GAC Reactivation Facility

October 16, 2025

Agenda

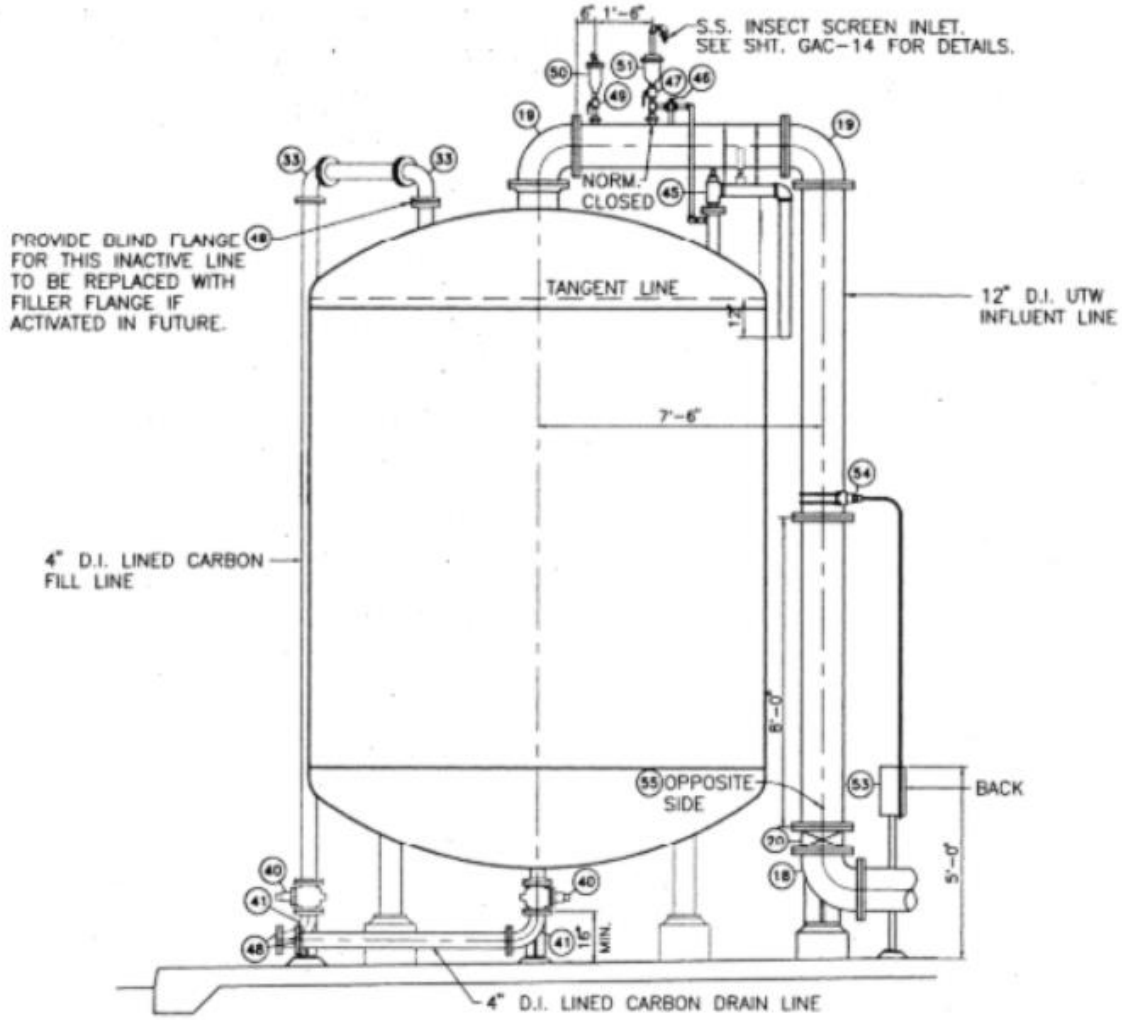
- Background
- Disposal options
- Business case analysis
- PFAS Removal
- Air Emissions
- Potential Locations
- Facility Layout
- Funding Avenues
- Schedule

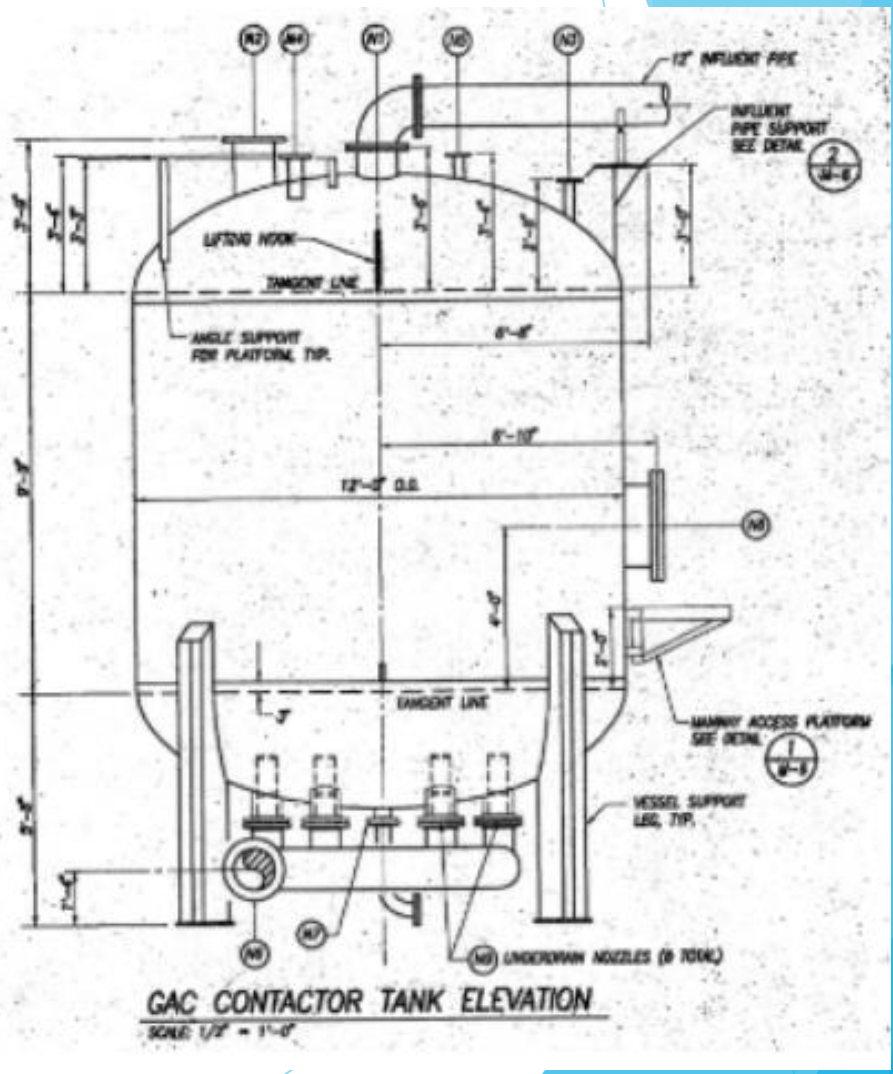
GAC Facilities on Island

FACILITY	NO OF CONTACTORS
Haleʻiwa Wells	4
Hōʻaeʻae Wells	14
Kunia Wells I	14
Kunia Wells II	12
Mililani Wells I	16
Mililani Wells III	4
Waialua Wells	6
Waipahu Wells I	14
Waipahu Wells II	6
Waipahu Wells III	10
Waipahu Wells IV	8
Waipio Hts Wells III	4
TOTAL:	112

1MM pounds/year

GAC Vessels


S.S. INSECT SCREEN INLET.
SEE SHT. GAC-14 FOR DETAILS.
NORM. CLOSED
PROVIDE BLIND FLANGE FOR THIS INACTIVE LINE TO BE REPLACED WITH FILLER FLANGE IF ACTIVATED IN FUTURE.
TANGENT LINE
12" D.I. UTW INFLUENT LINE
7'-6"
4" D.I. LINED CARBON FILL LINE
8'-0"
OPPOSITE SIDE
BACK
5'-0"
4" D.I. LINED CARBON DRAIN LINE


12" INFLUENT PIPE
INFLUENT PIPE SUPPORT SEE DETAIL
LIFTING NOOK
TANGENT LINE
ANGLE SUPPORT FOR PLATFORM, TYP.
6'-6"
8'-10"
12'-0" O.D.
TANGENT LINE
MANWAY ACCESS PLATFORM SEE DETAIL
VESSEL SUPPORT LEG, TYP.
UNDERDRAIN NOZZLES (8 TOTAL)
GAC CONTACTOR TANK ELEVATION
SCALE: 1/2" = 1'-0"

Background

- B+K brought on in 2021 to perform condition assessments of all GAC systems
- 1st Contract:
  - Produced field reports, work orders, and price lists
  - New disposal option for spent GAC needed due to AES coal burning facility closure in 2022
    - Several options researched, due to timing and cost, disposal at Waimānalo Gulch Sanitary Landfill selected
    - WGSL considered a short-term disposal option
  - Research GAC sourcing, vendors, supply stability, and pricing
- Current Contract:
  - Preliminary Engineering Report for siting GAC reactivation facility
  - Site assessments of highly ranked sites
  - Prepare 2-stage RFP for reactivation facility DBOM

Disposal Options

Option	Determination	
On-island landfilling	Infeasible	• WGSL closing in 2028 • H-POWER won't accept • PVT not permitted to accept • Requires 100% importing virgin GAC
Off-island landfilling	Infeasible	• No neighbor island facility will accept material • Staging area required • Stringent containerizing requirements for shipping • Requires 100% importing virgin GAC
Off-island reactivation	Infeasible	• Staging area required • Stringent containerizing requirements for shipping • Requires 100% importing GAC
On-island reactivation	Feasible	• Requires facility to be built • No on-island expertise to operate • Requires importing make-up GAC

Note: Any violation of shipping requirements may result in loss or denial of all future spent GAC shipments.

Business Case Analysis (May 2024)

- $13.4-$20.1 million design and construction cost (2024 dollars)
- Life-Cycle Costs over 20 years @ 3% inflation rate

tons	Virgin GAC per Year	Reactivated GAC per Year
250 tons	$2,065,000	$4,243,000
500 tons	$4,130,000	$4,650,500
750 tons	$6,195,000	$5,058,000
1000 tons	$8,260,000	$5,465,500

PFAS Removal

- EBCT: ranges from 10-20 mins
- GAC: bituminous coal
  - Greater removal efficiency than coconut shell-based carbon
- Next step
  - Estimate carbon needed to remove PFAS
  - Confirm PFAS concentrations in BWS system

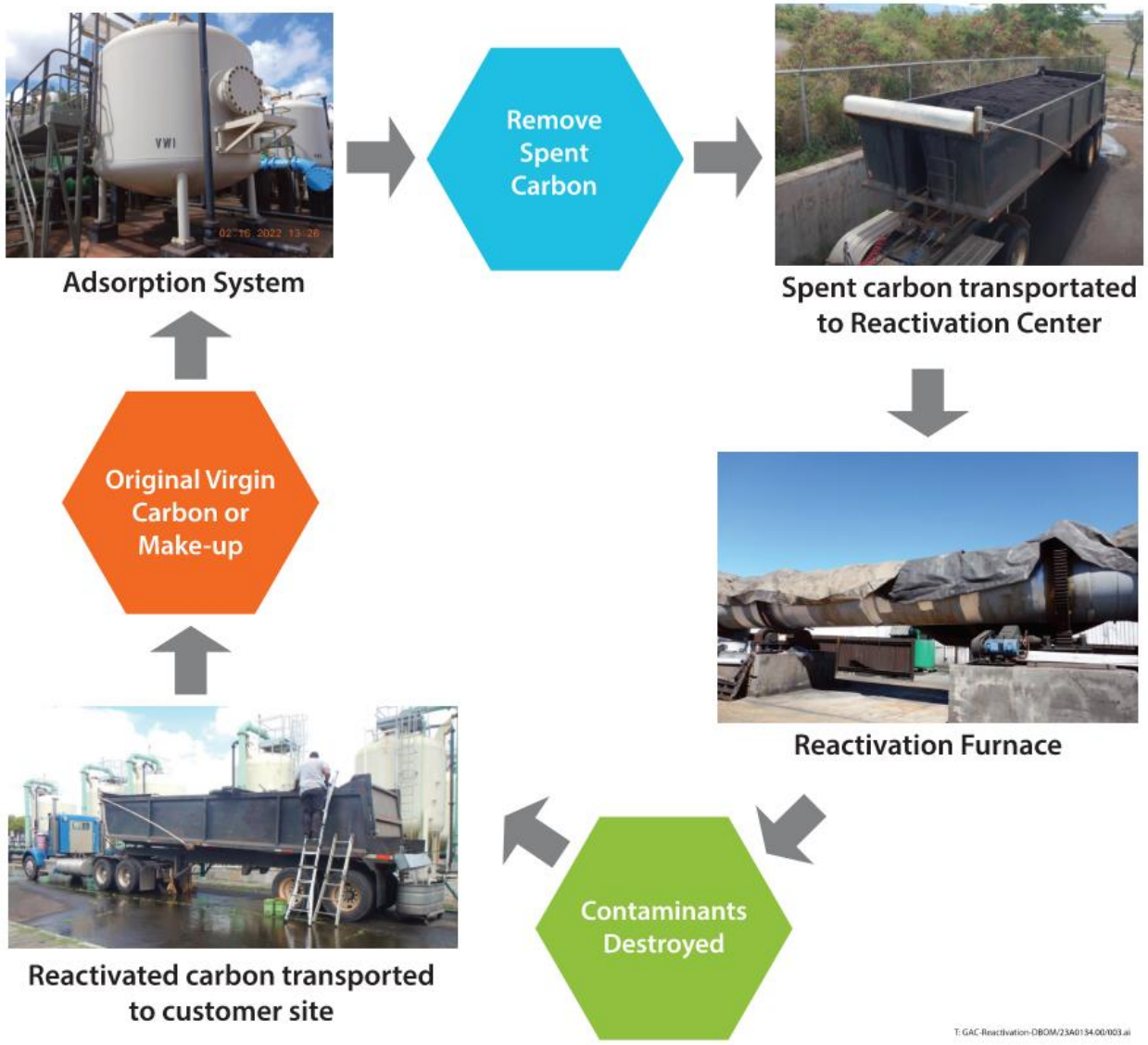
Air Permitting

- Non-covered source permit
- 6-12 months for permit
- Best available control technology
- Dispersion modeling study required
  - Uses publicly available air quality data
  - AERMOD EPA modeling program
- No expected adverse impact on aircraft due to stack heat emissions
- Expected pollutant emissions anticipated to be significantly lower than ambient air quality standards

GAC Reactivation Process

- Collection: Spent GAC is collected after all pore spaces are used up
- Transportation: Sent to the reactivation facility
- Thermal Reactivation: Heated at 800°C to 1000°C to remove contaminants
- Contaminants volatilize
- Adsorbed organics thermally destroyed
- Adsorptive capacity recovery up to 98%
- Cooling and Screening: Ensures quality of reactivated GAC
- Virgin carbon must be added due to losses
- Reuse: Reactivated GAC is returned to treatment systems

GAC Reactivation Process



Details of Potential Locations

Potential Locations

Former AES Site Added Later

Potential Locations

POTENTIAL ON-ISLAND REACTIVATION SITES

Site	Zoning	Ownership	Flood Zone	Sizing	Proximity to Interstate H-1/Honolulu Harbor	Utilities
Former Desalination Demonstration Facility	I-2	BWS	D	3.5 ac	0.6 mi / 21 mi	Water Sewer Stormwater Electricity
ʻEwa Shaft	AG-1	BWS	D	13 ac	1 mi / 16 mi	Electricity Water
Honolulu Harbor*	I-3	State of Hawaiʻi DOT Harbors Division	AE X	5.3 ac	1 mi / 0 mi	None
Hawaiʻi Meats	I-2	State of Hawaiʻi DOA	AE D VE	110 ac	2.5 mi / 23 mi	Electricity Stormwater Water
Sand Island	P-2	State of Hawaiʻi DLNR Land Division	AE X	16 ac	3 mi / 0 mi	Water Sewer Electricity
Par Hawaiʻi	I-2	ILPT KK 399	D	51 ac	4.5 mi / 23 mi	Water Stormwater Electricity

*This parcel is no longer available due to the new Kapālama Container Terminal construction.

Potential Locations

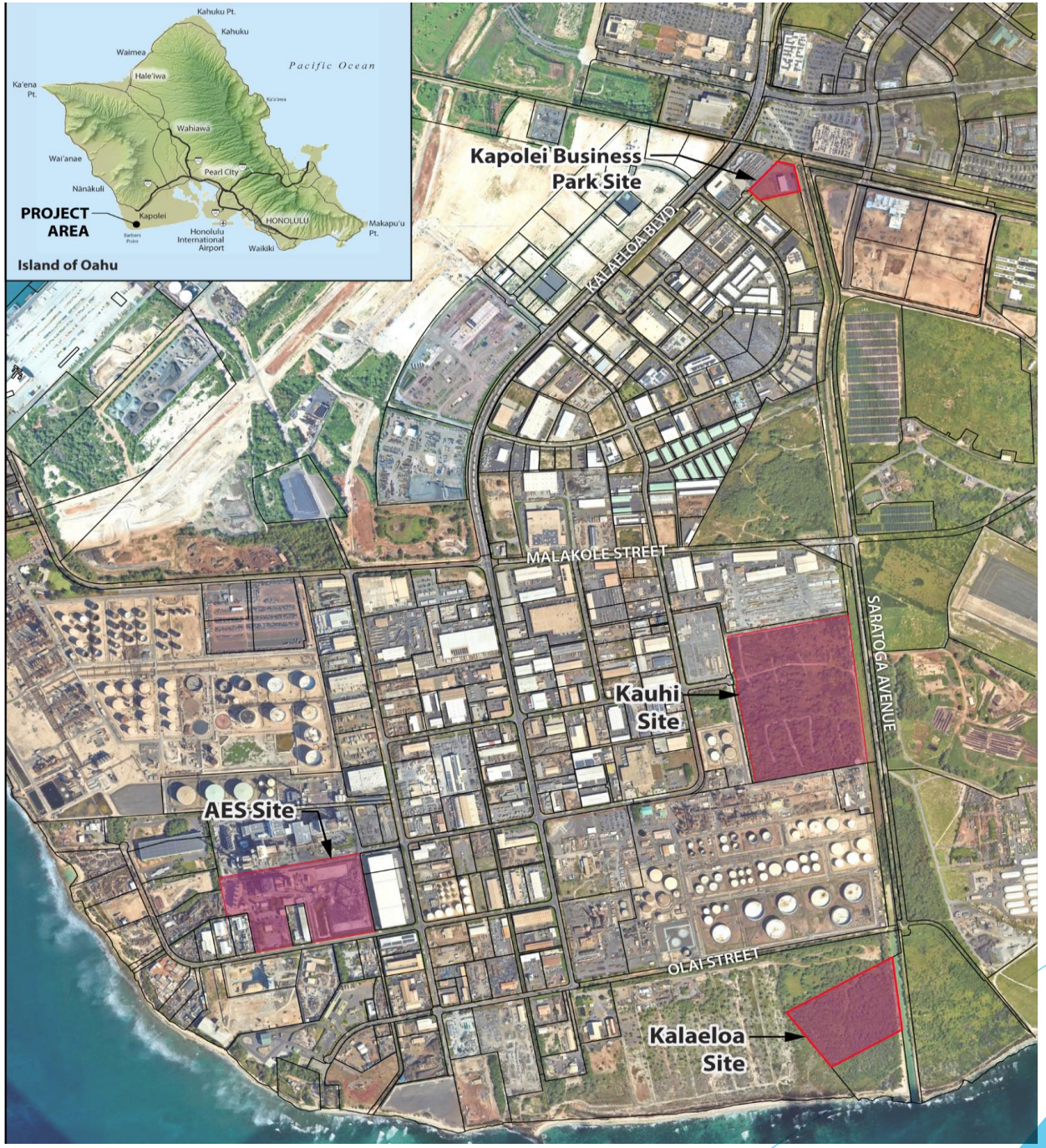
- Zoning:
  - 1—Preservation District
  - 3—Agricultural District
  - 5—Industrial District
- Ownership:
  - 1—Lessee
  - 3—Owned by the State of Hawai‘i
  - 5—Owned by BWS
- Sizing:
  - 1—Less than 10 acres
  - 3—Between 10 to 50 acres
  - 5—Greater than 50 acres
- Proximity to Interstate H-1:
  - 1—Greater than 3 miles
  - 3—1.5 to 3 miles
  - 5—0 to 1.5 miles
- Proximity to Honolulu Harbor:
  - 1—Greater than 20 miles
  - 3—10 to 20 miles
  - 5— 0 to 10 miles
- Utilities:
  - 1—No utilities within 500-foot radius, or less than three utilities either near or on-site
  - 3—Three utilities either near or on-site
  - 5—Four or more utilities either near or on-site

Potential Locations

POTENTIAL ON-ISLAND REACTIVATION SITES SCORING

Site	Zoning	Ownership	Sizing	Proximity to Interstate H-1/Honolulu Harbor	Utilities	Total Score
Former Desalination Demonstration Facility	**5**	**5**	**1**	**5 / 1**	**5**	**22**
ʻEwa Shaft	3	5	3	5 / 3	1	20
Honolulu Harbor	5	3	1	5 / 5	1	20
Hawai'i Meats	5	1	5	3 / 1	3	18
Sand Island	1	3	3	3 / 5	3	18
Par Hawai'i	5	1	5	1 / 1	3	16

Potential Locations



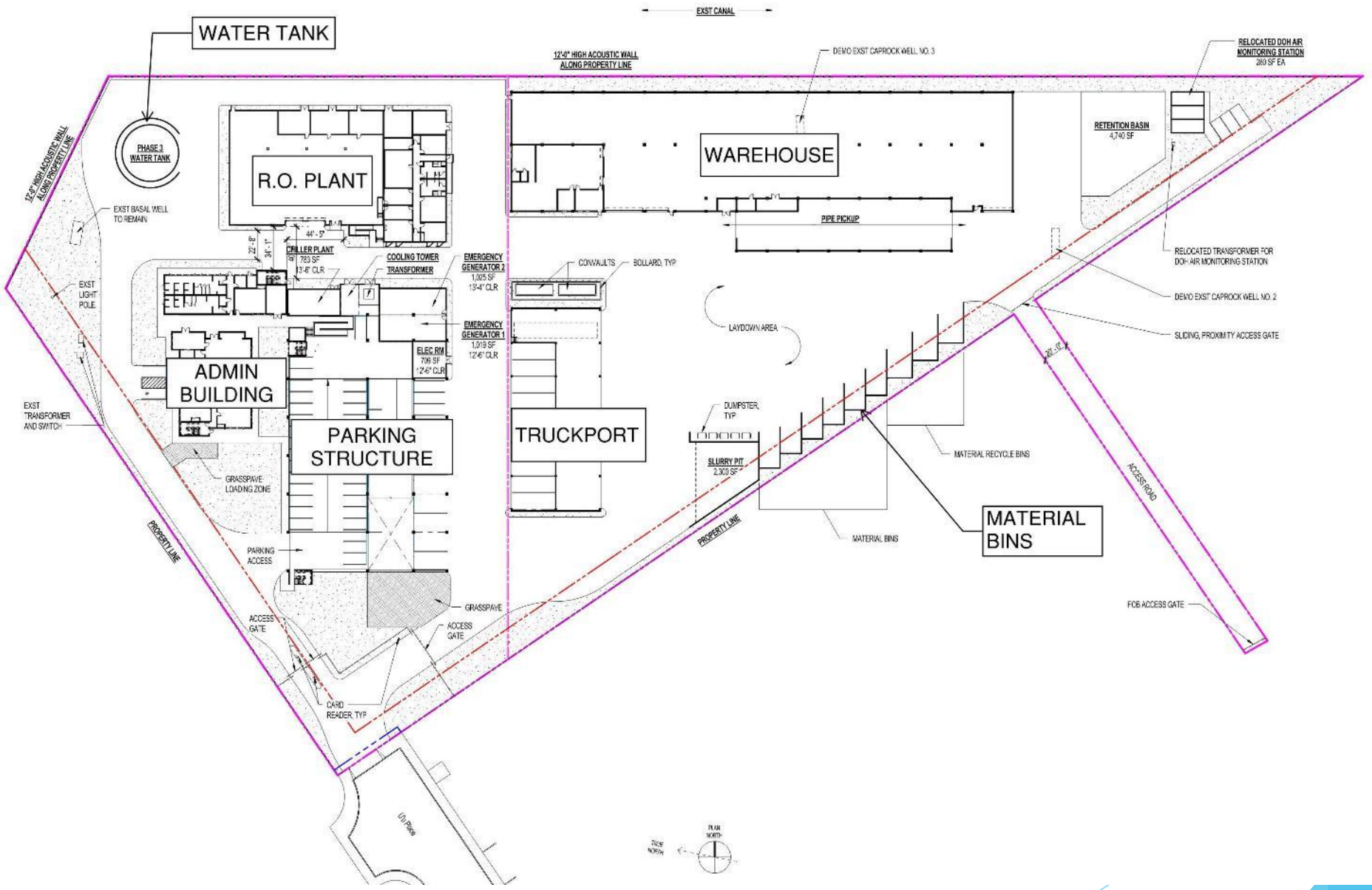
AES Site Property

- Owner: Hawai‘i MMGD 2 LLC
  - Lessee: AES Hawai‘i Inc
- 9-1-026: 028
- 28.51 acres
- $31.7 million (City property tax assessment, 2025)
- Neighbors Hawai‘i AirGas, and City and County of Honolulu’s H-POWER
- Zoned I-2, Intensive Industrial

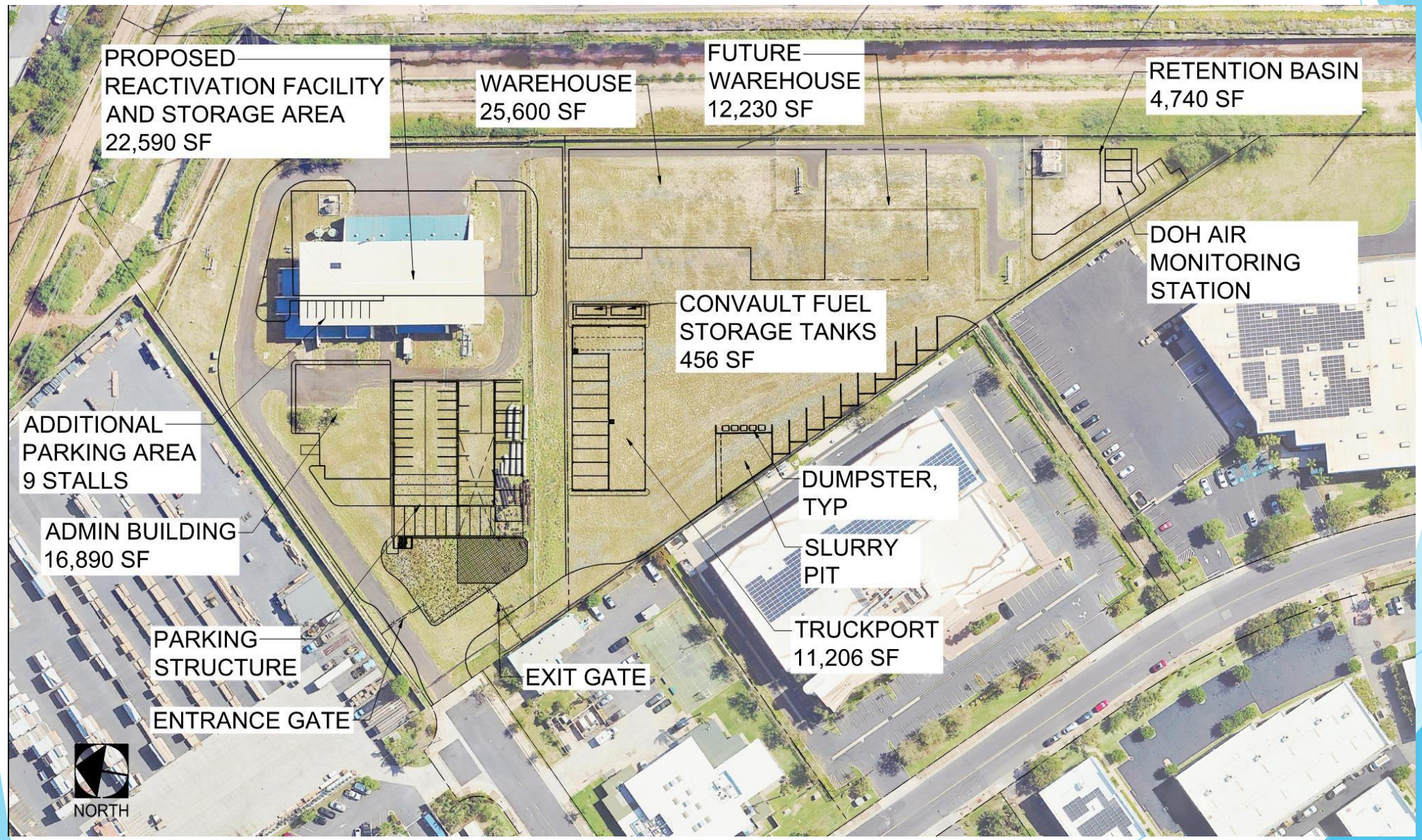
AES Site Evaluation

- Pros
  - Large available area for site facility
  - Situated in industrial area, no residential nearby
  - Available utilities in area
  - Zone I-2, City CUP Permit
- Cons
  - Time to negotiate and acquire property
  - Due Diligence needed to further assess and evaluate the property

Kapolei Baseyard Plan



Kapolei Revised Baseyard Plan

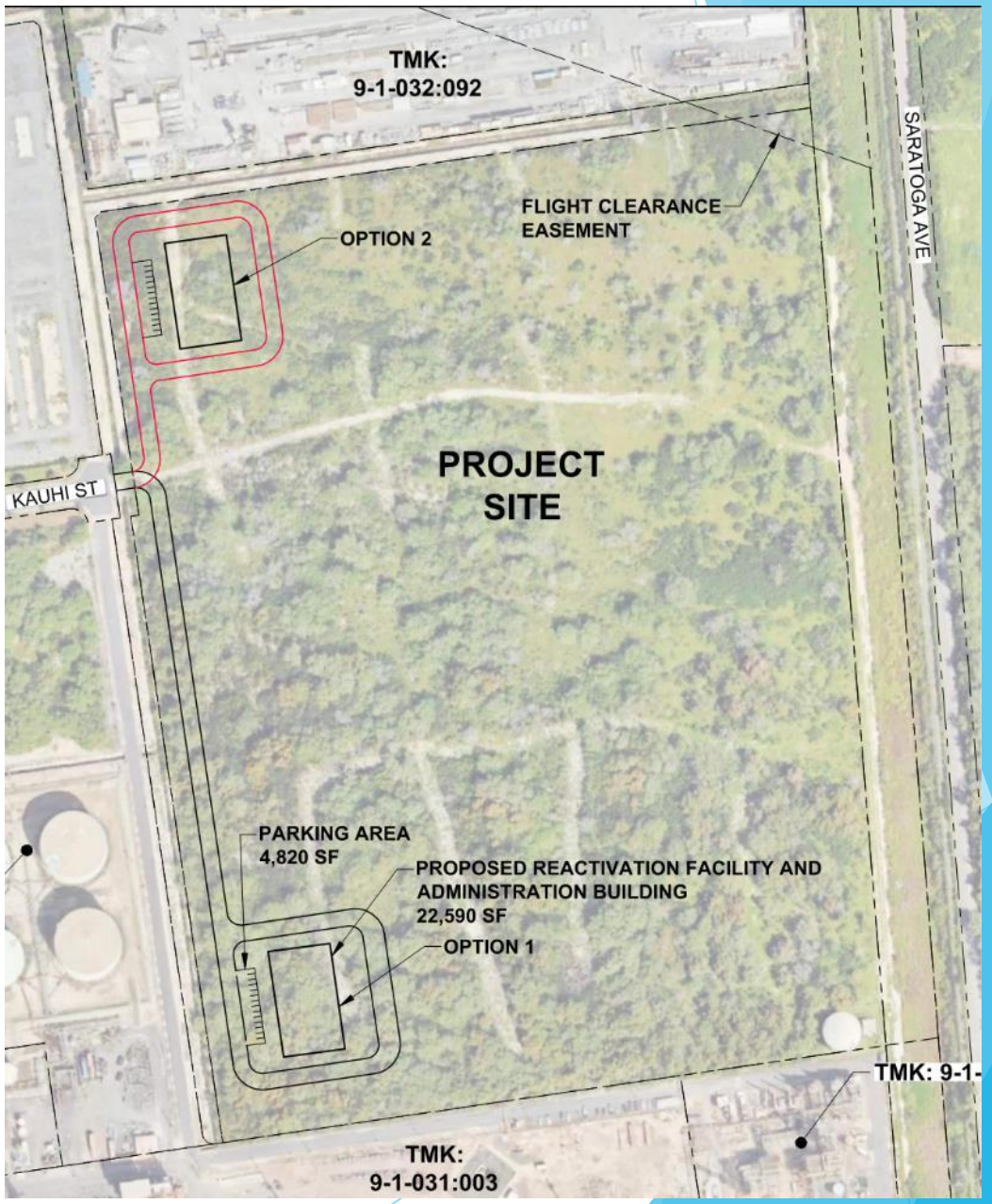


Kapolei Site

- Pros
  - BWS-owned property
  - Baseyard and Reactivation Facility can be co-located
  - Utilities available on-site
  - Near freeway access
  - No avigation easement
  - Zone I-2, City CUP Permit
- Cons
  - Amend deed and agreement
  - Near residential and business areas
  - Limited space for expansion

Kauhi Street Property

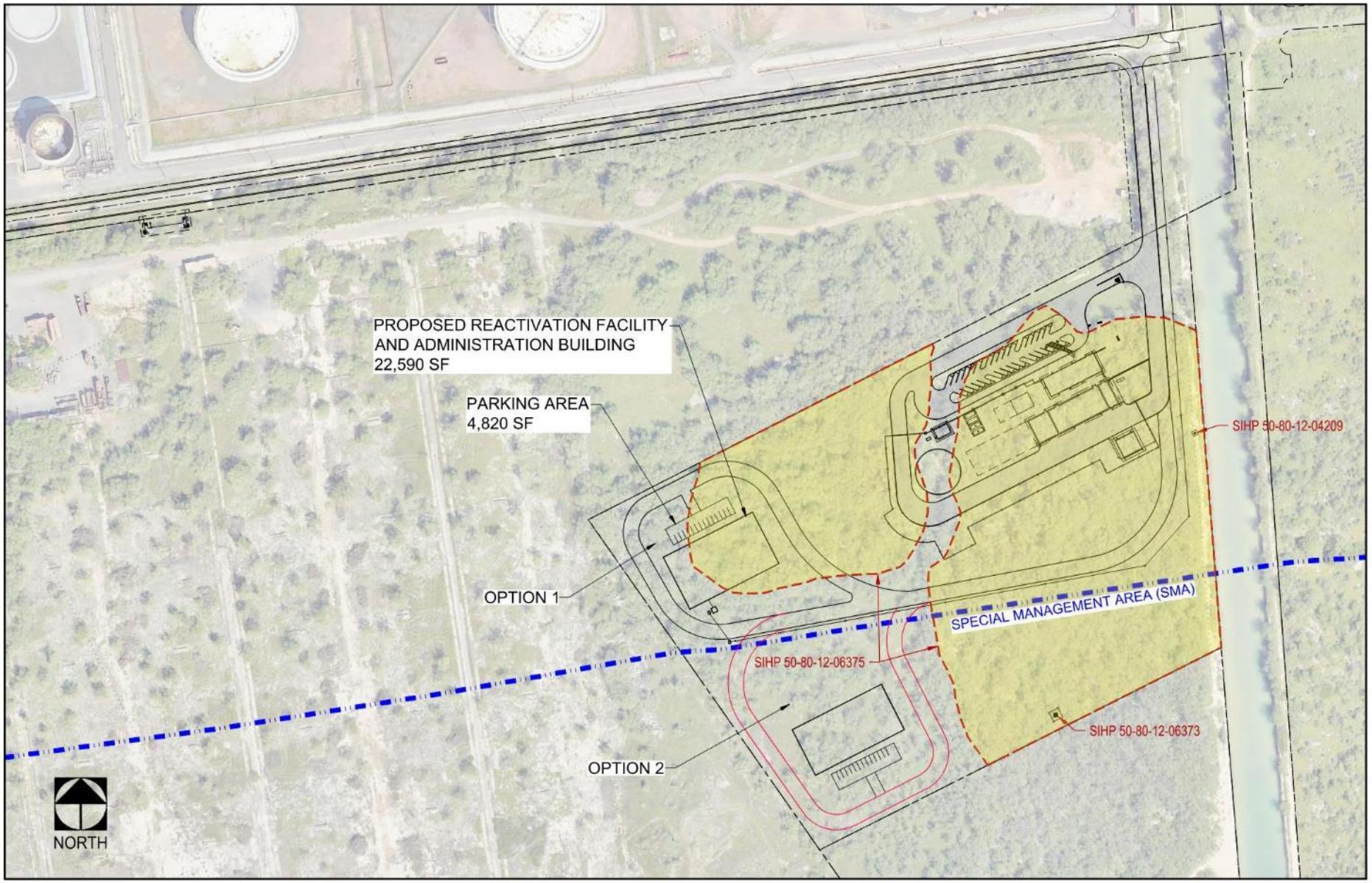
- Located between Kapolei and Kalaeloa sites
- Property borders Kauhi Street
- Owner: ILPT KK 399
  - Lessee: PAR Hawai‘i Refining LLC
- 9-1-032: 001
- 51.37 acres
- Property for sale
  - $48 million (City property tax assessment)
- Zoned I-2, Intensive Industrial



Kauhi Street Site Evaluation

- Pros
  - Property for sale by owner
  - Large available area to site facility and expand
  - Situated in industrial area
  - Available utilities in area
  - Zone I-2, City CUP Permit
- Cons
  - BWS would need to acquire property
    - Determine portion of property to acquire
  - Subdivision of property
  - Time to negotiate and acquire property
  - Archaeology and flora/fauna unknown
  - Need to bring in utilities to the facility
  - Near business and residential areas

Kalaeloa Conceptual Site Plan



Hawai‘i Community Development Authority (HCDA) Kalaeloa Community Development District

- Kalaeloa site is within HCDA’s Kalaeloa Community Development District
- Land use jurisdiction falls under HCDA for approval; not City zoning regulations
  - HAR Title 15, Chapter 215
- Site currently designated T-3 General Urban Zone (Eco-Industrial)
- HCDA in process of updating rules and master plan
  - Fall 2025 estimate for rules adoption
  - Proposed to retain T-3 designation
  - 60-foot height limit
- Land use approvals from HCDA
  - Rules Clearance Permit
  - Presentation to HCDA Board

Kalaeloa Site Evaluation

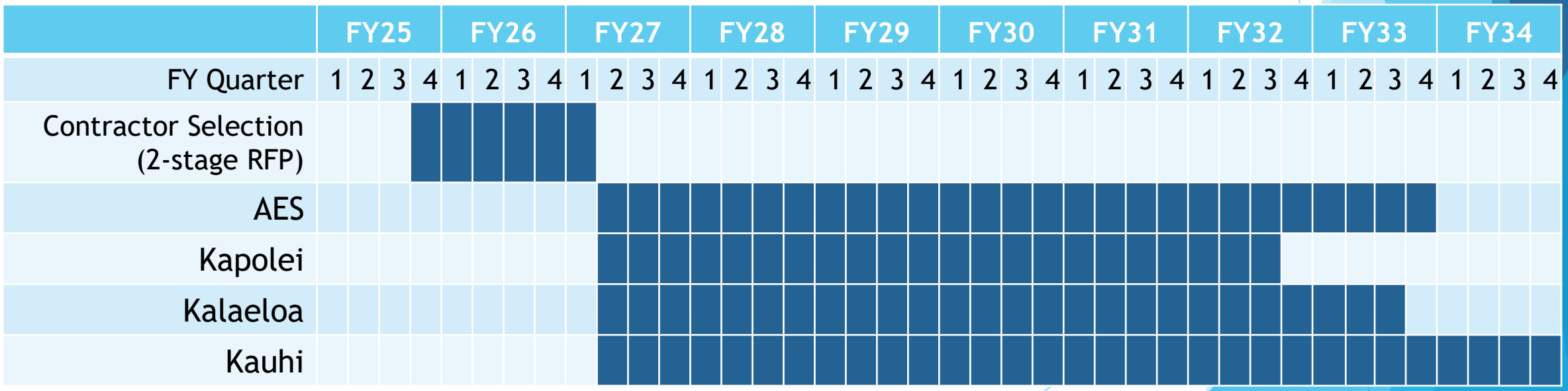
- Pros
  - BWS-owned property; Large open area
  - Desalination Facility and Reactivation Facility can be co-located
  - Located away from residences and businesses
  - Consistent with HCDA Kalaeloa Master Plan update & rules; HCDA meeting
    - Industrial use / 60-foot height
    - Rules Clearance Permit required
  - Outside Kalaeloa Airport Approach Surface Area
  - Potential sharing access and utilities with Desalination Facility
- Cons
  - Archaeological mitigation needed
  - Sharing site with another contractor
  - Need to bring in utilities (water, electrical, telcom) to the facility
  - Protected species area
  - Near source wells for desalination facility

Site Comparison Summary

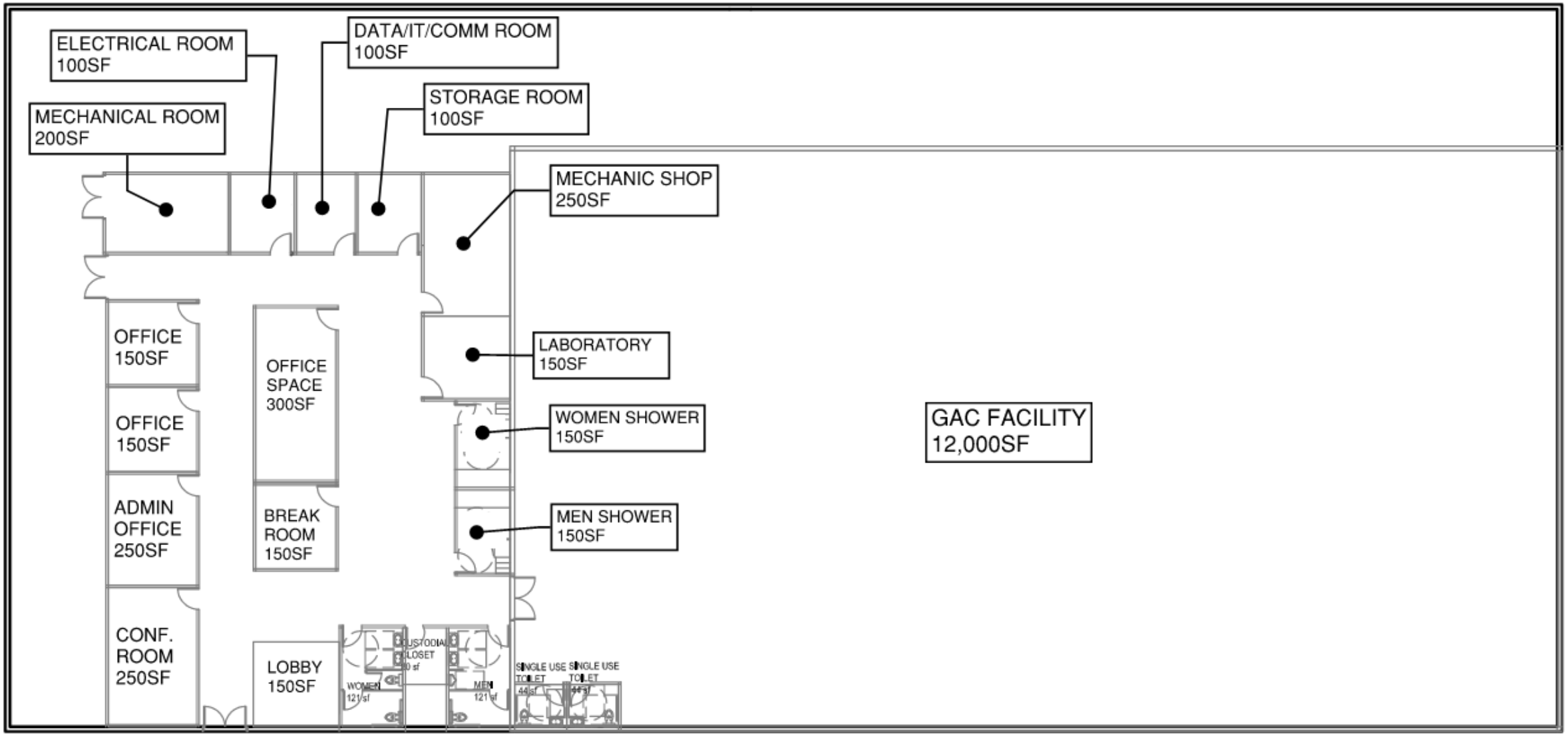
Site	Owner	Parcel Size	Available Utilities	Pros	Cons
AES	Hawaii MMGD 2 LLC	28.51 ac	Sewer Stormwater Water	• Large open area • Utilities available • Located within industrial area	• Time required to acquire land and perform due diligence
Kapolei	BWS & Campbell Estate	3.5 ac	Water Sewer Stormwater Electricity Telcom	• Baseyard and Reactivation Facility can be co-located • Utilities available on-site • Near freeway access • No avigation easement • Zone I-2	• Deed restrictions • Near residential areas • Limited space for expansion
Kalaeloa	BWS	20 ac	none	• Desalination Facility and Reactivation Facility can be co-located • Large, undeveloped area • No deed restriction or trilateral agreement • Zone T-3	• Archaeology • Sharing site with another contractor • Need to bring in utilities to the facility • Height restrictions due to avigation easement • Under HCDA jurisdiction
Kauhi St	ILPT KK 399	51 ac	Water Stormwater Electricity	• Large open area • Some utilities available on-site • Zone I-2	• Archaeology unknown • Flora/fauna unknown • Need to lease or buy land

Site Comparisons-Cost and Time

Site	Opinion of Probable Cost (million $)
AES	$25-$35
Kapolei	$12-$20
Kalaeloa	$15-$23
Kauhi	$36-$43



Typical Administrative Building and Laboratories



Funding Avenues

Option	Process	Estimated Costs	Projected Completion Date	Notes
Public-Private Partnership	Design-Build (DB)	Medium	Short	• BWS would finance capital cost, Contractor would recoup O&M costs through supplying reactivated GAC • Potential for long-term contract
	Service Contract	• Least up-front cost • Potentially least expensive	Medium	• Contractor would recoup costs through supplying reactivated GAC and changeout services • Potential for price fluctuations based on demand unless dictated in contract • Potential for long-term contract
Design-Bid-Build	Design consultant creates drawings & specs Potentially all or most permits and approvals obtained prior to bid	Most Expensive	Long	• Longest time to completion • Potentially limits design options • Allows for BWS to contract O&M or self-operate
Status quo	Service contract to procure virgin or reactivated GAC	Medium	N/A	• Supply chain vulnerabilities • Need for disposal • Largest GHG emissions

Next Steps

- RFP Development
- BWS and Non-BWS Treatment Trains
- On-going property research and studies
- Discussions with DOH

Acknowledgements and Mahalo

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    - Environmental Risk Analysis
    - Kai Hawaii
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Questions?