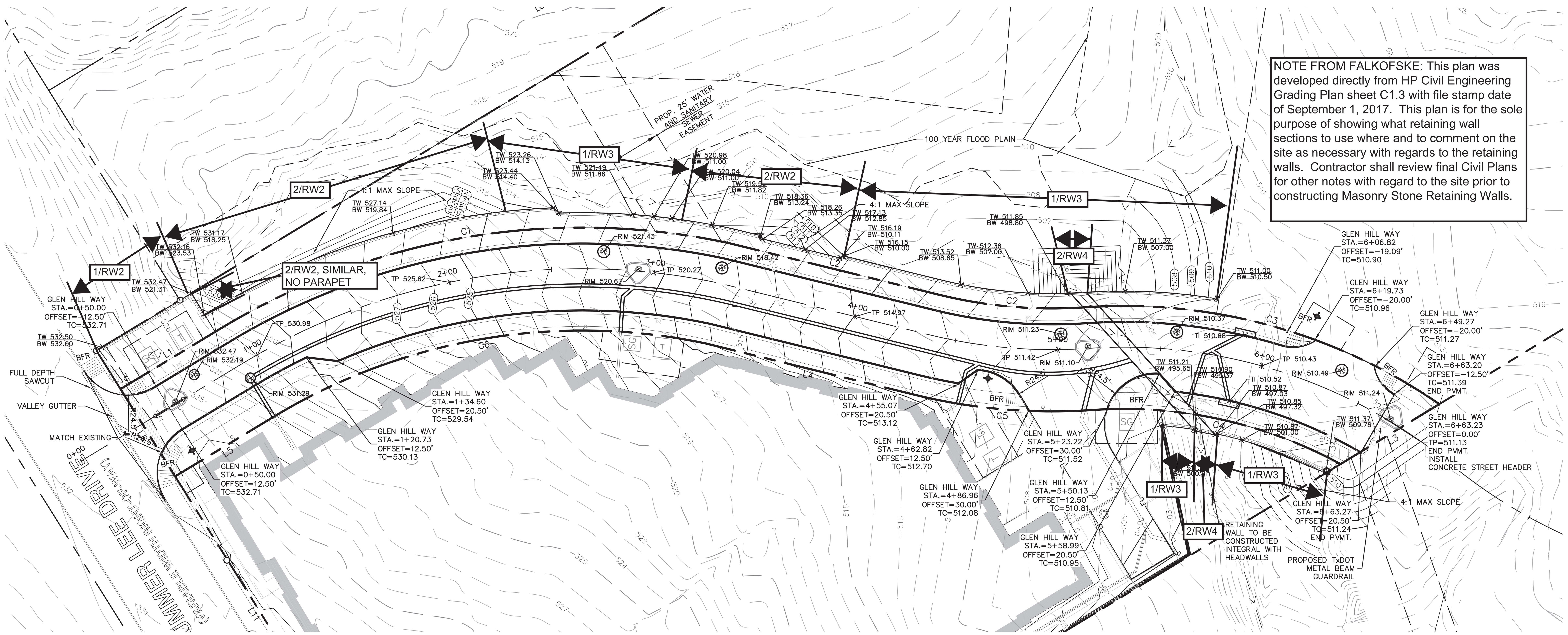

GRAPHIC SCALE

40 0 20 40

(IN FEET)

DATE	BY
DES. 05-19-17	MMR
DRN. 05-19-17	MMR
CHK. 05-19-17	AMB

NO.	DATE	REVISION	BY
2	10-11-17	UPDATED GRADING PLANS	AMB
1	07-17-17	UPDATED GRADING PLANS AND WALL DETAILS	AMB

Falkofske Engineering, Inc.
Structural Engineering Consultants
TX Reg. Engineering Firm F-4038
722 North Fielder Road
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(817) 261-8300

FALKOFSKE ENGINEERING

MASONRY RETAINING WALLS
HARBOR URBAN CENTER
SWC HORIZON ROAD AND SUMMER LEE DRIVE
ROCKWALL, TEXAS

WALLCO RETAINING WALLS, INC.
4800 S.E. LOOP 820
FORT WORTH, TEXAS 76140

STATE OF TEXAS
AARON M. BERKES
107154
LICENSED PROFESSIONAL ENGINEER
5-20-20

RECORD DRAWINGS

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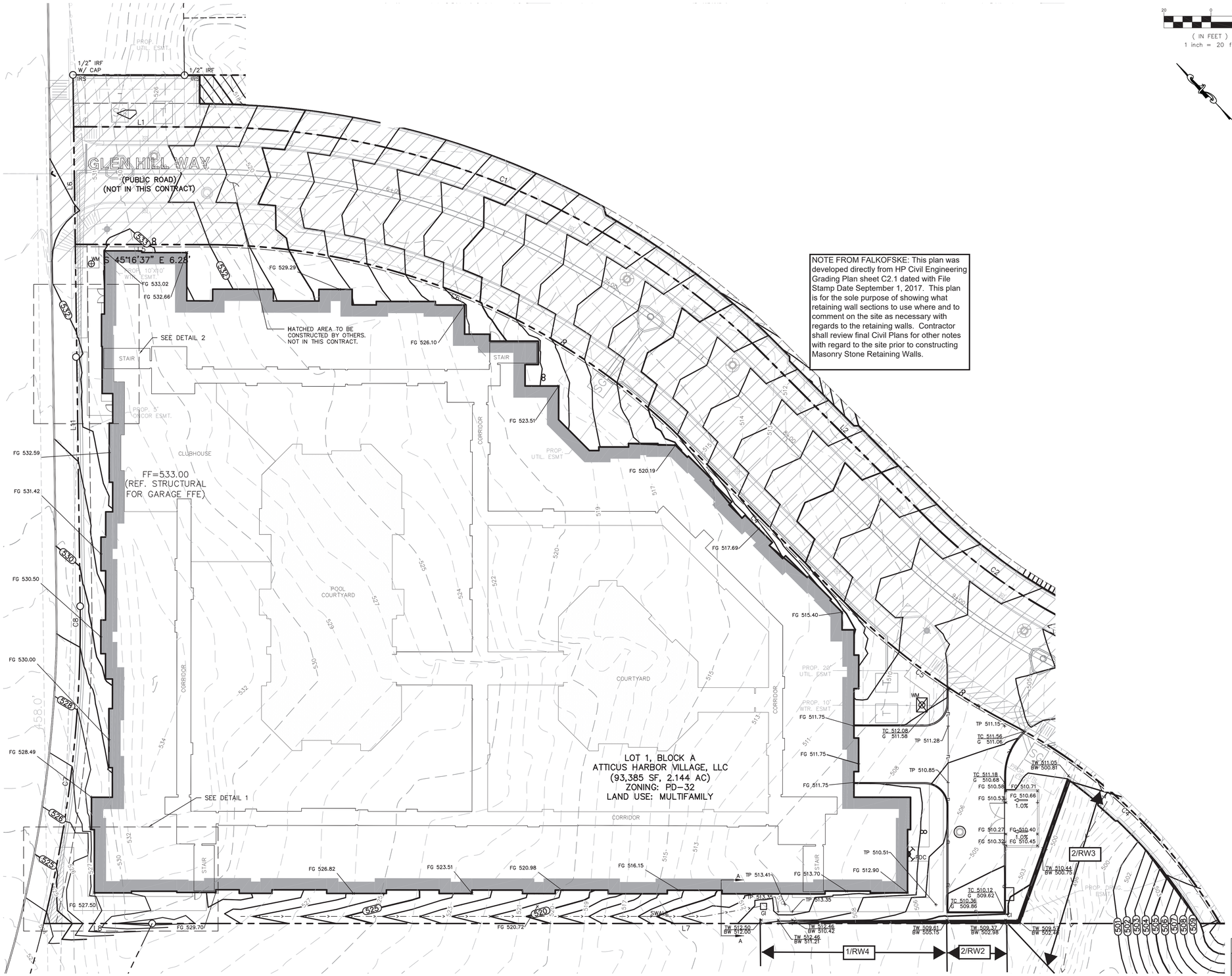
DATE: 05/20/2020 BY: Aaron Berkes, P.E.

JOB NO. 291.17

SP1



NOTE FROM FALKOFSKE: This plan was developed directly from HP Civil Engineering Grading Plan sheet C2.1 dated with File Stamp Date September 1, 2017. This plan is for the sole purpose of showing what retaining wall sections to use where and to comment on the site as necessary with regards to the retaining walls. Contractor shall review final Civil Plans for other notes with regard to the site prior to constructing Masonry Stone Retaining Walls.

20 0 10 20
(IN FEET)
1 inch = 20 ft.

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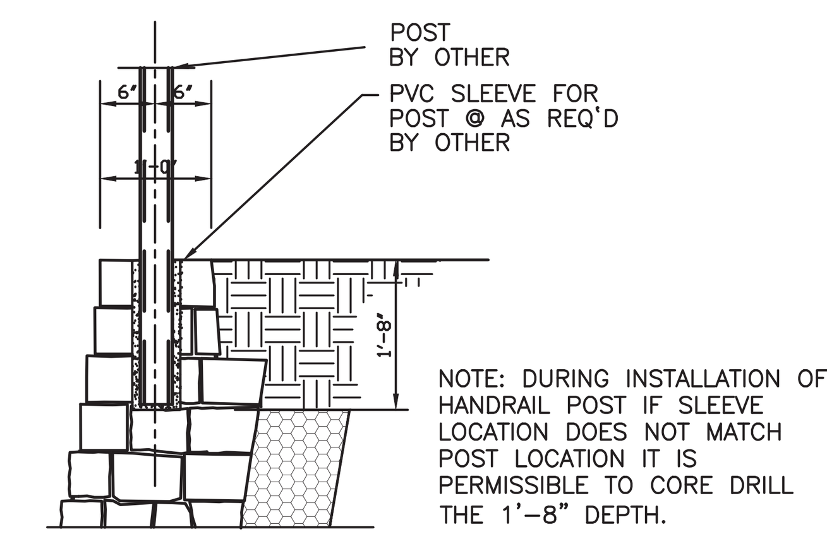
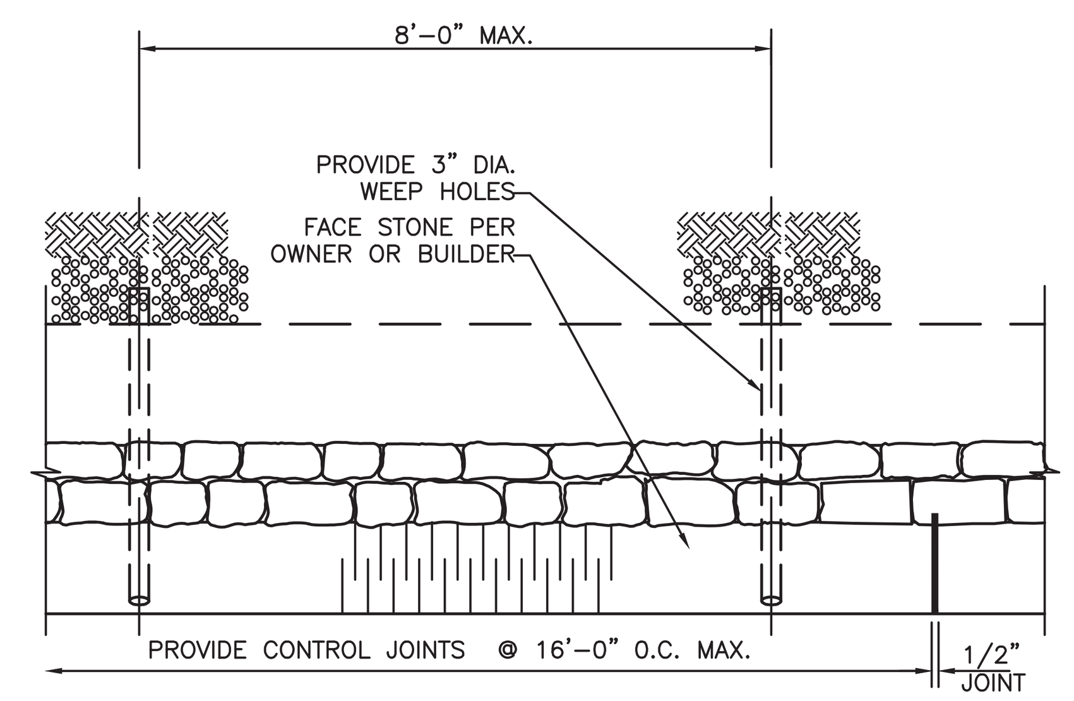
JOB NO. 291.17

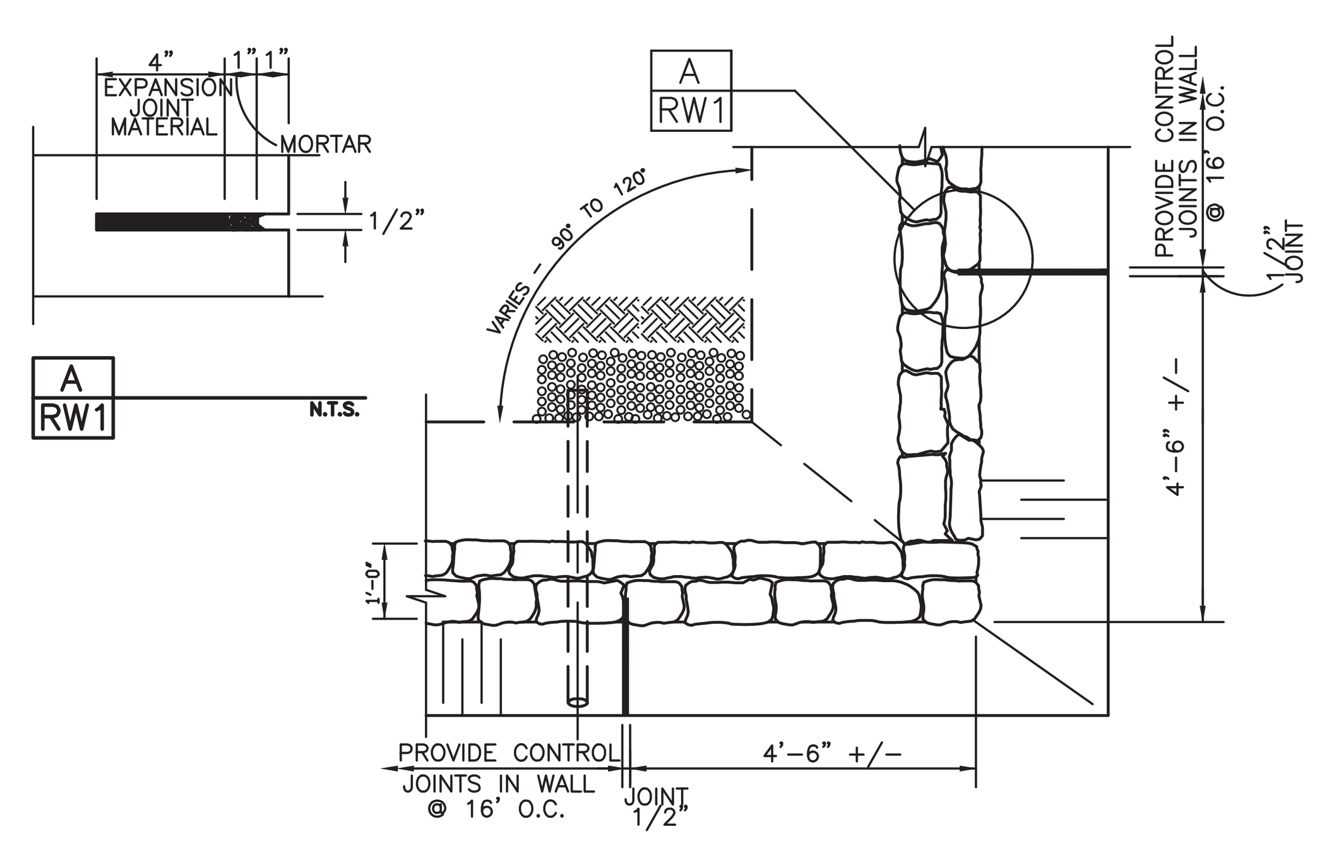
SP2



1 RW1 WALL SECTION W/HANDRAIL POST
CONTRACTOR OPTION N.T.S.



2 RW1 TYPICAL PLAN VIEW AT BASE N.T.S.



3 RW1 TYPICAL PLAN VIEW AT CORNERS N.T.S.

1. Design Building Code

International Building Code, 2009 Edition

2. Geotechnical Report

Firm: ECS Texas, LLP.
Report No. 19:6898 Dated: August 12, 2016
Allowable Bearing Capacity 1500psf, 2500psf

Note:
All of the above noted bearing capacities are anticipated throughout the site. Each wall section has a design for multiple bearing capacity options. It will be field verified which bearing condition to use based on the conditions of the soil at the base of the wall during excavation. If the bearing capacity changes along the length of the retaining wall it is permitted to change bearing capacity designs as needed.

3. Geotechnical Criteria

Bearing on Stiff Natural Undisturbed Clayey Soils or Compacted and Tested Soils

Allowable Bearing = 1500 psf, min.
Friction Angle between Base of Wall and Soil - 17 deg

Backfill Soil Parameters:
Backfill Soil - On Site Soils
Backfill On Site Soil Angle of Internal Friction PHI = 26 deg

Base Soil Parameters:
Soil at Toe - Natural, Undisturbed or Fill Soils
Angle of Internal Friction PHI = 26 deg

Bearing on Remediated Base

Allowable Bearing = 2500 psf, min.
Friction Angle Between Base of Wall and Soil - 28 deg

Backfill Soil Parameters:
Backfill Soil - On Site Soils
Backfill Angle of Internal Friction PHI = 26 deg

Base Soil Parameters:
Soil at Toe - Natural, Undisturbed Soils
Angle of Internal Friction PHI = 26 deg

The use of heavy equipment within 3'-0" of the wall could damage the wall and should be avoided.

Locate base of walls on undisturbed or properly compacted soil.

4. Materials:

Rock for Wall Construction:

Average density of masonry stone wall varies from 135 pcf to 145 pcf. Size of stone within wall varies from 4" to 18". Crushed concrete is acceptable to be used in the wall construction in place of natural stone. Face stone to be coordinated between contractor and owner/developer.

Drainage Zone Materials:

Drainage zone materials may be composed of clean gravel or stone ranging from 1" to 5". Crushed concrete is acceptable provided it is clean and generally free of dust or other deleterious materials. Drainage zone shall be wrapped with filter fabric. Filter fabric shall be Mirafi 140N or approved equal.

Portland Cement Mortar for Retaining Wall Construction.

The portland cement mortar used for construction of the masonry stone retaining walls shall be provided with the following proportions per cubic yard of concrete. The portland cement mortar supplier shall provide "batch tickets" clearly indicating that the appropriate amount of materials are provided in each concrete mixer truck load. The batch tickets shall clearly indicate the amount batched, the date, the project name and shall be provided to Falkofske Engineering, Inc. for review, documentation, and file.

Contents	Amount per cubic yard	
Type 1 Portland cement:	376	lbs
Type F Fly Ash	94	lbs
Fine Aggregate (sand):	3250	lbs
Potable Water	235	lbs
Admixture Eucon 100	48	oz average

Concrete retarders such as "Eucon 100 Retarder" may be used at the discretion of the masonry wall contractor. A greater amount of retarder (about 64 ounces) is typically used during hot periods and a less amount of retarder (about 32 ounces) is typically used during cool weather.

Please note that the above proportions will provide a portland cement mortar with a compressive strength of about f'c = 2500 psi. Falkofske Engineering, Inc. does not require any concrete testing provided the above proportions are verified by way of the "batch tickets".

5. Construction Reviews

Falkofske Engineering, Inc. shall be called for construction review of masonry wall.

6. Retaining Wall Design Constraints

Retaining walls should not have solid fence placed on top of wall other than that shown on these plans.
Retaining walls shall not have additional surcharge placed above wall other than that shown on these plans.
Retaining walls shall not have slope at base or top of wall that exceed that which is shown on these plans.
The retaining walls noted above require special design.

Minor variations in the construction of the retaining walls from these documents may be accepted at the discretion of the design engineer.

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MASONRY RETAINING WALLS – NOTES & STANDARD DETAILS
HARBOR URBAN CENTER
SWC HORIZON ROAD AND SUMMER LEE DRIVE
ROCKWALL, TEXAS

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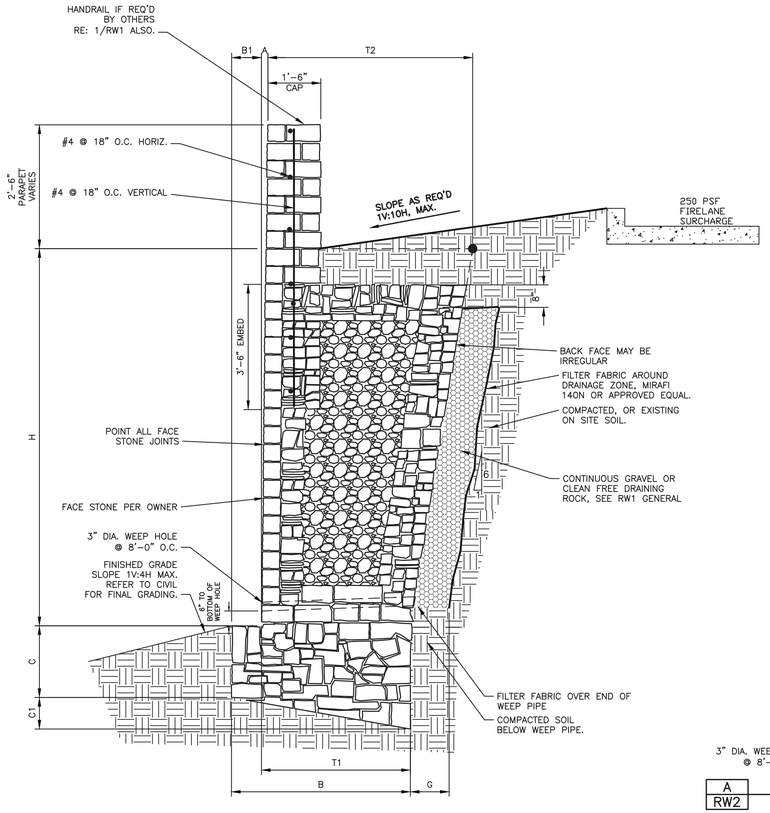
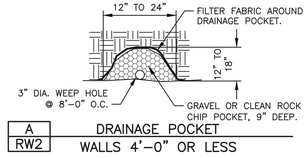
JOB NO. 291.17

RW1





A / RW2 — DRAINAGE POCKET
WALLS 4'-0" OR LESS

NOTE: RETAINING WALL HAS BEEN DESIGNED FOR VEHICULAR IMPACT LOADING AND FIRELANE SURCHARGE.

MASONRY WALL SCHEDULE
1500 psf – BEARING CAPACITY (STIFF NATURAL UNDISTURBED SOILS OR COMPACTED AND TESTED SOILS SEE GENERAL NOTES SHEET RW1)

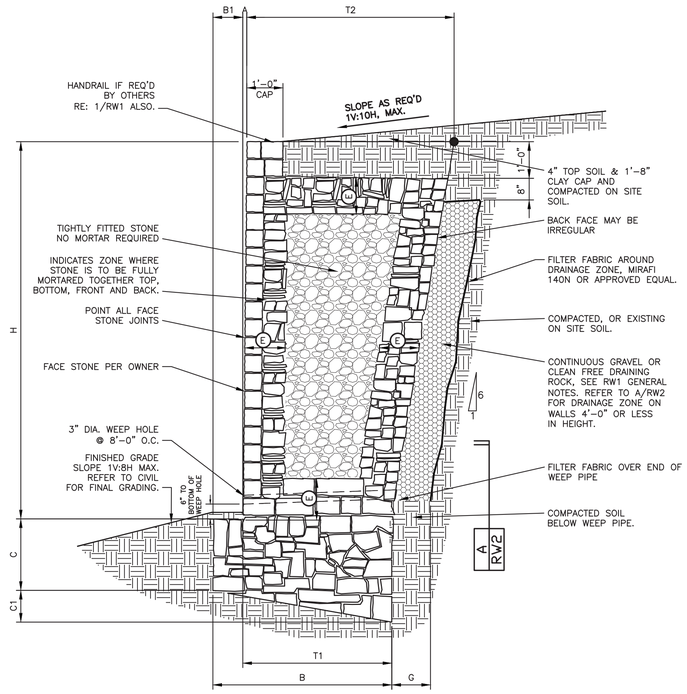
WALL HEIGHT H	BASE WIDTH B	TOE B1	BASE DEPTH (TOE) C	BASE DEPTH (HEEL) C1	BATTER A	FULLY MORTARED ZONE E	THICKNESS OF WALL T1	THICKNESS OF WALL T2	DRAINAGE ZONE THICKNESS G	BEARING CAPACITY
4'-0"	4'-0"	2'-6"	2'-6"	0'-9"	0'-1"	FULLY MORTARED	2'-0"	2'-8"	2'-0"	
5'-0"	4'-6"	2'-6"	2'-6"	0'-10"	0'-1 1/4"	FULLY MORTARED	2'-6"	3'-4"	2'-0"	1500 psf
6'-0"	5'-3"	2'-6"	3'-0"	1'-0"	0'-1 1/2"	FULLY MORTARED	3'-0"	4'-0"	2'-0"	
7'-0"	6'-3"	2'-9"	4'-0"	1'-2"	0'-1 3/4"	FULLY MORTARED	3'-6"	4'-8"	2'-0"	1950 psf
8'-0"	7'-0"	3'-3"	5'-0"	1'-4"	0'-2"	FULLY MORTARED	3'-9"	5'-1"	2'-0"	2200 psf
9'-0"	8'-3"	3'-9"	5'-9"	1'-6"	0'-2 1/4"	FULLY MORTARED	4'-6"	6'-0"	2'-0"	2500 psf
10'-0"	9'-3"	4'-3"	6'-6"	1'-8"	0'-2 1/2"	FULLY MORTARED	5'-0"	6'-8"	2'-0"	2700 psf
11'-0"	10'-6"	4'-9"	7'-6"	1'-10"	0'-2 3/4"	FULLY MORTARED	5'-9"	7'-7"	2'-0"	3000 psf
12'-0"	11'-3"	5'-3"	8'-3"	2'-0"	0'-3"	FULLY MORTARED	6'-0"	8'-0"	2'-0"	3250 psf

WALL DESIGN CRITERIA

BEARING Qa	SLOPE TOP β	SLOPE BOT β1	ACTIVE PRESSURE Øa	PASSIVE PRESSURE Øp	FRICTION ANGLE BASE δ	SLOPE OF BACK OF WALL α	SURCHARGE q
1500PSF	0 deg	14 deg	26 deg	26 deg	17 deg	99.46 deg	250 psf

USE THIS SCHEDULE FOR 2/RW2

2 / RW2 — TYPICAL VERTICAL WALL SECTION – FIRELANE AND VEHICULAR IMPACT BEARING IN CLAY



MASONRY WALL SCHEDULE
1500 psf – BEARING CAPACITY (STIFF NATURAL UNDISTURBED SOILS OR COMPACTED AND TESTED SOILS SEE GENERAL NOTES SHEET RW1)

WALL HEIGHT H	BASE WIDTH B	TOE B1	BASE DEPTH (TOE) C	BASE DEPTH (HEEL) C1	BATTER A	FULLY MORTARED ZONE E	THICKNESS OF WALL T1	THICKNESS OF WALL T2	DRAINAGE ZONE THICKNESS G	BEARING CAPACITY
1'-0"	1'-0"	0'-0"	0'-6"	0'-2"	1/4"	FULLY MORTARED	1'-0"	1'-2"	SEE A/RW2	
2'-0"	1'-2"	0'-2"	0'-9"	0'-3"	1/2"	FULLY MORTARED	1'-0"	1'-4"	SEE A/RW2	
3'-0"	1'-6"	0'-3"	0'-9"	0'-4"	3/4"	FULLY MORTARED	1'-3"	1'-9"	SEE A/RW2	
4'-0"	2'-1"	0'-5"	1'-0"	0'-5"	1"	FULLY MORTARED	1'-8"	2'-4"	SEE A/RW2	
5'-0"	2'-9"	0'-7"	1'-3"	0'-6"	0'-1 1/4"	0'-8"	2'-2"	3'-0"	2'-0"	1500 psf
6'-0"	3'-5"	0'-10"	1'-6"	0'-8"	0'-1 1/2"	0'-10"	2'-7"	3'-7"	2'-0"	
7'-0"	4'-0"	1'-0"	1'-9"	0'-9"	0'-1 3/4"	0'-10"	3'-0"	4'-2"	2'-0"	
8'-0"	4'-10"	1'-4"	2'-0"	0'-11"	0'-2"	1'-0"	3'-6"	4'-10"	2'-0"	
9'-0"	5'-9"	1'-7"	2'-3"	1'-1"	0'-2 1/4"	1'-0"	4'-2"	5'-8"	2'-0"	
10'-0"	6'-5"	1'-10"	3'-0"	1'-2"	0'-2 1/2"	1'-3"	4'-7"	6'-3"	2'-0"	1700 psf
11'-0"	7'-1"	2'-0"	3'-9"	1'-3"	0'-2 3/4"	1'-3"	5'-1"	6'-11"	2'-0"	1800 psf
12'-0"	7'-10"	2'-3"	4'-6"	1'-5"	0'-3"	1'-6"	5'-7"	7'-7"	2'-0"	2000 psf

3

WALL DESIGN CRITERIA

BEARING Qa	SLOPE TOP β	SLOPE BOT β1	ACTIVE PRESSURE Øa	PASSIVE PRESSURE Øp	FRICTION ANGLE BASE δ	SLOPE OF BACK OF WALL α	SURCHARGE q
1500PSF	5.71 deg	7.13 deg	26 deg	26 deg	17 deg	99.46 deg	0 psf

USE THIS SCHEDULE FOR 1/RW2

1 / RW2 — TYPICAL VERTICAL WALL SECTION – 1V:10H MAX SLOPE ABOVE WALL BEARING IN CLAYEY OR SANDY SOILS
3/4" = 1'-0"

NO.	DATE	REVISION	BY
3	04-10-18	UPDATED RETAINING WALL SCHEDULE	EG
2	10-11-17	UPDATED GRADING PLANS	AMB
1	07-17-17	UPDATED GRADING PLANS AND WALL DETAILS	AMB
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	DRN. 05-19-17	MMR	
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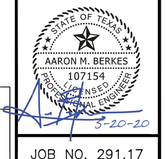

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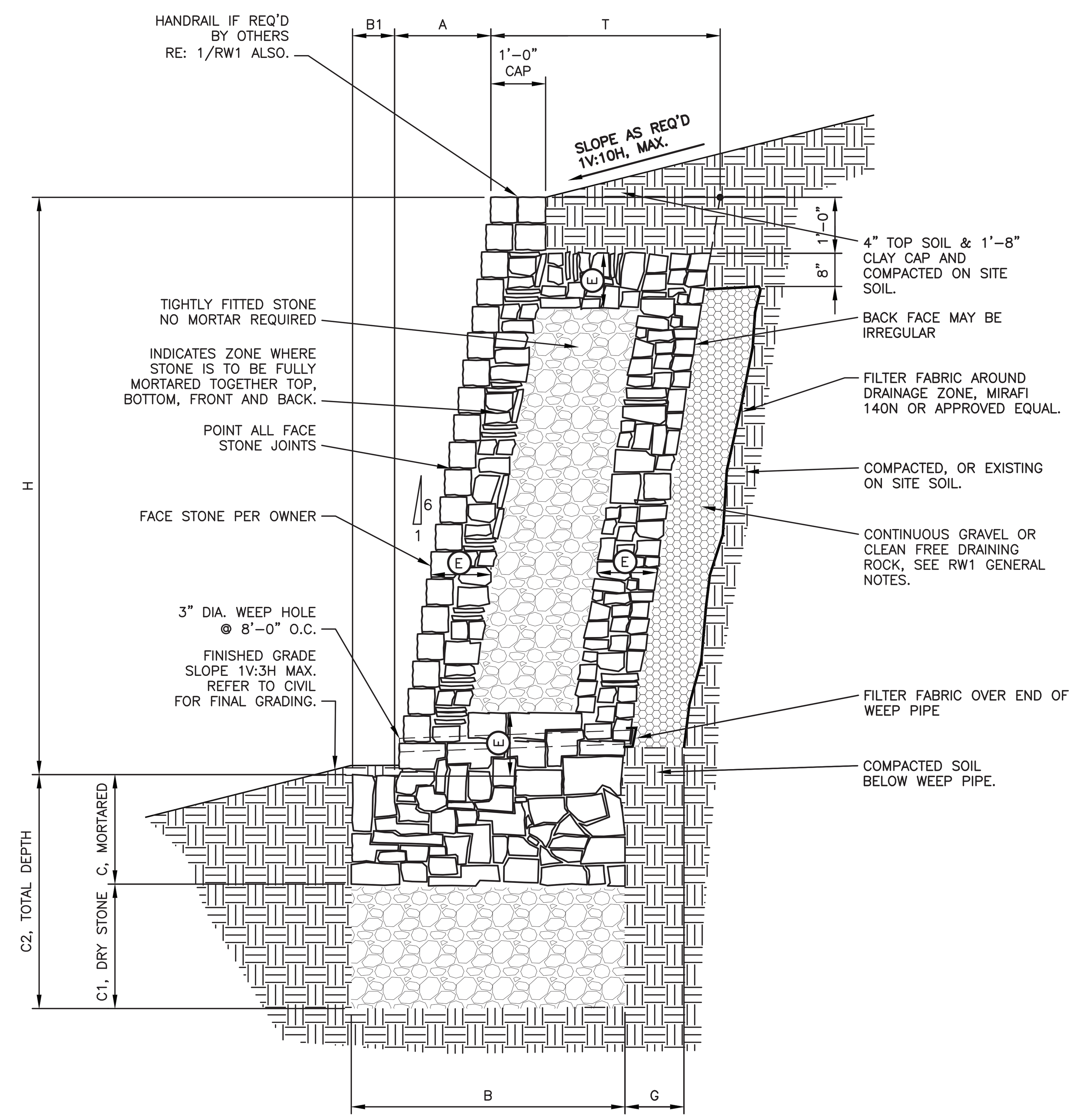
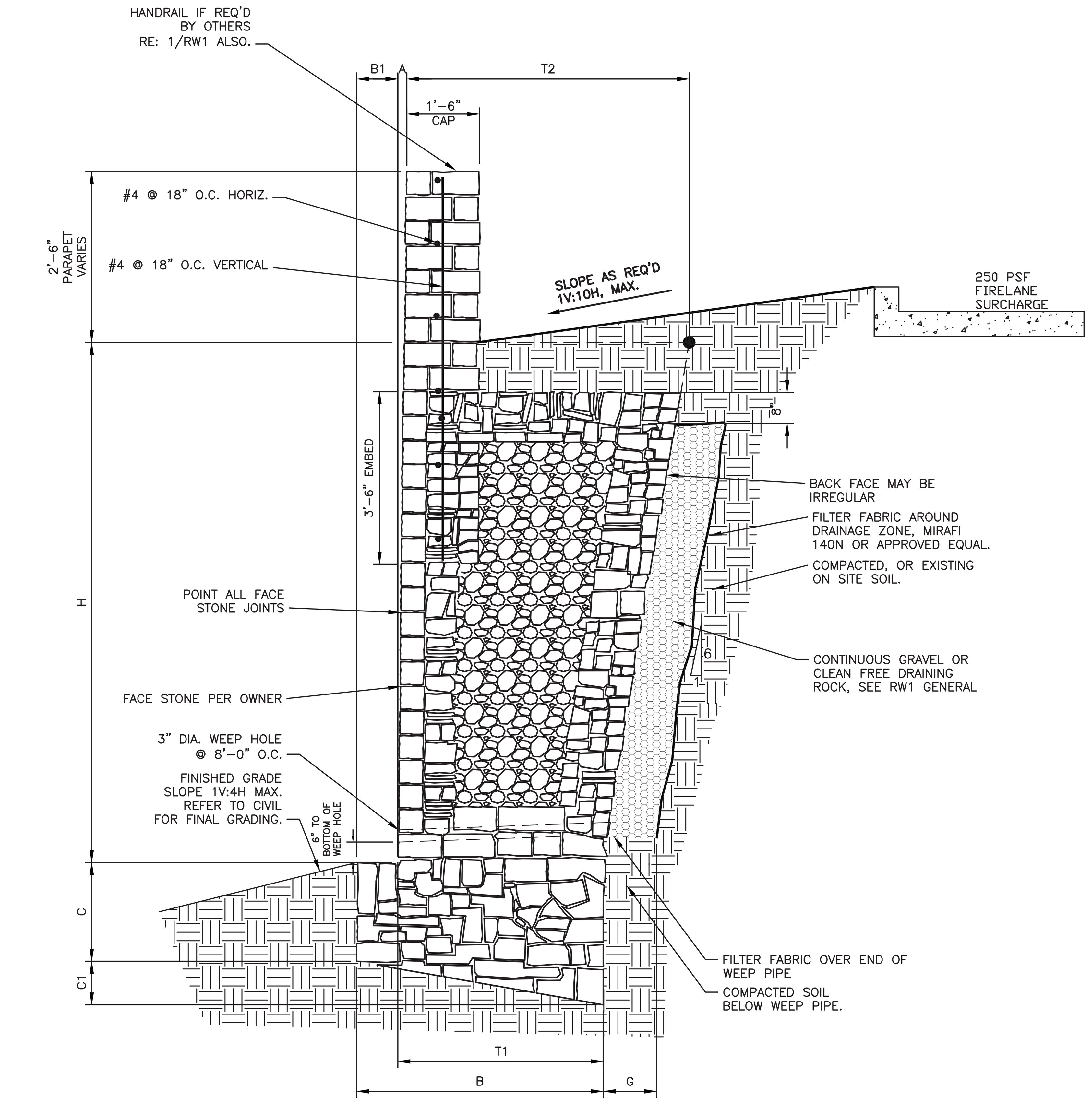
JOB NO. 291.17

RW2





NOTE: RETAINING WALL HAS BEEN DESIGNED FOR VEHICULAR IMPACT LOADING AND FIRELANE SURCHARGE.

MASONRY WALL SCHEDULE
2500 psf – BEARING CAPACITY (STIFF NATURAL UNDISTURBED SOILS OR COMPACTED AND TESTED SOILS SEE GENERAL NOTES SHEET RW1)

WALL HEIGHT H	BASE WIDTH B	TOE B1	MORTARED DEPTH C	DRY STONE DEPTH C1	TOTAL DEPTH C2	BATTER A	FULLY MORTARED ZONE E	THICKNESS OF WALL T	DRAINAGE ZONE THICKNESS G	BEARING CAPACITY
8'-0"	4'-11"	0'-10"	8'-0"	4'-0"	6'-0"	1'-4"	1'-0"	4'-1"	1'-0"	2500 psf
9'-0"	6'-0"	1'-1"	8'-0"	4'-0"	7'-0"	1'-6"	1'-0"	4'-11"	1'-0"	
10'-0"	6'-7"	1'-1"	8'-0"	4'-0"	8'-0"	1'-8"	1'-2"	5'-6"	1'-0"	
11'-0"	7'-3"	1'-2"	8'-0"	4'-0"	8'-6"	1'-10"	1'-2"	6'-1"	1'-3"	2750 psf

WALL DESIGN CRITERIA

BEARING Qa	SLOPE TOP β	SLOPE BOT β1	ACTIVE PRESSURE Φa	PASSIVE PRESSURE Φp	FRICTION ANGLE BASE δ	SLOPE OF BACK OF WALL α	SURCHARGE q
2500PSF	5.71 deg	18.43 deg	26 deg	26 deg	28 deg	99.46 deg	0 psf

USE THIS SCHEDULE FOR 2/RW3

MASONRY WALL SCHEDULE
1500 psf – BEARING CAPACITY (STIFF NATURAL UNDISTURBED SOILS OR COMPACTED AND TESTED SOILS SEE GENERAL NOTES SHEET RW1)

WALL HEIGHT H	BASE WIDTH B	TOE B1	BASE DEPTH (TOE) C	BASE DEPTH (HEEL) C1	BATTER A	FULLY MORTARED ZONE E	THICKNESS OF WALL T1	THICKNESS OF WALL T2	DRAINAGE ZONE THICKNESS G	BEARING CAPACITY
1'-0"	3'-0"	1'-0"	2'-6"	0'-7"	1/4"	FULLY MORTARED	2'-0"	2'-2"	SEE A/RW4	1500 psf
2'-0"	3'-1"	1'-0"	2'-6"	0'-7"	1/2"	FULLY MORTARED	2'-1"	2'-5"	SEE A/RW4	
3'-0"	3'-3"	1'-1"	2'-6"	0'-7"	3/4"	FULLY MORTARED	2'-2"	2'-8"	SEE A/RW4	
4'-0"	3'-9"	1'-5"	2'-6"	0'-8"	0'-1"	FULLY MORTARED	2'-4"	3'-0"	2'-0"	
5'-0"	4'-3"	1'-10"	2'-6"	0'-9"	0'-1 1/4"	FULLY MORTARED	2'-5"	3'-3"	2'-0"	
6'-0"	4'-10"	2'-2"	2'-6"	0'-10"	0'-1 1/2"	FULLY MORTARED	2'-8"	3'-8"	2'-0"	
7'-0"	5'-9"	2'-7"	2'-9"	1'-1"	0'-1 3/4"	FULLY MORTARED	3'-2"	4'-4"	2'-0"	
8'-0"	6'-6"	3'-0"	3'-3"	1'-2"	0'-2"	FULLY MORTARED	3'-6"	4'-10"	2'-0"	1700 psf
9'-0"	7'-3"	3'-5"	3'-6"	1'-3"	0'-2 1/4"	FULLY MORTARED	3'-10"	5'-4"	2'-0"	1750 psf
10'-0"	7'-11"	3'-10"	4'-0"	1'-5"	0'-2 1/2"	FULLY MORTARED	4'-1"	5'-9"	2'-0"	1900 psf
11'-0"	8'-7"	4'-2"	4'-6"	1'-7"	0'-2 3/4"	FULLY MORTARED	4'-5"	6'-3"	2'-0"	2200 psf
12'-0"	9'-3"	4'-5"	4'-9"	1'-8"	0'-3"	FULLY MORTARED	4'-10"	6'-10"	2'-0"	2300 psf
13'-0"	10'-0"	4'-9"	5'-3"	1'-9"	0'-3 1/4"	FULLY MORTARED	5'-3"	7'-5"	2'-0"	2500 psf
14'-0"	10'-8"	5'-0"	5'-9"	1'-10"	0'-3 1/2"	FULLY MORTARED	5'-8"	8'-0"	2'-0"	2800 psf

WALL DESIGN CRITERIA

BEARING Qa	SLOPE TOP β	SLOPE BOT β1	ACTIVE PRESSURE Φa	PASSIVE PRESSURE Φp	FRICTION ANGLE BASE δ	SLOPE OF BACK OF WALL α	SURCHARGE q
1500PSF	0 deg	7.13 deg	26 deg	26 deg	17 deg	99.46 deg	250 psf

USE THIS SCHEDULE FOR 1/RW3

2 / RW3 — TYPICAL WALL SECTION – 1V:10H MAX SLOPE ABOVE WALL
1V:3H MAX SLOPE BELOW WALL
WITH REMEDIATED BASE
BEARING IN CLAYEY SOILS
1/2" = 1'-0"

1 / RW3 — TYPICAL VERTICAL WALL SECTION – FIRELANE
SURCHARGE AND VEHICULAR IMPACT
BEARING IN CLAY

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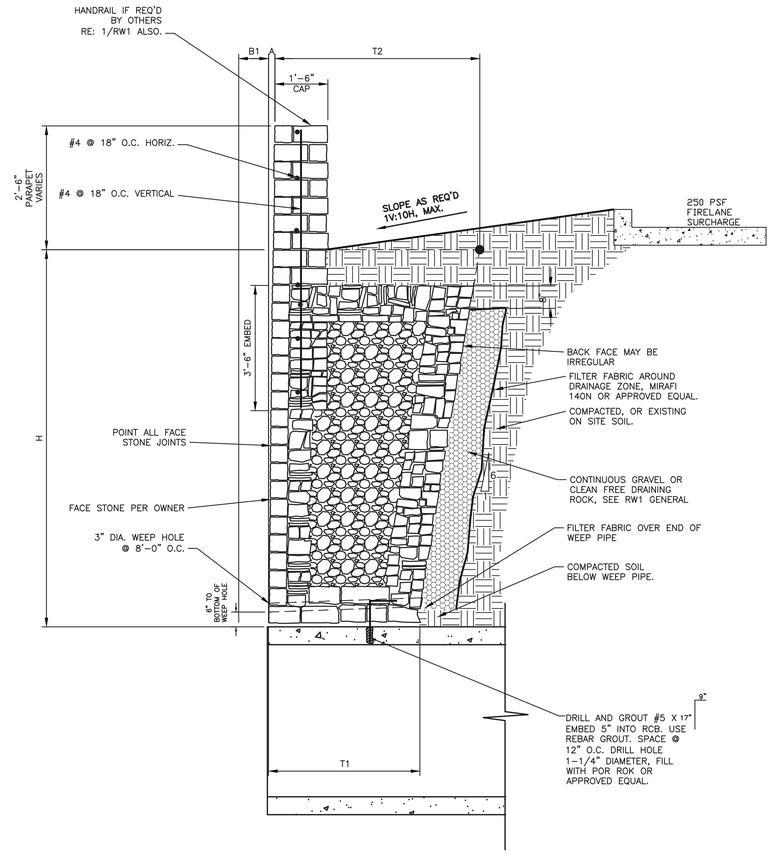
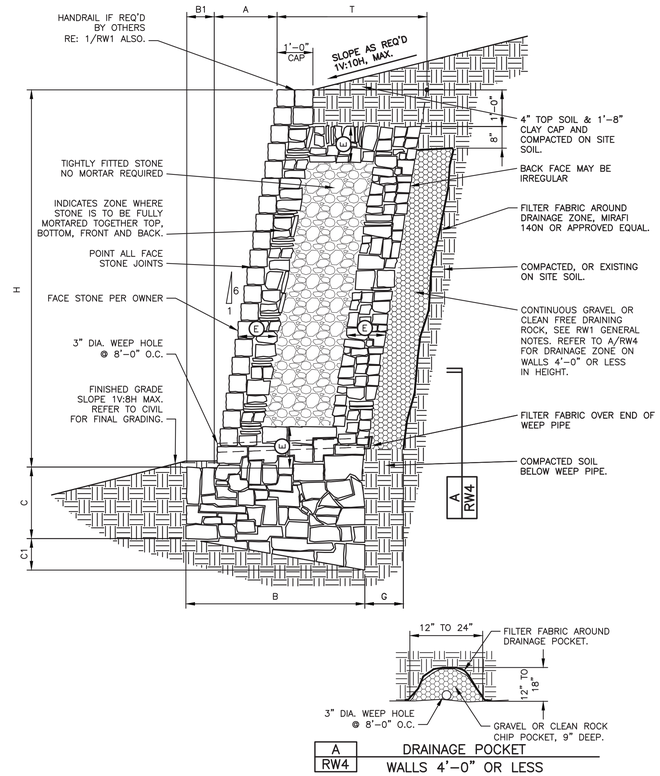
STATE OF TEXAS — AARON M. BERKES — 107154 — LICENSED PROFESSIONAL ENGINEER
5-20-20

JOB NO. 291.17

RW3





A RW4 DRAINAGE POCKET
WALLS 4'-0" OR LESS

MASONRY WALL SCHEDULE
1500 psf - BEARING CAPACITY (BEARING ON CONCRETE SEE GENERAL NOTES SHEET RW1)

WALL HEIGHT H	BATTER A	FULLY MORTARED ZONE E	THICKNESS OF WALL T1	THICKNESS OF WALL T2	DRAINAGE ZONE THICKNESS G	BEARING CAPACITY
6'-0"	0'-1 1/2"	FULLY MORTARED	2'-8"	3'-8"	2'-0"	1500 psf
7'-0"	0'-1 3/4"	FULLY MORTARED	3'-2"	4'-4"	2'-0"	
8'-0"	0'-2"	FULLY MORTARED	3'-6"	4'-10"	2'-0"	1700 psf

WALL DESIGN CRITERIA

BEARING Qa	SLOPE TOP β	SLOPE BOT β1	ACTIVE PRESSURE Øa	PASSIVE PRESSURE Øp	FRICTION ANGLE BASE δ	SLOPE OF BACK OF WALL α	SURCHARGE q
1500PSF	0 deg	7.13 deg	26 deg	26 deg	17 deg	99.46 deg	250 psf

USE THIS SCHEDULE FOR 2/RW4

MASONRY WALL SCHEDULE
1500 psf - BEARING CAPACITY (STIFF NATURAL UNDISTURBED SOILS SEE GENERAL NOTES SHEET RW1)

WALL HEIGHT H	BASE WIDTH B	TOE B1	BASE DEPTH (TOE) C	BASE DEPTH (HEEL) C1	BATTER A	FULLY MORTARED ZONE E	THICKNESS OF WALL T	DRAINAGE ZONE THICKNESS G	BEARING CAPACITY
1'-0"	1'-0"	0'-0"	0'-6"	0'-2"	0'-2"	FULLY MORTARED	1'-0"	SEE A/RW4	1500 psf
2'-0"	1'-2"	0'-2"	0'-9"	0'-3"	0'-4"	FULLY MORTARED	1'-0"	SEE A/RW4	
3'-0"	1'-7"	0'-3"	0'-9"	0'-4"	0'-6"	FULLY MORTARED	1'-4"	SEE A/RW4	
4'-0"	2'-3"	0'-4"	1'-0"	0'-5"	0'-8"	FULLY MORTARED	1'-11"	SEE A/RW4	
5'-0"	2'-9"	0'-5"	1'-3"	0'-6"	0'-10"	0'-8"	2'-4"	1'-0"	
6'-0"	3'-5"	0'-7"	1'-6"	0'-8"	1'-0"	0'-10"	2'-10"	1'-0"	
7'-0"	4'-1"	0'-9"	1'-9"	0'-9"	1'-2"	0'-10"	3'-4"	1'-0"	

WALL DESIGN CRITERIA

BEARING Qa	SLOPE TOP β	SLOPE BOT β1	ACTIVE PRESSURE Øa	PASSIVE PRESSURE Øp	FRICTION ANGLE BASE δ	SLOPE OF BACK OF WALL α	SURCHARGE q
1500PSF	5.71 deg	7.13 deg	26 deg	26 deg	17 deg	99.46 deg	0 psf

USE THIS SCHEDULE FOR 1/RW4

2 RW4 VERTICAL FACE WALL SECTION WITH IMPACT PARAPET AND FIRELANE - ON TOP OF CULVERT
1V:10H MAX SLOPE ABOVE WALL

1 RW4 TYPICAL WALL SECTION - 1V:10H MAX SLOPE ABOVE WALL
1V:8H MAX SLOPE BELOW WALL
BEARING IN CLAYEY OR SANDY SOILS
1/2" = 1'-0"

RECORD DRAWINGS
THIS DRAWING HAS BEEN REVISED TO SHOW THOSE CHANGES DURING THE CONSTRUCTION PROCESS REPORTED BY THE CONTRACTOR TO FALKOFSKE ENGINEERING, INC. AND CONSIDERED TO BE SIGNIFICANT. THIS DRAWING IS NOT GUARANTEED TO BE "AS BUILT" BUT IS BASED ON THE INFORMATION MADE AVAILABLE.
DATE: 05/20/2020 BY: Aaron Berkes, P.E.

NO.	DATE	REVISION	BY
2	10-11-17	UPDATED GRADING PLANS	AMB
1	07-17-17	UPDATED GRADING PLANS AND WALL DETAILS	AMB
	05-19-17		

	DES.	DRN.	CHK.
DATE	05-19-17	05-19-17	05-19-17
BY	MMR	MMR	AMB

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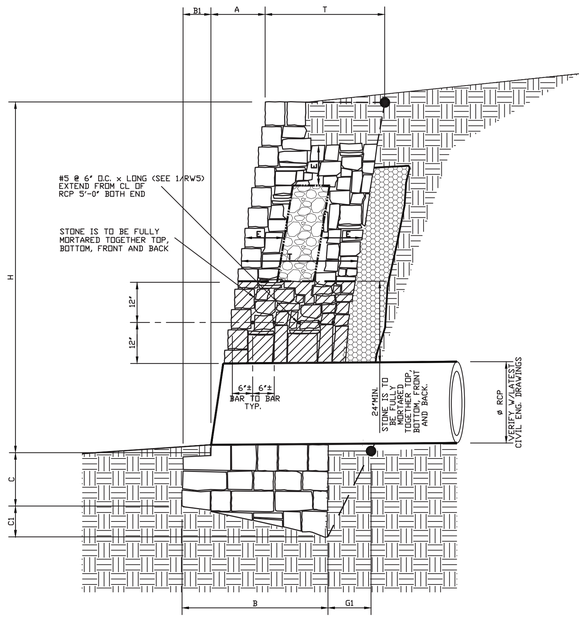
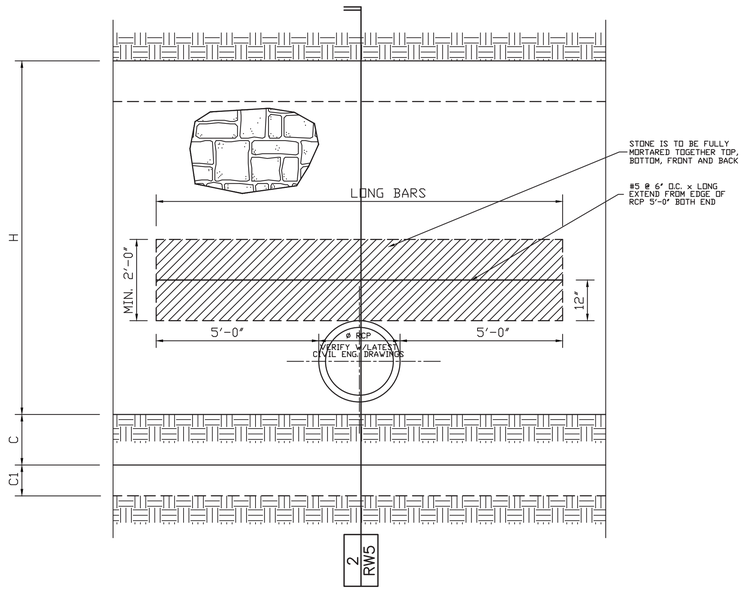
STATE OF TEXAS
AARON M. BERKES
107154
LICENSED PROFESSIONAL ENGINEER
5-20-20

JOB NO. 291.17

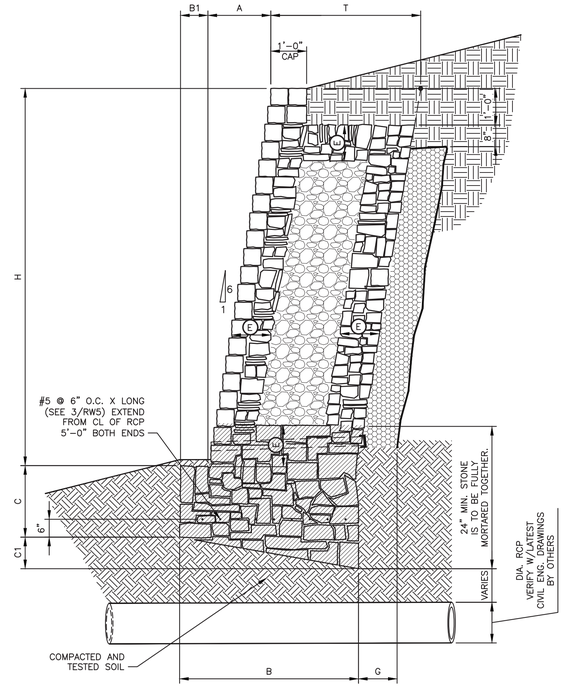
RW4



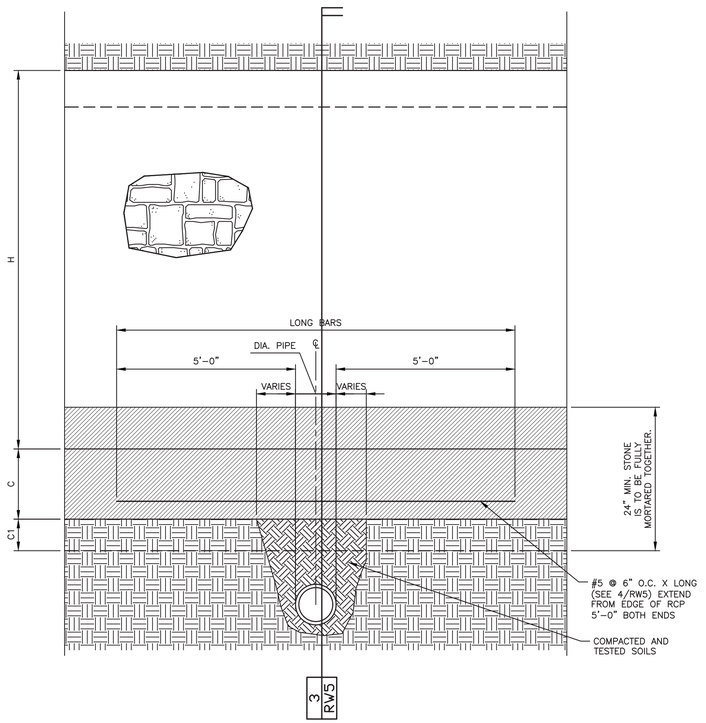
2 RW5 WALL SECTION W/RCP



1 RW5 WALL ELEVATION W/RCP



4 RW5 WALL SECTION W/RCP BELOW WALL



3 RW5 WALL ELEVATION W/RCP BELOW WALL

NO.	DATE	REVISION	BY
1	10-11-17	UPDATED GRADING PLANS	AMB

DES. 05-19-17 MMR
DRN. 05-19-17 MMR
CHK. 05-19-17 AMB
DATE

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RW5