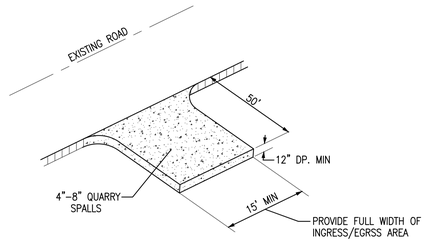
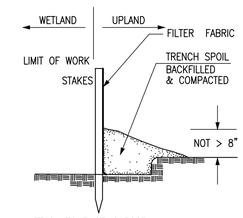
EROSION CONTROL:

1. 12"ø SILT SACK OR APPROVED EQUAL TO BE INSTALLED AS SHOWN ON PLAN.
2. DE-WATERING TO BE PUMPED TO DIRT BAG, LOCATIONS AS SHOWN ON PLAN.
3. ALL DISTURBED AREAS, CUT AND FILL AREAS, ARE TO BE BROUGHT TO FINISHED GRADE AND PLANTED PER LANDSCAPE PLAN BY ECCOTERRA DESIGN GROUP LLC.
4. CRUSHED STONE ENTRANCE TO BE MAINTAINED UNTIL PAVEMENT BASE COURSE HAS BEEN INSTALLED
5. HAY MULCH, OR OTHER SUITABLE EROSION PROTECTION, SHALL BE UTILIZED ON ALL EXPOSED SLOPES
6. CONSTRUCTION SITE TO BE SPRINKLED TO CONTROL DUST DURING TIMES OF EXCESSIVE CONSTRUCTION DUST.



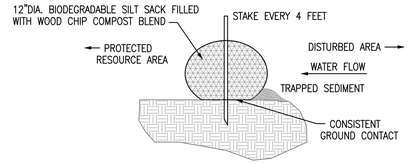
CRUSHED STONE CONSTRUCTION ENTRANCE

(NOT TO SCALE)



SILT FENCE

(NOT TO SCALE)



SILT SOCK DETAIL

NOT TO SCALE

FOR REGISTRY USE ONLY

I HEREBY CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN CONFORMANCE WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.

TIMOTHY R. BENNETT P.L.S. #36856 DATE

REVISIONS	
APRIL 24, 2023	BOARD OF HEALTH PEER REVIEW
MAY 10, 2023	PLANNING BOARD PEER REVIEW
JUNE 21, 2023	PLANNING BOARD PEER REVIEW

KEVIN S. GRADY CIVIL No. 46264 REGISTERED PROFESSIONAL ENGINEER COMMONWEALTH OF MASSACHUSETTS

SITE PLAN

ASSESSORS MAP F9 LOT 11 & 12C
#0 &74 CONGRESS STREET
PEMBROKE, MASSACHUSETTS

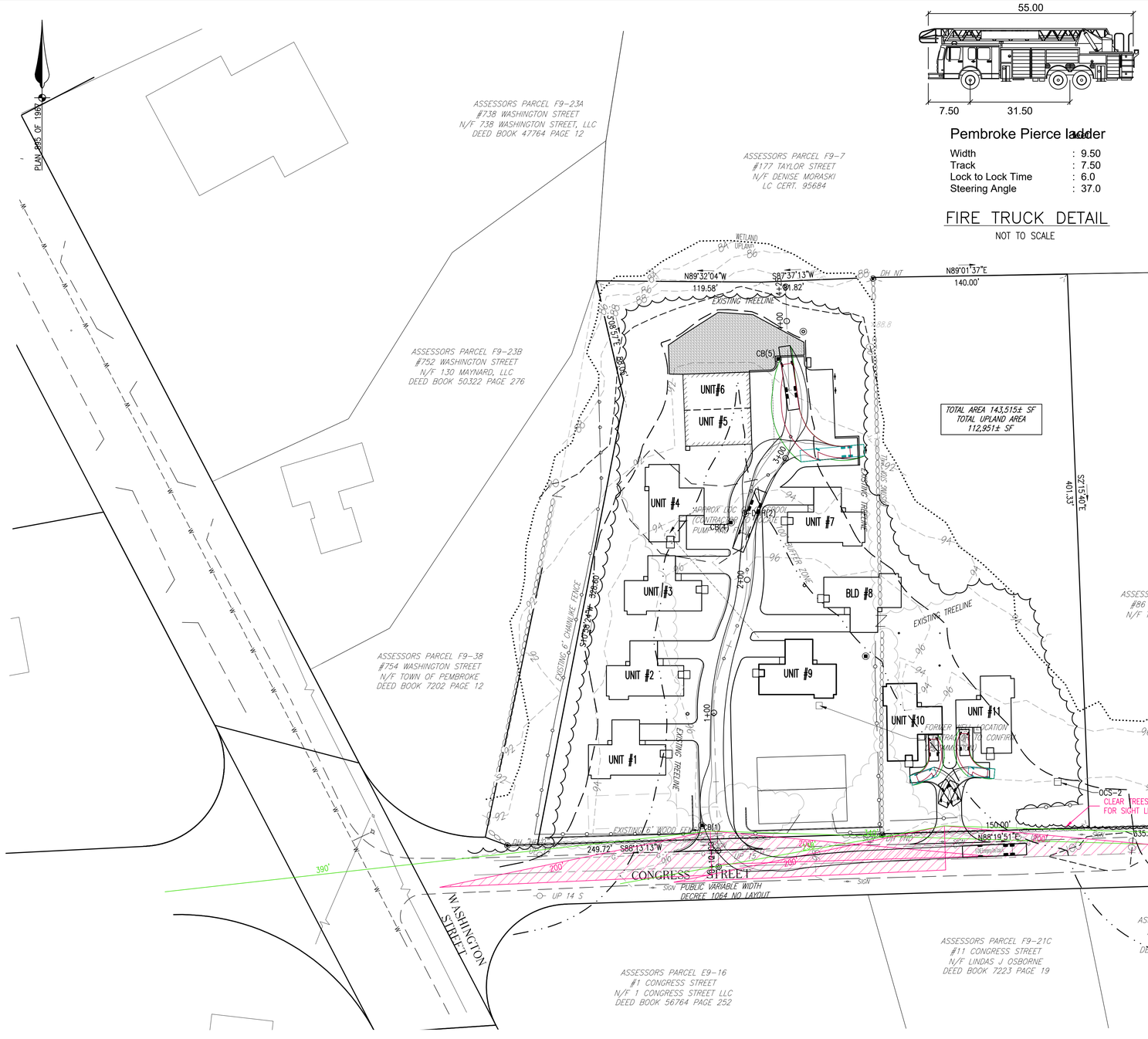
PREPARED FOR:
WHATBARN, LLC
29 DUCK HILL ROAD
DUXBURY MA 02332

MARCH 13, 2023
SCALE: AS NOTED
JOB No. 22-286

GRADY CONSULTING, L.L.C.
Civil Engineers, Land Surveyors & Landscape Architects
71 Evergreen Street, Suite 1, Kingston, MA 02364
Phone (781) 585-2300

EROSION CONTROL

Scale 1" = 20'



FOR REGISTRY USE ONLY

I HEREBY CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN CONFORMANCE WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.

TIMOTHY R. BENNETT P.L.S. #36856 DATE

COMMONWEALTH OF MASSACHUSETTS
KEVIN S. GRADY
CIVIL
No. 46264
REGISTERED PROFESSIONAL ENGINEER

POSTED SPEED LIMIT = 30 MPH

STOPPING SIGHT DISTANCE	REQUIRED	PROP. MAIN DRIVE	PROP DRIVE 2
30 MPH	200 FT	340 FT +	340 FT +
35 MPH	250 FT	340 FT +	340 FT +

INTERSECTION SIGHT DISTANCE	REQUIRED	PROP. MAIN DRIVE	PROP DRIVE 2
30 MPH	335 FT	340 FT +	340 FT +
35 MPH	390 FT	340 FT +	340 FT +

40 0 40 80 120

Scale 1" = 40'

REVISIONS	
APRIL 24, 2023	BOARD OF HEALTH PEER REVIEW
MAY 10, 2023	PLANNING BOARD PEER REVIEW
JUNE 21, 2023	PLANNING BOARD PEER REVIEW

SITE PLAN

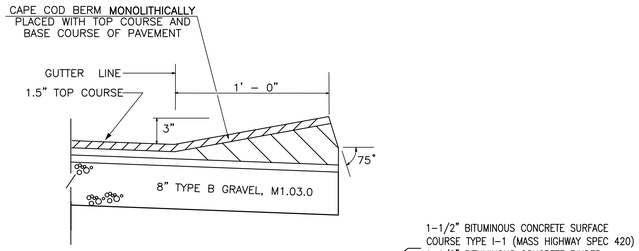
ASSESSORS MAP F9 LOT 11 & 12C
#0 &74 CONGRESS STREET
PEMBROKE, MASSACHUSETTS

PREPARED FOR:
WHATBARN, LLC
29 DUCK HILL ROAD
DUXBURY MA 02332

MARCH 13, 2023
SCALE: AS NOTED
JOB No. 22-286

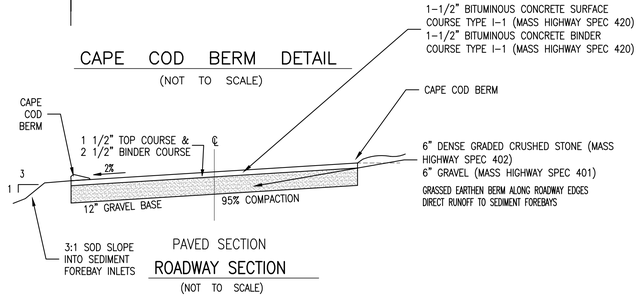
SAFETY

GRADY CONSULTING, L.L.C.
Civil Engineers, Land Surveyors & Landscape Architects
71 Evergreen Street, Suite 1, Kingston, MA 02364
Phone (781) 585-2300



CAPE COD BERM DETAIL

(NOT TO SCALE)



ROADWAY SECTION

(NOT TO SCALE)

Table 1
Minimum Cover Requirements for ADS N-12®, N-12 ST, and N-12 WT (per AASHTO) with AASHTO H-25 or HS-25 Load

Inside Diameter, ID, in.(mm)	Minimum Cover ft. (m)	Inside Diameter, ID, in.(mm)	Minimum Cover ft. (m)
4 (100)	1 (0.3)	24 (600)	1 (0.3)
6 (150)	1 (0.3)	30 (750)	1 (0.3)
8 (200)	1 (0.3)	36 (900)	1 (0.3)
10 (250)	1 (0.3)	42 (1050)	1 (0.3)
12 (300)	1 (0.3)	48 (1200)	1 (0.3)
15 (375)	1 (0.3)	54 (1350)	2 (0.6)
18 (450)	1 (0.3)	60 (1500)	2 (0.6)

Note: Minimum covers presented here were calculated assuming Class III backfill material compacted to 90% standard Proctor density around the pipe and a minimum of 6-inches (0.15m) structural backfill over the pipe crown, as recommended in Section 5 of the Drainage Handbook, with an additional layer of compacted traffic lane sub-base for a total cover as required. In shallow traffic installations, especially where pavement is involved, a good quality compacted material to grade is required to prevent surface settlement and rutting.

ADS

Maximum Cover

Wall thrust generally governs the maximum cover a pipe can withstand and conservative maximum cover heights will result when using the information presented in the *Structures* section (Section 2) of the Drainage Handbook.

The maximum burial depth is highly influenced by the type of backfill and level of compaction around the pipe. General maximum cover limits for ADS N-12, N-12 ST, N-12 WT pipe, (ASTM F2306 and AASTHO M252/M294 Type S pipes) are shown in Table 3 for a variety of backfill conditions.

Table 3 was developed assuming pipe is installed in accordance with ASTM D2321 and the *Installation* section (Section 5) of the Drainage Handbook. Additionally, the calculations assume zero hydrostatic load, incorporate the maximum safety factors represented in Structures section of the Drainage Handbook, use material properties consistent with the expected performance characteristics for N-12 (per ASTM F2306) materials as shown in Table 2 below, and assume the native soil is of adequate strength and is suitable for installation. For applications requiring fill heights greater than those shown in Table 3 or where hydrostatic pressure due to groundwater is present, contact an ADS engineering representative.

Figure 1
ADS N-12®, N-12 ST, and N-12 WT (per AASHTO) Trench Detail Under Pavement

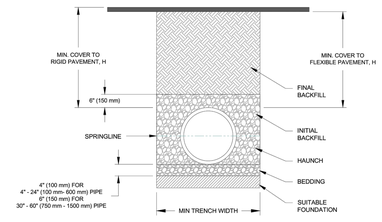


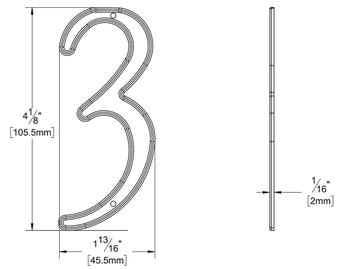
Table 2
ADS N-12 (per AASHTO) Mechanical Properties

Cell Class	Factored Compressive Strain (%)	Tension Strain (%)	Initial		75-Year	
			Fu (psi)	E (psi)	Fu (psi)	E (psi)
ASTM D3350 435400C	4.1	5.0	3,000	110,000	900	21,000

*****CONTRACTOR SHALL USE WATERTIGHT PIPE IF GROUNDWATER IS ENCOUNTERED WITHIN DRAINAGE TRENCH******

PRODUCT DATA SHEET

Product Description: Nail on house number 3. Fabricated from die cast zinc in a black finish. 4 1/8" high and 1 13/16" wide with 1/16" projection. Ships with mounting hardware.



Overall Size: 4 1/8" H X 1 13/16" W X 1/16" D

Material: Die Cast Zinc

Finish: Black

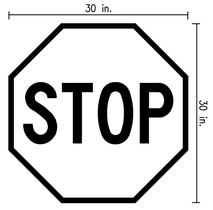
Cross Reference

Manufacturer	Part Number

3

NUMBER PLATE / PLAQUE DETAIL (HOUSE)

N.T.S.



STOP SIGN SHALL CONFORM TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES WITH THE EXCEPTION OF BEING DIAMOND GRADE.

12" WIDE x 12 FT LONG STOP LINE TO BE PLACED 4 FT IN ADVANCE OF NEAREST CROSSWALK.

STOP SIGN DETAIL

(NOT TO SCALE)

CONSTRUCTION SEQUENCE:

STAKE LIMIT OF WORK CLEARING
INSTALL SILT SOCK EROSION CONTROL BARRIER
CLEAR AND GRUB SITE AREAS
INSTALL CONSTRUCTION APRON & DRIVEWAY BASE
STAKE DRAINAGE BASIN LOCATION
BRING CUT AREAS TO SUBGRADE
INSTALL SILT FENCE FOR STOCKPILE AREA
INSTALL FOUNDATION & BEGIN FRAMING
INSTALL TEMPORARY DRAINAGE AREAS WHERE NECESSARY
INSTALL ELECTRIC, GAS & WATER UTILITIES
PLACE FILL MATERIAL TO BASE COURSE
CONSTRUCT DRAINAGE BASINS
COMPLETE FINISH GRADING
INSTALL ENERGY DISSIPATERS AND CONNECT ALL OUTLETS
COMPLETE BUILDING CONSTRUCTION
INSTALL\RAISE MANHOLE STRUCTURES TO FINISH GRADE DRAIN, SEWER,
LOAM & SEED DISTURBED AREAS, MULCH AND PLANT RAIN GARDEN & LANDSCAPE AREAS
INSTALL FINISH PAVEMENT COAT
SCHEDULE FINAL SITE INSPECTION FOR CERTIFICATION
REMOVE SEDIMENT CONTROLS

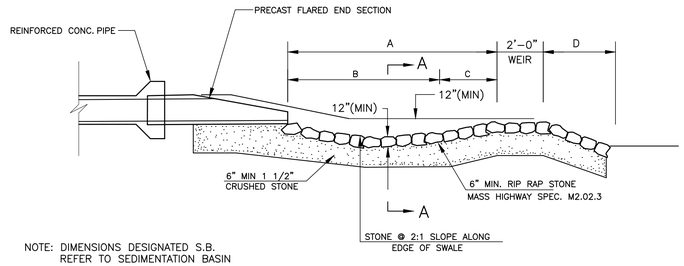
CONSTRUCTION NOTES

GENERAL:

1. THE ACCURACY OF EXISTING UTILITY LOCATIONS, DIMENSIONS AND LINES IS FROM EXISTING INFORMATION OF RECORD AND IS NOT WARRANTED. CONTRACTOR TO VERIFY PRIOR TO INITIATING CONSTRUCTION.
2. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL SECURE ALL NECESSARY STATE, MUNICIPAL AND OTHER UTILITY PERMITS AND VERIFY THE PROPOSED LOCATIONS OF UTILITIES WITH UTILITY COMPANIES.
3. CONTRACTOR SHALL NOTIFY "DIG SAFE" (1-800-322-4844) AT LEAST 4 DAYS PRIOR TO CONSTRUCTION.
4. UNDERGROUND UTILITIES SHALL BE INSTALLED IN ACCORDANCE WITH THE SPECIFICATIONS OF THE APPROPRIATE DEPARTMENT OR COMPANY.
5. ALL CONSTRUCTION SHALL CONFORM TO TOWN OF PEMBROKE PLANNING BOARD RULES AND REGULATIONS, DPW SPECIFICATIONS, CONSERVATION COMMISSION REGULATIONS AND ALL OTHER APPLICABLE CODES.
6. ALL STUMPS SHALL BE DISPOSED OFF SITE.
7. CLEANUP – UPON COMPLETION OF ALL WORK ON THE GROUND, THE DEVELOPER SHALL REMOVE FROM THE STREETS AND ADJOINING PROPERTY, ALL TEMPORARY STRUCTURES AND ALL SURPLUS MATERIAL AND RUBBISH WHICH MAY HAVE ACCUMULATED DURING CONSTRUCTION, AND SHALL LEAVE THE WORK IN A NEAT AND ORDERLY CONDITION. DURING CONSTRUCTION, THE DEVELOPER SHALL KEEP THE SITE FREE OF RUBBISH WHICH MAY BE CARRIED BY WIND OR RAIN OFF THE SITE TO ABUTTING PROPERTIES OR ONTO PUBLIC WAYS.

DRAINAGE SYSTEM NOTES:

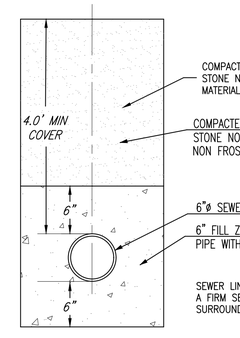
1. CONTACT THE DESIGN ENGINEER FOR APPROVAL OF ANY CONSTRUCTION PHASE CHANGES.
2. CONTRACTOR TO AVOID SOILS COMPACTION WITHIN DRAINAGE SYSTEM AREA. CONTRACTOR SHOULD AVOID MACHINERY OR VEHICLE USE OVER STORM WATER SYSTEMS.



NOTE: DIMENSIONS DESIGNATED S.B. REFER TO SEDIMENTATION BASIN

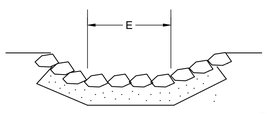
DIMENSIONS DESIGNATED D.B. REFER TO DETENTION BASIN

SECTION B–B

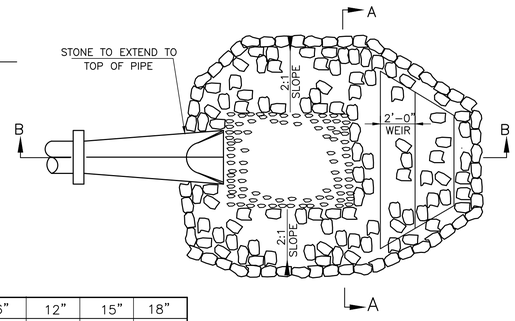


TYPICAL SEWER TRENCH DETAIL

(NOT TO SCALE)



SECTION A–A



PLAN

PIPE DIA.	6"	12"	15"	18"
A	6'–0"	10'–0"	12'–6"	15'–0"
B	4'–6"	7'–6"	9'–6"	11'–3"
C	1'–6"	2'–6"	3'–0"	3'–9"
D	2'–0"	3'–0"	4'–0"	4'–6"
E	2'–0"	4'–0"	5'–0"	6'–0"

NOTES:
1. STONE FOR EROSION CONTROL PADS SHALL COMPLY WITH MDPW MATERIAL SPEC M 2.02.3. RIP RAP SHALL BE 6" MIN. IN AVERAGE DIAMETER.
2. STONE BERM FOR SILT TRAP SHALL BE CONSTRUCTED AROUND SIDES OF EROSION CONTROL PADS

DETAIL – SILT TRAP, EROSION CONTROL PAD

(NOT TO SCALE)

SEWER CONNECTION NOTES:

1. THE CONNECTION AT THE EXISTING SEWER LINE IS TO BE AS DIRECTED BY THE BOARD OF HEALTH
2. CONSTRUCTION MATERIALS AND METHODS SHALL CONFORM TO TOWN OF PEMBROKE AND STATE OF MASSACHUSETTS STANDARDS AND REQUIREMENTS.
3. DE-WATERING OF TRENCH, IF REQUIRED, SHOULD BE CONDUCTED IN CONFORMITY WITH LOCAL REGULATIONS.
4. PRIOR TO ANY CONSTRUCTION, A STREET OPENING PERMIT AND A SEWER CONSTRUCTION PERMIT MUST BE OBTAINED BY THE CONTRACTOR FROM THE TOWN OF PEMBROKE D.P.W. (UNLESS SEWER CONNECTION IS NOT IN R.O.W.)
5. SEWER MAINS TO BE PVC SCH 40 OR AS OTHERWISE NOTED.
6. CONTRACTOR SHALL NOTIFY THE TOWN OF PEMBROKE BOARD OF HEALTH OF TIMING OF CONSTRUCTION
7. SURPLUS EXCAVATION MATERIAL TO BE HAULED OFF AND LEGALLY DISPOSED OF BY CONTRACTOR.
8. THE CONTRACTOR MUST INSTALL DETECTABLE "GREEN" MARKING TAPE, APPROXIMATELY ONE (1) FOOT ABOVE THE PROPOSED SEWER MAIN FOR ITS ENTIRE LENGTH.
9. THERE SHALL BE NO FIELD CHANGES TO THIS PLAN WITHOUT PRIOR NOTIFICATION OF BOTH THE DESIGN ENGINEER AND THE TOWN OF PEMBROKE SEWER DIVISION.
10. THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO BACKFILLING SO THAT AN "AS-BUILT" PLAN MAY BE COMPILED AND SUBMITTED TO THE PEMBROKE BOARD OF HEALTH.
11. ALL INTERIOR PLUMBING CHANGES SHALL BE MADE BY A LICENSED PLUMBER AND IN FULL COMPLIANCE WITH ALL STATE AND LOCAL PLUMBING CODE REQUIREMENTS.
12. CONTRACTOR IS TO RESTORE TO ORIGINAL CONDITION ANY UTILITIES OR IMPROVEMENTS DAMAGED DURING CONSTRUCTION INCLUDING LOAMING AND SEEDING OF LAWNS.
13. CONTRACTOR TO VERIFY EXISTING SEWER ELEVATIONS.

FOR REGISTRY USE ONLY

I HEREBY CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN CONFORMANCE WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.

TIMOTHY R. BENNETT P.L.S. #36856 DATE

REVISIONS	
APRIL 24, 2023	BOARD OF HEALTH PEER REVIEW
MAY 10, 2023	PLANNING BOARD PEER REVIEW
JUNE 21, 2023	PLANNING BOARD PEER REVIEW

SITE PLAN

ASSESSORS MAP F9 LOT 11 & 12C
#0 &74 CONGRESS STREET
PEMBROKE, MASSACHUSETTS

DETAILS – SITE

KEVIN S. GRADY CIVIL No. 46264 REGISTERED PROFESSIONAL ENGINEER

PREPARED FOR:
WHATBARN, LLC
29 DUCK HILL ROAD
DUXBURY MA 02332

MARCH 13, 2023
SCALE: AS NOTED
JOB No. 22-286

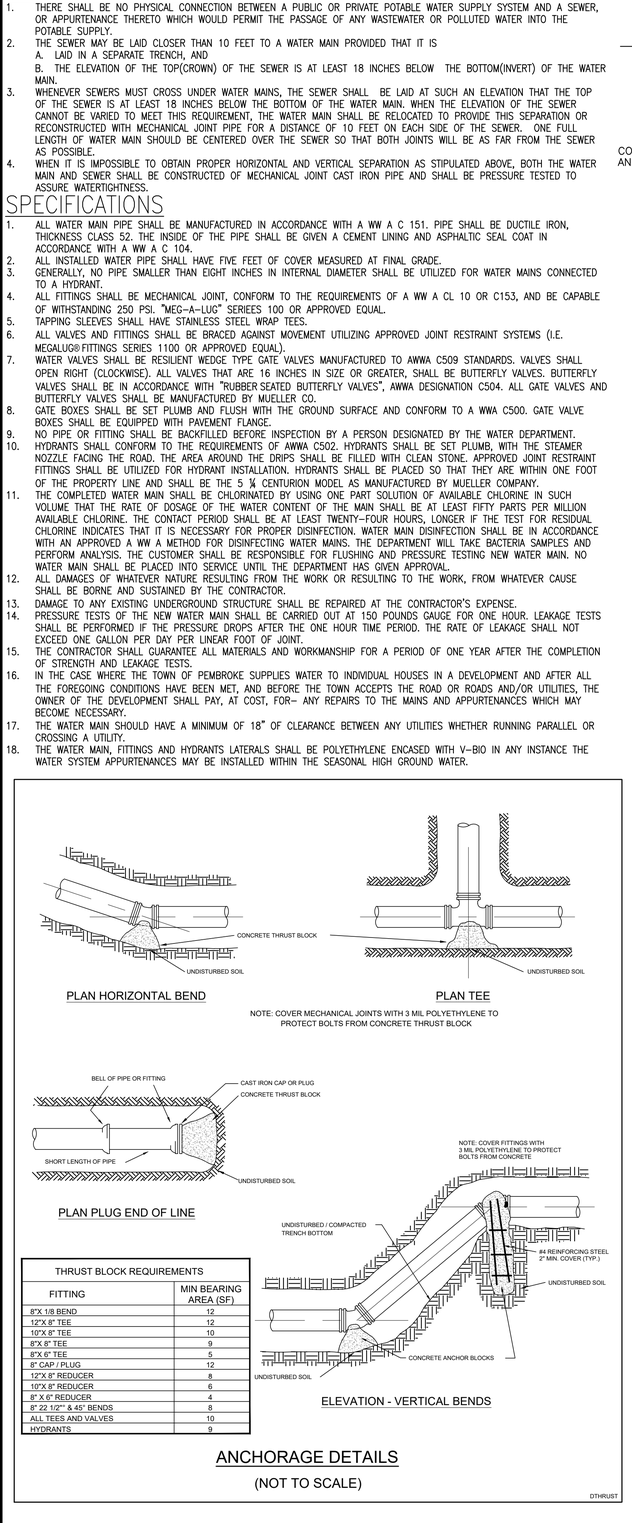
GRADY CONSULTING, L.L.C.
Civil Engineers, Land Surveyors & Landscape Architects
71 Evergreen Street, Suite 1, Kingston, MA 02364
Phone (781) 585-2300

WATER SUPPLY NOTES

1. THERE SHALL BE NO PHYSICAL CONNECTION BETWEEN A PUBLIC OR PRIVATE POTABLE WATER SUPPLY SYSTEM AND A SEWER, OR APPURTENANCE THERETO WHICH WOULD PERMIT THE PASSAGE OF ANY WASTEWATER OR POLLUTED WATER INTO THE POTABLE SUPPLY.
2. THE SEWER MAY BE LAID CLOSER THAN 10 FEET TO A WATER MAIN PROVIDED THAT IT IS
   A. LAID IN A SEPARATE TRENCH, AND
   B. THE ELEVATION OF THE TOP(CROWN) OF THE SEWER IS AT LEAST 18 INCHES BELOW THE BOTTOM(INVERT) OF THE WATER MAIN.
3. WHENEVER SEWERS MUST CROSS UNDER WATER MAINS, THE SEWER SHALL BE LAID AT SUCH AN ELEVATION THAT THE TOP OF THE SEWER IS AT LEAST 18 INCHES BELOW THE BOTTOM OF THE WATER MAIN. WHEN THE ELEVATION OF THE SEWER CANNOT BE VARIED TO MEET THIS REQUIREMENT, THE WATER MAIN SHALL BE RELOCATED TO PROVIDE THIS SEPARATION OR RECONSTRUCTED WITH MECHANICAL JOINT PIPE FOR A DISTANCE OF 10 FEET ON EACH SIDE OF THE SEWER. ONE FULL LENGTH OF WATER MAIN SHOULD BE CENTERED OVER THE SEWER SO THAT BOTH JOINTS WILL BE AS FAR FROM THE SEWER AS POSSIBLE.
4. WHEN IT IS IMPOSSIBLE TO OBTAIN PROPER HORIZONTAL AND VERTICAL SEPARATION AS STIPULATED ABOVE, BOTH THE WATER MAIN AND SEWER SHALL BE CONSTRUCTED OF MECHANICAL JOINT CAST IRON PIPE AND SHALL BE PRESSURE TESTED TO ASSURE WATERTIGHTNESS.

SPECIFICATIONS

1. ALL WATER MAIN PIPE SHALL BE MANUFACTURED IN ACCORDANCE WITH A WW A C 151. PIPE SHALL BE DUCTILE IRON, THICKNESS CLASS 52. THE INSIDE OF THE PIPE SHALL BE GIVEN A CEMENT LINING AND ASPHALTIC SEAL COAT IN ACCORDANCE WITH A WW A C 104.
2. ALL INSTALLED WATER PIPE SHALL HAVE FIVE FEET OF COVER MEASURED AT FINAL GRADE.
3. GENERALLY, NO PIPE SMALLER THAN EIGHT INCHES IN INTERNAL DIAMETER SHALL BE UTILIZED FOR WATER MAINS CONNECTED TO A HYDRANT.
4. ALL FITTINGS SHALL BE MECHANICAL JOINT, CONFORM TO THE REQUIREMENTS OF A WW A CL 10 OR C153, AND BE CAPABLE OF WITHSTANDING 250 PSI. "MEG-A-LUG" SERIEES 100 OR APPROVED EQUAL.
5. TAPPING SLEEVES SHALL HAVE STAINLESS STEEL WRAP TEES.
6. ALL VALVES AND FITTINGS SHALL BE BRACED AGAINST MOVEMENT UTILIZING APPROVED JOINT RESTRAINT SYSTEMS (I.E. MEGALUG® FITTINGS SERIES 1100 OR APPROVED EQUAL).
7. WATER VALVES SHALL BE RESILIENT WEDGE TYPE GATE VALVES MANUFACTURED TO AWWA C509 STANDARDS. VALVES SHALL OPEN RIGHT (CLOCKWISE). ALL VALVES THAT ARE 16 INCHES IN SIZE OR GREATER, SHALL BE BUTTERFLY VALVES. BUTTERFLY VALVES SHALL BE IN ACCORDANCE WITH "RUBBER SEATED BUTTERFLY VALVES", AWWA DESIGNATION C504. ALL GATE VALVES AND BUTTERFLY VALVES SHALL BE MANUFACTURED BY MUELLER CO.
8. GATE BOXES SHALL BE SET PLUMB AND FLUSH WITH THE GROUND SURFACE AND CONFORM TO A WWA C500. GATE VALVE BOXES SHALL BE EQUIPPED WITH PAVEMENT FLANGE.
9. NO PIPE OR FITTING SHALL BE BACKFILLED BEFORE INSPECTION BY A PERSON DESIGNATED BY THE WATER DEPARTMENT.
10. HYDRANTS SHALL CONFORM TO THE REQUIREMENTS OF AWWA C502. HYDRANTS SHALL BE SET PLUMB, WITH THE STEAMER NOZZLE FACING THE ROAD. THE AREA AROUND THE DRIPS SHALL BE FILLED WITH CLEAN STONE. APPROVED JOINT RESTRAINT FITTINGS SHALL BE UTILIZED FOR HYDRANT INSTALLATION. HYDRANTS SHALL BE PLACED SO THAT THEY ARE WITHIN ONE FOOT OF THE PROPERTY LINE AND SHALL BE THE 5 ¼ CENTURION MODEL AS MANUFACTURED BY MUELLER COMPANY.
11. THE COMPLETED WATER MAIN SHALL BE CHLORINATED BY USING ONE PART SOLUTION OF AVAILABLE CHLORINE IN SUCH VOLUME THAT THE RATE OF DOSAGE OF THE WATER CONTENT OF THE MAIN SHALL BE AT LEAST FIFTY PARTS PER MILLION AVAILABLE CHLORINE. THE CONTACT PERIOD SHALL BE AT LEAST TWENTY-FOUR HOURS, LONGER IF THE TEST FOR RESIDUAL CHLORINE INDICATES THAT IT IS NECESSARY FOR PROPER DISINFECTION. WATER MAIN DISINFECTION SHALL BE IN ACCORDANCE WITH AN APPROVED A WW A METHOD FOR DISINFECTING WATER MAINS. THE DEPARTMENT WILL TAKE BACTERIA SAMPLES AND PERFORM ANALYSIS. THE CUSTOMER SHALL BE RESPONSIBLE FOR FLUSHING AND PRESSURE TESTING NEW WATER MAIN. NO WATER MAIN SHALL BE PLACED INTO SERVICE UNTIL THE DEPARTMENT HAS GIVEN APPROVAL.
12. ALL DAMAGES OF WHATEVER NATURE RESULTING FROM THE WORK OR RESULTING TO THE WORK, FROM WHATEVER CAUSE SHALL BE BORNE AND SUSTAINED BY THE CONTRACTOR.
13. DAMAGE TO ANY EXISTING UNDERGROUND STRUCTURE SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
14. PRESSURE TESTS OF THE NEW WATER MAIN SHALL BE CARRIED OUT AT 150 POUNDS GAUGE FOR ONE HOUR. LEAKAGE TESTS SHALL BE PERFORMED IF THE PRESSURE DROPS AFTER THE ONE HOUR TIME PERIOD. THE RATE OF LEAKAGE SHALL NOT EXCEED ONE GALLON PER DAY PER LINEAR FOOT OF JOINT.
15. THE CONTRACTOR SHALL GUARANTEE ALL MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE YEAR AFTER THE COMPLETION OF STRENGTH AND LEAKAGE TESTS.
16. IN THE CASE WHERE THE TOWN OF PEMBROKE SUPPLIES WATER TO INDIVIDUAL HOUSES IN A DEVELOPMENT AND AFTER ALL THE FOREGOING CONDITIONS HAVE BEEN MET, AND BEFORE THE TOWN ACCEPTS THE ROAD OR ROADS AND/OR UTILITIES, THE OWNER OF THE DEVELOPMENT SHALL PAY, AT COST, FOR– ANY REPAIRS TO THE MAINS AND APPURTENANCES WHICH MAY BECOME NECESSARY.
17. THE WATER MAIN SHOULD HAVE A MINIMUM OF 18" OF CLEARANCE BETWEEN ANY UTILITIES WHETHER RUNNING PARALLEL OR CROSSING A UTILITY.
18. THE WATER MAIN, FITTINGS AND HYDRANTS LATERALS SHALL BE POLYETHYLENE ENCASED WITH V-BIO IN ANY INSTANCE THE WATER SYSTEM APPURTENANCES MAY BE INSTALLED WITHIN THE SEASONAL HIGH GROUND WATER.

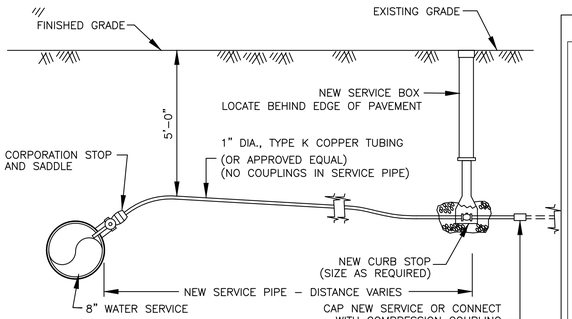


THRUST BLOCK REQUIREMENTS	
FITTING	MIN BEARING AREA (SF)
8"X 1/8 BEND	12
12"X 8" TEE	12
10"X 8" TEE	10
8"X 8" TEE	9
8"X 6" TEE	5
8" CAP / PLUG	12
12"X 8" REDUCER	8
10"X 8" REDUCER	6
8" X 6" REDUCER	4
8" 22 1/2"' & 45° BENDS	8
ALL TEES AND VALVES	10
HYDRANTS	9

ANCHORAGE DETAILS

(NOT TO SCALE)

DTHRUST

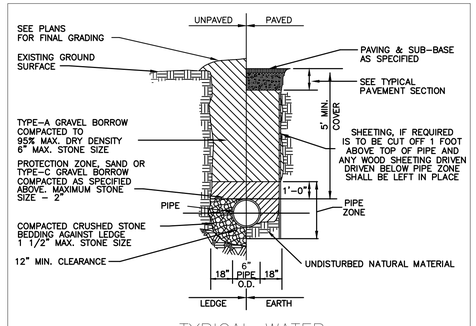


1. SERVICES SHALL CONSIST OF COPPER TUBING, A CORPORATION COCK AT THE MAIN, A CURB STOP AND CURB BOX AT THE PROPERTY LINE AND AN INSIDE VALVE AND METER ON THE OWNERS PREMISES.
2. ALL SERVICE PIPE SHALL BE OF TYPE "K" COPPER TUBING, THE SIZE TO BE DETERMINED BY THE DEPARTMENT.
3. SERVICE PIPE SHALL BE PLACED FIVE FEET BELOW FINAL GRADE.
4. SERVICE BOXES SHALL BE CENTERED OVER THE CURB STOP AND SET FLUSH WITH THE GROUND SURFACE.
5. CONNECTIONS TO WATER MAINS SHALL BE DONE BY THE DEPARTMENT. A SERVICE CHARGE WILL BE LEVIED FOR THIS SERVICE.
6. NO PIPE OR FITTING SHALL BE BACKFILLED BEFORE INSPECTION BY A PERSON DESIGNATED BY THE DEPARTMENT.
7. ALL DAMAGE OF WHATEVER NATURE RESULTING FROM THE WORK, OR RESULTING TO THE WORK FROM WHATEVER CAUSE SHALL BE BORNE AND SUSTAINED BY THE CONTRACTOR.
8. DAMAGES TO ANY EXISTING UNDERGROUND STRUCTURE SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
9. NO WATER SERVICE SHALL BE INSTALLED NEARER THAN 10 FEET TO ANY SEPTIC TANK, CESSPOOL, LEACHING FIELD DRAINAGE PIT, SEWER LINE OR DRAIN LINE AS PER DEP 310 CMR, SECTION 15.211.
10. THE CONTRACTOR WILL HAVE AN APPROVED STREET OPENING PERMIT FROM THE PEMBROKE DEPARTMENT OF PUBLIC WORKS (THE DEPARTMENT) PRIOR TO THE START OF ANY WORK PERFORMED IN A PUBLIC WAY.
11. A SERVICE LINE INSTALLED BY A PRIVATE CONTRACTOR IN A PUBLIC WAY MUST BE GUARANTEED FOR ONE YEAR FROM THE DATE OF COMPLETION. THE CONTRACTOR SHALL REPAIR ANY SETTLEMENT OF THE TRENCH PAVEMENT BY A METHOD APPROVED BY THE DEPARTMENT AND AT HIS OWN EXPENSE FOR THE SAME ONE-YEAR PERIOD STARTING FROM THE DATE OF COMPLETION.

1"ø DOMESTIC WATER SERVICE DETAIL

HYDRANT DETAIL

(NOT TO SCALE)

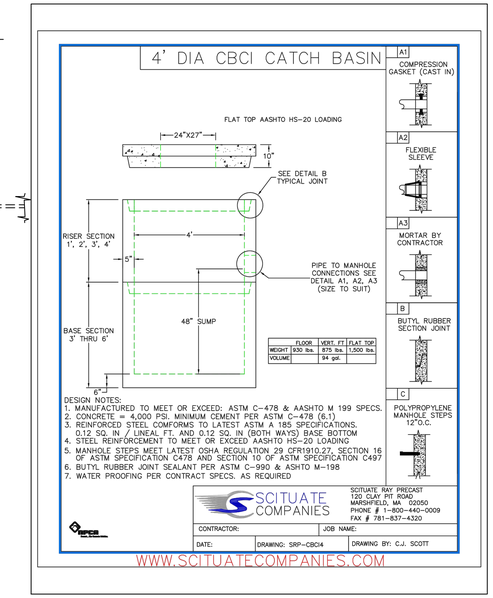


TYPICAL WATER TRENCH DETAIL

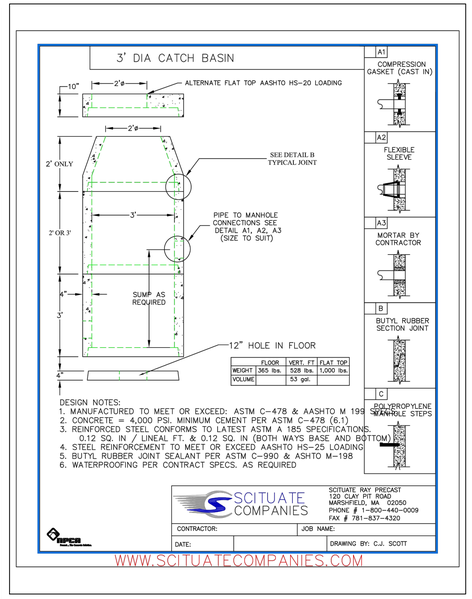
NOT TO SCALE

1. GRAVEL BORROW SHALL CONFORM TO MASS HIGHWAY SPECIFICATION M1.03.0
2. CRUSHED STONE BEDDING SHALL CONFORM TO MASS HIGHWAY SPECIFICATION M2.01.1

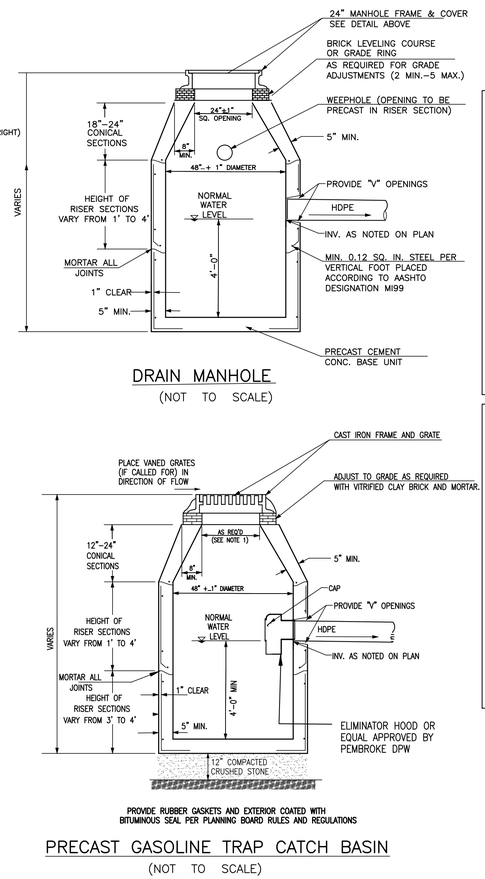
DWTRCH



SHALLOW CATCH BASIN DETAIL



MANHOLE FOR ROOF DRAIN SYSTEM



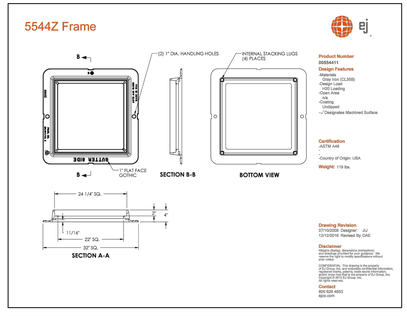
DRAIN MANHOLE

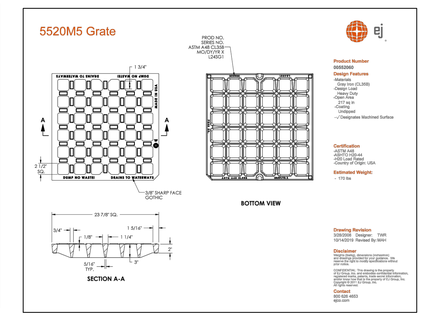
(NOT TO SCALE)

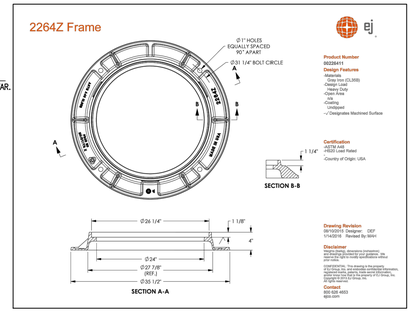
PROVIDE RUBBER GASKETS AND EXTERIOR COATED WITH BITUMINOUS SEAL PER PLANNING BOARD RULES AND REGULATIONS

PRECAST GASOLINE TRAP CATCH BASIN

(NOT TO SCALE)







MANHOLE GRATES AND COVERS

(NOT TO SCALE)

FOR REGISTRY USE ONLY

I HEREBY CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN CONFORMANCE WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.

TIMOTHY R. BENNETT P.L.S. #36856 DATE

COMMONWEALTH OF MASSACHUSETTS
KEVIN S. GRADY
CIVIL
No. 46264
REGISTERED
PROFESSIONAL ENGINEER

REVISIONS	
APRIL 24, 2023	BOARD OF HEALTH PEER REVIEW
MAY 10, 2023	PLANNING BOARD PEER REVIEW
JUNE 21, 2023	PLANNING BOARD PEER REVIEW

SITE PLAN

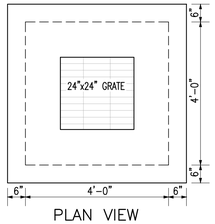
ASSESSORS MAP F9 LOT 11 & 12C
#0 &74 CONGRESS STREET
PEMBROKE, MASSACHUSETTS

PREPARED FOR:
WHATBARN, LLC
29 DUCK HILL ROAD
DUXBURY MA 02332

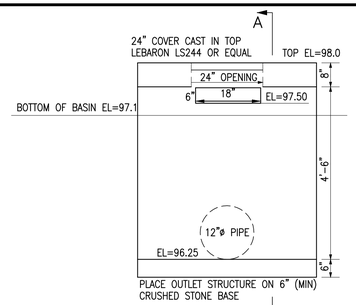
MARCH 13, 2023
SCALE: AS NOTED
JOB No. 22-286

GRADY CONSULTING, L.L.C.
Civil Engineers, Land Surveyors & Landscape Architects
71 Evergreen Street, Suite 1, Kingston, MA 02364
Phone (781) 585-2300

DETAILS – WATER & DRAIN



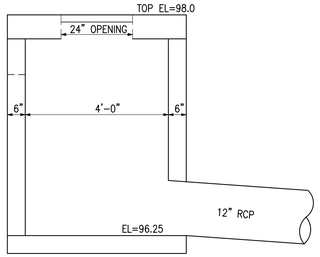
PLAN VIEW



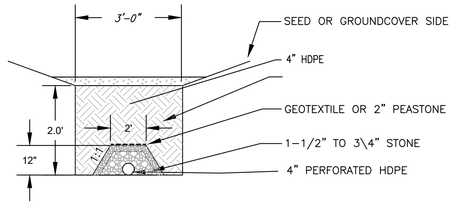
*OVERALL STRUCTURE HEIGHT MAY BE ADJUSTED BY THE MANUFACTURER

INFILTRATION BASIN #2
OUTLET CONTROL STRUCTURE

(NOT TO SCALE)



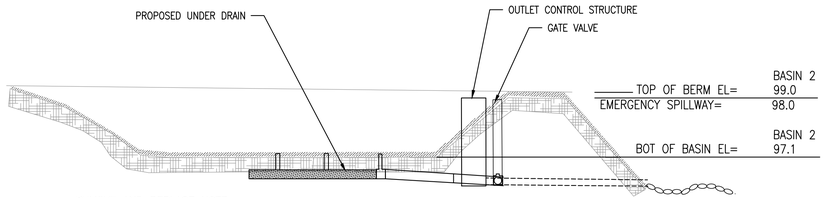
SECTION A–A



	BASIN 2
100 YR STORM EL =	97.96
25 YR STORM EL =	97.83
10 YR STORM EL =	97.76
2 YR STORM EL =	97.62

UNDER DRAIN CROSS SECTION DETAIL

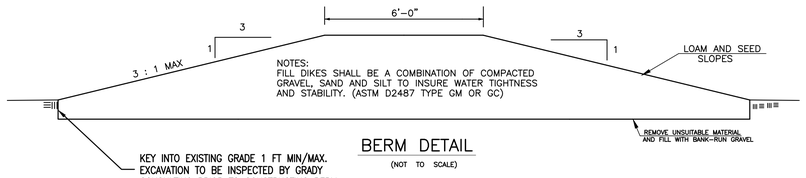
(NOT TO SCALE)



REMOVE AND REPLACE NOTE:
EXCAVATE ALL MATERIAL (FILL) TO MEDIUM LOAMY SAND LAYER. REPLACE PROPOSED INFILTRATION AREA WITH WITH CLEAN COARSE SAND. PLACE 6" BENTONITE LAYER AT THE PROPOSED FINISH GRADE IN NON–INFILTRATING AREAS (SEE PLAN SH 6). BENTOINITE AREAS TO BE FINE GRADED WITH 3–4" OF LOAM AND SEED. EXCAVATION TO BE INSPECTED BY GRADY CONSULTING PRIOR TO SOIL PLACEMENT.
CLEAN COURSE VOLUME ESTIMATE = 97.0–91.7 X 700 SF = 165± CY INFILTRATION BASIN #2

INFILTRATION BASIN DETAIL

(NOT TO SCALE)



BERM DETAIL

(NOT TO SCALE)

KEVIN S. GRADY CIVIL No. 46264 REGISTERED PROFESSIONAL ENGINEER
COMMONWEALTH OF MASSACHUSETTS

0-74 Congress St *NRCC 24-hr C 100-Year Rainfall=8.68"*
Prepared by Grady Consulting LLC
HydroCAD® 10.20-2g s/n 09955 © 2022 HydroCAD Software Solutions LLC

Pond 1P: Subsurface #1 - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 11 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

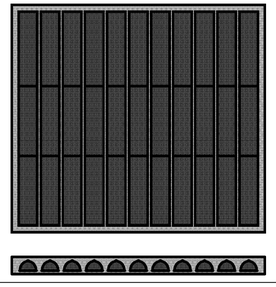
3 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 31.50' Row Length +12.0" End Stone x 2 = 33.50' Base Length
11 Rows x 33.0" Wide + 6.0" Spacing x 10 + 12.0" Side Stone x 2 = 37.25' Base Width
6.0" Stone Base + 18.5" Chamber Height + 6.0" Stone Cover = 2.54' Field Height

33 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 11 Rows = 917.9 cf Chamber Storage

3,171.7 cf Field - 917.9 cf Chambers = 2,253.8 cf Stone x 40.0% Voids = 901.5 cf Stone Storage

Chamber Storage + Stone Storage = 1,819.4 cf = 0.042 af
Overall Storage Efficiency = 57.4%
Overall System Size = 33.50' x 37.25' x 2.54'

33 Chambers
117.5 cy Field
83.5 cy Stone



0-74 Congress St-Chamber Alternative *NRCC 24-hr C 100-Year Rainfall=8.68"*
Prepared by Grady Consulting LLC
HydroCAD® 10.20-2g s/n 09955 © 2022 HydroCAD Software Solutions LLC

Pond SS2: Subsurface #2 - Chamber Wizard Field A

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 8 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

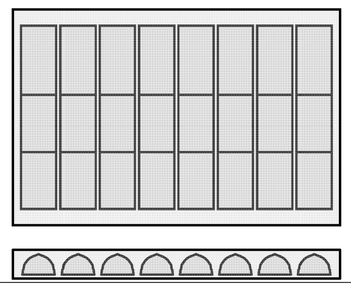
3 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 22.50' Row Length +24.0" End Stone x 2 = 26.50' Base Length
8 Rows x 52.0" Wide + 6.0" Spacing x 7 + 12.0" Side Stone x 2 = 40.17' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

24 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 8 Rows = 1,341.2 cf Chamber Storage

3,769.8 cf Field - 1,341.2 cf Chambers = 2,428.6 cf Stone x 40.0% Voids = 971.5 cf Stone Storage

Chamber Storage + Stone Storage = 2,312.6 cf = 0.053 af
Overall Storage Efficiency = 61.3%
Overall System Size = 26.50' x 40.17' x 3.54'

24 Chambers
139.6 cy Field
89.9 cy Stone



0-74 Congress St-Chamber Alternative *NRCC 24-hr C 100-Year Rainfall=8.68"*
Prepared by Grady Consulting LLC
HydroCAD® 10.20-2g s/n 09955 © 2022 HydroCAD Software Solutions LLC

Pond SS2: Subsurface #2 - Chamber Wizard Field B

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 3 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

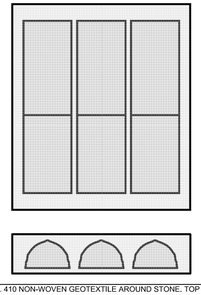
2 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 15.50' Row Length +18.0" End Stone x 2 = 18.50' Base Length
3 Rows x 52.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 16.00' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

6 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 3 Rows = 346.5 cf Chamber Storage

1,048.3 cf Field - 346.5 cf Chambers = 701.9 cf Stone x 40.0% Voids = 280.7 cf Stone Storage

Chamber Storage + Stone Storage = 627.2 cf = 0.014 af
Overall Storage Efficiency = 59.8%
Overall System Size = 18.50' x 16.00' x 3.54'

6 Chambers
38.8 cy Field
26.0 cy Stone



0-74 Congress St-Chamber Alternative *NRCC 24-hr C 100-Year Rainfall=8.68"*
Prepared by Grady Consulting LLC
HydroCAD® 10.20-2g s/n 09955 © 2022 HydroCAD Software Solutions LLC

Pond SS2: Subsurface #2 - Chamber Wizard Field C

Chamber Model = Cultec R-330XLHD (Cultec Recharger® 330XLHD)
Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf
Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
Row Length Adjustment= +1.50' x 7.45 sf x 3 rows

52.0" Wide + 6.0" Spacing = 58.0" C-C Row Spacing

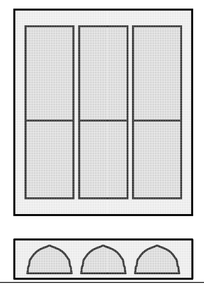
2 Chambers/Row x 7.00' Long +1.50' Row Adjustment = 15.50' Row Length +18.0" End Stone x 2 = 18.50' Base Length
3 Rows x 52.0" Wide + 6.0" Spacing x 2 + 12.0" Side Stone x 2 = 16.00' Base Width
6.0" Stone Base + 30.5" Chamber Height + 6.0" Stone Cover = 3.54' Field Height

6 Chambers x 52.2 cf +1.50' Row Adjustment x 7.45 sf x 3 Rows = 346.5 cf Chamber Storage

1,048.3 cf Field - 346.5 cf Chambers = 701.9 cf Stone x 40.0% Voids = 280.7 cf Stone Storage

Chamber Storage + Stone Storage = 627.2 cf = 0.014 af
Overall Storage Efficiency = 59.8%
Overall System Size = 18.50' x 16.00' x 3.54'

6 Chambers
38.8 cy Field
26.0 cy Stone



0-74 Congress St-Chamber Alternative *NRCC 24-hr C 100-Year Rainfall=8.68"*
Prepared by Grady Consulting LLC
HydroCAD® 10.20-2g s/n 09955 © 2022 HydroCAD Software Solutions LLC

Pond SS3: Subsurface #3 - Chamber Wizard Field A

Chamber Model = Cultec R-150XLHD (Cultec Recharger® 150XLHD)
Effective Size= 29.8"W x 18.0"H => 2.65 sf x 10.25'L = 27.2 cf
Overall Size= 33.0"W x 18.5"H x 11.00'L with 0.75' Overlap
Row Length Adjustment= +0.75' x 2.65 sf x 9 rows

33.0" Wide + 6.0" Spacing = 39.0" C-C Row Spacing

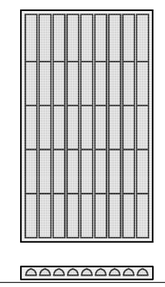
5 Chambers/Row x 10.25' Long +0.75' Row Adjustment = 52.00' Row Length +12.0" End Stone x 2 = 54.00' Base Length
9 Rows x 33.0" Wide + 6.0" Spacing x 8 + 12.0" Side Stone x 2 = 30.75' Base Width
12.0" Stone Base + 18.5" Chamber Height + 6.0" Stone Cover = 3.04' Field Height

45 Chambers x 27.2 cf +0.75' Row Adjustment x 2.65 sf x 9 Rows = 1,239.7 cf Chamber Storage

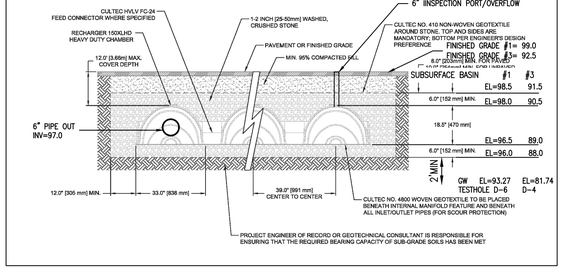
5,050.7 cf Field - 1,239.7 cf Chambers = 3,811.0 cf Stone x 40.0% Voids = 1,524.4 cf Stone Storage

Chamber Storage + Stone Storage = 2,764.1 cf = 0.063 af
Overall Storage Efficiency = 54.7%
Overall System Size = 54.00' x 30.75' x 3.04'

45 Chambers
187.1 cy Field
141.1 cy Stone

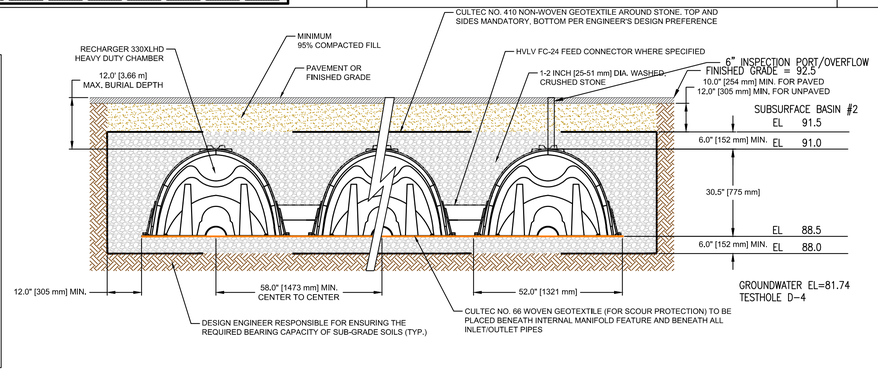


Typical Cross Section for Traffic Application



SUBSURFACE SYSTEM X–SECTION

(NOT TO SCALE)



FOR REGISTRY USE ONLY

I HEREBY CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN CONFORMANCE WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.

TIMOTHY R. BENNETT P.L.S. #36856 DATE

REVISIONS	
APRIL 24, 2023	BOARD OF HEALTH PEER REVIEW
MAY 10, 2023	PLANNING BOARD PEER REVIEW
JUNE 20, 2023	PLANNING BOARD PEER REVIEW

SITE PLAN

ASSESSORS MAP F9 LOT 11 & 12C
#0 &74 CONGRESS STREET
PEMBROKE, MASSACHUSETTS

PREPARED FOR:
WHATBARN, LLC
29 DUCK HILL ROAD
DUXBURY MA 02332

MARCH 13, 2023
SCALE: AS NOTED
JOB No. 22–286

GRADY CONSULTING, L.L.C.
Civil Engineers, Land Surveyors & Landscape Architects
71 Evergreen Street, Suite 1, Kingston, MA 02364
Phone (781) 585–2300

DETAILS – DRAIN

PARCEL F9-23B
'INGTON STREET
MAYNARD, LLC
50322 PAGE 276

PLAN 895 OF 1967

'ESSORS PARCEL F9-38
54 WASHINGTON STREET
F TOWN OF PEMBROKE
D BOOK 7202 PAGE 12

S13°08'57"E 88.05'

60.4'(50'MIN)

55.0'(50'MIN)

S10°58'24"W 328.60'

249.72' S88°13'13"W

BENCHMARK
TOP OF FOUNDATION
EL=93.63
(NAVD 88 DATUM)

PROPOSED SWALE

PROPOSED SILT TRAP
EROSION CONTROL OUTLET (TYP)
(SEE DETAIL SH 17)

6" INSPECTION
PORT/OVERFLOW PIPE
WITH GRATE AT GRADE

+99.1
SUBSURFACE
BASIN #1

PROPOSED SILT TRAP
EROSION CONTROL OUTLET (TYP)
(SEE DETAIL SH 17)

REMOVE AND REPLACE AREA
FOR INFILTRATION 700± SF
(SEE INFILTRATION BASIN DETAIL
SH 19)

INFILTRATION
BASIN #2

OCS-2

TOP OF BERM
ELEV=99.0

450.00'
N88°19'51"E

335.14'±0 D.F

PROPOSED
RETAINING
WALL

PROPOSED SWALE

EMERGENCY UNDERDRAIN
(SEE DETAIL SH 19)

CONGRESS STREET

PUBLIC VARIABLE WIDTH
DECREE 1064 NO LAYOUT

EXISTING 6' CHAINLINK FENCE

EXISTING 6' WOOD FENCE

EXISTING TREELINE

EXISTING STONEWALL

EXISTING GUTTER LINE

WETLAND
UPLAND

DH "HELD"

DH FND

UP 14

UP 14 S

UP 15

SIGN

UNIT 1
T.O.F.=102.0
SLAB EL=101.0

UNIT 2
T.O.F.=100
SLAB EL=99.0

UNIT #3
T.O.F.=98.0
SLAB EL=97.0

UNIT 4
T.O.F.=97.0
SLAB EL=96.5

UNIT 5
T.O.F.=93.63
SLAB EL=92.77

ALT UNIT
T.O.F.=93.63
SLAB EL=92.77

UNIT #7
T.O.F.=97.0
SLAB EL=96.5

UNIT #8
T.O.F.=100.0
SLAB EL=99.5

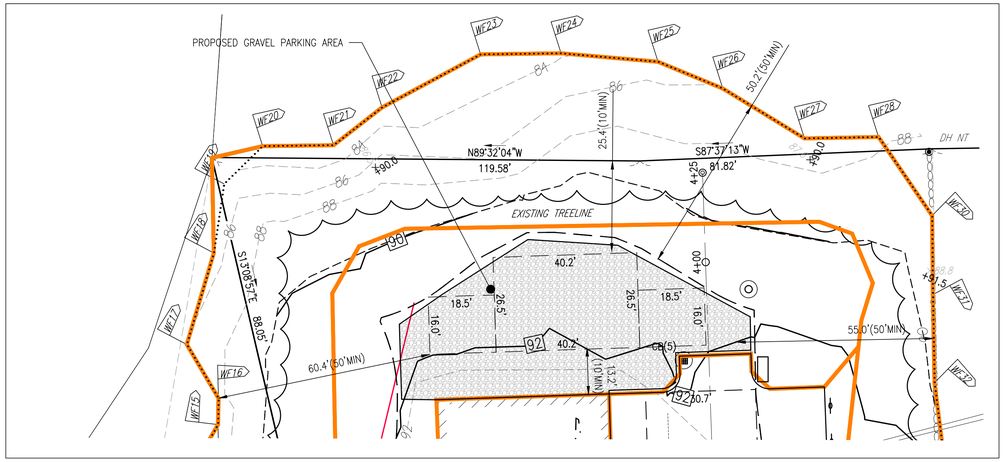
UNIT #9
T.O.F.=100.0
SLAB EL=99.3

UNIT #10
T.O.F.=104.0
SLAB EL=103.5

UNIT #11
T.O.F.=104.0
SLAB EL=103.5

CB(1) CB(2) CB(3) CB(4) CB(5) CB(6) CB(7)

DMH(2)



20 0 20 40 60

Scale 1" = 20'

FOR REGISTRY USE ONLY

I HEREBY CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN CONFORMANCE WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.

TIMOTHY R. BENNETT P.L.S. #36856 DATE

REVISIONS	
APRIL 24, 2023	BOARD OF HEALTH PEER REVIEW
MAY 10, 2023	PLANNING BOARD PEER REVIEW
JUNE 21, 2023	PLANNING BOARD PEER REVIEW

KEVIN S. GRADY CIVIL No. 46264 REGISTERED PROFESSIONAL ENGINEER

SITE PLAN

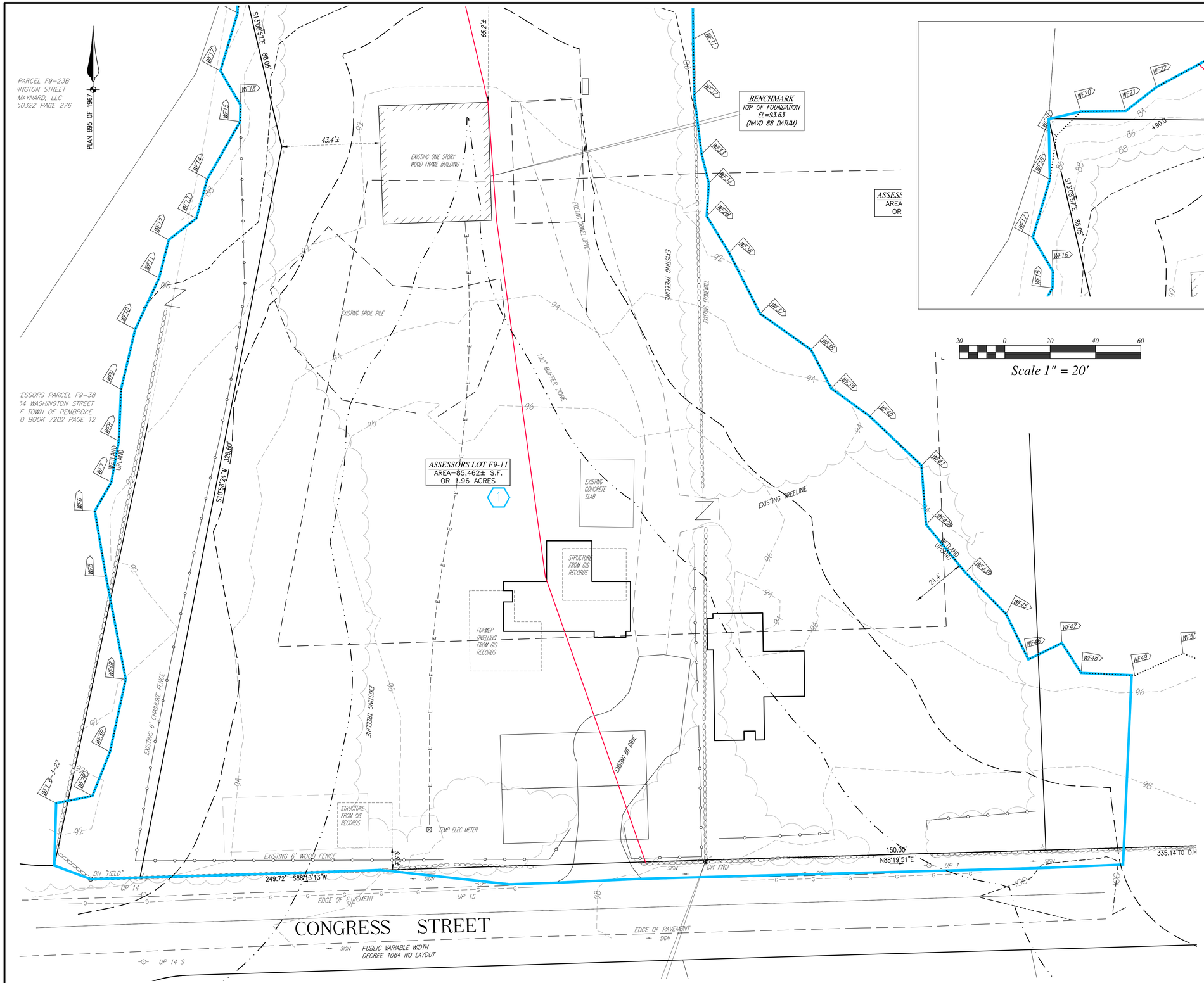
ASSESSORS MAP F9 LOT 11 & 12C
#0 &74 CONGRESS STREET
PEMBROKE, MASSACHUSETTS

PREPARED FOR:
WHATBARN, LLC
29 DUCK HILL ROAD
DUXBURY MA 02332

MARCH 13, 2023
SCALE: AS NOTED
JOB No. 22-286

GRADY CONSULTING, L.L.C.
Civil Engineers, Land Surveyors & Landscape Architects
71 Evergreen Street, Suite 1, Kingston, MA 02364
Phone (781) 585-2300

POST-DEVELOPMENT PLAN



FOR REGISTRY USE ONLY

I HEREBY CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN CONFORMANCE WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.

TIMOTHY R. BENNETT P.L.S. #36856 DATE

REVISIONS	
APRIL 24, 2023	BOARD OF HEALTH PEER REVIEW
MAY 10, 2023	PLANNING BOARD PEER REVIEW
JUNE 21, 2023	PLANNING BOARD PEER REVIEW

COMMONWEALTH OF MASSACHUSETTS
KEVIN S. GRADY
CIVIL
No. 46264
REGISTERED PROFESSIONAL ENGINEER

SITE PLAN

ASSESSORS MAP F9 LOT 11 & 12C
#0 &74 CONGRESS STREET
PEMBROKE, MASSACHUSETTS

PREPARED FOR:
WHATBARN, LLC
29 DUCK HILL ROAD
DUXBURY MA 02332

MARCH 13, 2023
SCALE: AS NOTED
JOB No. 22-286

PRE-DEVELOPMENT PLAN

GRADY CONSULTING, L.L.C.
Civil Engineers, Land Surveyors & Landscape Architects
71 Evergreen Street, Suite 1, Kingston, MA 02364
Phone (781) 585-2300