
Chapter 20302

Waimea Aquifer System Area

CHAPTER 20302 - TABLE OF CONTENTS

20302 WAIMEA AQUIFER SYSTEM AREA.....	20302-1
20302-1 SYSTEM AREA PROFILE.....	20302-1
20302-1.1 General.....	20302-1
20302-1.2 Economy and Population	20302-1
20302-1.2.1 Economy	20302-1
20302-1.2.2 Population	20302-1
20302-1.3 Land Use.....	20302-2
20302-1.3.1 2000 Kauaʻi General Plan	20302-2
20302-1.3.2 Kauaʻi Zoning.....	20302-2
20302-2 EXISTING WATER RESOURCES.....	20302-6
20302-2.1 Ground Water.....	20302-6
20302-2.2 Surface Water.....	20302-6
20302-2.3 Water Conservation	20302-6
20302-2.4 Rainwater Catchment.....	20302-6
20302-2.5 Recycled Water	20302-6
20302-3 EXISTING WATER USE.....	20302-10
20302-3.1 General.....	20302-10
20302-3.2 Domestic Use.....	20302-11
20302-3.3 Industrial Use.....	20302-11
20302-3.4 Irrigation Use	20302-11
20302-3.4.1 Ground Water	20302-12
20302-3.4.2 Recycled Water.....	20302-12
20302-3.4.3 Surface Water.....	20302-12
20302-3.5 Agricultural Use.....	20302-12
20302-3.5.1 Ground Water	20302-12
20302-3.5.2 Surface Water.....	20302-12
20302-3.6 Military Use	20302-12
20302-3.7 Municipal Use	20302-12
20302-3.7.1 County Water Systems	20302-12
20302-3.7.2 State Water Systems.....	20302-13
20302-3.7.3 Federal Water Systems	20302-14
20302-3.7.4 Private-Public Water Systems.....	20302-14
20302-3.7.5 Per Capita Use	20302-14
20302-3.8 Existing Water Use by Resource.....	20302-14

20302-3.8.1	Ground Water	20302-14
20302-3.8.2	Surface Water.....	20302-14
20302-3.8.3	Water Conservation	20302-15
20302-3.8.4	Rainwater Catchment	20302-15
20302-3.8.5	Recycled Water.....	20302-15
20302-4	FUTURE WATER USE.....	20302-16
20302-4.1	Full Build-Out Water Demand Projections.....	20302-16
20302-4.1.1	Refined Land Use Based Water Projection.....	20302-16
20302-4.1.2	Water Use Rates	20302-18
20302-4.2	Water Demand Projections to the Year 2035	20302-18
20302-4.3	Summary	20302-21
20302-5	RESOURCE AND FACILITY RECOMMENDATIONS	20302-22
20302-5.1	Water Source Adequacy	20302-22
20302-5.1.1	Full Build-Out	20302-22
20302-5.1.2	Twenty-Year Projection	20302-22
20302-5.2	Source Development Requirements	20302-22
20302-5.2.1	Supply-Side Management.....	20302-22
20302-5.2.2	Demand-Side Management	20302-24
20302-5.3	Recommended Alternatives.....	20302-25

FIGURES

Figure 20302-1: General Plan Land Use Map	20302-4
Figure 20302-2: County Zoning	20302-5
Figure 20302-3: Well Location	20302-7
Figure 20302-4: Streams & Diversions.....	20302-8
Figure 20302-5: Water System & Service Area	20302-9
Figure 20302-6: Existing Water Use by Category – Waimea ASYA.....	20302-11
Figure 20302-7: DOW Existing Water Use by Category – Waimea ASYA	20302-13
Figure 20302-8: Water Demand Projection Summary – Waimea ASYA.....	20302-19
Figure 20302-9: Medium Growth Rate B Water Demand Projection by Category – Waimea ASYA.....	20302-20
Figure 20302-10: Medium Growth Rate B Water Demand Projections and Full Build-Out – Waimea ASYA.....	20302-21

TABLES

Table 20302-1: Historical Population – Waimea ASYA.....	20302-1
Table 20302-2a: Population Projection – Waimea ASYA.....	20302-2
Table 20302-2b: Population Projection – Percent Change – Waimea ASYA.....	20302-2
Table 20302-3: General Plan Estimated Land Use Allocation Acreage – Waimea ASYA.....	20302-2
Table 20302-4: County Zoning Estimated District Allocation Acreage – Waimea ASYA.....	20302-3
Table 20302-5: Existing Water Use by Category – Waimea ASYA.....	20302-10
Table 20302-6: DOW Existing Water Use by Category – Waimea ASYA.....	20302-13
Table 20302-7: Per Capita Use – Waimea ASYA.....	20302-14
Table 20302-8: Pumpage – Waimea ASYA.....	20302-14
Table 20302-9: General Plan Full Build-Out Water Demand Projection – Waimea ASYA.....	20203-16
Table 20302-10: Zoning Full Build-Out Water Demand Projection – Waimea ASYA.....	20302-16
Table 20302-11: Future State Water Projects – Waimea ASYA.....	20302-17
Table 20302-12: Irrigation of Agricultural Lands.....	20302-18
Table 20302-13: Water Demand Projection – Waimea ASYA.....	20302-19
Table 20302-14: Medium Growth Rate B Water Demand Projection by Category – Waimea ASYA.....	20302-20
Table 20302-15: Summary of Demand Projections.....	20302-21

20302 WAIMEA AQUIFER SYSTEM AREA

20302-1 SYSTEM AREA PROFILE

20302-1.1 General

The Waimea [20302] Aquifer System Area (ASYA) is roughly bound on the west and northwest by Waimea Canyon Drive and Kōkeʻe Road from Waimea town to past the end of Kōkeʻe Road, along the northeast side along the west ridge above the Wainiha River and through a portion of the ʻAlakai Swamp near the head of the Halepaʻakai Stream, and back down to Waimea town along the east ridge of the Mokihana Stream and Waimea River.

The Waimea ASYA includes the east side of Waimea Town, Kōkeʻe State Park, and the Waimea Canyon.

Average annual rainfall ranges from 25 inches per year along the coast to 320 inches in the mountains. The sustainable yield is 37 mgd.

20302-1.2 Economy and Population

20302-1.2.1 Economy

Lands within the Waimea ASYA are largely uninhabited and undeveloped. Rural residential and community commercial areas are concentrated in proximity to Waimea Town, nearer to the shoreline area and Kaumualiʻi Highway. The largest industries in Waimea are related to accommodations and food service, healthcare and social assistance and retail trade.

20302-1.2.2 Population

The population contributing to the demand within the Waimea ASYA is almost completely located in the residential area located in Waimea town. Scattered residences located in proximity to Kōkeʻe State Park mainly rely on catchment systems and therefore do not contribute to water demand in this ASYA.

Historical population data for the Waimea ASYA is summarized in **Table 20302-1**. Population projections through the year 2035 are summarized in **Table 20302-2a**. As summarized in **Table 20302-2b**, it is estimated that the area will experience growth rates between 3 to 8 percent per decade.

Table 20302-1: Historical Population – Waimea ASYA

	Year		
	1990	2000	2010
Population	982	1,183	1,163
Percent Change		20.47	-1.72

Data Source: Socioeconomic Analysis and Forecasts (2014) Technical Report.
Data redistributed and evaluated for Waimea ASYA.

Table 20302-2a: Population Projection – Waimea ASYA

Growth Rate	Population by Year								
	2015	2016	2017	2018	2019	2020	2025	2030	2035
A – Low	1,186	1,191	1,195	1,199	1,203	1,207	1,230	1,255	1,282
B – Med.	1,195	1,203	1,210	1,218	1,226	1,234	1,276	1,322	1,373
C – High	1,197	1,205	1,213	1,221	1,230	1,238	1,284	1,334	1,389

Data Source: Socioeconomic Analysis and Forecasts (2014) Technical Report. Data redistributed and evaluated for Waimea ASYA.

Table 20302-2b: Population Projection – Percent Change – Waimea ASYA

Growth Rate	2015-2025 % Change	2025-2035 % Change
A – Low	3.7	4.2
B – Medium	6.8	7.6
C – High	7.3	8.2

20302-1.3 Land Use

20302-1.3.1 2000 Kaua‘i General Plan

The 2000 Kaua‘i County General Plan Land Use Designation Map for the Waimea ASYA is shown on **Figure 20302-1**. The estimated land use allocation acreage for each land use designation within the system area is listed in **Table 20302-3**.

Table 20302-3: General Plan Estimated Land Use Allocation Acreage – Waimea ASYA

General Plan Land Use Designation	Acreage	Percent of Total
Agricultural	161	0.5
Military	0	0.0
Open	32,459	99.0
Park	9	0.0
Residential Community	175	0.5
Resort	0	0.0
Transportation	0	0.0
Urban Center	0	0.0
DHHL	0	0.0
TOTAL	32,803	100.0

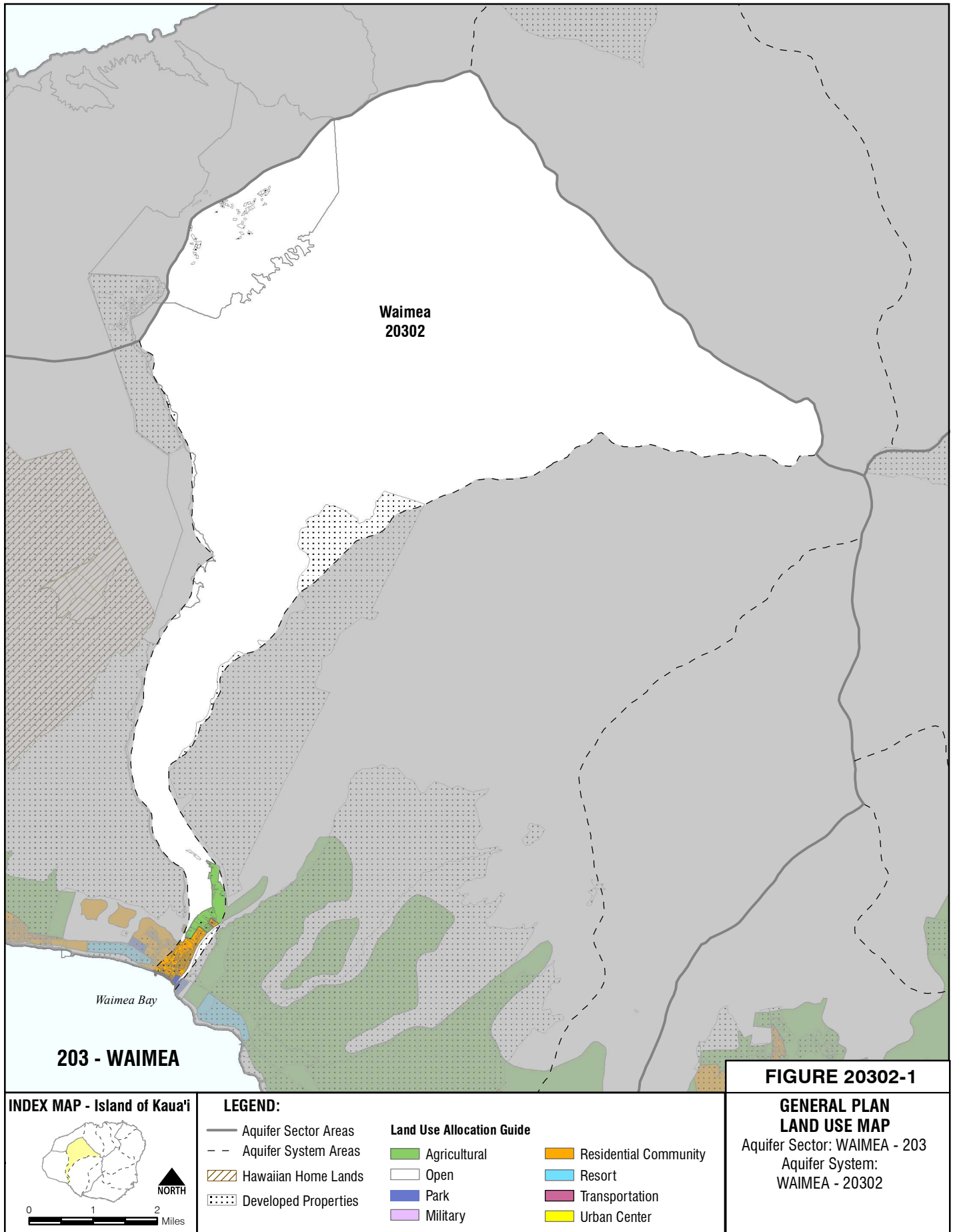
20302-1.3.2 Kaua‘i Zoning

Kaua‘i County Zoning Map for the Waimea ASYA is shown on **Figure 20302-2**. The estimated land use allocation acreage for each zoning district within the system area is listed in **Table 20302-4**.

Table 20302-4: County Zoning Estimated District Allocation Acreage – Waimea ASYA

Zoning District	Acreage	Percent of Total
Agriculture	1	0.0
Commercial – General	13	0.0
Commercial - Neighborhood	0	0.0
Conservation	32,025	98.8
Industrial – General	0	0.0
Industrial - Limited	0	0.0
Open	172	0.5
Residential	159	0.5
Resort	0	0.0
Project Development	0	0.0
Special Planning Area	0	0.0
Special Treatment	0	0.0
No Zoning	57	0.2
DHHL	0	0.0
TOTAL	32,427	100.0

The number of dwelling units allowed in residential and resort districts varies by the type of residential or resort district. The average number of dwelling units allowed in residential districts in the Waimea ASYA is 3.24 dwelling units per acre.



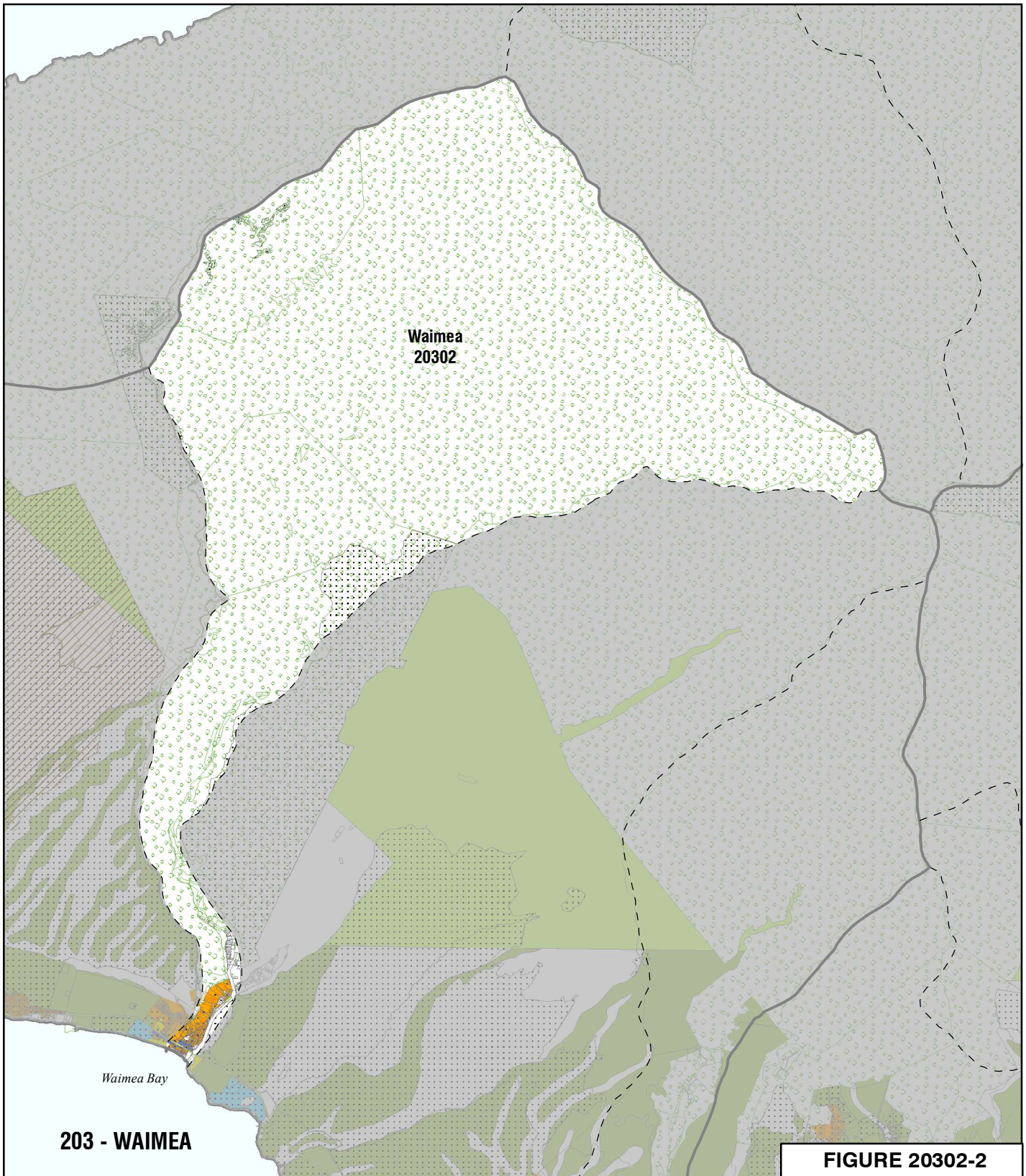
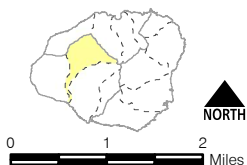


FIGURE 20302-2

INDEX MAP - Island of Kaua'i



LEGEND:

- Aquifer Sector Areas
- - - Aquifer System Areas
- ▨ Hawaiian Home Lands
- ▤ Developed Properties

Zoning Designations:

- Agriculture
- Commercial - General
- Commercial - Neighborhood
- Conservation
- Industrial - General

- Industrial - Limited
- No Zoning
- Open
- Residential
- Resort
- Special District

COUNTY ZONING

Aquifer Sector: WAIMEA - 203
 Aquifer System:
 WAIMEA - 20302

20302-2 EXISTING WATER RESOURCES

20302-2.1 Ground Water

The Waimea ASYA has a sustainable yield of 37 mgd. According to the 2014 CWRM database, there are 2 production wells in the system, both classified as municipal. There are also 3 wells drilled and categorized as “unused.” Refer to **Appendix A** for this database. **Figure 20302-3** shows the well locations.

20302-2.2 Surface Water

There are no streams classified as perennial in the Waimea ASYA.

In accordance with the Code, the CWRM must establish and administer instream flow standards (IFS) on a stream-by-stream basis as necessary to protect public interests. IFS is defined as “a quantity or flow of water or depth of water which is required to be present at a specific location in a stream system at certain specified times of the year to protect fishery, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses.” Considerably more research and study need to be completed to accumulate the data and perspective necessary to conduct a thorough and meaningful assessment of IFS. Until permanent IFS are established, interim IFS have been adopted. The interim IFS are defined as the amount of water flowing in each stream at the time the administrative rules governing them were adopted in 1988 and 1989. In order to assess surface water sustainability, this KWUDP assumes that no additional diversions will be allowed from any stream without amendment of the interim IFS.

There are 34 declared stream diversions in the CWRM database shown on **Figure 20302-4**, which accounts for 12 percent of the 292 declared stream diversions on the island. The declared stream diversions are listed in **Appendix B**. The total declared flow for the Waimea ASYA is 0.28 mgd.

The Kekaha Ditch Irrigation System (KEDIS) and the Kōke’e Ditch Irrigation System (KODIS) both start in the Waimea ASYA and include several diversions from this ASYA.

20302-2.3 Water Conservation

Water conservation increases the amount of water available and helps to ensure the long-term viability of water resources. Water conservation measures for this ASYA are as described in **Section 1.5.7** of this report. There are no ASYA specific special conservation measures in place at this time.

20302-2.4 Rainwater Catchment

Rainwater catchment is a viable resource for areas that are not served by ground water or surface water. **Figure 20302-5** shows the possible catchment areas, or parcels with a building value greater than \$20,000 and assumed to be developed but without a ground water or surface water source.

20302-2.5 Recycled Water

There are no wastewater reclamation facilities in the Waimea ASYA.

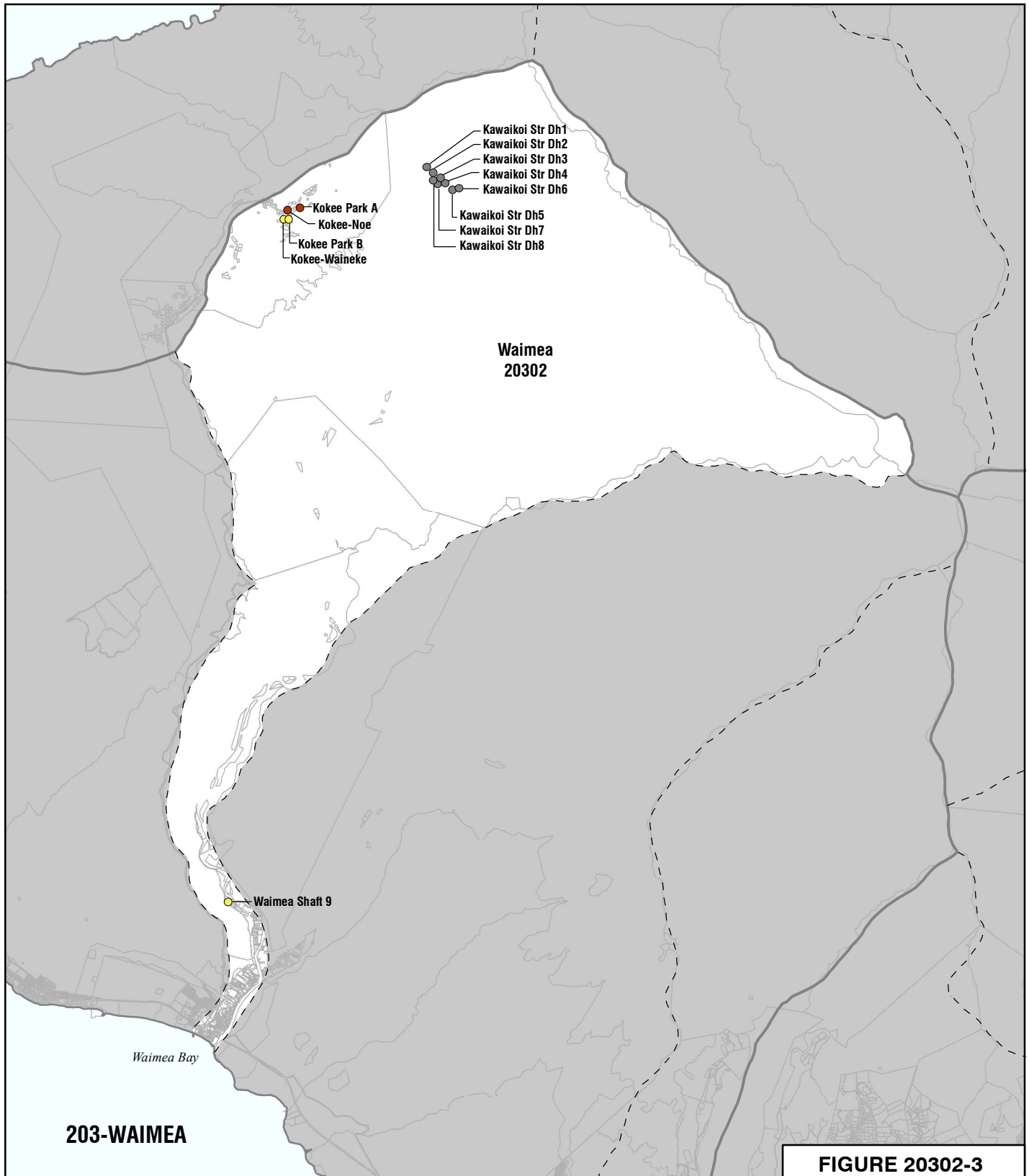
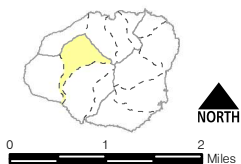


FIGURE 20302-3

INDEX MAP - Island of Kaua'i



LEGEND:

- Aquifer Sector Areas
- - - Aquifer System Areas
- TMK

Well Use Types

- Abandoned
- Agriculture
- Domestic
- Industrial
- Irrigation
- Military
- Municipal
- Observation
- Other

- Unused

WELL LOCATION

Aquifer Sector: WAIMEA - 203
Aquifer System:
WAIMEA - 20302

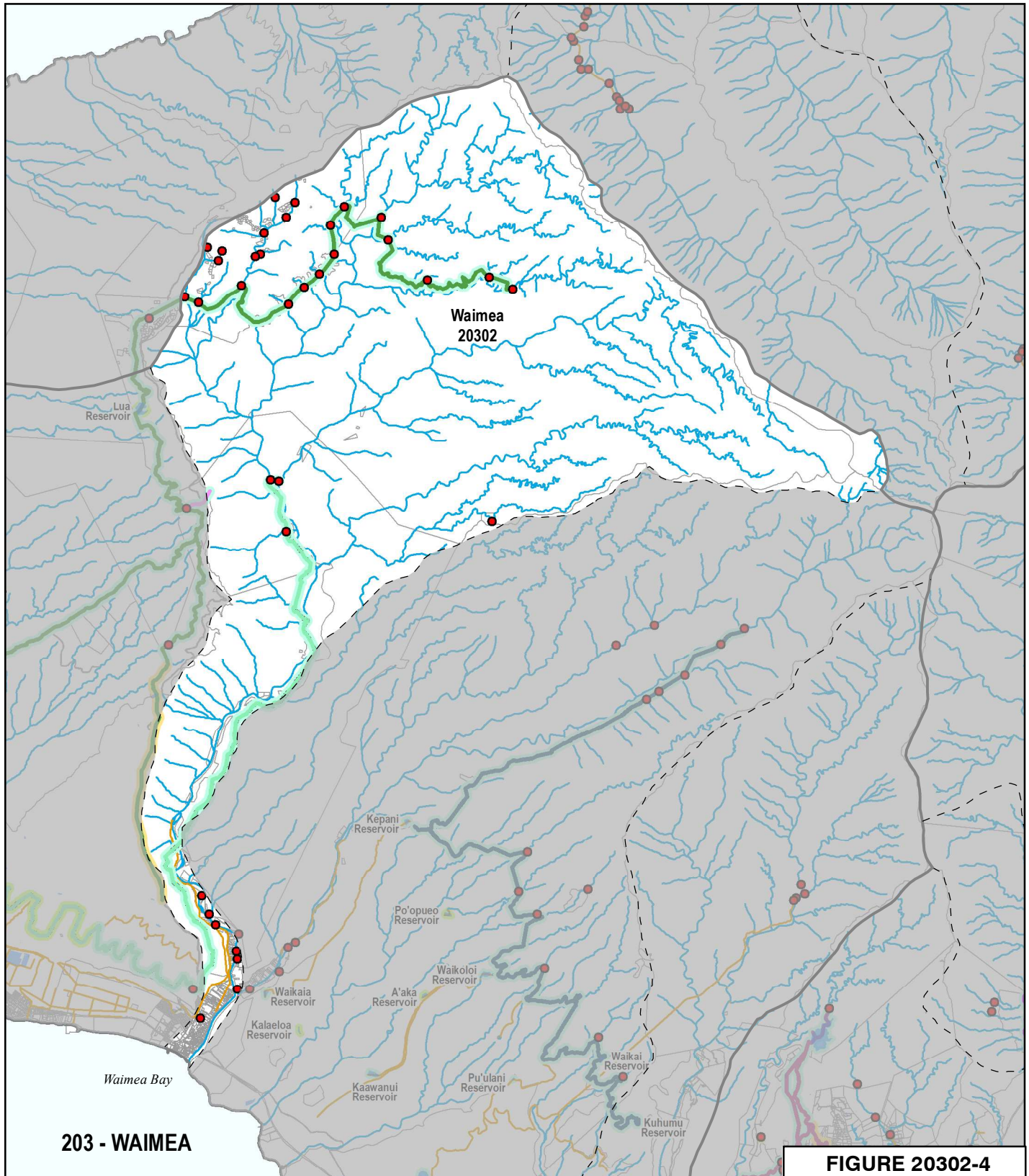
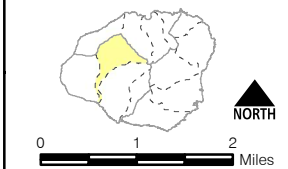


FIGURE 20302-4

STREAMS & DIVERSIONS

Aquifer Sector: WAIMEA - 203
 Aquifer System:
 WAIMEA - 20302

INDEX MAP - Island of Kaua'i



LEGEND:

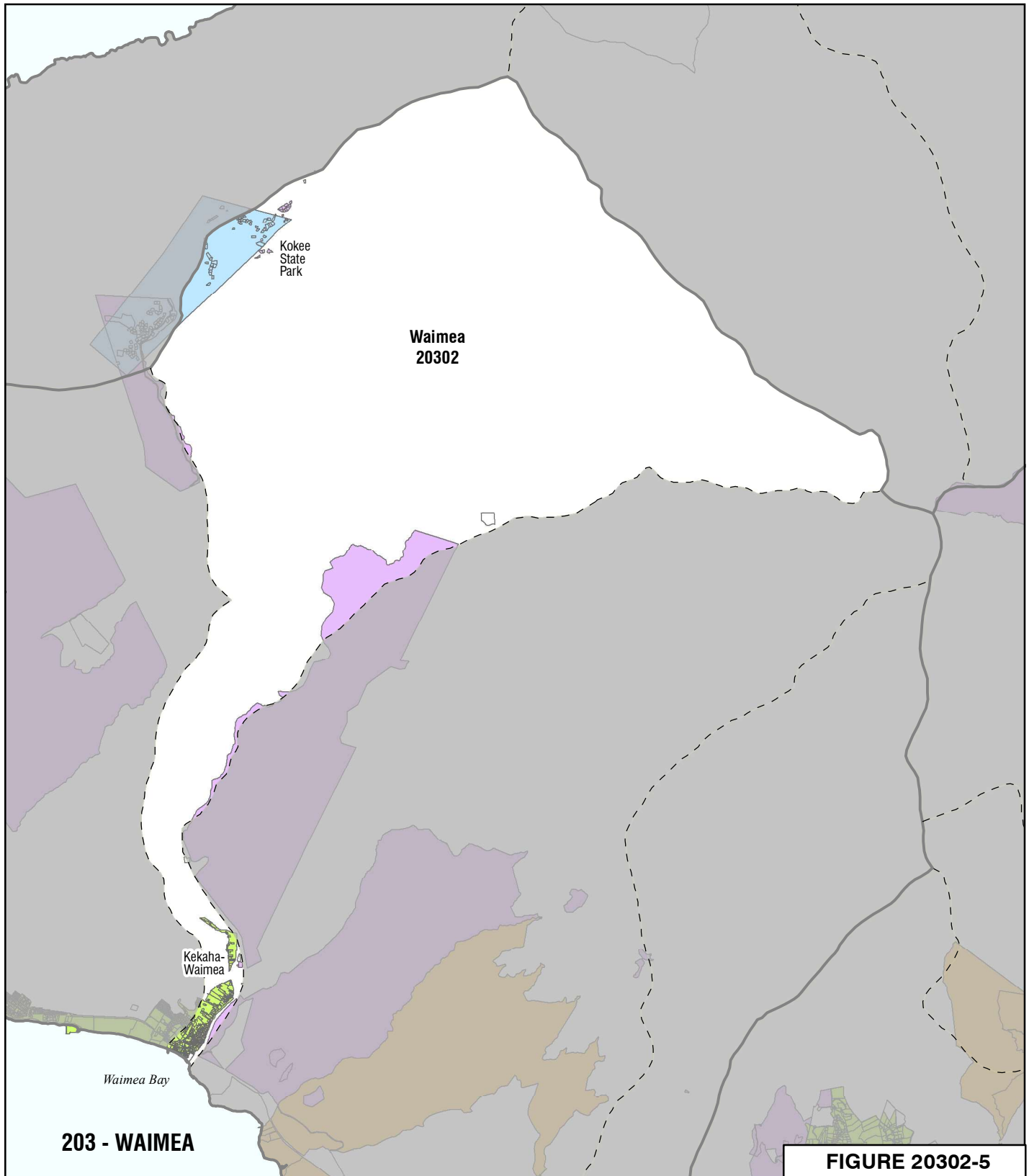
- Aquifer Sector Areas
- - - Aquifer System Areas
- Perennial Streams
- Irrigation Systems
- Diversions
- Reservoirs, Ponds
- TMK

Irrigation Systems

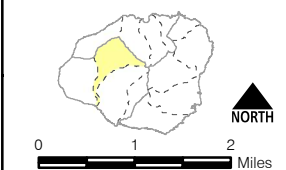
- Kekaha Ditch
- Kōke'e Ditch

Status

- Active
- Inactive
- Unknown
- Abandoned



INDEX MAP - Island of Kaua'i



LEGEND:

- Aquifer Sector Areas
- - Aquifer System Areas
- DOW Service Area
- Private Water System
- State Water System
- Federal Water System
- Possible Catchment Area (Building Value > \$20,000)

FIGURE 20302-5

WATER SYSTEM & SERVICE AREA

Aquifer Sector: WAIMEA - 203
 Aquifer System:
 WAIMEA - 20302

20302-3 EXISTING WATER USE

20302-3.1 General

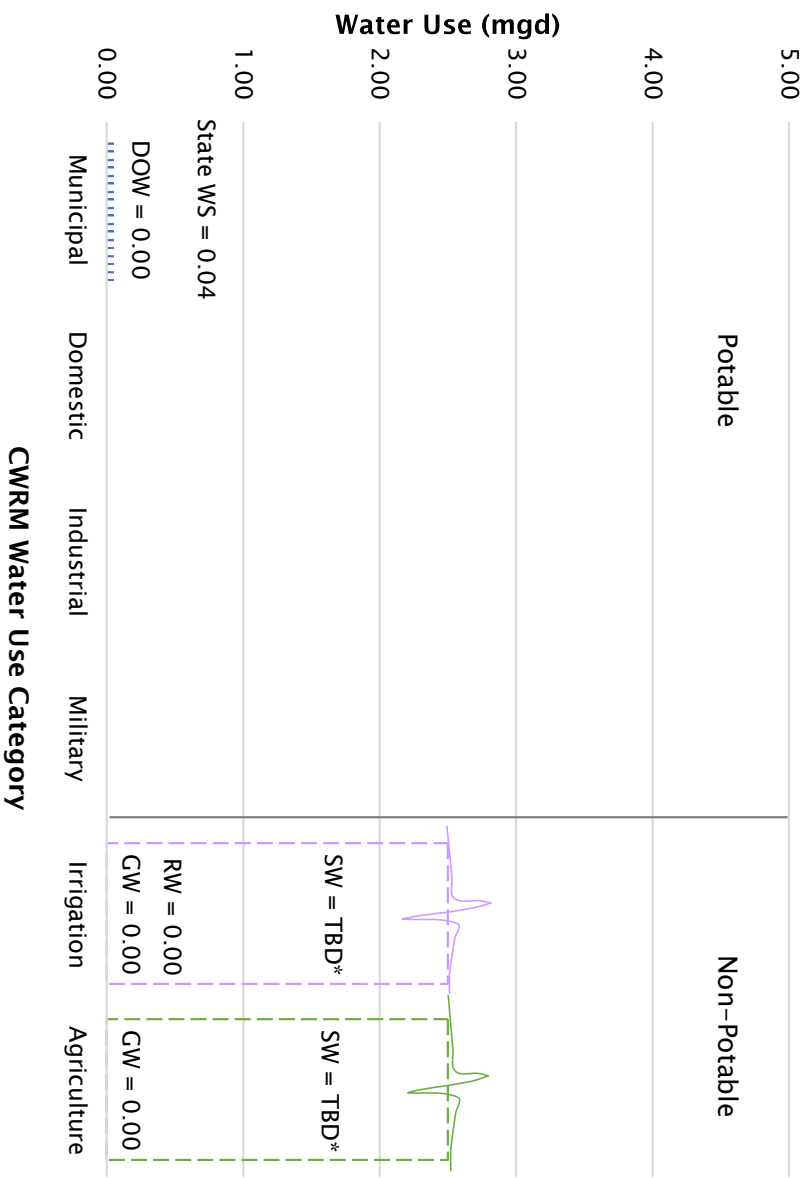
The following section presents the total estimated average water use within the Waimea ASYA. The total estimated average water use was based on data from CWRM (well pumpage) and DOH (Sanitary Surveys for Public Water Systems and estimated recycled water usage) for the year of 2014. **Table 20302-5** and **Figure 20302-6** summarize the water use in accordance with CWRM categories.

Table 20302-5: Existing Water Use by Category – Waimea ASYA

CWRM Category	Ground Water (mgd)	Other Sources (mgd)	Total (mgd)	Percent of Total
Domestic			0.00	0.0
Industrial			0.00	0.0
Irrigation			0.00	0.0
Agriculture		TBD ¹	0.00	0.0
Military			0.00	0.0
Municipal				
DOW System			0.00	0.0
State WS	0.04		0.04	100.0
Private-Public WS			0.00	0.0
TOTAL	0.04		0.04	100.0

¹ Surface Water – TBD from AWUDP

Figure 20302-6: Existing Water Use by Category – Waimea ASYA



*Values to be determined by other components of the Hawai'i Water Plan

20302-3.2 Domestic Use

There is are no wells classified as “Domestic” in the Waimea ASYA.

20302-3.3 Industrial Use

There are no wells classified as “Industrial” in the 2014 CWRM database.

The Waimea Mauka Hydropower Plant is owned and operated by the State Department of Agriculture’s Agribusiness Development Corporations (ADC). Originally built in 1952 by the Sugar Plantation, the Waimea Mauka Hydropower plant is located along the Kekaha Ditch Irrigation System. Water comes from the Waihulu and Koaie Intakes.

20302-3.4 Irrigation Use

Irrigation use has been divided into ground water, recycled water, and surface water.

20302-3.4.1 Ground Water

There are no wells classified as “Irrigation” in the Waimea ASYA.

20302-3.4.2 Recycled Water

There is no recycled water use in the Waimea ASYA.

20302-3.4.3 Surface Water

Information on surface water use for irrigation is to be determined by the AWUDP. However, typically, due to the location of parks and other landscaped areas within communities, it is assumed that it is unlikely for landscaping to be irrigated with surface water.

20302-3.5 Agricultural Use

Agricultural irrigation use has been divided into ground water, recycled water, and surface water.

20302-3.5.1 Ground Water

There are no wells classified as “Agriculture” in the Waimea ASYA.

20302-3.5.2 Surface Water

Information on surface water use for agriculture is to be determined by the AWUDP.

20302-3.6 Military Use

There is no military water use in the Waimea ASYA.

20302-3.7 Municipal Use

There are 2 wells in the CWRM database classified as MUNST – Municipal State. Municipal can be subcategorized into the other water use categories: Domestic, Industrial, Agricultural, Military, and Municipal.

20302-3.7.1 County Water Systems

Kekaha-Waimea Water System

The DOW has one major water system that serves the Waimea ASYA. The Kekaha-Waimea water system is DOH Public Water System (PWS) No. 406 and services areas in both the Kekaha ASYA and Waimea ASYA. The majority of the water system serves the Kekaha ASYA and therefore was discussed in **Section 20301**.

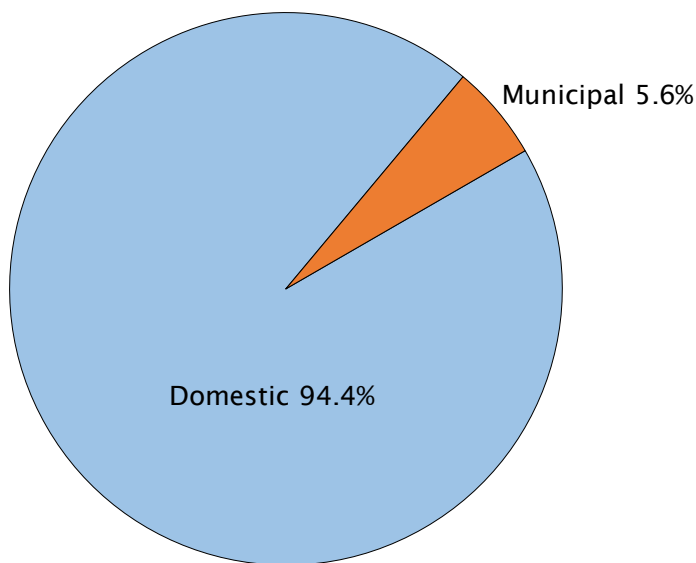
DOW Water Use by Category

DOW water use is subcategorized in **Table 20302-6** to the extent possible based on available meter data and is depicted in **Figure 20302-7**.

Table 20302-6: DOW Existing Water Use by Category – Waimea ASYA

CWRM Water Use Category	DOW Metered Water Use (mgd)	Percent of Total
Agricultural	0.000	0.0
Domestic	0.136	94.4
Industrial	0.000	0.0
Military	0.000	0.0
Municipal	0.008	5.6
Total	0.144	100.0

Figure 20302-7: DOW Existing Water Use by Category – Waimea ASYA



20302-3.7.2 State Water Systems

The Kōkeʻe State Park Water System (PWS 425) is a non-transient, non-community water system and is the only State water system in the Waimea ASYA regulated by the DOH. The water system is owned by the State Department of Land and Natural Resources (DLNR) State Parks Division. The water system serves 2,000 people through 93 service connections per the 2011 DOH Sanitary Survey. Water is provided to the Kōkeʻe State Park's museum, lodge restaurant, rental cabins, park ranger office, park pavilions, private vacation residences, and NASA facility. In addition, the water

system provides wholesale treated water to the Navy's PMRF water system (PWS 430). Water for this system is supplied by two wells, with reported pumpage of 0.04 mgd.

20302-3.7.3 Federal Water Systems

There are no Federal water systems in the Waimea ASYA regulated by the DOH.

20302-3.7.4 Private-Public Water Systems

There are no private-public water systems in the Waimea ASYA regulated by the DOH.

20302-3.7.5 Per Capita Use

The per capita existing water use consumption based on domestic DOW metered water use and private-public water system use is presented in **Table 20302-7**. The per capita use in the Waimea ASYA is approximately 34.8% lower than the overall County of Kaua'i per capita use.

Table 20302-7: Per Capita Use – Waimea ASYA

	DOW Metered Water Use – Domestic (mgd)	Private-Public Water System (mgd)	90% of 2015 Population	Per Capita Use (gpd)
Waimea ASYA	0.136	0	1,195	126
County of Kaua'i	9.360	2.951	63,462	194

20302-3.8 Existing Water Use by Resource

20302-3.8.1 Ground Water

Table 20302-8 summarizes the current production, sustainable yield (SY), and percentage of SY for the current production. Current production is represented by the 2014 average yield calculated from the actual pumping data.

Table 20302-8: Pumpage – Waimea ASYA

Pumpage (mgd)	SY (mgd)	Pumpage Portion of SY
0.04	37	0.1%

Based on available information from the CWRM database, the current ground water use is 0.1 percent of the sustainable yield.

20302-3.8.2 Surface Water

Information on surface water use for agriculture is to be determined by the AWUDP.

20302-3.8.3 Water Conservation

Water conservation, including water loss management, may reduce water use. See **Section 20302-2.3** for existing conservation efforts.

20302-3.8.4 Rainwater Catchment

Developed parcels that are not supplied by ground water or surface water are assumed to be supplied by rainwater catchment.

20302-3.8.5 Recycled Water

There is no recycled water use in the Waimea ASYA.

20302-4 FUTURE WATER USE

20302-4.1 Full Build-Out Water Demand Projections

The full build-out water demand projections based on the General Plan and County Zoning for the Waimea ASYA is listed in **Tables 20302-9** and **20302-10**, respectively. Each land use class is associated with the most appropriate CWRM water use category.

Table 20302-9: General Plan Full Build-Out Water Demand Projection – Waimea ASYA

GP Category	CWRM Category	Water Demand (mgd)
Agriculture	Agriculture/Domestic	0.00
Open	Domestic	0.00
Military	Military	0.00
Park	Irrigation	0.03
Residential	Domestic/Municipal	0.28
Resort	Domestic/Irrigation/Municipal	0.00
Transportation	Municipal	0.00
Urban Center	Domestic/Industrial/Municipal	0.00
DHHL	Domestic	0.00
TOTAL		0.32

Table 20302-10: Zoning Full Build-Out Water Demand Projection – Waimea ASYA

Zoning Class	CWRM Category	Water Demand (mgd)
Agriculture	Agriculture/Domestic	0.00
Commercial	Municipal	0.06
Industrial	Industrial/Municipal	0.00
Open	Domestic	0.00
Residential	Domestic/Municipal	0.26
Resort	Domestic/Irrigation/Municipal	0.00
DHHL	Domestic	0.00
TOTAL		0.32

20302-4.1.1 Refined Land Use Based Water Projection

State Water Projects Plan

Table 20302-11 lists future State water projects reported in the 2021 SWPP update. The total projected demand to the year 2034 for the two State water projects within the Waimea ASYA is 0.002 mgd, both using potable sources.

Table 20302-11: Future State Water Projects – Waimea ASYA

Project Name	State of Hawai'i Department	Primary Use	Water Development Strategy	2034 Demand (mgd)
Waimea High School New Library	DOE	Potable	REMAIN	0.0009
Waimea High School – Renovate Buildings C & H	DOE	Potable	REMAIN	0.0006
TOTAL REMAIN				0.0015
TOTAL WAIMEA ASYA SWPP 2034 DEMAND				0.0015

As mentioned in **Section 2.2.2.5.1**, State water projects with the water development strategy of REMAIN are located within the service areas of County water systems which need to be coordinated with the respective County water departments. Both of the State projects within the Waimea ASYA were assigned the REMAIN water development strategy and results in a total 2034 demand of 0.0015 mgd. This accounts for 0.004 percent of the 37 mgd sustainable yield for the Waimea ASYA.

State Department of Hawaiian Home Lands

There are no DHHL tracts in the Waimea ASYA.

Agricultural Water Use and Development Plan

The AWUDP dated 2003 (revised 2004) was limited in scope. More recent, comprehensive information on agricultural lands is available in the County of Kaua'i Important Agricultural Lands (IAL) Study.

In 2019, a public review draft of the AWUDP was released and it is anticipated that the next phase of the AWUDP will provide agricultural water demand projections in greater detail and will supersede information in the KWUDP when it becomes available.

County of Kaua'i Important Agricultural Lands Study

34 acres of agricultural lands within the Waimea ASYA received a score of 28 or better in the County of Kaua'i IAL Study. Lands that receive a score of 28 or better were determined to have met all eight IAL criteria to some degree. Only a subset of lands with a score of 28 or better is expected to be designated as IALs. **Table 20302-12** compares these lands that received a score of 28 or better to the declared surface water use from diversions and to the diversified water use rate of 3,400 gallons per acre per day (gpad) estimated in the 2004 AWUDP.

Table 20302-12: Irrigation of Agricultural Lands

(1) Declared Surface Water Use from Diversions (mgd)	0.28
(2) Agricultural Lands with a Score ≥ 28 (Acres)	34
- How many acres can be sustained by (1) at a water rate of 3,400 gpad? (Acres)	82
- What percent of (2) can be sustained with a water rate of 3,400 gpad?	241
- If all of (2) were to be irrigated, what is the water unit rate? (gpac)	8,267

20302-4.1.2 Water Use Rates

Water use unit rates are based on the *Water System Standards* (WSS), as discussed in Chapter 2.

The General Plan provides only broad density guidelines for residential and resort designations. For these designations, under the assumption that most residents would like their communities, including the development density, to remain similar in the future, the average number of dwelling units as allowed by zoning was used as the density (i.e., 3.24 dwelling units per acre for residential designation).

20302-4.2 Water Demand Projections to the Year 2035

The following section presents water demand projections to the year 2035 for the Waimea ASYA. The projected low, medium, and high growth rates are listed in **Table 20302-13** and are graphed in **Figure 20302-8**. Potable (domestic, industrial, municipal, and military water uses) and non-potable (irrigation) water demands are also differentiated.

Table 20302-13: Water Demand Projection – Waimea ASYA

Water Use Category	Water Demand by Year (mgd)								
	2015	2016	2017	2018	2019	2020	2025	2030	2035
GROWTH RATE C (HIGH)									
TOTAL	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Potable	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Non-Potable	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GROWTH RATE B (MEDIUM)									
TOTAL	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05
Potable	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05
Non-Potable	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GROWTH RATE A (LOW)									
TOTAL	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05
Potable	0.04	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05
Non-Potable	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Figure 20302-8: Water Demand Projection Summary – Waimea ASYA

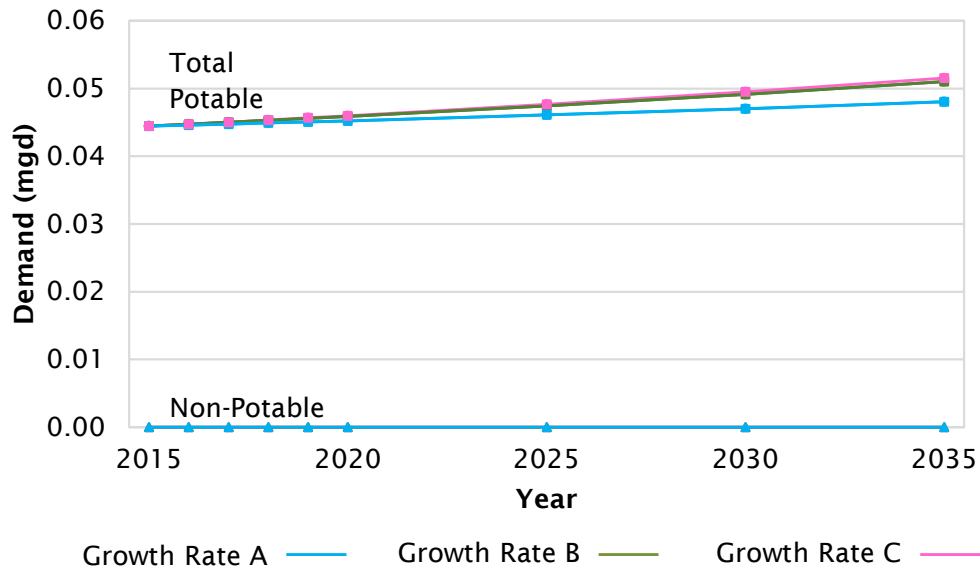


Figure 20302-9 shows the breakdown of water demand projections for a medium growth rate by CWRM categories through the year 2035. Table 20302-14 summarizes this figure.

Figure 20302-9: Medium Growth Rate B Water Demand Projection by Category - Waimea ASYA

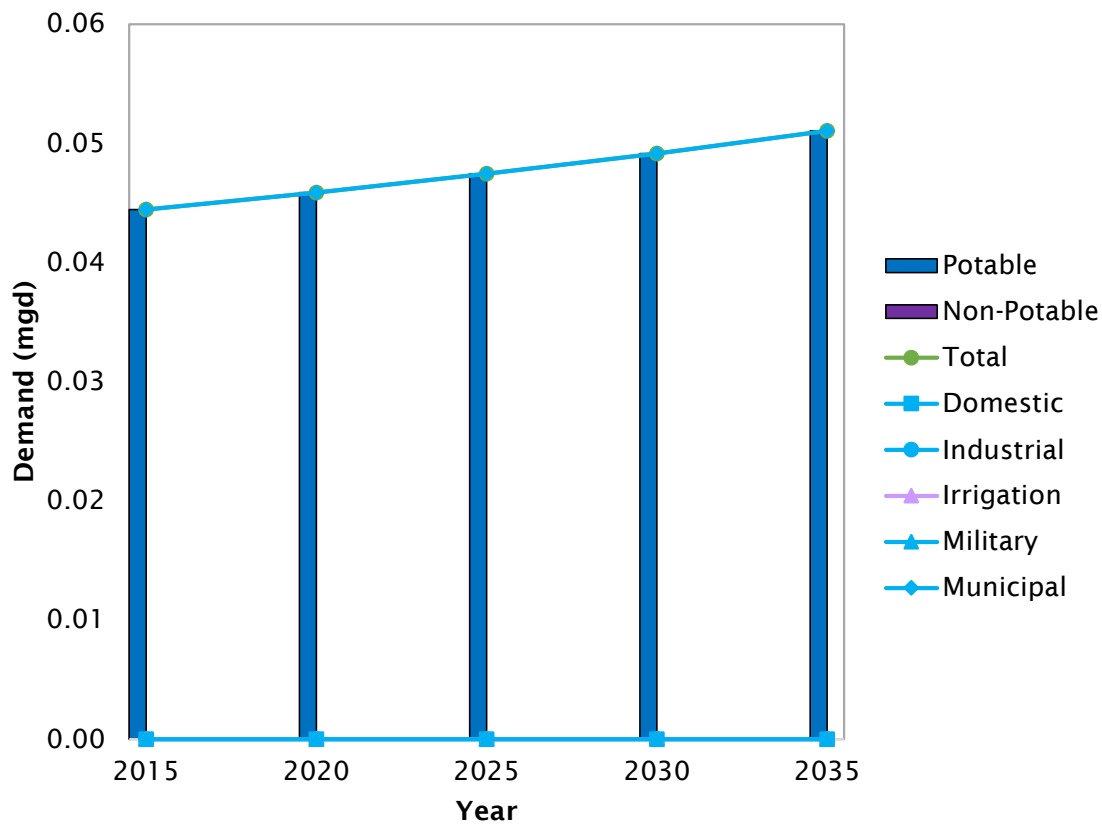


Table 20302-14: Medium Growth Rate B Water Demand Projection by Category - Waimea ASYA

Water Use Category	Water Use by Year (mgd)								
	2015	2016	2017	2018	2019	2020	2025	2030	2035
Total	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05
Potable	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05
Non-Potable	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Domestic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Industrial	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Irrigation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Military	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Municipal	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05
DOW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

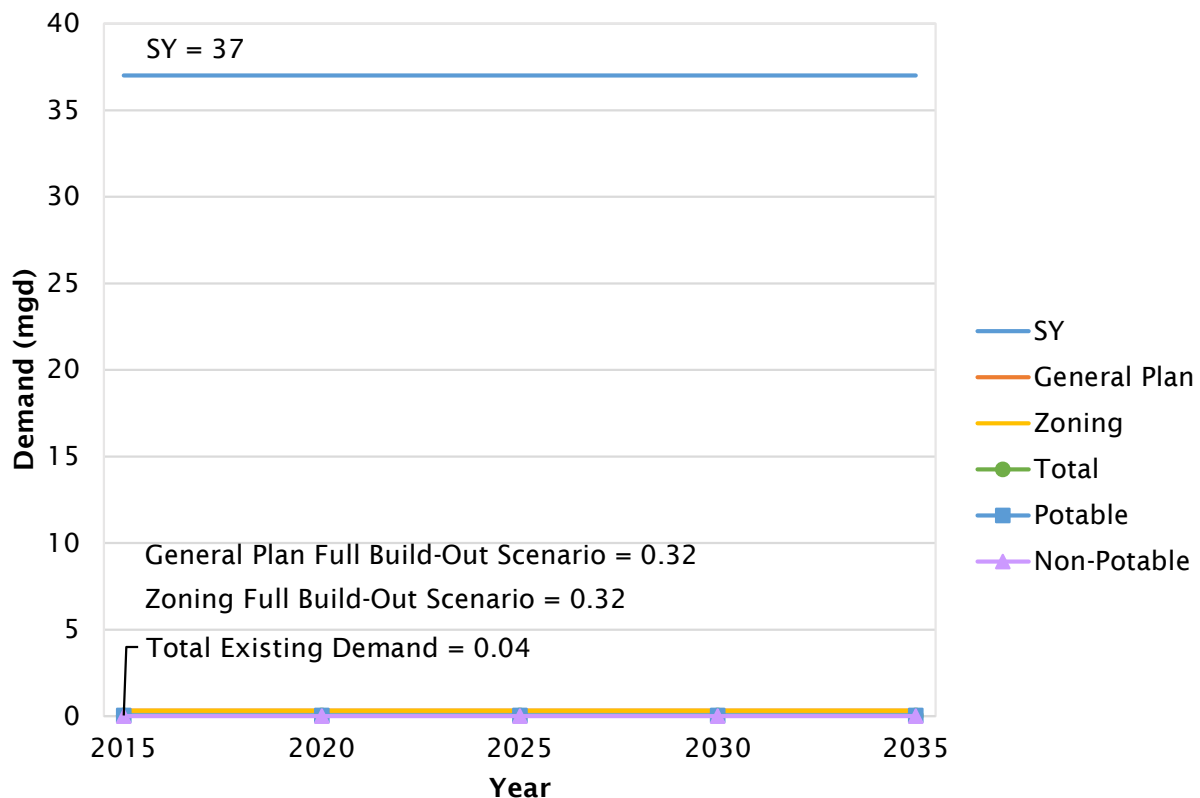
20302-4.3 Summary

Figure 20302-10 illustrates the magnitude of the sustainable yield, both General Plan and Zoning full build-out water use projections, and water use projection through the year 2035 focusing on Medium Growth Rate B. **Table 20302-15** summarizes the General Plan, Zoning, and 20-year water demand projection scenarios for the Waimea ASYA. The sustainable yield is presented to draw comparisons. All demands are in mgd.

Table 20302-15: Summary of Demand Projections

SY (mgd)	FBO (mgd)		Medium Growth Rate Demand by Year (mgd)								
	GP	Zoning	2015	2016	2017	2018	2019	2020	2025	2030	2035
37	0.32	0.32	0.04	0.04	0.04	0.05	0.05	0.05	0.05	0.05	0.05

Figure 20302-10: Medium Growth Rate B Water Demand Projections and Full Build-Out - Waimea ASYA



Note: Total existing demand includes municipal, domestic, industrial, military, and irrigation water uses. It does not include agriculture water use. For future agricultural water use analysis, please see Section 20302-4.1.1 County of Kaua'i Important Agricultural Lands Study.

20302-5 RESOURCE AND FACILITY RECOMMENDATIONS

20302-5.1 Water Source Adequacy

20302-5.1.1 Full Build-Out

Development to the highest extent allowed by the General Plan and County Zoning within the Waimea ASYA is sustainable, with General Plan and County Zoning full build-out water demands both requiring 0.9 percent of the 37 mgd sustainable yield.

20302-5.1.2 Twenty-Year Projection

The 2035 water demand projection for the Waimea ASYA is sustainable and is only 0.1 percent of the 37 mgd sustainable yield.

20302-5.2 Source Development Requirements

20302-5.2.1 Supply-Side Management

Supply-side management, including conventional water resource measures, water conservation, and alternative water resource measures, were evaluated to meet projected water demands.

Conventional Water Resource Measures

Ground Water

The 2035 water demand projection for the Waimea ASYA is only 0.1 percent of the 37 mgd sustainable yield. This indicates that theoretically, more water could be pumped from the aquifer without impairing the utility or quality of the water resource if wells are optimally placed and the proper due diligence with regard to traditional and customary rights and impacts has been completed. However, it is noted that sustainable yield does not consider the feasibility of developing the ground water resources, and that the safe yield of an individual production well may be limited by localized ground water behavior near the well as a result of pumpage. Water supply reliability and quality, feasibility, environmental and cultural impacts, and water rights shall be considered as projects and programs develop. More detailed and site-specific evaluation of these impacts shall be required and accomplished through the environmental review process (HRS Chapter 343) for source development projects and programs utilizing public funding, and CWRM could consider requiring compliance with the environmental review process for private source development projects and programs also. **Section 1.5.3.1** provides additional information regarding the protection of traditional and customary rights.

Development within the Waimea ASYA includes Waimea, which is served by DOW's Kekaha-Waimea water system. Currently all of the water system's sources are in the Kekaha ASYA.

Surface Water

There are 34 declared diversions in the Waimea ASYA. Many of these diversions are for the Kekaha Ditch Irrigation System (KEDIS) and the Kōkeʻe Ditch Irrigation System (KODIS). Both irrigation systems have their intakes in the Waimea ASYA and deliver the water to their service area in the Kekaha ASYA.

In 2017, interim instream flow standards (IIFS) related to these irrigation systems were established through the Waimea Watershed Agreement to take steps to restore flows in streams. The agreement notes that diversions must be justified with no more water taken than is needed for other beneficial uses. Beneficial uses include agriculture and renewable energy, and the irrigation systems should continue to be maintained to allow for present and future uses. For the Waimea ASYA, the agreement identifies that provision of water for kalo farmers along the Menehune Ditch are to be maintained.

Water Transfer

As mentioned above, the intakes for the KEDIS and KODIS are located in the Waimea ASYA, and irrigation water from these systems is transferred to service areas in the Kekaha ASYA.

Water can also be transferred between ASYAs through public water systems. The DOW's Kekaha-Waimea water system services areas in the Kekaha ASYA and in the Waimea ASYA, with all of its water sources located in the Kekaha ASYA. The Waimea Booster Station has the capability to transfer water from Kekaha to Waimea. The system does not currently have the capability to transfer water in the reverse direction from Waimea to Kekaha. Similarly, the Kōkeʻe State Park water system service area is in the Nāpali and Waimea ASYA and is fed by water sources located in the Waimea ASYA.

Water Conservation

The per capita use in the Waimea ASYA is approximately 34.8% lower than the overall County of Kauaʻi per capita use. There are no ASYA-specific conservation measures in place at this time; however, there are general water conservation programs that are described in **Section 1.5.7**. Water conservation, including water loss management, can increase the amount of water available and help to ensure the long-term viability of water resources.

Alternative Water Resource Measures

Rainwater Catchment

Rainwater can be utilized as a water resource in several ways.

Rainwater can be harvested in rainwater catchment systems which can be utilized to supply domestic potable water needs. These systems are viable in areas that receive abundant rainfall and are a suitable source of potable water for individual domestic users in areas outside the limits of municipal water systems. Generally, these are remote areas and are not expected to expand significantly because most development is anticipated to be concentrated within existing urban areas. Therefore, use of rainwater catchment systems is not anticipated to increase significantly.

Rainwater can also be used to supplement or satisfy agricultural non-potable water needs through ambient rainfall.

See the Storm Water Reuse section below to see how rainwater as storm water runoff can be reclaimed and reused.

Storm Water Reuse

Rainfall can turn into storm water runoff. Storm water runoff from impervious surfaces in urban areas can be significant. This water could be captured, treated, and used as a source of non-potable water (e.g., irrigation), integrated with recycled water, or even as potable and/or non-potable ground water recharge. However, due to the lack of storm water reuse standards, the high initial infrastructure costs, and the treatment requirements, storm water reclamation and reuse on a small or large scale may not be feasible and requires further assessment as noted in the Water Resource Protection Plan. The U.S. Department of the Interior, Bureau of Reclamation published An Appraisal of Stormwater Reclamation and Reuse Opportunities in Hawai'i (Storm Water Report) in 2008 but did not identify any storm water reclamation and reuse opportunities in the Waimea ASYA.

Recycled Water

Recycled water is a valuable resource; an increase in its use may lower the dependence on potable sources. However, there are no wastewater reclamation facilities (WWRFs) in the Waimea ASYA.

Desalination

Desalination of brackish ground water is a potential alternative; however, due to its high capital and operational costs, it likely would not be considered when other potable water sources are available.

20302-5.2.2 Demand-Side Management

Development Density Control

The full build-out demand for the Waimea ASYA based on County Zoning is 0.32 mgd which is 0.9 percent of the sustainable yield. This indicates that there are adequate water resources to sustain the level of development that is allowed by law. In the Waimea ASYA, the average number of dwelling units allowed by County Zoning is 3.24 dwelling units per acre in residential districts.

The full build-out demand for the Waimea ASYA based on the General Plan is 0.32 mgd which is 0.9 percent of sustainable yield. Therefore, development density control likely may not be necessary. However, the County Planning Department could consider development density control for areas where there is the flexibility to do so, such as areas that are not yet zoned as residential or resort, and promote sustainable development. Further, it is noted that the full build-out scenario is unlikely to occur since it assumes all land is developed to the maximum extent.

20302-5.3 Recommended Alternatives

To optimize appropriate use of water resources, the quality of the water source should be matched to the quality of water required. The highest quality of water shall be reserved for the most valuable end use. Potable water is considered the highest quality water, and the sustenance of life is the most valuable end use. Recycled water, brackish water, untreated surface water, and other lower quality water sources should be used for landscaping and agriculture when available, thereby reserving potable water for human consumption. If there is a practical alternative water source available, that alternative source should be used in lieu of ground water or surface water. With this in mind, the following recommendations are made for the Waimea ASYA:

Alternative Water Resources

Use of alternative water sources can reduce demands on both ground and surface water resources and conserve water resources as a whole. However, aside from rainwater, there are no available alternative water sources in the area. Alternative water sources are unlikely to be developed when other water resources are readily available.

Conservation

Water resources are a finite resource that should be managed and used wisely. It should be conserved and not wasted. Implementation of conservation measures should continue to be encouraged.

Ground Water

Meeting future demands at a reasonable cost is a planning objective, and conventional sources, such as ground water, are typically the most cost-effective means for meeting projected water demands. Projected potable water needs are within the sustainable yield for this area. Therefore, ground water resources could continue to be used and developed to meet potable water needs now and into the future. However, as noted above, development of conventional water resource measures can have challenges, and water supply reliability and quality, feasibility, environmental and cultural impacts, and water rights shall be considered as projects and programs develop.

Development of ground water resources is the primary strategy to serve future potable demands in the Waimea ASYA.

Surface Water

Surface water, where available, should be used to meet non-potable demands if alternative water resources are not available. As discussed in the Waimea Watershed Agreement, diversions must be justified with no more water being taken than is needed for beneficial uses, such as for agriculture and renewable energy, and the established interim instream flow standards (IIFS) shall be met. In addition, it is critical that the KODIS and KEDIS continue to be maintained to allow for present and future uses. Utilization of surface waters for non-potable water demands has the potential to minimize future dependence on the use of ground water.

Demand-Side Management

Full build-out demand based on the General Plan is 0.9 percent of sustainable yield. At this projection, implementation of development density control by the County Planning Department is not needed in this area. Although the projection is sustainable, the County Planning Department will need to consider potential impacts on available water resources when considering any future zoning modifications. Modifications that may result in increased development density within the area will increase demands on water resources.