



# REDWOOD ROCHESTER HILLS

E. AVON ROAD  
ROCHESTER HILLS, MI 48307  
OAKLAND COUNTY



7510 E. PLEASANT VALLEY RD  
INDEPENDENCE, OH 44131

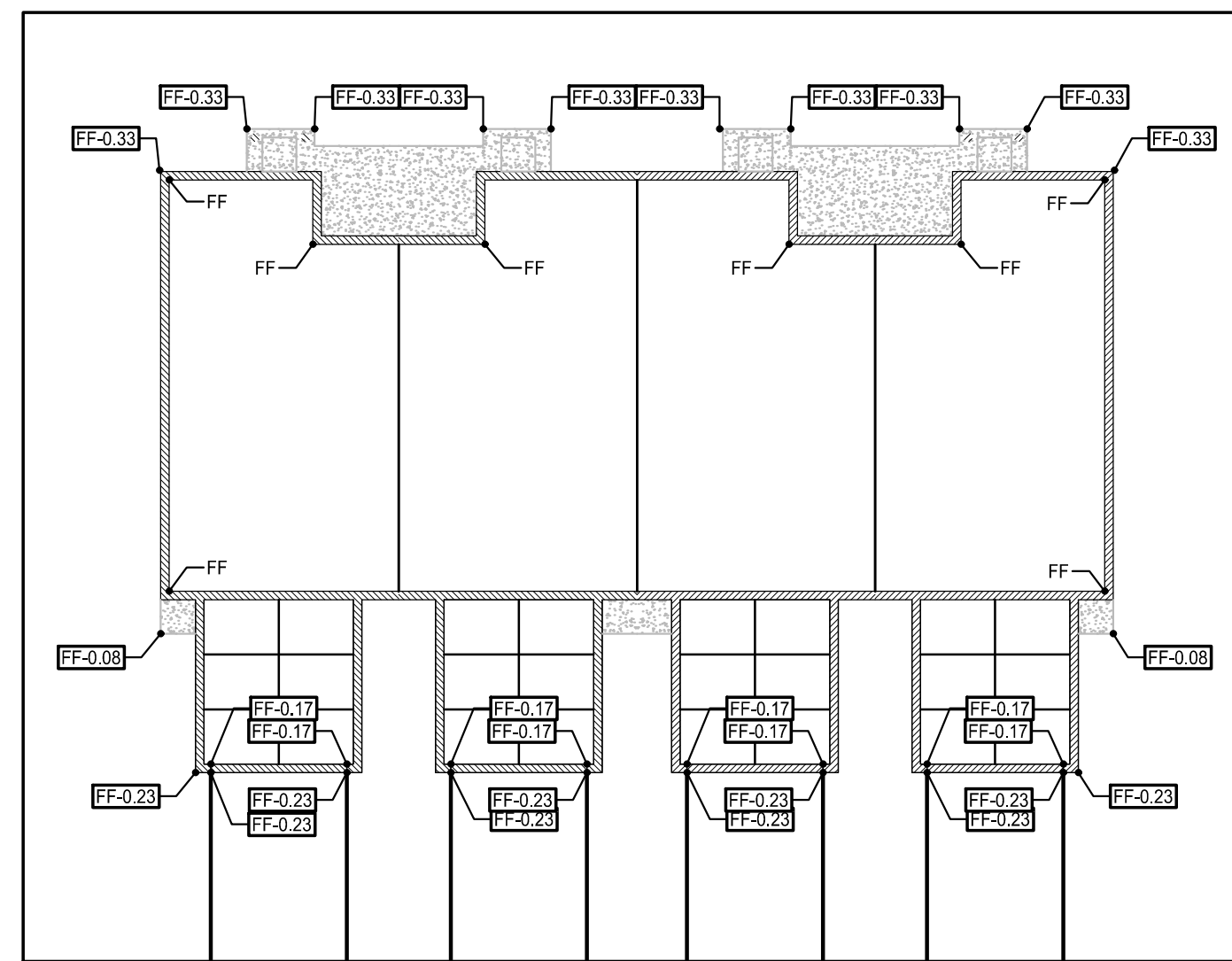


Bergmann Associates, Architects, Engineers,  
Landscape Architects & Surveyors, D.P.C.  
7050 West Saginaw Hwy.  
Suite 200  
Lansing, MI 48917

office: 517.272.9835  
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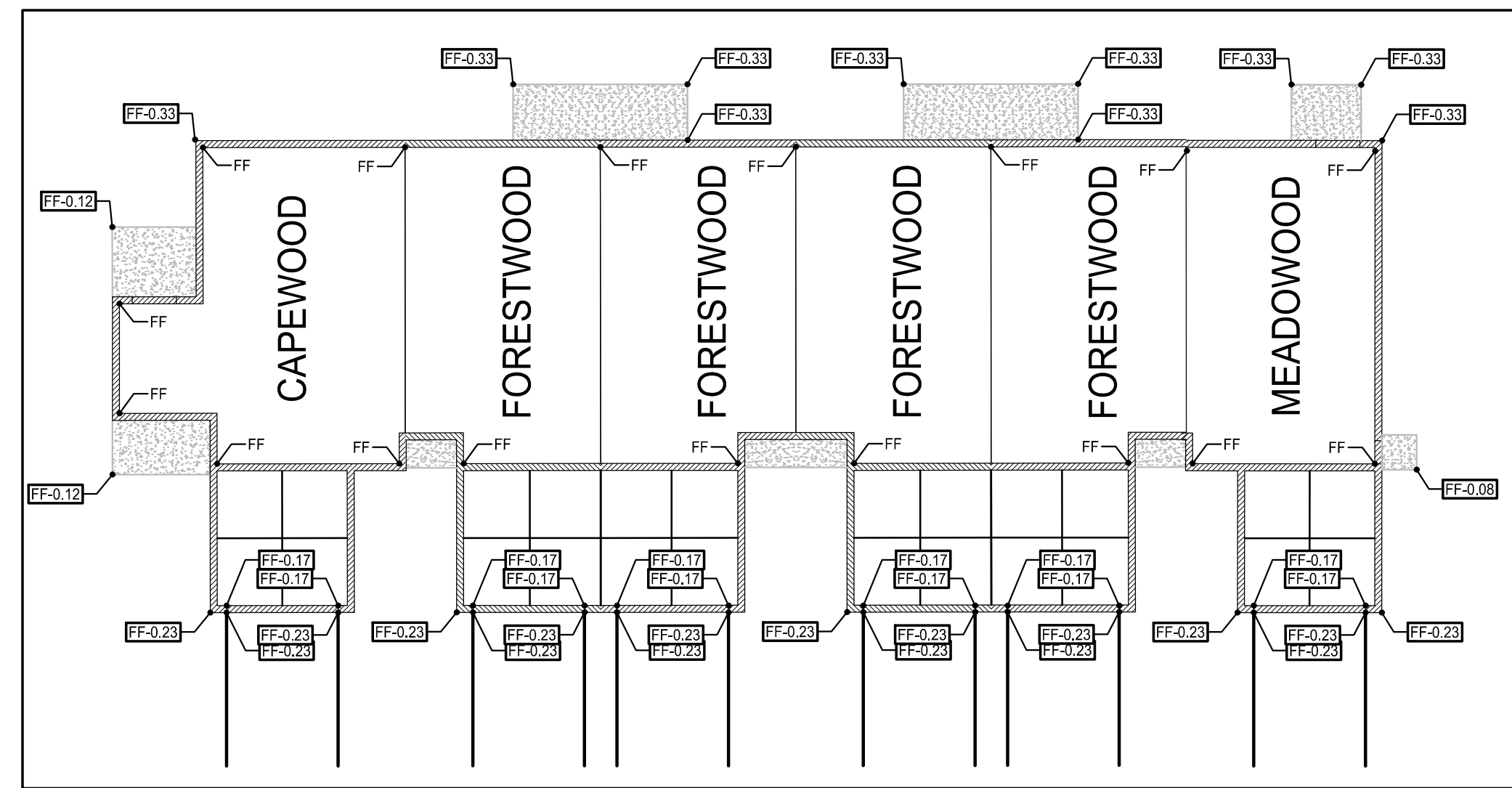
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DATE	DESCRIPTION
11/16/2018	PUD REVIEW
02/04/2019	REV. PER CITY COMMENTS
03/21/2019	2ND REV. PER CITY COMMENTS
08/02/2019	3RD REV. PER CITY COMMENTS
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06/09/2020	ENGINEERING RESUBMITTAL
07/06/2020	ENGINEERING RESUBMITTAL



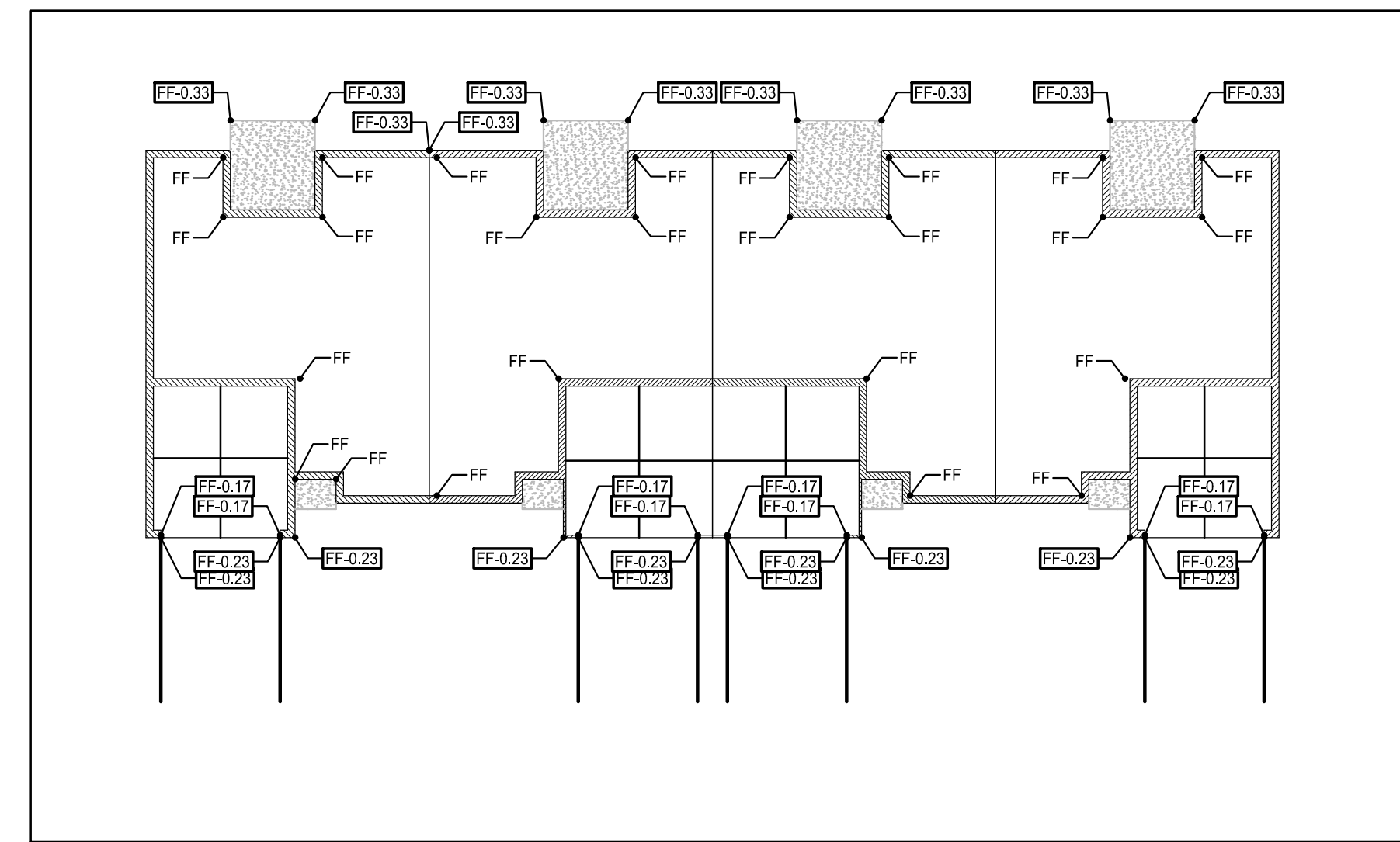
HAYDENWOOD TYPICAL GRADING DETAIL

SCALE: 1" = 20'



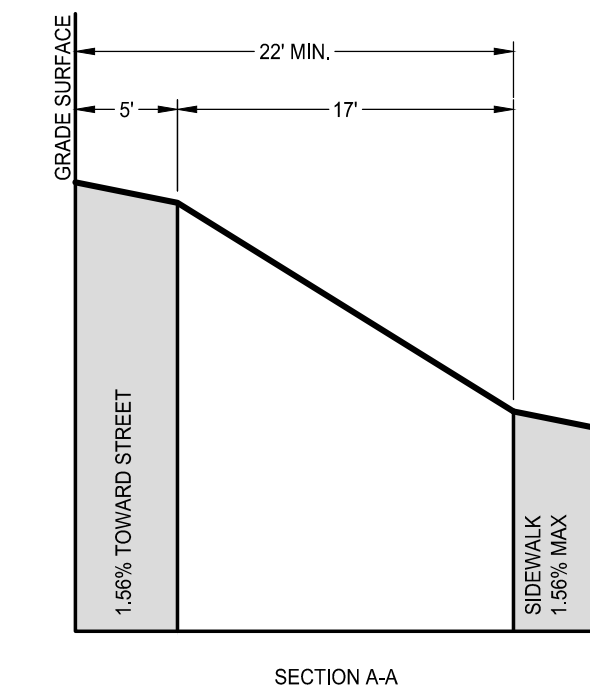
CAPEWOOD-FORESTWOOD-MEADOWWOOD TYPICAL GRADING DETAIL

SCALE: 1" = 20'



WILLOWOOD TYPICAL GRADING DETAIL

SCALE: 1" = 20'



SECTION A-A

### LEGEND

ACCESSIBLE PATH 1.56% MAX SIDE SLOPE  
AND 4.69% MAX LONGITUDINAL SLOPE

TYPICAL BUILDING GRADING DETAIL

SCALE: 1" = 20'

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Project Manager: P. FURTAW, PE	Checked By: P. FURTAW, PE
Designed By: I. GRAHAM, PE	Drawn By: I. GRAHAM, PE
Date Revisd: NOVEMBER 9, 2018	Project Number: 12963.00

### DRIVEWAY GRADING DETAILS

**C600**

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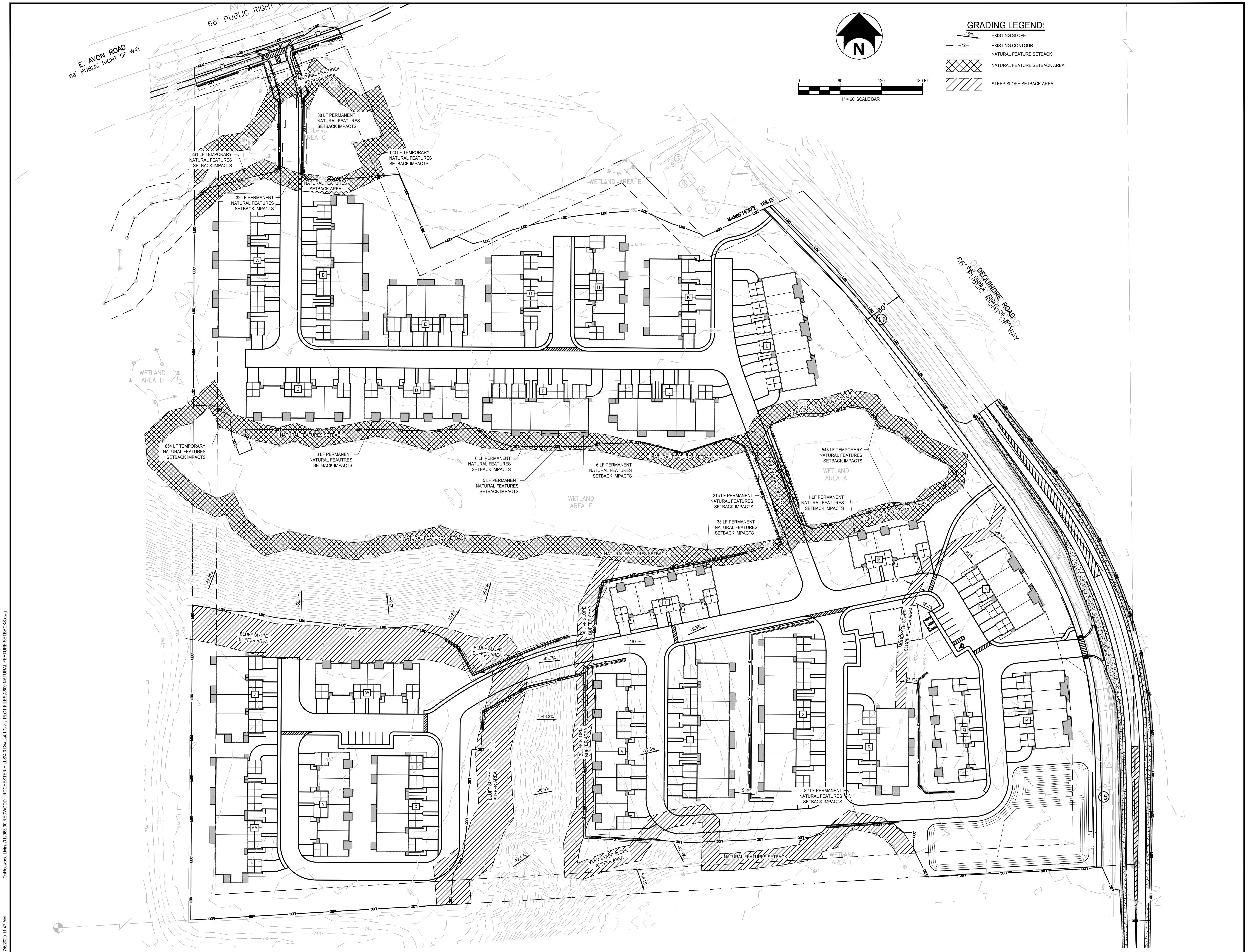
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## NATURAL FEATURE SETBACKS

# C601

CITY FILE #18-022 SECTION 13



7/6/2020 11:47 AM  
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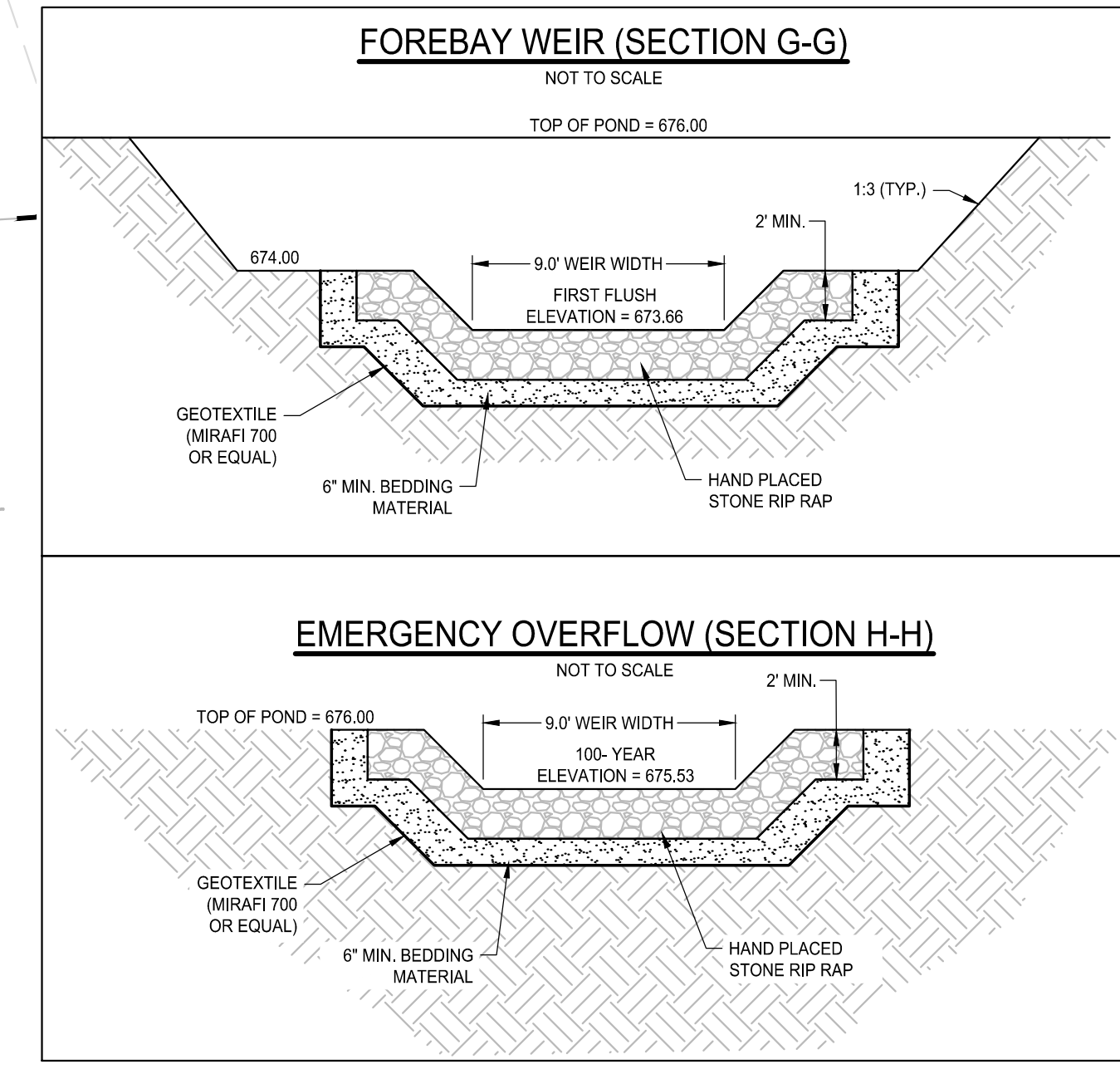
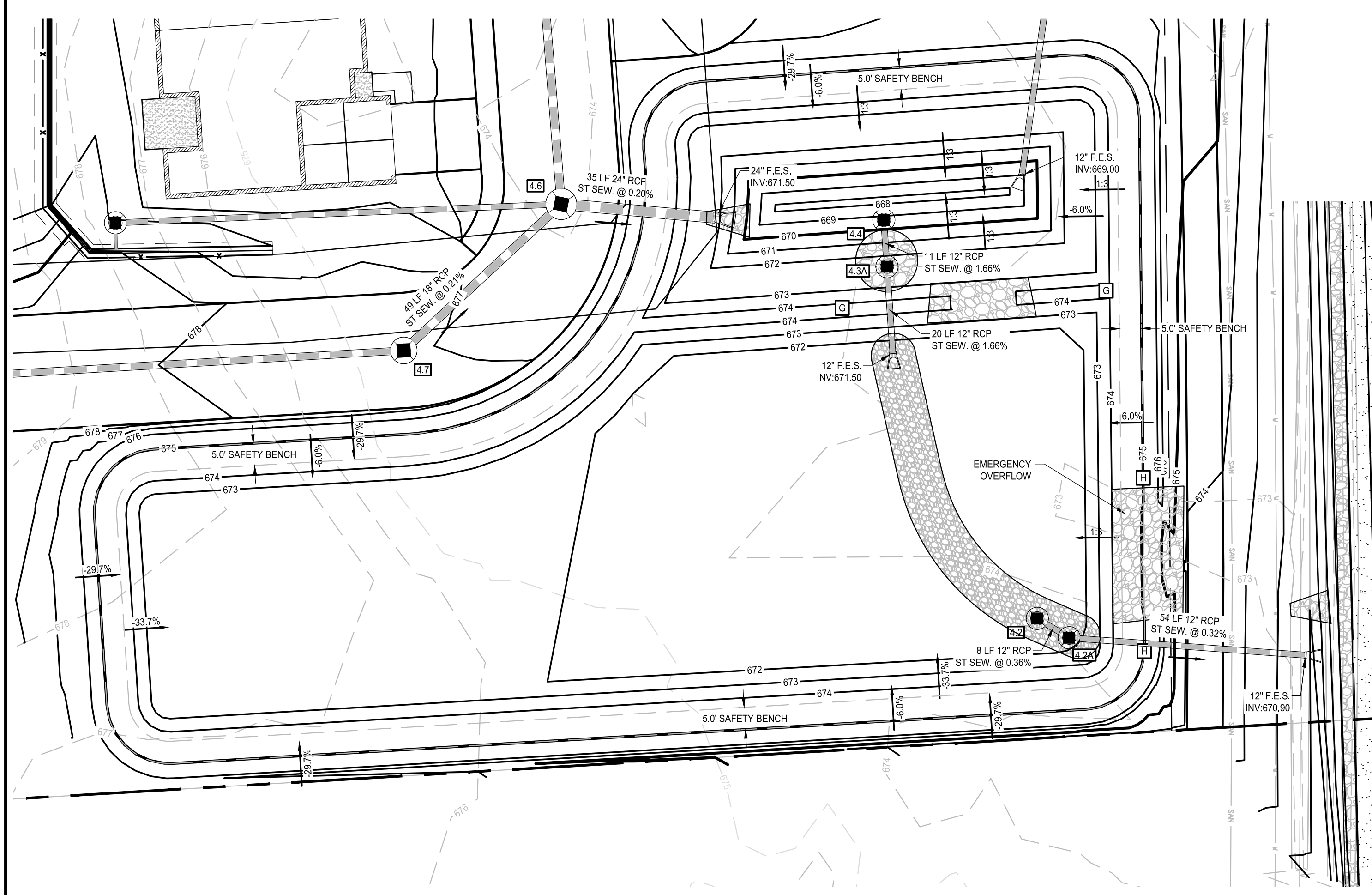
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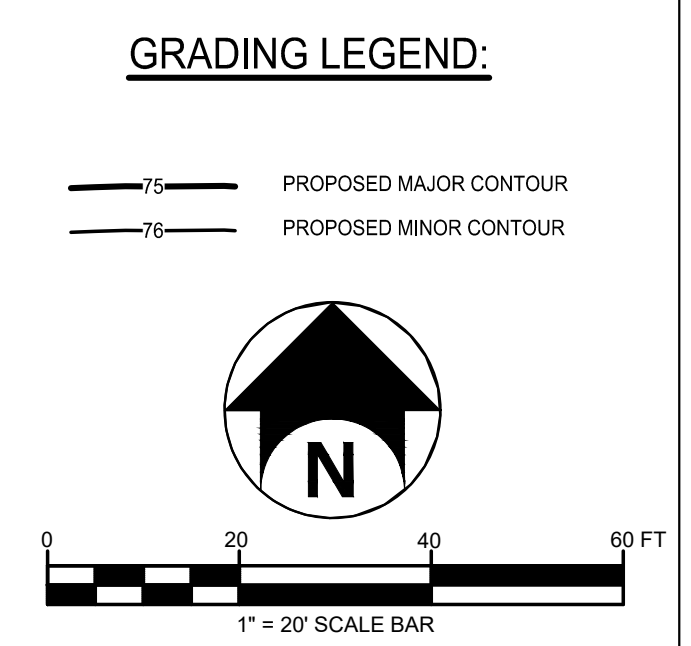
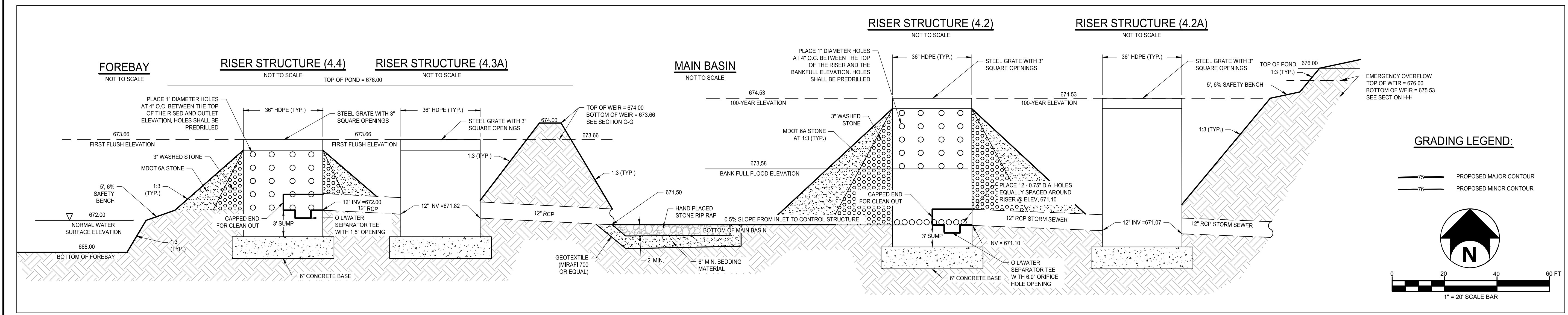
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Site Conditions					
Drainage Area =	7.76 Acres				
Impervious Area =	3.58 Acres				
Runoff Coefficient =	0.60				
Allowable Release Rate =	0.2 cfs/acre				
$Q_0 =$	1.552 cfs				
$Q_{10} =$	0.333 cfs				
(Allowable Release Rate)	$Q_0 = 0.20 * A$				
	$Q_{10} = Q_0 / (A * C)$				
Water Quality Volume					
$V_{WQ} =$	8445 cf				
(Water Quality Volume)	$V_{WQ} = 1815 * A * C$				
Bankfull Flood (1-Year) Volume					
$V_{BF} =$	31583 cf				
(Bankfull Flood Volume)	$V_{BF} = 6788 * A * C$				
100 Year Volume					
$T_{100} =$	115.3 min				
(Storage Time)	$T_{25} = -25 + \sqrt{\frac{6562.5}{Q_0}}$				
$V_5 =$	7091 cf				
(Storage per Acre Imperviousness)	$V_5 = \frac{10500 * T}{T + 25} - 40 * Q_0 * T$				
$V_T =$	32992 cf				
(Total Storage Volume Required)					
100 Year Volume					
$T_{100} =$	150.8 min				
(Storage Time)	$T_{100} = -25 + \sqrt{\frac{10312.5}{Q_0}}$				
$V_5 =$	12142 cf				
(Storage per Acre Imperviousness)	$V_5 = \frac{16500 * T}{T + 25} - 40 * Q_0 * T$				
$V_T =$	56493 cf				
(Total Storage Volume Required)	$V_T = V_5 * A * C$				
Forebay Storage Provided					
Elevation	Area (sf)	Depth (ft)	Volume (cf)	Total Volume (cf)	Elevation
671	2183	0	0	0	671
672	2874	1	2529	2529	672
673	3636	1	3255	5784	673
674	4469	1	4053	9836	674
Storage Provided					
Elevation	Area (sf)	Depth (ft)	Volume (cf)	Total Volume (cf)	Elevation
671.1	5200	0	0	0	671.1
672	8137	0.9	6669	6669	672
673	18730	1	13434	20102	673
674	20713	1	19722	39824	674
674.72	24202.84	0.72	22458	62281	674.72
Storage Elevations					
Water Quality	$X_{WQ} =$	673.66			
Bankfull (1-Year)	$X_{BF} =$	673.58			
100 Year	$X_{100} =$	674.53			
	25 Year	$X_{25} =$	673.65		



Water Quality	
$Q_{WQ} =$	0.098 cfs
$h_{weir} =$	1.780 ft
$A =$	0.0147 sf
$D =$	1.5 inches
$N =$	1.20
$N =$	1
$A_{new} =$	0.0123 sf
$Q_{new} =$	0.081 cfs
$T_{new} =$	28.8 hrs
(Allowable Release Rate, 24-hour Detention Time)	
(Water Quality Head)	
(Calculated Flow Area)	
(Orifice Diameter)	
(Number of Orifice Holes Needed)	
(Number of Orifice Holes Used)	
(Actual Flow Area)	
(Actual Water Quality Flow)	
(Time to Drain Water Quality Volume, > 24 Hours)	
Bankfull Flood	
$Q =$	0.219 cfs
$h_{weir} =$	1.73 ft
$A_2 =$	0.0335 sf
$D =$	0.75 inches
$N =$	10.92
$N =$	10
$A_{new} =$	0.0307 sf
$Q_{new} =$	0.201 cfs
$T_{BF} =$	43.70 hrs
(Allowable Release Rate, Bankfull Flood)	
(Bankfull Flood Head)	
(Calculated Flow Area)	
(Orifice Diameter)	
(Number of Orifice Holes Needed)	
(Number of Orifice Holes Used)	
(Actual Flow Area)	
(Actual Bankfull Flood Flow)	
(Time to Drain Bankfull Flood Volume, 24-48 Hours)	
100 Year Flood	
$Q_0 =$	1.552 cfs
$Z_{out} =$	672.00
$h_{weir} =$	2.53 ft
$A_{100} =$	0.1959 sf
$D =$	6 inches
$N =$	1.00
$N =$	0
$A_{new} =$	0.0000 sf
$Q_{TOT} =$	0.000 cfs
(Allowable Release Rate, 100-Year Flood)	
(Crown of 12" Outfall Pipe)	
(Calculated Outlet Tee Flow Area)	
(Outlet Tee Diameter)	
(Number of Orifice Holes Needed)	
(Number of Orifice Holes Used)	
(Actual Outlet Tee Flow Area)	
(100-Year Release Rate)	
Forebay Weir	
$I_{10} =$	1.248 in/hr
$C =$	0.600
$A =$	7.758
$Q_{10} =$	5.804 cfs
$C =$	3.4
Top of Weir =	674.00
$H =$	0.343
$B =$	8.487 ft
(10-Year Rainfall Intensity)	
(Runoff Coefficient)	
(Drainage Area)	
(10-Year Runoff)	
(Weir Coefficient)	
(Head on Weir)	
(Calculated Width of Weir)	



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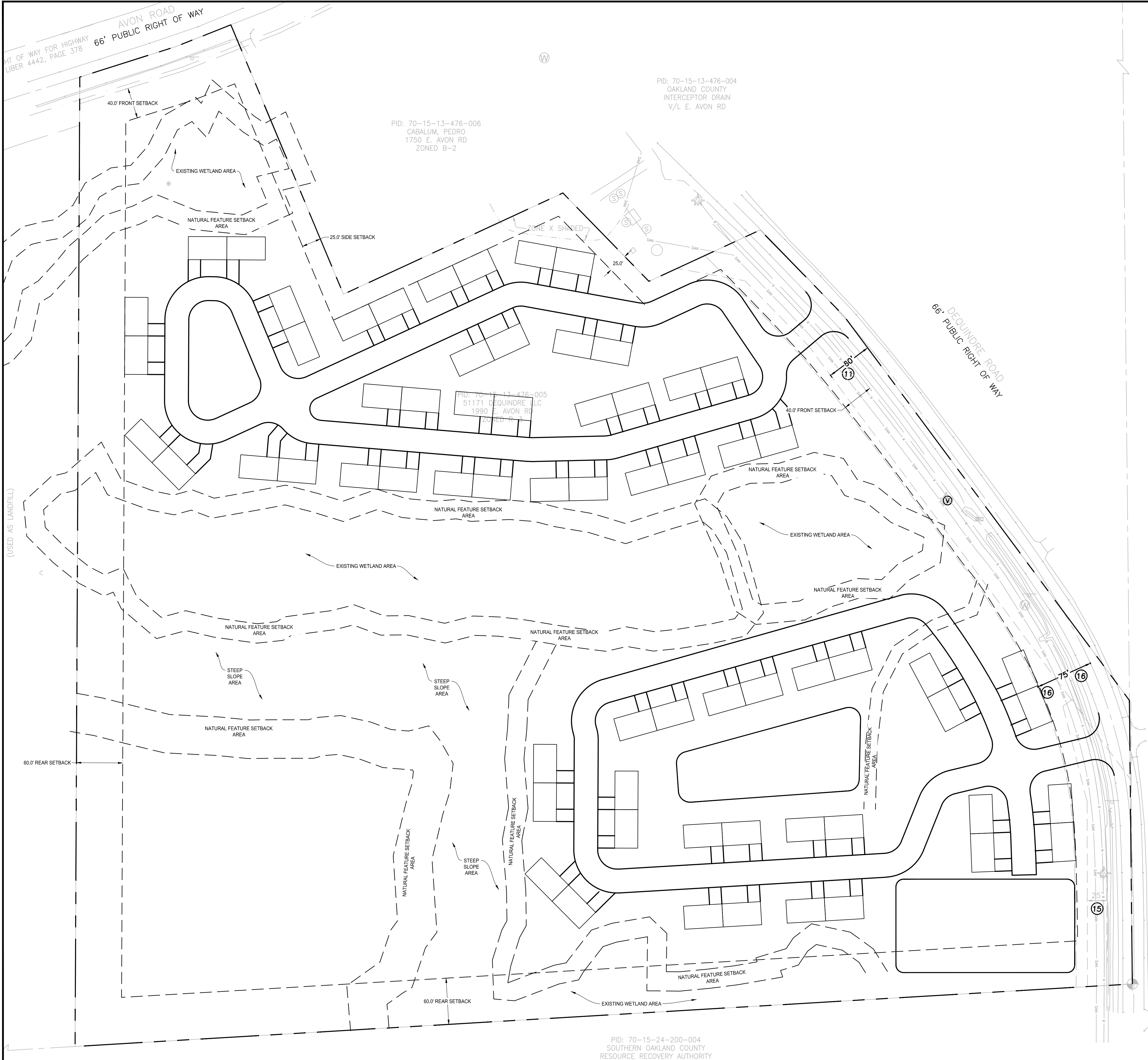
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Project Manager	Checked By
P. FURTAW, PE	P. FURTAW, PE
Designer	Drawn By
I. GRAHAM, PE	I. GRAHAM, PE
Date Revisd	Project Number
NOVEMBER 9, 2018	12963.00

## DETENTION POND PLAN AND DETAILS

# C602

ARCH ID 24K05  
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 User: C:\Users\jgibson\Documents\Projects\Redwood Living\012963.001 REDWOOD - ROCHESTER HILLS.dwg



**SITE DATA:**

PARCEL ID: 70-15-13-476-005  
 LAND USE: ATTACHED UNIT  
 ZONING: SITE - R3 - ONE FAMILY RESIDENTIAL DISTRICT (MR OVERLAY)  
 NORTH - R1 - ONE FAMILY RESIDENTIAL DISTRICT (PUD OVERLAY)  
 EAST - SHELBY TOWNSHIP  
 WEST - R3 - ONE FAMILY RESIDENTIAL DISTRICT  
 SOUTH - R3 - ONE FAMILY RESIDENTIAL DISTRICT  
 UNIT BREAKDOWN: 82 TOTAL UNITS = 2.73 UNITS PER ACRE  
 LOT AREA: 29.95 ACRES  
 SETBACKS: FRONT - 35 FEET  
 SIDE - 25 FEET  
 REAR - 60 FEET

**SITE LEGEND:**

--- PROPERTY SETBACK LINE  
 - - - - - PROPERTY LINE

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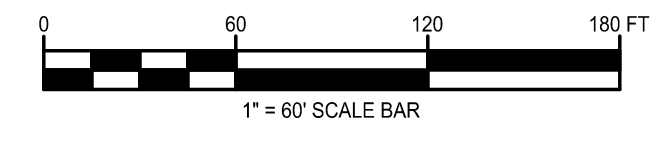
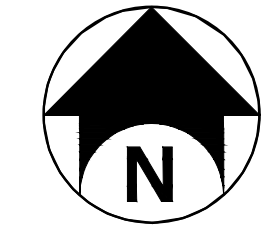
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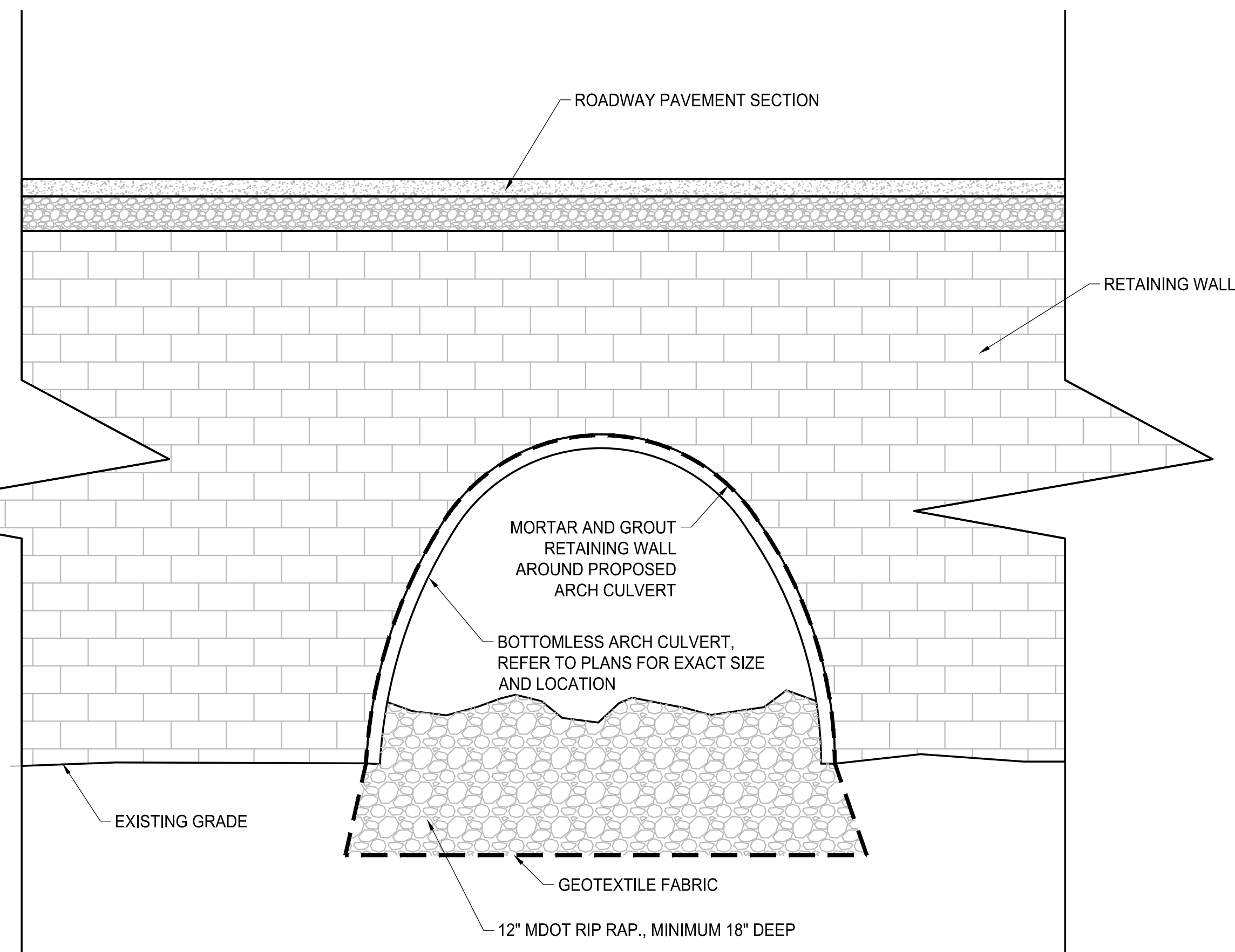
Project Manager: P. FURTAW, PE	Checked By: P. FURTAW, PE
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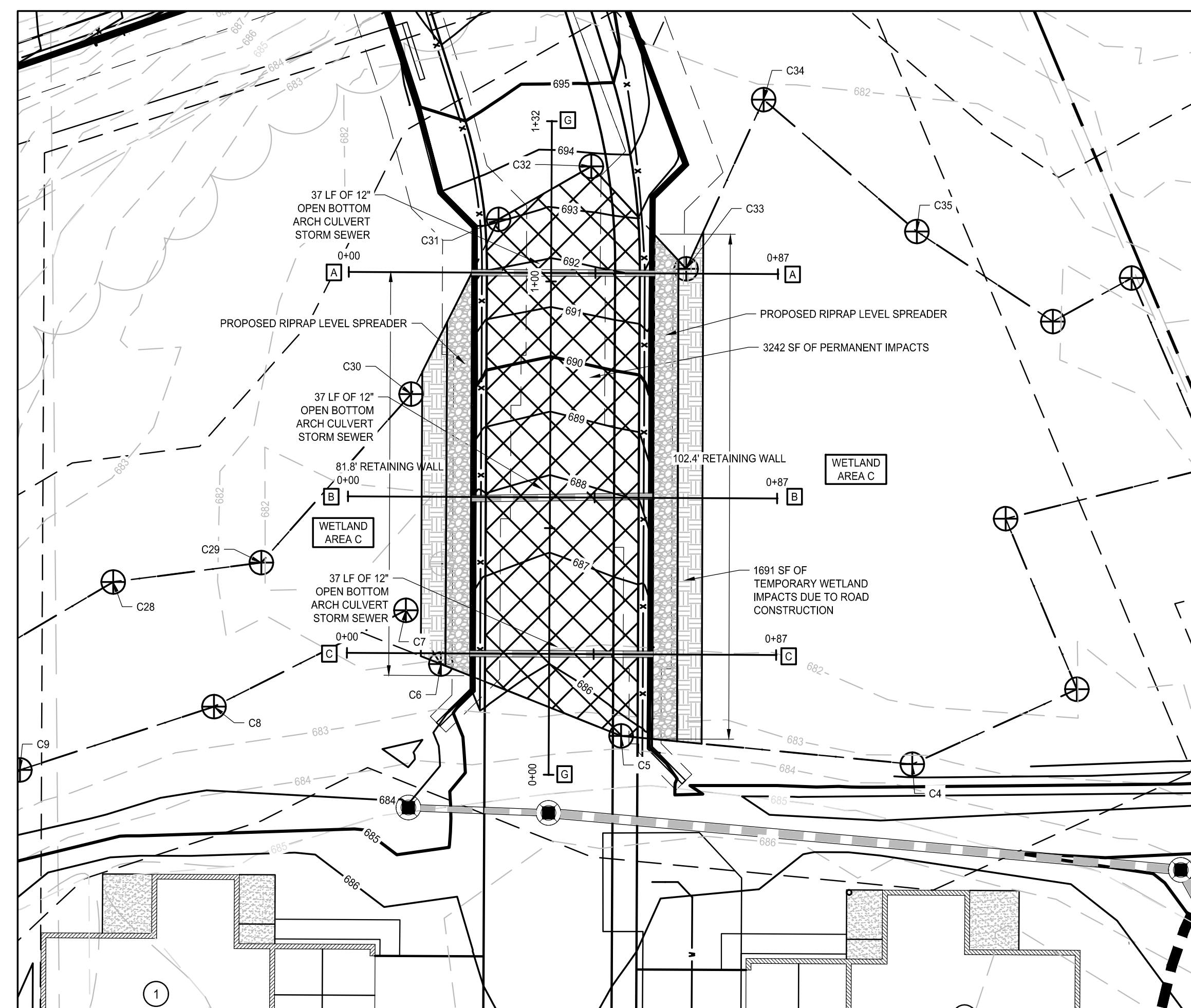
**EXISTING ZONING EXHIBIT**

**C604**

ARCH D 24x35



BOTTOMLESS ARCH CULVERT DETAIL



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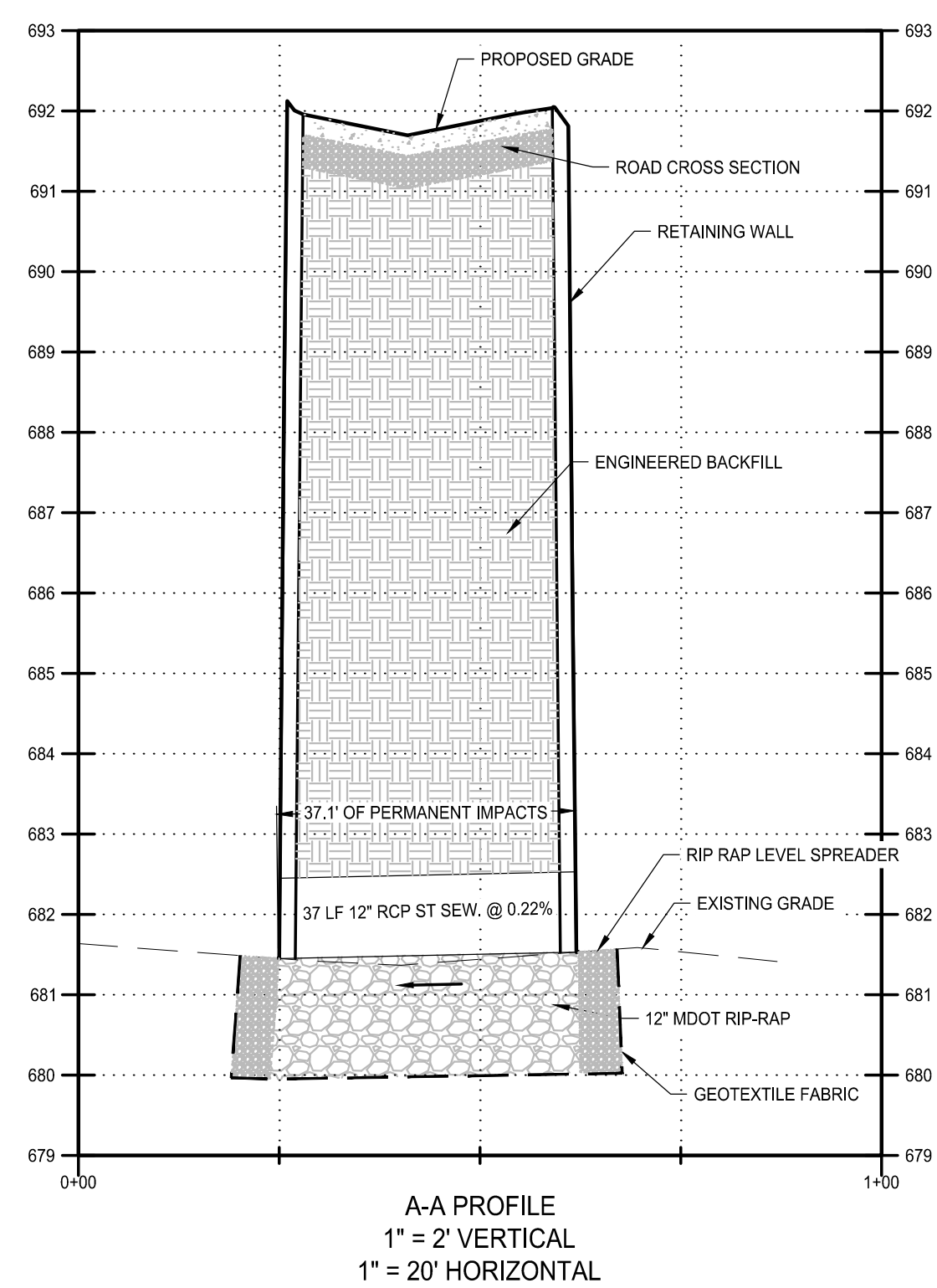


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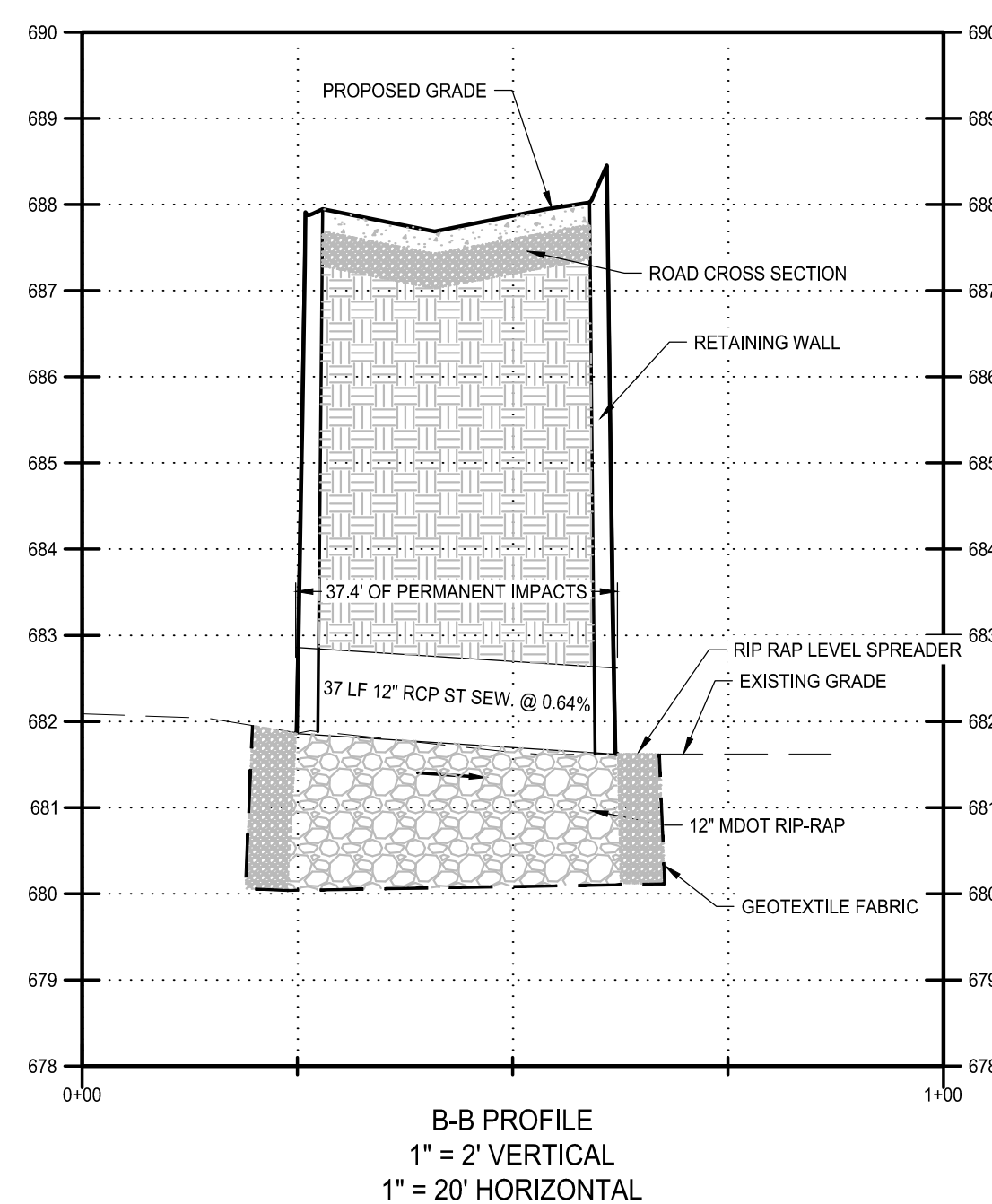
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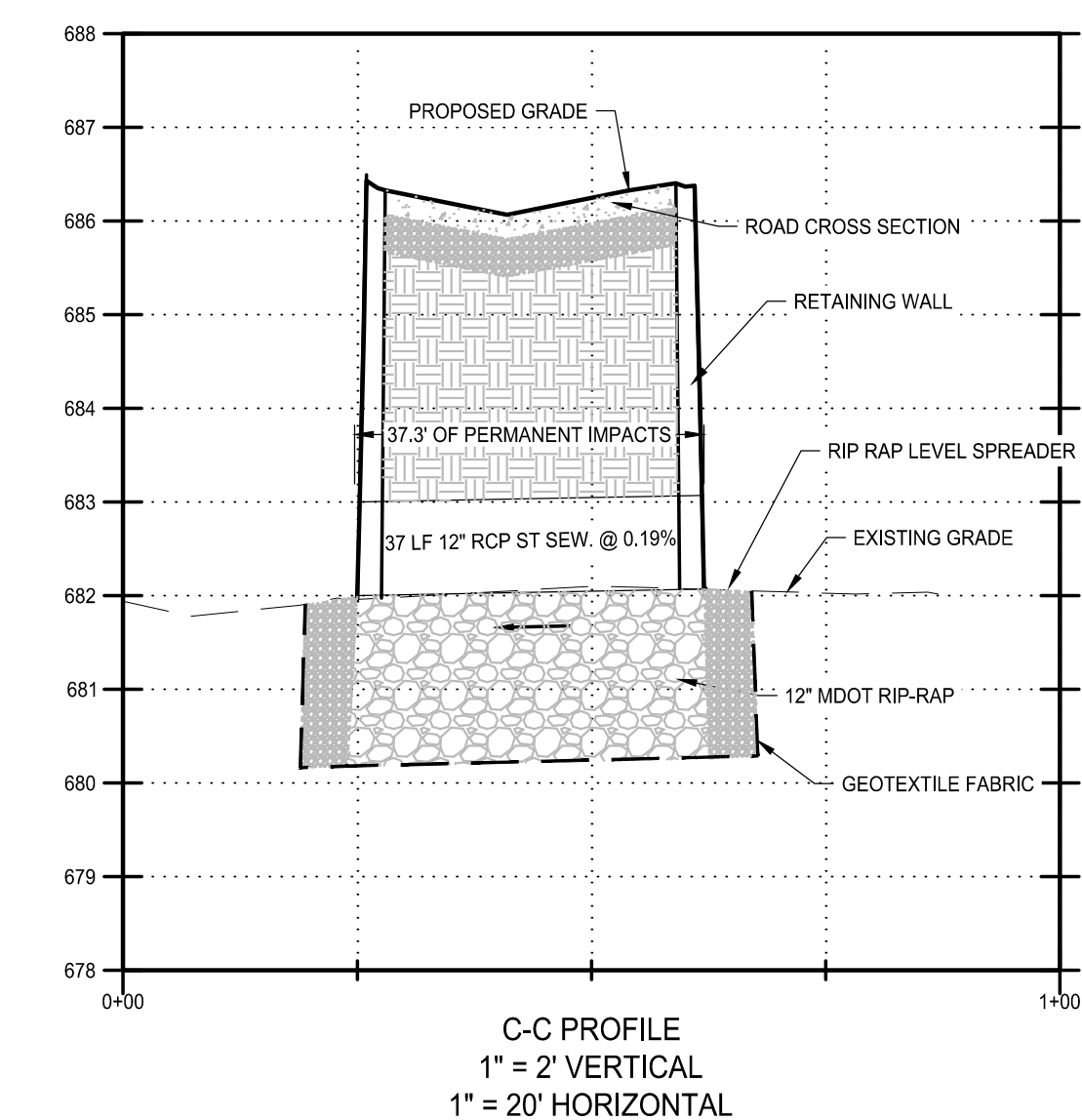
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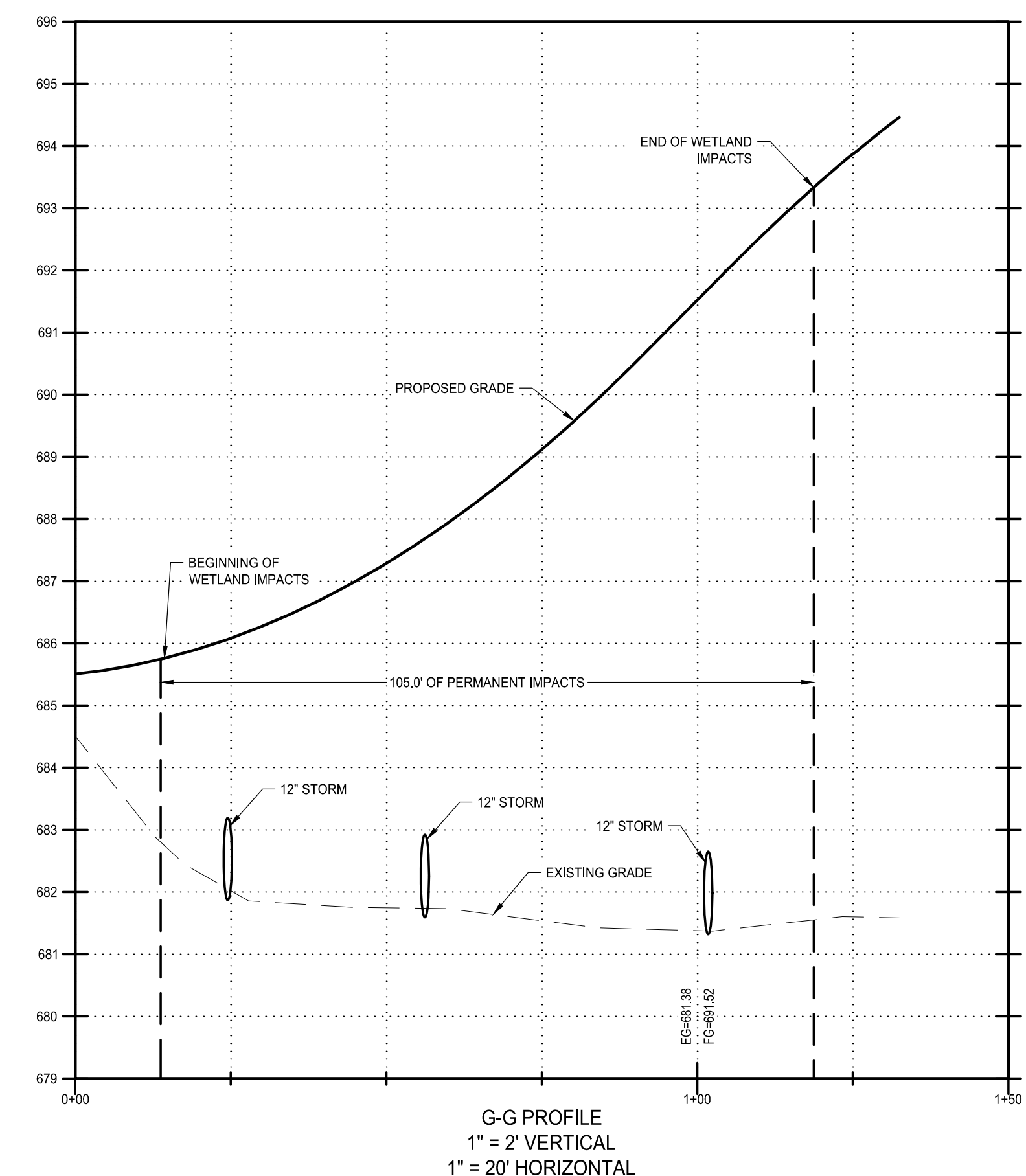
A-A PROFILE  
1" = 2' VERTICAL  
1" = 20' HORIZONTAL



B-B PROFILE  
1" = 2' VERTICAL  
1" = 20' HORIZONTAL



C-C PROFILE  
1" = 2' VERTICAL  
1" = 20' HORIZONTAL

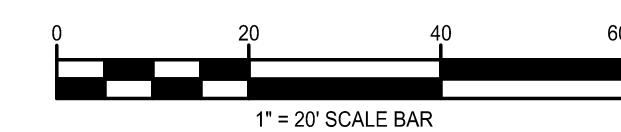
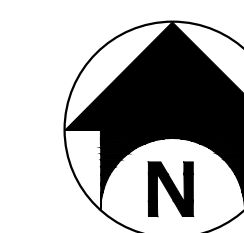


G-G PROFILE  
1" = 2' VERTICAL  
1" = 20' HORIZONTAL

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ALL TEMPORARY IMPACTS ARE TO BE RESTORED TO ORIGINAL GRADE WITH ORIGINAL SOILS OR EQUIVALENT SOILS AND SEEDED WITH A CITY-APPROVED WETLAND SEED MIX. RESTORATION OF ANY TEMPORARY WETLAND IMPACTS WILL BE SUBJECT TO INSPECTION BY CITY AND ASTI UPON COMPLETION.

- PERMANENT WETLAND IMPACTS
- TEMPORARY WETLAND IMPACTS
- WETLAND FLAG IDENTIFICATION



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**WETLAND C PLAN**

**C605**

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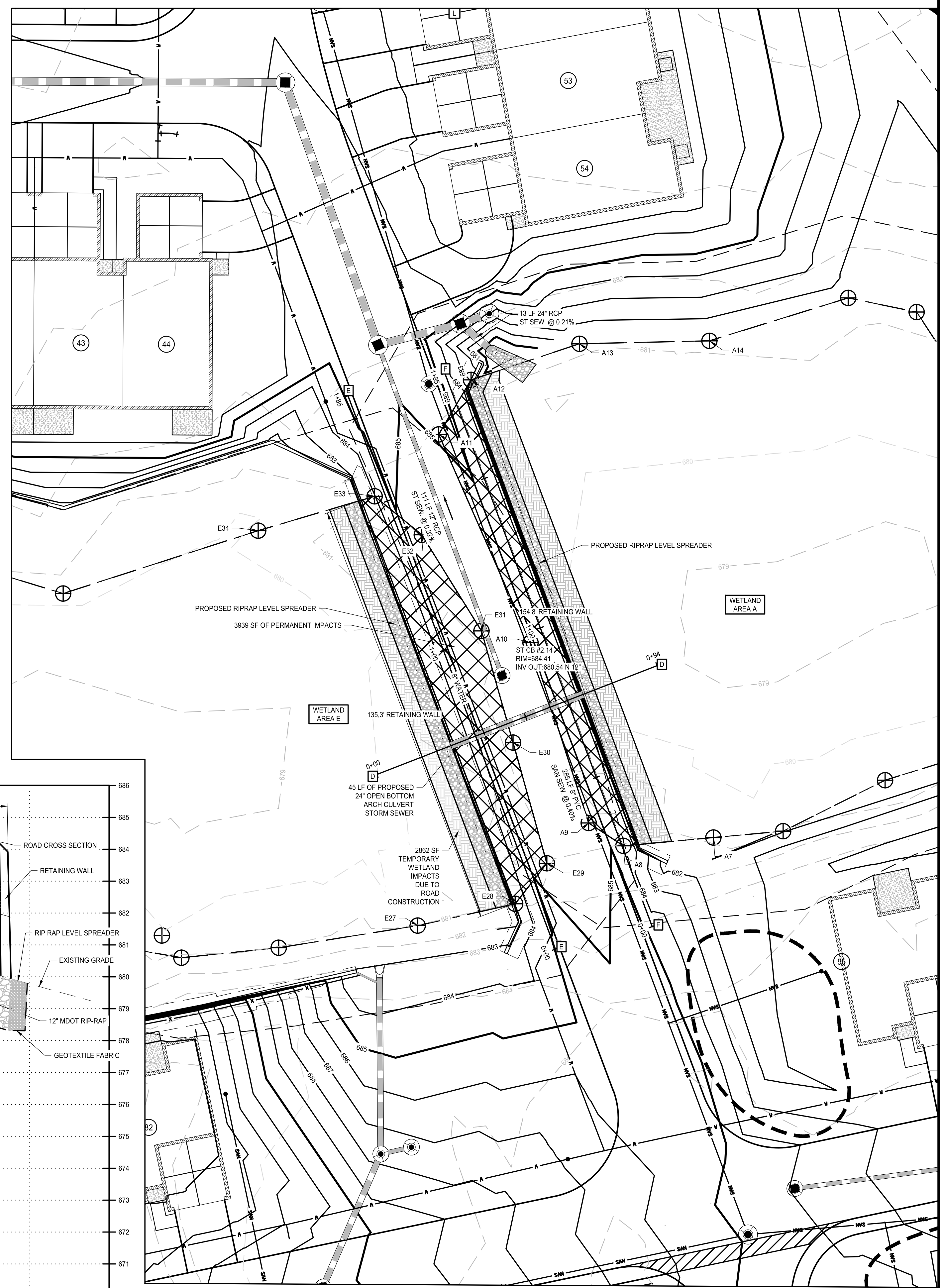
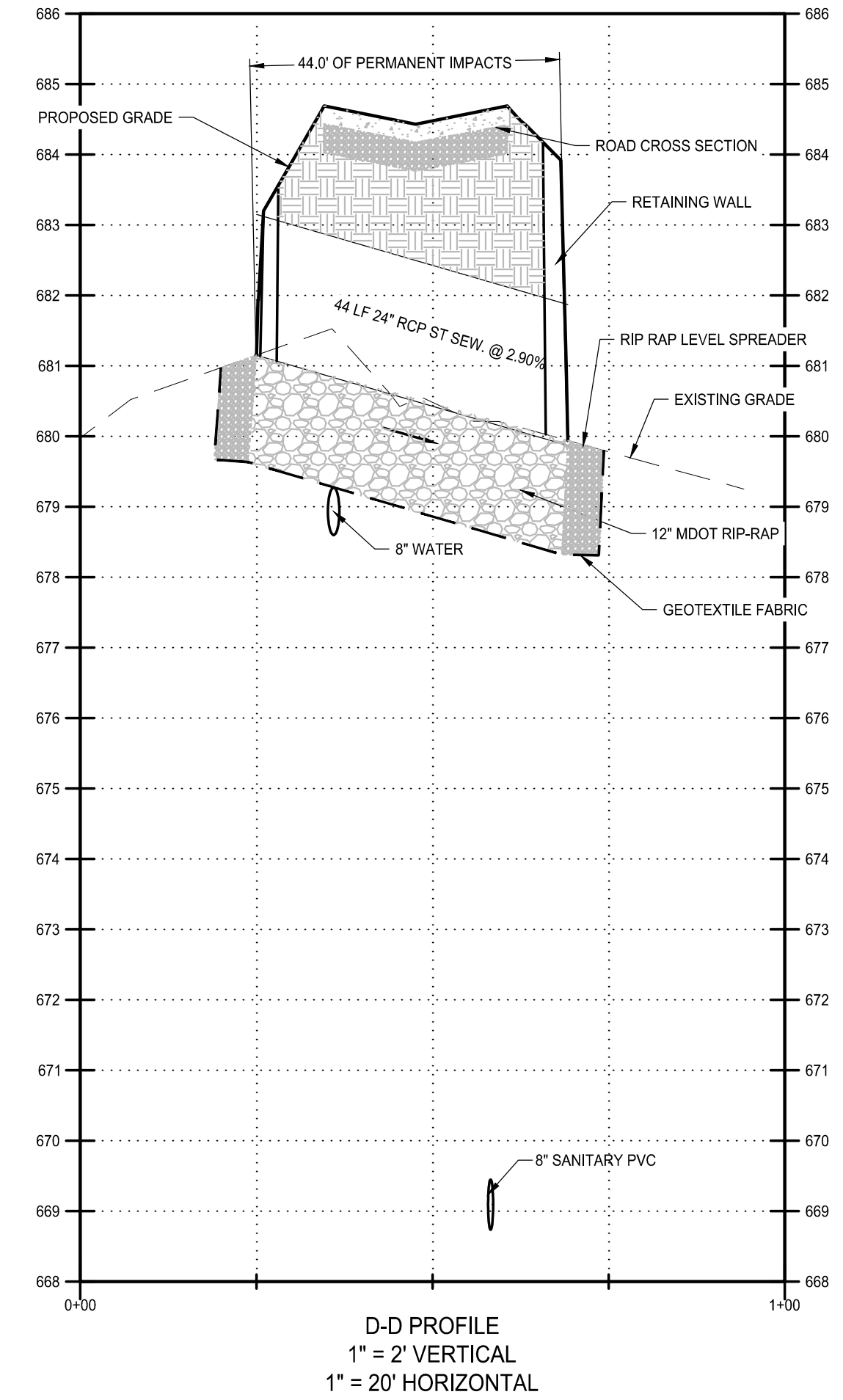
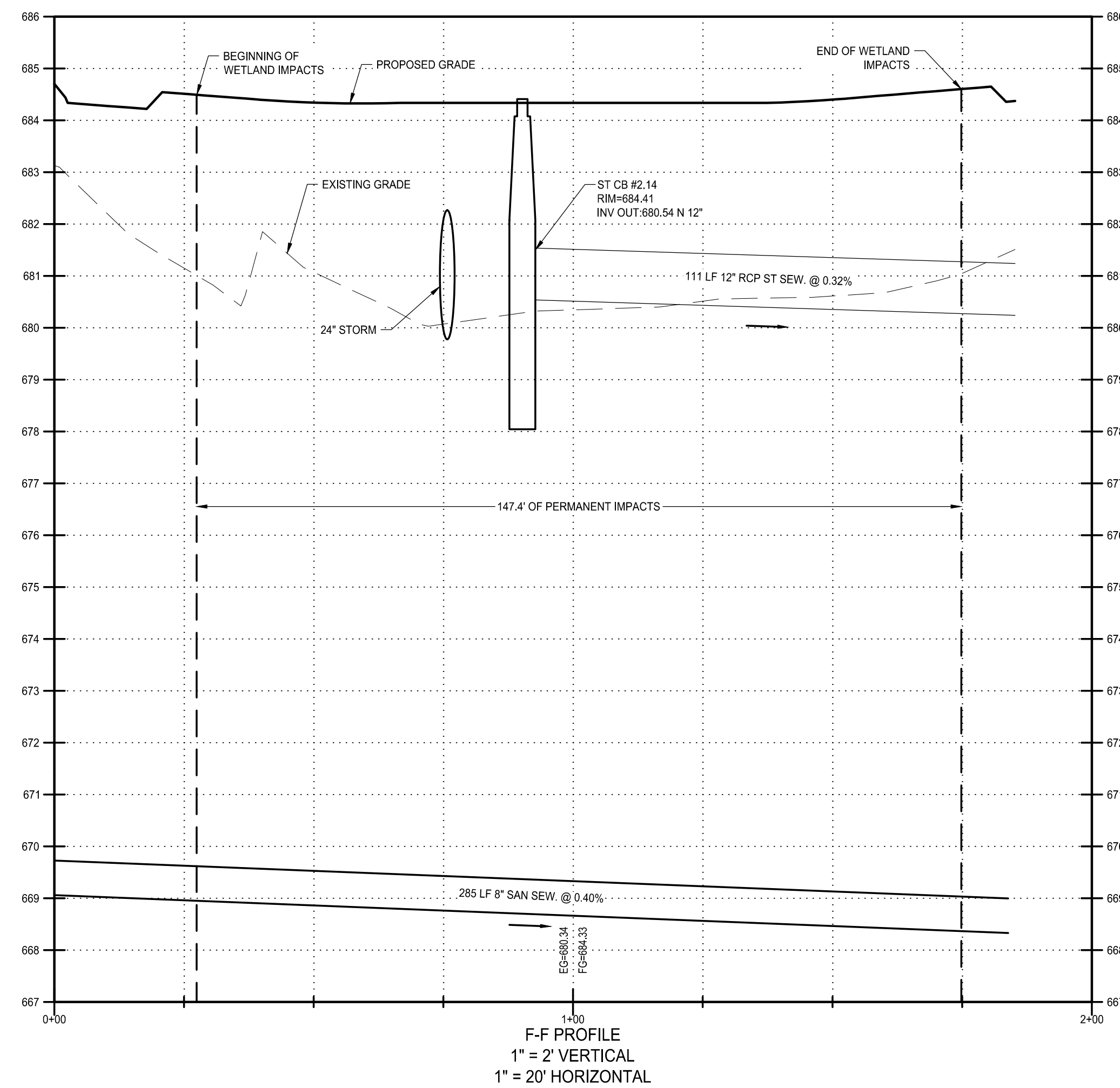
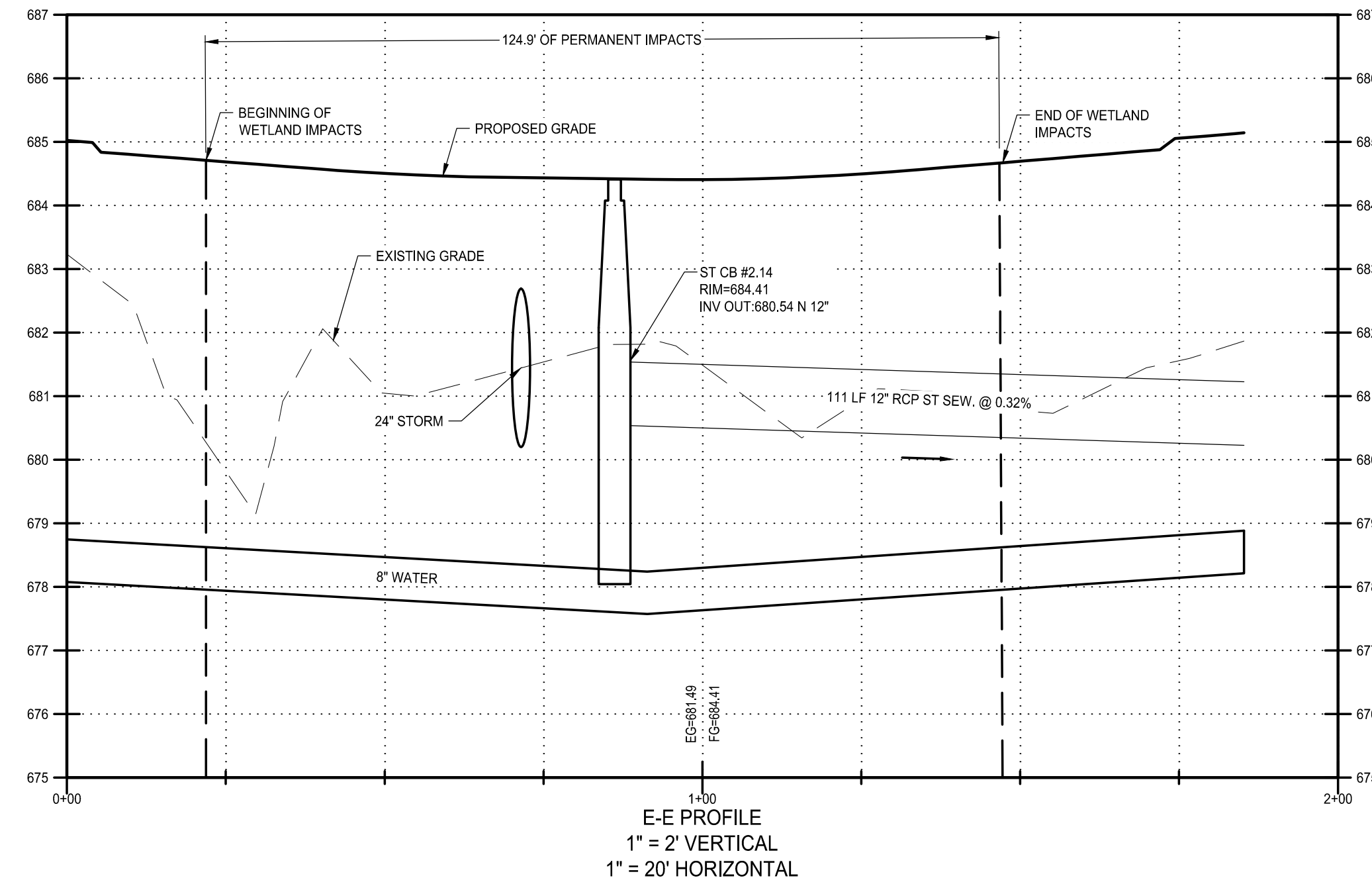


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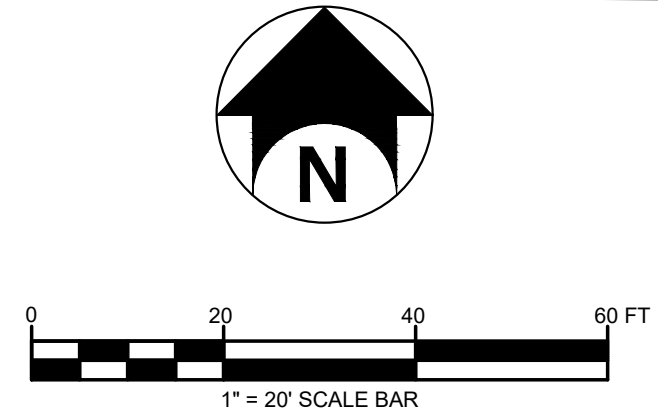
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### WETLAND A & E PLAN

# C606