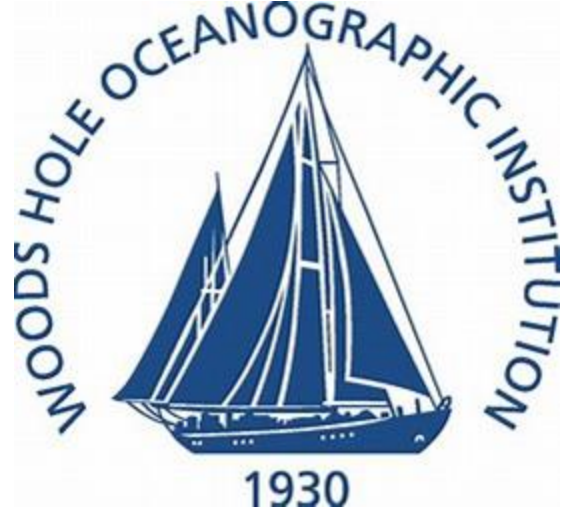


# Implementing a Pilot-Scale Permeable Reactive Barrier For Groundwater Nitrogen Remediation in Great Pond



## What is a Permeable Reactive Barrier?

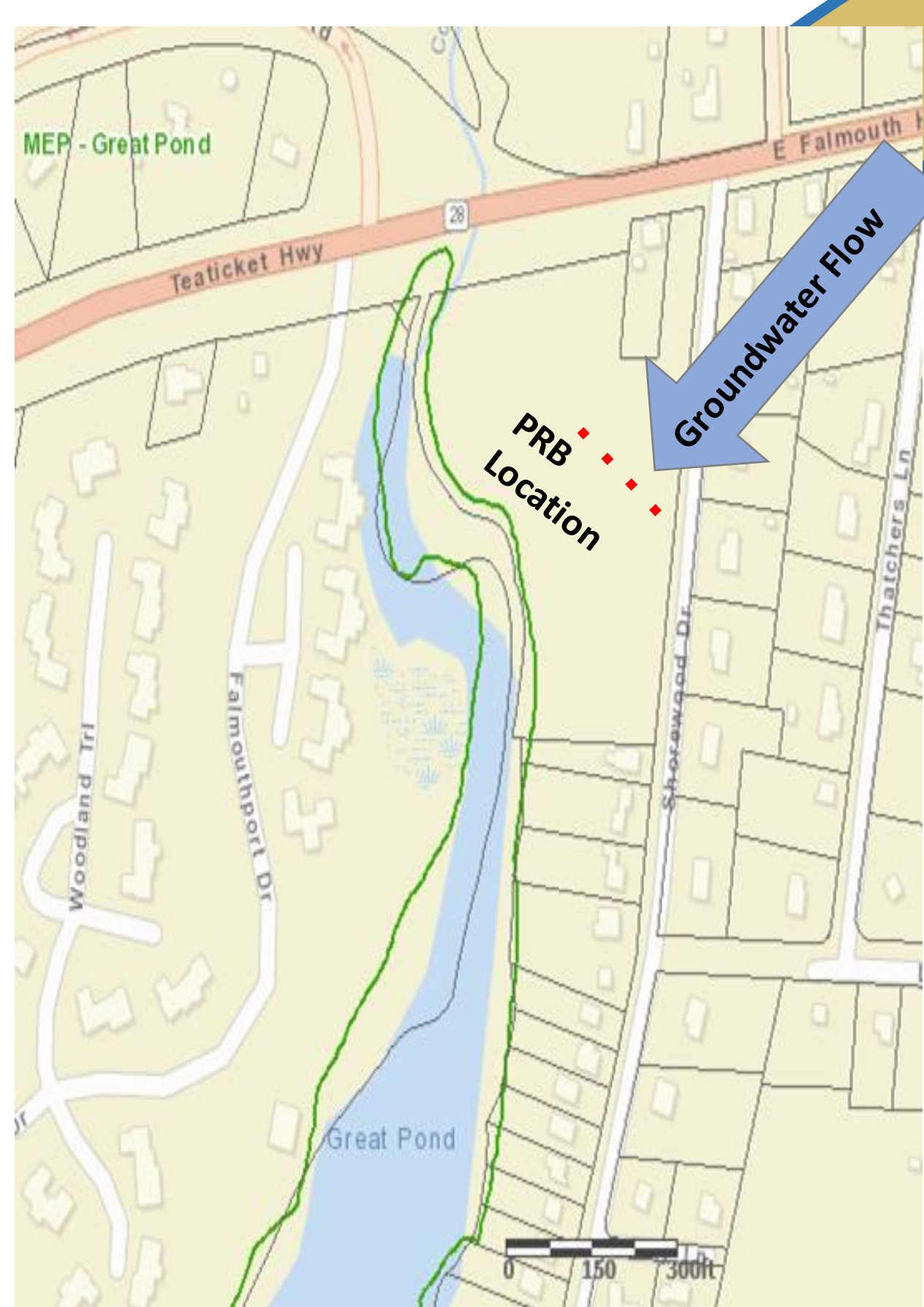
A PRB is a means to intercept nutrient enriched groundwater using a carbon source such as **Vegetable Oil**. Carbon stimulates bacterial conversion of nitrate in the groundwater to nitrogen gas thus reducing the nutrient concentration **before** it enters the estuary.

## What about environmental impacts?

Emulsified vegetable oil (EVO) is a soybean-based, food grade substrate. Brush clearing is required for the well installations and injections. Overall, **minimal impact** is expected on the ecological landscape.

## How much nitrogen will it remove?

This project will consist of a 120' PRB. A PRB of this length is expected to remove upwards of 530 kg N/yr. This is equal to the nitrogen from **130 houses** in the upper region of the estuary. There is potential for future extension of the PRB to 300'.



Expected location of the PRB at 0 Shorewood Drive.

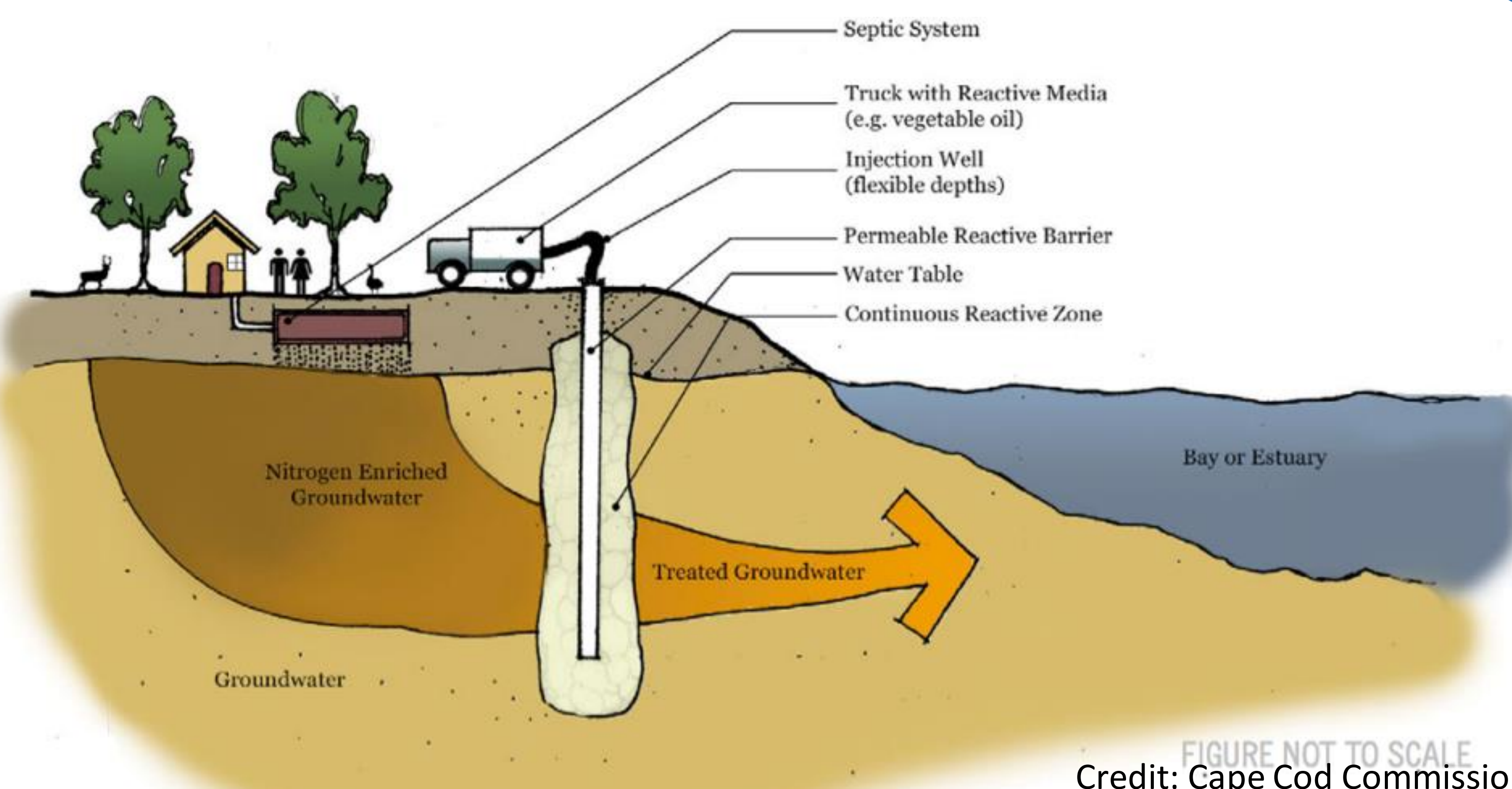


FIGURE NOT TO SCALE  
Credit: Cape Cod Commission



Direct push drill rig installing temporary injection point

## Why is the Shorewood Drive location ideal?

- Shallow depth to the groundwater
- High nitrate concentration
- Moderate groundwater velocity
- Near the head of the estuary where flushing is limited

Installing a PRB is a more **cost-effective** approach to nitrogen remediation in the upper watershed than sewerage.

Performance and residual impacts of EVO on the groundwater will be regularly monitored through a network of subsurface monitoring wells.



Clearing at Shorewood Drive for the PRB mapping. Clearing will not remove any mature trees, only underbrush and small saplings. Pictured represents the anticipated amount of clearing required for the PRB installation.

## How long will it last?

Determining the longevity of the EVO in the field is a major goal of this project. This location is a pilot scale project and has been **designed to last 2 years** initially. A full-scale system is expected to last between 5 and 10 years.

## Questions?

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