Plan Check Comments

Douglas County
Community Development
1594 Esmeralda Ave
Minden, NV 89423

Permit Type: Commercial Permit

Application Number: DB23-0477

Project Description: Genoa Church Foundation Repair, structural only

Site Address:
182 NIXON ST
Genoa, NV 89411

Document Name: Plan SUB 3

Report Date: 03-29-2023

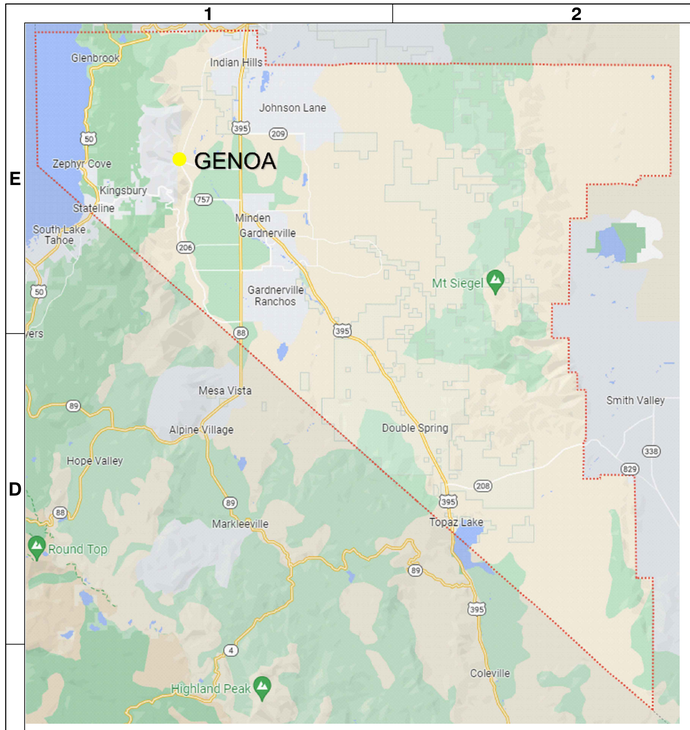
Reviewer Contact Information:

Reviewer Name	Reviewer Email	Reviewer Phone No.:
Tim Davis	tdavis@douglasnv.us	775-782-6224
Rebecca Spates	rspates@douglasnv.us	775-782-6226

General Comments

Corrections in the following table need to be applied before a permit can be issued

DB23-0477



LOCATION PLAN
SCALE: NTS

T(s)	Sa(g)
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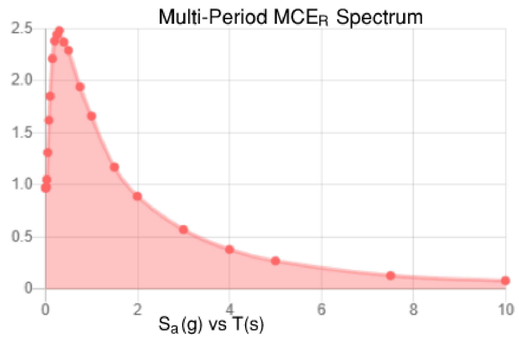
0.010	0.970
0.020	0.980
0.030	1.050
0.050	1.310
0.075	1.620
0.100	1.850
0.150	2.210
0.200	2.380
0.250	2.440
0.300	2.480
0.400	2.370
0.500	2.290
0.750	1.940
1.000	1.660
1.500	1.170
2.000	0.890
3.000	0.570
4.000	0.380
5.000	0.270
7.500	0.130
10.000	0.081



GENERAL NOTES:

1. PROJECT PURPOSE IS TO REPAIR ORIGINAL CHAPEL FOUNDATIONS AND LEVEL THE CHAPEL FLOOR RELATIVE TO THE BUILDING ADDITION. ADDITIONALLY, DRAINAGE IMPROVEMENTS WILL INCLUDE SITE GRADING AND CONSTRUCTION OF A RETAINING WALL TO PREVENT WATER RUNOFF FROM CORD AY STREET IMPACTING THE BUILDING FOUNDATIONS.
2. ANALYSIS FOR CAPACITY OF EXISTING STRUCTURE, INCLUDING FLOOR FRAMING AND WALLS, TO APPLIED LOADS WAS NOT COMPLETED. THE ANALYSIS AND DESIGN WAS LIMITED TO TO THE PROPOSED FOUNDATION ELEMENTS. FOUNDATION REPAIR MAY CHANGE THE DYNAMIC RESPONSE OF THE EXISTING WOOD STRUCTURE.
3. CONTRACTOR SHALL LOCATE ALL UTILITIES AND PROTECT THEM IN PLACE. CALL 811 A MINIMUM OF TWO FULL WORKING DAYS BEFORE DIGGING.
4. THERE ARE SEVERAL UTILITIES CONNECTED TO THE CHAPEL BUILDING. PRIOR TO MOVING THE CHAPEL BUILDING THESE UTILITIES MUST BE DE-ENERGIZED AND DISCONNECTED FROM THE STRUCTURE BEING LEVELED. THIS INCLUDES UTILITIES AND MECHANICAL EQUIPMENT IN THE CRAWL SPACE BENEATH THE CHAPEL. CONTRACTOR TO VERIFY THE SIZE, TYPE, LOCATION AND OPERATIONAL STATUS OF ALL UTILITIES.
5. A PROPERTY SURVEY WAS NOT COMPLETED FOR THESE PLANS. PROPERTY BOUNDARIES AND LOCATION OF BUILDING AND LANDSCAPING RELATIVE TO THE PROPERTY BOUNDARIES ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY PROPERTY BOUNDARIES AND ALL EXISTING IMPROVEMENTS PRIOR TO CONSTRUCTION.
6. THE ORIGINAL CHAPEL IS FOUNDED ON TIMBER POSTS AND STONE FOOTINGS. ALL EXISTING FOOTINGS SHALL BE REPLACED WITH NEW CONCRETE FOOTING AS SHOWN ON THE PLANS. EXISTING INTERIOR POST CONDITIONS VARY. MANY CAN BE LEFT IN PLACE AND REUSED. SOME ARE ROTTED DUE TO SOIL CONTACT AND MAY NEED TRIMMING OF ROTTEN WOOD, OR REPLACED ENTIRELY. CONTRACTOR TO FIELD VERIFY THE CONDITION OF EACH EXISTING INTERIOR FOUNDATION ELEMENT PRIOR TO CONSTRUCTION.
7. EXISTING EXTERIOR FOUNDATION ELEMENTS ARE TO BE REMOVED AND REPLACED WITH A CONCRETE BLOCK STEM WALL AND CONCRETE FOOTINGS. BLOCK LAYOUT AS SHOWN ON PLANS IS APPROXIMATE. CONTRACTOR TO ADJUST FOOTING AND BLOCK LAYOUT TO FIT LEVELED BUILDING. GRADE SOIL ADJACENT TO STEM WALL AND FOOTING TO DRAIN AND TO KEEP BOTTOM OF FOOTING BELOW DESIGN FROST DEPTH.
8. PROPOSED RETAINING WALL IS BASED ON STANDARD NEVADA DOT DRAWING CW-1, WALL TYPE 1A. ASSOCIATED REFERENCES INCLUDE DRAWINGS CW-4, CW-5, CW-6, STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION (2014), SECTIONS 640, 501, 505, 701, 706, AND 722.
9. TRAFFIC CLOSURES MY BE REQUIRED ON CORD AY STREET TO FACILITATE CONSTRUCTION OF BUILDING FOUNDATIONS AND RETAINING WALL. CONTRACTOR TO DEVELOP TRAFFIC CONTROL PLAN AND SUBMIT TO THE COUNTY FOR APPROVAL.
10. CONTRACTOR TO PREPARE SWPPP PLAN AND SUBMIT TO THE COUNTY FOR APPROVAL.
11. SIMPSON STRUCTURAL CONNECTORS ARE CALLED OUT ON PLANS. USE FASTENERS PER SIMPSON STRONG TIE FOR EACH TYPE OF CONNECTOR. CONTRACTOR MAY USE ALTERNATIVE EQUIVALENT OR BETTER CONNECTORS AND FASTENERS.
12. LEVELING OF THE CHAPEL STRUCTURE WILL INTRODUCE STRAINS TO THE EXISTING DEFORMED FLOOR, WALL AND ROOF FRAMING. CONTRACTOR TO MAKE PROVISIONS TO PROTECT THE EXISTING STRUCTURE TO THE EXTENT PRACTICABLE TO AVOID ADDITIONAL DAMAGE. THIS MAY REQUIRE: REMOVING EXISTING WINDOWS TO AVOID BREAKING GLASS AND MILL WORK; LEVELING THE BUILDING OVER A LONG PERIOD OF TIME TO ALLOW DEFORMED STRUCTURAL ELEMENTS TO REGAIN THEIR ORIGINAL SHAPE.
13. THE EXISTING BUILDING HAS A FIRE SPRINKLER SYSTEM. IT WILL NOT BE MODIFIED AS PART OF THIS PROJECT.
14. THE EXISTING SHELL BUILDING CONSTRUCTION TYPE WALLS ARE WOOD FRAME WITH WOOD SIDING. ROOF IS WOOD FRAME WITH ASPHALT SHINGLES.

APPROVED
Douglas County
Community Development
BUILDING DIVISION
DATE 03-29-2023 PERMIT # DB23-0477
BY
The Approval of Plans and Specifications does not Permit the violation of any Section of the Building Code or any County Ordinance or State Law.

THIS SET OF PLANS MUST BE KEPT ON BUILDING SITE AT ALL TIMES DURING PROGRESS OF CONSTRUCTION FOR INPECTION PURPOSES. -SEC. 106.3.1

DESIGN CODES, REFERENCES AND CRITERIA:

1. DOUGLAS COUNTY ADOPTED BUILDING CODES:
   2018 INTERNATIONAL BUILDING CODE (IBC)
   2018 INTERNATIONAL RESIDENTIAL CODE (IRC)
   2018 UNIFORM PLUMBING CODE (UPC)
   2018 UNIFORM MECHANICAL CODE (UMC)
   2017 NATIONAL ELECTRICAL CODE (NEC)
   2018 INTERNATIONAL ENERGY CONSERVATION CODE (IECC)
   2018 INTERNATIONAL FIRE CODE (IFC)
   2018 INTERNATIONAL FUEL GAS CODE (IFGC)
   2018 INTERNATIONAL URBAN WILDFIRE INTERFACE FIRE CODE FOR THE LAKE TAHOE AREA (WUI)
2. INTERNATIONAL BUILDING CODE (IBC) 2021. ASSEMBLY GROUP A, RISK CATEGORY II
3. ASCE 7-22 MINIMUM DESIGN LOADS AND ASSOCIATED CRITERIA FOR BUILDINGS AND OTHER STRUCTURES
4. ASCE 7 ONLINE HAZARD TOOL
5. SITE ELEVATION 4,825 FEET (NAVD88). DOUGLAS COUNTY CRITERIA FOR SITE ELEVATIONS LESS THAN 5,999 FEET CAN BE USED.
6. SEISMIC ZONE: IBC = D / IRC = D2 & E FOR SOME SITE SPECIFIC AREAS. MULTI-PERIOD MCER SPECTRUM REFERENCED FROM ASCE 7 ON LINE HAZARD TOOL. SEE SPECTRUM DATA TO LEFT.
7. WIND SPEED: MINIMUM 120 MPH V ULT' - EXPOSURE C, RISK CATEGORY II
8. SNOW LOAD: 45.1 PSF GROUND SNOW LOAD PER ASCE 7 FOR 20-YEAR MRI. GREATER THAN COUNTY MINIMUM OF 40 PSF
9. LIVE LOAD: 100 PSF FOR ASSEMBLY AREA WITH MOVEABLE SEATS, PER ASCE7-22 TABLE 4.3-1
10. MINIMUM DESIGN FROST DEPTH: 18 INCHES
11. ALLOWABLE MAXIMUM SOIL BEARING PRESSURE: 1,500 PSF (UNLESS SITE SPECIFIC ANALYSIS PERFORMED)
12. LOAD COMBINATIONS FOR STRENGTH DESIGN ARE PROVIDED IN ASCE7-22, CHAPTER 2. NOTE THAT ONLY DEAD, LIVE, SNOW, WIND, AND SEISMIC LOADS WERE CONSIDERED IN THE DESIGN.

    2.3 LOAD COMBINATIONS FOR STRENGTH DESIGN
    2.3.1 BASIC COMBINATIONS
    1a. 1.4D
    2a. 1.2D + 1.6L + (0.5Lr or 0.3S or 0.5R)
    3a. 1.2D + (1.6Lr or 1.0S or 1.6R) + (L or 0.5W)
    4a. 1.2D + 1.0(W or WT)+ L + (0.5Lr or 0.3S or 0.5R)
    5a. 0.9D + 1.0(W or WT)

    2.3.6 BASIC COMBINATIONS WITH SEISMIC LOAD EFFECTS
    6. 1.2D + Ev + Eh + L + 0.15S
    7. 0.9D − Ev + Ehr
13. CONCRETE MINIMUM COMPRESSIVE STRENGTH, f'c = 2,500 PSI
14. REBAR MINIMUM YIELD STRENGTH, fy = 40 KSI
15. LOAD BEARING CONCRETE MASONRY UNITS PER ASTM C90, NORMAL WEIGHT.
16. SEE NDOT SHEET CW-4 FOR RETAINING WALL MATERIAL PROPERTIES, WHICH ARE DIFFERENT THAN THOSE SHOWN ABOVE.
17. PER IBC 1202.4.1.1 PROVIDE MINIMUM VENTILATION AREA OF 1 SF PER 150 SF OF CRAWL SPACE.
    FOR THE CHAPEL BUILDING:
    (40 FT X 20 FT)/150 X 144 IN^2/FT^2 = 768 IN^2
    768 IN^2/ (8 IN X 16 IN) = 6 CMU BLOCK SIZED VENTS.
18. PER IBC 1209.1 PROVIDE ACCESS OPENING TO CRAWL SPACE OF AT LEAST 18 INCHES BY 24 INCHES.

SHEET INDEX:

DOUGLAS COUNTY
COMMUNITY DEVELOPMENT
BUILDING DIVISION
BUILDER AND OWNER
RESPONSIBLE FOR COMPLIANCE
WITH ALL APPLICABLE CODES
ALL WORK SUBJECT TO FIELD
INSPECTION APPROVAL

811 Know what's below. Call before you dig.

PROPERTY APN: 1319-09-702
PROPERTY ADDRESS: 182 NIXON STREET, GENOA, NV 89411

DESIGN PROFESSIONALS:

CORY WILDER, P.E.
NV 30653

REVISION 0-2023-03-23
FOR CONSTRUCTION
ISSUED: 2023-03-23

TOWN OF GENOA

Mark	Description	Date	Appr

TOWN OF GENOA
CHURCH FOUNDATION REPAIR

COVER SHEET

Rev:	0 -
Date:	3/17/23
M&N Project No.	222911
Drawing date:	
Drawing Scale:	1:1 (0 SHEET)
Plot scale:	1:1 (0 SHEET)
Designed by:	CW
Dwn by:	FS
Cad by:	ME
Reviewed by:	GN
Submitted by:	SUBMITTER'S NAME MOFFATT & NICHOL

moffatt & nichol

PROFESSIONAL ENGINEER - STATE OF NEVADA
CORY A. WILDER
Exp: 06/30/24
CIVIL
No. 30653
SEAL 3/23/23

Sheet Reference No.
G-001
INDEX: 01 OF 10

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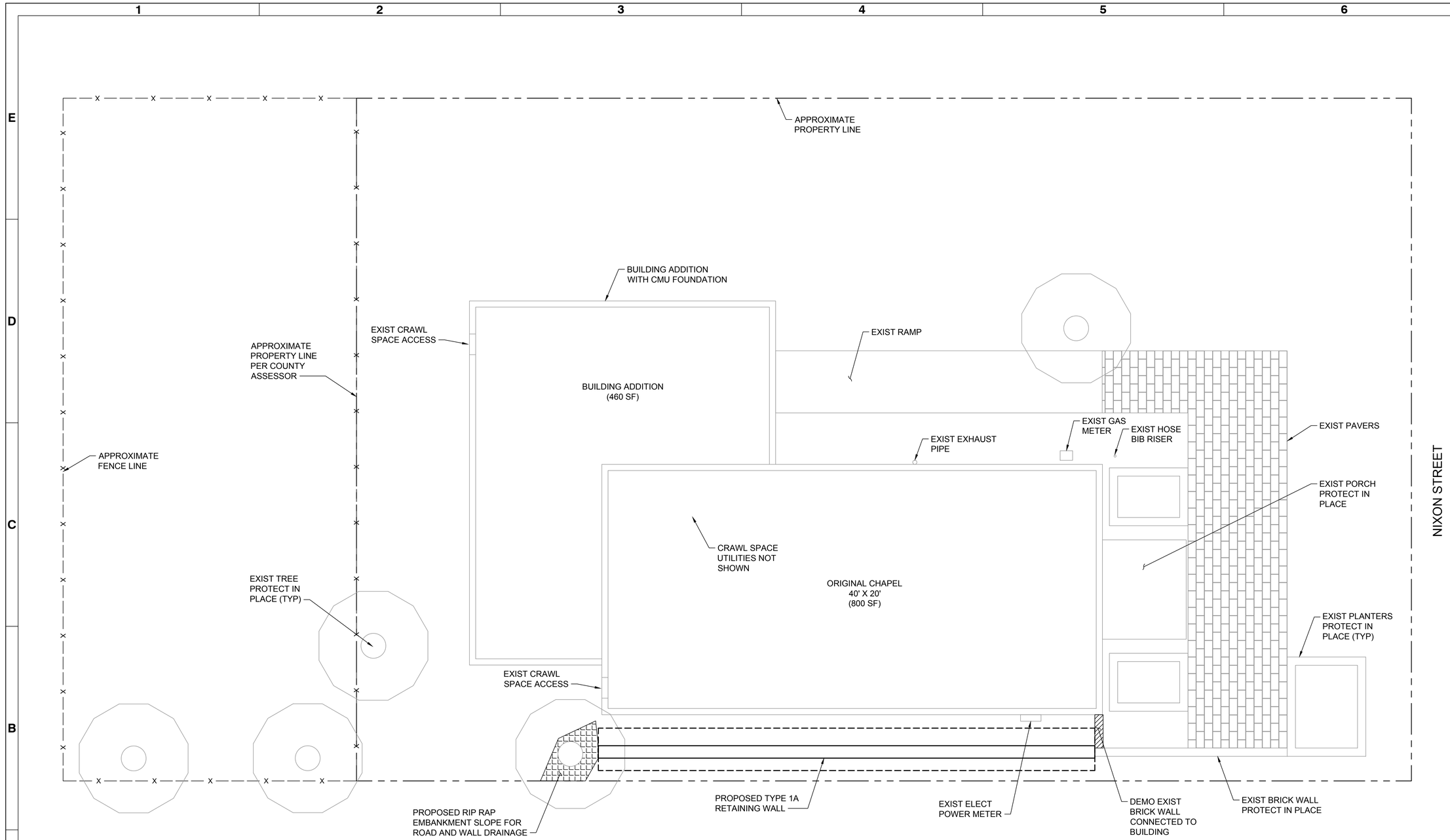
DB23-0477



NOTES

1. LOCATION OF PROPERTY BOUNDARIES, BUILDINGS, LANDSCAPING, ETC ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY ALL INFORMATION.

PLAN

SCALE: 1/4"=1'-0"

PROPERTY APN: 1319-09-702
PROPERTY ADDRESS: 182 NIXON STREET, GENOA, NV 89411

DOUGLAS COUNTY
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Know what's below. Call before you dig.

4'-0" 0'-0" 4'-0" 8'-0"

SCALE: 1/4"=1'-0"

REVISION 0-2023-03-23
FOR CONSTRUCTION
ISSUED: 2023-03-23

TOWN OF GENOA
SINCE 1851

Mark	Description	Date	Appr

TOWN OF GENOA
CHURCH FOUNDATION REPAIR

SITE PLAN

Designed by: CW	Cad by: ME	Drawing code:	Rev: 0 -
Drawn by: FS			Date: 3/17/23
Reviewed by: GN	Submitted by: SUBMITTERS NAME MOFFATT & NICHOL	Drawing Scale: Plot scale: 1:1 (D SHEET)	M&N Project No. 223911

moffatt & nichol

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CORY A. WILDER
Exp: 06/30/24
CIVIL
No. 30653
SEAL 3/23/23

Sheet Reference No.
S-001
INDEX: 02 OF 10

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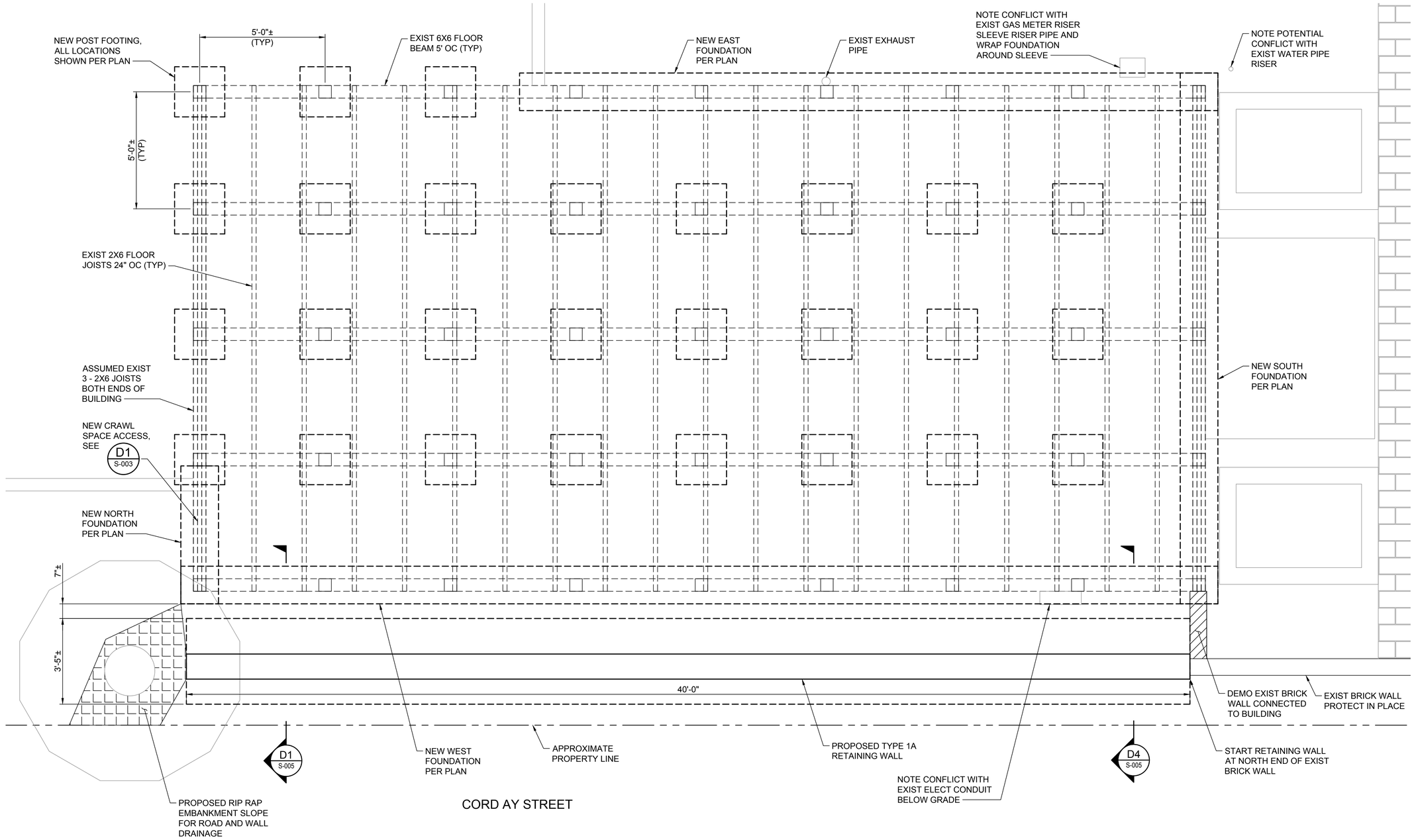
DB23-0477



PLAN
SCALE: 1/2"=1'-0"

NOTES

1. LOCATION OF PROPERTY BOUNDARIES, BUILDINGS, LANDSCAPING, ETC ARE APPROXIMATE. CONTRACTOR TO FIELD VERIFY ALL INFORMATION.

DOUGLAS COUNTY
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BUILDING DIVISION
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Know what's below. Call before you dig.

2'-0" 0'-0" 2'-0" 4'-0"
SCALE: 1/2"=1'-0"

REVISION 0-2023-03-23
FOR CONSTRUCTION
ISSUED: 2023-03-23

TOWN OF GENOA
SINCE 1861

Mark	Description	Date	Appr

TOWN OF GENOA
CHURCH FOUNDATION REPAIR

FOUNDATION PLAN

moffatt & nichol

PROFESSIONAL ENGINEER - STATE OF NEVADA
CORY A. WILDER
Exp: 06/30/24
CIVIL
No. 30653
SEAL 3/23/23

Rev:	0 -
Date:	3/17/23
M&N Project No.	222911
Drawing Scale:	1:1 (D SHEET)
Plot scale:	1:1
Designed by:	CW
Cad by:	ME
Drawing date:	
Dwn by:	FS
Reviewed by:	GN
Submitted by:	SUBMITTER'S NAME MOFFATT & NICHOL

Sheet Reference No.
S-002
INDEX: 03 OF 10

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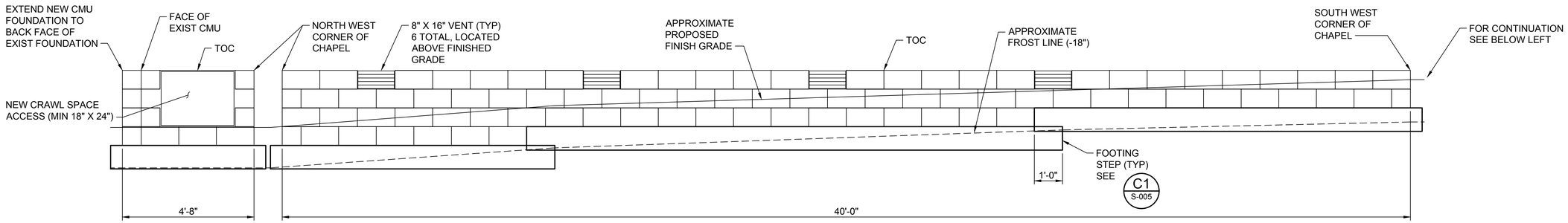
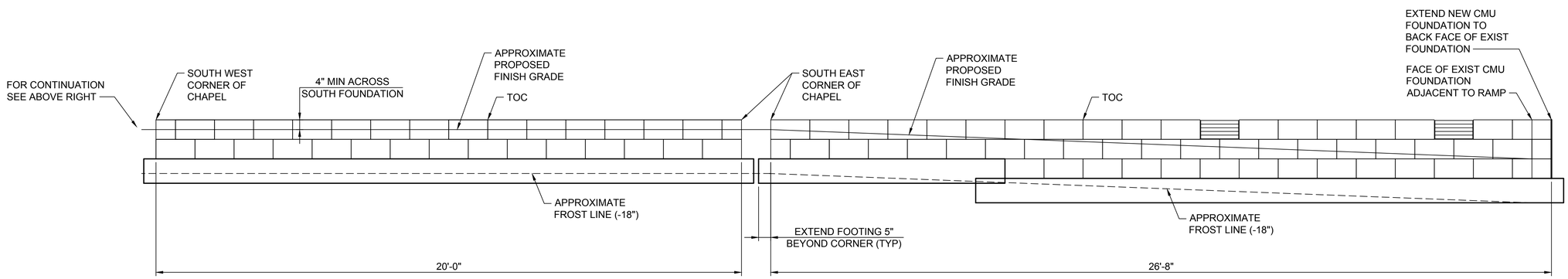


D1 S-003 NORTH FOUNDATION ELEVATION
SCALE: 1/2"=1'-0" SEE SHT S-004 FOR TYPICAL SECTIONS

D2 S-003 WEST FOUNDATION ELEVATION
SCALE: 1/2"=1'-0" SEE SHT S-004 FOR TYPICAL SECTIONS



B1 S-003 SOUTH FOUNDATION ELEVATION
SCALE: 1/2"=1'-0" SEE SHT S-004 FOR TYPICAL SECTIONS

B3 S-003 EAST FOUNDATION ELEVATION
SCALE: 1/2"=1'-0" SEE SHT S-004 FOR TYPICAL SECTIONS

EXISTING 4 COURSE STEM WALL UNDER ADDITION ON WEST WALL

EXISTING SOUTH WALL FOUNDATION IS BURIED. LOWER GRADE TO 4" BELOW TOC

EXISTING 3 COURSE STEM WALL UNDER RAMP

NOTES

1. FIELD LOCATE ALL UTILITY PENETRATIONS OF CMU WALL. INSTALL PER DETAIL A1 S-004

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Know what's below. Call before you dig.

2'-0" 0'-0" 2'-0" 4'-0"
SCALE: 1/2"=1'-0"

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FOR CONSTRUCTION
ISSUED: 2023-03-23

TOWN OF GENOA
CHURCH FOUNDATION REPAIR

BUILDING FOUNDATION ELEVATION

Rev.	Appr	Date	Description	Mark
0	-			

Date: 3/17/23
M&N Project No. 222911
Drawing cnstr:
Drawing Scale:
Plot scale: 1:1 (D SHEET)

Designed by: CW
Dwn by: FS
Ckd by: ME
Reviewed by: GN
Submitted by: SUBMITTER'S NAME MOFFATT & NICHOL

moffatt & nichol

PROFESSIONAL ENGINEER - STATE OF NEVADA
CORY A. WILDER
Exp: 06/30/24
CIVIL
No. 30653
SEAL 3/23/23

Sheet Reference No.
S-003
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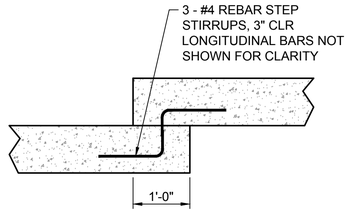
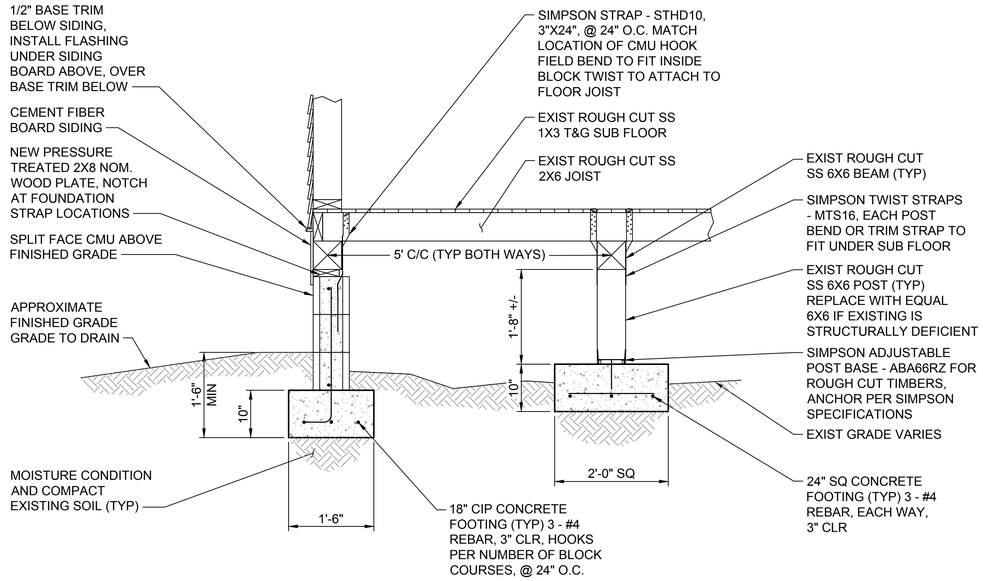
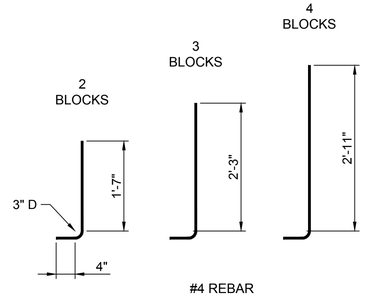


C1 S-004 TYPICAL EXTERIOR STEM WALL FOOTING STEP
SCALE: 3/4"=1'-0" SEE SHT S-003 FOR APPROX LOCATIONS



C3 S-004 TYP EXTERIOR STEM WALL AND FOOTING
SCALE: 3/4"=1'-0" SEE SHT S-003

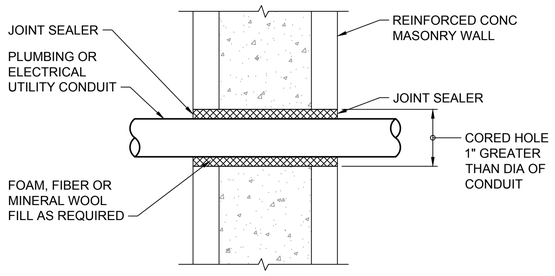
C4 S-004 TYP INTERIOR POST AND FOOTING
SCALE: 3/4"=1'-0" SEE SHT S-003



C5 S-004 CMU REBAR HOOKS
SCALE: 3/4"=1'-0"

NOTES

1. TYPICAL THREE COURSE BLOCK SECTION SHOWN. ADJUST NUMBER OF COURSES AND FOOTING ELEVATION TO FIT TERRAIN AND MAINTAIN MINIMUM FROST DEPTH. SEE FOUNDATION WALL ELEVATIONS FOR APPROXIMATE LAYOUT.
2. INSTALL CMU REBAR HOOKS AND FLOOR FRAME STRAPS AT EACH BUILDING CORNER, BOTH WALLS OF CORNER.
3. INSTALL CMU REBAR HOOKS AND FLOOR FRAME STRAPS BELOW EACH BUILDING ENVELOPE OPENING AT KING STUD LOCATIONS (LEFT AND RIGHT OF EACH OPENING).



A1 S-004 UTILITY PENETRATION DETAIL
SCALE: 3"=1'-0"

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2'-0" 0'-0" 1'-0" 2'-0"
SCALE: 3/4"=1'-0"

REVISION 0-2023-03-23
FOR CONSTRUCTION
ISSUED: 2023-03-23

TOWN OF GENOA

Mark	Description	Date	Appr

TOWN OF GENOA
CHURCH FOUNDATION REPAIR

BUILDING FOUNDATION SECTIONS

Designed by: CW	Cad by: ME	Drawing code:	Rev: 0 -
Drawn by: FS	Reviewed by: GN	Submitted by: SUBMITTERS NAME MOFFATT & NICHOL	Drawing Scale: 1:1 (D SHEET) Plot scale: 1:1
			Date: 3/7/23
			M&N Project No. 222911

moffatt & nichol

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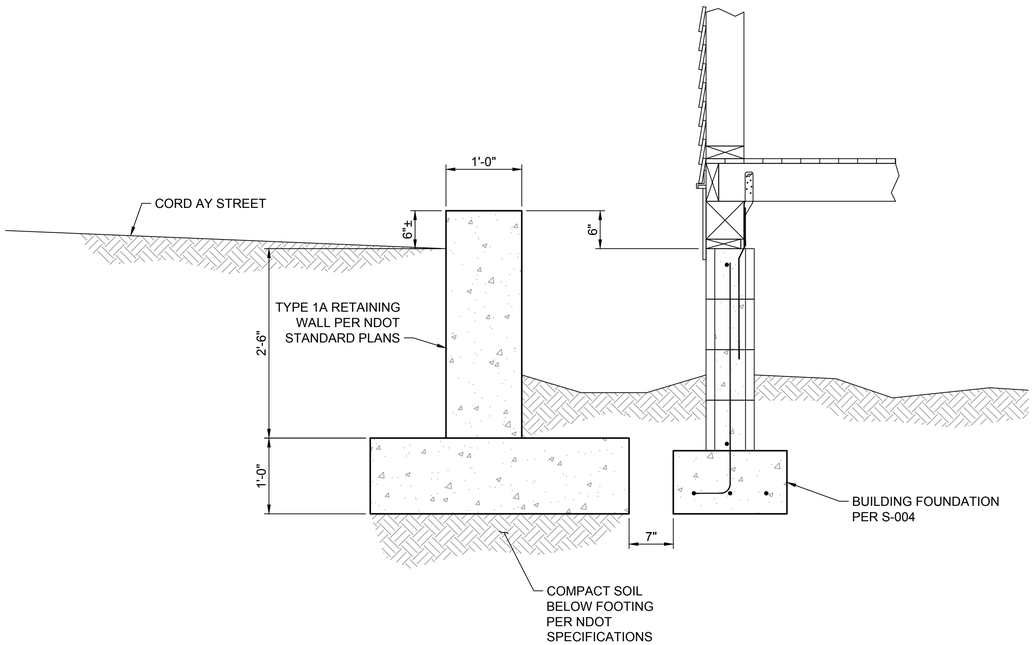
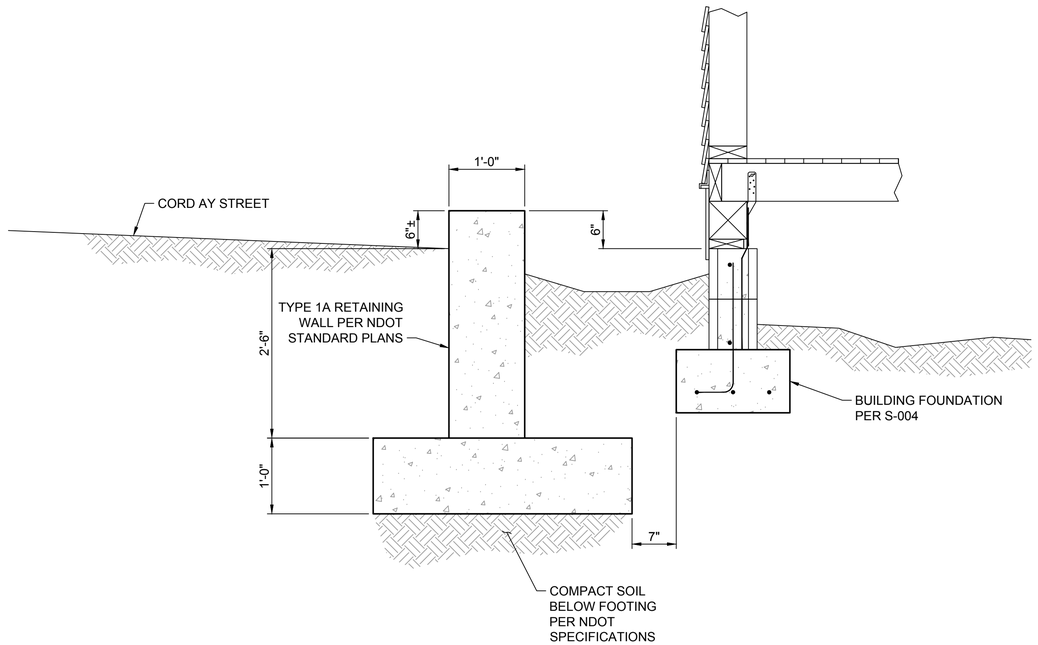
DB23-0477



D1 SECTION
S-005 SCALE: 1"=1'-0"



D4 SECTION
S-005 SCALE: 1"=1'-0"

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1'-0" 0'-0" 1'-0" 2'-0"
SCALE: 1"=1'-0"

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FOR CONSTRUCTION
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TOWN OF GENOA
SINCE 1861

Mark	Description	Date	Appr

TOWN OF GENOA
CHURCH FOUNDATION REPAIR

FOUNDATION TYPICAL SECTIONS

moffatt & nichol

Designed by: CW
Drawn by: FS
Checked by: ME
Reviewed by: GN
Submitted by: SUBMITTER'S NAME MOFFATT & NICHOL
Date: 3/17/23
M&N Project No. 222911
Drawing code:
Drawing Scale: Plot scale: 1:1 (D SHEET)
Rev. 0 -

PROFESSIONAL ENGINEER - STATE OF NEVADA
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Exp: 06/30/24
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No. 30653
SEAL 3/23/23

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S-005
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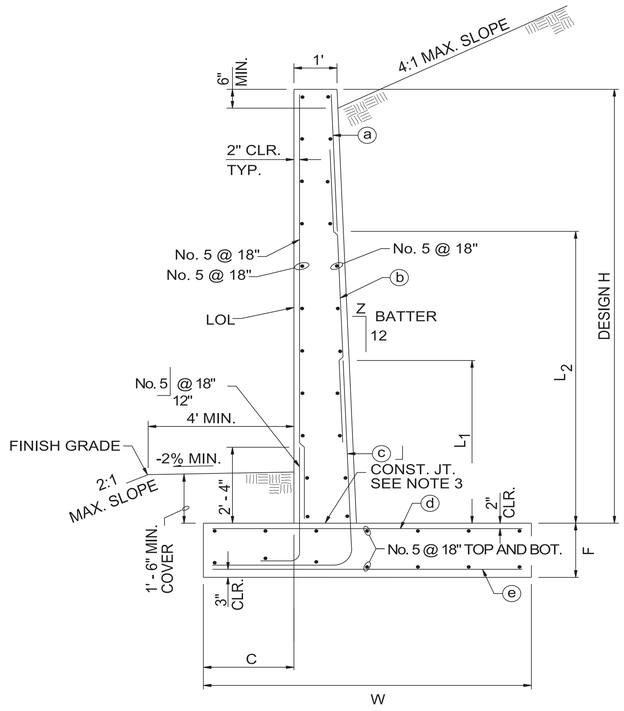

TYPICAL SECTION: TYPE 1A

NOTES:

1. For additional notes see detail CW-4.
2. For details not shown and drainage requirements see details CW-4 thru CW-6.
3. Roughen construction joint surface to ¼-inch amplitude.
4. Geotechnical Engineer will verify maximum allowable bearing pressures for actual site soil conditions.

REINFORCED CONCRETE RETAINING WALL TYPES 1A, 1B AND 1C					
BACKFILL CONDITION	WALL TYPE REQUIRED FOR SEISMIC ACCELERATION				
	0.15G	0.25G	0.35G	0.40G	0.50G
LEVEL BACKFILL WITH SURCHARGE	1A	1A	1A	1A	1A
SLOPING BACKFILL WITHOUT SURCHARGE					
SLOPE ≤ 4:1	1A	1B	1B	1B	1B
4:1 SLOPE ≤ 3:1	1B	1B	1B	1B	*
3:1 SLOPE ≤ 2:1	1C	*	*	*	*

* SPECIAL DESIGN REQUIRED

LAYOUT AND REINFORCEMENT DATA	TYPE 1A - REINFORCED CONCRETE RETAINING WALL TABLE OF DIMENSIONS AND REINFORCING STEEL													
DESIGN H	4'	6'	8'	10'	12'	14'	16'	18'	20'	22'	24'	26'	28'	30'
W	3' - 5"	4' - 10"	6' - 2"	7' - 8"	9'	10' - 4"	11' - 7"	12' - 11"	14' - 8"	16' - 4"	18' - 1"	19' - 9"	21' - 4"	22' - 11"
F	1'	1'	1'	1' - 4"	1' - 4"	1' - 4"	1' - 4"	1' - 6"	1' - 8"	2'	2' - 4"	2' - 9"	3' - 3"	3' - 9"
C	1'	1' - 3"	1' - 6"	1' - 9"	2' - 1"	2' - 5"	2' - 10"	3' - 3"	3' - 9"	4' - 3"	4' - 10"	5' - 5"	6'	6' - 7"
BATTER, Z	½	½	½	½	½	½	½	½	½	⅝	⅝	¾	¾	⅞
(a) BARS	-	-	-	-	-	-	-	-	No. 5 @ 18"	No. 5 @ 18"	No. 5 @ 12"	No. 5 @ 12"	No. 5 @ 12"	No. 5 @ 12"
(b) BARS	-	-	-	-	No. 5 @ 12"	No. 5 @ 12"	No. 6 @ 12"	No. 5 @ 6"	No. 5 @ 6"	No. 5 @ 6"	No. 6 @ 6"	No. 6 @ 6"	No. 7 @ 6"	No. 7 @ 6"
(c) BARS	No. 5 @ 12"	No. 5 @ 12"	No. 5 @ 12"	No. 5 @ 6"	No. 6 @ 6"	No. 7 @ 6"	No. 7 @ 6"	No. 8 @ 6"	No. 9 @ 6"	No. 9 @ 6"	No. 10 @ 6"	No. 10 @ 6"	No. 11 @ 6"	No. 11 @ 6"
(d) BARS	No. 5 @ 12"	No. 5 @ 12"	No. 5 @ 12"	No. 5 @ 6"	No. 5 @ 6"	No. 6 @ 6"	No. 7 @ 6"	No. 8 @ 6"	No. 9 @ 6"	No. 9 @ 6"	No. 9 @ 6"	No. 9 @ 6"	No. 9 @ 6"	No. 9 @ 6"
(e) BARS	No. 5 @ 12"	No. 5 @ 12"	No. 5 @ 12"	No. 5 @ 12"	No. 5 @ 12"	No. 6 @12"	No. 5 @ 6"	No. 5 @ 6"	No. 5 @ 6"	No. 5 @ 6"	No. 5 @ 6"	No. 6 @ 6"	No. 6 @ 6"	No. 6 @ 6"
L_1	-	-	-	-	5'	6'	6' - 6"	7'	No. 7' - 6"	8'	8' - 6"	9'	9' - 6"	10'
L_2	-	-	-	-	-	-	-	-	14'	15' - 6"	17'	18' - 6"	20'	22'
EST. QTY.: CONCRETE FT.^{3}/FT.	7.8	11.6	15.5	22.4	27.0	31.9	36.8	44.2	52.8	67.3	81.2	101.5	121.9	148.8
EST. QTY.: REINF. LBS./FT.	31	42	53	88	108	151	193	259	329	364	455	514	629	679
MAX TOE PRESSURE (KSF): LEVEL SLOPE WITH SURCH.	1.0	1.3	1.6	1.9	2.2	2.4	2.6	2.9	3.0	3.2	3.4	3.7	3.9	4.2
LEVEL SLOPE @ 0.15G	0.9	1.2	1.5	1.9	2.1	2.4	2.6	2.9	3.1	3.3	3.5	3.8	4.1	4.5
LEVEL SLOPE @ 0.25G	0.9	1.2	1.6	2.0	2.3	2.5	2.8	3.1	3.3	3.6	3.8	4.1	4.5	4.8
LEVEL SLOPE @ 0.35G	1.0	1.3	1.6	2.1	2.4	2.7	3.0	3.3	3.6	3.9	4.1	4.5	4.9	5.3
LEVEL SLOPE @ 0.40G	1.0	1.3	1.7	2.2	2.5	2.8	3.1	3.5	3.7	4.0	4.3	4.6	5.1	5.5
LEVEL SLOPE @ 0.50G	1.1	1.4	1.8	2.3	2.7	3.0	3.4	3.8	4.0	4.4	4.7	5.1	5.5	6.0
SLOPE ≤ 4:1	0.7	1.1	1.4	1.8	2.1	2.4	2.7	3.0	3.2	3.6	3.8	4.1	4.5	4.9
SLOPE ≤ 4:1 @ 0.15G	0.8	1.2	1.6	2.1	2.5	2.8	3.2	3.6	3.9	4.2	4.6	4.9	5.4	5.8

STANDARD BAR LAPS		
BAR No.	UNCOATED	EPOXIED
4	20"	24"
5	26"	30"
6	31"	36"
7	39"	45"
8	51"	60"
9	64"	78"
10	82"	98"
11	100"	120"

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NEVADA DEPARTMENT OF TRANSPORTATION

CHIEF BRIDGE ENGR.
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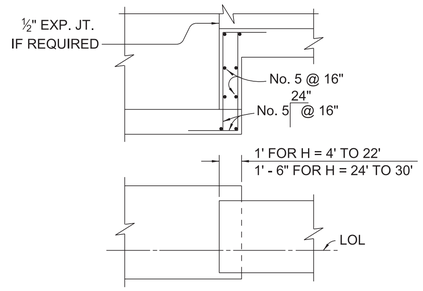
ADOPTED
12/2002

REVISED
10/2015

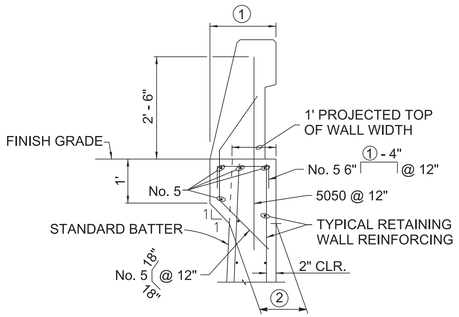
CANTILEVER CONCRETE RETAINING WALL TYPE 1A

SPEC. # 502

DETAIL NUMBER CW-1

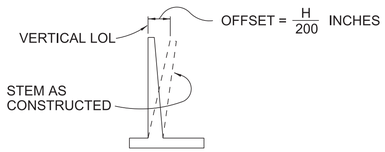


FOOTING STEP



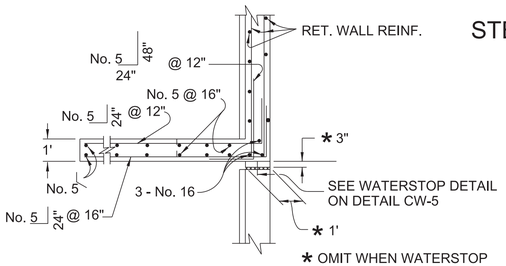
DIMENSION ①, BARRIER RAIL WIDTH, TO BE AS SHOWN IN THE PROJECT PLANS. STEM WIDTH ② AT BASE OF HAUNCH TO BE DETERMINED AS SHOWN.

STEM HAUNCH FOR BARRIER RAIL

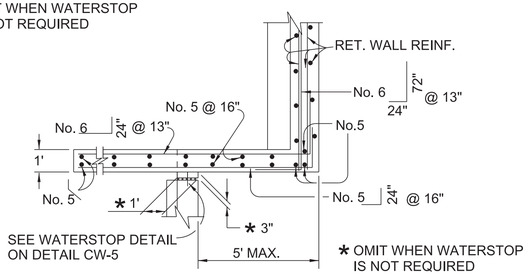


VALUES FOR OFFSETTING FORMS TO BE DETERMINED BY THE ENGINEER

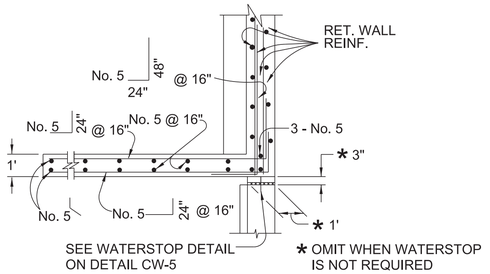
APPROXIMATE WALL OFFSET VALUES



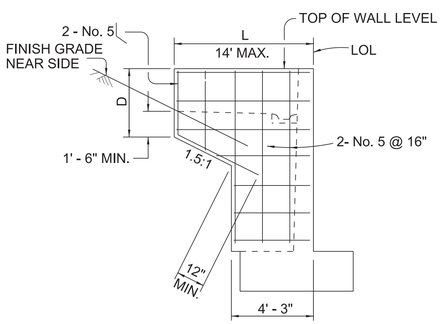
PLAN
RETURN WALL TYPE A



PLAN
RETURN WALL TYPE B

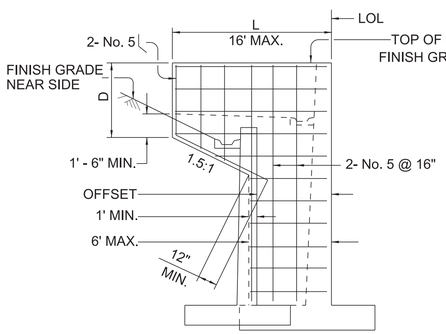


PLAN
RETURN WALL TYPE C



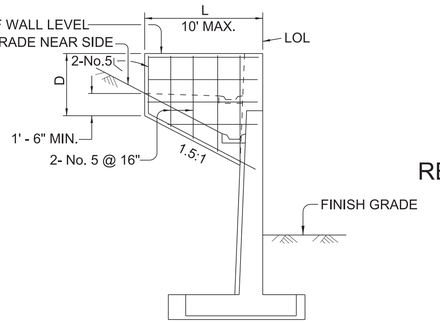
USE WHERE H = 8' OR LESS

ELEVATION
RETURN WALL TYPE A



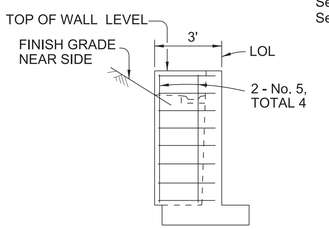
USE WHERE H = 10' OR MORE ON OFFSET WALLS

ELEVATION
RETURN WALL TYPE B



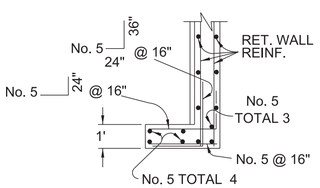
USE WHERE H = 10' OR MORE ON STRAIGHT WALLS

ELEVATION
RETURN WALL TYPE C



USE WHERE H = 6' OR LESS

ELEVATION
RETURN WALL TYPE D



PLAN
RETURN WALL TYPE D

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NOTES:

1. Design Specifications: AASHTO LRFD Bridge Design Specifications, 6th Edition 2012.
2. Loading: Live load surcharge pressure equal to 2-feet of earth.

   Seismic Acceleration = 0.15g, 0.25g, 0.35g, 0.40g and 0.50g, where ½ the peak ground acceleration is used in the design.
3. Concrete: All concrete shall be class A or AA modified, major, with F'c = 4 ksi at 28 days.
4. Reinforcing Steel: All reinforcing steel shall be ASTM A615 grade 60 or A706.
5. Design Data: Cantilevered Walls are designed based on the following parameters.

   Soil Properties:
   Internal Angle of Friction = 32°
   Unit Weight = 0.120 kcf
   Cohesion = 0.200 ksf
   Equivalent Active Fluid Pressure = 0.036 kcf
   Level Backfill
   Equivalent Active Fluid Pressure = 0.060 kcf
   2H: 1V Backfill
   Equivalent Active Fluid Pressure = Rankine Method, Sloping Backfill
   Equivalent Passive Fluid Pressure = 0.360 kcf
   Top of Footing Down
   Coefficient of Friction between Concrete Footing and Foundation Soil = 0.450
   Static + Seismic Earth Pressure Coefficient: K_ae: Mononobe-Okabe Method, If can be determined. Otherwise, special design required.
6. Footing Steps: Footing steps not required unless shown in plans. For dimension, D, see project plans.
7. Return Walls: Return wall not required unless shown in plans. For dimension, D, see project plans.
8. Drainage: Drainage system, gutter, drain, pipe, not required unless specified in the plans.
9. Stability Factors, For check only:
   Static Overturning = 2.0
   Static Sliding = 1.5
   Seismic Overturning = 1.5
   Seismic Sliding = 1.1

NEVADA DEPARTMENT OF TRANSPORTATION

CHIEF BRIDGE ENGR.
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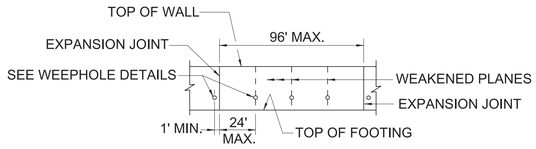
ADOPTED
10/2002

REVISED
10/2015

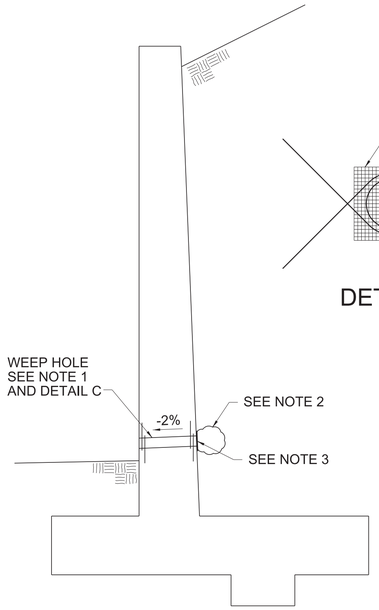
CANTILEVER CONCRETE
RETAINING WALL DETAILS NO.1

SPEC. #
502

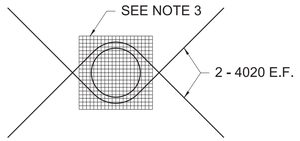
DETAIL
NUMBER
CW-4



WALL EXPANSION JOINTS AND WEAKENED PLANES



WEEP HOLE

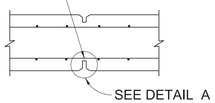


DETAIL C

WEEP HOLE NOTES:

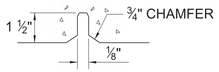
1. 4-inch dia. drains at 25-feet maximum center to center. Exposed drains shall be located 3-inches ± above finish grade.
2. 2-cubic feet of type 2 drain backfill encapsulated in a geotextile fabric securely tied. Geotexile shall meet the following:
   - A. Meet at least class 2 strength requirement per AASHTO M288 test method.
   - B. Have an AOS not greater than U.S. sieve No. 40.
   - C. Have a permittivity of at least 0.5 Sec^{-1}
3. 6-inch square aluminum or galvanized steel wire mesh hardware cloth, 4 openings per inch and minimum wire diameter 0.03-inches.

CUT OR BUTT EVERY OTHER FRONT FACE HORIZONTAL BAR AT WEAKENED PLANES



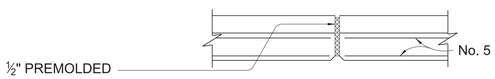
SECTION

JOINT MAY BE FORMED WITH ⅛" HARDBOARD AND CUT BACK TO THE ROOT OF THE CHAMFER ON THE EXPOSED FACE



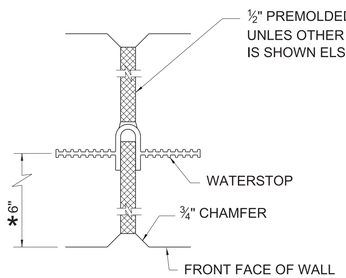
DETAIL A

WEAKENED PLANES



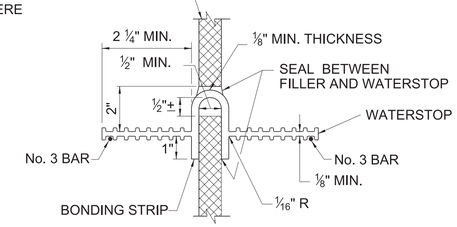
PLAN OF WALL WITH EXPANSION JOINT ONLY

PLAN OF WALL WITH EXPANSION JOINT AND WATERSTOP



WALL EXPANSION JOINT WITH WATERSTOP

*FOR WALL THICKNESS LESS THAN 12", USE ½ THE WALL THICKNESS



WATERSTOP

WATERSTOP NOTES:

1. Holes will be permitted in the outer ½-inch of the web for wire, rings, etc. tie web to No. 3 reinforcing bars @ 16-inch maximum intervals to support the waterstop in proper position during concrete placement. Alternative detail may be submitted for approval of the engineer.
2. Waterstop to have 5 or more pairs of raised ribs to provide 0.1-square inches minimum rib cross-section area on each half of the waterstop.

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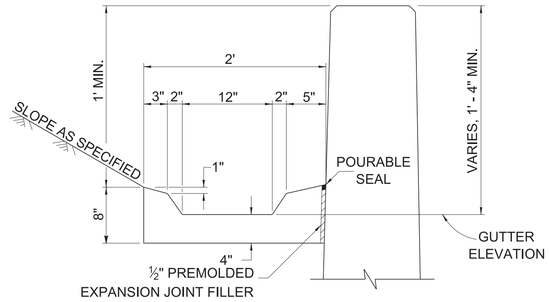
ADOPTED
10/2002

REVISED
6/2004

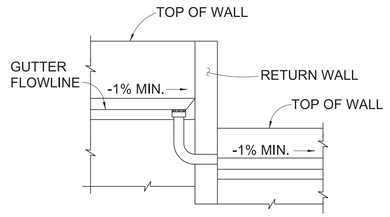
CANTILEVER CONCRETE RETAINING WALL DETAILS NO. 2

SPEC. # 502

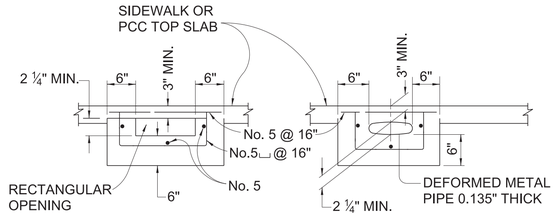
DETAIL NUMBER CW-5



TYPICAL GUTTER DETAIL

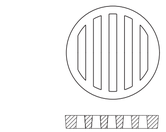


SECTION A-A



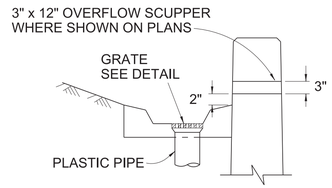
AREA OF OPENING TO BE NOT LESS THAN THAT OF PIPE FROM WALL GUTTER. MAKE OPENING TRANSITION IN WALL. EDGE OPENING IN CURB FACE TO ¾" MINIMUM RADIUS.

OUTLET DETAIL - SECTION B-B

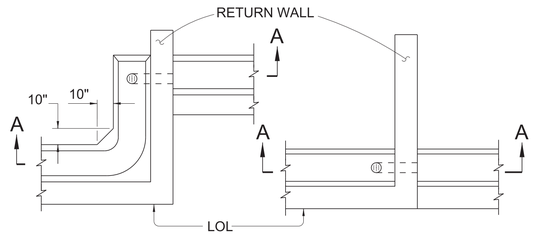


SIZES TO FIT STANDARD HUBS

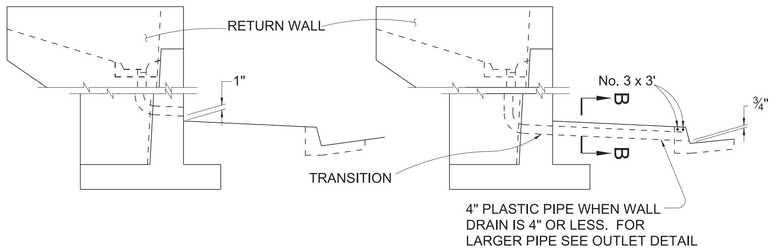
GRATE DETAIL



WALL DRAIN DETAIL

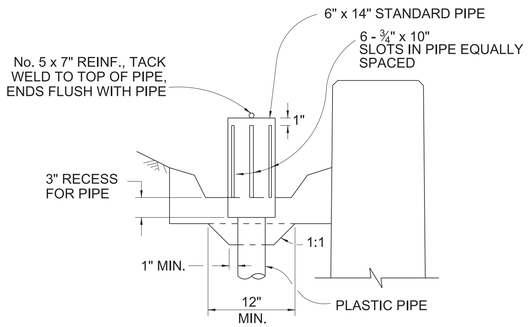


PLAN-OFFSET WALL PLAN-CONTINUOUS WALL
DRAIN THROUGH RETURN WALL

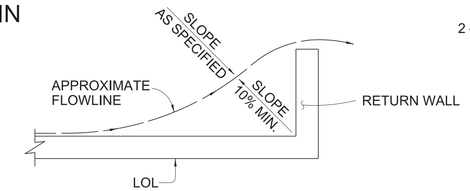


RETAINING WALL
FACE OF WALL OUTLET

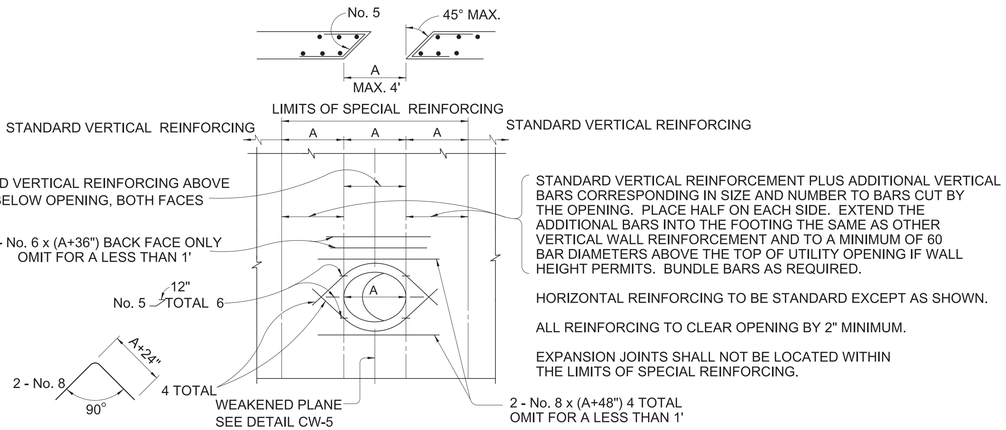
RETAINING WALL
GUTTER OUTLET



ALTERNATIVE WALL DRAIN
WITH PIPE DOME



WALL DRAINAGE
WHERE GUTTER NOT REQUIRED



STANDARD VERTICAL REINFORCEMENT PLUS ADDITIONAL VERTICAL BARS CORRESPONDING IN SIZE AND NUMBER TO BARS CUT BY THE OPENING. PLACE HALF ON EACH SIDE. EXTEND THE ADDITIONAL BARS INTO THE FOOTING THE SAME AS OTHER VERTICAL WALL REINFORCEMENT AND TO A MINIMUM OF 60 BAR DIAMETERS ABOVE THE TOP OF UTILITY OPENING IF WALL HEIGHT PERMITS. BUNDLE BARS AS REQUIRED.

HORIZONTAL REINFORCING TO BE STANDARD EXCEPT AS SHOWN.

ALL REINFORCING TO CLEAR OPENING BY 2" MINIMUM.

EXPANSION JOINTS SHALL NOT BE LOCATED WITHIN THE LIMITS OF SPECIAL REINFORCING.

MAXIMUM SIZE OF OPENING (A) = 4'

RETAINING WALL UTILITY OPENING

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ADOPTED
12/2002

REVISED

CANTILEVER CONCRETE
RETAINING WALL DETAILS NO. 3

SPEC. # 502

DETAIL NUMBER
CW-6