Project Name: Town of Bristol, Silver Creek (Golf Course) Water Quality Improvements

Contract Number: SNEPWG18-1-Bristol

Grant Period: September 1, 2018 through September 30, 2021

Report Type: Final

January 31, 2022

Grantee Organization:
Town of Bristol
Edward M. Tanner, Principal Planner
(401) 253-7000 x128
etanner@bristolri.gov

Executive Summary:

With funding assistance from a 2018 Southeast New England Program (SNEP) Watershed Grant, the Town of Bristol has completed design, permitting and construction of the Bristol Golf Course Water Quality Improvements project. This multi-faceted project provides environmental and recreational benefits that will resonate beyond Bristol into the greater Narragansett Bay watershed. Bristol's municipally-owned nine-hole golf course consists of 26+ acres of land that was historically part of a larger private 18-hole course. The surrounding East Bay Industrial Park comprises remaining land from the original private golf course.

The goals of this project are to restore freshwater wetlands at the golf course and to improve the water quality of two tributaries that flow into Narragansett Bay, increasing flood storage capacity, and enhancing functions of freshwater wetland habitat. The redesigned golf course has a smaller active recreation footprint than the previously existing course; and has a redesigned layout using

less land area while still providing public access and desirable public outdoor recreational opportunities. The project included the restoration of several impoundments within the golf course, installation of stormwater management best management practices (BMP), realignment of several golf holes, removal of historic fill adjacent to streams and wetland areas, daylighting of piped streams, and the planting of over 2,400 native plants as buffer areas between wetlands and playable portions of the golf course. The Town of Bristol intends to maintain the golf course property as open space for public recreation and enjoyment, but with improved environmental conditions.

The Town selected an engineering and landscape architectural consultant team to design and permit property improvements, while also incorporating input from community stakeholders. The Town coordinated and led stakeholder meetings with representatives of local environmental and recreation groups to guide the consulting team in their early design activities. The consulting team gathered necessary topographic survey, wetlands delineation, soils, and other site-specific existing conditions data and refined design plans with input from the Town and stakeholder group. After evaluating numerous design options, the Town selected a consensus "master plan" that identified the overall modified layout of the golf course and general locations of proposed wetland and habitat restoration activities.

Prior to construction of any site improvements, the Town submitted design plans to the Rhode Island Department of Environmental Management (RIDEM) for wetlands permitting. A wetland permit was issued by RIDEM and includes conditions and requirements for work within and adjacent to wetland resource areas. The Town also prepared and submitted the required quality assurance program plan (QAPP) to the U.S. Environmental Protection Agency (EPA). The QAPP was approved by EPA and includes methods and procedures for data collection including water quality monitoring as well as procedures for modeling and monitoring of construction and restoration activities.

The Town put construction plans and specifications out to bid to retain the services of a qualified contractor to conduct construction and restoration work at the golf course. Throughout the autumn of 2020 and spring of 2021 the Town and its consultant team oversaw construction of "Phase I" site improvements. "Phase I" construction included all wetland and water quality activities proposed south of Broadcommon Road within the Silver Creek watershed. These plans also included portions of the planned wetland restoration and water quality improvements north of Broadcommon Road within the Jacobs Marsh watershed. Construction activities were substantially completed in mid-April 2021.

Construction November 2020.

Construction November 2020.

Construction March 2021.

Construction March 2021.

Construction March 2021.

Construction April 2021.

Restoration plantings and public outreach activities commence in spring 2021. These activities included guided tours of the property to showcase and explain improvements to Town officials and the general public. In May 2021 volunteers and project partners coordinated the delivery and planting of over 1,600 native trees, shrubs, and herbaceous plants throughout the property. After an initial hot and dry period where individual plants were watered by hand by volunteers several days per week, regular precipitation over the summer months has helped to ensure a high rate of plant survivability.

Restoration Plants May 2021.

Restoration Plantings May 2021.

Restoration Plantings May 2021.

Restoration Plantings May 2021.

All "Phase I" construction and wetland restoration seeding and planting activities were substantially completed in spring 2021. However, some work, including additional wetland plantings to fill voids observed after the growing season remained and additional plantings were completed in the fall. Approximately 822 plants were installed in September 2021 by community volunteers with oversight by Save the Bay staff. In addition, public engagement and outreach activities continued into September, including preparation of an educational brochure, informational signage for the course, and an enhanced project page on the Town's website. Also, in September, our consultant team completed an Ecological Management Plan to guide future management and maintenance activities at the golf course property

Post-construction June 2021.

Post-construction June 2021.

Post-construction July 2021.

Post-construction October 2021.

Post-construction October 2021.

Overall project costs for design, permitting and construction of "Phase I" improvements totaled $527,837.84. The Town of Bristol expended a total of $201,155.49 in direct expenses related to project design, construction and outreach. The Town also logged in-kind match hours for Town personnel / equipment and volunteer personnel to manage this project and assist our consultants with construction oversight, monitoring, and restoration planting activities. The total indirect in-kind match value expended is $26,682.35. A total of $300,000 in SNEP grant funds were expended for direct expenses related to project design, permitting, construction, and public outreach.

Additional construction work on "Phase II" of the Bristol Golf Course Water Quality Improvements began in spring 2021 with funding assistance from other grant sources. This work is ongoing and will be completed in spring 2022. The Town is currently working to identify an operator who will manage the course with the intent of opening to the public in summer of 2022.

The Bristol Golf Course Water Quality Improvements Project is supported by the Southeast New England Program (SNEP) Watershed Grants. SNEP Watershed Grants are funded by the U.S. Environmental Protection Agency (EPA) through a collaboration with Restore America's Estuaries (RAE). For more on SNEP Watershed Grants, see www.snepgrants.org The Town of Bristol acknowledges and thanks EPA and RAE for their guidance and funding assistance with this exciting and successful project.

January 31, 2022

Project Name: Town of Bristol, Silver Creek (Golf Course) Water Quality Improvements
Contract Number: SNEPWG18-1-Bristol
Grant Period: September 1, 2018 through September 30, 2021

Grantee Organization:
Town of Bristol
Edward M. Tanner, Principal Planner
(401) 253-7000 x128
etanner@bristolri.gov

Report Type: Final

Project Report Narrative:
The Town of Bristol has completed design, permitting and construction of all proposed site improvements at the Bristol Golf Course. The project included restoration of freshwater wetlands at the course property to improve the water quality of two tributaries that flow into Narragansett Bay, increasing flood storage capacity, and enhancing functions of freshwater wetland habitat. To accomplish this, the Town redesigned the 26+ acre nine-hole public golf course with a smaller active recreation footprint than the previously existing course; and with a redesigned layout using less land area while still providing public access and desirable public outdoor recreational opportunities. Working with our selected consultants — the engineering firm Wright-Pierce and the landscape architect firm Gardner & Gerrish, LLC — the Town managed and provided oversight for all project construction activities. The Town's selected contractor — US Pitchcare, LLC — completed construction of all site improvements.

Public education and involvement is an important component of this project. Working with project partners including Save the Bay and Save Bristol Harbor, the Town coordinated the planting of over 2,400 native plants on the property by community volunteers to enhance restoration. We have also prepared public educational materials, including project information on the Town's website as well as an educational brochure and educational signage that will be installed at the course prior to its opening in 2022.

Project Results:
The goals of this project were to restore freshwater wetlands at the 26+ acre Bristol Golf Course and to improve the water quality of two tributaries that flow into Narragansett Bay, increasing

flood storage capacity, and enhancing functions of freshwater wetland habitat. The project included the restoration of several impoundments within the golf course, installation of stormwater management best management practices (BMP), removal of historic fill adjacent to streams and wetland areas, daylighting of piped streams, and the planting of native shrubs, trees, and herbaceous plants as buffer areas between wetlands and playable portions of the golf course. The intent of the Town of Bristol is to maintain this golf course property as open space for public recreation and enjoyment, but with improved environmental conditions.

Upon receipt of a 2018 Southeast New England Program (SNEP) Watershed Grant, the Town of Bristol began preparations for the design of the Bristol Golf Course Water Quality Improvements project. In December 2018, a representative of the Town of Bristol attended the 9th Annual National Summit on Coastal and Estuarine Restoration and Management where this project was presented to a national audience along with other SNEP grant recipients.

In early 2019, after advertising a qualifications-based Invitation to Bid for engineering and landscape design services, the Town selected a consultant team consisting of the engineering firm Wright-Pierce and the landscape architect firm Gardner & Gerrish, LLC to design and permit all property improvements. In the spring and summer of 2019 the Town coordinated and led "stakeholder" meetings with representatives of local environmental and recreation minded groups to guide the consulting team in their early design activities. Throughout 2019 the consulting team gathered necessary topographic survey, wetlands delineation, soils, and other site-specific existing conditions data and refined design plans with input from the stakeholder group. After evaluating numerous design options, the Town selected a consensus "master plan" (copy attached) that identified the overall modified layout of the golf course and general locations of proposed wetland and habitat restoration activities. The Town also met with wetland regulators at the Rhode Island Department of Environmental Management (RIDEM) to review existing conditions and preliminary improvement plans.

Throughout the first half of 2020, the Town and its consultant team submitted design plans to RIDEM for wetlands permitting and also prepared and submitted the required quality assurance program plan (QAPP) to the U.S. Environmental Protection Agency (EPA). The QAPP included methods and procedures for data collection including water quality monitoring by our community partner Save Bristol Harbor as well as procedures for modeling and monitoring of construction and restoration activities. The QAPP was approved by EPA in late May 2020, and the wetland permit was issued by RIDEM in late August 2020. Approved permit design plans are attached.

In May 2020, our consultant team completed "Phase I" construction plans and bid specifications, which included all wetland and water quality activities proposed south of Broadcommon Road within the Silver Creek watershed. These plans also include portions of the planned wetland restoration and water quality improvements north of Broadcommon Road within the Jacobs Marsh

watershed. The Town put construction plans out to bid, and in early June we received bids from five contractors. After reviewing bids and qualifications and evaluating budget considerations, the Town awarded construction to US Pitchcare, LLC. After review of bids and costs associated with base plans and alternatives, the Town sought additional funding for water quality improvements from RIDEM through its Office of Water Resources / Nonpoint Source Program, Clean Water Act Section 319 grant program. In June 2020 we were informed that the Town had been selected for funding from the 319 grant program to assist with construction. Throughout the autumn of 2020 and spring of 2021 the Town oversaw construction of "Phase I" site improvements by US Pitchcare. Construction activities were substantially completed in mid-April 2021.

Restoration plantings and public outreach activities also commence in spring 2021. These activities included guided tours of the property to showcase and explain improvements to Town officials and the general public. In addition, as part of the Town's Earth Day cleanup activities, volunteers organized by the Bristol Conservation Commission and Save Bristol Harbor spent several hours cleaning the golf course and surrounding properties of refuse while learning about the project and its environmental benefits. In May, Save the Bay coordinated and oversaw the delivery and planting of over 1,600 native trees, shrubs, and herbaceous wetland plants throughout the property. A total of 25 community volunteers assisted with the planting. After an initial hot and dry period where individual plants were watered by hand by volunteers several days per week, regular precipitation over the summer months helped to ensure a high rate of plant survivability.

Although the golf course was closed to play in 2021, the Town continued to maintain the property throughout the growing season with a minimal level of mowing so as to provide access to the property and to preserve existing greens and tee box areas while restoration project activities were underway. In addition, in order to improve course conditions and to make way for restoration activities and changes to the golf course layout, the Town worked with our local electricity provider, National Grid, to remove numerous service poles, wires and equipment which had been installed in the 1960's to service irrigation pumps. The removal of this equipment, along with the related removal of large wooden poles and netting along the easterly property line by a private contractor eliminate man-made objects within restored natural areas and improve the overall course design. The Town has since worked with NGRID and a neighboring property owner to install a new electric service to power future course irrigation.

In February 2021, the Town of Bristol was informed that we had been awarded a grant from the Rhode Island Infrastructure Bank's "Resilient Rhody" Municipal Resilience Program (MRP) to assist with funding "Phase II" of golf course improvements including completion of all restoration activities north of Broadcommon Road to Tupelo Street. Work on this portion of the overall project commenced in May 2021 and was substantially completed by our contractor in late June.

All "Phase I" construction and wetland restoration seeding and planting activities were substantially completed in spring 2021. However, some work, including additional wetland plantings to fill voids observed after the growing season remained and additional plantings were completed in the fall. Approximately 822 plants were installed in September 2021 by community volunteers with oversight by Save the Bay staff. In addition, public engagement and outreach activities continued into September, including preparation of an educational brochure, informational signage for the course, and an enhanced project page on the Town's website. Also, in September, our consultant team completed an Ecological Management Plan to guide future management and maintenance activities at the golf course property (copy attached).

Compliance

The Town coordinated project design and received a wetland permit from RIDEM. The Town also received approval of our QAPP from EPA. All project activities, including construction, restoration, and monitoring have been conducted in compliance with specifications and conditions of the RIDEM wetland permit and the approved QAPP.

Project Partners

The project team included representatives of the Town of Bristol's Department of Community Development and the Department of Parks and Recreation; the Bristol Conservation Commission; Save Bristol Harbor; and Save The Bay. These organizations have worked together in various capacities on numerous water quality, flood control, open space, and habitat improvements related projects. Save Bristol Harbor has compiled over a decade's worth of baseline water quality data within Silver Creek and Bristol Harbor through the use of trained volunteers in partnership with the URI Watershed Watch program. Save Bristol Harbor volunteers continued monitoring and documenting water quality throughout this project and will continue with these efforts with assistance from the Town in accordance with the approved QAPP. Two additional sampling locations were added to the monitoring program downstream of the Bristol Golf Course within both Silver Creek to the south and within an unnamed coastal stream to the north. These two locations were included in water quality sampling and monitoring activities during the 2019, 2020 and 2021 sampling seasons; and these activities will continue post-construction. Save the Bay is a project partner that provided staff time to conduct site visits, recommend habitat restoration actions, and assist with design plans. Save the Bay staff and volunteers also provided assistance by photo-documenting construction activities and overseeing all restoration planting and public education activities.

Volunteer and Community Involvement

The project team included members of the community, specifically representatives of Save Bristol Harbor, local recreation enthusiasts, and Bristol's Conservation Commission. During the project design phase, the Town held several stakeholder meetings. These meetings were attended by members of the community who provided input on the project plans. In addition, volunteers from Save Bristol Harbor continue to collect and analyze water samples downstream from the project to assess long term changes in water quality within both Silver Creek flowing south from the golf course property and the unnamed stream flowing north from the property to Jacob's Marsh. As noted above, representatives of Save the Bay also worked with our landscape architect consultant to develop an appropriate restoration planting plan and they recruited and supervised community volunteers to plant and care for over 2,400 trees, shrubs, and herbaceous wetland plants on the golf course property. Volunteers who assisted with plantings included local residents, as well as members of the Bristol Conservation Commission, Save Bristol Harbor, and Mount Hope High School.

Outreach & Communications

The project team has provided regular updates to Bristol residents through the Town Council and Town Administrator's office and through the use of the Town's website and social media outlets. In addition, Bristol's local weekly newspaper the *Bristol Phoenix* has published several articles describing the project in both print and electronic formats (copies attached). Two of these articles were published in spring 2021 and highlighted construction activities and volunteer restoration planting activities. The Town has also printed and displayed a large banner at the golf course property informing the public of the project and its watershed restoration goals (photo attached). As noted previously, the Town has also prepared an educational brochure (copy attached) and has designed and fabricated two educational signs (images attached) that will be permanently installed on the golf course prior to opening in 2022 to provide information on the project to future course users.

Project Budget Report

Overall expenditures for this project totaled $527,837.84. The Town of Bristol expended a total of $201,155.49 in direct expenses related to project design, construction and outreach. The Town also logged in-kind match hours for Town personnel / equipment and volunteer personnel to manage this project and assist our consultants with construction oversight, monitoring, and restoration planting activities. The total indirect in-kind match value expended is $26,682.35. A total of $300,000 in SNEP grant funds were expended for direct expenses related to project design, permitting, construction, and public outreach.

Summary Budget Table

Budget Category	Total Budgeted Grant Funds	Total Budgeted Match	Total Budgeted Grant + Match	Actual Grant Funds Expended	Actual Match Funds Expended	Actual Expended Grant + Match	Match Source
Personnel w/ Fringe	0	$18,771	$18,771	0	$26,682.35	$26,682.35	Town of Bristol
Travel	$3,000	$1,000	$4,000	0	$2,093.28	$2,093.28	Town of Bristol
Equipment	0	0	0	0	$783.96	$783.96	Town of Bristol
Contractual	$297,000	$113,578	$410,578	$300,000.00	$162,259.16	$462,259.16	Town of Bristol
Other	0	0	0	0	$36,019.09	$36,019.09	Town of Bristol
TOTAL	$300,000	$133,349	$433,349	$300,000.00	$227,837.84	$527,837.84	Town of Bristol

Detailed Project Budget Table
A detailed project budget table is attached.

Budget Narrative

The Bristol Golf Course Water Quality Improvements Project is supported by a SNEP Watershed Grant. SNEP Watershed Grants are funded by the EPA through a collaboration with Restore America's Estuaries (RAE). For more on SNEP Watershed Grants, see www.snepgrants.org The Town of Bristol acknowledges and thanks EPA and RAE for their guidance and funding assistance with this exciting and successful project.

The Town of Bristol has successfully completed all work associated with this SNEP grant funded project. Contractual expenses included the services of engineering and landscape architect consultants to develop the project design, prepare permit applications, develop the QAPP, and coordinate bidding and construction oversight. Additional contractual expenses included earthwork and construction activities associated with improvements and wetland restoration, including landscape enhancements and plantings at the golf course property.

The Town of Bristol has provided grant match in the form of staff time to facilitate overall project implementation including project management, and oversight of the selected consultants and

contractor. Our project partners from Save the Bay have assisted with landscape and wetland restoration planting design and oversight of volunteers and planting activities.

The above activities were all budgeted with our original SNEP grant project proposal. However, our contractual expenses for engineering design work and construction have exceeded original budget estimates. The Town has secured additional project funding to assist with construction activities through the RIDEM 319 grant program; and a portion of the Town's match expenses for construction will be reimbursed through that grant.

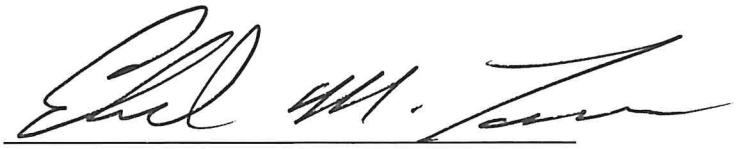
Supporting Materials

The following supporting materials are attached to this report:

- Detailed Project Budget Table;
- Master Plan Image;
- Approved Permit Set Design Plans;
- Ecological Management Plan;
- Project Brochure;
- Images of Signs to be Installed at Golf Course; and
- Scanned Copies of Newspaper Articles Describing Project Activities.

Certification

The undersigned verifies that the descriptions of activities and expenditures in this final report are accurate to the best of my knowledge; and that the activities were conducted in agreement with the grant contract. I also understand that matching funds levels established in the grant contract must be met.



Edward M. Tanner
Principal Planner

DATE: January 31, 2022
Town of Bristol, Department of Community Development

Detailed Project Budget Table: FINAL REPORT

Town of Bristol Silver Creek Water Quality - Golf Course (September 1, 2018 throught September 30, 2021)

Budget Category	Hours Worked This Period	Cost Per Hour	Total Budgeted Funds	Budgeted Grant Funds	Budgeted Non-Fed Match	Grant Funds Expended Cumulative	Match Funds Expended Cumulative	Match Source
Personnel/Fringe								
Diane Williamson	10	61.44	2,880.00	0	2,880.00	0	5,253.12	Town of Bristol
Ed Tanner	92	51.97	4,848.00	0	4,848.00	0	15,149.26	Town of Bristol
Tim Shaw	0	43.48	2,155.00	0	2,155.00	0	608.72	Town of Bristol
Jimmy Sylvester (DPW)	18	48.58	-	0	-	0	1,141.63	Town of Bristol
Save Bristol Harbor Volunteers	16	24.69	2,469.00	0	2,469.00	0	851.81	volunteer hours
Save the Bay Volunteers	128	24.69	6,419.00	0	6,419.00	0	3,677.81	volunteer hours
Travel								
2018 Watershed conference			3,500.00	3,000.00	500.00	0	2,093.28	Town of Bristol
Grantee Meetings			500.00	0	500.00	0	0	Town of Bristol
Equipment								
Backhoe-Wheeled Excavator (DPW)	18	33.36	0	0	0	0	783.96	Town of Bristol
Contractual								
Ecological Mgmt Plan			2,500.00	0	2,500.00	0	0	Town of Bristol
QAPP Development			5,000.00	5,000.00	0	5,000.00	0	
Survey			11,000.00	0	11,000.00	0	11,000.00	Town of Bristol
Engineering			30,000.00	30,000.00	0	56,491.61	0	
Permitting			5,000.00	5,000.00	0	5,000.00	300.00	Town of Bristol
Bid Plans and Specs			10,000.00	10,000.00	0	10,000.00	0	
Construction Admin.			20,000.00	20,000.00	0	21,749.35	0	
Community Outreach			13,980.00	13,980.00	0	0	0	
Signage and Outreach Brochures			6,000.00	0	6,000.00	0	120	Town of Bristol
Contractor - US Pitchcare, LLC			307,098.00	213,020.00	94,078.00	201,759.04	150,839.16	Town of Bristol
Supplies / Other								
Property Maintenance			0	0	0	0	12,000.00	Town of Bristol
Electrical Service and Pole Removal			0	0	0	0	20,401.09	Town of Bristol
Poles and Netting Removal							3,120.00	Town of Bristol
Tree Disposal							400.00	Town of Bristol
Portable Toilet							98.00	Town of Bristol
Total Direct			433,349.00	300,000.00	133,349.00	300,000.00	227,837.84	
Total Indirect			-		-			
Total	**282**		**433,349.00**	**300,000.00**	**133,349.00**	**300,000.00**	**227,837.84**	

Hole	1	2	3	4	5	6	7	8	9	Total
Yards	150	135	125	165	105	135	115	155	185	1270
Par	3	3	3	3	3	3	3	3	3	27

Bristol Golf Course
Water Quality Improvements

PROJ NO	DATE	FIGURE:
T12324	11/13/2019	1

WRIGHT-PIERCE
Engineering a Better Environment

BID SET No. _____

TOWN OF BRISTOL, RHODE ISLAND

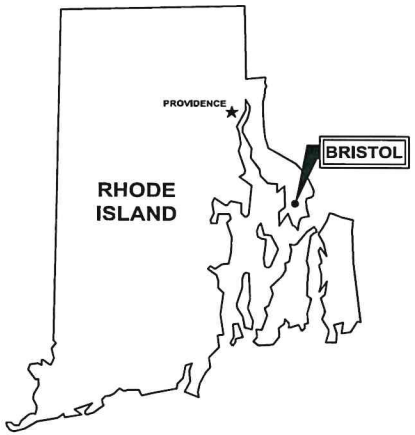
CONTRACT DRAWINGS FOR

GOLF COURSE WATER QUALITY IMPROVEMENTS

JANUARY 2020

REGULATORY REVIEW

REVISED AUGUST 2020



DRAWING INDEX

LOCATION PLAN
SCALE: NTS

THOMAS SIMBRO
No. 8878
REGISTERED PROFESSIONAL ENGINEER
(C.V.) 11/5/20

WRIGHT-PIERCE
Engineering a Better Environment
888.621.8156 | www.wright-pierce.com

GARDNER + GERRISH
LANDSCAPE ARCHITECTS LLC

FOR REVIEW _____
FOR BIDDING _____
WP PROJECT No. 20198

GENERAL NOTES

1. THE CONTRACTOR IS REFERRED TO SECTION 01050 OF THE SPECIFICATIONS REGARDING COORDINATION WITH OTHERS, INCLUDING RESPONSIBILITIES AND RELATED COSTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COMPLETE ADHERENCE TO ALL PROVISIONS AND REQUIREMENTS OF THE CONTRACT DOCUMENTS INCLUDING, BUT NOT LIMITED TO, THESE CONTRACT DRAWINGS, THE CONTRACT GENERAL REQUIREMENTS, SPECIAL CONDITIONS AND TECHNICAL SPECIFICATIONS, AND TO ALL PERMITS APPENDED THERE TO.
2. INFORMATION ABOUT EXISTING UTILITIES SHOWN ON THE DRAWINGS IS BASED ON THE BEST AVAILABLE DATA, IS APPROXIMATE ONLY, AND IS PROVIDED FOR REFERENCE ONLY. EXISTING UNDERGROUND UTILITIES ARE SHOWN AT ASSUMED ELEVATIONS TO ALERT THE CONTRACTOR OF THEIR PRESENCE. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING THE EXACT ACTUAL LOCATION AND ELEVATION OF ALL EXISTING UTILITIES WITHIN THE CONTRACT LIMIT LINES.
3. PRIOR TO ANY EXCAVATION WORK, IT IS THE CONTRACTORS RESPONSIBILITY TO THOROUGHLY FAMILIARIZE HIMSELF WITH THE DETAILS OF THE PROJECT AREA. THIS FAMILIARIZATION SHALL INCLUDE COORDINATION WITH THE OWNER, ENGINEER AND CONTRACT OPERATOR'S PERSONNEL AND REVIEW OF RECORD DRAWINGS THAT MAY BE AVAILABLE. EXTREME CAUTION SHALL BE EXERCISED IN ALL EXCAVATIONS TO ENSURE THAT EXISTING UTILITIES AND STRUCTURES WITHIN THE CONTRACT LIMIT LINES ARE NOT DAMAGED.
4. BELOW GRADE UTILITY INFORMATION IS BASED ON INFORMATION AS PROVIDED ON RECORD DRAWINGS. LOCATION OF UTILITIES SHOWN IS ONLY APPROXIMATE AND MAY NOT BE COMPLETE. THE CONTRACTOR SHALL ASCERTAIN THE LOCATION AND SIZE OF EXISTING UTILITIES IN THE FIELD PRIOR TO COMMENCING WORK. REFER TO SPECIFICATION SECTION 01050. ADDITIONAL TEST PITS, BEYOND THOSE SHOWN, MAY BE REQUIRED. UTILITY CONTACTS ARE AS FOLLOWS:

ELECTRIC:	GAS:	DIG SAFE:	SEWER:	WATER:
NATIONAL GRID TEL: 1-800-322-3223	NATIONAL GRID TEL: 1-800-870-1664	1-800-DIG-SAFE	1-401-253-8877	1-401-245-2022

5. THE CONTRACTOR SHALL NOTIFY THE DIG SAFE CENTER (TEL NO. 1-888-344-7233) AT LEAST THREE BUSINESS DAYS PRIOR TO ANY EXCAVATION. ADDITIONAL INFORMATION OR CONTACT WITH DIGSAFE IS AVAILABLE @ WWW.DIGSAFE.COM
6. ALL WORK SHALL COMPLY WITH THE LATEST RHODE ISLAND STATE BUILDING AND LIFE SAFETY SUPPLEMENTS.
7. CONTRACTOR SHALL ASSUME RESPONSIBILITY FOR ALL ON-SITE SAFETY FROM THE TIME CONSTRUCTION ACTIVITIES BEGIN UNTIL ALL WORK IS COMPLETED AND ACCEPTED BY THE OWNER. ALL WORK SHALL COMPLY WITH THE CURRENT OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) REQUIREMENTS.
8. CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE LOCATION AND ACTIVITIES OF HIS WORK FORCES WITH THE THE TOWN TO MINIMIZE INTERFERENCE WITH NORMAL TOWN OPERATIONS AND SPECIAL EVENTS.
9. ALL EXISTING SEWER AND STORM DRAIN LINES ENCOUNTERED DURING CONSTRUCTION ARE TO REMAIN IN SERVICE. ANY EXISTING SEWERS, STORM DRAIN LINES OR CULVERTS DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER, EXCEPT WHEN IN DIRECT CONFLICT WITH THE NEW SEWER OR WHEN NOT SHOWN OR INDICATED.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL MATERIALS, LABOR, APPARATUS AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL GOVERNING AGENCIES HAVING LAWFUL JURISDICTION OVER THE WORK.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SUPPORT AND PROTECTION OF ALL UTILITIES AND STRUCTURES DURING CONSTRUCTION.
12. DO NOT SCALE DRAWINGS UNLESS OTHERWISE NOTED. WRITTEN DIMENSIONS AND STATIONING SHALL PREVAIL.
13. CONTRACTOR TO NOTE THAT ALL EXISTING INFORMATION ON THE DRAWINGS IS SHOWN WITH A LIGHTER LINE WEIGHT AND INDICATED WITH A SLANTED TYPE TEXT.
14. THE OWNER WILL BE RESPONSIBLE FOR OBTAINING THE PERMITS LISTED IN THE SUPPLEMENTARY OR SPECIAL CONDITIONS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO BE FAMILIAR WITH THE APPLICABLE PROVISIONS OF EACH PERMIT AS THEY APPLY TO THE WORK AND TO ABIDE BY THOSE PROVISIONS DURING CONSTRUCTION. COPIES OF ALL OBTAINED PERMITS ARE AVAILABLE FOR REVIEW FROM THE OWNER. ALL OTHER PERMITS ARE THE RESPONSIBILITY OF THE CONTRACTOR.
15. ALL TEST PITS SHALL BE EXCAVATED PRIOR TO CONSTRUCTION LAYOUT AND RESULTS REPORTED TO THE ENGINEER FOR REVIEW FOR CONFORMANCE TO THE PLANS. TEST PITS ARE REQUIRED WHERE SHOWN ON THE PLANS AND AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHALL DETERMINE THE EXACT SIZE, TYPE, LOCATION, AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO THE START OF CONSTRUCTION BY DIGGING TEST PITS WHERE UTILITY INFORMATION IS QUESTIONABLE AND/OR CRITICAL.
16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PREVENTION OF EROSION. ALL DISTURBED EARTH SURFACES ARE TO BE STABILIZED IN THE SHORTEST PRACTICAL TIME AND TEMPORARY EROSION CONTROL DEVICES SHALL BE EMPLOYED UNTIL SUCH TIME AS ADEQUATE SOIL STABILIZATION HAS BEEN ACHIEVED. TEMPORARY STORAGE OF EXCAVATED MATERIAL IS TO BE IN A MANNER THAT WILL MINIMIZE EROSION. THE CONTRACTOR SHALL DISPOSE OF UNSUITABLE EXCAVATED MATERIAL AT A SITE PROVIDED BY HIM WHICH IS IN COMPLIANCE WITH ALL FEDERAL, STATE AND LOCAL LAWS. MATERIALS AND METHODS USED FOR TEMPORARY EROSION CONTROL SHALL BE AS SPECIFIED BY THE RHODE ISLAND SOIL AND EROSION CONTROL HANDBOOK. REFER TO SPECIFICATION SECTION 02270 AND DRAWING C-11.
17. THE CONTRACTOR SHALL PROVIDE, INSTALL AND MAINTAIN PROPER SEDIMENT AND SOIL EROSION CONTROL DEVICES DURING ALL CONSTRUCTION ACTIVITIES THROUGHOUT THE ENTIRE PROJECT, AS REQUIRED BY THE CONTRACT DOCUMENTS AND ALL APPURTENANT CITY OR STATE (RIDEM, CRMC, ETC) REGULATIONS. ALL REQUIRED ENVIRONMENTAL CONTROLS SHALL BE INSTALLED PRIOR TO ANY OTHER CONSTRUCTION ACTIVITY. THE CONTRACTOR SHALL IMMEDIATELY PROVIDE UPON ORDER FROM THE ENGINEER, SUPPLEMENTAL PERMANENT AND/OR TEMPORARY SOIL EROSION CONTROL, AND/OR SEDIMENT CONTROL DEVICES. MATERIALS AND METHODS USED SHALL BE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. SUPPLEMENTAL MATERIALS AND METHODS SHALL BE THE CONTRACTOR'S RESPONSIBILITY, WITH THE ACKNOWLEDGEMENT OF THE ENGINEER.
18. THE CONTRACTOR SHALL SUBMIT PERIODIC REPORTS AND DETAILS AS MAY BE REQUIRED BY VARIOUS REGULATORY AGENCIES INCLUDING, BUT NOT LIMITED TO, THE RIDEM, AND ALL THE APPROPRIATE REGULATING AGENCIES.
19. THE CONTRACTOR SHALL MINIMIZE CLEARING OPERATIONS. CLEARING AND GRUBBING SHALL BE IN ACCORDANCE WITH SPECIFICATION SECTION 02110. CLEARING LIMITS SHALL BE AS INDICATED ON THE DRAWINGS. ALL GRUBBINGS AND EXCESS EXCAVATED MATERIAL ARE THE PROPERTY OF THE CONTRACTOR AND WILL BE DISPOSED OF AT A SITE PROVIDED BY THE CONTRACTOR IN COMPLIANCE WITH ALL STATE AND LOCAL LAWS.
20. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING TRAFFIC FLOW AT ALL TIMES. THE CONTRACTOR IS REQUIRED TO SUBMIT A TRAFFIC CONTROL PLAN TO THE OWNER PRIOR TO COMMENCING CONSTRUCTION. THE CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES WITH THE OWNER.
21. OPEN TRENCHES IN THE ROADWAY MUST BE BACKFILLED AT THE END OF THE WORKDAY. OPEN TRENCHES OUTSIDE OF THE ROADWAY MAY BE LEFT OPEN IF THE CONTRACTOR PROVIDES ADEQUATELY SAFE BARRICADING AND LIGHTS.
22. THE CONTRACTOR SHALL CONTROL DUST TO A TOLERABLE LIMIT AS OUTLINED IN SPECIFICATION SECTION 01562. THE CONTRACTOR SHALL NOT TRACK OR SPILL EARTH AND DEBRIS ON PUBLIC STREETS OUTSIDE THE PROJECT AREA. STREETS OPENED TO THE PUBLIC SHALL BE KEPT SWEPT AND FREE OF DEBRIS.
23. CONTROL OF DUST USING WATER SHALL BE PROVIDED FOR ALL RAW SLOPES AND FOR ALL EARTH STOCKPILES AND EARTH PILED ALONG EXCAVATIONS AND SURFACES OF REFILLED TRENCHES. IN NO CASE SHALL EXCAVATED MATERIAL BE STOCKPILED ON PAVED SURFACES OR PLACED AT SUCH LOCATIONS WHERE THE MATERIAL CAN RUNOFF INTO INLAND WETLAND AREAS, WATERCOURSES OR ADJACENT PROPERTIES.
24. ALL ROAD AND PARKING AREA SURFACES SHALL PITCH 1/4 INCH PER FOOT MINIMUM UNLESS OTHERWISE NOTED. ALL VEGETATED AREAS ABOVE MEAN HIGH WATER ELEVATION THAT ARE EXCAVATED, FILLED OR OTHERWISE DISTURBED BY THE CONTRACTOR AND ARE NOT TO BE PAVED OR FILLED WITH RIPRAP SHALL BE LOAMED, GRADED, LIMED, FERTILIZED, SEEDED AND MULCHED AT NO ADDITIONAL EXPENSE TO THE OWNER.
25. SUITABLE EXCAVATED MATERIAL MAY BE INCORPORATED IN THE PROJECT, WITH EXCESS MATERIAL DISPOSED OF AT A LOCATION PROVIDED BY THE CONTRACTOR. THESE PROVISIONS SHALL IN NO WAY RELIEVE THE CONTRACTOR OF HIS OBLIGATIONS TO PROPERLY DISPOSE OF AND REPLACE ANY MATERIAL DETERMINED BY THE ENGINEER TO BE UNSUITABLE FOR BACKFILLING. THE CONTRACTOR SHALL DISPOSE OF UNSUITABLE AND EXCESS MATERIAL IN ACCORDANCE WITH THE APPLICABLE SECTIONS OF THE CONTRACT DOCUMENTS.
26. EXCAVATION CLOSE TO EXISTING UTILITIES AND STRUCTURES SHOULD BE PERFORMED BY HAND TO DETERMINE THE EXACT UTILITY LOCATION BEFORE DRIVING PILES AND/OR SHEETING OR OTHER SOIL SUPPORT SYSTEMS OR BEFORE EXCAVATING BY BACKHOE OR SIMILAR EQUIPMENT.
27. WHEN EQUIPMENT AND/OR MATERIALS ARE BEING DELIVERED TO THE PROJECT, THE CONTRACTOR SHALL FURNISH SUCH FLAG PERSONS AS ARE NECESSARY FOR THE DIRECTION AND CONTROL OF TRAFFIC ON ROADWAYS, AT THE ENTRANCE TO THE CONSTRUCTION SITE FOR SUCH PERIODS OF TIME AS IS ORDERED BY THE ENGINEER OR OWNER. FLAGGERS SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.
28. ALL AREAS DISTURBED BY CONSTRUCTION SHALL BE RESTORED TO PRE- CONSTRUCTION CONDITIONS.
29. DURING THE WORK PERFORMED UNDER THIS CONTRACT, IT IS ANTICIPATED THAT MULTIPLE EXCAVATIONS MAY BE OPEN CONCIDENTALLY. RESPONSIBILITY FOR PREVENTING FLOODING ENVIRONMENTAL OR MATERIAL DAMAGE, OR OTHER ADVERSE EVENTS RESULTANT FROM STORM WATER REROUTED DUE TO AN EXCAVATION, IS THE RESPONSIBILITY OF THE CONTRACTOR WORKING IN THE EXCAVATION; CLOSE SELF-COORDINATION PRIOR TO EXCAVATING, IS THEREFORE MANDATORY. RESPONSIBILITY FOR MAINTAINING THE SITE STORM WATER COLLECTION SYSTEM AND DRAINAGE PATTERNS, COMPLETE WITH ANTI-SILTATION PROVISIONS, COMPLIANCE WITH ENVIRONMENTAL CONCERNS, PROTECTING THE OWNERS EQUIPMENT AND FACILITIES, ETC., SHALL BE COORDINATED.
30. LAY DOWN AREAS FOR EQUIPMENT AND MATERIAL STORAGE, AND FOR EXCAVATED MATERIALS WILL BE DESIGNATED BY THE OWNER, ENGINEER AND/OR CONTRACTOR AND SHALL BE COORDINATED BY THE CONTRACTOR AND MAINTAINED AND RESTORED BY THE CONTRACTOR, AT NO ADDITIONAL COST TO THE OWNER.

SITE GRADING NOTES

1. ALL AREAS THAT ARE EXCAVATED, FILLED, OR OTHERWISE DISTURBED BY THE CONTRACTOR SHALL BE LOAMED, GRADED, LIMED, FERTILIZED, SEEDED AND MULCHED, UNLESS OTHERWISE NOTED. THE TOP 6 INCHES OF SOIL SHALL BE LOAM. REFER TO SPECIFICATION SECTION 02485, LANDSCAPING/LOAM AND SEED.
2. ALL STORM DRAINAGE INLETS SHALL BE PROTECTED BY HAY BALE FILTERS TO PREVENT ENTRY OF SEDIMENT FROM RUNOFF WATERS DURING CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL AND DISPOSAL OF ALL COLLECTED SEDIMENT, AND THAT WHICH COLLECTS IN THE STORM DRAIN SYSTEM.
3. ALL CATCH BASINS, MANHOLES, VALVE PITS, VALVE BOXES AND OTHER BURIED FACILITIES WITH SURFACE ACCESS SHALL BE ADJUSTED TO MATCH FINAL GRADES, UNLESS OTHERWISE INDICATED.
4. CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL DEBRIS AND EXCESS EXCAVATED MATERIAL FROM WITHIN THE CONSTRUCTION LIMIT OF WORK, TO A SUITABLE SITE PROVIDED BY THE CONTRACTOR. IN COMPLIANCE WITH ALL STATE AND LOCAL REGULATIONS. ANY EXCESS SUITABLE MATERIAL MAY REMAIN ON SITE AT THE REQUEST OF THE OWNER.
5. CONTRACTOR SHALL REMOVE AND REPLACE, OR REPAIR, ALL CURBS, SIDEWALKS, PAVEMENT AND OTHER ITEMS DAMAGED BY HIS CONSTRUCTION ACTIVITIES TO AT LEAST THEIR ORIGINAL CONDITION, TO THE SATISFACTION OF THE OWNER AND ENGINEER.
6. WHERE EXISTING PAVEMENT IS REMOVED AND REPLACED, MATCH EXISTING GRADES TO THE EXTENT POSSIBLE. COORDINATE FINE GRADING WITH THE ENGINEER.
7. ALL VALVE BOXES AND OTHER BURIED FACILITIES WITH SURFACE ACCESS SHALL BE ADJUSTED TO MATCH FINAL GRADES, UNLESS OTHERWISE INDICATED.
8. CONTRACTOR SHALL NOT TRACK OR SPILL EARTH, DEBRIS OR OTHER CONSTRUCTION MATERIAL ON PUBLIC OR PRIVATE STREETS AND PLANT DRIVES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE IMMEDIATE ASSOCIATED CLEAN UP.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR GRADING ALL AREAS TO DRAIN.
10. CONTRACTOR SHALL RE-USE OR DISPOSE OF EXCESS EXCAVATED MATERIAL WITHIN THE SITE LIMITS OR AN AREA DESIGNATED BY THE OWNER IF NOT ON SITE.

BASE PLAN NOTES

1. BASE PLAN AND MAPPING BASED ON TOPOGRAPHIC SURVEY COMPLETED BY NARRAGANSETT ENGINEERING INC., 3012 EAST MAIN ROAD, PORTSMOUTH, RI 02871, DATED 10/25/2014.
2. ALL ELEVATIONS REFER TO THE NAVD 88 DATUM. PROJECT BENCH MARKS ARE AS NOTED ON THE CIVIL DRAWINGS.
3. THE HORIZONTAL DATUM FOR THIS PROJECT IS THE RI3800 AND THE VERTICAL DATUM FOR THIS PROJECT IS THE NAVD 88 DATUM. THE PROJECT DATA IS FROM POST PROCESSED GPS.
4. ANY EXISTING UTILITIES SHOWN ON THIS PLAN WERE LOCATED FROM FIELD SURVEY INFORMATION AND RECORD DATA. THE SURVEYOR DOES NOT GUARANTEE THAT ALL EXISTING OR ABANDONED UTILITIES HAVE BEEN SHOWN ON THE PLANS AND DOES NOT WARRANT THAT UTILITIES ARE SHOWN IN THE EXACT LOCATION INDICATED.
5. THE PROPERTY LINES SHOWN ON THE PLANS WERE TAKEN FROM THE TAX ASSESSOR'S PLAT FROM THE TOWN OF BRISTOL AND ARE SHOWN APPROXIMATELY. THE PROPERTY LINES SHOWN ARE NOT THE RESULT OF A FIELD SURVEY BY NARRAGANSETT ENGINEERING INC.
6. THE TOPOGRAPHIC SURVEY USED FOR THE BASE MAPPING CONFORMS TO A CLASS 2 (T-2) TOPOGRAPHICAL AS ADOPTED BY THE RHODE ISLAND BOARD OF REGISTRATION FOR PROFESSIONAL LAND SURVEYORS.

SITE LAYOUT NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LAYOUT OF ALL PROPOSED WORK AS SHOWN ON THE DRAWINGS. THE ENGINEER WILL PROVIDE TWO POINTS THAT DEFINE THE HORIZONTAL CONTROL. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THIS PROVIDED LAYOUT INFORMATION THROUGHOUT THE COURSE OF CONSTRUCTION. REPORT ANY LAYOUT DISCREPANCIES IMMEDIATELY TO THE ENGINEER.
2. REFER TO THE SITE LAYOUT DRAWINGS FOR LAYOUT OF THE PROPOSED WORK.
3. THE LOCATION AND LIMITS OF ALL ON-SITE WORK AND STORAGE AREAS SHALL BE REVIEWED/COORDINATED WITH, AND ACCEPTABLE TO, THE OWNER AND ENGINEER. THE CONTRACTOR SHALL LIMIT HIS ACTIVITIES TO THESE AREAS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RE-ESTABLISHING AND RESETTING ALL EXISTING PROPERTY MONUMENTATION DISTURBED BY HIS OPERATIONS. THIS WORK SHALL BE DONE BY A LAND SURVEYOR REGISTERED IN THE STATE OF RHODE ISLAND, AT NO ADDITIONAL COST TO THE OWNER.
5. WRITTEN DIMENSIONS SHALL PREVAIL. DO NOT SCALE DISTANCES FROM THE DRAWINGS. REPORT ANY DISCREPANCIES IMMEDIATELY TO THE ENGINEER.

CIVIL ABBREVIATIONS

&	AND
Ø, DIA	DIAMETER
#, NO	NUMBER
APP'D	APPROVED
BC	BOTTOM OF CURB
BLDG	BUILDING
BW	BOTTOM OF WALL
CB	CATCH BASIN
CEN	CENTER
CFS	CUBIC FEET PER SECOND
CI	CAST IRON
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CO	CLEANOUT
CONC	CONCRETE
COR	CORNER
CY	CUBIC YARD
DEMO	DEMOLITION
DMH	DRAIN MANHOLE
DI	DUCTILE IRON
DR	DRAIN
DWG	DRAWING
EL	ELEVATION
EMH	ELECTRIC MANHOLE
FM	FORCE MAIN
FT	FEET
G	GAS
HP	HIGH POINT
HYD	HYDRANT
IN	INCH
INF	INFLUENT
INV	INVERT
LBS	POUNDS
LP	LOW POINT
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM
MW	MONITORING WELL
N	NORTH
NGVD	NATIONAL GEODETIC VERTICAL DATUM
N/A	NOT AVAILABLE/APPLICABLE
NTS	NOT TO SCALE
OD	OUTSIDE DIAMETER
PC	PERFORATED CLAY
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PS	PRIMARY SLUDGE
PT	POINT OF TANGENCY
PVC	POLYVINYL CHLORIDE
RCP	REINFORCED CONCRETE PIPE
RD	ROOF DRAIN
REQ'D	REQUIRED
S	SLOPE, SEWER
SD	STORM DRAIN
SF	SQUARE FEET
SMH	SANITARY SEWER MANHOLE
SQ	SQUARE
STA	STATION
T, XFMR	TRANSFORMER
TBM	TEMPORARY BENCH MARK
TC	TOP OF CURB
THK	THICKNESS
TOS	TOP OF STRUCTURE
TW	TOP OF WALL
TYP	TYPICAL
UD	UNDERDRAIN
UG	UNDERGROUND
UGE	UNDERGROUND ELECTRIC
VC	VITRIFIED CLAY
W/	WITH

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
1			
2			
3			
4			
5			

DESIGNED BY:
CAS COORD.:
CAD:
CHECKED BY:
QA/QC:
APPROVED BY:
DATE:
PROJECT NO.: 20198

THOMAS SINGRO No. 6874 REGISTERED PROFESSIONAL ENGINEER STATE OF RHODE ISLAND

GARDNER + GERRISH LANDSCAPE ARCHITECTS LLC

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TOWN OF BRISTOL
GOLF COURSE WATER QUALITY IMPROVEMENTS
BRISTOL, RI

GENERAL NOTES, LEGEND AND ABBREVIATIONS

DRAWING
C-1

J:\ENG\R\BRISTOL\20198-GOLFCOURSEWATERQUALITYIMPROVE\20198A\DRAWINGS\CIV\20198-CS-EXISTINGCONDITIONS.DWG | 20198-CS-ExistingConditions | 1:2.5849 | --- | 1/20/2020 10:10:41 AM | CHRISTOPHER.HINKLEY

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DRAWING C-2

TOWN OF BRISTOL
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BRISTOL, RI

EXISTING CONDITIONS

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THOMAS SIMBRO
No. 8878
REGISTERED PROFESSIONAL ENGINEER
RCVD: 1/20/20

DESIGNED BY:	
CAD COORD:	
CAD:	
CHECKED BY:	
DATE:	
APPROVED BY:	
DATE:	
PROJECT NO:	20198

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
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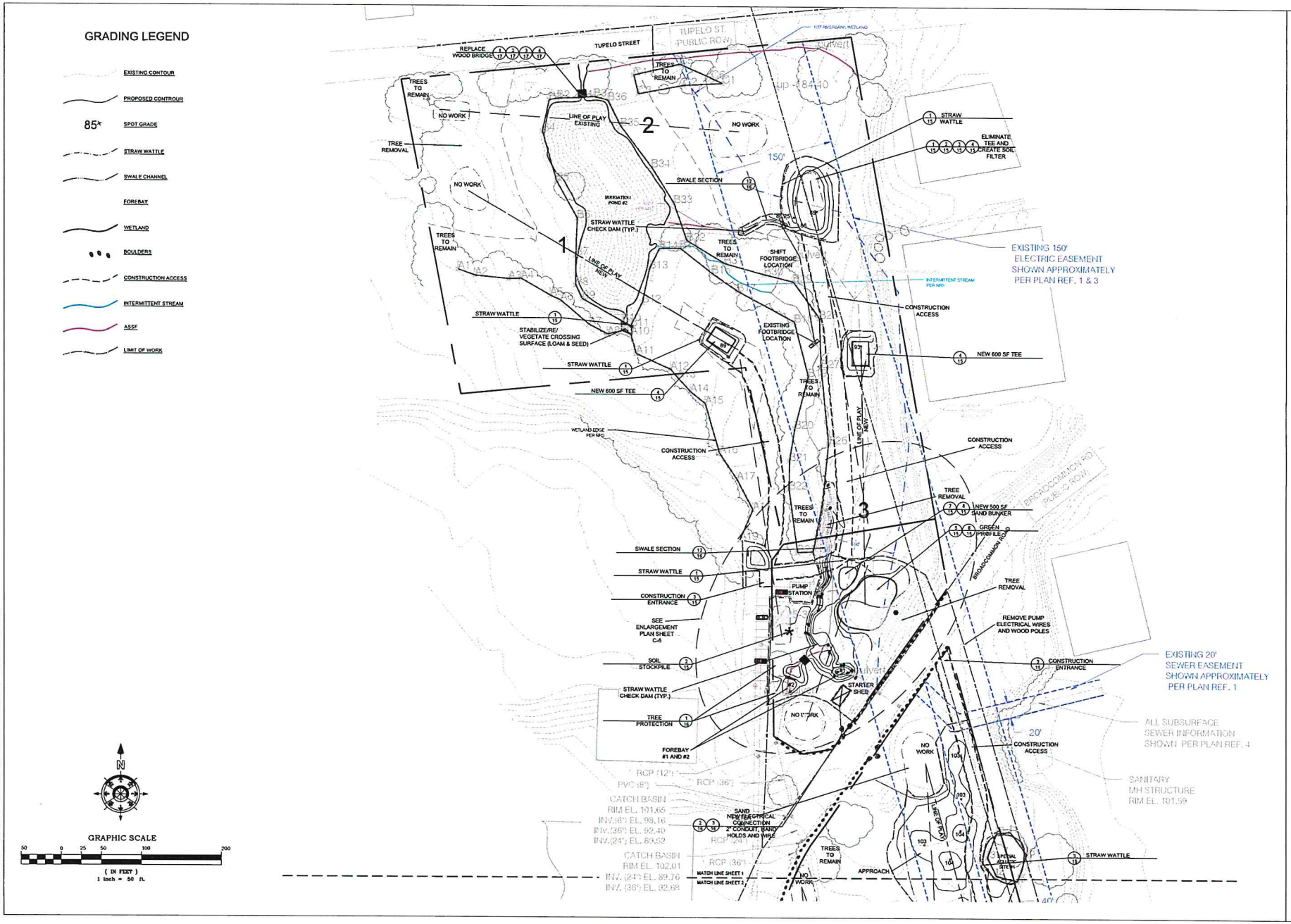

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
1	DEM COMMENTS 5-11-20		6/24/20

DESIGNED BY: T. GER
DRAWN BY: C.HIN
CHECKED BY: C.HIN/T.GER
APPROVED BY: T.GER/M.SHUR
DATE: 21 MAY 2020
PROJECT NO.: 20198

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TOWN OF BRISTOL
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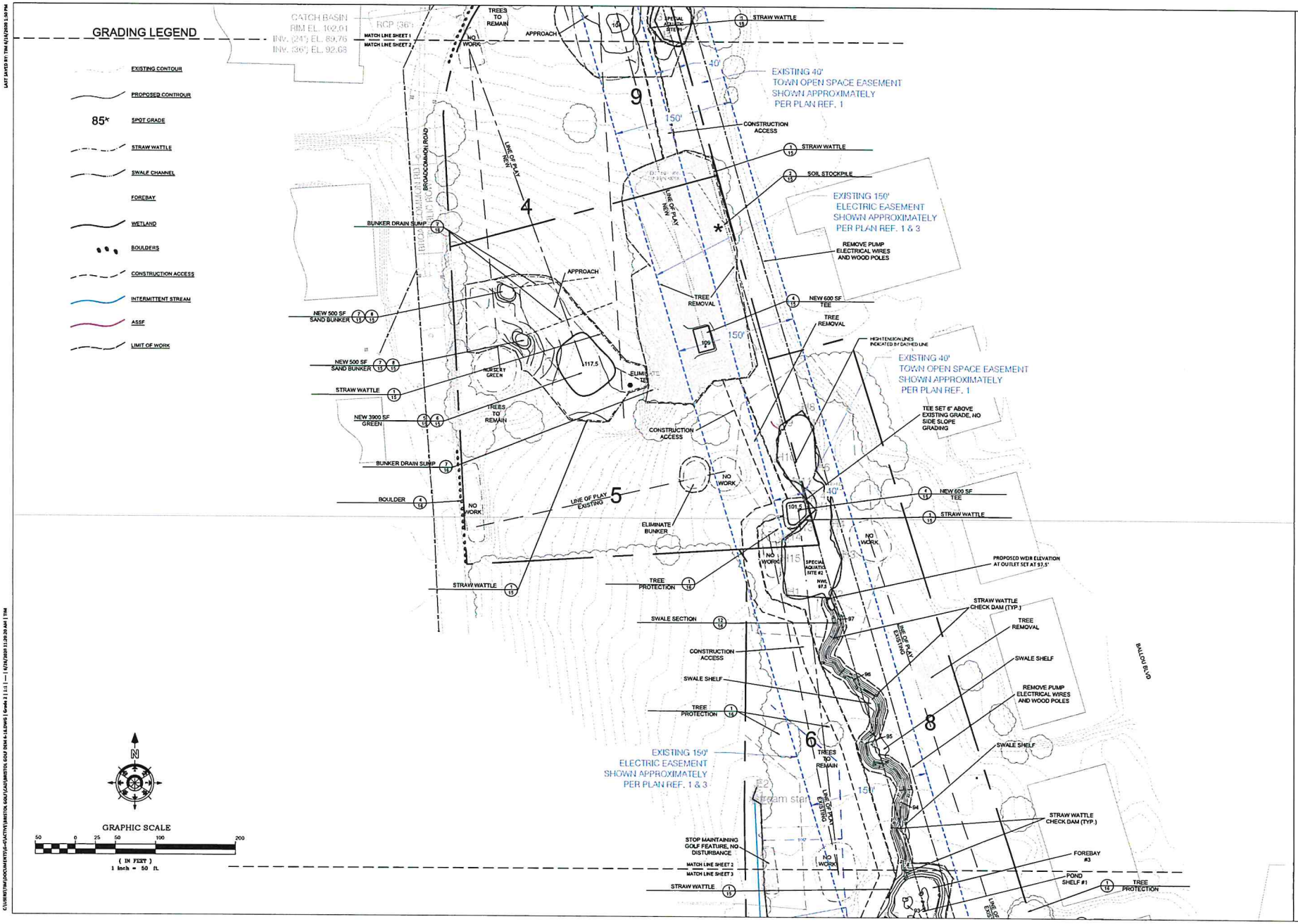
BRISTOL, RI

PROPOSED GRADING PLAN 1

DRAWING
C-3



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NO	SUBMISSIONS/REVISIONS	APP'D	DATE
1	DEM COMMENTS 5-11-20		5/11/20

DESIGNED BY: TGER
CAD TECH: CHM
CAD FILE: C-HMZ.GER
CHECKED BY: T.SHM/S.HUB
DATE: 21 MAY 2020
APPROVED BY: T.SHM/TGER
DATE: 21 MAY 2020
PROJECT NO: 20198

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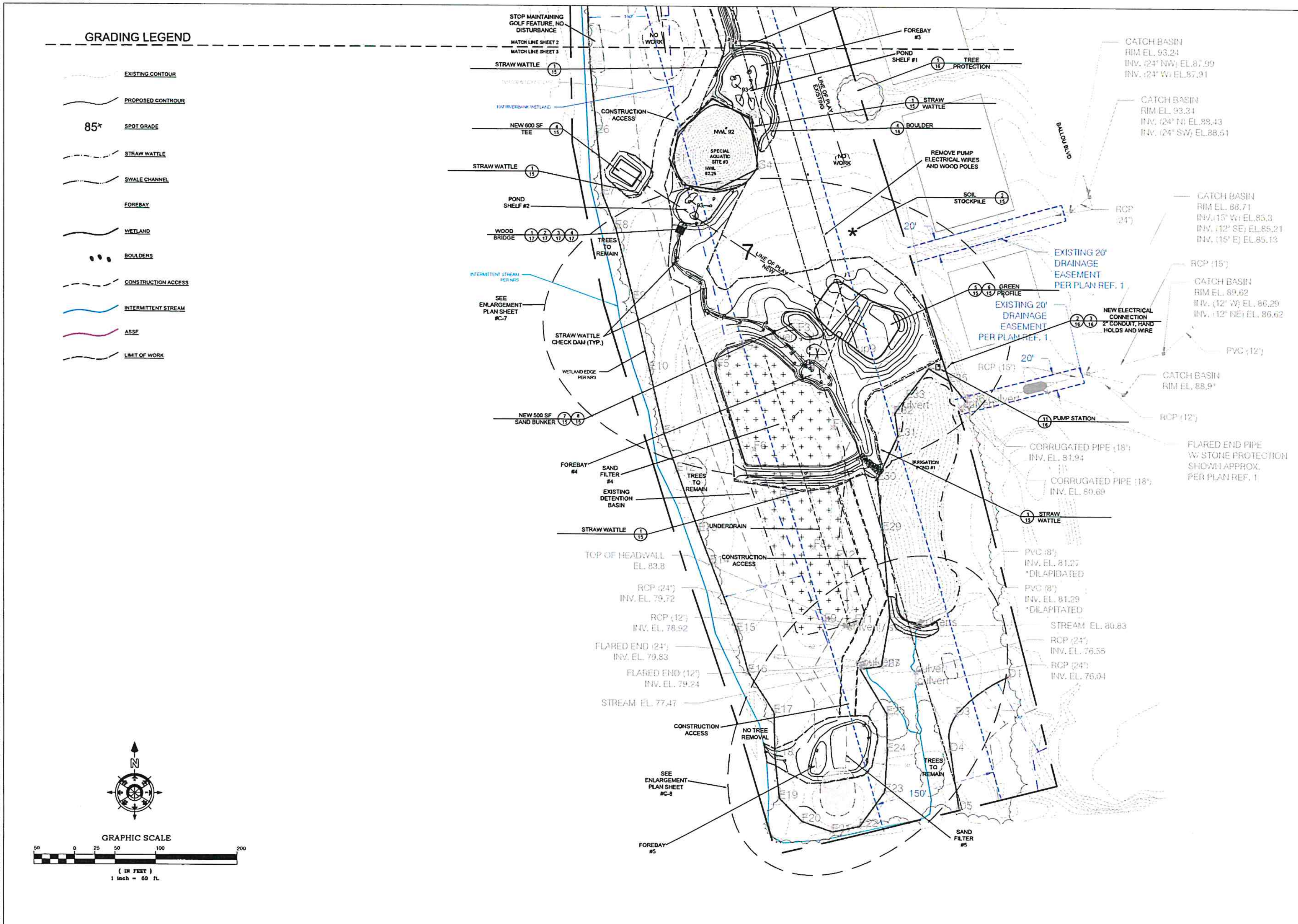
BRISTOL, RI

PROPOSED GRADING PLAN II

DRAWING
C-4



NO	SUBMISSIONS/REVISIONS	APP'D	DATE
1	DEM COMMENTS 5-11-20		6/26/20

DESIGNED BY: T GER
CAD COORD: C HIN
CAD: C HIM/T GER
CHECKED BY: T SIM/S HUB
DATE: 21 MAY 2020
APPROVED BY: T SIM/T GER
DATE: 21 MAY 2020
PROJECT NO: 20198

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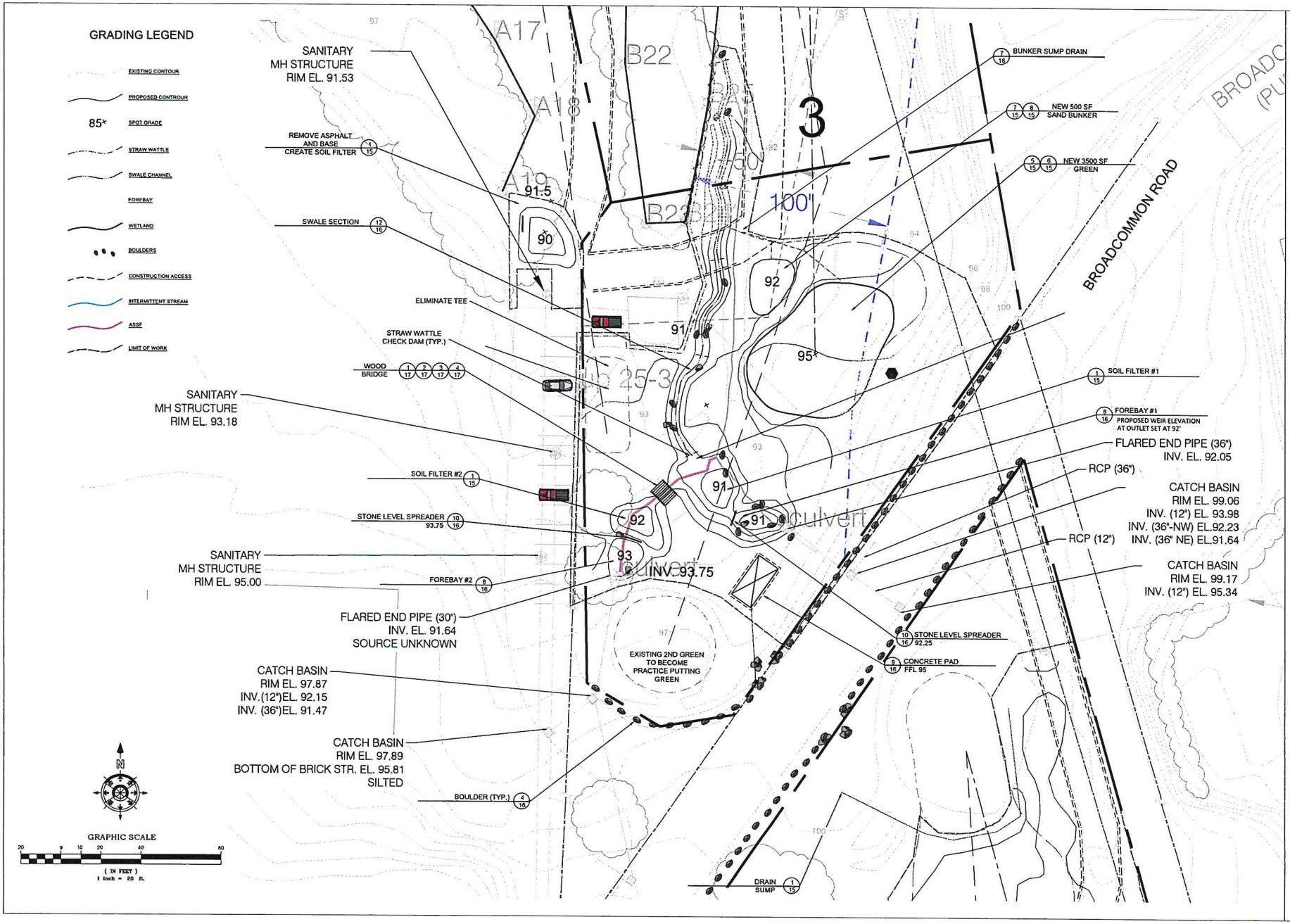
TOWN OF BRISTOL
GOLF COURSE WATER QUALITY IMPROVEMENTS
BRISTOL, RI

PROPOSED GRADING PLAN III

DRAWING
C-5



NO	SUBMISSIONS/REVISIONS	APP'D	DATE
1	DEM COMMENTS 5-13-20		9/24/20

DESIGNED BY: T GER
DRAWN BY: C HIN
CAD: C:\HIN\T GER
CHECKED BY: T SIMS/S HUR
DATE: 21 MAY 2020
APPROVED: T MAC GER
SCALE: AS NOTED
PROJECT NO.: 20188

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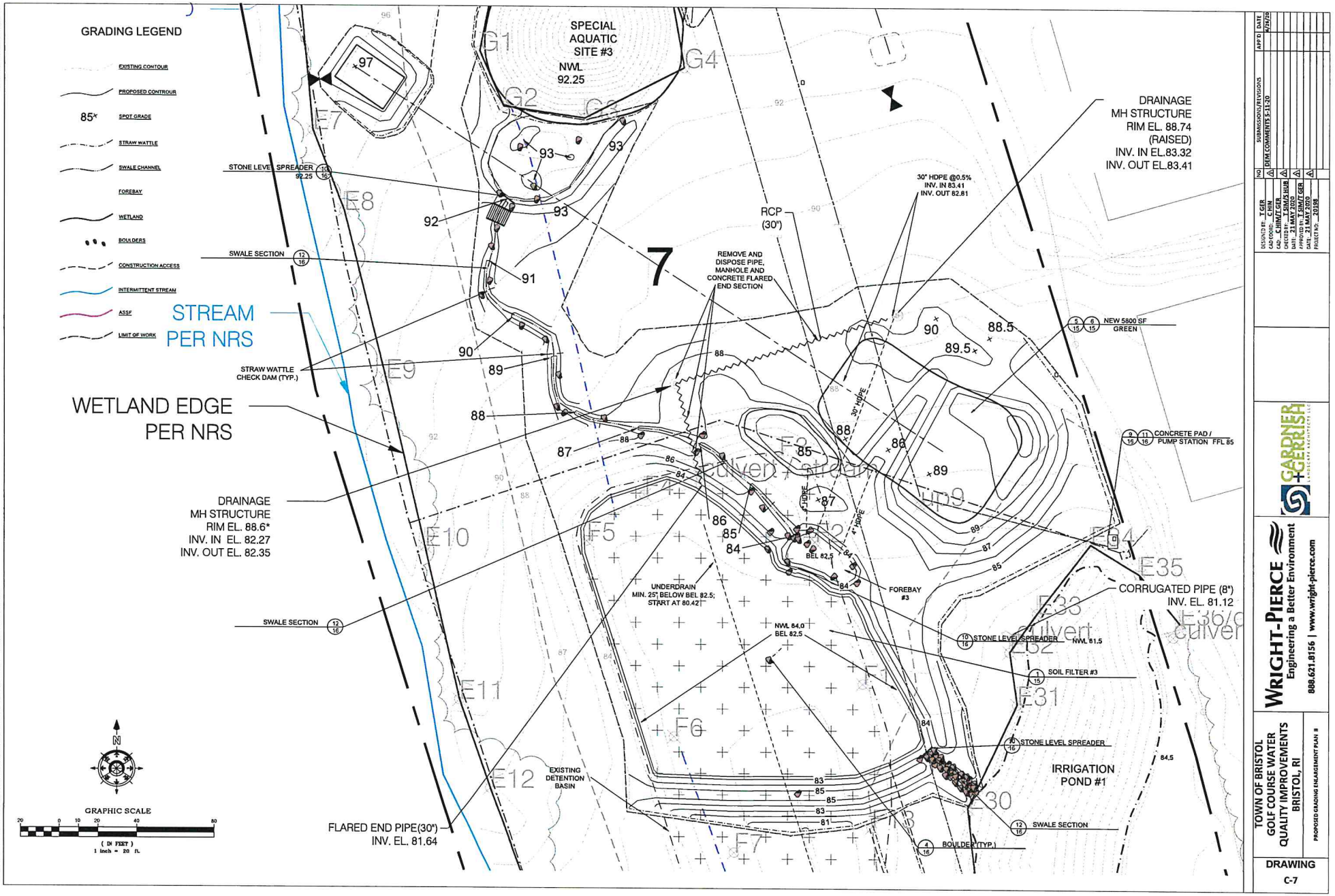
TOWN OF BRISTOL
GOLF COURSE WATER QUALITY IMPROVEMENTS
BRISTOL, RI

PROPOSED GRADING ENLARGEMENT PLAN I

DRAWING
C-6


GRADING LEGEND
EXISTING CONTOUR
PROPOSED CONTROUR
85x SPOT GRADE
STRAW WATTLE
SWALE CHANNEL
FOREBAY
WETLAND
BOULDERS
CONSTRUCTION ACCESS
INTERMITTENT STREAM
ASSF
LIMIT OF WORK
STREAM PER NRS
WETLAND EDGE PER NRS
SPECIAL AQUATIC SITE #3
NWL 92.25
DRAINAGE MH STRUCTURE RIM EL. 88.74 (RAISED) INV. IN EL.83.32 INV. OUT EL.83.41
STONE LEVEL SPREADER 92.25
SWALE SECTION
STRAW WATTLE CHECK DAM (TYP.)
RCP (30")
30" HDPE @0.5% INV. IN 83.41 INV. OUT 82.81
REMOVE AND DISPOSE PIPE, MANHOLE AND CONCRETE FLARED END SECTION
NEW 5800 SF GREEN
CONCRETE PAD / PUMP STATION FFL 85
DRAINAGE MH STRUCTURE RIM EL. 88.6* INV. IN EL. 82.27 INV. OUT EL. 82.35
UNDERDRAIN MIN. 25' BELOW BEL 82.5; START AT 80.42
BEL 82.5
FOREBAY #3
NWL 84.0 BEL 82.5
CORRUGATED PIPE (8") INV. EL. 81.12
STONE LEVEL SPREADER NWL 81.5
SOIL FILTER #3
STONE LEVEL SPREADER
IRRIGATION POND #1
SWALE SECTION
BOULDER (TYP.)
EXISTING DETENTION BASIN
FLARED END PIPE(30") INV. EL. 81.64
GRAPHIC SCALE
(IN FEET)
1 inch = 20 ft.
TOWN OF BRISTOL
GOLF COURSE WATER QUALITY IMPROVEMENTS
BRISTOL, RI
PROPOSED GRADING ENLARGEMENT PLAN II
DRAWING
C-7
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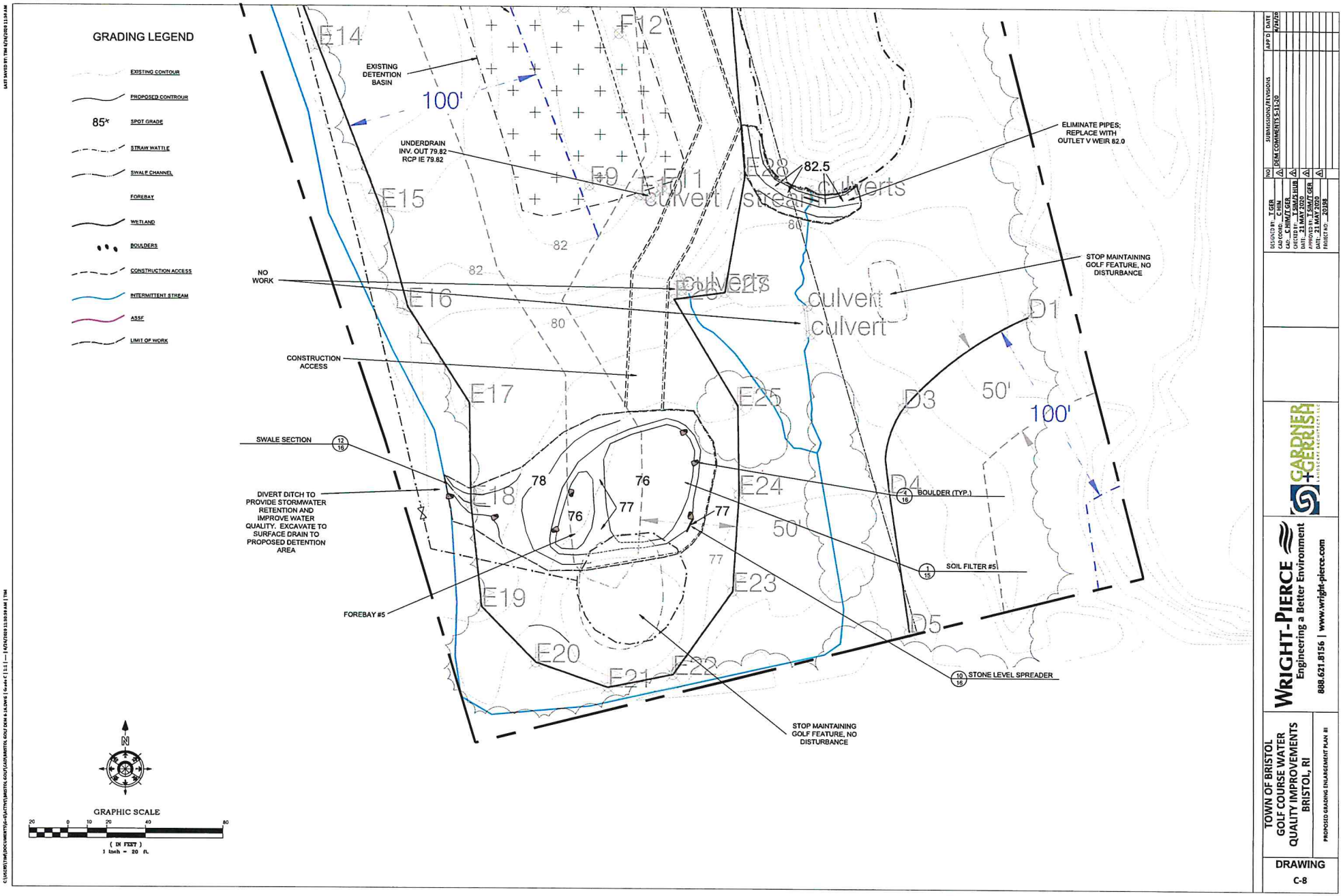
SUBMISSIONS/REVISIONS
DESIGNED BY: TEGR
DRAWN BY: CHM
CAD: C:\CHM\7.DGN
CHECKED BY: T.SIM/S.HUR
DATE: 21 MAY 2020
APPROVED BY: T.SIM
SCALE: AS SHOWN
PROJECT NO: 20198



NO	SUBMISSIONS/REVISIONS	APP'D	DATE
1	DEM COMMENTS 5-11-20		5/14/20

DESIGNED BY: T.GER
CAD CODE: C.HIN
CAD: C.HIN/T.GER
CHECKED BY: T.SIMS/S.HUR
DATE: 21 MAY 2020
APPROVED BY: T.MAC/T.GER
DATE: 21 MAY 2020
PROJECT NO: 20198

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TOWN OF BRISTOL
GOLF COURSE WATER QUALITY IMPROVEMENTS
BRISTOL, RI

PROPOSED GRADING ENLARGEMENT PLAN III

DRAWING
C-8

PLANTING LEGEND

BENTGRASS / LOW MOW BLUEGRASS SEED/SOD

APPROXIMATELY 29,860 SQ. FT.

PRIMARY ROUGH - BLUEGRASS/FESCUE/RYE SEED/SOD

APPROXIMATELY 86,790 SQ. FT.

WET MEADOW SEED

APPROXIMATELY 61,422 SQ. FT.

UPLAND SEED

APPROXIMATELY 21,185 SQ. FT.

LIMIT OF WORK

PLANT SCHEDULE

TREES	QTY	BOTANICAL / COMMON NAME	CONT	CAL	SIZE	NATIVE	NATURE	
	15	Juniperus virginiana / Eastern Red Cedar	B&B		6'-8'	YES	M - HS	
	5	Liriodendron tulipifera / Tulip Tree	B&B		2"-3"	YES	M - HS	
	18	Nyssa sylvatica / Sour Gum	B&B		2"-3"	YES	M - HS	
	25	Pinus strobus / White Pine	B&B		6'-8'	YES	M - HS	
	5	Quercus alba / White Oak	B&B		2"-3"	YES	M - HS	

SHRUBS	QTY	BOTANICAL / COMMON NAME	SIZE	HT.	NATIVE	NATURE	BLOOM	SPACING
	118	Aronia arbutifolia / Red Chokeberry	7 Gal	5'-6'	YES	M - HS	SPRING	AS" o.c.
	276	Clethra alnifolia / Summersweet Clethra	7 Gal	3'-5'	YES	M - S	July	AS" o.c.
	67	Cornus sericea / Red Twig Dogwood	7 Gal	5'-7'	YES	M - HS	WINTER	AS" o.c.
	251	Ilex glabra / Inkberry Holly	7 Gal	5'-6'	YES	M - S	June	AS" o.c.
	178	Ilex verticillata / Winterberry	7 Gal	5'-6'	YES	M - HS	WINTER	AS" o.c.
	115	Lindera benzoin(Bush) / Spicebush Laurel	7 Gal	4'-5'	YES	M - S	April - May	AS" o.c.
	61	Myrica pensylvanica / American Laurel	7 Gal	5'-6'	YES	M - HS	White - June	AS" o.c.
	271	Myrica gale / Sweetgale	7 Gal	2'-3'	YES	M - S	SPRING	AS" o.c.
	53	Rhododendron maximum / Rose Bay	7 Gal	5'-6'	YES	M - HS	June	AS" o.c.
	93	Spiraea betulifolia / Birchleaf Spirea	7 Gal	2'-3'	YES	M - S	July - August	AS" o.c.
	104	Spiraea tomentosa / Steeplebush	7 Gal	2'-3'	YES	M - S	July - Sept	AS" o.c.
	142	Vaccinium corymbosum / Highbush Blueberry	7 Gal	5'-7'	YES	M - HS	White - June	AS" o.c.
	38	Viburnum dentatum / Arrowwood	7 Gal	6'-8'	YES	M - HS	White - June	AS" o.c.

N

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

TUPELO STREET

TUPELO ST. (PUBLIC ROW)

TOP OF RIVERBANK WETLAND

TREES TO REMAIN

RESTORATION EDGE

IRRIGATION POND #2

TOP OF RIVERBANK

WET MEADOW RESTORATION SEED

TREES TO REMAIN

INTERMITTENT STREAM

ADD WOOD DEBRIS TO STREAM CHANNEL

BENTGRASS

ROUGH GRASS

WETLAND EDGE

TREES TO REMAIN

ADD WOOD DEBRIS TO STREAM CHANNEL

RESTORATION EDGE

BROADCOMMON ROAD (PUBLIC ROW)

BROADCOMMON ROAD

BENTGRASS

SAND BUNKER

PUMP STATION

ROUGH GRASS

WET MEADOW RESTORATION SEED

ALL SUBSURFACE SEWER INFORMATION SHOWN PER PLAN REF. 4

TREES TO REMAIN

BENTGRASS

RESTORATION EDGE

VERNAL AQUATIC SITE 1

MATCH LINE SHEET 1
MATCH LINE SHEET 2

ROUGH GRASS

WET MEADOW RESTORATION SEED

SHRUB CONTAINER / B&B PLANTING

LANDSCAPE NOTES

1. ALL NEW PLANT MATERIALS SHALL CONFORM TO THE MINIMUM GUIDELINES ESTABLISHED FOR NURSERY STOCK, PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN, INC. IN ADDITION, ALL NEW PLANT MATERIAL FOR THE PROJECT SHALL BE OF SPECIMEN QUALITY.
2. ALL NEW PLANTS TO BE BALLED AND BURLAPPED OR CONTAINER GROWN, UNLESS OTHERWISE NOTED ON THE PLANT LIST.
3. THE CONTRACTOR SHALL SUPPLY ALL NEW PLANT MATERIAL IN QUANTITIES SUFFICIENT TO COMPLETE THE PLANTING SHOWN ON THE DRAWINGS.
4. ANY PROPOSED SUBSTITUTIONS OF PLANT SPECIES SHALL BE MADE WITH PLANTS OF EQUIVALENT OVERALL FORM, HEIGHT, BRANCHING HABIT, FLOWER, LEAF, COLOR, FRUIT AND CULTURE, AND ONLY AFTER WRITTEN APPROVAL OF THE LANDSCAPE ARCHITECT.
5. ALL NEW PLANTS SHALL BE TAGGED AND APPROVED BY THE LANDSCAPE ARCHITECT AT THE NURSERY PRIOR TO DIGGING OR DELIVERY TO THE SITE.
6. CONTRACTOR SHALL LOCATE AND VERIFY ALL EXISTING UTILITY LINES PRIOR TO PLANTING AND SHALL REPORT ANY CONFLICTS TO THE LANDSCAPE ARCHITECT.
7. STAKE LOCATIONS OF ALL PROPOSED PLANTING FOR APPROVAL BY THE LANDSCAPE ARCHITECT PRIOR TO THE COMMENCEMENT OF PLANTING. INDIVIDUAL STAKES SHALL BE PLACED FOR TREES AND SHRUBS. EDGE OF PLANTING BEDS SHALL BE PAINTED. NOTIFY LANDSCAPE ARCHITECT 24 HOURS PRIOR TO DESIRED APPROVAL.
8. ALL NEW PLANTS SHALL BE SUPPLIED AND INSTALLED DURING THE PERIODS OF APRIL 1 - JULY 1 AND/OR SEPTEMBER 1 - NOVEMBER 1.
9. PREPARE ALL SHRUB PLANTING BEDS TO A MINIMUM DEPTH OF EIGHTEEN INCHES (18") WITH SPECIFIED PLANTING MIX: 1/3 SCREENED LOAM, 2" COMPOST, BLEND COMPOST INTO TOP 6" OF SOIL. PLANTING MIX SHALL BE FREE OF SUBSOIL, LUMPS, STONES, PLANTS, ROOTS, AND OTHER FOREIGN MATTER.
10. ALL SHRUB BEDS AND INDIVIDUAL TREE PITS SHALL RECEIVE THREE INCHES (3") OF BARK MULCH FOR SPECIFICATIONS, PERENNIAL AND GROUNDCOVER BEDS SHALL RECEIVE TWO INCHES (2"). PROVIDE LANDSCAPE ARCHITECT WITH SAMPLE FOR APPROVAL.
11. ALL BURLAP, TWINE AND WIRE SHALL BE COMPLETELY REMOVED OR CUT AWAY AT TIME OF INSTALLATION.
12. PLANT WARRANTY SHALL BE FOR ONE FULL GROWING SEASON FROM THE TIME OF INSTALL.
13. LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING ALL DAMAGED, STOLEN, DEAD, DECLINING OR LOST MATERIAL UNTIL COMPLETION OF MAINTENANCE PERIODS OR WARRANTY PERIODS.
14. IF NO IRRIGATION SYSTEM IS PLANNED, CONTRACTOR SHALL INFORM OWNER OF WATERING REQUIREMENTS.
15. ALL AREAS TO BE SEEDED OR SODDED SHALL RECEIVE SIX INCHES (6") OF LOAM, MEASURED AFTER INSTALLATION, PRIOR TO SEEDING.
16. PRUNE TREES IN ACCORDANCE WITH THE SPECIFICATIONS.
17. ALL EXISTING LAWN AREAS DESIGNED TO REMAIN SHALL BE AERATED, FERTILIZED AND OVERSEEDED, AS DIRECTED BY THE LANDSCAPE ARCHITECT.
18. IN ADDITION TO LOCATIONS DEFINED FOR SEED ON THE PLANTING PLAN, THE CONTRACTOR SHALL BE RESPONSIBLE FOR SEEDING ANY DISTURBED AREAS.
19. ALL VEGETATION AND DEBRIS SHALL BE REMOVED FROM PROPOSED PLANTING AREAS PRIOR TO PLANTING AND BACKFILLING. CONTRACTOR SHALL REMOVE ALL DEBRIS FROM SITE AS WORK PROGRESSES.
20. LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING CLOSE COORDINATION WITH OWNER, GENERAL CONTRACTOR, RELATED SUBCONTRACTORS, LANDSCAPE ARCHITECT, AND ALL SITE WORK RELATED ITEMS.
21. SEED MIXTURE SHALL BE RI BLACK BEAUTY MIX BY JOHNATHON GREEN OR APPROVED EQUAL. 85% TALL TURF FESCUE, 15% KENTUCKY BLUE GRASS. # SLS1016057
22. NO CUTTING, PRUNING, OR REMOVAL OF ANY TREES THAT STAND ON TOWN PROPERTY IS ALLOWED WITH THIS PROJECT.

NO	SUBMISSIONS/REVISIONS	(APP'D)	DATE
1	DEM COMMENTS 5-11-20		5/22/20
2			
3			
4			
5			
6			

DESIGNED BY: T.GER
DRAWN BY: C.HIN
C.K.D.: C.HIN/T.GER
CHECKED BY: T.SIMS/S.HUR
DATE: 21 MAY 2020
APPROVED BY: T.GER
APPROVAL DATE: 21 MAY 2020
PROJECT NO.: 20198

GARDNER + GERRISH
LANDSCAPE ARCHITECTURE LLC

WRIGHT-PIERCE
Engineering a Better Environment
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TOWN OF BRISTOL
GOLF COURSE WATER QUALITY IMPROVEMENTS
BRISTOL, RI

PROPOSED PLANTING PLAN 1

DRAWING
C-9

LAST SAVED BY: TIM 5/24/2020 11:44 AM

C:\USERS\TIM\DOCUMENTS\GI-DOCTYPE\BRISTOL GOLF\CAD\BRISTOL GOLF_NEW R-6.DWG | Layout: 1 | 1:1 | — | 5/24/2020 11:45:13 AM | TIM

PLANTING LEGEND

BENTGRASS / LOW MOW BLUEGRASS SEED/SOD

APPROXIMATELY 29,660 SQ. FT.

PRIMARY ROUGH - BLUEGRASS/FESCUE/RYE SEED/SOD

APPROXIMATELY 86,790 SQ. FT.

WET MEADOW SEED

APPROXIMATELY 61,422 SQ. FT.

UPLAND SEED

APPROXIMATELY 21,185 SQ. FT.

LIMIT OF WORK

PLANT SCHEDULE

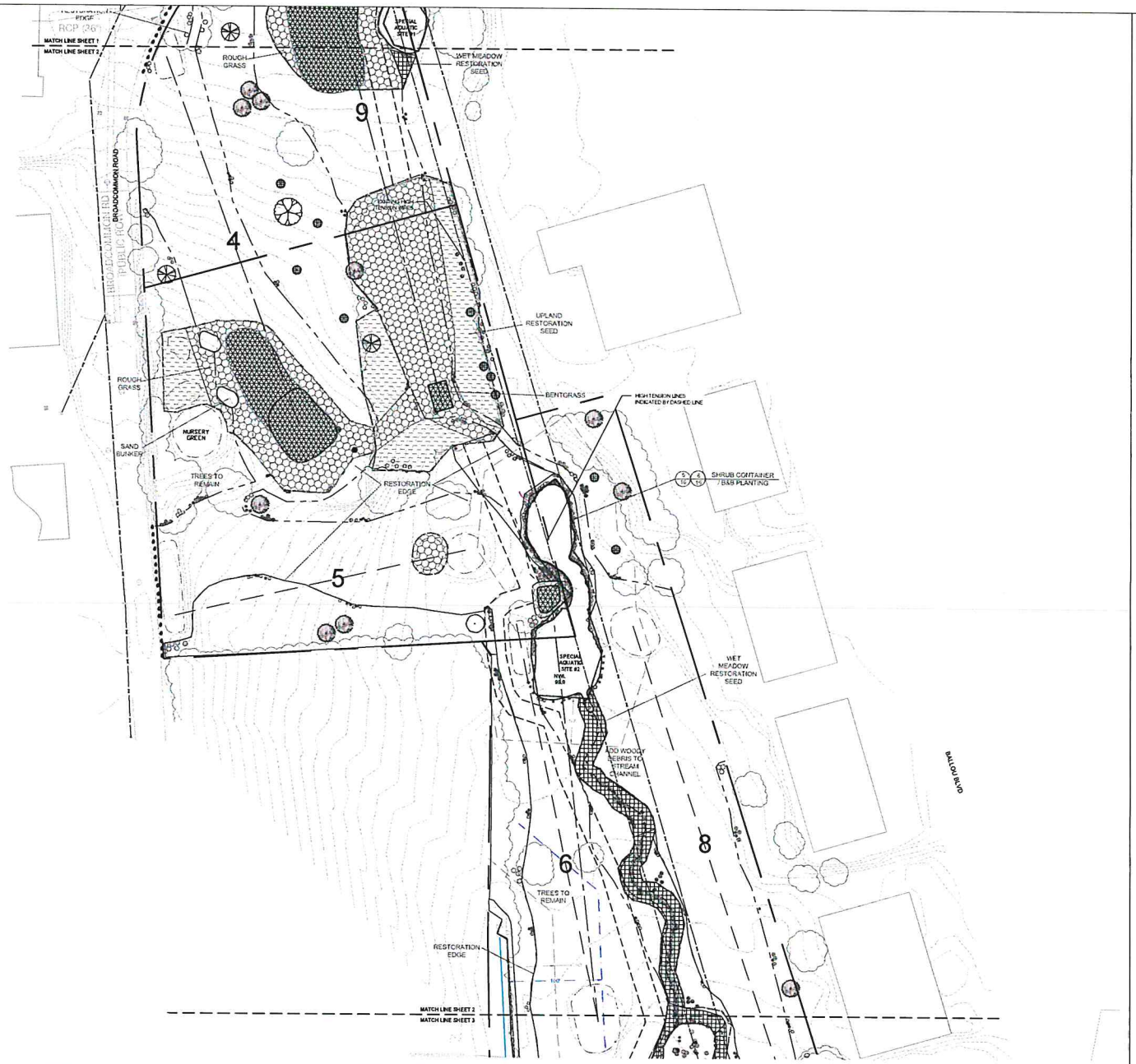
TREES	QTY	BOTANICAL / COMMON NAME	CONT	CAL	SIZE	NATIVE	MATURE	
	16	*Juniperus virginiana* / Eastern Red Cedar	#Pot		7'-8'	YES	40' x 10'	
	3	*Liriodendron tulipifera* / Tulip Tree	#Pot		7'-8'	YES	70'+ 35'	
	18	*Nyssa sylvatica* / Sour Gum	#Pot		7'-8'	YES	40' x 45'	
	25	*Pinus strobus* / White Pine	#Pot		7'-8'	YES	80'+ 35'	
	3	*Quercus alba* / White Oak	#Pot		7'-8'	YES	70'+ 35'	
SHRUBS	QTY	BOTANICAL / COMMON NAME	SIZE	CAT.	NATIVE	MATURE	BLOOM	SPACING
	153	*Aronia arbutifolia* / Red Chokeberry	Plug	1'-1'	YES	6'+ 10'	APR/MAY	48" o.c.
	254	*Clethra alnifolia* / Summersweet Clethra	Plug	2'-3'	YES	5'+ 8'	July	48" o.c.
	67	*Cornus sericea* / Red Twig Dogwood	Plug	2'-3'	YES	5'+ 10'	WINTER	48" o.c.
	211	*Ilex glabra* / Inkberry Holly	Plug	1'-2'	YES	5'+ 8'	June	48" o.c.
	175	*Ilex verticillata* / Winterberry	Plug	1'-2'	YES	5'+ 12'	WINTER	48" o.c.
	111	*Itea virginica* 'Sprich Laurel'	Plug	1'-2'	YES	2'+ 3'	JUNE + JULY	24" o.c.
	67	*Kalmia latifolia* / Mountain Laurel	Plug	1'-2'	YES	18"+ 15'	May + June	36" o.c.
	211	*Myrica pala* / Sweetgale	Plug	1'-2'	YES	2'+ 3'	APR/MAY	24" o.c.
	67	*Rhododendron maximum* / Rose Bay	Plug	2'-3'	YES	10'+ 15'	June	48" o.c.
	181	*Spiraea latifolia* / Broad-leaved	Plug	1'-2'	YES	3'+ 6'	July + August	36" o.c.
	196	*Spiraea tomentosa* / Steeplebush	Plug	1'-2'	YES	3'+ 6'	July + Sept	36" o.c.
	142	*Vaccinium corymbosum* / Highbush Blueberry	Bag	1'-3'	YES	10'+ 12'	May + June	48" o.c.
	16	*Viburnum dentatum* / Viburnum	Plug	1'-2'	YES	10'+ 12'	May + June	48" o.c.

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)

1 inch = 50 ft.



NO	SUBMISSIONS/REVISIONS	APP'D	DATE
1	DEM COMMENTS 5-11-20		5/25/20

DESIGNED BY: T.GER
CAD CODE: C-HIN
CAD: C:\HIN\T.GER
CHECKED BY: T.SIMS/JHUB
DATE: 21 MAY 2020
APPROVED BY: T.SIMS/T.GER
DATE: 21 MAY 2020
PROJECT NO.: 20159

TOWN OF BRISTOL
GOLF COURSE WATER QUALITY IMPROVEMENTS
BRISTOL, RI

PROPOSED PLANTING PLAN II

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GARDNER + GERRISH
LANDSCAPE ARCHITECTS, LLC

DRAWING
C-10

PLANTING LEGEND

BENTGRASS / LOW MOW BLUEGRASS SEED/SOD

APPROXIMATELY 29,860 SQ. FT.

PRIMARY ROUGH - BLUEGRASS/FESCUE/RYE SEED/SOD

APPROXIMATELY 86,790 SQ. FT.

WET MEADOW SEED

APPROXIMATELY 61,422 SQ. FT.

UPLAND SEED

APPROXIMATELY 21,185 SQ. FT.

LIMIT OF WORK

PLANT SCHEDULE

TREES	QTY	BOTANICAL / COMMON NAME	CONT	CAL	SIZE	NATIVE	MATURE	
	15	Juniperus virginiana / Eastern Red Cedar	B&B		5'-6'	YES	40' x 10'	
	5	Liriodendron tulipifera / Tulip Tree	B&B		5'-6'	YES	60'x 30'	
	10	Nyssa sylvatica / Sour Gum	B&B		5'-6'	YES	40' x 15'	
	25	Pinus strobus / White Pine	B&B		5'-6'	YES	50'x 20'	
	7	Quercus alba / White Oak	B&B		5'-6'	YES	50'x 30'	

SHRUBS	QTY	BOTANICAL / COMMON NAME	SIZE	HT.	NATIVE	MATURE	BLOOM	SPACING
	133	Aronia arbutifolia / Red Chokeberry	3 Gal	3'-4'	YES	6'x 10'	SPRING	48" o.c.
	204	Clethra alnifolia / Summersweet Clethra	3 Gal	3'-4'	YES	6'x 6'	July	48" o.c.
	47	Cornus sericea / Red Twig Dogwood	3 Gal	3'-4'	YES	6'x 10'	WINTER	48" o.c.
	231	Ilex glabra / Inkberry Holly	3 Gal	3'-4'	YES	6'x 8'	June	48" o.c.
	175	Ilex verticillata / Winterberry	3 Gal	3'-4'	YES	6'x 10'	WINTER	48" o.c.
	111	Kalmia angustifolia / Sheep Laurel	3 Gal	2'-3'	YES	2'x 3'	June - July	24" o.c.
	97	Kalmia latifolia / Mountain Laurel	3 Gal	3'-4'	YES	10'x 15'	May - June	48" o.c.
	271	Myrica pen / Sweetgale	3 Gal	2'-3'	YES	3'x 6'	SPRING	36" o.c.
	63	Rhododendron maximum / Rose Bay	3 Gal	2'-3'	YES	10'x 15'	June	60" o.c.
	131	Spiraea latifolia / Meadow Sweet	3 Gal	2'-3'	YES	3'x 4'	July - August	36" o.c.
	164	Spiraea tomentosa / Steeplebush	3 Gal	2'-3'	YES	3'x 4'	July - Sept	36" o.c.
	142	Vaccinium corymbosum / Highbush Blueberry	3 Gal	6'-7'	YES	10'x 12'	May - June	48" o.c.
	88	Viburnum dentatum / Arrowwood	3 Gal	5'-6'	YES	10'x 12'	May - June	60" o.c.

N

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)

1 inch = 50 ft.

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
1	DEM COMMENTS 5-11-20		6/24/20

DESIGNED BY — T. GER
DRAWN BY — C. EWA
CAD — CHM/T.GER
CHECKED BY — T.SIMAS HUB
DATE — 21 MAY 2020
APPROVED BY — T.SIMAS
SCALE — 1" = 50'-0"
PROJECT NO. — 20158

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LANDSCAPE ARCHITECTS, LLC

TOWN OF BRISTOL
GOLF COURSE WATER QUALITY IMPROVEMENTS
BRISTOL, RI

PROPOSED PLANTING PLAN III

DRAWING
C-11

RESTORATION LEGEND

MOW 3X WEEK @ 2" (BLUE/FESCUE)
APPROXIMATELY 353,190 SQ. FT.

MOW 5X A WEEK @ 0.1" (FINE TURF)
APPROXIMATELY 52,560 SQ. FT.

TREE MANAGEMENT AREA
MOWING/MAINTAIN TWICE A YEAR @ 18"-3' (SECONDARY ROUGH)
APPROXIMATELY 198,410 SQ. FT.

NO MOWING - ALLOW TO RE-VEGETATE - WET MEADOW
SLICE SEED WET MEADOW RESTORATION MIX
APPROXIMATELY 227,930 SQ. FT.

NO MOWING - ALLOW TO RE-VEGETATE - UPLAND
SLICE SEED UPLAND RESTORATION MIX
APPROXIMATELY 170,615 SQ. FT.

N

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)
1 inch = 50 ft.

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
1	DEM COMMENTS 5-11-20		6/26/20
2			
3			
4			
5			

DESIGNED BY: T GER
CAD COORD: C HIN
CAD: C HIM/T GER
CHECKED BY: T SIM/S HUB
DATE: 21 MAY 2020
APPROVED BY: T SIM/T GER
DATE: 21 MAY 2020
PROJECT NO: 20198

GARDNER + GERRISH LANDSCAPE ARCHITECTS LLC

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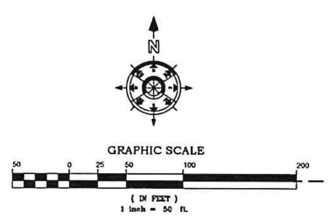
TOWN OF BRISTOL
GOLF COURSE WATER QUALITY IMPROVEMENTS
BRISTOL, RI

PROPOSED RESTORATION PLAN I

DRAWING
C-12

RESTORATION LEGEND

Symbol	Description
(blank)	MOW 3X WEEK @ 2" (BLUE/FESCUE) APPROXIMATELY 353,190 SQ. FT.
(grid pattern)	MOW 5X A WEEK @ 0.1" (FINE TURF) APPROXIMATELY 52,560 SQ. FT.
(blank)	TREE MANAGEMENT AREA MOWING/MAINTAIN TWICE A YEAR @ 18"-3' (SECONDARY ROUGH) APPROXIMATELY 198,410 SQ. FT.
(dot pattern)	NO MOWING - ALLOW TO RE-VEGETATE - WET MEADOW SLICE SEED WET MEADOW RESTORATION MIX APPROXIMATELY 227,930 SQ. FT.
(triangle pattern)	NO MOWING - ALLOW TO RE-VEGETATE - UPLAND SLICE SEED UPLAND RESTORATION MIX APPROXIMATELY 170,615 SQ. FT.



NO	SUBMISSIONS/REVISIONS	APP'D	DATE
1	DEM COMMENTS 5-11-20		6/26/20
2			
3			
4			

DESIGNED BY: T GER
CAD COORD: C HIN
CAD: C HIM/T GER
CHECKED BY: T SIM/S HUB
DATE: 21 MAY 2020
APPROVED BY: T SIM/T GER
DATE: 21 MAY 2020
PROJECT NO: 20198

GARDNER + GERRISH LANDSCAPE ARCHITECTS LLC

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TOWN OF BRISTOL
GOLF COURSE WATER QUALITY IMPROVEMENTS
BRISTOL, RI

PROPOSED RESTORATION PLAN II

DRAWING
C-13

RESTORATION LEGEND

MOW 3X WEEK @ 2" (BLUE/FESCUE)

APPROXIMATELY 353,190 SQ. FT.

MOW 5X A WEEK @ 0.1" (FINE TURF)

APPROXIMATELY 52,560 SQ. FT.

TREE MANAGEMENT AREA
MOWING/MAINTAIN TWICE A YEAR @ 18"-3" (SECONDARY ROUGH)

APPROXIMATELY 198,410 SQ. FT.

NO MOWING - ALLOW TO RE-VEGETATE - WET MEADOW
SLICE SEED WET MEADOW RESTORATION MIX

APPROXIMATELY 227,930 SQ. FT.

NO MOWING - ALLOW TO RE-VEGETATE - UPLAND
SLICE SEED UPLAND RESTORATION MIX

APPROXIMATELY 170,615 SQ. FT.

N

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
1	DEM COMMENTS 5-11-20		5/21/20

DESIGNED BY... T.GER
DRAWN BY... C.HIN
CAD... C:\HIN\T.GER
CHECKED BY... T.SIM/S.HUB
DATE... 21 MAY 2020
APPROVED BY... T.SIM/T.GER
DATE... 21 MAY 2020
PROJECT NO.... 20198

GARDNER + GERRISH
LANDSCAPE ARCHITECTURE LLC

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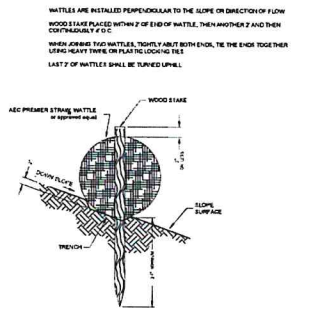
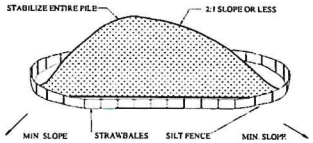
TOWN OF BRISTOL
GOLF COURSE WATER QUALITY IMPROVEMENTS
BRISTOL, RI

PROPOSED RESTORATION PLAN III

DRAWING
C-14



1 TYPICAL 9" STRAW WATTLE NO SCALE



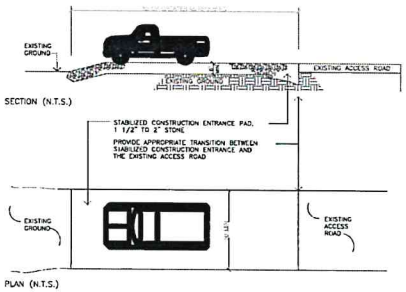
To be used where topsoil is necessary for regrading and vegetating disturbed areas. Topsoil is applied to subsoils that are draughty (having low available moisture for plants), stony, salty, having low permeability, or are extremely acid. It is also used to backfill around shrub and tree transplants. Preservation of existing topsoil is beneficial for all types of lawn or ornamental plantings.

Temporary stockpile stabilization measures include vegetative cover, mulch, non-vegetative cover and peripheral sediment trapping barriers. The stabilization measure(s) selected should be appropriate for the time of year, site conditions and required period of use.

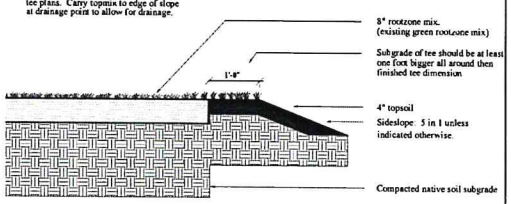
SEE GRADING PLAN FOR LOCATIONS.

INSTALLATION NOTES:
1. Area chosen for stockpiling operations shall be dry and stable
2. Maximum slope of stockpile shall be 1:2
3. Upon completion of soil stockpiling, each pile shall be surrounded with either silt fencing or strawbales, then stabilized with vegitation or covered.

2 SOIL STOCKPILING NO SCALE

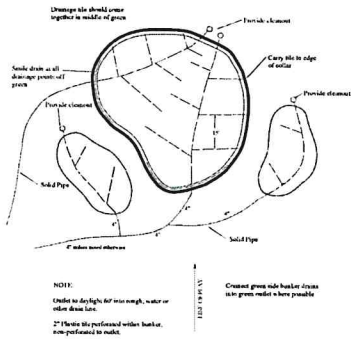


3 STABILIZED CONSTRUCTION ENTRANCE (IF NECESSARY) NO SCALE

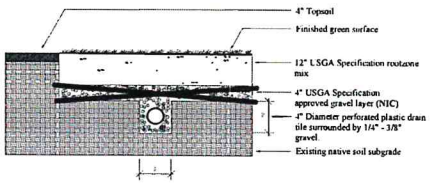


NOTE: At least one tee per hole shall have a side slope no greater than 1' in 12' to meet ADA accessibility requirements.

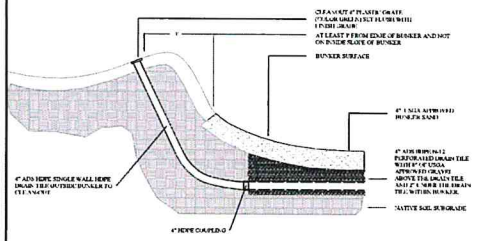
4 TEE DETAIL SECTION NO SCALE



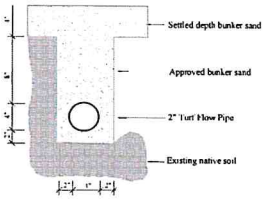
5 TYPICAL GREEN COMPLEX UNDERDRAIN PLAN NO SCALE



6 GREEN PROFILE NO SCALE



7 BUNKER DETAIL AND CLEANOUT NO SCALE



8 BUNKER UNDERDRAIN SECTION NO SCALE

GENERAL NOTES NOTES:
1. ALL DISTURBED AREAS SHALL BE REPLACED IN KIND UNLESS OTHERWISE SHOWN.

2. THE DRAINAGE SYSTEM SHALL BE CLEANED BY THE CONTRACTOR PRIOR TO ACCEPTANCE OF THE PROJECT AT NO ADDITIONAL COST.

3. FOR ALL EXCAVATION AND PLACEMENT OF FILL, THE CONTRACTOR SHALL PERFORM THE WORK IN FULL COMPLIANCE WITH THE RHODE ISLAND STANDARD SPECIFICATION SECTION.

4. IN ADDITION TO THE CONTRACT DOCUMENT, SPECIFICATIONS TO GOVERN THIS PROJECT ARE RHODE ISLAND STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 1997 EDITION INCLUDING ALL REVISIONS AND SUPPLEMENTAL SPECIFICATIONS. STANDARD DETAILS FOR THIS PROJECT ARE RHODE ISLAND STANDARD DETAILS.

5. WORK SHOWN ON THE PLANS FOR WHICH THERE ARE NO PARTICULAR DETAILS, "CALL-OUTS", OR SPECIFICATIONS DOES NOT RELIEVE THE CONTRACTOR FROM FURNISHING AND INSTALLING THE WORK. THE CONTRACTOR SHALL THOROUGHLY EXAMINE DETAILS, THE CONTRACT DOCUMENTS AND PLANS AND INSPECT THE SITE, AND THE BID PRICE SHALL INCLUDE ALL SERVICES AND MATERIALS NECESSARY TO COMPLETE THE PROJECT. ANY CHANGES TO THE PROJECT OR THE INSTALLATION OF AN ITEM FOR WHICH NO PARTICULAR DETAIL OR SPECIFICATION WAS PROVIDED MUST BE REVIEWED BY AND MUST BE ACCEPTABLE TO THE ENGINEER.

6. DRAIN LINES SHALL BE HIGH-DENSITY POLYETHYLENE PIPE (HDPE) "ADS" N-12 SMOOTH INTERIOR HIGH DENSITY POLYTHYLENE CORRUGATED PIPE WITH WATERTIGHT JOINTS/FITTINGS, OR AN APPROVED EQUAL. FOR DRAIN LINES 30" AND LARGER SHALL HAVE "O" RING GASKETS, AND THE JOINTS ON THE OUTSIDE OF PIPE SHALL BE MORTARED.

8. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT THE CONDITIONS OF ALL PERMITS, SPECIFICATIONS, AS WELL AS FEDERAL, STATE AND LOCAL REGULATIONS ARE STRICTLY ENFORCED. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR ALL ASPECTS OF ON-SITE SAFETY.

9. THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF ALL EXISTING DRAINAGE & UTILITIES, BOTH UNDERGROUND AND OVERHEAD, BEFORE EXCAVATION BEGINS IN ACCORDANCE WITH DIGSAFE AND BY CONTACTING THE INDIVIDUAL UTILITY COMPANIES. EXCAVATION SHALL BE IN ACCORDANCE WITH ALL STATUTES, ORDINANCES, RULES AND REGULATIONS OF ANY CITY, STATE OR FEDERAL AGENCY THAT MAY BE APPLICABLE, ANY DAMAGE TO EXISTING UTILITIES SHALL BE THE CONTRACTOR'S RESPONSIBILITY.

10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL MAINTENANCE AND PROTECTION OF PEDESTRIAN AND VEHICULAR TRAFFIC INCLUDING POLICE PROTECTION. ALL TEMPORARY CONSTRUCTION SIGNS, BARRICADES AND LANE CLOSURES SHALL BE IN CONFORMANCE WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (M.U.T.C.D.)

11. ALL REQUIRED AUTHORIZATION TO PERFORM WORK MUST BE OBTAINED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

12. ALL MANHOLE RIM ELEVATIONS ARE TO BE SET IN THE FIELD AT THE PROPOSED SURFACE LEVEL.

13. THE CONTRACTOR IS REQUIRED TO PROVIDE APPROPRIATE TRENCHING, CONDUITS, WIRING AND BACKFILL AS REQUIRED TO INSTALL THE PROPOSED UNDERGROUND ELECTRIC SERVICE AS SHOWN AND IN ACCORDANCE WITH LOCAL AND STATE REQUIREMENTS.

14. THE SITE IS A PART OF A PREVIOUSLY DEVELOPED SITE WHOSE BUILDINGS WERE DEMOLISHED. GARDNER+GERRISH, LLC. DOES NOT MAKE ANY CLAIMS AS TO THE SUBSURFACE MATERIAL OR CONDITIONS.

15. THE DRAINAGE AND UTILITY PLAN AND DRAINAGE DETAILS SHOWN ON LANDSCAPE PLANS ARE SUBJECT TO CHANGE WITH RESPECT TO REQUIRED UTILITY PERMIT CONDITIONS.

GENERAL NOTES CONT.:
16. CONSTRUCTION INDICATED ON THESE PLANS SHALL BE IN ACCORDANCE WITH THE LATEST REVISION OF AND MODIFICATIONS TO THE STATE OF RHODE ISLAND STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION AND THE SPECIFICATIONS ACCOMPANYING THESE PLANS. IN CASE OF CONFLICT, THE SPECIAL PROVISIONS OF THE SPECIFICATIONS ACCOMPANYING THESE PLANS SHALL GOVERN.

17. ALL ITEMS NOT REFERENCED FOR MODIFICATION WILL BE "EXISTING TO REMAIN" UNLESS OTHERWISE DIRECTED BY THE LANDSCAPE ARCHITECT.

18. ANY EXISTING PROPERTY THAT WAS NOT PROPOSED TO BE MODIFIED THAT IS DAMAGED BY THE CONTRACTOR SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE RHODE ISLAND DEPARTMENT OF TRANSPORTATION.

19. THE CONTRACTOR SHALL NOT BE ALLOWED TO STOCK PILE CONSTRUCTION MATERIALS WITHIN THE CLEAR ZONE DURING NON-WORKING HOURS. THE CONTRACTOR SHALL PLACE ALL STOCKPILED MATERIAL IN A PLACE DESIGNATED BY THE LANDSCAPE ARCHITECT SO AS NOT TO CAUSE A SAFETY HAZARD.

20. THE FREQUENCY AND APPLICATION RATES FROM DUST CONTROL ITEMS WILL BE DETERMINED BY THE CONTRACTOR. CALCIUM CHLORIDE SHALL NOT BE USED FOR DUST CONTROL.

21. DIMENSIONS SHOWN ON THE PLANS ARE APPROXIMATE.

22. ANY SIDEWALK OR ROADWAY DISTURBED BY CONSTRUCTION ACTIVITY SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST. THE COST SHALL BE CONSIDERED INCIDENTAL TO THE PRICE BID FOR THE ASSOCIATED WORK ITEM CAUSING THE DAMAGE. ANY SIDEWALKS OR ROADWAYS DAMAGED, OR TO BE RESTORED SHALL MATCH THE SAME MATERIAL THAT EXIST, INCLUDING CONCRETE BASE, UNLESS OTHERWISE INDICATED ON THE PLANS.

23. LOCATION AND DEPTH OF EXISTING UTILITIES ARE APPROXIMATE AND HAVE BEEN PLOTTED FROM THE BEST AVAILABLE INFORMATION. THE CONTRACTOR SHALL CHECK AND VERIFY LOCATIONS OF ALL EXISTING UNDERGROUND UTILITIES.

24. BUILDING SERVICE CONNECTIONS (ELECTRIC, WATER AND SANITARY) ARE SHOWN WHEREVER POSSIBLE. THE CONTRACTOR IS TO ASSUME THAT SERVICES ARE PRESENT TO ALL BUILDINGS. THEIR LOCATIONS ARE TO BE CHECKED WITH THE APPROPRIATE UTILITY COMPANIES.

25. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT DAMAGE TO WALLS, LOT CURBS AND FENCES ABUTTING SIDEWALKS DESIGNATED FOR REPLACEMENT OR REMOVAL. WHERE DIRECTED, NEW SIDEWALKS SHALL MEET SAID WALLS AND FENCES. PRIOR TO SIDEWALK REMOVAL, A SAW CUT SHALL BE PROVIDED IN ALL SIDEWALKS TO BE REMOVED A DISTANCE, TO BE DETERMINED BY THE ENGINEER (6 INCHES MINIMUM) FROM THE FACE OF ADJACENT BUILDINGS, RETAINING WALLS, LOT CURBS AND FENCES. THE FINAL SIX INCHES (MINIMUM) OF SIDEWALK SHALL BE REMOVED WITH CAUTION UNDER THE RESIDENT ENGINEERS SUPERVISION. THERE WILL BE NO ADDITIONAL PAYMENT FOR ANY LABOR OR EQUIPMENT NECESSARY TO MEET THIS "REMOVE WITH CAUTION" REQUIREMENT. PAYMENT OF THE REMOVAL OF THE FINAL (6" MINIMUM) OF SIDEWALK WILL BE INCLUDED UNDER CODE 201.0403 "REMOVE AND DISPOSE SIDEWALKS". THE REQUIRED SAW CUT WILL BE PAID FOR UNDER 932.0230 "FULL DEPTH SAW CUT OF PORTLAND CEMENT CONCRETE SIDEWALK/DRIVEWAY" WHICH EVER POSSIBLE.

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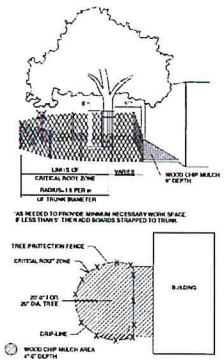
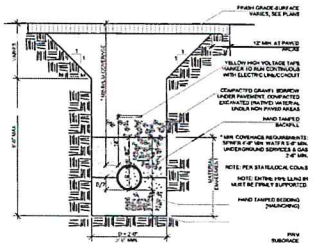
TOWN OF BRISTOL
GOLF COURSE WATER QUALITY IMPROVEMENTS
BRISTOL, RI

PROPOSED DETAIL PLAN I

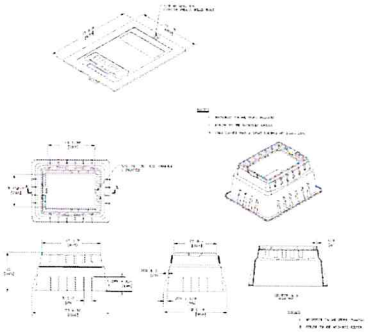
DRAWING
C-15



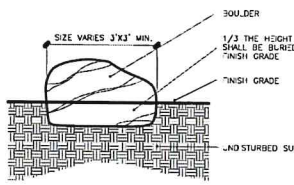
1 TYPICAL TREE PROTECTION NO SCALE



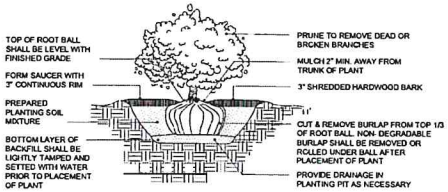
2 UTILITY TRENCH NO SCALE



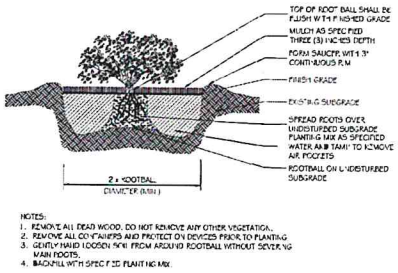
3 ELECTRICAL HAND HOLD NO SCALE



4 TYPICAL BOULDER NO SCALE

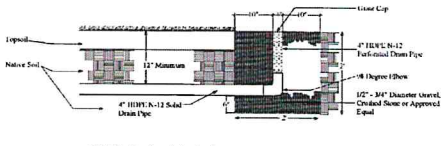


5 TYPICAL B&B SHRUB PLANTING NO SCALE



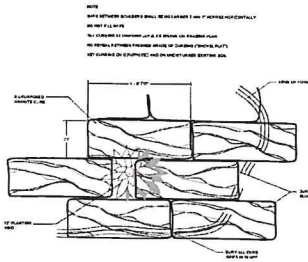
NOTES:
1. REMOVE ALL DEAD WOOD. DO NOT REMOVE ANY OTHER VEGETATION.
2. REMOVE ALL CONTAINERS AND PROTECT ON DEVICES PRIOR TO PLANTING.
3. GENTLY HAND LOOSEN SOIL FROM AROUND ROOTBALL WITHOUT SEVERING MAIN ROOTS.
4. BACKFILL WITH SPEC'D SOIL PLANTING MIX.

6 TYPICAL CONTAINER SHRUB PLANTING NO SCALE

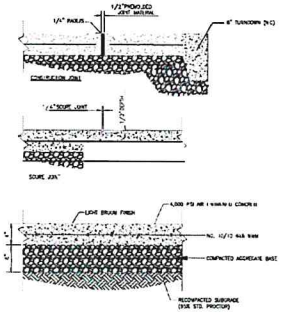


NOTE: Elevation of ground at location of grate cap should be at least one foot deeper than invert of pipe in bottom of deepest part of bunker

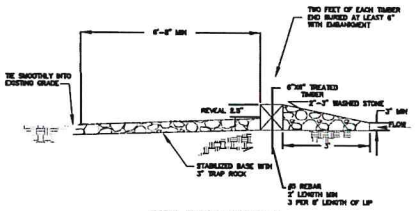
7 BUNKER DRAIN WITH SUMP NO SCALE



8 FOREBAY PLAN NO SCALE



9 CONCRETE PAD NO SCALE

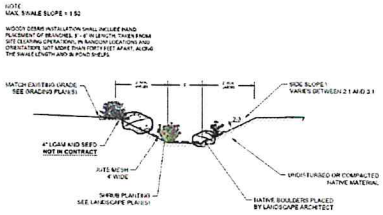


RIGID LIP WITH TIMBER
(DESIGN FLOWS 5 C.F.S. TO 30 C.F.S.)

10 LEVEL SPREADER NO SCALE

REMOVED FROM PLANS

11 NO SCALE



12 SWALE SECTION NO SCALE

THOMAS SIMPSO
No. 6078
REGISTERED PROFESSIONAL ENGINEER
STATE OF MAINE
2015

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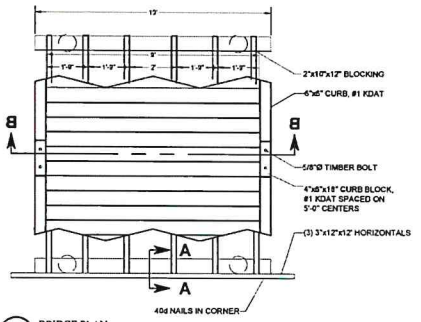
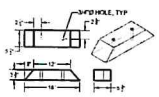
TOWN OF BRISTOL
GOLF COURSE WATER QUALITY IMPROVEMENTS
BRISTOL, RI

PROPOSED DETAIL PLAN II

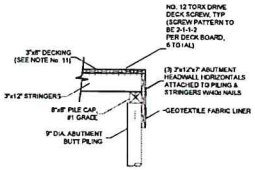
DRAWING
C-16



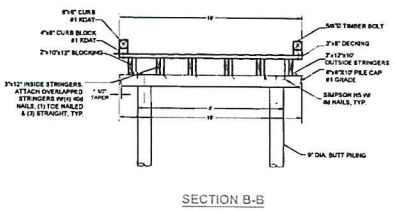
1 BRIDGE PLAN NO SCALE



2 BRIDGE CURB NO SCALE



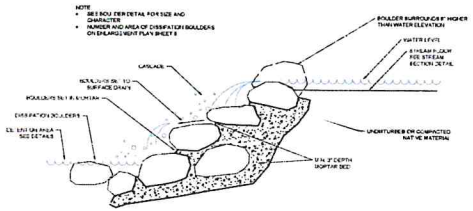
3 BRIDGE SECTION A-A NO SCALE



4 BRIDGE SECTION B-B NO SCALE

BRIDGE NOTES:

1. ALL TIMBER, FASTENERS, AND CONSTRUCTION SHALL BE MARINE GRADE.
2. PILINGS SHALL BE DOUGLAS FIR, CONFORMING TO ASTM D-25 TREATED TO A MINIMUM .60 POUND PER CUBIC FOOT NET RETENTION OF CCA, AWPA STANDARDS.
3. FRAMING LUMBER AND TIMBERS SUCH AS BENTS, STRINGERS, NAILERS, BRACING, AND BLOCKING SHALL BE SOUTHERN YELLOW PINE, NO. 2 GRADE OR BETTER, TREATED TO A MINIMUM .60 POUNDS PER CUBIC FOOT NET RETENTION OF CCA, AWPA STANDARDS. DECKING SHALL BE SOUTHERN YELLOW PINE, NO. 2 GRADE OR BETTER, TREATED TO A MINIMUM .60 POUNDS PER CUBIC FOOT NET RETENTION OF CCA, AWPA STANDARDS.
4. UNLESS OTHERWISE SPECIFIED, ALL BOLTS, SCREWS, AND NAILS SHALL BE CARBON STEEL, HOT DIPPED GALVANIZING, CONFORMING TO FEDERAL SPECIFICATION FF-S-575 C
5. WASHERS SHALL BE CARBON STEEL, HOT DIPPED GALVANIZED, CONFORMING TO FEDERAL SPECIFICATION FF-W-92B, TYPE L, GRADE 1, CLASS A.
6. NUTS SHALL BE CARBON STEEL, HOT DIPPED GALVANIZED, CONFORMING TO FEDERAL SPECIFICATION FF-N-836 A (1).
7. DECKING AND EXPOSED CORNERS SHALL BE BEVELED/ROUTERED AND SANDED TO REMOVE SPLINTERS AND SHARP EDGES.
8. SPLICES OF STRUCTURAL MEMBERS MAY BE MADE OVER SUPPORTS; SPLICES BETWEEN SUPPORTS PROHIBITED UNLESS OTHERWISE APPROVED BY THE ENGINEER. USE ONLY LONGEST LENGTHS OF MATERIALS AND JOIN ONLY WHERE SOLID FASTENING CAN BE MADE.
9. ALL OUTSIDE STRINGER SPLICES SHALL BE MADE WITH A 2"x10" SCAB, 12" LONG WITH (2) 16d NAILS EACH SIDE OF JOINT AT EACH SPLICE.
10. NO SPLICES SHALL BE ALLOWED FOR BRIDGE DECKING.
11. 3"x8" DECKING SHALL BE BUTTED TIGHTLY BOARD TO BOARD TO ALLOW FOR BOARD SHRINKAGE AFTER DECK CONSTRUCTION.



5 ROCK FALLS NO SCALE

THOMAS SMERD No. 6879 REGISTERED PROFESSIONAL ENGINEER STATE OF RHODE ISLAND

20198

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TOWN OF BRISTOL
GOLF COURSE WATER QUALITY IMPROVEMENTS
BRISTOL, RI

PROPOSED DETAIL PLAN III

DRAWING
C-17

UNDERDRAIN SOILFILTER
SCALE: 1"=2'

UNDERDRAIN SOILFILTER
SCALE: NTS

NO	SUBMISSIONS/REVISIONS	APP'D	DATE
A			
A			
A			
A			
A			

DESIGNED BY:
CAD CODE:
CAD:
CHECKED BY:
APPROVED BY:
DATE:
PROJECT NO.: 20198

THOMAS SIMARO
No. 8574
PROFESSIONAL ENGINEER
COMMONWEALTH OF MASSACHUSETTS

GARDNER + CERRISH
LANDSCAPE ARCHITECTS LLC

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TOWN OF BRISTOL
GOLF COURSE WATER QUALITY IMPROVEMENTS
BRISTOL, RI
DETAILS IV

DRAWING C-18

BRISTOL, RI

SEPTEMBER 2021

Ecological Management Plan

20198

Golf Course Water Quality Improvement

WRIGHT-PIERCE
Engineering a Better Environment

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Section 1 Introduction

The Bristol Golf Course Water Quality Improvements project was designed and constructed to achieve the water quality enhancement goals of the Southeast New England Program (SNEP) Watershed Grant. In collaboration with Gardner and Gerrish Landscape Architects, LLC improvements were designed to enhance water quality, improve flood management, increase course aesthetics and playability, and reduce maintenance demands. The course layout was modified to increase playability, improve abutter safety, renew course interest with more dynamic shot values, maintaining turf area and increasing wildlife habitat.

In compliance with the SNEP Grant, the purpose of this document is to provide details on how to manage the Bristol Golf Course in regard to the recent water treatment, wetland, landscape, and turf improvements considering the ecological aspect of the project.

Section 2 Stormwater Treatment Operation and Maintenance

2.1 General

2.1.1 Stormwater Treatment BMPs

Runoff produced by the Bristol Golf Course and the surrounding watershed are treated by the following stormwater best management practices (BMPs):

- vegetated swales,
- level lip spreaders,
- forebays and
- underdrained soil filters.

Additional storm drain features include catch basins and culverts. A display showing the location of these BMPs on a map of the golf course is available in Appendix A.

2.1.2 Inspections

It is clear that an inspection program is necessary to ensure that a stormwater facility remains operational. Inspections should be performed on a regular basis and scheduled based on the stormwater control type and characteristics. In addition, inspections should occur after major rainfall events for those components deemed to be critically affected by the resulting runoff. Not all inspections can be conducted by direct human observation. For subsurface systems, such as soil filter underdrains, video equipment may be required. There may be cases where other specialized equipment is necessary. The inspection program should be tailored to address the operational characteristics of the system. It is not mandatory that all inspectors be trained engineers, but they should have some knowledge or experience with stormwater systems. In general, trained stormwater engineers should, however, direct them. Inspections by registered engineers should be performed where routine inspection has revealed a question of structural or hydraulic integrity affecting public safety.

The inspection process should document observations made in the field and should cover structural conditions, hydraulic operational conditions, evidence of vandalism, condition of vegetation, occurrence of obstructions, unsafe conditions, and build-up of trash, sediments, and pollutants. This is also an efficient way to take water quality measurements required for monitoring programs and to incorporate them into the inspection history.

2.1.3 Maintenance Scheduling and Performance

Maintenance activities can be divided into two types: scheduled and corrective. Scheduled maintenance tasks are those that are typically accomplished on a regular basis and can generally be scheduled without referencing inspection reports. These items consist of such things as vegetation maintenance (such as mowing or trimming perennials) and trash and debris removal. These tasks are required at well-defined time intervals and should be considered a requirement for most, if not all, stormwater structural facilities. A maintenance crew is typically given a fixed scope of responsibility to address these items.

Corrective tasks consist of items such as sediment removal, bank stabilization, and outlet structure repairs that are done on an as-needed basis. These tasks are typically scheduled based on inspection results or in response to complaints. Corrective maintenance sometimes calls for more specialized expertise and equipment than scheduled

tasks. For example, a task such as sediment removal from a stormwater basin requires specialized equipment for which not every jurisdiction is willing to invest. Therefore, some maintenance tasks might be effectively handled on a contract basis with an outside entity specializing in that field. In addition, some corrective maintenance may also require a formal design and bid process to accomplish the work. The following sections describe appropriate maintenance and inspection activities for the best management practices used at the Bristol Golf Course.

2.2 Storm Drain Maintenance and Inspection Activities

2.2.1 General

The water quality improvement BMPs chosen for the site were based on systems that would fit with the nature of the project site, provide water quality benefits to the maximum extent feasible, and reduce the amount of goose habitat. The design of this system was focused on treating the stormwater that flows from the adjacent industrial area to the grassed soil filter basin as well as overland flows that are often contaminated with avian droppings.

The grassed underdrained soil filter basin was incorporated into the Bristol Golf Club Water Quality project. This system was designed to treat the storm water collected in the adjacent industrial park and the runoff from the golf course. The restored wetlands are designed to improve native habitat, reduce the open space available for geese congregation, and to provide storage and treatment for storm water runoff.

Maintenance, inspection, and repairs will be generally carried out by the Town of Bristol and its course lessee / operator who will oversee course operations and perform regular maintenance with assistance from private contractor as needed.

2.2.2 Grassed Underdrained Soil Filter

Inspections are an integral part of system maintenance. During the six months immediately after construction grassed soil filter facilities should be inspected at least twice or more following precipitation events of at least 1.0 inch to ensure that the system is functioning properly. Thereafter, inspections should be conducted on an annual basis and after storm events of greater than or equal the 1-year, 24-hour Type III precipitation event.

Materials deposited on the surface of the grassed soil filter facilities (e.g., trash and debris) should be removed manually, and properly disposed of. Sediment should be removed from the bottom of the grassed soil filter. Clean-out of any catch basins or inlet structures should be accomplished annually via catch vac or vactor truck. All structural components, which include inlet and outlet structures, pipes, frame and grate, cover, and underdrain system, should be inspected annually and any deficiencies should be reported.

The grassed soil filter should be mowed as required to maintain heights in the 4–6-inch range, with mandatory mowing once heights exceed 10 inches. Fertilization should be avoided when establishing vegetation within the grassed soil filter. Snow should not be stored in the soil filter. Soil filters should be checked for accumulated sediments and removed when they occupy 10% of the filter or sediment forebay bottom. If trenches fail to drain after surface sediment accumulations are removed, the filter medium must be replaced using the same design and installation methods. The soil filter should be checked for dissipation of water after large storm events. The soil filter should be completely drained after filling from the storm event.

An underdrained soil filter inspection checklist is available in Appendix B.

2.2.3 Forebays

Forebays should be inspected annually and following major storms. Sediment and plant debris should be removed from the forebays at least annually.

2.2.4 Level Lip Spreaders

Level spreaders should be inspected annually and following major storms. The level spreader pool should be inspected for sand accumulation and debris that may reduce its capacity. Sediment buildup should be removed when it has accumulated to approximately 25% of design volume or capacity. Sediments should be disposed of appropriately. Debris such as leaf litter, branches, and tree growth should be removed from the spreader. Reconstruct the level spreader if flow from the spreader channelizes.

2.2.5 Vegetated Swales

Inspect swales and ditches once each spring and fall, and after major storm events. Remove any obstructions and accumulated sediment or debris once each spring and fall. Repair slumping side slopes and repair any erosion of the ditch channel once each fall.

2.2.6 Catch Basins and Culverts

Catch basin grates should be cleared of debris and litter once each spring and fall. Accumulated sediment and debris should be removed from the bottom of the basins, inflow channels to the basins, and pipes between basins, and legally disposed of.

Remove accumulated sediment and debris from culvert outlets, once each spring and fall, and after major storm events. Accumulated sediment and debris should be removed from the culvert inlet, outlet, and the inside of the culvert. Repair any erosion damage at the culvert's inlet and outlet once each spring and fall, and after major storm events.

2.3 Best Management Practices Maintenance Agreement

2.3.1 General

A major contributor to unmaintained stormwater facilities is a lack of clear ownership and responsibility definition. In order for an inspection and maintenance program to be effective, the roles for each responsibility must be clearly defined prior to construction of a system. This can be accomplished with a maintenance agreement between the site owners and the responsible party.

Some key aspects of these maintenance agreements are the clear delineation of responsibilities, such as:

- Identification of who will perform inspection duties and how often.
- Listed duties that are to be performed by the owner, such as mowing, debris removal, and replanting of vegetation.
- Defined roles for the responsible authority, such as inspection, and/or modifications to the system such as resizing an orifice.
- Determination of a course of action to be taken if the owner does not fulfill their obligations (i.e., repayment to the responsible authority for activities that the owner did not perform).
- Development of a pollution prevention plan by the owner.
- Requirement of a report, possibly annually, that would serve to keep the owner involved and aware of their responsibilities.

The Town of Bristol will inspect and maintain the stormwater BMPs present on site and will hire an Operator to be responsible for regular mowing in accordance with the mowing map (included in Appendix C), vegetation clearing, removal of trash, general upkeep of property, and reporting any obvious problems to the town. The Town of Bristol has not yet selected an operator for the golf course property. Coordination between the Town and the Operator will be required to work out the details of the lease.

2.3.2 Source of Funding for BMP O&M Activities

The Town of Bristol will pay for long-term operation and maintenance of the stormwater BMPs implemented as part of this project. Although the course will be leased to an operator, the Town will retain responsibility for ensuring that proper maintenance is conducted.

2.4 Care of Trees and Shrubs

2.4.1 Trees and Shrubs

The plants should be inspected periodically and pruned to remove only injured, dying, or dead branches from trees and shrubs, according to standard professional horticultural and arboricultural practices and in accordance with ANSI A300 (Part 3) Pruning Standards. Any pruning that is done should retain natural character. Plants should not be sheared or shaped into unnatural forms.

Planting beds should be weeded approximately once per month during the growing season.

Pest and disease control, if necessary, should be achieved without the use of pesticides and herbicides, following the Northeast Organic Farming Association's Standards for Organic Land Care, which can be purchased here: http://www.organiclandcare.net/node/1790.

Landscape mulch should be refreshed annually with a natural-colored brown mulch of 100% fine-shredded pine bark or other softwood bark, of uniform size and free from rot, leaves, twigs, debris, stones, or any material harmful to plant growth.

2.4.2 Watering

All plantings should be thoroughly watered at least twice a week for the growing seasons of 2021 and 2022. After that initial establishment period, watering can be performed as needed during unusually hot or dry weather.

Section 3 Turf Management

3.1 General

The maintenance of healthy and dense turf on a golf course is critical to both enhancing course quality and allowing the implementation of environmentally sound management practices. Healthy turf is best able to withstand the stresses of golfer traffic, combat pest and disease infestation, and respond favorably to efforts aimed at reducing the use of chemical fertilizers and pesticides in the management of golf courses.

The natural characteristics of turf grass limit movement of pesticides and fertilizers into underlying soils and ground water. Thatch produced by the turf acts as an organic filter to chemically bind pesticides that otherwise might enter surface and ground waters. Turf grass root systems are both extensive and fibrous, resulting in maximum absorption of pesticide residues which may penetrate the turf canopy and thatch layers. Also, the naturally acidic soils of the northeast maximize the adsorption of fertilizer elements, especially phosphorus.

The purpose of this turf management program is to identify the fertility program, cultural practices, and pest management procedures to be implemented during both the construction and long-term maintenance of the golf course. This plan has been drawn from the collective experiences of the golf course architect, regional golf course superintendents, University agronomists and extension personnel and water quality scientists, and a review of applied research.

3.2 Fertility Program

The availability of basic growth nutrients of nitrogen, phosphorus and potassium is essential to the growth of any vegetation species and turf grasses are no exception. Adequate quantities must be available to the turf in specific periods in its life cycle to stimulate and maintain growth. These nutrients are naturally available in the existing soils but must be supplemented to support the proper growth of turf. Supplemental inputs of nutrients are achieved through the implementation of a fertility program. The focus of such a program is to deliver only such nutrients as are necessary to support suitable turf growth in a manner which both maximizes their availability to the turf and eliminates waste and the release of excess nutrients to surface and ground waters.

A number of research studies on the leaching and surface runoff potential of nitrogen and phosphorous applied to turf grasses have concluded with the finding that appropriate applications do not pose a risk to surface and ground water quality. Petrovic (1990), reporting on the results of research on nitrogen concentrations in ground water beneath turf grass plots exceeded the drinking water standard of 10 ppm only in sandy soils and only if either high levels (i.e., greater than 3.0 lbs./1000 sq.ft.) of soluble nitrogen are used in a single application or daily irrigation is practiced coupled with the application of similarly high rates of water-soluble nitrogen sources. Another recent research by Linde et. al. (1994) has concluded with results of no findings above the 10-ppm standard. Phosphorous release following turf grass fertilizer applications has been found to be insignificant by a number of researchers. Young et. al. (1985) reported that phosphorus rapidly becomes fixed in the soil profile and vertical movement in most soils ranges between 0.3 and 1.2 inches/year. Watachke and Mumma (1989) found that under the extreme rainfall conditions that were actually required to produce runoff from a healthy turf plot (i.e., 6.0 inches/hour) only 0.5 lbs./acre of phosphorous loss occurred.

The results of virtually all research studies completed on the fate of nutrients applied to turf have supported adherence to the following general guidelines in order to minimize and/or eliminate the potential for any release of nutrients due to fertilizer applications on golf turf.

1. Irrigation should be limited to the replacement of lost soil moisture and the evapotranspiration loses of the turf.
2. When appropriate, nitrogen applications should be made using slow-release sources such as natural organic sources, IBDU, methylene ureas, and coated ureas. For this golf course, a heavy reliance on natural organic fertilizers will be utilized.
3. All fertilizer applications should be timed to occur at the time of active plant uptake.
4. Applications should not be made immediately preceding a significant storm event.
5. Application rates should be limited to the documented needs of the turf given an understanding of site-specific soil deficiencies.

3.3 Turf Grass Post-Establishment Period

The post-establishment period consists of the life of the course subsequent to the first two years following germination of the turf. Fertilizer applications should be based on the results of analytical soil tests and examination turf conditions. Estimates of anticipated application rates for this period are as follows:

Table 3-1 Nutrient Application Rates

Golf Surface	Nitrogen	Phosphorus	Potassium
Greens (2.75 A)	2.5 lbs./1000sf/year	Based on soil test	51 lbs./1000sf/year
Tees (2.50 A)	3.0 lbs./1000sf/year	Based on soil test	51 lbs./1000sf/year
Fairways (28 A)	2.0 lbs./1000sf/year	Based on soil test	Based on soil test
Roughs (35 A)	1.5 lbs./1000sf/year	Based on soil test	160 lbs./acre/year

3.4 Cultural Management Program

Cultural practices refer to those activities involving the addition of materials to the turf grass system for the purpose of stimulating, maintaining and/or improving growth. These practices include irrigation, topdressing, fertilizer applications, and the application of amendments such as lime for pH adjustment and iron and other appropriate micro-nutrients to prevent foliar chlorosis. As fertility requirements are addressed herein as a separate section, this section on cultural management will focus on non-fertility practices.

3.4.1 Irrigation

The most significant controllable source of environmental stress to turf is moisture: too much water is as stressful to the turf as is too little water. If turf moisture is not adequately controlled, the resulting stress to the turf will make it more vulnerable to disease and pest infestation. The basic tools available to control moisture include the design and construction of golf surfaces and the implementation of a proper irrigation program.

Design and construction practices such as elevating tees and providing suitable cross surface air flow/drainage and providing/installing proper surface and sub-surface drainage systems are intended primarily to prevent the accumulation and retention of too much moisture. An irrigation system is intended to ensure the provision of an adequate supply of moisture to offset evapotranspiration losses.

The irrigation system will be simple but state of the art, incorporating computerized and manual controls. The computer controls will include over-ride capabilities that allow the golf course superintendent to adjust delivery to each area of the course to respond to needs which may vary from day to day. Irrigation will be limited to intensive

play areas (tees, greens, and fairways). Minimal water will be used as the desire for the layout is a dry, test course where the bump and run shot can be utilized. In order to assist in determining the appropriate application, the superintendent will periodically inspect soil core samples from various turf areas. If water has not penetrated to a desired depth within six to eight hours following an irrigation, then the irrigation time should be increased. If the water has moved well beyond the desired depth within six to eight hours, then the irrigation time should be decreased.

3.4.2 Topdressing

Topdressing aids in thatch decomposition, lessens grain development, stimulates new shoot growth, encourages stolon rooting, and improves playing conditions on putting surfaces by allowing truer and faster ball roll. Although some thatch is desirable to provide a degree of resiliency and to better retain fertilizer and pesticide elements, excess thatch accumulation is the one of the most significant limiting factors in the development of healthy, disease free turf. By mixing suitable topdressing materials into the organic thatch layer, the decomposition of the thatch is enhanced, and the formation of individual layers prevented. Also, topdressing with compost or a compost/mineral mix (such as Sand-Aid, an organic material derived from seaweed) and porous ceramics such as Axis, may aid in reducing the incidence of certain diseases and watering requirements. Studies conducted at Cornell University have demonstrated that monthly applications of topdressings composed of as little as 10.0 pounds of suppressive compost per 1000 square feet are effective in suppressing diseases such as dollar spot, brown patch, Pythium root rot, Typhula blight, and red thread.

The recommended topdressing program is as follows:

- Greens 0.20 cubic yards/1000 SF up to eight times per season
- Tees 0.25 cubic yards/1000 SF up to four times per season

3.4.3 Other Amendments

Iron applications may be necessary to correct iron chlorosis. Applications at up to 2.0 ounces/1000 SF should be made as necessary. Soil pH should be modified as necessary through the application of lime to achieve a reading between 5.5 and 6.5. Other nutrients and mineral amendments should be applied as necessary to respond to deficiencies detected through periodic soil and tissue sampling.

3.5 Mechanical Management Practices

Mechanical management practices include mowing, thatch removal, aerification, spiking and rolling. These practices establish and maintain appropriate turf height, prevent the excessive accumulation of thatch, enhance oxygen/root exchange, prevent excessive compaction, and improve green roll and putting speeds.

3.5.1 Mowing

Regular mowing practices enhance turf density, color, texture, root development, wear tolerance, and other key aspects of turf quality. As taller grass has a higher evapotranspiration rate, proper mowing can reduce the irrigation demand of turf. On the other hand, if grasses are mown too short it may produce undue stress which will make the turf more susceptible to pest and disease infestations. The recommended mowing practices are as follows:

Table 3-2 Mowing Practices

	GREENS	TEES	FAIRWAYS	ROUGHS	FAR ROUGH
Height (inches)	0.19	0.5	0.75	2.0-3.0	6.0+
Frequency	6-7 times/wk.	3 times/wk.	3 times/wk.	once per wk.	3 times / yr.
Clippings	remove	remove	return	return	return

A map depicting areas to be mowed and the frequency of mowing is available in Appendix C.

Vertical mowing can be used to reduce mower induced grain on greens and thatch accumulation. Such mowing practices also can be used to break up the cores produced by aerification equipment (see aerification).

Excessive thatch accumulation increases disease susceptibility of the turf and reduces tolerance to drought, cold and heat. It also restricts the movement of air, water, and fertilizer into soil. Some thatch is necessary as a cushion and for retaining fertilizer and pesticide elements, but excessive thatch should be removed using a variety of mechanical equipment. As a general guideline, thatch removal should take place when the thatch accumulation exceeds 1/2 inch on fairway and tee areas and 1/4 inch on greens.

Clippings are to be removed from tees and greens to improve turf quality and playing conditions. Once removed, clippings will be taken to a central location and composted with sand to produce topsoil for future use such as divot repair on the course.

3.5.2 Aerification

Aerification practices reduce soil compaction, improve surface water infiltration, enhance root penetration, and air exchange, and facilitate nutrient uptake by the turf. Aerification is accomplished by coring of the turf/soil matrix. A variety of machines are available for this activity. Cores can be deposited on the turf surface and broken up to act as a topdressing to enhance thatch decomposition and smooth the playing surface. Aerification of greens typically is followed by topdressing to smooth the playing surface and further mix the topdressing into the accumulated thatch layer.

3.5.3 Spiking

Spiking is useful in reducing soil compaction at the thatch/soil surface interface and in improving moisture infiltration and root/air exchange. This practice also can help reduce thatch accumulation and grain development by lifting the blades of grass prior to mowing.

3.5.4 Rolling

Light weight rolling equipment may be used to smooth turf surfaces and increase ball roll. When used during the summer growth months, rolling can allow the use of higher cutting heights, thereby increasing stress tolerance. In order to prevent excessive soil compaction, rolling should not be conducted more frequently than twice per week.

3.6 Integrated Pest Management

All pest control activities will adhere to integrated pest management (IPM) practices. IPM is an approach to pest control which seeks to anticipate and address the full range of physical, cultural, and biological factors affecting the development of pest populations at a given site. This approach does not seek, as a goal, the eradication of pest populations; rather, it seeks to prevent the growth of pest populations and/or disease infestations above

acceptable threshold levels. To achieve these goals an IPM program is one that must be flexible and reduce reliance on any single mechanism such as chemical pesticide applications. Given that this is a holistic approach to pest control, the implementation of an IPM program has the direct benefit of reducing the use of chemical pesticides in the maintenance program for the golf course.

The implementation of an IPM program requires the disciplined completion of a specific protocol of tasks. The results of each task are synthesized to ensure an integrated approach to decision making. The results of some tasks serve as base data on the characteristics of the site and local pest population while the results of others serve as feedback relative to the effectiveness of the control program. Regardless of the ultimate application of the information generated, each task is critical to the successful implementation of IPM. Description of the specific tasks, in sequential order, follows below:

3.6.1 Delineation of the Management Area

Turf management areas on a golf course for which an area-specific program must be implemented include greens, tees, fairways, roughs, and turf buffers. Each area is exposed to different types and levels of use activity, different cultural practices, and different pest susceptibilities. Turf species selection and the appropriate choice and use of cultural and mechanical maintenance practices are critical first steps to ensure effective and efficient pest control. Turf selection for each area and area-specific cultural and mechanical maintenance practices are discussed herein under the headings of TURFGRASS SELECTION, CULTURAL MANAGEMENT PROGRAM, and MECHANICAL MANAGEMENT PRACTICES, respectively.

3.6.2 Initial Information Gathering

The gathering of information on potential pest populations ensures that as the turf becomes established the superintendent has the knowledge and tools necessary to anticipate and address likely pest problems. The background information to be gathered during this task should include:

1. Identification of likely pest species and information on their specific life cycles and their physical, cultural, and biological requirements.
2. Identification of all applicable controls available for each identified pest species. These controls would include cultural, biological, and chemical options.
3. Information on pest infestations and successful control strategies experienced in the area of the site.

There are many potential pests of turf grasses including the fungal species Pythium and Rhizoctonia, the bacteria Xanthamonas, various insects and nematodes, weeds such as nutsedge, and mammals such as shrews, moles, and ground hogs.

3.6.3 Monitoring of Pests and Non-Target Organisms

Monitoring consists of the frequent examination of each course management area to determine the status of pest and non-pest organisms. Information to be gathered includes the identification of species present, their level of activity, and the extent of impact. Monitoring is essential to the superintendent's ability to make early and accurate diagnoses of pest presence and threat prior to the pest reaching unacceptable levels.

Monitoring for weed, insect, and small animal pests can be done through visual inspection of the turf surface, thatch, and root zones. The intensity of monitoring activities for weed and insect pests should be adjusted to reflect the life cycles of the potential pests. For example, monitoring for specific weed pests should be intensified when

the species are most likely to germinate given the time of the growing season and specific environmental conditions conducive to such germination. While turf will not display symptomatic signs before weed germination, symptoms of moderate insect infestations may be detectable. Accordingly, monitoring for insect pests should include sample counts to both establish an action threshold and determine when the threshold is exceeded.

Monitoring for early disease and fungal detection is more difficult. Early detection often is impossible, and the rapidity and severity of damage caused by such diseases as Pythium blight dictate the need for preventative applications of fungicides when and if environmental conditions are favorable for the development of the disease. The incidence of disease has been found to be closely linked to measurable environmental conditions, primarily high temperatures and humidity, degree of sun exposure, and leaf wetness. Optimum temperatures for the development of a number of diseases likely to affect the course are as follows:

Table 3-3 Disease Temperature Range

DISEASE	OPTIMUM TEMPERATURE RANGE(F]
Dollar Spot	60 to 85
Snow Mold	68 to 77
Pythium Root Rot	52 to 70
Pythium blight	74 to 93
Summer patch	83 to 87
Brown patch	70 to 90
Yellow tuft	48 to 75
Necrotic ring spot	59 to 82

A number of diagnostic tools have become available in recent years to aid in the early detection of diseases, but their effectiveness remains spotty. These tools range from simple predictor models using readily collected environmental data to diagnostic kits utilizing biochemical information. Examples of the predictor models include those developed for the Pythium blight by Nutter et al. (1983). An example of the biochemical diagnostic kits is that developed by the Agri-Diagnostic Associates. The Agri-Diagnostics detection kit includes immunoassays for four diseases: Pythium blight, Brown patch, Yellow patch, and Dollar spot.

3.6.4 Establishing Damage Thresholds and Action Levels

As the objective of the IPM is the control of pest populations at acceptable levels, it is crucial that sound efforts be made to establish acceptability thresholds for each pest. The threshold of acceptability will vary for each pest and for each management area of a golf course. For example, greens are expected to support a higher quality turf than rough areas; accordingly, the acceptability threshold for a given pest on a green will be much lower than the threshold for a rough area. The setting of thresholds involves consideration of economics and the tolerance of patrons. The superintendent will establish appropriate thresholds based on these considerations.

Action levels are levels of synthesized information which indicate that damage thresholds are or are about to be exceeded. Such synthesized information will include weather and cultural data, the specific period of the pest life cycle, and the accumulated knowledge of previous experiences controlling the pest on the site. Although some guidance on the initial setting of action levels can be obtained, the levels thus established should be set very

conservatively and adjusted upward only as site-specific history information has been developed. Initially, the superintendent should consult with other golf course superintendents in the area to establish action thresholds.

3.6.5 Define Effective Treatments

The full range of potentially effective treatments for each pest should be identified and assessed as to its applicability to given situations. This range would include biological, cultural, and chemical treatments. Appropriate cultural practices which have the effect of reducing pest infestations to levels below the action level are discussed herein under the heading of CULTURAL MANAGEMENT PROGRAM. The following discussion focuses on biological and chemical control treatments.

Biological control is defined as the regulation of pest populations by their natural enemies, including antagonists, parasites, and predators. Biological controls, if target specific, can be effective. However, frequently this effectiveness is unpredictable. This unpredictability means that the superintendent will be taking a risk in selecting such treatment that may place the turf in jeopardy. For this reason, a decision to select a biological control must be made early in order to provide an opportunity to implement other strategies.

In general, biological control efforts have been targeted to insect pests. Research on biological control of disease and weed problems has only recently begun. One effectively proven biological control is the use of bacteria Bacillus popillae to produce milky spore disease which, in turn, controls the growth of White grub populations. It has been suggested that predatory nematodes be considered for the control of Japanese beetle grubs and black cutworms. Other biological controllers of insect populations include such small mammals as moles and shrews. These small mammals, however, often cause more damage to the turf than the insects.

Chemical pesticide applications are essential elements of any effective IPM program. As with cultural and biological controls, chemical applications should be made only as necessary to prevent the pest infestations from surpassing acceptable thresholds and only if the application constitutes the best available control. Best available control refers to the control effort which will achieve the desired result at an acceptable cost and minimum environmental impact relative to other available options. Environmental impact in this context includes damage to non-target species, water quality and air quality.

It is anticipated that a number of currently available pesticides will be used in maintenance and that yet to be developed pesticides eventually will be used when appropriate. Given the constantly evolving nature of the chemical industry, it is impossible to identify all the chemical pesticides to be employed over the life of the course.

The following basic guidelines will govern the use of chemical pesticides:

1. Use pesticides only as a component of IPM and only to the extent that they represent best available control either singly or in combination with other non-chemical control mechanisms.
2. Use only those pesticides which have been registered for use in the State of Rhode Island.
3. Store and apply pesticides in strict conformance with label directions.
4. Use new products as they become available only to the extent that they represent best available control relative to existing products.

3.6.6 Making the Treatment Decision

The decision-making process is the essence of IPM. Decisions must be made by the superintendent based on the best available data and knowledge of the site gained by site specific experiences. The goal of all decisions is to utilize the best available control so that acceptability thresholds for each turf pest are not exceeded.

3.6.7 Evaluation of Treatment and Record-Keeping

These tasks provide the feedback information necessary to ensure the selection of best available control over time. The data base established through the completion of these tasks represents the site-specific experience garnered through the implementation of IPM. Each control effort should be followed by a review of the treatment's effectiveness and detailed records should be kept in a computerized data base for enhanced retrieval and correlative analysis. Records should specify the location of treatments, the severity of the infestation, the type and level of treatment applied, the date of treatment, and the specific environmental conditions encountered at the management area immediately prior to, during, and immediately following treatment.

Appendix A
BMP Map

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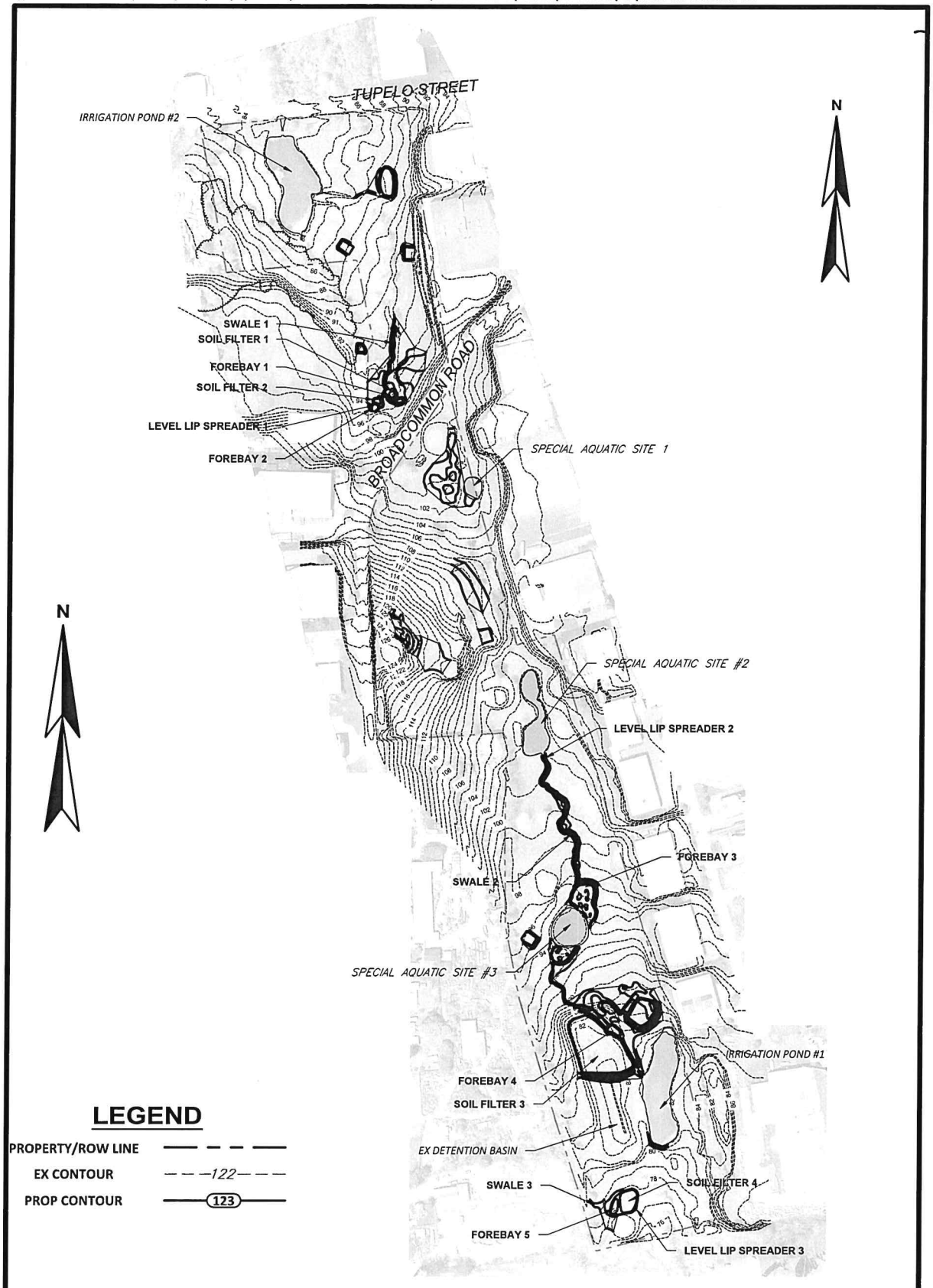


TOWN OF BRISTOL GOLF COURSE WATER QUALITY IMPROVEMENTS BRISTOL, RI	NO.	REVISIONS	DRAWN BY / APP'D
PROJ NO: 20198 DATE: JUNE 2020	1		
	2		
	3		
WRIGHT-PIERCE Engineering a Better Environment	BMPs REFERENCE: DWG E-1		FIGURE: 1

Appendix B
Underdrained Soil Filter Inspection Checklist

Grassed Underdrained Soil Filter Operation, Maintenance and Management Inspection Checklist

Project: Bristol Golf Club Stormwater Improvements

Location: Ballou Blvd, Bristol, RI

Site Status:

Date:

Time:

Inspector:

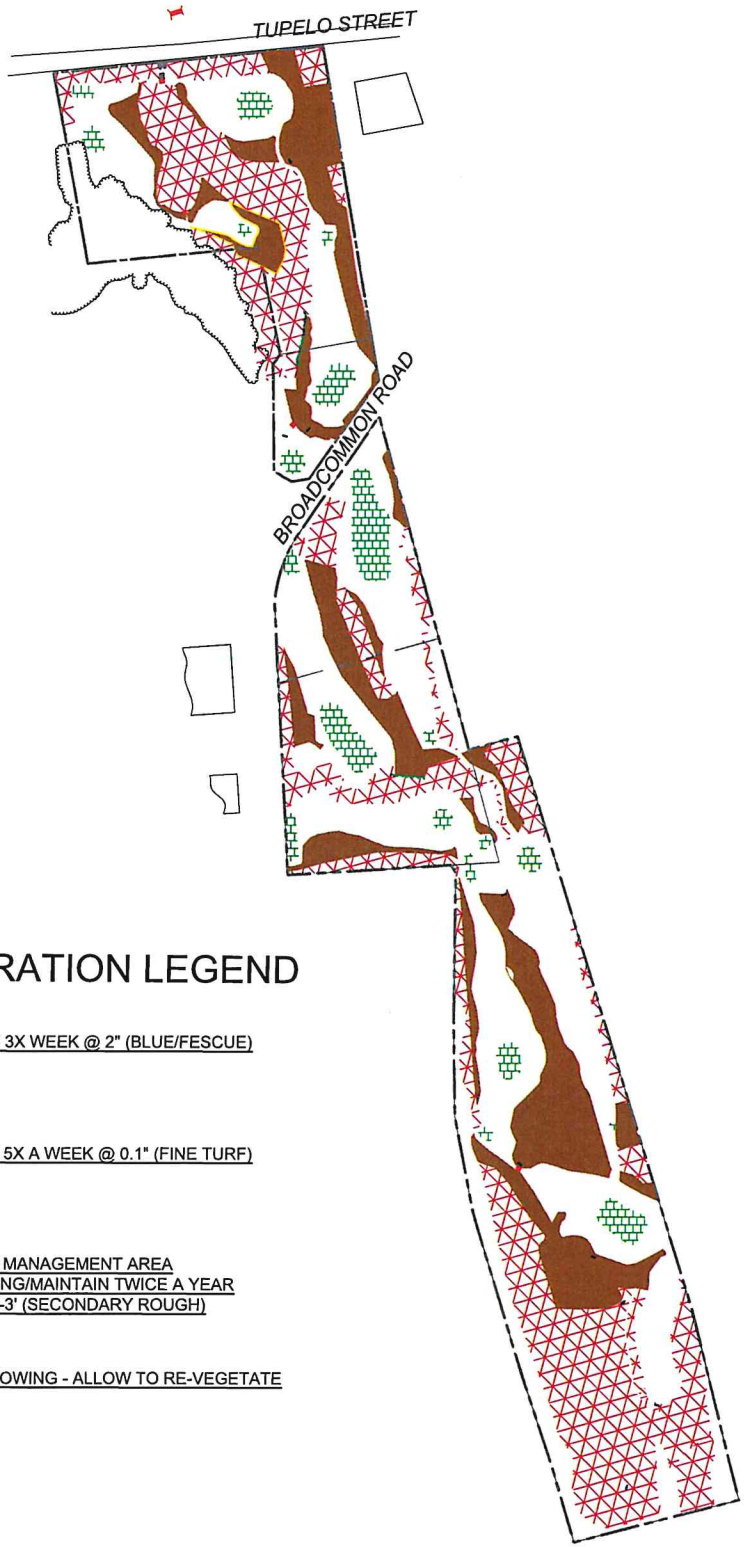
MAINTENANCE ITEM	SATISFACTORY / UNSATISFACTORY	COMMENTS
1. Debris Cleanout (Annual, After Major Storms)		
Filter and contributing areas clean of debris		
No dumping of yard wastes into practice		
Litter (branches, etc.) has been removed		
2. Vegetation (Annual, After Major Storms)		
Fertilized per specifications		
Plant composition according to approved plans		
No placement of inappropriate plants		
Grass height not greater than 10 inches in grassed soil filter		

MAINTENANCE ITEM	SATISFACTORY/ UNSATISFACTORY	COMMENTS
No evidence of erosion		
3. Check Dams/Energy Dissipaters/Sumps (Annual, After Major Storms)		
No evidence of sediment buildup		
Sumps should not be more than 50% full of sediment		
No evidence of erosion at downstream toe of drop structure		
4. Dewatering (Semi-annually)		
Dewaters between storms		
No evidence of standing water		
5. Sediment Deposition (Annual, after Major Storms)		
Swale clean of sediments		
Sediments should not be > 20% of swale design depth		
6. Outlet/Overflow Spillway (Annual, After Major Storms)		
Good condition, no need for repair		
No evidence of erosion		
No evidence of any blockages		
7. Integrity of Filter Bed (Annual, After Major Storms)		
Filter bed has not been blocked or filled inappropriately		

Comments:

Actions to be Taken:

Appendix C
Mowing Map



RESTORATION LEGEND

- MOW 3X WEEK @ 2" (BLUE/FESCUE)
- MOW 5X A WEEK @ 0.1" (FINE TURF)
- TREE MANAGEMENT AREA MOWING/MAINTAIN TWICE A YEAR @ 18"-3' (SECONDARY ROUGH)
- NO MOWING - ALLOW TO RE-VEGETATE

0 250 500

TOWN OF BRISTOL GOLF COURSE WATER QUALITY IMPROVEMENTS BRISTOL, RI	NO.	REVISIONS	DRAWN BY / APP'D
PROJ NO: 20198 DATE: AUGUST 2021	1		
	2		
	3		
WRIGHT-PIERCE Engineering a Better Environment	MOWING MAP REFERENCE: DWG E-1		FIGURE: 1

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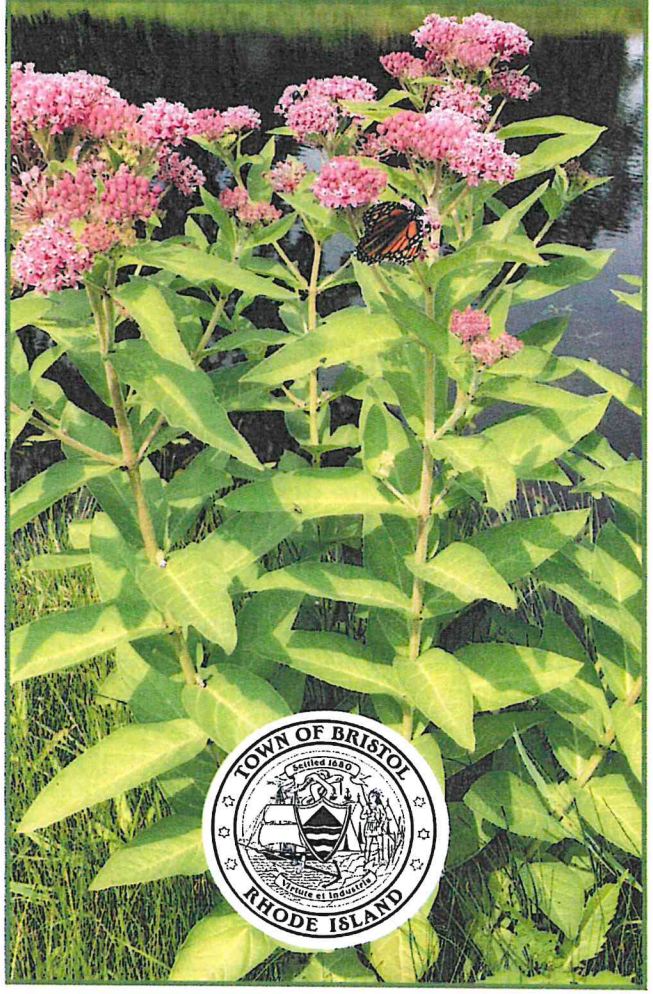
ABOUT THE PROJECT

The Bristol Golf Course Project incorporates and retains a nine-hole golf course, although in a modified layout as seen on the Master Plan image. It also includes a robust public outreach and public engagement component with many stakeholders including *Bristol Department of Parks and Recreation, Golf Course Committee, Save the Bay, Save Bristol Harbor, Mt. Hope High School*, and the *Bristol Conservation Commission*. Volunteers from these organizations have provided input into the project design and assisted in the field with monitoring construction, and planting over 1,600 native shrubs and trees.

Funding for the Bristol Golf Course water quality improvements has been provided by generous grants from the United States Environmental Protection Agency's, Southeast New England Program (SNEP) and Restore Americas Estuaries; the Rhode Island Department of Environmental Management's Office of Water Resources Nonpoint Source Program, and the Rhode Island Infrastructure Bank.

BRISTOL GOLF COURSE



New green under construction June 2021

ABOUT THE COURSE

Bristol's municipally-owned nine-hole golf course consists of 26+ acres of open space that was historically part of a larger private 18-hole course. Since the 1980's the course has been owned by the Town of Bristol and leased to a private operator.

The Town of Bristol is working to restore the freshwater wetlands at the Bristol Golf Course with the goals of improving the water quality of two tributaries that flow into Narragansett Bay – Silver Creek which flows south to Bristol Harbor, and an unnamed coastal stream which flows north to the Warren River.

RESTORATION

In 2021, the Town completed a restoration project at the Bristol Golf Course which includes connecting small impoundments within the course, removing fill adjacent to streams, daylighting piped streams and restoring a buffer of native shrubs, trees and grasses between the playable course and the wetlands

Restoration efforts have also increased flood storage capacity within the watersheds and enhance functions of freshwater wetland habitat. Restoration activities have also substantially improved the playability of the golf course and enhance public access and enjoyment of the property.

Wetland restoration June 2021

NATIVE ECOSYSTEM

Previously, the golf course provided an ideal habitat for geese that fed in large numbers, leading to waste being washed directly into ponds and streams.

By converting areas surrounding streams and ponds from managed turf to native wetland vegetation, runoff from the managed turf is reduced, and the vegetation creates a natural filter between the streams and surrounding developments.

This project has not only improves the water quality and stormwater drainage of the streams and ponds throughout the course, but it is also improving the natural ecosystem and allowing native wildlife to live comfortably without negatively impacting water quality or pedestrian access.

Restoring the Wetlands of Silver Creek

In 2021, the Town of Bristol restored wetlands on the course by redesigning the course to move low lying greens, fairways and tees out of wetland areas.

The restoration project included connecting the small ponds through stream-like swales and removing fill from the wetlands. These ponds and streams on the south side of the course flow into Silver Creek toward Bristol Harbor. Prior to the restoration project, the worst water quality in the creek was found downstream of the golf course.

Restoring the Silver Creek wetlands increases the flood storage capacity within the watershed and improves the water quality of the streams that flow to Narragansett Bay, while providing enhanced wildlife habitat for frogs and toads, pollinators, wading birds and hawks.

Prior to restoration, managed turf extended directly to the edge of the ponds, creating an ideal feeding area for Canada geese. Goose droppings and fertilizer runoff flowed into the ponds.

The edge of the ponds now features native wetland plants. This vegetation creates a natural filter and deterrent for geese.

The stream that had been placed into a pipe when the course was first constructed was "daylighted," and a swale was created.

Swales and shallow streams were constructed to connect the ponds to one another during rain events and the wet season.

Community volunteers from Save Bristol Harbor, the Bristol Conservation Commission and Save The Bay planted a buffer of native shrubs and trees along the swales, wetlands and ponds.

Their efforts resulted in planting over 2,000 native shrubs and trees in the new wetlands.

This project was made possible with support from:

EPA · SNEP Southeast New England Program · Restore America's Estuaries · Save The Bay Narragansett Bay · Save Bristol Harbor

The Bristol Golf Course Restoration project is supported by the Southeast New England Program (SNEP) Watershed Grants. SNEP Watershed Grants are funded by the U.S. Environmental Protection Agency (EPA) through a collaboration with Restore America's Estuaries (RAE). For more on the Southeast New England Program, see www.epa.gov/snep.

Restoring the Environment at the Bristol Golf Course

Bristol's municipally-owned nine-hole golf course consists of 26 acres of open space that was historically wetlands and agricultural fields.

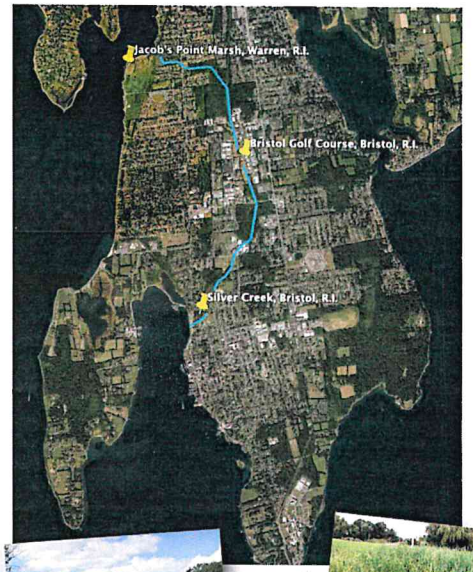
In the 1960s, a privately-owned, 18-hole golf course was created. To build it, wetlands were filled in and streams were diverted into underground pipes.The Town of Bristol acquired what is currently the nine-hole course in the 1980s.

In 2021, the Town of Bristol redesigned the course to restore the wetlands. The project will improve the water quality of the two tributaries that flow through the course and into Narragansett Bay.

The project also enhanced public access with the addition of a walking path, and improved course playability, as the course was moved out of wetland areas.

In the 1962 aerial imagery (left, top), fields and wet meadows covered the area that is now the golf course and industrial park. Up until 2019 (left), the course extended into the wetlands before being redesigned to allow for wetland restoration.

Silver Creek flows south to Bristol Harbor and an unnamed stream flows north under Tupelo Street to Jacob's Point Marsh and the Warren River.



Broadcommon Road storm drains once emptied storm water directly into the the golf course's stream.

Today, newly created wetlands help filter bacteria and other pollutants out of the water, making for healthier habitat throughout the golf course and downstream.

Prior to restoration, the golf course's ponds had no buffers to filter polluted runoff. Water quality was poor and there was little suitable habitat. Today, the wetlands and native plants provide habitat for frogs, toads, pollinators and wading birds like egrets and migratory shorebirds. Plants also help to remove nutrients from fertilizer runoff from the course.

This project was made possible with support from:

EPA · SNEP Southeast New England Program · RHODE ISLAND INFRASTRUCTURE BANK · SAVE THE BAY. NARRAGANSETT BAY · SAVE BRISTOL HARBOR

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Town of Bristol
Steven Contente,
Town Administrator
WRIGHT-PIERCE
Engineering a Better Environment
GARDNER + GERRISH
LANDSCAPE ARCHITECTS LLC
US Pitchcare
SNEP
RESTORE AMERICA'S ESTUARIES
RHODE ISLAND INFRASTRUCTURE BANK
SAVE THE BAY
NARRAGANSETT BAY
SAVE BRISTOL HARBOR
Bristol Golf Course
Improvements
Restoring Silver Creek Watershed
Surface Water/Pond
Existing Tees
Proposed Tees
Bridge
Wetland/Storm Storage
Existing Green
New Green
Planting

Bristol Phoenix

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PHOTOS BY RICHARD W. DIONNE JR.

Master horticulturist Cassie Heneault (left) and Lisa Cadan, of Bristol, pose among their Vancouver Island Haze Sativa Dominant Hybrid plants inside their Providence warehouse.

The lady growers

Women forging a path in a medicinal cannabis industry that is dominated by men

BY KRISTEN RAY
kray@eastbaymediagroup.com

As Lisa Cadan took her seat at a recent Rhode Island Department of Business Regulation meeting for cannabis cultivators, she could not help but take in the room before her: the audience was almost entirely men, a vast majority of them accompanied by their attorneys.

The purpose of the discussion was to review Gov. Gina Raimondo's recent proposed bill regarding recreational marijuana, but for Ms. Cadan, of Bristol, and her business partner, Cassy Heneault, their company, Elle-Cie, had always represented

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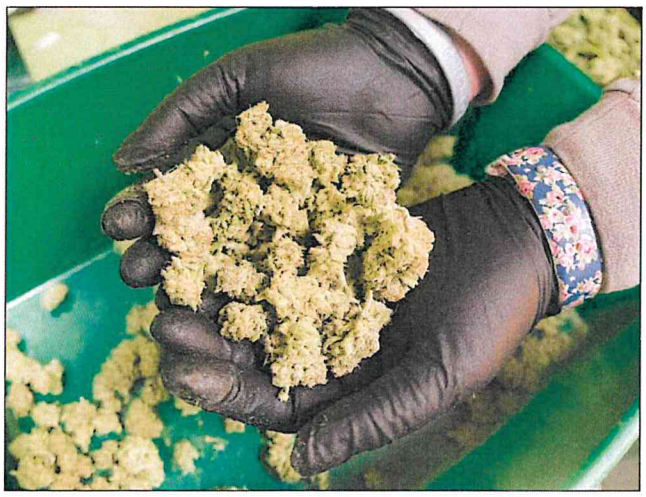

Master horticulturist Cassie Heneault holds a clump of buds ready for packaging.

A makeover for the town's best, worst (and only) golf course

With a $300,000 federal grant and local match, golf course will undergo a watershed-friendly redesign

BY CHRISTY NADALIN
cnadalin@eastbaymediagroup.com

Long before the Bristol Golf Club gained national notoriety for being "of a worseness so extreme that you occasionally wonder if it's not ironic," ("When a Bad Golf Course Edges Into Goodness," New York Times, May 22, 2011), it was the site of an important watershed for both the Warren River and Bristol Harbor. In fact, it still is.

Regardless of the opinion of writer and course aficionado Charles McGrath, who claimed that whoever designed it "deserves credit for stubbornness" for building a golf course "where nobody else would have thought it possible," it is and will remain a recreational resource for its longtime fans and the people of Bristol.

Town Administrator Steven Contente reports that residents like it and want to keep it; the town planning department agrees, and they are working to create a plan that will allow golf and environmental stewardship to work together on the property, into the future.

Topographically, the golf club occupies a high point about where Tupelo Street runs between Hope Street and Metacom Avenue. To the north, water runs downhill to Oyster Point, ending up in the Warren River. To the south, it runs through much of Bristol until it reaches the harbor.

Decades of abuse have left much of the watershed at death's door, and concrete steps must (and are) being

See **REDESIGN** Page 2

Super scientists!

Kickemuit and Mt. Hope students among the state's best scientists

PAGE 13

REDESIGN: Golf course has dramatic impact on Silver Creek watershed

From Page 2

taken to remediate it — something the town has known since the results of a major 2007 study on the health of the water body was completed.

A lot of dirty water

Looking at the report that emerged from that study, the first thing that strikes you is how massive the Silver Creek watershed really is. It covers a good part of the interior of Bristol, encompassing not only the Tupelo Street golf course, but also the Broad Common Road manufacturing corridor, Mt. Hope High School, St. Mary's Cemetery, and hundreds of private homes. It all adds up to a lot of pressure on an ecosystem that performs its important function best when it is simply left alone.

Contaminants enter the watershed from a variety of potential sources, natural and otherwise. Geese are a huge problem. Their droppings contain compounds that upset the nitrogen balance of the ecosystem. Fertilizers and urban and industrial runoff act much the same way, and it only gets worse downstream. An application of fertilizer, or the droppings of a flock of geese, percolate into the watershed up at the golf course. The contaminated water flows downstream to the high school, where Silver Creek picks up the chemicals from any fertilizer used on fields or nearby lawns, increasing the concentration of pollutants.

RICHARD W. DIONNE JR.

On Wednesday, the fairway on the ninth hole was wet and muddy. This fairway also includes a drainage ditch and large pond that has grown larger over the years.

The water quality continues to decrease as the water branches, flowing through the cemetery, behind Benjamin Church Manor, and past Guiteras School. By the time creek flows into the brackish pond in front of Guiteras, the water is filthy. Here it receives a final splash of goose before flowing into the harbor with the next falling tide.

"The Bristol Golf Course has been on the town's radar screen for a long time," said Ed Tanner, town planner. "It's the headwaters of Silver Creek. As soon as you get off the golf course, it's a river. On the course, it's fully mowed, piped and channeled. It's become a flooding and water quality issue all the way downstream."

For the past decade or so, volunteers from Save Bristol Harbor have been collecting data through their water sampling activities. They began in the harbor itself, and have gradually worked their way upstream, creating a comprehensive picture of the health of the watershed from beginning to end.

"Silver Creek is a huge contributor to pollution problems in Bristol Harbor and Narragansett Bay," said Mr. Tanner.

EPA gives town $300,000

The grant, which was applied for by Director of Community Development Diane Williamson, and received in the fall, consists of $300,000 from the federal Environmental Protection Agency, specifically earmarked for southern New England estuary restoration. The match will be made up of some town money, as well as staff and volunteer time.

The plan is to restore some of the course to its natural state, including vegetation that will help filter the water. "The design stage is next," said Mr. Tanner. "We think we know what we want to do out there, we just don't have the exact layout yet. But one of the important goals is to maintain the golf course. The town purchased this land back in the 1980s as open space, and there is the expectation that we will maintain some type of course."

What kind of course that will be remains to be seen. It will be a much different course than what they have today, but the town's goal is to keep nine holes.

"We'll have to see how the design works out," said Mr. Tanner. "The main goal is water quality and eliminating flooding issues, but we want to keep active recreation here."

They have an engineering consultant in place, Wright-Pierce, which has worked with the town on recent projects at Guiteras School, as well as at the Town Beach; the team includes a landscape architect who specializes in golf course restoration.

They are looking at an April kickoff for design and permitting, and construction realistically getting underway in the spring of 2020.

Bristol tees up plans for a $1 million golf course makeover

View fullscreen

(/uploads/original/20200130-100306-bristol golf course-5.jpg)

Town Planner Ed Tanner (left) and Director of Community Development Diane Williamson look at plans for an improved Bristol Golf Club — envisioned as a nine-hole, par-3 course with new design, holes, water management, bridges, walkways and more.

Posted Thursday, January 30, 2020 6:00 pm

By Christy Nadalin

At just over 26 acres, Bristol's golf course, off Tupelo Street, is never going to compete with Pebble Beach. But thoughtful planning by a team including the town, Save the Bay, Save Bristol Harbor, the Recreation Department, engineers, and landscape architecture consultants who specialize in golf courses have come up with a plan for a community resource that looks poised to serve as a lot of things to a lot of people.

"We had two goals," said Ed Tanner, Town Planner. "We needed to do something about the water quality in Silver Creek, and we wanted to maintain a viable and hopefully much better golf course."

Both of those things were in dire need of rescue.

Silver Creek has long been a major contributor to pollution problems in Bristol Harbor and Narragansett Bay. Decades of abuse have left much of the watershed at death's door, and since a major 2007 study on the health of the water body was completed, the town has been taking steps to remediate it.

Topographically, the golf course occupies a high point about where Tupelo Street runs between Hope Street and Metacom Avenue. To the north, water runs downhill to Oyster Point, ending up in the Warren River. To the south, it runs through much of Bristol until it reaches the harbor.

It's a massive watershed, covering a good part of the interior of Bristol, encompassing not only the golf course, but also the Broad Common Road manufacturing corridor, Mt. Hope High School, St. Mary's Cemetery, and hundreds of private homes. It all adds up to a lot of pressure on an ecosystem that performs its important function best when it is simply left alone.

Contaminants enter the watershed from a variety of potential sources, natural and otherwise. Geese, regulars at the course, are a huge problem. Their droppings contain compounds that upset the nitrogen balance of the ecosystem. Fertilizers, urban and industrial runoff, act much the same way, and it only gets worse downstream. An application of fertilizer, or the droppings of a flock of geese, percolate into the watershed up at the golf course. The contaminated water flows downstream to the high school, where Silver Creek picks up the chemicals from any fertilizer used on fields or nearby lawns, increasing the concentration of pollutants. The water quality continues to decrease as the water branches, flowing through the cemetery, behind Benjamin Church Manor, and past the Guiteras School. By the time the creek flows into the brackish pond in front of Guiteras, the water is filthy. Here it receives a final splash of goose before flowing into the harbor with the next falling tide.

The course itself was receiving no love either, earning national notoriety for being "of a worseness so extreme that you occasionally wonder if it's not ironic," ('When a Bad Golf Course Edges Into Goodness (https://onpar.blogs.nytimes.com/2011/05/22/when-a-bad-golf-course-edges-into-goodness/),' New York Times, May 22, 2011).

In the fall of 2018, Director of Community Development Diane Williamson received a $300,000 grant from the federal Environmental Protection Agency, specifically earmarked for southern New England estuary restoration. The plan at the time (https://www.eastbayri.com/stories/a-makeover-for-bristols-best-worst-and-only-golf-course,63930?) was to prioritize the watershed, while making improvements to the course in the process, with a combination of town funds and volunteer and in-kind efforts.

Since then, a state DEM grant for recreational facilities, through the Green Economy bond, was announced, and applied for. The town has asked the state for $400,000 to make it a better course.

"We are hoping that resonates with DEM and they see this as a nice regional amenity," said a cautiously optimistic Mr. Tanner. "We hope to hear in March; we have our fingers crossed."

In the meantime, after many iterations, they have settled on a course master plan. It's somewhat similar in layout to the old one, though it will move in the reverse direction and eliminate the two longer holes at the southernmost end of the course. "We are going to let the areas that want to be wet, stay wet, and golf on the land that's high and dry." Planners hope that realigned holes will also eliminate the history of problems with golf balls encroaching on neighboring properties.

The end result will be a nine-hole, par-3 course.

"The designer hopes to introduce interesting elements and natural features, so even though it will be short, it will be fun and playable," said Mr. Tanner.

Plantings will be designed to let nature take over in some areas, with natural buffers around the wettest parts of the course. Walking paths and bridges will create a parklike atmosphere that will make the course enjoyable for walks and birdwatching as well.

Organizers envision a walking course (though limited carts could be made available for players with mobility issues.) The Town Recreation Department is excited about potential opportunities to add another recreational facility to its list of resources.

The town is unsure if longtime operator ELJ is interested in continuing to manage the course, as they have done so under a lease for many years.

Though they have not determined the details of any future management structure, the town does plan to take a more active management role in the course moving forward. Later this year they will be putting out an RFP looking for interest from management entities.

Engineering consultant Wright-Pierce has worked with the town on recent projects at Guiteras School as well as at the Town Beach, and they are also working with Providence-based landscape architects Garner + Gerrish.

"The budget is just over a million total," said Mr. Tanner. In addition to the existing $300,000 grant and the hoped-for $400,000 grant, the town has commitments for in-kind services, plantings, and volunteers. "We're going to structure the bid with alternates so we can back out of things that we can't afford. We did that at the town beach and it worked nicely."

If all goes according to plan, the town is looking at permitting through the spring, going out for bid in May and June, groundbreaking in July, seeding in the fall, and reintroducing Bristol's golfers into their natural habitat in July 2021.

2 Comments Sort by Newest

Add a comment...

Lindsay Green

Thank you to the author (Christy Nadalin) for telling it like it is about pollution of Silver Creek: "By the time the creek flows into the brackish pond in front of Guiteras, the water is filthy." Absolutely. After rain, the water is always a dark brown flowing out to the harbor under the bridge by Sip N Dip.Hopefully returning wetlands to what they originally were at the golf course will improve the water quality a bit. The project is exciting.

Like · Reply · 1 · 27w

James W Farley

Great idea, and long overdue.

Like · Reply · 1 · 27w

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Bristol Phoenix

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THURSDAY, APRIL 15, 2021

A win-win for golf and water

Coming soon: a water quality project that will also be a recreational and public educational facility

BY CHRISTY NADALIN
cnadalin@eastbaymedigroup.org

PHOTOS BY RICHARD W. DIONNE JR.

Bristol Town Planner Ed Tanner (right) discusses plans for the new, par-three, nine-hole golf course with Treasurer Julie Goucher and Town Council President Nathan Calouro.

Wenley Furgeson (center), director of habitat restoration at Save the Bay, discusses plans for a pond on the new golf course with landscape architect Tim Gerrish (right) and a project manager.

Meetings on the golf course are nothing new — though the rumble of earth-moving equipment was a constant at this particular one, last Friday morning on the site of the Bristol Golf Course, just west of Ballou Boulevard. The mood was high as town officials met with Save the Bay and a landscape architect to review the progress of this groundbreaking new project. "There's a lot going on here," said Ed Tanner, town planner.

"It's rare to have a win, win, win," said Council Chairman Nathan Calouro. "But that's what we have here."

Topographically, the golf course occupies a high point about where Tupelo Street runs between Hope Street and Metacom Avenue. To the north, water runs downhill to Oyster Point, ending up in the Warren River. To the south, it runs through much of Bristol until it reaches the harbor.

Decades of abuse once saw this watershed at death's door, though remediation efforts are having an effect. A major 2007 study on the health of the water shows how massive the Silver Creek watershed really is. It covers a good part of the interior of Bristol, encompassing not only the Tupelo Street golf course, but also the Broad Common Road manufacturing corridor, Mt. Hope High School, St. Mary's Cemetery, and hundreds of private homes. It all adds up to a lot of pressure on an ecosystem that performs its important function best when it is simply left alone.

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It's environmental stewardship, with a round of golf

The Bristol Golf Course has been on the town's radar screen for a long time. Mr. Tanner and Community Development Director Diane Williamson have long sought ways to address this issue, while still maintaining that land, purchased by the town in the 1980s as open space, as a recreational facility.

They consulted with Wright-Pierce, an engineering firm which has worked with the town on recent projects at Guiteras School, as well as at the Town Beach. Also on the team: Landscape Architect Tim Ger-

See GOLF Page 7

GOLF: Renovations to course are a win-win for golf and the environment

APRIL 15, 2021

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rish, who specializes in golf course restoration, and Wenley Ferguson, director of restoration with Save the Bay.

"We've been discussing this for 10 years," said Ms. Ferguson, who has been consulting with the town for 25 years, since there was still a Cumberland Farms gas station at Silver Creek. She admitted she was "depressed" when she first heard that the Town was not going to completely return the property to wetland and was still interested in maintaining a golf course. "I originally thought of this as a restoration project, and the town decided to keep a playable course," said Ms. Ferguson. She soon came around. "This has amazing water quality benefits — I was so excited that the town kept moving forward with this. And Tim is a landscape architect who gets it."

"I understand Wenley's goals and how to incorporate them into a golf course," said Mr. Gerrish.

What's more, because of the project's primary goal as a wetland restoration project, federal and state grant money has flowed in, covering the lion's share of the costs. "We got some good grants," said Mr. Tanner. "It's nice that others see the benefit of this."

Better habitat, better to play

"This never wanted to be a golf course," said Mr. Tanner, of the sodden wetland that was once pockmarked with concrete pillars, nets, and other atypical golf hazards. "The stormwater from Ballou Boulevard., this industrial cul-de-sac, used to go down the drain and dump into the grass. We've intercepted that." A series of ponds, interconnected streams, and natural features will route the water into a sand filter treatment system.

And it's all being incorporated into a new, nine-hold, par-3 course that will we interesting and fun to play. "Tim saw what we had here, and he thought through the whole process," said Mr. Tanner. "He even incorporated a walking path for non-golfers."

"We're enhancing the golf course, but at its heart this is a water quality project," said Mr. Tanner. With a natural stream and water trickling pond to pond, surrounded by natural plantings, the course will be dry, and geese, who like open spaces far from high grasses where predators lurk, should stay away. Much of the southern extension of the course will be allowed to return to its natural state.

Our goal is to connect recreation and the environment," said Town Administrator Steven Contente. "We can bring in youth groups and have educational exhibits on stormwater, nitrogen levels, and how that impacts the harbor and shellfish — and they can play golf."

"It's a huge investment in the community; we're going to have something we're all going to be proud of."

Volunteers bring life to the golf course

Planting marathon puts 1,600 plants in the ground in four days

BY CHRISTY NADALIN
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It's not often (if ever) you hear of nonprofit volunteers being asked to turn up in numbers to supply free labor to enhance a golf course, but that's exactly what happened last week in Bristol.

This particular course, the new and vastly improved Bristol Golf Course, is still a season away from opening for golfers. But a key element of its not-so-secret secondary purpose — watershed filtration — was put into place last week.

Under the direction of Save the Bay's Wenley Ferguson, 20 volunteers descended on the site beginning last Tuesday. In all, 1,600 shrubs, trees and herbaceous freshwater wetland plants were set in place in predetermined locations on the course.

"Save the Bay turned out their great network of volunteers," said Bristol Town Planner Ed Tanner, who has been guiding this project since its inception several years ago. "We also had a big showing from Save Bristol Harbor, other Bristol residents, and Mt. Hope High School students — and I think every member of the conservation commission showed up, too."

Volunteers served from two hours to two days, in weather that was favorable for working outside (though Mr. Tanner would like to see a little rain in the forecast now that this massive plant purchase is in the ground and looking to establish itself).

Planting locations were very specific, according to the landscape plan, to frame water features — so wherever there's a stream, pond or wetland, there are new, native plants surrounding that feature. They will take some time to thicken and fill in the space they are meant to occupy, and when they do, they won't serve just an aesthetic purpose but a functional one: helping to filter runoff from the industrial neighborhood around the course to keep it from entering the fragile Silver Creek watershed.

PHOTOS BY RICHARD W. DIONNE JR.

Wenley Ferguson of Save the Bay directs volunteers where to plant nearly 1,600 trees and shrubs along the future Bristol Golf Course last week.

The team planted a range of species, including silky dogwoods, pussy willows, tulip trees and sweet gum.

The nuts-and-bolts of finalizing the project continues under Mr. Tanner's leadership — he has just confirmed contractor U.S. Pitchcare as the lowest qualified bidder for phase 2 of the the project, which will start next week, visible on the north side of Broadcommon Road. Getting the course up and running, powering the irrigation pumps, and hiring a contractor to operate the course itself, under town authority, are all projects to be tackled in the near future.

Karlo Berger (left) and Kendra Beaver of Save the Bay plant species along the embankment of the catch pond.

Volunteers (from left to right) Wenley Ferguson of Save the Bay (left), Bristol Town Planner Ed Tanner, Abigail Welch and Tony Morettini of the Bristol Conservation Commission plant native plants and trees at the Bristol Golf Course last Thursday.

Bristol Phœnix.

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