

COUNTY OF MAUI WASTEWATER RECLAMATION DIVISION

Water and Infrastructure Committee

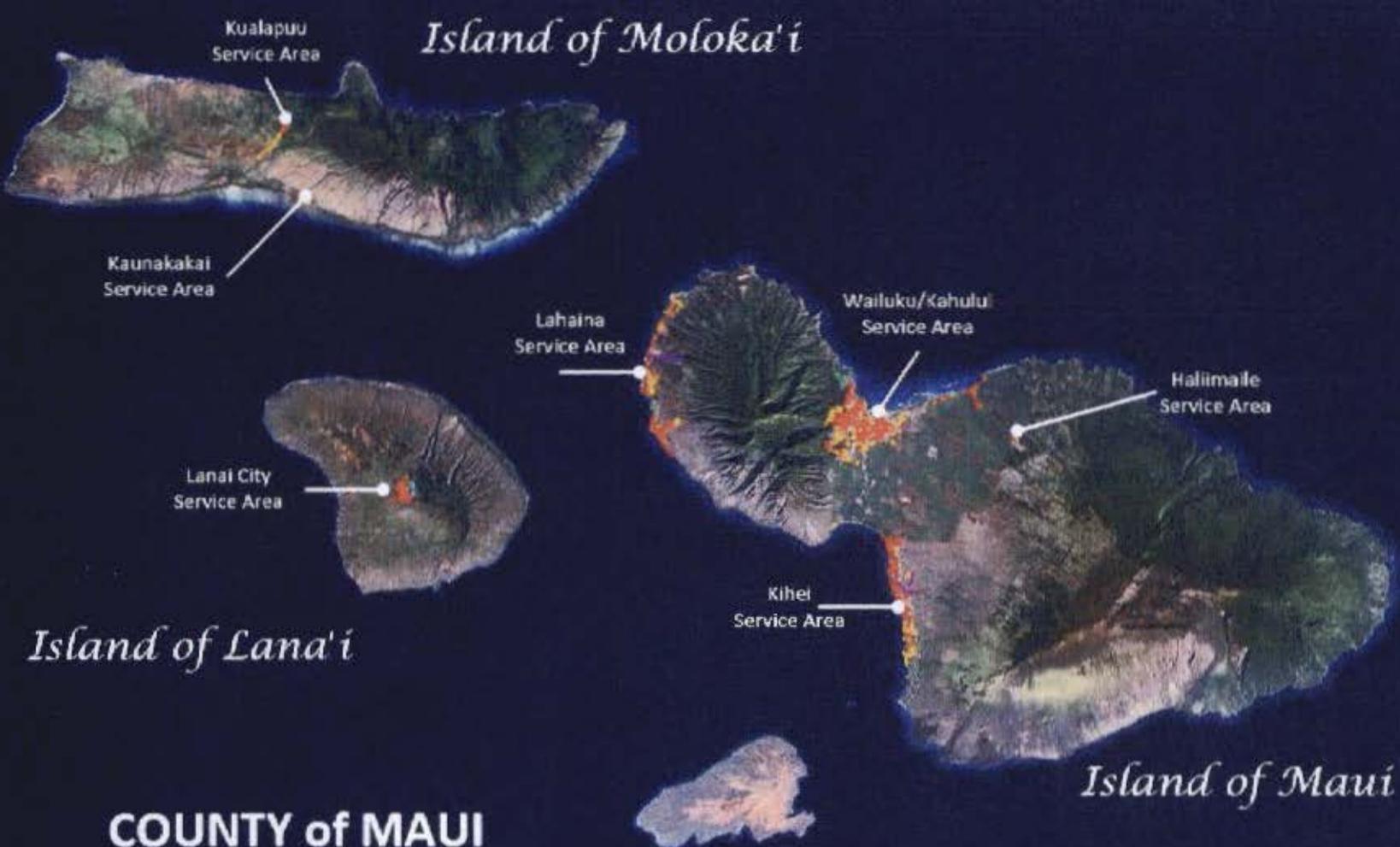
March 11, 2019

Presented by Eric Nakagawa

RECEIVED AT WAI MEETING ON 3/11/19
BY DEM, Eric Nakagawa

“Global” Performance Measures

- ◎ **Reliability of existing facilities over the long term at the lowest possible cost (99.9978%)**
- ◎ **Increase volume of reclaimed water**
- ◎ **Expand sewer system to non-sewered areas**
- ◎ **Improve quality of treated effluent**



**COUNTY of MAUI
SEWER SERVICE AREAS**



KIHEI WASTEWATER COLLECTION SYSTEM



- Legend**
- | | |
|----------------------|------------------------|
| Gravity Sewer | Pump Stations |
| Ownership | Ownership |
| — County of Maui | ■ County |
| — City of Kihei | ■ City |
| — Wailea | ■ Wailea |
| Force Mains | Treatment Tanks |
| Ownership | ■ Treatment Tanks |
| — County of Maui | |
| — City of Kihei | |
| — Wailea | |

LAHAINA WASTEWATER COLLECTION SYSTEM



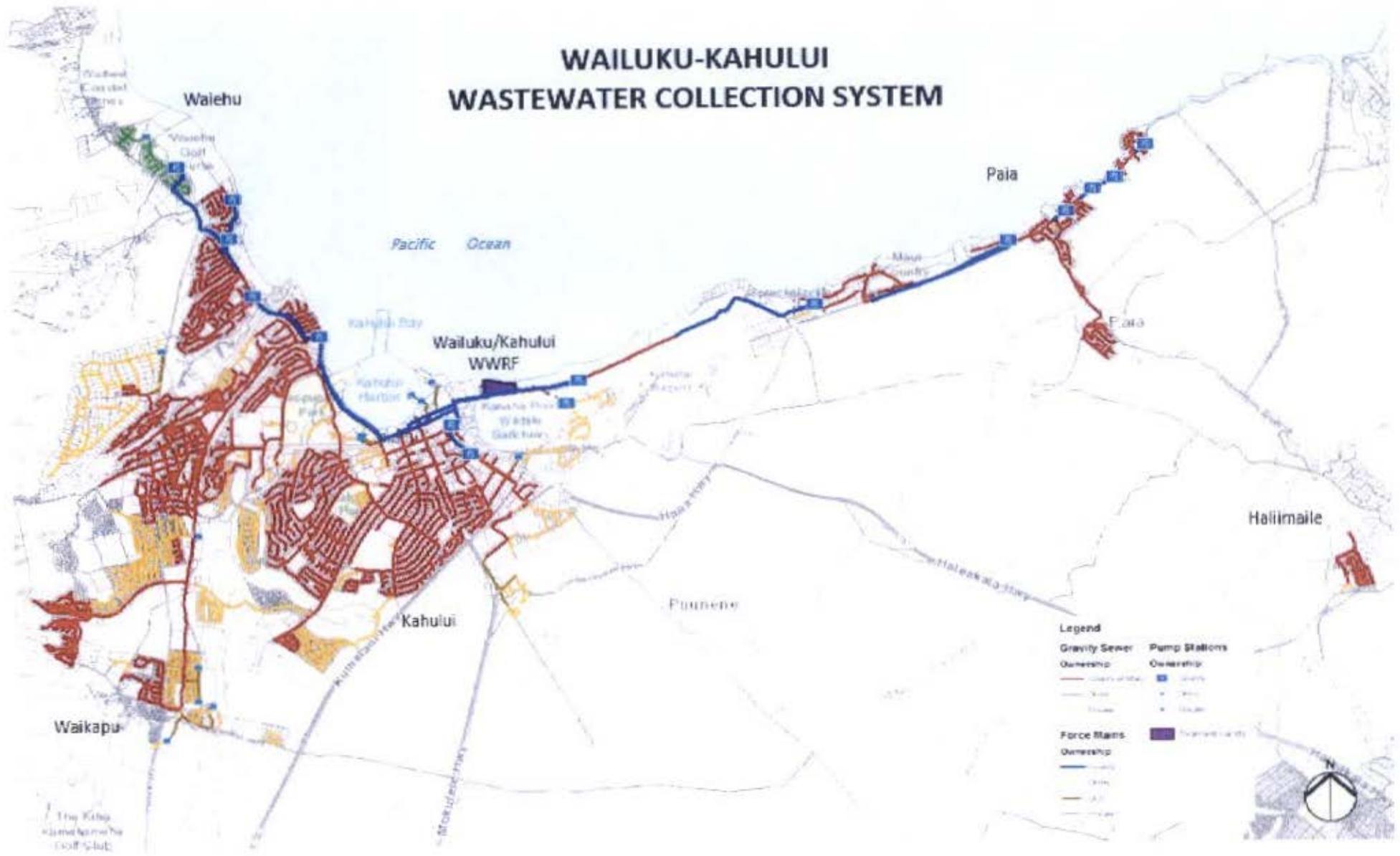
Pacific Ocean

Legend

Gravity Sewer	Pump Stations
Ownership	Ownership
— County of Maui	■ County
— State	■ State
— Private	■ Private
Force Mains	■ Treatment Facility
Ownership	
— County	
— State	
— Private	



WAILUKU-KAHULUI WASTEWATER COLLECTION SYSTEM

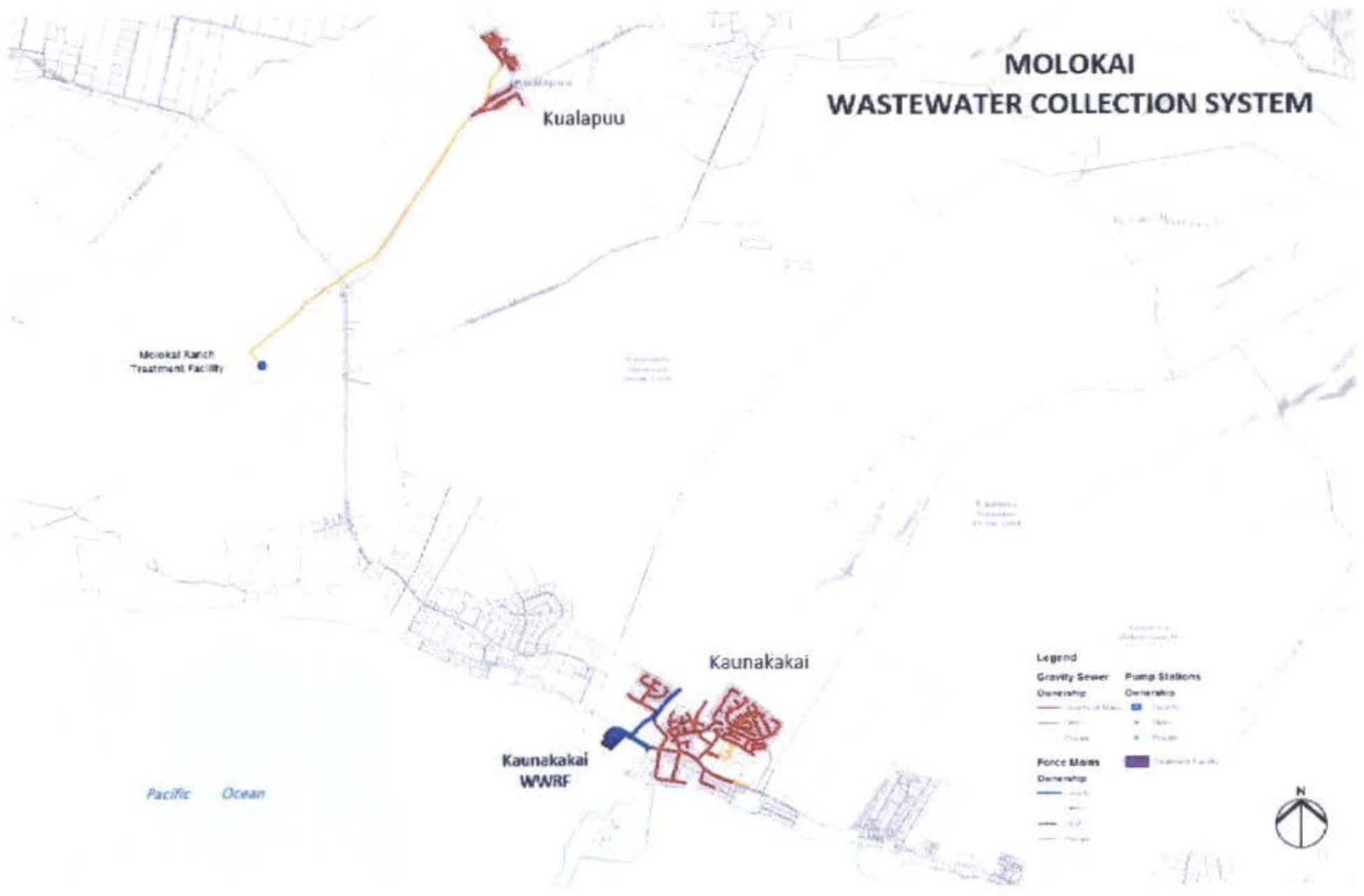


Legend

Gravity Sewer Ownership	Pump Stations Ownership
— Kahului	■ City
— Waiehu	■ County
— Fara	■ State
Force Mains Ownership	■ Hawaiian
— City	
— County	
— State	

The Kahului Golf Club

MOLOKAI WASTEWATER COLLECTION SYSTEM



Moikoi Ranch
Treatment Facility

Kualapuu

Kaunakakai

Kaunakakai
WWRF

Pacific Ocean

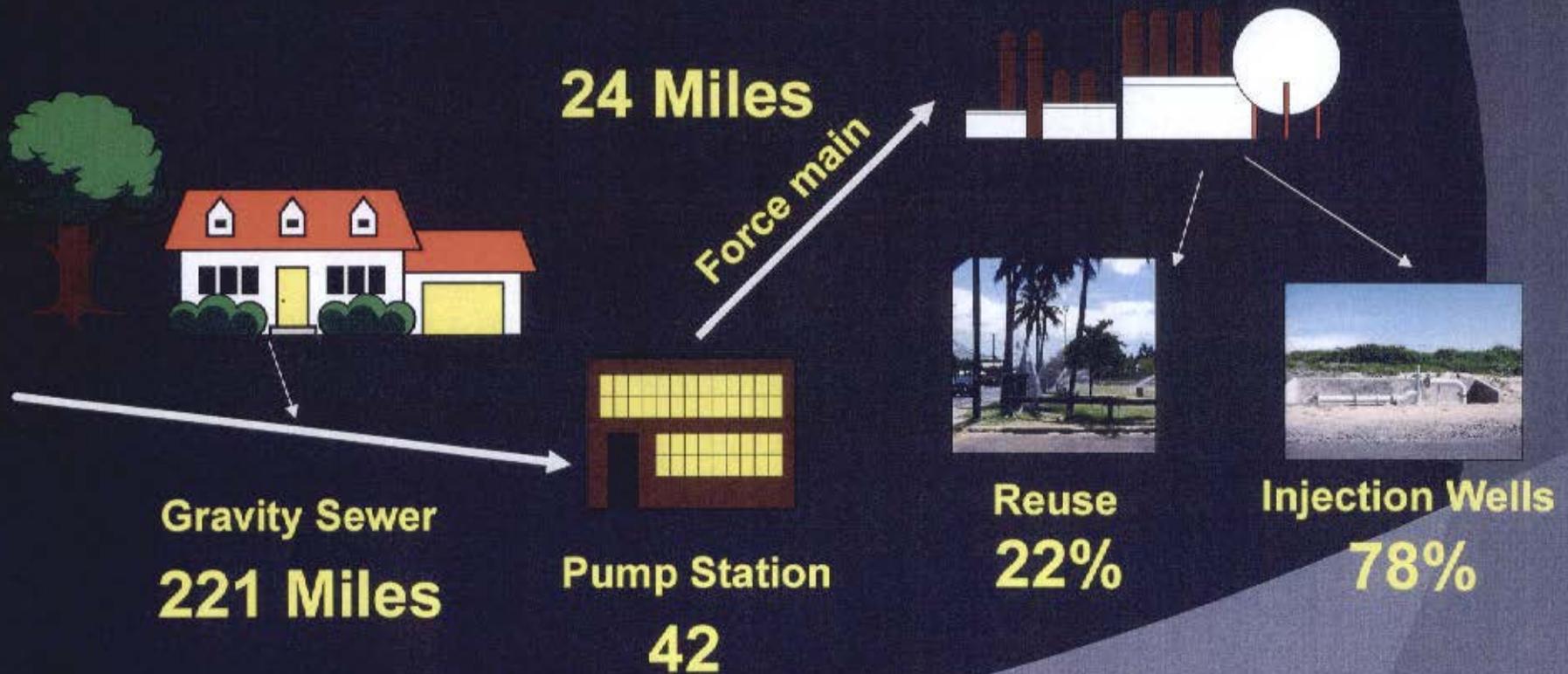
- Legend**
- | | |
|----------------------|----------------------|
| Gravity Sewer | Pump Stations |
| Ownership | Ownership |
| — County of Maui | ■ County |
| — State | ■ State |
| — Private | ■ Private |
| Force Mains | ■ Treatment Facility |
| Ownership | |
| — County | |
| — State | |
| — Private | |



Where does my sewage go?

5 Locations

Wastewater Reclamation Facility



5 Wastewater Reclamation Facilities



Kihei WWRF



Lahaina WWRF



Kahului WWRF



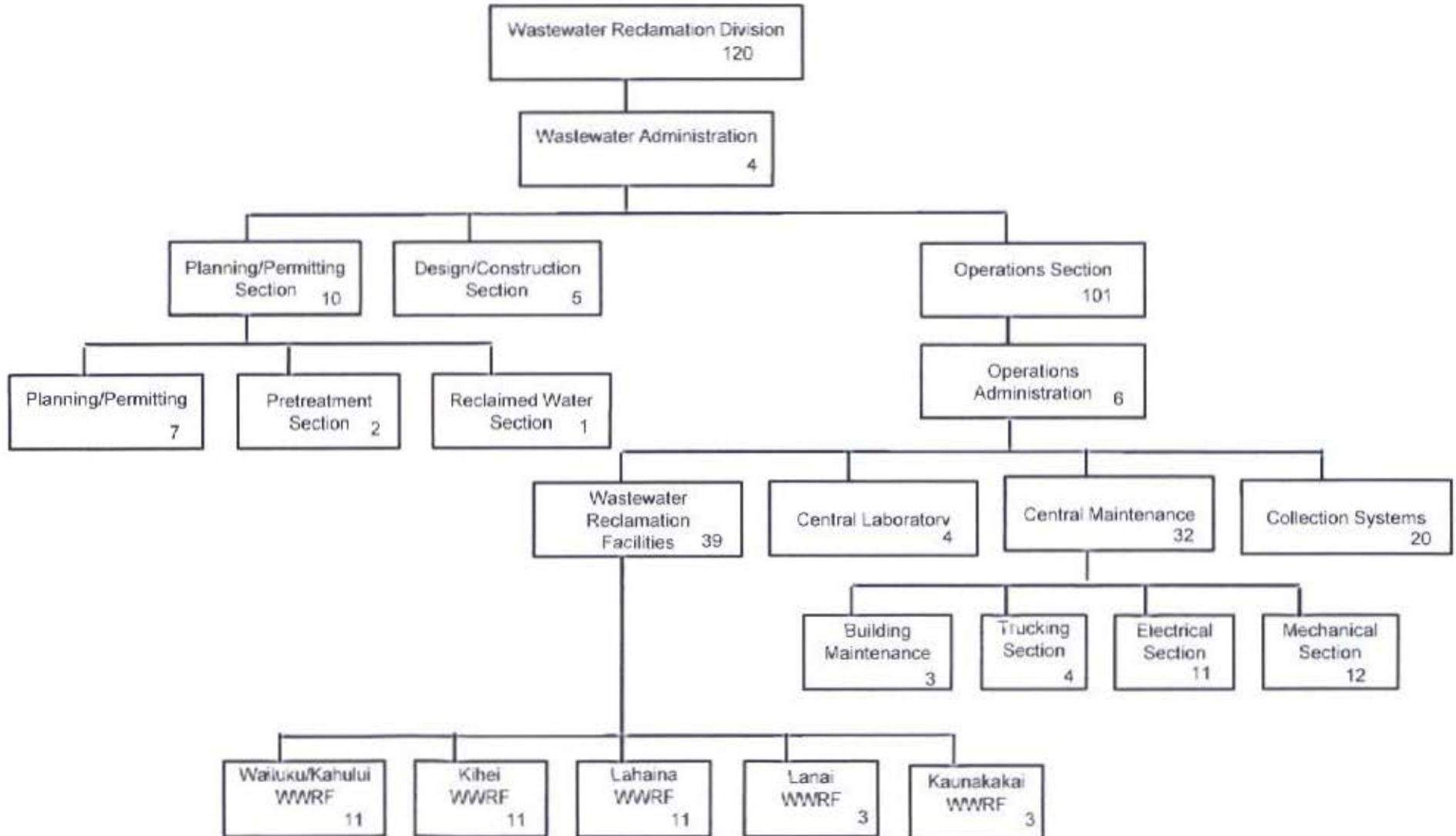
Molokai WWRF



Lanai WWRF

WASTEWATER RECLAMATION DIVISION

Existing Organization Structure



Funding History

1960 1970 1980 1990 2000 2010 2020

Gravity flow of raw sewage to ocean

Federal funds to construct wastewater system

Rehabilitation, replacement, reliability upgrades

Sewer system subsidized by general fund

Sewer system funded by sewer fees only



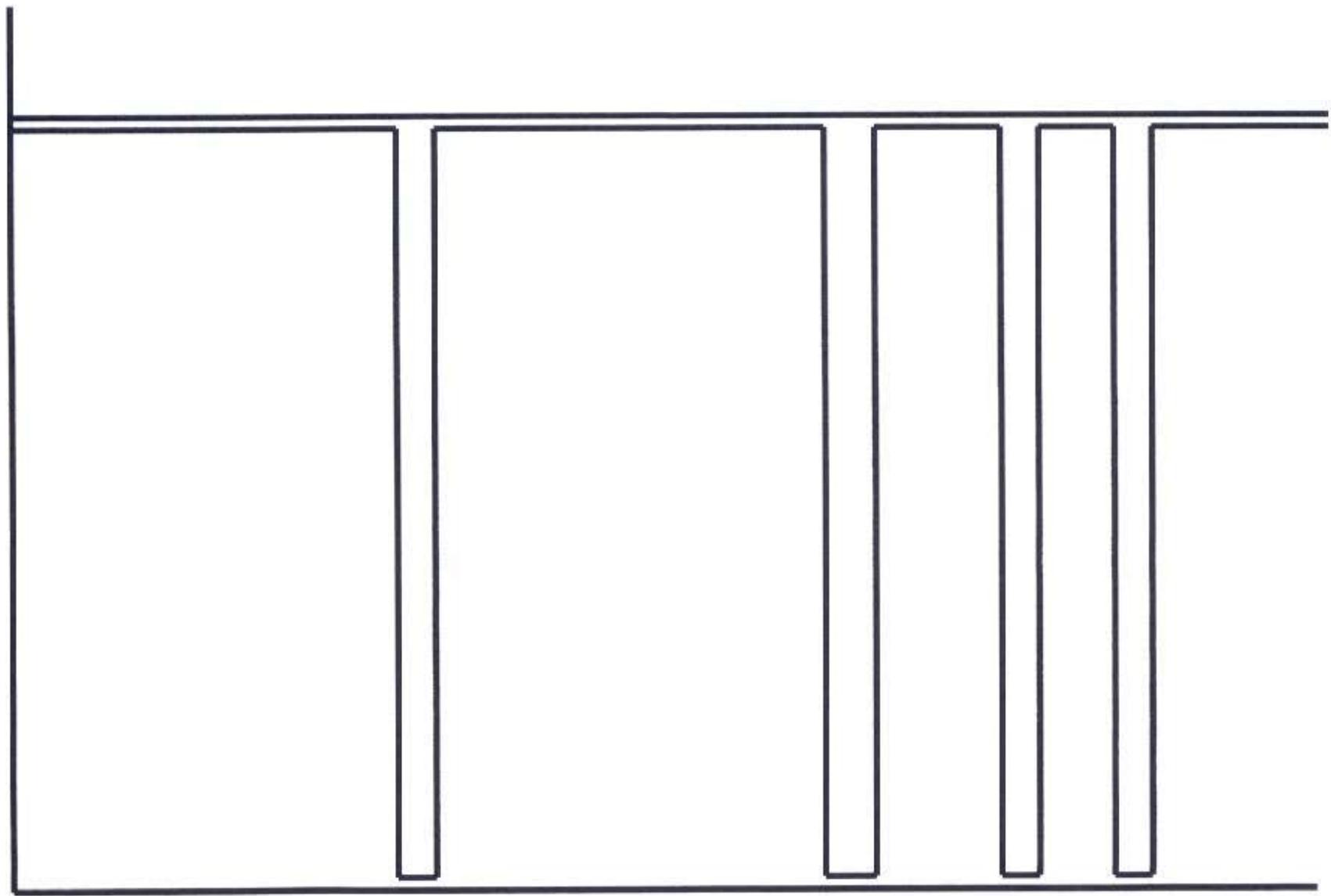
“Global” Performance Measures

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Capacity vs. Reliability?

PIPELINE RELIABLE CAPACITY

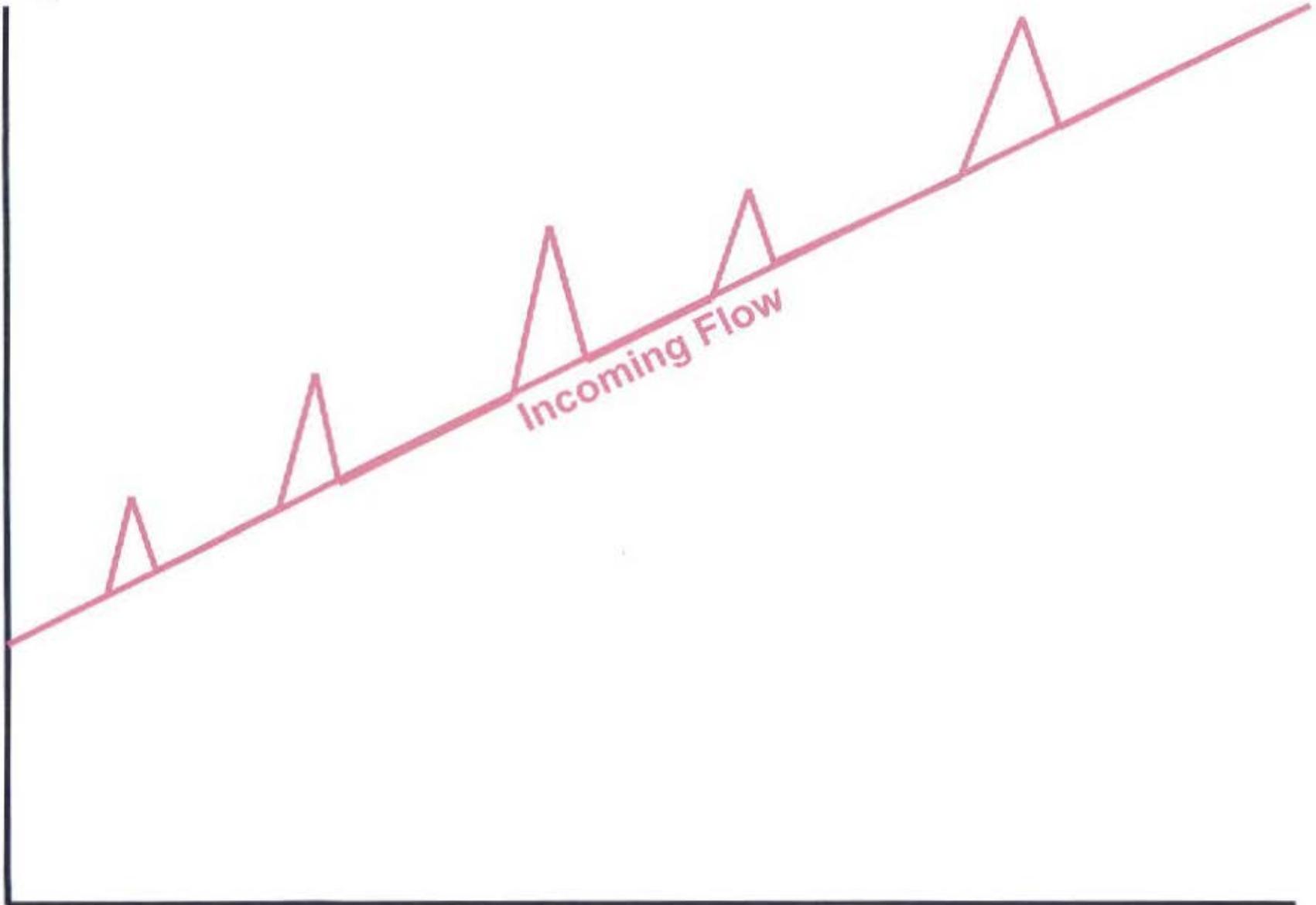
Capacity



Time

PIPELINE RELIABLE CAPACITY

Capacity

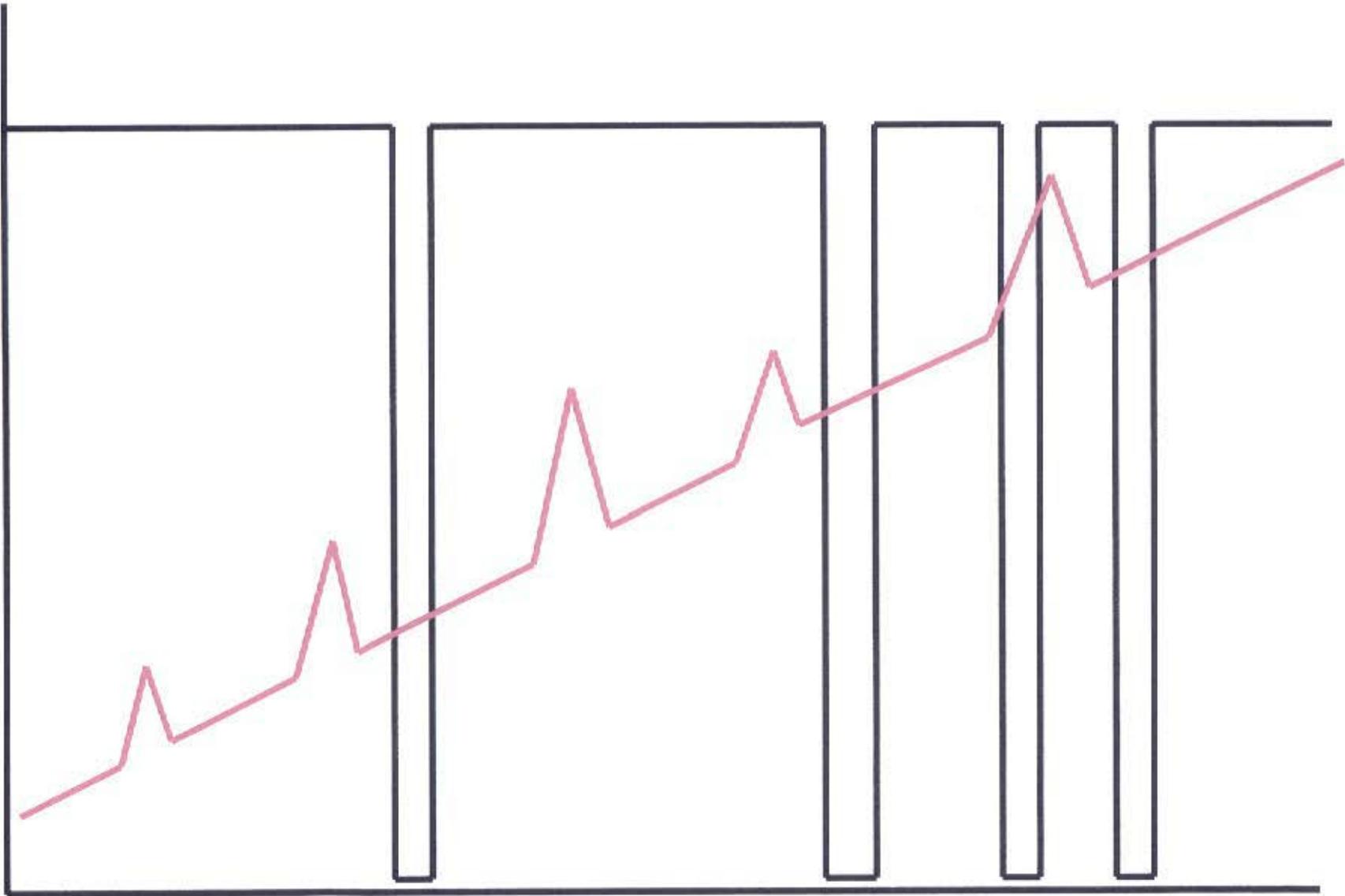


Incoming Flow

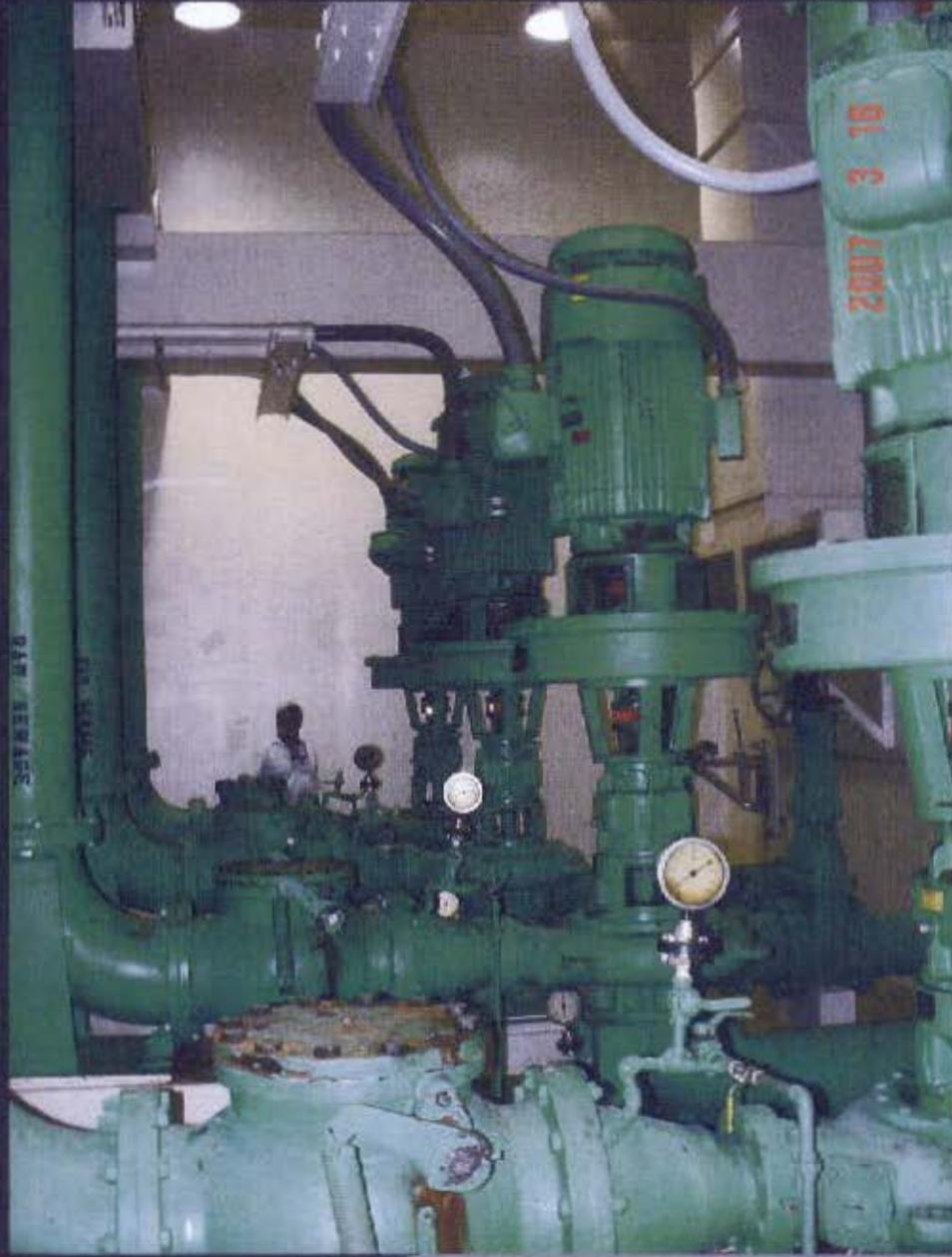
Time

PIPELINE RELIABLE CAPACITY

Capacity

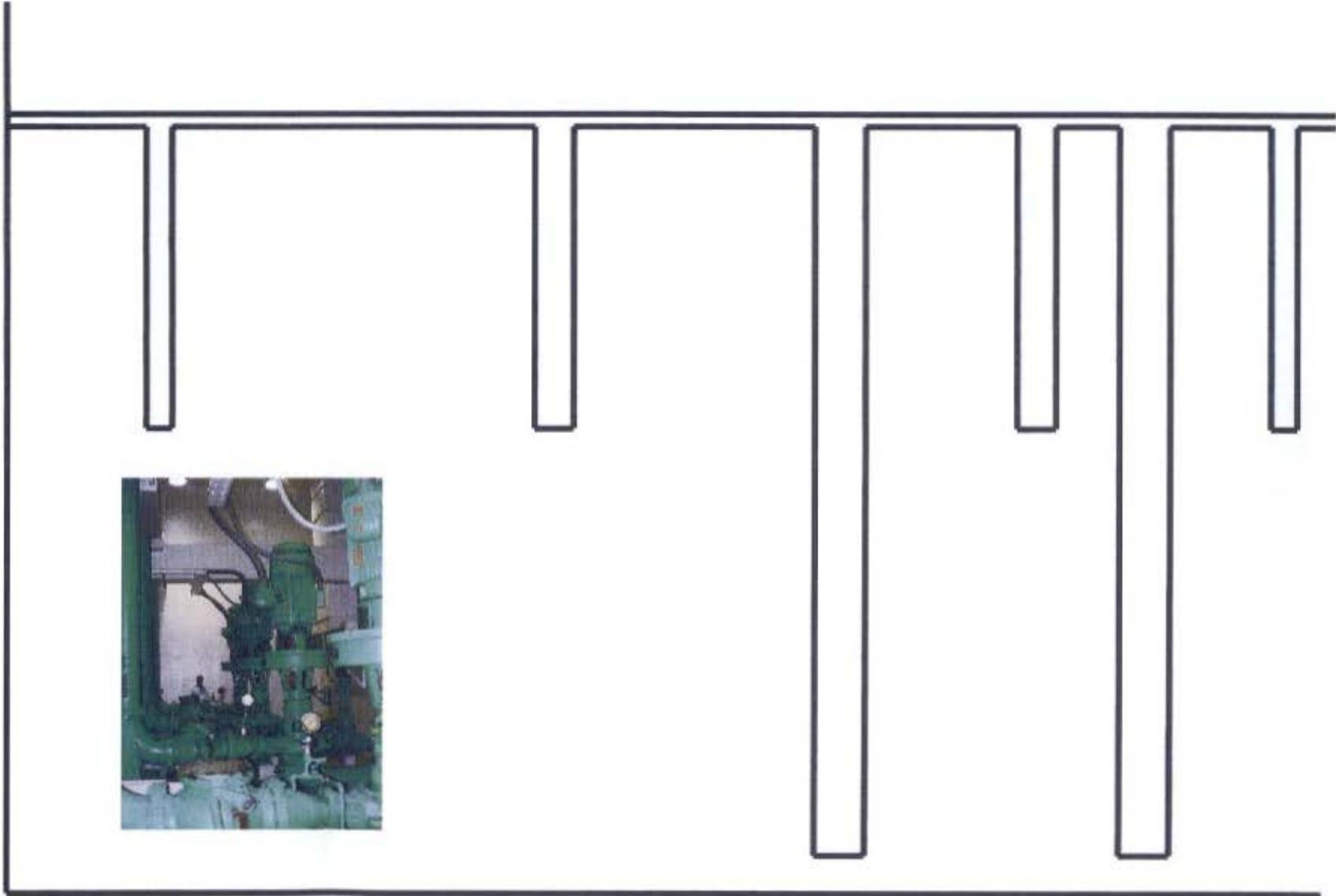


Time



PUMP STATION RELIABLE CAPACITY

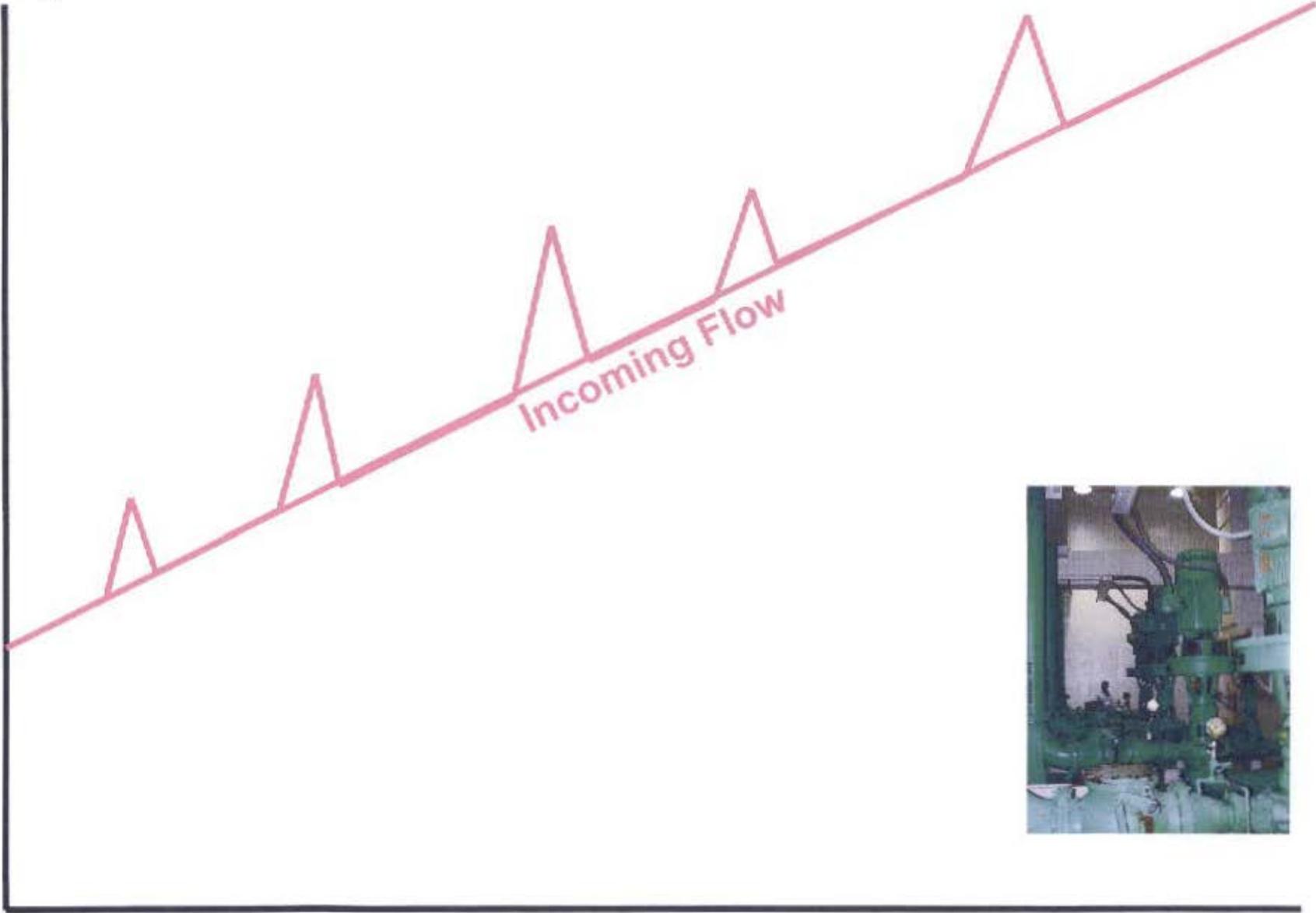
Capacity



Time

PUMP STATION RELIABLE CAPACITY

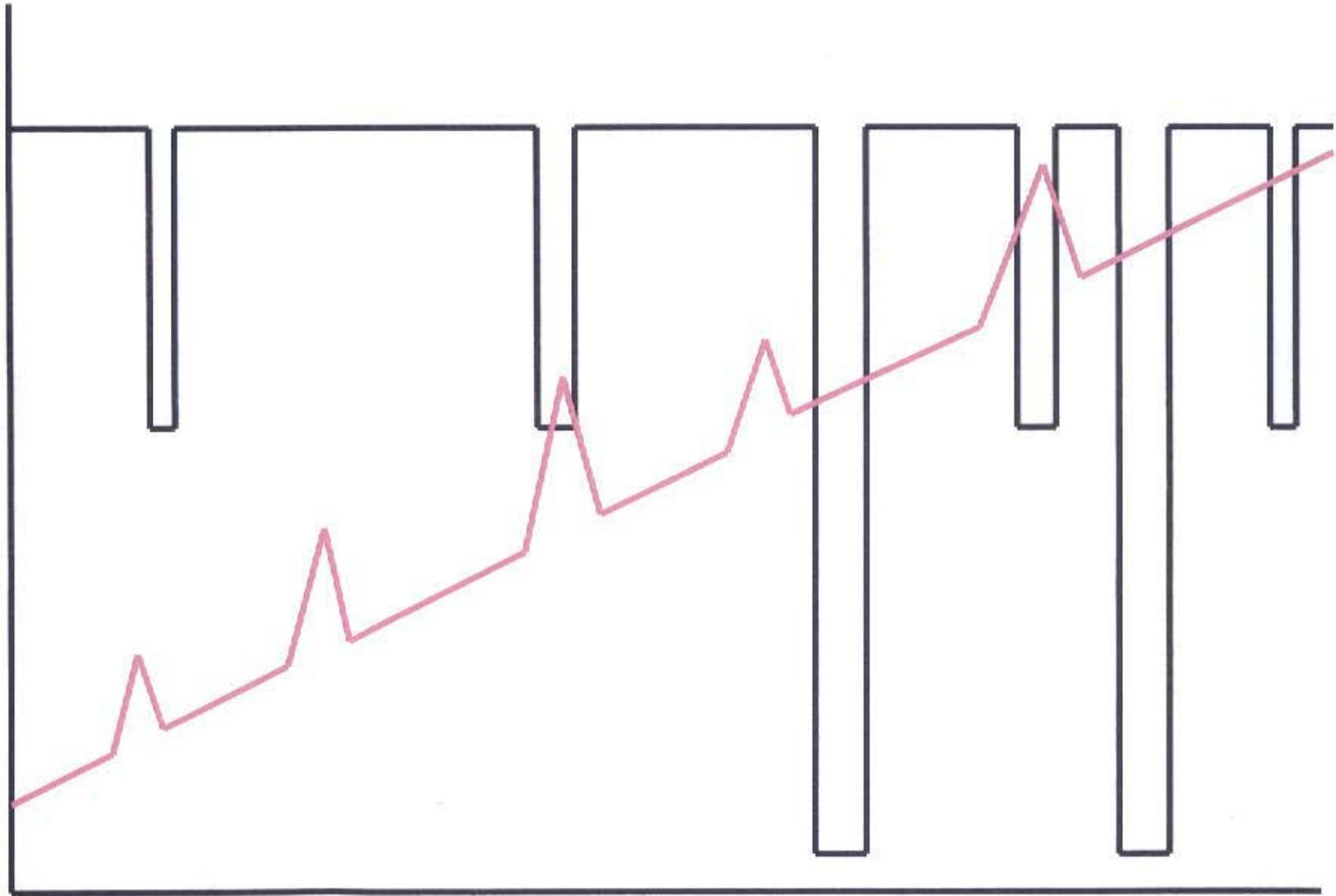
Capacity



Time

PUMP STATION RELIABLE CAPACITY

Capacity



Time



TREATMENT PLANT RELIABLE CAPACITY

Capacity

Capacity at 30 mg/L (Permit Requirement)

Capacity at 5 mg/L (Well Performance)

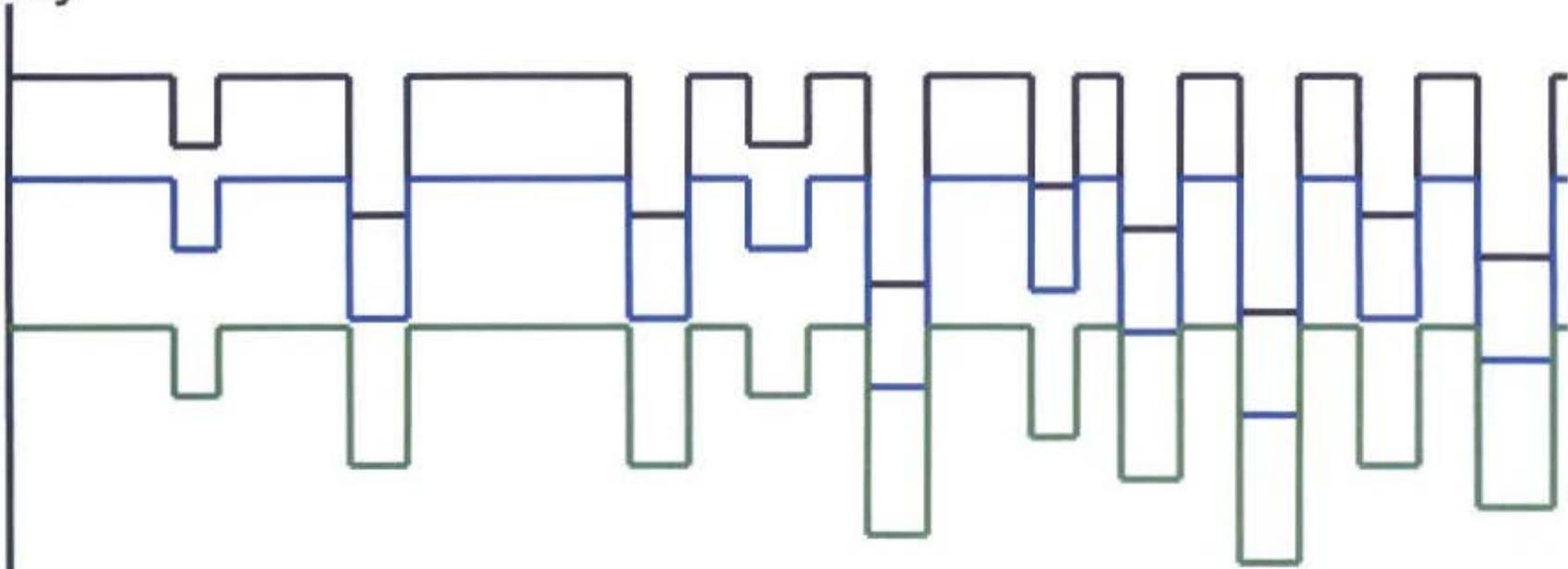
Capacity at 2 mg/L (Reuse)



Time

TREATMENT PLANT RELIABLE CAPACITY

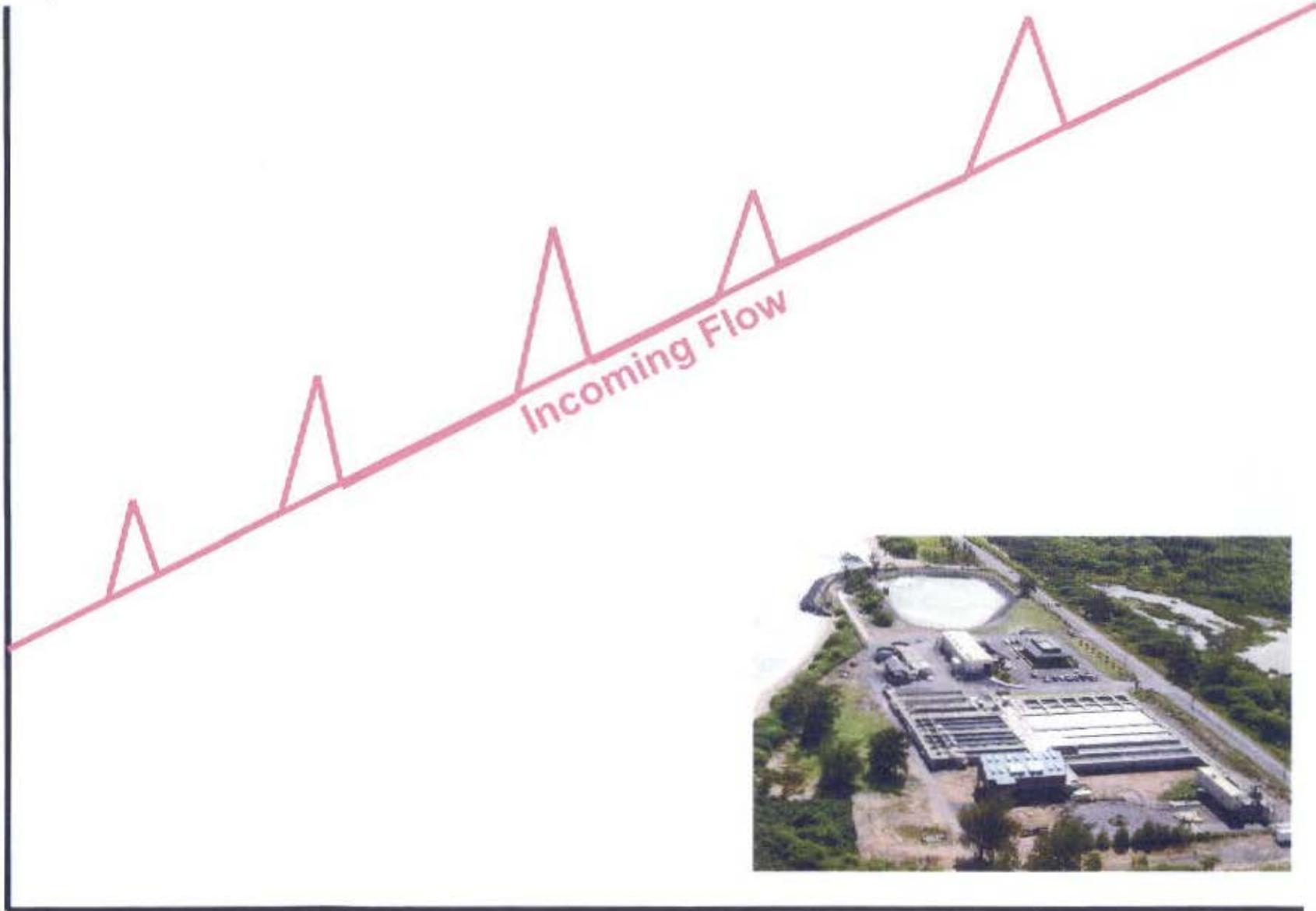
Capacity



Time

TREATMENT PLANT RELIABLE CAPACITY

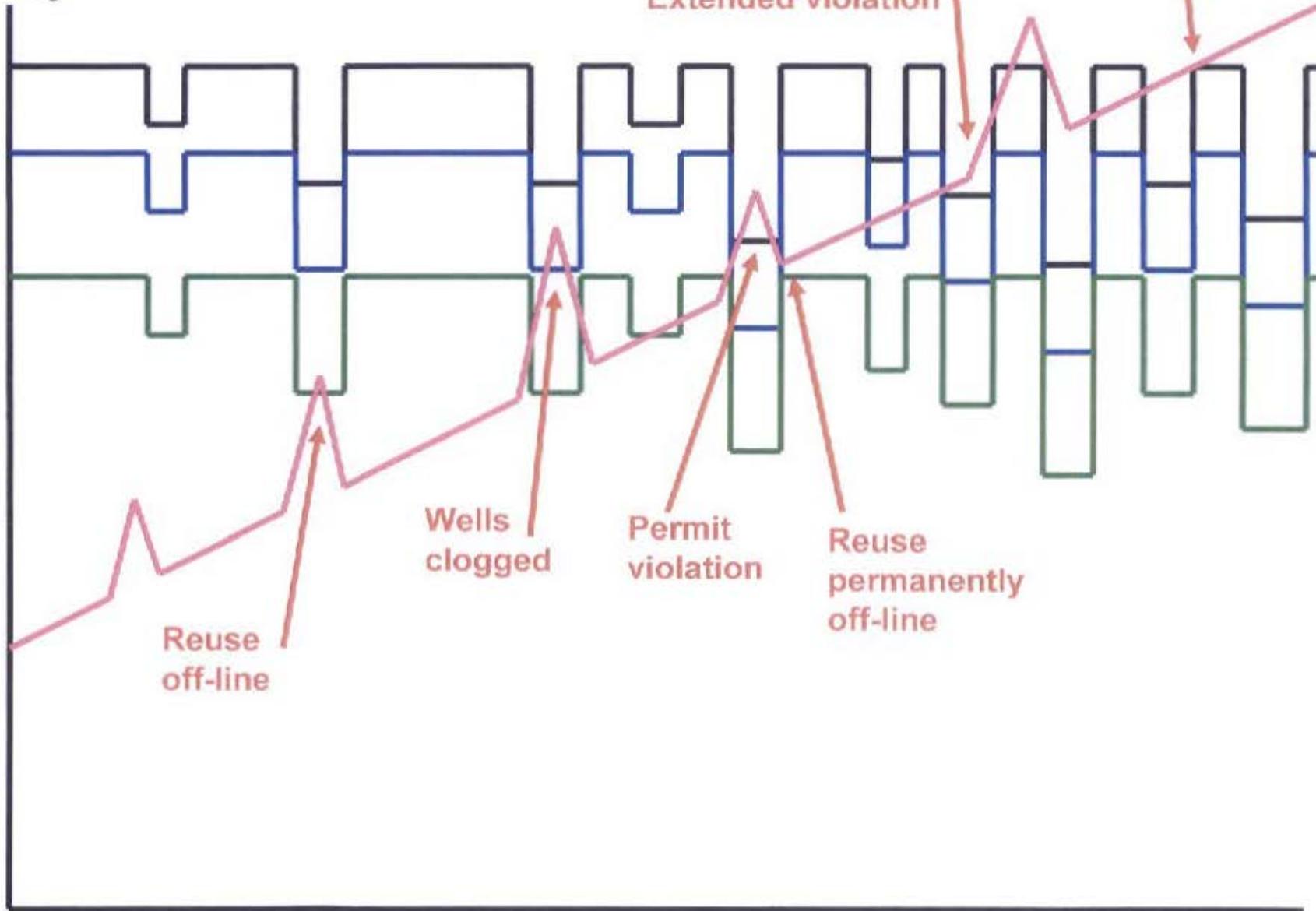
Capacity



Time

TREATMENT PLANT RELIABLE CAPACITY

Capacity



Time

WASTEWATER RECLAMATION DIVISION SYSTEM RELIABILITY

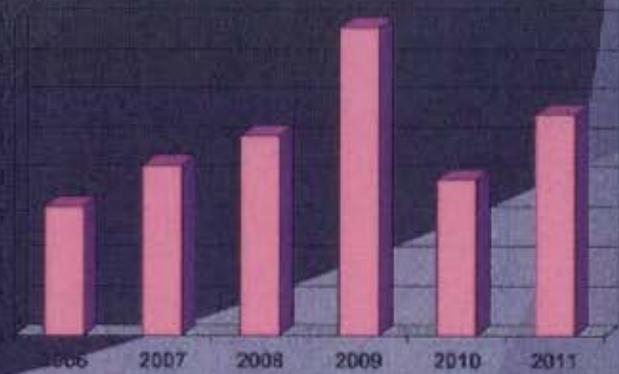
YEARS	WASTEWATER PROCESSED (gallons)	WASTEWATER SPILLED (gallons)	RELIABILITY	EQUIVALENT ANNUAL "DOWN-TIME"
1992-1994	14,965,881,000	6,358,000	99.9575 %	3 hours 43 minutes
2003-2005	15,859,597,000	352,868	99.9978 %	12 minutes
2008-2010	13,759,793,943	130,351	99.9991 %	5 minutes
2016-2018	14,923,559,000	146,460	99.9999 %	5 minutes

- **Develop and Implement Programs**
 - Asset Management Program (AMPS)
 - Central Maintenance Program

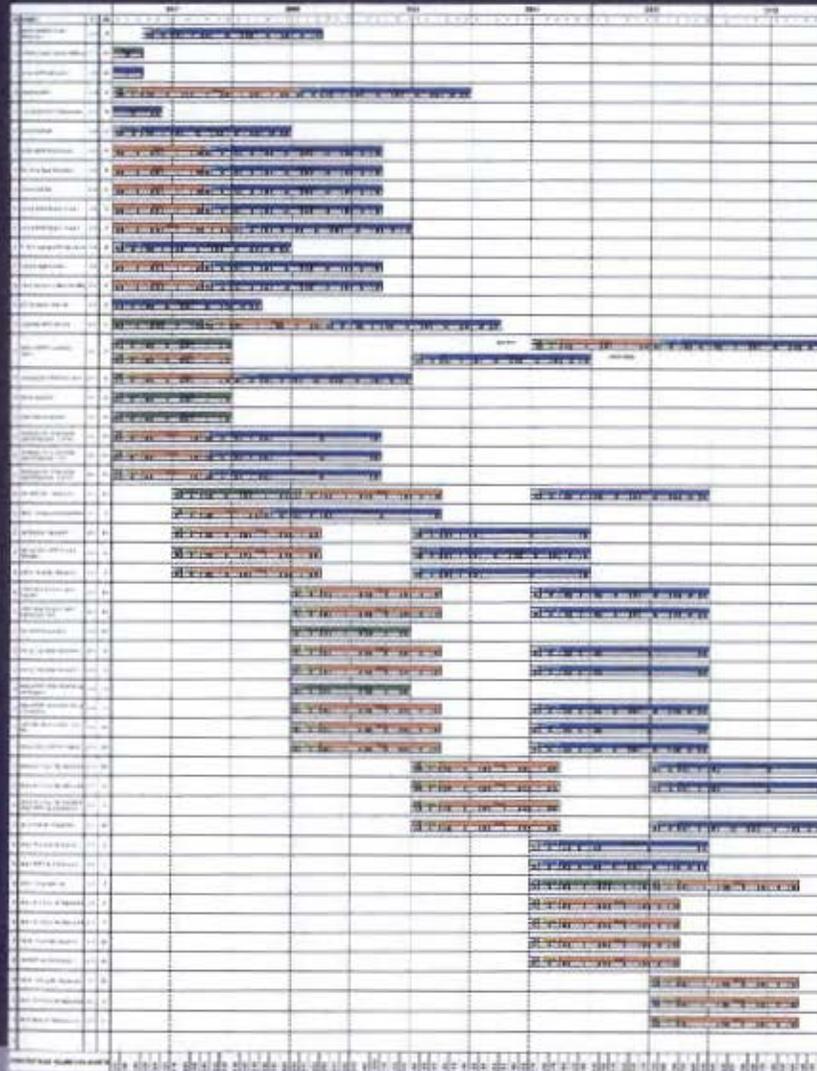
ID	Task Name	2005				2006				2007				2008				2009				2010											
		01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08
1	Pump No. 1 Regular Maintenance	●				●				●				●				●				●				●				●			
2	Pump No. 1 Performance Testing																																
3	Pump No. 1 Complete Overhaul																																
4	Pump No. 1 Replacement																																
5	Sachtes Regular Maintenance	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
6	Sachtes Replacement																																
7	Air Conditioning System Maintenance	●				●				●				●				●				●				●				●			
8	Air Conditioning System Replacement																																
9	Elevator Regular Maintenance	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
10	Elevator Performance Testing	●				●				●				●				●				●				●				●			
11	Elevator Replacement																																

ID	Task Name	2006				2007				2008				2009				2010				2011											
		01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08
1	Project 1																																
2	Project 2																																
3	Project 3																																
4	Project 4																																
5	Project 5																																
6	Project 6																																
7	Project 7																																
8	Project 8																																
9	Project 9																																
10	Project 10																																
11	Project 11																																
12	Project 12																																
13	Project 13																																

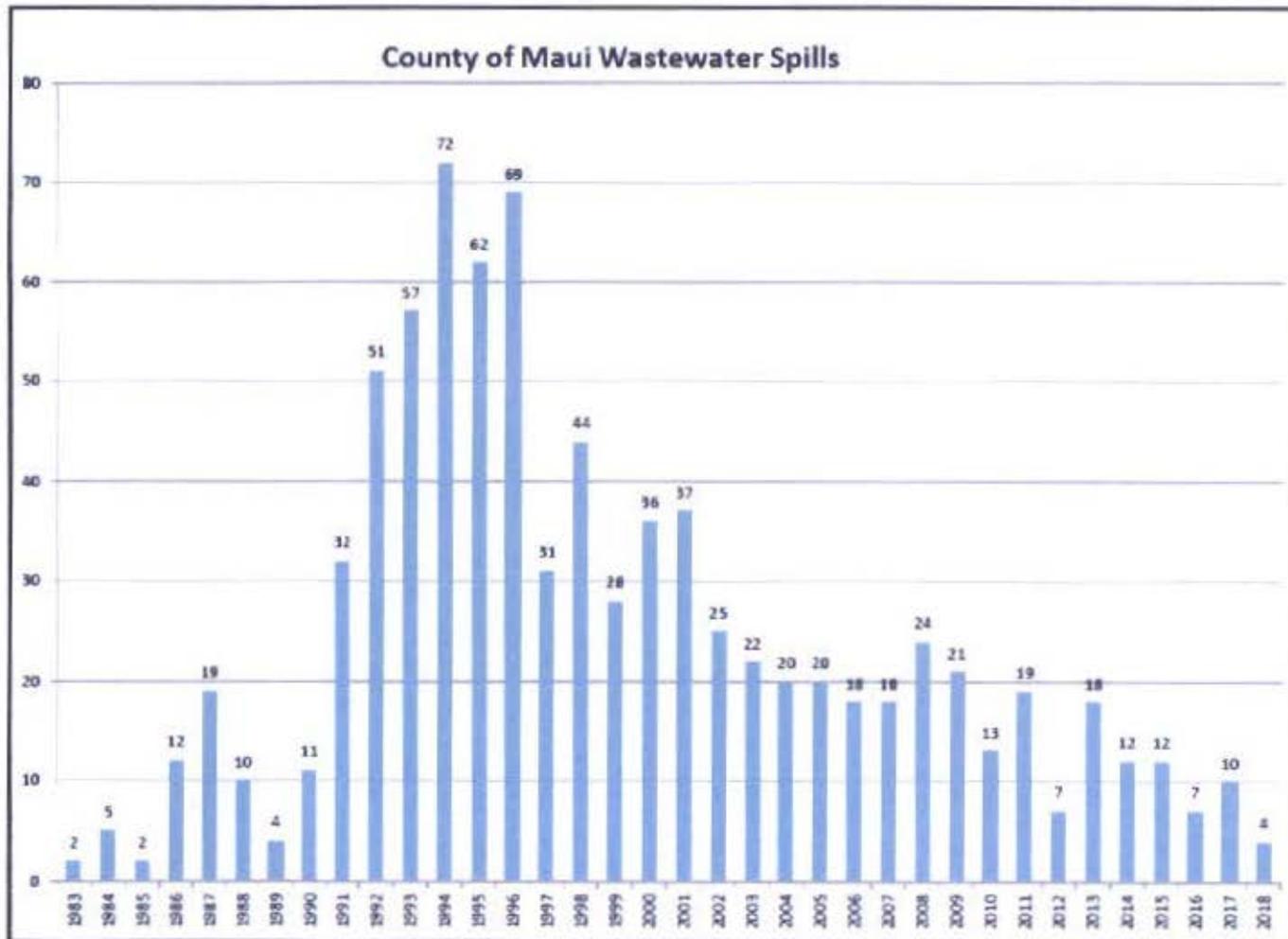
ID	Task Name	2006				2007				2008				2009				2010				2011											
		01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08	09	10	11	12	01	02	03	04	05	06	07	08
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13	Project 13																																



- **Develop and Implement Programs**
– **20 Year Capital Improvement Program**

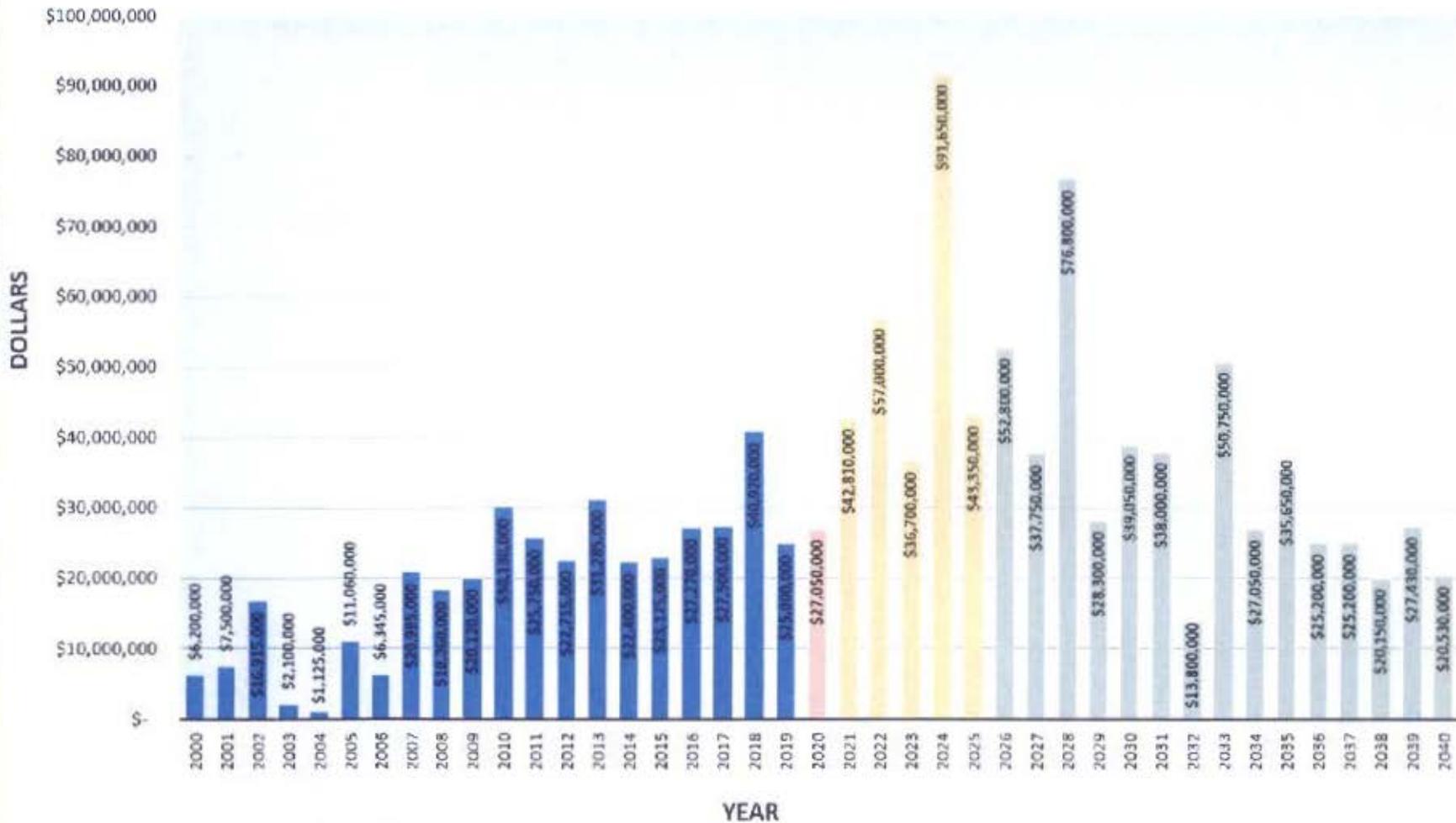


Results?



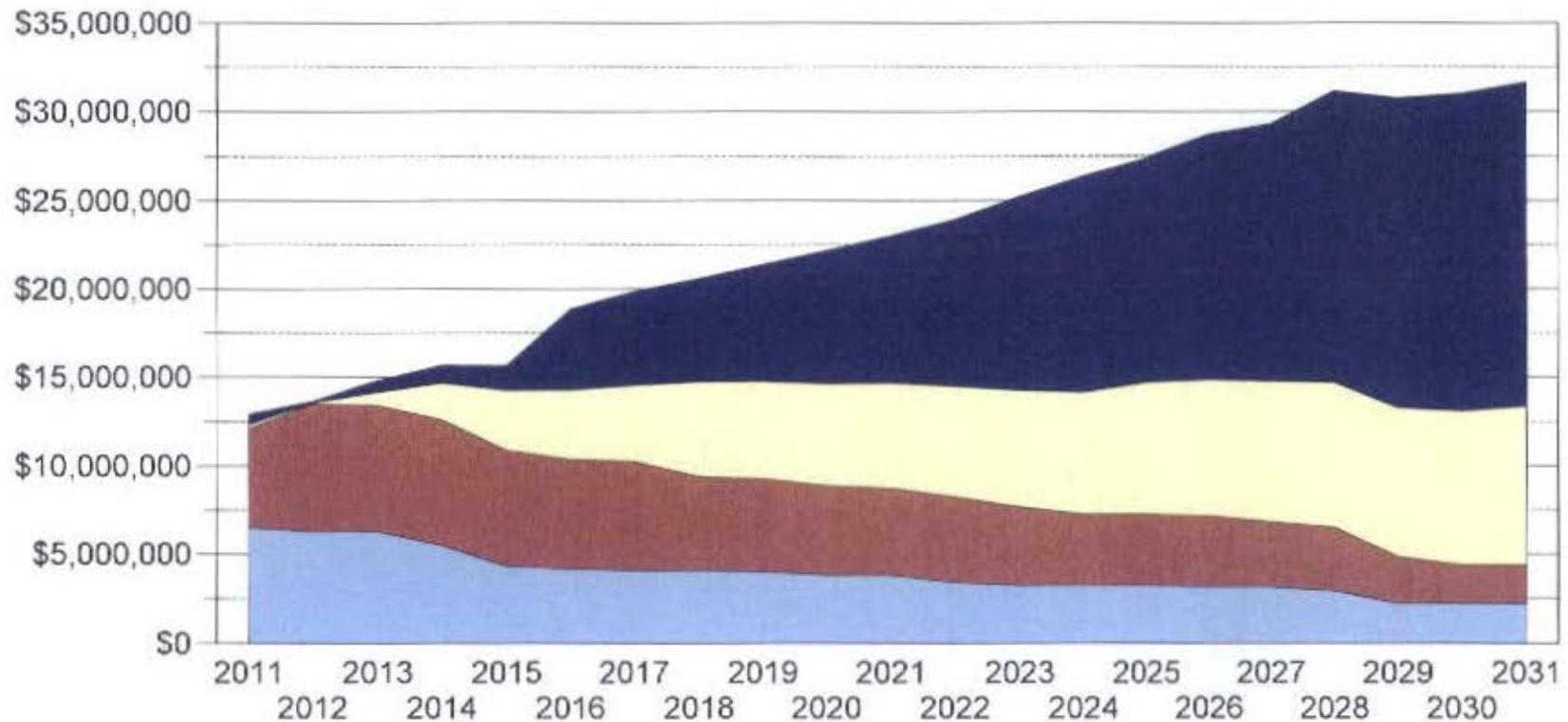
At What Cost?

ANNUAL WWRD CIP COSTS



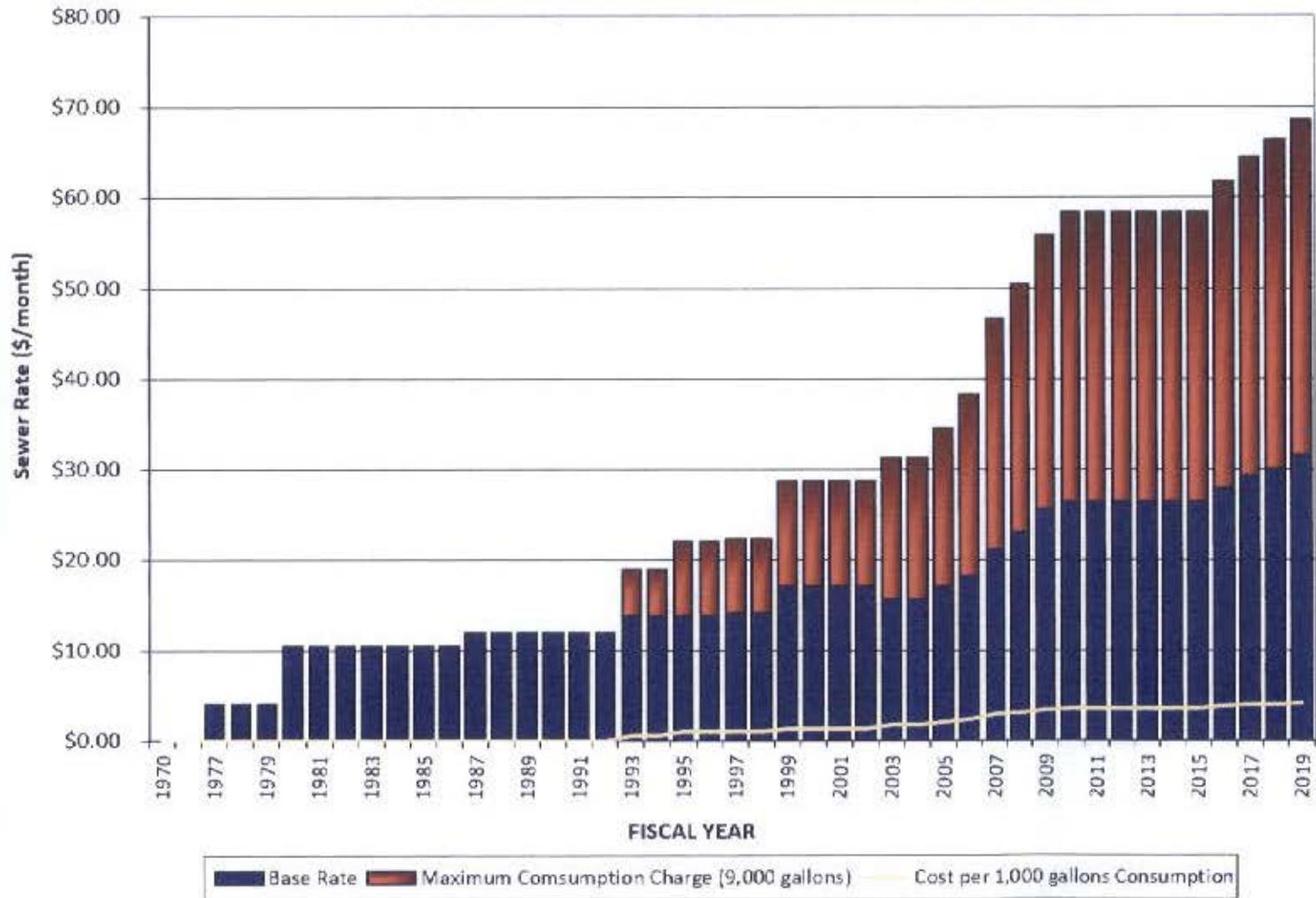
Increased debt...

EXISTING & PROPOSED DEBT SERVICE Wastewater Reclamation Division



How it affected sewer rates...

HISTORY OF MAUI SEWER RATES
(Maximum Billing Single-Family Residence)



“Global” Performance Measures

- ◎ Reliability of existing facilities over the long term at the lowest possible cost (99.9978%) 
- ◎ Increase volume of reclaimed water
- ◎ Expand sewer system to non-sewered areas
- ◎ Improve quality of treated effluent

Wastewater Reclamation Division Reclaimed Water Program

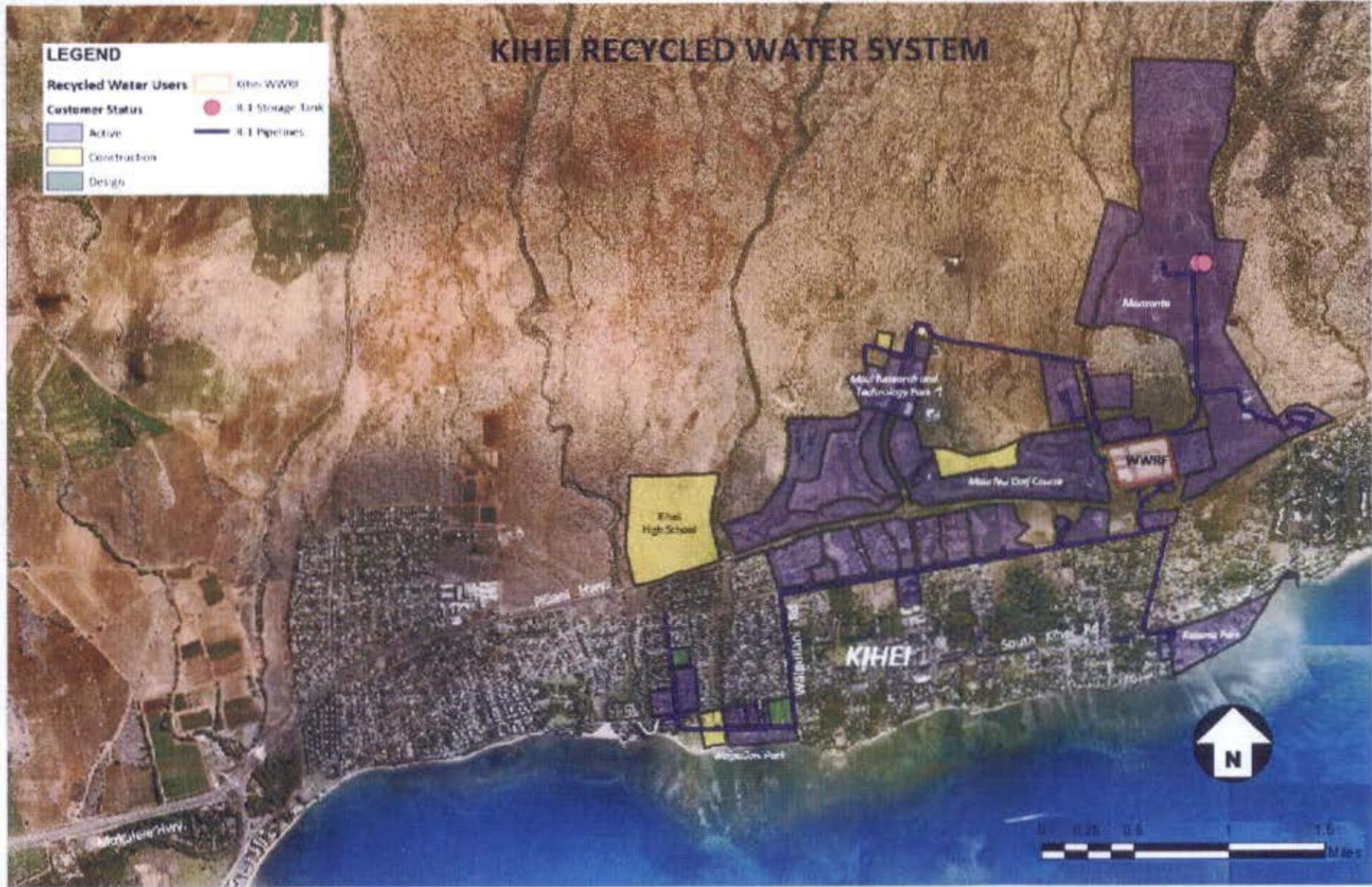


- ◎ \$40 Million in Reuse Infrastructure
- ◎ \$1 million per year for Operations
- ◎ Recycled 1.1 billion gallons in 2018

- ◎ \$1.55 per 1000 gal. vs \$5.70 per 1000 gal.
- ◎ 2010-2018
 - Cost = \$3.0 million/year
 - Revenues = \$536,000/year
 - 82% is subsidized with sewer fees



Current Reuse



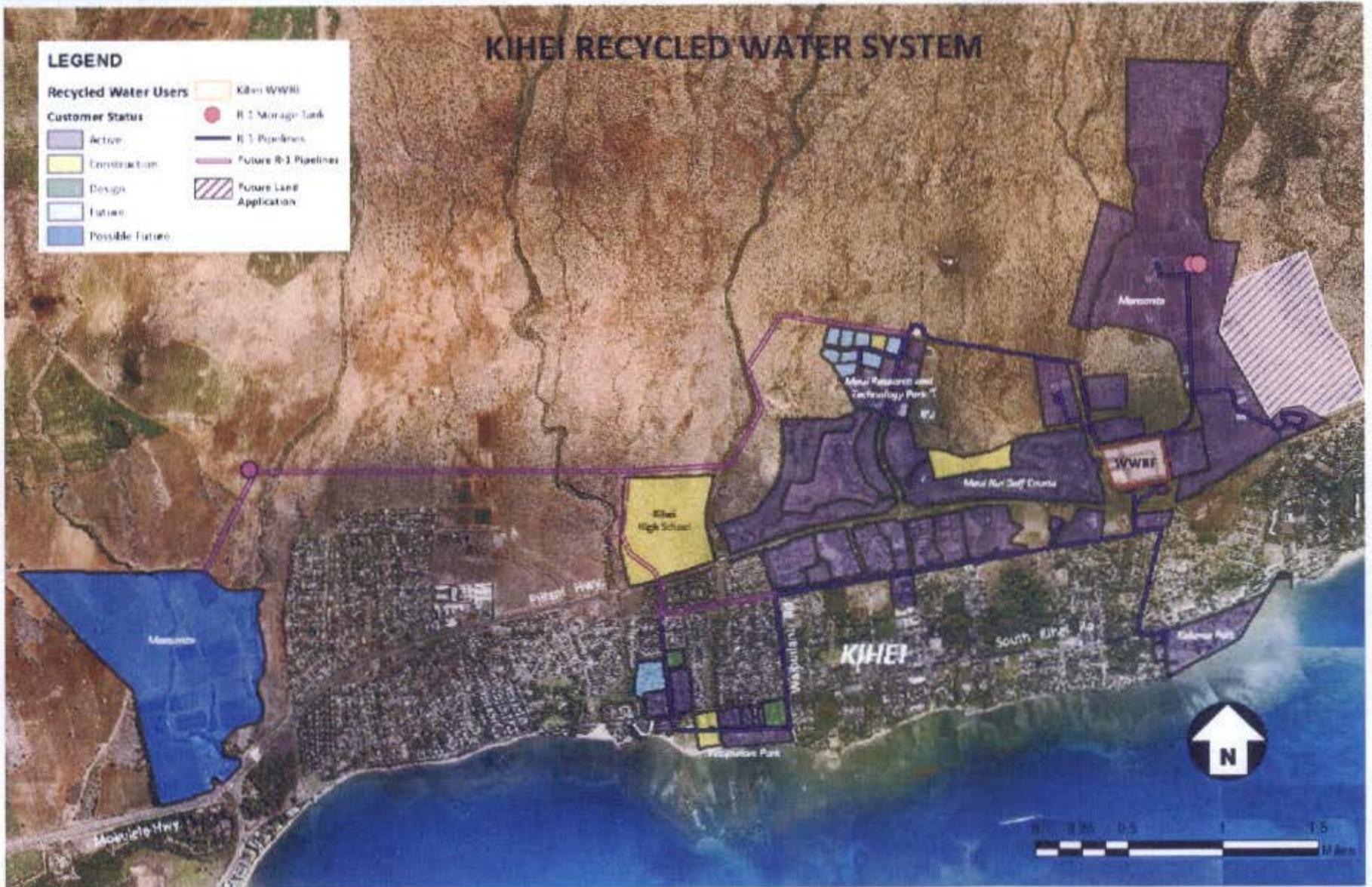
Expand Reuse

KIHEI RECYCLED WATER SYSTEM

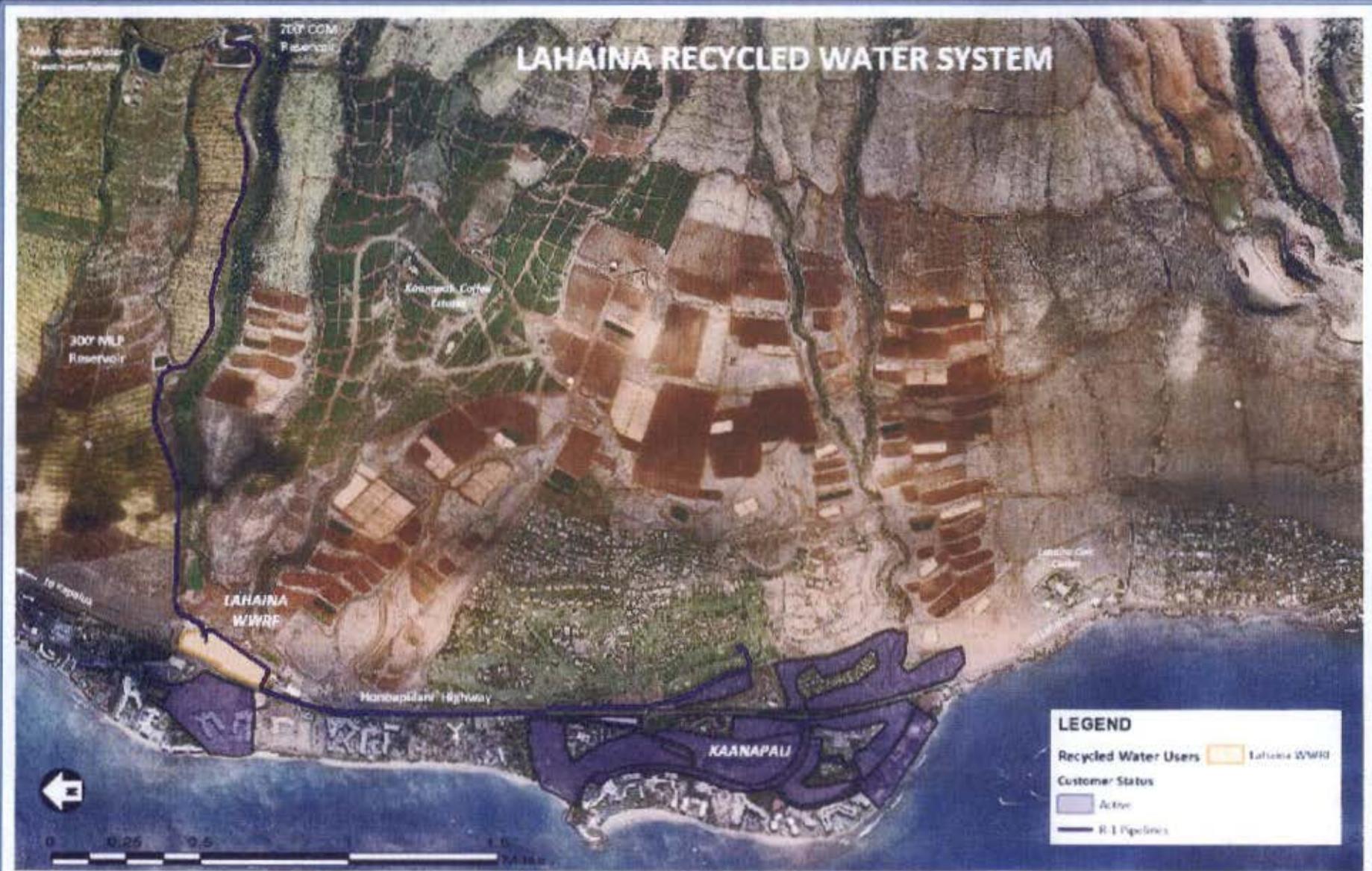
LEGEND

Recycled Water Users	
	Kihei WWRP
	R-1 Storage Tank
	Active
	Construction
	Design
	Future
	Possible Future

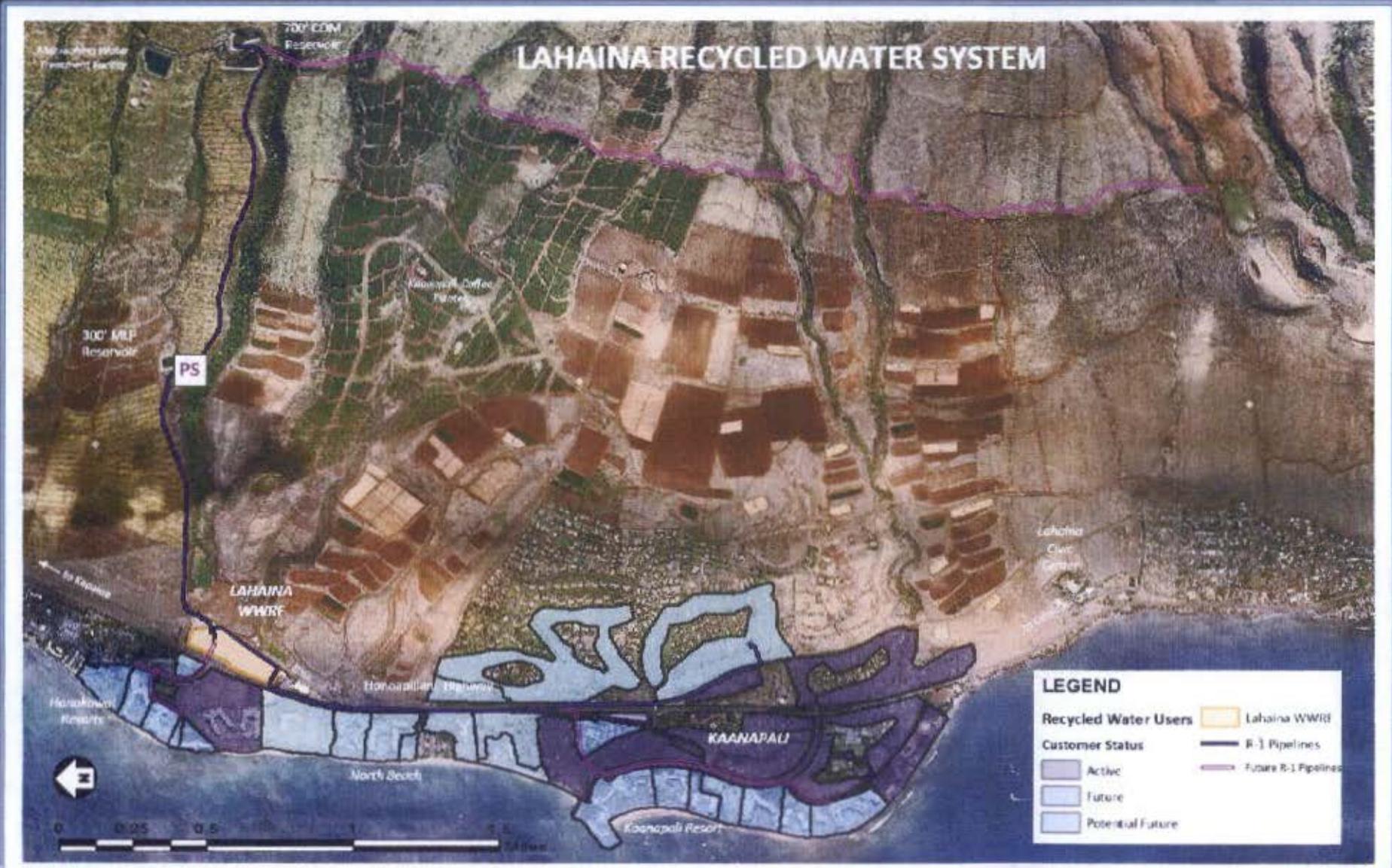
	R-1 Pipelines
	Future R-1 Pipelines
	Future Land Application



Current Reuse



Expand Reuse



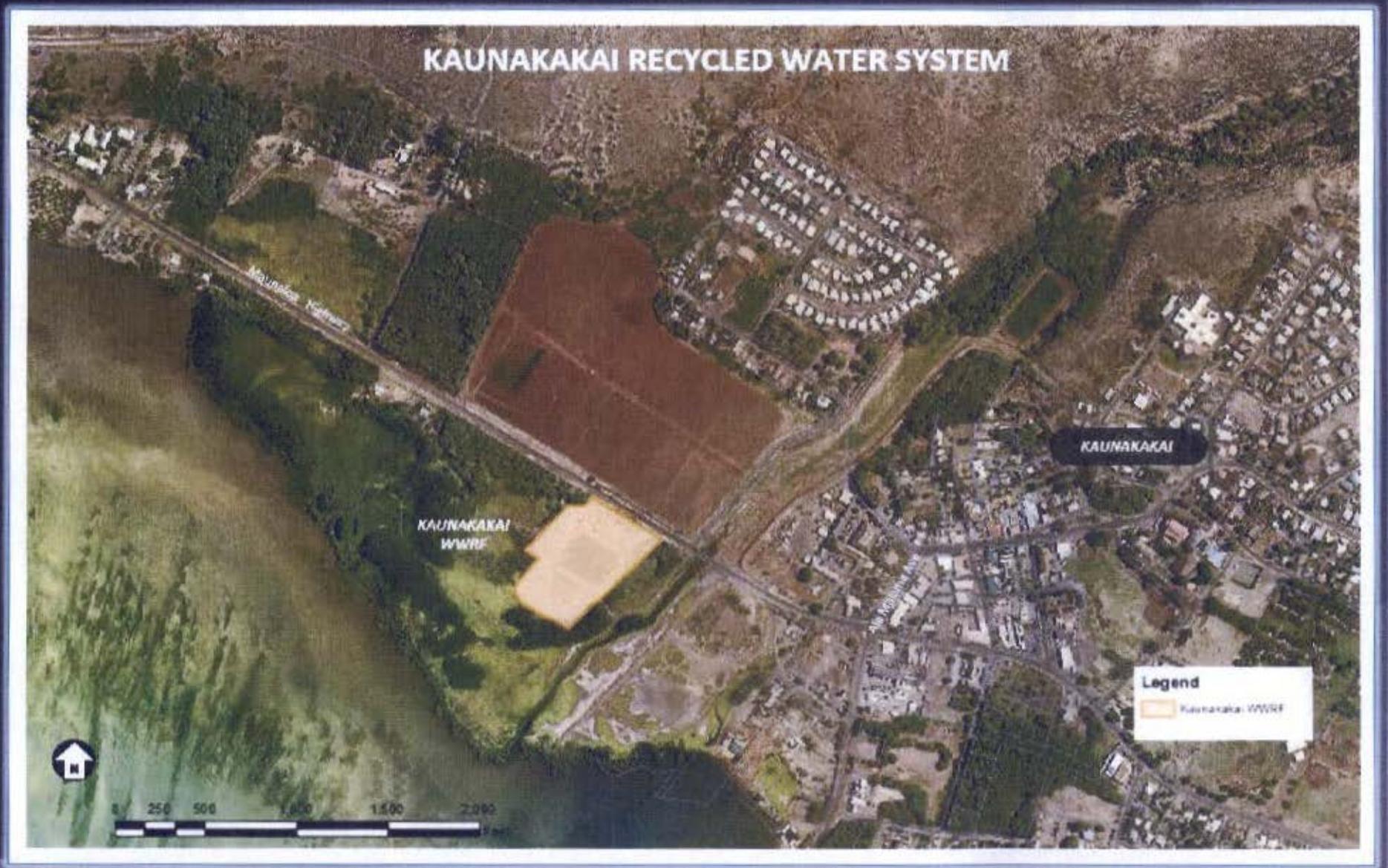
Current Reuse



Expand Reuse



Current Reuse



Expand Reuse

KAUNAKAKAI RECYCLED WATER SYSTEM



Future Plans?



Decentralize:

- Scalping Plants
- Satellite Facilities

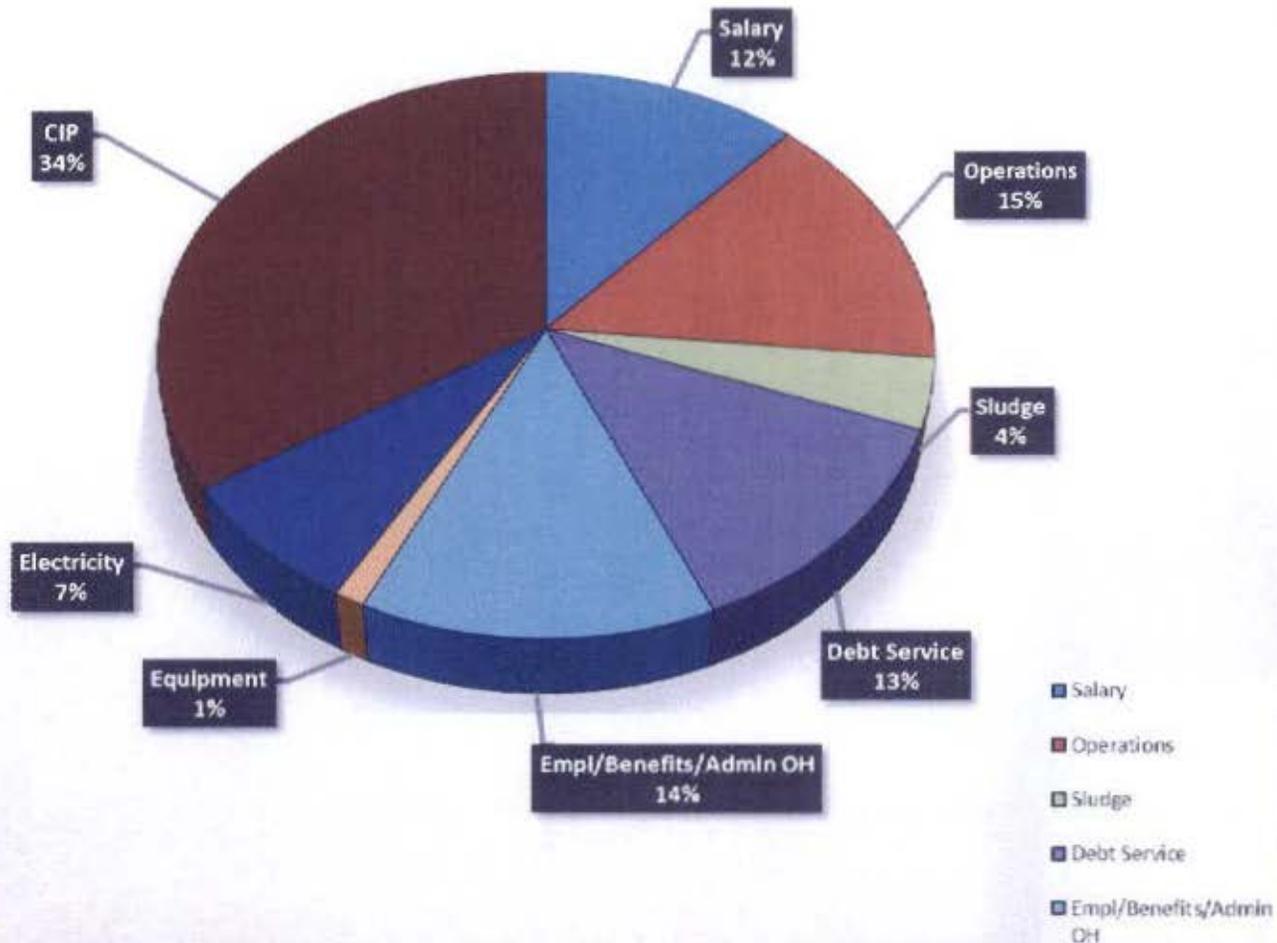
● Potable Reuse



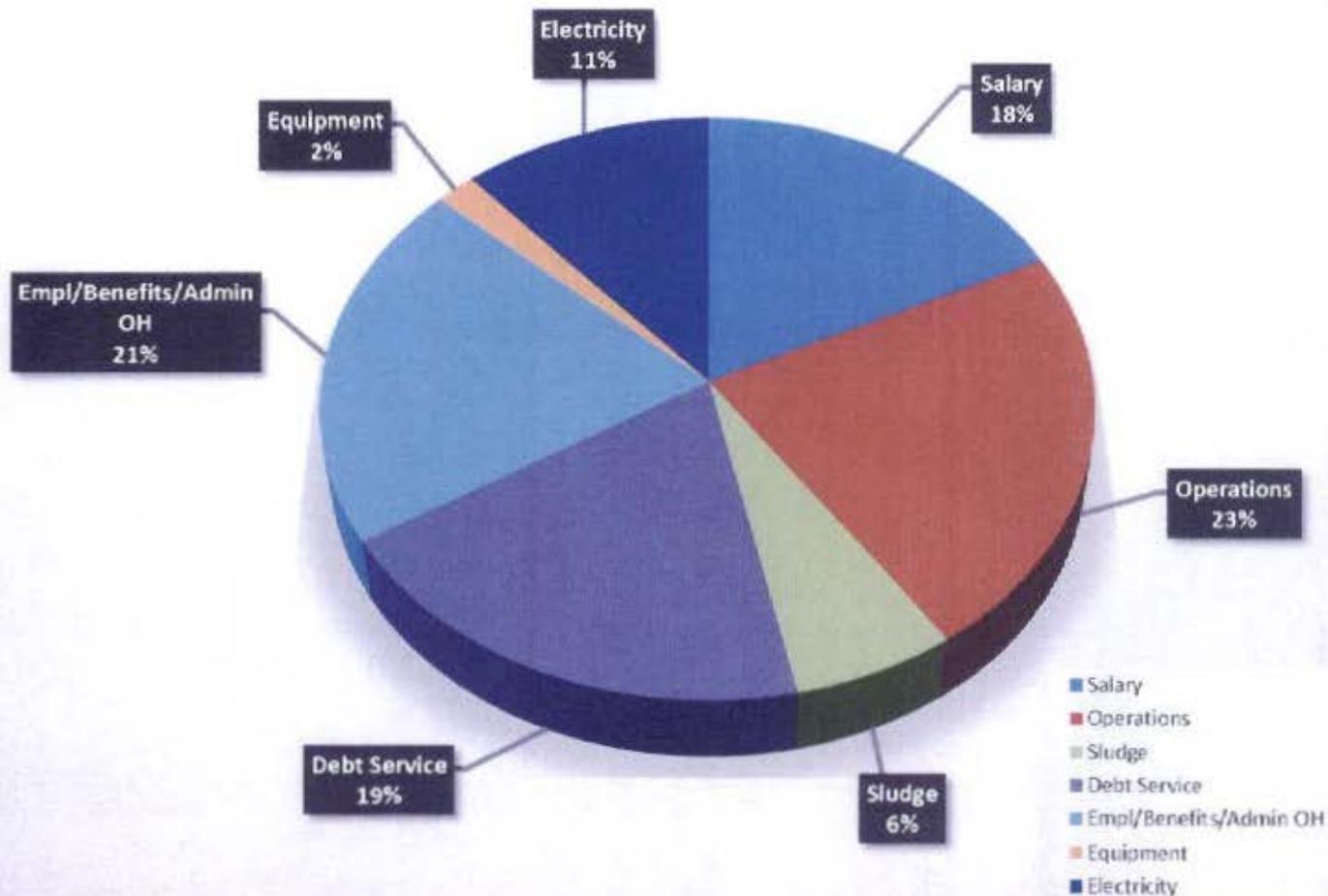
Future Plans and Challenges Facing WWRD

- ⦿ Aging infrastructure and equipment
- ⦿ Reducing Energy Use
- ⦿ Balancing CIP vs. Sewer Rates
- ⦿ Increasing Debt
- ⦿ Stricter Regulatory Requirements

Wastewater Reclamation Division Total FY2019 - \$71,532,979



Wastewater Reclamation Division FY 2019 - \$47,061,979 (ABC)



How WWRD Faces Challenges

- **⦿ Aging infrastructure and equipment**
 - **Budgeted 34% of FY2019 for CIP (rehabilitation/replacement projects)**
 - **Team of Professional Consultants**
 - **More efficient process and equipment**
 - **Preventive Maintenance: Central Maintenance Section**

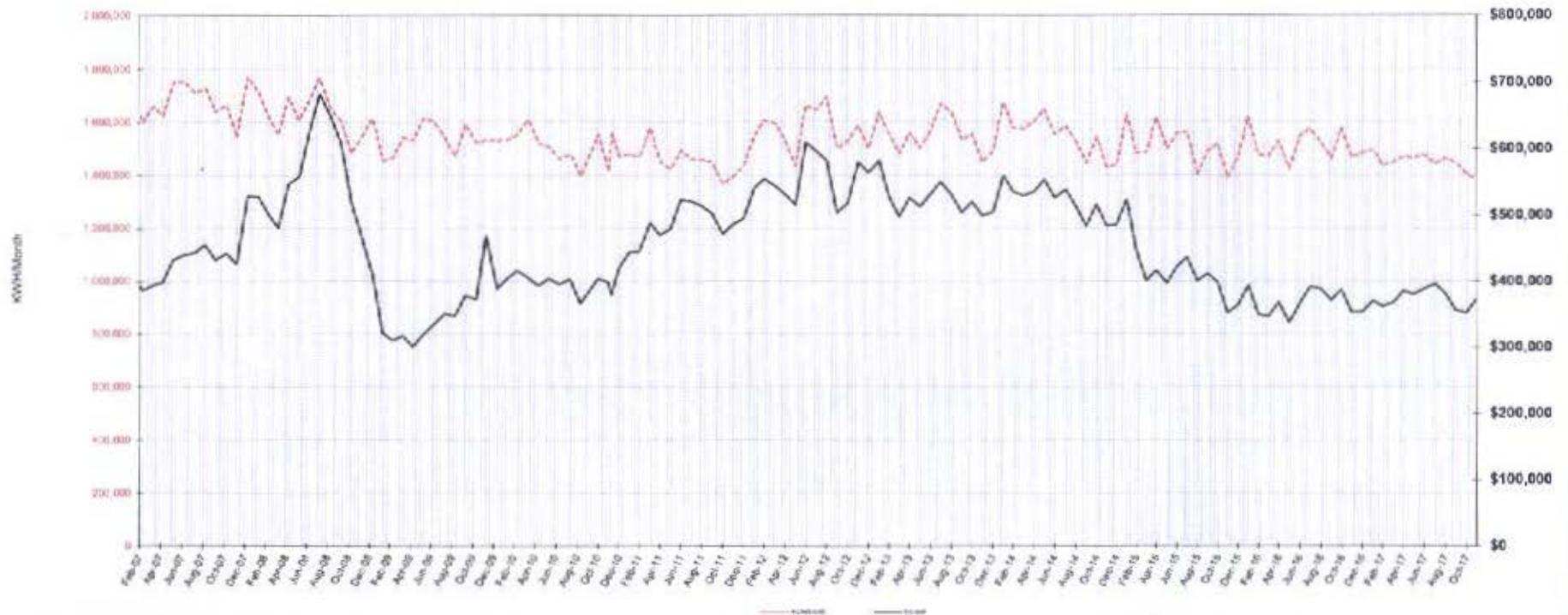
How WWRD Faces Challenges

○ Reducing Energy Usage

- Budgeted 11% of FY2019 for Electricity
- Install energy efficient equipment
- Installed photovoltaic and wind systems
- Team of Professional Consultants
 - Optimize the biological treatment process
 - Train our wastewater staff

Power Cost/Usage

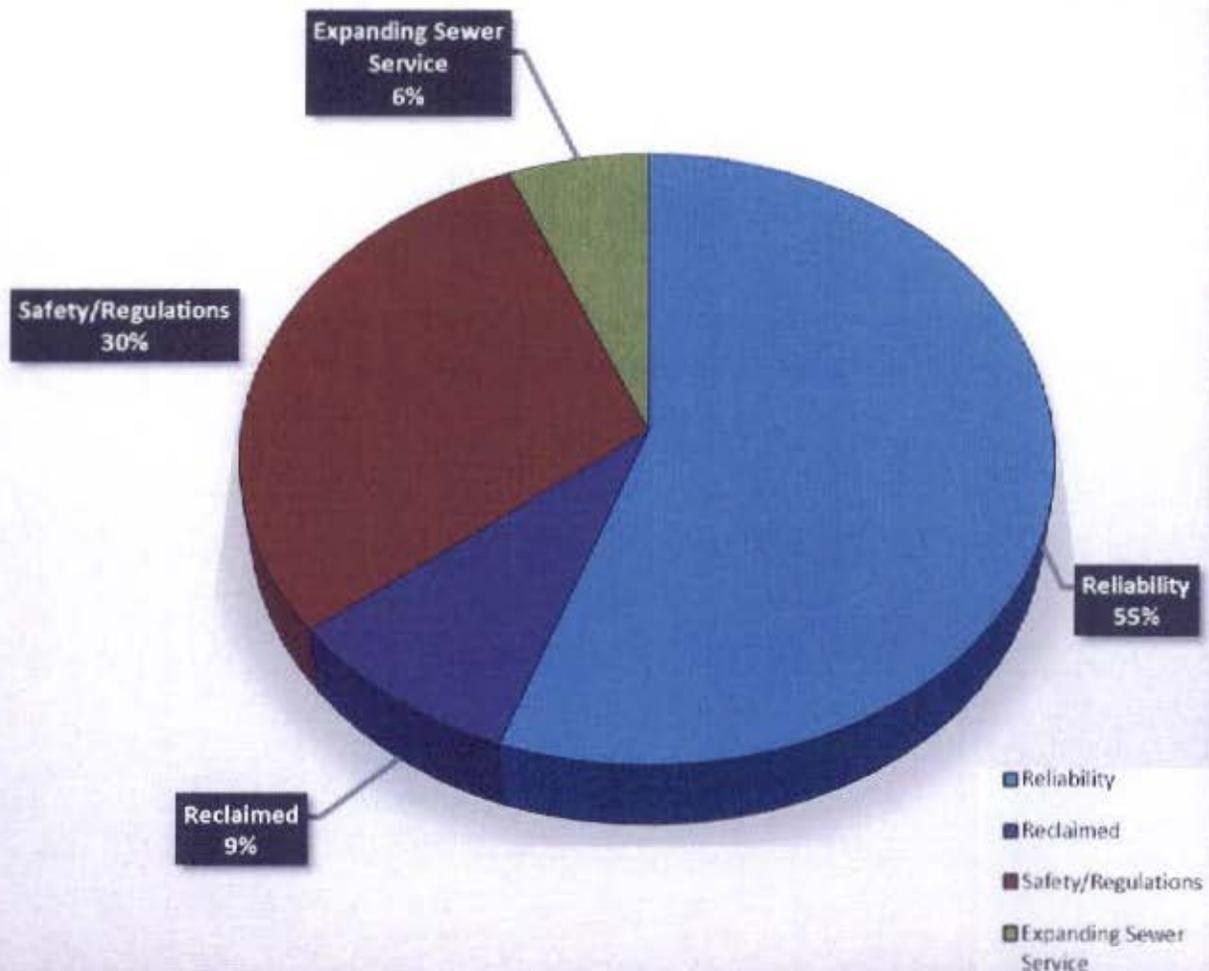
Power Cost
Wastewater Reclamation Division



Future Plans and Challenges Facing WWRD

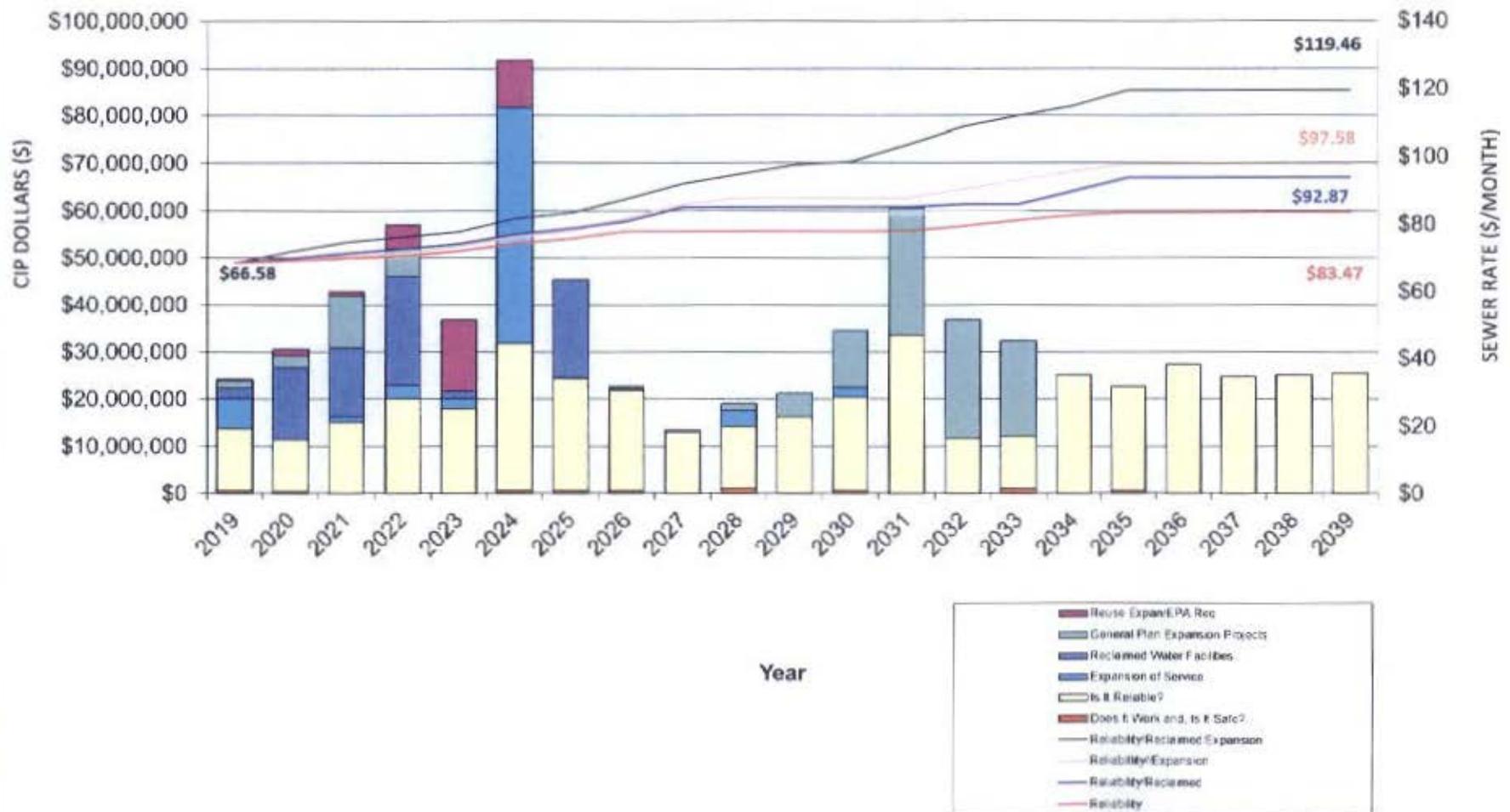
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Wastewater Reclamation Division Fiscal Year 2019 – CIP (\$24M)

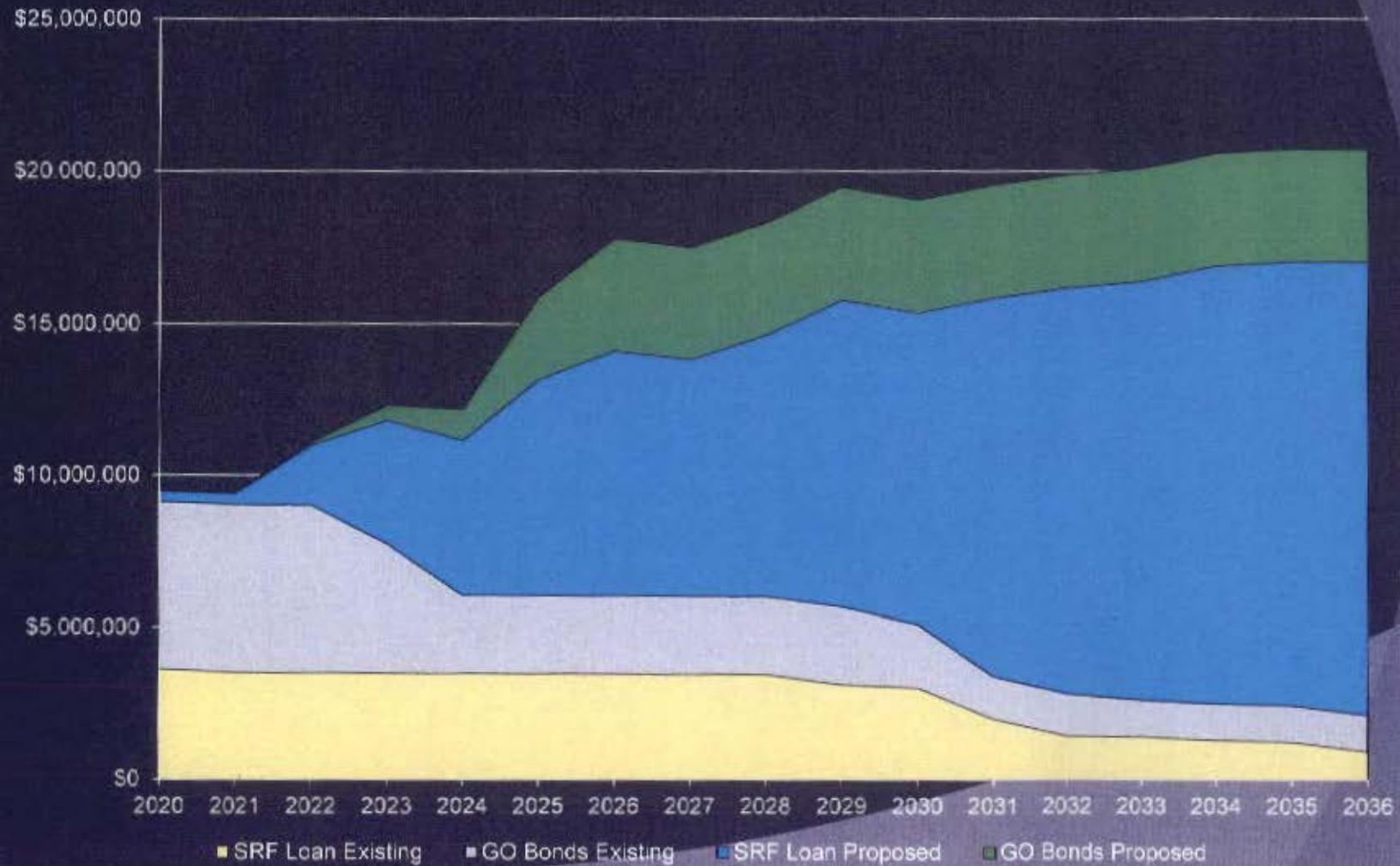


Future Plans?

CIP PRIORITY SPENDING vs RATES



Existing & Proposed Debt Service



How WWRD Faces Challenges

◎ Reduce Debt

- Budgeted 19% of FY2019 for Debt Service
- Pay down debt service with lapsing funds
- Increase the amount of Cash CIP projects
- Utilize State of Hawaii Revolving Funding
- Search for Federal Funding

Future Plans and Challenges Facing WWRD

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WASTEWATER RECLAMATION DIVISION

Water and Infrastructure Committee

March 11, 2019

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