State of Hawaii

STATE WATER PROJECTS PLAN - UPDATE

for the

Department of Land and Natural Resources
Engineering Division

Consultant:

FUKUNAGA & ASSOCIATES, INC.

1357 Kapiolani Blvd., Suite 1530
Honolulu, Hawaii 96814

Presentation Outline

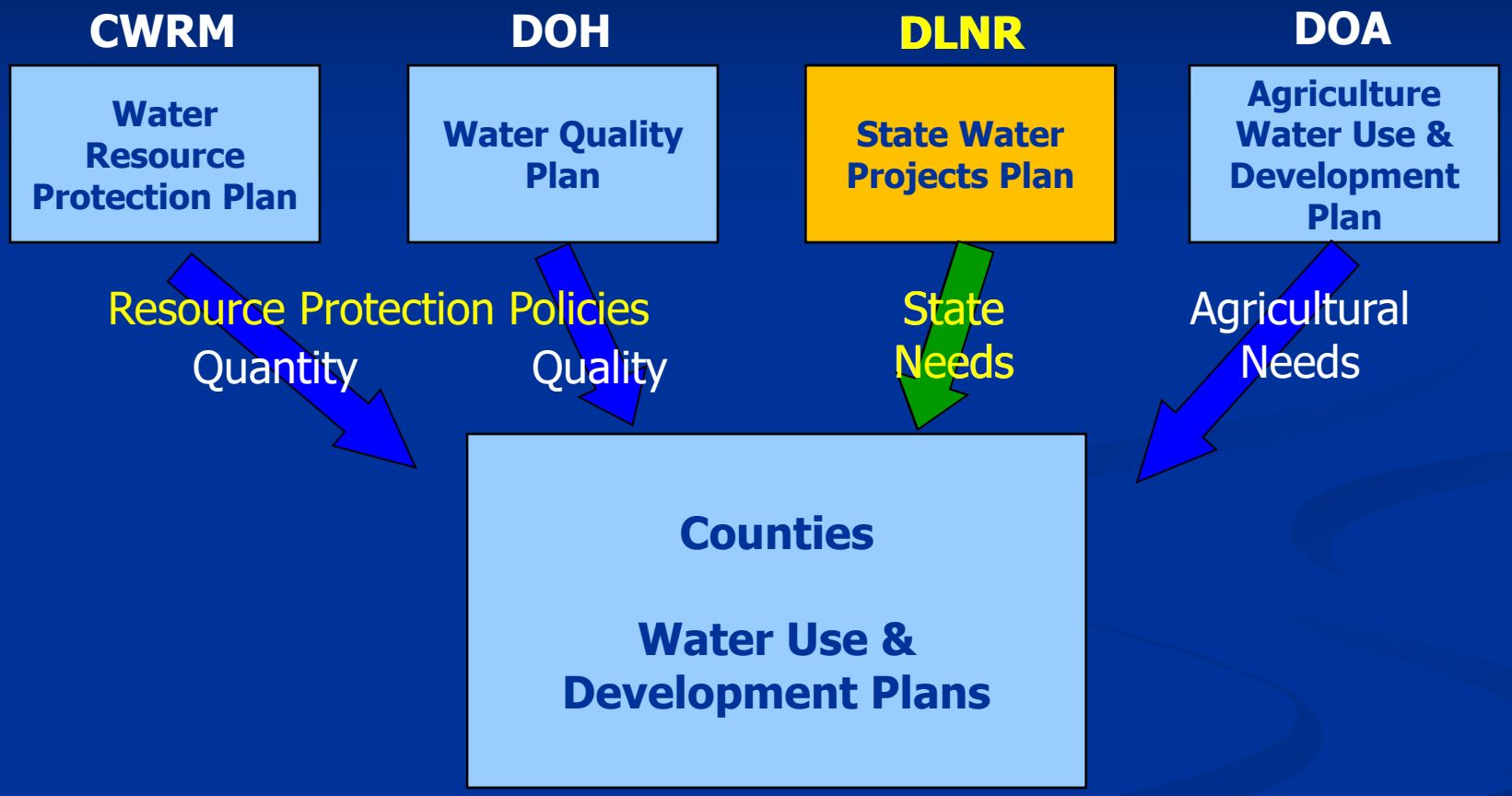
- Introduction
- Key Tasks
- Technical Approach
- Projected Water Demands
- Water Development Strategies
- Conclusions & Recommendations

Introduction

Objective of the State Water Projects Plan (SWPP):

". . . to provide a framework for planning and implementation of water development programs to meet projected water demands for <u>State</u> projects."

Hawaii Water Plan



Integrate Water Use & Land Development Policies

Introduction

Preparation responsibility:

- State Agency
  - Department of Land and Natural Resources (DLNR), Engineering Division
- Consultant
  - Fukunaga & Associates, Inc.
  - Akinaka & Associates, Ltd.

Introduction

- SWPP last updated in 2003 for all State Agencies
- SWPP update for DHHL projects only adopted by CWRM in 2017

Introduction

- What the State Water Projects Plan IS:
  - A planning level guide that provides general estimates of State water needs and conceptual water development options that could potentially meet those water needs
- What the State Water Projects Plan IS NOT:
  - A water management plan that holistically evaluates all water related issues within certain areas
  - A water master plan that identifies specific infrastructure planning and programming details

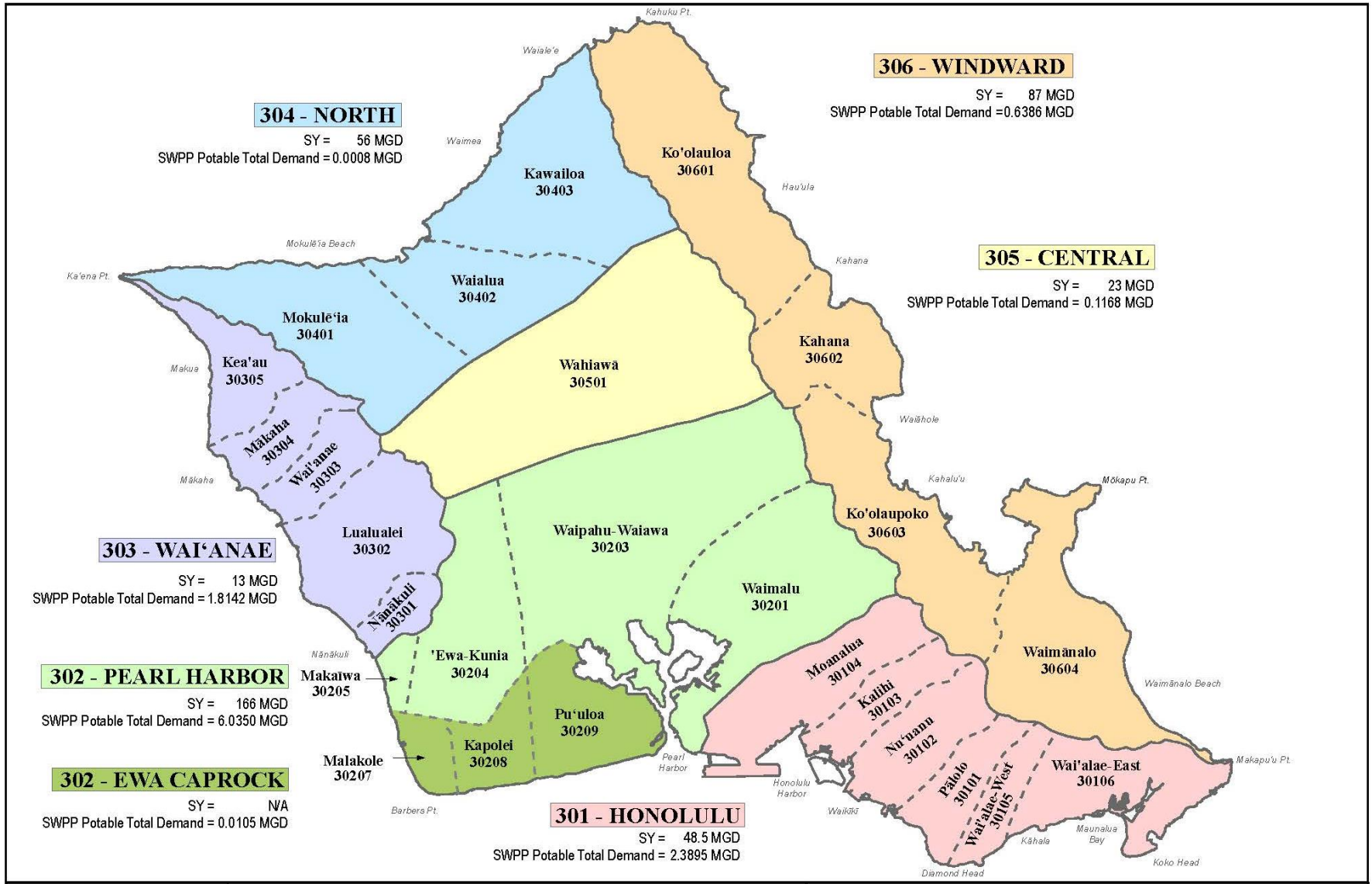
Key Tasks

- Inventory of Existing State Sources: Water Systems, Wells and Stream Diversions
- Identification of Proposed State Projects/Developments
- Assessment of Future Water Demand Projections
  - 20-Year Timeframe
- Water Development Strategies
  - Potential Implementation Plan
- Consistency With Other Components of Hawaii Water Plan

Technical Approach

Technical Approach
Data Collection

- Public Drinking Water System Data from Department of Health
- CWRM Well and Stream Diversion Database
- Available Project Master Plans
- Survey of State Agencies



State Water Projects Plan Update - Statewide

Hydrologic Units - Oʻahu

FIGURE 3-2

Fukunaga & Associates, Inc., *Consulting Engineers*

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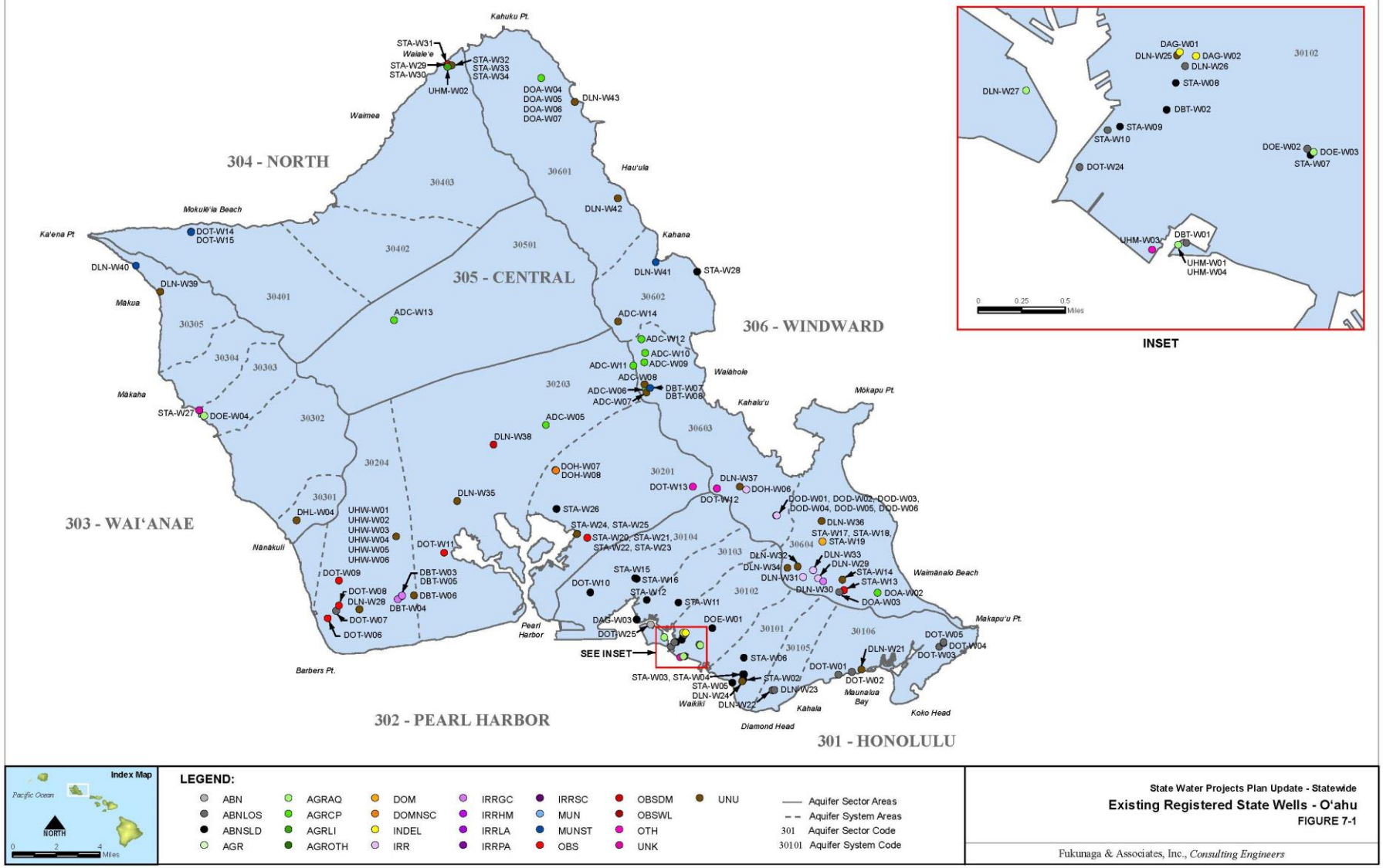

State Water Projects Plan Update - Statewide

Existing Registered State Wells - Oʻahu

FIGURE 7-1

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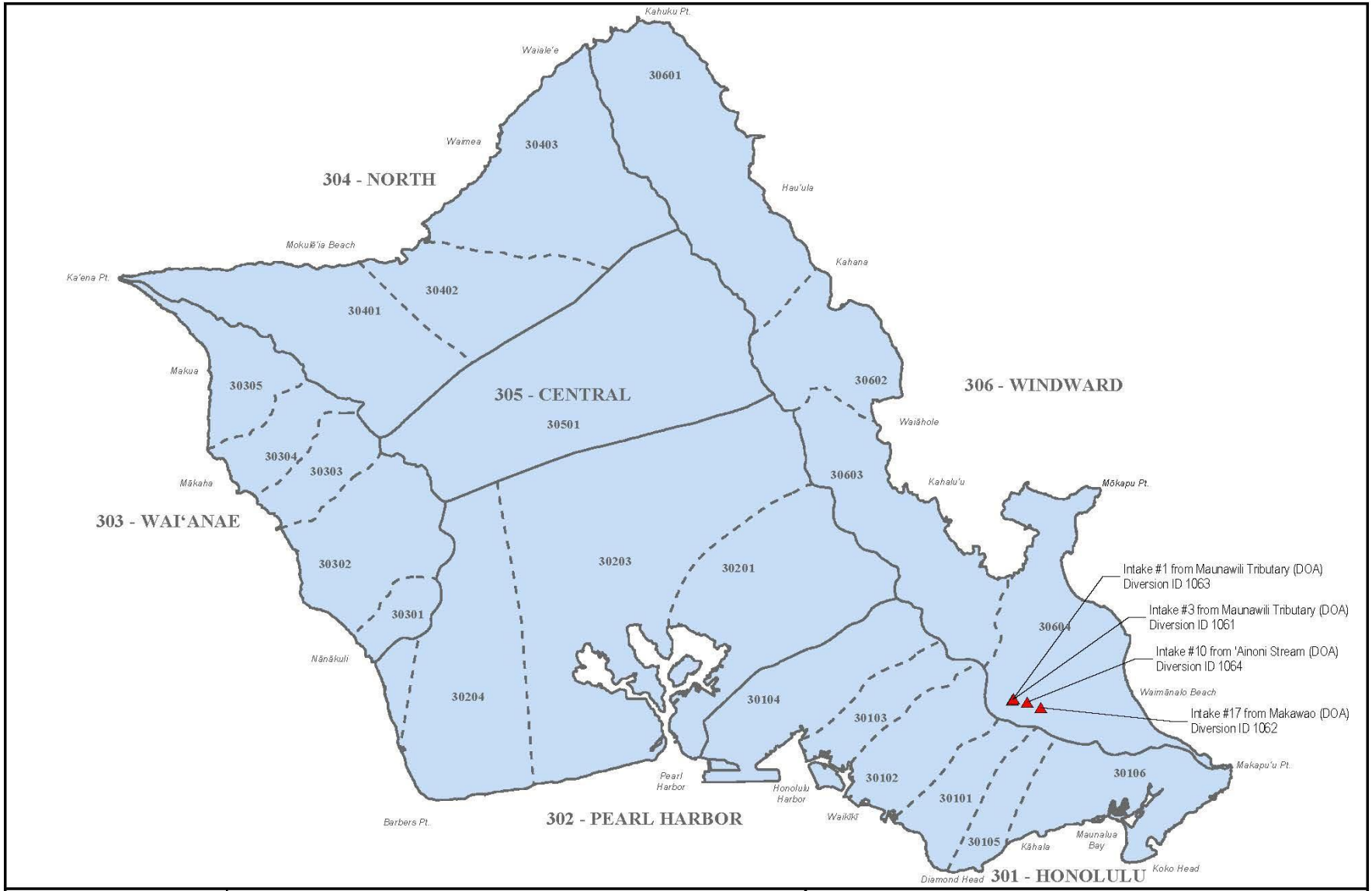

Index Map

NORTH

0 2.5 5 Miles

Legend

- State Stream Diversions
- Aquifer Sector Areas
- Aquifer System Areas
- 301 Aquifer Sector Code
- 30101 Aquifer System Code

State Water Projects Plan Update - Statewide

Existing State Stream Diversions - Oʻahu

FIGURE 7-2

Fukunaga & Associates, Inc., *Consulting Engineers*

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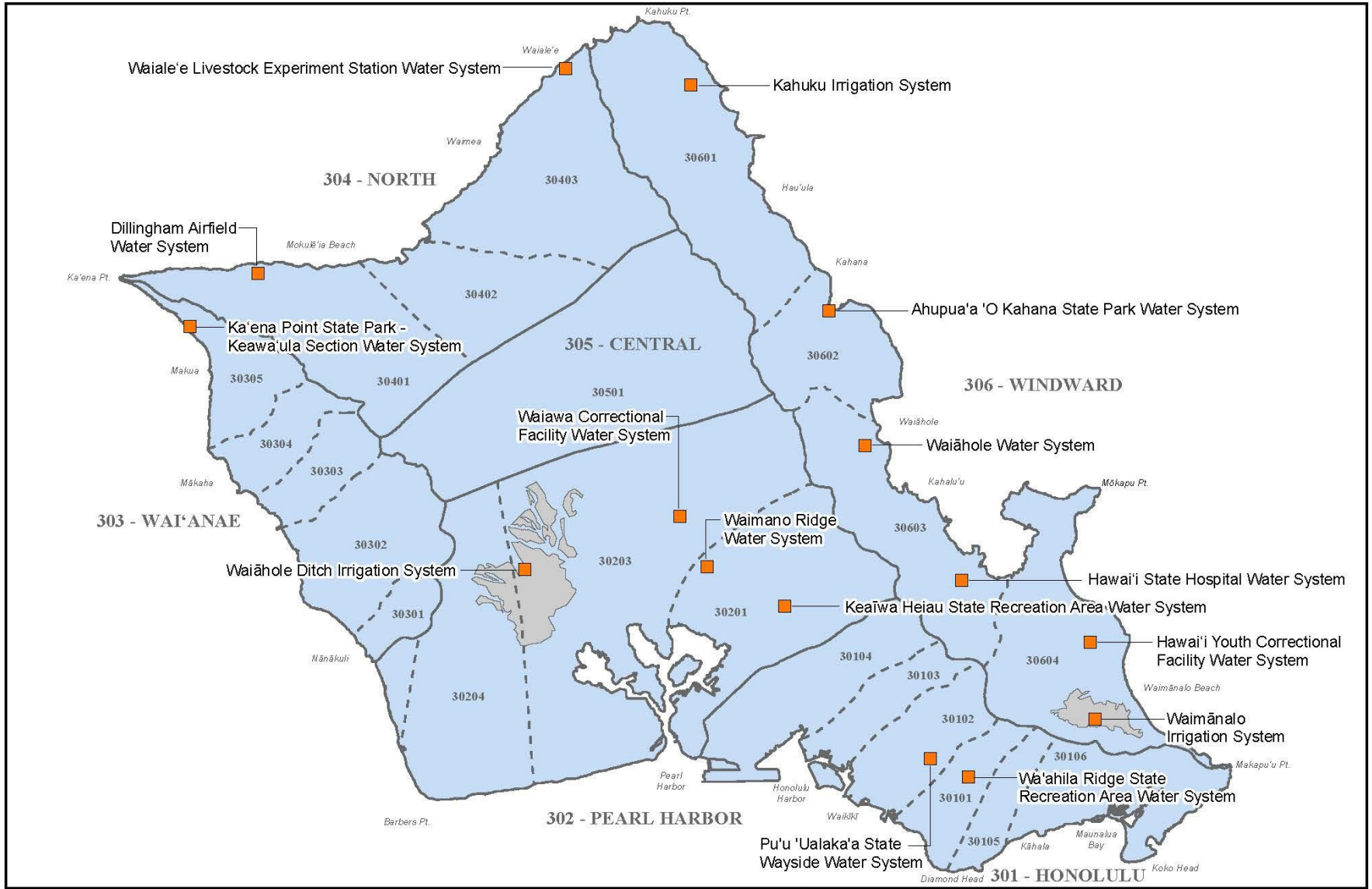

State Water Projects Plan Update - Statewide

Existing State Water Systems - Oʻahu

FIGURE 7-3

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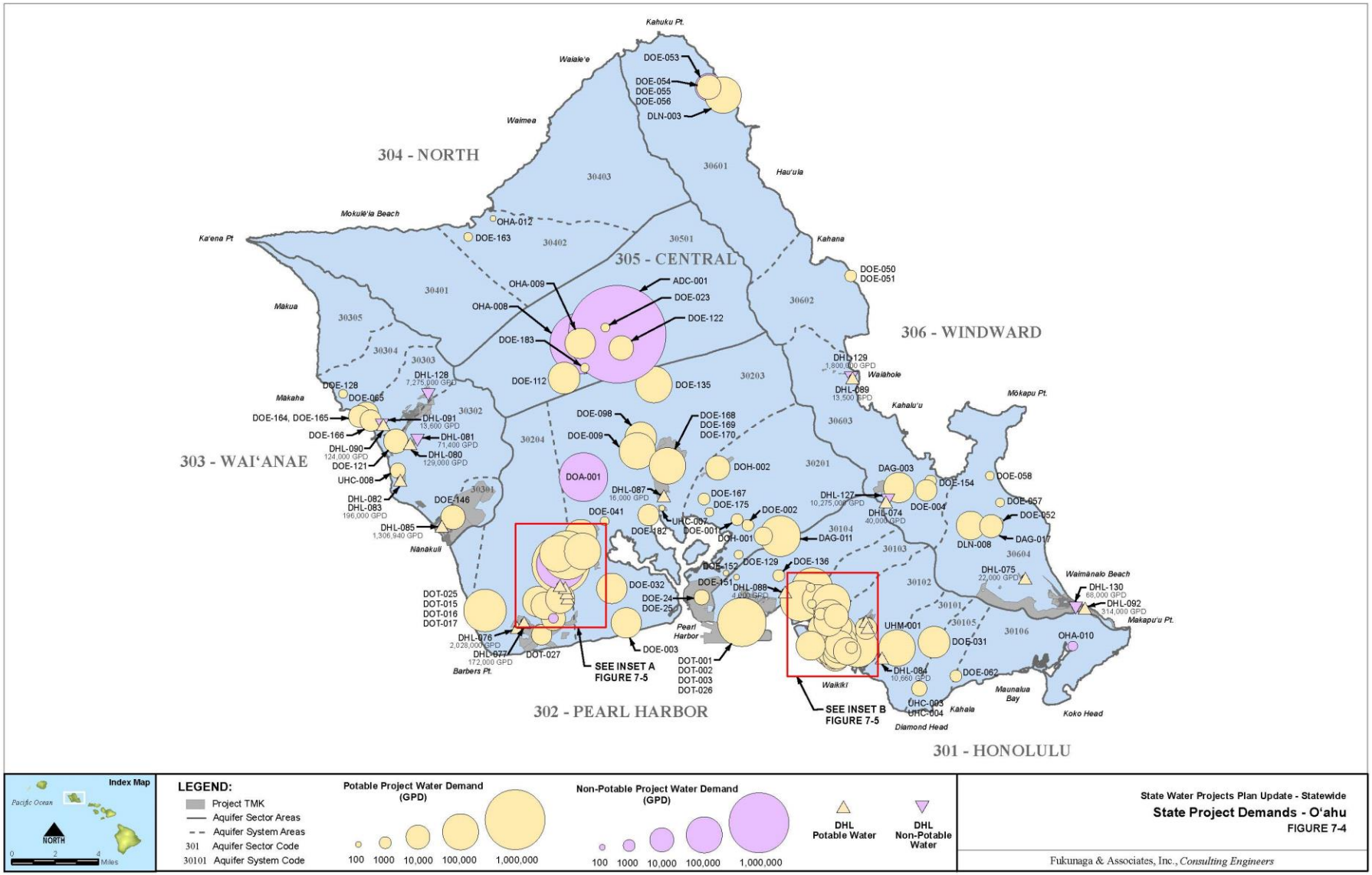
Projected Water Demands

Projected Water Demands

- Applied water demand unit rate based on Water System Standards (potable) and AWUDP (non-potable)
  - Some agencies used non-standard guidelines and methods
- Demand projections for potable, non-potable
- Sorted by State department, island, hydrologic unit
- Low, medium and high demand forecasts

Table 3-1 – Domestic Consumption Guidelines Average Daily Demand*				
ZONING DESIGNATION	HAWAIʻI	KAUAʻI	MAUI	OʻAHU
RESIDENTIAL				
Single Family or Duplex	400 gal/unit	500 gal/unit	600 gal/unit or 3,000 gal/acre	500 gal/unit or 2,500 gal/acre
Multi-Family Low Rise	400 gal/unit	350 gal/unit	560 gal/unit or 5,000 gal/acre	400 gal/unit or 4,000 gal/acre
Multi-Family High Rise	400 gal/unit	350 gal/unit	560 gal/unit	300 gal/unit
COMMERCIAL				
Commercial Only	3,000 gal/acre	3,000 gal/acre	6,000 gal/acre	3,000 gal/acre
Commercial/Industrial Mix	--	5,000 gal/acre	140 gal/1,000 sq. ft.	100 gal/1,000 sq. ft.
Commercial/Residential Mix	--	3,000 gal/acre	140 gal/1,000 sq. ft.	120 gal/1,000 sq. ft.
RESORT (to include hotel for Maui only)	400 gal/unit (1)	350 gal/unit	350 gal/unit or 17,000 gal/acre	350 gal/unit or 4,000 gal/acre
LIGHT INDUSTRY	4,000 gal/acre	4,000 gal/acre	6,000 gal/acre	4,000 gal/acre
SCHOOLS, PARKS	4,000 gal/acre or 60 gal/student	4,000 gal/acre or 60 gal/student	1,700 gal/acre or 60 gal/student	4,000 gal/acre or 60 gal/student
AGRICULTURE		2,500 gal/acre	5,000 gal/acre	4,000 gal/acre

*Where two or more figures are listed for the same zoning, the daily demand resulting in higher consumption use shall govern the design unless specified otherwise.


Kahuku Pt.
Waialeʻe
Waimea
Haʻuʻula
Kahana
Mokulēʻia Beach
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71,400 GPD
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DHL-080
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DOT-016
DOT-017
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DHL-077
172,000 GPD
DOT-027
SEE INSET A
FIGURE 7-5
DOT-001
DOT-002
DOT-003
DOT-026
SEE INSET B
FIGURE 7-5
DAG-003
DOE-154
DOE-058
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DHL-074
40,000 GPD
DOE-004
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Index Map
Pacific Ocean
NORTH
0 2 4 Miles
LEGEND:
Project TMK
Aquifer Sector Areas
Aquifer System Areas
301 Aquifer Sector Code
30101 Aquifer System Code
Potable Project Water Demand (GPD)
100 1000 10,000 100,000 1,000,000
Non-Potable Project Water Demand (GPD)
100 1000 10,000 100,000 1,000,000
DHL Potable Water
DHL Non-Potable Water
State Water Projects Plan Update - Statewide
State Project Demands - Oʻahu
FIGURE 7-4
Fukunaga & Associates, Inc., Consulting Engineers
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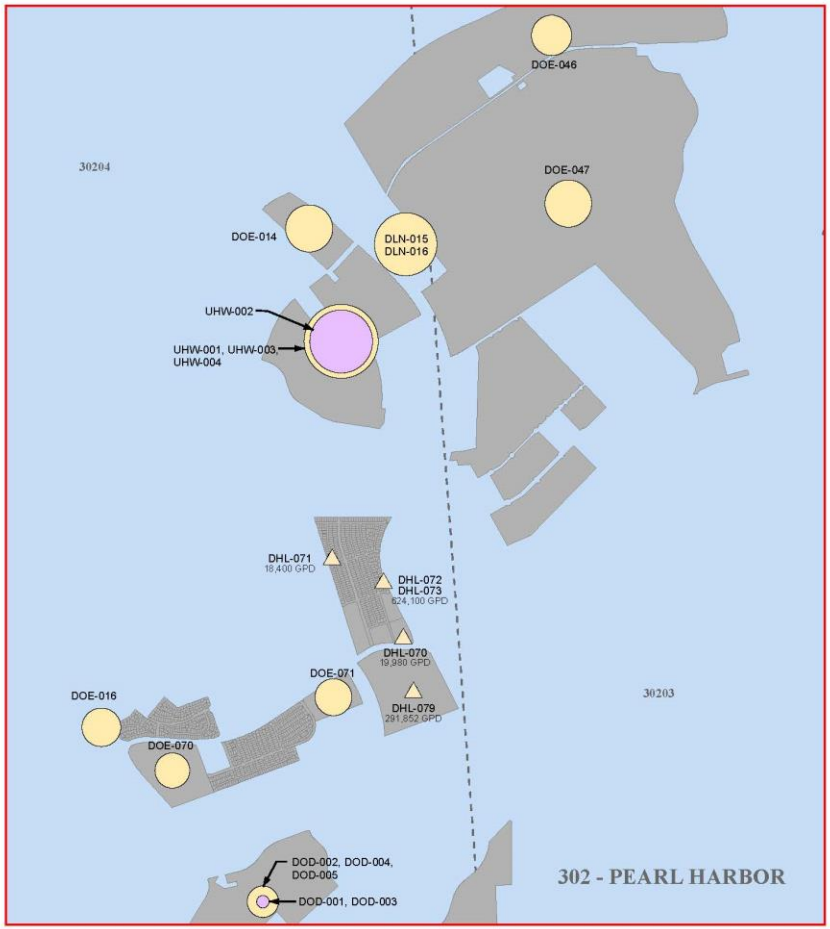

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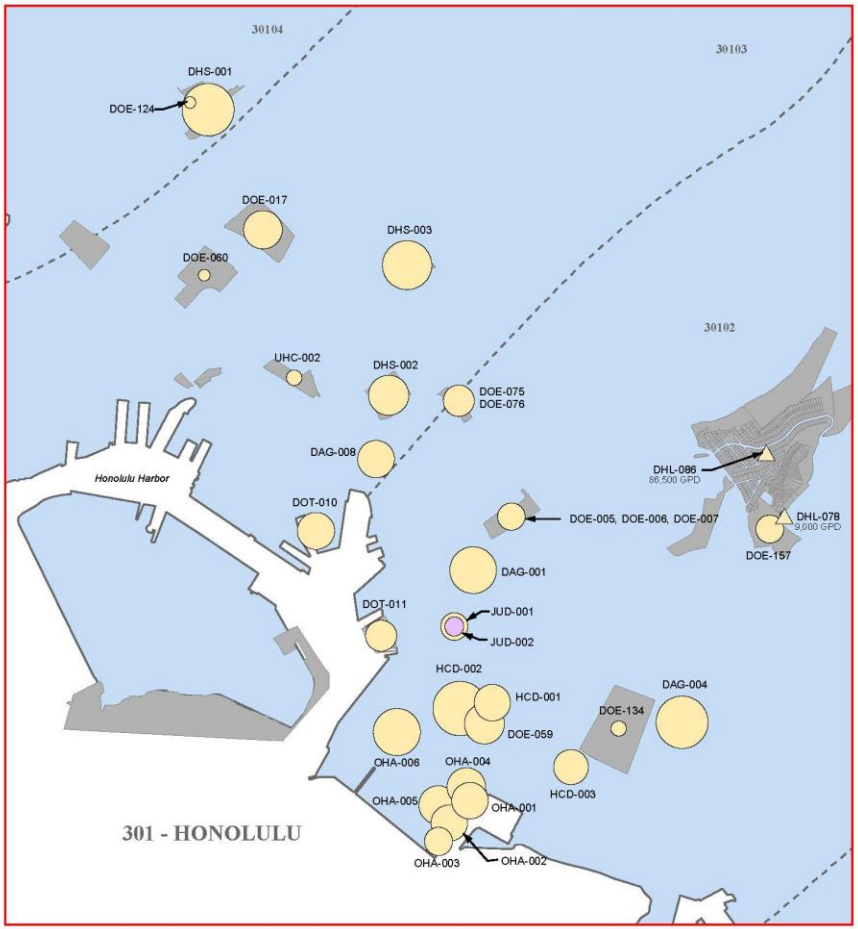

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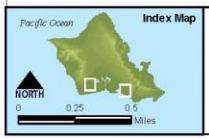

LEGEND:

- Project TMK
- Aquifer Sector Areas
- Aquifer System Areas
- 301 Aquifer Sector Code
- 30101 Aquifer System Code

Potable Project Water Demand (GPD)

100 1000 10,000 100,000 1,000,000

Non-Potable Project Water Demand (GPD)

100 1000 10,000 100,000 1,000,000

DHL Potable Water

DHL Non-Potable Water

State Water Projects Plan Update - Statewide

State Project Demands - O'ahu - Insets

FIGURE 7-5

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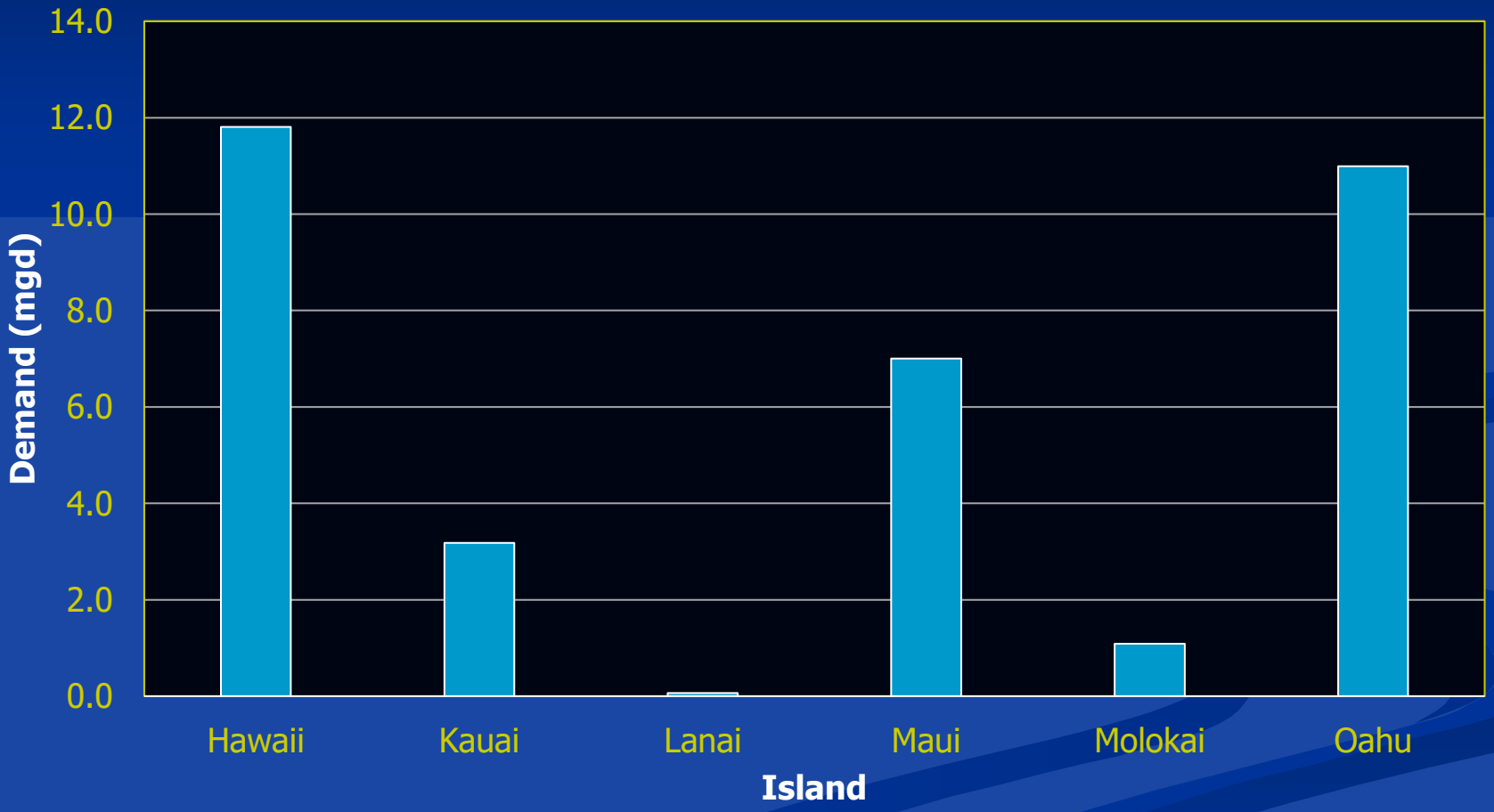
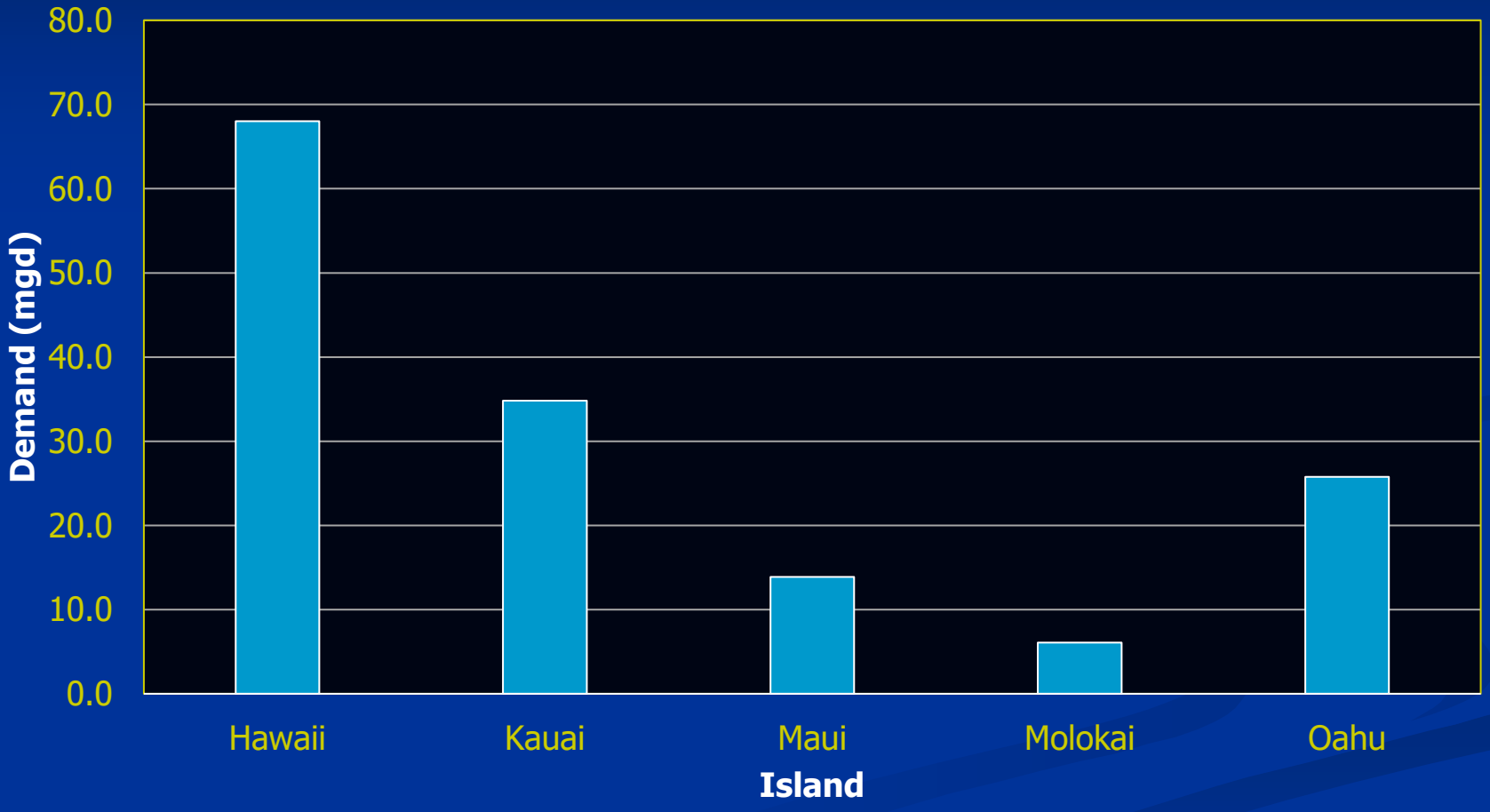
Cumulative 2034 Potable Water Demands



Cumulative 2034 Non-Potable Water Demands



Water Development Strategies

Water Development Strategies

- Potential options to meet projected water demands
- Iterative process:
  - Identify projects with determined water supply strategy
  - Identify projects with potential water supply options
  - Identify projects within the service area of a County water system
  - Identify projects without water supply options
- Majority of projects expected to be served by County water systems

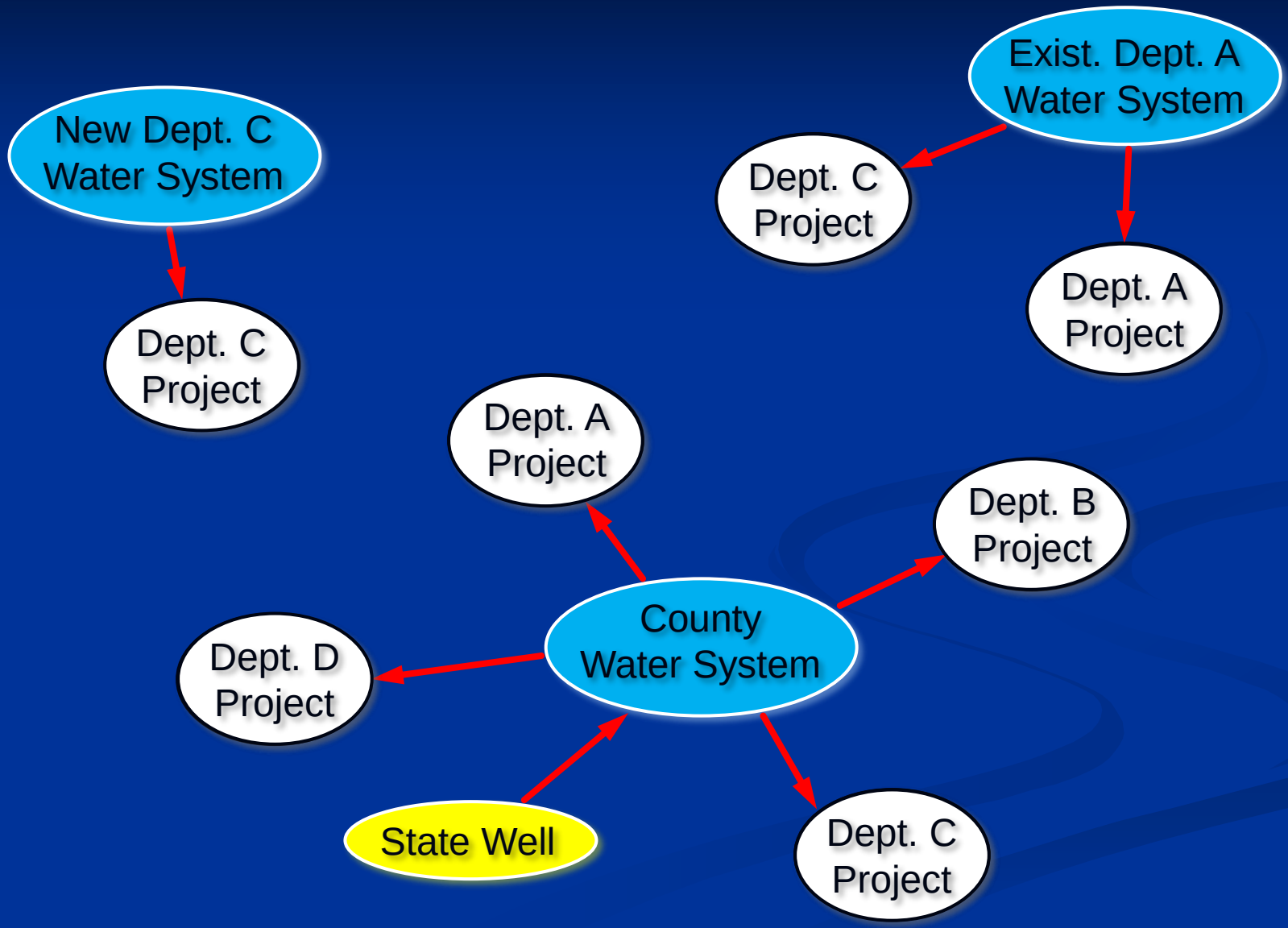
Water Development Strategy Options

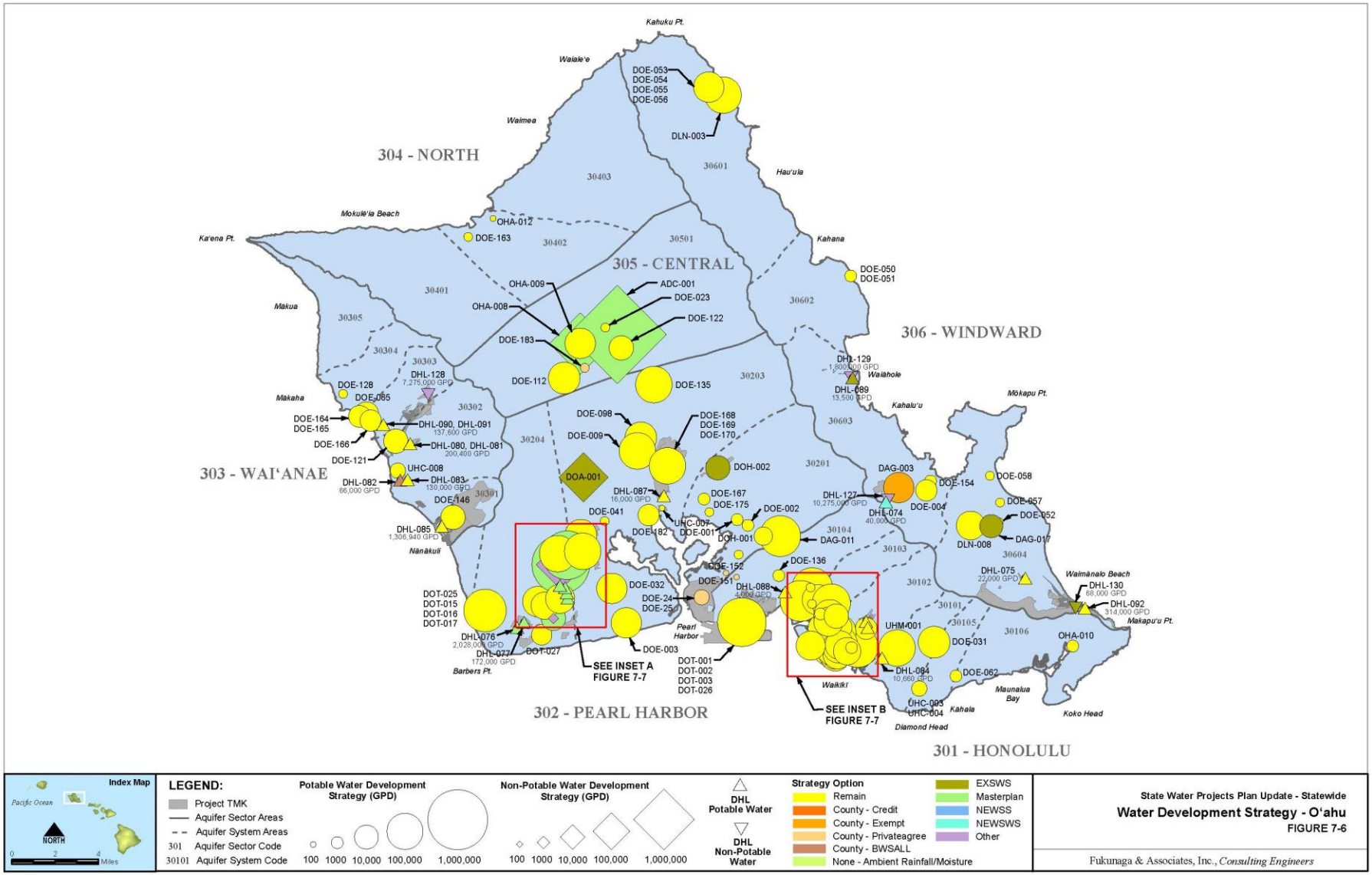
Abbreviation Code	Water Development Strategy Option	Water Type
EXSWS	Existing State Water Systems	Potable & NP
EXSS	Existing State or private sources	Potable & NP
MASTERPLAN	Existing and planned water master plans	Potable & NP
COUNTY-CREDIT	Credit for County Water Department facilities charges	Potable
COUNTY-BWSALL	Water allocation credits with Honolulu Board of Water Supply reserved for specific agencies	Potable
COUNTY-EXWALL	Water allocation credits with Honolulu Board of Water Supply	Potable
COUNTY-EXEMPT	Exempt from County Water Development facilities charges	Potable
COUNTY-PRIVATEAGREE	Agreements for provision of water service by private purveyor	Potable
NEWSWS	New State Water Systems	Potable & NP
NEWSS	New and/or planned State wells	Potable
REMAIN	Remaining balance of water demand to be supplied by County Water Systems	Potable
OTHER – CATCHMENT	Individual water catchment systems	Potable
OTHER – STREAM DIVERSION	Potential stream diversions	Non-Potable
OTHER – SPRING SOURCES	Potential spring sources	Non-Potable
OTHER – RECYCLED	Recycled wastewater	Non-Potable
OTHER-SEAWATER	Deep sea ocean saltwater	Non-Potable
NONE	Ambient rainfall sufficient to sustain agricultural demands	Non-Potable

Water Development Strategies
Other Considerations

- Consistency with WRPP, WQP, AWUDP and County WUDP updates
- Promote use of non-potable resources
- Water conservation initiatives
- Food Safety Modernization Act

Development of Project Sources Strategy

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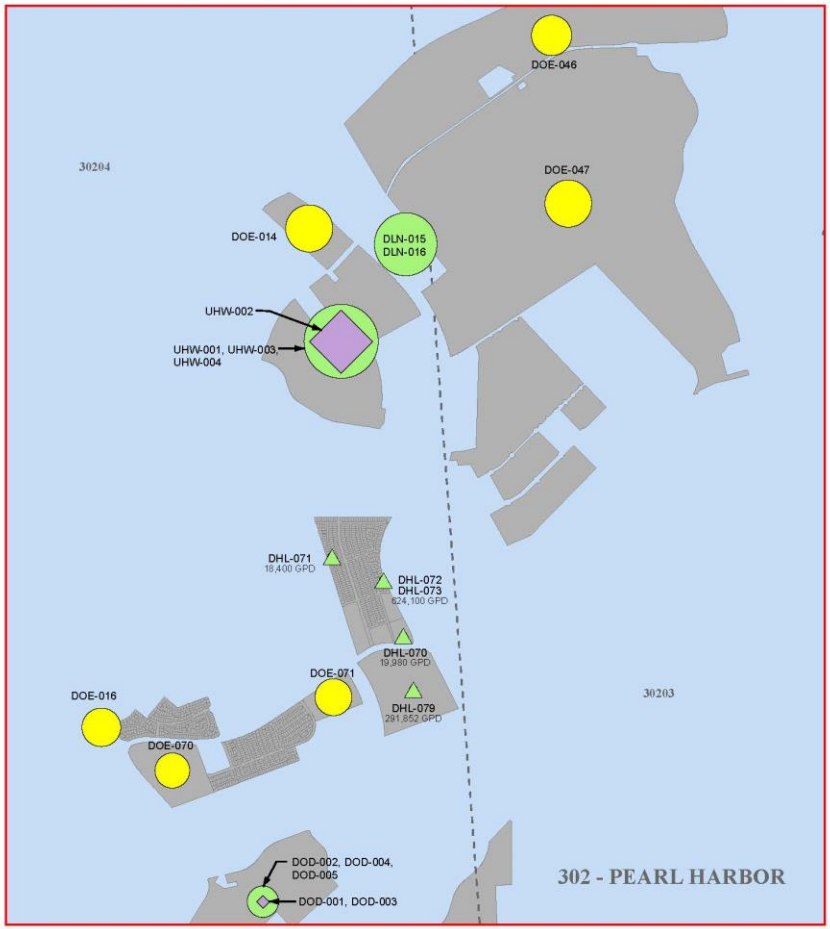
DHL Potable Water
DHL Non-Potable Water
Strategy Option
Remain
County - Credit
County - Exempt
County - Privateagree
County - BWSALL
None - Ambient Rainfall/Moisture
EXSWS
Masterplan
NEWSS
NEWSWS
Other
State Water Projects Plan Update - Statewide
Water Development Strategy - Oʻahu
FIGURE 7-6
Fukunaga & Associates, Inc., Consulting Engineers
JUNE 2020



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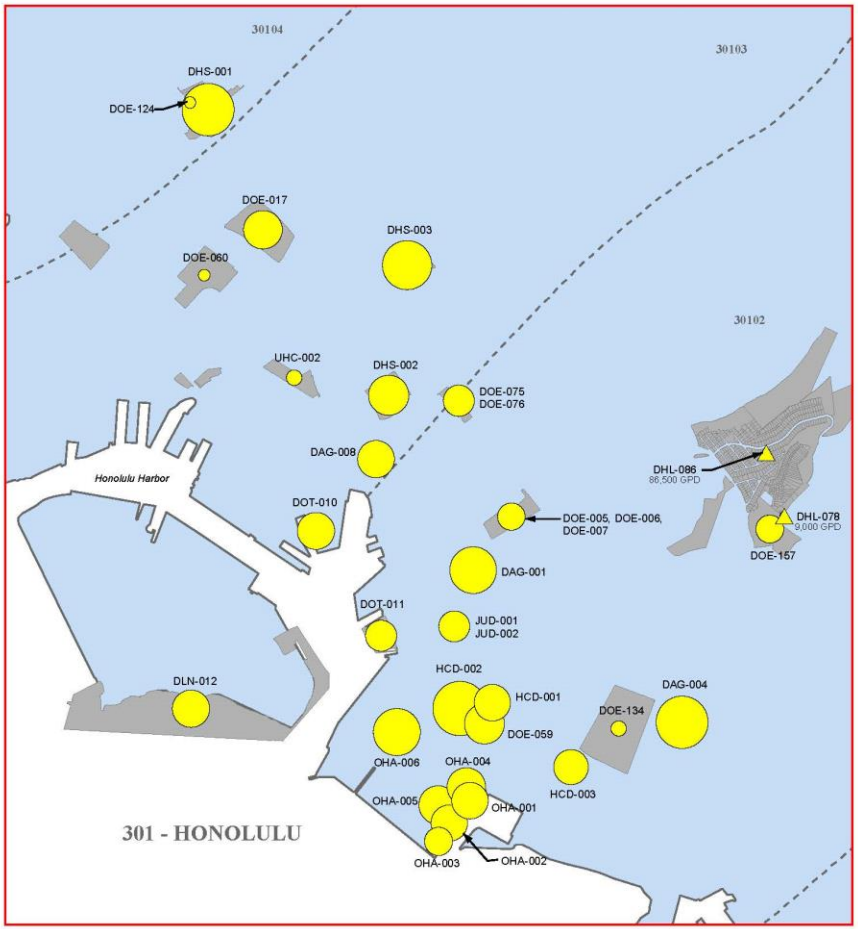

INSET B

LEGEND:

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Potable Water Development Strategy (GPD)

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Non-Potable Water Development Strategy (GPD)

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△ DHL Potable Water

▽ DHL Non-Potable Water

Strategy Option

- Remain
- County - Credit
- County - Exempt
- County - Privateagree
- County - BWSALL
- None - Ambient Rainfall/Moisture
- EXSWS
- Masterplan
- NEWSS
- NEWSWS
- Other

State Water Projects Plan Update - Statewide

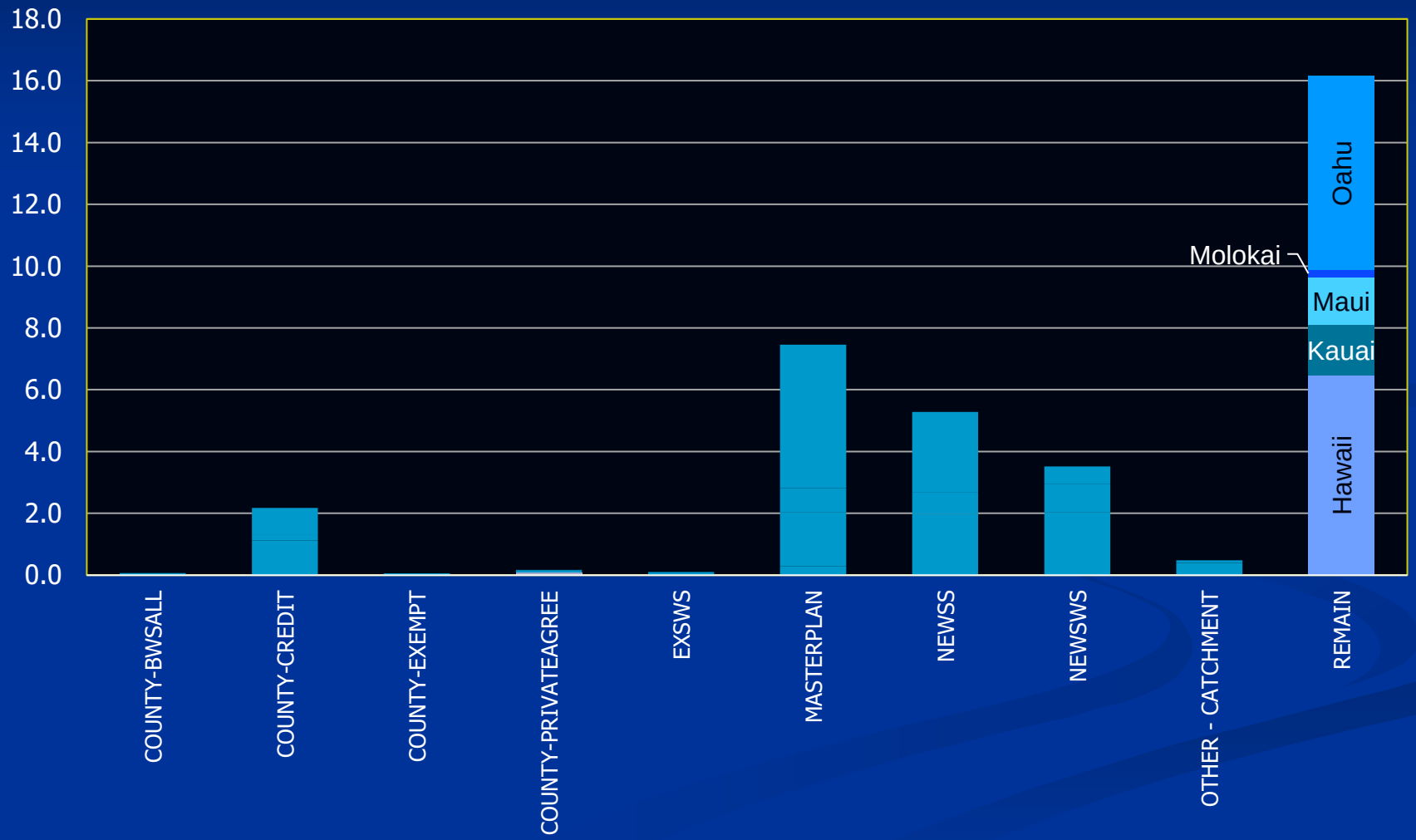
Water Development Strategy - O'ahu - Insets

FIGURE 7-7

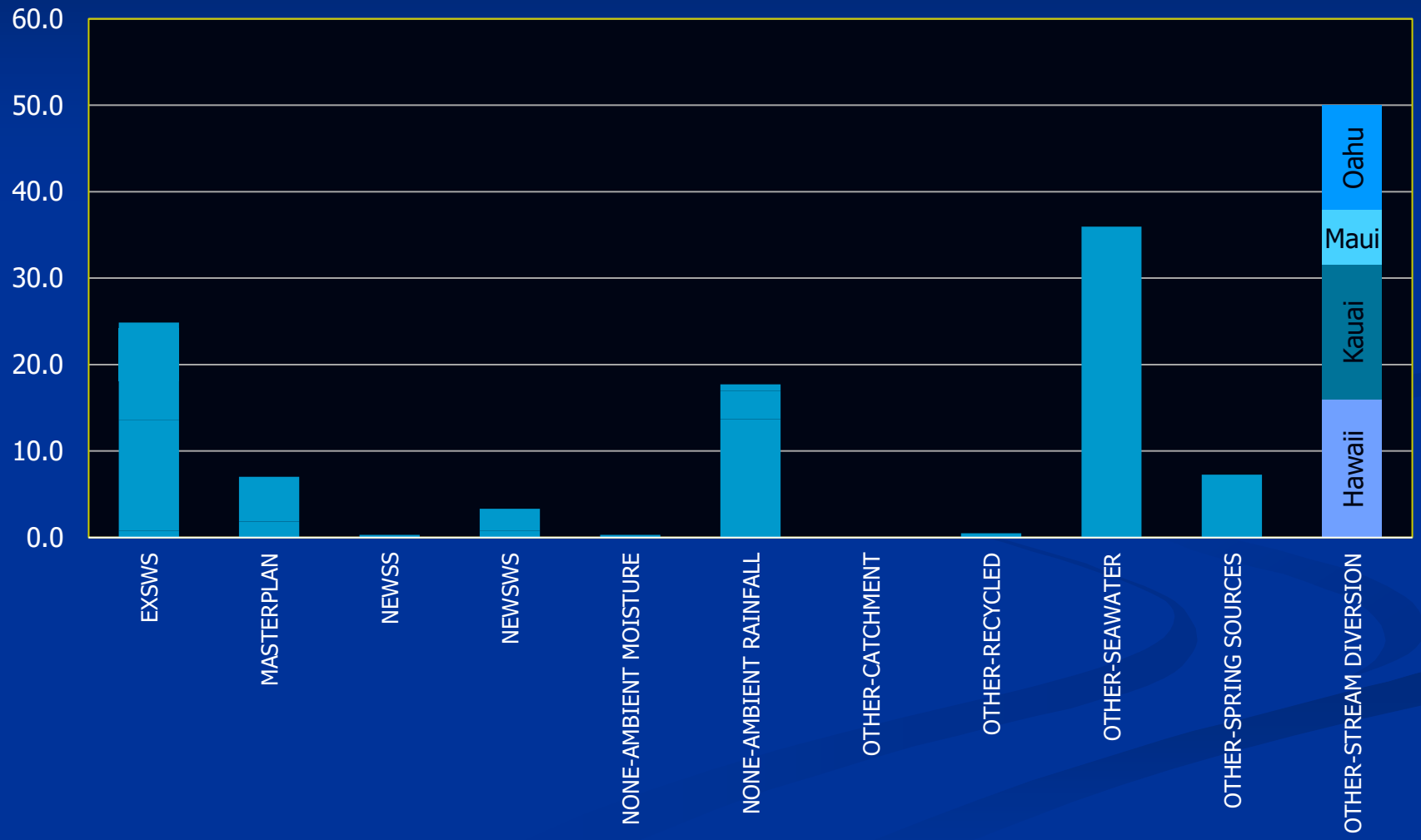
Fukunaga & Associates, Inc., *Consulting Engineers*

JUNE 2020

2034 Potable Water Development Strategy



2034 Non-Potable Water Development Strategy



Conclusions & Recommendations

Conclusions & Recommendations

- Actions to be pursued – DLNR Engineering to work in cooperation with State agencies:
  - Integrate water demands and development strategy options with County WUDPs
  - Coordinate with County Water Departments to assess feasibility of accommodating State project demands and plan new sources as necessary
  - Review and update existing data: water master plans; State's water resource database
  - Resource preservation: continue to implement the Hawaii Water Conservation Plan; seek non-potable source strategies and begin to develop methods to utilize recycled water

Thank you!