Bustins Island Village Corporation
Established 1913

CUMBERLAND COUNTY
SOIL & WATER
CONSERVATION DISTRICT

The Bustins Island Green Infrastructure Project

A Maine Coastal Community Grant
September 2019 – June 2021

Presented for Casco Bay Coastal Academy by:
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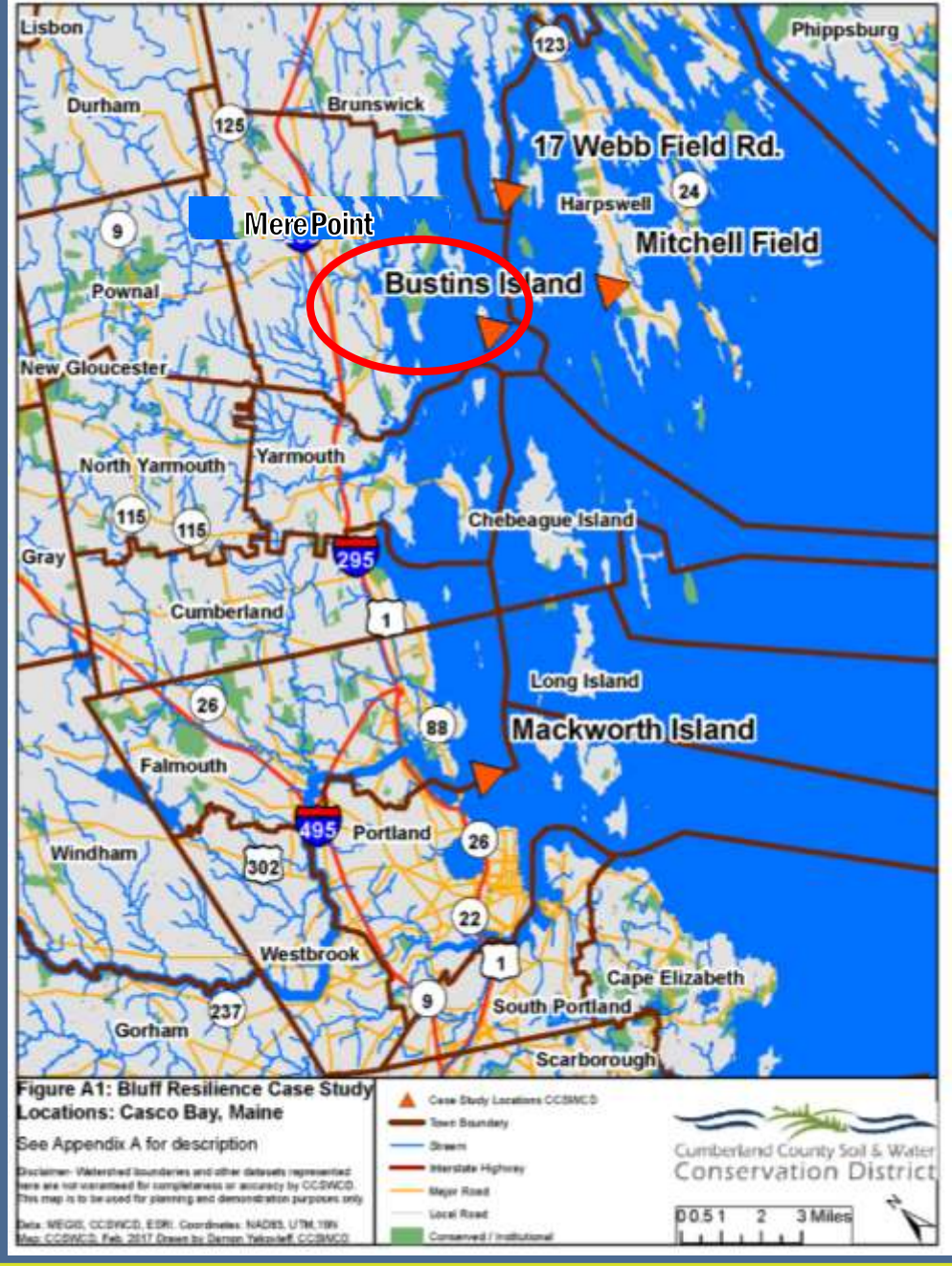
December 17, 2020

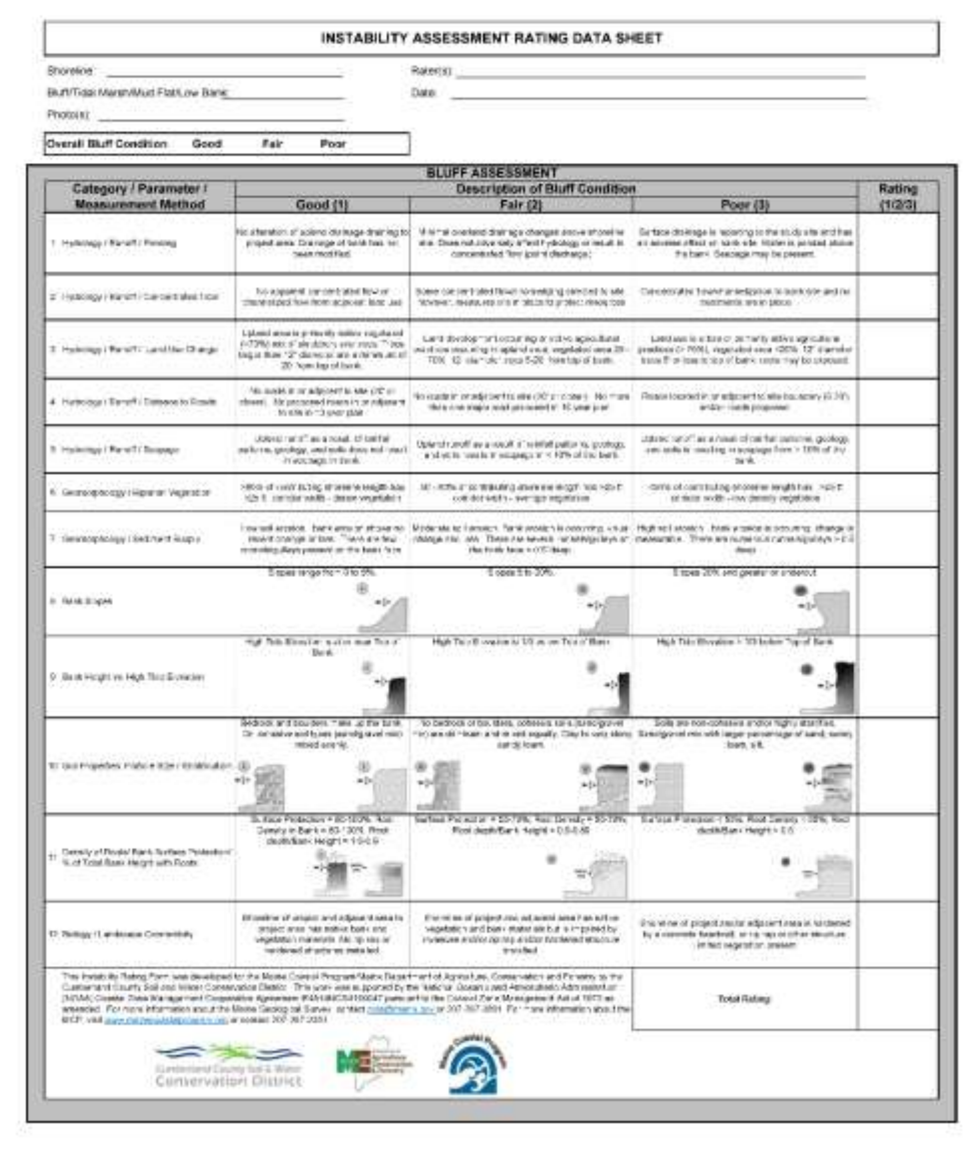
Bustins Island

- Off Coast of Freeport
- Unbridged Island, seasonal community
- Efforts to assess and reduce bluff erosion since 2016



Building on Previous Work

- NOAA-funded project to study bluff erosion in Casco Bay
- On-island efforts to assess & experiment


INSTABILITY ASSESSMENT RATING DATA SHEET

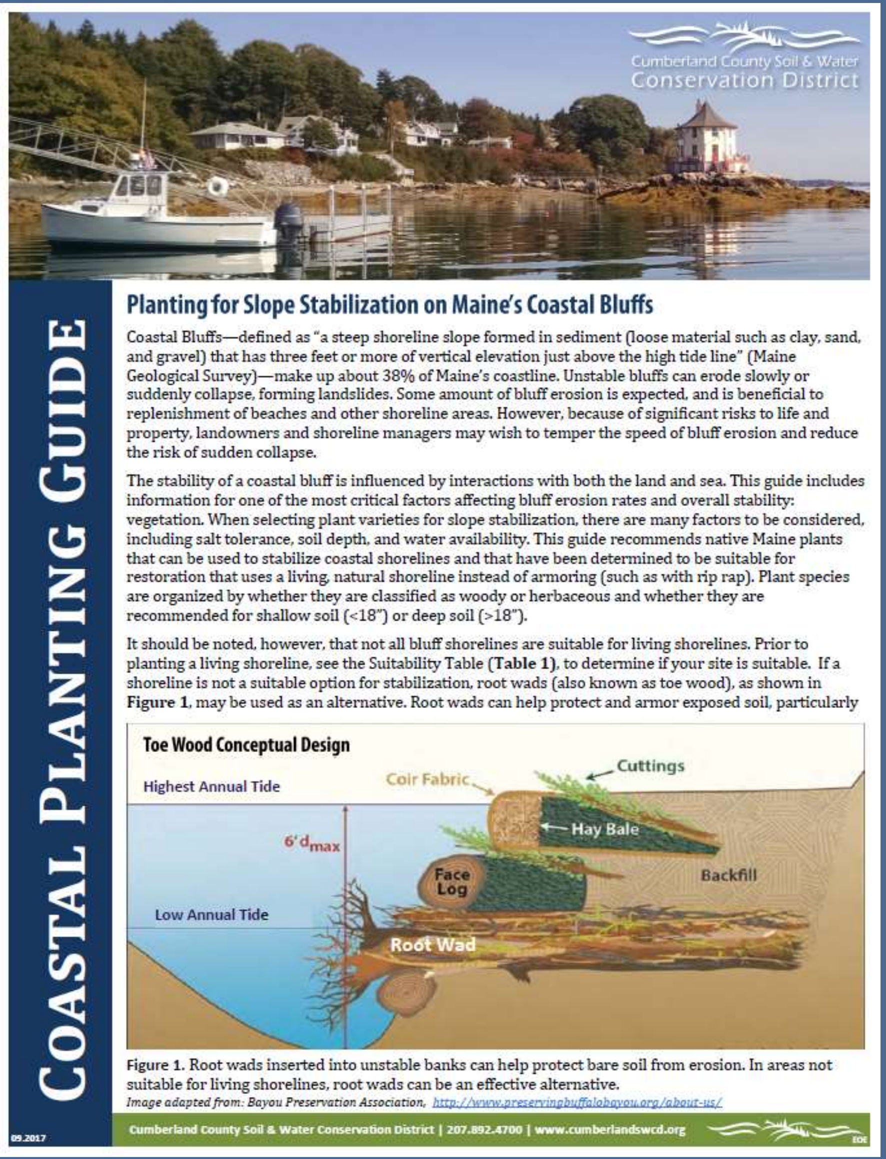
Shoreline:
Bluff/Tidal Marsh/Mud Flat/Low Bank:
Photo(s):
Rater(s):
Date:

Overall Bluff Condition: Good Fair Poor

BLUFF ASSESSMENT

Category / Parameter / Measurement Method	Description of Bluff Condition: Good (1)	Fair (2)	Poor (3)	Rating (1/2/3)

Total Rating



COASTAL PLANTING GUIDE

Planting for Slope Stabilization on Maine's Coastal Bluffs

Coastal Bluffs—defined as "a steep shoreline slope formed in sediment (loose material such as clay, sand, and gravel) that has three feet or more of vertical elevation just above the high tide line" (Maine Geological Survey)—make up about 38% of Maine's coastline. Unstable bluffs can erode slowly or suddenly collapse, forming landslides. Some amount of bluff erosion is expected, and is beneficial to replenishment of beaches and other shoreline areas. However, because of significant risks to life and property, landowners and shoreline managers may wish to temper the speed of bluff erosion and reduce the risk of sudden collapse.

The stability of a coastal bluff is influenced by interactions with both the land and sea. This guide includes information for one of the most critical factors affecting bluff erosion rates and overall stability: vegetation. When selecting plant varieties for slope stabilization, there are many factors to be considered, including salt tolerance, soil depth, and water availability. This guide recommends native Maine plants that can be used to stabilize coastal shorelines and that have been determined to be suitable for restoration that uses a living, natural shoreline instead of armoring (such as with rip rap). Plant species are organized by whether they are classified as woody or herbaceous and whether they are recommended for shallow soil (<18") or deep soil (>18").

It should be noted, however, that not all bluff shorelines are suitable for living shorelines. Prior to planting a living shoreline, see the Suitability Table (**Table 1**), to determine if your site is suitable. If a shoreline is not a suitable option for stabilization, root wads (also known as toe wood), as shown in **Figure 1**, may be used as an alternative. Root wads can help protect and armor exposed soil, particularly

Toe Wood Conceptual Design

Highest Annual Tide
Coir Fabric
Cuttings
Hay Bale
$6' d_{max}$
Face Log
Backfill
Low Annual Tide
Root Wad

Figure 1. Root wads inserted into unstable banks can help protect bare soil from erosion. In areas not suitable for living shorelines, root wads can be an effective alternative.
Image adapted from: Bayou Preservation Association, http://www.preservingbuffalobayou.org/about-us/

09.2017

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2019 Coastal Community Grant Project

- Funded by Maine Coastal Program
- Focus on managing upland runoff to reduce erosion rates on coastal bluffs
- Using low-cost, locally available methods suitable for islands
- Decentralized approach, "Low Impact Development" or LID

Project Area
Bustins Island, Freeport

Bluff failure at location of arrow

Image source: CCSWCD

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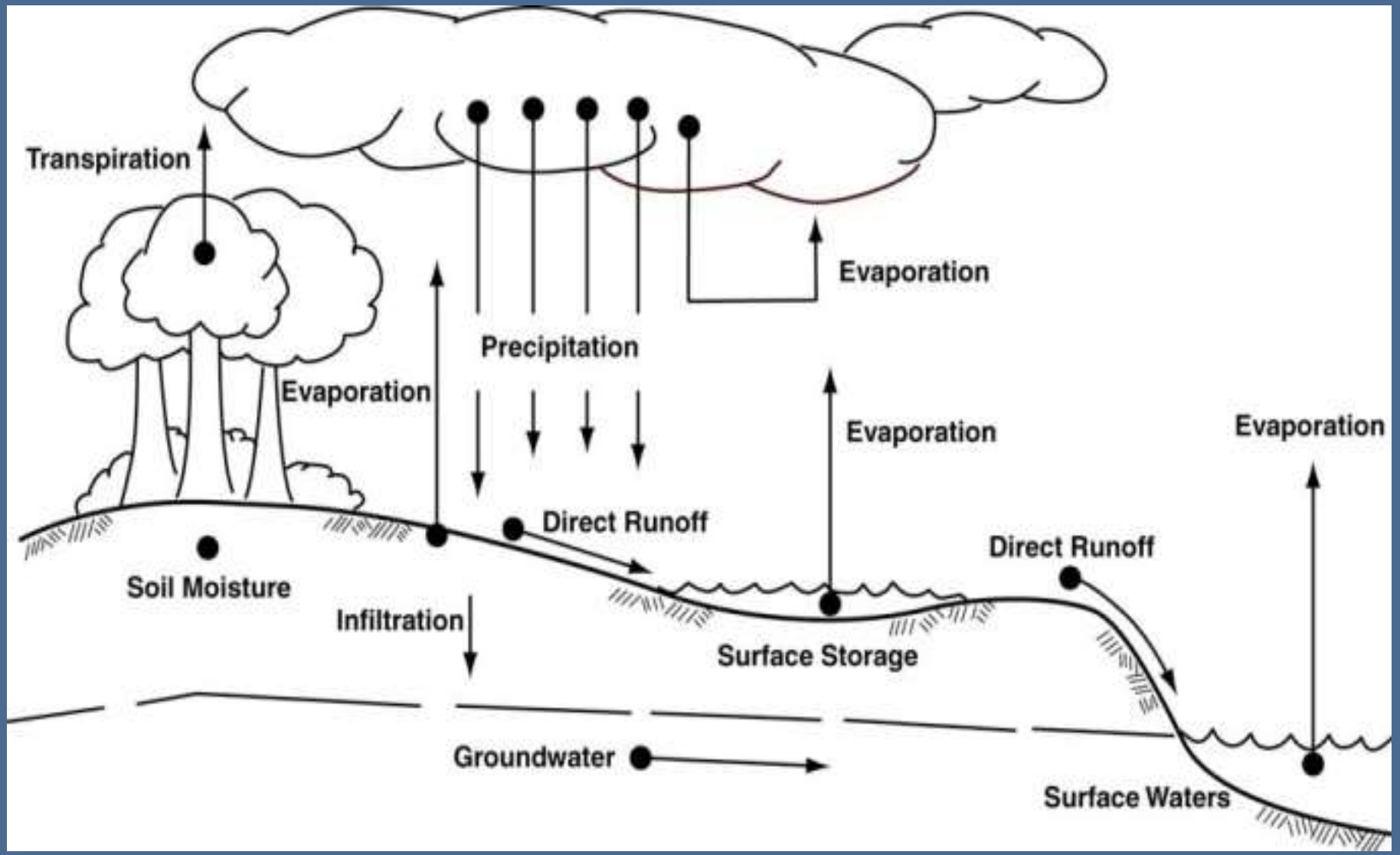
Project Goal:

To slow or capture stormwater runoff that now flows into the island's southeast sub-basin

The water cycle

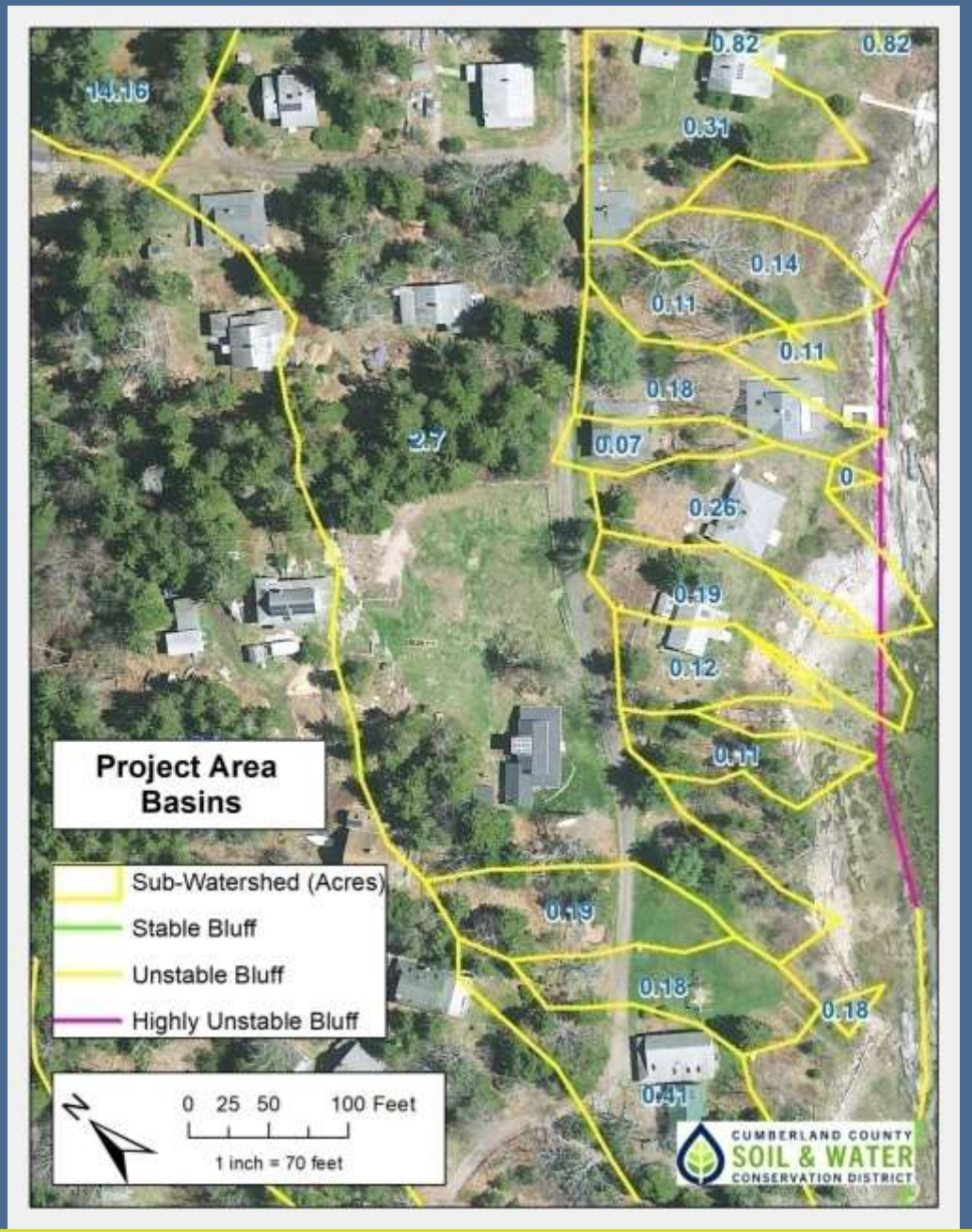


Project Method: Green Infrastructure

- Work with natural systems and materials to:
  - Recharge the aquifer
  - Protect coastal bluffs
  - Reduce road erosion
  - Restore habitats

Potential for solutions

- Upland areas carrying stormwater runoff
- Sloping land to work with
- Natural basins w/good drainage
- Unbuilt areas w/ good drainage



Conceptual Designs
&
Pilot Projects

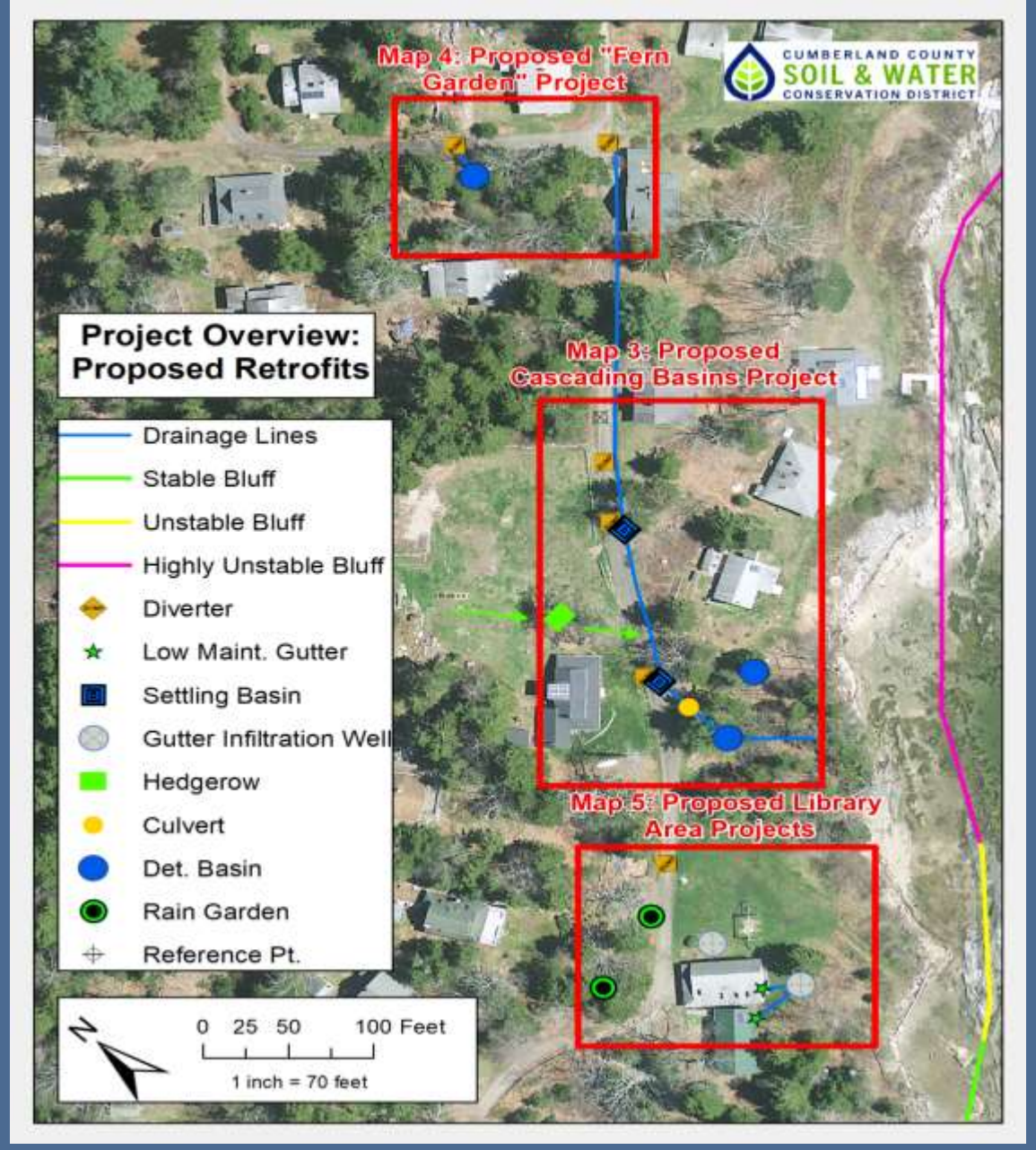
PLEASE NOTE:

CONCEPTS ARE FOR CONSIDERATION ONLY

PENDING LANDOWNER/BIVC PERMISSIONS

Bustin islands: Green Infrastructure

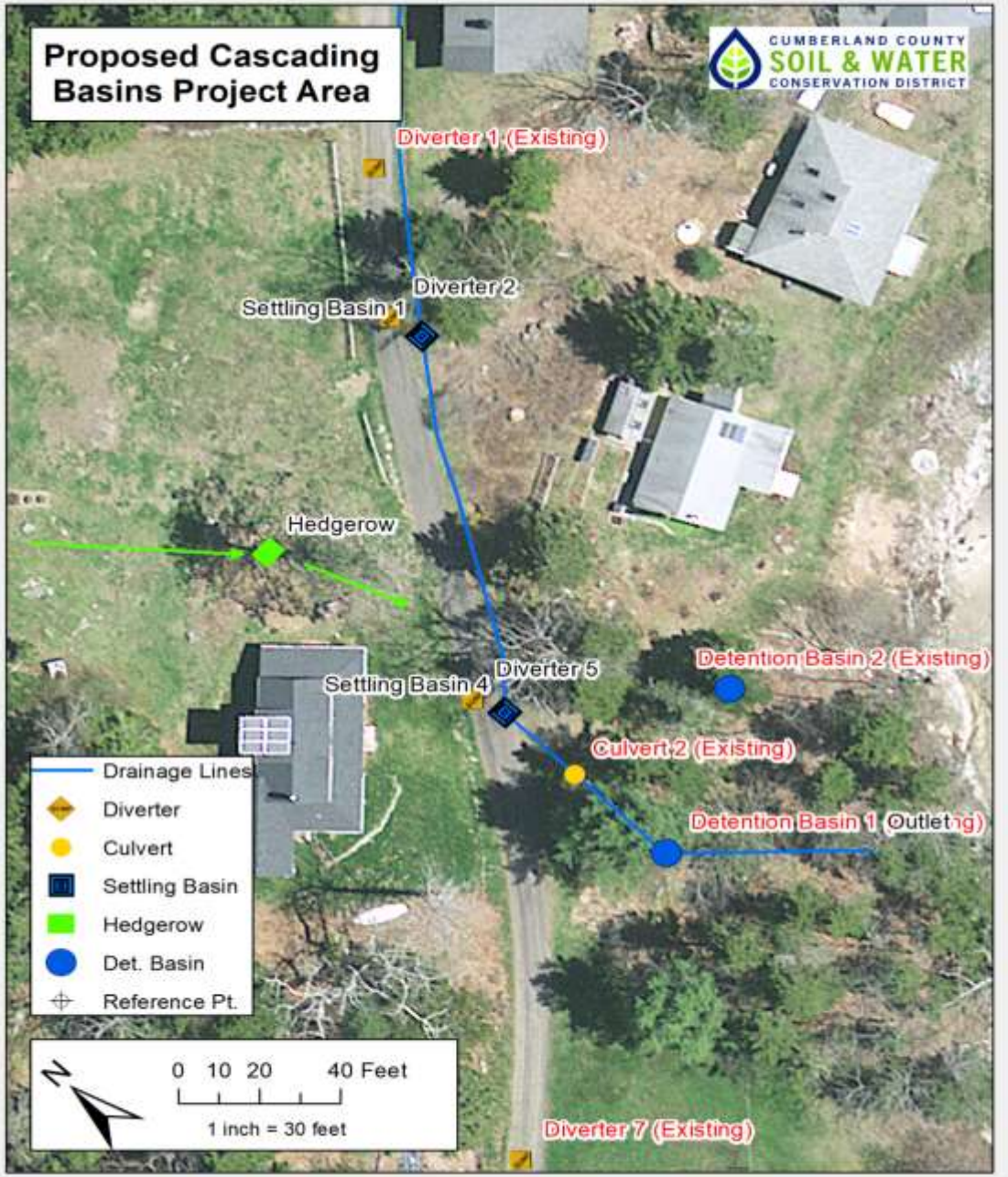
- The Four R's:
  - Recharge the aquifer
  - Reduce road erosion
  - Restore habitats
  - Redirect runoff from coastal bluffs

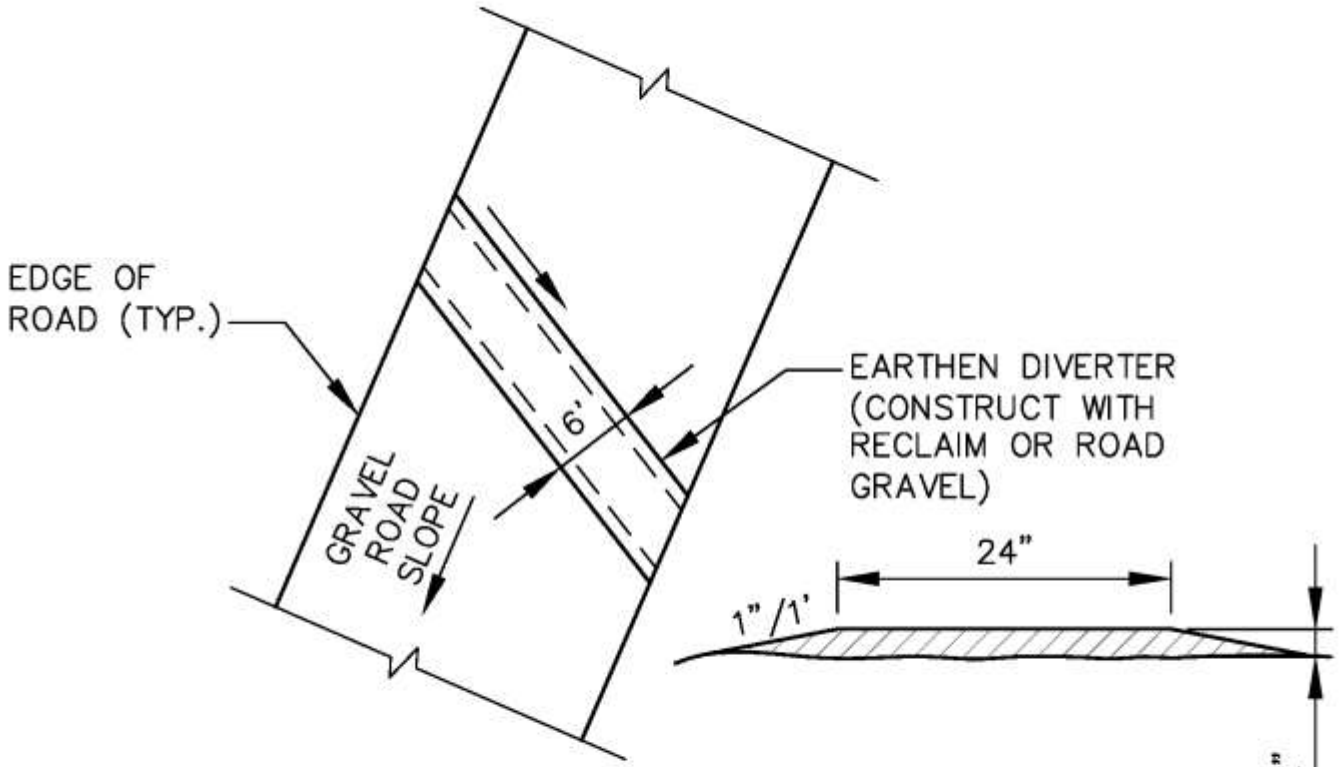


Proposed:

3 areas of focus to slow or capture stormwater now flowing into the island's southeast subbasin

Area 1 Proposed Solution: Divert road runoff into constructed & natural settling basins

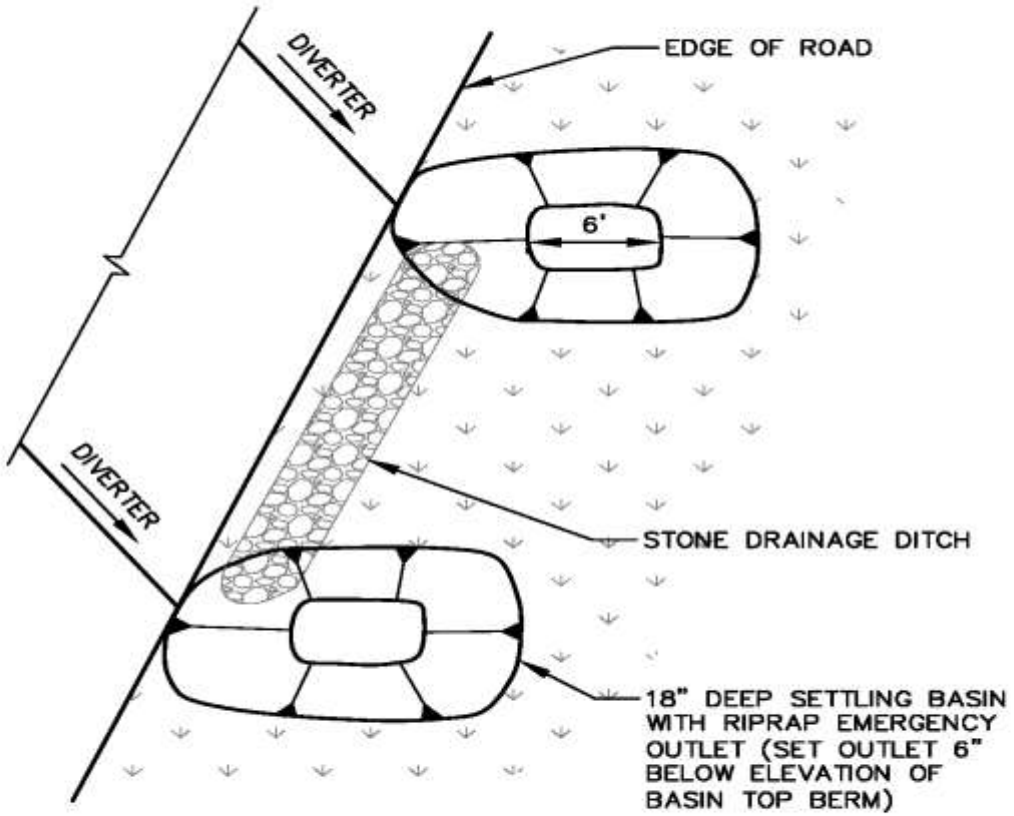




DIVERTER BERM

NOT TO SCALE

Pilot Project: Constructed roadside basin at top of road which now flows into ditch

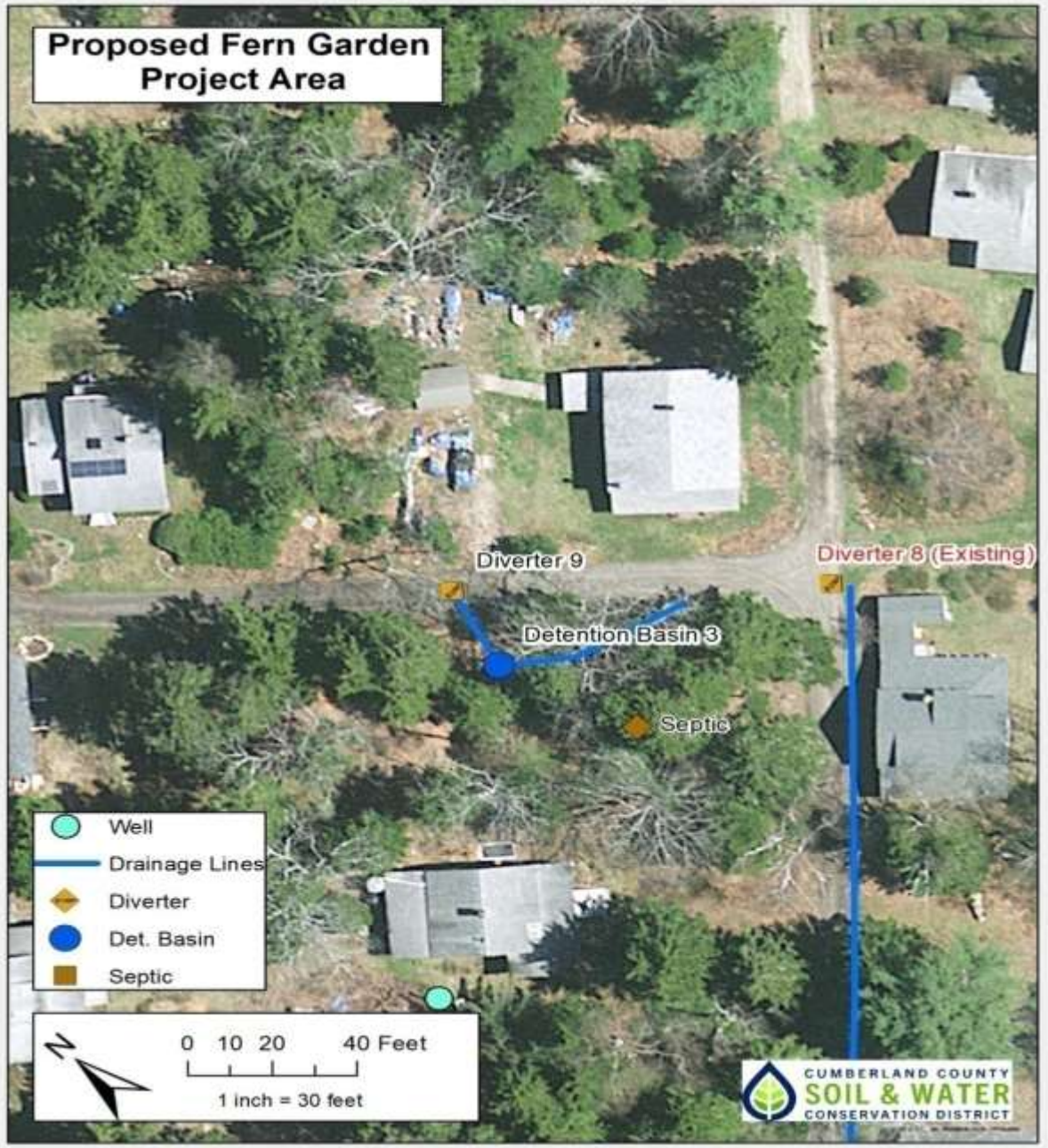


ROADSIDE SETTLING BASIN

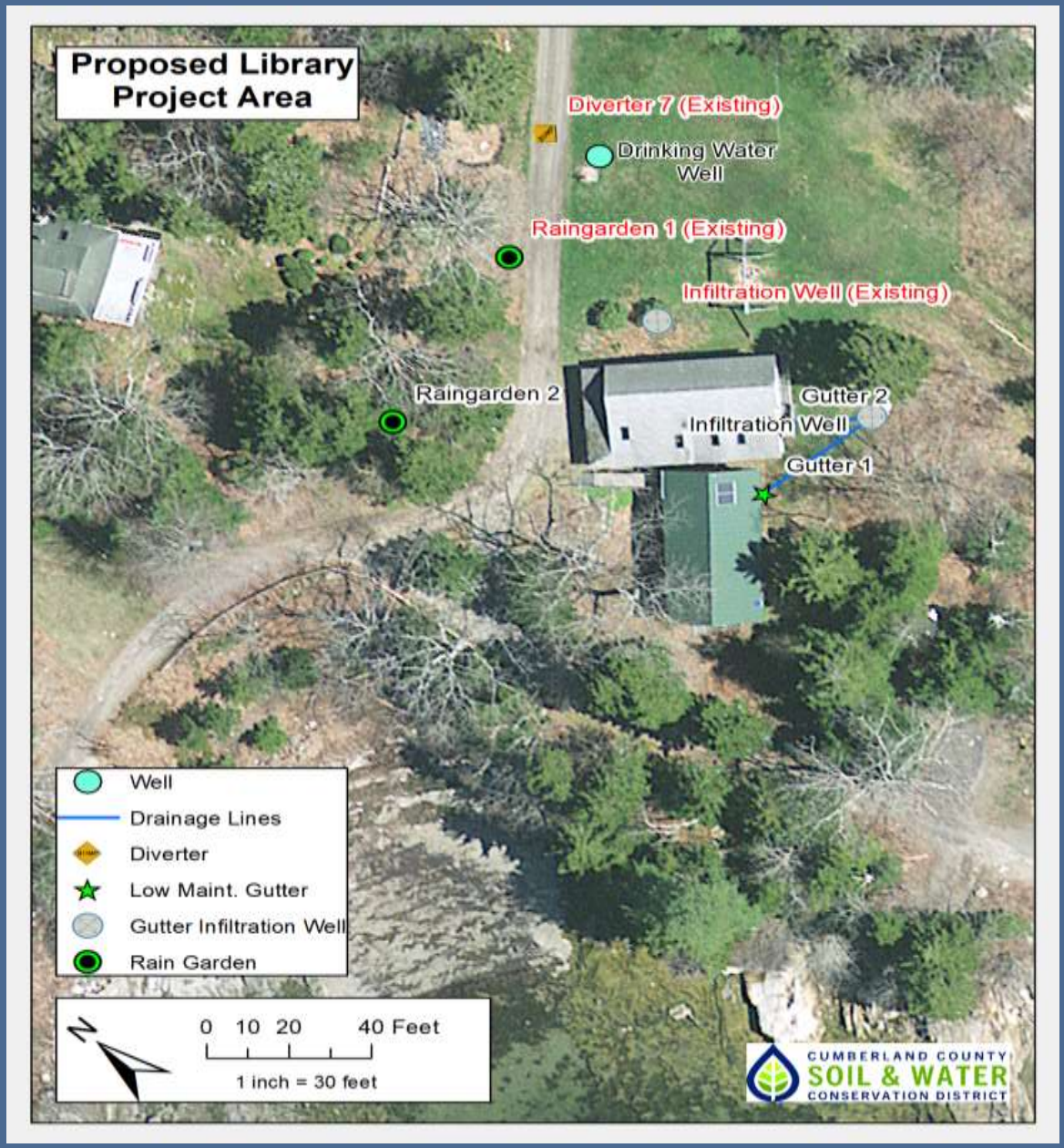
NOT TO SCALE

Pilot Project: Natural Settling Basins at System Outlet

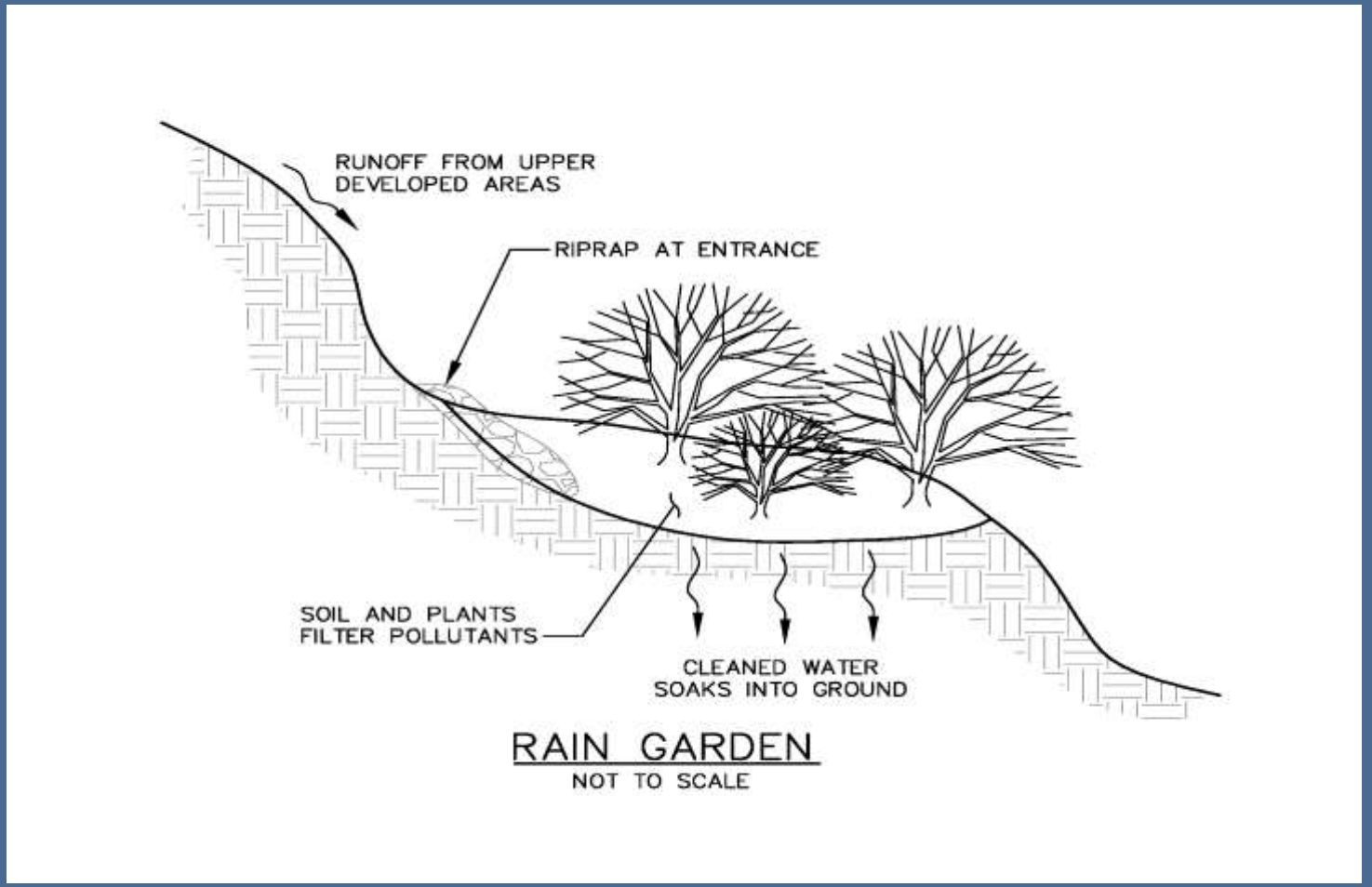
Area 2 Proposed Concept: Divert road runoff into constructed settling/infiltration basin "Fern Garden"



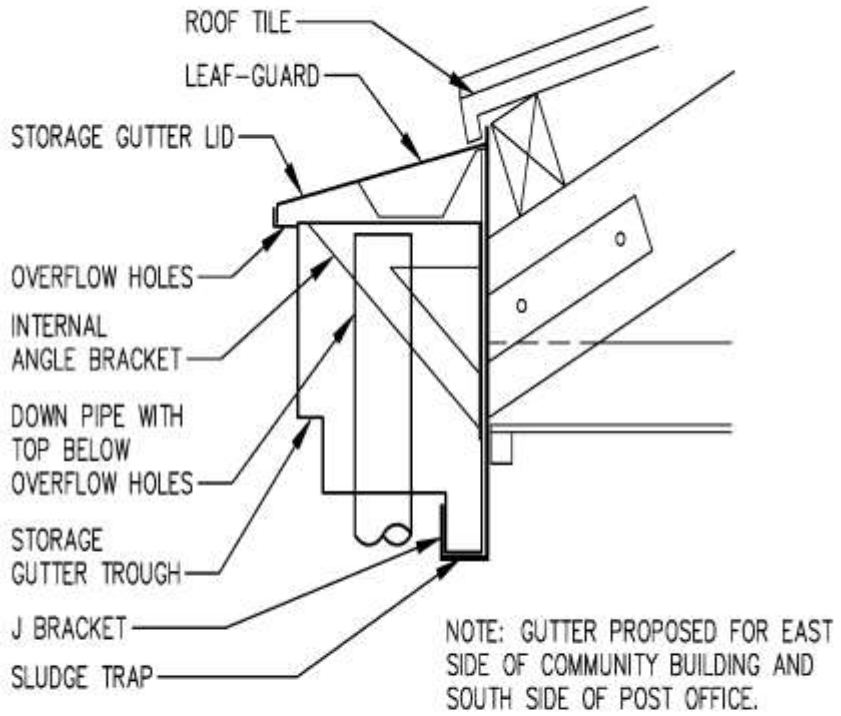
Area 3 Proposed Solution: Reduce runoff from hill across from post office and from building roof



Pilot Project: Capture runoff from hill in rain garden – Plan to add additional gardens

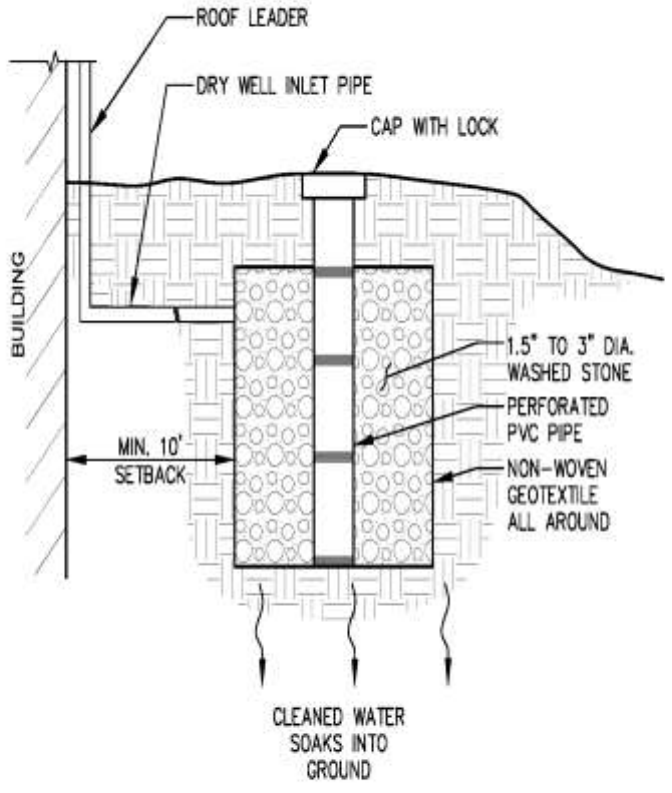


Options: Low-maintenance gutter on back of building and infiltration well OR drip lines into dry well



LOW MAINTENANCE GUTTER

NOT TO SCALE

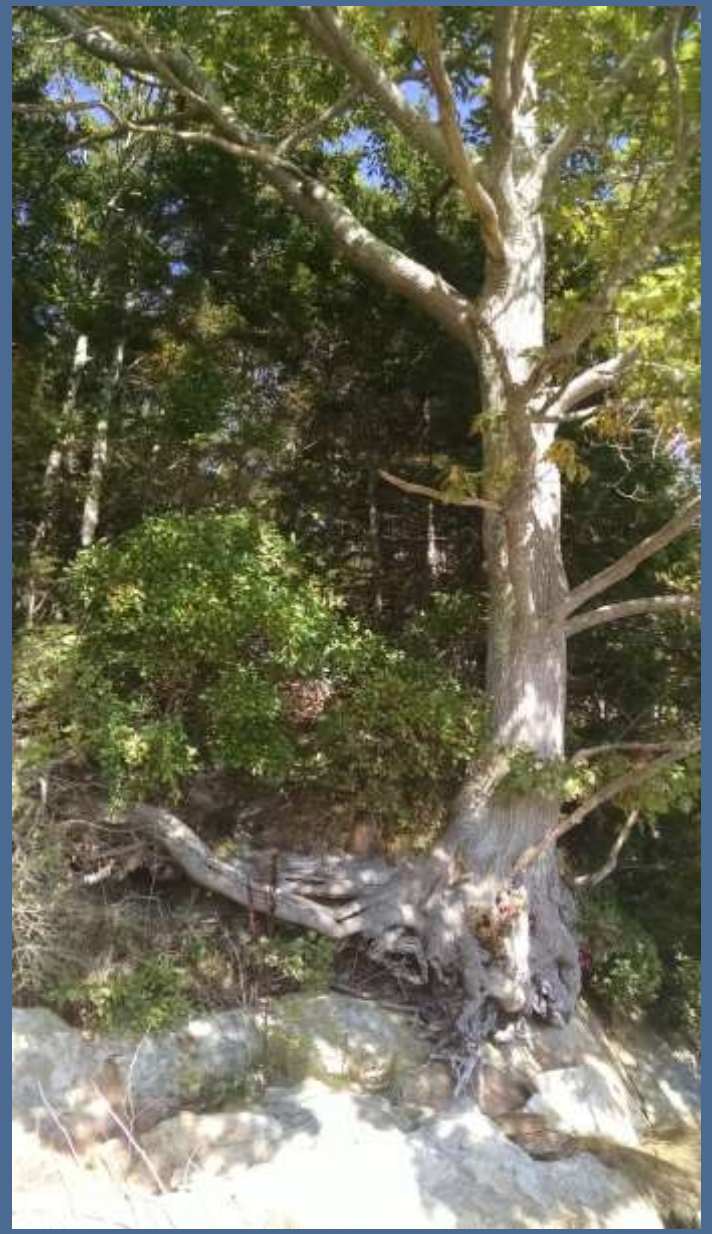


GUTTER INFILTRATION WELL

NOT TO SCALE

Next Steps

- Continue site assessments in Spring, 2021
- Project team to prioritize proposed projects in consultation with B.I.V.C. Board of Overseers and landowners
- Based on prioritization, CCSWCD to develop detailed designs, with operation and maintenance plans, for spring/fall 2021 implementation (w/ landowner permission and with funding if needed)
- Develop native plant lists and propagate plants



Questions?

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