



MEMORANDUM

To: Tisbury Open Space and Recreation Committee
From: Casey Chatelain and Rich Claytor, P.E.
Date: May 5, 2023
Re: **Veterans Memorial Park Drainage/Stormwater Control Measures**
Task 3: Concept Plans for Recreational Enhancements, Stormwater Controls, and Vegetation Enhancements

Introduction

On behalf of the Town of Tisbury Open Space and Recreation Committee, Horsley Witten Group, Inc. (HW) is working to identify opportunities for Veterans Memorial Park (the Park) to improve stormwater management while taking into consideration current and future uses of the park. Stormwater drainage to and within the site requires improvement, as currently site conditions after rainfall events at times conflicts with recreational uses of the park. For example, heavy rain during the Beach Road Music Festival in August 2022 delayed the festival and left the site in such poor condition that youth soccer was unable to use the field for the Fall 2022 season.

The objective of this project is to develop a Master Plan for Veterans Memorial Park. The goal of this task in particular is to prepare and assess alternative concept plans that balance future park uses with addressing the known stormwater issues at the Park and nutrient loading to Mud Creek and Lagoon Pond.

In previous stages of this work the HW team completed an initial field reconnaissance of the Park and contributing drainage area, identified and assessed several potential stormwater control measures (SCMs), and presented those potential SCMs to representatives from the Tisbury Town Manager's office, the Tisbury Open Space and Recreation Committee, and the Tisbury Water Resources Committee.

Using feedback from Tisbury representatives HW advanced a subset of the previously identified SCMs to the approximate 25% preliminary design stage for two alternative plans for the park, developed a matrix of options for recreational uses and stormwater attenuation and treatment for those alternatives, and developed a preliminary cost-benefit analysis for the alternatives.

Previous Work

As a part of the ongoing project the HW team previously developed a memorandum detailing twelve potential stormwater control measures identified during site reconnaissance. In addition

to the identified SCMs, this memorandum covered existing conditions at Veterans Memorial Park, current and future uses of the Park, how stormwater at the park contributes to water quality issues in Lagoon Pond, and other work previously done by others in the vicinity of Veterans Memorial Park. Following a presentation of the SCMs to Town representatives, feedback was provided to the HW team leading to the elimination of six potential SCMs from further review.

Alternatives

The six remaining SCMs were advanced to the conceptual 25% design stage in order to develop two alternative plans for the park. It is important to note that there are impacts from eliminating the other SCMs. First and foremost, it alters the amount of stormwater runoff that needs to be handled by the remaining SCMs. None of the alternatives analyzed in this memorandum will be able to handle 100% of the stormwater runoff in the watershed to Veterans Memorial Park. This, in turn, limits the potential water quality improvements that can happen via SCM construction. In addition, none of the alternatives analyzed as a part of this study will prepare the Park for the impacts of sea level rise and the associated increase in storm surges.

The remaining SCMs and their water quality volume targets (updated from the previous memorandum to account for the removal of upgradient SCMs) are listed below in Table 1. These targets are the total amount of stormwater runoff that will reach each SCM in a 1-inch storm, not the amount of volume provided by each design. The percentage of these targets reached by each design alternative is detailed below in Tables 3 and 4 in the Cost Benefit Analysis section of this memorandum. Please see Appendices A and B for conceptual design alternatives referenced in this memorandum.

Table 1: Stormwater Control Measures Advanced

SCM Name and Location	SCM Type	SCM WQv Target (1-inch runoff in ac-ft)
Causeway Road 1	Water Quality Swale	0.10
Causeway Road 2	Constructed stormwater treatment wetland	0.17
Causeway Road 3 (Recreation Courts)	Constructed stormwater treatment wetland	0.53
State Road Vacant Lot	Subsurface infiltration chambers	0.11
Park North (low point)	Gravel wetlands	0.02
Lagoon Pond Road Parking Lot	Bioretention island	0.01

Under both alternatives assessed, the proposed conceptual design for State Road Vacant Lot, Causeway Road 1, and Park North does not change. The State Road Lot conceptual design calls for subsurface infiltration chambers that divert stormwater from the existing drainage pipe in State Road. The Causeway Road 1 conceptual design draws water off of the Causeway Road surface via an inlet flume into a sediment forebay. Stormwater then goes into a bioretention area on the northern side of the existing sidewalk before draining into a wet swale on the southern side of the existing sidewalk. The Park North conceptual designs (referred to as the 'Park's Low Point' in previous tasks) calls for a gravel wetland on the north side of the existing sidewalk. The conceptual designs for State Road Vacant Lot and Park North are similar to those presented previously. During this stage of the project the designs have been advanced and the orientation of the underground chambers for State Road Vacant Lot has been shifted (see Appendix C for State Road Vacant Lot Conceptual Designs).

For the first alternative, SCMs were designed to maximize the amount of stormwater treatment (reference Appendix A for the Alternative 1 plan set). In this alternative, existing recreational uses were moved to other areas of Veterans Memorial Park where feasible. Existing recreational uses that are unable to be shifted to other areas were removed in this alternative. The conceptual designs for Causeway Road 2 include an 'Extended Detention (ED) Constructed Wetland,' a walking path, and a boardwalk crossing. Stormwater is brought into this SCM by being diverted from the existing drainage pipe in Causeway Road. Due to this SCM's extent and location, the playground and swing set currently in this location, are proposed to be shifted to the northeast corner of the Park. The Causeway Road 3 conceptual design (referred to as 'Recreation Courts; in previous tasks) is another ED Constructed Wetland in the area currently occupied by the basketball and volleyball courts. These courts are to be removed from the Park under this alternative. The final conceptual design for this alternative, the Lagoon Pond Road parking lot, calls for a bioretention area between the parking lot and the baseball diamond. This would involve shifting the baseball diamond and associated structures to the north and re-grading the parking lot to direct stormwater to the SCM.

In the second alternative, SCMs were designed to incorporate existing recreational uses of Veterans Memorial Park (reference Appendix B for the Alternative 2 plan set). This includes designing smaller SCMs, which would treat less stormwater, shifting existing recreational uses, and designing around existing recreational uses. This alternative's conceptual designs for Causeway Road 2 and Causeway Road 3 are still ED Constructed Wetlands. However, they are much smaller in size. With these designs the playground is able to remain in place, the swing set is shifted slightly to remain in this vicinity, and the basketball court is re-oriented and shifted to the north. The volleyball court is proposed for removal. The conceptual design for Lagoon Pond Road continues to be a bioretention area of the same size, but shifted to be in the center of the parking lot instead of between the parking lot and baseball diamond. The baseball diamond and associated structures do not need to be shifted and the parking lot would only need minimal regrading.

The third alternative assessed as part of this work is the "do-nothing" alternative. In this alternative no SCMs are built and all recreational amenities remain in place.

Alternatives Matrix

Table 2: Alternatives Matrix

	Maximize Stormwater (Alternative 1)	Retain Recreation (Alternative 2)	Do-nothing Alternative
Soccer	Yes	Yes	Yes
Baseball	Yes – Eastern field needs to be shifted north	Yes	Yes
Basketball	No	Yes	Yes
Volleyball	No	No	Yes
Playground	Yes – moved to NE corner of Park	Yes	Yes*
Swing set	Yes – moved to NE corner of Park	Yes – shifted slightly in same vicinity	Yes*
Beach Road Music Festival	Yes	Yes	Yes*
Car Show	Yes	Yes	Yes*
Stormwater treatment of 1-inch storm	Moderate	Some	None
Nitrogen Removal	54 kg/year	33 kg/year	0 kg/year
Habitat creation	Yes	Yes	No
Educational Opportunity	Yes	Yes	No
Construction Cost	\$927,000	\$786,000	\$0
Sea Level Rise/Storm Surge Protection	No	No	No

*While these recreational uses would remain, stormwater runoff will continue to interfere with these uses after storm events

Cost/Benefit Analysis

Maximize Stormwater Alternative 1

There are many benefits associated with this alternative. If fully implemented, it will create a significant amount of wetlands habitat. Wetlands habitat provides a number of ecosystem services, including nitrogen attenuation. It is estimated that this alternative will lead to the removal of approximately 54 kilograms of nitrogen per year from stormwater runoff. It is important to note that this analysis utilizes methodology in accordance with the Massachusetts Small MS4 General Permit. Simple infiltration of surface runoff at State Road Vacant Lot will achieve minimal removal of nitrogen in groundwater. In order to achieve the estimated nitrogen removal from the performance curves in the MS4 General Permit, advanced designs will need to include a nitrogen removing filter media such as a wood-chip layer or other carbon source. If this is not incorporated into future designs then the total nitrogen removal Alternative 1 is closer to 33 kilograms of nitrogen per year.

In addition to the ecosystem services that wetlands habitats provide, designs under this alternative allow for passive recreational and educational opportunities. Importantly, these conceptual designs will handle a significant amount of the stormwater runoff from impervious surfaces within the watershed to Veterans Memorial Park in a 1-inch storm (Table 3). In part due to other SCMs being eliminated from consideration there is no alternative that is able to handle 100% of stormwater runoff during a 1-inch storm.

Table 3: Stormwater Volume From 1-inch Storm Handled Under Maximize Stormwater Alternative 1

SCM Name and Location	% Stormwater Volume
Causeway Road 1	17%
Causeway Road 2	97%
Causeway Road 3 (Recreation Courts)	67%
State Road Vacant Lot	74%
Park North (Low Point)	102%
Lagoon Pond Road Parking Lot	115%

Not all current recreational uses of Veterans Memorial Park will be able to continue with this alternative. The design for Causeway Road 3 utilizes space currently occupied by the volleyball and basketball courts. There is not enough space within the Park to relocate either of these amenities. In order to allow for continued use of the remaining existing recreational uses the eastern baseball field will need to be shifted slightly to the north to accommodate this

alternative’s Lagoon Pond Road design and the playground and swing set will need to be relocated to the northeast corner of the park to accommodate this alternative’s Causeway Road 2 design.

Under this alternative there is planning-level estimated construction cost of \$927,000. A breakdown of costs per SCM for this alternative is included in Appendix D. This breakdown separates costs out into site clearing and preparation costs, site and drainage improvement costs, and landscape improvement costs. The total costs for each SCM are

- Causeway Road 1 - \$136,000
- Causeway Road 2 - \$209,000
- Causeway Road 3 (Recreation Courts) - \$142,000
- State Road Vacant Lot - \$167,000
- Park North (Low Point) - \$108,000
- Lagoon Pond Road - \$165,000

In addition to direct construction costs for the SCMs, there are also costs associated with moving the playground and swing set to the northeast corner of the Park and significant costs associated with shifting the baseball field to the north. There is also a reasonably high cost associated with regrading the Lagoon Pond Road parking lot. This regrading is essential to ensure stormwater is directed into the SCM.

Retain Recreation Alternative 2

This alternative provides many of the same benefits as Maximize Stormwater Alternative 1, but in different quantities. It will create wetlands habitat and allow for passive recreational and educational opportunities, but to a much lesser extent. It will also handle less stormwater runoff than Maximize Stormwater Alternative 1 (Table 4). As a result, it will also lead to less nitrogen removal. This alternative is estimated to remove 42 kilograms per year of nitrogen from stormwater runoff to Veterans Memorial Park. For the reasons described in Alternative 1, if enhanced N removal is not incorporated into future designs then the nitrogen removal of this alternative is closer to 21 kilograms of nitrogen per year.

Table 4: Stormwater Volume From 1-inch Storm Under Retain Recreation Alternative

SCM Name and Location	% Stormwater Handled
Causeway Road 1	17%
Causeway Road 2	59%
Causeway Road 3 (Recreation Courts)	41%
State Road Vacant Lot	74%

Park North (low point)	102%
Lagoon Pond Road Parking Lot	115%

Most current recreational uses of the Park will continue under this alternative. Both baseball fields and the playground will be able to remain in place and the basketball court could be shifted on-site (note other locations than the one shown might be appropriate given further assessment. While it will need to be shifted slightly the swing set will be able to remain in the vicinity of the playground. There is not enough space, however, to accommodate both baseball fields, the basketball court, the soccer fields, and volleyball even under this alternative. While most of those amenities will remain, there is no volleyball court under this alternative. It is also important to note that the reduction in stormwater treatment under this alternative will impact the use and enjoyment of amenities at the Park. There may be some puddling and wet areas of Veterans Memorial Park after rainfall events that exceed the capacity of these SCM designs, depending on the design approach (i.e., on-line versus off-line).

Under this alternative there is a planning level estimated construction cost of \$786,000. A breakdown of costs per SCM similar to that provided for Alternative 1 is included in Appendix E. The total costs per SCM for this alternative are

- Causeway Road 1 - \$136,000
- Causeway Road 2 - \$158,000
- Causeway Road 3 (Recreation Courts) - \$154,000
- State Road Vacant Lot - \$167,000
- Park North (Low Point) - \$108,000
- Lagoon Pond Road - \$63,000

In this alternative Causeway Road 2 and Lagoon Pond Road are less expensive. For Causeway Road 2 this is due to the smaller size of this SCM as compared to the design in Alternative 1. For Lagoon Pond Road the cost is lower because under this alternative there is no need to shift the baseball diamond and associated infrastructure and minimal regrading of the parking lot is required. The conceptual designs for Causeway Road 3 (Recreation Courts) are more expensive under this alternative. While the conceptual designs for this SCM are smaller than in Alternative 1 these plans call for rebuilding the basketball court in a new location. Estimated construction costs for this SCM would be lower than in the Maximize Stormwater Alternative if the basketball court was not rebuilt.

Do-Nothing Alternative

The initial cost for this alternative is zero, but there are costs associated with doing nothing. Messy field conditions after rainfall events will continue to occur. In 2022, an extreme rainfall event coincided with the Beach Road Music Festivals use of Veterans Memorial Park. As a result, the fields were left in such poor condition that youth soccer was not able to play at the Park in the fall season. While not assessed as a part of this memorandum, there is a cost

associated with repairing the field so that recreation can continue at the Park. In addition, standing water at the playground and swing set will continue to deter recreational use of those amenities (Figure 1).



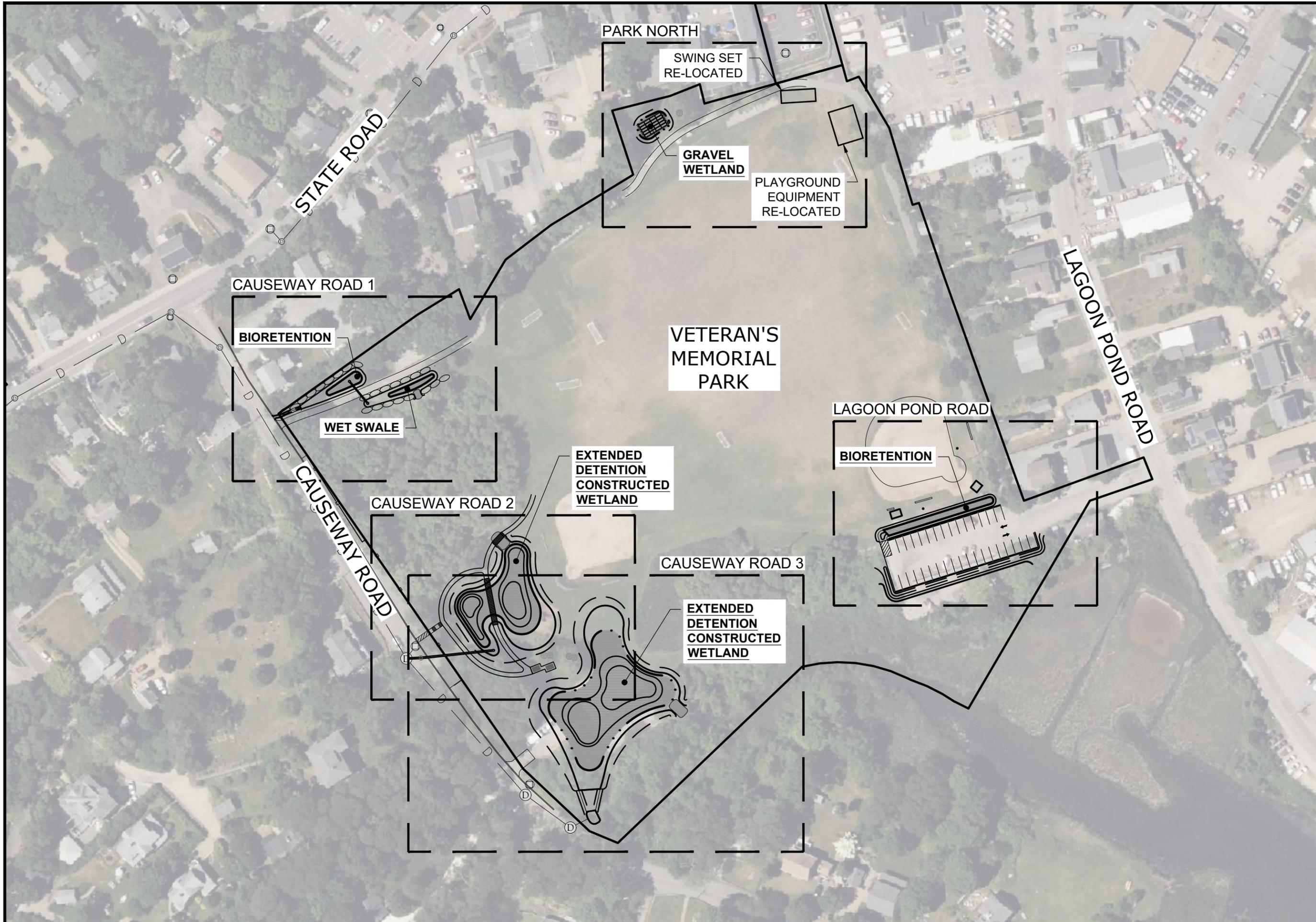
Figure 1 Standing Water at the Park's Playground During Site Reconnaissance

Under dry conditions, this alternative allows for all existing recreational uses of the park to remain. However this alternative provides for no stormwater treatment, no habitat creation, no nitrogen removal, and no educational opportunities. If no SCMs are constructed, current recreational uses of the park will be in conflict with both stormwater and each other. This is because the Park is currently, and will continue to be with this alternative, poorly drained which impacts current and future uses of the area.

There will also be a lost opportunity cost associated with this alternative's lack of nitrogen removal. Veterans Memorial Park sits in the watershed for Lagoon Pond. Lagoon Pond is impaired and has a Total Maximum Daily Load (TMDL) for Total Nitrogen (TN) that was promulgated in 2015. Stormwater runoff from impervious surfaces contributes 11% of the controllable nitrogen sources to Lagoon Pond. At the time of this memorandum efforts are underway by the Massachusetts Department of Environmental Protection to classify any watershed with a TMDL as a "Nitrogen Sensitive Area". If enacted as currently proposed, this classification would require one of two things: 1) Every home with an on-site septic system in a Nitrogen Sensitive Area must upgrade to "best available nitrogen reducing technology" within five years; or 2) a community in a Nitrogen Sensitive Area must obtain a Department of Environmental Protection approved Watershed Permit. In order to be approved for a Watershed

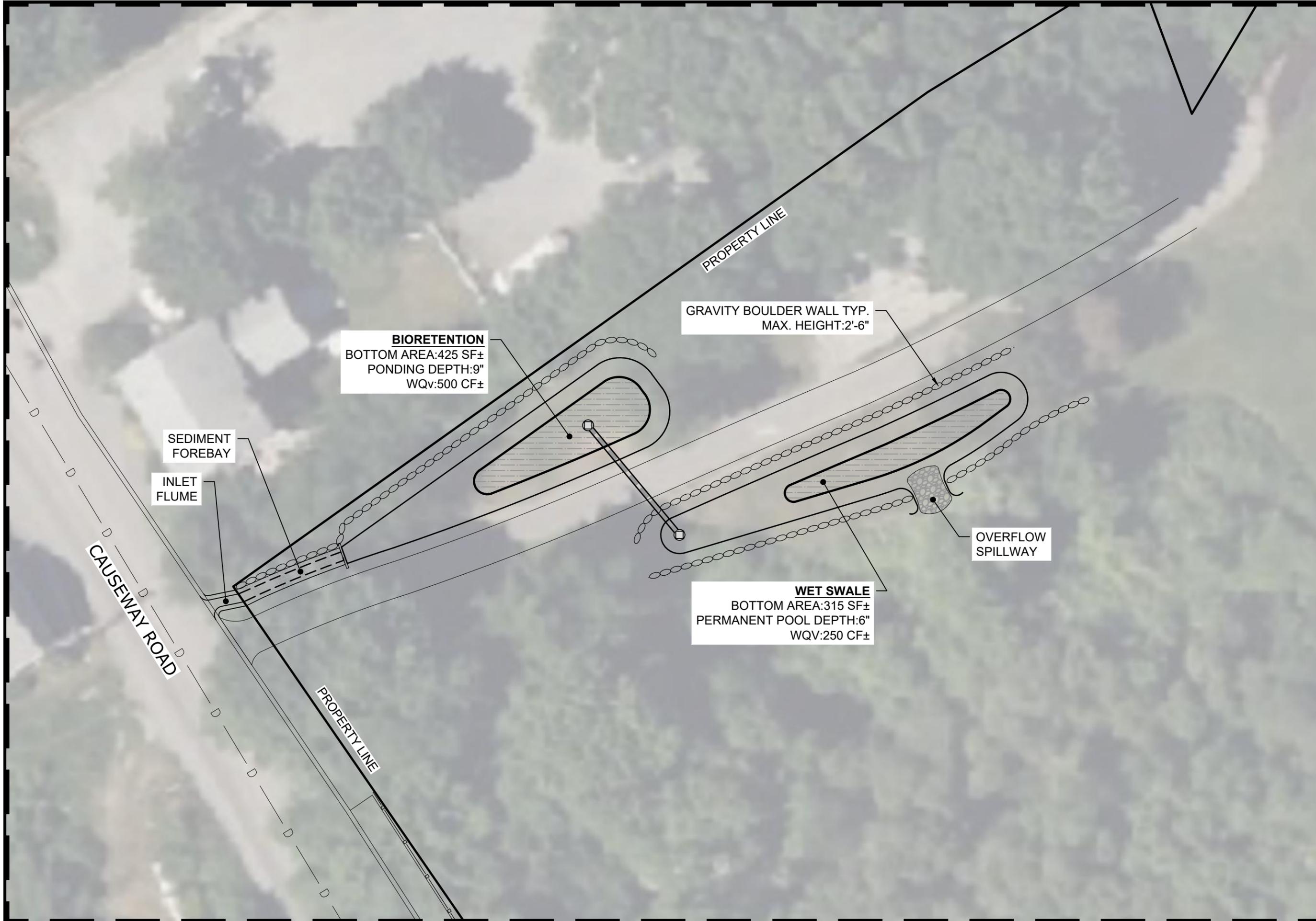
Permit, the community must demonstrate that it can achieve a 75% reduction in the excess nitrogen load within twenty years. By removing zero nitrogen this alternative does not help the Town of Tisbury meet the requirements to obtain a Watershed Permit, should the Town choose to go that route. Alternatives 1 and 2, however, provide cost effective nitrogen removal in addition to the stormwater and habitat benefits they provide.

Appendix A:
Alternative 1 Conceptual Level Designs

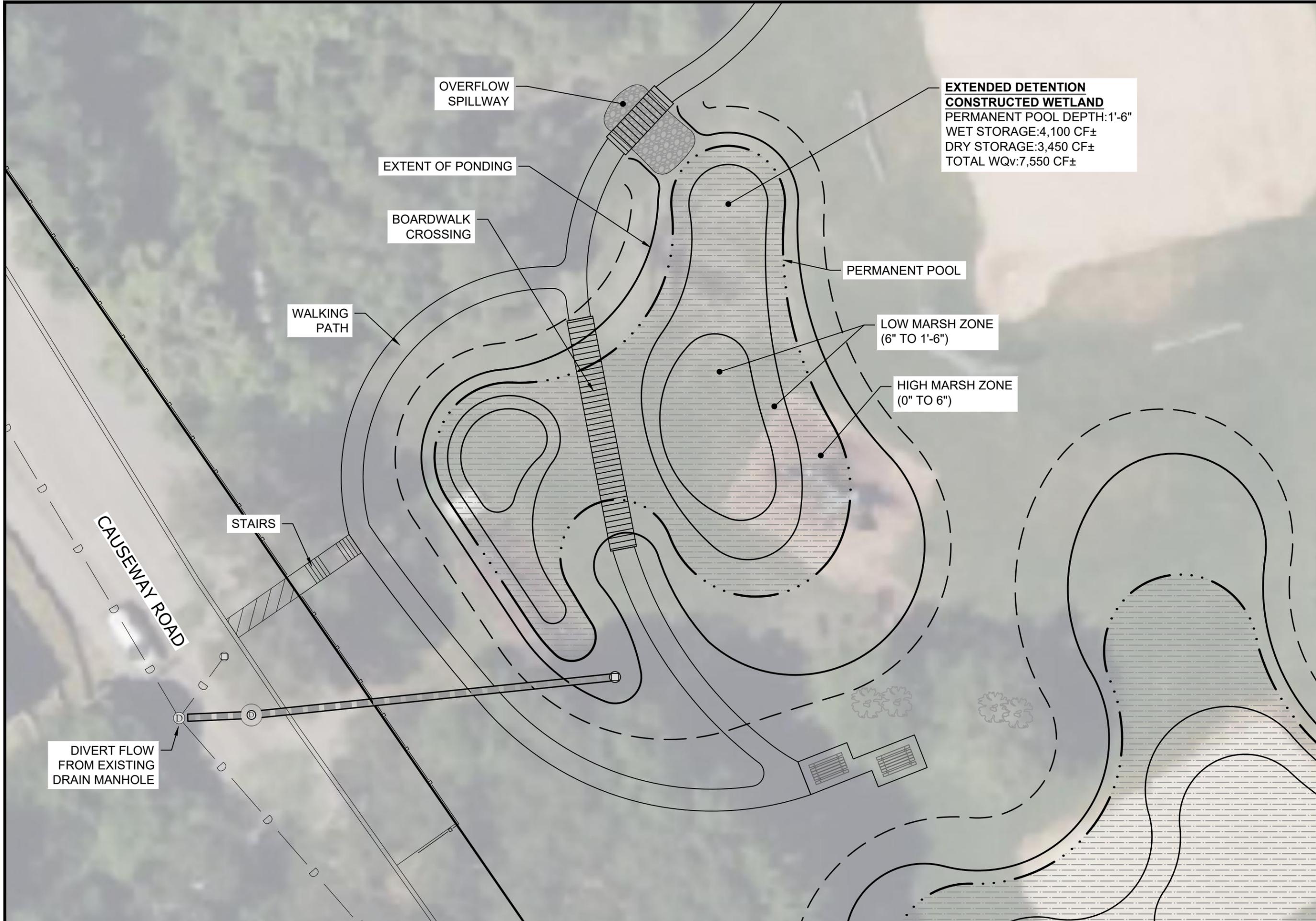


Prepared For: Tisbury Open Space & Rec. Committee 68 High Point Lane Tisbury, MA 02588 Phone: 508-686-4270 Fax:		Date: MAY 2023 Drawn By: MCL Design By: MCL Checked By: RAC	
Project Number: 20090		Revisions	
Sheet Number: 1 of 6		Horsley Witten Group, Inc. Sustainable Environmental Solutions www.horsleywitten.com 90 Route 6A Sandwich, MA 02563 508-833-6600 voice 508-833-3750 fax	
Veteran's Memorial Park 25% Preliminary Concepts (ALT1) Tisbury, Massachusetts		PARK OVERALL	

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<p>Date: MAY 2023</p>																							
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<p>VETERAN'S MEMORIAL PARK 25% PRELIMINARY CONCEPTS (ALT1) TISBURY, MASSACHUSETTS CAUSEWAY 1</p>																							
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DIVERT FLOW FROM EXISTING DRAIN MANHOLE

CAUSEWAY ROAD

STAIRS

WALKING PATH

BOARDWALK CROSSING

EXTENT OF PONDING

OVERFLOW SPILLWAY

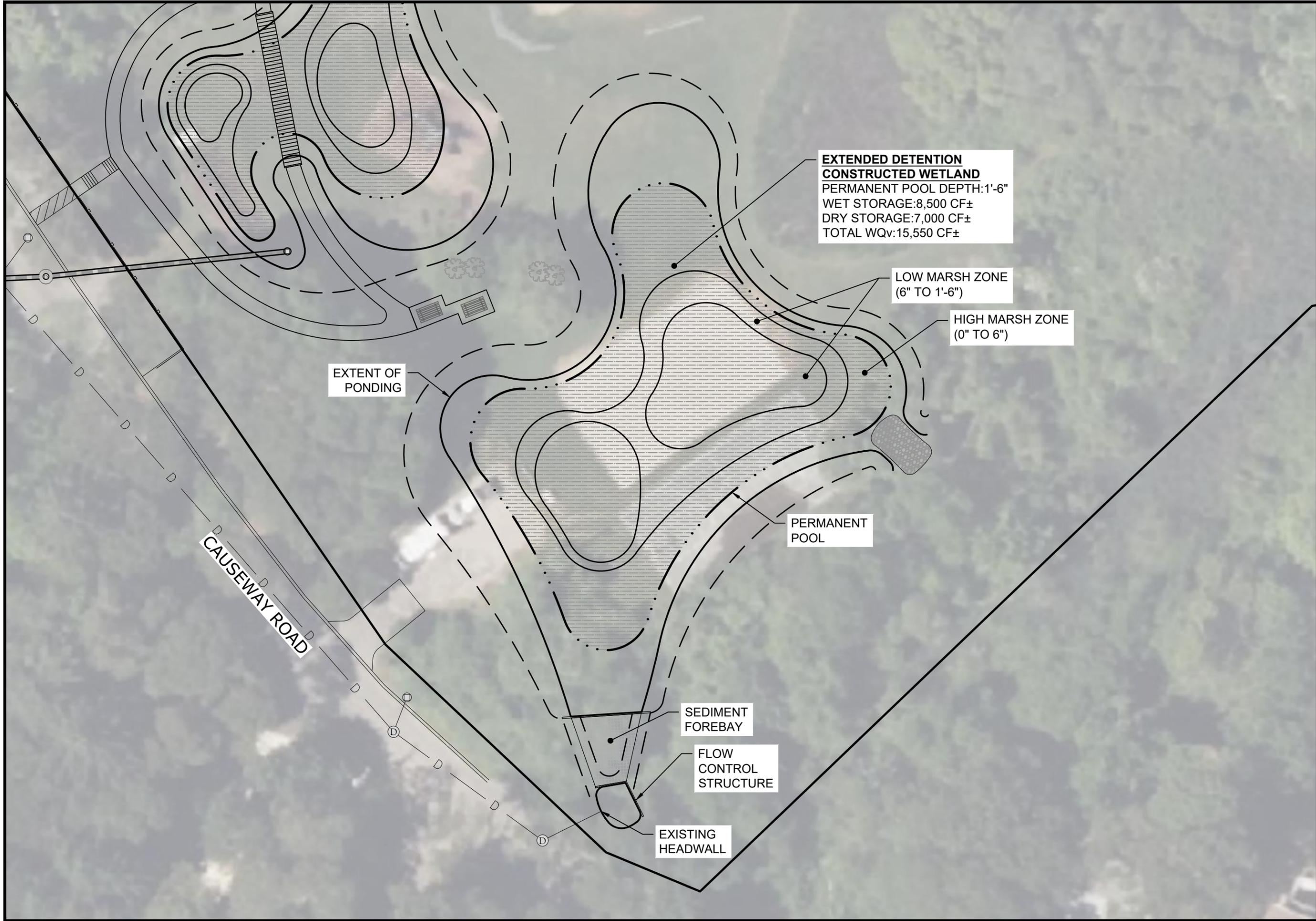
PERMANENT POOL

LOW MARSH ZONE (6" TO 1'-6")

HIGH MARSH ZONE (0" TO 6")

**EXTENDED DETENTION
CONSTRUCTED WETLAND**
PERMANENT POOL DEPTH: 1'-6"
WET STORAGE: 4,100 CF±
DRY STORAGE: 3,450 CF±
TOTAL WQv: 7,550 CF±

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<p>Survey & Preliminary Layout Provided By: Horsley Witten Group, Inc. Sustainable Environmental Solutions www.horsleywitten.com 90 Route 6A Sandwich, MA 02563 508-833-6600 voice 508-833-3750 fax</p>		<p>Sheet Number: 3 of 6</p>											
<p>Drawn By: MCL Checked By: RAC</p>		<p>Date: MAY 2023</p>											
<p>Design By: MCL</p>		<p>Project Title: VETERAN'S MEMORIAL PARK 25% PRELIMINARY CONCEPTS (ALT1) TISBURY, MASSACHUSETTS CAUSEWAY 2</p>											
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**EXTENDED DETENTION
CONSTRUCTED WETLAND**
 PERMANENT POOL DEPTH: 1'-6"
 WET STORAGE: 8,500 CF±
 DRY STORAGE: 7,000 CF±
 TOTAL WQV: 15,550 CF±

**LOW MARSH ZONE
(6" TO 1'-6")**

**HIGH MARSH ZONE
(0" TO 6")**

**EXTENT OF
PONDING**

**PERMANENT
POOL**

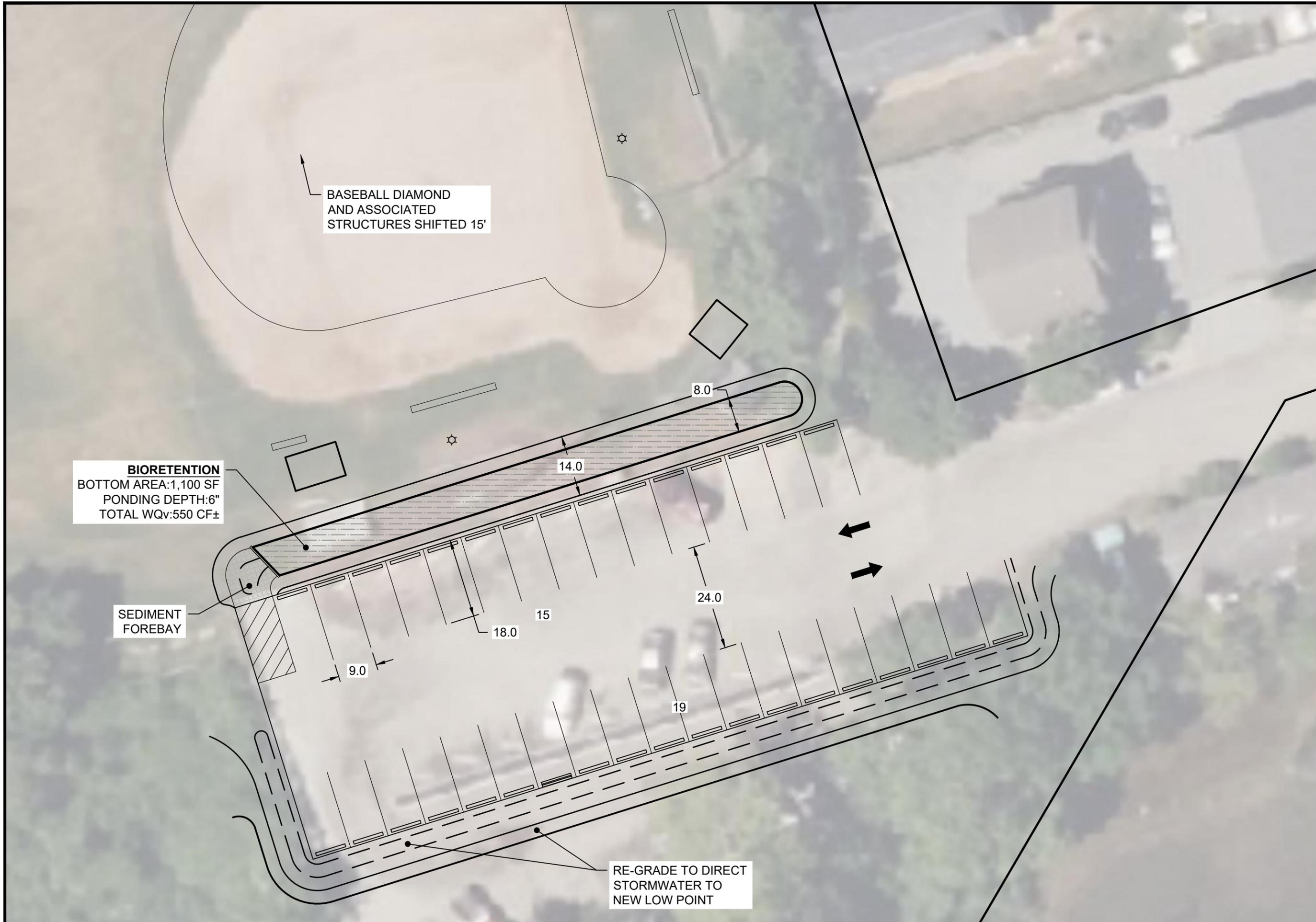
CAUSEWAY ROAD

**SEDIMENT
FOREBAY**

**FLOW
CONTROL
STRUCTURE**

**EXISTING
HEADWALL**

Prepared For: Tisbury Open Space & Rec. Committee 66 High Point Lane Tisbury, MA 02588 Phone: --- Fax: ---		Date: MAY 2023 Design By: MCL Drawn By: MCL Checked By: RAC	
Survey & Preliminary Layout Provided By:		Revisions	
Project Number: 20090		By / Appr. / Description	
Sheet Number: 4 of 6		Title: VETERAN'S MEMORIAL PARK 25% PRELIMINARY CONCEPTS (ALT1) TISBURY, MASSACHUSETTS CAUSEWAY 3	
Prepared By: Horsley Witten Group, Inc. Sustainable Environmental Solutions www.horsleywitten.com 90 Route 6A Sandwich, MA 02563 508-833-6600 voice 508-833-3750 fax		Revisions Table:	



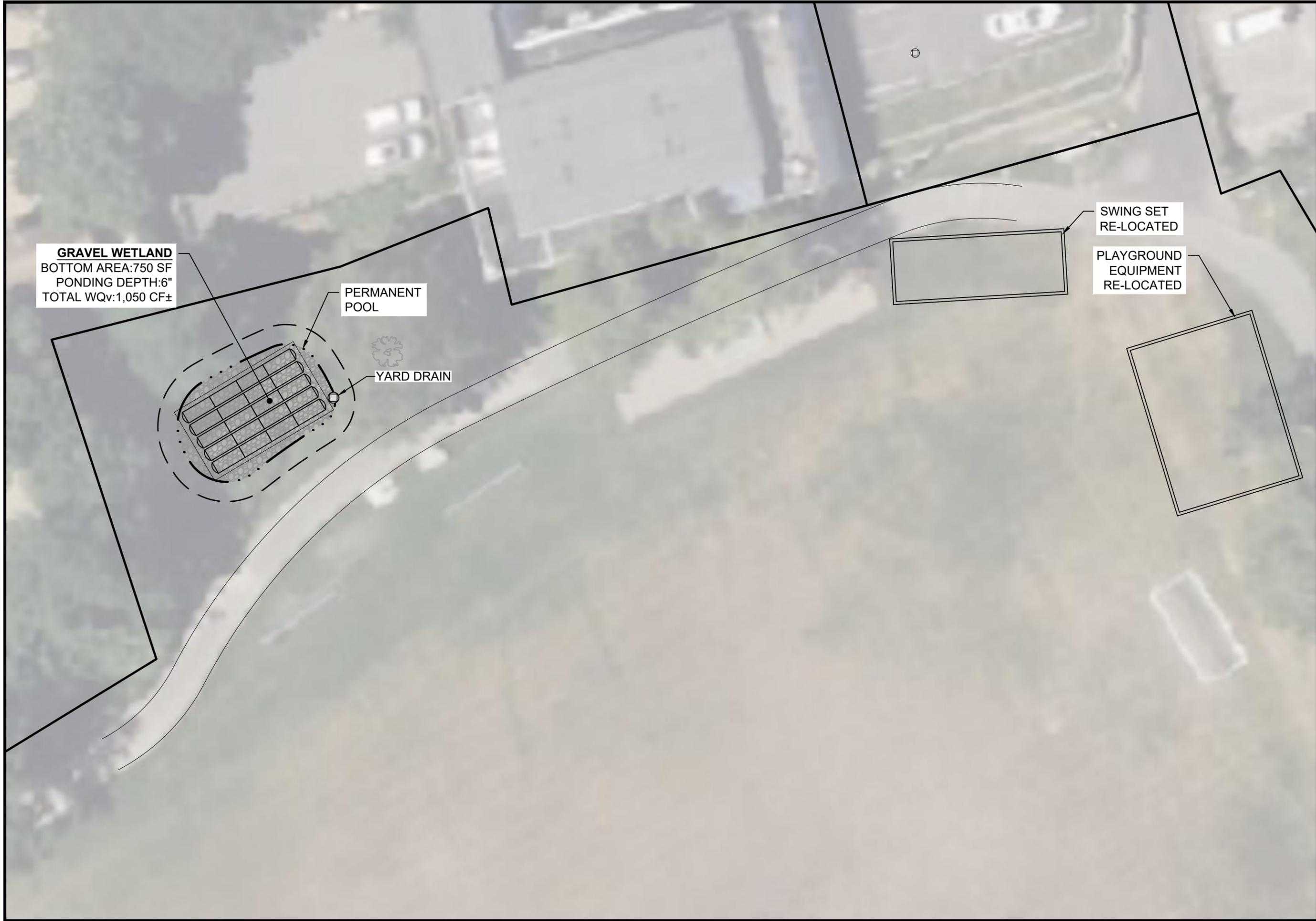
BASEBALL DIAMOND AND ASSOCIATED STRUCTURES SHIFTED 15'

BIORETENTION
BOTTOM AREA: 1,100 SF
PONDING DEPTH: 6"
TOTAL WQv: 550 CF±

SEDIMENT FOREBAY

RE-GRADE TO DIRECT STORMWATER TO NEW LOW POINT

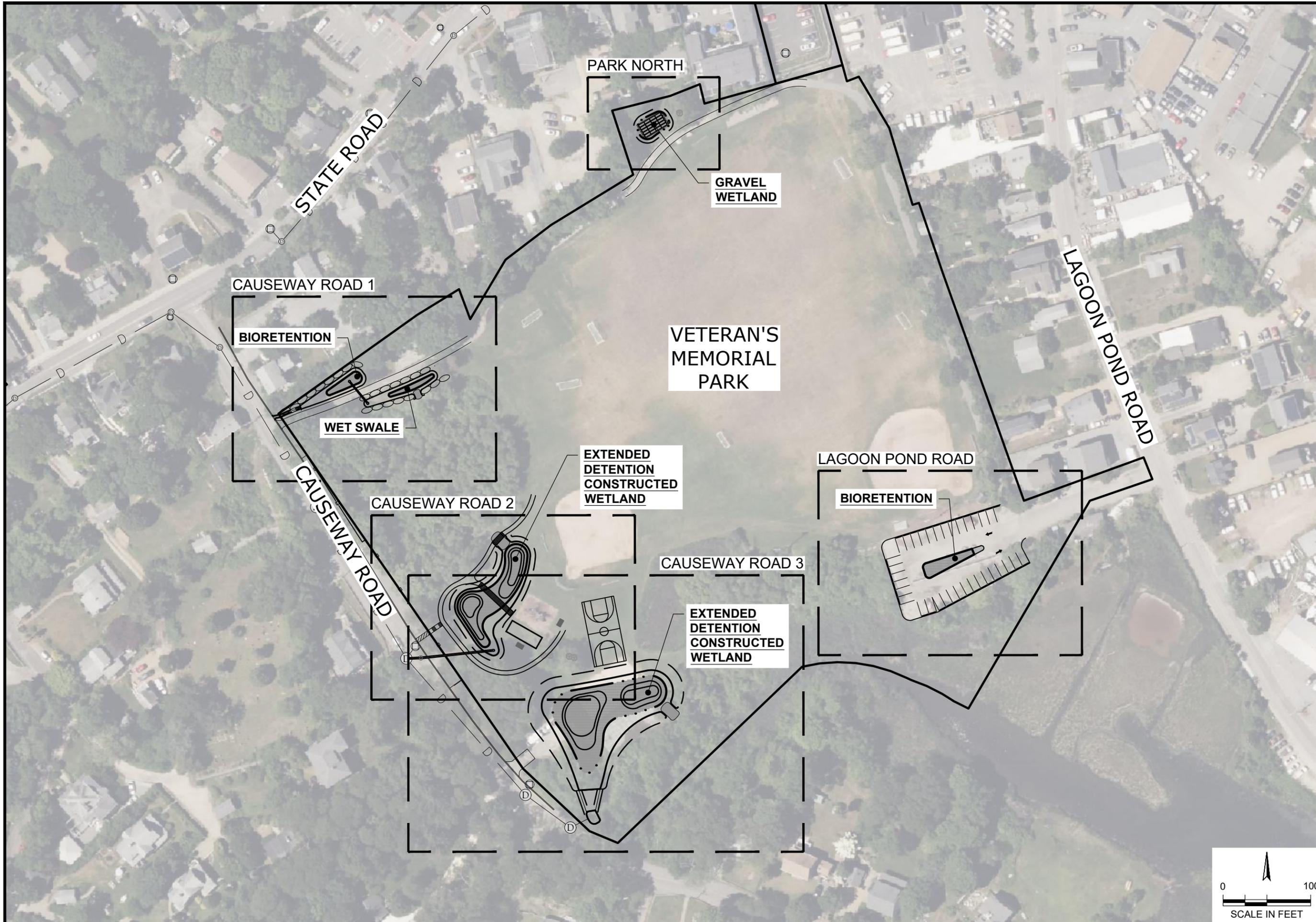
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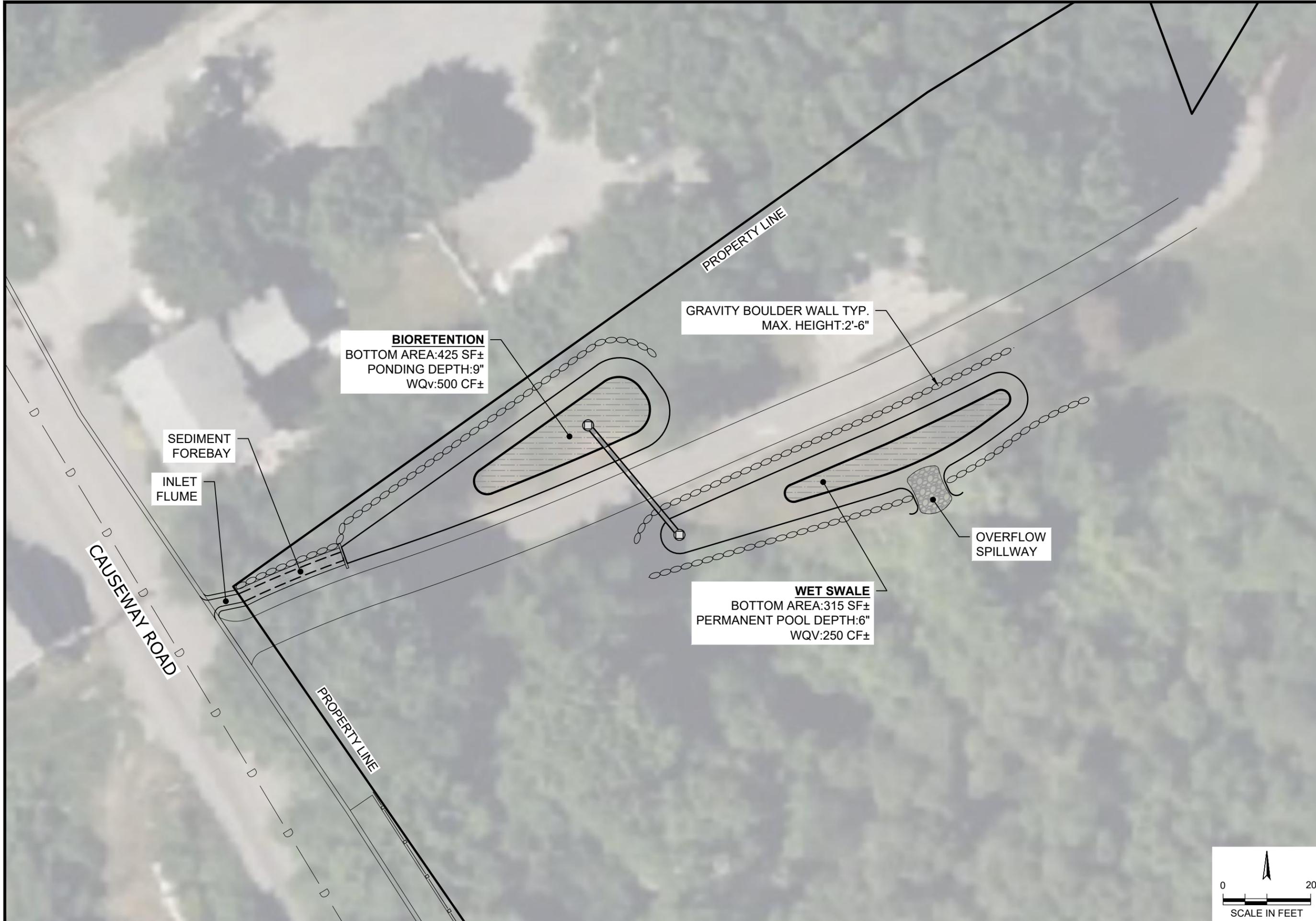
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Sheet Number: 6 of 6	
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Print Set: VETERAN'S MEMORIAL PARK 25% PRELIMINARY CONCEPTS (ALT1) TISBURY, MASSACHUSETTS	
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Project Title: PARK NORTH	
Company Information: Horsley Witten Group, Inc. Sustainable Environmental Solutions www.horsleywitten.com 90 Route 6A Sandwich, MA 02563 508-833-6600 voice 508-833-3750 fax	

Appendix B:
Alternative 2 Conceptual Level Designs

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Print Set: VETERAN'S MEMORIAL PARK 25% PRELIMINARY CONCEPTS (ALT2) TISBURY, MASSACHUSETTS		Print Title: PARK OVERALL											



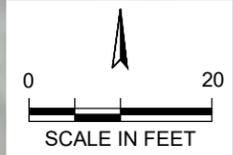
BIORETENTION
 BOTTOM AREA: 425 SF±
 PONDING DEPTH: 9"
 WQV: 500 CF±

GRAVITY BOULDER WALL TYP.
 MAX. HEIGHT: 2'-6"

WET SWALE
 BOTTOM AREA: 315 SF±
 PERMANENT POOL DEPTH: 6"
 WQV: 250 CF±

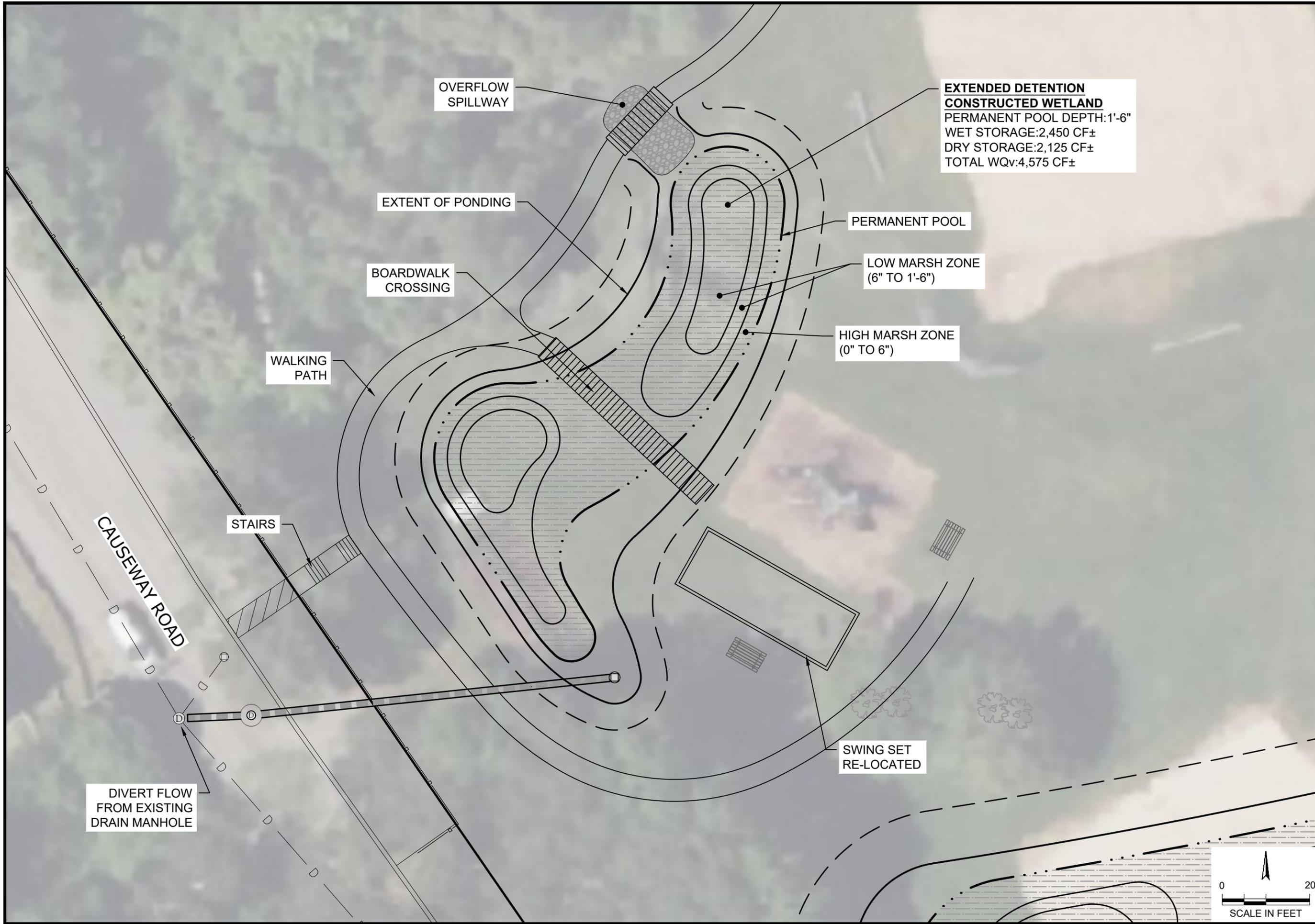
SEDIMENT FOREBAY
INLET FLUME

OVERFLOW SPILLWAY



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**EXTENDED DETENTION
CONSTRUCTED WETLAND**
 PERMANENT POOL DEPTH: 1'-6"
 WET STORAGE: 2,450 CF±
 DRY STORAGE: 2,125 CF±
 TOTAL WQV: 4,575 CF±

PERMANENT POOL

LOW MARSH ZONE
(6" TO 1'-6")

HIGH MARSH ZONE
(0" TO 6")

OVERFLOW
SPILLWAY

EXTENT OF PONDING

BOARDWALK
CROSSING

WALKING
PATH

STAIRS

CAUSEWAY ROAD

DIVERT FLOW
FROM EXISTING
DRAIN MANHOLE

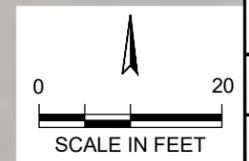
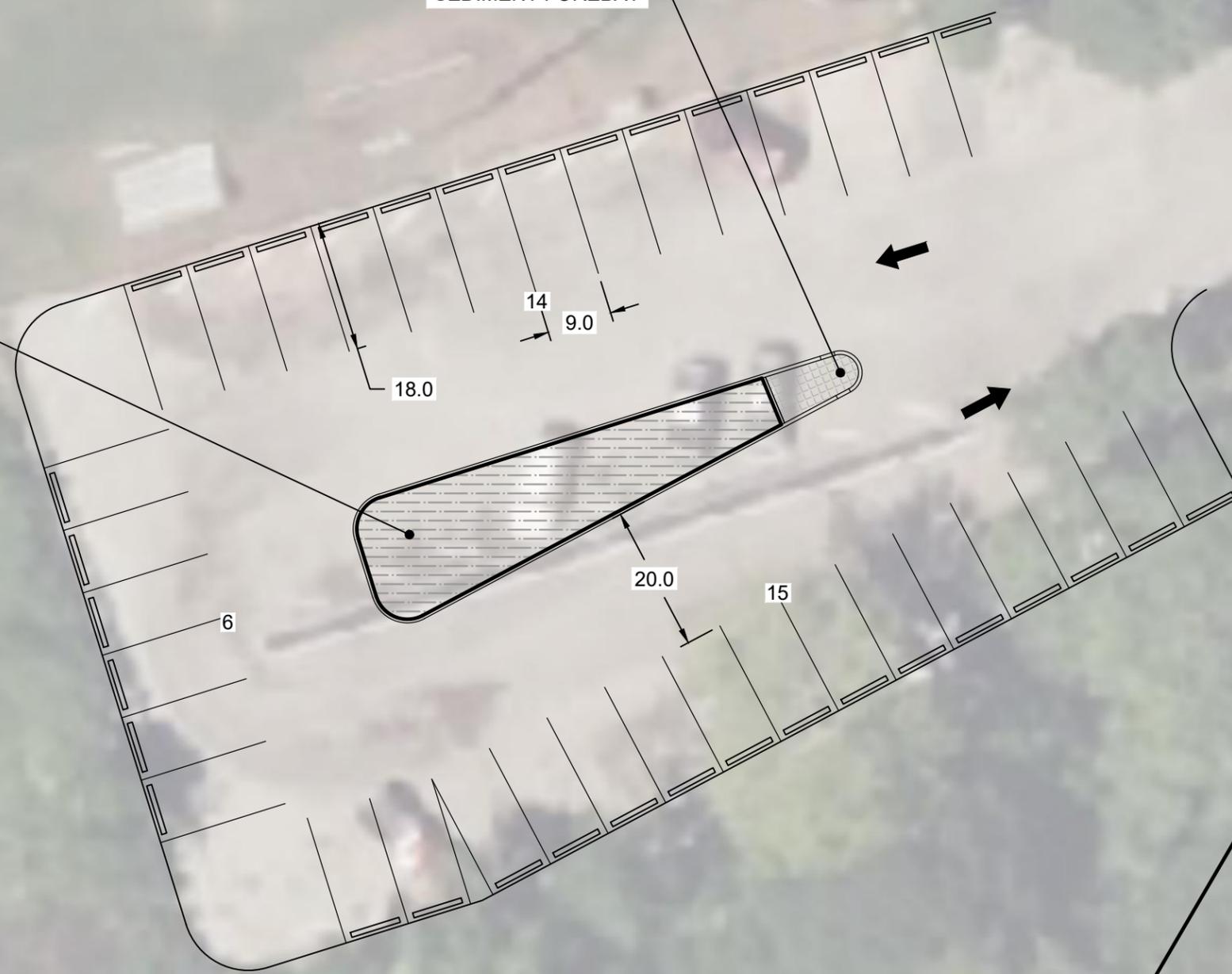
SWING SET
RE-LOCATED



<p>Revisions</p> <table border="1"> <thead> <tr> <th>Rev.</th> <th>Date</th> <th>By</th> <th>Description</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>		Rev.	Date	By	Description																																								
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<p>Horsley Witten Group, Inc. Sustainable Environmental Solutions www.horsleywitten.com 90 Route 6A Sandwich, MA 02563 508-833-6600 voice 508-833-3750 fax</p>																																													
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<p>CAUSEWAY 2</p>																																													

BIORETENTION
 BOTTOM AREA: 750 SF
 PONDING DEPTH: 9"
 TOTAL WQv: 550 CF±

SEDIMENT FOREBAY



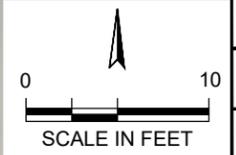
Prepared For: Tisbury Open Space & Rec. Committee 68 High Point Lane Tisbury, MA, 02588 Phone: 508-686-4270 Fax:	Project Number: 20090	Date: MAY 2023 Design By: MCL Drawn By: MCL Checked By: RAC	Revisions <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Rev.</th> <th>Date</th> <th>By</th> <th>Appr.</th> <th>Description</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>	Rev.	Date	By	Appr.	Description																																																			Horsley Witten Group, Inc. Sustainable Environmental Solutions www.horsleywitten.com 90 Route 6A Sandwich, MA 02563 508-833-6600 voice 508-833-3750 fax
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Project Number: 20090		Sheet Number: 5 of 6																																																									



GRAVEL WETLAND
 BOTTOM AREA: 750 SF
 PONDING DEPTH: 6"
 TOTAL WQv: 1,050 CF±

PERMANENT
 POOL

YARD DRAIN

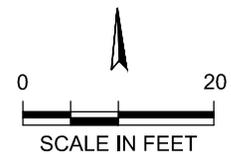
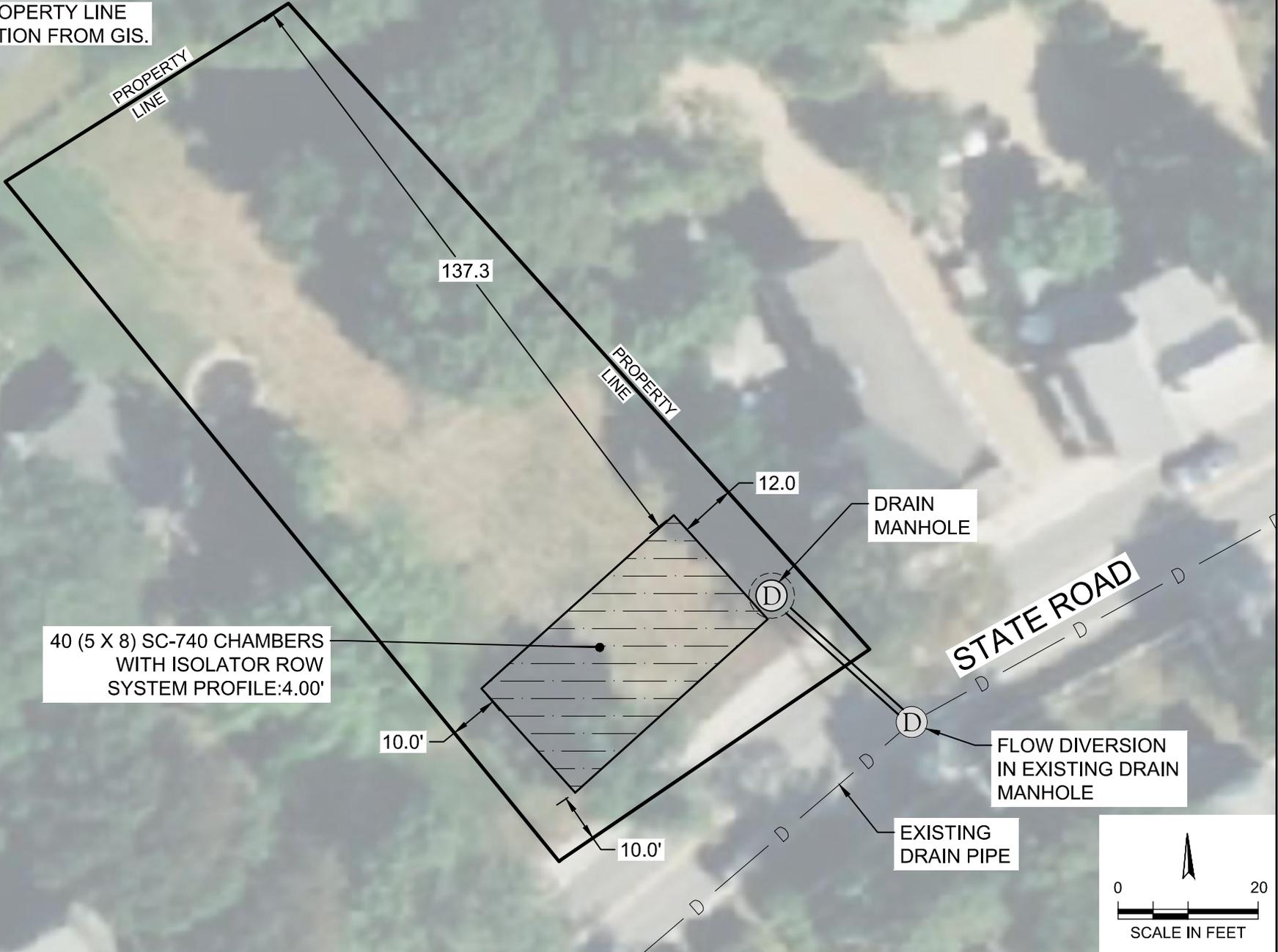


Prepared For: Tisbury Open Space & Rec. Committee 68 High Point Lane Weymouth, MA 02588 Phone: 508-686-4270 Fax: ----		Date: MAY 2023 Design By: MCL Drawn By: MCL Checked By: RAC																																																								
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Horsley Witten Group, Inc.
 Sustainable Environmental Solutions
 www.horsleywitten.com
 90 Route 6A
 Sandwich, MA 02563
 508-833-6600 voice
 508-833-3750 fax

Appendix C:
State Road Vacant Lot Conceptual Designs

NOTE: PROPERTY LINE INFORMATION FROM GIS.



Title:		
STATE ROAD LOT		
Project:	Sheet:	Date:
20090	1	APRIL 2023
Design By:	Drawn By:	Checked By:
MCL	MCL	RAC

Project:

**STORMWATER RETROFITS
25% CONCEPT PLANS
TISBURY, MASSACHUSETTS**

Prepared For:

Tisbury Open Space & Rec. Committee
66 High Point Lane
Vineyard Haven, MA 02568
Phone: --
Fax: --

Design By:

Horsley Witten Group, Inc.
Sustainable Environmental Solutions
www.horsleywitten.com
90 Route 6A
Sandwich, MA 02563
508-833-6600 voice
508-833-3150 fax



Appendix D:
Alternative 1 Planning Level Estimated
Construction Costs

Project: Veteran's Memorial Park (ALT1)
Location: Tisbury, MA
Project #: 22090

Horsley Witten Group
Sustainable Environmental Solutions



Submission: Engineer's Opinion of Probable Cost 25%
Date: May 2023

Estimator: MCL
Checked By: RAC

25% OPINION OF PROBABLE COST

CAUSEWAY 1

\$136,000

Unit	Quantity	Unit Cost	Total Cost
------	----------	-----------	------------

Site Clearing and Preparation **\$37,800**

Site and Drainage Improvements **\$66,800**

Landscape Improvements **\$7,900**

CONSTRUCTION COSTS		Total Cost
		\$113,000
Contingency	20%	\$23,000
TOTAL CONSTRUCTION COSTS		\$136,000

TOTAL ESTIMATED COST **\$136,000**

ASSUMPTIONS & NOTES:

1. Price assumes no hazardous material removal.

Qualifications:

The following items are not included in the scope of work:
Street Opening Permits / Bonds For Off Site Work
Police / Traffic Details
Lighting
Temporary Water
Permitting
Soil Management Plan

Project: Veteran's Memorial Park (ALT1)
Location: Tisbury, MA
Project #: 22090

Horsley Witten Group
Sustainable Environmental Solutions



Submission: Engineer's Opinion of Probable Cost 25%
Date: May 2023

Estimator: MCL
Checked By: RAC

25% OPINION OF PROBABLE COST

CAUSEWAY 2

\$209,000

Unit	Quantity	Unit Cost	Total Cost
------	----------	-----------	------------

Site Clearing and Preparation **\$62,900**

Site and Drainage Improvements **\$75,300**

Landscape Improvements **\$35,400**

		Total Cost
CONSTRUCTION COSTS		\$174,000
Contingency	20%	\$35,000
TOTAL CONSTRUCTION COSTS		\$209,000

TOTAL ESTIMATED COST **\$209,000**

ASSUMPTIONS & NOTES:

1. Price assumes no hazardous material removal.

Qualifications:

The following items are not included in the scope of work:
Street Opening Permits / Bonds For Off Site Work
Police / Traffic Details
Lighting
Temporary Water
Permitting
Soil Management Plan

Project: Veteran's Memorial Park (ALT1)
Location: Tisbury, MA
Project #: 22090

Horsley Witten Group
 Sustainable Environmental Solutions



Submission: Engineer's Opinion of Probable Cost 25%
Date: May 2023

Estimator: MCL
Checked By: RAC

25% OPINION OF PROBABLE COST

CAUSEWAY 3 \$142,000

Unit	Quantity	Unit Cost	Total Cost
------	----------	-----------	------------

Site Clearing and Preparation \$47,200

Site and Drainage Improvements \$32,900

Landscape Improvements \$37,700

		Total Cost
CONSTRUCTION COSTS		\$118,000
Contingency	20%	\$24,000
TOTAL CONSTRUCTION COSTS		\$142,000

TOTAL ESTIMATED COST \$142,000

ASSUMPTIONS & NOTES:

1. Price assumes no hazardous material removal.

Qualifications:

The following items are not included in the scope of work:
 Street Opening Permits / Bonds For Off Site Work
 Police / Traffic Details
 Lighting
 Temporary Water
 Permitting
 Soil Management Plan

Project: Veteran's Memorial Park
Location: Tisbury, MA
Project #: 22090



Submission: Engineer's Opinion of Probable Cost 25%
Date: May 2023

Estimator: MCL
Checked By: RAC

25% OPINION OF PROBABLE COST

STATE STREET VACANT LOT \$167,000

Unit	Quantity	Unit Cost	Total Cost
------	----------	-----------	------------

Site Clearing and Preparation \$38,500

Site and Drainage Improvements \$97,100

Landscape Improvements \$2,500

		Total Cost
CONSTRUCTION COSTS		\$139,000
Contingency	20%	\$28,000
TOTAL CONSTRUCTION COSTS		\$167,000

TOTAL ESTIMATED COST \$167,000

ASSUMPTIONS & NOTES:

1. Price assumes no hazardous material removal.

Qualifications:

The following items are not included in the scope of work:
 Street Opening Permits / Bonds For Off Site Work
 Police / Traffic Details
 Lighting
 Temporary Water
 Permitting
 Soil Management Plan

Project: Veteran's Memorial Park (ALT1)
Location: Tisbury, MA
Project #: 22090

Horsley Witten Group
Sustainable Environmental Solutions



Submission: Engineer's Opinion of Probable Cost 25%
Date: May 2023

Estimator: MCL
Checked By: RAC

25% OPINION OF PROBABLE COST

LAGOON POND ROAD **\$165,000**

Unit	Quantity	Unit Cost	Total Cost
------	----------	-----------	------------

Site Clearing and Preparation **\$98,300**

Site and Drainage Improvements **\$32,500**

Landscape Improvements **\$5,600**

		Total Cost
CONSTRUCTION COSTS		\$137,000
Contingency	20%	\$28,000
TOTAL CONSTRUCTION COSTS		\$165,000

TOTAL ESTIMATED COST **\$165,000**

ASSUMPTIONS & NOTES:

1. Price assumes no hazardous material removal.

Qualifications:

The following items are not included in the scope of work:
Street Opening Permits / Bonds For Off Site Work
Police / Traffic Details
Lighting
Temporary Water
Permitting
Soil Management Plan

Project: Veteran's Memorial Park (ALT1)
Location: Tisbury, MA
Project #: 22090

Horsley Witten Group
 Sustainable Environmental Solutions



Submission: Engineer's Opinion of Probable Cost 25%
Date: May 2023

Estimator: MCL
Checked By: RAC

25% OPINION OF PROBABLE COST

PARK NORTH \$108,000

Unit	Quantity	Unit Cost	Total Cost
------	----------	-----------	------------

Site Clearing and Preparation			\$29,700
Site and Drainage Improvements			\$52,600
Landscape Improvements			\$7,000

			Total Cost
CONSTRUCTION COSTS			\$90,000
Contingency	20%		\$18,000
TOTAL CONSTRUCTION COSTS			\$108,000

TOTAL ESTIMATED COST \$108,000

ASSUMPTIONS & NOTES:

1. Price assumes no hazardous material removal.

Qualifications:

The following items are not included in the scope of work:
 Street Opening Permits / Bonds For Off Site Work
 Police / Traffic Details
 Lighting
 Temporary Water
 Permitting
 Soil Management Plan

Appendix E:
Alternative 2 Planning Level Estimated
Construction Costs

Project: Veteran's Memorial Park (ALT2)
Location: Tisbury, MA
Project #: 22090

Horsley Witten Group
Sustainable Environmental Solutions



Submission: Engineer's Opinion of Probable Cost 25%
Date: May 2023

Estimator: MCL
Checked By: RAC

25% OPINION OF PROBABLE COST

CAUSEWAY 1

\$136,000

Unit	Quantity	Unit Cost	Total Cost
------	----------	-----------	------------

Site Clearing and Preparation

\$37,800

Site and Drainage Improvements

\$66,800

Landscape Improvements

\$7,900

CONSTRUCTION COSTS		Total Cost
		\$113,000
Contingency	20%	\$23,000
TOTAL CONSTRUCTION COSTS		\$136,000

TOTAL ESTIMATED COST

\$136,000

ASSUMPTIONS & NOTES:

1. Price assumes no hazardous material removal.

Qualifications:

The following items are not included in the scope of work:
Street Opening Permits / Bonds For Off Site Work
Police / Traffic Details
Lighting
Temporary Water
Permitting
Soil Management Plan

Project: Veteran's Memorial Park (ALT2)
Location: Tisbury, MA
Project #: 22090

Horsley Witten Group
 Sustainable Environmental Solutions



Submission: Engineer's Opinion of Probable Cost 25%
Date: May 2023

Estimator: MCL
Checked By: RAC

25% OPINION OF PROBABLE COST

CAUSEWAY 2 \$158,000

Unit	Quantity	Unit Cost	Total Cost
------	----------	-----------	------------

Site Clearing and Preparation \$38,300

Site and Drainage Improvements \$69,400

Landscape Improvements \$23,200

		Total Cost
CONSTRUCTION COSTS		\$131,000
Contingency	20%	\$27,000
TOTAL CONSTRUCTION COSTS		\$158,000

TOTAL ESTIMATED COST \$158,000

ASSUMPTIONS & NOTES:

1. Price assumes no hazardous material removal.

Qualifications:

The following items are not included in the scope of work:
 Street Opening Permits / Bonds For Off Site Work
 Police / Traffic Details
 Lighting
 Temporary Water
 Permitting
 Soil Management Plan

Project: Veteran's Memorial Park (ALT2)
Location: Tisbury, MA
Project #: 22090

Horsley Witten Group
Sustainable Environmental Solutions



Submission: Engineer's Opinion of Probable Cost 25%
Date: May 2023

Estimator: MCL
Checked By: RAC

25% OPINION OF PROBABLE COST

CAUSEWAY 3 **\$154,000**

Unit	Quantity	Unit Cost	Total Cost
------	----------	-----------	------------

Site Clearing and Preparation **\$39,000**

Site and Drainage Improvements **\$62,200**

Landscape Improvements **\$26,600**

		Total Cost
CONSTRUCTION COSTS		\$128,000
Contingency	20%	\$26,000
TOTAL CONSTRUCTION COSTS		\$154,000

TOTAL ESTIMATED COST **\$154,000**

ASSUMPTIONS & NOTES:

1. Price assumes no hazardous material removal.

Qualifications:

The following items are not included in the scope of work:
Street Opening Permits / Bonds For Off Site Work
Police / Traffic Details
Lighting
Temporary Water
Permitting
Soil Management Plan

Project: Veteran's Memorial Park
Location: Tisbury, MA
Project #: 22090



Submission: Engineer's Opinion of Probable Cost 25%
Date: May 2023

Estimator: MCL
Checked By: RAC

25% OPINION OF PROBABLE COST

STATE STREET VACANT LOT \$167,000

Unit	Quantity	Unit Cost	Total Cost
------	----------	-----------	------------

Site Clearing and Preparation \$38,500

Site and Drainage Improvements \$97,100

Landscape Improvements \$2,500

		Total Cost
CONSTRUCTION COSTS		\$139,000
Contingency	20%	\$28,000
TOTAL CONSTRUCTION COSTS		\$167,000

TOTAL ESTIMATED COST \$167,000

ASSUMPTIONS & NOTES:

1. Price assumes no hazardous material removal.

Qualifications:

The following items are not included in the scope of work:
 Street Opening Permits / Bonds For Off Site Work
 Police / Traffic Details
 Lighting
 Temporary Water
 Permitting
 Soil Management Plan

Project: Veteran's Memorial Park (ALT2)
Location: Tisbury, MA
Project #: 22090

Horsley Witten Group
Sustainable Environmental Solutions



Submission: Engineer's Opinion of Probable Cost 25%
Date: May 2023

Estimator: MCL
Checked By: RAC

25% OPINION OF PROBABLE COST

LAGOON POND ROAD **\$63,000**

Unit	Quantity	Unit Cost	Total Cost
------	----------	-----------	------------

Site Clearing and Preparation **\$21,200**

Site and Drainage Improvements **\$24,800**

Landscape Improvements **\$5,600**

		Total Cost
CONSTRUCTION COSTS		\$52,000
Contingency	20%	\$11,000
TOTAL CONSTRUCTION COSTS		\$63,000

TOTAL ESTIMATED COST **\$63,000**

ASSUMPTIONS & NOTES:

1. Price assumes no hazardous material removal.

Qualifications:

The following items are not included in the scope of work:
Street Opening Permits / Bonds For Off Site Work
Police / Traffic Details
Lighting
Temporary Water
Permitting
Soil Management Plan

Project: Veteran's Memorial Park (ALT2)
Location: Tisbury, MA
Project #: 22090



Submission: Engineer's Opinion of Probable Cost 25%
Date: May 2023

Estimator: MCL
Checked By: RAC

25% OPINION OF PROBABLE COST

PARK NORTH \$108,000

Unit	Quantity	Unit Cost	Total Cost
------	----------	-----------	------------

Site Clearing and Preparation \$29,700

Site and Drainage Improvements \$52,600

Landscape Improvements \$7,000

		Total Cost
CONSTRUCTION COSTS		\$90,000
Contingency	20%	\$18,000
TOTAL CONSTRUCTION COSTS		\$108,000

TOTAL ESTIMATED COST \$108,000

ASSUMPTIONS & NOTES:

1. Price assumes no hazardous material removal.

Qualifications:

The following items are not included in the scope of work:
 Street Opening Permits / Bonds For Off Site Work
 Police / Traffic Details
 Lighting
 Temporary Water
 Permitting
 Soil Management Plan