SEACOAST ENGINEERING COMPANY

P.O. BOX 155 • 459 WASHINGTON STREET
DUXBURY, MASSACHUSETTS 02331
(781) 934-8188 • FAX (781) 934-9188

- CIVIL ENGINEERING
- ENVIRONMENTAL
- MARINE ENGINEERING

- TITLE V
- PERMITS
- STRUCTURES

October 10, 2022

Ms., Tracy Mayo, R.S., Health Agent
Duxbury Board of Health
878 Tremont Street
Duxbury, MA 02332

RE: George Prebola
49 Allens Lane, Duxbury, MA 02332
Title 5 Upgrade

Dear Ms. Mayo:

At the request of our client, George Prebola, we are submitting this Title 5 Septic System Design Plan and supporting information. They include the following:

1. Engineering Plan (1 sheet), Septic System Repair Plan for 49 Allens Lane, Duxbury, MA, 02332, dated October 10, 2022, and prepared by Merrill Engineers and Land Surveyors, Hanover, MA.
2. Application for Disposal System Construction Permit.
3. Soil Logs.
4. Checks for $230.00 (plan review) and $35.00 (variance).

This plan provides for a complete upgrade to the existing four (4) bedroom system. No increase in flow is planned.

One (1) variance to the Town of Duxbury Board of Health Supplementary Rules and Regulations is requested. It is the following:

1. Section 1.10(1)(2)- Septic system to be within 150' to a Bordering Vegetated Wetland (BVW). Request to reduce the required setback to 88.5'.

Please review. Should there be any questions, please contact this office. Thank you very much.

Very truly yours,

Paul A. Brogna, P.E.
Principal

Enclosure: as
cc: George Prebola
File

Project:	*#49 Allens Lane*	Job No.:	*22-576*
Location:	*#49 Allens Lane*		
Designed By:	*Joshua Green, E.I.T.*	Date:	*10/8/2022*
Checked By:	*Paul Brogna, P.E.*	Date:	
		Sheet:	1 of 2

PROPOSED PUMP DESIGN CALCULATION

DESIGN DAILY FLOW (N\A no aditional flows; assume 110gpd)

Actual D.D.F. =	440	gpd	
Use for Design: D.D.F. =	440	gpd	Title V: 15.203: System Sewage Flow Criteria

CALCULATE PUMP CHAMBER SIZE

Force Main Diameter		2	inches	
Emergency Storage (24 hr) =		440	gallons	Title V: 15.231(2)
Back Flow from Delivery Pipes (Y=0, N=1)		0		
Back Flow from Delivery Pipes		2	gallons	
Chamber Size Interior	TRY:	1,000	gallons	
*Length =		7.75	ft	
*Width =		4.90	ft	
*Height to Outlet Invert =		4.00	ft	
*Height Max of chamber =		5.00	ft	
Vol. Per depth of chamber =		284.05	gal/1ft depth	
*Volume of Chamber to Invert =		1137	gallons	
*Volume of Chamber including above Invert out =		1421	gallons	
Emergency Storage (24 hr) Depth =		1.55	ft	
Dose Depth ("OFF" to "ON") =		1.00	ft	
Dose Volume ("OFF" to "ON") =		284.05		
Depth required for Operation of Pumps: ("BOT"-"OFF", "ON"-"ALARM") =		0.50	ft	
Vol. required for Operation of Pumps: ("BOT" to "OFF", "ON" to "ALARM") =		143	gallons	
Total Dosing Chamber Vol req'd =		869	gallons	
		MEETS DESIGN CRITERIA		
		USE FOR DESIGN		**1,000 gal. chamber**

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Checked By:	*Paul Brogna, P.E.*	Date:	
		Sheet:	2 of 2

PROPOSED PUMP DESIGN CALCULATION

Static Head:

Pump Chamber Outlet Invert Elev. = 11.60

Force Main Discharge Elev. = 14.40

Pump Intake Elev. = 7.65

Static Head = 6.75 ft

Pipe Length= 10 ft

Gravity (g)= 32.2 ft/s

Pipe Dia= 1 1/2 in ***USED FOR DESIGN***

FRICTION CHART FOR PVC SCHEDULE 40 PIPE (Flow Coefficient C - 150)

G.P.M.	hf/ft	Hf	V	Hv=(V^2)/2g	Hs	TDH	15% SAFETY FACTOR	20% SAFETY FACTOR
8	0.556	0.06	1.26	0.025	6.75	6.83	7.85	8.20
10	0.834	0.08	1.58	0.039	6.75	6.87	7.90	8.25
15	1.74	0.17	2.37	0.087	6.75	7.01	8.06	8.41
20	2.96	0.30	3.16	0.155	6.75	7.20	8.28	8.64
25	4.46	0.45	3.94	0.241	6.75	7.44	8.55	8.92
30	6.27	0.63	4.73	0.347	6.75	7.72	8.88	9.27
35	8.4	0.84	5.52	0.473	6.75	8.06	9.27	9.68
40	10.7	1.07	6.3	0.616	6.75	8.44	9.70	10.12
45	13.5	1.35	7.09	0.781	6.75	8.88	10.21	10.66
50	16.5	1.65	7.88	0.964	6.75	9.36	10.77	11.24

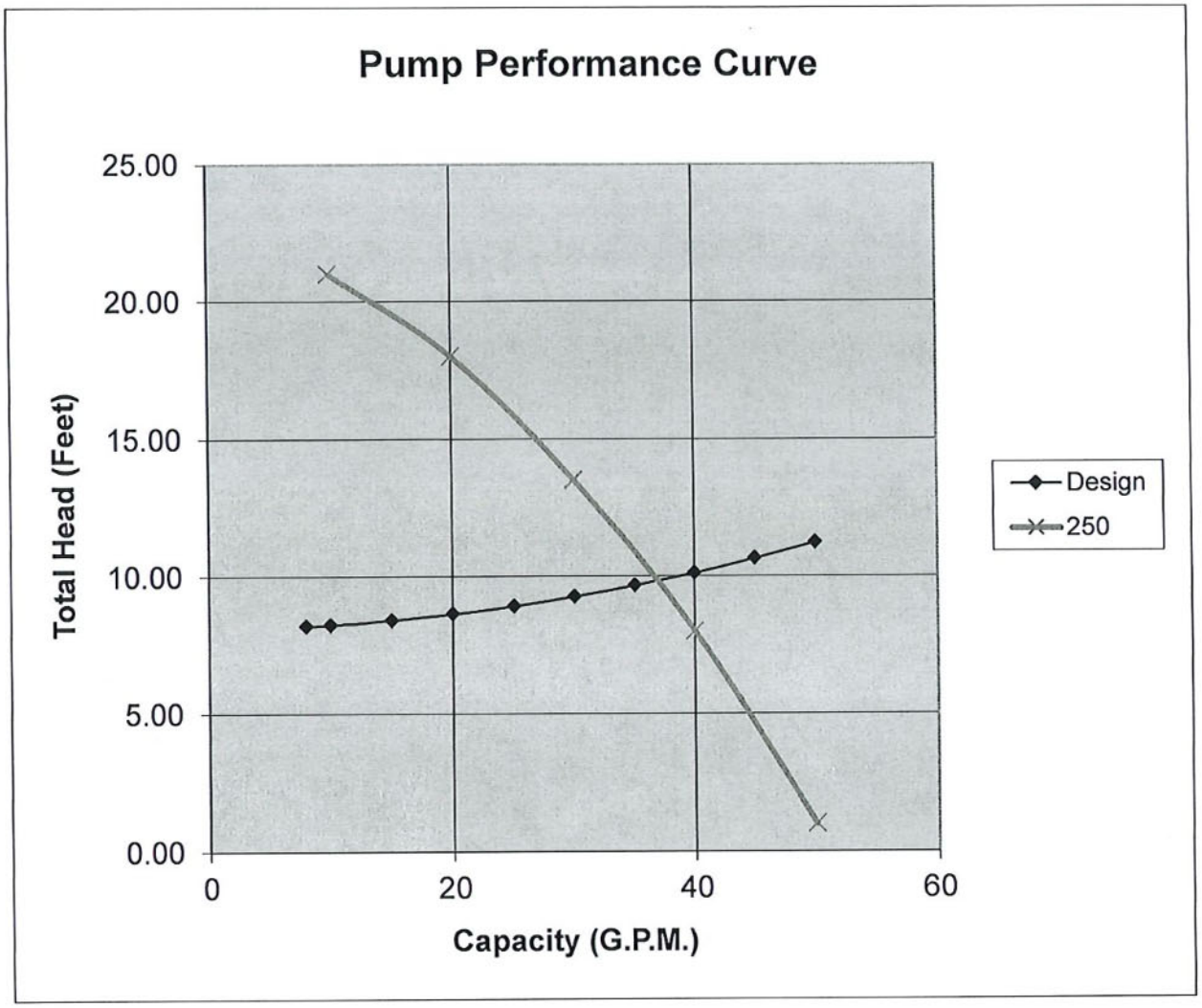
Chart includes: 1 check valve, 1 gate valve & 5 elbows

Pipe Dia= 1 1/4 in

FRICTION CHART FOR PVC SCHEDULE 40 PIPE (Flow Coefficient C - 150)

G.P.M.	hf/ft	Hf	V	Hv=(V^2)/2g	Hs	TDH	15% SAFETY FACTOR	20% SAFETY FACTOR
6	0.714	0.07	1.29	0.026	6.75	6.85	7.87	8.22
8	1.19	0.12	1.72	0.046	6.75	6.91	7.95	8.30
10	1.78	0.18	2.15	0.072	6.75	7.00	8.05	8.40
15	3.76	0.38	3.22	0.161	6.75	7.29	8.38	8.74
20	6.42	0.64	4.29	0.286	6.75	7.68	8.83	9.21
25	9.74	0.97	5.37	0.448	6.75	8.17	9.40	9.81
30	13.6	1.36	6.44	0.644	6.75	8.75	10.07	10.50
35	18.2	1.82	7.51	0.876	6.75	9.45	10.86	11.33
40	23.6	2.36	8.59	1.146	6.75	10.26	11.79	12.31
45	29.5	2.95	9.67	1.452	6.75	11.15	12.82	13.38

Chart includes: 1 check valve, 1 gate valve & 5 elbows


Pump Performance Curve
25.00
20.00
15.00
10.00
5.00
0.00
Total Head (Feet)
0
20
40
60
Capacity (G.P.M.)
Design
250

FORM 12: TITLE 5 ON-SITE (PAGE 2 & 3 COMBINED)

Location address or lot #: 49 ALLENS LANE, DUXBURY
Applicant/Owner: GEORGE PALETTOLA
DEEP HOLE # 1 DATE: 8/22/22 WEATHER: CLOUDY/RAIN TEMP: 70'S
Location (identify on site plan): Refer to sketch attached
Land Use: RES Slope: 0-3% Surface Stones: ____ Y ☑ N ☐
Vegetation: GRASS Stone Walls: ____ Y ☐ N ☑
Landform: ____

Distance From: Open Water Bodies — ft. Possible Wet/Area 100'+ ft. Drinking water Well — ft.
Drainageway — ft. Property Line 10'+ ft. Other ____

Deep Observation Hole Log

Depth	Soil Horizon	Soil Texture	Soil Color	Soil Motting	Other: Structures, Stones, Boulders, Consistency, %Gravel
0"-8"	A	SANDY LOAM	10YR3/3	—	FRIABLE
8"-16"	B	LOAMY SAND	10YR5/6	—	FRIABLE
16"-24"	C_1	FINE LOAMY SAND	2.5Y 6/4	—	FIRM IN PLACE, 10% GRAVEL LOOSE IN HAND, 10% COBBLES/STONES
24"-78"	C_2	FINE LOAMY SAND	2.5Y 6/4	—	TIGHT IN PLACE, 15% GRAVEL FRIABLE IN HAND, 25% COBBLES/STONES
78"-144"	C_3	MED-COARSE SAND	2.5Y 5/6	—	LOOSE, 10% GRAVEL SINGLE GRAIN

Parent Material (geologic): OUTWASH Depth to Bedrock: —
Depth to Groundwater: Standing Water in Hole: — Weeping from Pit Face: —
Estimated Seasonal High Groundwater: 126" WET

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OCT 12 2022
BOARD OF HEALTH
DUXBURY, MA 02332

DETERMINATION FOR SEASONAL HIGH WATER TABLE

Method Used: ☐ Depth observed standing in obs. Hole ____ ☐ Depth to soil mottles: ____
☐ Depth to weeping from side of obs. Hole ____ ☐ Groundwater adjustment ____

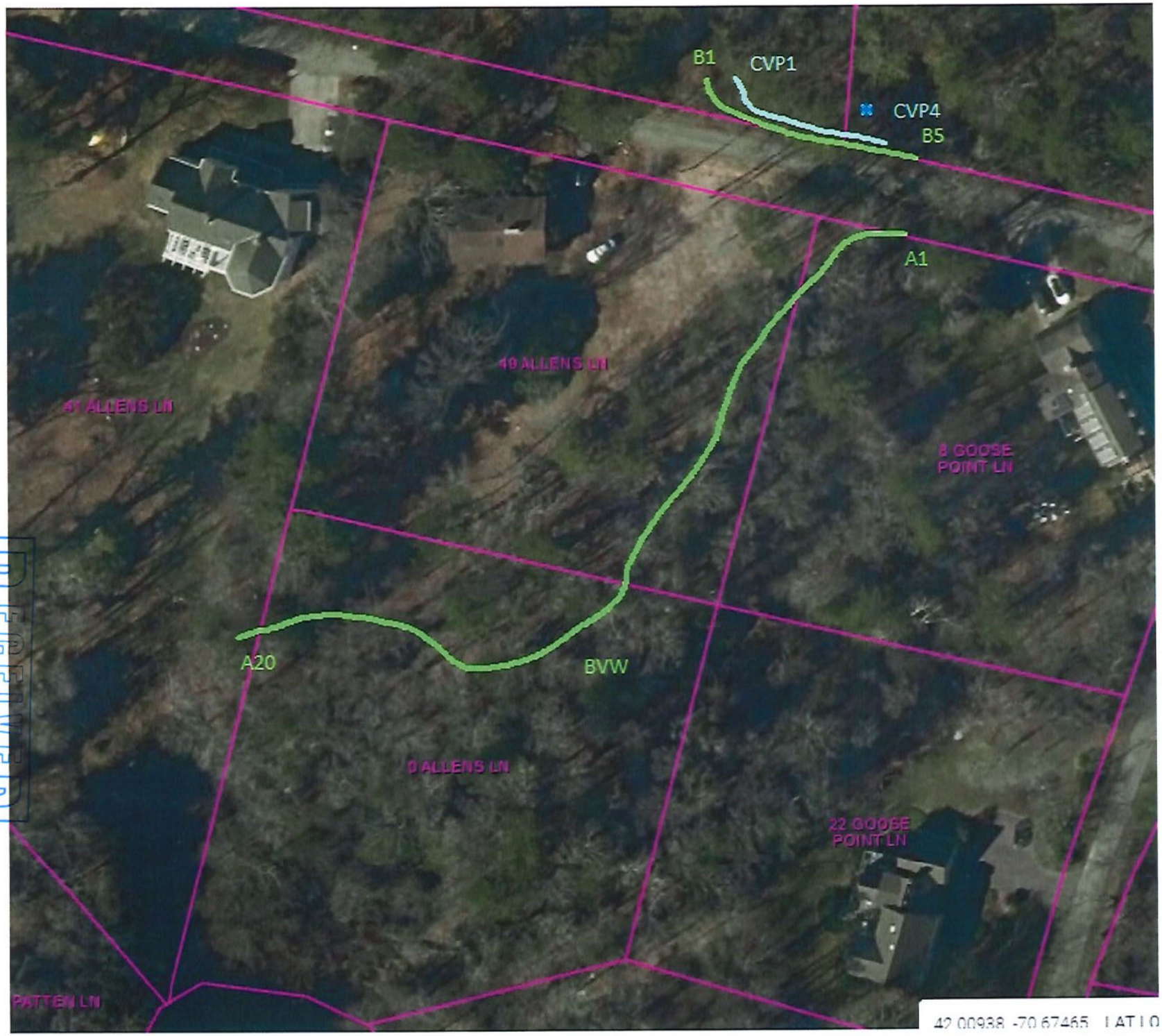
Index Well #: ____ Reading Date: ____ Index well Level: ____ Adj. Factor: ____ Adj. Ground water level: ____

PERCOLATION TEST

Date:	8/22/22			
Observation Hole #:	1			
Depth to Perc:	84"-102"			
Start Presoak/Time@	1026			
End Presoak:	1041			
Time @ 9":	1043			
Time @ 6":	1048			
Time @ (9"-6")	5 MIN			
Rate Min./Inch:	2 MIN/IN			

*Minimum of 1 Percolation test must be performed in both the primary and reserve area.

Performed By: PAUL BROGNA, PE. Site Suitability: Passes ☑
Witnesses By: TRACY MAYO, RS Agent Failed ☐
Comments: ____ Additional Testing Needed: Y ☐ N ☑



ECR

Environmental Consulting & Restoration, LLC

WETLAND DELINEATION MEMO

TO: Seacoast Engineering
FROM: Brad Holmes
DATE: September 9, 2022
RE: 49 Allens Lane, Duxbury

Per your request, Environmental Consulting & Restoration, LLC (ECR) performed a review of the existing conditions at the property located at 49 Allen Lane in Duxbury (the site) on August 15, 2022. The purpose of the review was to identify wetland resource areas on and near the site. The site is located to the south of Allens Lane and consists of a single-family home with an associated driveway, maintained lawn, landscaped area, etc. The weather on August 15th was partly cloudy and warm (approximately 75-80 degrees) with light wind and dry site conditions. Wetland resource areas are located within the eastern and southern portions of the site as well as offsite to the north of Allens Lane. ECR placed Bordering Vegetated Wetland (BVW) flags (pink/black striped ribbons) #A1 to #A20 along the limit of the wetland that extends through the eastern and southern portions of the site. BVW flags #B1 to #B5 were placed along the nearest limit of the wetland to the north of Allens Lane. The vegetated wetlands were delineated following the methodology established by the Massachusetts Department of Environmental Protection (DEP) regulations found at 310 CMR 10.55 pertaining to the delineation of Bordering Vegetated Wetlands. The delineation was performed by analyzing vegetation, hydrology within 12 inches of the surface, and soil conditions within 20 inches of the surface. The wetlands contain hydric soils, saturated soils, and dominant wetland indicator plants. ECR also identified the limit of a Certified Vernal Pool as mapped by the MA Natural Heritage & Endangered Species Program. The Vernal Pool is located entirely within the "B" series wetland offsite to the north. Vernal Pool flags (blue ribbons) #CVP1 to #CVP4 were placed along the mean annual high-water line of the pool for reference. Also note, Land Subject to Coastal Storm Flowage (FEMA flood zone AE) appears to extend onto the southern-most portion of the site. As a result of ECR's wetland delineation at the site, ECR is able to confirm that the site contains the following wetland resource areas and areas of Conservation Commission jurisdiction:

- Bordering Vegetated Wetlands
- 100-foot Buffer Zone to BVW
- Land Subject to Coastal Storm Flowage (FEMA flood zone AE)

Also review of the MassGIS wetlands database reveals the following:

1. The site is not located within Estimated/Priority Habitat for Rare Species according to the Massachusetts Natural Heritage & Endangered Species Program (MaNHESP).
2. The site does not contain a U.S.G.S. mapped stream.
3. The site is not located within an Area of Critical Environmental Concern.

Upon review of this wetland delineation memo, please contact me at (617) 529 – 3792 or Brad@ecrwetlands.com with any questions or requests for additional information.

Thank you,
Brad Holmes, Professional Wetland Scientist #1464
Manager

49 ALLENS

Letter of Transmittal

SEACOAST ENGINEERING COMPANY
CIVIL • ENVIRONMENTAL • MARINE
TITLE V • PERMITS • STRUCTURES
P.O. Box 1815
459 Washington Street
Duxbury, MA 02331
Office (781) 934-8188 • Fax (781) 934-9188

To: DUXBURY BOARD OF HEALTH
Company
MS. TRACY MAYO, RS
Attn.
878 TREMONT STREET
Address
DUXBURY, MA 02332
City, State Zip

Date	Job No.
10/10/22	22-020

Re:
GEORGE PREBOLA
PO BOX 1028
(49 ALLENS LANE)
DUXBURY, MA 02331

RECEIVED
OCT 12 2022
BOARD OF HEALTH
DUXBURY, MA 02332

We are sending you

- ☑ Attached
- ☐ Under separate cover via _____
- ☐ Shop drawings
- ☐ Samples
- ☑ Specifications SOIL LOGS
- ☐ Prints
- ☐ Copy of letter
- ☑ APPLICATION
- ☑ Plans
- ☐ Change order
- ☑ CHECKS

Copies	Date	No.	Description
3	10/10/22		SEPTIC SYSTEM REPAIR PLAN
1	10/10/22		CHECKS # 1355 ($230), # 1357 ($35)
1	10/10/22		APPLICATION FOR DISPOSAL WORKS CONST. PERMIT
1	8/22/22		SOIL LOGS

These are transmitted as checked

- ☑ For approval
- ☐ Approved as submitted
- ☐ Resubmit ____ copies for approval
- ☐ For review and comment
- ☐ For your use
- ☐ Approved as noted
- ☐ Submit ____ copies for distribution
- ☐ Print returned after loan to us
- ☐ As requested
- ☐ Returned for corrections
- ☐ Return ____ corrected prints
- ☐ _____
- ☐ For bids due _____ 19 ____
- ☐ _____

Remarks

FOR YOUR REVIEW AND APPROVAL. ONE VARIANCE IS REQUESTED, SECTION 1.10(1)(2) SEPTIC SYSTEM TO BE 88.5' FROM WETLANDS IN LIEU OF 150'. SHOULD THERE BE ANY QUESTIONS, PLEASE LET ME KNOW. THANK YOU VERY MUCH.

Copy to GEORGE PREBOLA
FILE

Signed [signature] (AGENT)

If enclosures are not as indicated, please notify us promptly.