

3rd Annual Joint Government Water Conference
“Implementing Hawaii Water Plans”

County of Hawaii
Water Use & Development Plan Update
Keauhou & Waimea Aquifer Systems



County of Hawaii
Department of Water Supply

Jon Nishimura, P.E.
Fukunaga & Associates, Inc.

August 2015

Presentation Outline

- **Background – 2010 Hawaii County WUDP**
- **Plan Update - Objective & Goals**
- **Technical Approach – Refinements**
- **Issues**

Background

Hawaii County Water Use & Development Plan

- Updated original WUDP prepared in 1990
- Initiated in 2004
- Final Draft Plan 2010
- Adopted by County Ordinance – February 2011
- Accepted by CWRM – November 2011

Background

Key Issues Identified

- **Assessment of Land Use Plans and Policies**
- **Development of planning projections of water use**
- **Projected water use by Agriculture**

Background

Findings and Recommendations

- Conducted the initial island-wide assessment
- Identification of “more sensitive” and “less sensitive” areas
- Priority focus on more “sensitive” areas
 - Hualalai Aquifer Sector – Keauhou Aquifer System
 - West Mauna Kea Aquifer Sector – Waimea Aquifer System

County WUDP Objective

*. . . to set forth the **allocation of water to land use** through the development of policies & strategies to guide the County in its planning, management and development of water resources to meet projected demands.*

Key Goals

- **Provide guidance for the management of the island's water resources to ensure that future water needs of the County are met, while preserving the integrity of the island's water resources.**
- **Ensure that sustainable water resources are integrated into the formulation and development of land use policies by the County.**

Technical Approach

Guiding Principles

- **Public Trust Doctrine – *...waters of the State are held for the benefit of the citizens of the State.***
- **Water is a most precious resource & shall be used wisely – to be conserved; not wasted**
- **Highest quality water shall be used for the community's highest beneficial uses**
- **Lower quality water (reuse water, surface water, brackish water) should be used whenever feasible**

Assessment of Land Use Policies

■ Initial Assessment

(Uniform Island-wide Comparison)

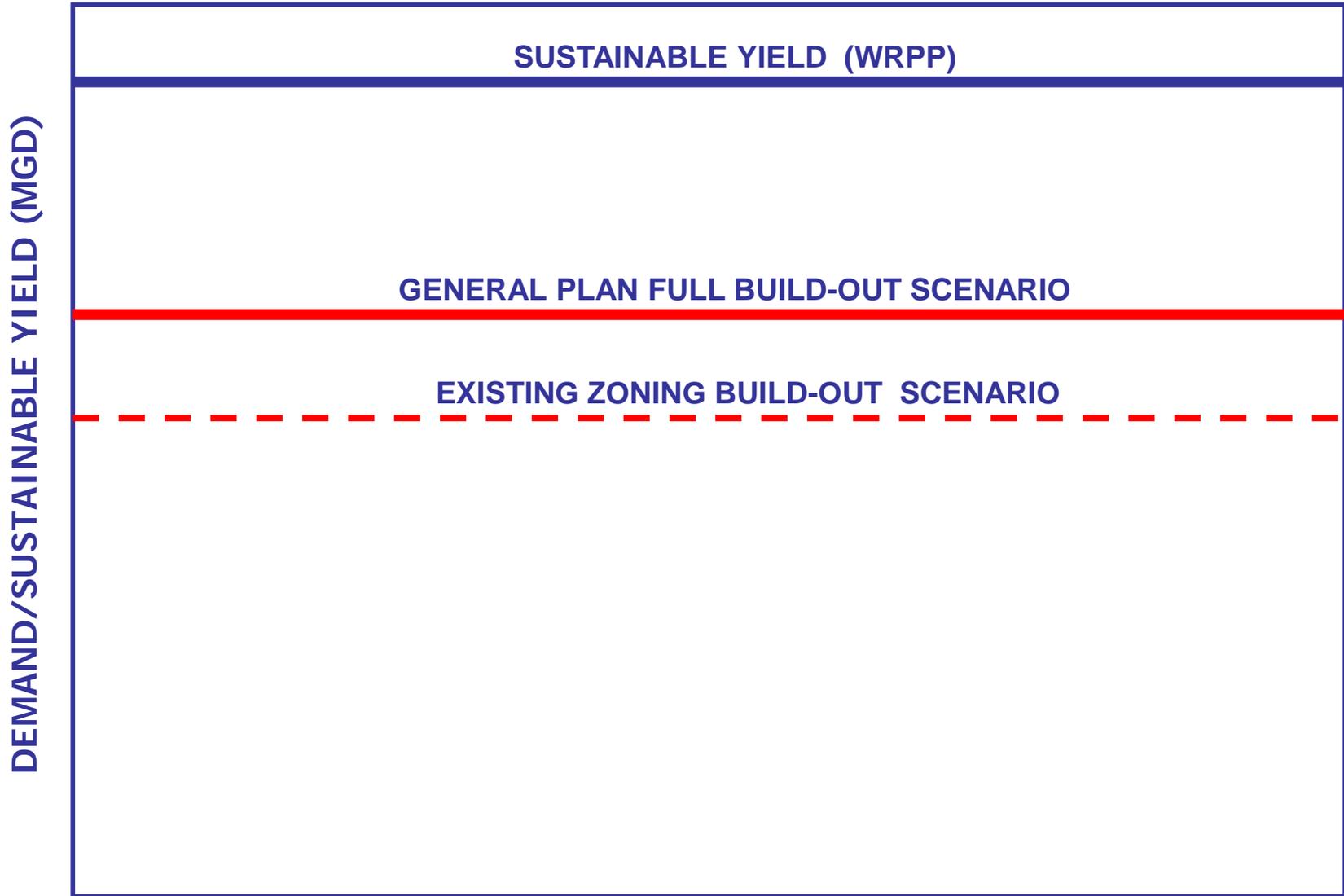
- Preliminary evaluation of sustainability of land use policies
- Identification of “more sensitive” and “less sensitive” areas
- Concept of “Full Build-out” scenarios
- Application of standard water planning methods to existing land use plans and policies
- Focus on domestic demands and groundwater sources

Full Build-out Scenario – ALL land area to be developed to its theoretical maximum extent

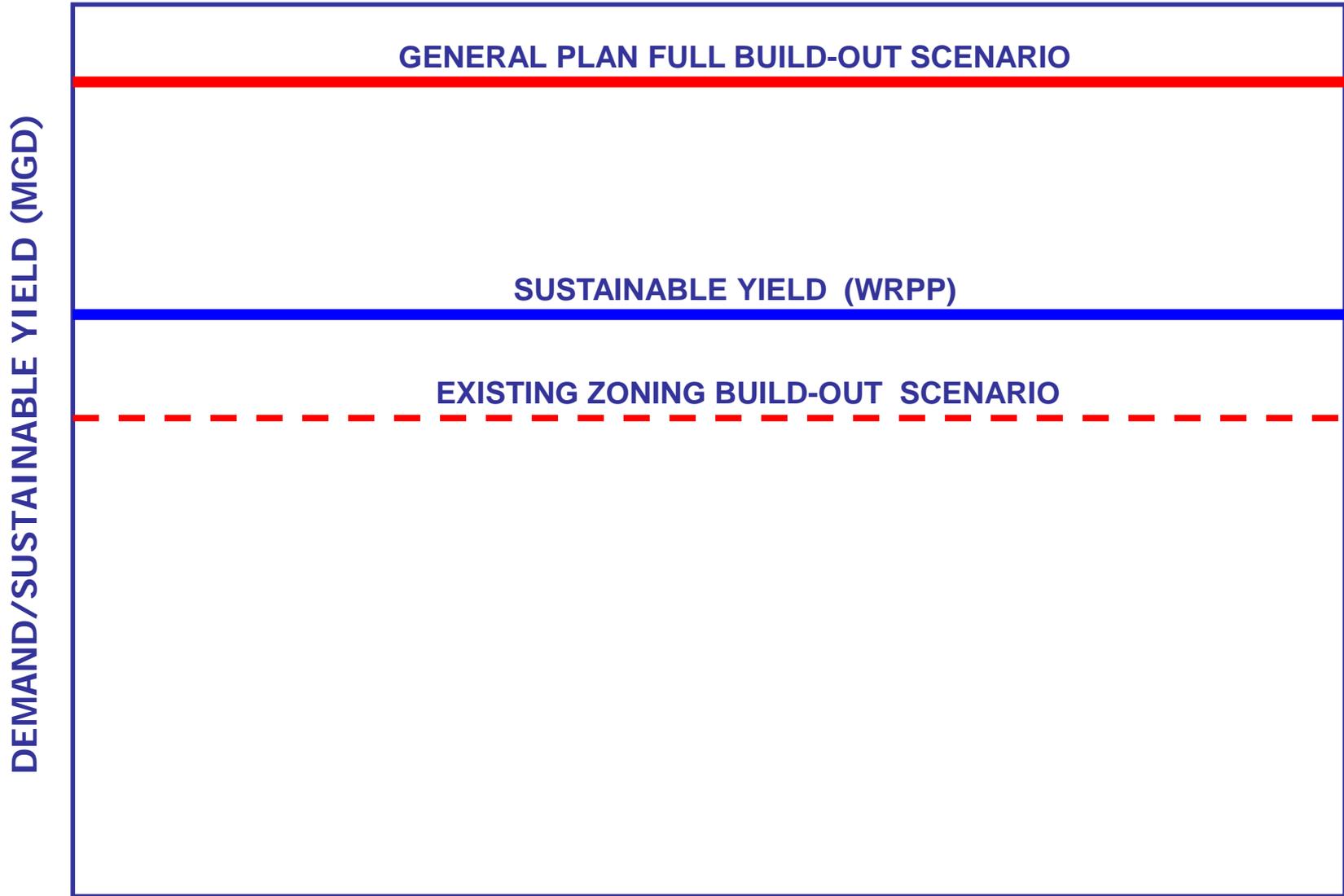
Land Use Policies

- **State Land Use Classifications**
 - Generalized Land Use Policies
- **County General Plan – LUPAG**
 - Land Use Pattern Allocation Guide
 - Ultimate Development “County Vision”
 - Community Development Plans – “Local Area Vision”
- **County Zoning**
 - Allowable Development “authorized” by Ordinance
 - Need permits and regulatory approvals

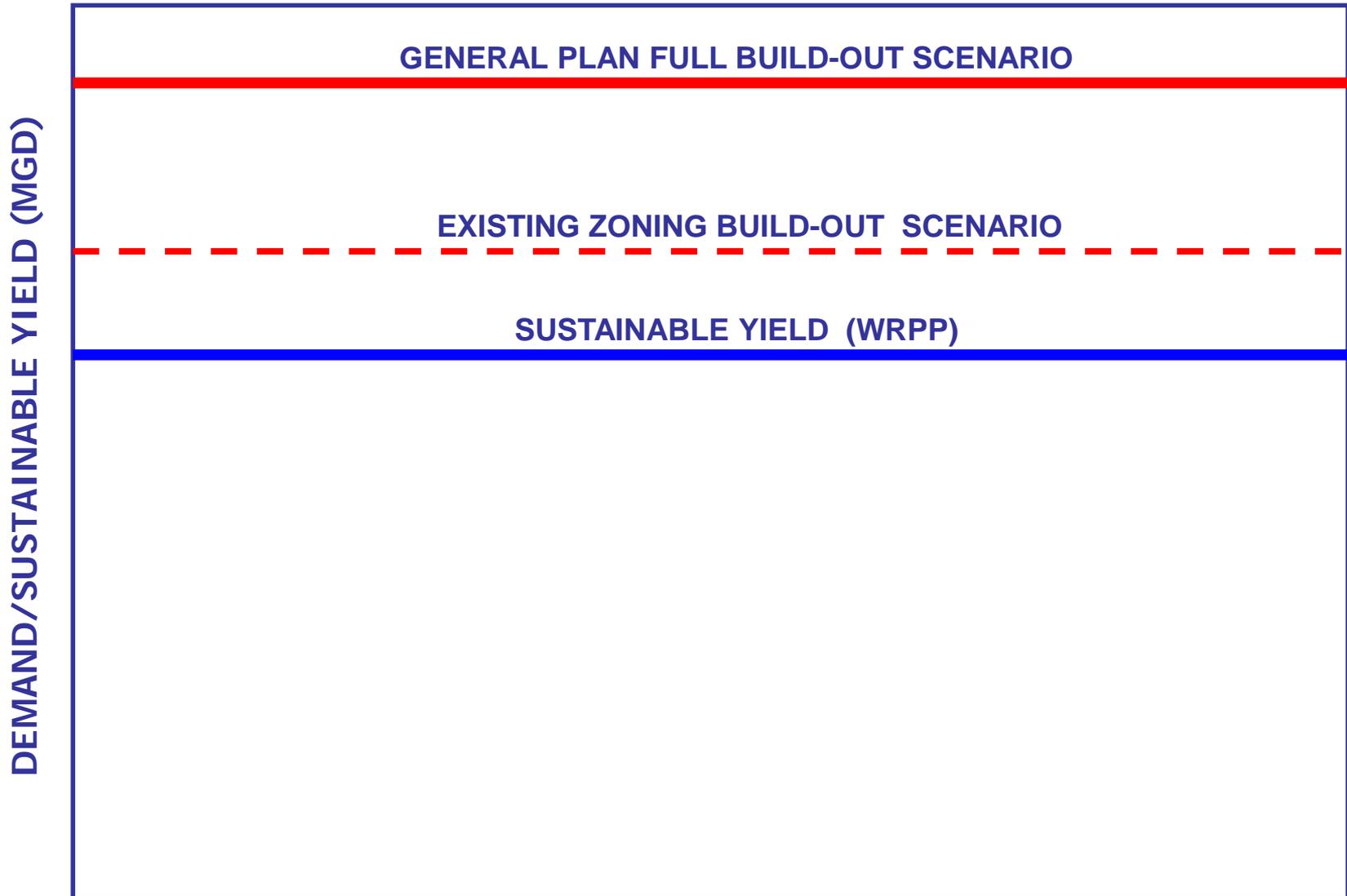
SUSTAINABILITY OF LAND USE POLICIES



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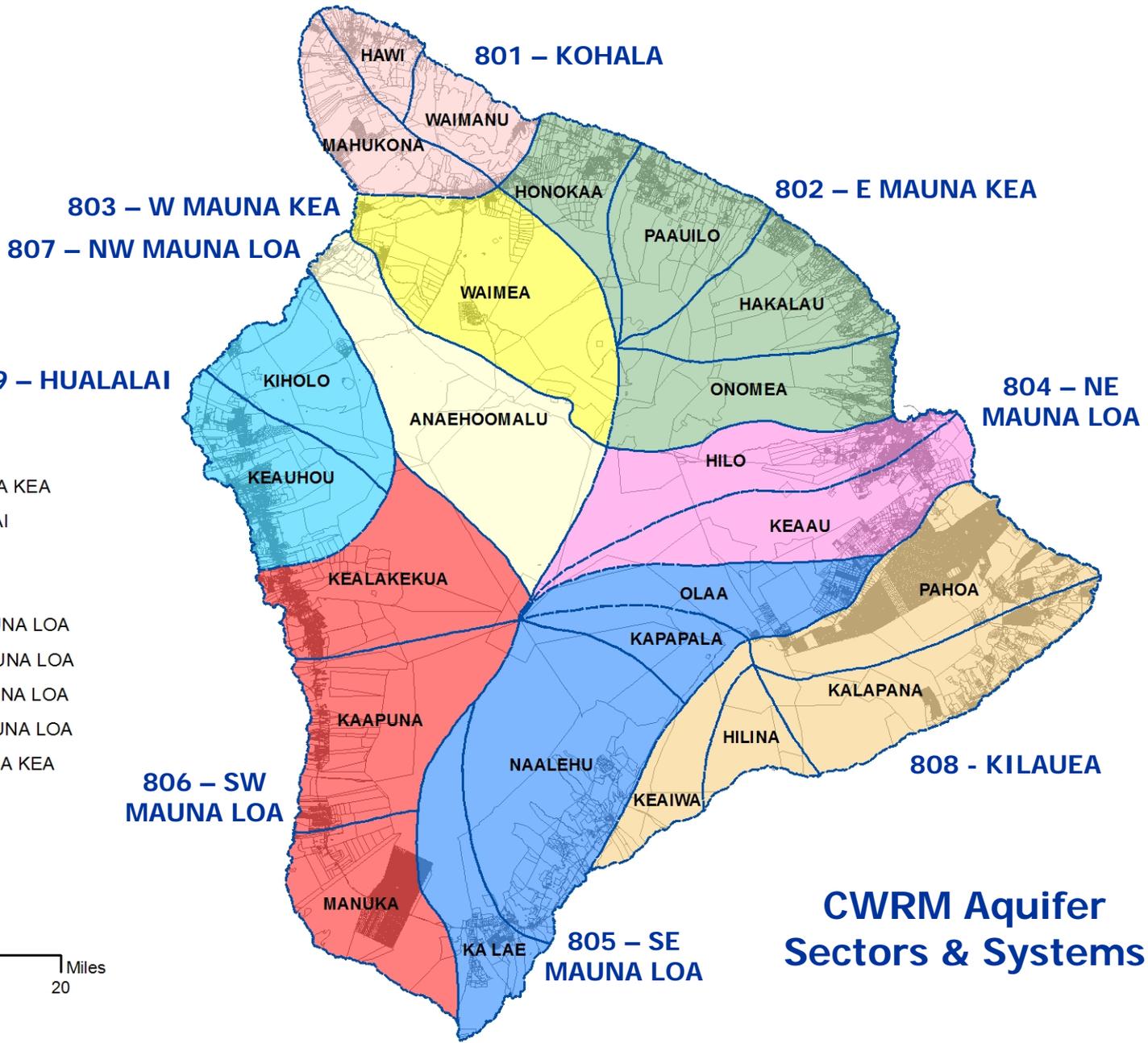
SUSTAINABILITY OF LAND USE POLICIES



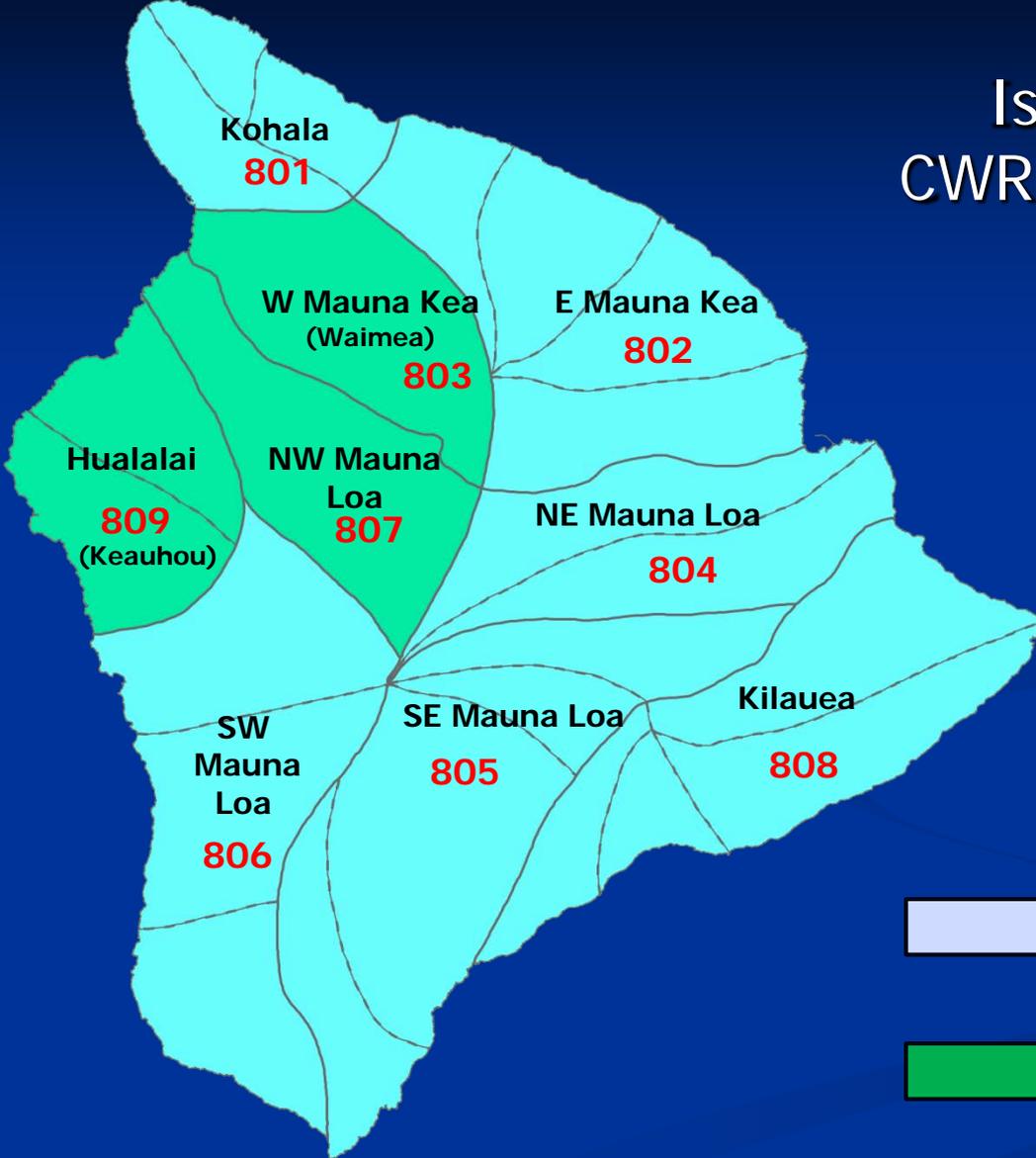
Initial Assessment Considerations

- It is understood that the assessments are highly conservative – objective is to identify the more sensitive and less sensitive areas on the island.
- Sustainable yield values from WRPP are conservative estimates that establish safe limits to avoid degradation of the ground water resources.
- Full build scenarios are inherently conservative, based on gross areas, irrespective of development limitations.
- Typically, if an area is deemed less sensitive, the water resources in the area are well within sustainable limits to accommodate the potential development.
- If areas are found to be more sensitive, more refined analyses of existing development is conducted, and adjustments to future development can be implemented if necessary.

Full Build-out Scenario – ALL land area to be developed to its theoretical maximum extent



Island of Hawaii CWRM Aquifer Sectors



-  Abundant Sustainable Yield
-  Additional Study Warranted

Refinements - Keauhou

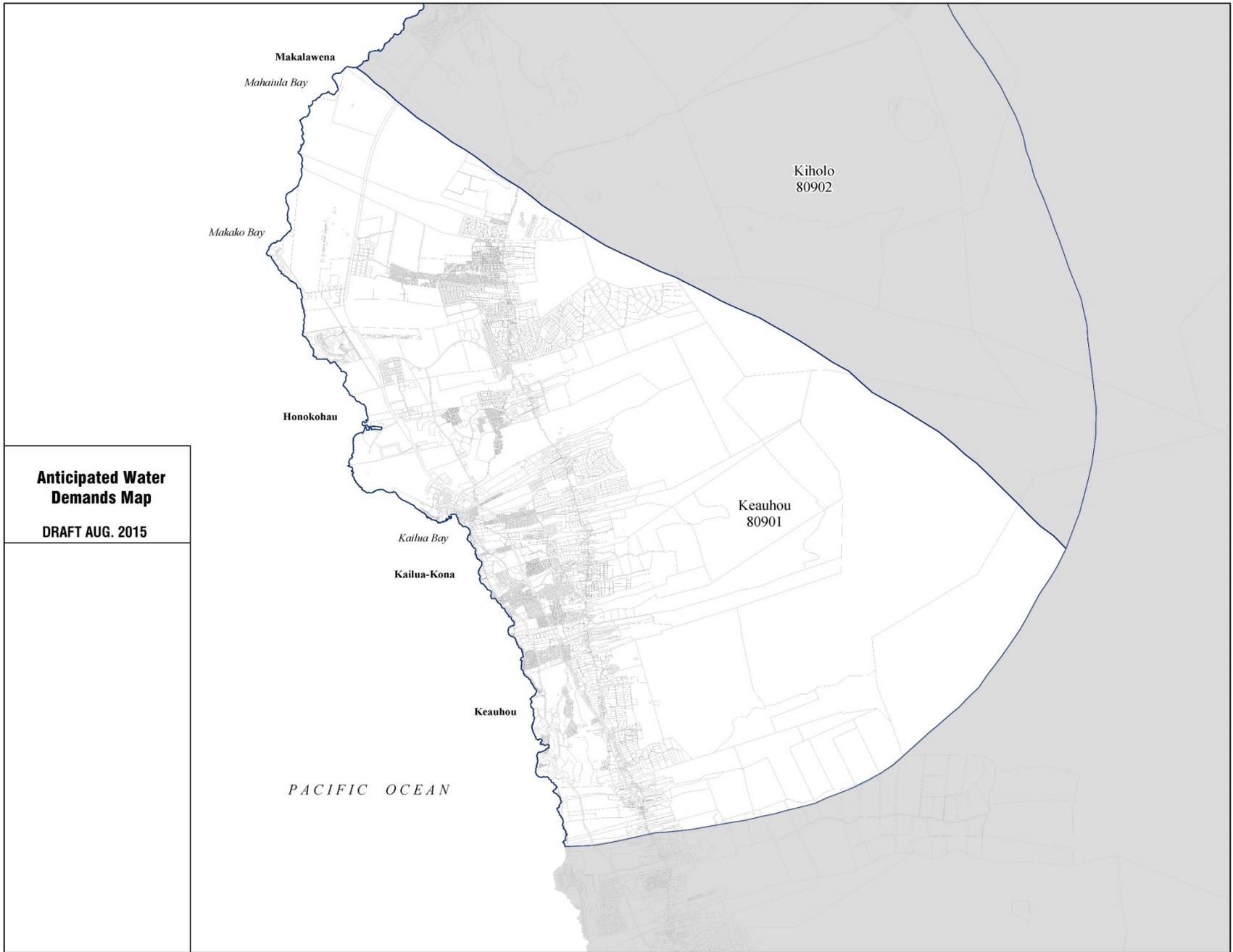
Incorporation of New Planning Information

- LUPAG Updates – County Planning Department
- Kona Community Development Plan
- Proposed and Recent Masterplan Developments

Refinements - Keauhou

Assessment of Recent Developments

- Identification of existing users / developed parcels
- Identify lands with “Anticipated Water Demand”
 - Water Entitlements
 - Vacant parcels with service laterals
 - Approved building permits
 - DWS water commitments/credits
 - Developer agreements
 - Department of Hawaiian Home Lands needs (not already included in above)
 - Public Facility needs (State Water Projects Plan)
 - Kona Community Development Plan projects (not already included in above)
- Evaluation of water use trends – “unit rates” (typically based on metered data)
- Conduct reality check of original water use projections



Makalawena

Mahaiula Bay

Makako Bay

Honokohau

Kailua Bay

Kailua-Kona

Keauhou

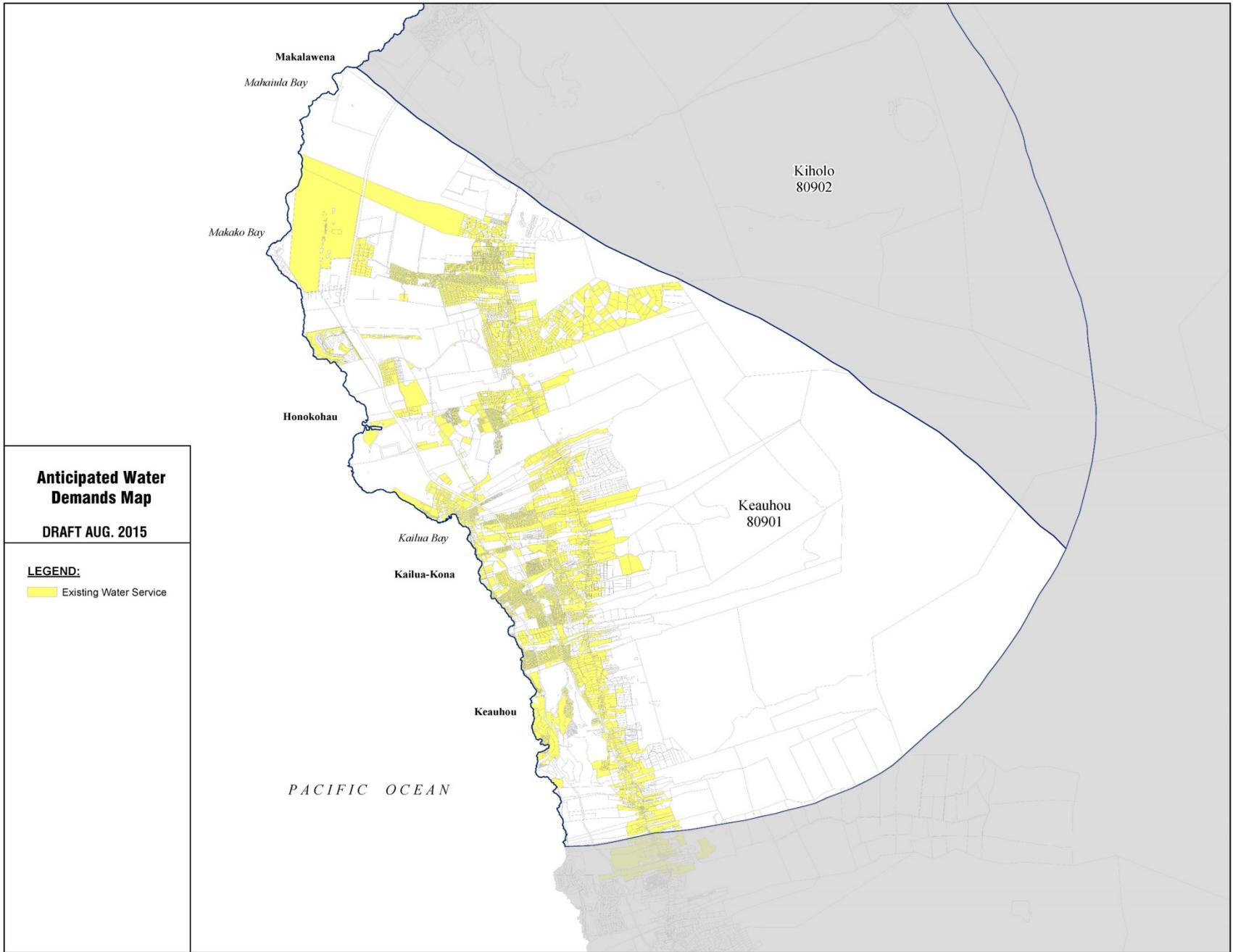
PACIFIC OCEAN

Kiholo
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Keauhou
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**Anticipated Water
Demands Map**

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Anticipated Water Demands Map

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LEGEND:

- Existing Water Service
- Water Commitments
- Developer Agreements
- Vacant Laterals
- Open Building Permits

Makalawena
Mahaiula Bay

Makako Bay

Honokohau

Kaihua Bay

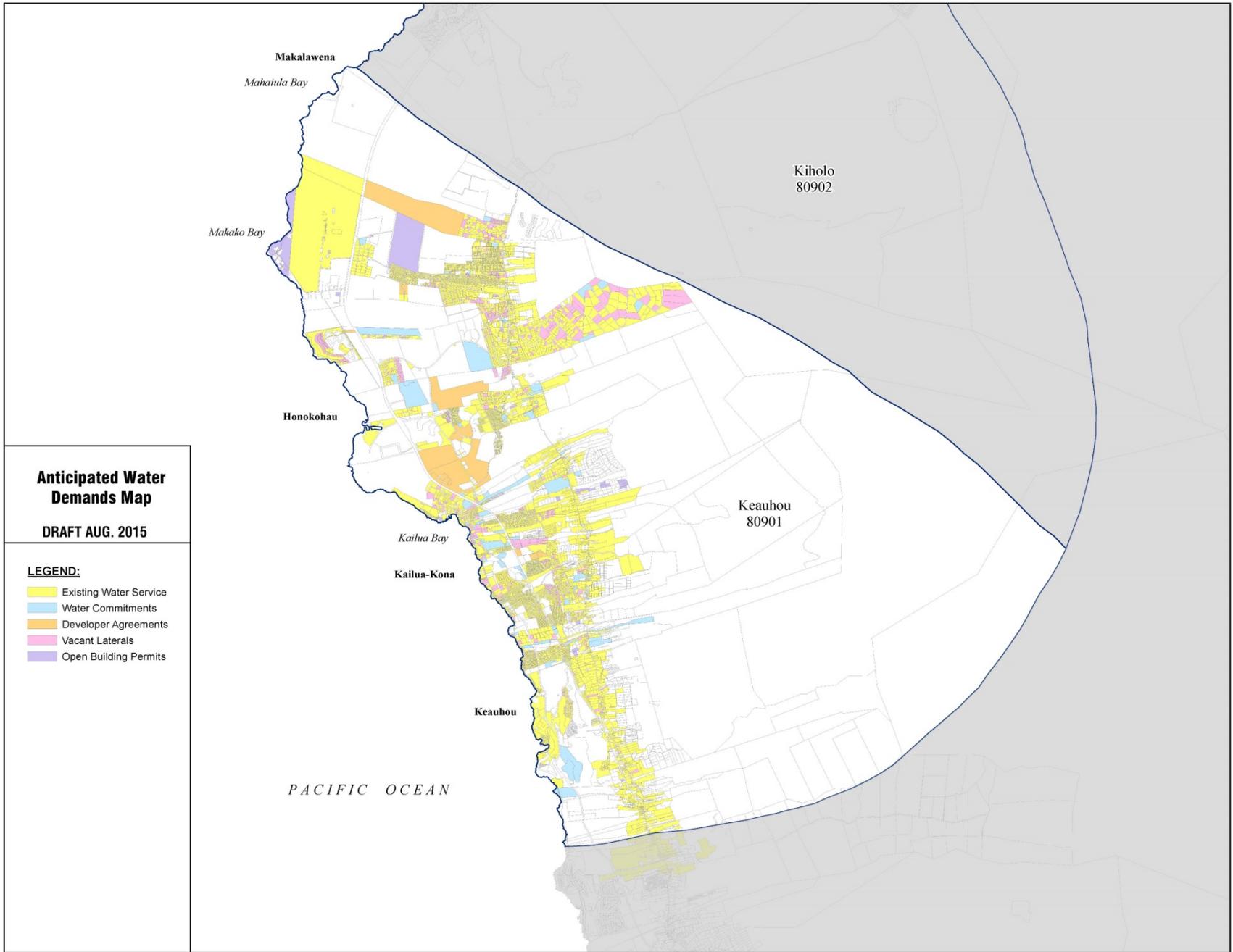
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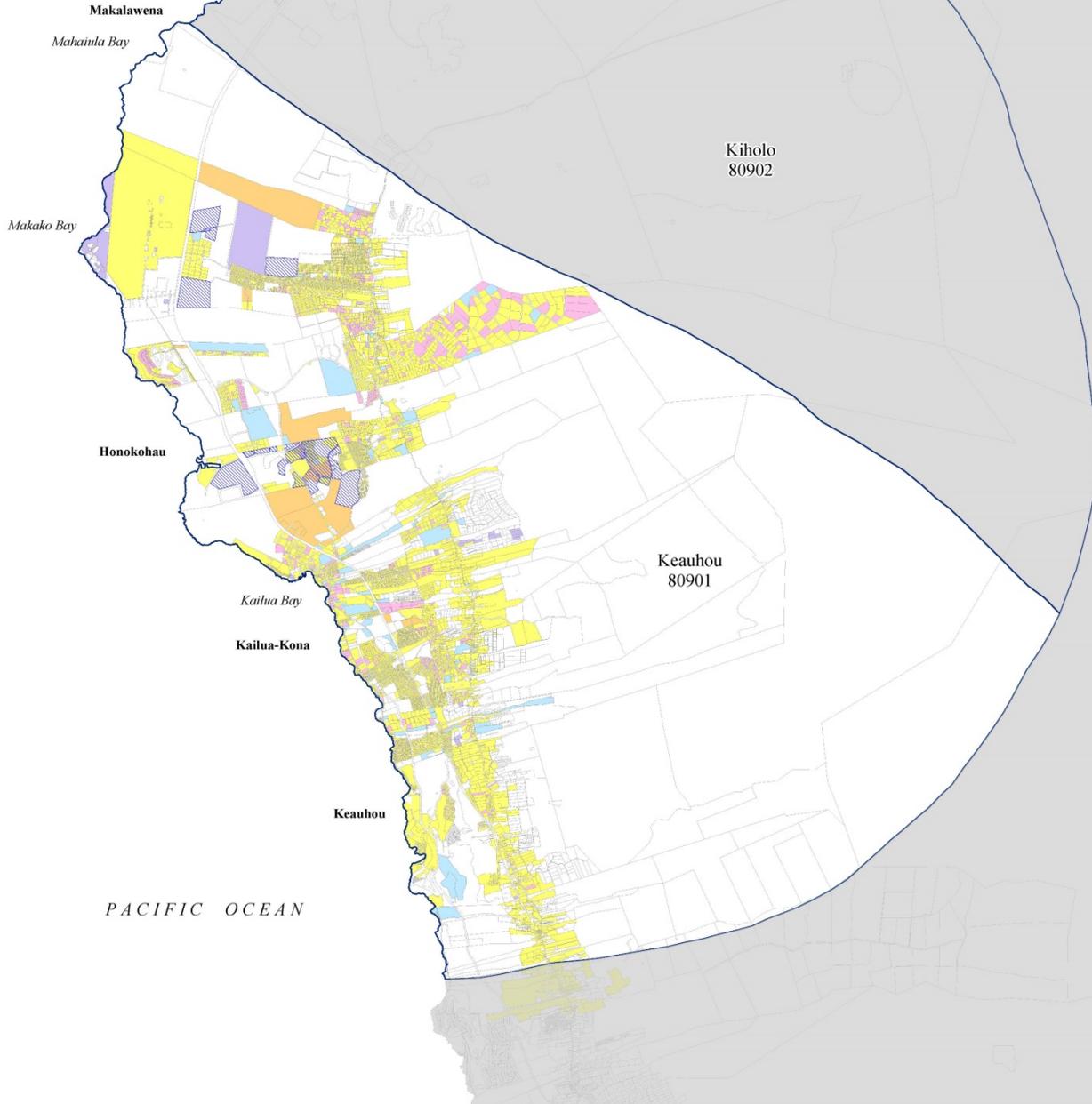


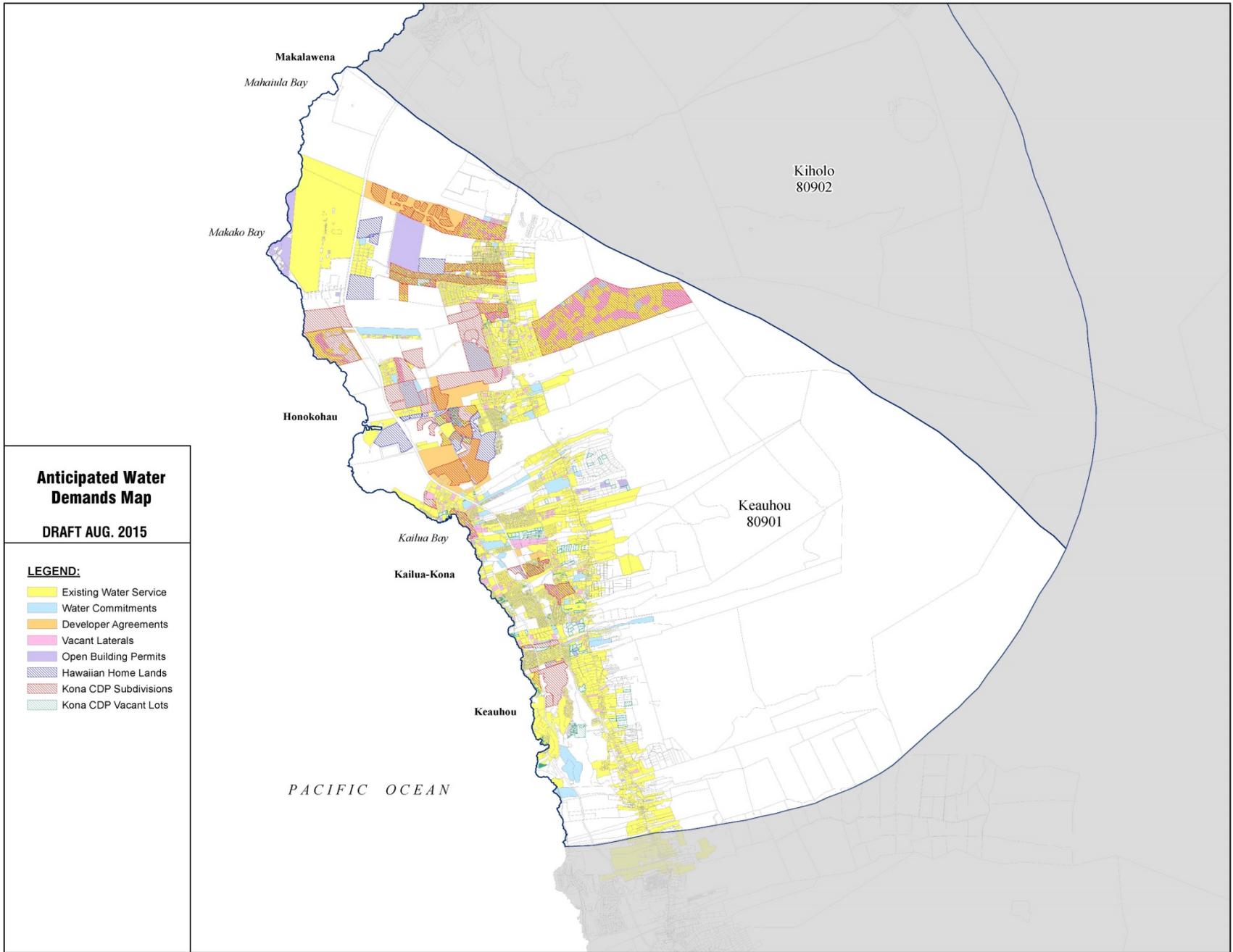
Anticipated Water Demands Map

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LEGEND:

- Existing Water Service
- Water Commitments
- Developer Agreements
- Vacant Laterals
- Open Building Permits
- Hawaiian Home Lands





Adjusted Water Use – Unit Rates

Land Use Category	Average Daily Demand	
	2010 HWUDP	2015 HWUDP - Keauhou
		Anticipated Demands
Residential	1000 gpu*	400 gpu
Commercial	3000 gpa	3000 gpa
Industrial	4000 gpa	4000 gpa
Resort	400 gpu or 17000 gpa**	400 gpu
Agricultural	3400 gpa***	N/A

* Used for North Kona and South Kohala Districts

** Resort (gpa) based on Maui rate

***Based on initial rate for AWUDP

gpu = gallons per unit

gpa = gallons per acre

Anticipated Water Demand – Keauhou

Component	CWRM Category	Water Demand (MGD)
Existing Developed Parcels	Domestic/Irrigation/Municipal	14.68 *
Water Entitlements		
Vacant service laterals	Municipal	1.10
Developer agreements	Municipal	3.39
Water credit commitments	Municipal	2.66
Approved building permits	Municipal	0.09
Other Developments	Irrigation/Municipal	0.45
Department of Hawaiian Homes	Irrigation/Municipal	3.40
State Projects	Irrigation/Municipal	0.06
Kona Community Development Plan	Municipal	1.85
TOTAL		27.86

* Pumpage records - highest 12 month – MAV – AUG 2012- JUL 2014

Refinements - Keauhou

Assessment of Zoning Water Demand

- Identification of existing users / developed parcels
- Identify undeveloped zoned parcels
 - Residential, Commercial, Industrial, Resort, Agriculture
- Identify lands not included in County Zoning and/or Water Service Area
 - Department of Hawaiian Home Lands needs (not already included in above)
- Apply realistic regional – “unit rates” (typically based on metered data)
- Conduct reality check of original water use projections

**County Zoning
Build-out Map**

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Mahaiula Bay

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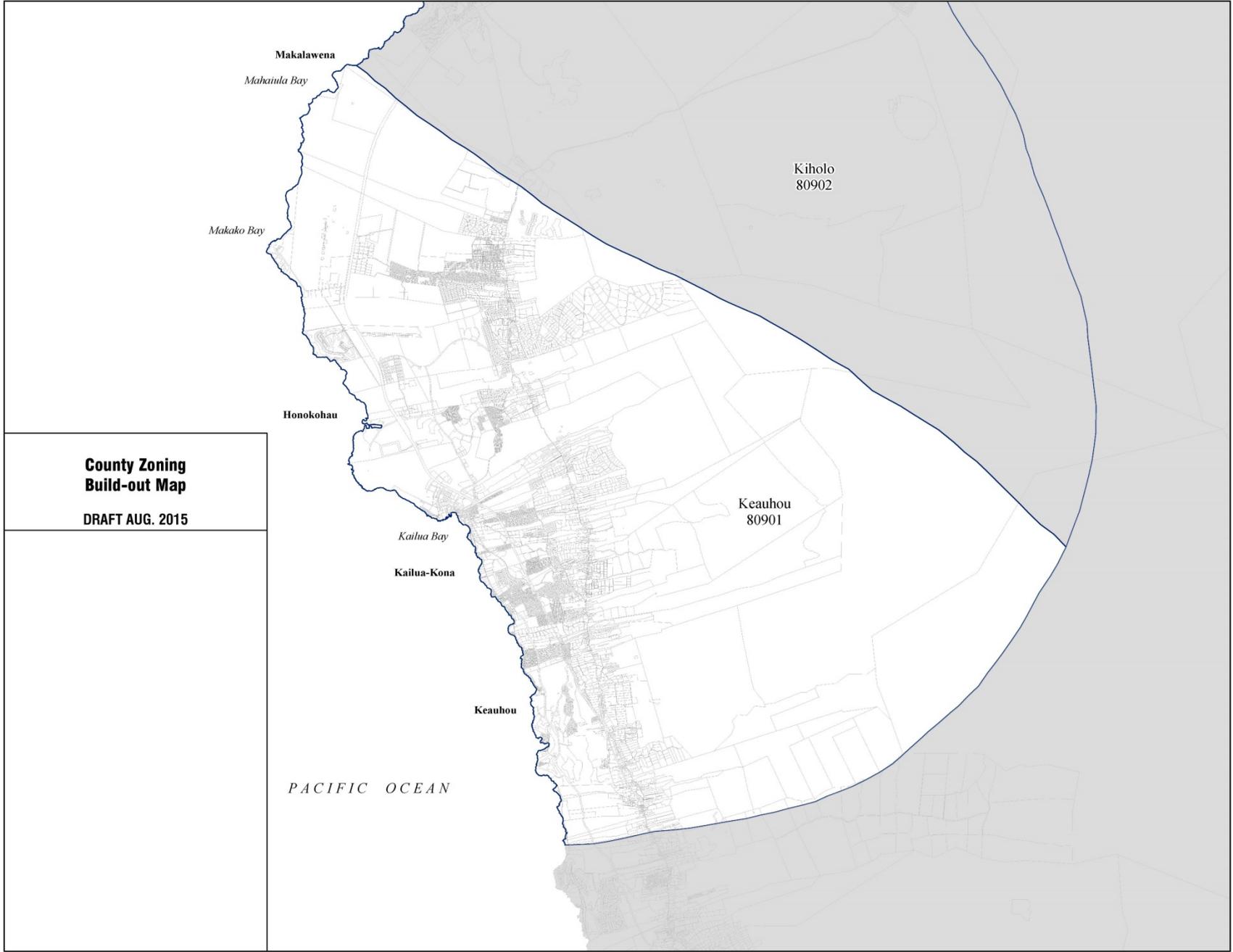
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**County Zoning
Build-out Map**

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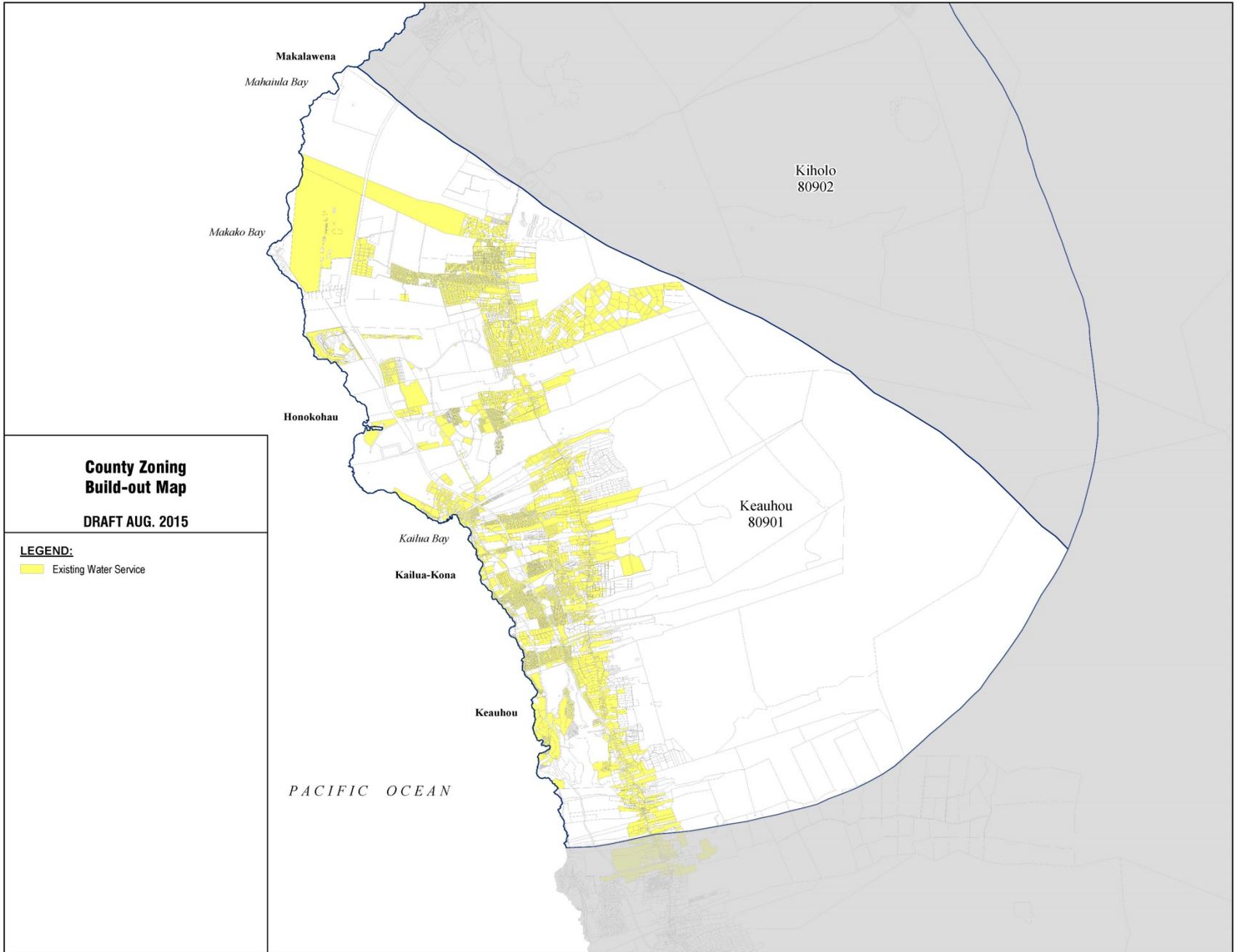
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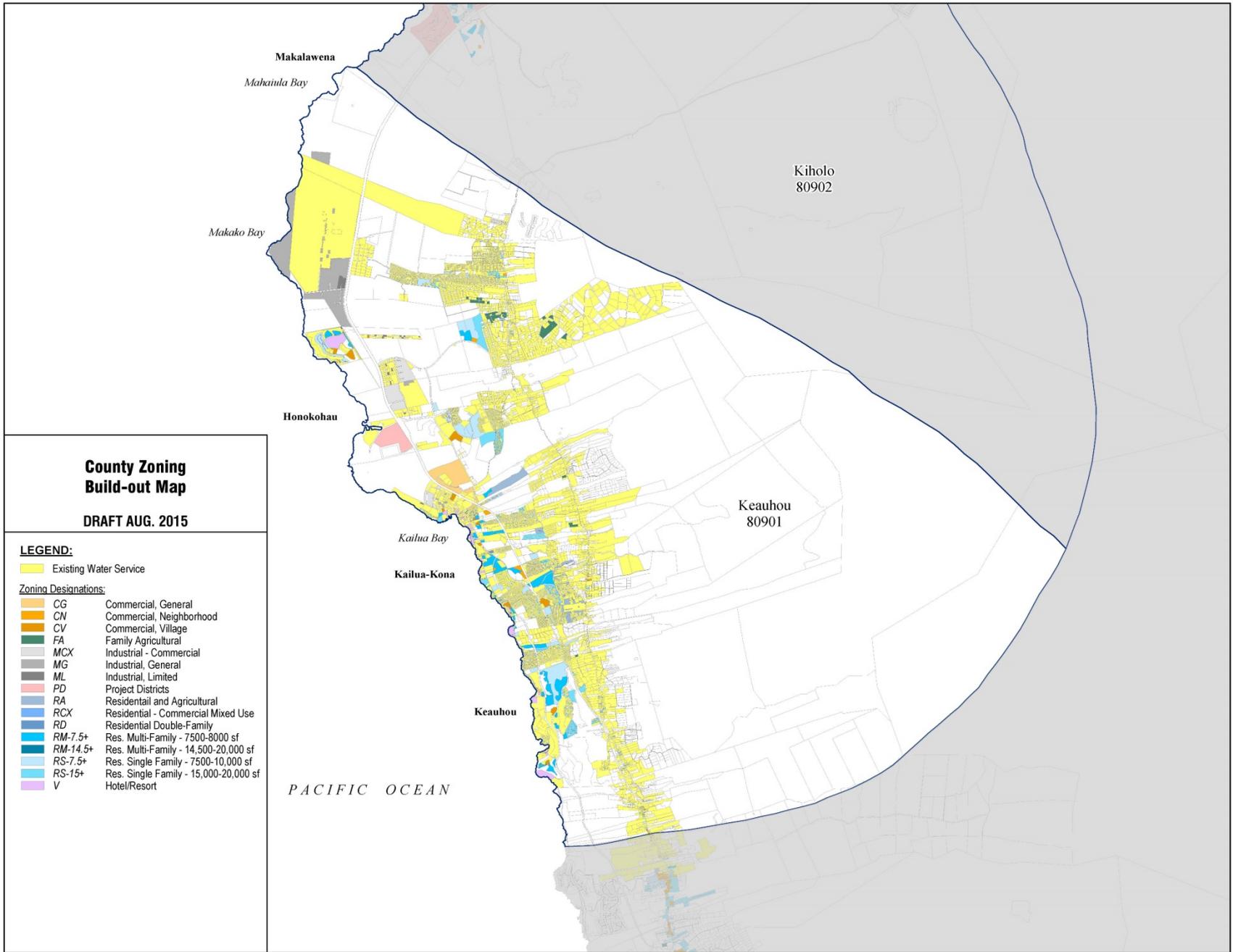
Keauhou

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**County Zoning
Build-out Map**

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LEGEND:

- Existing Water Service
- Zoning Designations:**
- CG Commercial, General
- CN Commercial, Neighborhood
- CV Commercial, Village
- FA Family Agricultural
- MCX Industrial - Commercial
- MG Industrial, General
- ML Industrial, Limited
- PD Project Districts
- RA Residential and Agricultural
- RCX Residential - Commercial Mixed Use
- RD Residential Double-Family
- RM-7.5+ Res. Multi-Family - 7500-8000 sf
- RM-14.5+ Res. Multi-Family - 14,500-20,000 sf
- RS-7.5+ Res. Single Family - 7500-10,000 sf
- RS-15+ Res. Single Family - 15,000-20,000 sf
- V Hotel/Resort

PACIFIC OCEAN

County Zoning Build-out Map

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Existing Water Service

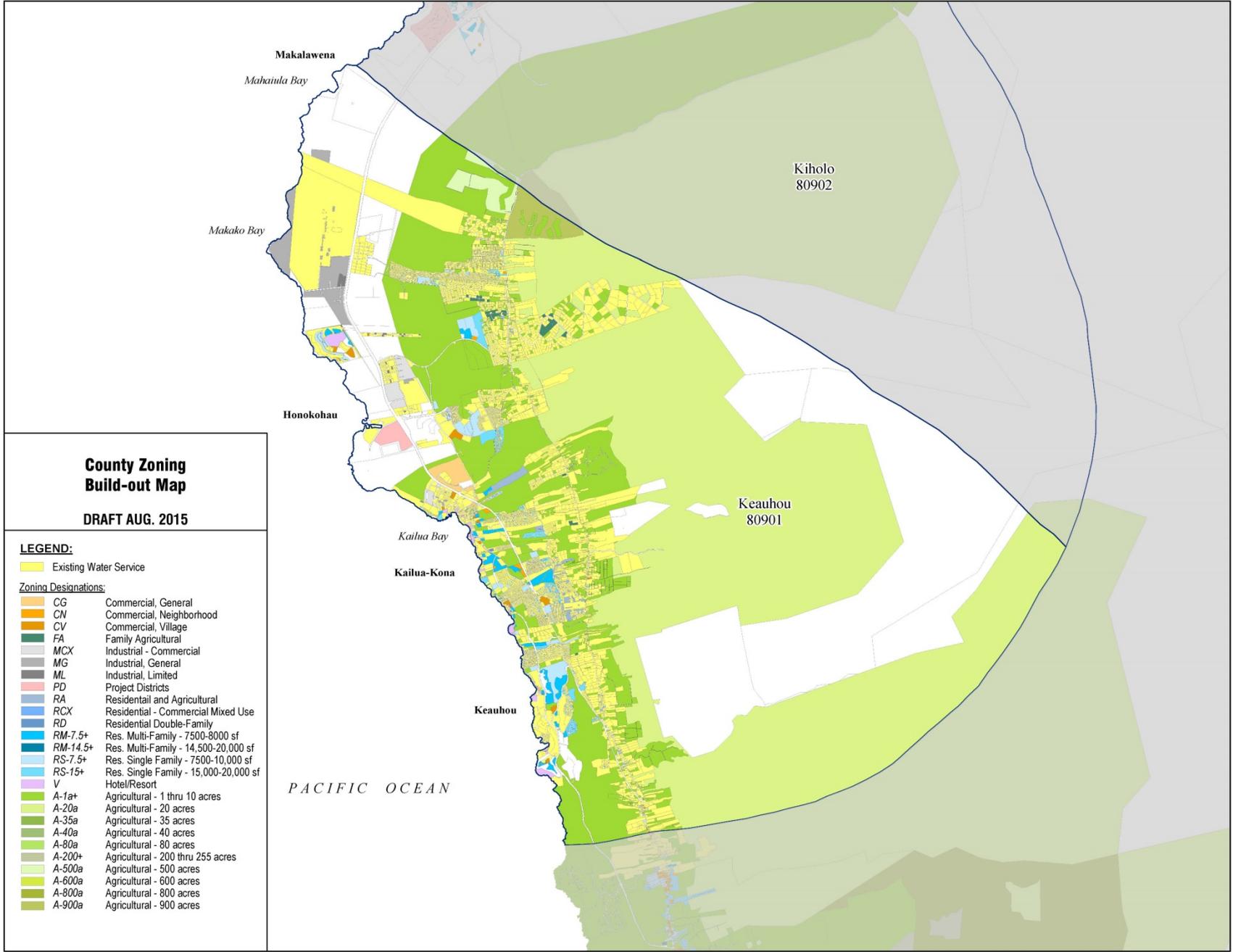
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- V Hotel/Resort
- A-1a+ Agricultural - 1 thru 10 acres
- A-20a Agricultural - 20 acres
- A-35a Agricultural - 35 acres
- A-40a Agricultural - 40 acres
- A-80a Agricultural - 80 acres
- A-200+ Agricultural - 200 thru 255 acres
- A-500a Agricultural - 500 acres
- A-600a Agricultural - 600 acres
- A-800a Agricultural - 800 acres
- A-900a Agricultural - 900 acres

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County Zoning Build-out Map

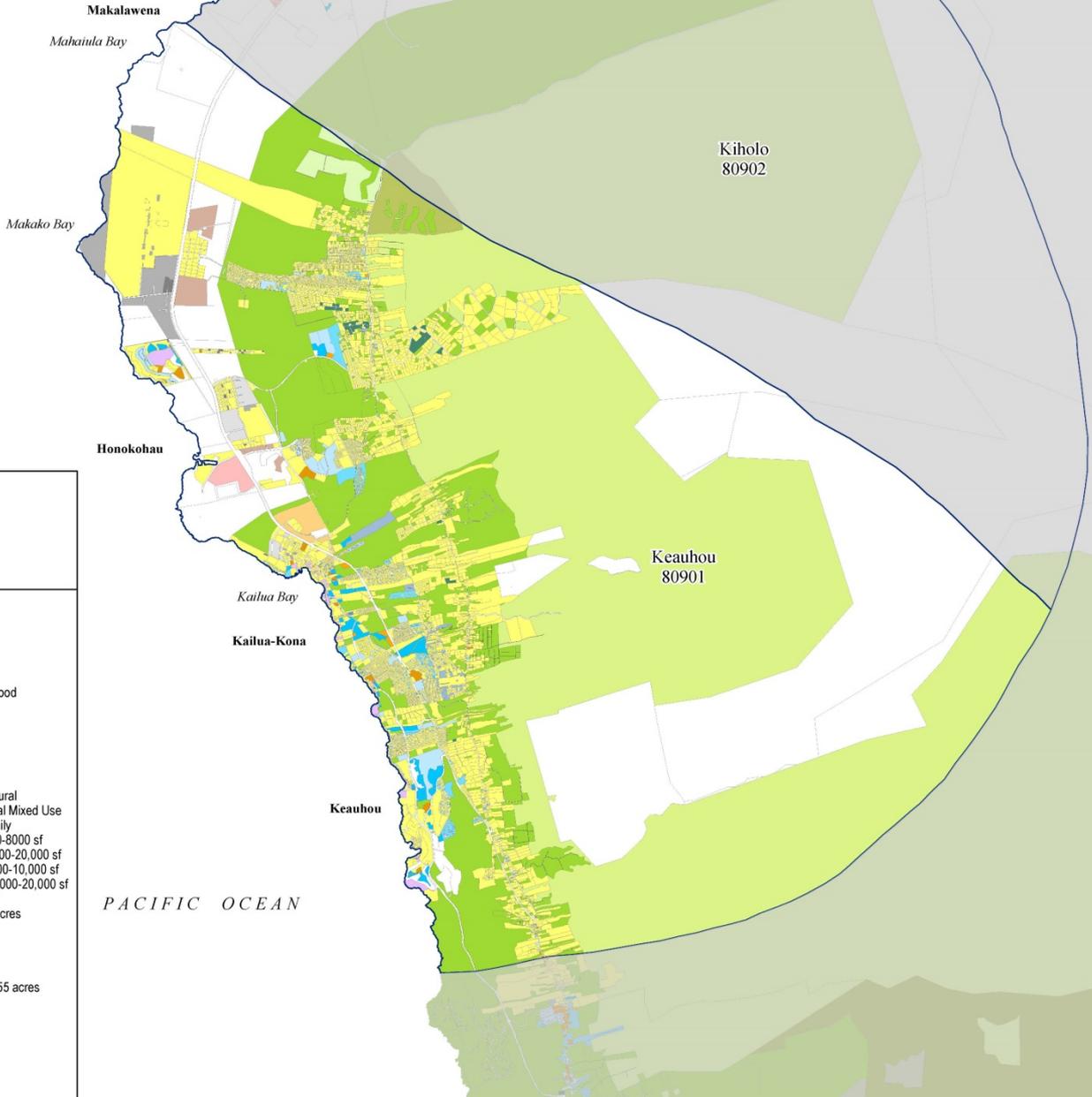
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- A-800a Agricultural - 800 acres
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- Hawaiian Home Lands



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Agricultural	3400 gpa***	210 gpa

* Used for North Kona and South Kohala Districts

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***Based on initial rate for AWUDP

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County Zoning Water Demand – Keauhou

Zoning District/ Component	CWRM Category	Water Demand (MGD)
Existing Developed Parcels	Domestic/Irrigation/Municipal	14.68 *
Residential	Domestic/Irrigation/Municipal	4.31
Resort	Irrigation/Municipal	0.57
Commercial	Municipal	0.38
Industrial	Industrial	0.91
Agricultural	Agricultural	3.45
Other Developments	Irrigation/Municipal	0.45
Department of Hawaiian Homes	Irrigation/Municipal	3.40
TOTAL		28.33

* Pumpage records - highest 12 month – MAV – AUG 2012- JUL 2014

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Projected Water Demands

- **Establish baseline of existing water use (e.g. water meter records; monitoring; pumpage)**
- **Project “infill” of undeveloped or under-developed lands (growth based on socio-economic activity)**
- **Based on Population Growth Scenarios (low, medium & high – consistent with methods of County Planning Department)**
- **Assume that types of future development in a given region will be similar in character with existing conditions.**

Historical Groundwater Pumpage and Population Growth

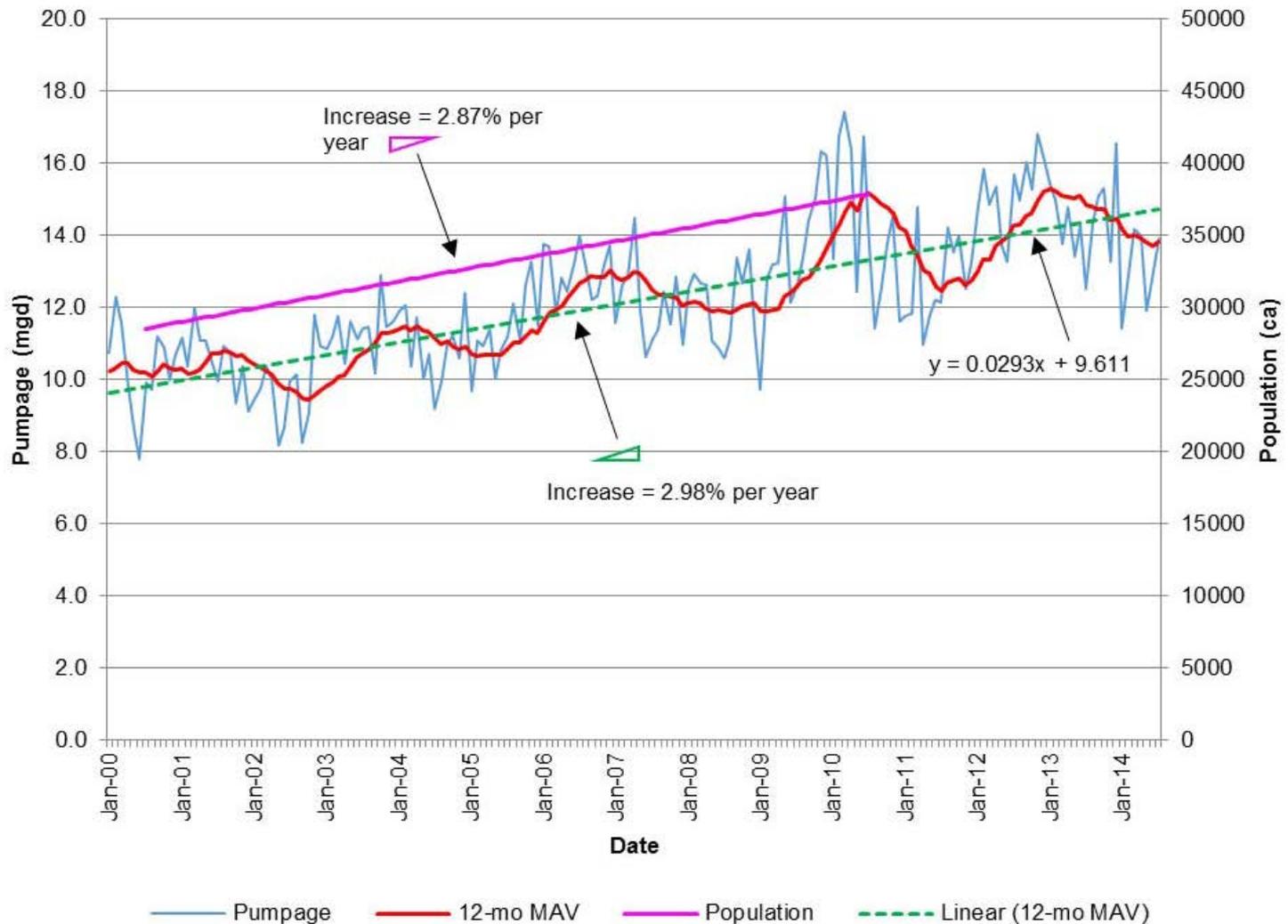
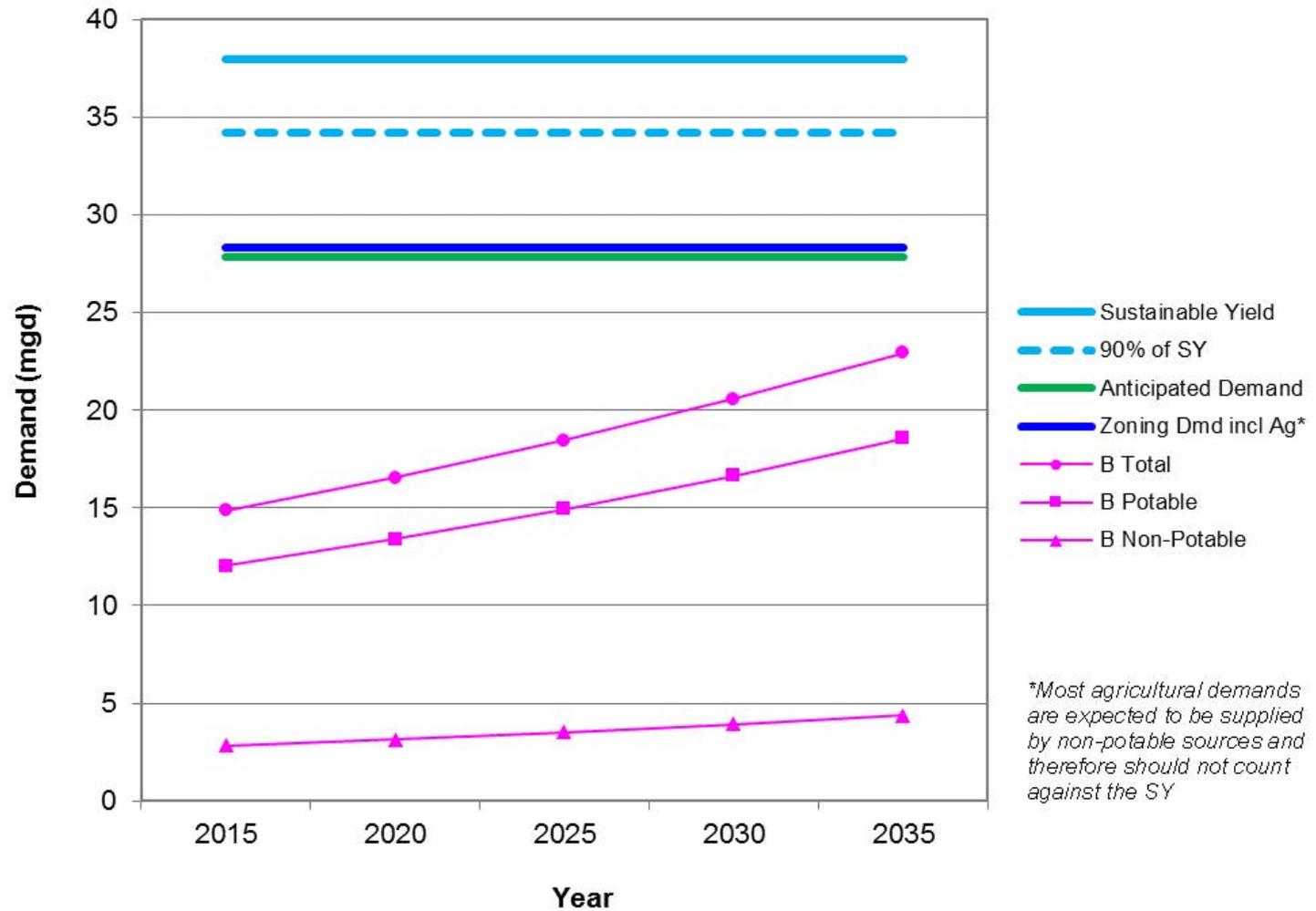
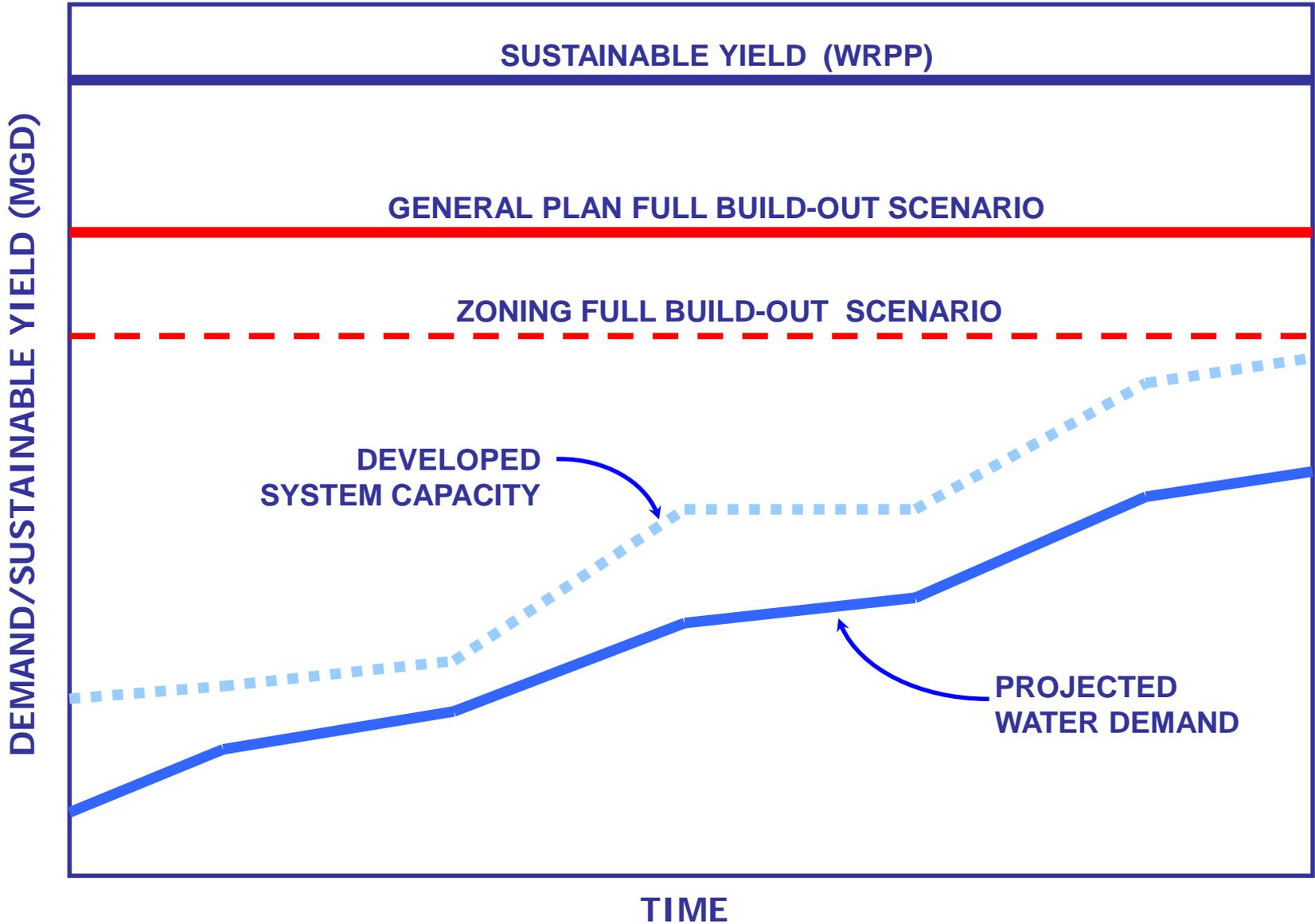


Figure 3-7: Summary of Water Demand Scenarios – Keauhou ASYA



MEETING PROJECTED DEMANDS



Identification of Resource Options

- **Protection of Watershed Reserves**
- **Consistently apply demand-side measures**
 - **Conservation Programs and Policies**
 - **Xeriscape/Landscape management**
 - **Manage development**
- **Maximize use of lower quality water (reuse water, surface water, brackish water) whenever feasible**
- **Develop and maintain conventional water system infrastructure prudently**
- **Strictly adhere to requirements of CWRM well permitting process – including assessment of impacts of all new well development**

Opportunity to Focus Future Efforts

- **Identification of data needs**
 - Promote efforts to better understand the hydrogeological conditions
 - Awareness of Traditional and Cultural needs – identify sources of regional knowledge
- **Linking of land planning policies with infrastructure & resource availability**
 - Public needs – State Water Projects Plan, County Public Facilities requirements
 - Private developer land plans – Kona Community Development Plan

Tentative Schedule

■ Project Description

- CWRM Conditional Approval – February 18, 2015
- Updated Phase 1 PD submitted – March 4, 2015

■ Draft Phase 1 for Keauhou

- Draft submitted to staff for review – May 15, 2015
- Discussion/coordination between staff & County
- Presentation to CWRM – August 2015

■ Draft Phase 2 for Keauhou

- Draft PD submitted to staff for review – May 30, 2015
- Discussion/coordination between staff & County

Questions?

Contact: Jon Nishimura, P.E.
Fukunaga & Associates, Inc.

jnishimura@fukunagaengineers.com