



F4383

APPROVED DATE:
FRANKLIN PLANNING BOARD

BEING A MAJORITY

LEGAL NOTES

UTILITIES ARE PLOTTED AS A COMPILATION OF RECORD DOCUMENTS, MARKINGS AND OTHER OBSERVED EVIDENCE TO DEVELOP A VIEW OF THE UNDERGROUND UTILITIES AND SHOULD BE CONSIDERED APPROXIMATE. BACKING EXCAVATION, THE EXACT LOCATION OF UNDERGROUND FEATURES CANNOT BE ACCURATELY, COMPLETELY AND RELIABLY DEPICTED. ADDITIONAL UTILITIES, NOT EVIDENCED BY RECORD DOCUMENTS OR OBSERVED PHYSICAL EVIDENCE, MAY EXIST. CONTRACTORS (IN ACCORDANCE WITH MASS.G.L. CHAPTER 82 SECTION 40 AS AMENDED) MUST CONTACT ALL UTILITY COMPANIES BEFORE EXCAVATING AND DRILLING AND CALL DIGSAFE AT 1(888)DIG-SAFE(7233).

CONSTRUCTION ON THIS LAND IS SUBJECT TO ANY EASEMENTS, RIGHTS-OF-WAY, RESTRICTIONS, RESERVATIONS, OR OTHER LIMITATIONS WHICH MAY BE REVEALED BY AN EXAMINATION OF THE TITLE.

OWNER

NORFOLK COUNTY DEVELOPMENT LLC
185 QUINCY SHORE DRIVE, #26
QUINCY, MA 02171

DEED BOOK 33300 PAGE 92
PLAN NO. 40 OF 2014 PLAN BK. 628
A.M. 270 LOT 29.2

APPLICANT

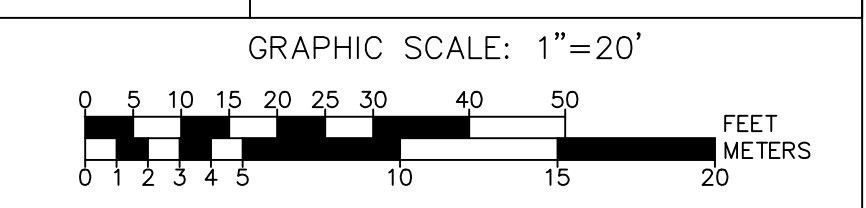
FRANKLIN LEARNING RE LLC.
ATTN: MANOJ GANDHI
206 GREAT ROAD
LITTLETON, MA. 01460

SITE PLAN MODIFICATION
505 WEST CENTRAL STREET
LOT 3
(515 WEST CENTRAL STREET)
FRANKLIN
MASSACHUSETTS

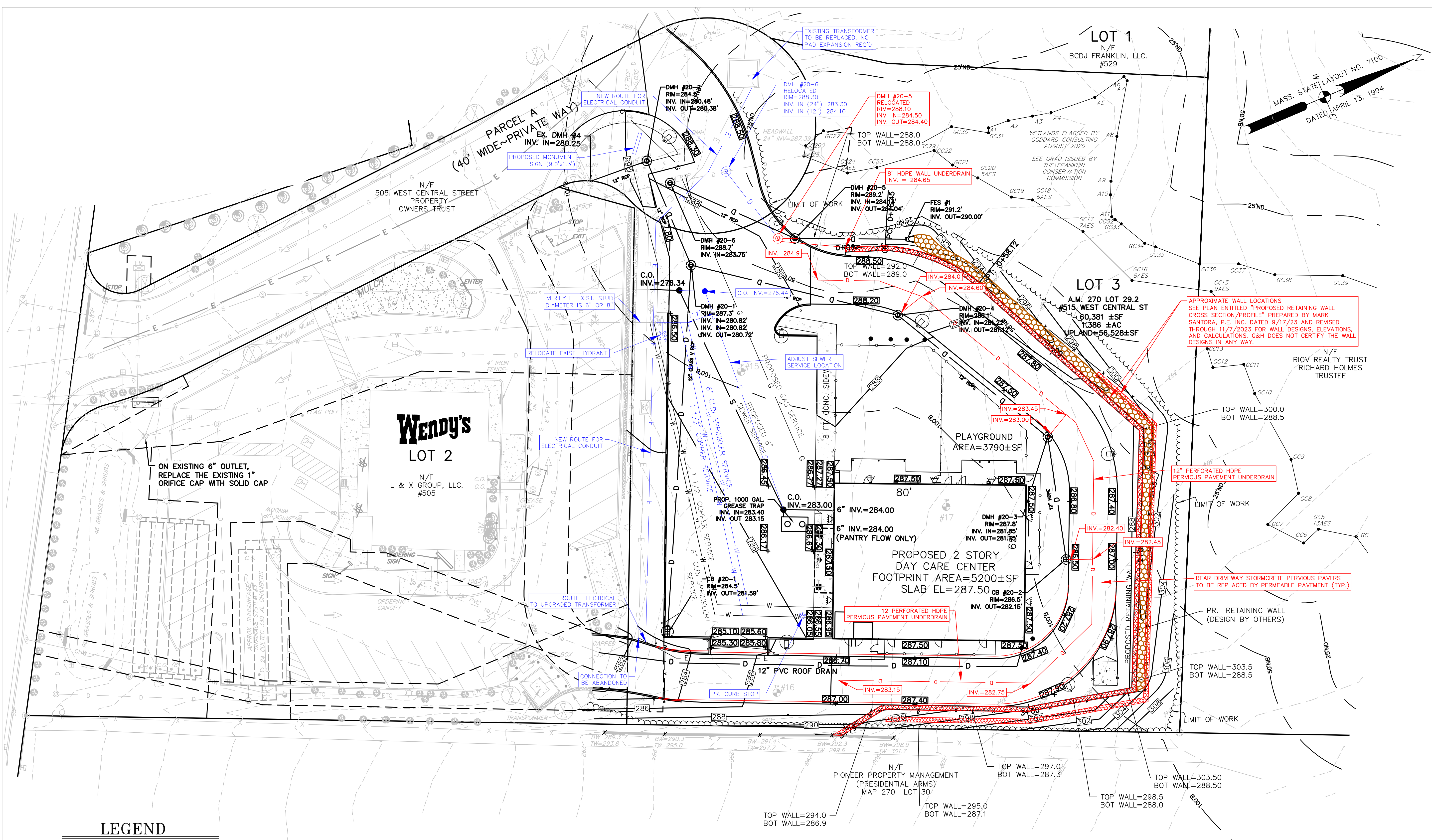
FIELD CHANGE
PLAN

NOVEMBER 22, 2023

DATE	REVISION DESCRIPTION



Guerriere & Halnon, Inc.
ENGINEERING & LAND SURVEYING
55 WEST CENTRAL ST. PH. (508) 528-3221
FRANKLIN, MA 02038 FX. (508) 528-7921
www.gandhengineering.com

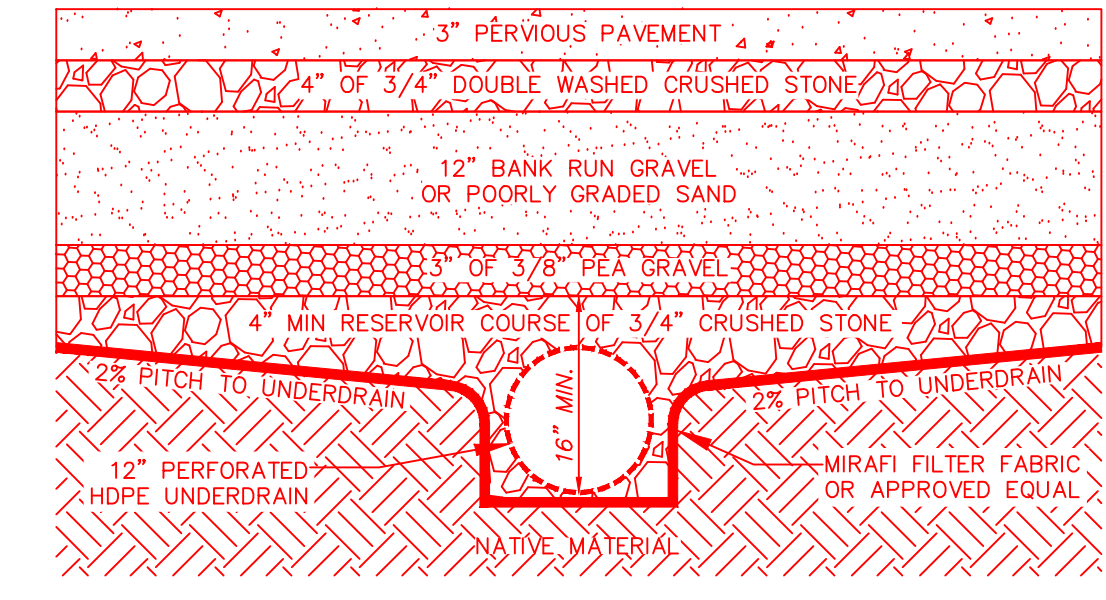


LEGEND

⊞	CATCH BASIN	☆	LIGHT POLE
⊙	DRAIN MANHOLE	⊕	UTILITY POLE
⊙	ELECTRIC MANHOLE	•	GUY WIRE
⊙	SEWER MANHOLE	—	SIGN
○	MANHOLE	•	WETFLAG
⊕	GAS VALVE	⊕	UTILITY POLE
⊕	GAS SHUT OFF VALVE	⊕	PROP. PARKING LIGHTING
⊕	WATER VALVE	⊕	PROP. SECURITY LIGHTING
⊕	WATER SHUT OFF VALVE	X 000.0	SPOT ELEVATION
⊕	FIRE HYDRANT	⊕	RIPRAP
—	EXISTING CONTOUR	—	EXISTING DRAIN LINE
—	EXISTING WATER LINE	—	

PROPOSED FIELD CHANGES

- STORMCRETE PERVIOUS PAVERS TO BE REPLACED BY PERMEABLE PAVEMENT. DUE TO LEDGE AND PERSISTENT HIGH GROUNDWATER BENEATH THE REAR ACCESS ROAD, INSTALLATION OF AN UNDERDRAIN CONNECTED TO THE STORMWATER CHAMBERS IS PROPOSED.
- THE PROPOSED WALL DESIGN IS TO BE A TERRACED DESIGN PREPARED BY MARK SANTORA, P.E. INC. INSTALLATION OF A SUBDRAIN 4" BELOW THE PROPOSED RETAINING WALL IS PROPOSED TO INTERCEPT GROUNDWATER ENTERING THE SITE, AND WILL CONNECT TO DMH #20-5.
- DMH#20-5 AND DMH #20-6 LOCATIONS ADJUSTED TO AVOID CONFLICTS WITH EXISTING AND PROPOSED UTILITIES.
- EXISTING TRANSFORMER AT SITE ENTRANCE TO BE UPGRADED, AND NEW ELECTRICAL SERVICE CONDUIT INSTALLED PARALLEL TO THE EXISTING RUN.
- FIRE AND DOMESTIC SERVICE CONNECTIONS TO BE MODIFIED TO ACCOUNT FOR FIELD CONDITIONS. CONTRACTOR TO VERIFY DIAMETER OF EXISTING STUB. EXISTING HYDRANT TO BE RELOCATED. SEWER SERVICE TO BE ADJUSTED TO MAINTAIN MIN 10" SEPERATION TO WATER SERVICES.
- MONUMENT SIGN PROPOSED AT SITE ENTRANCE.



PERVIOUS PAVEMENT CROSS SECTION
N.T.S.

G:\CDP\Franklin\F4383\DWG\F4383 SITE - field change 9-11-23.dwg, 11/28/2023 4:03:10 PM, [1044]

Factor of Safety Calculations

DESIGN CRITERIA

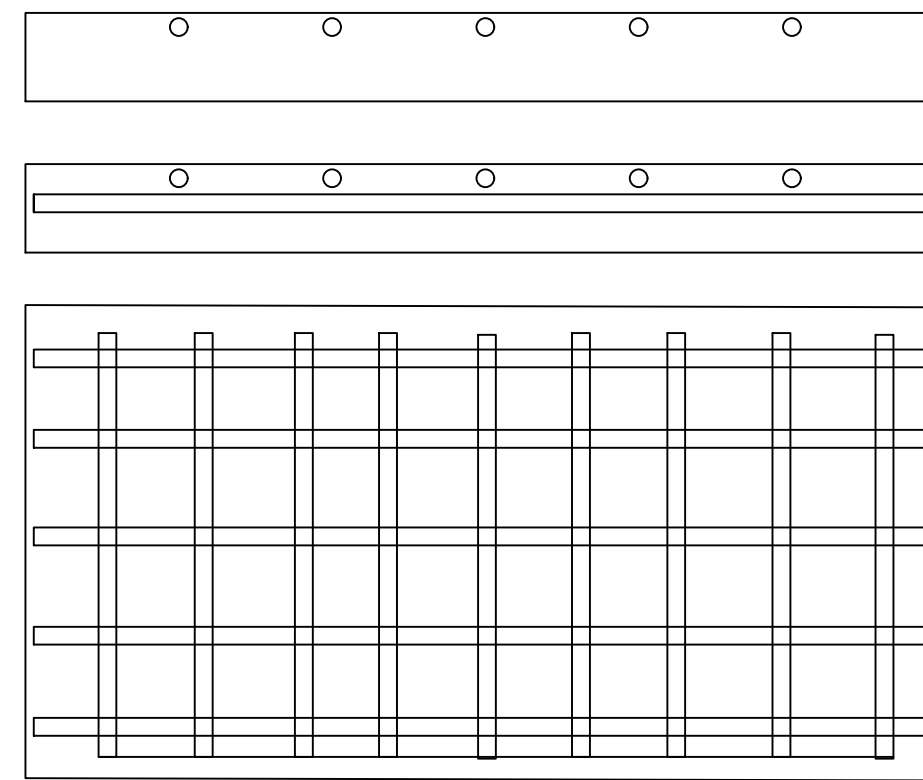
F_v = vertical component of active force
 F_h = horizontal component of active force
 F_a = total active exerted by soil on wall
 F_r = frictional resistance to sliding
 λ = unit weight of soil = 120lb/ft³
 α = angle of repose = 40 d
 H = height of wall = 8 ft max
 K_a = Rankine coefficient = 0.2197
 W_f = weight of block per linear ft = 1616 lb/ft
 Y_r = resultant force location - $H(0.333) = 2.67$

CALCULATIONS FOR SLIDING

Calculate sliding factor of safety
 FS must be > 1.5
 $W_f = 2054$ lb/ft
 4 Block Section- Tallest Wall-8' H
 $F_r = W_f + F_v \tan \alpha$
 $= 2054 + 42.6$
 $= 2097$ lb/ft
 $F_a = 0.5 \lambda KaH = 0.5(120) 0.22 (8)$
 $F_h = F_a \cos \alpha = 80.9$ lb/ft
 $F_v = F_a \sin \alpha = 50.8$ lb/ft
 $F_a = 0.5 \lambda KaH = 105.6$ lb/ft
 Therefore $F.S. = F_r / F_h = 2097 / 80.9 = 25.9 > 1.5$

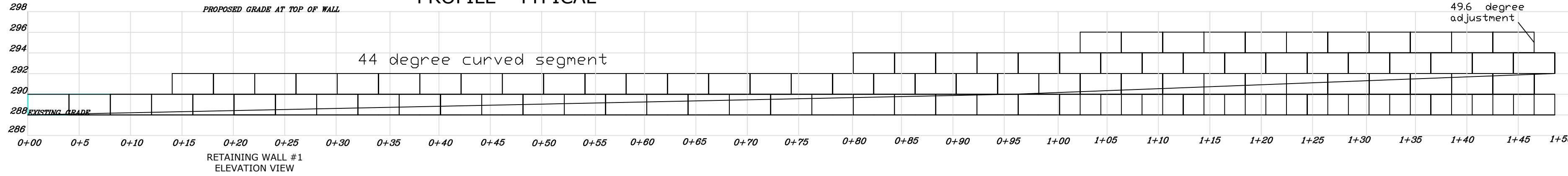
CALCULATIONS FOR OVERTURNING

Calculate factor of safety against Overturning
 FS must be > 2.0
 $W_f = 2054$ lb/ft
 4 Block Section
 $F.S. = M_r / M_o$ where
 M_r = Force Moment resisting Overturning
 M_o = Force Moment driving/causing Overturning
 $M_r = W_f [1 + (0.5)H \tan 90d - B] + F_v [2 + (0.333)H \tan 90d - B]$
 $= 2054 [1 + 0.5(8)(0.017)] + 50.8 [2 + 0.333(8)(0.017)]$
 $= 2194 + 104 = 2298$
 $M_o = F_h Y_r = 80.9 \times 2.67 = 217$
 Therefore $F.S. = M_r / M_o = 2298 / 217 = 10.6 > 2.0$

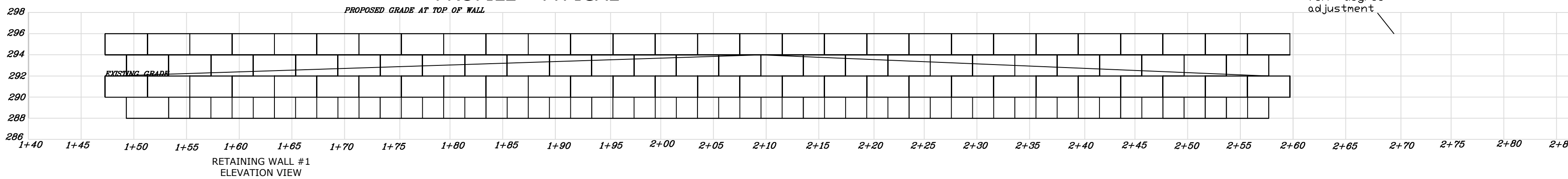


Rebar Reinforced Footing

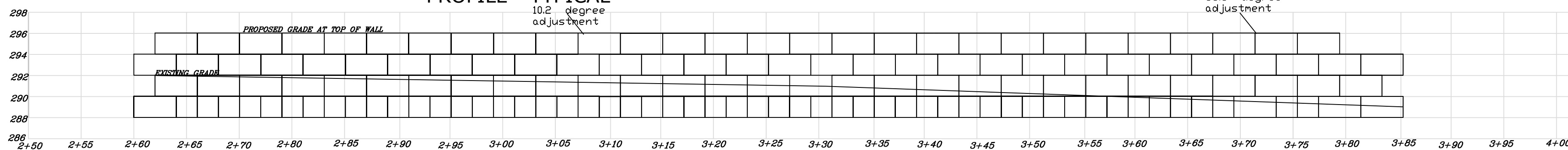
RETAINING WALL PROFILE - TYPICAL



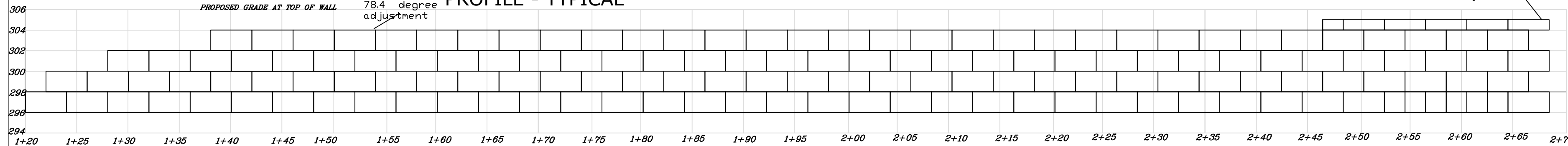
RETAINING WALL PROFILE - TYPICAL



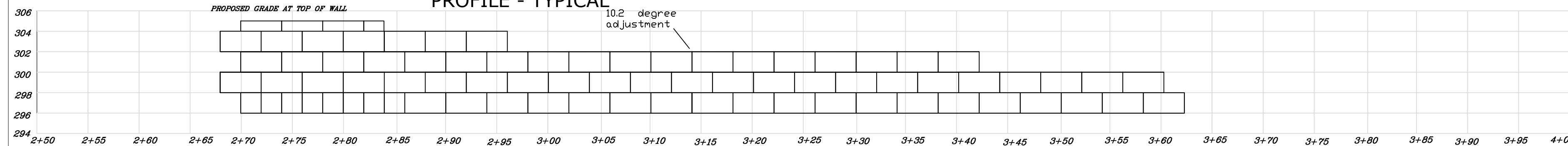
RETAINING WALL PROFILE - TYPICAL



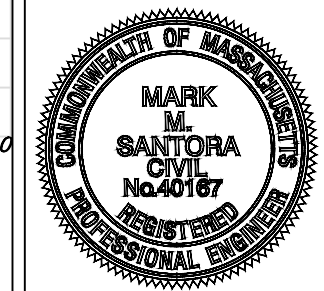
RETAINING UPPER WALL PROFILE - TYPICAL



RETAINING UPPER WALL PROFILE - TYPICAL



11/7/23	WALL DESIGN	MMS
DATE	REVISIONS	APPV'D



APPLICANT:
Bob Baker
 515 West Central Street
 Franklin MA

Owner:

PROJECT TITLE:
Proposed Large Block Retaining Wall System

PLAN TITLE:
Proposed Retaining Wall Cross Section/Profile

DATE: Sep 7, 2023

SCALE: NTS

DRAWN BY: MMS	CHECKED BY: MMS	APPROVED BY: MMS
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MARK SANTORA, P.E. INC.
 Civil & Environmental Engineering
 123 Old Westboro Road
 North Grafton, MA 01536
 Phone (508) 839-5113

SHEET:
2 OF 2



Guerriere & Halnon, Inc.

ENGINEERING & LAND SURVEYING

www.gandhengineering.com

Est. 1972

Milford Office
333 West Street, P. O. Box 235
Milford, MA 01757-0235
(508) 473-6630/Fax (508) 473-8243

Franklin Office
55 West Central Street
Franklin, MA 02038-2101
(508) 528-3221/Fax (508) 528-7921

Whitinsville Office
1029 Providence Road
Whitinsville, MA 01588-2121
(508) 234-6834/Fax (508) 234-6723

F4383

December 12, 2023

Franklin Planning Board
355 East Central Street
Franklin, MA 02038

RE: Request for Field Change
515 West Central Street, Franklin, MA

Dear Members of the Board:

On behalf of our client, Franklin Learning RE LLC, we are formally requesting a field change to allow for the installation of permeable pavement in place of the previously proposed Stormcrete pervious pavers on the north side of the building. Due to the presence of ledge and high groundwater, installation of an underdrain is proposed. The proposed changes are shown in red on the plan and the recently approved field changes addressing utility conflicts and a proposed monument sign are shown in blue.

In addition, the proposed retaining wall has been designed, and its configuration varies slightly from the wall shown on the endorsed site plans, which was shown in a general manner pending full design. The proposed wall is a terraced design as prepared by Mark Santora, P.E. Inc. Installation of a subdrain 4' below the wall is proposed to intercept groundwater entering the site and will connect to DMH #20-5.

Thank you in advance for your consideration and we look forward to meeting with the Board at the next available meeting. Should you have any further questions or require additional information, please contact our office.

Sincerely,
Guerriere & Halnon, Inc.

Amanda Cavaliere

Amanda Cavaliere
Franklin Office Manager

Town of Franklin

355 East Central Street
Franklin, Massachusetts 02038-1352



Phone: (508) 520-4907
www.franklinma.gov

DEPARTMENT OF PLANNING AND COMMUNITY DEVELOPMENT

DATE: December 13, 2023
TO: Franklin Planning Board
FROM: Department of Planning and Community Development
RE: 515 West Central Street
Field Change

The Applicant has requested the following field changes:

1. To allow for the installation of permeable pavement in place of the previously proposed Stormcrete pervious pavers north of the building.
2. Slight changes to the retaining wall – plans are provided.

Date: December 13, 2023 Job No.: 10520.07
To: Ms. Breeka Lí Goodlander
Mr. Gregory Rondeau
Cc: Amy Love, Mike Maglio
From: Matt Crowley
Subject: **515 West Central Field Changes**

BETA has reviewed proposed field change documents for the project located at 515 West Central Street in Franklin, MA and offers the following comments:

- The proposed pervious pavement detail is generally consistent with the Stormwater Handbook. Comments specific to the porous pavement are as follows:
 - The designer should confirm the proposed porous pavement thickness of 3" is suitable to support waste collection vehicle and fire apparatus loads. Porous pavement has a lower load-bearing capacity than conventional pavement.
 - The bottom of the reservoir course should be flat, and it is recommended to raise the subdrain from the reservoir bottom to promote recharge when groundwater levels stabilize or are lower during the dry season.
 - The Operation and Maintenance Plan should be updated to reference the porous pavement and include specific maintenance requirements (e.g. power washing and vacuum sweeping). The approved O&M includes proprietary documentation for the porous concrete that is no longer applicable.
- Subdrains from the porous pavement area will be directed to the existing infiltration basin near the front of Lot 2 (Wendy's). If the proposed modification is approved, the existing basin should be monitored during dry periods to ensure a permanent pool is not created. If the storage volume of the pond is affected, additional calculations or corrective measures may be required to ensure the site remains in compliance with the approved stormwater objectives.
- BETA did not perform a detailed review of all stormwater documentation; however, the updated HydroCAD model input was noted to be consistent with the approved 2021 model, except for the proposed cover type change for the porous pavement area. While the stormwater objectives of the approved project are still anticipated to be met, the designer should ensure summary tables are fully representative of the HydroCAD output and the narrative and calculations are clear and consistent throughout each section.
- A letter dated November 8, 2023, from Mark Santora, PE, (the Engineer of Record (EOR)) has been provided in response to BETA's limited draft retaining wall design comments. The EOR has indicated that comments have been satisfactorily been addressed and BETA defers final structural design and review to the EOR and permit granting authority.
- It is BETA's understanding that the critical path for construction is the proposed retaining wall. The Commission and Board may choose to act on this aspect of the project alone at their discretion.



MARK SANTORA, P.E. INC.

Civil & Environmental Engineering

123 Old Westboro Road
North Grafton, MA 01536
(508) 887-0170

November 8, 2023

Mr. Matthew Crowley PE
Senior Project Manager
BETA Group, Inc.
315 Norwood Park South, 2nd Floor
Norwood, MA 02062

Subject: 515 Central Street, Franklin MA – Retaining Wall Design Comments

In response to your comments in red on the above referenced Retaining Wall Design Plan dated September 26th, 2023, I offer the following:

Phi of 40 degrees is very high for backfill. Typical values are 32 or 34 degrees.

Acknowledged – The Phi value representing the angle of repose is high sand or other loose soil. The original design assumed a glacial till was behind the wall,. After a site visit it was apparent that the material behind the wall is stable rock. As a result we feel that 40degrees is a representative Phi Value.

These tiered walls are close enough that the lower wall needs to be designed for surcharge loading. To avoid surcharge loading, the upper wall needs a setback of twice the height of the lower wall.

Acknowledged – At a site meeting in October with the Design Engineer of Record, Owner, Site Contractor & Large block manufacturer, it was observed that the material behind the proposed walls is predominantly stable bedrock. The wall designs have been modified to show the proposed upper tier to be installed on a shelf of stable bedrock. The site contractor has indicated that he would be able to shape the rock to accommodate the new design concept. As a result the upper walls weight will not surcharge to the lower wall.

The overturning calculation doesn't appear to take into consideration the varying block depths.

Acknowledged – The overturning calculation does not consider the varying block depths however the calculation is conservative in that the lower block turned sideways provides additional stability due to the weight of the backfill soil on the section of the lower block that protrudes to the rear. The calculation assumes only the weight of the blocks as a resisting moment when in fact the soil on top of the lower block adds to the resisting force.

Additionally, pursuant to a suggestion made by the design engineer, we have added a 6' wide footing at the base of the lower wall that will extend the base another 2 feet. The extended base will double the weight of soil backfill increasing the resisting moment further. We also have added proposed geogrid tying the top of the lower wall to the bottom of the upper wall.

As a result the factor of safety against overturning is significantly higher than the calculated factor of safety of 10.6.

Bearing capacity check?

The proposed upper wall is designed to bear on stable bedrock and the lower wall on a concrete footing which bears on stable bedrock. The bearing capacity of stable bedrock varies from 16,000 lbs per square foot to 32,000 lbs per square foot depending on the geology. The wall has no load other than its own weight and the weight of the backfill soil. The backfill soil was existing prior and will only be moved for construction. With no added loading and the high bearing capacity of the stable base, it is intuitively evident that the bearing capacity is sufficient.

These calculations appear to be identical to the calculations on Sheet 1.

Acknowledged –The calculations are the same, the walls have a maximum height of 8ft and the calculations are based on an 8ft wall. Some of the walls are less than 8ft and as such we have not provided analysis for lower heights as the calculations demonstrate adequacy up to the maximum reveal of 8ft. The calculations as provided do not take any credit for the geogrid, or the resisting weight of backfill soil and as such are conservative.

Thank you for your attention to our response to your comments above.

Sincerely



Mark Santora PE # 40167