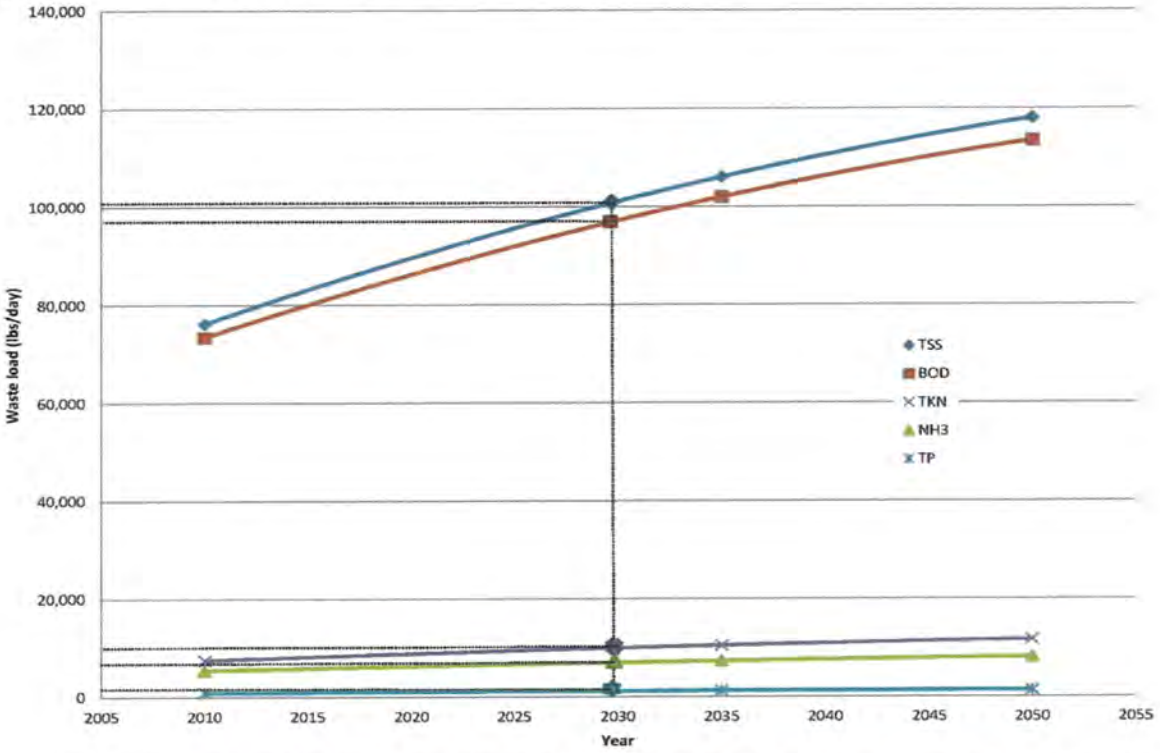


Figure ES 3. Honouliuli WWTP Load Projections (with 2030 extrapolation)



Extrapolated 2030 flow and load results are shown in **Table ES 5** and **Table ES 6**, respectively, for comparison purposes.

Table ES 5. Extrapolated Year 2030 Flow Parameters from the Honouliuli System Model

Flow Parameter	WWTP (mgd)	Waipahu (mgd)	Pearl City (mgd)	Waimalu (mgd)	Halawa (mgd)
Honouliuli Typical Year					
Annual Average	37.6	12.9	10.6	5.3	1.9
Maximum 30-day	38.3	-	-	-	-
Maximum 24-Hour	48.9	15.7	12.9	7.6	2.9
Peak 1-Hour	64.7	22.7	18.1	10.3	4.6
2-Year, 6-Hour Event					
Maximum 24-Hour	62.0	17.8	18.4	10.2	3.4
Peak 1-Hour	107.6	28.9	36.6	18.1	5.5

Table ES 6. Extrapolated Year 2030 Influent Waste Loading

Contaminants	2010 Waste Load Coefficient (lbs/capita/day)(1)	2030 Waste Load (lbs/day)(2)
BOD	0.225	97,140
TSS	0.234	101,007
TKN	0.023	9,921
NH3	0.016	6,922
TP	0.0026	1,124

(1) From **Table ES 4**.

(2) 2030 Waste Load (lbs/day) = Extrapolated from second order polynomial curves shown in Fig ES 2

1 Introduction and Overview

1.1 Background

The City and County of Honolulu (CCH) Department of Environmental Services (ENV) is in the process of developing the Honouliuli/Waipahu/Pearl City Wastewater Facilities Plan (Honouliuli Fac Plan), which covers the Honouliuli sewer basin. The study area for the Honouliuli Fac Plan consists of the Honouliuli Wastewater Treatment Plant (WWTP) and its wastewater service area, including the Ewa and Central Oahu area from Ko Olina to Halawa with the focus on the main conveyance system flowing east to west, from Halawa to Waimalu to Pearl City to Waipahu and to the WWTP.

The Honouliuli sewer basin serves a current population of over 300,000 and includes 17 CCH operated wastewater pump stations (WWPSs) and the Honouliuli influent pump station (IPS). The Honouliuli WWTP provides primary treatment to all flow and secondary treatment to approximately half of the total flow received. In 2010, the Honouliuli WWTP treated an average of 25.39 million gallons per day (mgd) of wastewater from the sewer basin.

CCH is currently operating under a Capital Improvement Plan (CIP) established in the *Final Sewer Infiltration and Inflow (I/I) Plan* (Fukunaga and Associates, 1999), hereafter referred to as the *Sewer I/I Plan*. The purpose of the *Sewer I/I Plan* was to develop the optimal approach to minimize sanitary sewer overflows (SSOs) and fulfill the requirements of the 1995 Consent Decree (Civil No. 94-00765 DAE) between the CCH, the State of Hawaii (Hawaii), and United States Environmental Protection Agency (EPA). Since the completion of the *Sewer I/I Plan*, there have been several population, flow, and load projections including: *Draft Wastewater Long-Term Plan* (CH2M Hill, 2008), *Work Task 1: Population, Flow & Waste Load Projections* (EDAW/AECOM, 2008), and *Work Task 4.A: Design Flows and Waste Load Determination* (AECOM, 2010). In addition, the 2010 Consent Decree includes an update of the 1999 *Sewer I/I Plan.* Currently, there is an ongoing *Sewer I/I Assessment and Rehabilitation Program Update* project which is using flow monitoring and rain data to calibrate a hydraulic model of the collection system.

Additionally, the 2010 Consent Decree requires the upgrade of the existing Honouliuli WWTP to full secondary treatment by 2024. The population, flow, and load projections conducted under this work task and summarized in this technical memorandum will be used as basis of design criteria for the upgrade of the WWTP.

1.2 Scope and Purpose

The scope and purpose of this project is to:

- Update the previous population projections from Task 4.A using 2010 Census data and other population and development data made available since the previous projection effort conducted in 2008;
- Provide population projections through the year 2050, with projections for an intermediate design year of 2035 for design of facilities that could be constructed in phases; and
- Update flow and load projections using the population projections.

The intermediate year of 2035 was chosen to correlate with the *City and County of Honolulu Socioeconomic Projections to 2035* (CCH Department of Planning and Permitting [DPP], September 2009) and the *Population and Economic Projections for the State of Hawaii to 2035* (Hawaii Department of Business, Economic Development, and Tourism [DBEDT], July 2009). Although the 2010 Consent Decree projects use 2030 projections, the 2035 projections are conservative values to use for 2030. The ultimate projection (2050) was chosen based on the fact that construction of the upgraded Honouliuli WWTP is not required to be completed until 2024 and 2024 to 2035 is only 11 years. Typically, WWTPs are designed for 20 to 30 years. *It is recommended*

that the population, flows, and loads be reevaluated prior to the intermediate year to determine if 2050 basis of design values are reasonable as there are many unknowns with upcoming developments.

This task projects population and wastewater flows at the WWPSs along the East Interceptor (which include the Halawa, Waimalu, Pearl City, and Waipahu WWPSs) and the Honouliuli IPS and loads at Honouliuli WWTP. These wastewater flow projections will determine needs for upgrading and/or expanding the existing collection system along the East Interceptor and the flow and load projections will determine needs for upgrading and/or expanding the existing treatment system at the Honouliuli WWTP. The results of this task will be used as the basis of design criteria for the Halawa, Waimalu, Pearl City, and Waipahu WWPSs and the Honouliuli WWTP.

1.3 Objectives

The objectives of this task were defined and executed in the following order:

a. Determine 2010 population in each tributary area (Halawa, Waimalu, Pearl City, and Waipahu WWPSs and Honouliuli IPS).

b. Project 2035 and 2050 population in each tributary area.

c. Determine 2010 wastewater flows at Halawa, Waimalu, Pearl City, and Waipahu WWPSs and Honouliuli WWTP.

d. Estimate 2010 per capita flow in each tributary area based on 2010 wastewater flows and population.

e. Project 2035 and 2050 wastewater flow in each area using 2010 per capita flow and 2035 and 2050 population, respectively.

f. Determine 2010 loads at Honouliuli WWTP.

g. Project 2035 and 2050 loads at the WWTP using 2010 waste load coefficients and 2035 and 2050 population, respectively.

2 EXISTING COLLECTION SYSTEM

2.1 Honouliuli Sewer Basin

The Honouliuli WWTP provides service to the developed areas in the region around Pearl Harbor, from Halawa in the east to Ko Olina in the west, and extending to Mililani in the north. The Honouliuli WWTP services the communities of Halawa, Aiea, Waimalu, Pearl City, Pacific Palisades, Waiawa, Waipahu, Mililani, Waipio, Village Park, Crestview, Waikele, Kunia, Kapolei, West Loch, Ewa Beach, Makakilo, and Ko Olina. The total service area includes approximately 22,000 acres of developed land and 54,000 acres of undeveloped land.

2.2 Wastewater Pump Stations and Tributary Areas

Within the collection and transport system, wastewater generally flows from east to west and from *mauka* (mountain area) to *makai* (ocean area). Seventeen CCH-operated WWPSs are located throughout the Honouliuli basin, excluding the IPS at the WWTP. The Honouliuli Fac Plan focuses on the area known as the East Interceptor which includes the Halawa, Waimalu, Pearl City and Waipahu WWPSs and their associated sewers and force mains. **Figure 2-1** shows the CCH operated WWPSs, Honouliuli WWTP, and the East Interceptor. A schematic of the connectivity of the tributary areas for each WWPS is shown in **Figure 2-2**.

2.2.1 Honouliuli IPS

The Honouliuli IPS is located on the Honouliuli WWTP site at 91-1000 Geiger Road, adjacent to the Coral Creek Golf Course. The IPS receives wastewater from local tributary areas in the vicinity of the Honouliuli WWTP, as well as flows discharged from the West Beach Resort #1 WWPS (Ko Olina), West Beach Resort #2 WWPS (Ko Olina), Makakilo WWPS, Kapolei Business Park WWPS (privately operated), STA 3R WWPS (military operated), Ewa Gentry WWPS, Ewa Gentry 2 WWPS, Ewa Beach WWPS, and from the East Interceptor (which includes the Waipahu WWPS, Pearl City WWPS, Waimalu WWPS, and Halawa WWPS).

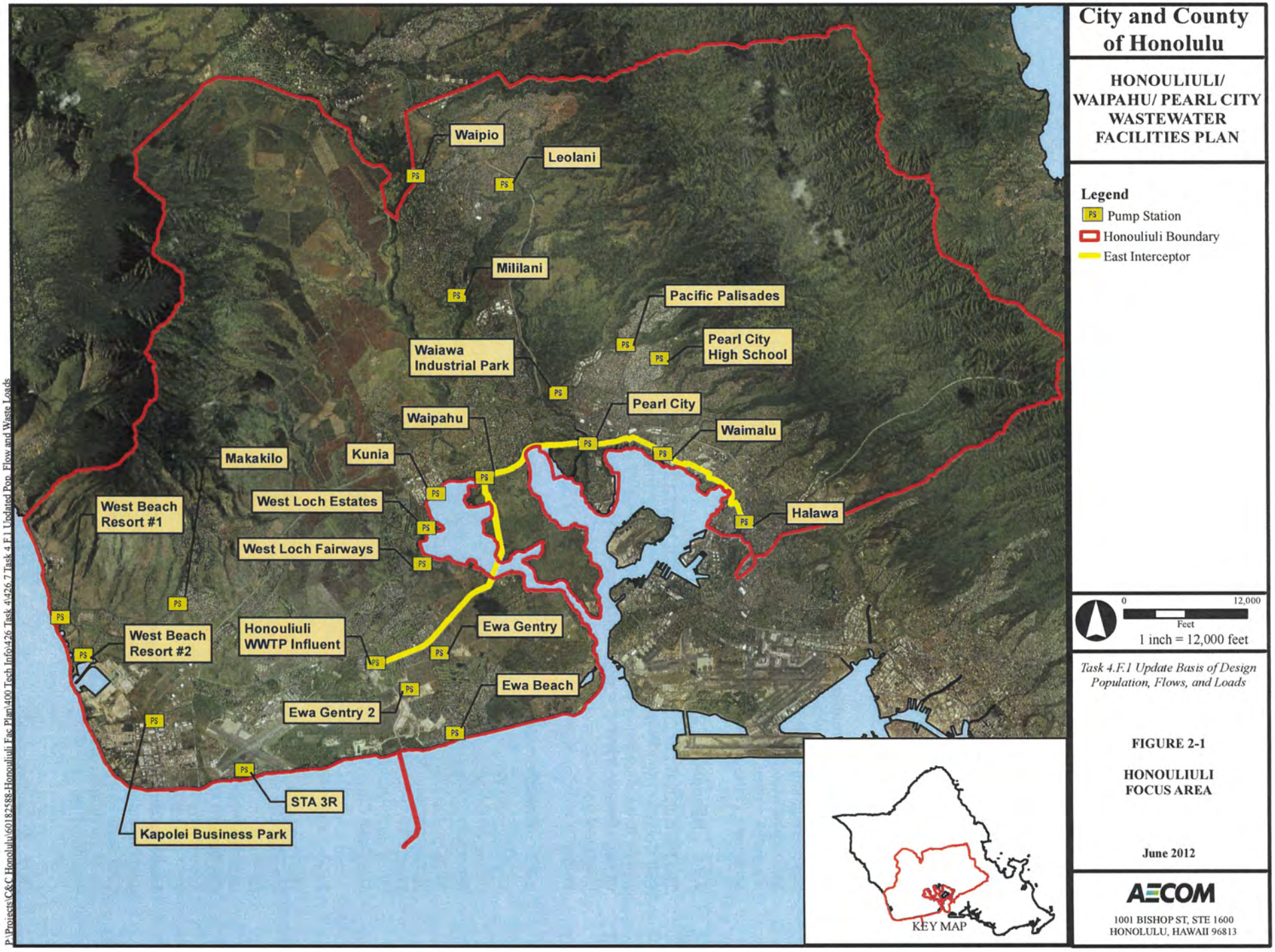
2.2.2 Waipahu WWPS

The Waipahu WWPS is located at 93-065 Waipahu Depot Road near the Waipahu Convenience Center (CCH refuse and recycling center), the Honolulu Fire Department Vehicle Maintenance Facility and Ke Kula Makai (Honolulu Police Academy). The WWPS is located on a portion of two parcels that total approximately 58 acres, although the WWPS footprint is approximately 0.7 acres. The WWPS has been in service since 1963 and receives gravity flow from the local Waipahu tributary area, along with pumped flows from the Kunia WWPS, Waipio WWPS, Leolani WWPS (privately operated), and the Mililani WWPS. The Waipahu WWPS discharges into a dual force main system that conveys flows to the 84-inch diameter sewer tributary to the Honouliuli IPS. The Pearl City WWPS (discussed below) also discharges into the dual force main system.

2.2.3 Pearl City WWPS

The Pearl City WWPS is located on an approximately 0.7 acre site at 790 Lehua Avenue, adjacent to undeveloped land owned by the Federal government. The WWPS has been in service since 1966. The WWPS receives gravity flow from the local Pearl City tributary area, which includes Pearl City High School WWPS (privately operated) along with pumped flows from the Halawa, Waimalu and Waiawa tributary areas. The Pearl City WWPS currently discharges into the dual force main system that also serves the Waipahu WWPS. The dual force main system conveys flows to the 84-inch diameter sewer tributary to the Honouliuli IPS.

The Pearl City WWPS is currently located in the flood zone. The *Sewer I/I Plan* (Fukunaga and Associates, 1999) recommended relocating and upgrading of the Pearl City WWPS; this project is included in the 2010 Consent Decree for evaluation and recommendation to determine the needs of the Pearl City WWPS. The evaluation and recommendation of the Pearl City WWPS is a task included in the Honouliuli/Waipahu/Pearl City Wastewater Facilities Plan.


Waipio
Leolani
Mililani
Pacific Palisades
Pearl City High School
Waiawa Industrial Park
Pearl City
Waipahu
Waimalu
Kunia
Makakilo
West Beach Resort #1
West Loch Estates
West Loch Fairways
Halawa
West Beach Resort #2
Honouliuli WWTP Influent
Ewa Gentry
Ewa Beach
Ewa Gentry 2
STA 3R
Kapolei Business Park
PS
KEY MAP
City and County of Honolulu
HONOULIULI/ WAIPAHU/ PEARL CITY WASTEWATER FACILITIES PLAN
Legend
Pump Station
Honouliuli Boundary
East Interceptor
0
12,000
Feet
1 inch = 12,000 feet
Task 4.F.1 Update Basis of Design Population, Flows, and Loads
FIGURE 2-1
HONOULIULI FOCUS AREA
June 2012
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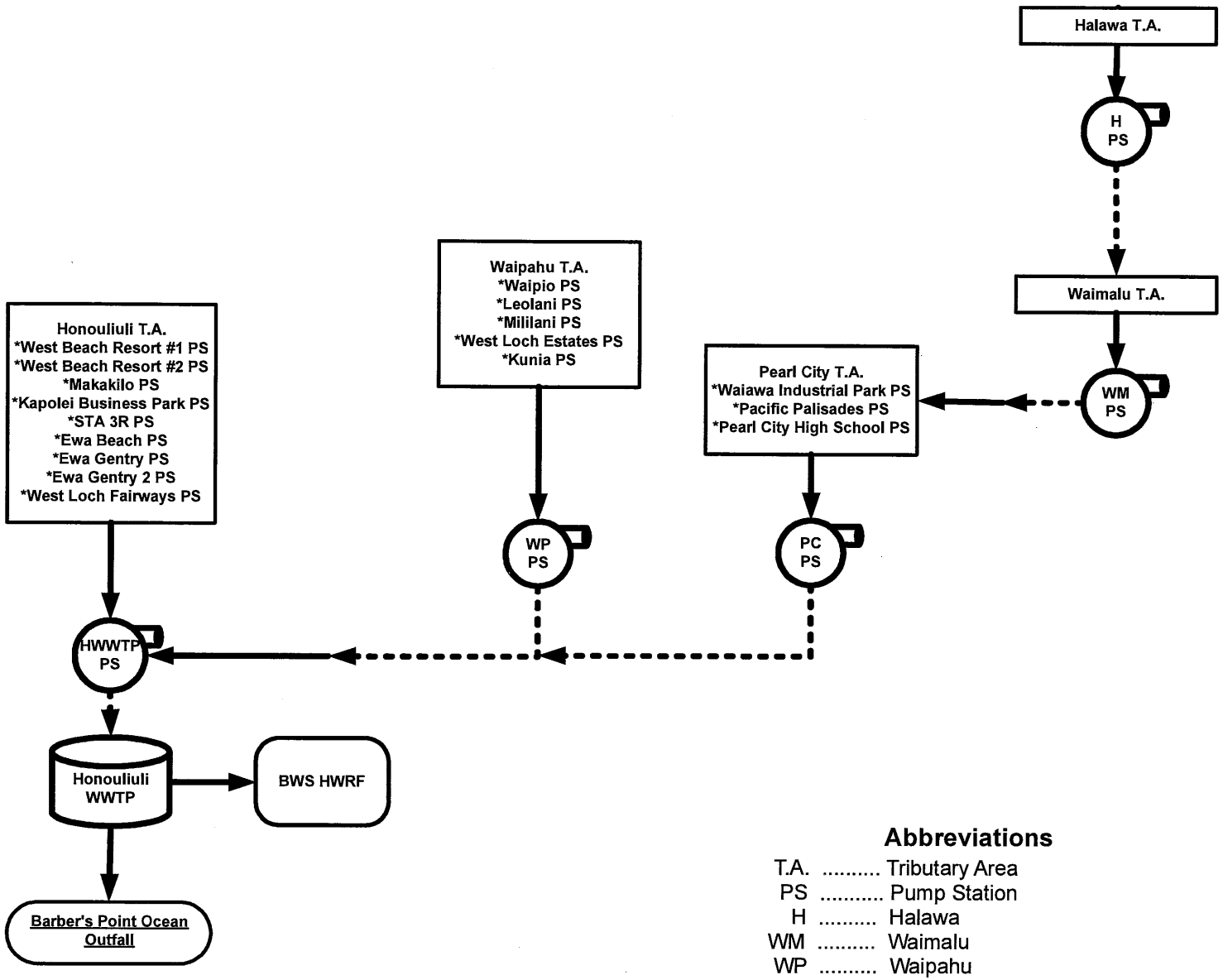

Abbreviations

T.A.	Tributary Area
PS	Pump Station
H	Halawa
WM	Waimalu
WP	Waipahu
PC	Pearl City
BWS	Board of Water Supply
HWRF	Honouliuli Water Recycling Facility
HWWTP	Honouliuli Wastewater Treatment Plant

City and County of Honolulu

HONOULIULI/ WAIPAHU/ PEARL CITY WASTEWATER FACILITIES PLAN

Legend

- T.A. — Tributary Area
- PS — Wastewater Pump Station
- Force Main Flow
- Gravity Flow
- WWTP — Wastewater Treatment Plant
- Ocean Outfall
- Water Recycling Facility

Task 4.F.1 Update Basis of Design Population, Flows, and Loads

FIGURE 2-2

HONOULIULI BASIN EXISTING COLLECTION SYSTEM FLOW SCHEMATIC

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2.2.4 Waimalu WWPS

The Waimalu WWPS is located at 245 Kamehameha Highway in the northeast corner of the 21.4 acre Neal Blaisdell Park. The WWPS has been in service since 1968. The WWPS serves the Waimalu tributary area in addition to receiving flows from the Halawa WWPS. The Waimalu WWPS force main discharges flow to the Pearl City WWPS tributary system.

2.2.5 Halawa WWPS

The Halawa tributary area flows are all collected at the Halawa WWPS. The Halawa WWPS is located on an approximately 0.3 acre site at 99-560 Salt Lake Boulevard, adjacent to Halawa Stream and the lower portion of the Aloha Stadium parking lot. The WWPS has been in service since 1970. The Halawa WWPS force main discharges flow to the Waimalu WWPs tributary system.

3 METHODOLOGY

As noted above, population, flow, and load projections for the Honouliuli sewer basin were conducted through the year 2050, including projections for an intermediate design year of 2035. The methodology used to conduct these projections is presented in this section.

3.1 Population Projections

Conducting the population projections entailed a substantial data collection effort. Key agencies contacted include the Hawaii Department of Business, Economic Development, and Tourism (DBEDT) and CCH Department of Planning and Permitting (DPP), which are responsible for conducting socioeconomic projections for Hawaii and the island of Oahu, respectively. Also, numerous planning reports and data were reviewed, including the following (listed chronologically):

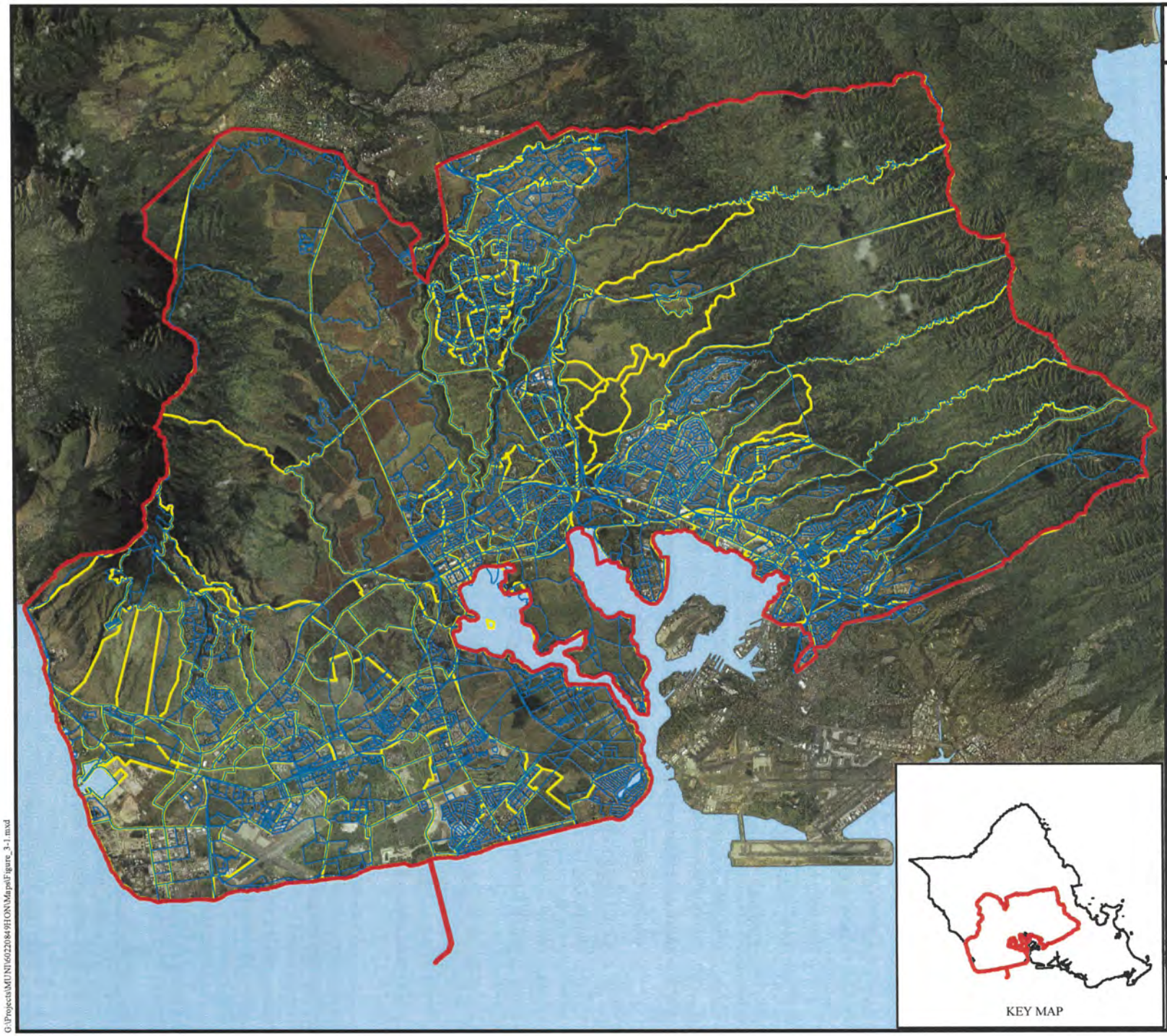
- General Plan: Objectives and Policies, Amended October 2002 (CCH DPP)
- Central Oahu Sustainable Communities Plan, December 2002 (CCH DPP)
- Primary Urban Center Development Plan, June 2004 (CCH DPP)
- Population and Economic Projections for the State of Hawaii to 2035, July 2009 (Hawaii DBEDT)
- City and County of Honolulu Socioeconomic Projections to 2035, September 2009 (CCH DPP)
- Honouliuli High-Capacity Transit Corridor Project Final Environmental Impact Statement/Section 4(f) Evaluation, June 2010 (CCH and US Department of Transportation)
- Annual Report on the Status of Land Use on Oahu: Fiscal Year 2009, August 2010 (CCH DPP)
- Get on Board! Transit Oriented Development Handbook, Spring 2011 (CCH DPP)
- Oahu Regional Transportation Plan 2035, April 2011 (Oahu Metropolitan Planning Organization)
- Proposed Revised Ewa Development Plan, May 2011 (CCH DPP)
- 2010 Census Summary File 1 for Hawaii, June 2011 (US Census Bureau)
- 2010 Annual Visitor Research Report, September 2011 (Hawaii Tourism Authority)

The projections consider long-term, historic trends for the sewer basin, as well as available data and projections released by CCH and large-scale developments and proposed projects in the area. Previous population and employment projections conducted by AECOM and others (identified in **Section 1.1**) were also referenced to assist with the effort.

The source most relied on was the CCH DPP socioeconomic projections to 2035, which are generally used and accepted for county infrastructure planning efforts (AECOM, 2011a). A copy of CCH DPP's 2035 projections is provided as **Appendix A**. CCH DPP's projections are derived from county projections conducted by Hawaii DBEDT. CCH DPP allocates the county projections by Transportation Analysis Zones (TAZ) on Oahu based on local development plans, policies, and development patterns. Each TAZ contains residential, employment (jobs), and visitor accommodation unit data projected through the year 2035.

A total of 764 TAZs comprise the county. To determine the TAZs located within the Honouliuli sewer basin, the TAZ boundaries were overlaid on the sewer basin boundary in GIS. This process resulted in the identification of 201 TAZs within the sewer basin, as illustrated in **Figure 3-1**.

The sewer basin was then divided into tributary areas for the Honouliuli IPS and the Waipahu, Pearl City, Waimalu, and Halawa WWPSs to determine which TAZs (and associated population) are located within each tributary area for the purpose of projecting future tributary area populations. The boundaries of the existing pump



City and County of Honolulu

HONOULIULI/ WAIPAHU/ PEARL CITY WASTEWATER FACILITIES PLAN

Legend

- Sewer Basin
- 2010 Census Blocks
- TAZ Boundaries

0 12,000
Feet
1 inch = 12,000 feet

Task 4.F.1 Update Basis of Design Population, Flows, and Loads

FIGURE 3-1

TRANSPORTATION ANALYSIS ZONES AND US CENSUS BLOCKS

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KEY MAP

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station tributary areas in the sewer basin were estimated in GIS using the current limits of the Honouliuli sewer collection system. In the future, it was assumed that 100% of the population would contribute to the collection system, and the tributary area boundaries were expanded to provide full coverage of the sewer basin (see **Figure 3-2**). The future tributary area boundaries were determined based on review of aerial photography and topographic information. It is understood, however, that future development will not necessarily extend into all parts of the expanded tributary area boundaries. As described in **Section 3.2.4** , the acreage of new development outside of the existing Honouliuli sewer collection system tributary area was estimated based on projected population growth and estimated population densities for those areas.

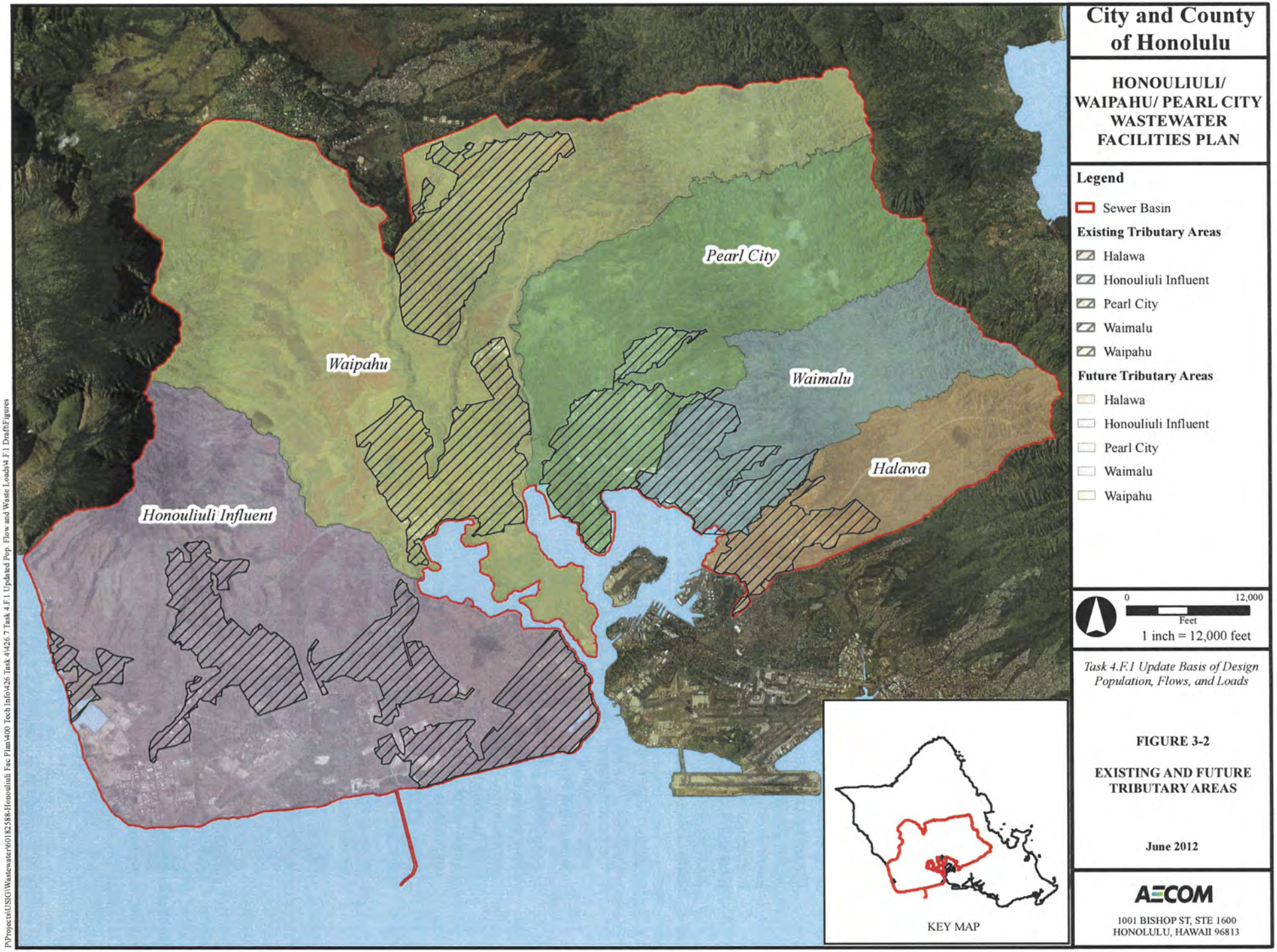
Where the boundaries of the TAZs do not match the boundaries of the tributary areas or sewer basin, the TAZ populations were allocated in proportion to the area within each basin. For example, if only 50% of the area of a given TAZ is within a particular tributary area, only 50% of the TAZ population was assigned to that tributary area. Exceptions were taken in instances where it was evident that population was focused in a certain portion of the TAZ due to development patterns and/or land use conditions.

Three population categories were projected as part of this effort: Residential, Non-Residential, and Visitor. Details on the projection approach for each category is provided below.

3.1.1 Residential Population Projections Approach

Based on communication with CCH DPP, the Hawaii DBEDT has acknowledged that their 2035 projections (on which the CCH DPP projections are based) underestimated the in-migration rate for Oahu, which resulted in a lower 2010 population projection than what was reported by the 2010 Census (AECOM, 2011b). Hawaii DBEDT is in the process of updating their projections to 2040 using the 2010 Census data, but the results are not yet available (AECOM, 2011c). Therefore, AECOM updated the CCH DPP residential projections to reflect the more accurate and more recent 2010 Census data and extended the projections to 2050 using the stepwise approach below:

- Step 1: Determine 2010 TAZ populations based on analysis of 2010 Census data at the block level. For this process, the 2010 Census block GIS shapefiles were overlaid on the TAZ boundaries (see **Figure 3-1**). Where the boundaries of the Census blocks do not match the boundaries of the TAZs, the Census populations were allocated within the TAZs in the same manner described above. The results of Step 1 are provided in **Appendix B** and are the source of the estimated 2010 population.
- Step 2: The projected 2010 TAZ population prepared by the CCH DPP was replaced with the revised 2010 TAZ population based on 2010 Census data (results from Step 1) and used as the starting point for future projections. The 2010 population was adjusted (reduced) to account for non-sewered population located within the Honouliuli sewer basin based on review of the existing tributary area boundaries. Note: This existing non-sewered population was added back into future projections based on the assumption that 100% of the population will ultimately be connected to the sewer system.
- Step 3: Determine 2015 TAZ population. Population growth predicted by the CCH DPP for each TAZ from 2010 to 2015 was added to the revised 2010 TAZ population.
- Step 4: Repeat Step 3 for the remaining period of CCH DPP projections (through 2035) for each five year increment.
- Step 5: For the remaining projection period (2035 through 2050), projections are primarily a continuation of growth rates and trends identified in CCH DPP's 2035 projections for individual TAZs. If a TAZ demonstrated less than 1% annual growth in DPP's projections, then the growth was projected in a linear fashion. If a TAZ demonstrated greater than 1% annual growth in CCH DPP's projections, available development plans and other planning resources were reviewed to determine if the growth rate should be sustained or modified. In most instances, the annual growth rate was decreased for these TAZs but was not allowed to go below 1% annual growth.
- Step 6: The population values for all TAZs located completely or partially within a tributary area boundary were summed to arrive at the estimated 2010 through 2050 populations for each of the tributary areas, and the Honouliuli sewer basin as a whole.



City and County of Honolulu

HONOULIULI/ WAIPAHU/ PEARL CITY WASTEWATER FACILITIES PLAN

Legend

- Sewer Basin

Existing Tributary Areas

- Halawa
- Honouliuli Influent
- Pearl City
- Waimalu
- Waipahu

Future Tributary Areas

- Halawa
- Honouliuli Influent
- Pearl City
- Waimalu
- Waipahu

0 12,000
Feet
1 inch = 12,000 feet

Task 4.F.1 Update Basis of Design Population, Flows, and Loads

FIGURE 3-2

EXISTING AND FUTURE TRIBUTARY AREAS

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3.1.2 Non-Residential Population Projections Approach

CCH DPP's non-residential population projections for 2010 through 2035 were used "as is". Non-Residential population is a sum of the following CCH DPP land use forecast variables, which capture all employment/jobs within a TAZ:

- J1 – jobs in military
- J2 – jobs in government
- J3 – jobs in hotel
- J4 – jobs in agriculture
- J5 – jobs in transportation, communication, and utilities
- J6 – jobs in industrial
- J7 – jobs in finance, insurance, and real estate
- J8 – jobs in service
- J9 – jobs in retail
- J10 – jobs in construction (fixed and floating)
- J11 – jobs in construction (floating) Note: Refers to construction workers at job site as opposed to in company office; i.e. not included in J10.

Similar to the 2008 EDAW/AECOM projections effort, it was assumed that the 2035 ratios between Residential population and Non-Residential population for each TAZ would stay the same through the remainder of the projection period (i.e. through 2050), and future Non-Residential population was calculated by applying these ratios. The resulting non-residential population projections are presented in **Appendix C**.

3.1.3 Visitor (Hotel) Population Projections Approach

The main source for estimating Visitor population is CCH DPP's land use forecast variable "VU", which represents the estimated number of visitor accommodation units. These include hotel rooms as well as housing units held for use by visitors. CCH DPP's VU projections for 2010 through 2035 for each TAZ were multiplied by 2 (assuming average occupancy of two people per VU). The 2010 hotel average occupancy rate for Oahu of 78.2%, as reported by the Hawaii Tourism Authority, was then applied to arrive at a projected Visitor population (Hawaii Tourism Authority, 2011).

It was assumed that the 2035 ratios between Residential population and Visitor population for each TAZ would stay the same through the remainder of the projection period (i.e. through 2050), and future Visitor population was calculated by applying these ratios. The resulting visitor population projections are presented in **Appendix C**.

3.1.4 Departures from Previous Population Projection Efforts

As noted above, population projections were conducted by EDAW/AECOM in August 2008 as part of a previous effort for the Honouliuli Fac Plan. Three noteworthy departures from this previous effort are identified below:

- The following data that were not available for the previous effort were incorporated: 2010 Census data and 2035 projections prepared by the DBEDT and CCH DPP.
- Projections for tunnel design / build-out conditions (year 2150) were not conducted since the gravity sewer tunnel (GST) alternatives are not being actively considered for the Honouliuli sewer basin at this time.
- The 2008 EDAW/AECOM report assumed CCH DPP's land use forecast variable "VU" reflects Visitor population. However, per CCH DPP's definition, VU = hotel rooms + housing units held for use by visitors. VU therefore represents the estimated number of visitor accommodation units and not Visitor population. The approach for estimating Visitor population was adjusted for the current effort to reflect this, as described in **Section 3.1.3.**

3.2 Flow Projections

3.2.1 Overview of Approach

Wastewater flows to the Honouliuli WWTP are composed of three components: sanitary flow, dry weather infiltration, and wet weather infiltration/inflow. Development of flow projections for the intermediate design year of 2035 and design year of 2050 involved development of projections for each of the three components of the flow. Flow projections were based initially on measurements of actual flows from flow metering conducted in the 2009-2011 time period as part of the Sewer I/I Assessment and Rehabilitation Program Update project. Projections of future flows were then based on projections of population increase and anticipated areas of new development. A calibrated InfoWorks model was used to route flows through the collection and transport system to generate projected flows at the Honouliuli WWTP. The following sections describe the development and calibration of the InfoWorks model for representing current conditions flows, and the approach for generating sanitary, dry weather infiltration, and wet weather infiltration/inflow components for future flows.

3.2.2 Development and Calibration of InfoWorks Model

Design flows were developed using an InfoWorks model of the collection and transport system tributary to the Honouliuli WWTP. Details on the model development and calibration process are presented in the *Draft Task 4 Wastewater Hydraulic Flow Model Update Technical Memorandum* prepared for the Sewer I/I Assessment and Rehabilitation Program Update project.

The pipe sizes and invert elevations used in the model were generated from the CCH's GIS system. Tributary sub-basins were developed based on data from a GIS geodatabase provided by CCH. This database identified land use by individual property lots, and the model subcatchment delineations were, therefore, developed by individual property lot.

Current conditions base sanitary flows were initially developed from water use records. Infiltration was initially estimated as a percentage of night time low flow from the meter data. Based on meter data, separate diurnal curves were developed for weekdays and weekends. Initial dry weather flows were then adjusted as necessary to match meter data.

Current conditions wet weather flows were developed by adjusting the model parameters that control direct overland flow and wet weather infiltration (the rapid and slow responses to rainfall) to match meter data. The overland flow parameters are related to surface features that define the percentage of rainfall that becomes runoff, and the routing of the runoff. Factors that affect the wet weather infiltration include the degree of soil saturation, and the depth of the water table. The InfoWorks model includes features that can represent changing groundwater saturation and water table depth conditions based on changing rainfall conditions. These features allow the model to simulate seasonal variations to base flow and wet weather infiltration based on seasonal rainfall patterns.

The model was calibrated to 32 flow meters distributed throughout the Honouliuli tributary area. Additional detail on the model development and calibration process is presented in the *Draft Task 4 Wastewater Hydraulic Flow Model Update Technical Memorandum* prepared for the Sewer I/I Assessment and Rehabilitation Program Update project.

3.2.3 Development of Future Dry Weather Flow

The approach to the development of future base sanitary flows included the following steps:

- Define initial wastewater generation rates (in units of gallons per capita-day [gpcd]) from literature values for each of the three categories of population that were used in the population projections presented in Section 3.1 above.
- Using metered flow data from the Honouliuli WWTP and actual 2010 population data, adjust the wastewater generation rates to match actual 2010 data.
- Apply the adjusted wastewater generation rates to future projections of population in each of the three population categories, for 2035 and 2050.

The initial literature values selected for wastewater generation rates were as follows (Metcalf & Eddy, 2003):

- Residential 71 gpcd
- Non-Residential 13 gpcd
- Visitor 60 gpcd

The 2010 average sanitary flow (excluding dry weather groundwater infiltration and wet weather infiltration/inflow) at the Honouliuli WWTP was 20.9 mgd. Applying the above wastewater generation rates to the 2010 population for each of the three categories resulted in a computed sanitary flow at the Honouliuli WWTP of 23.7 mgd. The wastewater generation rates were then reduced by a ratio of 20.9/23.7, so that the resulting computed sanitary flow matched the measured flow of 20.9 mgd. The resulting wastewater generation rates were as follows:

- Residential 63 gpcd
- Non-Residential 11 gpcd
- Visitor 53 gpcd

These rates were then applied to the 2035 and 2050 population projections for each of the three categories of population, to arrive at the projected total sanitary flows. The distribution of sanitary flows by area is described below.

For future dry weather infiltration flows, it was assumed that the ratio of infiltration to sanitary flow would remain constant. Infiltration flows were, therefore, increased in proportion to the increase in sanitary flow.

Trends in water usage data were examined statistically, and indicate a slight reduction in usage in recent years. However, estimating the extent to which water will continue to be conserved leading into years 2035 and 2050 would be very speculative. Therefore, sanitary flows were not adjusted to account for additional per capita reduction in water usage.

3.2.4 Development of Future Wet Weather Infiltration/Inflow

Projecting future wet weather flows required identification of approximate acreages of new developments required to accommodate the projected population within the Honouliuli sewer basin. As described above, population projections were developed for each TAZ in the Honouliuli sewer basin. Some of those TAZs are located within the existing model tributary area, some are located outside of the model tributary area, and some are partially in and partially out of the model tributary area. To estimate the approximate extent of new runoff area to add to the model to account for new development in areas outside of the existing model runoff delineation areas, the following approach was taken:

- GIS was used to classify each TAZ as one of the following to determine its relation to existing tributary area boundaries: fully within existing boundaries ("Within"), partially within and partially outside of existing boundaries ("Partial"), and fully outside existing boundaries ("Outside").
- Population for each TAZ classification was allocated as follows:
  - Within: Assumed all future population and associated development occurs within the existing tributary areas.
  - Partial: Assumed a portion of future population and associated development occurs within the existing tributary areas (infill, redevelopment, etc.), and the rest occurs outside of the existing tributary areas. The following splits were made based on consideration of geographic features and land availability for the TAZs classified as "Partial":
    - Waipahu: 40% of future development occurs within existing tributary area, 60% of future development occurs outside the existing tributary area
    - Honouliuli: 30% of future development occurs within existing tributary area, 70% of future development occurs outside the existing tributary area

  - Note – There were no "Partial" TAZs in the Pearl City, Waimalu, and Halawa tributary areas with projected population growth, so no split was applied for these tributary areas.
- Outside: Assumed all future population and associated development occurs outside the existing tributary areas.

To estimate the land area needed to accommodate the projected population in each TAZ classified as "Outside" or the portion of each TAZ classified as "Partial" that was assumed to be outside of the existing tributary area boundaries, the projected population in those areas was divided by the average 2010 population density (persons per acre) for the appropriate major pump station tributary area. For the Honouliuli tributary area, this average density was modified for some TAZs due to land area limitations and the high density development that is anticipated to support the expanding Kapolei area (also known as the "Second City").

These new areas were added to the model assuming 0.1 percent impervious area, and average values for groundwater infiltration. The assumption regarding 0.1 percent impervious area is based on 0.1 percent impervious area being observed in most of the other areas covered by the collection system model. Further details can be found in the *Draft Task 4 Wastewater Hydraulic Flow Model Update Technical Memorandum* prepared for the Sewer I/I Assessment and Rehabilitation Program Update project.

Dry weather infiltration was added based on an average value of infiltration/acre computed from existing basins. Since the pipe routing from the new development areas is unknown at this time, the new model tributary areas were assumed to be connected to the closest existing pump station.

For future development within existing model tributary areas, the runoff and groundwater characteristics were not changed. Sanitary flows were increased based on the increase in population, and dry weather infiltration was increased in proportion to the increase in sanitary flow.

3.2.5 Development of Design Flows

Versions of the Honouliuli system model were developed as described above to represent conditions for 2010, 2035, and 2050. To determine design flows for those years, the model was further modified to remove upstream hydraulic restrictions. These modifications involved increasing pipe sizes and pump station capacities to eliminate significant surcharging during the 2-year, 6-hour design storm. The CCH, in an agreement with the regulatory agencies, committed to controlling flows for the 2-year, 6-hour storm event.

To develop annual average daily flows, the models were run for a "typical year" annual simulation. Other maximum 24-hour flows (e.g. maximum day, maximum 30-day) were also derived from the results of the typical year annual simulation. To determine peak hour flows, the models were run for the 2-year, 6-hour storm.

The "typical year" rainfall was developed by analyzing rainfall from an approximately 30-year period of record. For each year, the following statistics were calculated:

- Total number of storms
- Total annual rainfall depth
- Number of storms with intensities
  - Larger than a 1 year storm
  - 75-100% of a 1 year storm
  - 50-75% of a 1 year storm
- Number of storms with depths
  - Larger than a 1 year storm
  - 75-100% of a 1 year storm
  - 50-75% of a 1 year storm

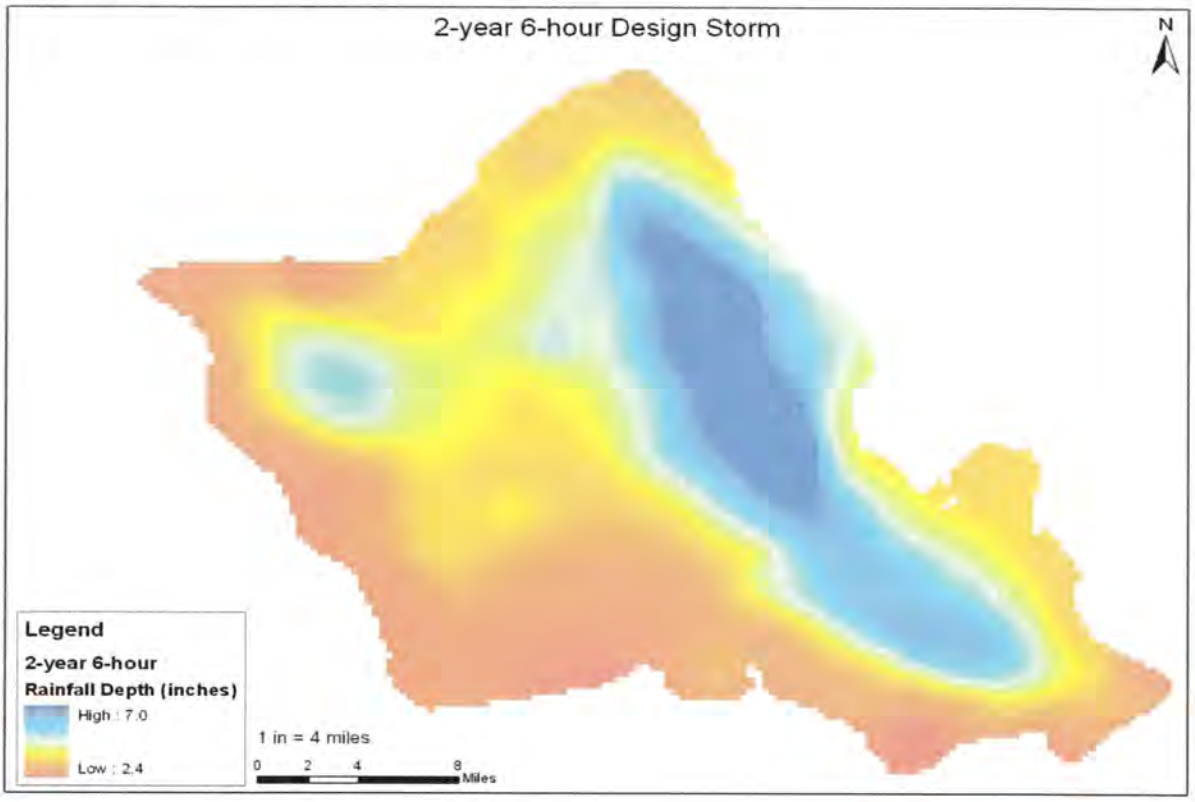
The average of each statistic over the period of record was calculated for each rain gage in the project area. A scoring system was developed to characterize how close each year came to the 30-year average for each statistic. For the year that came closest to the 30-year average, a limited number of individual storms were added and/or subtracted until the 30-year average was matched. For the Honouliuli project area, the "typical year" was based on the 1986 rainfall.

The 2-year, 6-hour storm rainfall was based on data from Atlas 14 developed by the National Oceanic and Atmospheric Administration (NOAA) as the successor to dated rainfall atlases across the nation.

Atlas 14 - Volume 4 provides precipitation frequency estimates for the Hawaiian Islands (NOAA, 2011). **Figure 3-3** presents the distribution of rainfall across Oahu for the 2-year, 6-hour storm based on Atlas 14. Since wet weather flows can be affected by antecedent rainfall conditions, it was important to establish an appropriate antecedent condition for the 2-year, 6-hour design storm. The appropriate antecedent condition was selected based on simulating a long term period (approximately 10 years) and determining what conditions occurred in the 2-year, 6-hour storm to produce a peak flow that would occur at roughly the same frequency, every two years.

Additional details on the development of the typical year and the 2-year, 6-hour rainfall are presented in the *Draft Task 4 Wastewater Hydraulic Flow Model Update Technical Memorandum* prepared for the Sewer I/I Assessment and Rehabilitation Program Update.

Figure 3-3. Depth for the 2-Year 6-Hour Storm on Oahu



3.3 Load Projections

There are two methods available to estimate load projections at the WWTP: waste load coefficient or concentration. The method used for this TM is the waste load coefficient method. The concentration method was not used because water conservation and water use habits may reduce per capita flow over time, resulting in changing pollutant concentration. The per capita waste load coefficient is based on year 2010 data (waste load

[lbs/day] and population [capita]). These values are used to estimate waste load coefficients (lbs/capita/day). Industry data shows that waste load coefficients remain relatively constant and are not affected by fluctuations in water usage.

The waste load coefficients, along with the 2035 and 2050 population projections are then used to determine mass loadings independent of concentration and flow.

4 UPDATED POPULATION PROJECTION RESULTS

4.1 2010 Population

CCH DPP's total projected 2010 Residential population of 911,841 for Honolulu County (Oahu) was 4.5% lower than the 2010 Census population of 953,207. Furthermore, CCH DPP's total projected 2010 Residential population of 301,887 for the 201 TAZs located within the Honouliuli sewer basin was 5.2% lower than the 2010 Census population of 317,718 for the same area. This disparity affirms that actual population growth in Oahu, and particularly within the Honouliuli sewer basin, is outpacing the growth projected by Hawaii DBEDT and CCH DPP. A comparison of 2000 and 2010 Residential population for the Honouliuli sewer basin based on US Census data is provided in **Table 4-1** to further demonstrate the strong growth the area has recently experienced.

Table 4-1. 2000 and 2010 Census Population for TAZs within the Honouliuli Sewer Basin

2000 Census Population(1)	2010 Census Population(1)	Increase
267,082	317,718	19.0%

(1) Census population includes both sewered and unsewered population
Sources:
- City and County of Honolulu Socioeconomic Projections to 2035, September 2009 (CCH DPP)
- 2000 and 2010 Census Summary File 1 for Hawaii (US Census Bureau)

Results from the updated 2010 Residential, Non-Residential, and Visitor populations for the Honouliuli sewer basin are provided in **Table 4-2**. As noted in the population methodology section (**Section 3.1**), the updated projections incorporate more accurate Residential population data from the 2010 Census that was not available for previous projection efforts. The 2010 population projections reported in the 2008 EDAW/AECOM Report are also provided in **Table 4-2** for comparison purposes. In addition, **Table 4-2** also shows that in 2010 there are approximately 33% of Non-Residential to Residential Population in the Honouliuli sewer basin.

Table 4-2. Updated Population Projections Results

Pump Station Tributary Area[1]	2008 EDAW/AECOM Report			Projection Update								
	2010[2]			2010[3]			2035			2050		
	Res	Non-Res	Visitor	Res	Non-Res	Visitor	Res	Non-Res	Visitor	Res	Non-Res	Visitor
Halawa	17,562	15,940	0	15,787	14,193	0	15,562	15,060	0	15,395	15,168	0
Waimalu	37,358	15,159	71	32,791	13,213	97	31,695	14,811	92	30,987	15,176	92
Pearl City	36,259	10,229	0	39,079	14,503	0	59,956	22,385	0	67,633	26,598	0
Waipahu	117,713	27,803	0	128,546	31,492	0	133,979	48,212	0	134,327	50,403	0
Honouliuli Influent	96,208	22,347	3,249	90,214	29,456	1,805	167,042	100,834	11,267	201,082	134,375	14,897
Total	305,101	91,479	3,320	306,417	102,857	1,902	408,234	201,302	11,359	449,424	241,720	14,989
Equivalent Population	347,626[4]			325,976[4]			452,938[4]			504,239[4]		

(1)Populations presented are for the areas shown in **Figure 3-2**.
(2) Population for 2010 was interpolated from the 2000 and 2030 estimates reported in the 2008 EDAW/AECOM Report. 2010 population = 2000 population + (10/30) × (2030 population - 2000 population).

(3) Results do not include the following estimated population not served by sewer (based on comparison of aerial photographs and limits of existing collection system): 9,177 Residential; 17,095 Non-Residential.
(4) The following equation was used to arrive at a population value to facilitate computation of per capita sanitary flows/loadings: Population Equivalent = Res Pop + (11/63) × Non-Res Pop + (53/63) × Visitor Pop (63, 11, and 53 are gallons per capita per day wastewater generation values for residential, non-residential, and visitor, respectively, as presented in **Section 3.2.3**).

The updated 2010 Residential population results for the Honouliuli sewer basin are only 0.4% higher than the previous estimate. However, the allocation of the population within the sewer basin varies.

Table 4-3 shows the differences from previous projections. The most populous portion of the sewer basin in 2010 was the Waipahu tributary area, followed by the Honouliuli Influent tributary area.

Table 4-3. Difference in Year 2010 Population Between 2008 and Current Projections(1)

Pump Station Tributary	Res	Non-Res	Visitor
Halawa	-10.1%	-11.0%	0.0%
Waimalu	-12.2%	-12.8%	36.6%
Pearl City	7.8%	41.8%	0.0%
Waipahu	9.2%	13.3%	0.0%
Honouliuli Influent	-6.2%	31.8%	-44.4%
Total	0.4%	12.4%	-42.7%

(1) Percent difference = (2010 Census Population - Previous Projection)/Previous projection

The updated 2010 results for Non-Residential and Visitor populations show a greater departure from the previous estimates as compared to the residential populations (see **Table 4-3**).

These differences are largely attributed to the use of CCH DPP's 2000-2035 socioeconomic projections data that were not available at the time of the preparation of the 2008 EDAW/AECOM projections, which reflect different results and trends in these population categories. Also, as described in **Section 3.1.3**, a different approach was used to estimate the Visitor population for the projection update.

4.2 2035 Basis of Design Population

The results of the 2035 population projections indicate robust growth within the Honouliuli sewer basin, particularly in Non-Residential and Visitor populations. **Table 4-4** shows the projected population increase between 2010 and 2035. Most of this growth is projected to occur within the Honouliuli IPS tributary area, where the growing City of Kapolei is located as well as several proposed master planned communities, resorts, and other developments (see **Table 4-5** and **Figure 4-1**). However, the mature existing areas of Halawa, Waimalu, and Pearl City may experience alternative Residential and Non-Residential growth should delays occur due to permitting, land use impacts, and market issues related to agricultural lands and master planned communities. The main drivers anticipated for alternative growth scenarios are the economics for immediate housing demand. In addition, **Table 4-2** shows that the ratio of Non-Residential to Residential Population increases to nearly 50% in 2035.

Table 4-4. Projected Growth between 2010 and 2035(1)

Pump Station Tributary	Res	Non-Res	Visitor
Halawa	-1.4%	6.1%	0.0%
Waimalu	-3.3%	12.1%	-5.2%
Pearl City	53.4%	54.3%	0.0%
Waipahu	4.2%	53.1%	0.0%
Honouliuli Influent	85.2%	242.3%	524.2%
Total	33.2%	95.7%	497.2%

(1) Percent difference = (Projected 2035 Population - 2010 Census Population)/2010 Census Population

Table 4-5. Status of Known Development Projects witin the Honouliuli Sewer Basin

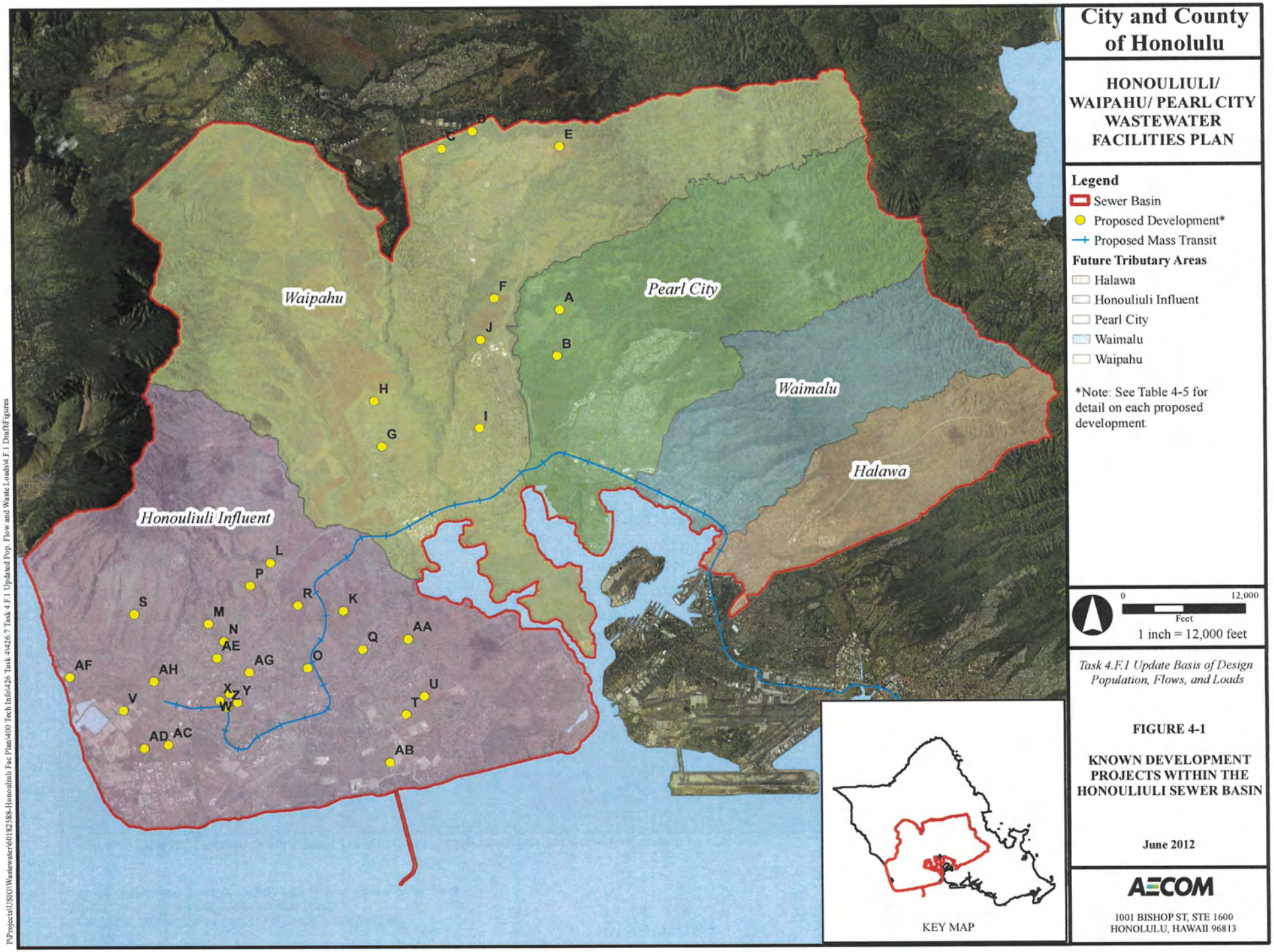
Development Name[1]	Original Land Area (Acres) from Development Plans			Status	Remaining Land Area (Acres) to be Developed		
	Res	Non-Res	Visitor		Res	Non-Res	Visitor
Pearl City Tributary Area							
A. Castle & Cooke Waiawa	150	-	-	Proposed	150	-	-
B. Waiawa by Gentry	500	-	-	Project development rights lapsed in 2009	500	-	-
Subtotal	650	-	-	-	650	-	-
Waipahu Tributary Area							
C. Mililani Technology Park	-	216	-	Majority of Phase I (approx. 79 acres) is developed with some lots available (approx. 26 acres). Phase II land is currently for sale (137 acres). Land is not approved and could be used for commercial or residential.	-	137	-
D. Launani Valley	28	-	-	Complete	-	-	-
E. Mililani Mauka	409	16	-	Complete	-	-	-
F. Koa Ridge	500	-	-	Proposed; development to begin 2013 and completed by 2022.	500	-	-
G. Royal Kunia Phase I	144	1	-	Complete	-	-	-
H. Royal Kunia Phase II	327	123	-	Construction to begin in 2011	327	123	-
I. Waikele	35	-	-	Complete	-		-
J. Wahiawa Hospital Medical Park	-	100	-	Proposed	-	100	-
Subtotal	1,443	456	-	-	827	360	-
Honouliuli Influent Tributary Area							
K. East Kapolei - Ho'opili	925	195	-	Proposed; construction to begin 2013 and last around 20 years.	925	195	-
L. Kapolei North	150	-	-	Proposed	150	-	-
M. Makakilo D2	96	-	-	Proposed	100	-	-
N. Makakilo (C & D)	105	-	-	Complete	-	-	-
O. DHHL East Kapolei	341	67	-	Proposed	341	67	-
P. Kalaeloa (HCDA)	267	693	-	Proposed	267	693	-
Q. Ewa Villages	54	-	-	Proposed	54	-	-

Table 4—5. Status of Known Development Projects witin the Honouliuli Sewer Basin (continued)

Development Name[1]	Original Land Area (Acres) from Development Plans			Status	Remaining Land Area (Acres) to be Developed		
	Res	Non-Res	Visitor		Res	Non-Res	Visitor
R. UH West Oahu Campus	275	116	-	Under construction	275	116	-
S. Makaiwa Hills (Upper and Lower)	908	31	-	Proposed	908	31	-
T. Laulani Commercial	-	20	-	Proposed	-	20	-
U. Ewa by Gentry Makai (East and West)	172	-	-	Under construction; nearing build-out; approx. 80% complete	34	-	-
V. Kalaeloa Barbers Point Harbor		210	-	Under construction; approx. 50% complete	-	105	-
W. Mehana at City of Kapolei	108	2	-	Under construction; approx. 50% complete; build-out expected by 2015	54	1	-
X. Leihano Senior Community	43	-	-	Proposed; construction to begin 2012	43	-	-
Y. Kapolei Mixed Use	-	91	-	Proposed	-	91	-
Z. Kapolei Commercial	-	91	-	Proposed	-	91	-
AA. Ewa by Gentry	94	64	-	Residential complete; industrial proposed	-	64	-
AB. Ocean Pointe / Hoakalei	269	73	39	Under construction; approx. 50% complete	135	37	20
AC. Kapolei Business Park	-	268	-	Phase I complete; approx. 40% remains for construction	-	107	-
AD. Kapolei Harborside	-	339	-	Proposed	-	339	-
AE. Palailai Residential	30	14	-	Complete	-	-	-
AF. Ko Olina Resort	50	16	42	Under construction; approx. 50% complete	25	8	21
AG. Villages of Kapolei	28	27	-	Under construction; approx. 60% complete	11	11	-
AH. Kapolei West	234	12	-	Proposed	234	12	-
Subtotal	4,149	2,329	81	-	3,556	1,988	41
Total	6,242	2,785	81	-	5,033	2,348	41

(1) Approximate location of developments identified on **Figure 4-1**.
Sources:

- Proposed Revised Ewa Development Plan, May 2011 (CCH DPP)
- Central Oahu Sustainable Communities Plan, December 2002 (CCH DPP)
- Online project status research conducted by AECOM, November 2011



City and County of Honolulu

HONOULIULI/ WAIPAHU/ PEARL CITY WASTEWATER FACILITIES PLAN

Legend

- Sewer Basin
- Proposed Development*
- Proposed Mass Transit

Future Tributary Areas

- Halawa
- Honouliuli Influent
- Pearl City
- Waimalu
- Waipahu

*Note: See Table 4-5 for detail on each proposed development.

0 12,000 Feet

1 inch = 12,000 feet

Task 4.F.1 Update Basis of Design Population, Flows, and Loads

FIGURE 4-1

KNOWN DEVELOPMENT PROJECTS WITHIN THE HONOULIULI SEWER BASIN

June 2012

AECOM
1001 BISHOP ST, STE 1600
HONOLULU, HAWAII 96813

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The strong projected growth within the Honouliuli sewer basin is supported by recent growth trends (see **Table 4-1**) as well as CCH DPP planning documents and growth policies. Oahu is divided into eight planning areas that are used by the CCH DPP for long-term planning efforts. Three of these planning areas are located partially or completely within the sewer basin: Ewa, Central Oahu, and Primary Urban Center (see **Figure 4-2**). These three planning areas are identified by the CCH General Plan to experience the majority of growth and development on the island over the next several decades. Also, one of the main objectives identified in the General Plan is to develop a Second Urban Center in the Ewa planning area with its nucleus in the Kapolei area. This objective is supported by several policy statements in the General Plan, such as the following (CCH DPP, 2002a):

- Allocate funds from the City and County's capital-improvement program for public projects that are needed to facilitate development of the secondary urban center at Kapolei.
- Encourage the development of a major residential, commercial, and employment center within the secondary urban center at Kapolei.
- Encourage the continuing development of Barbers Point as a major industrial center.
- Encourage the development of the Ewa Marina Community as a major residential and recreation area emphasizing recreational boating activities through the provision of a major marina and a related maritime commercial center containing light-industrial, commercial, and visitor accommodation uses.

Furthermore, the Honouliuli Rail Transit Project will traverse through the Honouliuli sewer basin and possibly encourage higher density, transit oriented development in the vicinity of the proposed stations, as reflected in the transit oriented development plans prepared by CCH DPP for several neighborhoods in the sewer basin (CCH DPP, 2011a). The rail project will also help support and connect many of the proposed developments identified in the Ewa Development Plan and Central Oahu Sustainable Communities Plan (CCH DPP, 2011b; CCH DPP, 2002b).

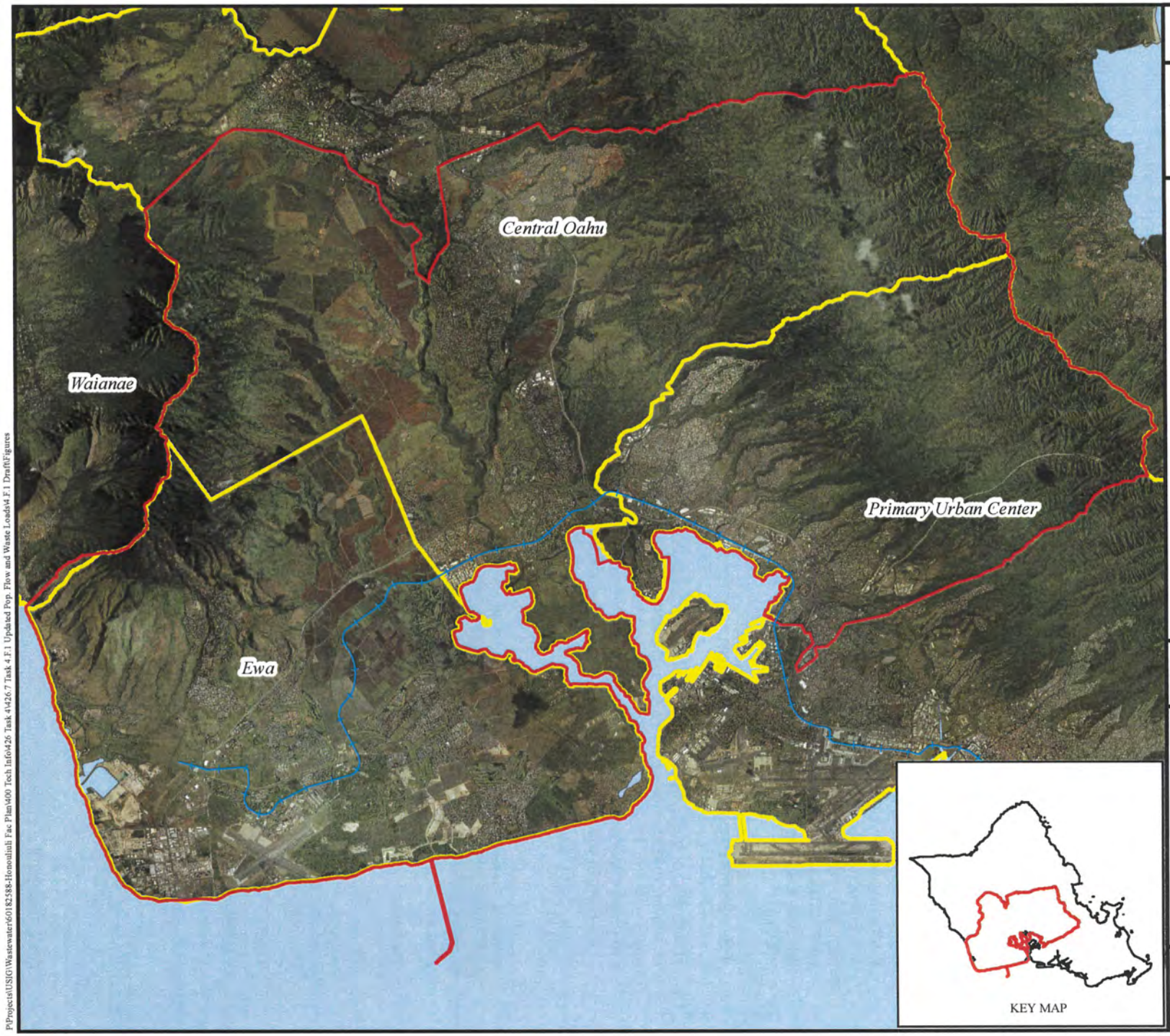
4.3 2050 Projected Population

The results of the 2050 population projections indicate continued growth within the Honouliuli sewer basin, albeit at a lower rate than between years 2010 and 2035. **Table 4-6** shows the projected growth in the Honouliuli sewer basin over the 15 years between 2035 and 2050. Similar to the 2035 projections, the majority of this growth is projected to occur within the Honouliuli IPS tributary area, and growth is projected to be negligible in the Halawa and Waimalu tributary areas unless market forces dictate the demand for additional residential population in the area. In addition, **Table 4-2** shows that the ratio of Non-Residential to Residential Population increases to nearly 54% in 2050.

Table 4-6. Projected Growth between 2035 and 2050[1]

Pump Station Tributary	Res	Non-Res	Visitor
Halawa	-1.1%	0.7%	0.0%
Waimalu	-2.2%	2.5%	0.0%
Pearl City	12.8%	18.8%	0.0%
Waipahu	0.3%	4.5%	0.0%
Honouliuli Influent	20.4%	33.3%	32.2%
Total	10.1%	20.1%	32.0%

(1) Percent difference = (Projected 2050 Population - Projected 2035 Population)/Projected 2035 Population



City and County of Honolulu

HONOULIULI/ WAIPAHU/ PEARL CITY WASTEWATER FACILITIES PLAN

Legend

- Proposed Mass Transit
- Sewer Basin
- DPP Planning Area

0 12,000
Feet
1 inch = 12,000 feet

Task 4.F.1 Update Basis Of Design Populations, Flows, and Loads

FIGURE 4-2

CCH DPP PLANNING AREAS WITHIN HONOULIULI SEWER BASIN

June 2012

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HONOLULU, HAWAII 96813

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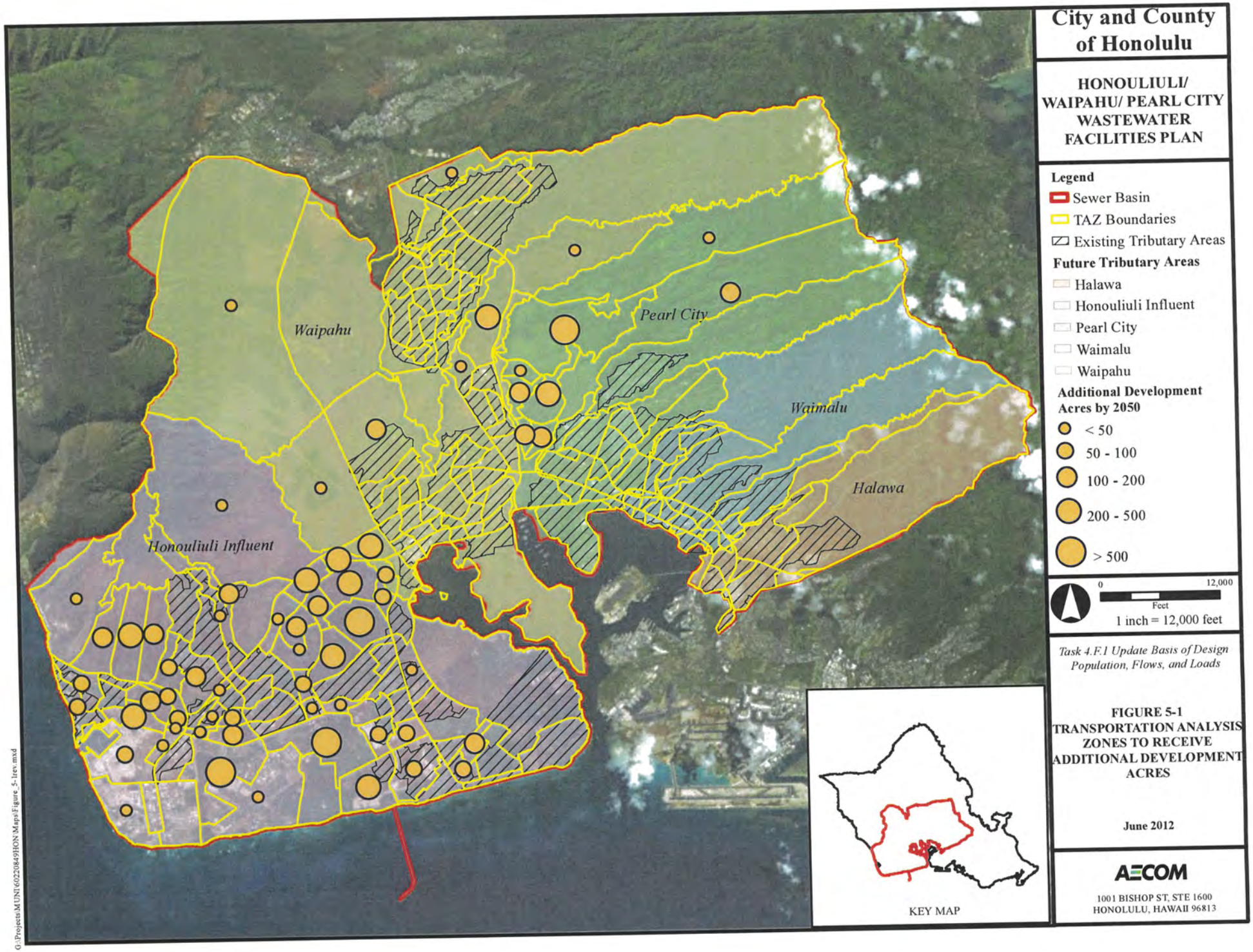
5 UPDATED FLOW AND LOAD PROJECTIONS

5.1 Potential Future Development Areas

Figure 4-1 illustrates the approximate location of future developments within the Honouliuli sewer basin as identified in the Ewa Development Plan and Central Oahu Sustainable Communities Plan prepared by the CCH DPP and the existing Honouliuli sewer system tributary areas. As indicated in **Figure 4-1**, future developments were only identified for the Pearl City, Waipahu, and Honouliuli tributary areas. Within the Waipahu and Honouliuli tributary areas, the proposed future developments are expected to occur both within and outside of the existing sewer system tributary area, while for Pearl City, the two proposed developments are located outside of the existing sewer system tributary area. For Halawa and Waimalu, none of the TAZs located fully or partially outside of the existing sewer system tributary area were predicted to experience population growth in 2035 or 2050. As described above, for the TAZs that are predicted to have population growth and are located fully within the existing tributary areas, it was assumed that the growth will primarily involve redevelopment of existing sites and will require minimal conversion of new land area that is not currently sewered. For TAZs that are predicted to have population growth and are located fully outside of the existing tributary areas, the area required for development was estimated by applying an average population density to the predicted new population. For TAZs that are located partially outside of existing tributary areas, a proportion of the new population was assigned to the area outside of the existing tributary area, and the extent of the new area was computed based on an average population density. **Table 5-1** presents the estimated additional total new development area by design year by major tributary area based on the approach described above, and **Figure 4-1** shows the approximate location of the areas receiving the additional development acres. **Appendix E** contains additional information for individual TAZs, including the assigned percent infiltration value. The acreage presented below differs from the acreage presented in *TM 4.A – Design Flows and Waste Load Determination* (AECOM, 2010). The acreage in the previous TM was based on the entire tributary area, and the acreage presented in **Table 5-1** is based on the sewered parcels. By using the acreage of sewered parcels (plus an allowance for area in public rights-of-way) rather than the entire tributary area, the collection system model more appropriately simulates I/I related to new development. Since future flows were estimated based on sanitary flow *and* I/I, accurately estimating the developed acreage should lead to more accurate flow projections. **Figure 5-1** shows the estimated increase of developed acreage for each TAZ. Please note that the additional development symbols on **Figure 5-1** do not indicate exactly where the additional development is expected to occur; rather they represent the estimated increase of developed acreage within each respective TAZ boundary.

Table 5-1. Estimated Total Additional Development Acres by Design Year

Pump Station Tributary Area	Year 2010 (acres)	Year 2035		Year 2050	
		Increase from 2010 (acres)	Total (acres)	Increase from 2010 (acres)	Total (acres)
Halawa	903	0	903	0	903
Waimalu	2,124	0	2,124	0	2,124
Pearl City	2,462	1,603	4,065	2,181	4,643
Waipahu	6,826	1,326	8,152	1,960	8,786
Honouliuli Influent	7,570	4,173	11,743	5,931	13,501
Total	19,885	7,102	26,987	10,072	29,957



City and County of Honolulu

HONOULIULI/ WAIPAHU/ PEARL CITY WASTEWATER FACILITIES PLAN

Legend

- Sewer Basin
- TAZ Boundaries
- Existing Tributary Areas

Future Tributary Areas

- Halawa
- Honouliuli Influent
- Pearl City
- Waimalu
- Waipahu

Additional Development Acres by 2050

- < 50
- 50 - 100
- 100 - 200
- 200 - 500
- > 500

0 12,000 Feet

1 inch = 12,000 feet

Task 4.F.1 Update Basis of Design Population, Flows, and Loads

FIGURE 5-1
TRANSPORTATION ANALYSIS ZONES TO RECEIVE ADDITIONAL DEVELOPMENT ACRES

June 2012

AECOM
1001 BISHOP ST, STE 1600
HONOLULU, HAWAII 96813

G:\Projects\MUNI\60220849\HON\Maps\Figure_5-1rev.mxd

5.2 2010 Flow and Load

Flow parameters derived from the Honouliuli system model using the typical rainfall year and the 2-year, 6-hour design storm for year 2010 conditions are presented in **Table 5-2**. A range of flow parameters were developed from output from the Honouliuli System Model for review and consideration for use in sizing various components of the Honouliuli WWTP expansion and/or upgrade. Certain WWTP unit processes are sized based on the annual average flow while others are sized on the maximum day, peak 1-hour, or other flow parameter. The basis of computing each of the flow parameters listed in **Table 5-2** is presented below.

The annual average flow was computed by averaging each of the hourly flows derived from the Honouliuli System Model using the typical rainfall year.

Table 5-2. Year 2010 Flow Parameters from the Honouliuli System Model

Flow Parameter	WWTP (mgd)	Waipahu (mgd)	Pearl City (mgd)	Waimalu (mgd)	Halawa (mgd)
Honouliuli Typical Year					
Annual Average	27.5	11.6	8.8	5.3	1.8
Maximum 30-day	27.9	-	-	-	-
Maximum 24-Hour	33.8	13.7	12.2	7.6	2.9
Peak 1-Hour	49.5	20.4	16.9	10.2	3.8
2-Year, 6-Hour Event					
Maximum 24-Hour	45.0	15.0	16.2	10.2	3.3
Peak 1-Hour	82.2	24.3	30.7	18.1	5.4

The maximum 30-day and maximum day flows were computed by first totalizing each of the hourly flows derived from the Honouliuli System Model into total daily flows, from midnight-to-midnight. The maximum day value represents the highest of the 365 total daily flows in the record. The maximum 30-day value was computed by taking 30-day running averages through the entire record and selecting the maximum 30-day running average. This value conservatively represents a maximum month value. As can be seen from inspection of **Table 5-2**, the maximum 30-day flow is only slightly higher than the annual average flow, suggesting that there is not substantial variation in flow from month-to-month at the treatment plant under current conditions.

The maximum 24-hour flow from the typical rainfall year output from the Honouliuli System Model was derived by taking 24-hour running averages through the entire record of hourly flows. As can be seen from inspection of **Table 5-2**, the maximum 24-hour flow is only slightly higher than the maximum day flow. This suggests that no single rain event (including an event that may have occurred over portions of two calendar days) was predominant in defining a maximum 24-hour flow for the typical rainfall year.

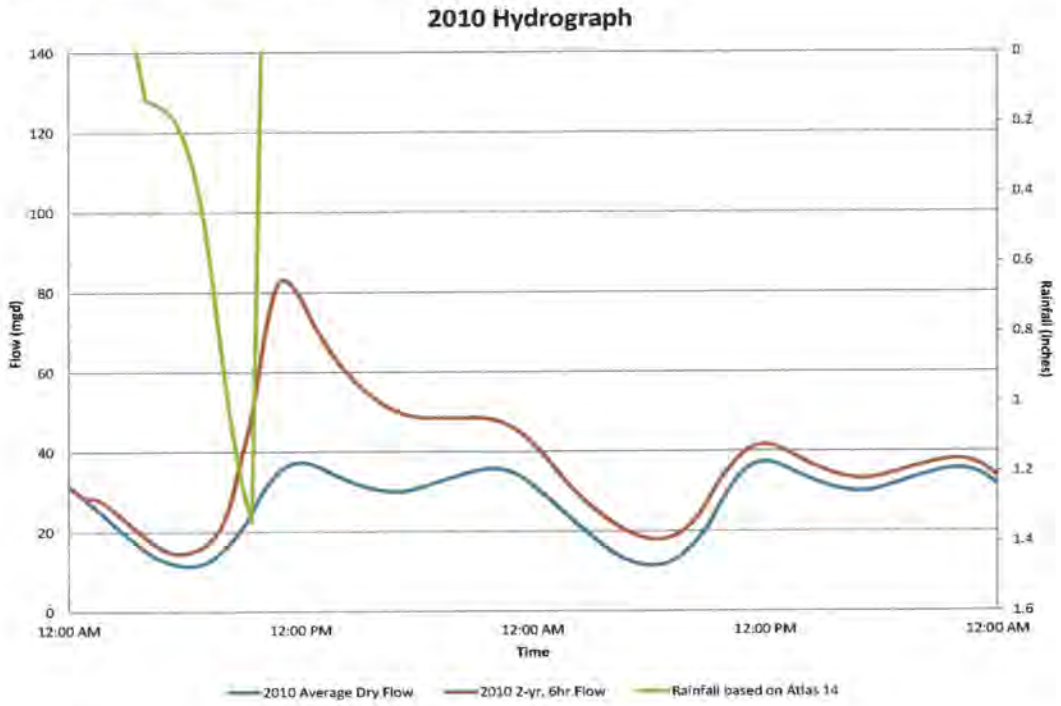
The peak 1-hour flow derived from the typical rainfall year output from the Honouliuli System Model represents the single highest hour flow in the model output.

The maximum 24-hour flow from the 2-year, 6-hour event was derived by taking 24-hour running averages through the record of hourly flows in the model output for the 2-year, 6-hour design storm.

The peak 1-hour flow derived from the 2-year, 6-hour event from the Honouliuli System Model represents the single highest hour flow in the model output for that storm. The peak 1-hour flow was derived by predicting peak 15-minute flows during a 2-year, 6 hour event. The peak 15-minute flows were then used to calculate the maximum possible 2-year, 6-hour event peak hour flows by aligning wet weather peaks and diurnal peaks.

Figure 5-2 shows a plot of the estimated WWTP influent flow for the typical year and 2-year, 6 hour storm using 2010 flow data. As shown, the peak hour flow increases from approximately 37 mgd during an average day up to approximately 82 mgd during the 2-year, 6 hour storm. This is substantially higher than the maximum peak flow of approximately 50 mgd recorded during 2010, but corresponds with high flows that have been periodically recorded at the Honouliuli WWTP in the past.

Figure 5-2. Estimated Honouliuli WWTP Flow – 2-Year, 6-Hour Storm in 2010



Each of these flow values will be evaluated for use in sizing WWTP unit processes under Task 12.C - Secondary Treatment Process Evaluation and Selection of the Honouliuli/Waipahu/Pearl City Wastewater Facilities Plan.

Influent contaminant concentrations were based on full-year 2010 average concentrations for BOD and TSS that were provided by the CCH ENV, Department of Environmental Quality, Monitoring and Compliance Branch. Since full-year 2010 data were not available for Total Kjehldahl nitrogen (TKN), ammonia nitrogen (NH3-N), and total phosphorous (TP), data from the *Wastewater and Process Sampling Analysis for Work Task 12.D Hydraulic Analysis, Process Modeling, and Optimization* (AECOM, 2012) were used. Separate data collected in October 2010 and described in *Analysis of Wastewater and Odor Sampling* (AECOM, 2011) were compared with the 2012 data and found to be reasonably similar.

Currently, sludge is being hauled regularly from Wahiawa WWTP and Paalaa Kai WWTP to Honouliuli WWTP. The sludge is introduced to the influent flow at the septage receiving station. Since CCH has plans to reroute the imported sludge directly to the solids processing stream, sludge loads from Wahiawa and Paalaa Kai were subtracted from the total influent waste load. The contribution of BOD and TSS from the imported sludge was assumed to be a 1:1 ratio, based on total solids by weight. The resulting BOD and TSS contribution from imported sludge was determined to be approximately 6%. The TKN, NH3, and TP contribution from imported sludge, therefore, was assumed to be 6% as well.

The 2010 influent waste load was calculated using the 2010 concentrations and the 2010 average flow recorded at the Honouliuli WWTP of 25.39 mgd. It is noted that the year 2010 average flow recorded at the WWTP is about 8% less than the 27.5 mgd 2010 annual average flow generated from the collection system model and reported in **Table 5-2**. As documented in the Draft Task 4 Wastewater Hydraulic Flow Model Update Technical Memorandum prepared for the Sewer I/I Assessment and Rehabilitation Program Update, the collection system model is well calibrated and appropriately conservative, leading to the slight over-prediction of year 2010 annual average flow. The waste load coefficient was calculated by dividing the daily waste load by the updated 2010 Honouliuli sewer basin equivalent population of 325,976 (see **Table 4-2**). **Table 5-3** summarizes the 2010 influent waste loading values, which will be used to determine years 2035 and 2050 projected waste loadings.

Table 5-3. 2010 Influent Waste Loading

Contaminants	2010 Concentration (mg/L)	2010 Waste Load (lbs/day)[3]	2010 Waste Load Without Imported Sludge (lbs/day)[4]	2010 Waste Load Coefficient (lbs/capita/day)[5]
BOD	368[1]	77,925	73,425[4]	0.225
TSS	381[1]	80,678	76,178[4]	0.234
TKN	37[2]	7,898	7,424[5]	0.023
NH3	27[2]	5,717	5,374[5]	0.016
TP	4.3[2]	913	858[5]	0.0026

(1) From CCH ENV Monitoring and Compliance

(2) From *Wastewater and Process Sampling Analysis for Work Task 12.D Hydraulic Analysis, Process Modeling, and Optimization* (AECOM, 2012)

(3) 2010 Waste Load (lbs/day) = 2010 Concentration (mg/L) × 2010 average influent flow (25.39 mgd) × 8.34 (conversion factor)

(4) 2010 Waste Load Without Imported Sludge = 2010 Waste Load - Average Daily Loading from Wahiawa WWTP and Paalaa Kai WWTP (4,500 lbs/day of BOD and TSS)

(5) 2010 Waste Load Without Imported Sludge = 2010 Waste Load x 94% (Imported sludge accounts for ~6% of the influent waste load, hence 94%)

(6) 2010 Waste Load Coefficient (lbs/capita/day) = 2010 Waste Load Without Imported Sludge (lbs/day) / 2010 equivalent population (325,976)

5.3 2035 Basis of Design Flow and Load

Flow parameters derived from the Honouliuli system model using the typical rainfall year and the 2-year, 6-hour design storm for year 2035 conditions are presented in **Table 5-4**.

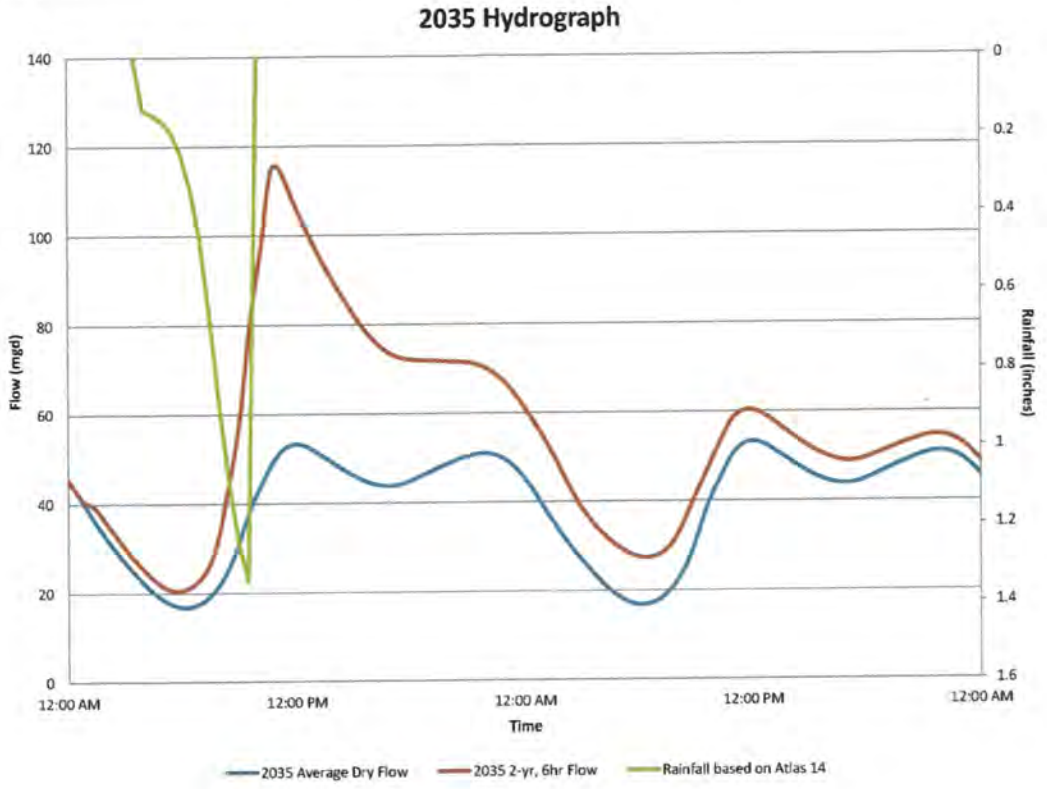
Table 5-4. Year 2035 Flow Parameters from the Honouliuli System Model

Flow Parameter	WWTP (mgd)	Waipahu (mgd)	Pearl City (mgd)	Waimalu (mgd)	Halawa (mgd)
Honouliuli Typical Year					
Annual Average	39.6	13.2	10.8	5.3	1.9
Maximum 30-day	40.3	-	-	-	-
Maximum Day	50.0	-	-	-	-
Maximum 24-Hour	50.3	16.1	14.7	7.6	2.9
Peak 1-Hour	69.7	23.0	20.0	10.3	4.9
2-Year, 6-Hour Event					
Maximum 24-Hour	65.4	18.3	20.4	10.2	3.4
Peak 1-Hour	114.2	29.7	37.7	18.1	5.5

Figure 5-3 shows a plot of the estimated WWTP influent flow for the typical year and 2- year, 6 hour storm using 2035 flow data. The flow range is impacted by the heavy rainfall similar to the year 2010 simulation. The peak hour flow increases from approximately 53 mgd during an average day up to approximately 114 mgd during the 2-year, 6 hour storm.

Each of these flow parameters was developed from output from the Honouliuli System Model as described above for year 2010 and will be evaluated for use in sizing WWTP unit processes under Task 12.C - Secondary Treatment Process Evaluation and Selection of the Honouliuli/Waipahu/Pearl City Wastewater Facilities Plan. The same relationships between the annual average and maximum 30-day flows and the maximum day and maximum 24-hour flows discussed above for year 2010 conditions are observed from inspection of **Table 5-4** for year 2035 conditions.

Figure 5-3. Estimated Honouliuli WWTP Flow – 2-Year, 6-Hour Storm in 2035



The year 2035 influent waste loadings are shown in **Table 5-5.** The 2010 Waste Load Coefficients (**Table 5-3**) were multiplied by the 2035 equivalent population projection of 452,938 (see **Table 4-2**). This projection assumes that the contribution of contaminants per capita will remain constant over time.

Table 5-5. Year 2035 Influent Waste Loading

Contaminants	2010 Waste Load Coefficient (lbs/capita/day)[1]	2035 Waste Load (lbs/day)[2]
BOD	0.225	101,911
TSS	0.234	105,987
TKN	0.023	10,418
NH3	0.016	7,247
TP	0.0026	1,178

(1) From **Table 5-3**

(2) 2035 Waste Load (lbs/day) = 2010 Waste Load Coefficient (lbs/capita/day) × 2035 equivalent population projection (452,938)

5.4 2050 Projected Flow and Load

Flow parameters derived from the Honouliuli system model using the typical rainfall year and the 2-year, 6-hour design storm for year 2050 conditions are presented in **Table 5-6**.

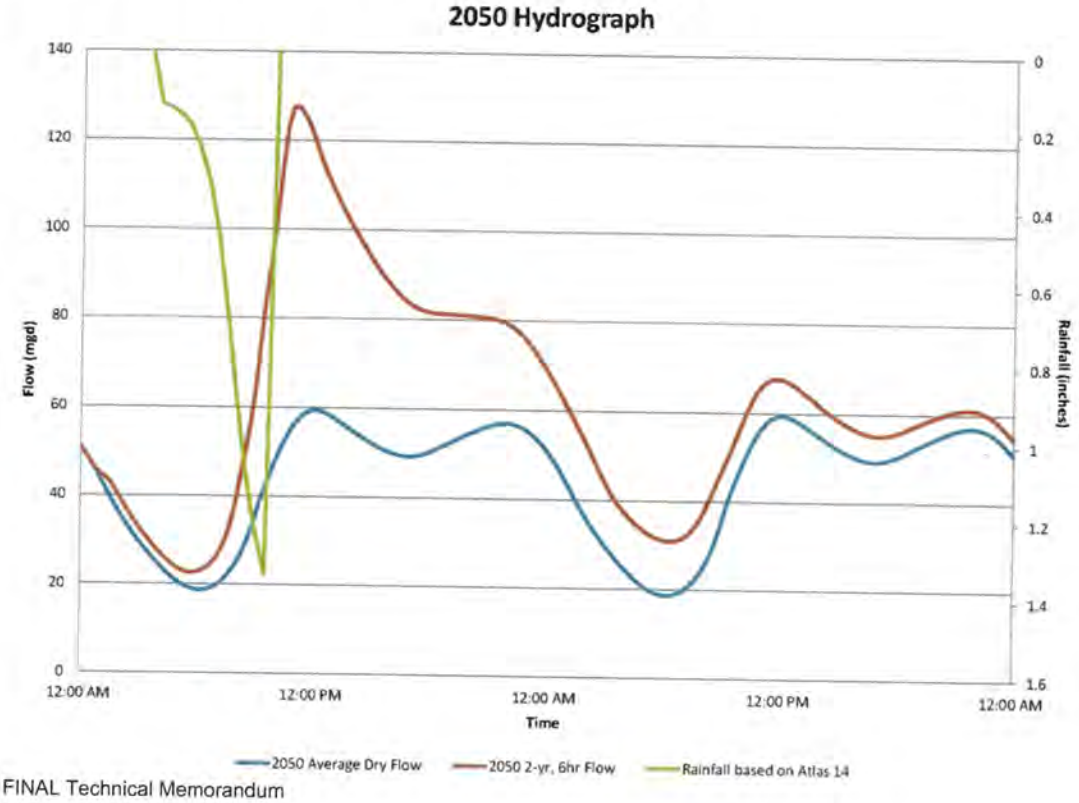
Table 5-6. Year 2050 Flow Parameters from the Honouliuli System Model

Flow Parameter	WWTP (mgd)	Waipahu (mgd)	Pearl City (mgd)	Waimalu (mgd)	Halawa (mgd)
Honouliuli Typical Year					
Annual Average	44.4	14.1	11.5	5.3	1.9
Maximum 30-day	45.1	-	-	-	-
Maximum Day	56.7	-	-	-	-
Maximum 24-Hour	57.0	17.3	15.5	7.5	2.9
Peak 1-Hour	79.5	24.3	21.1	10.2	5.1
2-Year, 6-Hour Event					
Maximum 24-Hour	73.5	19.9	21.8	10.1	3.4
Peak 1-Hour	126.4	32.2	40.1	18.0	5.5

Each of these flow parameters was developed from output from the Honouliuli System Model as described above for year 2010 and will be evaluated for use in sizing WWTP unit processes under Task 12.C - Secondary Treatment Process Evaluation and Selection of the Honouliuli/Waipahu/Pearl City Wastewater Facilities Plan. The same relationships between the annual average and maximum 30-day flows and the maximum day and maximum 24-hour flows discussed above for year 2010 and year 2035 conditions are observed from inspection of **Table 5-6** for year 2050 conditions.

Figure 5-4 shows a plot of the estimated WWTP influent flow for the typical year and 2-year, 6 hour storm using 2050 flow data. The flow range is impacted by the heavy rainfall similar to the year 2010 and 2035 simulations. The peak hour flow increases from approximately 59 mgd during an average day up to approximately 126 mgd during the 2-year, 6 hour storm.

Figure 5-4. Estimated Honouliuli WWTP Flow – 2-Year, 6 Hour Storm in 2050



The year 2050 influent waste loadings are shown in **Table 5-7**. The 2010 Waste Load Coefficients were multiplied by the 2050 equivalent population projection of 504,239 (see **Table 4-2**). This projection assumes that contribution of contaminants per capita will remain constant over time.

Table 5-7. Year 2050 Influent Waste Loading

Contaminants	2010 Waste Load Coefficient (lbs/capita/day)[1]	2050 Waste Load (lbs/day)[2]
BOD	0.225	113,454
TSS	0.234	117,992
TKN	0.023	11,597
NH3	0.016	8,068
TP	0.0026	1,311

(1) From **Table 5-3**

(2) 2050 Waste Load (lbs/day) = 2010 Waste Load Coefficient (lbs/capita/day) × 2050 equivalent population projection (504,239)

5.5 Intermediate Design Year Projections

If an intermediate design year is desired, such as year 2030, the flow and load projections can be extrapolated from the second order polynomial curves, shown in **Figure 5-5** and **Figure 5-6**.

Figure 5-5. Honouliuli WWTP Flow Projections (with 2030 extrapolation)

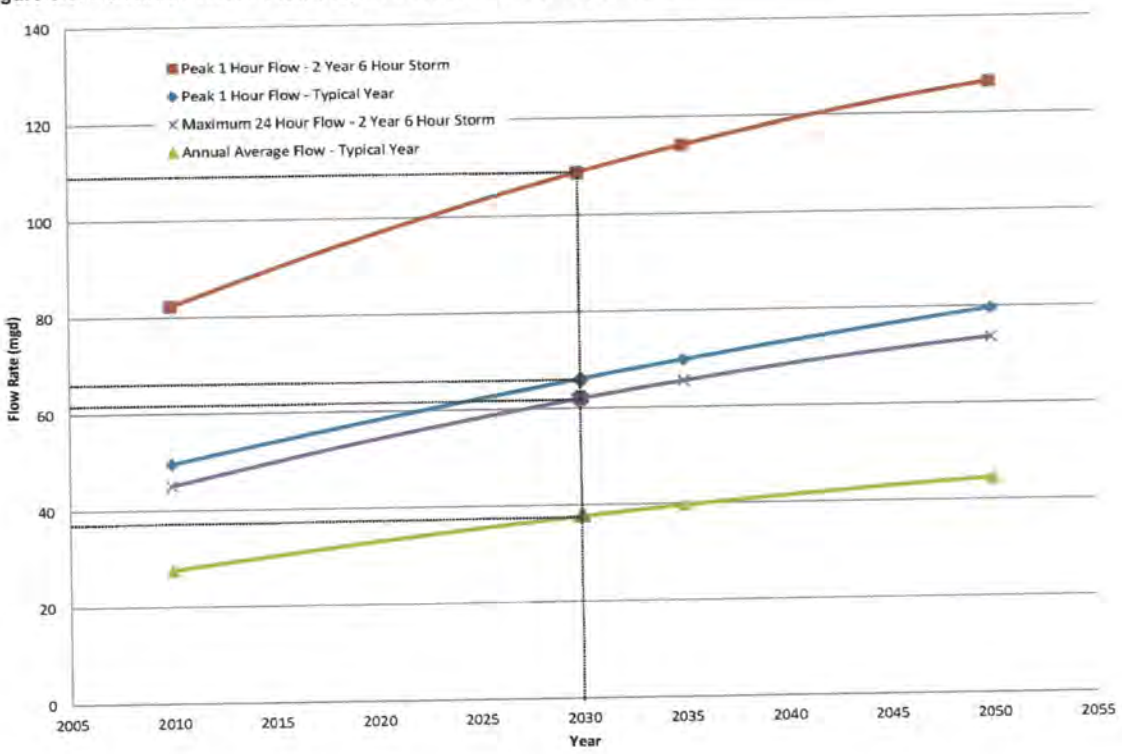
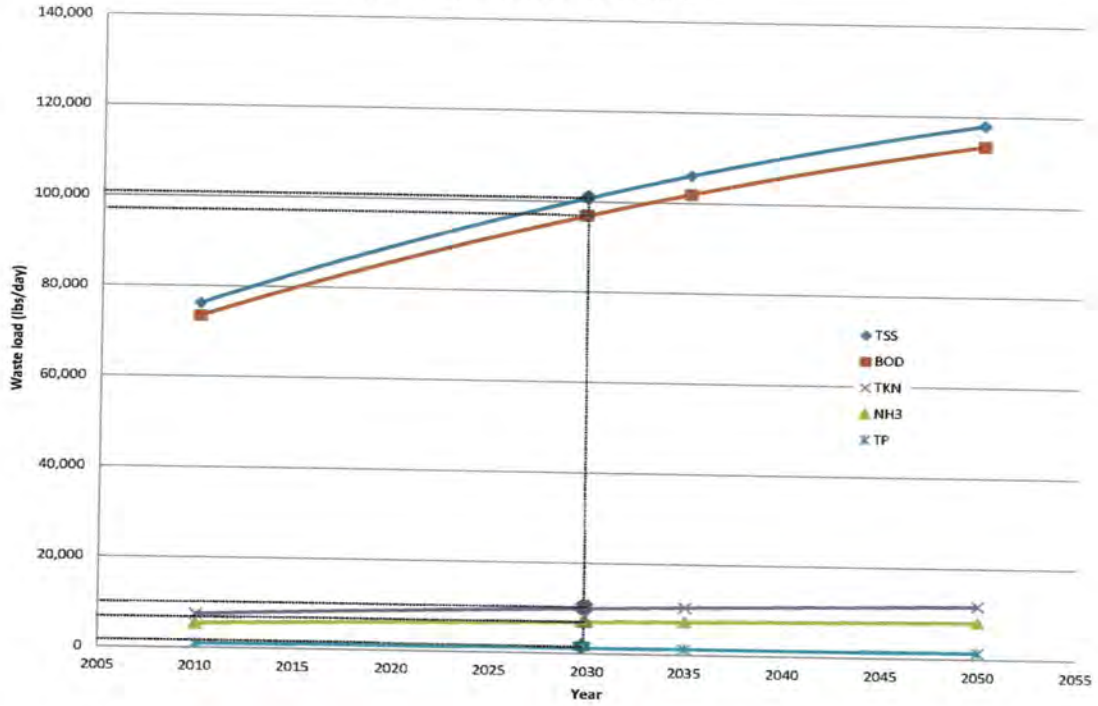


Figure 5-6. Honouliuli WWTP Load Projections (with 2030 extrapolation)



Extrapolated 2030 flow and load results are shown in **Table 5-8** and **Table 5-9**, respectively, for comparison purposes.

Table 5-8. Extrapolated Year 2030 Flow Parameters from the Honouliuli System Model

Flow Parameter	WWTP (mgd)	Waipahu (mgd)	Pearl City (mgd)	Waimalu (mgd)	Halawa (mgd)
Honouliuli Typical Year					
Annual Average	37.6	12.9	10.6	5.3	1.9
Maximum 30-day	38.3	-	-	-	-
Maximum 24-Hour	48.9	15.7	12.9	7.6	2.9
Peak 1-Hour	64.7	22.7	18.1	10.3	4.6
2-Year, 6-Hour Event					
Maximum 24-Hour	62.0	17.8	18.4	10.2	3.4
Peak 1-Hour	107.6	28.9	36.6	18.1	5.5

Table 5-9. Extrapolated Year 2030 Influent Waste Loading

Contaminants	2010 Waste Load Coefficient (lbs/capita/day)(1)	2030 Waste Load (lbs/day)(2)
BOD	0.225	97,140
TSS	0.234	101,007
TKN	0.023	9,921
NH_3	0.016	6,922
TP	0.0026	1,124

(1) From **Table 5-3**

(2) 2030 Waste Load (lbs/day) = Extrapolated from second order polynomial curves shown in Fig. 5-2

Appendix A.
City and County of Honolulu Socioeconomic Projections to Year 2035

City and County of Honolulu
Socioeconomic Projections

Department of Planning and Permitting
September 2009

	DP Area	Total Resident Population	Population in Group Quarters	Visitor Accomm Units	Resident Housing Units	Households: 1 Person	2 Persons	3 Persons	4 Persons	5+ Persons	Total	Average Size	Employment (jobs): Armed Forces	Public Admin	Hotel	Agri-culture	Transp, Comm, Utilities	Industrial	Fin, Ins, & Real Estate	Services	Retail	Constr	Total
Year 2000	Primary Urban Center	419,333	16,995	34,170	171,773	44,066	46,596	25,424	18,634	18,269	152,989	2.63	14,780	27,639	15,242	1,392	34,540	24,631	27,673	134,447	70,928	11,568	362,840
	Ewa	68,696	420	392	20,797	2,031	4,163	3,731	4,136	4,863	18,924	3.61	1,056	1,045	504	356	1,079	2,245	1,075	6,565	2,483	3,530	19,938
	Central Oahu	148,208	6,145	207	45,878	5,906	10,976	8,759	8,525	8,630	42,796	3.32	12,673	3,465	79	741	2,225	2,296	1,852	14,778	8,382	4,034	50,525
	East Honolulu	46,735	149	371	17,099	2,268	5,669	3,461	2,771	2,019	16,188	2.88	0	265	188	54	459	230	602	3,454	1,504	807	7,563
	Koolaupoko	117,999	5,627	60	36,964	4,814	10,551	7,168	6,468	6,441	35,442	3.17	11,318	2,264	25	777	1,376	1,150	1,301	14,974	6,433	1,623	41,241
	Koolauloa	14,546	753	595	4,473	602	841	538	517	1,184	3,682	3.75	0	146	309	424	244	109	232	3,224	1,020	191	5,899
	North Shore	18,380	400	17	6,648	1,023	1,716	1,188	969	997	5,893	3.05	511	64	6	465	143	392	155	1,533	1,147	508	4,924
	Waianae	42,259	456	509	12,356	1,253	2,127	1,746	1,698	3,711	10,535	3.97	100	421	304	552	195	119	249	3,991	1,327	941	8,199
	OAHU TOTAL	876,156	30,945	36,321	315,988	61,963	82,639	52,015	43,718	46,114	286,449	2.95	40,438	35,309	16,657	4,761	40,261	31,172	33,139	182,966	93,224	23,202	501,129
Year 2005	Primary Urban Center	417,336	16,995	32,819	173,438	54,378	44,305	23,885	16,127	19,392	158,086	2.53	15,626	28,657	16,196	856	36,802	24,622	26,464	145,453	73,458	12,711	380,845
	Ewa	82,595	420	499	25,404	3,386	5,713	4,524	4,721	5,630	23,975	3.43	1,119	1,411	265	219	1,185	1,940	400	17,395	4,054	9,947	37,935
	Central Oahu	157,008	6,145	207	49,439	7,911	12,842	9,062	8,450	9,024	47,289	3.19	13,398	3,594	107	454	2,367	2,218	1,141	25,588	10,048	5,618	64,533
	East Honolulu	49,229	149	371	18,279	2,636	6,227	3,665	2,798	2,070	17,396	2.82	0	269	190	34	489	230	602	3,454	1,504	679	7,451
	Koolaupoko	117,004	5,627	60	37,174	5,306	10,920	7,050	6,198	6,308	35,781	3.11	11,966	2,341	26	477	1,462	1,150	1,295	15,263	6,464	1,089	41,533
	Koolauloa	14,482	753	595	4,518	611	822	515	497	1,202	3,646	3.77	0	150	305	259	259	109	229	3,274	1,024	118	5,727
	North Shore	18,118	400	17	6,648	1,345	1,887	1,160	878	918	6,190	2.86	540	64	9	286	147	392	155	1,533	1,147	99	4,372
	Waianae	43,923	456	51	13,038	2,036	2,670	1,908	1,698	3,606	11,918	3.65	106	438	26	337	207	119	249	3,991	1,327	612	7,412
	OAHU TOTAL	899,695	30,945	34,619	327,938	77,609	85,387	51,767	41,367	48,150	304,282	2.86	42,755	36,924	17,124	2,922	42,918	30,780	30,535	215,951	99,026	30,873	549,808
Year 2008	Primary Urban Center	416,049	16,995	31,133	177,826	58,229	45,953	24,024	15,754	18,222	162,181	2.46	15,727	28,551	15,813	623	37,515	24,611	25,584	151,799	74,673	14,544	389,440
	Ewa	90,872	420	941	28,758	4,109	6,786	5,155	5,223	5,875	27,148	3.33	1,126	2,062	478	162	1,209	1,716	240	21,506	4,801	9,527	42,827
	Central Oahu	158,606	6,145	218	51,387	8,770	13,855	9,399	8,509	8,622	49,154	3.10	13,486	3,576	111	337	2,414	2,163	894	28,585	10,068	6,675	68,309
	East Honolulu	49,063	149	381	18,738	2,904	6,596	3,732	2,707	1,895	17,833	2.74	0	268	193	26	497	230	602	3,454	1,504	178	6,952
	Koolaupoko	114,087	5,627	68	37,234	5,694	11,371	7,016	5,977	5,781	35,839	3.03	12,043	2,335	38	352	1,496	1,150	1,283	15,402	6,461	867	41,427
	Koolauloa	14,142	753	603	4,532	654	859	520	492	1,134	3,658	3.66	0	150	307	193	265	109	229	3,287	1,024	86	5,650
	North Shore	17,697	400	29	6,675	1,429	1,943	1,152	847	844	6,215	2.78	544	64	15	210	149	392	155	1,533	1,147	109	4,318
	Waianae	43,776	456	221	13,364	2,590	3,019	1,977	1,707	3,355	12,648	3.42	106	435	112	251	219	119	249	3,991	1,327	993	7,802
	OAHU TOTAL	904,292	30,945	33,594	338,514	84,379	90,380	52,974	41,216	45,727	314,677	2.78	43,032	37,441	17,067	2,154	43,764	30,490	29,236	229,557	101,005	32,979	566,725
Year 2010	Primary Urban Center	418,664	16,995	30,961	178,805	58,356	46,156	24,186	15,867	18,403	162,968	2.46	15,243	28,376	15,298	623	37,119	24,602	25,153	151,962	74,219	15,489	388,084
	Ewa	94,504	420	1,154	29,883	4,252	7,047	5,365	5,439	6,113	28,216	3.33	1,094	2,046	570	162	1,195	1,532	196	22,067	4,681	12,633	46,176
	Central Oahu	158,965	6,145	212	51,456	8,758	13,860	9,418	8,533	8,654	49,223	3.10	13,066	3,552	105	337	2,392	2,119	835	28,716	9,956	1,537	62,615
	East Honolulu	49,129	149	370	18,744	2,899	6,590	3,734	2,714	1,903	17,840	2.75	0	266	183	26	495	230	602	3,454	1,504	151	6,911
	Koolaupoko	114,209	5,627	68	37,237	5,680	11,355	7,019	5,987	5,802	35,842	3.03	11,671	2,323	38	352	1,477	1,150	1,280	15,404	6,436	847	40,978
	Koolauloa	14,156	753	586	4,532	653	857	519	492	1,136	3,658	3.66	0	150	288	193	262	109	229	3,287	1,024	86	5,628
	North Shore	17,724	400	28	6,677	1,426	1,941	1,153	849	847	6,217	2.79	527	64	14	210	148	392	155	1,533	1,147	100	4,290
	Waianae	44,490	456	217	13,572	2,620	3,064	2,011	1,737	3,412	12,843	3.43	103	434	108	251	210	119	249	3,991	1,327	210	7,002
	OAHU TOTAL	911,841	30,945	33,596	340,906	84,643	90,871	53,405	41,617	46,270	316,807	2.78	41,704	37,211	16,604	2,154	43,298	30,253	28,699	230,414	100,294	31,053	561,684
Year 2015	Primary Urban Center	427,429	16,995	27,452	184,935	60,908	47,837	24,792	16,108	18,415	168,059	2.44	15,237	28,552	15,595	646	39,650	24,602	25,153	159,064	76,408	14,318	399,225
	Ewa	107,234	420	4,496	34,341	4,959	8,216	6,184	6,206	6,783	32,349	3.30	1,095	3,203	1,628	166	1,309	2,657	1,657	27,418	9,212	14,319	62,664
	Central Oahu	161,999	6,145	184	53,121	9,272	14,507	9,703	8,686	8,619	50,786	3.07	13,069	3,577	105	347	2,557	2,390	1,076	31,138	10,040	4,219	68,518
	East Honolulu	51,119	149	321	19,745	3,139	7,036	3,911	2,786	1,910	18,782	2.71	0	268	183	26	528	230	602	3,454	1,504	422	7,217
	Koolaupoko	115,631	5,627	62	38,185	5,996	11,833	7,166	6,032	5,725	36,752	2.99	11,671	2,335	38	362	1,582	1,150	1,280	15,643	6,436	1,299	41,796
	Koolauloa	14,592	753	1,276	4,737	745	961	564	522	1,119	3,911	3.54	0	150	435	200	280	109	229	3,433	1,038	307	6,181
	North Shore	18,325	400	26	6,994	1,523	2,057	1,201	875	852	6,508	2.75	527	64	14	219	169	392	155	1,533	1,147	191	4,411
	Waianae	45,518	456	189	14,060	2,777	3,223	2,095	1,788	3,429	13,312	3.39	103	435	107	256	224	119	249	3,991	1,327	360	7,171
	OAHU TOTAL	941,847	30,945	34,006	356,118	89,318	95,669	55,616	43,003	46,852	330,458	2.76	41,702	38,584	18,105	2,222	46,299	31,649	30,401	245,674	107,112	35,435	597,183
Year 2020	Primary Urban Center	432,487	16,995	27,175	190,539	64,570	49,420	25,265	16,059	17,941	173,255	2.40	15,237	29,269	15,639	646	41,069	24,602	25,274	164,347	77,336	14,924	408,343
	Ewa	123,101	420	6,495	40,140	5,894	9,870	7,262	7,156	7,517	37,699	3.25	1,094	3,343	2,142	166	1,513	3,330	2,336	32,231	12,352	14,467	72,974
	Central Oahu	166,078	6,145	182	55,473	10,013	15,460	10,109	8,893	8,521	52,996	3.02	13,067	3,662	105	347	2,647	2,623	1,181	33,656	10,141	5,226	72,655
	East Honolulu	51,238	149	318	20,141	3,337	7,319	3,953	2,735	1,811	19,155	2.67	0	287	183	26	544	230	602	3,454	1,504	175	7,005
	Koolaupoko	116,118	5,627	60	39,037	6,385	12,377	7,275	6,007	5,527	37,570	2.94	11,671	2,394	38	362	1,635	1,150	1,282	15,808	6,436	1,309	42,085
	Koolauloa	14,899	753	1,263	4,927	755	969	567	527	1,156	3,975	3.56	0	153	479	200	290	109	230	3,549	1,068	318	6,396
	North Shore	18,770	400	24	7,293	1,640	2,169	1,247	889	837	6,782	2.71	527	64	14	219	172	392	155	1,533	1,147	204	4,427
	Waianae	46,776	456	186	14,706	2,999	3,445	2,200	1,854	3,431	13,930	3.33	103	446	108	256	229	119	249	3,991	1,327	402	7,230
	OAHU TOTAL	969,467	30,945	35,703	372,256	95,593	101,029	57,877	44,119	46,743	345,362	2.72	41,699	39,618	18,708	2,222	48,099	32,555	31,309	258,569	111,311	37,025	621,115
Year 2025	Primary Urban Center	437,818	16,995	28,315	196,197	68,700	51,118	25,669	15,960	17,462	178,910	2.35	15,237	29,855	15,658	653	42,300	24,602	25,323	169,266	78,051	15,177	416,122
	Ewa	137,721	420	6,768	45,669	6,894	11,429	8,276	8,034	8,158	42,791	3.21	1,093	3,475	2,398	171	1,718	3,867	2,991	37,509	15,388	15,484	84,094
	Central Oahu	171,595	6,145	189	58,343	10,862	16,547	10,618	9,170	8,498	55,695	2.97	13,067	3,741	105	357	2,722	2,871	1,280	36,274	10,283	5,773	76,473
	East Honolulu	50,400	149	331	20,141	3,466	7,455	3,912	2,633	1,688	19,155	2.62	0	288	183	26	562	230	602	3,454	1,504	172	7,021
	Koolaupoko	114,975	5,627	62	39,280	6,675	12,690	7,285	5,891	5,263	37,804	2.89	11,671	2,447	38	373	1,689	1,150	1,283	15,905	6,436	997	41,989
	Koolauloa	15,150	753	1,316	5,098	808	1,023	588	541	1,152	4,112	3.50	0	157	500	204	299	109	231	3,659	1,103	306	6,568
	North Shore	19,126	400	26	7,563	1,753	2,281	1,281	897	818	7,030	2.66	527	64	14	225	175	392	155	1,533	1,147	204	4,436
	Waianae	47,847	456	193	15,298	3,214	3,656	2,295	1,911	3,419	14,495	3.27	103	455	107	267	236	119	249	3,991	1,327	406	7,260
	OAHU TOTAL	994,632	30,945	37,200	387,589	102,372	106,200	59,923	45,037	46,458	359,991	2.68	41,698	40,482	19,003	2,276	49,701	33,340	32,114	271,591	115,239	38,519	643,963
Year 2030	Primary Urban Center	442,994	16,995	29,235	201,805	72,422	52,684	26,047	15,901	17,056	184,109	2.31	15,237	30,332	15,687	653	43,517	24,602	25,388	174,074	78,782	16,042	424,314
	Ewa	151,332	420	6,986	51,012	7,919	12,993	9,237	8,842	8,700	47,691	3.16	1,094	3,592	2,743	171	1,915	4,276	3,642	42,956	18,062	15,640	94,091
	Central Oahu	177,029	6,145	195	61,241	11,739	17,659	11,109	9,432	8,469	58,409	2.93	13,067	3,805	105	357	2,804	3,078	1,373	38,838	10,557	6,200	80,184
	East Honolulu	49,600	149	342	20,141	3,609	7,541	3,901	2,532	1,572	19,155	2.58	0	290	183	26	580	230	602	3,454	1,504	172	7,041
	Koolaupoko	113,243	5,627	70	39,280	6,923	12,912	7,247	5,740	4,981	37,804	2.85	11,671	2,478	38	373	1,730	1,150	1,283	15,994	6,449	1,008	42,174
	Koolauloa	15,336	753	1,358	5,246	857	1,072	605	552	1,144	4,231	3.45	0	160	529	204	308	109	231	3,758	1,128	289	6,716
	North Shore	19,375	400	26	7,784	1,852	2,378	1,307	899	797	7,233	2.62	527	66	14	225	179	392	155	1,533	1,147	189	4,427
	Waianae	48,667	456	201	15,812	3,416	3,846	2,376	1,955	3,392	14,985	3.22	103	460	107	267	249	119	249	3,991	1,327	375	7,247
	OAHU TOTAL	1,017,576	30,945	38,413	402,321	108,739	111,086	61,828	45,852	46,110	373,616	2.64	41,699	41,183	19,406	2,276	51,282	33,956	32,923	284,598	118,956	39,915	666,194
Year 2035	Primary Urban Center	447,715	16,995	30,142	207,218	76,113	54,189	26,355	15,820	16,647	189,126	2.28	15,237	30,874	15,700	658	44,791	24,602	25,617	178,851	80,189	16,820	433,339
	Ewa	164,556	420	7,204	56,344	8,999	14,601	10,188	9,613	9,185	52,586	3.12	1,096	3,714	2,914	175	2,092	4,752	4,026	48,604	19,798	16,263	103,434
	Central Oahu	181,423	6,145	202	63,784	12,580	18,660	11,539	9,622	8,391	60,792	2.88	13,067	3,870	105	364	2,887	3,302	1,443	41,285	11,050	6,213	83,586
	East Honolulu	48,843	149	352	20,141	3,738	7,653	3,863	2,435	1,466	19,155	2.54	0	292	183	28	595	230	602	3,454	1,504	178	7,066
	Koolaupoko	111,594	5,627	71	39,280	7,157	13,137	7,200	5,592	4,718	37,804	2.80	11,671	2,530	38	381	1,778	1,150	1,284	16,074	6,485	1,029	42,420
	Koolauloa	15,452	753	1,401	5,372	905	1,118	619	560	1,129	4,332	3.39	0	163	544	210	316	109	235	3,843	1,151	273	6,844
	North Shore	19,517	400	27	7,966	1,948	2,459	1,327	895	771	7,400	2.58	527	77	14	230	182	392	155	1,533	1,147	180	4,437
	Waianae	49,217	456	206	16,242	3,620	3,991	2,447	1,992	3,346	15,395	3.17	103	471	107	273	253	119	249	3,991	1,327	361	7,254
	OAHU TOTAL	1,038,317	30,945	39,605	416,347	115,062	115,808	63,537	46,529	45,652	386,589	2.61	41,701	41,991	19,605	2,319	52,894	34,656	33,611	297,635	122,651	41,317	688,380

Appendix B.
Populations for Study Areas TAZs as Derived from 2010 Census Data

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Halawa	150030067011020	370	0
Halawa	150030067021000	370	0
Halawa	150030067021001	370	211
Halawa	150030067021002	370	93
Halawa	150030067021003	370	40
Halawa	150030067021004	370	37
Halawa	150030067021005	370	0
Halawa	150030067021006	370	0
Halawa	150030067021008	370	1608
Halawa	150030067021009	370	0
Halawa	150030067021010	370	0
Halawa	150030074001042	397	0
Halawa	150030074001044	397	15
Halawa	150030074001045	397	0
Halawa	150030074001121	397	0
Halawa	150030074001122	397	0
Halawa	150030074001123	397	0
Halawa	150030074001133	397	0
Halawa	150030074001141	394	0
Halawa	150030074001143	394	0
Halawa	150030074001146	394	0
Halawa	150030074001147	394	0
Halawa	150030074001148	394	131
Halawa	150030074001153	394	4
Halawa	150030074001154	394	0
Halawa	150030074001178	394	0
Halawa	150030074001179	394	0
Halawa	150030074001182	394	0
Halawa	150030074001183	394	0
Halawa	150030074001184	394	0
Halawa	150030074001185	394	0
Halawa	150030074001218	397	0
Halawa	150030075021000	371	0
Halawa	150030075021001	371	0
Halawa	150030075021002	371	0
Halawa	150030075021003	375	5
Halawa	150030075021004	371	0
Halawa	150030075021005	371	0
Halawa	150030075021006	376	0
Halawa	150030075021009	371	0
Halawa	150030075021010	371	0
Halawa	150030075021011	371	0
Halawa	150030075021012	371	0
Halawa	150030075021013	371	0
Halawa	150030075021014	371	0
Halawa	150030075021015	371	0

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Halawa	150030075021016	371	0
Halawa	150030075021017	371	0
Halawa	150030075021018	371	928
Halawa	150030075021019	371	1
Halawa	150030075021020	371	0
Halawa	150030075021021	371	0
Halawa	150030075021022	371	0
Halawa	150030075021023	371	0
Halawa	150030075021024	371	0
Halawa	150030075021025	371	0
Halawa	150030075021026	371	0
Halawa	150030075021027	371	0
Halawa	150030075021028	371	0
Halawa	150030075021029	371	0
Halawa	150030075021030	371	0
Halawa	150030075021031	370	0
Halawa	150030075021032	370	94
Halawa	150030075021033	370	214
Halawa	150030075021034	376	134
Halawa	150030075021035	376	0
Halawa	150030075021036	376	0
Halawa	150030075021037	376	0
Halawa	150030075021038	376	0
Halawa	150030075021039	376	0
Halawa	150030075021040	376	0
Halawa	150030075021041	376	0
Halawa	150030075021042	376	0
Halawa	150030075021043	376	0
Halawa	150030075021044	376	0
Halawa	150030075021045	376	0
Halawa	150030075021046	376	0
Halawa	150030075021047	376	0
Halawa	150030075021048	376	0
Halawa	150030075021049	376	0
Halawa	150030075021050	376	0
Halawa	150030075021051	376	0
Halawa	150030075021052	376	0
Halawa	150030075021053	376	0
Halawa	150030075021054	376	0
Halawa	150030075021055	376	0
Halawa	150030075021056	376	0
Halawa	150030075021057	376	0
Halawa	150030075021058	376	0
Halawa	150030075021059	375	0
Halawa	150030075031000	375	22
Halawa	150030075031001	375	388

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Halawa	150030075031002	375	72
Halawa	150030075031004	375	106
Halawa	150030075031006	375	432
Halawa	150030075031007	375	47
Halawa	150030075031008	375	91
Halawa	150030075031009	375	51
Halawa	150030075031010	375	120
Halawa	150030075031011	375	161
Halawa	150030075031014	375	111
Halawa	150030075031015	375	94
Halawa	150030075031016	375	85
Halawa	150030075031017	375	113
Halawa	150030075031018	375	49
Halawa	150030075031019	375	82
Halawa	150030075031020	375	89
Halawa	150030075031021	375	80
Halawa	150030075031022	375	74
Halawa	150030075031023	375	30
Halawa	150030075031024	375	63
Halawa	150030075031025	375	106
Halawa	150030075031026	375	68
Halawa	150030075032000	376	0
Halawa	150030075032001	375	818
Halawa	150030075032002	375	88
Halawa	150030075032003	375	200
Halawa	150030075032004	375	60
Halawa	150030075032005	375	82
Halawa	150030075032006	375	145
Halawa	150030075032007	375	0
Halawa	150030075032008	371	4
Halawa	150030075032009	375	0
Halawa	150030075032010	375	0
Halawa	150030075032011	375	0
Halawa	150030075032012	375	128
Halawa	150030075032013	375	119
Halawa	150030075032014	375	0
Halawa	150030075032015	375	0
Halawa	150030075032016	375	0
Halawa	150030075032017	375	0
Halawa	150030075032018	375	0
Halawa	150030075032019	375	29
Halawa	150030075032020	375	88
Halawa	150030075032021	375	156
Halawa	150030075032022	375	0
Halawa	150030075032023	375	122
Halawa	150030075032024	375	73

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Halawa	150030075032025	375	0
Halawa	150030075032026	374	0
Halawa	150030075032027	374	0
Halawa	150030075032028	375	0
Halawa	150030075032029	375	0
Halawa	150030075032030	375	0
Halawa	150030075032031	375	0
Halawa	150030075032032	375	0
Halawa	150030075032033	375	0
Halawa	150030075032034	375	0
Halawa	150030075032035	375	0
Halawa	150030075032036	375	0
Halawa	150030075032037	371	0
Halawa	150030075041000	396	0
Halawa	150030075041001	396	0
Halawa	150030075041002	396	0
Halawa	150030075041003	396	0
Halawa	150030075041004	396	0
Halawa	150030075041005	396	0
Halawa	150030075041007	396	0
Halawa	150030075041008	396	0
Halawa	150030075041009	395	67
Halawa	150030075041010	395	247
Halawa	150030075041011	395	91
Halawa	150030075041012	395	84
Halawa	150030075041013	395	199
Halawa	150030075041014	395	727
Halawa	150030075041015	395	93
Halawa	150030075041016	395	0
Halawa	150030075041017	395	0
Halawa	150030075041018	395	0
Halawa	150030075042000	395	295
Halawa	150030075042001	395	1229
Halawa	150030075042002	395	139
Halawa	150030075042003	395	0
Halawa	150030075051000	372	0
Halawa	150030075051001	373	291
Halawa	150030075051002	373	0
Halawa	150030075051003	373	99
Halawa	150030075051004	373	105
Halawa	150030075051005	373	190
Halawa	150030075051006	373	182
Halawa	150030075051007	373	123
Halawa	150030075051008	373	74
Halawa	150030075051009	373	42
Halawa	150030075051010	373	119

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Halawa	150030075051011	373	120
Halawa	150030075051012	373	92
Halawa	150030075051013	373	108
Halawa	150030075051014	373	144
Halawa	150030075051015	373	95
Halawa	150030075051016	373	42
Halawa	150030075051017	373	85
Halawa	150030075051018	373	116
Halawa	150030075051019	373	103
Halawa	150030075051020	373	62
Halawa	150030075051021	373	214
Halawa	150030075052000	373	0
Halawa	150030075052001	373	416
Halawa	150030075052002	373	0
Halawa	150030075052003	373	0
Halawa	150030075052004	373	0
Halawa	150030075052005	373	0
Halawa	150030075052006	373	0
Halawa	150030075052007	373	48
Halawa	150030075052008	373	800
Halawa	150030075052009	373	54
Halawa	150030075052010	373	82
Halawa	150030075052011	373	38
Halawa	150030075052012	373	0
Halawa	150030075052013	373	0
Halawa	150030075052014	373	0
Halawa	150030075052015	373	278
Halawa	150030075052016	373	216
Halawa	150030075053000	374	1000
Halawa	150030075053001	374	0
Halawa	150030075053002	374	0
Halawa	150030075053003	374	0
Halawa	150030075053004	374	0
Halawa	150030075053005	373	0
Halawa	150030075053006	373	0
Halawa	150030075053007	373	0
Halawa	150030075053008	373	0
Halawa	150030075053009	374	0
Halawa	150030075053010	374	0
Halawa	150030075053011	374	0
Halawa	150030075053012	374	0
Halawa	150030075053013	373	0
Halawa	150030075061000	372	64
Halawa	150030075061001	372	508
Halawa	150030075061002	372	0
Halawa	150030075061003	372	0

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Halawa	150030075061004	372	29
Halawa	150030075061005	372	0
Halawa	150030075061006	373	0
Halawa	150030075061007	373	0
Halawa	150030075061008	372	140
Halawa	150030075061009	372	16
Halawa	150030075061010	372	0
Halawa	150030075061011	372	0
Halawa	150030075061012	372	0
Halawa	150030075061013	372	176
Halawa	150030077022009	405	0
Halawa	150030077022010	405	102
Halawa	150030077022011	405	73
Halawa	150030077022012	405	69
Halawa	150030077022013	405	22
Halawa	150030077022014	405	160
Halawa	150030103061003	371	0
Halawa Subtotal			*18,029*
Honouliuli Influent	150030083011000	560	0
Honouliuli Influent	150030083011001	560	0
Honouliuli Influent	150030083011002	560	0
Honouliuli Influent	150030083011003	560	0
Honouliuli Influent	150030083011004	560	0
Honouliuli Influent	150030083011005	560	0
Honouliuli Influent	150030083011006	560	0
Honouliuli Influent	150030083011007	560	0
Honouliuli Influent	150030083011008	560	0
Honouliuli Influent	150030083011009	560	0
Honouliuli Influent	150030083011010	560	0
Honouliuli Influent	150030083011011	560	0
Honouliuli Influent	150030083011012	560	0
Honouliuli Influent	150030083011013	560	0
Honouliuli Influent	150030083011014	560	0
Honouliuli Influent	150030083011015	560	0
Honouliuli Influent	150030083011016	560	0
Honouliuli Influent	150030083011017	560	0
Honouliuli Influent	150030083011018	560	0
Honouliuli Influent	150030083011019	560	0
Honouliuli Influent	150030083011020	560	0
Honouliuli Influent	150030083011021	560	0
Honouliuli Influent	150030083011022	560	0
Honouliuli Influent	150030083011023	560	0
Honouliuli Influent	150030083011024	560	0
Honouliuli Influent	150030083011025	560	0
Honouliuli Influent	150030083011026	560	0
Honouliuli Influent	150030083011027	560	0

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Honouliuli Influent	150030083011028	560	0
Honouliuli Influent	150030083011029	560	0
Honouliuli Influent	150030083011030	560	0
Honouliuli Influent	150030083011031	560	0
Honouliuli Influent	150030083011032	560	0
Honouliuli Influent	150030083011033	560	0
Honouliuli Influent	150030083011034	560	0
Honouliuli Influent	150030083011035	560	0
Honouliuli Influent	150030083011036	560	0
Honouliuli Influent	150030083011037	560	0
Honouliuli Influent	150030083011038	560	0
Honouliuli Influent	150030083011039	560	0
Honouliuli Influent	150030083011040	560	0
Honouliuli Influent	150030083011041	560	0
Honouliuli Influent	150030083011042	560	0
Honouliuli Influent	150030083011043	560	0
Honouliuli Influent	150030083011044	560	0
Honouliuli Influent	150030083011045	560	0
Honouliuli Influent	150030083011046	560	0
Honouliuli Influent	150030083011047	560	0
Honouliuli Influent	150030083011048	560	0
Honouliuli Influent	150030083011049	560	0
Honouliuli Influent	150030083011050	560	0
Honouliuli Influent	150030083011051	560	0
Honouliuli Influent	150030083011052	560	0
Honouliuli Influent	150030083011053	560	0
Honouliuli Influent	150030083011054	560	0
Honouliuli Influent	150030083011055	560	0
Honouliuli Influent	150030083011056	560	0
Honouliuli Influent	150030083011057	560	0
Honouliuli Influent	150030083011058	560	0
Honouliuli Influent	150030083011059	560	0
Honouliuli Influent	150030083011060	560	0
Honouliuli Influent	150030083011061	560	0
Honouliuli Influent	150030083011062	560	0
Honouliuli Influent	150030083011063	560	0
Honouliuli Influent	150030083011064	560	0
Honouliuli Influent	150030083011065	560	0
Honouliuli Influent	150030083011066	560	0
Honouliuli Influent	150030083011067	560	0
Honouliuli Influent	150030083011068	560	0
Honouliuli Influent	150030083011069	560	0
Honouliuli Influent	150030083011070	560	0
Honouliuli Influent	150030083011071	560	0
Honouliuli Influent	150030083011072	560	0
Honouliuli Influent	150030083011073	560	0

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Honouliuli Influent	150030083011074	560	0
Honouliuli Influent	150030083011075	560	0
Honouliuli Influent	150030083011076	560	0
Honouliuli Influent	150030083011077	560	0
Honouliuli Influent	150030083011078	560	0
Honouliuli Influent	150030083011079	560	0
Honouliuli Influent	150030083011080	560	0
Honouliuli Influent	150030083011081	560	0
Honouliuli Influent	150030083011082	560	0
Honouliuli Influent	150030083011083	560	0
Honouliuli Influent	150030083011084	560	0
Honouliuli Influent	150030083011085	560	0
Honouliuli Influent	150030083011086	560	0
Honouliuli Influent	150030083011087	560	0
Honouliuli Influent	150030083011088	560	0
Honouliuli Influent	150030083011089	560	0
Honouliuli Influent	150030083011090	560	0
Honouliuli Influent	150030083011091	560	0
Honouliuli Influent	150030083011092	560	0
Honouliuli Influent	150030083011093	560	0
Honouliuli Influent	150030083011094	560	0
Honouliuli Influent	150030083011095	560	0
Honouliuli Influent	150030083011096	560	0
Honouliuli Influent	150030083011097	560	0
Honouliuli Influent	150030083011098	560	0
Honouliuli Influent	150030083011099	560	0
Honouliuli Influent	150030083011100	560	0
Honouliuli Influent	150030083012000	560	0
Honouliuli Influent	150030083012001	560	0
Honouliuli Influent	150030083012002	560	0
Honouliuli Influent	150030083012003	560	0
Honouliuli Influent	150030083012004	559	39
Honouliuli Influent	150030083012005	561	479
Honouliuli Influent	150030083012006	561	161
Honouliuli Influent	150030083012007	561	93
Honouliuli Influent	150030083012008	561	515
Honouliuli Influent	150030083013000	560	0
Honouliuli Influent	150030083013001	560	0
Honouliuli Influent	150030083013002	560	0
Honouliuli Influent	150030083013003	560	0
Honouliuli Influent	150030083013004	560	0
Honouliuli Influent	150030083013005	560	0
Honouliuli Influent	150030083013006	560	0
Honouliuli Influent	150030083013007	560	0
Honouliuli Influent	150030083013008	560	0
Honouliuli Influent	150030083013009	560	0

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Honouliuli Influent	150030083013010	560	0
Honouliuli Influent	150030083013011	560	0
Honouliuli Influent	150030083013012	560	0
Honouliuli Influent	150030083013013	560	0
Honouliuli Influent	150030083013014	560	0
Honouliuli Influent	150030083013015	560	0
Honouliuli Influent	150030083013016	560	0
Honouliuli Influent	150030083013017	560	0
Honouliuli Influent	150030083013018	560	0
Honouliuli Influent	150030083013019	560	0
Honouliuli Influent	150030083013020	560	0
Honouliuli Influent	150030083013022	560	0
Honouliuli Influent	150030083013023	560	0
Honouliuli Influent	150030083013024	561	0
Honouliuli Influent	150030083013025	561	295
Honouliuli Influent	150030083013026	561	76
Honouliuli Influent	150030083013027	561	66
Honouliuli Influent	150030083013028	561	27
Honouliuli Influent	150030083013029	561	87
Honouliuli Influent	150030083013030	561	110
Honouliuli Influent	150030083013031	561	65
Honouliuli Influent	150030083013032	561	140
Honouliuli Influent	150030083013033	561	58
Honouliuli Influent	150030083013034	561	104
Honouliuli Influent	150030083013035	561	166
Honouliuli Influent	150030083013036	561	0
Honouliuli Influent	150030083013037	561	236
Honouliuli Influent	150030083013038	561	75
Honouliuli Influent	150030083013039	561	46
Honouliuli Influent	150030083013040	561	415
Honouliuli Influent	150030083013041	561	85
Honouliuli Influent	150030083013042	561	55
Honouliuli Influent	150030083013043	561	81
Honouliuli Influent	150030083013044	561	73
Honouliuli Influent	150030083013045	561	138
Honouliuli Influent	150030083013046	561	131
Honouliuli Influent	150030083013047	561	123
Honouliuli Influent	150030083013048	561	106
Honouliuli Influent	150030083013049	561	123
Honouliuli Influent	150030083013050	561	117
Honouliuli Influent	150030083013051	561	0
Honouliuli Influent	150030083013052	561	0
Honouliuli Influent	150030083013053	561	0
Honouliuli Influent	150030083013054	560	0
Honouliuli Influent	150030083013055	560	0
Honouliuli Influent	150030083013056	560	0

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Honouliuli Influent	150030083013057	561	120
Honouliuli Influent	150030083013058	561	51
Honouliuli Influent	150030083013059	561	118
Honouliuli Influent	150030083013060	561	87
Honouliuli Influent	150030083021000	557	335
Honouliuli Influent	150030083021001	560	479
Honouliuli Influent	150030083021002	557	165
Honouliuli Influent	150030083021003	557	243
Honouliuli Influent	150030083021004	560	0
Honouliuli Influent	150030083021005	557	285
Honouliuli Influent	150030083021006	557	154
Honouliuli Influent	150030083021007	557	119
Honouliuli Influent	150030083021008	557	127
Honouliuli Influent	150030083021009	557	235
Honouliuli Influent	150030083022000	557	375
Honouliuli Influent	150030083022001	557	343
Honouliuli Influent	150030083022002	557	276
Honouliuli Influent	150030083022003	557	152
Honouliuli Influent	150030083022004	557	289
Honouliuli Influent	150030083022005	558	378
Honouliuli Influent	150030083022006	557	141
Honouliuli Influent	150030083022007	557	255
Honouliuli Influent	150030083023000	558	172
Honouliuli Influent	150030083023001	558	1142
Honouliuli Influent	150030083023002	558	352
Honouliuli Influent	150030083023003	558	544
Honouliuli Influent	150030083023004	558	188
Honouliuli Influent	150030084021000	562	192
Honouliuli Influent	150030084021001	562	0
Honouliuli Influent	150030084021002	563	569
Honouliuli Influent	150030084021003	562	657
Honouliuli Influent	150030084021004	562	715
Honouliuli Influent	150030084021005	562	68
Honouliuli Influent	150030084021006	562	64
Honouliuli Influent	150030084021007	563	54
Honouliuli Influent	150030084021008	563	107
Honouliuli Influent	150030084021009	563	97
Honouliuli Influent	150030084021010	563	76
Honouliuli Influent	150030084021011	563	60
Honouliuli Influent	150030084022000	563	108
Honouliuli Influent	150030084022001	563	122
Honouliuli Influent	150030084022002	563	125
Honouliuli Influent	150030084022003	563	79
Honouliuli Influent	150030084022004	563	642
Honouliuli Influent	150030084022005	563	72
Honouliuli Influent	150030084022006	563	52

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Honouliuli Influent	150030084022007	563	118
Honouliuli Influent	150030084022008	563	91
Honouliuli Influent	150030084022009	563	418
Honouliuli Influent	150030084022010	563	101
Honouliuli Influent	150030084022011	563	67
Honouliuli Influent	150030084022012	563	72
Honouliuli Influent	150030084022013	563	280
Honouliuli Influent	150030084022014	563	105
Honouliuli Influent	150030084022015	563	85
Honouliuli Influent	150030084022016	563	93
Honouliuli Influent	150030084023000	556	6
Honouliuli Influent	150030084023001	556	260
Honouliuli Influent	150030084023002	556	126
Honouliuli Influent	150030084023003	556	138
Honouliuli Influent	150030084023004	556	173
Honouliuli Influent	150030084023005	556	234
Honouliuli Influent	150030084023006	556	214
Honouliuli Influent	150030084023007	556	144
Honouliuli Influent	150030084023008	556	129
Honouliuli Influent	150030084023009	556	376
Honouliuli Influent	150030084023010	556	109
Honouliuli Influent	150030084023011	556	234
Honouliuli Influent	150030084023012	556	72
Honouliuli Influent	150030084023013	556	230
Honouliuli Influent	150030084023014	556	199
Honouliuli Influent	150030084023015	556	207
Honouliuli Influent	150030084023016	556	66
Honouliuli Influent	150030084051000	551	77
Honouliuli Influent	150030084051001	551	333
Honouliuli Influent	150030084051002	551	1684
Honouliuli Influent	150030084051003	551	248
Honouliuli Influent	150030084051004	560	0
Honouliuli Influent	150030084051005	551	301
Honouliuli Influent	150030084051006	551	125
Honouliuli Influent	150030084051007	551	1424
Honouliuli Influent	150030084051008	551	105
Honouliuli Influent	150030084051009	551	367
Honouliuli Influent	150030084051010	551	0
Honouliuli Influent	150030084061000	555	38
Honouliuli Influent	150030084061001	555	2514
Honouliuli Influent	150030084061002	555	89
Honouliuli Influent	150030084061003	555	24
Honouliuli Influent	150030084061004	555	45
Honouliuli Influent	150030084061005	555	302
Honouliuli Influent	150030084061006	555	153
Honouliuli Influent	150030084061007	555	73

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Honouliuli Influent	150030084061008	555	59
Honouliuli Influent	150030084061009	555	232
Honouliuli Influent	150030084061010	555	32
Honouliuli Influent	150030084061011	555	31
Honouliuli Influent	150030084061012	555	51
Honouliuli Influent	150030084061013	555	20
Honouliuli Influent	150030084061014	555	88
Honouliuli Influent	150030084061015	555	89
Honouliuli Influent	150030084061016	555	29
Honouliuli Influent	150030084061017	555	276
Honouliuli Influent	150030084061018	555	35
Honouliuli Influent	150030084061019	555	30
Honouliuli Influent	150030084061020	555	27
Honouliuli Influent	150030084061021	555	30
Honouliuli Influent	150030084061022	555	42
Honouliuli Influent	150030084061023	555	35
Honouliuli Influent	150030084061024	555	20
Honouliuli Influent	150030084061025	555	361
Honouliuli Influent	150030084061026	555	0
Honouliuli Influent	150030084061027	560	0
Honouliuli Influent	150030084061028	555	130
Honouliuli Influent	150030084061029	555	34
Honouliuli Influent	150030084061030	555	61
Honouliuli Influent	150030084061031	555	37
Honouliuli Influent	150030084061032	555	70
Honouliuli Influent	150030084061033	555	81
Honouliuli Influent	150030084061034	555	190
Honouliuli Influent	150030084061035	555	230
Honouliuli Influent	150030084061036	555	86
Honouliuli Influent	150030084061037	555	56
Honouliuli Influent	150030084061038	555	60
Honouliuli Influent	150030084061039	555	126
Honouliuli Influent	150030084061040	555	111
Honouliuli Influent	150030084071000	564	52
Honouliuli Influent	150030084071001	563	73
Honouliuli Influent	150030084071002	564	79
Honouliuli Influent	150030084071003	564	155
Honouliuli Influent	150030084071004	564	82
Honouliuli Influent	150030084071005	564	71
Honouliuli Influent	150030084071006	564	202
Honouliuli Influent	150030084071007	564	74
Honouliuli Influent	150030084071008	564	84
Honouliuli Influent	150030084071009	564	240
Honouliuli Influent	150030084071010	564	76
Honouliuli Influent	150030084071011	564	73
Honouliuli Influent	150030084071012	564	230

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Honouliuli Influent	150030084071013	564	44
Honouliuli Influent	150030084071014	564	119
Honouliuli Influent	150030084071015	564	91
Honouliuli Influent	150030084071016	564	98
Honouliuli Influent	150030084071017	564	161
Honouliuli Influent	150030084071018	564	125
Honouliuli Influent	150030084071019	564	113
Honouliuli Influent	150030084071020	564	58
Honouliuli Influent	150030084071021	564	108
Honouliuli Influent	150030084071022	564	215
Honouliuli Influent	150030084071023	564	246
Honouliuli Influent	150030084071024	564	129
Honouliuli Influent	150030084071025	564	23
Honouliuli Influent	150030084071026	564	18
Honouliuli Influent	150030084071027	564	5
Honouliuli Influent	150030084071028	564	98
Honouliuli Influent	150030084071029	564	39
Honouliuli Influent	150030084071030	564	144
Honouliuli Influent	150030084081000	564	606
Honouliuli Influent	150030084081001	564	451
Honouliuli Influent	150030084081002	564	98
Honouliuli Influent	150030084081003	564	80
Honouliuli Influent	150030084081004	564	192
Honouliuli Influent	150030084081005	564	468
Honouliuli Influent	150030084081006	564	90
Honouliuli Influent	150030084081007	564	102
Honouliuli Influent	150030084081008	564	103
Honouliuli Influent	150030084081009	564	21
Honouliuli Influent	150030084081010	564	256
Honouliuli Influent	150030084081011	564	277
Honouliuli Influent	150030084081012	564	158
Honouliuli Influent	150030084081013	564	61
Honouliuli Influent	150030084081014	564	162
Honouliuli Influent	150030084081015	564	80
Honouliuli Influent	150030084081016	564	65
Honouliuli Influent	150030084081017	564	79
Honouliuli Influent	150030084081018	564	4
Honouliuli Influent	150030084081019	564	136
Honouliuli Influent	150030084081020	564	115
Honouliuli Influent	150030084081021	564	126
Honouliuli Influent	150030084081022	564	33
Honouliuli Influent	150030084081023	564	74
Honouliuli Influent	150030084081024	564	76
Honouliuli Influent	150030084081025	564	113
Honouliuli Influent	150030084081026	564	31
Honouliuli Influent	150030084081027	564	30

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Honouliuli Influent	150030084081028	563	17
Honouliuli Influent	150030084082000	565	195
Honouliuli Influent	150030084082001	565	0
Honouliuli Influent	150030084082002	565	53
Honouliuli Influent	150030084082003	565	376
Honouliuli Influent	150030084082004	565	0
Honouliuli Influent	150030084101000	567	91
Honouliuli Influent	150030084101001	544	206
Honouliuli Influent	150030084101002	544	4
Honouliuli Influent	150030084101003	544	19
Honouliuli Influent	150030084101004	554	676
Honouliuli Influent	150030084101005	554	103
Honouliuli Influent	150030084101006	554	79
Honouliuli Influent	150030084101007	554	242
Honouliuli Influent	150030084101008	544	155
Honouliuli Influent	150030084101009	566	29
Honouliuli Influent	150030084101010	544	0
Honouliuli Influent	150030084101011	566	23
Honouliuli Influent	150030084101012	566	14
Honouliuli Influent	150030084101013	554	398
Honouliuli Influent	150030084101014	554	90
Honouliuli Influent	150030084101015	566	175
Honouliuli Influent	150030084101016	566	42
Honouliuli Influent	150030084111000	570	0
Honouliuli Influent	150030084111001	553	1237
Honouliuli Influent	150030084112000	554	174
Honouliuli Influent	150030084112001	554	1161
Honouliuli Influent	150030084112002	554	298
Honouliuli Influent	150030084112003	554	578
Honouliuli Influent	150030084121000	552	1146
Honouliuli Influent	150030084121001	552	65
Honouliuli Influent	150030084121002	552	221
Honouliuli Influent	150030084121003	552	207
Honouliuli Influent	150030084121004	552	99
Honouliuli Influent	150030084121005	552	176
Honouliuli Influent	150030084121006	552	1822
Honouliuli Influent	150030084121007	552	454
Honouliuli Influent	150030084122000	552	531
Honouliuli Influent	150030084122001	552	195
Honouliuli Influent	150030084122002	552	513
Honouliuli Influent	150030084122003	552	151
Honouliuli Influent	150030084122004	552	963
Honouliuli Influent	150030084122005	552	0
Honouliuli Influent	150030085021000	573	0
Honouliuli Influent	150030085021001	574	0
Honouliuli Influent	150030085021002	573	0

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Honouliuli Influent	150030085021003	574	0
Honouliuli Influent	150030085021004	574	0
Honouliuli Influent	150030085021005	574	0
Honouliuli Influent	150030085021006	574	0
Honouliuli Influent	150030085021007	574	0
Honouliuli Influent	150030085021008	574	0
Honouliuli Influent	150030085021009	574	0
Honouliuli Influent	150030085021010	580	0
Honouliuli Influent	150030085021011	578	0
Honouliuli Influent	150030085021011	579	0
Honouliuli Influent	150030085021013	578	0
Honouliuli Influent	150030085021014	574	0
Honouliuli Influent	150030085021015	574	0
Honouliuli Influent	150030085021017	574	0
Honouliuli Influent	150030085021018	597	0
Honouliuli Influent	150030085021019	571	0
Honouliuli Influent	150030085021020	571	0
Honouliuli Influent	150030085021021	571	0
Honouliuli Influent	150030085021022	571	237
Honouliuli Influent	150030085021023	571	0
Honouliuli Influent	150030085021024	571	0
Honouliuli Influent	150030085021025	571	0
Honouliuli Influent	150030085021026	571	0
Honouliuli Influent	150030085021027	571	0
Honouliuli Influent	150030085021028	571	0
Honouliuli Influent	150030085021029	571	0
Honouliuli Influent	150030085021030	571	0
Honouliuli Influent	150030085021031	571	0
Honouliuli Influent	150030085021032	571	0
Honouliuli Influent	150030085021033	571	0
Honouliuli Influent	150030085021034	571	0
Honouliuli Influent	150030085021035	571	0
Honouliuli Influent	150030085021036	571	0
Honouliuli Influent	150030085021037	571	0
Honouliuli Influent	150030085021038	571	0
Honouliuli Influent	150030085021039	571	0
Honouliuli Influent	150030085021040	571	0
Honouliuli Influent	150030085021041	571	0
Honouliuli Influent	150030085021042	571	0
Honouliuli Influent	150030085021043	571	0
Honouliuli Influent	150030085021044	571	0
Honouliuli Influent	150030085021045	571	0
Honouliuli Influent	150030085021046	571	0
Honouliuli Influent	150030085021047	571	0
Honouliuli Influent	150030085021048	572	0
Honouliuli Influent	150030085021049	571	0

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Honouliuli Influent	150030085021050	571	0
Honouliuli Influent	150030085021051	571	0
Honouliuli Influent	150030085021052	571	0
Honouliuli Influent	150030085021053	571	0
Honouliuli Influent	150030085021054	571	0
Honouliuli Influent	150030085021055	572	0
Honouliuli Influent	150030085021056	572	0
Honouliuli Influent	150030085021057	572	0
Honouliuli Influent	150030085021058	572	0
Honouliuli Influent	150030085021059	571	0
Honouliuli Influent	150030085021060	571	350
Honouliuli Influent	150030085021061	571	12
Honouliuli Influent	150030085021062	571	0
Honouliuli Influent	150030085021063	571	176
Honouliuli Influent	150030085021064	571	56
Honouliuli Influent	150030085021065	573	0
Honouliuli Influent	150030085021066	573	0
Honouliuli Influent	150030085021067	571	0
Honouliuli Influent	150030085021068	571	0
Honouliuli Influent	150030085021069	571	49
Honouliuli Influent	150030085021070	571	152
Honouliuli Influent	150030085021071	571	67
Honouliuli Influent	150030085021072	571	75
Honouliuli Influent	150030085021073	571	0
Honouliuli Influent	150030085021074	571	0
Honouliuli Influent	150030085021075	571	0
Honouliuli Influent	150030085021076	574	0
Honouliuli Influent	150030085021077	574	0
Honouliuli Influent	150030085021078	574	0
Honouliuli Influent	150030085021079	574	0
Honouliuli Influent	150030085021080	574	0
Honouliuli Influent	150030085021081	574	268
Honouliuli Influent	150030085021082	574	0
Honouliuli Influent	150030085021083	574	0
Honouliuli Influent	150030085021084	574	0
Honouliuli Influent	150030085021085	574	0
Honouliuli Influent	150030085021086	574	0
Honouliuli Influent	150030085021087	574	0
Honouliuli Influent	150030085021088	574	1
Honouliuli Influent	150030085021089	574	0
Honouliuli Influent	150030085021090	574	0
Honouliuli Influent	150030085021091	574	24
Honouliuli Influent	150030085021092	574	0
Honouliuli Influent	150030085021093	574	164
Honouliuli Influent	150030085021094	573	0
Honouliuli Influent	150030085021095	574	0

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Honouliuli Influent	150030085021096	574	0
Honouliuli Influent	150030085021097	574	194
Honouliuli Influent	150030085021098	574	120
Honouliuli Influent	150030085021099	574	0
Honouliuli Influent	150030085021100	574	0
Honouliuli Influent	150030085021101	574	0
Honouliuli Influent	150030085021102	574	0
Honouliuli Influent	150030085021103	574	0
Honouliuli Influent	150030085021104	574	0
Honouliuli Influent	150030085021105	574	0
Honouliuli Influent	150030085021106	574	0
Honouliuli Influent	150030085021107	574	0
Honouliuli Influent	150030085021108	574	23
Honouliuli Influent	150030085021109	574	0
Honouliuli Influent	150030085021110	574	10
Honouliuli Influent	150030085021111	574	63
Honouliuli Influent	150030085021112	574	94
Honouliuli Influent	150030085021113	573	0
Honouliuli Influent	150030085021114	573	0
Honouliuli Influent	150030085021115	573	0
Honouliuli Influent	150030085021116	573	0
Honouliuli Influent	150030085021117	573	0
Honouliuli Influent	150030085021118	573	0
Honouliuli Influent	150030085021119	573	0
Honouliuli Influent	150030085021120	573	0
Honouliuli Influent	150030085021121	574	0
Honouliuli Influent	150030085021122	573	0
Honouliuli Influent	150030085021123	573	0
Honouliuli Influent	150030085021124	574	0
Honouliuli Influent	150030085021125	574	0
Honouliuli Influent	150030085021126	573	0
Honouliuli Influent	150030085021127	574	0
Honouliuli Influent	150030085021128	574	0
Honouliuli Influent	150030085021129	573	0
Honouliuli Influent	150030085021130	574	0
Honouliuli Influent	150030085021131	574	0
Honouliuli Influent	150030085021132	574	0
Honouliuli Influent	150030085021133	574	0
Honouliuli Influent	150030085021134	573	0
Honouliuli Influent	150030085021135	573	0
Honouliuli Influent	150030085021136	573	0
Honouliuli Influent	150030085021137	572	0
Honouliuli Influent	150030085021138	572	0
Honouliuli Influent	150030085021139	572	0
Honouliuli Influent	150030085021140	572	0
Honouliuli Influent	150030085021141	572	0

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Honouliuli Influent	150030085021142	572	0
Honouliuli Influent	150030085021143	572	0
Honouliuli Influent	150030085021144	572	0
Honouliuli Influent	150030085021145	572	0
Honouliuli Influent	150030085021146	572	0
Honouliuli Influent	150030085021147	571	0
Honouliuli Influent	150030085021148	572	0
Honouliuli Influent	150030085021149	572	0
Honouliuli Influent	150030085021150	573	0
Honouliuli Influent	150030085021151	573	0
Honouliuli Influent	150030085021152	572	0
Honouliuli Influent	150030085021153	571	0
Honouliuli Influent	150030085021154	572	0
Honouliuli Influent	150030085021155	572	0
Honouliuli Influent	150030085021156	572	0
Honouliuli Influent	150030085021157	572	0
Honouliuli Influent	150030085021158	572	0
Honouliuli Influent	150030085021159	574	0
Honouliuli Influent	150030085021160	574	0
Honouliuli Influent	150030085021161	574	0
Honouliuli Influent	150030085021162	574	0
Honouliuli Influent	150030085021163	574	0
Honouliuli Influent	150030085021164	574	0
Honouliuli Influent	150030085021165	580	0
Honouliuli Influent	150030085021166	574	0
Honouliuli Influent	150030085021167	580	0
Honouliuli Influent	150030085021168	580	1
Honouliuli Influent	150030085021169	574	0
Honouliuli Influent	150030085021170	574	0
Honouliuli Influent	150030085021171	574	0
Honouliuli Influent	150030085021172	575	0
Honouliuli Influent	150030085021173	575	0
Honouliuli Influent	150030085021174	573	0
Honouliuli Influent	150030085021175	573	0
Honouliuli Influent	150030085021176	574	0
Honouliuli Influent	150030085021177	574	0
Honouliuli Influent	150030085021178	574	0
Honouliuli Influent	150030085021179	574	0
Honouliuli Influent	150030085021180	572	0
Honouliuli Influent	150030085021181	574	0
Honouliuli Influent	150030085021182	574	0
Honouliuli Influent	150030085021183	574	0
Honouliuli Influent	150030085021184	574	0
Honouliuli Influent	150030085021185	574	0
Honouliuli Influent	150030085021186	571	0
Honouliuli Influent	150030085021187	574	0

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Honouliuli Influent	150030085021188	565	0
Honouliuli Influent	150030085021189	572	0
Honouliuli Influent	150030086061000	606	145
Honouliuli Influent	150030086061001	606	820
Honouliuli Influent	150030086061002	606	681
Honouliuli Influent	150030086061003	606	0
Honouliuli Influent	150030086061004	606	254
Honouliuli Influent	150030086061005	606	56
Honouliuli Influent	150030086061006	606	89
Honouliuli Influent	150030086061007	606	597
Honouliuli Influent	150030086061008	606	78
Honouliuli Influent	150030086061009	606	43
Honouliuli Influent	150030086061010	591	0
Honouliuli Influent	150030086061011	591	0
Honouliuli Influent	150030086061012	591	0
Honouliuli Influent	150030086062000	602	316
Honouliuli Influent	150030086062001	602	33
Honouliuli Influent	150030086062002	602	105
Honouliuli Influent	150030086062003	602	251
Honouliuli Influent	150030086062004	602	787
Honouliuli Influent	150030086062005	602	161
Honouliuli Influent	150030086062006	602	317
Honouliuli Influent	150030086062007	602	396
Honouliuli Influent	150030086062008	602	35
Honouliuli Influent	150030086062009	602	124
Honouliuli Influent	150030086062010	602	54
Honouliuli Influent	150030086062011	602	94
Honouliuli Influent	150030086062012	602	539
Honouliuli Influent	150030086062013	602	50
Honouliuli Influent	150030086062014	602	64
Honouliuli Influent	150030086062015	602	573
Honouliuli Influent	150030086063000	599	0
Honouliuli Influent	150030086063001	763	0
Honouliuli Influent	150030086063002	604	525
Honouliuli Influent	150030086063002	763	525
Honouliuli Influent	150030086063003	599	0
Honouliuli Influent	150030086063004	599	0
Honouliuli Influent	150030086063005	605	0
Honouliuli Influent	150030086063006	605	0
Honouliuli Influent	150030086063007	599	0
Honouliuli Influent	150030086063008	599	0
Honouliuli Influent	150030086064000	601	276
Honouliuli Influent	150030086064001	601	1163
Honouliuli Influent	150030086064002	601	118
Honouliuli Influent	150030086064003	601	424
Honouliuli Influent	150030086091000	585	0

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Honouliuli Influent	150030086091000	588	360
Honouliuli Influent	150030086091001	588	101
Honouliuli Influent	150030086091002	588	158
Honouliuli Influent	150030086091003	588	266
Honouliuli Influent	150030086091004	588	111
Honouliuli Influent	150030086091005	588	128
Honouliuli Influent	150030086091006	581	0
Honouliuli Influent	150030086091006	584	146
Honouliuli Influent	150030086091006	585	147
Honouliuli Influent	150030086091007	588	132
Honouliuli Influent	150030086091008	588	58
Honouliuli Influent	150030086091009	585	0
Honouliuli Influent	150030086091009	587	0
Honouliuli Influent	150030086091010	587	0
Honouliuli Influent	150030086091011	587	0
Honouliuli Influent	150030086092000	581	0
Honouliuli Influent	150030086092001	581	299
Honouliuli Influent	150030086092002	581	160
Honouliuli Influent	150030086092003	584	0
Honouliuli Influent	150030086092004	586	0
Honouliuli Influent	150030086101000	582	0
Honouliuli Influent	150030086101001	582	49
Honouliuli Influent	150030086101002	583	0
Honouliuli Influent	150030086101003	582	2
Honouliuli Influent	150030086101004	583	0
Honouliuli Influent	150030086101005	583	111
Honouliuli Influent	150030086101006	583	627
Honouliuli Influent	150030086101007	583	87
Honouliuli Influent	150030086101008	583	171
Honouliuli Influent	150030086101009	582	0
Honouliuli Influent	150030086101010	582	0
Honouliuli Influent	150030086101012	578	4
Honouliuli Influent	150030086111001	617	32
Honouliuli Influent	150030086111002	615	0
Honouliuli Influent	150030086111003	613	0
Honouliuli Influent	150030086111004	617	0
Honouliuli Influent	150030086111005	617	0
Honouliuli Influent	150030086111006	617	0
Honouliuli Influent	150030086111007	611	52
Honouliuli Influent	150030086111008	611	0
Honouliuli Influent	150030086121000	614	0
Honouliuli Influent	150030086121001	614	0
Honouliuli Influent	150030086121002	614	0
Honouliuli Influent	150030086121003	614	0
Honouliuli Influent	150030086121004	614	0
Honouliuli Influent	150030086121005	614	0

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Honouliuli Influent	150030086121006	614	0
Honouliuli Influent	150030086121007	614	0
Honouliuli Influent	150030086121008	614	0
Honouliuli Influent	150030086121009	614	0
Honouliuli Influent	150030086121010	614	0
Honouliuli Influent	150030086121011	614	0
Honouliuli Influent	150030086121012	614	0
Honouliuli Influent	150030086121013	614	0
Honouliuli Influent	150030086121014	614	0
Honouliuli Influent	150030086121015	614	0
Honouliuli Influent	150030086121016	614	1119
Honouliuli Influent	150030086121017	614	242
Honouliuli Influent	150030086121018	614	23
Honouliuli Influent	150030086121019	614	46
Honouliuli Influent	150030086121020	614	128
Honouliuli Influent	150030086121021	614	153
Honouliuli Influent	150030086121022	614	249
Honouliuli Influent	150030086121023	614	445
Honouliuli Influent	150030086121024	614	42
Honouliuli Influent	150030086121025	614	49
Honouliuli Influent	150030086121026	614	617
Honouliuli Influent	150030086121027	614	237
Honouliuli Influent	150030086121028	614	489
Honouliuli Influent	150030086121029	614	131
Honouliuli Influent	150030086121030	614	1281
Honouliuli Influent	150030086121031	614	90
Honouliuli Influent	150030086121032	614	27
Honouliuli Influent	150030086121033	614	131
Honouliuli Influent	150030086121034	614	188
Honouliuli Influent	150030086121035	614	330
Honouliuli Influent	150030086131000	610	643
Honouliuli Influent	150030086131001	610	81
Honouliuli Influent	150030086131002	610	51
Honouliuli Influent	150030086131003	610	41
Honouliuli Influent	150030086131004	610	88
Honouliuli Influent	150030086131005	610	0
Honouliuli Influent	150030086141000	608	49
Honouliuli Influent	150030086141001	608	356
Honouliuli Influent	150030086141002	608	315
Honouliuli Influent	150030086142004	618	23
Honouliuli Influent	150030086142005	618	0
Honouliuli Influent	150030086142038	618	0
Honouliuli Influent	150030086143000	607	58
Honouliuli Influent	150030086143001	607	634
Honouliuli Influent	150030086143001	608	634
Honouliuli Influent	150030086143002	607	0

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Honouliuli Influent	150030086143003	607	33
Honouliuli Influent	150030086143004	607	0
Honouliuli Influent	150030086143005	608	0
Honouliuli Influent	150030086144000	609	317
Honouliuli Influent	150030086144001	609	431
Honouliuli Influent	150030086145000	609	1393
Honouliuli Influent	150030086145001	609	116
Honouliuli Influent	150030086145002	609	162
Honouliuli Influent	150030086146000	609	0
Honouliuli Influent	150030086146001	609	1239
Honouliuli Influent	150030086146002	609	287
Honouliuli Influent	150030086146003	609	0
Honouliuli Influent	150030086147000	614	53
Honouliuli Influent	150030086147001	607	860
Honouliuli Influent	150030086147002	608	117
Honouliuli Influent	150030086147003	608	205
Honouliuli Influent	150030086147004	607	0
Honouliuli Influent	150030086148003	603	0
Honouliuli Influent	150030086148004	603	0
Honouliuli Influent	150030086149000	546	0
Honouliuli Influent	150030086149001	546	0
Honouliuli Influent	150030086149002	546	0
Honouliuli Influent	150030086149003	549	0
Honouliuli Influent	150030086149003	600	0
Honouliuli Influent	150030086149003	764	0
Honouliuli Influent	150030086149004	546	0
Honouliuli Influent	150030086149005	546	0
Honouliuli Influent	150030086149006	549	0
Honouliuli Influent	150030086149008	764	0
Honouliuli Influent	150030086149009	549	0
Honouliuli Influent	150030086149010	547	14
Honouliuli Influent	150030086149010	549	13
Honouliuli Influent	150030086149011	547	157
Honouliuli Influent	150030086149016	546	0
Honouliuli Influent	150030086149017	546	0
Honouliuli Influent	150030086149018	546	0
Honouliuli Influent	150030086149019	546	0
Honouliuli Influent	150030086149020	547	0
Honouliuli Influent	150030086171000	569	1
Honouliuli Influent	150030086171001	569	144
Honouliuli Influent	150030086171002	569	74
Honouliuli Influent	150030086171003	569	0
Honouliuli Influent	150030086171004	569	747
Honouliuli Influent	150030086171005	569	24
Honouliuli Influent	150030086171006	569	0
Honouliuli Influent	150030086171007	569	34

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Honouliuli Influent	150030086171008	569	46
Honouliuli Influent	150030086171009	569	34
Honouliuli Influent	150030086171010	569	0
Honouliuli Influent	150030086171011	569	67
Honouliuli Influent	150030086171012	569	4
Honouliuli Influent	150030086171013	552	0
Honouliuli Influent	150030086171014	569	77
Honouliuli Influent	150030086171015	569	118
Honouliuli Influent	150030086171016	569	54
Honouliuli Influent	150030086171017	569	121
Honouliuli Influent	150030086171018	569	86
Honouliuli Influent	150030086171019	569	0
Honouliuli Influent	150030086172000	569	0
Honouliuli Influent	150030086172001	598	0
Honouliuli Influent	150030086172002	569	250
Honouliuli Influent	150030086172003	569	29
Honouliuli Influent	150030086172004	569	51
Honouliuli Influent	150030086172005	569	34
Honouliuli Influent	150030086172006	569	46
Honouliuli Influent	150030086172007	569	16
Honouliuli Influent	150030086172008	569	32
Honouliuli Influent	150030086172009	569	39
Honouliuli Influent	150030086172010	569	37
Honouliuli Influent	150030086172011	569	39
Honouliuli Influent	150030086172012	569	46
Honouliuli Influent	150030086172013	569	33
Honouliuli Influent	150030086172014	569	35
Honouliuli Influent	150030086172015	569	22
Honouliuli Influent	150030086172016	597	0
Honouliuli Influent	150030086172017	569	0
Honouliuli Influent	150030086172018	569	0
Honouliuli Influent	150030086172019	569	0
Honouliuli Influent	150030086172020	569	0
Honouliuli Influent	150030086172021	569	0
Honouliuli Influent	150030086172022	569	313
Honouliuli Influent	150030086172023	569	0
Honouliuli Influent	150030086172024	569	48
Honouliuli Influent	150030086172025	569	25
Honouliuli Influent	150030086172026	569	30
Honouliuli Influent	150030086172027	598	0
Honouliuli Influent	150030086172028	570	0
Honouliuli Influent	150030086172029	570	0
Honouliuli Influent	150030086172030	570	1
Honouliuli Influent	150030086172031	570	38
Honouliuli Influent	150030086172032	570	0
Honouliuli Influent	150030086172033	570	7

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Honouliuli Influent	150030086172034	570	43
Honouliuli Influent	150030086172035	570	26
Honouliuli Influent	150030086172036	570	4
Honouliuli Influent	150030086172037	552	0
Honouliuli Influent	150030086172038	569	39
Honouliuli Influent	150030086172039	570	1
Honouliuli Influent	150030086172040	570	29
Honouliuli Influent	150030086172041	570	0
Honouliuli Influent	150030086172042	569	33
Honouliuli Influent	150030086172043	569	23
Honouliuli Influent	150030086172044	569	22
Honouliuli Influent	150030086172045	569	81
Honouliuli Influent	150030086172046	569	23
Honouliuli Influent	150030086173000	560	0
Honouliuli Influent	150030086173001	550	991
Honouliuli Influent	150030086173002	550	0
Honouliuli Influent	150030086173003	550	0
Honouliuli Influent	150030086173004	547	1
Honouliuli Influent	150030086173005	560	0
Honouliuli Influent	150030086173006	550	25
Honouliuli Influent	150030086173007	550	46
Honouliuli Influent	150030086173008	560	0
Honouliuli Influent	150030086173009	560	0
Honouliuli Influent	150030086173010	550	1241
Honouliuli Influent	150030086173011	550	127
Honouliuli Influent	150030086173012	550	115
Honouliuli Influent	150030086173013	550	145
Honouliuli Influent	150030086173014	550	147
Honouliuli Influent	150030086173015	550	58
Honouliuli Influent	150030086173016	550	171
Honouliuli Influent	150030086173017	550	0
Honouliuli Influent	150030086173018	547	0
Honouliuli Influent	150030086173019	550	0
Honouliuli Influent	150030086174000	568	0
Honouliuli Influent	150030086174001	568	85
Honouliuli Influent	150030086174002	568	0
Honouliuli Influent	150030086174003	568	552
Honouliuli Influent	150030086174004	568	133
Honouliuli Influent	150030086174005	568	476
Honouliuli Influent	150030086174006	568	131
Honouliuli Influent	150030086174007	568	130
Honouliuli Influent	150030086174008	568	117
Honouliuli Influent	150030086174009	568	560
Honouliuli Influent	150030086174010	568	50
Honouliuli Influent	150030086174011	568	95
Honouliuli Influent	150030086174012	568	69

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Honouliuli Influent	150030086174013	568	99
Honouliuli Influent	150030086174014	568	0
Honouliuli Influent	150030086174015	568	114
Honouliuli Influent	150030086174016	568	108
Honouliuli Influent	150030086174017	568	65
Honouliuli Influent	150030086174018	568	83
Honouliuli Influent	150030086174019	568	115
Honouliuli Influent	150030086174020	552	0
Honouliuli Influent	150030086175000	551	0
Honouliuli Influent	150030086175001	551	189
Honouliuli Influent	150030086175002	551	0
Honouliuli Influent	150030086175003	551	0
Honouliuli Influent	150030086175004	551	0
Honouliuli Influent	150030086175005	551	0
Honouliuli Influent	150030086221000	610	0
Honouliuli Influent	150030086221001	610	245
Honouliuli Influent	150030086221002	610	60
Honouliuli Influent	150030086221003	610	162
Honouliuli Influent	150030086221004	610	197
Honouliuli Influent	150030086221005	610	106
Honouliuli Influent	150030086222000	610	164
Honouliuli Influent	150030086222001	610	167
Honouliuli Influent	150030086222002	610	59
Honouliuli Influent	150030086222003	610	136
Honouliuli Influent	150030086222004	610	2
Honouliuli Influent	150030086222005	610	40
Honouliuli Influent	150030086222006	610	136
Honouliuli Influent	150030086222007	610	110
Honouliuli Influent	150030086222008	610	125
Honouliuli Influent	150030086222009	610	113
Honouliuli Influent	150030086222010	610	112
Honouliuli Influent	150030086222011	610	42
Honouliuli Influent	150030086222012	610	160
Honouliuli Influent	150030086222013	610	66
Honouliuli Influent	150030086222014	610	116
Honouliuli Influent	150030086222015	610	181
Honouliuli Influent	150030086222016	610	138
Honouliuli Influent	150030086222017	610	354
Honouliuli Influent	150030086222018	610	57
Honouliuli Influent	150030086222019	610	94
Honouliuli Influent	150030086223000	610	0
Honouliuli Influent	150030086223001	610	0
Honouliuli Influent	150030086223001	611	0
Honouliuli Influent	150030086223002	610	0
Honouliuli Influent	150030086223003	610	375
Honouliuli Influent	150030086223004	610	149

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Honouliuli Influent	150030086223005	610	57
Honouliuli Influent	150030086223006	610	145
Honouliuli Influent	150030086223007	610	200
Honouliuli Influent	150030086223008	612	0
Honouliuli Influent	150030086223009	612	0
Honouliuli Influent	150030086223010	585	0
Honouliuli Influent	150030086223011	610	0
Honouliuli Influent	150030086223012	610	0
Honouliuli Influent	150030086223013	610	0
Honouliuli Influent	150030087031012	560	0
Honouliuli Influent	150030087031014	560	0
Honouliuli Influent	150030115001000	592	0
Honouliuli Influent	150030115001001	590	4
Honouliuli Influent	150030115001002	590	0
Honouliuli Influent	150030115001003	592	121
Honouliuli Influent	150030115001003	593	120
Honouliuli Influent	150030115001003	594	0
Honouliuli Influent	150030115001003	595	0
Honouliuli Influent	150030115001003	596	0
Honouliuli Influent	150030115001004	589	0
Honouliuli Influent	150030115001005	593	0
Honouliuli Influent	150030115001006	593	0
Honouliuli Influent	150030115002000	597	862
Honouliuli Influent	150030115002001	597	28
Honouliuli Influent	150030115002002	597	390
Honouliuli Influent	150030115002003	597	113
Honouliuli Influent	150030115002004	597	174
Honouliuli Influent	150030115002005	599	0
Honouliuli Influent	150030115002006	599	0
Honouliuli Influent	150030115002007	599	0
Honouliuli Influent	150030115002008	597	114
Honouliuli Influent	150030115002009	599	0
Honouliuli Influent	150030115002010	597	33
Honouliuli Influent	150030115002011	597	180
Honouliuli Influent	150030115002012	597	37
Honouliuli Influent	150030115002013	597	33
Honouliuli Influent	150030115002014	597	144
Honouliuli Influent	150030115002015	597	0
Honouliuli Influent	150030115002016	597	0
Honouliuli Influent	150030115002017	597	40
Honouliuli Influent	150030115002018	597	30
Honouliuli Influent	150030115002019	598	0
Honouliuli Influent	150030115002020	570	0
Honouliuli Influent	150030115003000	601	102
Honouliuli Influent	150030115003001	601	0
Honouliuli Influent	150030115003002	601	369

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Honouliuli Influent	150030115003003	601	0
Honouliuli Influent	150030115003004	601	0
Honouliuli Influent	150030115003005	601	608
Honouliuli Influent	150030115003006	601	74
Honouliuli Influent	150030115003007	601	73
Honouliuli Influent	150030115003008	601	0
Honouliuli Influent	150030115003009	601	64
Honouliuli Influent	150030115003010	601	139
Honouliuli Influent	150030115003011	601	207
Honouliuli Influent	150030115003012	601	56
Honouliuli Influent	150030115003013	601	88
Honouliuli Influent	150030115003014	601	343
Honouliuli Influent	150030115003015	601	372
Honouliuli Influent	150030115003016	601	310
Honouliuli Influent	150030115003017	601	115
Honouliuli Influent	150030115003018	601	0
Honouliuli Influent	150030115003019	601	0
Honouliuli Influent	150030115003020	601	45
Honouliuli Influent	150030115003021	601	105
Honouliuli Influent	150039400021004	614	0
Honouliuli Influent	150039803001001	577	0
Honouliuli Influent	150039803001003	578	0
Honouliuli Influent	150039803001004	578	0
Honouliuli Influent	150039803001005	577	0
Honouliuli Influent	150039803001006	576	0
Honouliuli Influent	150039803001007	575	0
Honouliuli Influent	150039803001008	575	0
Honouliuli Influent	150039803001009	575	0
Honouliuli Influent	150039803001010	575	0
Honouliuli Influent	150039803001011	576	0
Honouliuli Influent	150039803001012	576	0
Honouliuli Influent	150039803001013	576	0
Honouliuli Influent	150039803001014	575	0
Honouliuli Influent	150039803001015	575	0
Honouliuli Influent	150039803001016	578	0
Honouliuli Influent Subtotal			*99,009*
Pearl City	150030078041000	422	29
Pearl City	150030078041001	422	122
Pearl City	150030078041002	422	79
Pearl City	150030078041003	416	130
Pearl City	150030078041004	416	128
Pearl City	150030078041005	422	256
Pearl City	150030078041006	422	113
Pearl City	150030078041007	422	147
Pearl City	150030078041008	422	66
Pearl City	150030078041009	422	110

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Pearl City	150030078041010	422	180
Pearl City	150030078041011	422	93
Pearl City	150030078041012	422	71
Pearl City	150030078041013	422	94
Pearl City	150030078041014	422	0
Pearl City	150030078041015	422	120
Pearl City	150030078041016	422	169
Pearl City	150030078051000	421	93
Pearl City	150030078051001	421	178
Pearl City	150030078051002	421	104
Pearl City	150030078051003	421	95
Pearl City	150030078051004	421	92
Pearl City	150030078051005	421	232
Pearl City	150030078051006	421	93
Pearl City	150030078051007	421	98
Pearl City	150030078051008	421	106
Pearl City	150030078051009	421	171
Pearl City	150030078051010	421	785
Pearl City	150030078051011	421	798
Pearl City	150030078051012	421	0
Pearl City	150030078052007	421	1523
Pearl City	150030078052008	421	0
Pearl City	150030078052009	421	0
Pearl City	150030078052010	421	0
Pearl City	150030078052011	421	0
Pearl City	150030078101006	418	133
Pearl City	150030078103000	417	0
Pearl City	150030078103001	417	9
Pearl City	150030078103003	416	1948
Pearl City	150030078103004	416	127
Pearl City	150030080011000	430	474
Pearl City	150030080011001	430	78
Pearl City	150030080011002	430	32
Pearl City	150030080011003	430	0
Pearl City	150030080011006	430	0
Pearl City	150030080011007	430	0
Pearl City	150030080011008	430	66
Pearl City	150030080011009	430	9
Pearl City	150030080011010	429	0
Pearl City	150030080011011	430	45
Pearl City	150030080012000	431	0
Pearl City	150030080012001	431	234
Pearl City	150030080012002	431	0
Pearl City	150030080012003	431	62
Pearl City	150030080012004	431	0
Pearl City	150030080012005	431	0

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Pearl City	150030080012006	431	183
Pearl City	150030080012007	431	90
Pearl City	150030080012008	431	82
Pearl City	150030080012009	431	68
Pearl City	150030080021001	426	1
Pearl City	150030080021002	426	0
Pearl City	150030080021003	425	0
Pearl City	150030080021004	425	0
Pearl City	150030080021005	424	0
Pearl City	150030080021006	424	75
Pearl City	150030080021007	424	14
Pearl City	150030080021008	424	81
Pearl City	150030080021009	424	43
Pearl City	150030080021018	425	37
Pearl City	150030080021019	424	83
Pearl City	150030080021020	424	144
Pearl City	150030080021021	424	67
Pearl City	150030080022000	424	0
Pearl City	150030080022001	423	178
Pearl City	150030080022002	423	97
Pearl City	150030080022003	423	108
Pearl City	150030080022004	423	93
Pearl City	150030080022005	423	58
Pearl City	150030080022006	423	59
Pearl City	150030080022007	423	69
Pearl City	150030080022008	423	72
Pearl City	150030080022009	423	122
Pearl City	150030080022010	423	104
Pearl City	150030080022011	423	109
Pearl City	150030080022012	424	322
Pearl City	150030080022013	423	45
Pearl City	150030080022014	423	38
Pearl City	150030080022015	423	27
Pearl City	150030080022016	424	71
Pearl City	150030080022017	424	35
Pearl City	150030080022018	424	47
Pearl City	150030080031000	433	0
Pearl City	150030080031001	433	64
Pearl City	150030080031002	433	8
Pearl City	150030080031003	434	508
Pearl City	150030080031004	434	102
Pearl City	150030080031005	434	90
Pearl City	150030080031006	434	51
Pearl City	150030080031007	434	82
Pearl City	150030080031008	434	172
Pearl City	150030080031009	434	116

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Pearl City	150030080031010	433	9
Pearl City	150030080031011	433	419
Pearl City	150030080031012	433	208
Pearl City	150030080031013	433	108
Pearl City	150030080031014	433	133
Pearl City	150030080031015	433	17
Pearl City	150030080032000	433	0
Pearl City	150030080032001	438	0
Pearl City	150030080032002	433	1012
Pearl City	150030080032003	433	98
Pearl City	150030080032004	433	0
Pearl City	150030080032005	433	0
Pearl City	150030080032006	433	14
Pearl City	150030080032007	433	25
Pearl City	150030080032008	433	0
Pearl City	150030080032009	433	807
Pearl City	150030080032010	433	625
Pearl City	150030080032011	433	0
Pearl City	150030080051000	439	105
Pearl City	150030080051001	439	945
Pearl City	150030080051002	439	830
Pearl City	150030080051003	439	140
Pearl City	150030080051004	439	112
Pearl City	150030080051005	439	72
Pearl City	150030080051006	439	129
Pearl City	150030080051007	439	69
Pearl City	150030080051008	439	0
Pearl City	150030080051009	439	105
Pearl City	150030080051010	439	80
Pearl City	150030080051011	439	75
Pearl City	150030080051012	439	104
Pearl City	150030080052000	439	101
Pearl City	150030080052001	439	71
Pearl City	150030080052002	439	512
Pearl City	150030080052003	439	108
Pearl City	150030080052004	439	82
Pearl City	150030080052005	439	142
Pearl City	150030080052006	439	92
Pearl City	150030080052007	439	45
Pearl City	150030080052008	439	119
Pearl City	150030080052009	439	135
Pearl City	150030080052010	439	70
Pearl City	150030080052011	439	53
Pearl City	150030080052012	439	87
Pearl City	150030080052013	439	62
Pearl City	150030080052014	439	629

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Pearl City	150030080052015	439	96
Pearl City	150030080052016	439	66
Pearl City	150030080052017	439	67
Pearl City	150030080052018	439	68
Pearl City	150030080052019	439	116
Pearl City	150030080053000	439	109
Pearl City	150030080053001	439	382
Pearl City	150030080053002	439	153
Pearl City	150030080053003	439	120
Pearl City	150030080053004	439	0
Pearl City	150030080053005	439	55
Pearl City	150030080053006	439	163
Pearl City	150030080053007	439	154
Pearl City	150030080053008	439	241
Pearl City	150030080053009	439	0
Pearl City	150030080061000	438	1
Pearl City	150030080061001	438	34
Pearl City	150030080061002	437	213
Pearl City	150030080061003	438	0
Pearl City	150030080061004	438	5
Pearl City	150030080061005	438	0
Pearl City	150030080061006	438	0
Pearl City	150030080061007	437	454
Pearl City	150030080061008	437	111
Pearl City	150030080061009	437	87
Pearl City	150030080061010	437	119
Pearl City	150030080061011	437	289
Pearl City	150030080061012	437	106
Pearl City	150030080061013	437	71
Pearl City	150030080061014	437	94
Pearl City	150030080061015	437	112
Pearl City	150030080061016	437	123
Pearl City	150030080061017	437	122
Pearl City	150030080061018	437	129
Pearl City	150030080061019	437	85
Pearl City	150030080061020	437	56
Pearl City	150030080061021	437	106
Pearl City	150030080061022	437	82
Pearl City	150030080061023	437	190
Pearl City	150030080062000	437	31
Pearl City	150030080062001	437	35
Pearl City	150030080062002	437	241
Pearl City	150030080062003	437	114
Pearl City	150030080062004	437	175
Pearl City	150030080062005	437	150
Pearl City	150030080062006	437	66

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Pearl City	150030080062007	437	142
Pearl City	150030080062008	437	94
Pearl City	150030080062009	437	101
Pearl City	150030080062010	437	85
Pearl City	150030080062011	437	122
Pearl City	150030080062012	437	145
Pearl City	150030080062013	437	174
Pearl City	150030080062014	437	125
Pearl City	150030080062015	437	162
Pearl City	150030080062016	437	154
Pearl City	150030080062017	437	56
Pearl City	150030080062018	437	97
Pearl City	150030080071000	436	151
Pearl City	150030080071001	436	132
Pearl City	150030080071002	436	181
Pearl City	150030080071003	436	106
Pearl City	150030080071004	436	68
Pearl City	150030080071005	436	87
Pearl City	150030080071006	436	74
Pearl City	150030080071007	436	55
Pearl City	150030080071008	436	87
Pearl City	150030080071009	436	243
Pearl City	150030080071010	436	207
Pearl City	150030080071011	436	84
Pearl City	150030080071012	436	107
Pearl City	150030080071013	436	185
Pearl City	150030080071014	436	154
Pearl City	150030080071015	436	52
Pearl City	150030080071016	436	92
Pearl City	150030080071017	436	135
Pearl City	150030080071018	436	78
Pearl City	150030080071019	436	176
Pearl City	150030080071020	436	104
Pearl City	150030080072000	435	189
Pearl City	150030080072001	435	111
Pearl City	150030080072002	435	276
Pearl City	150030080072003	435	69
Pearl City	150030080072004	435	149
Pearl City	150030080072005	435	124
Pearl City	150030080072006	435	232
Pearl City	150030080072007	435	102
Pearl City	150030080072008	435	186
Pearl City	150030080072009	435	121
Pearl City	150030080072010	435	136
Pearl City	150030080072011	435	214
Pearl City	150030080072012	435	75

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Pearl City	150030080072013	435	198
Pearl City	150030080072014	435	95
Pearl City	150030080072015	435	99
Pearl City	150030080072016	435	94
Pearl City	150030080072017	435	72
Pearl City	150030080072018	435	164
Pearl City	150030080072019	435	42
Pearl City	150030087012001	440	0
Pearl City	150030087012002	440	0
Pearl City	150030087012003	440	9
Pearl City	150030087012004	440	0
Pearl City	150030087012005	440	0
Pearl City	150030087012006	440	0
Pearl City	150030087012007	440	0
Pearl City	150030087012008	440	0
Pearl City	150030087012009	440	0
Pearl City	150030087012010	440	0
Pearl City	150030087012013	440	0
Pearl City	150030087012014	440	0
Pearl City	150030087012015	440	0
Pearl City	150030087012016	440	0
Pearl City	150030087012019	440	0
Pearl City	150030087012020	440	3
Pearl City	150030087012021	440	0
Pearl City	150030087012022	440	0
Pearl City	150030087012023	440	0
Pearl City	150030087012024	440	33
Pearl City	150030087012025	440	0
Pearl City	150030087012026	440	0
Pearl City	150030087012027	440	0
Pearl City	150030087012028	440	0
Pearl City	150030087012029	440	0
Pearl City	150030087012030	440	408
Pearl City	150030087012031	440	0
Pearl City	150030087012032	440	0
Pearl City	150030087012033	440	32
Pearl City	150030087012034	440	125
Pearl City	150030087012035	440	0
Pearl City	150030087012036	440	0
Pearl City	150030087012037	440	0
Pearl City	150030087012038	440	0
Pearl City	150030087012039	440	0
Pearl City	150030087012040	440	0
Pearl City	150030087012041	440	0
Pearl City	150030087012042	440	0
Pearl City	150030089203000	465	0

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Pearl City	150030089203003	466	0
Pearl City	150030089211011	464	0
Pearl City	150030089211012	464	0
Pearl City	150030089211013	464	0
Pearl City	150030089211014	464	0
Pearl City	150030089211015	464	0
Pearl City	150030089211016	464	0
Pearl City	150030089211017	464	0
Pearl City	150030089211018	464	0
Pearl City	150030089211022	464	0
Pearl City	150030089312000	464	0
Pearl City	150030089312001	464	0
Pearl City	150030089312002	475	276
Pearl City	150030089312003	475	0
Pearl City	150030089312004	475	0
Pearl City	150030089312005	475	1
Pearl City	150030089312006	475	0
Pearl City	150030089312007	475	0
Pearl City	150030114002000	432	0
Pearl City	150030114002001	432	812
Pearl City	150030114002002	432	111
Pearl City	150030114002003	432	0
Pearl City	150030114002004	432	0
Pearl City	150030114002005	432	0
Pearl City	150030114002006	432	0
Pearl City	150030114002007	432	0
Pearl City	150030114002008	432	2
Pearl City	150030114002009	432	0
Pearl City	150030114002010	432	0
Pearl City	150030114002011	432	0
Pearl City	150030114003000	432	87
Pearl City	150030114003001	432	0
Pearl City	150030114003002	432	92
Pearl City	150030114003003	432	457
Pearl City	150030114003004	432	41
Pearl City	150030114003005	432	85
Pearl City	150030114003006	432	116
Pearl City	150030114003007	432	48
Pearl City	150030114003008	432	31
Pearl City	150030114003009	432	123
Pearl City	150030114003010	432	0
Pearl City	150030114003011	432	44
Pearl City	150030114003012	432	0
Pearl City	150030114003013	432	3241
Pearl City	150030114003014	432	0
Pearl City	150030114003015	440	0

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Pearl City	150030114003017	432	0
Pearl City	150030114003018	432	0
Pearl City	150030114003019	432	0
Pearl City Subtotal			*39,987*
Waimalu	150030074001043	397	0
Waimalu	150030074001046	397	0
Waimalu	150030074001047	397	0
Waimalu	150030075031001	375	97
Waimalu	150030075031003	405	54
Waimalu	150030075031004	375	160
Waimalu	150030075031005	375	45
Waimalu	150030075031010	375	119
Waimalu	150030075031012	375	0
Waimalu	150030075031013	375	39
Waimalu	150030075041006	396	0
Waimalu	150030077011000	403	289
Waimalu	150030077011001	403	6
Waimalu	150030077011002	403	39
Waimalu	150030077011003	403	30
Waimalu	150030077011004	403	45
Waimalu	150030077011005	403	38
Waimalu	150030077011006	403	68
Waimalu	150030077011007	403	54
Waimalu	150030077011008	403	143
Waimalu	150030077011009	403	52
Waimalu	150030077011010	403	0
Waimalu	150030077011011	403	32
Waimalu	150030077011012	403	29
Waimalu	150030077011013	403	27
Waimalu	150030077011014	403	29
Waimalu	150030077011015	403	35
Waimalu	150030077011016	403	43
Waimalu	150030077011017	403	56
Waimalu	150030077011018	403	18
Waimalu	150030077011019	403	136
Waimalu	150030077011020	403	96
Waimalu	150030077011021	403	0
Waimalu	150030077011022	403	0
Waimalu	150030077011023	403	58
Waimalu	150030077011024	403	33
Waimalu	150030077012000	401	160
Waimalu	150030077012001	402	0
Waimalu	150030077012002	402	11
Waimalu	150030077012003	402	14
Waimalu	150030077012004	403	0
Waimalu	150030077012005	402	0

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Waimalu	150030077012006	401	11
Waimalu	150030077012007	401	512
Waimalu	150030077012008	402	90
Waimalu	150030077012009	401	166
Waimalu	150030077012010	401	260
Waimalu	150030077012011	401	90
Waimalu	150030077012012	401	27
Waimalu	150030077012013	402	83
Waimalu	150030077012014	402	66
Waimalu	150030077012015	402	0
Waimalu	150030077012016	402	135
Waimalu	150030077012017	402	114
Waimalu	150030077012018	401	14
Waimalu	150030077012019	401	53
Waimalu	150030077012020	401	0
Waimalu	150030077012021	402	13
Waimalu	150030077012022	402	0
Waimalu	150030077013000	399	82
Waimalu	150030077013001	399	74
Waimalu	150030077013002	400	20
Waimalu	150030077013003	400	239
Waimalu	150030077013004	400	62
Waimalu	150030077013005	400	60
Waimalu	150030077013006	399	0
Waimalu	150030077013007	399	528
Waimalu	150030077013008	399	0
Waimalu	150030077013009	399	0
Waimalu	150030077013010	399	0
Waimalu	150030077013011	399	0
Waimalu	150030077013012	399	0
Waimalu	150030077013013	399	0
Waimalu	150030077013014	399	0
Waimalu	150030077013015	399	0
Waimalu	150030077013016	399	0
Waimalu	150030077013021	399	0
Waimalu	150030077013022	399	0
Waimalu	150030077013023	399	0
Waimalu	150030077021000	404	105
Waimalu	150030077021001	404	61
Waimalu	150030077021002	404	15
Waimalu	150030077021003	404	81
Waimalu	150030077021004	407	0
Waimalu	150030077021005	404	53
Waimalu	150030077022000	405	304
Waimalu	150030077022001	405	0
Waimalu	150030077022002	405	399

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Waimalu	150030077022003	405	512
Waimalu	150030077022004	405	116
Waimalu	150030077022005	405	115
Waimalu	150030077022006	405	241
Waimalu	150030077022007	405	100
Waimalu	150030077022008	405	50
Waimalu	150030077022015	405	158
Waimalu	150030077022016	405	80
Waimalu	150030077022017	405	49
Waimalu	150030077022018	405	0
Waimalu	150030077022019	405	39
Waimalu	150030077022020	405	36
Waimalu	150030077023000	405	256
Waimalu	150030077023001	405	508
Waimalu	150030077023002	405	61
Waimalu	150030077023003	405	45
Waimalu	150030077023004	405	26
Waimalu	150030077023005	405	228
Waimalu	150030077023006	405	61
Waimalu	150030077023007	405	54
Waimalu	150030077023008	405	34
Waimalu	150030077023009	405	69
Waimalu	150030077023010	405	36
Waimalu	150030077023011	405	163
Waimalu	150030077023012	405	121
Waimalu	150030077023013	405	55
Waimalu	150030077023014	405	49
Waimalu	150030077023015	405	72
Waimalu	150030077023016	405	10
Waimalu	150030077023017	405	0
Waimalu	150030077023018	405	94
Waimalu	150030077023019	405	61
Waimalu	150030077023020	405	45
Waimalu	150030077023021	405	78
Waimalu	150030077023022	405	32
Waimalu	150030078052000	421	56
Waimalu	150030078052001	421	313
Waimalu	150030078052002	421	4
Waimalu	150030078052003	421	0
Waimalu	150030078052004	419	0
Waimalu	150030078052005	421	0
Waimalu	150030078052006	421	79
Waimalu	150030078052012	421	33
Waimalu	150030078052013	421	240
Waimalu	150030078052014	421	43
Waimalu	150030078071000	407	440

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Waimalu	150030078072000	407	812
Waimalu	150030078073000	407	1000
Waimalu	150030078074000	408	0
Waimalu	150030078074001	408	1113
Waimalu	150030078075000	407	594
Waimalu	150030078075001	407	168
Waimalu	150030078075002	407	165
Waimalu	150030078076000	407	1113
Waimalu	150030078081000	410	61
Waimalu	150030078081001	410	53
Waimalu	150030078081002	410	245
Waimalu	150030078081003	410	111
Waimalu	150030078081004	410	33
Waimalu	150030078081005	410	72
Waimalu	150030078081006	410	143
Waimalu	150030078081007	410	99
Waimalu	150030078081008	410	126
Waimalu	150030078081009	410	102
Waimalu	150030078081010	411	456
Waimalu	150030078081011	411	0
Waimalu	150030078081012	412	0
Waimalu	150030078082000	413	0
Waimalu	150030078082001	413	5
Waimalu	150030078082002	409	755
Waimalu	150030078082003	409	147
Waimalu	150030078082004	409	836
Waimalu	150030078082005	413	0
Waimalu	150030078082006	413	102
Waimalu	150030078082007	413	0
Waimalu	150030078082008	413	0
Waimalu	150030078091000	414	264
Waimalu	150030078091001	414	602
Waimalu	150030078091002	414	267
Waimalu	150030078091003	414	87
Waimalu	150030078092000	414	329
Waimalu	150030078092001	414	58
Waimalu	150030078092002	414	1457
Waimalu	150030078092003	419	174
Waimalu	150030078092004	414	45
Waimalu	150030078092005	419	38
Waimalu	150030078092006	419	56
Waimalu	150030078092007	421	0
Waimalu	150030078101000	418	95
Waimalu	150030078101001	418	160
Waimalu	150030078101002	418	387
Waimalu	150030078101003	418	507

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Waimalu	150030078101004	418	73
Waimalu	150030078101005	418	121
Waimalu	150030078101006	418	310
Waimalu	150030078101007	418	172
Waimalu	150030078101008	418	137
Waimalu	150030078101009	418	99
Waimalu	150030078102000	415	136
Waimalu	150030078102001	415	234
Waimalu	150030078102002	415	253
Waimalu	150030078102003	415	103
Waimalu	150030078102004	415	182
Waimalu	150030078102005	415	99
Waimalu	150030078102006	415	84
Waimalu	150030078102007	415	81
Waimalu	150030078103002	416	0
Waimalu	150030078111000	420	470
Waimalu	150030078111001	420	101
Waimalu	150030078111002	420	4
Waimalu	150030078111003	420	134
Waimalu	150030078111004	420	0
Waimalu	150030078111005	420	61
Waimalu	150030078111006	420	174
Waimalu	150030078111007	406	1145
Waimalu	150030078111008	406	81
Waimalu	150030078111009	406	129
Waimalu	150030078111010	406	32
Waimalu	150030078111011	406	118
Waimalu	150030078111012	406	85
Waimalu	150030078111013	406	41
Waimalu	150030078111014	420	0
Waimalu	150030078111015	406	0
Waimalu	150030078112000	406	137
Waimalu	150030078112001	406	2099
Waimalu	150030078112002	406	109
Waimalu	150030078112003	406	59
Waimalu	150030078112004	406	11
Waimalu	150030078112005	406	0
Waimalu	150030080011004	429	417
Waimalu	150030080011005	429	165
Waimalu	150030080011012	428	0
Waimalu	150030080011013	428	0
Waimalu	150030080021000	426	0
Waimalu	150030080021010	427	165
Waimalu	150030080021011	426	0
Waimalu	150030080021012	426	0
Waimalu	150030080021013	426	0

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Waimalu	150030080021014	427	0
Waimalu	150030080021015	425	87
Waimalu	150030080021016	425	158
Waimalu	150030080021017	425	191
Waimalu	150030080021018	425	37
Waimalu Subtotal			*31,765*
Waipahu	150030086142000	618	0
Waipahu	150030086142001	618	0
Waipahu	150030086142002	618	0
Waipahu	150030086142003	618	0
Waipahu	150030086142004	618	23
Waipahu	150030086142006	618	0
Waipahu	150030086142007	539	17
Waipahu	150030086142008	539	0
Waipahu	150030086142009	539	0
Waipahu	150030086142010	539	30
Waipahu	150030086142011	539	36
Waipahu	150030086142012	539	87
Waipahu	150030086142013	539	122
Waipahu	150030086142014	539	26
Waipahu	150030086142015	539	0
Waipahu	150030086142017	539	0
Waipahu	150030086142018	539	0
Waipahu	150030086142019	539	0
Waipahu	150030086142020	539	0
Waipahu	150030086142021	539	0
Waipahu	150030086142022	539	40
Waipahu	150030086142023	539	60
Waipahu	150030086142024	539	0
Waipahu	150030086142025	539	0
Waipahu	150030086142026	539	0
Waipahu	150030086142027	539	39
Waipahu	150030086142028	539	0
Waipahu	150030086142029	539	0
Waipahu	150030086142030	539	0
Waipahu	150030086142031	618	0
Waipahu	150030086142032	618	0
Waipahu	150030086142033	618	0
Waipahu	150030086142034	618	0
Waipahu	150030086142035	618	0
Waipahu	150030086142036	618	0
Waipahu	150030086142037	539	0
Waipahu	150030086148000	545	0
Waipahu	150030086148001	545	0
Waipahu	150030086148002	545	0
Waipahu	150030086149007	547	60

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Waipahu	150030086149011	547	104
Waipahu	150030086149012	547	122
Waipahu	150030086149013	545	0
Waipahu	150030086149014	548	0
Waipahu	150030086149015	548	0
Waipahu	150030087011000	440	0
Waipahu	150030087011001	440	0
Waipahu	150030087011002	441	699
Waipahu	150030087011003	441	110
Waipahu	150030087011004	441	242
Waipahu	150030087011005	441	223
Waipahu	150030087011006	441	312
Waipahu	150030087011007	441	207
Waipahu	150030087011008	441	240
Waipahu	150030087011009	441	254
Waipahu	150030087011010	441	397
Waipahu	150030087011011	441	284
Waipahu	150030087012000	440	0
Waipahu	150030087012011	440	0
Waipahu	150030087012012	440	0
Waipahu	150030087012017	441	0
Waipahu	150030087012018	442	0
Waipahu	150030087013000	442	805
Waipahu	150030087013001	442	149
Waipahu	150030087013002	442	119
Waipahu	150030087013003	442	150
Waipahu	150030087013004	442	171
Waipahu	150030087013005	442	108
Waipahu	150030087013006	442	81
Waipahu	150030087013007	442	238
Waipahu	150030087013008	442	262
Waipahu	150030087013009	442	146
Waipahu	150030087013010	442	109
Waipahu	150030087014000	441	67
Waipahu	150030087014001	441	182
Waipahu	150030087014002	441	192
Waipahu	150030087014003	441	94
Waipahu	150030087014004	441	65
Waipahu	150030087014005	441	289
Waipahu	150030087014006	441	398
Waipahu	150030087014007	441	298
Waipahu	150030087014008	441	178
Waipahu	150030087014009	441	33
Waipahu	150030087014010	441	87
Waipahu	150030087014011	441	174
Waipahu	150030087014012	441	221

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Waipahu	150030087014013	441	343
Waipahu	150030087014014	441	250
Waipahu	150030087021000	447	10
Waipahu	150030087021001	447	0
Waipahu	150030087021002	447	111
Waipahu	150030087021003	448	1097
Waipahu	150030087021004	448	231
Waipahu	150030087021005	447	236
Waipahu	150030087021006	447	222
Waipahu	150030087021007	447	155
Waipahu	150030087021008	447	1068
Waipahu	150030087021009	447	0
Waipahu	150030087021010	445	26
Waipahu	150030087021011	447	0
Waipahu	150030087021012	447	0
Waipahu	150030087021013	445	177
Waipahu	150030087021014	445	86
Waipahu	150030087021015	445	62
Waipahu	150030087022000	444	657
Waipahu	150030087022001	444	39
Waipahu	150030087022002	446	0
Waipahu	150030087022003	446	1027
Waipahu	150030087022004	446	117
Waipahu	150030087022005	446	182
Waipahu	150030087022006	446	90
Waipahu	150030087031000	560	0
Waipahu	150030087031001	560	0
Waipahu	150030087031002	548	104
Waipahu	150030087031003	548	278
Waipahu	150030087031004	548	692
Waipahu	150030087031005	548	0
Waipahu	150030087031006	548	5
Waipahu	150030087031007	548	362
Waipahu	150030087031008	548	788
Waipahu	150030087031009	560	0
Waipahu	150030087031010	560	0
Waipahu	150030087031011	560	0
Waipahu	150030087031013	560	0
Waipahu	150030087031015	560	0
Waipahu	150030087032000	454	583
Waipahu	150030087032001	454	783
Waipahu	150030087032002	454	318
Waipahu	150030087032003	454	276
Waipahu	150030087032004	454	36
Waipahu	150030087033000	548	0
Waipahu	150030087033001	455	12

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Waipahu	150030087033002	455	0
Waipahu	150030087033003	454	0
Waipahu	150030087033004	454	135
Waipahu	150030087033005	454	969
Waipahu	150030087033006	454	0
Waipahu	150030087033007	455	0
Waipahu	150030087033008	455	2
Waipahu	150030087033009	455	0
Waipahu	150030087033010	455	156
Waipahu	150030087033011	548	6
Waipahu	150030087034000	453	1332
Waipahu	150030088001000	451	0
Waipahu	150030088001001	450	9
Waipahu	150030088001002	450	326
Waipahu	150030088001003	450	268
Waipahu	150030088001004	450	192
Waipahu	150030088001005	450	147
Waipahu	150030088001006	450	216
Waipahu	150030088001007	450	225
Waipahu	150030088001008	450	272
Waipahu	150030088001009	450	132
Waipahu	150030088001010	450	58
Waipahu	150030088002000	451	0
Waipahu	150030088002001	451	0
Waipahu	150030088002002	451	1059
Waipahu	150030088002003	451	238
Waipahu	150030088002004	451	365
Waipahu	150030088002005	451	180
Waipahu	150030088002006	451	163
Waipahu	150030088002007	451	248
Waipahu	150030088002008	451	0
Waipahu	150030088002009	450	0
Waipahu	150030088003000	451	0
Waipahu	150030088003001	452	0
Waipahu	150030088003002	452	572
Waipahu	150030088003003	452	239
Waipahu	150030088003004	452	174
Waipahu	150030088003005	452	69
Waipahu	150030088003006	452	203
Waipahu	150030088003007	451	0
Waipahu	150030088003008	451	312
Waipahu	150030088003009	451	544
Waipahu	150030088003010	452	102
Waipahu	150030088003011	452	44
Waipahu	150030088004000	450	174
Waipahu	150030088004001	450	304

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Waipahu	150030088004002	450	325
Waipahu	150030088004003	450	189
Waipahu	150030088004004	450	287
Waipahu	150030088004005	450	316
Waipahu	150030088004006	450	102
Waipahu	150030089061000	506	63
Waipahu	150030089061001	506	807
Waipahu	150030089061002	506	12
Waipahu	150030089061003	506	111
Waipahu	150030089062000	504	193
Waipahu	150030089062001	504	310
Waipahu	150030089062002	504	243
Waipahu	150030089062003	504	160
Waipahu	150030089063000	504	555
Waipahu	150030089063001	505	430
Waipahu	150030089063002	505	51
Waipahu	150030089063003	505	77
Waipahu	150030089063004	505	37
Waipahu	150030089063005	505	64
Waipahu	150030089063006	505	26
Waipahu	150030089063007	505	423
Waipahu	150030089063008	505	108
Waipahu	150030089063009	505	30
Waipahu	150030089063010	505	52
Waipahu	150030089063011	505	19
Waipahu	150030089071000	500	0
Waipahu	150030089071001	500	0
Waipahu	150030089071002	500	0
Waipahu	150030089071003	500	229
Waipahu	150030089071004	500	98
Waipahu	150030089071005	500	231
Waipahu	150030089071006	500	16
Waipahu	150030089071007	500	7
Waipahu	150030089071008	500	133
Waipahu	150030089071009	500	384
Waipahu	150030089071010	500	42
Waipahu	150030089071011	500	375
Waipahu	150030089072000	503	140
Waipahu	150030089072001	503	154
Waipahu	150030089072002	503	31
Waipahu	150030089072003	503	853
Waipahu	150030089072004	503	0
Waipahu	150030089072005	503	0
Waipahu	150030089073000	501	418
Waipahu	150030089073001	501	69
Waipahu	150030089073002	501	117

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Waipahu	150030089073003	501	226
Waipahu	150030089074000	502	60
Waipahu	150030089074001	502	344
Waipahu	150030089074002	502	36
Waipahu	150030089074003	502	57
Waipahu	150030089074004	502	63
Waipahu	150030089074005	502	143
Waipahu	150030089074006	502	6
Waipahu	150030089081000	483	315
Waipahu	150030089081001	483	54
Waipahu	150030089081002	483	1321
Waipahu	150030089081003	483	83
Waipahu	150030089081004	483	58
Waipahu	150030089081005	483	65
Waipahu	150030089081006	483	73
Waipahu	150030089081007	483	75
Waipahu	150030089081008	481	0
Waipahu	150030089082000	482	54
Waipahu	150030089082001	482	66
Waipahu	150030089082002	482	161
Waipahu	150030089082003	482	108
Waipahu	150030089082004	482	221
Waipahu	150030089082005	482	121
Waipahu	150030089082006	482	267
Waipahu	150030089082007	482	77
Waipahu	150030089083000	484	44
Waipahu	150030089083001	484	977
Waipahu	150030089083002	484	133
Waipahu	150030089083003	484	63
Waipahu	150030089083004	484	62
Waipahu	150030089083005	484	59
Waipahu	150030089083006	484	380
Waipahu	150030089083007	484	40
Waipahu	150030089083008	484	89
Waipahu	150030089083009	484	84
Waipahu	150030089083010	484	110
Waipahu	150030089083011	484	127
Waipahu	150030089083012	484	281
Waipahu	150030089083013	484	84
Waipahu	150030089083014	484	185
Waipahu	150030089091000	485	82
Waipahu	150030089091001	485	382
Waipahu	150030089091002	485	90
Waipahu	150030089091003	485	51
Waipahu	150030089091004	485	930
Waipahu	150030089091005	485	140

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Waipahu	150030089091006	486	289
Waipahu	150030089091007	486	204
Waipahu	150030089091008	486	238
Waipahu	150030089091009	486	94
Waipahu	150030089091010	486	83
Waipahu	150030089091011	486	69
Waipahu	150030089091012	486	142
Waipahu	150030089092000	485	97
Waipahu	150030089092001	485	198
Waipahu	150030089092002	485	353
Waipahu	150030089092003	485	97
Waipahu	150030089092004	485	143
Waipahu	150030089092005	485	124
Waipahu	150030089121000	449	0
Waipahu	150030089121001	449	199
Waipahu	150030089121002	449	161
Waipahu	150030089121003	449	30
Waipahu	150030089121004	449	248
Waipahu	150030089121005	449	117
Waipahu	150030089121006	449	232
Waipahu	150030089121007	449	194
Waipahu	150030089121008	449	880
Waipahu	150030089121009	449	161
Waipahu	150030089121010	449	155
Waipahu	150030089121011	449	26
Waipahu	150030089121012	449	167
Waipahu	150030089131000	458	97
Waipahu	150030089131001	458	116
Waipahu	150030089131002	458	178
Waipahu	150030089131003	458	195
Waipahu	150030089131004	458	139
Waipahu	150030089131005	458	261
Waipahu	150030089131006	458	195
Waipahu	150030089131007	458	177
Waipahu	150030089131008	458	226
Waipahu	150030089131009	458	93
Waipahu	150030089131010	458	360
Waipahu	150030089131011	458	118
Waipahu	150030089131012	458	176
Waipahu	150030089132000	459	0
Waipahu	150030089132001	459	377
Waipahu	150030089132002	459	304
Waipahu	150030089132003	459	102
Waipahu	150030089132004	459	279
Waipahu	150030089132005	459	172
Waipahu	150030089132006	459	69

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Waipahu	150030089132007	545	0
Waipahu	150030089132008	459	204
Waipahu	150030089132009	459	220
Waipahu	150030089132010	459	58
Waipahu	150030089141000	457	1346
Waipahu	150030089141001	457	951
Waipahu	150030089141002	457	296
Waipahu	150030089141003	457	60
Waipahu	150030089141004	457	0
Waipahu	150030089141005	457	101
Waipahu	150030089141006	457	234
Waipahu	150030089141007	457	145
Waipahu	150030089142000	456	1938
Waipahu	150030089142001	456	0
Waipahu	150030089142002	456	20
Waipahu	150030089142003	456	7
Waipahu	150030089142004	545	0
Waipahu	150030089142005	545	0
Waipahu	150030089142006	456	0
Waipahu	150030089151000	499	67
Waipahu	150030089151001	497	429
Waipahu	150030089151002	497	113
Waipahu	150030089151003	497	112
Waipahu	150030089151004	497	92
Waipahu	150030089151005	496	0
Waipahu	150030089151006	497	209
Waipahu	150030089151007	499	350
Waipahu	150030089151008	499	0
Waipahu	150030089151009	499	13
Waipahu	150030089151010	499	110
Waipahu	150030089151011	499	91
Waipahu	150030089151012	499	62
Waipahu	150030089151013	494	0
Waipahu	150030089151014	498	0
Waipahu	150030089151015	498	356
Waipahu	150030089151016	498	156
Waipahu	150030089151017	498	62
Waipahu	150030089151018	498	307
Waipahu	150030089151019	497	102
Waipahu	150030089151020	497	72
Waipahu	150030089151021	497	147
Waipahu	150030089151022	498	0
Waipahu	150030089152000	496	412
Waipahu	150030089152001	496	0
Waipahu	150030089152002	496	0
Waipahu	150030089152003	496	0

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Waipahu	150030089152004	496	1270
Waipahu	150030089152005	496	3
Waipahu	150030089152006	496	701
Waipahu	150030089152007	496	0
Waipahu	150030089171000	492	0
Waipahu	150030089171001	492	0
Waipahu	150030089171002	492	234
Waipahu	150030089171003	492	169
Waipahu	150030089171004	492	330
Waipahu	150030089171005	492	146
Waipahu	150030089171006	492	109
Waipahu	150030089171007	492	0
Waipahu	150030089171008	492	0
Waipahu	150030089171009	492	664
Waipahu	150030089171010	492	23
Waipahu	150030089171011	492	74
Waipahu	150030089171012	492	277
Waipahu	150030089171013	492	62
Waipahu	150030089171014	492	64
Waipahu	150030089172000	491	101
Waipahu	150030089172001	491	42
Waipahu	150030089172002	492	635
Waipahu	150030089172003	492	63
Waipahu	150030089172004	491	46
Waipahu	150030089172005	491	102
Waipahu	150030089172006	491	87
Waipahu	150030089172007	491	61
Waipahu	150030089172008	491	69
Waipahu	150030089172009	491	278
Waipahu	150030089172010	491	124
Waipahu	150030089172011	490	421
Waipahu	150030089172012	490	32
Waipahu	150030089172013	490	113
Waipahu	150030089172014	490	83
Waipahu	150030089172015	490	112
Waipahu	150030089172016	490	0
Waipahu	150030089172017	491	33
Waipahu	150030089172018	490	0
Waipahu	150030089181000	488	37
Waipahu	150030089181001	488	256
Waipahu	150030089181002	488	782
Waipahu	150030089181003	488	8
Waipahu	150030089181004	488	33
Waipahu	150030089181005	488	432
Waipahu	150030089181006	488	113
Waipahu	150030089181007	488	84

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Waipahu	150030089181008	488	161
Waipahu	150030089181009	488	85
Waipahu	150030089181010	488	111
Waipahu	150030089182000	487	476
Waipahu	150030089182001	487	123
Waipahu	150030089182002	487	32
Waipahu	150030089182003	489	125
Waipahu	150030089182004	487	0
Waipahu	150030089182005	489	0
Waipahu	150030089182006	489	0
Waipahu	150030089182007	489	0
Waipahu	150030089182008	489	0
Waipahu	150030089182009	489	0
Waipahu	150030089182010	489	0
Waipahu	150030089182011	489	0
Waipahu	150030089182012	487	51
Waipahu	150030089182013	487	30
Waipahu	150030089182014	487	10
Waipahu	150030089183000	487	57
Waipahu	150030089183001	487	351
Waipahu	150030089183002	487	115
Waipahu	150030089183003	487	295
Waipahu	150030089184000	489	264
Waipahu	150030089184001	489	827
Waipahu	150030089184002	489	110
Waipahu	150030089184003	489	26
Waipahu	150030089184004	487	59
Waipahu	150030089184005	487	96
Waipahu	150030089184006	489	59
Waipahu	150030089184007	489	89
Waipahu	150030089184008	487	76
Waipahu	150030089184009	487	56
Waipahu	150030089201000	469	0
Waipahu	150030089201001	469	0
Waipahu	150030089201002	472	0
Waipahu	150030089201003	472	0
Waipahu	150030089201004	472	0
Waipahu	150030089201005	472	0
Waipahu	150030089201006	472	0
Waipahu	150030089201007	472	0
Waipahu	150030089201008	472	0
Waipahu	150030089201009	472	0
Waipahu	150030089201010	472	0
Waipahu	150030089201011	472	0
Waipahu	150030089201012	472	0
Waipahu	150030089201013	472	0

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Waipahu	150030089201014	469	0
Waipahu	150030089201015	469	0
Waipahu	150030089201016	469	0
Waipahu	150030089201017	469	0
Waipahu	150030089201018	469	0
Waipahu	150030089201019	469	0
Waipahu	150030089201020	469	1252
Waipahu	150030089201021	486	2
Waipahu	150030089201022	486	4
Waipahu	150030089201023	486	0
Waipahu	150030089201024	486	27
Waipahu	150030089201025	486	0
Waipahu	150030089201026	469	99
Waipahu	150030089202000	466	104
Waipahu	150030089202001	466	975
Waipahu	150030089203001	465	142
Waipahu	150030089203002	466	0
Waipahu	150030089203004	465	122
Waipahu	150030089203005	465	0
Waipahu	150030089203006	465	81
Waipahu	150030089203007	465	315
Waipahu	150030089203008	465	17
Waipahu	150030089204000	466	933
Waipahu	150030089204001	466	223
Waipahu	150030089211000	464	87
Waipahu	150030089211001	464	45
Waipahu	150030089211002	464	126
Waipahu	150030089211003	464	104
Waipahu	150030089211004	464	138
Waipahu	150030089211005	464	163
Waipahu	150030089211006	464	143
Waipahu	150030089211007	464	848
Waipahu	150030089211008	464	127
Waipahu	150030089211009	464	115
Waipahu	150030089211010	464	140
Waipahu	150030089211019	464	0
Waipahu	150030089211020	464	0
Waipahu	150030089211021	464	0
Waipahu	150030089211023	464	146
Waipahu	150030089211024	464	130
Waipahu	150030089211025	464	72
Waipahu	150030089211026	464	198
Waipahu	150030089211027	464	86
Waipahu	150030089221000	463	0
Waipahu	150030089221001	463	0
Waipahu	150030089221002	486	0

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Waipahu	150030089221003	463	1634
Waipahu	150030089221004	463	101
Waipahu	150030089221005	463	0
Waipahu	150030089221006	463	65
Waipahu	150030089221007	463	34
Waipahu	150030089221008	463	86
Waipahu	150030089221009	463	0
Waipahu	150030089222000	461	1605
Waipahu	150030089223000	440	0
Waipahu	150030089223001	449	0
Waipahu	150030089223002	449	0
Waipahu	150030089223003	461	38
Waipahu	150030089223003	462	717
Waipahu	150030089223004	462	87
Waipahu	150030089223005	462	152
Waipahu	150030089223006	462	637
Waipahu	150030089223007	464	0
Waipahu	150030089223008	440	0
Waipahu	150030089223009	449	0
Waipahu	150030089224000	460	0
Waipahu	150030089224001	460	1015
Waipahu	150030089224002	460	0
Waipahu	150030089224003	460	0
Waipahu	150030089224004	460	106
Waipahu	150030089224005	460	0
Waipahu	150030089224006	460	11
Waipahu	150030089224007	460	0
Waipahu	150030089224008	463	0
Waipahu	150030089224009	460	0
Waipahu	150030089224010	460	0
Waipahu	150030089224011	460	0
Waipahu	150030089224012	452	0
Waipahu	150030089224013	451	0
Waipahu	150030089224014	451	0
Waipahu	150030089224015	460	750
Waipahu	150030089224016	460	221
Waipahu	150030089224017	460	70
Waipahu	150030089224018	460	150
Waipahu	150030089231000	467	0
Waipahu	150030089231001	467	25
Waipahu	150030089231002	467	50
Waipahu	150030089231003	467	1570
Waipahu	150030089231004	467	99
Waipahu	150030089231005	467	233
Waipahu	150030089231006	467	144
Waipahu	150030089231007	467	700

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Waipahu	150030089231008	467	74
Waipahu	150030089232000	467	0
Waipahu	150030089232001	467	1011
Waipahu	150030089233000	465	65
Waipahu	150030089233001	465	766
Waipahu	150030089241000	543	18
Waipahu	150030089241001	541	0
Waipahu	150030089241002	540	0
Waipahu	150030089241003	540	0
Waipahu	150030089241004	540	0
Waipahu	150030089241005	540	0
Waipahu	150030089241006	540	0
Waipahu	150030089241007	540	0
Waipahu	150030089241008	540	0
Waipahu	150030089241009	540	0
Waipahu	150030089241010	540	0
Waipahu	150030089241011	541	216
Waipahu	150030089241012	541	0
Waipahu	150030089241013	541	0
Waipahu	150030089241014	540	0
Waipahu	150030089241015	540	0
Waipahu	150030089241016	541	49
Waipahu	150030089241017	541	1550
Waipahu	150030089241017	543	82
Waipahu	150030089241018	541	151
Waipahu	150030089241019	541	21
Waipahu	150030089241019	543	21
Waipahu	150030089241020	541	443
Waipahu	150030089241021	543	126
Waipahu	150030089241022	541	163
Waipahu	150030089241023	540	0
Waipahu	150030089241024	541	0
Waipahu	150030089241025	541	298
Waipahu	150030089241026	541	0
Waipahu	150030089241027	541	0
Waipahu	150030089241028	541	136
Waipahu	150030089241029	541	74
Waipahu	150030089241030	541	43
Waipahu	150030089242000	543	130
Waipahu	150030089242001	543	97
Waipahu	150030089242002	543	152
Waipahu	150030089242003	543	43
Waipahu	150030089242004	543	1021
Waipahu	150030089242005	543	256
Waipahu	150030089242006	543	144
Waipahu	150030089242007	543	178

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Waipahu	150030089242008	458	0
Waipahu	150030089242009	543	53
Waipahu	150030089243000	543	140
Waipahu	150030089243001	543	165
Waipahu	150030089243002	543	182
Waipahu	150030089243003	543	187
Waipahu	150030089243004	543	206
Waipahu	150030089243005	543	327
Waipahu	150030089243006	543	166
Waipahu	150030089243007	543	136
Waipahu	150030089243008	543	157
Waipahu	150030089243009	543	135
Waipahu	150030089243010	543	357
Waipahu	150030089251000	542	61
Waipahu	150030089251001	541	205
Waipahu	150030089251001	542	307
Waipahu	150030089251002	542	75
Waipahu	150030089251003	542	65
Waipahu	150030089251004	542	70
Waipahu	150030089251005	542	94
Waipahu	150030089251006	541	156
Waipahu	150030089251006	542	156
Waipahu	150030089251007	542	1654
Waipahu	150030089251008	542	8
Waipahu	150030089251009	542	161
Waipahu	150030089251010	542	44
Waipahu	150030089251011	542	480
Waipahu	150030089252000	544	0
Waipahu	150030089252001	544	4
Waipahu	150030089252002	544	294
Waipahu	150030089252003	544	108
Waipahu	150030089252004	544	247
Waipahu	150030089252005	544	164
Waipahu	150030089252006	544	148
Waipahu	150030089252007	544	154
Waipahu	150030089252008	544	55
Waipahu	150030089252009	544	158
Waipahu	150030089252010	544	82
Waipahu	150030089252011	544	50
Waipahu	150030089252012	544	68
Waipahu	150030089252013	544	151
Waipahu	150030089252014	544	155
Waipahu	150030089252015	458	0
Waipahu	150030089253000	544	0
Waipahu	150030089253001	544	265
Waipahu	150030089253002	544	309

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Waipahu	150030089253003	544	122
Waipahu	150030089253004	544	252
Waipahu	150030089253005	544	250
Waipahu	150030089253006	618	0
Waipahu	150030089253007	544	0
Waipahu	150030089253008	459	0
Waipahu	150030089253009	618	0
Waipahu	150030089253010	544	0
Waipahu	150030089253011	544	330
Waipahu	150030089261000	494	0
Waipahu	150030089261001	495	1385
Waipahu	150030089261002	495	0
Waipahu	150030089261004	495	0
Waipahu	150030089261005	495	0
Waipahu	150030089261006	495	0
Waipahu	150030089261007	494	187
Waipahu	150030089271000	494	0
Waipahu	150030089271001	494	357
Waipahu	150030089271002	494	649
Waipahu	150030089271003	494	85
Waipahu	150030089271004	494	81
Waipahu	150030089271005	494	705
Waipahu	150030089271006	494	0
Waipahu	150030089271007	494	666
Waipahu	150030089271008	494	313
Waipahu	150030089271009	494	145
Waipahu	150030089271010	494	1833
Waipahu	150030089271011	494	198
Waipahu	150030089271012	494	65
Waipahu	150030089271013	494	0
Waipahu	150030089271014	494	61
Waipahu	150030089271015	493	22
Waipahu	150030089281000	494	0
Waipahu	150030089281001	494	0
Waipahu	150030089281002	494	1221
Waipahu	150030089281003	494	297
Waipahu	150030089281004	494	200
Waipahu	150030089281005	493	143
Waipahu	150030089281005	494	144
Waipahu	150030089281006	494	474
Waipahu	150030089281007	494	75
Waipahu	150030089281008	494	440
Waipahu	150030089281009	494	34
Waipahu	150030089281010	494	97
Waipahu	150030089281011	494	0
Waipahu	150030089281012	494	0

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Waipahu	150030089281013	494	180
Waipahu	150030089281014	494	75
Waipahu	150030089281015	494	97
Waipahu	150030089281016	494	56
Waipahu	150030089281017	494	81
Waipahu	150030089281018	494	99
Waipahu	150030089281019	493	171
Waipahu	150030089291000	493	0
Waipahu	150030089291001	493	344
Waipahu	150030089291002	493	0
Waipahu	150030089291003	493	727
Waipahu	150030089291004	493	208
Waipahu	150030089291005	493	30
Waipahu	150030089291006	494	355
Waipahu	150030089291007	494	178
Waipahu	150030089291008	493	390
Waipahu	150030089292000	493	681
Waipahu	150030089292001	493	127
Waipahu	150030089292002	493	457
Waipahu	150030089292002	494	457
Waipahu	150030089292003	493	98
Waipahu	150030089292004	493	52
Waipahu	150030089292005	493	54
Waipahu	150030089292006	493	678
Waipahu	150030089301000	493	0
Waipahu	150030089301001	493	1403
Waipahu	150030089301002	493	27
Waipahu	150030089301003	493	374
Waipahu	150030089301004	493	42
Waipahu	150030089301005	493	47
Waipahu	150030089301006	493	37
Waipahu	150030089301007	493	62
Waipahu	150030089301008	493	301
Waipahu	150030089301009	493	21
Waipahu	150030089301010	493	23
Waipahu	150030089301011	493	93
Waipahu	150030089301012	493	44
Waipahu	150030089301013	493	41
Waipahu	150030089301014	493	45
Waipahu	150030089311000	493	0
Waipahu	150030089311001	493	26
Waipahu	150030089311002	493	957
Waipahu	150030089311003	493	0
Waipahu	150030089311004	493	64
Waipahu	150030089311005	493	16
Waipahu	150030089311006	493	128

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Waipahu	150030089311007	493	0
Waipahu	150030089311008	493	0
Waipahu	150030089311009	493	286
Waipahu	150030089311010	493	48
Waipahu	150030089311011	493	461
Waipahu	150030089311012	493	154
Waipahu	150030089311013	493	84
Waipahu	150030089311014	493	366
Waipahu	150030089311015	493	182
Waipahu	150030089311016	493	4
Waipahu	150030089311017	493	257
Waipahu	150030089312008	471	0
Waipahu	150030089312009	470	0
Waipahu	150030114001000	443	0
Waipahu	150030114001001	443	0
Waipahu	150030114001002	443	0
Waipahu	150030114001003	443	0
Waipahu	150030114001004	443	0
Waipahu	150030114001005	443	0
Waipahu	150030114001006	443	0
Waipahu	150030114001009	443	0
Waipahu	150030114001012	443	0
Waipahu	150030114001013	443	0
Waipahu	150030114001014	443	50
Waipahu	150030114001015	443	0
Waipahu	150030114001016	444	0
Waipahu	150030114001017	443	0
Waipahu	150030114001018	443	0
Waipahu	150030114001019	443	0
Waipahu	150030114001020	443	0
Waipahu	150030114001021	443	0
Waipahu	150030114001022	443	0
Waipahu	150030114001023	443	0
Waipahu	150030114001024	443	0
Waipahu	150030114001025	443	0
Waipahu	150030114001026	443	0
Waipahu	150030114001027	443	0
Waipahu	150030114001028	443	0
Waipahu	150030114001029	443	0
Waipahu	150030114001030	443	0
Waipahu	150030114001031	443	0
Waipahu	150030114001032	443	0
Waipahu	150030114001033	443	0
Waipahu	150030114001034	443	0
Waipahu	150030114001035	443	0
Waipahu	150030114001036	443	0

Populations for Study Area TAZs as Derived from 2010 Census Data

Pump Station Tributary Area	Census Block ID	TAZ	POP
Waipahu	150030114001037	443	0
Waipahu	150030114001038	443	0
Waipahu	150030114001039	443	0
Waipahu	150030114001040	443	0
Waipahu	150030114001041	443	0
Waipahu	150030114001042	443	0
Waipahu	150030114001043	443	0
Waipahu	150030114001044	443	0
Waipahu	150030114001045	443	0
Waipahu	150030114001046	443	0
Waipahu	150030114001047	443	0
Waipahu	150030114001048	443	0
Waipahu	150030114001049	443	0
Waipahu	150030114001050	444	0
Waipahu	150030114001051	442	0
Waipahu	150030114001052	442	0
Waipahu	150030114001053	443	0
Waipahu	150030114001054	443	0
Waipahu	150030114001055	443	0
Waipahu	150030114001056	443	32
Waipahu	150030114001057	443	0
Waipahu	150030114001058	443	0
Waipahu	150030114001059	443	0
Waipahu	150039807001057	495	0
Waipahu Subtotal			*128,928*
TOTAL			**317,718**

Appendix C. Projected Residential, Non-Residential, and Visitor Populations by Tributary Area and Individual TAZs

Updated Residential, Non-Residential, and Visitor Population Projection Results

Pump Station Tributary Area	TAZ	Projection Update								
		2010[1]			2035			2050		
		Res	Non-Res	Visitor	Res	Non-Res	Visitor	Res	Non-Res	Visitor
Halawa	370	459	33	0	439	46	0	426	45	0
Halawa	371	933	2865	0	933	2979	0	933	2979	0
Halawa	372	647	0	0	600	0	0	572	0	0
Halawa	373	4338	940	0	4144	1037	0	4026	1008	0
Halawa	374	1000	197	0	948	262	0	919	254	0
Halawa	375	4907	2031	0	4780	2147	0	4692	2108	0
Halawa	376	134	0	0	132	0	0	129	0	0
Halawa	394	135	7358	0	145	7677	0	148	7838	0
Halawa	395	3171	619	0	3380	722	0	0	746	0
Halawa	396	0	150	0	0	190	0	0	190	0
Halawa	397	15	0	0	13	0	0	10	0	0
Halawa	405	48	0	0	48	0	0	47	0	0
Halawa Total		*15,787*	*14,193*	*0*	*15,562*	*15,060*	*0*	*11,902*	*15,168*	*0*
Honouiliuli Influent	545	0	0	0	708	626	0	1147	1015	0
Honouiliuli Influent	546	0	0	0	3846	913	0	5500	1306	0
Honouiliuli Influent	547	0	0	0	393	325	0	473	391	0
Honouiliuli Influent	549	0	0	0	7312	1415	0	10270	1987	0
Honouiliuli Influent	550	3066	87	0	2882	98	0	2768	94	0
Honouiliuli Influent	551	4853	441	0	5257	424	0	5379	434	0
Honouiliuli Influent	552	6543	76	0	6268	87	0	6097	85	0
Honouiliuli Influent	553	1237	377	0	1218	720	0	1197	708	0
Honouiliuli Influent	554	3799	249	0	3567	285	0	3424	274	0
Honouiliuli Influent	555	5997	1123	0	5746	940	0	5590	914	0
Honouiliuli Influent	556	2917	299	0	2772	383	0	2687	371	0
Honouiliuli Influent	557	0	0	0	3288	570	0	3171	550	0
Honouiliuli Influent	558	1388	439	0	2632	960	0	2550	930	0
Honouiliuli Influent	559	39	340	0	38	404	0	38	404	0
Honouiliuli Influent	560	479	0	0	471	0	0	465	0	0
Honouiliuli Influent	561	4622	205	0	4423	220	0	4299	214	0
Honouiliuli Influent	562	1696	94	6	1610	128	9	1549	123	9
Honouiliuli Influent	563	3683	949	0	3572	1094	0	3495	1070	0
Honouiliuli Influent	564	7339	750	0	7999	532	0	8200	545	0

Updated Residential, Non-Residential, and Visitor Population Projection Results

Pump Station Tributary Area	TAZ	Projection Update								
		2010[(1)]			2035			2050		
		Res	Non-Res	Visitor	Res	Non-Res	Visitor	Res	Non-Res	Visitor
Honouiliuli Influent	565	624	483	0	3429	2607	1486	4359	3314	1889
Honouiliuli Influent	566	283	264	0	1094	1112	0	1391	1414	0
Honouiliuli Influent	567	91	432	0	990	506	0	1348	689	0
Honouiliuli Influent	568	2982	474	0	3189	517	0	3250	527	0
Honouiliuli Influent	569	2977	965	0	3935	1067	0	4359	1182	0
Honouiliuli Influent	570	149	46	0	168	55	0	184	60	0
Honouiliuli Influent	571	0	0	0	4226	2279	0	7108	3833	0
Honouiliuli Influent	572	0	0	0	0	1376	0	0	1376	0
Honouiliuli Influent	573	0	0	0	50	2193	0	112	4934	0
Honouiliuli Influent	574	0	0	0	5941	3762	0	10658	6749	0
Honouiliuli Influent	575	0	0	0	0	2207	0	0	2207	0
Honouiliuli Influent	576	0	0	0	0	1825	0	0	1825	0
Honouiliuli Influent	577	0	0	0	19	1386	0	24	1721	0
Honouiliuli Influent	578	0	0	0	698	4659	0	929	6198	0
Honouiliuli Influent	579	0	0	0	156	2123	0	208	2824	0
Honouiliuli Influent	580	0	0	0	204	1486	0	290	2115	0
Honouiliuli Influent	581	459	211	2	711	240	3	824	278	4
Honouiliuli Influent	582	51	1551	1797	860	3643	9769	1144	4846	12995
Honouiliuli Influent	583	996	775	0	1595	949	0	1843	1097	0
Honouiliuli Influent	584	73	0	0	1984	164	0	2557	211	0
Honouiliuli Influent	585	147	86	0	1798	291	0	2232	361	0
Honouiliuli Influent	586	0	162	0	891	1305	0	1268	1857	0
Honouiliuli Influent	587	0	294	0	501	1984	0	704	2786	0
Honouiliuli Influent	588	1314	0	0	1263	0	0	1231	0	0
Honouiliuli Influent	589	0	1577	0	135	2075	0	180	2760	0
Honouiliuli Influent	590	4	2143	0	43	2400	0	52	2911	0
Honouiliuli Influent	591	0	681	0	0	736	0	0	736	0
Honouiliuli Influent	592	121	1239	0	265	1212	0	307	1403	0
Honouiliuli Influent	593	120	6540	0	327	10875	0	399	13260	0
Honouiliuli Influent	594	0	557	0	553	1135	0	710	1456	0
Honouiliuli Influent	595	0	195	0	3024	686	0	4023	913	0
Honouiliuli Influent	596	0	203	0	2330	704	0	3100	937	0

Updated Residential, Non-Residential, and Visitor Population Projection Results

Pump Station Tributary Area	TAZ	Projection Update								
		2010[1]			2035			2050		
		Res	Non-Res	Visitor	Res	Non-Res	Visitor	Res	Non-Res	Visitor
Honouiliuli Influent	597	2178	2186	0	2105	2369	0	2049	2306	0
Honouiliuli Influent	598	0	0	0	93	5585	0	132	7948	0
Honouiliuli Influent	599	0	0	0	755	1189	0	1074	1692	0
Honouiliuli Influent	600	0	0	0	7816	7621	0	11882	11585	0
Honouiliuli Influent	601	5051	499	0	5832	472	0	6095	493	0
Honouiliuli Influent	602	3899	118	0	3795	110	0	3709	108	0
Honouiliuli Influent	603	0	0	0	2754	872	0	7171	2271	0
Honouiliuli Influent	604	0	0	0	6001	4716	0	7948	6246	0
Honouiliuli Influent	605	0	0	0	79	3078	0	121	4699	0
Honouiliuli Influent	606	2763	335	0	2618	350	0	2527	338	0
Honouiliuli Influent	607	1585	357	0	3591	570	0	4197	666	0
Honouiliuli Influent	608	1676	158	0	2071	151	0	2222	162	0
Honouiliuli Influent	609	3945	357	0	4249	426	0	4343	435	0
Honouiliuli Influent	610	4972	627	0	6235	927	0	6737	1002	0
Honouiliuli Influent	611	26	1	0	823	140	0	1100	187	0
Honouiliuli Influent	612	0	237	0	670	1919	0	895	2564	0
Honouiliuli Influent	613	0	0	0	1290	194	0	1820	274	0
Honouiliuli Influent	614	6070	274	0	5777	201	0	5589	194	0
Honouiliuli Influent	615	0	0	0	2694	334	0	3801	471	0
Honouiliuli Influent	616	0	0	0	1568	139	0	2212	196	0
Honouiliuli Influent	617	0	0	0	28	335	0	25	302	0
Honouiliuli Influent	618	0	0	0	0	0	0	0	0	0
Honouiliuli Influent	763	0	0	0	525	0	0	525	0	0
Honouiliuli Influent	764	0	0	0	1292	1453	0	1815	2041	0
Honouiliuli Influent Total		*90,214*	*29,456*	*1,805*	*167,042*	*100,834*	*11,267*	*201,082*	*134,375*	*14,897*
Pearl City	416	2333	257	0	2269	316	0	2230	311	0
Pearl City	417	9	599	0	9	667	0	9	667	0
Pearl City	418	166	0	0	154	0	0	147	0	0
Pearl City	421	3465	76	0	3295	103	0	3192	100	0
Pearl City	422	1649	0	0	1558	0	0	1502	0	0
Pearl City	423	1179	64	0	1127	95	0	1098	93	0
Pearl City	424	982	1168	0	940	1265	0	914	1229	0

Updated Residential, Non-Residential, and Visitor Population Projection Results

Pump Station Tributary Area	TAZ	Projection Update								
		2010[1]			2035			2050		
		Res	Non-Res	Visitor	Res	Non-Res	Visitor	Res	Non-Res	Visitor
Pearl City	425	0	39	0	0	44	0	0	43	0
Pearl City	426	0	376	0	6	415	0	12	810	0
Pearl City	429	0	343	0	0	395	0	0	385	0
Pearl City	430	704	903	0	1271	1047	0	1514	1247	0
Pearl City	431	719	725	0	824	980	0	884	1051	0
Pearl City	432	5290	107	0	5221	146	0	5179	145	0
Pearl City	433	3547	3099	0	3776	4724	0	3892	4870	0
Pearl City	434	1121	0	0	1065	0	0	1033	0	0
Pearl City	435	2748	419	0	2615	483	0	2539	469	0
Pearl City	436	2558	240	0	2428	296	0	2355	287	0
Pearl City	437	4818	283	0	4612	360	0	4485	350	0
Pearl City	438	40	1581	0	40	1662	0	40	1662	0
Pearl City	439	6864	317	0	6586	402	0	6415	392	0
Pearl City	440	610	739	0	1420	915	0	1768	1139	0
Pearl City	464	0	0	0	0	0	0	0	0	0
Pearl City	465	0	0	0	0	0	0	0	0	0
Pearl City	473	0	0	0	0	0	0	0	0	0
Pearl City	474	0	0	0	1583	228	0	2077	299	0
Pearl City	475	277	1328	0	9334	2453	0	12248	3219	0
Pearl City	476	0	0	0	136	1510	0	187	2077	0
Pearl City	477	0	759	0	2183	1553	0	3590	2554	0
Pearl City	478	0	271	0	1985	567	0	2731	780	0
Pearl City	479	0	680	0	4304	1452	0	5921	1997	0
Pearl City	480	0	130	0	1215	307	0	1671	422	0
Pearl City Total		*39,079*	*14,503*	*0*	*59,956*	*22,385*	*0*	*67,633*	*26,598*	*0*
Waimalu	375	200	83	0	195	88	0	191	86	0
Waimalu	396	0	50	0	0	63	0	0	63	0
Waimalu	397	0	0	0	0	0	0	0	0	0
Waimalu	399	684	40	0	654	65	0	633	63	0
Waimalu	400	381	190	0	377	258	0	374	256	0
Waimalu	401	1293	554	0	1312	642	0	1318	645	0
Waimalu	402	526	857	0	531	955	0	537	966	0

Updated Residential, Non-Residential, and Visitor Population Projection Results

Pump Station Tributary Area	TAZ	Projection Update								
		2010[1]			2035			2050		
		Res	Non-Res	Visitor	Res	Non-Res	Visitor	Res	Non-Res	Visitor
Waimalu	403	1356	737	0	1327	845	0	1300	828	0
Waimalu	404	315	124	0	303	164	0	294	159	0
Waimalu	405	4789	804	0	4706	917	0	4648	906	0
Waimalu	406	4046	261	0	3843	317	0	3714	306	0
Waimalu	407	4292	156	0	4119	209	0	4013	204	0
Waimalu	408	1113	195	0	1058	246	0	1023	238	0
Waimalu	409	1738	341	0	1663	424	0	1616	412	0
Waimalu	410	1045	248	0	1008	312	0	987	306	0
Waimalu	411	456	1399	0	448	1577	0	448	1577	0
Waimalu	412	0	828	97	0	918	92	0	918	92
Waimalu	413	107	4399	0	106	4535	0	103	4409	0
Waimalu	414	3109	31	0	3027	57	0	2968	56	0
Waimalu	415	1172	28	0	1124	50	0	1095	49	0
Waimalu	416	0	0	0	0	0	0	0	0	0
Waimalu	418	2028	0	0	1878	0	0	1789	0	0
Waimalu	419	268	294	0	252	347	0	246	339	0
Waimalu	420	944	30	0	944	54	0	938	54	0
Waimalu	421	1671	37	0	1589	50	0	1539	48	0
Waimalu	425	510	350	0	508	394	0	499	387	0
Waimalu	426	1	560	0	9	618	0	18	1208	0
Waimalu	427	165	579	0	157	662	0	154	650	0
Waimalu	428	0	0	0	0	0	0	0	0	0
Waimalu	429	582	38	0	557	44	0	542	43	0
Waimalu Total		*32,791*	*13,213*	*97*	*31,695*	*14,811*	*92*	*30,987*	*15,176*	*92*
Waipahu	440	0	0	0	0	0	0	0	0	0
Waipahu	441	5839	1312	0	5515	1432	0	5333	1385	0
Waipahu	442	2338	458	0	2262	571	0	2206	557	0
Waipahu	443	82	251	0	82	301	0	82	301	0
Waipahu	444	696	331	0	746	426	0	777	444	0
Waipahu	445	351	316	0	330	401	0	315	383	0
Waipahu	446	1416	487	0	1336	588	0	1292	569	0
Waipahu	447	1802	1118	0	1648	1282	0	1558	1212	0

Updated Residential, Non-Residential, and Visitor Population Projection Results

Pump Station Tributary Area	TAZ	Projection Update								
		2010[1]			2035			2050		
		Res	Non-Res	Visitor	Res	Non-Res	Visitor	Res	Non-Res	Visitor
Waipahu	448	1328	124	0	1278	187	0	1243	182	0
Waipahu	449	2570	469	0	2468	564	0	2415	552	0
Waipahu	450	3542	120	0	3315	172	0	3189	165	0
Waipahu	451	3109	674	0	3104	1092	0	3089	1087	0
Waipahu	452	1403	90	0	1307	143	0	1252	137	0
Waipahu	453	1332	281	0	1338	360	0	1332	358	0
Waipahu	454	3100	912	0	2943	1040	0	2855	1009	0
Waipahu	455	170	1438	0	145	1603	0	131	1448	0
Waipahu	456	1965	1165	0	2278	1302	0	2438	1394	0
Waipahu	457	3133	717	0	2934	851	0	2823	819	0
Waipahu	458	2331	199	0	2181	266	0	2093	255	0
Waipahu	459	1785	317	0	1676	397	0	1615	382	0
Waipahu	460	2323	210	0	2155	296	0	2062	283	0
Waipahu	461	1643	1329	0	1546	1575	0	1488	1515	0
Waipahu	462	1593	1900	0	1477	2062	0	1410	1969	0
Waipahu	463	1920	207	0	1780	284	0	1701	271	0
Waipahu	464	2668	60	0	2649	160	0	2625	159	0
Waipahu	465	1508	130	0	1401	194	0	1340	186	0
Waipahu	466	2235	81	0	2065	128	0	1972	122	0
Waipahu	467	3906	290	0	3620	369	0	3460	353	0
Waipahu	468	0	1105	0	89	3205	0	117	4206	0
Waipahu	469	1351	1354	0	1518	2189	0	1602	2310	0
Waipahu	470	0	0	0	0	0	0	0	0	0
Waipahu	471	0	0	0	0	0	0	0	0	0
Waipahu	472	0	0	0	5570	666	0	7309	874	0
Waipahu	473	0	0	0	498	320	0	653	420	0
Waipahu	481	0	0	0	0	0	0	0	0	0
Waipahu	482	1075	298	0	987	381	0	938	362	0
Waipahu	483	2044	0	0	1885	0	0	1798	0	0
Waipahu	484	2718	399	0	2529	465	0	2421	445	0
Waipahu	485	2687	327	0	2517	413	0	2421	397	0
Waipahu	486	1152	195	0	1069	263	0	1022	252	0

Updated Residential, Non-Residential, and Visitor Population Projection Results

Pump Station Tributary Area	TAZ	Projection Update								
		2010[1]			2035			2050		
		Res	Non-Res	Visitor	Res	Non-Res	Visitor	Res	Non-Res	Visitor
Waipahu	487	1827	311	0	1673	392	0	1589	372	0
Waipahu	488	2102	124	0	1943	181	0	1853	173	0
Waipahu	489	1500	0	0	1395	0	0	1337	0	0
Waipahu	490	761	1679	0	699	1822	0	667	1739	0
Waipahu	491	943	118	0	872	176	0	829	167	0
Waipahu	492	2850	54	0	2635	89	0	2516	85	0
Waipahu	493	9775	445	0	8967	640	0	8518	608	0
Waipahu	494	9905	689	0	9355	1021	0	9047	987	0
Waipahu	495	1385	2799	0	1573	4202	0	1676	4478	0
Waipahu	496	2386	196	0	2298	294	0	2242	287	0
Waipahu	497	1276	54	0	1191	89	0	1141	85	0
Waipahu	498	881	0	0	816	0	0	778	0	0
Waipahu	499	693	132	0	664	188	0	646	183	0
Waipahu	500	1515	234	0	1427	315	0	1369	302	0
Waipahu	501	830	1858	0	794	2050	0	773	1997	0
Waipahu	502	709	54	0	672	89	0	651	86	0
Waipahu	503	1178	408	0	1087	491	0	1035	467	0
Waipahu	504	1461	54	0	1355	89	0	1294	85	0
Waipahu	505	1317	236	0	1220	313	0	1165	299	0
Waipahu	506	993	279	0	977	367	0	965	363	0
Waipahu	539	0	0	0	411	1061	0	385	994	0
Waipahu	540	0	130	0	0	184	0	0	184	0
Waipahu	541	3505	921	0	6900	3772	0	8102	4429	0
Waipahu	542	3175	1056	0	2910	1224	0	2765	1163	0
Waipahu	543	4479	78	0	4226	124	0	4082	120	0
Waipahu	544	3750	377	0	3495	491	0	3352	471	0
Waipahu	545	0	0	0	1566	1386	0	2540	2247	0
Waipahu	547	0	0	0	458	379	0	550	455	0
Waipahu	548	2235	542	0	2114	586	0	2038	565	0
Waipahu	618	0	0	0	45	249	0	45	249	0
Waipahu Total		*128,546*	*31,492*	*0*	*133,979*	*48,212*	*0*	*134,327*	*50,403*	*0*
Total		**306,417**	**102,857**	**1,902**	**408,234**	**201,302**	**11,359**	**445,931**	**241,720**	**14,989**

Updated Residential, Non-Residential, and Visitor Population Projection Results

Pump Station Tributary Area	TAZ	Projection Update								
		2010[1]			2035			2050		
		Res	Non-Res	Visitor	Res	Non-Res	Visitor	Res	Non-Res	Visitor

Notes:

1. Results do not include the following estimated population not served by sewer (based on comparison of aerial photographs and limits of existing collection system): 9,177 Residential; 17,095 Non-Residential.

Appendix D.
Application of Residential Population Projection Approach to Sample TAZ

Appendix D: Application of Residential Population Projection Approach to Sample TAZ

Conducted for TAZ 610 (located within the Honouliuli Influent tributary area)

Step 1: Determine 2010 TAZ population based on analysis of 2010 Census data at the block level.

2010 Census blocks located within TAZ 610	Block population	% of block within TAZ 610	Block population within TAZ 610
150030086131000	643	100%	643
150030086131001	81	100%	81
150030086131002	51	100%	51
150030086131003	41	100%	41
150030086131004	88	100%	88
150030086131005	0	100%	0
150030086221000	0	100%	0
150030086221001	245	100%	245
150030086221002	60	100%	60
150030086221003	162	100%	162
150030086221004	197	100%	197
150030086221005	106	100%	106
150030086222000	164	100%	164
150030086222001	167	100%	167
150030086222002	59	100%	59
150030086222003	136	100%	136
150030086222004	2	100%	2
150030086222005	40	100%	40
150030086222006	136	100%	136
150030086222007	110	100%	110
150030086222008	125	100%	125
150030086222009	113	100%	113
150030086222010	112	100%	112
150030086222011	42	100%	42
150030086222012	160	100%	160
150030086222013	66	100%	66
150030086222014	116	100%	116
150030086222015	181	100%	181
150030086222016	138	100%	138
150030086222017	354	100%	354
150030086222018	57	100%	57
150030086222019	94	100%	94
150030086223000	0	100%	0
150030086223001	0	100%	0
150030086223002	0	100%	0
150030086223003	375	100%	375
150030086223004	149	100%	149
150030086223005	57	100%	57
150030086223006	145	100%	145
150030086223007	200	100%	200
150030086223011	0	100%	0
150030086223012	0	100%	0
150030086223013	0	100%	0
Total	*4,972*		*4,972*

Step 2: Replace 2010 TAZ population prepared by the CCH DPP with the revised 2010 TAZ population based on 2010 Census data, and adjust to account for non-sewered population.

2010 TAZ population prepared by CCH DPP (4,881) replaced with estimate based on 2010 Census data (4,972).

All population assumed to be sewered within TAZ 610; no adjustment required.

Step 3: Determine 2015 TAZ population

2010 TAZ population based on 2010 Census data + (2015 CCH DPP population - 2010 CCH DPP population) = 2015 TAZ population

4,972 + (5,499 - 4,881) = 5,590 Average annual growth rate: 2.49%

Step 4: Determine populations through 2035 for each five year increment.

<u>2020 Population</u>
2015 TAZ population + (2020 CCH DPP population - 2015 CCH DPP population) = 2020 TAZ population

5,590 + (5,689 - 5,499) = 5,780 Average annual growth rate: 0.68%

<u>2025 Population</u>
2020 TAZ population + (2025 CCH DPP population - 2020 CCH DPP population) = 2025 TAZ population

5,780 + (5,842 - 5,689) = 5,933 Average annual growth rate: 0.53%

<u>2030 Population</u>
2025 TAZ population + (2030 CCH DPP population - 2025 CCH DPP population) = 2030 TAZ population

5,933 + (5,985 - 5,842) = 6,076 Average annual growth rate: 0.48%

<u>2035 Population</u>
2030 TAZ population + (2035 CCH DPP population - 2030 CCH DPP population) = 2035 TAZ population

6,076 + (6,144 - 5,985) = 6,235 Average annual growth rate: 0.52%

Step 5: Determine populations through 2050 for each five year increment.

Since TAZ 610 demonstrated less than 1% annual growth between 2030 and 2035, future growth was projected in a linear fashion.

2040 Population
2035 TAZ population + (2035 TAZ population * (average annual growth rate between 2030 and 2035 * 5)) = 2040 TAZ population

6,235 + (6,235 * (0.52% * 5)) = 6,398 Average annual growth rate: 0.52%

2045 Population
2040 TAZ population + (2040 TAZ population * (average annual growth rate between 2035 and 2040 * 5)) = 2045 TAZ population

6,398 + (6,398 * (0.52% * 5)) = 6,566 Average annual growth rate: 0.52%

2050 Population
2045 TAZ population + (2045 TAZ population * (average annual growth rate between 2040 and 2045 * 5)) = 2050 TAZ population

6,566 + (6,566 * (0.52% * 5)) = 6,737 Average annual growth rate: 0.52%

Appendix E.
Additional Development Acres and Infiltration Values by Individual TAZs

Potential Future Development Area Detail by TAZ

TAZ	Tributary Area	Year 2010				Year 2035					Year 2050				
		Population	Total Developed Land Area (acres)	Population Density	Infiltration During Wet Weather (%)	Population	Additional Developed Acres	Total Developed Land Area (acres)	Population Density	Infiltration During Wet Weather (%)	Population	Additional Developed Acres	Total Developed Land Area (acres)	Population Density	Infiltration During Wet Weather (%)
370	Halawa	37	2.8	13.4	4.0	37	0.0	2.8	13.4	4.0	37	0.0	2.8	13.4	4.0
371	Halawa	1,336	101.8	13.1	3.0	1,349	0.0	101.8	13.3	3.0	1,349	0.0	101.8	13.3	3.0
372	Halawa	1	0.2	7.4	3.0	1	0.0	0.2	7.4	3.0	1	0.0	0.2	7.4	3.0
373	Halawa	3,968	212.9	18.6	3.7	4,240	0.0	212.9	19.9	3.7	4,142	0.0	212.9	19.5	3.7
374	Halawa	0	2.3	0.0	4.0	0	0.0	2.3	0.0	4.0	0	0.0	2.3	0.0	4.0
375	Halawa / Waimalu	4,670	403.4	11.6	3.0	4,685	0.0	403.4	11.6	3.0	4,619	0.0	403.4	11.5	3.0
376	Halawa	11	6.3	1.7	3.0	11	0.0	6.3	1.7	3.0	11	0.0	6.3	1.7	3.0
394	Halawa	255	45.5	5.6	4.0	300	0.0	45.5	6.6	4.0	321	0.0	45.5	7.1	4.0
395	Halawa	1,706	94.2	18.1	3.2	1,860	0.0	94.2	19.8	3.2	1,934	0.0	94.2	20.5	3.2
396	Halawa	428	96.8	4.4	3.1	434	0.0	96.8	4.5	3.1	434	0.0	96.8	4.5	3.1
397	Halawa / Waimalu	0	1.1	0.0	3.0	0	0.0	1.1	0.0	3.0	0	0.0	1.1	0.0	3.0
399	Waimalu	139	63.8	2.2	4.9	123	0.0	63.8	1.9	4.9	110	0.0	63.8	1.7	4.9
400	Waimalu	297	20.2	14.7	3.9	302	0.0	20.2	15.0	3.9	300	0.0	20.2	14.9	3.9
401	Waimalu	1,051	51.4	20.5	3.0	1,073	0.0	51.4	20.9	3.0	1,077	0.0	51.4	21.0	3.0
402	Waimalu	411	34.3	12.0	3.0	426	0.0	34.3	12.4	3.0	432	0.0	34.3	12.6	3.0
403	Waimalu	796	90.2	8.8	1.8	791	0.0	90.2	8.8	1.8	772	0.0	90.2	8.6	1.8
404	Waimalu	1,193	26.5	45.0	2.9	1,190	0.0	26.5	44.9	2.9	1,184	0.0	26.5	44.7	2.9
405	Halawa / Waimalu	3,736	437.8	8.5	2.1	3,697	0.0	437.8	8.4	2.1	3,658	0.0	437.8	8.4	2.1
406	Waimalu	2,378	422.9	5.6	4.0	2,255	0.0	422.9	5.3	4.0	2,171	0.0	422.9	5.1	4.0
407	Waimalu	1,481	57.1	26.0	3.5	1,377	0.0	57.1	24.1	3.5	1,308	0.0	57.1	22.9	3.5
408	Waimalu	655	17.8	36.8	4.9	626	0.0	17.8	35.1	4.9	603	0.0	17.8	33.8	4.9
409	Waimalu	1,285	47.0	27.4	4.7	1,247	0.0	47.0	26.5	4.7	1,216	0.0	47.0	25.9	4.7
410	Waimalu	855	41.8	20.4	4.0	839	0.0	41.8	20.1	4.0	825	0.0	41.8	19.7	4.0
411	Waimalu	628	34.3	18.3	4.4	645	0.0	34.3	18.8	4.4	645	0.0	34.3	18.8	4.4
412	Waimalu	359	11.7	30.6	5.0	352	0.0	11.7	30.0	5.0	352	0.0	11.7	30.0	5.0
413	Waimalu	511	73.8	6.9	4.1	527	0.0	73.8	7.1	4.1	510	0.0	73.8	6.9	4.1
414	Waimalu	2,190	176.1	12.4	2.4	2,140	0.0	176.1	12.2	2.4	2,103	0.0	176.1	11.9	2.4
415	Waimalu	799	83.2	9.6	2.4	771	0.0	83.2	9.3	2.4	752	0.0	83.2	9.0	2.4
416	Waimalu / Pearl City	2,324	166.5	14.0	3.8	2,290	0.0	166.5	13.8	3.8	2,265	0.0	166.5	13.6	3.8
417	Pearl City	26	88.5	0.3	0.7	35	0.0	88.5	0.4	0.7	35	0.0	88.5	0.4	0.7
418	Waimalu / Pearl City	1,523	144.7	10.5	2.6	1,419	0.0	144.7	9.8	2.6	1,357	0.0	144.7	9.4	2.6
419	Waimalu	286	42.2	6.8	2.4	282	0.0	42.2	6.7	2.4	277	0.0	42.2	6.6	2.4
420	Waimalu	649	44.7	14.5	4.0	652	0.0	44.7	14.6	4.0	648	0.0	44.7	14.5	4.0
421	Waimalu / Pearl City	2,381	213.8	11.1	3.7	2,224	0.0	213.8	10.4	3.7	2,126	0.0	213.8	9.9	3.7
422	Pearl City	967	87.5	11.1	1.5	909	0.0	87.5	10.4	1.5	873	0.0	87.5	10.0	1.5
423	Pearl City	711	66.2	10.7	1.5	682	0.0	66.2	10.3	1.5	663	0.0	66.2	10.0	1.5
424	Pearl City	794	84.8	9.4	3.1	778	0.0	84.8	9.2	3.1	757	0.0	84.8	8.9	3.1

Potential Future Development Area Detail by TAZ

TAZ	Tributary Area	Year 2010				Year 2035					Year 2050				
		Population	Total Developed Land Area (acres)	Population Density	Infiltration During Wet Weather (%)	Population	Additional Developed Acres	Total Developed Land Area (acres)	Population Density	Infiltration During Wet Weather (%)	Population	Additional Developed Acres	Total Developed Land Area (acres)	Population Density	Infiltration During Wet Weather (%)
425	Waimalu / Pearl City	1,086	47.0	23.1	4.0	1,090	0.0	47.0	23.2	4.0	1,084	0.0	47.0	23.0	4.0
426	Waimalu / Pearl City	270	29.8	9.1	3.3	290	0.0	29.8	9.7	3.3	418	0.0	29.8	14.0	3.3
427	Waimalu	437	28.2	15.5	3.2	442	0.0	28.2	15.7	3.2	439	0.0	28.2	15.6	3.2
428	Waimalu	22	21.4	1.0	4.0	22	0.0	21.4	1.0	4.0	22	0.0	21.4	1.0	4.0
429	Waimalu / Pearl City	446	16.7	26.7	4.0	437	0.0	16.7	26.1	4.0	426	0.0	16.7	25.5	4.0
430	Pearl City	814	37.6	21.6	2.8	1,194	0.0	37.6	31.7	2.8	1,373	0.0	37.6	36.5	2.8
431	Pearl City	771	78.5	9.8	3.0	869	0.0	78.5	11.1	3.0	916	0.0	78.5	11.7	3.0
432	Pearl City	22	12.7	1.7	5.3	0	0.0	12.7	0.0	5.3	0	0.0	12.7	0.0	5.3
433	Pearl City	1,123	279.0	4.0	2.0	1,465	0.0	279.0	5.3	2.0	1,557	0.0	279.0	5.6	2.0
434	Pearl City	936	39.5	23.7	2.0	900	0.0	39.5	22.8	2.0	880	0.0	39.5	22.3	2.0
435	Pearl City	2,018	196.8	10.3	0.8	1,941	0.0	196.8	9.9	0.8	1,890	0.0	196.8	9.6	0.8
436	Pearl City	1,743	169.8	10.3	0.6	1,666	0.0	169.8	9.8	0.6	1,619	0.0	169.8	9.5	0.6
437	Pearl City	3,438	295.0	11.7	0.5	3,316	0.0	295.0	11.2	0.5	3,233	0.0	295.0	11.0	0.5
438	Pearl City	348	94.1	3.7	1.9	375	0.0	94.1	4.0	1.9	384	0.0	94.1	4.1	1.9
439	Pearl City	4,097	439.4	9.3	0.5	4,443	0.0	439.4	10.1	0.5	4,443	0.0	439.4	10.1	0.5
440	Waipahu / Pearl City	742	107.4	6.9	5.9	574	0.0	107.4	5.3	5.9	463	0.0	107.4	4.3	5.9
441	Waipahu	4,361	174.7	25.0	0.8	4,900	0.0	174.7	28.0	0.8	5,150	0.0	174.7	29.5	0.8
442	Waipahu	1,649	99.8	16.5	0.8	1,456	0.0	99.8	14.6	0.8	1,334	0.0	99.8	13.4	0.8
443	Waipahu	59	201.4	0.3	2.3	24	0.0	201.4	0.1	2.3	0	0.0	201.4	0.0	2.3
444	Waipahu	208	38.8	5.4	3.5	214	0.0	38.8	5.5	3.5	214	0.0	38.8	5.5	3.5
445	Waipahu	312	33.5	9.3	3.5	355	0.0	33.5	10.6	3.5	377	0.0	33.5	11.3	3.5
446	Waipahu	1,177	35.9	32.8	2.0	1,174	0.0	35.9	32.7	2.0	1,162	0.0	35.9	32.4	2.0
447	Waipahu	810	50.2	16.1	2.2	770	0.0	50.2	15.3	2.2	740	0.0	50.2	14.7	2.2
448	Waipahu	874	32.6	26.9	0.8	795	0.0	32.6	24.4	0.8	729	0.0	32.6	22.4	0.8
449	Waipahu	2,005	96.4	20.8	0.8	1,981	0.0	96.4	20.5	0.8	1,958	0.0	96.4	20.3	0.8
450	Waipahu	2,061	81.6	25.3	0.8	2,007	0.0	81.6	24.6	0.8	1,971	0.0	81.6	24.2	0.8
451	Waipahu	3,309	164.9	20.1	2.2	3,170	0.0	164.9	19.2	2.2	3,088	0.0	164.9	18.7	2.2
452	Waipahu	1,138	61.4	18.5	2.4	1,185	0.0	61.4	19.3	2.4	1,174	0.0	61.4	19.1	2.4
453	Waipahu	1,031	15.9	64.9	4.6	976	0.0	15.9	61.5	4.6	940	0.0	15.9	59.2	4.6
454	Waipahu	2,524	87.4	28.9	1.1	2,537	0.0	87.4	29.0	1.1	2,533	0.0	87.4	29.0	1.1
455	Waipahu	343	76.9	4.5	1.0	258	0.0	76.9	3.4	1.0	198	0.0	76.9	2.6	1.0
456	Waipahu	1,072	45.1	23.8	1.0	1,076	0.0	45.1	23.9	1.0	1,048	0.0	45.1	23.3	1.0
457	Waipahu	1,284	73.4	17.5	1.0	1,501	0.0	73.4	20.5	1.0	1,614	0.0	73.4	22.0	1.0
458	Waipahu	1,720	95.2	18.1	1.0	1,609	0.0	95.2	16.9	1.0	1,534	0.0	95.2	16.1	1.0
459	Waipahu	1,434	76.2	18.8	1.0	1,346	0.0	76.2	17.7	1.0	1,288	0.0	76.2	16.9	1.0
460	Waipahu	2,202	116.3	18.9	0.7	2,142	0.0	116.3	18.4	0.7	2,101	0.0	116.3	18.1	0.7
461	Waipahu	1,317	130.2	10.1	1.0	1,220	0.0	130.2	9.4	1.0	1,159	0.0	130.2	8.9	1.0

Potential Future Development Area Detail by TAZ

TAZ	Tributary Area	Year 2010				Year 2035					Year 2050				
		Population	Total Developed Land Area (acres)	Population Density	Infiltration During Wet Weather (%)	Population	Additional Developed Acres	Total Developed Land Area (acres)	Population Density	Infiltration During Wet Weather (%)	Population	Additional Developed Acres	Total Developed Land Area (acres)	Population Density	Infiltration During Wet Weather (%)
462	Waipahu	1,725	137.5	12.5	1.0	1,692	0.0	137.5	12.3	1.0	1,648	0.0	137.5	12.0	1.0
463	Waipahu	1,008	327.8	3.1	0.9	953	0.0	327.8	2.9	0.9	899	0.0	327.8	2.7	0.9
464	Waipahu / Pearl City	1,867	108.5	17.2	0.8	1,786	0.0	108.5	16.5	0.8	1,734	0.0	108.5	16.0	0.8
465	Waipahu / Pearl City	600	74.4	8.1	0.9	600	0.0	74.4	8.1	0.9	584	0.0	74.4	7.9	0.9
466	Waipahu	1,161	73.8	15.7	0.9	1,100	0.0	73.8	14.9	0.9	1,060	0.0	73.8	14.4	0.9
467	Waipahu	2,697	157.9	17.1	0.9	2,594	0.0	157.9	16.4	0.9	2,534	0.0	157.9	16.1	0.9
468	Waipahu	392	41.8	9.4	0.9	272	3.6	45.5	6.0	1.0	184	1.1	46.6	4.0	1.0
469	Waipahu	1,307	119.5	10.9	0.9	1,582	0.0	119.5	13.2	0.9	1,710	0.0	119.5	14.3	0.9
472	Waipahu	0	1.7	0.0	0.9	5,570	378.9	380.7	14.6	2.0	7,309	118.3	499.0	14.6	2.0
473	Waipahu / Pearl City	0	0.0	0.0	0.0	498	33.9	33.9	14.7	2.0	653	10.5	44.4	14.7	2.0
474	Pearl City	0	0.0	0.0	0.0	1,583	149.3	149.3	10.6	2.0	2,077	46.6	195.9	10.6	2.0
475	Pearl City	0	0.0	0.0	0.0	9,057	854.4	854.4	10.6	2.0	11,971	274.9	1129.3	10.6	2.0
476	Pearl City	0	0.0	0.0	0.0	136	12.8	12.8	10.6	2.0	187	4.8	17.6	10.6	2.0
477	Pearl City	0	0.0	0.0	0.0	2,183	114.9	114.9	19.0	2.0	3,590	74.1	188.9	19.0	2.0
478	Pearl City	0	0.0	0.0	0.0	1,985	75.2	75.2	26.4	2.0	2,731	28.3	103.4	26.4	2.0
479	Pearl City	0	0.0	0.0	0.0	4,304	298.9	298.9	14.4	2.0	5,921	112.3	411.2	14.4	2.0
480	Pearl City	0	0.0	0.0	0.0	1,215	110.5	110.5	11.0	2.0	1,671	41.5	151.9	11.0	2.0
481	Waipahu	18	11.2	1.6	0.0	18	0.0	11.2	1.6	1.0	18	0.0	11.2	1.6	1.0
482	Waipahu	1,213	61.1	19.9	0.0	1,167	0.0	61.1	19.1	1.0	1,133	0.0	61.1	18.6	1.0
483	Waipahu	1,639	124.7	13.1	0.0	1,538	0.0	124.7	12.3	1.0	1,482	0.0	124.7	11.9	1.0
484	Waipahu	2,682	179.5	14.9	0.0	2,569	0.0	179.5	14.3	1.0	2,498	0.0	179.5	13.9	1.0
485	Waipahu	1,343	127.4	10.5	0.0	1,244	0.0	127.4	9.8	1.0	1,181	0.0	127.4	9.3	1.0
486	Waipahu	889	79.9	11.1	0.0	844	0.0	79.9	10.6	1.0	813	0.0	79.9	10.2	1.0
487	Waipahu	1,615	112.3	14.4	0.0	1,526	0.0	112.3	13.6	0.8	1,470	0.0	112.3	13.1	0.8
488	Waipahu	843	104.3	8.1	0.0	748	0.0	104.3	7.2	0.8	689	0.0	104.3	6.6	0.8
489	Waipahu	1,178	97.7	12.1	0.0	1,111	0.0	97.7	11.4	0.5	1,073	0.0	97.7	11.0	0.5
490	Waipahu	885	60.6	14.6	0.0	862	0.0	60.6	14.2	0.6	832	0.0	60.6	13.7	0.6
491	Waipahu	825	55.9	14.8	0.0	787	0.0	55.9	14.1	0.4	758	0.0	55.9	13.6	0.4
492	Waipahu	2,524	174.7	14.4	0.0	2,390	0.0	174.7	13.7	0.4	2,314	0.0	174.7	13.2	0.4
493	Waipahu	6,903	470.3	14.7	0.0	6,409	0.0	470.3	13.6	0.9	6,118	0.0	470.3	13.0	0.9
494	Waipahu	3,628	424.4	8.5	0.0	3,316	0.0	424.4	7.8	0.9	3,115	0.0	424.4	7.3	0.9
495	Waipahu	947	110.8	8.5	0.0	1,349	7.7	118.5	11.4	1.1	1,510	4.2	122.7	12.3	1.1
496	Waipahu	266	62.8	4.2	0.0	221	0.0	62.8	3.5	1.0	185	0.0	62.8	2.9	1.0
497	Waipahu	911	78.0	11.7	0.0	861	0.0	78.0	11.0	1.0	828	0.0	78.0	10.6	1.0
498	Waipahu	571	41.1	13.9	0.0	529	0.0	41.1	12.9	0.5	505	0.0	41.1	12.3	0.5
499	Waipahu	441	32.4	13.6	0.0	429	0.0	32.4	13.2	1.0	417	0.0	32.4	12.9	1.0
500	Waipahu	920	83.1	11.1	0.0	874	0.0	83.1	10.5	1.0	835	0.0	83.1	10.0	1.0

Potential Future Development Area Detail by TAZ

TAZ	Tributary Area	Year 2010				Year 2035					Year 2050				
		Population	Total Developed Land Area (acres)	Population Density	Infiltration During Wet Weather (%)	Population	Additional Developed Acres	Total Developed Land Area (acres)	Population Density	Infiltration During Wet Weather (%)	Population	Additional Developed Acres	Total Developed Land Area (acres)	Population Density	Infiltration During Wet Weather (%)
501	Waipahu	691	35.3	19.6	0.0	691	0.0	35.3	19.6	1.0	671	0.0	35.3	19.0	1.0
502	Waipahu	531	38.8	13.7	0.0	511	0.0	38.8	13.2	1.0	497	0.0	38.8	12.8	1.0
503	Waipahu	1,108	124.5	8.9	0.0	1,060	0.0	124.5	8.5	1.0	1,024	0.0	124.5	8.2	1.0
504	Waipahu	886	72.9	12.2	0.0	822	0.0	72.9	11.3	1.0	783	0.0	72.9	10.7	1.0
505	Waipahu	1,186	90.1	13.2	0.0	1,133	0.0	90.1	12.6	1.0	1,097	0.0	90.1	12.2	1.0
506	Waipahu	490	220.0	2.2	0.0	490	0.0	220.0	2.2	1.0	482	0.0	220.0	2.2	1.0
539	Waipahu	0	0.0	0.0	0.0	411	28.0	28.0	14.7	2.0	385	-1.8	26.2	14.7	2.0
541	Waipahu	3,120	292.7	10.7	0.0	6,368	138.6	431.3	14.8	1.3	7,535	49.1	480.4	15.7	1.4
542	Waipahu	1,494	98.5	15.2	0.0	1,344	0.0	98.5	13.6	1.0	1,244	0.0	98.5	12.6	1.0
543	Waipahu	3,093	230.1	13.4	0.0	2,936	0.0	230.1	12.8	1.0	2,843	0.0	230.1	12.4	1.0
544	Waipahu	3,054	170.6	17.9	0.0	2,904	0.0	170.6	17.0	1.0	2,810	0.0	170.6	16.5	1.0
545	Honouliuli Influent / Waipahu	0	0.0	0.0	0.0	2,274	167.0	167.0	13.6	2.0	3,687	103.8	270.8	13.6	2.0
546	Honouliuli Influent	0	48.5	0.0	0.0	3,846	274.7	323.2	11.9	2.5	5,500	118.1	441.4	12.5	2.3
547	Honouliuli Influent / Waipahu	0	0.0	0.0	0.0	864	64.7	64.7	13.3	2.0	1,039	13.1	77.8	13.3	2.0
548	Waipahu	1,795	129.5	13.9	0.0	1,723	0.0	129.5	13.3	1.0	1,672	0.0	129.5	12.9	1.0
549	Honouliuli Influent	1	7.5	0.1	0.0	7,497	625.0	632.4	11.9	2.0	10,528	252.8	885.3	11.9	2.0
550	Honouliuli Influent	1,990	163.9	12.1	0.0	1,873	0.0	163.9	11.4	1.5	1,800	0.0	163.9	11.0	1.5
551	Honouliuli Influent	4,803	181.6	26.4	0.0	5,161	24.2	205.8	25.1	4.3	5,271	7.3	213.1	24.7	4.2
552	Honouliuli Influent	2,181	131.2	16.6	0.0	2,006	0.0	131.2	15.3	2.7	1,896	0.0	131.2	14.5	2.7
553	Honouliuli Influent	865	44.7	19.4	0.0	894	0.0	44.7	20.0	5.0	879	0.0	44.7	19.7	5.0
554	Honouliuli Influent	2,138	129.7	16.5	0.0	3,734	0.0	129.7	28.8	4.8	4,215	0.0	129.7	32.5	4.8
555	Honouliuli Influent	2,532	142.3	17.8	0.0	2,700	0.0	142.3	19.0	5.0	2,645	0.0	142.3	18.6	5.0
556	Honouliuli Influent	2,541	112.3	22.6	0.0	2,358	0.0	112.3	21.0	1.0	2,255	0.0	112.3	20.1	1.0
557	Honouliuli Influent	122	4.3	28.6	0.0	3,327	144.2	148.5	22.4	2.0	3,171	-5.1	143.4	22.1	2.0
558	Honouliuli Influent	1,469	119.3	12.3	0.0	2,426	76.0	195.3	12.4	2.0	2,424	0.0	195.3	12.4	2.0
559	Honouliuli Influent	26	86.7	0.3	0.0	259	0.0	86.7	3.0	1.0	244	0.0	86.7	2.8	1.0
560	Honouliuli Influent	81	256.9	0.3	0.0	156	0.0	256.9	0.6	1.0	152	0.0	256.9	0.6	1.0
561	Honouliuli Influent	207	1087.6	0.2	0.0	202	0.0	1087.6	0.2	1.0	198	0.0	1087.6	0.2	1.0
562	Honouliuli Influent	1,664	77.2	21.6	0.0	1,539	0.0	77.2	19.9	1.0	1,459	0.0	77.2	18.9	1.0
563	Honouliuli Influent	2,899	198.1	14.6	0.0	2,849	0.0	198.1	14.4	2.9	2,809	0.0	198.1	14.2	2.9
564	Honouliuli Influent	5,354	343.8	15.6	0.0	5,762	39.5	383.3	15.0	0.6	5,851	12.0	395.3	14.8	0.6
565	Honouliuli Influent	0	56.3	0.0	0.0	1,964	167.8	224.1	8.8	1.6	2,615	55.6	279.8	9.3	1.7
566	Honouliuli Influent	0	0.0	0.0	0.0	811	69.3	69.3	11.7	2.0	1,108	25.4	94.7	11.7	2.0
567	Honouliuli Influent	61	105.3	0.6	0.0	872	53.8	159.1	5.5	3.9	1,214	21.4	180.5	6.7	3.7
568	Honouliuli Influent	1,637	100.4	16.3	0.0	1,775	0.0	100.4	17.7	1.5	1,815	0.0	100.4	18.1	1.5
569	Honouliuli Influent	2,113	172.9	12.2	0.0	2,839	0.0	172.9	16.4	4.5	3,124	0.0	172.9	18.1	4.5

Potential Future Development Area Detail by TAZ

TAZ	Tributary Area	Year 2010				Year 2035					Year 2050				
		Population	Total Developed Land Area (acres)	Population Density	Infiltration During Wet Weather (%)	Population	Additional Developed Acres	Total Developed Land Area (acres)	Population Density	Infiltration During Wet Weather (%)	Population	Additional Developed Acres	Total Developed Land Area (acres)	Population Density	Infiltration During Wet Weather (%)
570	Honouliuli Influent	0	0.0	0.0	0.0	19	1.6	1.6	11.7	2.0	35	1.4	3.0	11.7	2.0
571	Honouliuli Influent	0	88.5	0.0	0.0	4,226	361.2	449.7	9.4	2.6	7,108	246.3	696.0	10.2	2.4
573	Honouliuli Influent	0	991.5	0.0	0.0	50	4.3	995.7	0.1	5.0	112	5.3	1001.0	0.1	5.0
574	Honouliuli Influent	0	159.4	0.0	0.0	5,561	475.3	634.7	8.8	2.8	9,976	377.4	1012.1	9.9	2.5
577	Honouliuli Influent	0	0.0	0.0	0.0	19	1.6	1.6	11.7	2.0	24	0.4	2.1	11.7	2.0
578	Honouliuli Influent	0	0.0	0.0	0.0	698	59.7	59.7	11.7	2.0	929	19.7	79.4	11.7	2.0
579	Honouliuli Influent	0	0.0	0.0	0.0	156	13.3	13.3	11.7	2.0	208	4.4	17.8	11.7	2.0
580	Honouliuli Influent	760	179.6	4.2	0.0	1,069	0.0	179.6	6.0	0.8	1,200	0.0	179.6	6.7	0.8
581	Honouliuli Influent	447	93.9	4.8	0.0	583	0.0	93.9	6.2	0.8	648	0.0	93.9	6.9	0.8
582	Honouliuli Influent	1,253	196.0	6.4	0.0	2,135	48.4	244.4	8.7	1.0	2,411	17.0	261.4	9.2	1.1
583	Honouliuli Influent	108	90.5	1.2	0.0	4,968	35.8	126.4	39.3	1.1	7,083	14.8	141.2	50.2	1.2
584	Honouliuli Influent	0	0.0	0.0	0.0	1,985	163.3	163.3	12.2	2.0	2,600	49.0	212.3	12.2	2.0
585	Honouliuli Influent	0	0.0	0.0	0.0	1,651	141.1	141.1	11.7	2.0	2,208	37.1	178.2	12.4	2.0
586	Honouliuli Influent	0	22.8	0.0	0.0	891	18.3	41.1	21.7	1.3	1,268	7.7	48.8	26.0	1.4
587	Honouliuli Influent	0	0.0	0.0	0.0	501	41.8	41.8	12.0	2.0	704	16.9	58.7	12.0	2.0
588	Honouliuli Influent	1,983	54.6	36.3	0.0	1,951	0.0	54.6	35.7	0.8	1,930	0.0	54.6	35.3	0.8
589	Honouliuli Influent	749	57.5	13.0	0.0	895	0.0	57.5	15.6	0.8	1,006	0.0	57.5	17.5	0.8
590	Honouliuli Influent	358	19.4	18.4	0.0	424	2.3	21.8	19.5	0.9	493	0.5	22.3	22.1	0.9
591	Honouliuli Influent	0	0.6	0.0	0.0	0	0.0	0.6	0.0	3.5	0	0.0	0.6	0.0	3.5
592	Honouliuli Influent	1,188	65.1	18.3	0.0	1,277	0.0	65.1	19.6	0.7	1,327	0.0	65.1	20.4	0.7
593	Honouliuli Influent	890	45.8	19.4	0.0	1,595	12.4	58.2	27.4	1.0	1,963	4.3	62.5	31.4	1.1
594	Honouliuli Influent	0	57.4	0.0	0.0	387	33.1	90.5	4.3	1.2	545	9.4	99.9	5.5	1.3
595	Honouliuli Influent	0	56.4	0.0	0.0	3,024	129.8	186.1	16.2	1.6	4,102	42.9	229.0	17.9	1.7
596	Honouliuli Influent	2	6.1	0.4	0.0	2,331	61.0	67.1	34.7	1.9	3,179	20.2	87.2	36.4	1.9
597	Honouliuli Influent	2,337	160.8	14.5	0.0	2,398	0.0	160.8	14.9	3.6	2,426	0.0	160.8	15.1	3.6
598	Honouliuli Influent	0	0.1	0.0	0.0	93	7.9	8.1	11.5	2.0	132	3.3	11.4	11.6	2.0
599	Honouliuli Influent	0	0.1	1.1	0.0	1,670	64.5	64.6	25.8	2.0	2,464	27.3	91.9	26.8	2.0
600	Honouliuli Influent	0	0.0	0.0	0.0	7,816	294.9	294.9	26.5	2.0	11,882	153.4	448.4	26.5	2.0
601	Honouliuli Influent	2,529	174.7	14.5	0.0	3,199	0.0	174.7	18.3	3.5	3,483	0.0	174.7	19.9	3.5
602	Honouliuli Influent	2,587	132.9	19.5	0.0	2,519	0.0	132.9	19.0	3.5	2,464	0.0	132.9	18.5	3.5
603	Honouliuli Influent	0	0.0	0.0	0.0	2,754	82.7	82.7	33.3	2.0	7,171	132.6	215.3	33.3	2.0
604	Honouliuli Influent	0	0.0	0.0	0.0	6,526	148.9	148.9	43.8	2.0	8,643	48.3	197.2	43.8	2.0
605	Honouliuli Influent	0	0.0	0.0	0.0	79	6.8	6.8	11.7	2.0	121	3.6	10.3	11.7	2.0
606	Honouliuli Influent	2,836	330.9	8.6	0.0	2,745	0.0	330.9	8.3	3.5	2,685	0.0	330.9	8.1	3.5
607	Honouliuli Influent	519	66.0	7.9	0.0	2,334	120.0	186.0	12.6	1.5	2,961	36.3	222.2	13.3	1.6
608	Honouliuli Influent	1,105	150.5	7.3	0.0	1,456	23.6	174.1	8.4	0.8	1,591	9.0	183.2	8.7	0.9
609	Honouliuli Influent	1,440	251.0	5.7	0.0	1,643	0.0	251.0	6.5	0.6	1,704	0.0	251.0	6.8	0.6

Potential Future Development Area Detail by TAZ

TAZ	Tributary Area	Year 2010				Year 2035					Year 2050				
		Population	Total Developed Land Area (acres)	Population Density	Infiltration During Wet Weather (%)	Population	Additional Developed Acres	Total Developed Land Area (acres)	Population Density	Infiltration During Wet Weather (%)	Population	Additional Developed Acres	Total Developed Land Area (acres)	Population Density	Infiltration During Wet Weather (%)
610	Honouliuli Influent	2,600	275.8	9.4	0.0	3,780	75.6	351.4	10.8	0.9	4,236	30.0	381.4	11.1	1.0
611	Honouliuli Influent	0	0.0	0.0	0.0	797	68.1	68.1	11.7	2.0	1,074	23.7	91.8	11.7	2.0
612	Honouliuli Influent	0	0.0	0.0	0.0	670	57.3	57.3	11.7	2.0	895	19.2	76.5	11.7	2.0
613	Honouliuli Influent	0	0.0	0.0	0.0	1,290	110.3	110.3	11.7	2.0	1,820	45.3	155.6	11.7	2.0
614	Honouliuli Influent	3,728	271.0	13.8	0.0	3,532	0.0	271.0	13.0	0.6	3,411	0.0	271.0	12.6	0.6
615	Honouliuli Influent	0	0.0	0.0	0.0	2,694	230.3	230.3	11.7	2.0	3,801	94.6	324.9	11.7	2.0
616	Honouliuli Influent	0	0.0	0.0	0.0	1,568	134.0	134.0	11.7	2.0	2,212	55.0	189.1	11.7	2.0
617	Honouliuli Influent	0	0.0	0.0	0.0	28	2.4	2.4	11.7	2.0	25	-0.3	2.1	11.7	2.0
618	Honouliuli Influent / Waipahu	0	0.0	0.0	0.0	45	3.1	3.1	14.7	2.0	45	0.0	3.1	14.7	2.0
763	Honouliuli Influent	0	0.0	0.0	0.0	1,050	44.9	44.9	23.4	2.0	1,050	0.0	44.9	23.4	2.0
764	Honouliuli Influent	0	0.0	0.0	0.0	1,292	110.4	110.4	11.7	2.0	1,815	44.7	155.1	11.7	2.0

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Appendix B
Biological Resource Assessment, SWCA Environmental Consultants, June 2015

SWCA®
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Biological Resources Assessment for Honouliuli Wastewater Treatment Plant Upgrade and Expansion Project

Prepared for

AECOM

Prepared by

SWCA Environmental Consultants

June 2015

BIOLOGICAL RESOURCES ASSESSMENT FOR HONOULIULI WASTEWATER TREATMENT PLANT UPGRADE AND EXPANSION PROJECT

Prepared for

AECOM
1001 Bishop Street, Suite 1600
Honolulu, Hawai'i 96813
808.521.3051

Prepared by

SWCA Environmental Consultants
Bishop Square ASB Tower
1001 Bishop Street, Suite 2800
Honolulu, Hawai'i 96813
808.548.7922
www.swca.com

SWCA Project No. 16822

June 8, 2015

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APPENDICES

TABLES

FIGURES

1. INTRODUCTION

AECOM is preparing a draft environmental impact statement (DEIS) pursuant to Chapter 343, Hawai'i Revised Statutes (HRS), and Title 11, Chapter 200, Administrative Rules, State of Hawai'i Department of Health (DOH). The City and County of Honolulu Department of Environmental Services proposes to upgrade the Honouliuli Wastewater Treatment Plant (Honouliuli facility) on the Island of O'ahu to provide secondary treatment and to expand the facility to accommodate future projected wastewater flow.

This upgrade will include the potential relocation of non-process facilities from the Sand Island Wastewater Treatment Plant to the Honouliuli facility. These facilities support island-wide wastewater treatment plants and wastewater pump stations. Although the final environmental assessment/environmental impact statement preparation notice submitted for this project and published in *The Environmental Notice* in July 2010 discusses potential impacts associated with proposed upgrades to and/or expansion of the Honouliuli major conveyance system in addition to the Honouliuli facility, itself, the current Honouliuli facility plan focuses only on the Honouliuli facility (AECOM 2010). The alternatives considered in the DEIS include only upgrades and expansions of the Honouliuli facility.

AECOM has asked SWCA Environmental Consultants (SWCA) to conduct a biological resources assessment to support the DEIS for the proposed project and to prepare a report that summarizes findings and provides recommendations to minimize impacts to sensitive natural resources. The survey area for this assessment consists of the existing Honouliuli facility at 91-1000 Geiger Road and the expansion property to the north and east, adjacent to the Coral Creek Golf Course (Figure 1).

1.1. Location and Vicinity

The survey area is at 91-1000 Geiger Road in 'Ewa Beach on the Island of O'ahu. The survey area consists of two components: the currently operating Honouliuli facility and its expansion area, which is proposed on predominately undeveloped land immediately to the north and east (see Figure 1). The survey area is accessed by Geiger Road. It is bounded by the Coral Creek Golf Course to the east, the O'ahu Railway and Land easement to the north, and Roosevelt Avenue/Geiger Road to the west and south. A portion of the expansion area is currently leased to Steel Tech Inc., a local construction company, as a storage area. Soils in the survey area are classified primarily as Mamala stony silty clay loam, 0%–12% slopes (MnC). Small percentages of Honouliuli clay, 0%–2% slopes (HxA); 'Ewa silty clay loam, 0%–2% slopes; and Waialua silty clay, 0%–3% slopes (WkA) occur in the southeast corner of the survey area.

2. METHODS

SWCA reviewed available scientific and technical literature regarding natural resources in and near the survey area. This literature review encompassed a thorough search of refereed scientific journals, technical journals and reports, environmental assessments and environmental impact statements, relevant government documents, and unpublished data that provide insight into the natural history and ecology of the area. SWCA also reviewed available geospatial data, aerial photographs, and topographic maps of the survey area.

SWCA Biologist Jason Cantley conducted flora and fauna pedestrian surveys of the entire survey area on November 16, 2014. Vegetation types and observed fauna were documented and described. Moreover, special attention was given to the documentation of threatened, endangered, or candidate species.

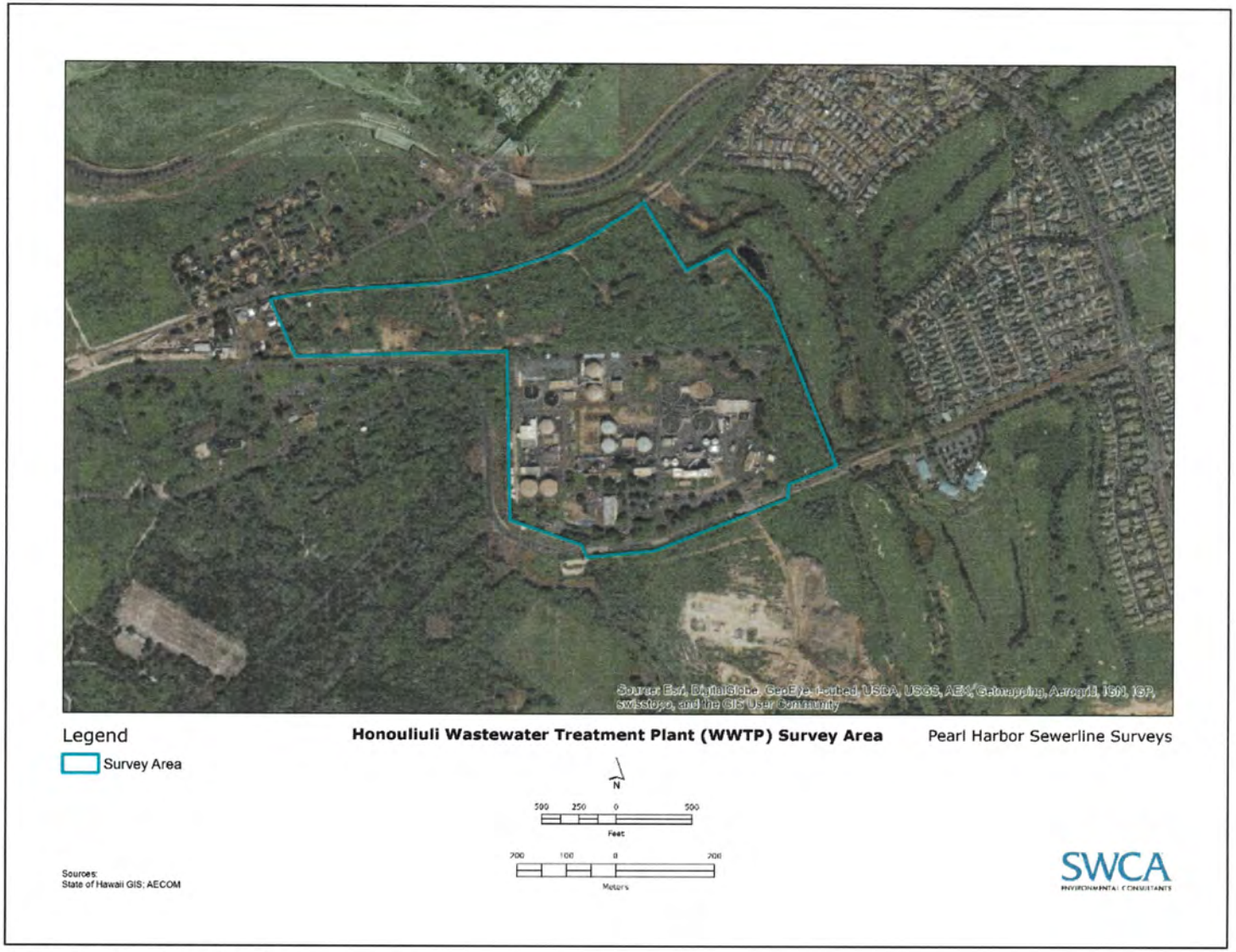

Figure 1. Survey area location.

2.1. Flora

Common plant species and vegetation types, as well as rare or listed species, were recorded during the flora survey. Areas more likely to support native plants (e.g., rocky outcrops and shady areas) were more intensively examined. A comprehensive list of all plant species present in the survey area was not within the scope of this survey.

Plants recorded during the survey are indicative of the season ("rainy" vs. "dry") and the environmental conditions at the time of the survey. As environmental conditions change, it is likely that species and plant abundances also undergo temporal or seasonal changes.

2.2. Fauna

Fauna surveys occurred *before* 11 am or *after* 4 pm when wildlife was most likely to be active. Field observations of birds were conducted using 8 × 30–millimeter binoculars. Visual and auditory observations were included in the survey. All observed birds, mammals, reptiles, amphibians, fish, and invertebrate species were noted during the survey.

Field surveys for the endangered Hawaiian hoary bat or ʻōpeʻapeʻa (*Lasiurus cinereus semotus*) were not conducted; however, areas of suitable habitat for foraging and roosting were noted when present.

2.3. Aquatic and Marine Flora and Fauna

Surveys for aquatic flora and fauna were not performed under this scope of work; however, a literature review of available data was done to determine species likely to be present in the Mamala Bay area.

2.4. Aquatic Environment

SWCA intensively reviewed available literature and previous field surveys of the potentially affected areas. SWCA identified amphidromous, estuarine, and itinerant marine species because they are the primary focus of discussion and assessment due to their importance to traditional Hawaiian gathering practices and lore, significance as indicators of ecosystem health, and the available literature concerning their biology.

3. RESULTS

In general, the plant and animal species assemblages are typical of those found in disturbed and urban areas on Oʻahu. The survey area does not encompass any designated or proposed critical habitat for threatened or endangered species.

No state or federally listed threatened, endangered, or candidate plant species were observed in the survey area during the survey. The survey area does not contain critical habitat for threatened or endangered species.

3.1. Flora

In all, 79 plant taxa were recorded during the flora survey (Appendix A). Of these, four are native to the Hawaiian Islands: ʻaʻaliʻi (Dodonaea viscosa), hinahina (*Vitex rotundifolia*), maʻo hau hele (*Hibiscus*

brackenridgei), and ʻuhaloa (*Waltheria indica*). Hinahina, ʻaʻaliʻi, and ʻuhaloa are not federally listed and are not considered endangered or at risk of extinction. However, maʻo hau hele, the Hawaiian state flower, is a federally listed species and was observed next to a facility building in a cultivated and maintained garden. The maʻo hau hele likely originated from a cultivated source and was not naturally occurring. Two additional species observed were of known Polynesian introduction: niu (*Cocos nucifera*) and kou (*Cordia subcordata*).

Overall, the vegetation in the expansion area is highly disturbed by past and current land uses. Open areas with extensive patches of bare ground exist in the northern portion, which is likely due to grazing by ungulates, vehicle traffic, and the deposition of trash and large debris. Metal scraps and debris are present in the western portion of the expansion area. Extensive graveled and asphalted areas also occur in the northern section of the expansion area. Existing vegetation is primarily characterized as a kiawe (*Prosopis pallida*) forest that covers approximately 47.8 acres, with sparse Guinea grass (*Urochloa maxima*) cover in the understory due to the presence of leaf litter, dry conditions, and grazing by ungulates (Figure 2). The kiawe trees range from 4.5 to 8.0 m (15 to 26 feet) tall and comprise roughly 70% of the tree cover throughout the expansion area. Large koa haole (*Leucaena leucocephala*) and Manila tamarind (*Pithecellobium dulce*) trees sparsely scattered throughout the kiawe forest make up most of the remaining tree cover. Two herbaceous species—lion's ear (*Leonotis nepetifolia*) and golden crown-beard (*Verbesina encelioides*)—are widely distributed throughout the understory. Other non-native herbaceous and shrub species scattered sparsely throughout the expansion area or in isolated patches include khaki weed (*Alternanthera pungens*), spiny amaranth (*Amaranthus spinosus*), wild bean (*Macroptilium lathyroides*), hairy abutilon (*Abutilon grandifolium*), *Sida ciliaris*, and *Sida rhombifolia*. The non-native, parasitic western field dodder (*Cuscuta campestris*) was also found climbing in larger trees throughout the expansion area.

The existing vegetation at the Honouliuli facility is primarily a manicured landscape with non-native grasses and herbs. Cultivated trees occur sporadically as planted individuals across the landscape and include monkey pod (*Samanea saman*), cannonball tree (*Couroupita guianensis*) and *Ficus* sp. trees. Much of the ground area is maintained entirely by mowing within the fenced area. The mowed vegetation is characterized by numerous weedy species that are common in abundance throughout the survey area. These include buffelgrass (*Cenchrus ciliaris*), common sandbur (*Cenchrus echinatus*), Guinea grass, khaki weed (*Alternanthera pungens*), coat buttons (*Tridax procumbens*), hairy garden spurge (*Euphorbia hirta*), buffalo clover (*Alysicarpus vaginalis*), *Macroptilium atropurpureum* and *M. lathyroides*, and false mallow (*Malvastrum coromandelianum* subsp. *coromandelianum).* Many other species were uncommon or rare (see Appendix A).

Figure 2. Kiawe (*Prosopis pallida*) forest at the Honouliuli facility expansion area with sparse Guinea grass (*Urochloa maxima*) cover in the understory.

Figure 3. Monkey pod (*Samanea saman*) and *Ficus sp.* trees at the Honouliuli facility with a weedy manicured ground cover in the understory.

3.2. Fauna

3.2.1. Avifauna

Ten introduced and one indigenous bird species were recorded during the survey in the survey area which includes Honouliuli facility expansion area and the currently operating Honouliuli facility (Table 1). The common myna (*Acridotheres tristis*) was the most abundant bird observed during the survey with 35 sightings. The cattle egret (*Bubulcus ibis*), zebra dove (*Geopelia striata*), and spotted dove (*Streptopelia chinensis*) were also common. All of these species are common to the main Hawaiian Islands, particularly in urban or disturbed areas (Hawai'i Audubon Society 2005). Only one indigenous species, the Pacific golden-plover, was observed in this area. A number of ducks could have been hybrids of the native koloa and mallard ducks, both of which are protected under the Migratory Bird Treaty Act (MBTA).

Table 1. Birds Observed by SWCA in and near the Survey Area

Common Name	Scientific Name	Status*	Count	MBTA
Cattle egret	*Bubulcus ibis*	NN	15	X
Common myna	*Acridotheres tristis*	NN	35	
Domestic duck	*Anas platyrhynchos domesticus*	NN	1	
House finch	*Haemorhous mexicanus*	NN	3	X
House sparrows	*Passer domesticus*	NN	3	
Koloa hybrid	*Anas wyvilliana x platyrhynchos*	HN	6	X
Pacific golden-plover, kolea	*Pluvialis fulva*	IM	3	X
Saffron finch	*Sicalis flaveola*	NN	1	
Spotted dove	*Streptopelia chinensis*	NN	6	
Zebra dove	*Geopelia striata*	NN	10	
	Total	**10**		

**Notes:* HN = hybrid native permanent resident, NN = non-native permanent resident; IM = indigenous and migratory.

3.2.1.1. ENDANGERED BIRDS

No threatened or endangered birds were observed during surveys in the survey area. O'ahu supports the largest number of Hawaiian stilts (*Himantopus mexicanus knudseni*) in the state, with an estimated 35%–50% of the population residing on the island (U.S. Fish and Wildlife Service [USFWS] 2011). Hawaiian stilts favor open wetland habitats with minimal vegetative cover and water depths of less than 24 centimeters (9.4 inches), as well as tidal mudflats (Robinson et al. 1999). Portions of the survey area appear to hold standing water after periods of extended heavy rainfall, which could attract the Hawaiian stilt and other endangered water birds such as nēnē (*Branta sandvicensis*), Hawaiian coot (*Fulica alai*), Hawaiian moorhen (*Gallinula chloropus*), and Hawaiian duck (*Anas wyvilliana*). Additionally, nearby developments and golf courses contain water features that may be attractive to these species, which increases the likelihood of them being present in the survey area. It should be noted that it is very unlikely that nēnē, Hawaiian coot, Hawaiian moorhen, and Hawaiian duck would be present on the site as they are all listed as endangered and have small populations on Oahu.

The survey area does not contain suitable habitat for most endangered birds on O'ahu because most are known to occur at higher altitudes; however, pueo (*Asio flammeus sandwichensis*), which is listed as

endangered on O'ahu by the State of Hawai'i, occupies wet and dry forests, grasslands, shrublands, and urban areas and could be present in the survey area because it contains this type of habitat.

3.2.2. Hawaiian Hoary Bat

Hawaiian hoary bats are known to occur on O'ahu in native, non-native, agricultural, and developed landscapes (U.S. Department of Agriculture 2009; USFWS 1998). Hawaiian hoary bats were not observed in the survey area; however, they have been documented roosting in trees that were present in the survey area, specifically coconut trees (*Cocos nucifera*), kiawe, christmasberry (*Schinus terebinthifolius*), and Chinese banyan (*Ficus macrocarpa*).

3.2.3. Other Mammals

Other fauna species observed during the survey were feral cats (*Felis catus*) and small Asian mongooses (*Herpestes javanicus*). It is likely that dogs (*Canis familiaris*) and cats (*Felis catus*) could enter the survey area due to the nearby residences. Other mammals that can be expected on-site include mice (*Mus musculus*) and rats (*Rattus* spp.).

3.2.4. Reptiles and Amphibians

No reptiles or amphibians were seen during the survey. None of the terrestrial reptiles or amphibians in Hawai'i are native to the islands.

3.2.5. Invertebrates

Only one native invertebrate—the indigenous globe skimmer (*Pantala flavescens*)—was seen during the survey. Two species of butterflies were observed in the survey area during the survey: Gulf fritillary (*Agraulis vanillae*) and the western pygmy blue butterfly (*Brephidium exilis*). Both are non-native to the Hawaiian Islands.

3.3. Aquatic and Marine Flora and Fauna

Surveys for aquatic flora and fauna were not performed under this scope of work; however, a literature review of available data was done to determine species likely to be present in the Mamala Bay area.

The National Oceanic and Atmospheric Administration (NOAA 2014) lists seven protected marine animals: humpback whales (*Megaptera novaeangliae*), spinner dolphins (*Stenella longirostris*), Pacific white-sided dolphins (*Lagenorhynchus obliquidens*), Hawaiian monk seals (*Monachus schauinslandi*), hawksbill sea turtles (*Eretmochelys imbricata*), leatherback sea turtles (*Dermochelys coriacea*), and green sea turtles (*Chelonia mydas*). The Hawaiian monk seal, green sea turtle, spinner dolphin, and humpback whale may occur in Mamala Bay in limited numbers on occasion.

3.4. Aquatic Environment

3.4.1. Groundwater and Surface Water

Streams from the Wai'anae Mountains are intermittent and discharge only during freshets (Nichols et al. 1997). The natural drainage of the 'Ewa Plain is mostly infiltrated. The area does not have many surface streams discharging into the ocean or Mamala Bay. There are no perennial streams close to the Honouliuli facility; however, Kaloi Gulch, which is part of the natural drainage system, runs along the eastern border of the survey area.

Kaloi Gulch originates at the southeastern end of the Wai'anae Mountains as a culmination of several gulches along the southeastern side of the Wai'anae Mountains. The drainage basin at the south boundary of 'Ewa Villages, which is adjacent to the northern boundary of the Honouliuli facility expansion area, was calculated to be 20.2 square kilometers (7.78 square miles) with a 100-year flood interval between 199.6 and 203.8 cubic meters (m^3) per second (7,050 and 7,200 cubic feet per second) (Belt Collins & Associates 1987). Near the Honouliuli facility, Kaloi Gulch is at an elevation slightly below the surrounding lands, and throughout the lower 'Ewa Plain, the gulch consists mostly of a human-made ditch. A human-made outlet exists on either side of One'ula Beach Park, but these appear to rarely have surface water.

The Honouliuli facility discharges into Mamala Bay, which is south of the facility between Ko'Olina and Pearl Harbor. It is classified as a Class A marine water and is permitted for recreational use, aesthetic enjoyment, and propagation of fish, shellfish, and wildlife (Hawai'i Administrative Rules [HAR] 11-54). Mamala Bay is on the DOH's Section 303D list, which is a list of waters that do not meet the state's water quality standards for one or more parameters. Mamala Bay was placed on this list for non-attainment of total nitrogen and chlorophyll *a* (DOH 2014). The closest site monitored by DOH is in 'Ewa Beach and is monitored for *Enterococci* and *Clostridium perfringens* periodically. Monitoring results from 2009 to 2014 were reviewed, and results were within the water quality standards for both parameters. No other water quality data were available near Mamala Bay.

The Honouliuli facility is within the Pearl Harbor sector of a Department of Land and Natural Resources aquifer. It is located above the underground injection control well line, which is a boundary between the exempted aquifer and underground source of drinking water. Groundwater near the Honouliuli facility is a source of drinking water; however, no public wells are located within 1-mile of the survey area.

3.4.1.1. WETLANDS

The National Wetland Inventory (NWI) indicates the presence of wetlands on land adjacent to the survey area on the north and east sides; however, no wetlands were identified in the survey area. The presence of facultative, facultative upland, and facultative wetland plant species in the survey area was noted. These species can occur in wetland and non-wetland environments and do not necessarily indicate the presence of wetlands in the survey area. Three criteria—wetland hydrology, hydric soils, and the presence hydrophytic vegetation—must be met to make a wetland determination. Wetland hydrology and hydric soils were not analyzed under this scope of work.

3.4.2. Water Quality and Effluent

The effluent from the Honouliuli facility is conveyed 2,670 meters (m) (8,760 feet) offshore to a depth of approximately 61 m (200 feet) where it is dispersed by a 533-m-long (1,750-foot-long) diffuser pipe at

the Barbers Point Deep Ocean Outfall. Because the effluent is of a lower density than seawater, it rises into the water column where ocean currents dilute and disperse it.

The current effluent discharge rate at the Barbers Point Deep Ocean Outfall is approximately 1 m^3 per second (22.8 million gallons per day [mgd]) (Table 2) (Shuai et al. 2014). The average daily flow to the Honouliuli facility was 1.13 $m^3 s^{-1}$ (25.8 mgd) in 2012. This annual average is expected to rise to 1.7 $m^3 s^{-1}$ (39.6 mgd) by 2035 and to 1.95 $m^3 s^{-1}$ (44.4 mgd) by 2050 (AECOM 2010). The peak flow capacity of the Barbers Point Deep Ocean Outfall is 4.9 $m^3 s^{-1}$ (112 mgd).

Table 2. Current parameters at the Barbers Point Deep Ocean Outfall

Wastewater Treatment Plant	Average Flow Rate ($m^3 s^{-1}$)	Average Concentration of Total Suspended Solids (grams m^{-3})	Average Solid Loading Rate (grams s^{-1})
Honouliuli facility	0.99	44.7	44.2

Source: Shuai et al. (2014)

Under the current conditions, the effluent contains not only the primary treated sewage, but some fraction of secondary treated sewage (the amount depending on the export of recycled water (R-1 water) which is used for irrigation, from the Honouliuli facility to the Hawai'i Water Recycling Facility [HWRF], as well as the brine byproduct of the reverse osmosis system used to produce R-O industrial freshwater supplied to customers).

If the water column at the site of the diffuser is stratified, which can occur in warmer summer months, the upper extent of the plume can be held below the surface, making it essentially invisible. In general, as submergence increases (i.e., the top of the plume is held further below the sea surface), diffusion decreases. In the design of the Barbers Point diffuser, high dilution was considered to be more important than submergence of the sewage field with the concomitant reduction in visual impact.

There are three stages in the hydrodynamic fate of the sewage plume from the diffuser. First, the effluent rises as a buoyant plume. This process is governed by the difference in density between the effluent and the ambient seawater. The second phase of transport is horizontal spreading. The direction and velocity are determined by the ocean currents integrated along the depth gradient where the plume occurs. Finally, turbulent mixing continually dilutes and disperses the effluent.

If flow in the outfall delivery pipe and the diffuser is too low, deposition of solids in the system occurs. This can partly be avoided in the design of the diffuser. The diameter of the diffuser is reduced along its length to maintain adequate velocity of the effluent as the volume is reduced by loss to the ocean. Also, deposition of solids in the system can be controlled by maintaining a minimum flow. If the flow to the diffuser pipe is 5 $m^3 s^{-1}$ (112 mgd), the velocity at the end of the diffuser pipe would be approximately 1.4 m s^{-1} (4.5 feet per second [fps]), but if the total effluent flow fell to 1 $m^3 s^{-1}$ (23 mgd), the velocity at the end of the diffuser pipe would be only approximately 0.2 m s^{-1} (0.7 fps).

At the other end of the flow spectrum is the ability of the system to handle high flows resulting from stormwater runoff. Peak 1-hour storm flow from a large (2-year recurrence interval) 6-hour storm for 2010 is projected to be 3.6 $m^3 s^{-1}$ (82.2 mgd). This would rise to 5 $m^3 s^{-1}$ (114 mgd) by 2035 and to 5.5 $m^3 s^{-1}$ (126 mgd) by 2050. The current design peak flow capacity for the system is 4.9 $m^3 s^{-1}$ (112 mgd).

The Barbers Point Deep Ocean Outfall currently discharges effluent partly comprising primary treated sewage. The City and County of Honolulu were required to obtain a Clean Water Act 301(h) waiver

permit to allow this. As part of the maintenance of this permit, a continuous long-term monitoring study was required. This permit also covered three other wastewater treatment plants on O'ahu, and the monitoring has been ongoing at these sites as well. A concern triggering the requirement for this monitoring program was that discharged organic particles might cause organic enrichment of the sediment near the diffuser and reduce biodiversity. Early studies of the sediments near the Barbers Point Deep Ocean Outfall show that benthic fluxes of dissolved nutrients in the zone of initial dilution (ZID) were higher than control areas in the 2 years of the study (1984 and 1985), and that organic flocs of sewage origin were seen within 50 m (164 feet) of the diffuser (Smith and Dollar 1987). However, when the biodiversity of the sediment infauna was assessed, there was no difference between samples from the ZID and the control sites, although the biomass of infaunal organisms was greater. To assure that the effects of the outfall were not increasing, a long-term monitoring program was initiated. This program samples the sediments at and near the outfalls and determines the diversity and abundance of polychaete worms, micromollusks, and crustaceans. These have been quantified for over 20 years. Additionally, samples of fishes near the discharge plumes have been monitored for pathologies. The data from these samples are stored in the U.S. Environmental Protection Agency's Storet data storage system (EPA 2014), and annual summaries are available through the University of Hawai'i Water Resources Research Center site (University of Hawai'i at Manoa 2015). A more in-depth analysis of the polychaete results was recently published using samples taken from 1990 to 2010 (Shuai et al. 2014). The conclusions of the benthic sampling at the Barbers Point Deep Ocean Outfall is that there is more year-to-year variation at any one site than between the ZID and control sites.

In summary, the effects of the sewage effluent delivered to the ocean by the Barbers Point diffuser is negligible under the existing conditions, even though a substantial fraction of the effluent consists of primary treated sewage. The question of whether this might change under future conditions (elimination of primary treated effluent and increase volume) is addressed below. Tables 3 and 4 present the projected parameters for the Barbers point diffuser.

Table 3. Projections for the Barbers Point Diffuser (million gallons per day)

Flows MGD	**2000**	**2030**	**2150**
Dry weather infiltration	9.26 (0.41 $m^3 s^{-1}$)	13.29 (0.58 $m^3 s^{-1}$)	13.29 (0.58 $m^3 s^{-1}$)
Sanitary flow	19.64 (0.86 $m^3 s^{-1}$)	30.59 (1.34 $m^3 s^{-1}$)	45.73 (2.00 $m^3 s^{-1}$)
Sanitary flow peaking factor	2	2	2
WWI/I peak daily	12.52 (0.55 $m^3 s^{-1}$)	23.73 (1.04 $m^3 s^{-1}$)	23.73 (1.04) $m^3 s^{-1}$
WWI/I peak hourly	60.61 (2.66 $m^3 s^{-1}$)	108.41 (4.75 $m^3 s^{-1}$)	108.41 (4.75 $m^3 s^{-1}$)
Design Flows	**2000**	**2030**	**2150**
Average dry weather daily flow	28.90 (1.27) $m^3 s^{-1}$	43.88 (1.92 $m^3 s^{-1}$) $m^3 s^{-1}$	59.02 (2.59 $m^3 s^{-1}$)
Peak dry weather daily flow	48.54 (2.13 $m^3 s^{-1}$)	74.48 (74.48 $m^3 s^{-1}$)	104.76 (4.59 $m^3 s^{-1}$)
Average wet weather daily flow	41.42 (1.81 $m^3 s^{-1}$)	67.61 (2.96 $m^3 s^{-1}$)	82.76 (3.63 $m^3 s^{-1}$)
Peak wet weather daily flow	61.06 (2.68 $m^3 s^{-1}$)	98.21 (4.30 $m^3 s^{-1}$)	128.49 (5.63) $m^3 s^{-1}$
Peak wet weather hourly flow	109.15 (4.78 $m^3 s^{-1}$)	182.89 (8.01) $m^3 s^{-1}$	213.17 (9.33 $m^3 s^{-1}$)

Notes: Sanitary flow = average daily flow - dry weather infiltration; WWI/I = wet weather infiltration and inflow.

Note that neither this table, nor Table 4, presents projections of volume, composition, or density of effluent produced from the diffuser.

Table 4. Waste Load Projections for Average Conditions at Barbers Point Deep Ocean Outfall

Parameter	Biochemical Oxygen Demand	Total Suspended Solids
Concentration (mg/ml)	280	300
Present waste load coefficient	0.19	0.20
Waste load 2007 (pounds/day)	62,580	67,050
Waste load 2030 (pounds/day)	80,898	86,676
Waste load 2150 (pounds/day)	127,275	136,366

Source: M & E Pacific (2008).

Note that neither this table, nor Table 3, presents projections of volume, composition, or density of effluent produced from the diffuser.

The volume of secondary effluent being discharged would be expected to increase by the amount of projected flow minus the amount going to the HWRF. There is insufficient Information on how much more R-1 water the HWRF may plan to accept. The HWRF brine water along with excess R-1 and reverse osmosis (RO) water will continue to be discharged through the outfall. HWRF currently takes 0.57 $m^3 s^{-1}$ (13 mgd) each day, of that 0.043 $m^3 s^{-1}$ (1 mgd) would be discharged as brine. Upgrades or improvements to the HWRF were not included in the scope of work, and therefore it is not known how the amount or quality may change.

4. DISCUSSION AND RECOMMENDATIONS

4.1. Flora

No naturally occurring threatened or endangered plants were found during the survey. One individual of ma'o hau hele was observed. Because of its presence in a maintained garden on historically disturbed land, this individual was likely cultivated then planted as an ornamental. Therefore, this plant is not considered to be of conservation value because it does not originate from a naturally occurring, wild population. For these reasons, there are no legal ramifications impeding its removal. Although the 'Ewa area is within the historical range of the endangered ko'oloa'ula (*Abutilon menziesii*), the species is not known to have been recently documented in survey area (personal communication, Greg Mansker, Horticulturist, Hawai'i Department of Land and Natural Resources, October 31, 2014) and has not been seen during recent surveys in the vicinity (AECOS 2010, 2011; SWCA 2012, 2013). Approximately 95% of the plant species seen during the survey are not native to Hawai'i. The native species present are common throughout the Hawaiian Islands. Therefore, the proposed project is not expected to have a significant, adverse impact on native botanical resources.

The removal of native vegetation should be avoiding, if possible. Additionally, some plants may provide food or habitat for endangered species listed in the fauna section below. These species should be considered when removing vegetation. Removal of shade trees is permitted; however, removal of trees taller than 4.6 m (15 feet) should be avoided between June 1 and September 15 to avoid impacts to the endangered Hawaiian hoary bat.

SWCA recommends that native Hawaiian plants be employed for landscaping around the survey area to the maximum extent possible. Potential native species that may be appropriate for landscaping at the survey area include ko'oloa'ula, kou, 'ilie'e (*Plumbago zeylanica*), and 'a'ali'i.

Additional information on selecting appropriate (non-invasive) plants for landscaping can be obtained from the following websites:

- http://www.nativeplants.Hawaii.edu/
- http://www.plantpono.org/non-invasive-plants.php
- http://www.hear.org/alternativestoinvasives/pdfs/mcaac_hpwra_a2i_list.pdf
- http://www.hear.org/oisc/oahuearlydetectionproject/pdfs/oedposterwhatnottoplant.pdf

4.2. Fauna

4.2.1. Federally Listed Species

No federally listed species were observed during the surveys; however, water features present in and near the survey area may attract the endangered Hawaiian stilt and other waterbirds. Additionally, Hawaiian hoary bats have been known to roost in vegetation observed in the survey area and could be present. The pueo could potentially be present within the survey area. The following recommendations could minimize impacts to waterbirds, pueo, and Hawaiian hoary bat.

Waterbirds

During construction, minor alterations of local topography in low-lying areas to prevent water from ponding could reduce attraction of Hawaiian stilt and other waterbirds. Additionally, the following best management practices would avoid and minimize impacts to the Hawaiian stilt and other waterbirds should they occur on-site before or during construction:

- In areas where Hawaiian waterbirds have been observed, nest searches will be conducted by a qualified biologist before work begins and after any subsequent delay in work of 3 or more days (during which birds may attempt nesting). Hawaiian stilts nest from middle February through late August, with variable peak nesting from year to year (Robinson et al. 1999).
- If a nest with eggs is discovered, work will cease within 46 m (150 feet) of the nest for a minimum of 70 days (10 weeks); if a nest with chicks is discovered, work will cease for a minimum of 49 days (7 weeks). These guidelines are intended to protect chicks, and may be shortened if monitoring is conducted often enough to note when chicks have fledged (usually 5–6 weeks after hatching). Work will not begin in the area until 2 weeks after chicks have fledged.
- If an endangered Hawaiian waterbird is found in the area during ongoing management activities, all activity within 15 m (50 feet) of the bird will cease; the bird will also not be approached within 15 m (50 feet). Work may continue after the bird leaves the area of its own accord.

Pueo

Suitable habitat for the state-listed pueo appears to be present in the survey area, so it is possible that they could be present. Mitigations measures can be taken to reduce disturbance to pueo. These include suspending work (particularly with machinery or vehicles) within 91 m (300 feet) of any area where distraction displays, vocalizations, or other indications of nesting by adult pueo are seen or heard, and only resume activity when it is apparent that the young have fledged or there is other confirmation that pueo nesting is no longer occurring. With these measures, there is not likely to be any adverse effect on the pueo.

Hawaiian hoary bats

Although the chances of adversely affecting Hawaiian hoary bats as a result of the proposed project are likely small, the following measures are recommended as a conservative impact avoidance measure:

- Any fences that are erected as part of the project should have barbless top-strand wire to prevent entanglements of the Hawaiian hoary bat on barbed wire. No fences in the survey area were observed with barbed wire during the survey; however, if fences are present, the top strand of barbed wire should be removed or replaced with barbless wire.
- No trees taller than 4.6 m (15 feet) should be trimmed or removed as a result of this project between June 1 and September 15, when juvenile bats that are not yet capable of flying may be roosting in the trees.

Implementation of these guidelines, which have been promulgated by the USFWS (1998), is expected to avoid all direct impacts to Hawaiian hoary bats.

4.2.2. Migratory Bird Treaty Act

SWCA observed the following four bird species federally protected under the MBTA during this survey: the cattle egret, Hawaiian duck–mallard hybrids, house finch (*Haemorhous mexicanus*), and Pacific golden-plover. Construction in the survey area may temporarily displace some of these bird species, but long-term impacts are not expected. These birds (likely limited to a few individuals) are expected to find suitable foraging habitat in nearby areas. The temporary displacement of these individuals in the survey area is not expected to affect an individual's survival or the overall species' populations. The Pacific golden-plover was the only species observed known to migrate from Hawai'i to elsewhere. However, its presence should not be of concern, because they do not nest in Hawai'i. It is expected that these birds would return when construction is complete; no long-term impacts are expected.

4.3. Aquatic and Marine Flora and Fauna

Surveys were not specifically conducted for rare, threatened, or endangered fauna found in streams or coastal waters; however based on literature review, it is not expected that the proposed project impact will have this species.

4.4. Aquatic Environment

Impacts to water quality from construction or operations at the Honouliuli facility and from the Barbers Point Deep Ocean Outfall may occur. During proposed construction, storm runoff can carry increased sediment into surface waters, potentially impacting water and benthic habitat quality at the margins of the estuary. Construction and ground disturbance should comply with the conditions of the Clean Water Act as well as HAR 11-54 and HAR 11-55. Permitting under the National Pollution Discharge Elimination System program may be required, which may include filing a notice of intent with DOH for general permit coverage for Stormwater Discharges Associated with Construction Activities (HAR 11-55 Appendix C), Discharges of Hydrotesting Waters (HAR 11-55 Appendix F), and Discharges Associated with Construction Activity Dewatering (HAR 11-55 Appendix G). During construction, the contractor should develop a stormwater pollution prevention plan (SWPPP) that complies with the Clean Water Act, HAR 11-54, and HAR 11-55, and that implement best management practices to minimize impacts to water quality in the Kaloi Gulch and other surface waters. Based on long-term studies, temporal differences in benthic organisms within sites are larger than between ZID and control sites, indicating that

under current conditions, the effects of diffused effluent are negligible and will have no impact on coastal waters. Impacts to groundwater as a result of construction are unlikely to occur.

Upgrades at the Honouliuli facility will effect operations at the plant, resulting in increases in effluent flow volumes. Despite this increase in flow volumes, pollutant loading for biochemical oxygen demand (BOD) and total suspended solids (TSS) is expected to decrease as a result of upgrades from primary to secondary treatment; therefore, impacts to coastal waters should not be affected significantly. Groundwater and surface waters will not be impacted.

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APPENDIX A. CHECKLIST OF PLANT SPECIES OBSERVED AT HONOULIULI WASTEWATER TREATMENT FACILITY ON NOVEMBER 16, 2014

The following checklist is an inventory of all the plant species observed by the SWCA biologist on November 16, 2014, during surveys at the Honouliuli facility, on the Island of O'ahu, Hawai'i. The plant names are arranged alphabetically by family and then by species into three groups: Gymnosperms, Monocots, and Dicots. The taxonomy and nomenclature are in accordance with Palmer (2003), Evenhuis and Eldredge (2011), Wagner et al. (1999), Wagner and Herbst (2003), and Staples and Herbst (2005). Recent name changes are those recorded in Wagner et al. (2012)..

Table Notes

Status:

E = endemic = native only to the Hawaiian Islands.
I = indigenous= native to the Hawaiian Islands and elsewhere.
P = Polynesian = introduced by Polynesians.
X =introduced/ alien = all those plants brought to the Hawaiian Islands by humans, intentionally or accidentally, after Western contact (Cook's arrival in the islands in 1778).

Relative Site Abundance:

A = Abundant = forming a major part of the vegetation within the survey area.
C = Common = widely scattered throughout the area or locally abundant within a portion of it.
U = Uncommon = scattered sparsely throughout the area or occurring in a few small patches.
R = Rare = only a few isolated individuals within the survey area.

Scientific Name	Common and Hawaiian Name(s)	Status	Honouliuli Facility	
			Manicured Lawn	Facility Expansion Site
GYMNOSPERMS				
Cupressaceae				
Juniperus sp.	juniper	X	R	
MONOCOT				
Aloaceae				
Aloe vera (L.) Burm.f.	aloe	X	R	R
Agavaceae				
Cordyline fruticosa (L.) A. Chev.	tī, kī	X	R	
Arecaceae				
Cocos nucifera L.	niu, ololani, coconut	P/I?	R	
Muscaceae				
Musa X paradisiaca L.	banana	X	R	
Poaceae				
Axonopus compressus (Sw.) Beauv.		X	R	

Scientific Name	Common and Hawaiian Name(s)	Status	Honouliuli Facility	
			Manicured Lawn	Facility Expansion Site
Bothriochloa pertusa (L.) A.Camus	pitted beardgrass	X	U	
Cenchrus ciliaris L.	buffelgrass	X	C	A
Cenchrus echinatus L.	common sand burr	X	C	
Chloris barbata Sw.	swollen fingergrass	X	U	
Chloris radiata (L.) Sw.	radiate fingergrass	X	U	
Cynodon dactylon (L.) Pers.	Bermuda grass	X	U	
Melinis repens (Willd.) Zizka	Natal redtop, Natal grass	X	U	
Paspalum conjugatum P.J.Bergius	Hilo grass	X	R	
Paspalum dilatatum Poir.	dallis grass	X	R	
Urochloa maxima (Jacq.) R. Webster	Guinea grass	X	C	A
DICOT				
Acanthaceae				
Asystasia gangetica (L.) T.Anderson	Chinese violet	X	U	
Amaranthaceae				
Alternanthera pungens Kunth	khaki weed	X	C	R
Alternanthera sessilis (L.) R.Br. ex DC.	sessile joyweed	X	U	
Amaranthus spinosus L.	spiny amaranth	X	U	R
Amaranthus viridis L.	slender amaranth, pakai	X	U	
Anacardiaceae				
Schinus terebinthifolius Raddi	Christmas berry, wilelaiki	X		UC
Apocynaceae				
Plumeria sp.	plumeria	X	R	
Asteraceae				
Bidens pilosa L.	Spanish needles			U
Calyptocarpus vialis Less.	nodeweed	X	U	
Dyssodia tenuiloba (DC.) B. L. Rob.	Dahlberg daisy	X	R	
Pluchea carolinensis (Jacq.) G. Don	sourbush, marsh fleabane	X		R
Sonchus oleraceus L.	sow thistle, pualele	X	R	
Synedrella nodiflora (L.) Gaertn.	nodeweed	X	U	
Tridax procumbens L.	coat buttons	X	C	
Verbesina encelioides (Cav.) Benth. & Hook.	golden crown-beard	X		
Boraginaceae				
Carmona retusa (Vahl) Masam.	Fukien tea tree, Philippine tea tree	X	R	
Cordia subcordata Lam.	kou	P/I?	R	
Heliotropium procumbens var. *depressum* (Cham.) Fosberg		X	R	
Capparaceae				
Cleome gynandra L.	cleome	X	R	

Scientific Name	Common and Hawaiian Name(s)	Status	Honouliuli Facility	
			Manicured Lawn	Facility Expansion Site
Chenopodiaceae				
Chenopodium murale L.	goosefoot, pigweed, lamb's quarters	X	R	
Convolvulaceae				
Ipomoea obscura (L.) Ker Gawl.	morning glory	X	U	
Ipomoea triloba L.	little bell	X	U	
Merremia aegyptia (L.) Urb.	hairy merremia, koali kua hulu	X	R	
Cucurbitaceae				
Cucumis dipsaceus Ehrenb. ex Spach	hedgehog gourd, teasel gourd	X	R	
Momordica charantia L.	balsam pear, bitter melon	X	U	R
Cuscutaceae				
Cuscuta campestris Yunck.	western field dodder	X		U
Euphorbiaceae				
Euphorbia hirta L.	hairy garden spurge	X	C	
Euphorbia hypericifolia (L.) Millsp.	graceful spurge	X	U	
Euphorbia hyssopifolia (L.) Small			R	
Euphorbia prostrata Aiton	Prostrate spurge	X	R	
Ricinus communis L.	castor bean	X	R	
Fabaceae				
Alysicarpus vaginalis (L.) DC.	buffalo clover	X	C	
Cassia fistula L.	golden shower tree	X	R	
Delonix regia (Bojer ex Hook.) Raf.	royal poinciana	X	R	
Desmodium tortuosum (Sw.) DC.	Florida beggarweed	X	R	
Leucaena leucocephala (Lam.) de Wit	koa haole	X	R	C
Macroptilium atropurpureum (DC.) Urb.		X	C	
Macroptilium lathyroides (L.) Urb.	wild bean, cow pea	X	C	
Prosopis pallida (Humb. & Bonpl. ex Willd.) Kunth	kiawe, algaroba, mesquite,	X		A
Pithecellobium dulce (Roxb.) Benth.	Manila tamarind, ʻopiuma	X	U	C
Senna alata (L.) Roxb.	candle bush	X	R	U
Samanea saman (Jacq.) Merr.	monkeypod, rain tree	X	A	
Lamiaceae				
Leonotis nepetifolia (L.) R. Br	lion's ear	X	R	C
Lecythidaceae				
Couroupita guianensis Aubl.	cannonball tree	X	R	
Malvaceae				
Abutilon grandifolium (Willd.) Sweet	hairy abutilon, maʻo	X	U	U
Hibiscus brackenridgei A. Gray	maʻo hau hele	E	R	
Hibiscus rosa-sinensis L.	Hibiscus	X	R	

Scientific Name	Common and Hawaiian Name(s)	Status	Honouliuli Facility	
			Manicured Lawn	Facility Expansion Site
Malva neglecta Wallr.	common mallow	X	R	
Malvastrum coromandelianum subsp. *coromandelianum* (L.) Garcke	false mallow	X	C	
Sida acuta Burm. f.		X	U	U
Sida ciliaris L.		X	R	
Sida rhombifolia L.		X	U	R
Moraceae				
Ficus microcarpa L. f.	Chinese banyan	X	R	
Nyctaginaceae				
Boerhavia coccinea Mill.	scarlet spiderling	X	U	
Passifloraceae				
Passiflora foetida	love-in-a-mist	X	R	
Solanaceae				
Caspsicum sp. L.	chili pepper	X	R	
Solanum melongena L.	eggplant	X	R	
Rubiaceae				
Gardenia jasminoides J. Ellis	common gardenia	X	R	
Rutaceae				
Citrus x limon	lemon	X	R	
Murraya paniculata (L.) Jack	mock orange	X	R	
Sapindaceae				
Dodonaea viscosa Jacq.	ʻaʻaliʻi	I	R	
Sterculiaceae				
Waltheria indica L.	ʻuhaloa	I	U	
Verbenaceae				
Vitex rotundifolia L. *f.*	hinahina, beach vitex	I	R	