Ma’alaea Wastewater Association

Travis Liggett MS, Executive Director

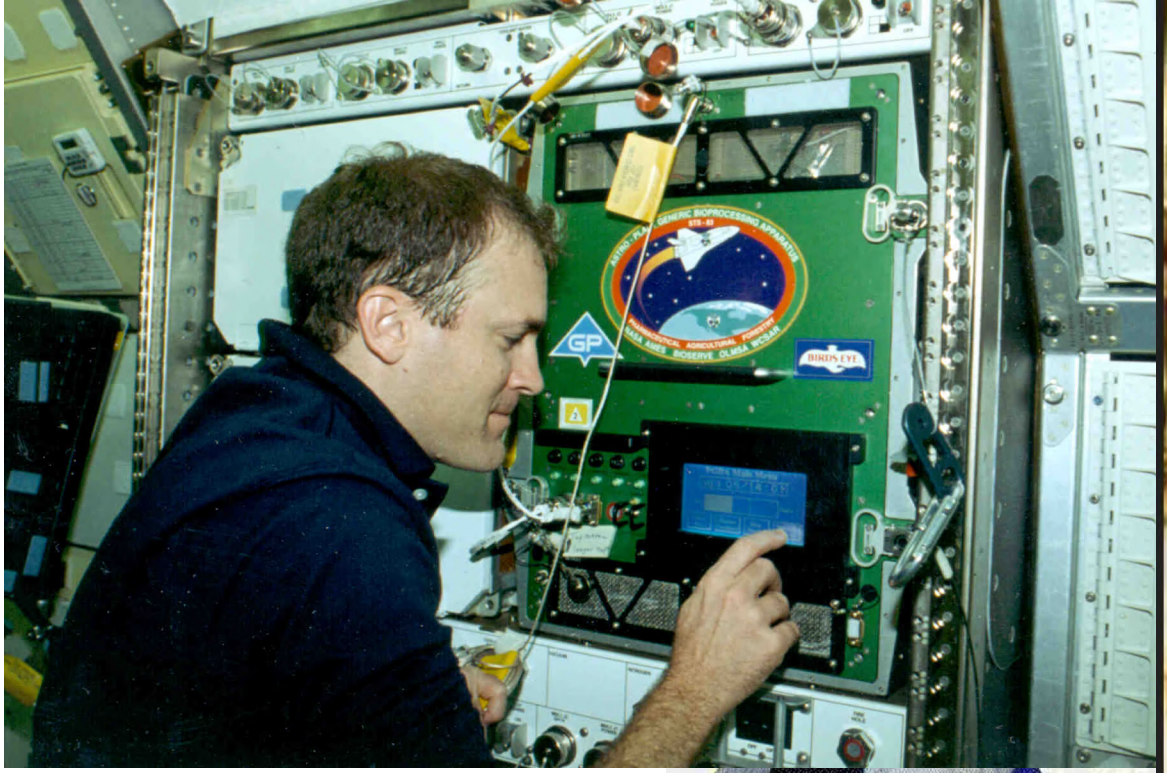
presents

MA'ALAEA WASTEWATER ASSOCIATION

Ma'alaea Regional Wastewater Reclamation System (MRWRS)
and
Irrigation Reuse Fire Break Greenbelts in Maui

1:30 pm October 19, 2023

Maui County Council ADEPT Committee



PGBA
Plant Generic BioProcessing Apparatus (PGBA)

STS-112 flight to International Space Station 2002

Identified nutrient solids deposition on soil & seeds as failure mode.

Nutrient removal is required for long-term R-1 irrigation reuse.

PHASE 1 :

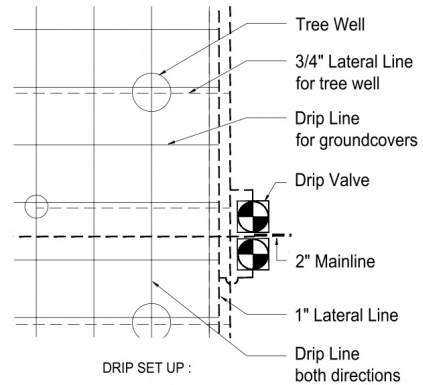
- 'TEST FOREST'
  11 ea. Trees
  8 - 5' x 5' tree wells
  3 - 3' x 3' tree wells

- GROUNDCOVERS
  12 ea. Native species
  Drip lines on grid
  - 7 1/2' spacing
    off lateral pvc line

- Gravity feed supply line

- Battery Operated
  Control Valves

- Single Drip Lines to trees



DRIP SET UP :

- 2" PVC Mainline
- 1" Lateral lines
- Drip Valves
  Battery Operated
- 3/4" laterals
  1 per tree
- Drip Lines
  for groundcovers
  off of 1" lateral line

IRRIG. DETAIL
scale: 1" = 8' - 0"

PHASE 2 :

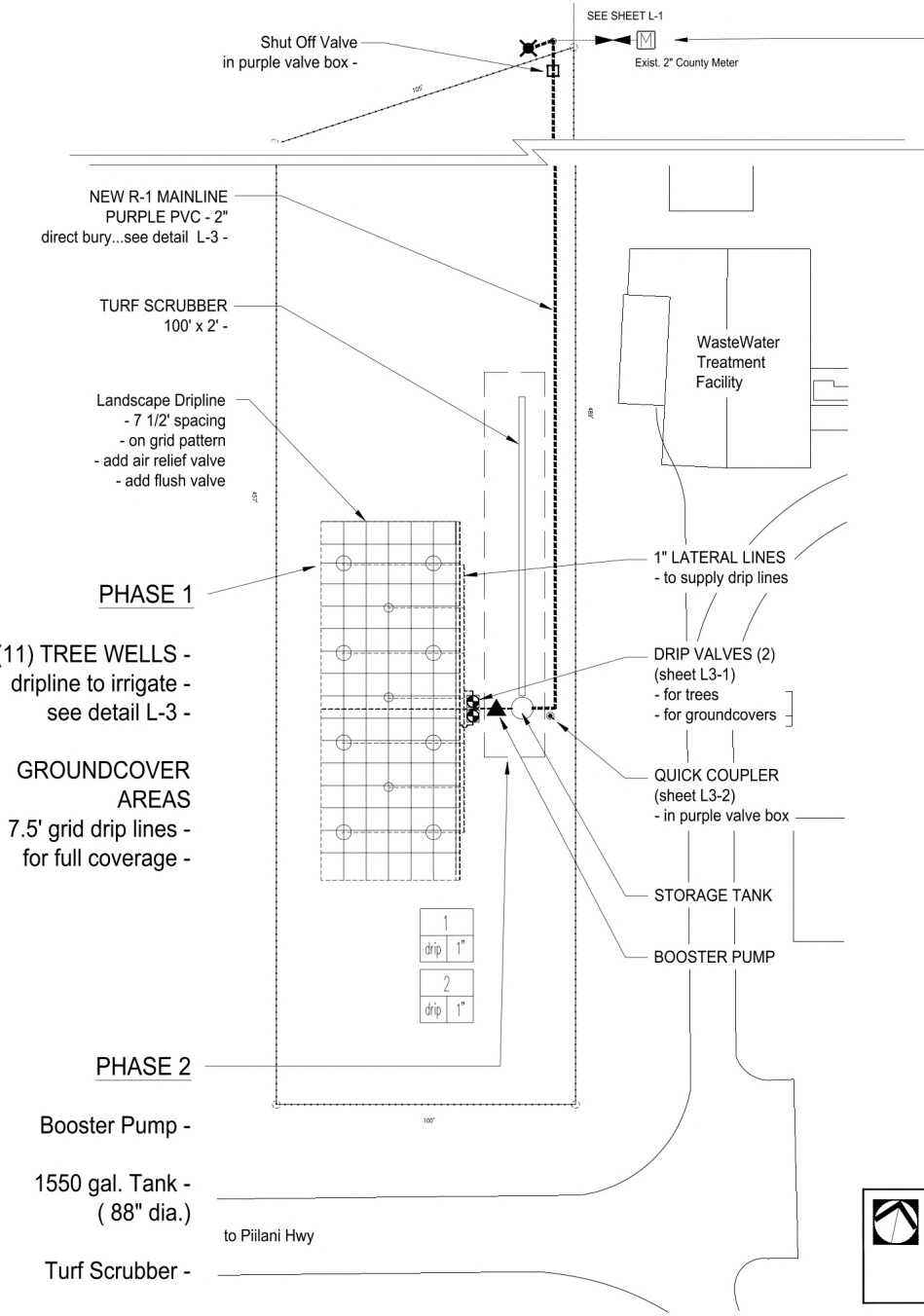
... in addition to phase 1
...with addition of electrical power

- BOOSTER PUMP

- 1550 gal. TANK

- TURF SCRUBBER

- IRRIGATION CONTROLLER
  in enclosure



R-1 - IRRIGATION P.O.C.

- Tie into existing exposed line outside of fence
  - location / source to be verified
  - verify existing exposed line is not energized
  - cap existing line to be abandoned

- WATER METER
  - existing meter within County property

- Install Gate Valve / Isolation Valve (sheet L3-3)
  - to isolate R-1 water for project
  - in purple valve box
  - install valve within project property

IRRIGATION EQUIPMENT

- 2" Sch. 40 PVC MAINLINE
  - purple / stamped 'recycled'...
- PVC LATERAL LINE...1"
- WATER METER
  - tie into existing County meter
- GATE VALVE - line size
- RAINBIRD DRIP VALVE
  - Battery Operated Valves
  - with purple caps
- IRRIGATION POINT OF CONNECTION
  - Verify with County Wastewater
- ISOLATION VALVE BOX
- QUICK COUPLER / HOSE BIB
  - in valve box, purple cover
- BOOSTER PUMP

1 — Station / Circuit Call Out
drip 3/4" — Valve type / Valve size

DRIP IRRIGATION

Dripline Tubing
- Snake line thru plant material
- install for full coverage
- Bury all lines under g.c./cinder
- 7.5' GRID LINE SPACING

R-1 WATER IRRIGATION PLAN
scale: 1" = 20' - 0"

K. TANAKA
LANDSCAPE
ARCHITECT

468 Polulani Dr.
Wailuku, HI
96793

(808) 243-9494
ktanaka001@hawaii.rr.com

PREPARED FOR:

REEF POWER R-1

2111 Piilani Highway
Kihei, Maui, Hawaii
TMK: (2) 2 - 2 - 084 : 000

KEVIN T. TANAKA
LICENSED PROFESSIONAL LANDSCAPE ARCHITECT
No. 10170
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY SUPERVISION

Signature — Expires 04-30-20

1 – Final Revised 04/25/22
2 –
3 –
4 –
5 –
6 –
7 –

Designed by	KT
Drawn by	KT
Checked by	KT
Date	SEPT 2021
File No.	20-008

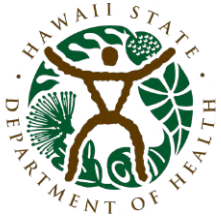
SHEET
L-2
2 of 3 sheets

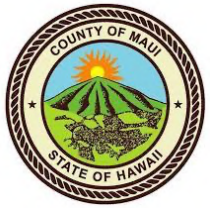
FOR COUNTY REVIEW – NOT FOR CONSTRUCTION

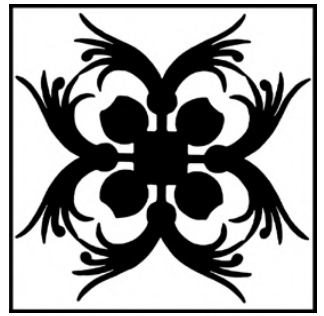
The history and future of MRWRS

October 2018	Town hall meeting attended by Sina Pruder - wastewater #1 community issue
September 2019	B&C feasibility report - funded by Ma'alaea community & S. Maui Council fund
Early 2020	Mahi Pono pledged 10 acres for MRWRS treatment plant & greenbelt
January 2022	GIA application - $250,000 awarded for preliminary design work
April 2022	County Council approved $9,500,000 SRF budget amendment to build MRWRS
June 2022	$33,700 South Maui County Council budget grant for survey study by Kelly King
October 2022	DEM applied for SRF
November 2022	HI DOH published SRF IUP with MRWRS ranked #6 out of 108 proposals
March 2023	GIA grant administered, preliminary design work began
	Basis of Design report delivered to Mayor Bissen's staff
July 2023	EA draft delivered, Mayor Bissen signed LOI for $9,500,000 FY2025 grant
July - Dec 2023	MWA formation, Preliminary Engineering Report, SMA permitting, DOH permitting
July 2024	Initiate detailed design work
Early 2025	Permitting complete, MWA initiates contracts & begins installation
Late 2025	Installation complete, operations and ratepaying commence

26 Project Partners



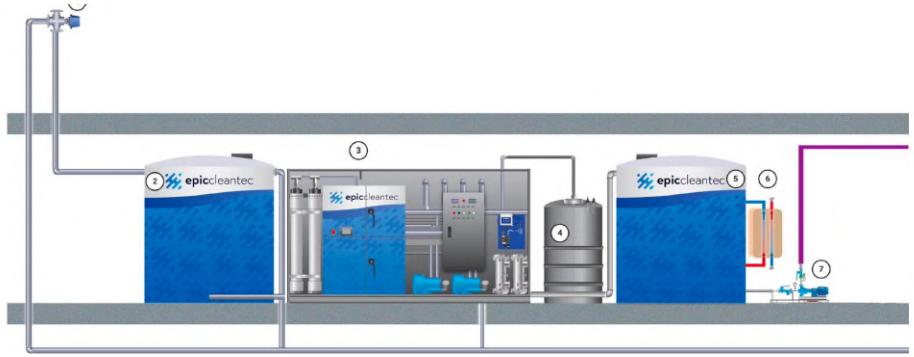


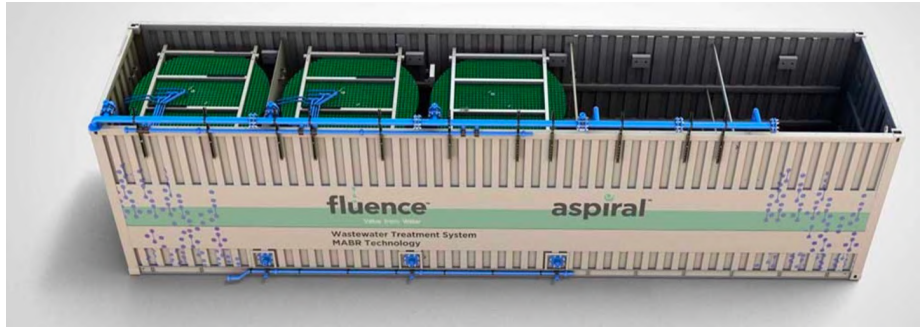


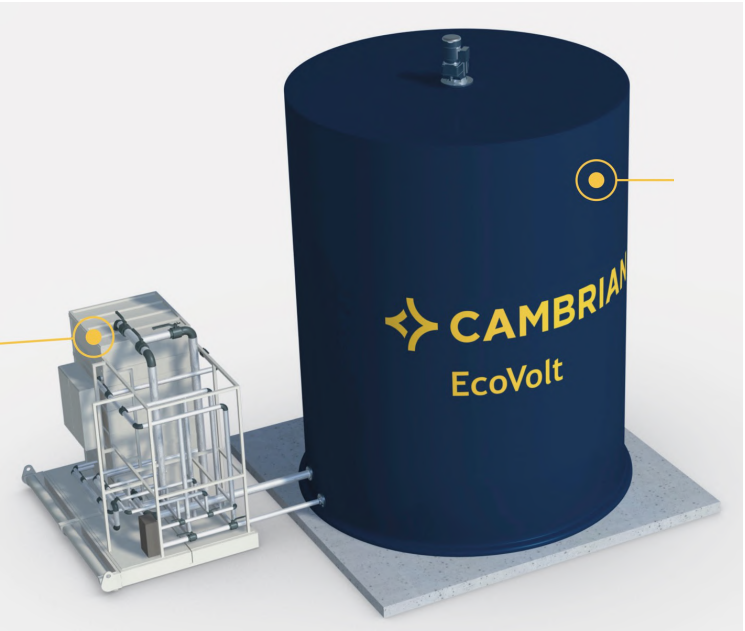
System Specification

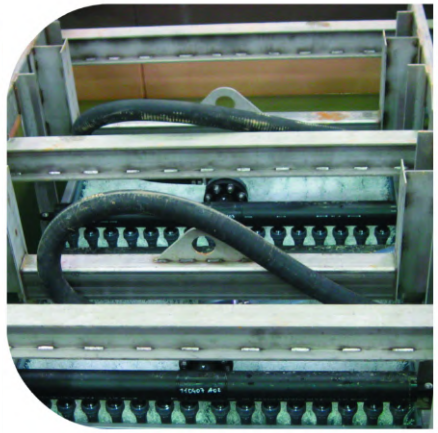
- Designed for at least 50 years service, is scalable and can meet future regulation
- Eliminate injection wells in Ma'alaea by serving residences, Triangle & Harbor
- Cutting edge advanced secondary treatment delivered in pretested package plant
- 100% UV disinfection to R-1 standards or better
- 100% irrigation reuse disposal to customer landscaping and greenbelt fire break
- Greenbelt planted with native Hawaiian tree and groundcover plant species
- 100% solar PV power with grid backup
- Storage pond / wetland for treated effluent storage before irrigation reuse
- Sludge-to-biochar pyrolysis for biosolids reuse
- Algal turf scrubber growing freshwater stream macroalgae limu polishes nutrients
- Grinder pumps & small diameter, pressurized conveyance
- Meet or exceed R-1 effluent water quality standards

Modular Package Plant Treatment Options: Membrane Bioreactor (MBR)
Moving Bed Bioreactor (MBBR)
Aerated Granular Sludge (AGS)









Sludge to biochar pyrolysis

Secondary treatment biosolids reuse with pyrolysis conversion of sludge to biochar

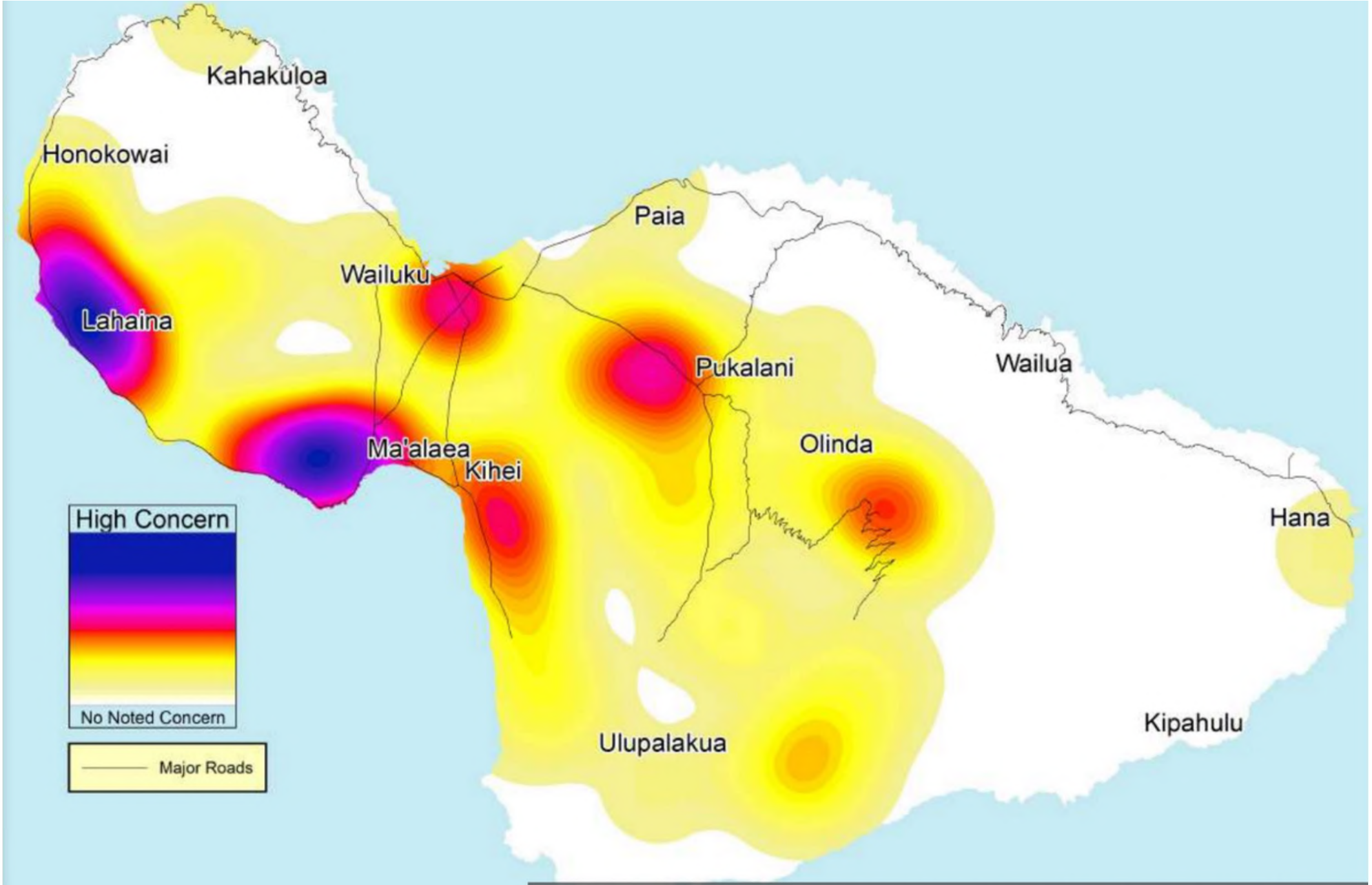
Pyrolysis: chemical process of decomposition by heat in the absence of oxygen to convert biosolids generated by the biological treatment process into biochar, transforming a waste product into something beneficial

Biochar: a charcoal-like substance produced using a pyrolysis process

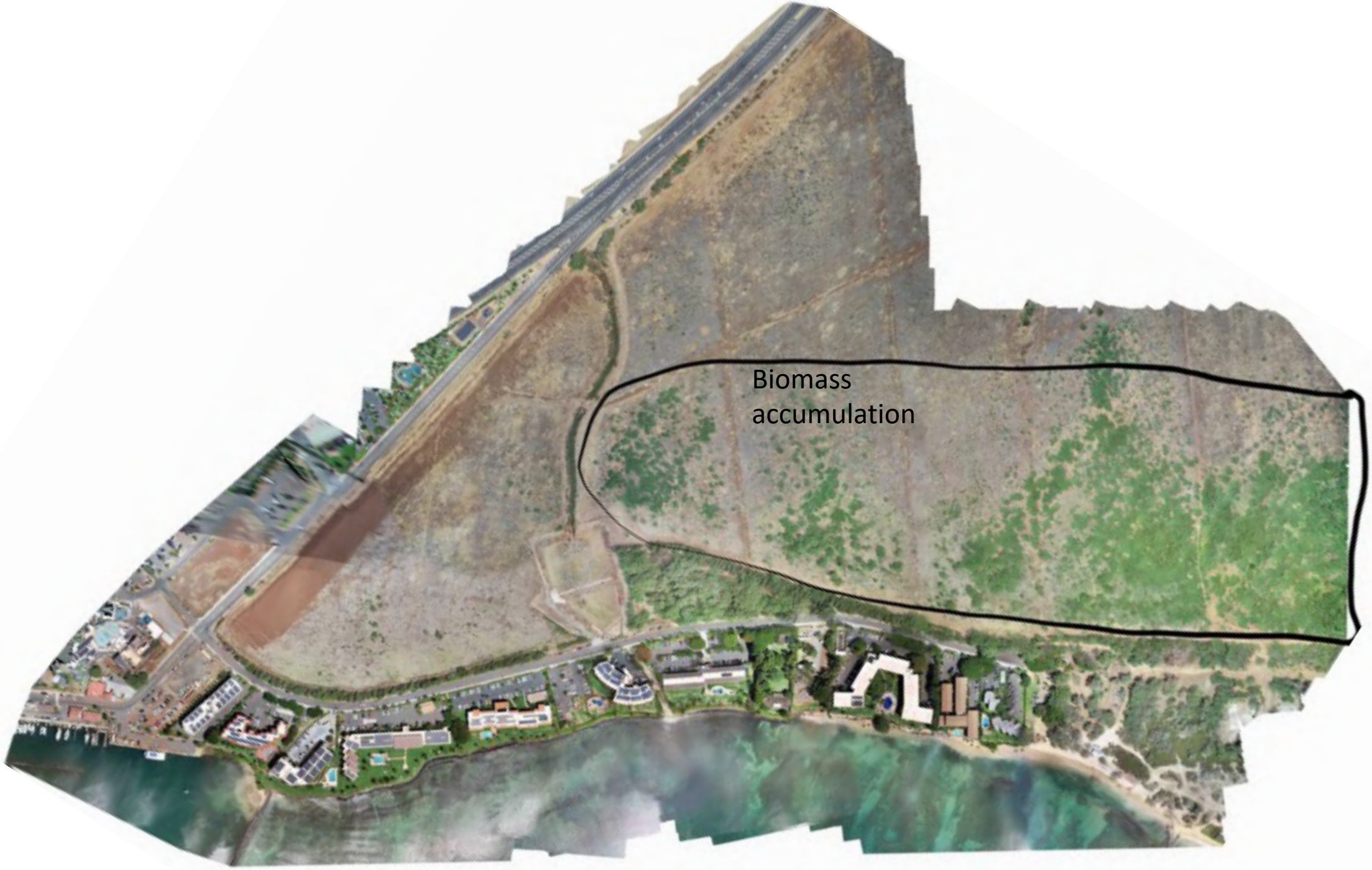
- pyrolysis sterilizes sludge and reduces contamination in biosolids
- biochar safely stores carbon to reduce greenhouse gasses
- biochar will be reused to fortify and stabilize soils
- biochar may also be used offsite to improve other soil elsewhere on the island
- biochar removes pharmaceuticals from reuse water
- Rich Earth Institute applied to National Science Foundation for pilot grant

Ma'alaea Regional Wastewater Reclamation System benefits

1. MRWRS is a community led solution developed over 5 years of work by MVA
2. Provides a major improvement to the health of all marine life in Ma’alaea Bay
3. Creates substantial fire break protection with native plants & sprinklers
4. Basis of Design document is community consensus with 25 reviewers
5. Can be delivered by the end of 2025
6. Makes more engineering and economic sense than Central Maui conveyance
7. Presents a far faster solution than Central Maui conveyance
8. Will provide a model for community-scale wastewater solutions
9. Regional design provides a solution for Hawaii's 88,000 cesspool problem
10. Eliminates substandard wastewater plants and majority of Maui injection wells
11. Demonstrates that our community can unite & solve problems
12. Some treatment technology solutions are likely to provide "surplus revenue"



Maui Collaborative Action Planning Workshop 2018 Areas of Concern.


Biomass
accumulation

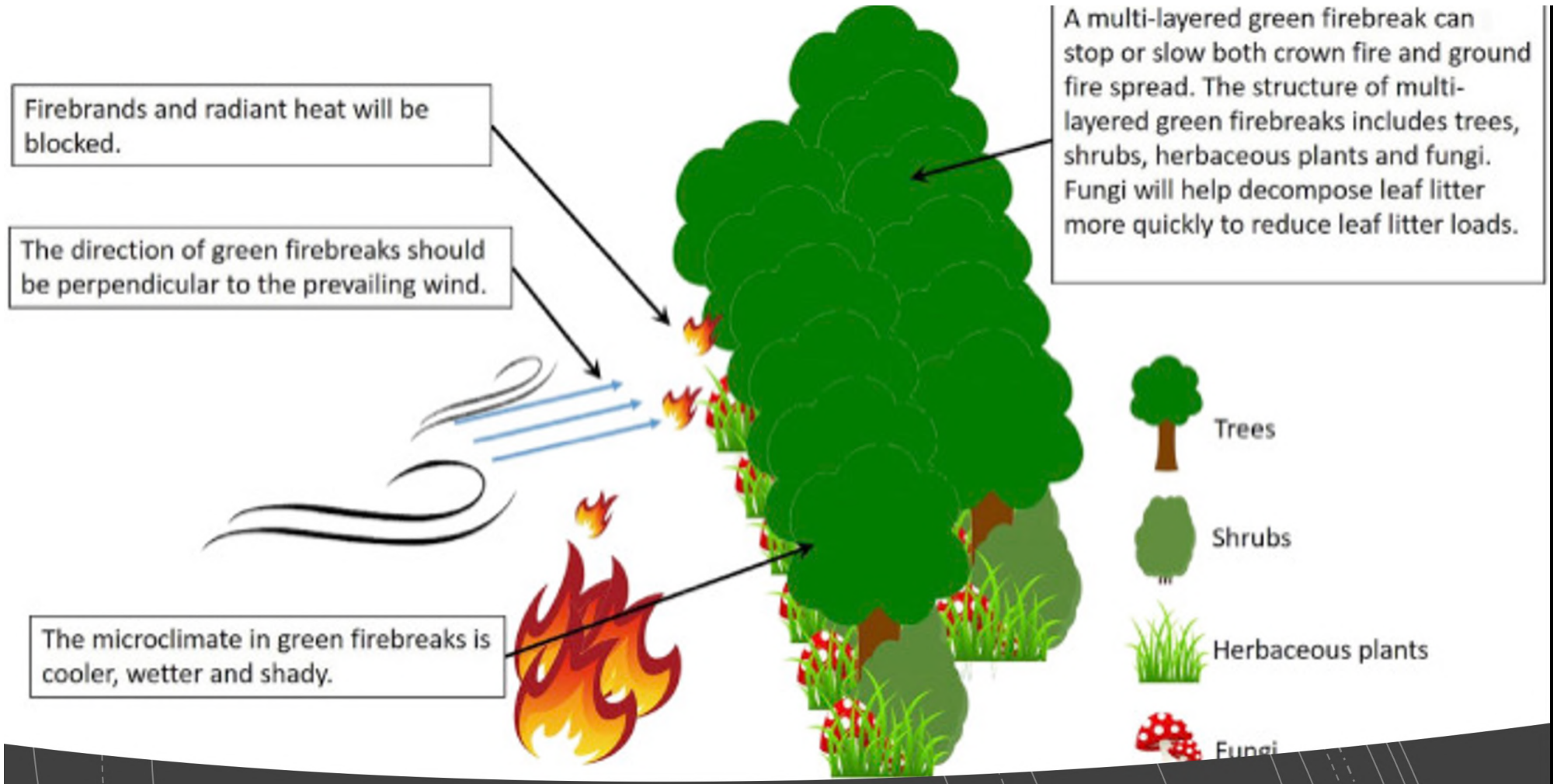

Greenbelt Site 7/25/2022

Irrigation Reuse Disposal Greenbelt Fire Breaks

- Eliminates discharge into groundwater & ocean
- Optimized to be an effective wind & fire break for Ma'alaea Village
- Planted with native Hawaiian tree and groundcover species to restore habitat
- Planted with native lei flowers to support pollinators
- Planted with vetiver to reduce sediment transport potential in the watershed
- Provides model for 100% reuse installations at Maui municipal facilities
- Provides model for irrigation reuse fire break in Kihei-Wailea
- Provides ideal application for all that reuse water discharging into injection

DOFAW Greenbreak

Photos: Ryan Peralta



Green strips or Green firebreaks – good idea – but do they work?....

- Reduced maintenance costs
- Enhance biodiversity
- Effective…*a fire that occurred in Fujian, China in 2000, was stopped by green firebreaks, but was not halted by a 12 m wide road*
- *Improve microclimate*
- *Reduced invasion*

Ma’alaea Regional Wastewater Reclamation System
Irrigation Reuse Fire Break Site Plan

PROJECT SITE PLAN
SCALE: 1" = 200'

ECOSOLUTIONS LLC
www.ecosoldesigns.com
ADDRESS: 2620 KANAKANUI ROAD
KIHEI, MAUI, HI 96753
PHONE: 808.268.8444

stamp:

consultant:

client contact:

project address:
MA'ALAEA VILLAGE
MA'ALAEA ROAD
WAILUKU, HI 96793

project title:
MA'ALAEA REGIONAL WASTEWATER RECLAMATION SYSTEM (MRWRS)

content:
OPTION A
SITE PLAN

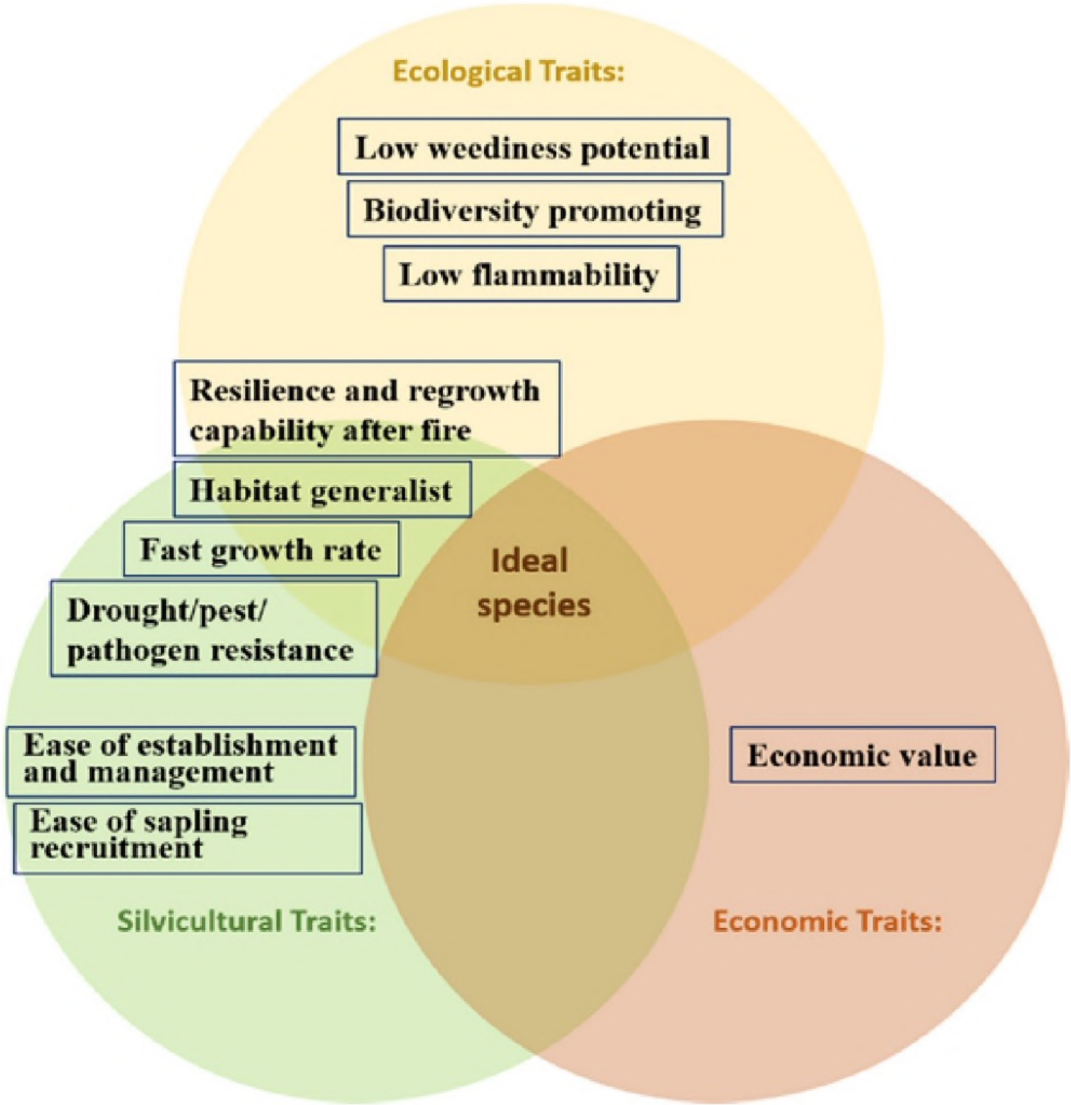
MVA PREFERRED CONFIGURATION OPTIMIZED FOR FIRE BREAK

⚠ revision:	date:

drawn by: DHW
checked by: MOL
date: SEPTEMBER 3, 2023
scale: AS SHOWN
sheet no.: 1 OF 1
project no.: 22-014
drawing no.: ECO 1

How do you select species?

Cui et al. 2019. Journal of Environmental Management. 233: 329-336



Windbreak Tree and Shrub Species*
MRWRS elevation 40 ft

maui Native Nursery

Loulu - Pritchardia spp.
-Height 18-20 ft
-Footprint 20 ft

Neneleau - Rhus sandwicensis
-Height 25 ft
-Footprint 20 ft

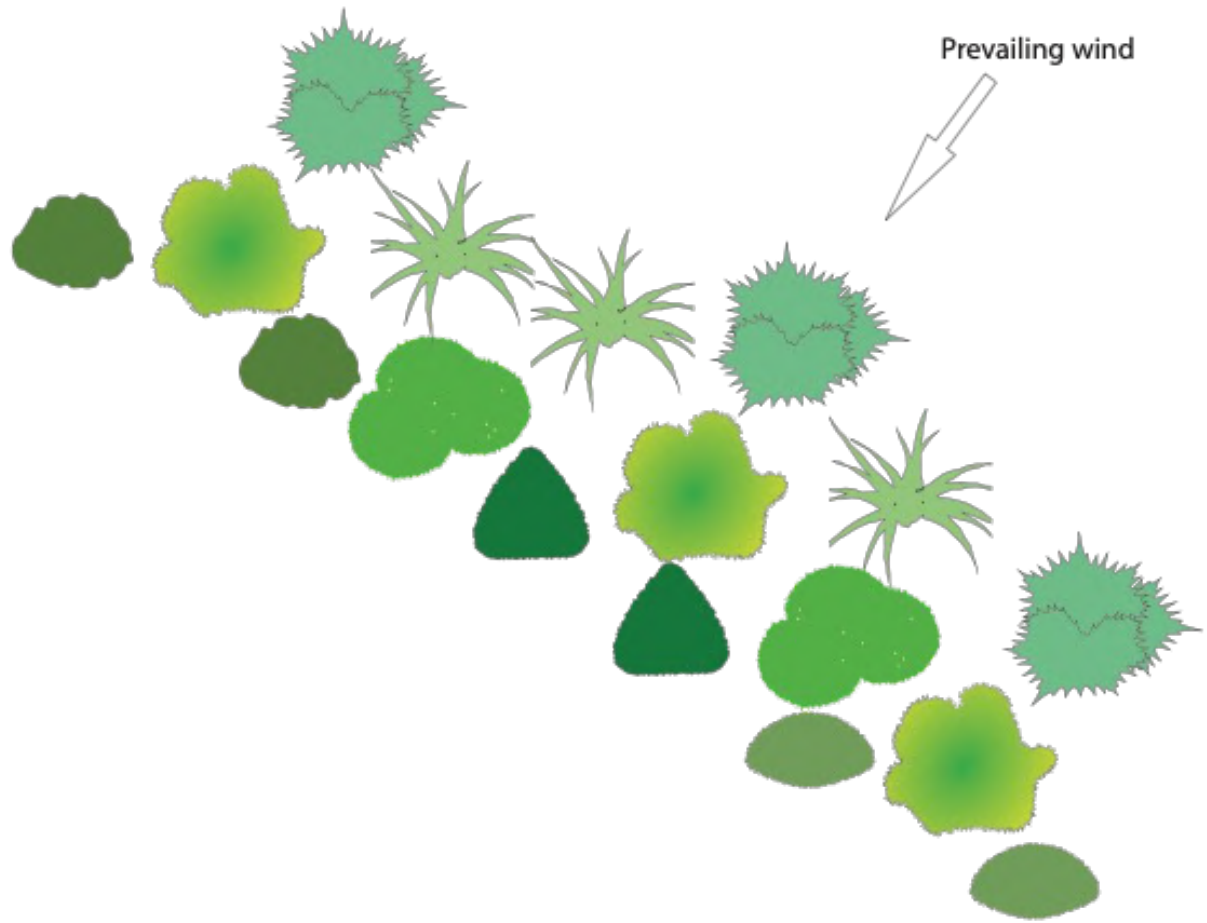
Koai'a - Acacia koaia
-Height 25 ft
-Footprint 20 ft

Hala - Pandanus tectorius
-Height 18 ft
-Footprint 20 ft

Milo - Thespesia populnea
-Height 15-30 ft
-Footprint 15 ft

Naio - Myoporum sandwicense
-Height 15-30 ft
-Footprint 15 ft

Alahe'e - Psydrax odorata
-Height 15-20 ft
-Footprint 15 ft



20′ 15′ *Mature plant footprint in feet

Scale 20′ 100′

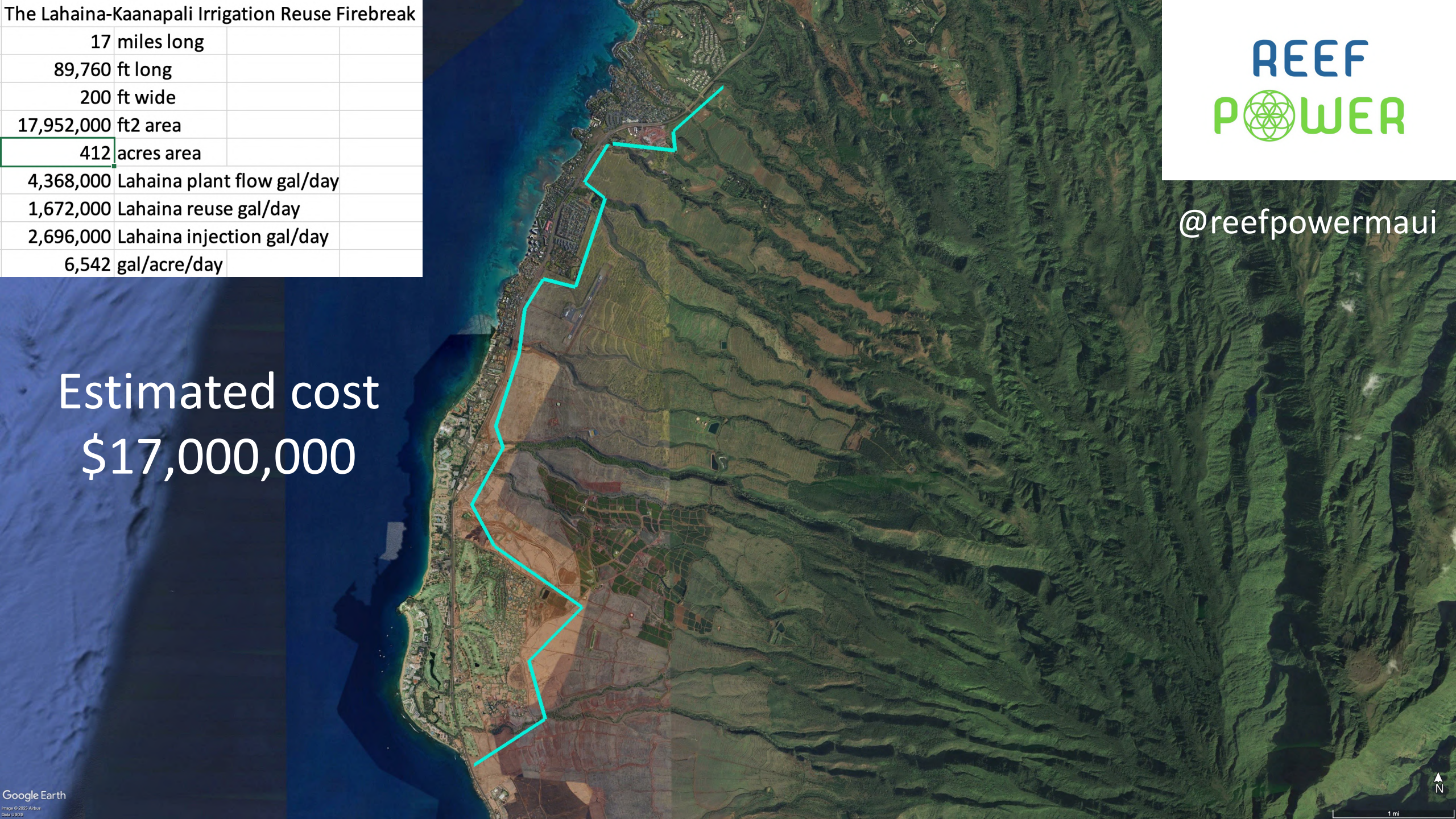
The Kihei Irrigation Reuse Firebreak		
13	miles long	
70,752	ft long	
200	ft wide	
14,150,400	ft2 area	
325	acres area	
3,668,000	Kihei plant flow gal/day	
1,942,000	Kihei reuse gal/day	
1,726,000	Kihei injection gal/day	
5,313	gal/acre/day	

REEF POWER

@reefpowermaui

Estimated cost $13,000,000

The Lahaina-Kaanapali Irrigation Reuse Firebreak			
17	miles long		
89,760	ft long		
200	ft wide		
17,952,000	ft2 area		
412	acres area		
4,368,000	Lahaina plant flow gal/day		
1,672,000	Lahaina reuse gal/day		
2,696,000	Lahaina injection gal/day		
6,542	gal/acre/day		



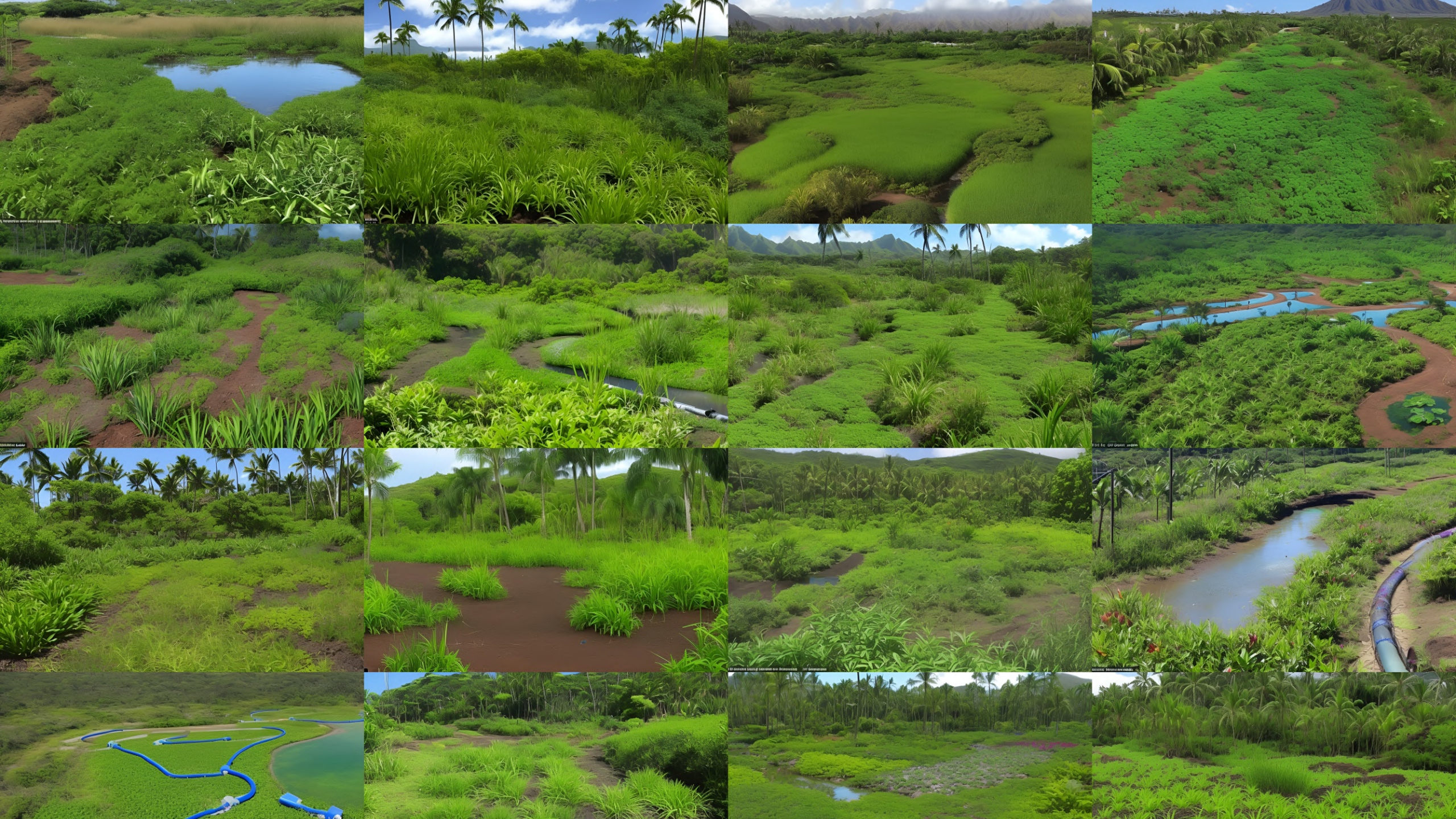
The Lahaina-Kaanapali Irrigation Reuse Firebreak			
17	miles long		
89,760	ft long		
200	ft wide		
17,952,000	ft2 area		
412	acres area		
4,368,000	Lahaina plant flow gal/day		
1,672,000	Lahaina reuse gal/day		
2,696,000	Lahaina injection gal/day		
6,542	gal/acre/day		

The Kahului Airport Irrigation Reuse Fire Break			
490	acres area		
5,458,000	Kihei plant flow gal/day		
121,000	Kihei reuse gal/day		
5,337,000	Kihei injection gal/day		
10,892	gal/acre/day		

REEF POWER

@reefpowermaui

Estimated cost $19,600,000



MA'ALAEA WASTEWATER ASSOCIATION

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ADEPT Committee

From: Travis Liggett <info@maalaeawastewater.org>
Sent: Thursday, October 19, 2023 5:11 PM
To: ADEPT Committee
Cc: Gabe Johnson; Axel I. Beers; Kate Griffiths
Subject: Ma'alaea Wastewater Association ADEPT 10/19 slides as presented
Attachments: Ma'alaea Wastewater Association ADEPT October-19-2023 AS PRESENTED.pdf

Aloha Chair Johnson and ADEPT Staff,

I'm writing to share the attached .pdf that includes the slides I presented today for Granicus. I made a couple of last minute changes, and I was asked to pull up slides that I had not planned to present, so I am sending a version that includes everything that was shown during the hearing today.

Mahalo,

Travis Liggett
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Ma'alaea Wastewater Association
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