



# City Wide Inclusive Sanitation Assessment of Port Vila

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VANUATU



**WATER  
& WASH  
FUTURES** 2023

Achieving SDG6 in a Changing Climate



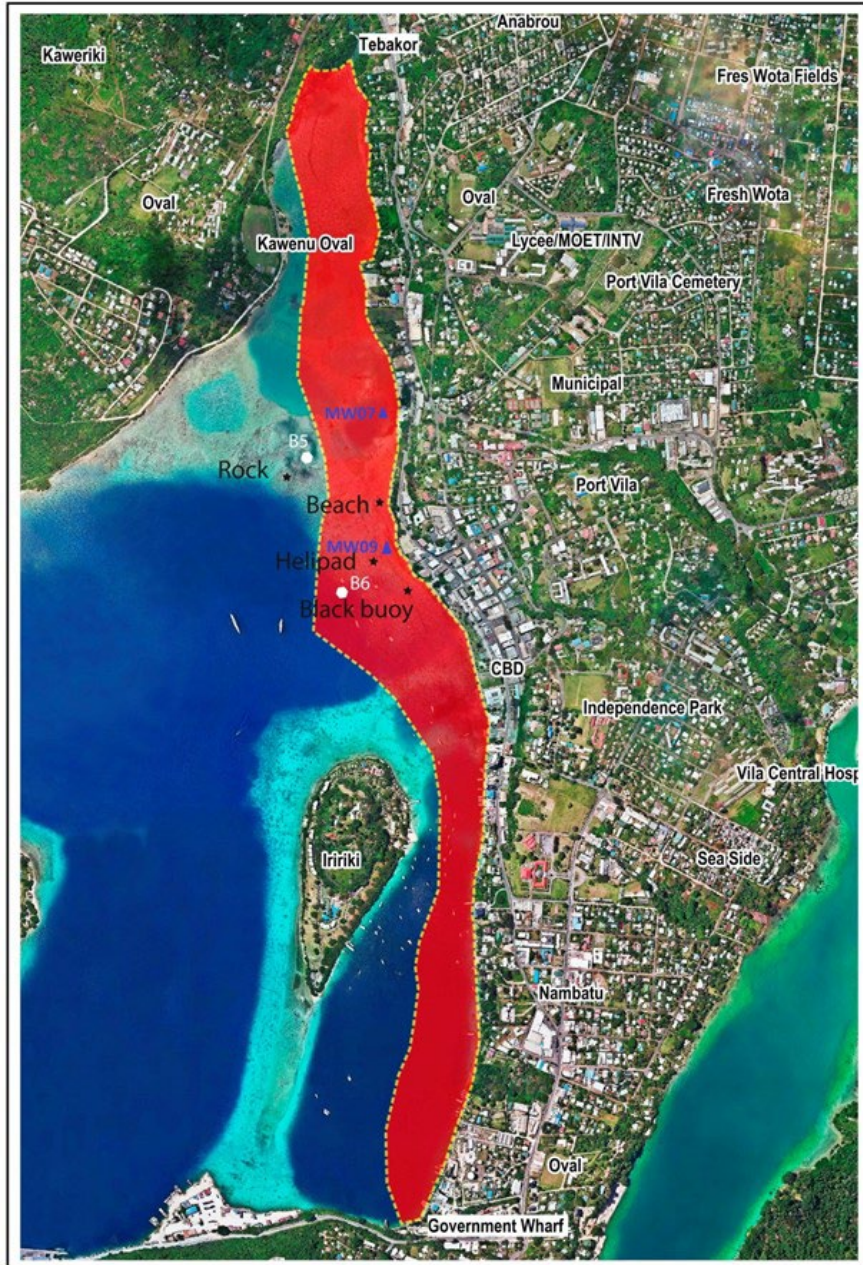
#WaWF23

# Port Vila Context

Routine testing in 2018/19 revealed elevated e. Coli, fecal streptococcus and enterococci in the recreational waters surrounding Port Vila.

DoWR was obliged to issue a ban on swimming in the Port Vila Bay in 2019.

On the 21<sup>st</sup> April 2020, the Department of Environmental Protection and Conservation (DEPC) established the Wastewater Taskforce to develop wastewater discharge permits under Pollution Control Act, wastewater standards and recreational water standards.



# Key Outputs of the National Wastewater Taskforce

National Wastewater Taskforce oversaw a City Wide Inclusive Sanitation Assessment of Port Vila (w/UNICEF support).

This included:

1. Institutional Assessment
2. Faecal Contamination Risk Assessment
3. Technological Recommendations to Mitigate Risks
4. Political Economy Assessment
5. Drafting of Wastewater Regulations

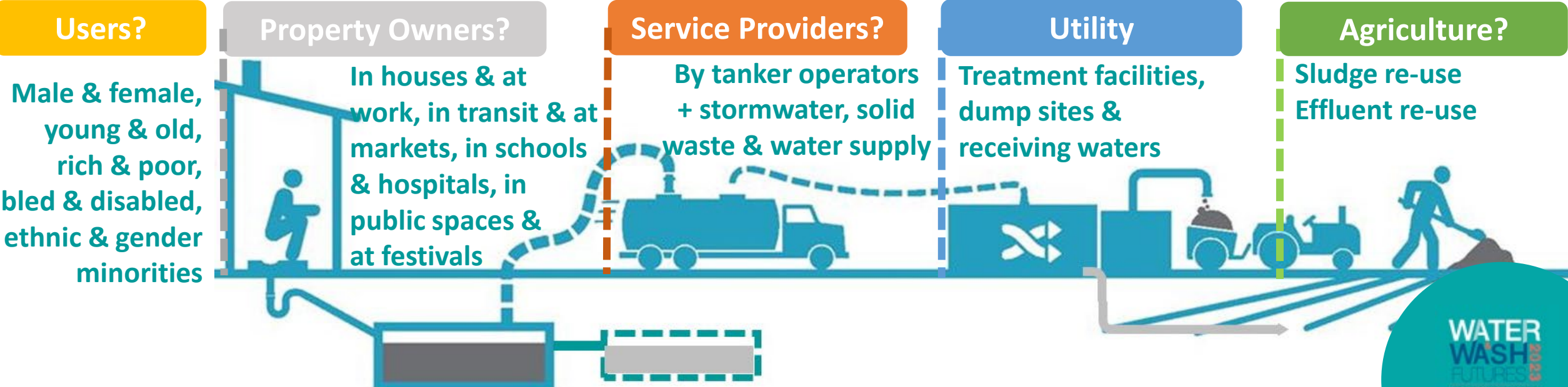
# 1. Institutional Responsibilities for Sanitation in Urban Vanuatu

*Separate the Regulation of Failure (National Government) from the Licensing of Compliance (Municipal / Provincial Council)*

National Government									
MoHealth	MoInfrastructure	MoLand&NR	MoEducation	MoInternal Affairs	MoEnvironment	MoAgriculture			
Public Health Act	Building Public Works Acts/Code Standards	Land Water Laws Acts	Plumbers Certification	Planning / LG Labour Laws	EIA / Wastewater Regulations	Fertilizer Standard			

Municipal (Provincial) Councils									
Sanitation By-laws	Property Rates	Planning Approvals	Building Permits	Transfer of Title Deed	Trade Licenses	Wastewater permit	Notify for EIA	Recreational water advisory	Accreditation of re-use



COLLECTION ➤ CONTAINMENT ➤ EMPTYING ➤ TRANSPORT ➤ TREATMENT ➤ REUSE/DISPOSAL





## 2. Summary of Faecal Contamination Risks

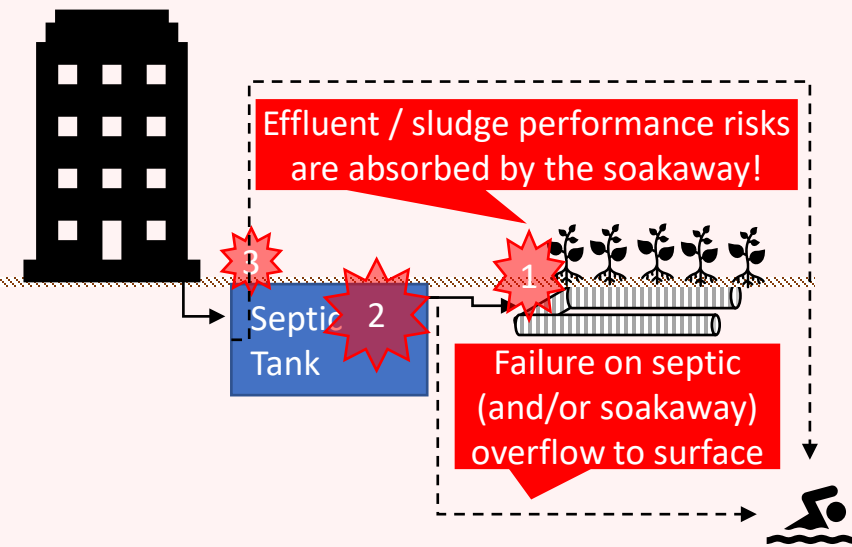
**In Port Vila, the contamination risk is from effluent discharge to open (land or water) rather than discharge into the soil**

- 1. Sewage Treatment Plants (STPs):** The primary risk occurs from poorly maintained STPs that either routinely (or occasionally) release pathogens via effluent to the surface water or land.
- 2. Septic Tanks:** The secondary risk occurs from septic tanks with inadequate soakaways that overflow to the open, or with no soakaway discharging effluent to drains, or having their effluent emptied and dumped in the open.
- 3. Dry Pit Toilets:** The tertiary risk occurs from dry pit toilets (VIP or bush toilets) in storm surge, flood prone and high-water table areas where water intrusion discharges pathogens to the surface.

# 3(a) Technology Recommendations to Mitigate Risks

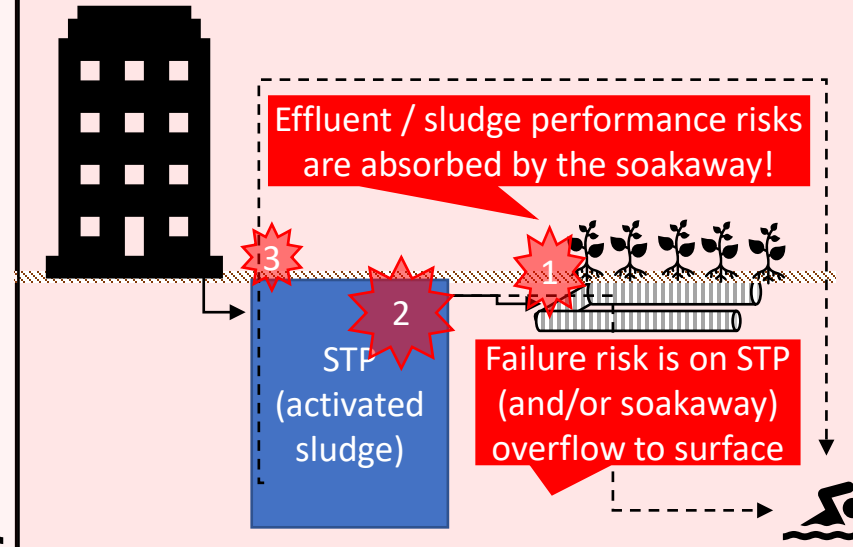
## Improve the Operation and Maintenance of Commercial Sewage Treatment Systems

Low Risk: >100 Septics (discharge to soakaway)



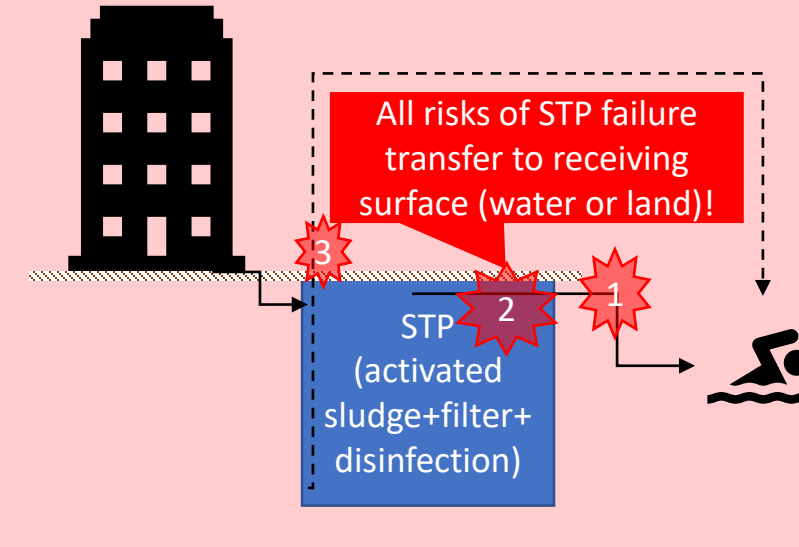
1. Likelihood of effluent failure = rarely (to surface)  
- Effluent monitoring NOT required
2. Likelihood of system failure = rarely (to surface)  
- Contracted maintenance NOT required
3. Likelihood of sludge failure = rarely (to surface)  
- Contracted removal of sludge (at least 4 years)

High Risk: <15 STPs (discharge to soakaway)



1. Likelihood of effluent failure = occasional on overflow  
- Effluent monitoring NOT required
2. Likelihood of STP failure = occasional on overflow  
- Contracted maintenance of STP (at least quarterly)
3. Likelihood of sludge failure = occasional on overflow  
- Contracted removal of sludge (at least annual)

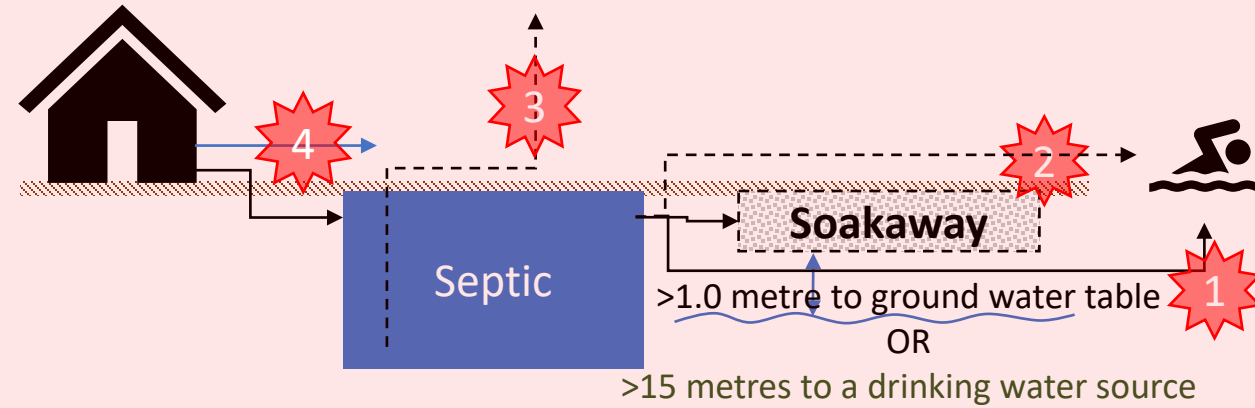
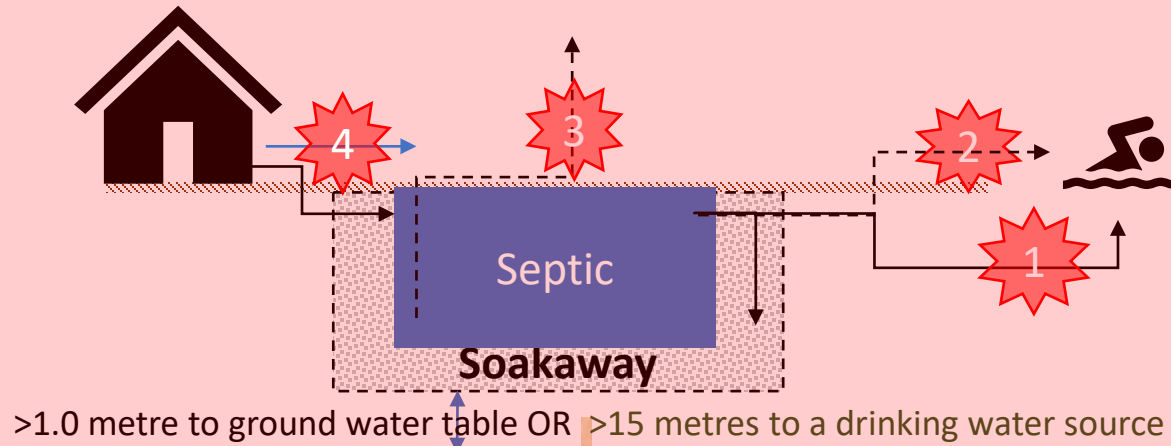
Highest Risk: <5 STPs (discharge to open)



1. Likelihood of effluent failure = continuous to outfall  
- Contracted effluent monitoring (at least monthly)
2. Likelihood of STP failure = continuous to outfall  
- Contracted maintenance of STP (at least monthly)
3. Likelihood of sludge failure = continuous to outfall  
- Contracted removal of sludge (at least 3 monthly)

# 3(b) Technology Recommendations to Mitigate Risks

## Upgrade the soakaways or reduce the wastewater loading



### CAUSE

### CONSEQUENCE

### SOLUTIONS

1. Septic tanks routinely discharging blackwater to surface / stormwater

Continuous pathogen risk

- Remove blackwater connections to stormwater / outfall
- Prevent storm/rainwater ingress to septic tanks

2. Septic tanks occasionally discharging blackwater to surface / stormwater

Occasional pathogen risk

- Remove greywater from septic tanks
- Upgrade from integrated to separate soakaways

3. Septic tanks being emptied (sometimes too often) and dumped indiscriminately

Possible pathogen risk

- Extend separate soakaways (wrap in geo-textile fabric)
- Empty septic sludge at least every 8 years (4 yrs. in CBD)
- Remove greywater connections to stormwater/outfall

4. Premises discharging greywater to surface / stormwater

Low pathogen risk

- Discharge greywater to separate soakaways
- Fit grease traps to greywater from kitchens



# 3(c) Technology Recommendations to Mitigate Risks

## Upgrade Dry Pit Toilets to Offset Pit Water Seal Toilets in High Water Table & Flood Prone Informal Settlements

### Dry Pit (aerobic)

High risk if inundated

#### Dry Pit

Vent pipe



Low cost to upgrade to water seal

#### Direct Pit



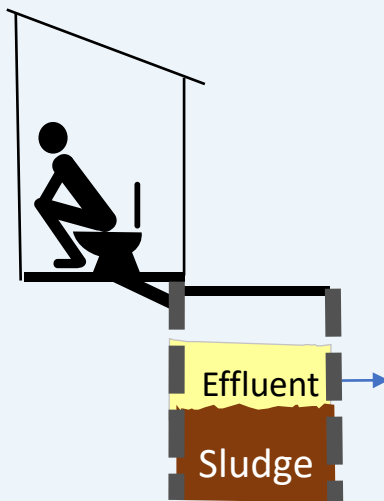
Difficult to empty

### Wet Pit (anaerobic)

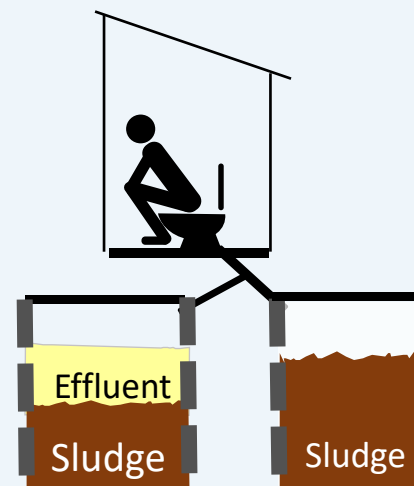
Low risk if inundated

Can add a second pit

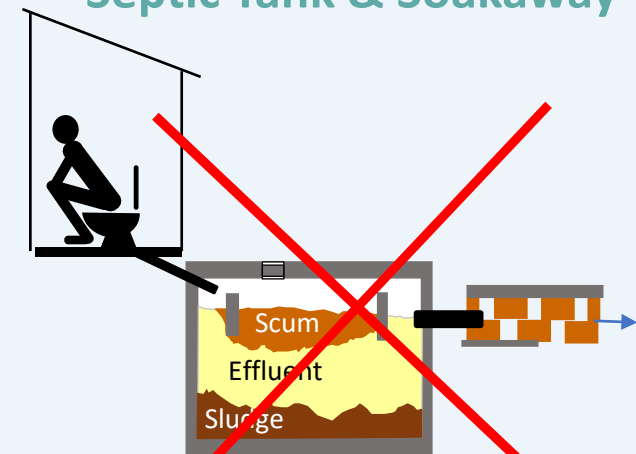
#### Offset Pit



#### Twin Offset Pit



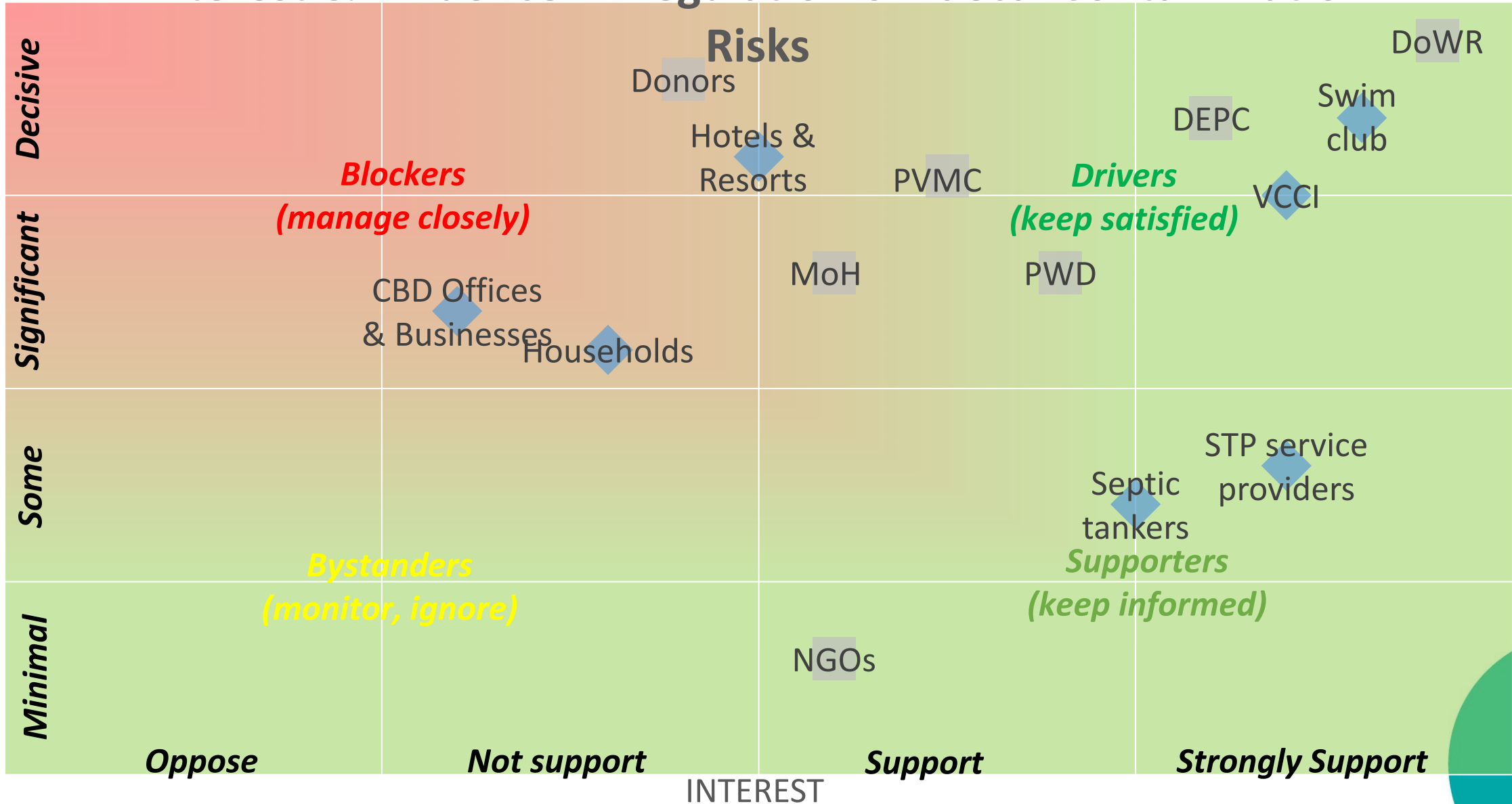
#### Septic Tank & Soakaway



High cost to build & empty

# 4. Political Economy Assessment

## Interest & Influence in Regulation of Faecal Contamination



# 5(a) Draft Wastewater Regulations

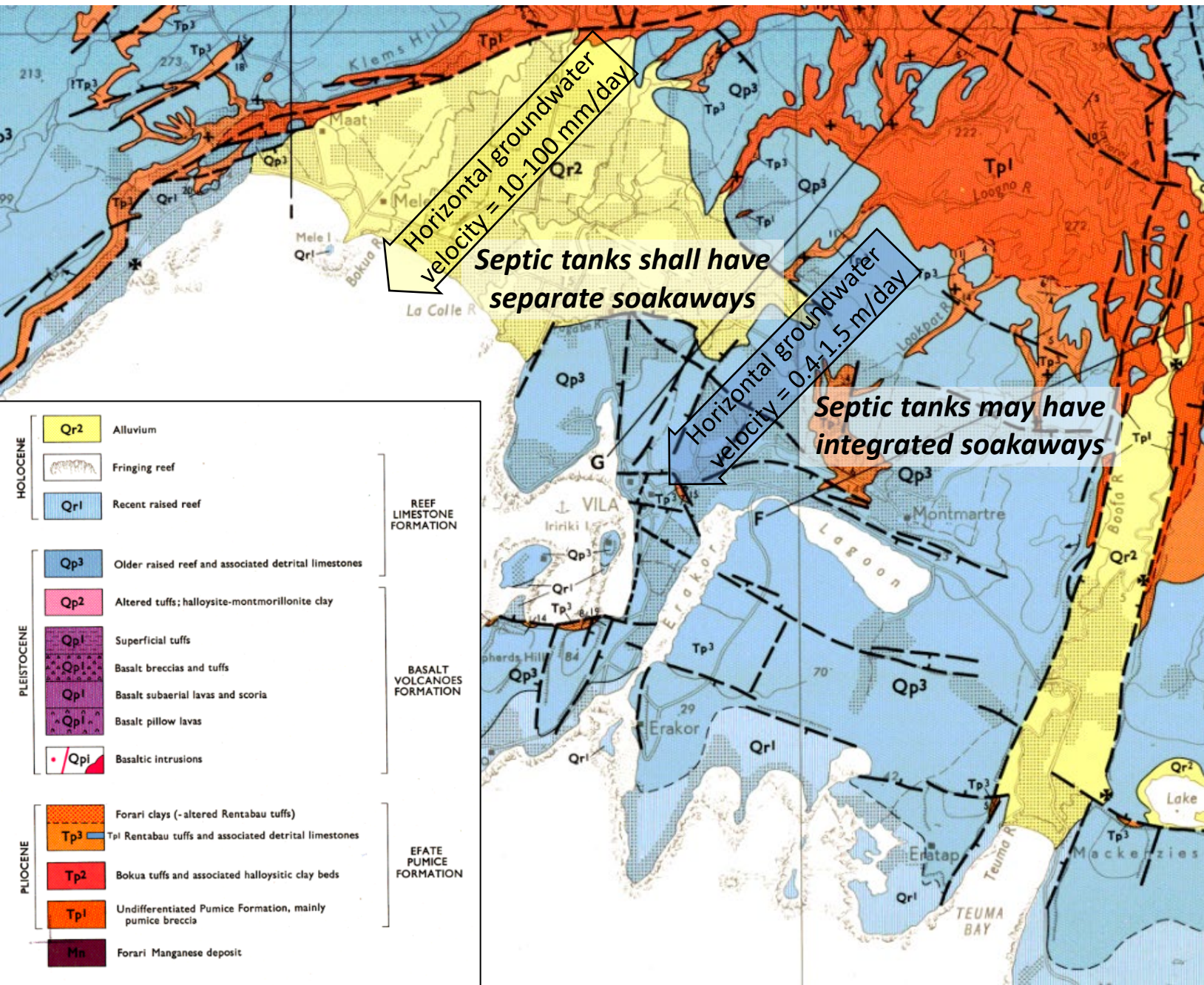
**Environmental Permits:** shall be obtained prior to the construction of any sewage treatment system in accordance with the Environment Impact Assessment (EIA) Regulation.

**Table 1: Summary of the Minimum Requirements for Sewage Treatment Systems**

Sewage Treatment System	Category of Risk	Minimum Design	Environmental Permit	Maintenance Contracts	Wastewater Permit
<b>Commercial Septic Tank (discharging to a soakaway)</b>	High	Engineered soakaway	23,000 VT (at planning)	1 contract (as detailed)	10,000 VT (10 yearly)
<b>Sewage Treatment Plant (discharging to a soakaway)</b>	Very high	Must never fail to open	23,000 VT (at planning)	2 contracts (as detailed)	15,000 VT (2 yearly)
<b>Sewage Treatment Plant (discharging to open)</b>	Extreme	Filtration & disinfection	23,000 VT (at planning)	3 contracts (as detailed)	30,000 VT (annual)

**Wastewater Permits:** shall be obtained periodically for the operation and maintenance of all sewage treatment systems in accordance with an Environmental Management and Monitoring Plan (EMMP).

# 5(b) Draft Municipal Council Septic Soakaway By-Law



## SEPTIC SOAKAWAY (DESIGN)

Soakaways for septic tanks in the:

- yellow areas (sandy soil) must be separated from the septic tank.
- blue areas (gravelly soil) may be integrated with the septic tank.
- blue areas (gravelly soil) with high ground water should be separated from the septic tank

Separating **greywater** from septic tank soakaways reduces faecal effluent risks

# 5(c) Draft Recreational Water Safety Standard

Classification matrix for faecal pollution of recreational water environments\*

		Microbial Assessment Category (95 <sup>th</sup> percentile intestinal enterococci/100 ml)				Exceptional circumstances <sup>3</sup>
		A ≤40	B 41-200	C 201-500	D >500	
Sanitary Inspection Category (susceptibility to faecal influence)	Very low	Very Good	Very Good	Follow up <sup>1</sup>	Follow up <sup>1</sup>	ACTION
	Low	Very Good	Good	Follow up	Follow up <sup>1</sup>	
	Moderate	Good <sup>2</sup>	Good	Poor	Poor	
	High	Good <sup>2</sup>	Fair <sup>2</sup>	Poor	Very Poor	
	Very high	Follow up <sup>2</sup>	Fair <sup>2</sup>	Poor	Very Poor	
Exceptional circumstances <sup>3</sup>		ACTION				

Safe Recreational Water Guidelines; WHO (2003), Pg. 84

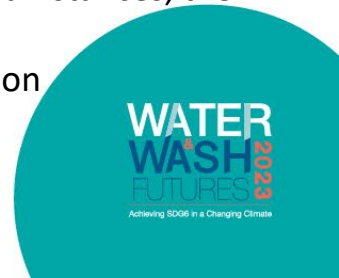
[Coastal Water Quality Vanuatu Monitoring Program // coastalwater.vu](http://coastalwater.vu)

<sup>1</sup> Implies non-sewage or unidentified sources of faecal indicators (e.g. livestock) which need to be verified.

<sup>2</sup> Indicates possible discontinuous/sporadic contamination (often driven by results such as rainfall). These results should be investigated further, and initial follow-up should include analytical results, review possible analytical errors.

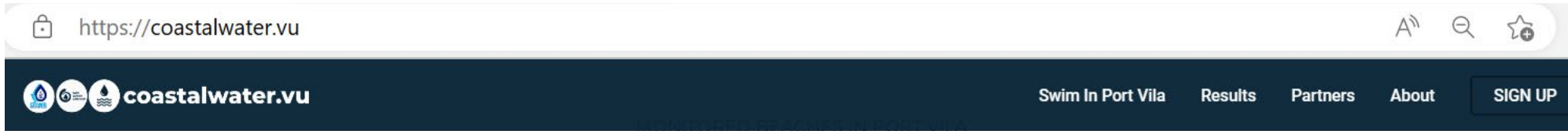
<sup>3</sup> Exceptional circumstances are known periods of higher risk (e.g. a rupture of a sewer in a recreational water catchment). Under such circumstances, the classification matrix may not fairly represent risk/safety.

\* In certain circumstances, there may be a risk of transmission of pathogens associated with more severe health effects of recreational water use. Public health authorities should be engaged in the identification of such conditions.

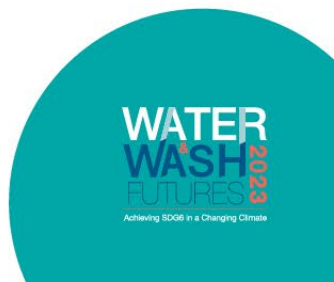
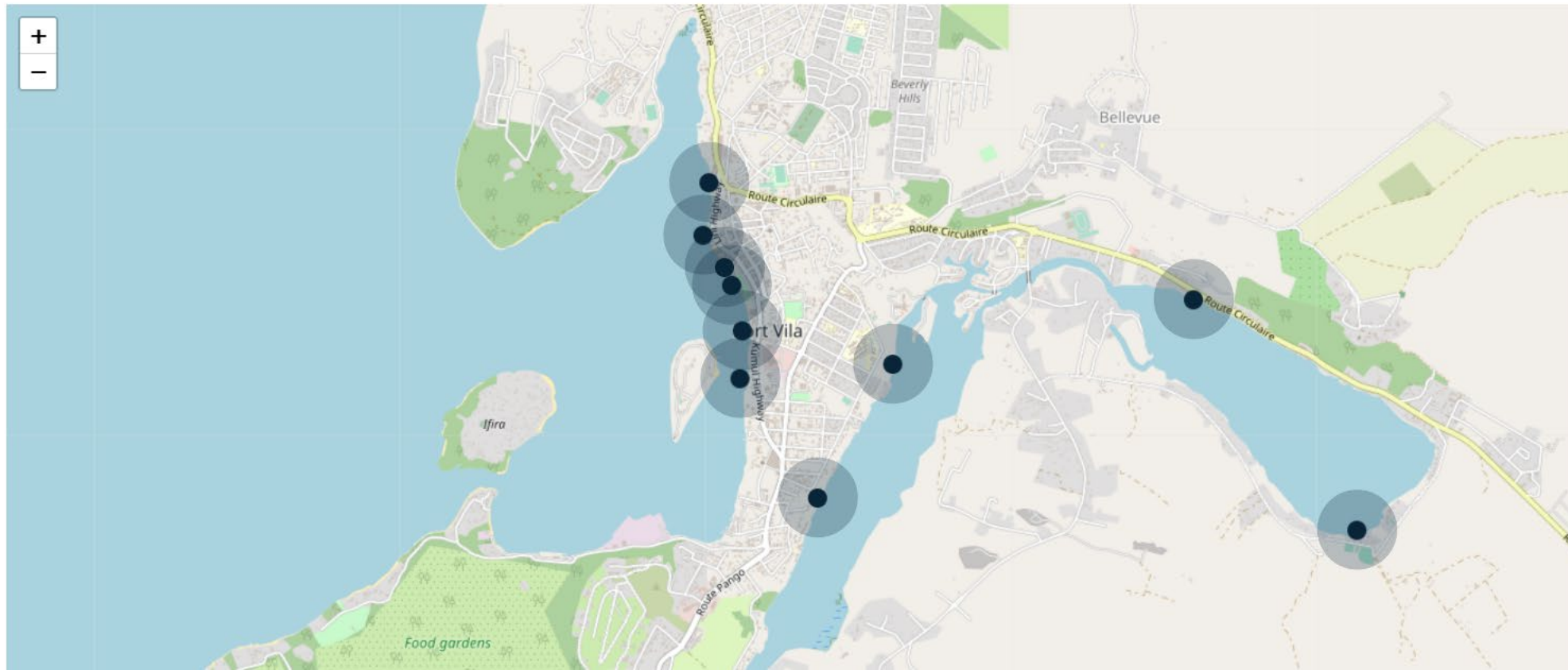


Enterococci cfu/100 ml	Port Vila Recreational Risk Classification		
<41	****	Good	Exposure risks are safe for swimming
41-200	***	Fair	Avoid swimming after heavy rainfall
201-500	**	Poor	Increased risk of disease for swimmers with poor immune function
>501	*	Bad	Avoid swimming at this location

# Weekly Monitoring of Enterococci Counts in Port Vila



## Locations Where We Collect Coastal Water Samples:



# Weekly Monitoring of Enterococci Counts in Port Vila

The screenshot shows a web browser displaying the website <https://coastalwater.vu>. The page features a dark teal background with white text and icons. At the top left, there are three circular icons representing water, a person, and a wave, followed by the text "coastalwater.vu". To the right of these icons is a navigation menu with links for "Swim In Port Vila", "Results", "Partners", and "About", along with a "SIGN UP" button. The main heading reads "Monitoring Coastal Water Quality For Safe Swimming In And Around Port Vila." Below this heading is a "Data Base" button. The date "February 07, 2023" is displayed in a light blue font. The data is presented in three rows, each with a smiley face icon, a location name, and a star rating:

Location	Rating
Port Vila Bay	****
First Lagoon	**
Second Lagoon	****



# Weekly Monitoring of Enterococci Counts in Port Vila

https://coastalwater.vu

coastalwater.vu

Swim In Port Vila Results Partners About SIGN UP

February 07, 2023

Print PDF

Location	Enterococci (CFU/ml) in Coastal Water
Chantilly's	30
Vodafone beach	25
Nambawan cafe	18
Sea front jetty	10
Iririki Wharf	6
Scuba diving	1
Ramada area	20
Sea side	600
Second lagoon Entrance	15
Club Hippique	20

Results	Rating	Description
< 41	****	Good
41 – 200	***	Fair
201 – 500	**	Poor
> 500	*	Bad
> 1000	TNTC	TNTC

*Good:* Bacterial levels are safe for bathing per NHMRC guidelines.

*Fair:* Bacterial levels indicate an increased risk of disease for





# Thank you

For further details:

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<https://coastalwater.vu/>

**WATER**  
**WASH** 2023  
**FUTURES**

Achieving SDG6 in a Changing Climate