

# Puako for Reefs

## Sanitary Sewer Route Selection Memorandum

**Project:** Puako Community Sanitary Sewer System

**Prepared for:** Puako for Reefs (PFR)

**Purpose:** Route Evaluation and Preferred Alignment Selection

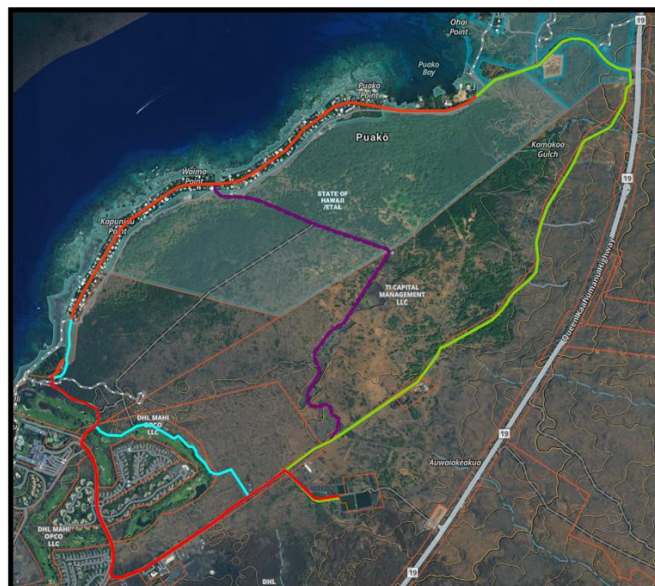
### 1. Background

Puako for Reefs (PFR) initially identified three potential sanitary sewer transmission routes connecting the Puako community collection system to **American Water's Mauna Lani Wastewater Treatment Facility (WWTF)**. During subsequent investigation and due diligence, additional variations of one route were evaluated to address constructability, permitting, environmental, real estate, cost, and schedule considerations.

### 2. Route Alternatives Evaluated

The following routes were evaluated:

- **Route 1 – Purple Line:** Connection originating from the center of the project main.
- **Route 2 – Yellow Line:** Connection originating from the north end of the project main.
- **Route 3 – Blue Line:** Connection originating from the south end of the project main.
- **Route 3B – Blue Line:** Southern connection following the fire access road and tying into the existing Fairmont/Mauna Lani sewer collection system.
- **Route 3C – Red Line:** Southern connection via Paniau Place, exiting to the fire access road, and ultimately connecting to the Mauna Lani sewer collection system.



### 3. Defined Project and Service Area

PFR has formally defined the project service area as follows:

- **Southern Boundary:** Southernmost residential parcel on Paniau Place
- **Northern Boundary:** Last residential parcel on Puako Beach Drive prior to the Puako Boat Ramp

The service area includes:

- **Current Demand:** Existing residences connecting at initial system startup
- **Future Demand:** Vacant lots within the project area anticipated to connect later
- **Future Growth:** Potential future extensions toward the Waialea community

### 4. Evaluation Summary

Based on the defined project area and service assumptions, each route was analyzed for technical feasibility, cost risk, environmental and land use permitting, real estate requirements, and schedule impacts.

#### 4.1 Initial Assumptions

The initial assumption was that the shortest route would represent the lowest-cost and lowest-risk option. Further investigation determined that **none of the existing Mauna Lani collection system assets have sufficient capacity to support Puako without significant upgrades or replacement**, regardless of route.

#### 4.2 Route 3 Findings (All Variants)

Routing new sewer mains through Mauna Lani (Routes 3, 3B, and 3C) would require construction in areas with:

- Dense existing underground utilities
- Extensive landscaping and irrigation systems
- Roadway crossings and traffic control requirements
- Limited staging and access areas

These conditions introduce a **high risk of cost overruns, schedule delays, and construction conflicts**, even if a new transmission main were constructed all the way to the WWTF. As a result, **all Route 3 variants were determined to be high-risk alternatives.**

#### 4.3 Route 2 Findings (Northward Flow)

Reorienting system flow from south-to-north (Route 2) created several material advantages:

- Eliminates the need to oversize the Puako Beach Drive collection main for future growth

- Allows only the **off-site transmission main** to be oversized for future expansion
- Places oversizing in areas with the **simplest construction conditions**
- Significantly reduces environmental, land use, and entitlement risk

## 5. Environmental and Real Estate Impacts

### Environmental Review

- **All routes except Route 2** trigger State environmental review requirements
- Route 2 avoids:
  - Environmental Assessment (EA)
  - Conservation District Use Application (CDUA)
- **Estimated savings:**
  - ~\$315,000 in environmental review costs
  - ~14–18 months in entitlement timeline

### Real Estate and Land Use

- **All routes except Route 2** require a State Land, use permit agreement
- Route 2 requires only:
  - County Right-of-Way (ROW) permit
  - Easement agreement with DiamondHead Land
  - Agreement with American Water
- **Estimated savings:**
  - ~\$160,000 in real estate and legal costs
  - Additional 8–12 months avoided following EA completion

## 6. Schedule Considerations

Route 2 provides a **1–2 year schedule advantage** over the other alternatives, primarily by avoiding State land jurisdiction and associated approval processes.

## 7. Cost and Risk Evaluation

Although Route 2 is estimated to be approximately **6% higher in base construction cost**, the reduction in:

- Entitlement risk
- Environmental review exposure
- Construction complexity
- Schedule uncertainty

results in **significantly lower overall project risk**.

The updated **Puako Route Evaluation Scorecard** reflects these findings.

[Puako Route Evaluation.xlsx](#)

| Scorecard        | Worst - Best   | Time Input | Time Weight | Cost Input | Cost Weight | Variable Input | Variable Weight | Total |
|------------------|----------------|------------|-------------|------------|-------------|----------------|-----------------|-------|
| <i>Weighting</i> | <b>1 - 5</b>   |            | <b>1.5</b>  |            | <b>2</b>    |                | <b>1</b>        |       |
| Route 1          | <i>example</i> | 1          | 1.5         | 2          | 4           | 2              | 2               | 7.5   |
| Route 2          |                | 5          | 7.5         | 1          | 2           | 5              | 5               | 14.5  |
| Route 3          |                | 2          | 3           | 3          | 6           | 3              | 3               | 12    |
| Route 3B         |                | 2          | 3           | 2          | 4           | 2              | 2               | 9     |
| Route 3C         |                | 2          | 3           | 2          | 4           | 2              | 2               | 9     |

## 8. Preferred Route Selection

Based on the technical, environmental, real estate, schedule, and risk evaluation, the **Technical Evaluation Team recommends Route 2 as the preferred sanitary sewer route** for the Puako Community Sewer Project.

If you have any questions, please contact me.

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