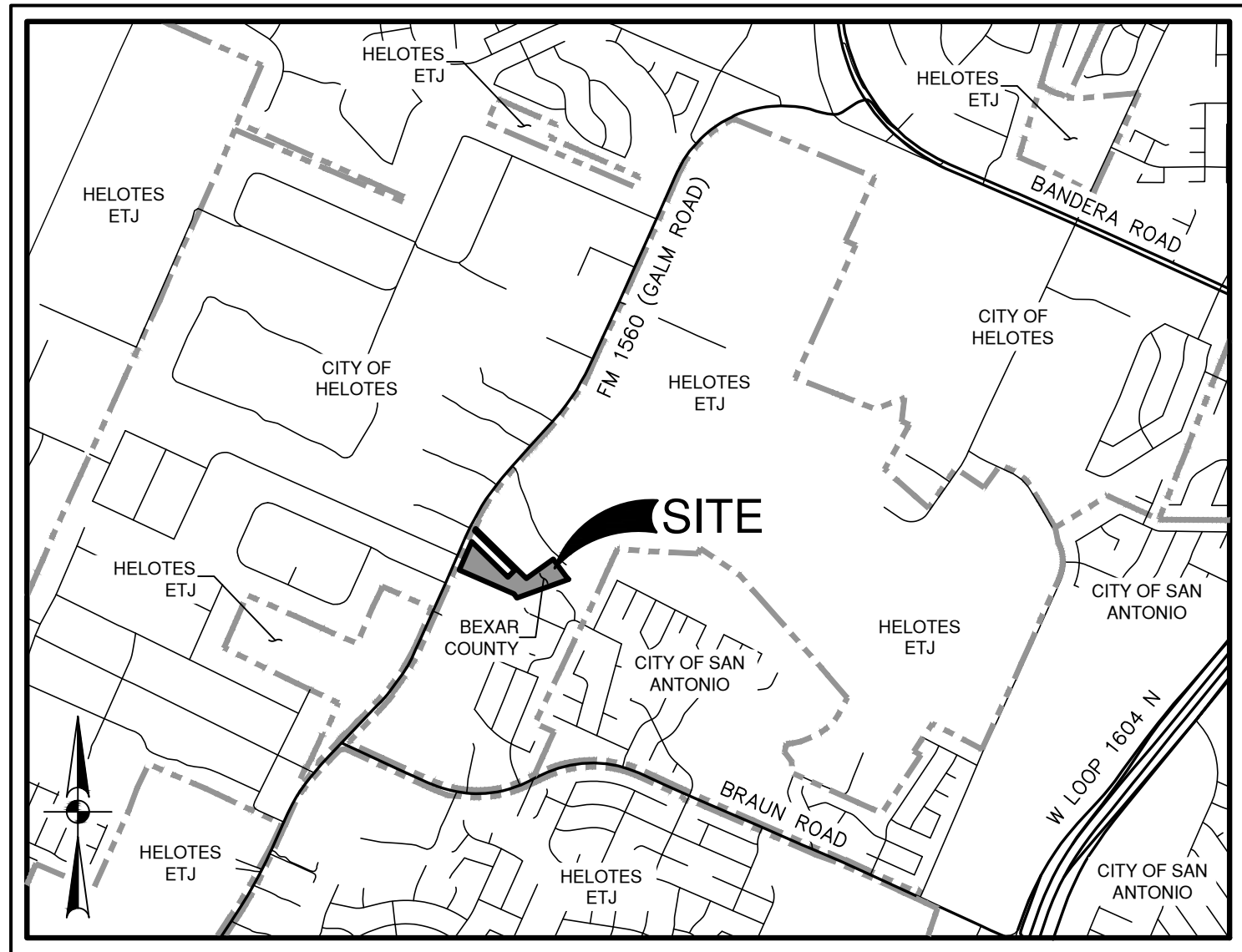


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APOLLO OAKS

BEXAR COUNTY, TEXAS

CIVIL CONSTRUCTION PLANS



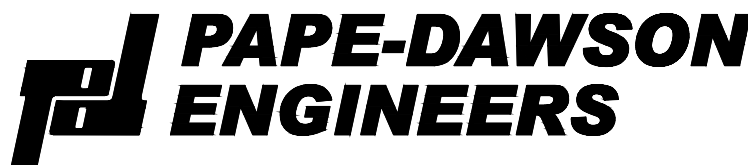
LOCATION MAP

NOT-TO-SCALE

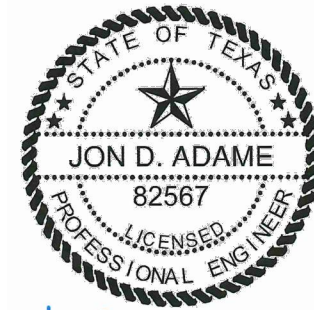
PREPARED FOR:

INVEST 5S, LLC
22202 CIELO VISTA
SAN ANTONIO, TX 78255

SEPTEMBER 2025



2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



Jon Adame
9-17-25

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OVERALL WATER DISTRIBUTION PLAN	C4.00
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WATER DISTRIBUTION PLAN NOTES	C4.11
OVERALL SANITARY SEWER PLAN	C5.00
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SANITARY SEWER LINE B & C PLAN & PROFILE	C5.02
SANITARY SEWER DETAILS	C5.10
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STORM WATER POLLUTION PREVENTION PLAN	C8.00
STORM WATER POLLUTION PREVENTION PLAN DETAILS	C8.10

WATER (SAWS PRESSURE ZONE 8)

DEVELOPER'S NAME: INVEST 5S, LLC	
ADDRESS: 22202 CIELO VISTA	
CITY: SAN ANTONIO	STATE: TX ZIP: 78255
PHONE# (540) 305-4056	FAX#
SAWS BLOCK MAP# 084-622 TOTAL EDU'S 38 TOTAL ACREAGE 8.443	
TOTAL LINEAR FOOTAGE OF PIPE: 12' 8" 2.081 PLAT NO. CP202506	
NUMBER OF LOTS 29 DUPLEX 6 TRIPLEX 29 SAWS JOB NO. 25-1039	

SEWER (UPPER-WEST SEWERSHED-LEON CREEK)

DEVELOPER'S NAME: INVEST 5S, LLC	
ADDRESS: 22202 CIELO VISTA	
CITY: SAN ANTONIO	STATE: TX ZIP: 78255
PHONE# (540) 305-4056	FAX#
SAWS BLOCK MAP# 084-622 TOTAL EDU'S 38 TOTAL ACREAGE 8.443	
TOTAL LINEAR FOOTAGE OF PIPE: 8" 1,534 LF PLAT NO. CP202506	
NUMBER OF LOTS 29 DUPLEX 6 TRIPLEX 29 SAWS JOB NO. 25-1532	

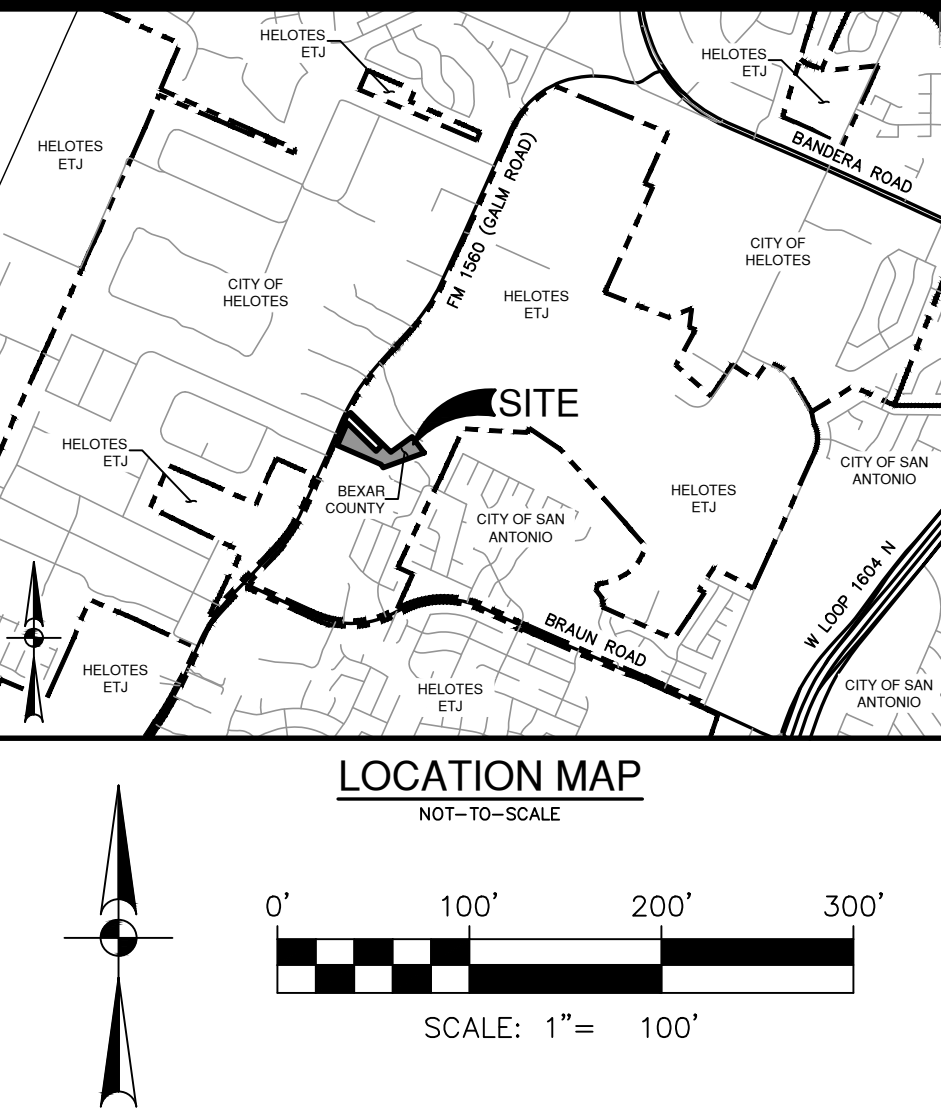
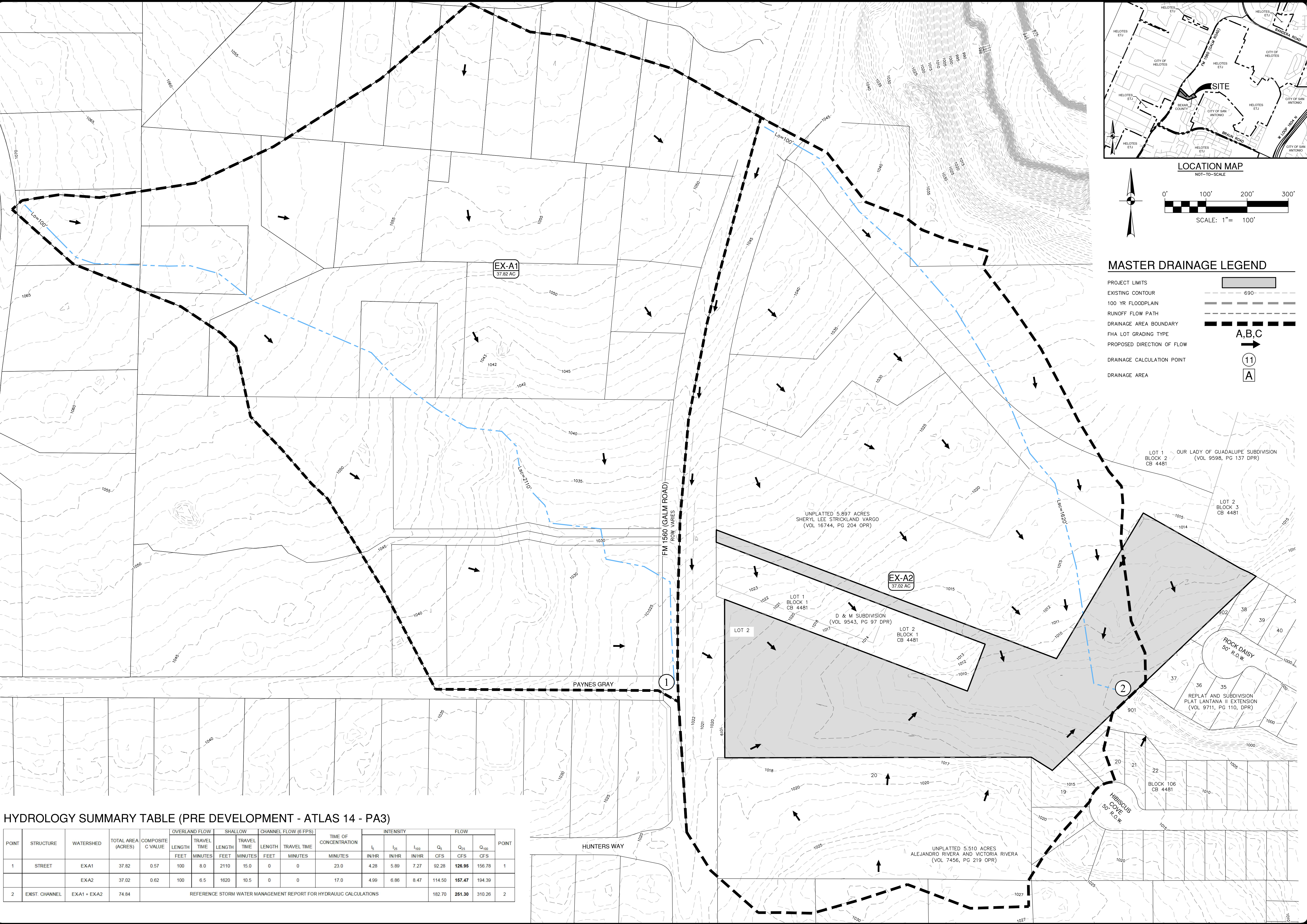
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HYDROLOGY SUMMARY TABLE (PRE DEVELOPMENT - ATLAS 14 - PA3)

POINT	STRUCTURE	WATERSHED	TOTAL AREA (ACRES)	COMPOSITE C VALUE	OVERLAND FLOW		SHALLOW		CHANNEL FLOW (6 FPS)		TIME OF CONCENTRATION	INTENSITY			FLOW			POINT
					LENGTH	TRAVEL TIME	LENGTH	TRAVEL TIME	LENGTH	TRAVEL TIME		I ₂	I ₅	I ₁₀	Q ₂	Q ₅	Q ₁₀	
					FEET	MINUTES	FEET	MINUTES	FEET	MINUTES		IN/HR	IN/HR	IN/HR	CFS	CFS	CFS	
1	STREET	EXA1	37.82	0.57	100	8.0	2110	15.0	0	0	23.0	4.28	5.89	7.27	92.28	126.95	156.78	1
		EXA2	37.02	0.62	100	6.5	1620	10.5	0	0	17.0	4.99	6.86	8.47	114.50	157.47	194.39	
2	EXIST. CHANNEL	EXA1 + EXA2	74.84		REFERENCE: STORM WATER MANAGEMENT REPORT FOR HYDRAULIC CALCULATIONS										182.70	251.30	310.26	2



MASTER DRAINAGE LEGEND	
PROJECT LIMITS	690'
EXISTING CONTOUR	---
100 YR FLOODPLAIN	---
RUNOFF FLOW PATH	---
DRAINAGE AREA BOUNDARY	---
FHA LOT GRADING TYPE	A,B,C
PROPOSED DIRECTION OF FLOW	→
DRAINAGE CALCULATION POINT	11
DRAINAGE AREA	A

DATE

NO. REVISION

Jon D. Adame
9-17-25

PAPE-DAWSON ENGINEERS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

APOLLO OAKS
BEXAR COUNTY, TEXAS

EXISTING CONDITIONS OVERALL DRAINAGE PLAN

PLAT NO. CP202506

JOB NO. 13657-00

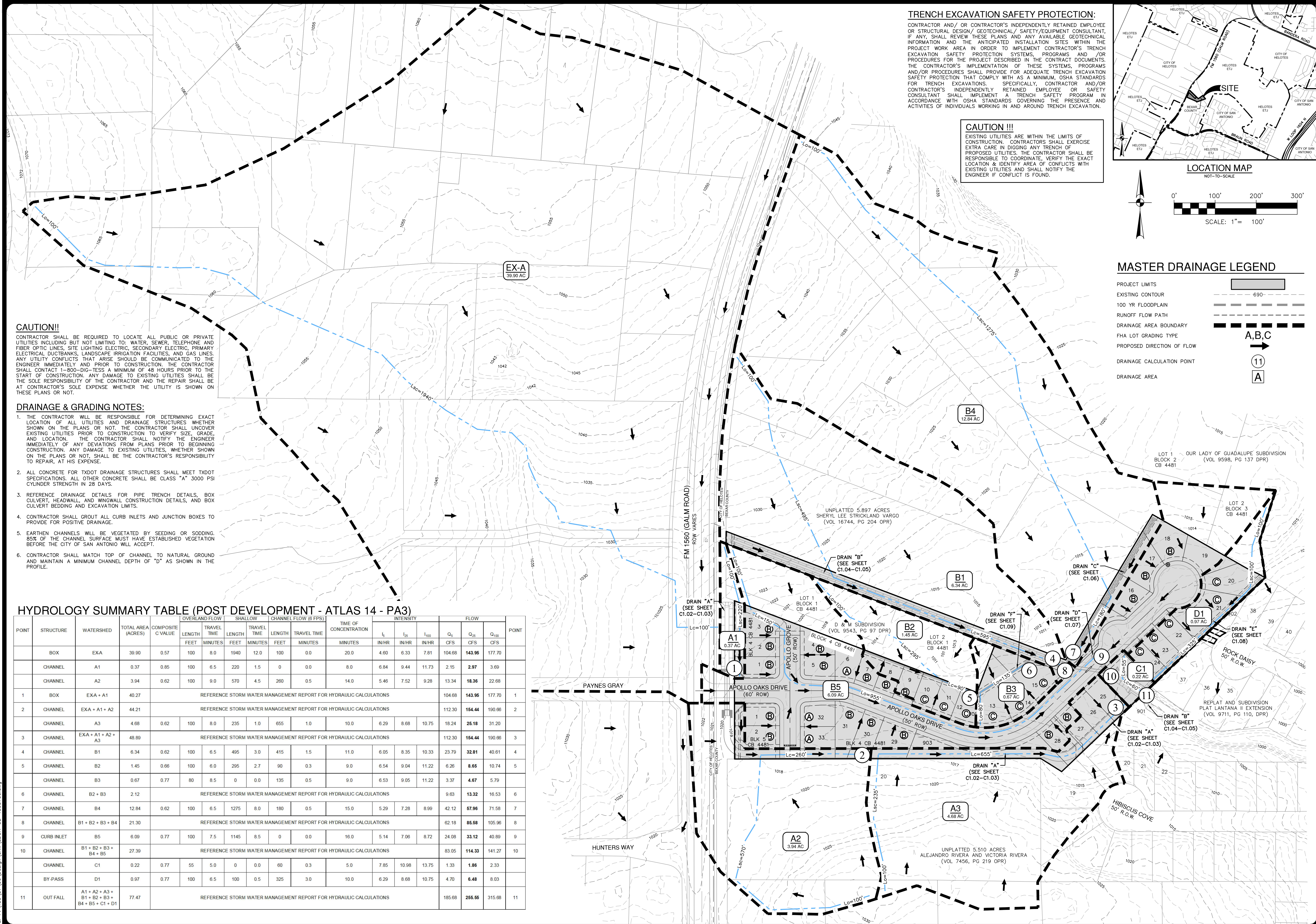
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DESIGNER CB

CHECKED JA DRAWN CB

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DATE

NO. REVISION

Jon D. Adame
9-17-25

PAPE-DAWSON
ENGINEERS

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TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

APOLLO OAKS
BEXAR COUNTY, TEXAS

ULTIMATE DEVELOPMENT OVERALL DRAINAGE PLAN

PLAT NO. CP202506

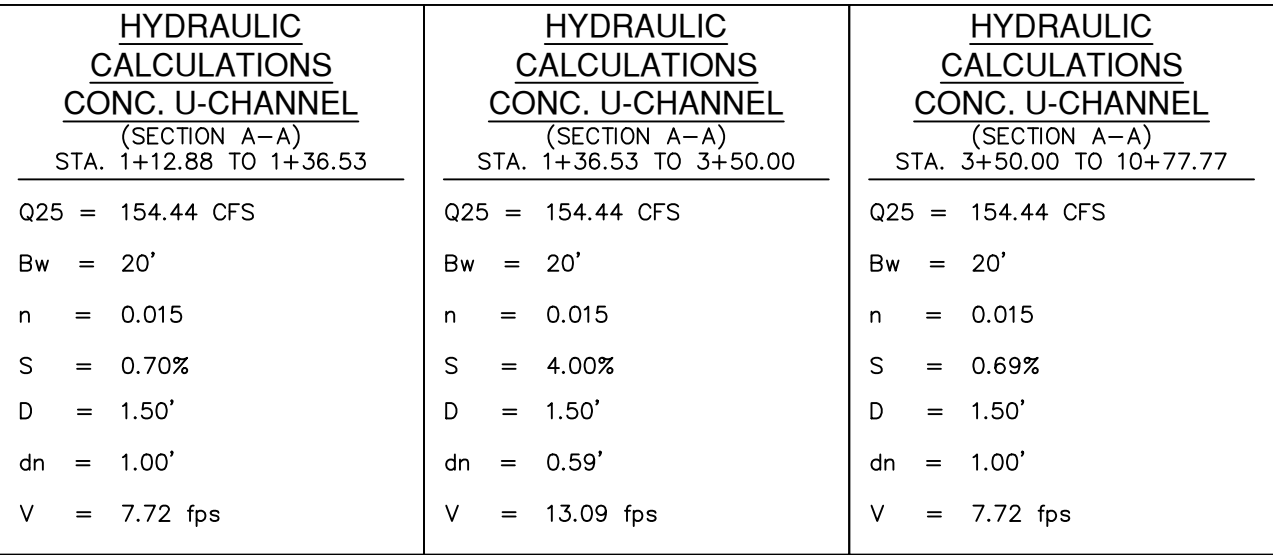
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DATE SEPTEMBER 2025

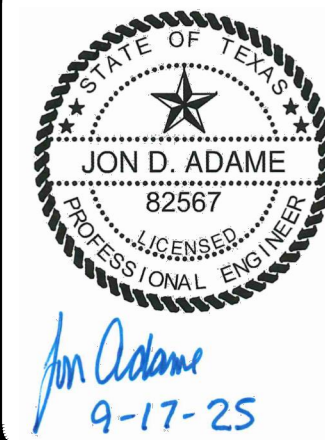
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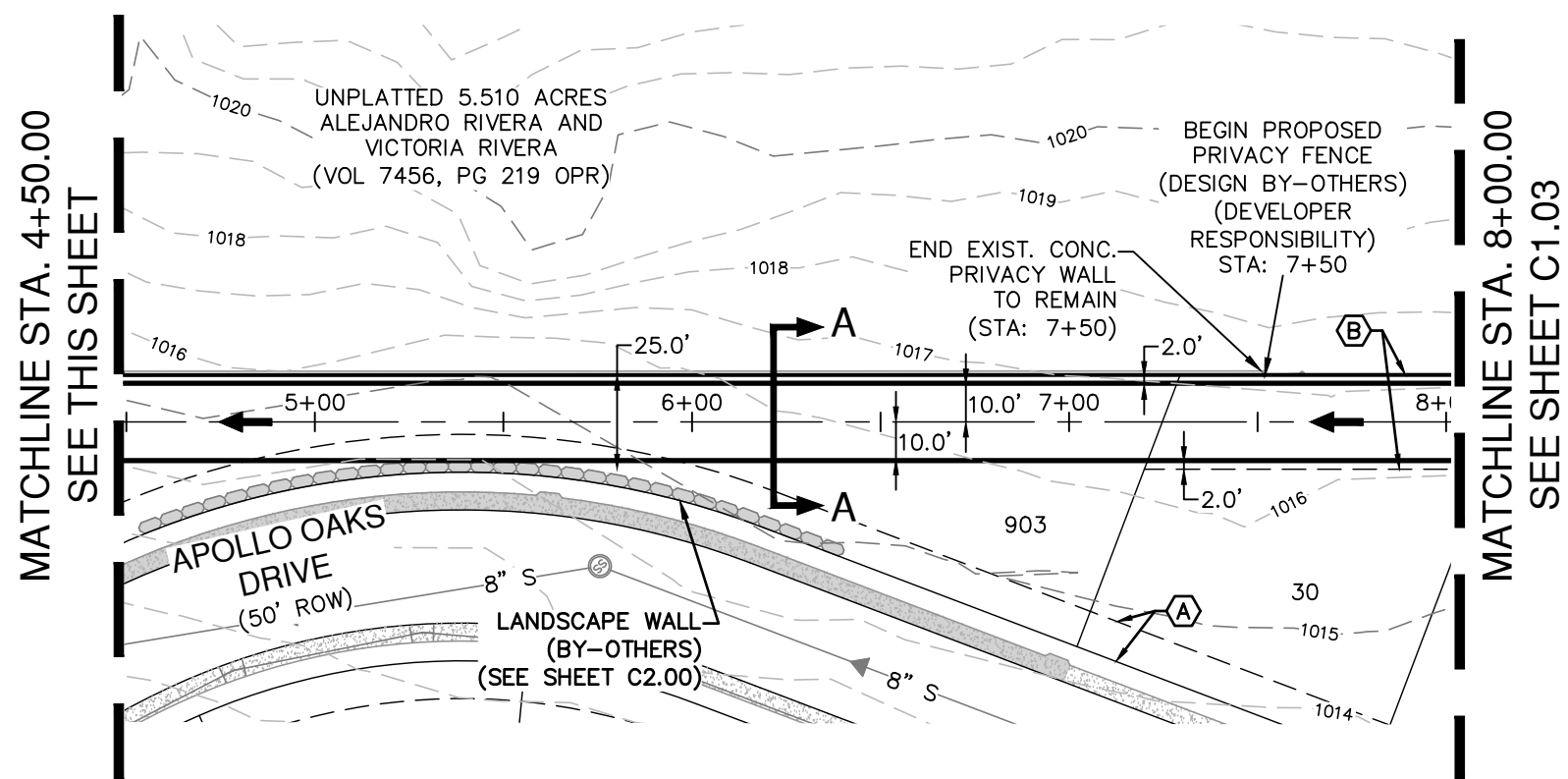


- (A) 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT
- (B) VARIABLE WIDTH DRAINAGE EASEMENT
- (C) 16' WATER EASEMENT
- (D) 4' SIDEWALK
- (E) 4' DEVELOPER SIDEWALK
- (F) 21' WATER, ELEC, GAS, TELE, CATV AND ACCESS ESMT (VOL 9711, PG 110 DPR)



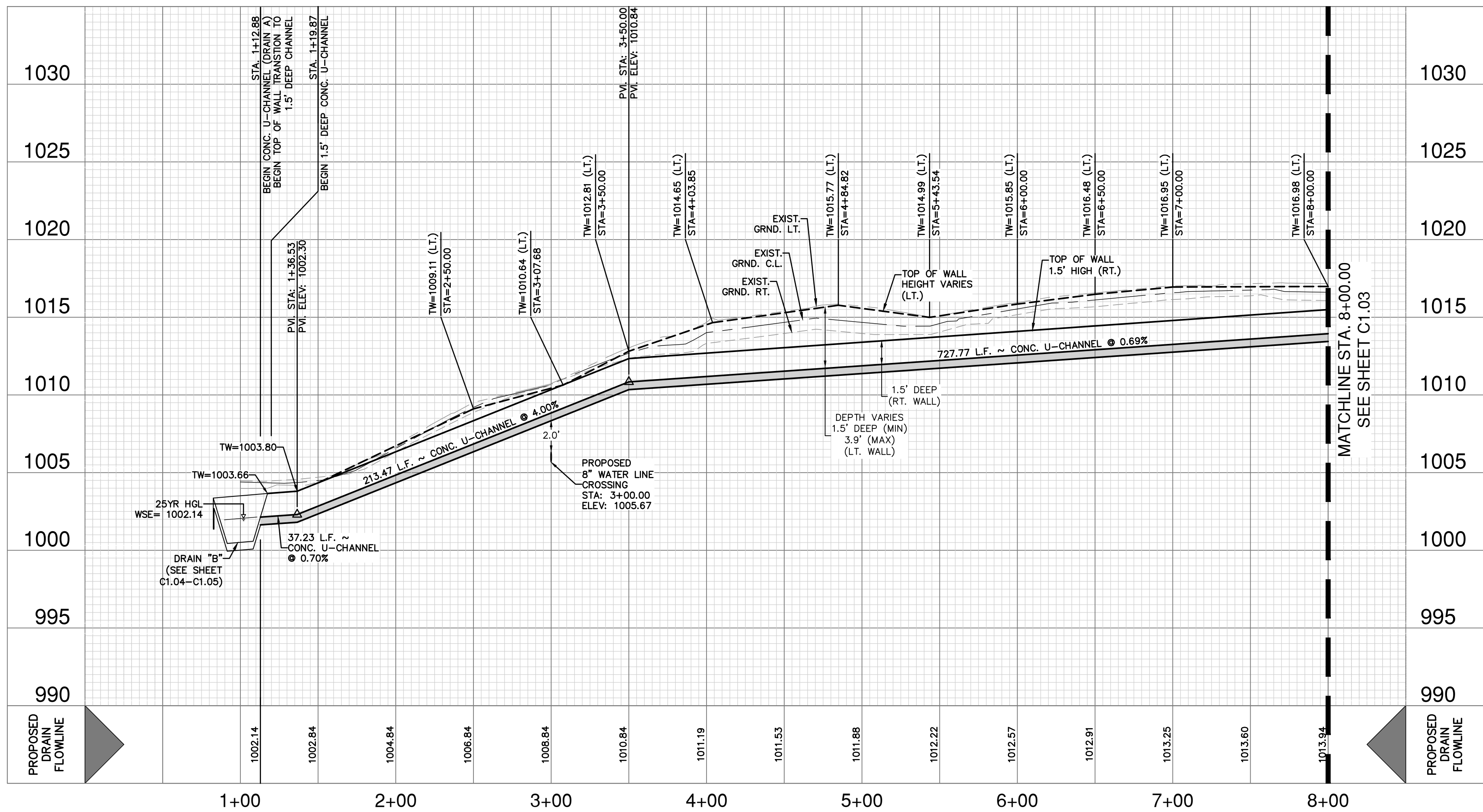
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ENGINEERS**

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800



DRAIN "A" ~ ST A. 1+00.00 T O STA. 8+00.00

VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 20'



OPEN CHANNEL NOTE:

CONTRACTOR SHALL REFERENCE TABLE 9.3.8.1 - "RETARDATION CLASS FOR LINING MATERIALS" PROVIDED ON SHEET C1.10 AND SUPPLIED RETARDANCE CLASS (RC) FOR CHOICE OF COVER WITHIN OPEN EARTHEN CHANNEL CROSS-SECTIONS.

DRAINAGE CONSTRUCTION NOTES:

1. ALL SINGLE BOX CULVERTS (SBC) AND ALL MULTIPLE BOX CULVERTS (MBC) SHALL BE PRECAST. (SEE SHEETS C1.13-C1.14 FOR PRECAST CONSTRUCTION DETAILS.)

DRAINAGE & GRADING NOTES:

1. A BEAR COUNTY ROW PERMIT MUST BE OBTAINED BEFORE WORKING IN BEAR COUNTY ROW. CONTRACTOR SHALL COORDINATE A TRAFFIC CONTROL PLAN WITH THE CITY OF SAN ANTONIO. ANY ADDITIONAL WORK, SUCH AS SIGNAGE, SHALL BE RECOMMENDED BY THE ENGINEER ONCE THE ROADWAYS ARE CONSTRUCTED.
2. THE CONTRACTOR WILL BE RESPONSIBLE FOR DETERMINING EXACT LOCATION OF ALL UTILITIES AND DRAINAGE STRUCTURES WHETHER SHOWN ON THE PLANS OR NOT. THE CONTRACTOR SHALL UNCOVER ALL UTILITIES AND DRAINAGE STRUCTURES TO VERIFY SIZE, GRADE, AND LOCATION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY OF ANY DEVIATIONS FROM PLANS PRIOR TO BEGINNING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MARKING ON THE PLANS OR NOT, SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR, AT HIS EXPENSE.
3. ALL CONCRETE FOR TxDOT DRAINAGE STRUCTURES SHALL MEET TxDOT SPECIFICATIONS. ALL OTHER CONCRETE SHALL BE CLASS "A" 3000 PSI CYLINDER STRENGTH IN 28 DAYS.
4. REFERENCE DRAINAGE DETAILS FOR PIPE TRENCH DETAILS, BOX CULVERT, HEADWALL, AND WINGWALL CONSTRUCTION DETAILS, AND BOX CULVERT BEDDING AND EXCAVATION LIMITS.
5. CONTRACTOR SHALL GROUT ALL CURB INLETS AND JUNCTION BOXES TO PROVIDE FOR POSITIVE DRAINAGE.
6. EARTHEN CHANNELS WILL BE VEGETATED BY SEEDING OR SODDING. 85% OF THE CHANNEL SURFACE MUST HAVE ESTABLISHED VEGETATION BEFORE THE CITY OF SAN ANTONIO WILL ACCEPT.
7. CONTRACTOR SHALL MATCH TOP OF CHANNEL TO NATURAL GROUND AND MAINTAIN A MINIMUM CHANNEL DEPTH OF "D" AS SHOWN IN THE PROFILE.

CAUTION!!

CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITING TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRICAL, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCTBANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. ANY UTILITY CONFLICTS THAT ARISE SHOULD BE COMMUNICATED TO THE ENGINEER IMMEDIATELY AND PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A MINIMUM OF 48 HOURS PRIOR TO THE START OF CONSTRUCTION. ANY DAMAGE TO EXISTING UTILITIES SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND THE REPAIR SHALL BE AT CONTRACTOR'S SOLE EXPENSE WHETHER THE UTILITY IS SHOWN ON THESE PLANS OR NOT.

TRENCH EXCAVATION SAFETY PROTECTION

CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/ GEOTECHNICAL/ SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ASSOCIATED INSTALLATION TECHNIQUE WITHIN THE TIME FRAME OF WORK AREA IN ORDER TO PREPARE CONTRACTOR'S PRELIMINARY EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES FOR THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR'S IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION TO COMPLY WITH ALL ANNUAL TRENCH EXCAVATION SAFETY PROGRAMS, SPECIFICALLY CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH THE REQUIREMENTS REGARDING TRENCH EXCAVATION ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

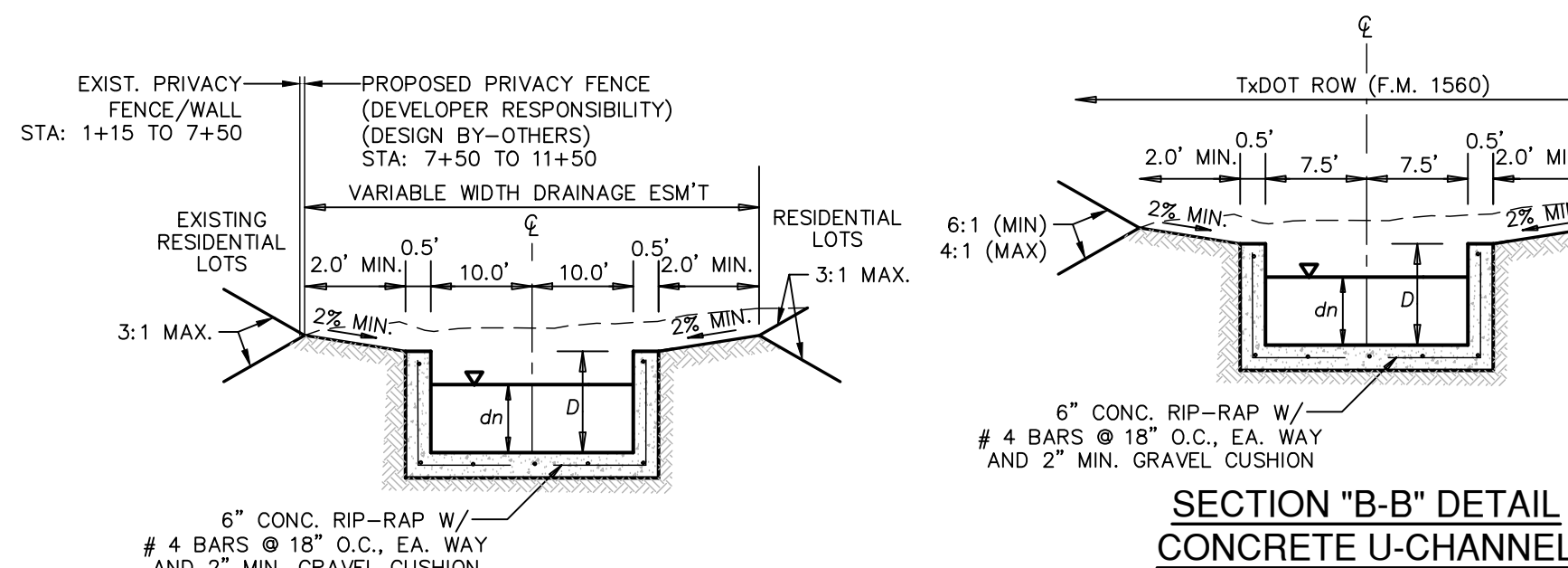
APOLLO OAKS
BEXAR COUNTY, TEXAS

DRAIN "A" ~ ST A. 1+00.00 TO STA. 8+00.00
DRAIN PLAN & PROFILE

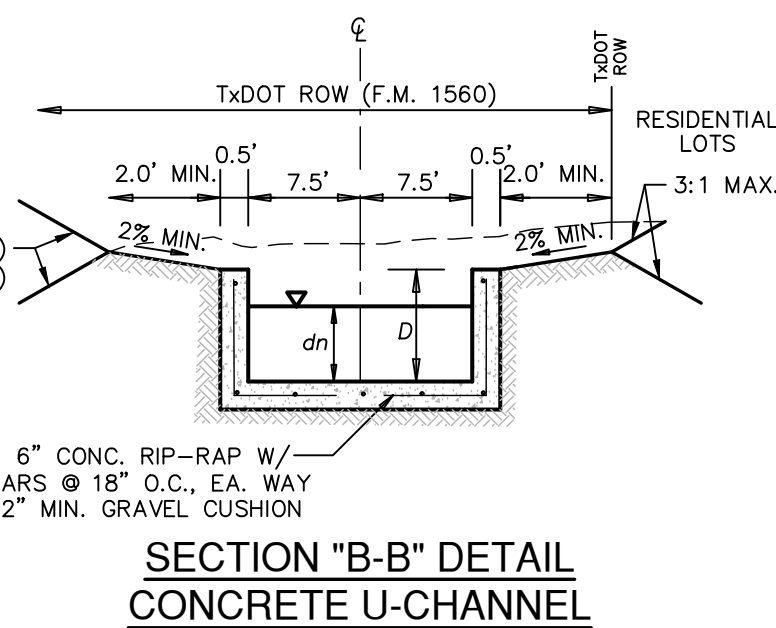
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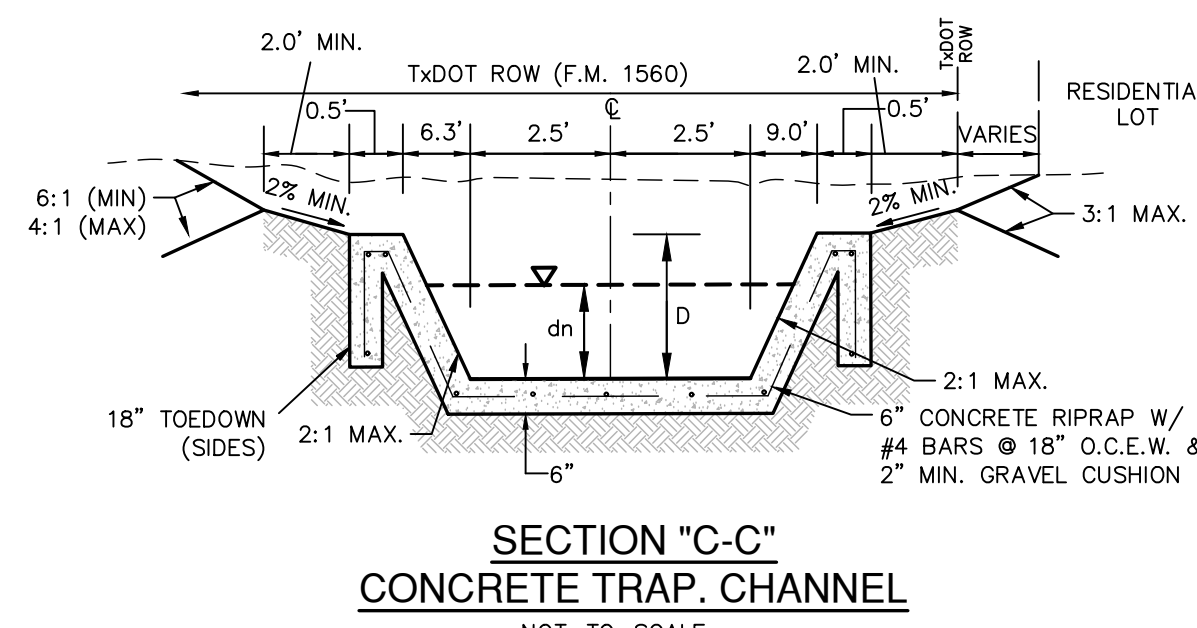
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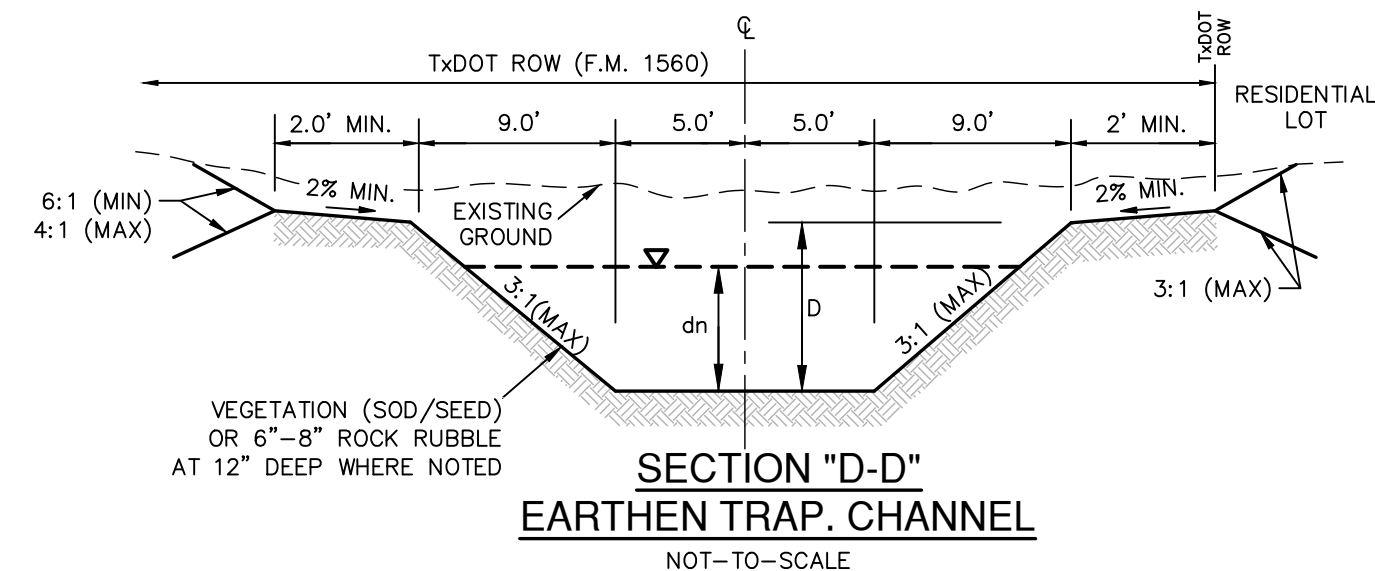
SECTION "A-A" DETAIL
CONCRETE U-CHANNEL
NOT-TO-SCALE



SECTION "B-B" DETAIL
CONCRETE U-CHANNEL
NOT-TO-SCALE



SECTION "C-C" DETAIL
CONCRETE TRAP CHANNEL
NOT-TO-SCALE

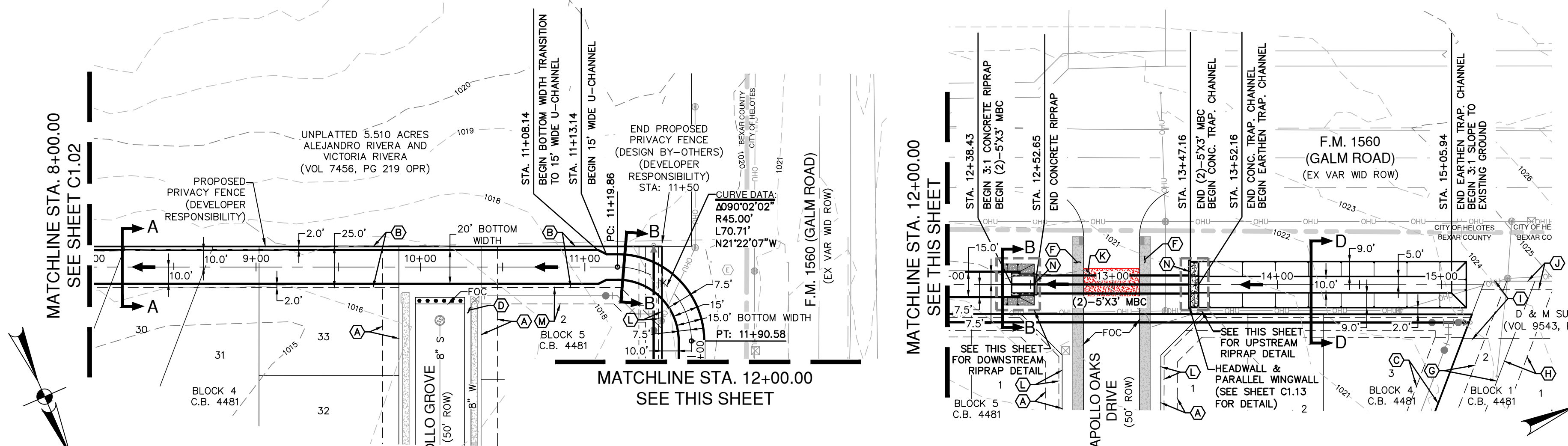


SECTION "D-D" DETAIL
EARTHEN TRAP CHANNEL
NOT-TO-SCALE

HYDRAULIC CALCULATIONS CONC. U-CHANNEL (SECTION A-A) STA. 1+15.00 TO 7+50.00	HYDRAULIC CALCULATIONS CONC. U-CHANNEL (SECTION A-A) STA. 10+77.77 TO 11+08.14
Q25 = 154.44 CFS	Q25 = 154.44 CFS
Bw = 20'	Bw = 20'
n = 0.015	n = 0.015
S = 0.69%	S = 1.15%
D = 1.50'	D = 1.50'
dn = 1.00'	dn = 0.86'
V = 7.72 fps	V = 8.98 fps

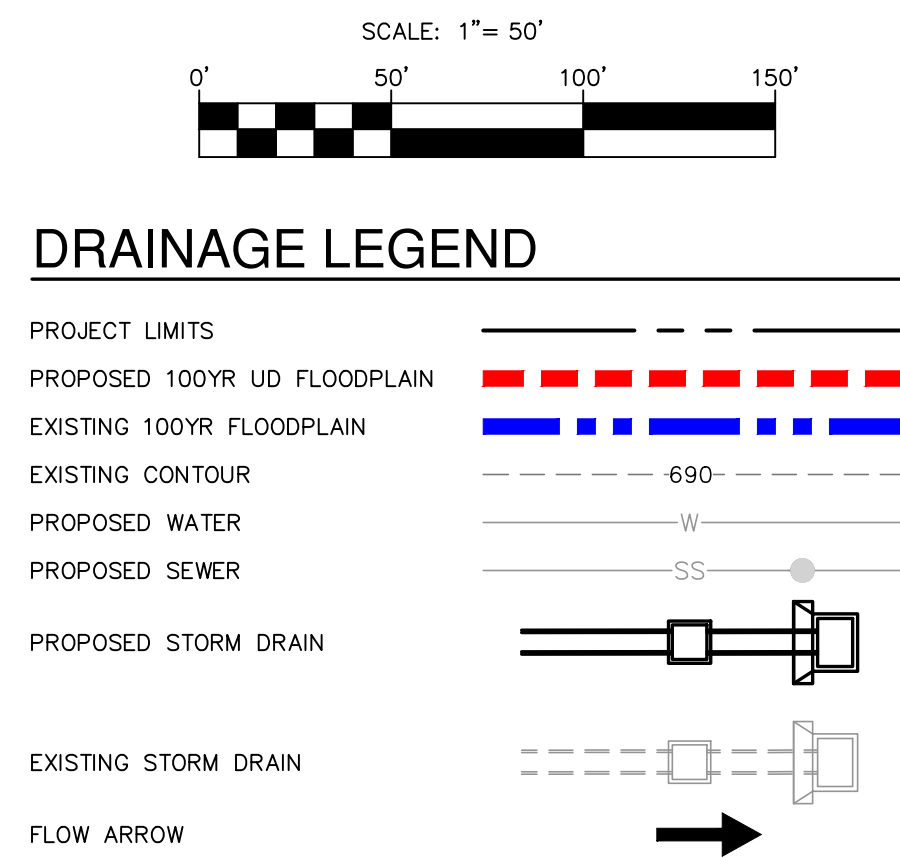
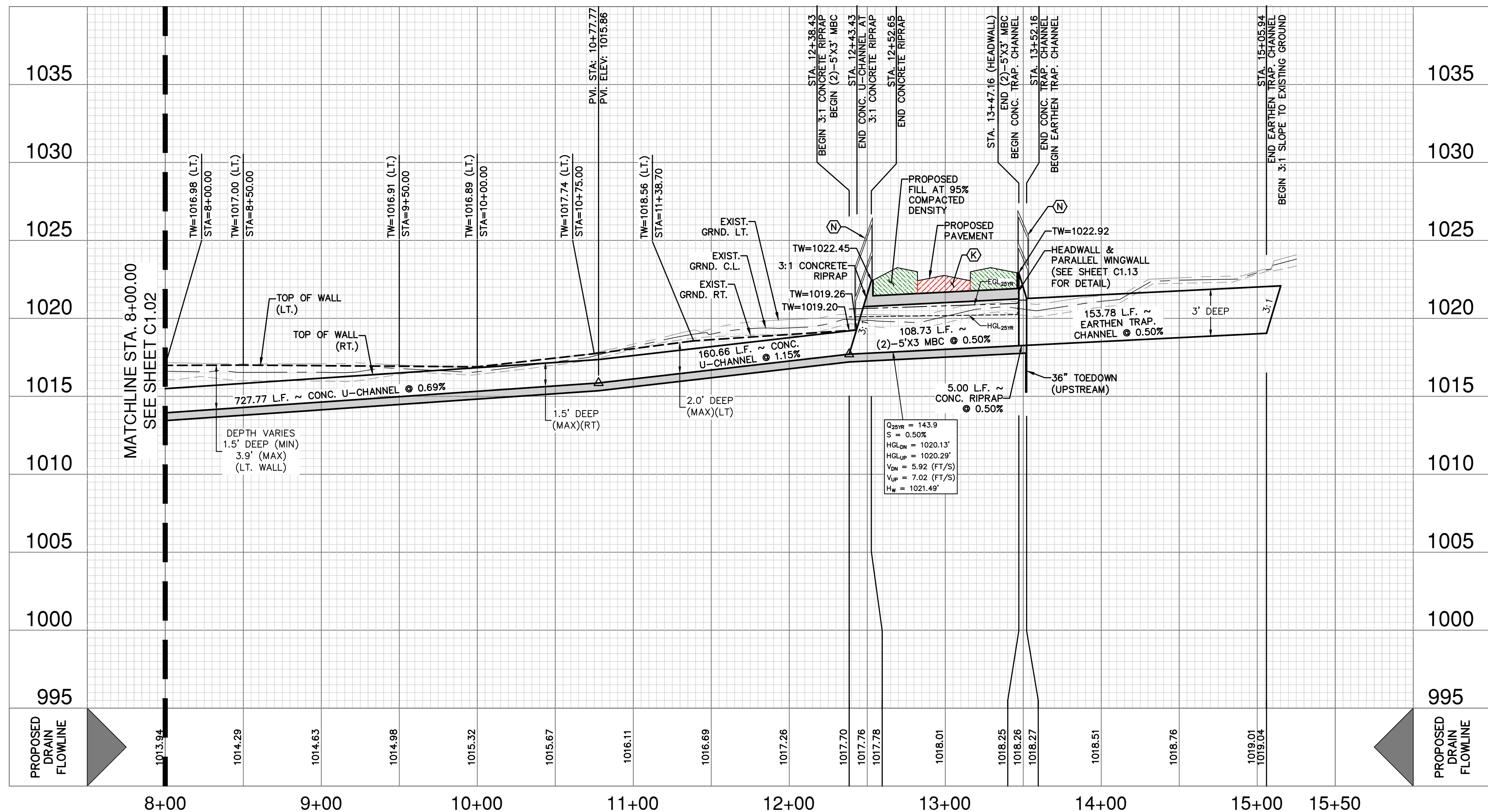
HYDRAULIC CALCULATIONS CONC. U-CHANNEL (SECTION B-B) STA. 11+08.14 TO 12+38.43	HYDRAULIC CALCULATIONS CONC. TRAP CHANNEL (SECTION C-C) STA. 13+47.16 TO 13+52.16
Q25 = 143.95 CFS	Q25 = 143.95 CFS
Bw = 15'	Bw = 10'
n = 0.015	n = 0.015
S = 1.15%	S = 0.50%
D = 1.50'	D = 3.00'
dn = 0.99'	dn = 1.40'
V = 9.69 fps	V = 7.24 fps

HYDRAULIC CALCULATIONS EARTH. TRAP CHANNEL (SECTION D-D) STA. 13+52.16 TO 15+05.94
Q25 = 143.95 CFS
Bw = 10'
n = 0.035
S = 0.50%
D = 3.00'
dn = 2.19'
V = 3.97 fps
$\tau_d = 0.47 \text{ LB/FT}^2$
RC = B, C, D



DRAIN "A" ~ STA. 8+00.00 TO END

VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 50'



- KEY LEGEND:**
- 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT
 - VARIABLE WIDTH DRAINAGE EASEMENT
 - VARIABLE WIDTH WATER EASEMENT
 - 4' SIDEWALK
 - 4' DEVELOPER SIDEWALK
 - 6' DEVELOPER SIDEWALK
 - 16' ELECTRIC, GAS, TELEPHONE AND CABLE TV EASEMENT (VOL 9543, PG 97, DPR)
 - 12' ELECTRIC, GAS, TELEPHONE AND CABLE TV EASEMENT (VOL 9543, PG 97, DPR)
 - 50' BUILDING SETBACK LINE (VOL 9543, PG 97, DPR)
 - 20' ELECTRIC, GAS, TELEPHONE AND CABLE TV EASEMENT (VOL 9543, PG 97, DPR)
 - MODIFIED PAVEMENT SECTION (SEE SHEET C2.10)
 - 1 VEHICLE NON-ACCESS EASEMENT (NOT-TO-SCALE)
 - 10' WATER ESMT
 - 40' L.F. ~ PIPE RAILING (SEE SHEET C2.10 FOR DETAIL)

OPEN CHANNEL NOTE:
CONTRACTOR SHALL REFERENCE TABLE 9.3.8.1 - "RETARDATION CLASS FOR LINING MATERIALS" PROVIDED ON SHEET C1.10 AND SUPPLIED RETARDANCE CLASS (RC) FOR CHOICE OF COVER WITHIN OPEN EARTHEN CHANNEL CROSS-SECTIONS.

DRAINAGE CONSTRUCTION NOTES:

- ALL SINGLE BOX CULVERTS (SBC) AND ALL MULTIPLE BOX CULVERTS (MBC) SHALL BE PRECAST. (SEE SHEETS C1.13-C1.14 FOR PRECAST CONSTRUCTION DETAILS.)

DRAINAGE & GRADING NOTES:

- A BEXAR COUNTY ROW PERMIT MUST BE OBTAINED BEFORE WORKING IN BEXAR COUNTY ROW. CONTRACTOR SHALL COORDINATE A TRAFFIC CONTROL PLAN FOR ALL WORK WITHIN THE ROW. ADDITIONAL WARNING SIGNS MAY BE RECOMMENDED BY THE ENGINEER ONCE THE ROADWAYS ARE CONSTRUCTED.
- THE CONTRACTOR WILL BE RESPONSIBLE FOR DETERMINING EXACT LOCATION OF ALL UTILITIES AND DRAINAGE STRUCTURES WHETHER SHOWN ON THE PLANS OR NOT. THE CONTRACTOR SHALL UNCOVER EXISTING UTILITIES PRIOR TO CONSTRUCTION TO VERIFY SIZE, GRADE, AND LOCATION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY OF ANY DEVIATIONS FROM PLANS PRIOR TO BEGINNING CONSTRUCTION. ANY DAMAGE TO EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR, AT HIS EXPENSE.
- ALL CONCRETE FOR TxDOT DRAINAGE STRUCTURES SHALL MEET TxDOT SPECIFICATIONS. ALL OTHER CONCRETE SHALL BE CLASS "A" 3000 PSI CYLINDER STRENGTH IN 28 DAYS.
- REFERENCE DRAINAGE DETAILS FOR PIPE TRENCH DETAILS, BOX CULVERT, HEADWALL, AND WINGWALL CONSTRUCTION DETAILS, AND BOX CULVERT BEDDING AND EXCAVATION LIMITS.
- CONTRACTOR SHALL GROUT ALL CURB INLETS AND JUNCTION BOXES TO PROVIDE FOR POSITIVE DRAINAGE.
- EARTHEN CHANNELS WILL BE VEGETATED BY SEEDING OR SODDING. 85% OF THE CHANNEL SURFACE MUST HAVE ESTABLISHED VEGETATION BEFORE THE CITY OF SAN ANTONIO WILL ACCEPT.
- CONTRACTOR SHALL MATCH TOP OF CHANNEL TO NATURAL GROUND AND MAINTAIN A MINIMUM CHANNEL DEPTH OF "D" AS SHOWN IN THE PROFILE.

CAUTION!!
CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITING TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCTBANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. ANY UTILITY CONFLICTS THAT ARISE SHOULD BE COMMUNICATED TO THE ENGINEER IMMEDIATELY AND PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL CONTACT 1-800-DIG-TESS A MINIMUM OF 48 HOURS PRIOR TO THE START OF CONSTRUCTION. ANY DAMAGE TO EXISTING UTILITIES SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND THE REPAIR SHALL BE AT CONTRACTOR'S SOLE EXPENSE WHETHER THE UTILITY IS SHOWN ON THESE PLANS OR NOT.

TRENCH EXCAVATION SAFETY PROTECTION:
CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/ GEOTECHNICAL/ SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND /OR PROCEDURES FOR THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR'S IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLY WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

DATE

NO. REVISION

STATE OF TEXAS
JON D. ADAME
82567
LICENSED PROFESSIONAL ENGINEER

Jon Adame
9-17-25

PAPE-DAWSON
ENGINEERS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #1028600

APOLLO OAKS
BEXAR COUNTY, TEXAS

DRAIN "A" ~ STA. 8+00.00 TO END
DRAIN PLAN & PROFILE

PLAT NO. CP202506

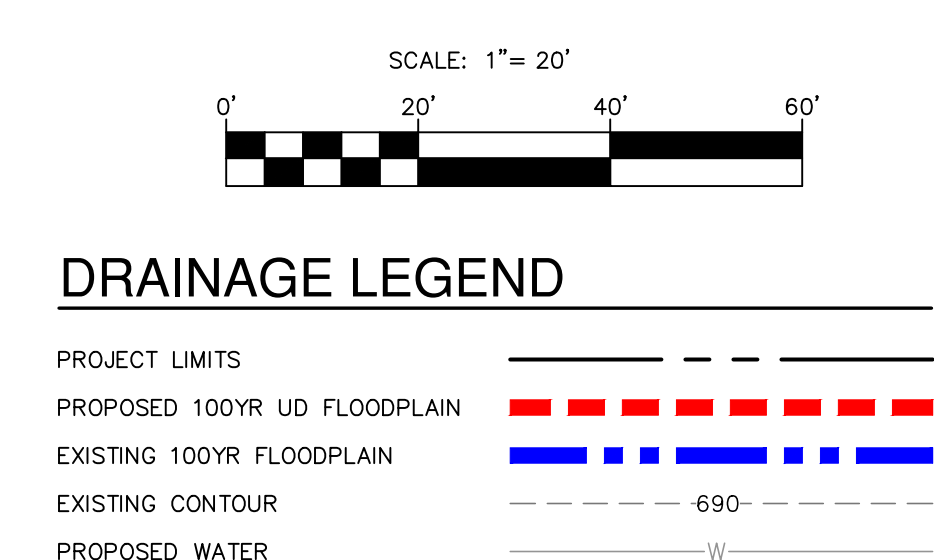
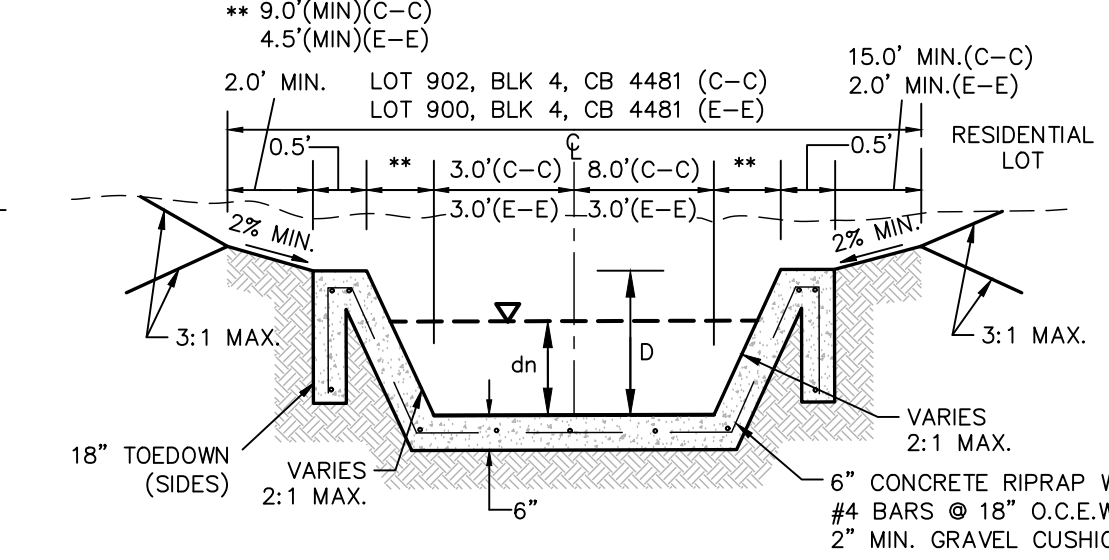
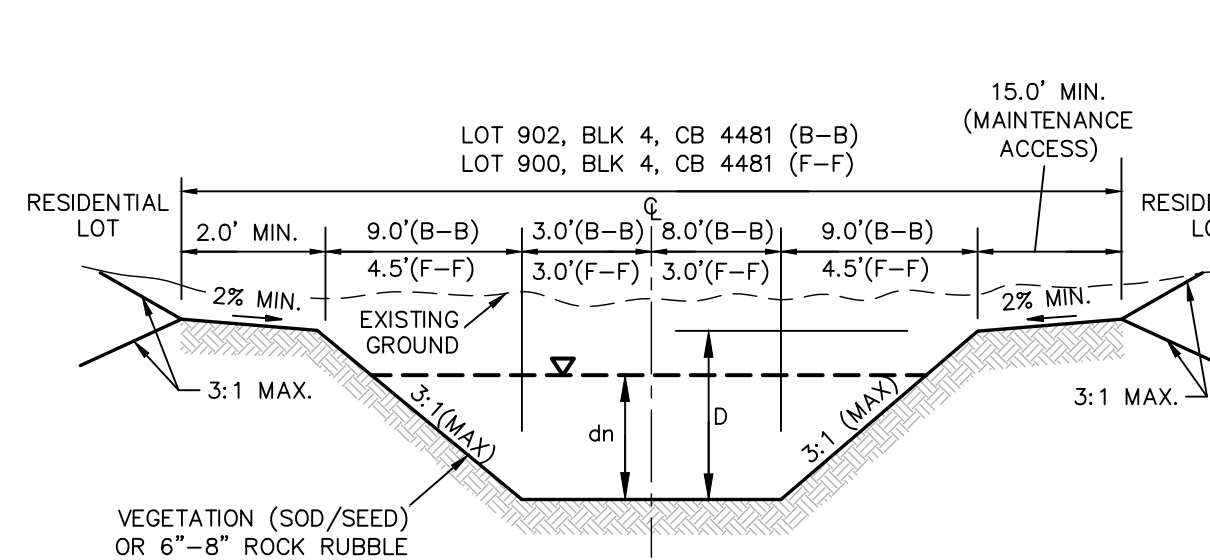
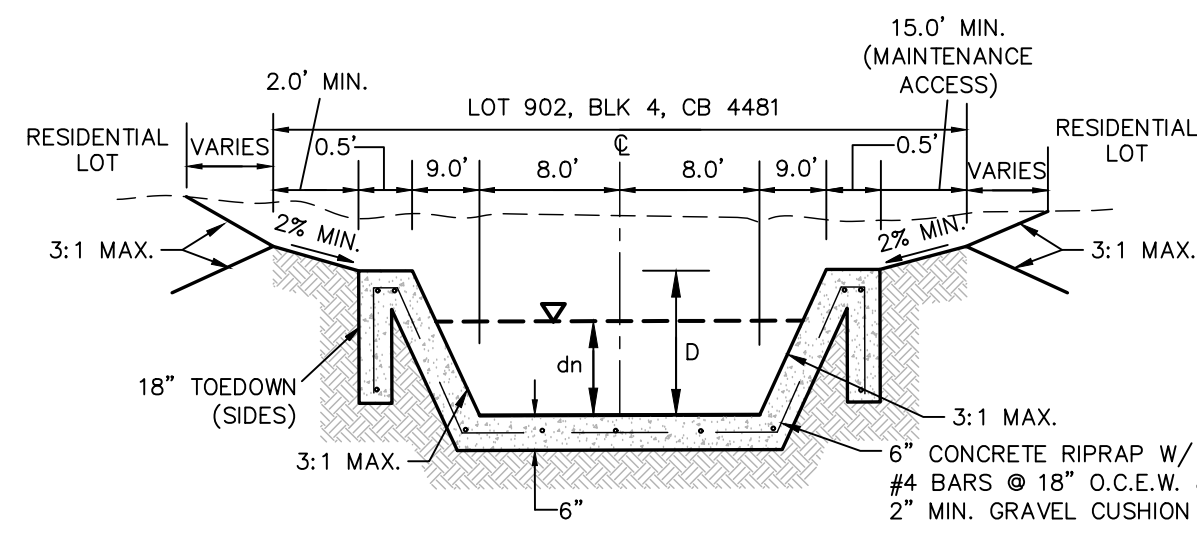
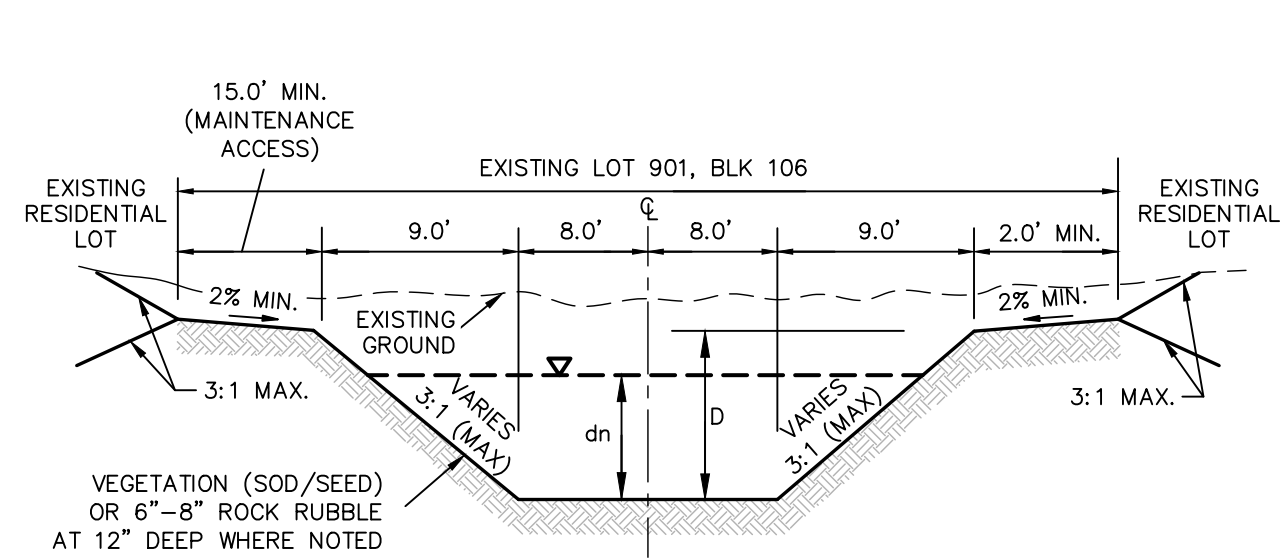
JOB NO. 13657-00

DATE SEPTEMBER 2025

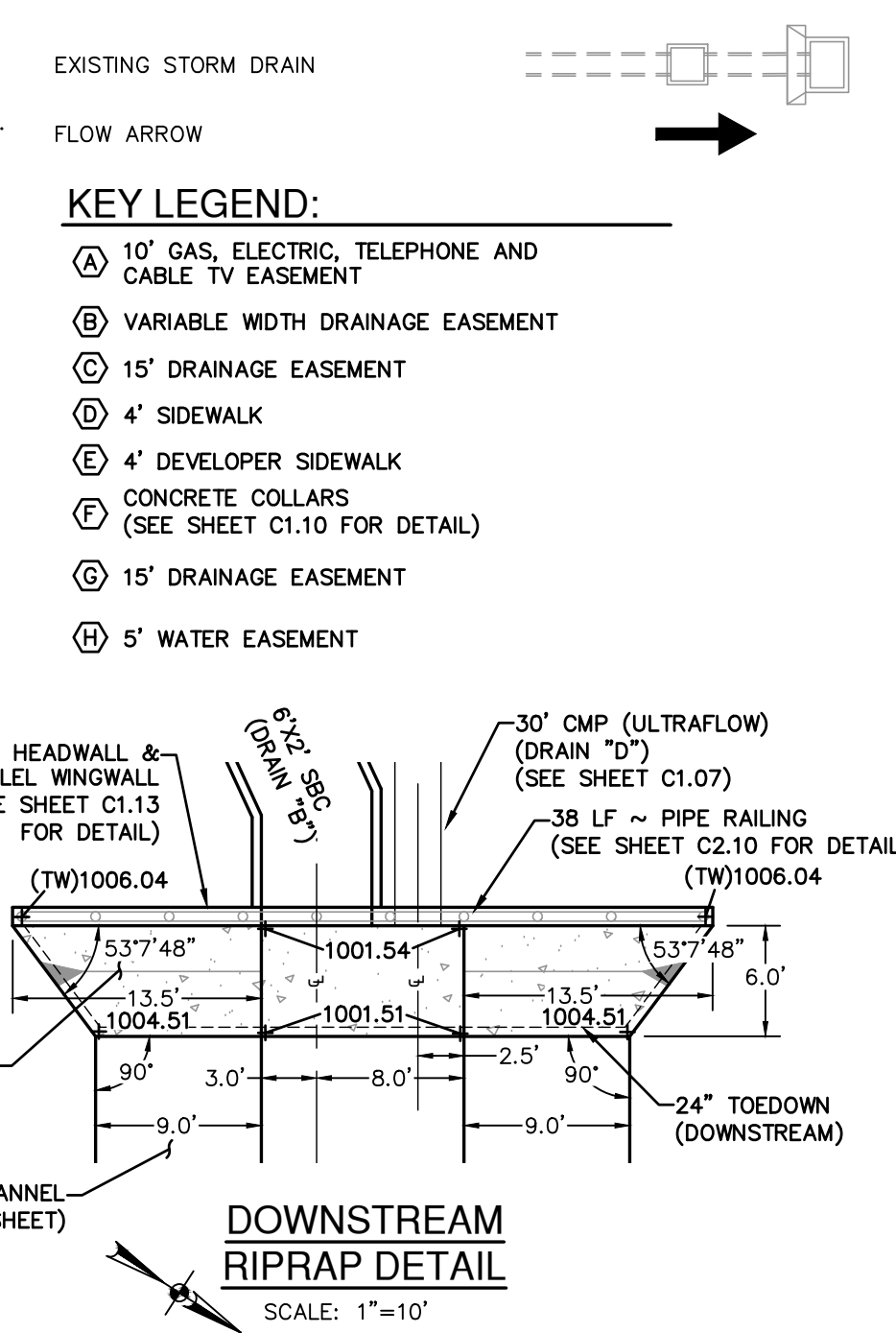
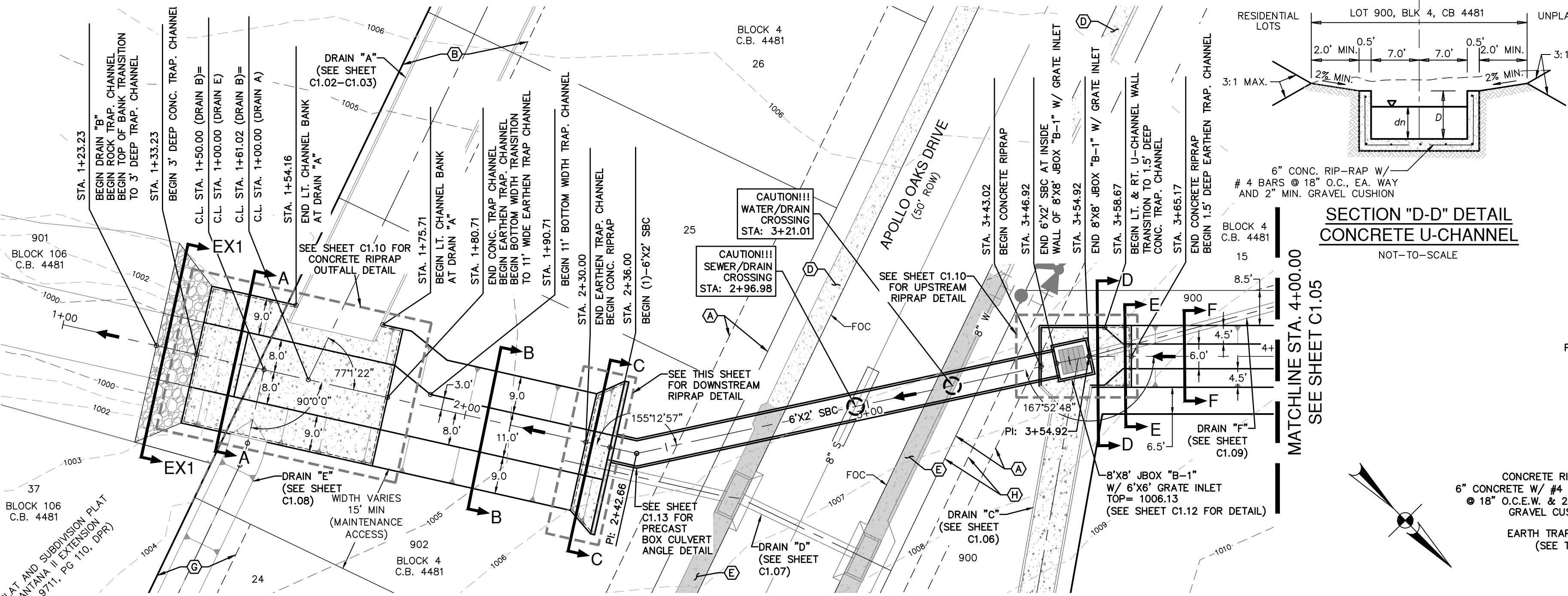
DRAWN CB

CHECKED JA

SHEET C1.03

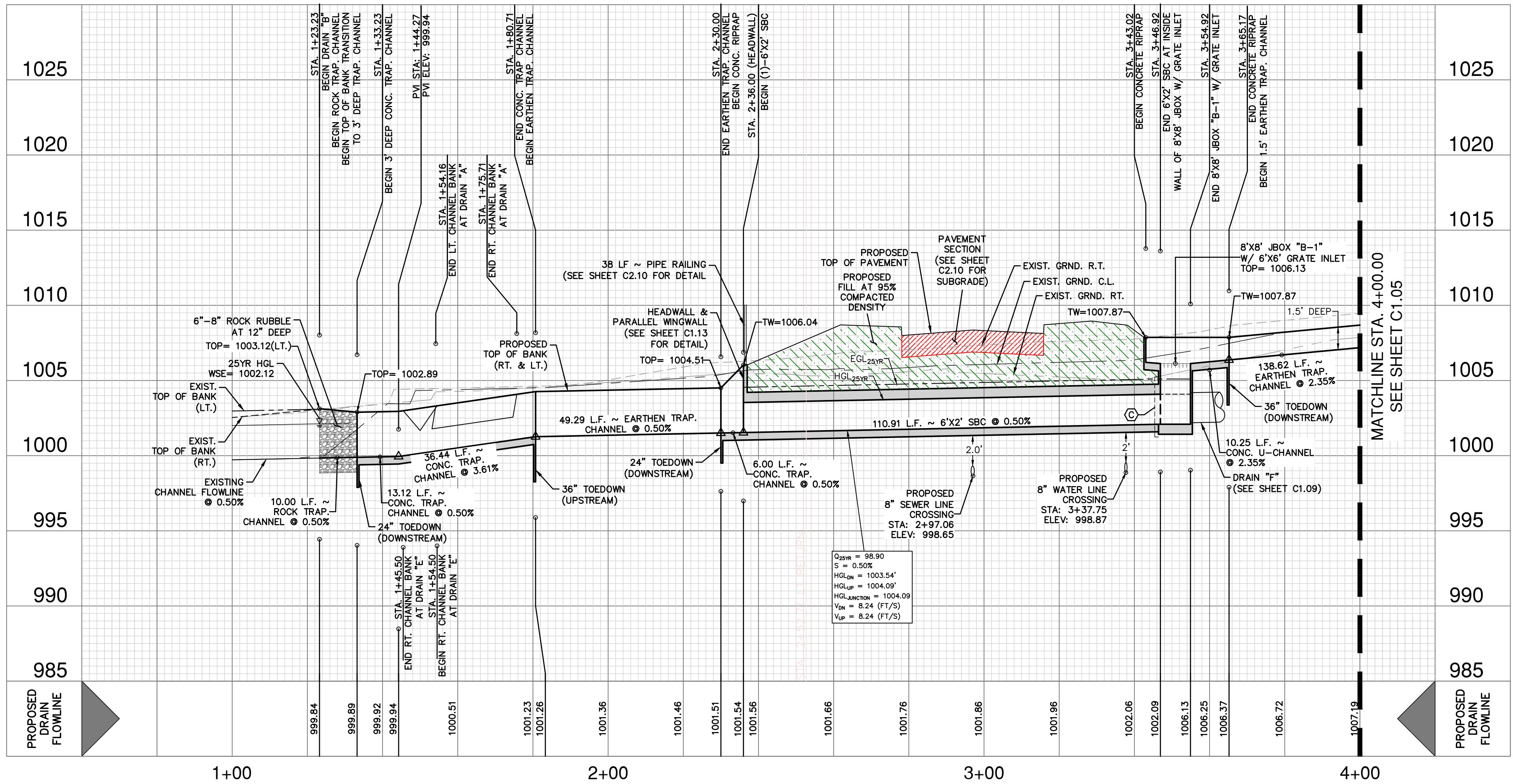


HYDRAULIC CALCULATIONS EARTH TRAP CHANNEL (SECTION EX1-EX1) STA. 1+23.23 TO 1+33.23 $Q_{25} = 255.55$ CFS $B_w = 16'$ $n = 0.035$ $S = 0.50\%$ $D = 3.00'$ $dn = 2.28'$ $V = 4.09$ fps $\tau_d = 0.50$ LB/FT ² RC= ROCK D50=6IN.	HYDRAULIC CALCULATIONS CONG. TRAP CHANNEL (SECTION A-A) STA. 1+33.23 TO 1+44.27 $Q_{25} = 255.55$ CFS $B_w = 16'$ $n = 0.015$ $S = 0.50\%$ $D = 3.00'$ $dn = 1.54'$ $V = 8.05$ fps	HYDRAULIC CALCULATIONS CONG. TRAP CHANNEL (SECTION A-A) STA. 1+44.27 TO 1+80.71 $Q_{25} = 255.55$ CFS $B_w = 16'$ $n = 0.015$ $S = 3.61\%$ $D = 3.00'$ $dn = 0.88'$ $V = 15.58$ fps
HYDRAULIC CALCULATIONS EARTH TRAP CHANNEL (SECTION B-B) STA. 1+80.71 TO 2+30.00 $Q_{25} = 114.33$ CFS $B_w = 11'$ $n = 0.035$ $S = 0.50\%$ $D = 3.00'$ $dn = 1.87'$ $V = 3.68$ fps $\tau_d = 0.42$ LB/FT ² RC= B.C.D	HYDRAULIC CALCULATIONS CONG. TRAP CHANNEL (SECTION C-C) STA. 2+30.00 TO 2+36.00 $Q_{25} = 114.33$ CFS $B_w = 11'$ $n = 0.015$ $S = 0.50\%$ $D = 3.00'$ $dn = 1.22'$ $V = 6.97$ fps	HYDRAULIC CALCULATIONS CONG. U-CHANNEL (SECTION D-D) STA. 2+43.02 TO 3+65.17 $Q_{25} = 85.58$ CFS $B_w = 14'$ $n = 0.015$ $S = 2.35\%$ $D = 1.50'$ $dn = 0.60'$ $V = 10.19$ fps
HYDRAULIC CALCULATIONS EARTH TRAP CHANNEL (SECTION F-F) STA. 3+65.17 TO 5+03.79 $Q_{25} = 32.81$ CFS $B_w = 6'$ $n = 0.035$ $S = 2.35\%$ $D = 1.50'$ $dn = 0.82'$ $V = 4.73$ fps $\tau_d = 0.91$ LB/FT ² RC= B.C.D		



DRAIN "B" ~ STA. 1+00.00 TO STA. 4+00.00

VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 20'



OPEN CHANNEL NOTE:
CONTRACTOR SHALL REFERENCE TABLE 9.3.8.1 - "RETARDATION CLASS FOR LINING MATERIALS" PROVIDED ON SHEET C1.10 AND SUPPLIED RETARDANCE CLASS (RC) FOR CHOICE OF COVER WITHIN OPEN EARTHEN CHANNEL CROSS-SECTIONS.

DRAINAGE CONSTRUCTION NOTES:
1. ALL SINGLE BOX CULVERTS (SBC) AND ALL MULTIPLE BOX CULVERTS (MBC) SHALL BE PRECAST. (SEE SHEETS C1.13-C1.14 FOR PRECAST CONSTRUCTION DETAILS.)

DRAINAGE & GRADING NOTES:
1. A BEAR COUNTY ROW PERMIT MUST BE OBTAINED BEFORE WORKING IN BEAR COUNTY ROW. CONTRACTOR SHALL COORDINATE A TRAFFIC CONTROL PLAN FOR ALL WORK WITHIN THE ROW. ADDITIONAL WARNING SIGNS MAY BE RECOMMENDED BY THE ENGINEER ONCE THE ROADWAYS ARE CONSTRUCTED.
2. THE CONTRACTOR WILL BE RESPONSIBLE FOR DETERMINING EXACT LOCATION OF ALL UTILITIES AND DRAINAGE STRUCTURES WHETHER SHOWN ON THE PLANS OR NOT. THE CONTRACTOR SHALL UNCOVER EXISTING UTILITIES PRIOR TO CONSTRUCTION TO VERIFY SIZE, GRADE, AND LOCATION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY FROM PLANS PRIOR TO BEGINNING CONSTRUCTION. ANY DAMAGE TO EXISTING UTILITIES, WHETHER SHOWN ON THE PLANS OR NOT, SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR, AT HIS EXPENSE.
3. ALL CONCRETE FOR TxDOT DRAINAGE STRUCTURES SHALL MEET TxDOT SPECIFICATIONS. ALL OTHER CONCRETE SHALL BE CLASS "A" 3000 PSI CYLINDER STRENGTH IN 28 DAYS.
4. REFERENCE DRAINAGE DETAILS FOR PIPE TRENCH DETAILS, BOX CULVERT, HEADWALL, AND WINGWALL CONSTRUCTION DETAILS, AND BOX CULVERT BEDDING AND EXCAVATION LIMITS.
5. CONTRACTOR SHALL GROUT ALL CURB INLETS AND JUNCTION BOXES TO PROVIDE FOR POSITIVE DRAINAGE.
6. EARTHEN CHANNELS WILL BE VEGETATED BY SEEDING OR SODDING. 85% OF THE CHANNEL SURFACE MUST HAVE ESTABLISHED VEGETATION BEFORE THE CITY OF SAN ANTONIO WILL ACCEPT.
7. CONTRACTOR SHALL MATCH TOP OF CHANNEL TO NATURAL GROUND AND MAINTAIN A MINIMUM CHANNEL DEPTH OF "D" AS SHOWN IN THE PROFILE.

CAUTION!!
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TRENCH EXCAVATION SAFETY PROTECTION:
CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN / GEOTECHNICAL / SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION, SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES FOR THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR'S IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLY WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

DATE

NO.

REVISION

STATE OF TEXAS
JON D. ADAME
82567
LICENSED PROFESSIONAL ENGINEER

for Adame
9-17-25

PAPE-DAWSON
ENGINEERS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1008600

APOLLO OAKS
BEXAR COUNTY, TEXAS

DRAIN "B" ~ STA. 1+00.00 TO STA. 4+00.00
DRAIN PLAN & PROFILE

PLAT NO. CP202506

JOB NO. 13657-00

DATE SEPTEMBER 2025

DESIGNER CB

CHECKED JA DRAWN CB

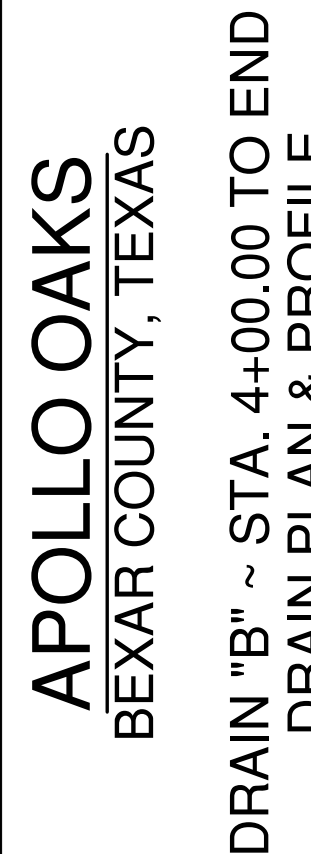
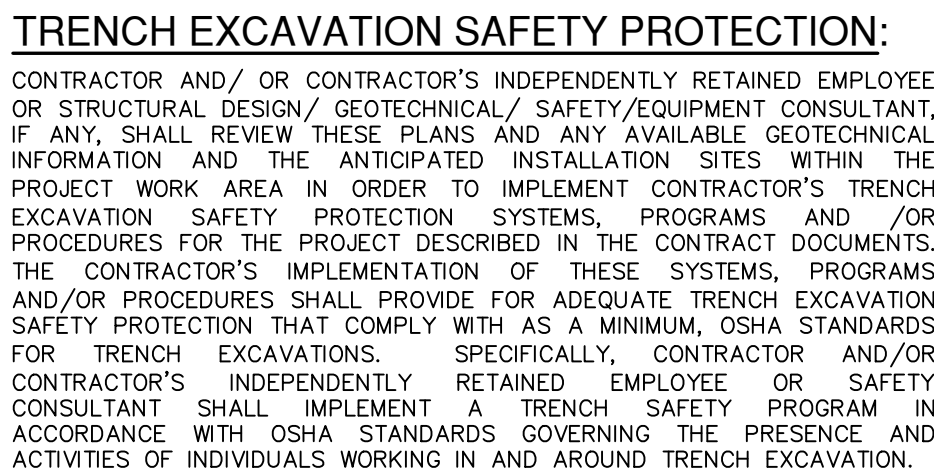
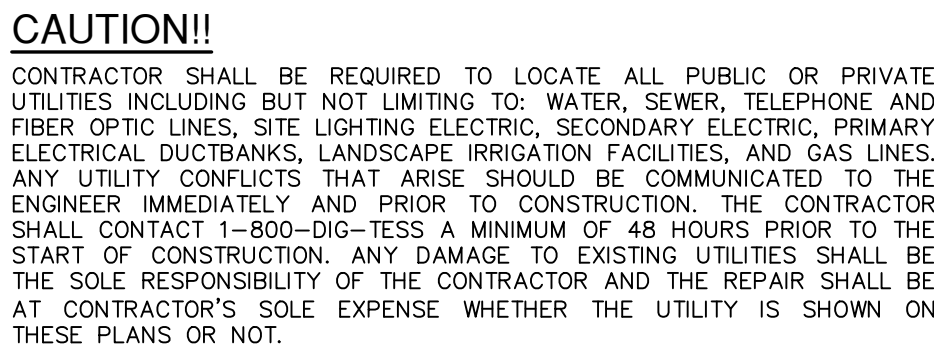
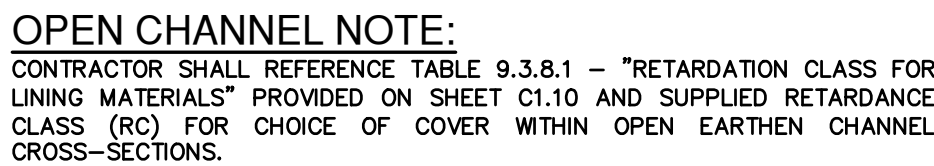
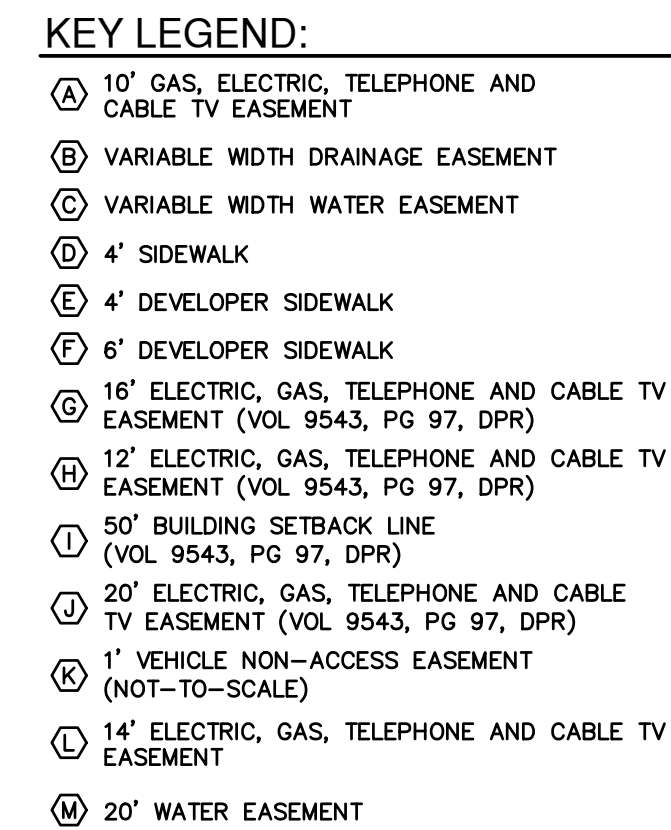
SHEET C1.04

The diagram shows a cross-section of an earthen trap channel. The top horizontal dimension is labeled "LOT 900, BLOCK 4, CB 4481". The channel has a trapezoidal shape with side slopes indicated as "3:1 MAX.". The bottom width is labeled "dn". The depth from the existing ground level to the channel bottom is labeled "D". The channel is lined with "VEGETATION (SOD/SEED) OR 6\"-8\" ROCK RUBBLE AT 12\" DEEP WHERE NOTED". The channel is flanked by "EXISTING PROPOSED RESIDENTIAL LOT" on both sides. The channel is labeled "SECTION 'F-F'" and "EARTHEN TRAP CHANNEL".

SECTION "F-F"

EARTHEN TRAP CHANNEL

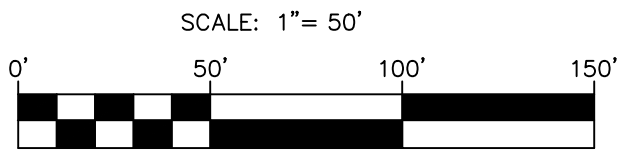
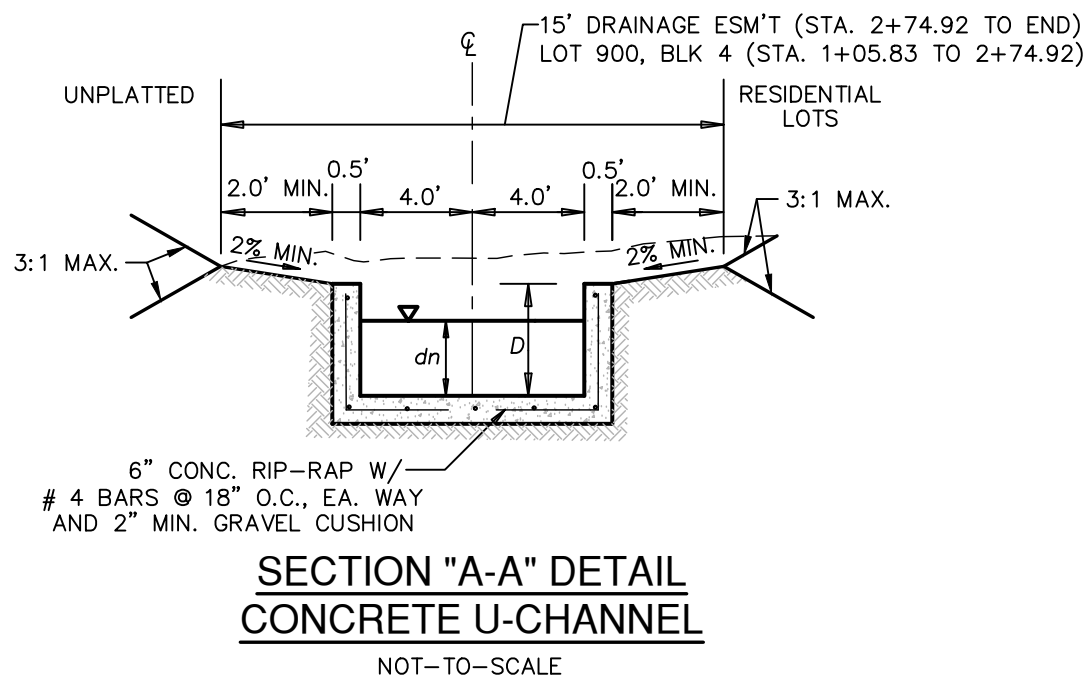
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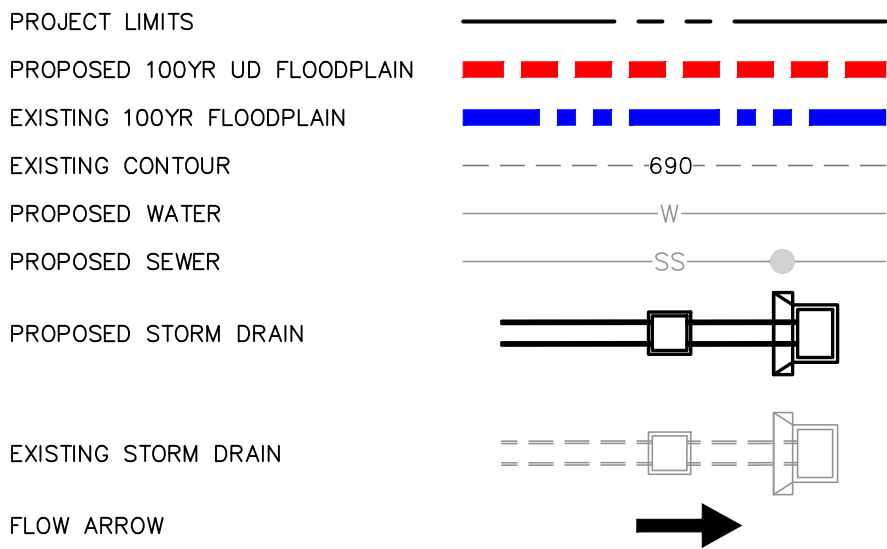
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THIS DOCUMENT HAS BEEN PRODUCED FROM MATERIAL THAT WAS STORED AND/OR TRANSMITTED ELECTRONICALLY AND MAY HAVE BEEN INADVERTENTLY ALTERED. RELY ONLY ON FINAL HARDCOPY MATERIALS BEARING THE CONSULTANT'S ORIGINAL SIGNATURE AND SEAL. AERIAL IMAGERY PROVIDED BY GOOGLE© UNLESS OTHERWISE NOTED. Imagery © 2016,CAPCOO\Digital Globe,Texas Orthographic Program, USDA Farm Service Agency.

HYDRAULIC CALCULATIONS CONC. U-CHANNEL (SECTION A-A) STA. 1+16.60 TO 2+80.38	HYDRAULIC CALCULATIONS CONC. U-CHANNEL (SECTION A-A) STA. 2+80.38 TO 3+50.00	HYDRAULIC CALCULATIONS CONC. U-CHANNEL (SECTION A-A) STA. 3+50.00 TO 4+50.00	HYDRAULIC CALCULATIONS CONC. U-CHANNEL (SECTION A-A) STA. 4+50.00 TO 5+19.13
Q25 = 57.96 CFS	Q25 = 57.96 CFS	Q25 = 57.96 CFS	Q25 = 57.96 CFS
Bw = 8'	Bw = 8'	Bw = 8'	Bw = 8'
n = 0.015	n = 0.015	n = 0.015	n = 0.015
S = 2.27%	S = 1.00%	S = 2.10%	S = 1.00%
D = 1.50'	D = 1.50'	D = 1.50'	D = 1.50'
dn = 0.70'	dn = 0.90'	dn = 0.71'	dn = 0.90'
V = 10.35 fps	V = 8.05 fps	V = 10.20 fps	V = 8.05 fps



DRAINAGE LEGEND



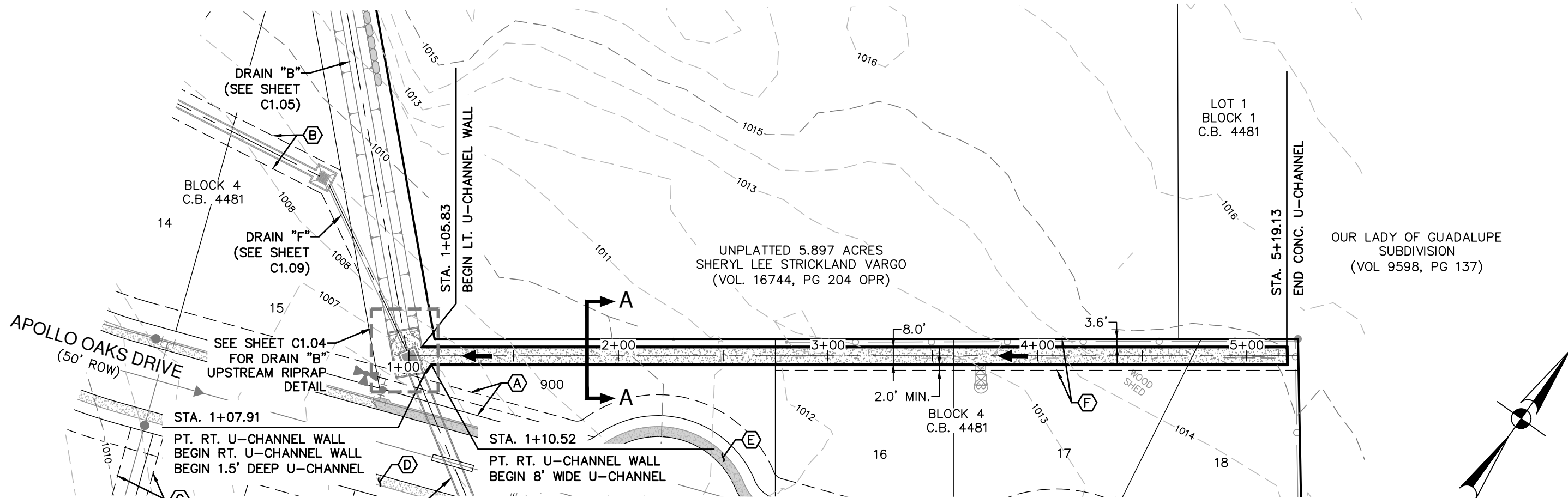
KEY LEGEND:

- (A) 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT
- (B) VARIABLE WIDTH DRAINAGE EASEMENT
- (C) 16' WATER EASEMENT
- (D) 4' SIDEWALK
- (E) 4' DEVELOPER SIDEWALK
- (F) 15' DRAINAGE EASEMENT



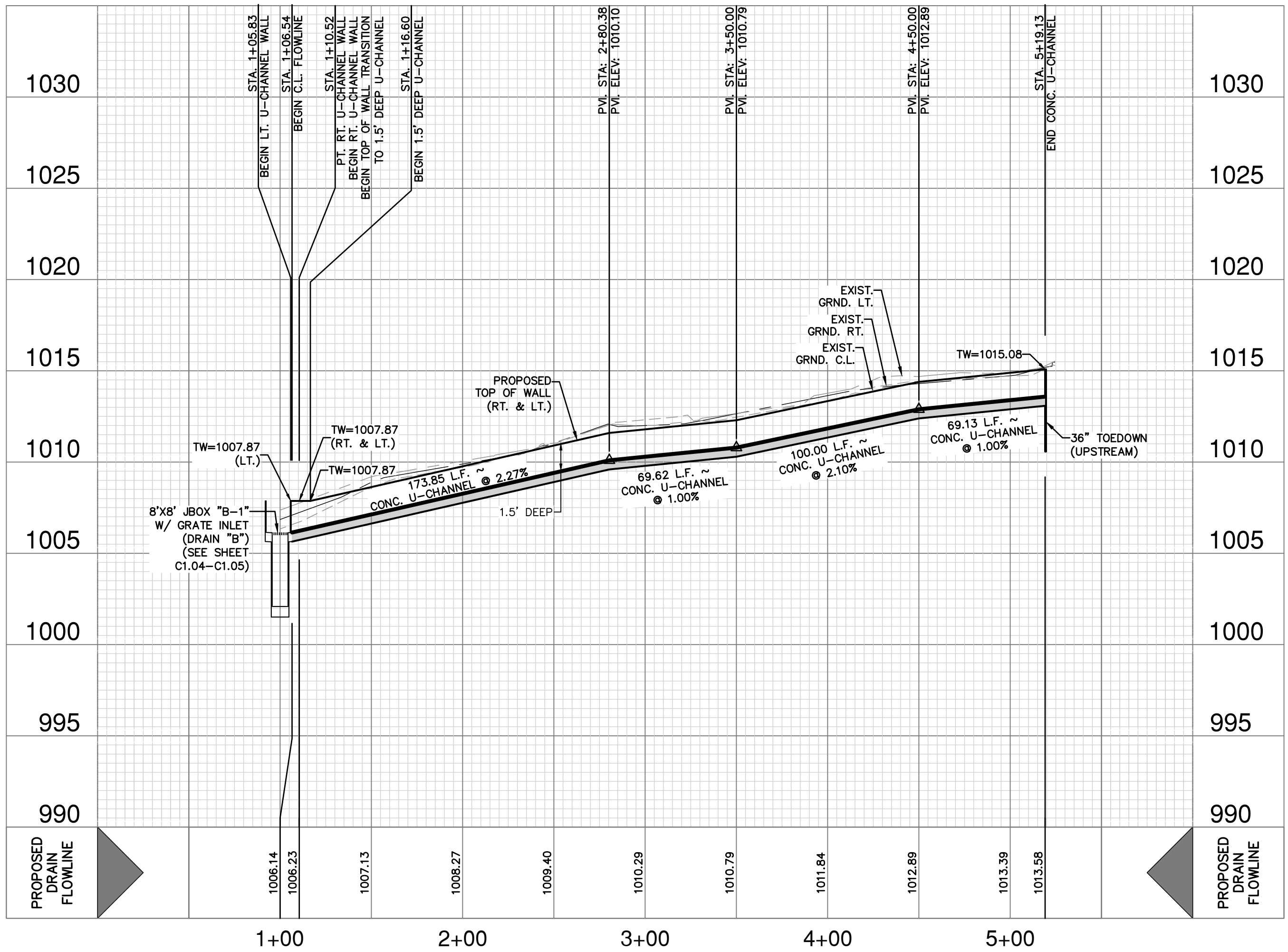
**PAPE-DAWSON
ENGINEERS**

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028600



DRAIN "C" ~ STA. 1+00.00 TO END

VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 50'



OPEN CHANNEL NOTE:

CONTRACTOR SHALL REFERENCE TABLE 9.3.8.1 - "RETARDATION CLASS FOR LINING MATERIALS" PROVIDED ON SHEET C1.10 AND SUPPLIED RETARDANCE CLASS (RC) FOR CHOICE OF COVER WITHIN OPEN EARTHEN CHANNEL CROSS-SECTIONS.

DRAINAGE CONSTRUCTION NOTES:

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- ALL CONCRETE FOR TXDOT DRAINAGE STRUCTURES SHALL MEET TXDOT SPECIFICATIONS. ALL OTHER CONCRETE SHALL BE CLASS "A" 3000 PSI CYLINDER STRENGTH IN 28 DAYS.
- REFERENCE DRAINAGE DETAILS FOR PIPE TRENCH DETAILS, BOX CULVERT, HEADWALL, AND WINGWALL CONSTRUCTION DETAILS, AND BOX CULVERT BEDDING AND EXCAVATION LIMITS.
- CONTRACTOR SHALL GROUT ALL CURB INLETS AND JUNCTION BOXES TO PROVIDE FOR POSITIVE DRAINAGE.
- EARTHEN CHANNELS WILL BE VEGETATED BY SEEDING OR SODDING. 85% OF THE CHANNEL SURFACE MUST HAVE ESTABLISHED VEGETATION BEFORE THE CITY OF SAN ANTONIO WILL ACCEPT.
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CAUTION!!

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TRENCH EXCAVATION SAFETY PROTECTION:

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DATE	
NO.	
REVISION	

PLAT NO.	CP202506
JOB NO.	13657-00
DATE	SEPTEMBER 2025
DESIGNER	CB
CHECKED	JA
DRAWN	CB
SHEET	C1.06



- | HYDRAULIC CALCULATIONS | |
|---|---|
| <u>CURB INLET "D-1" & "D-2" OPENING</u> | |
| (DRAIN "D") | |
| Q25 = | 33.12 CFS (16.56 CFS EACH INLET) |
| Bw = | C X L X H ^{3/2} (3/2) (WIER EQ.) |
| C = | 3.087 |
| h = | 0.79 FT |
| C = | $\frac{Q}{C \times L \times h^{3/2} (3/2)}$ |
| | 16.56 CFS |
| Local = | $(3.087)(0.79 \text{ FT})^{3/2} (3/2)$ |
| Local = | 7.64 FT |
| L = | USE (1)'-10" CURB INLET EACH SIDE |

OPEN CHANNEL NOTE:

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DRAINAGE & GRADING NOTES:

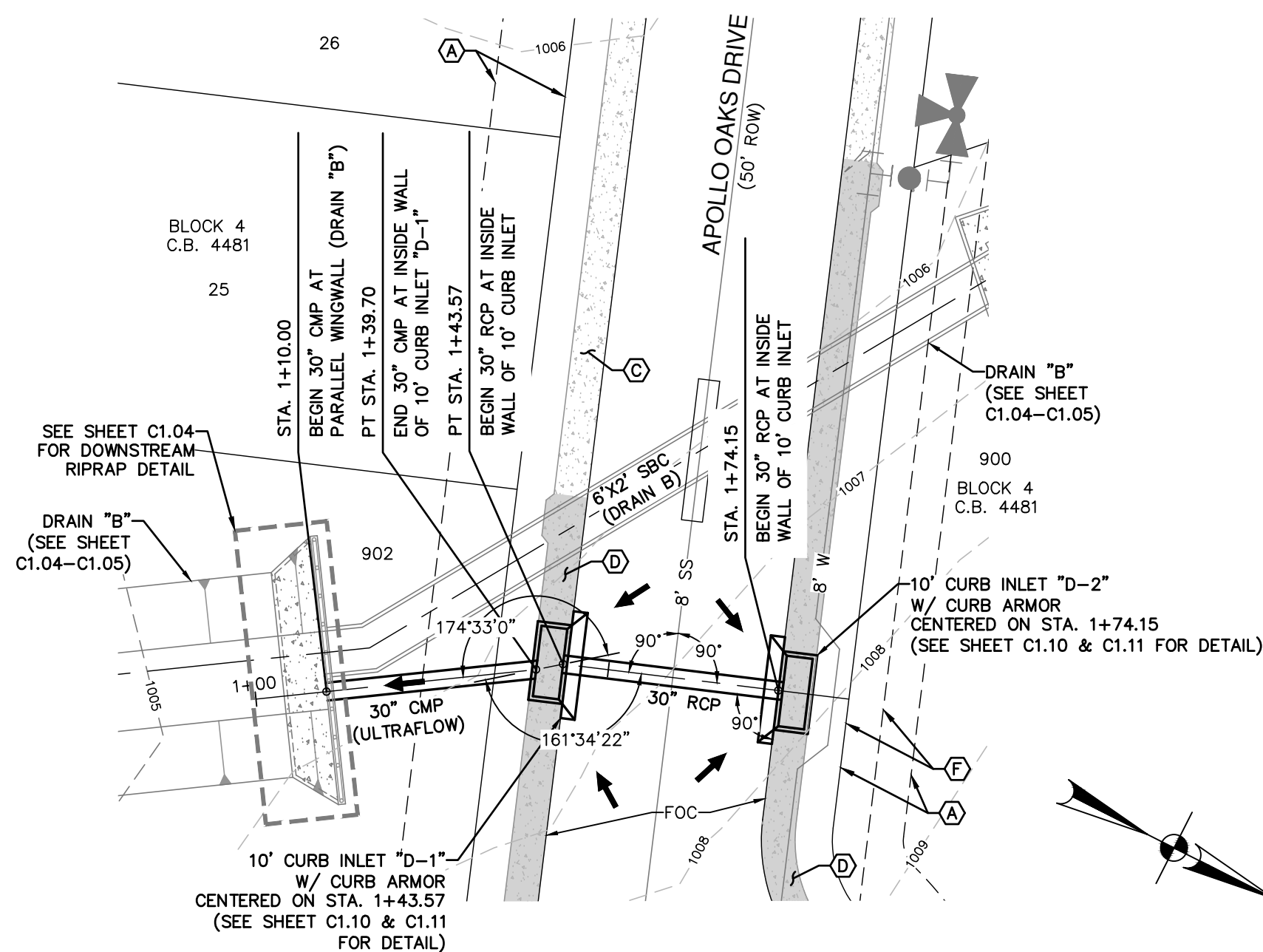
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TRENCH EXCAVATION SAFETY PROTECTION

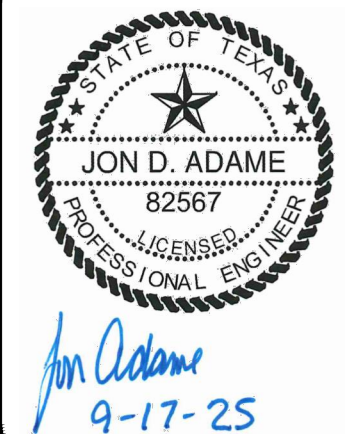
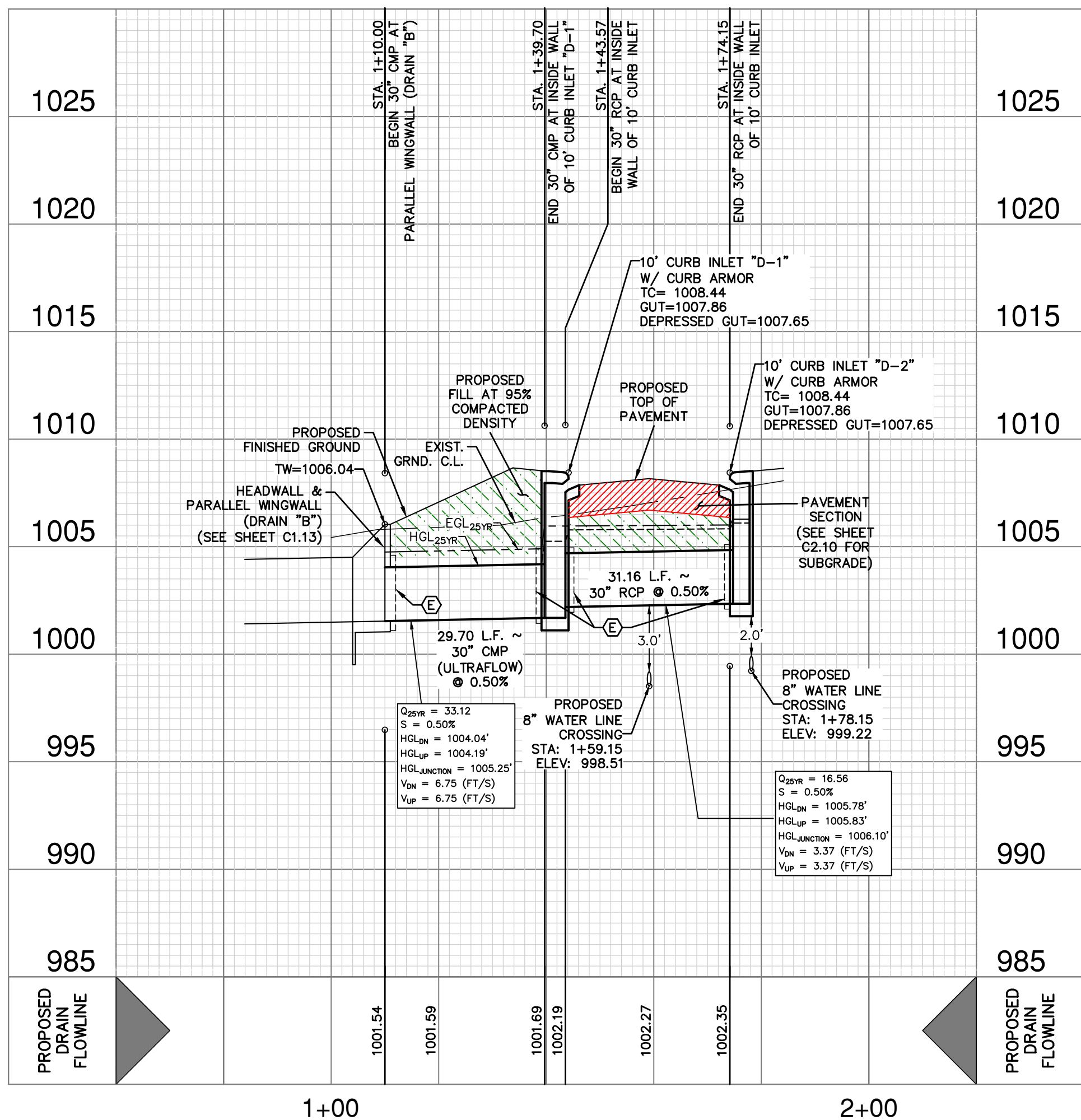
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DRAIN "D" ~ STA. 1+00.00 TO END

VERTICAL SCALE: 1" = 5'

HORIZONTAL SCALE: 1" = 20'



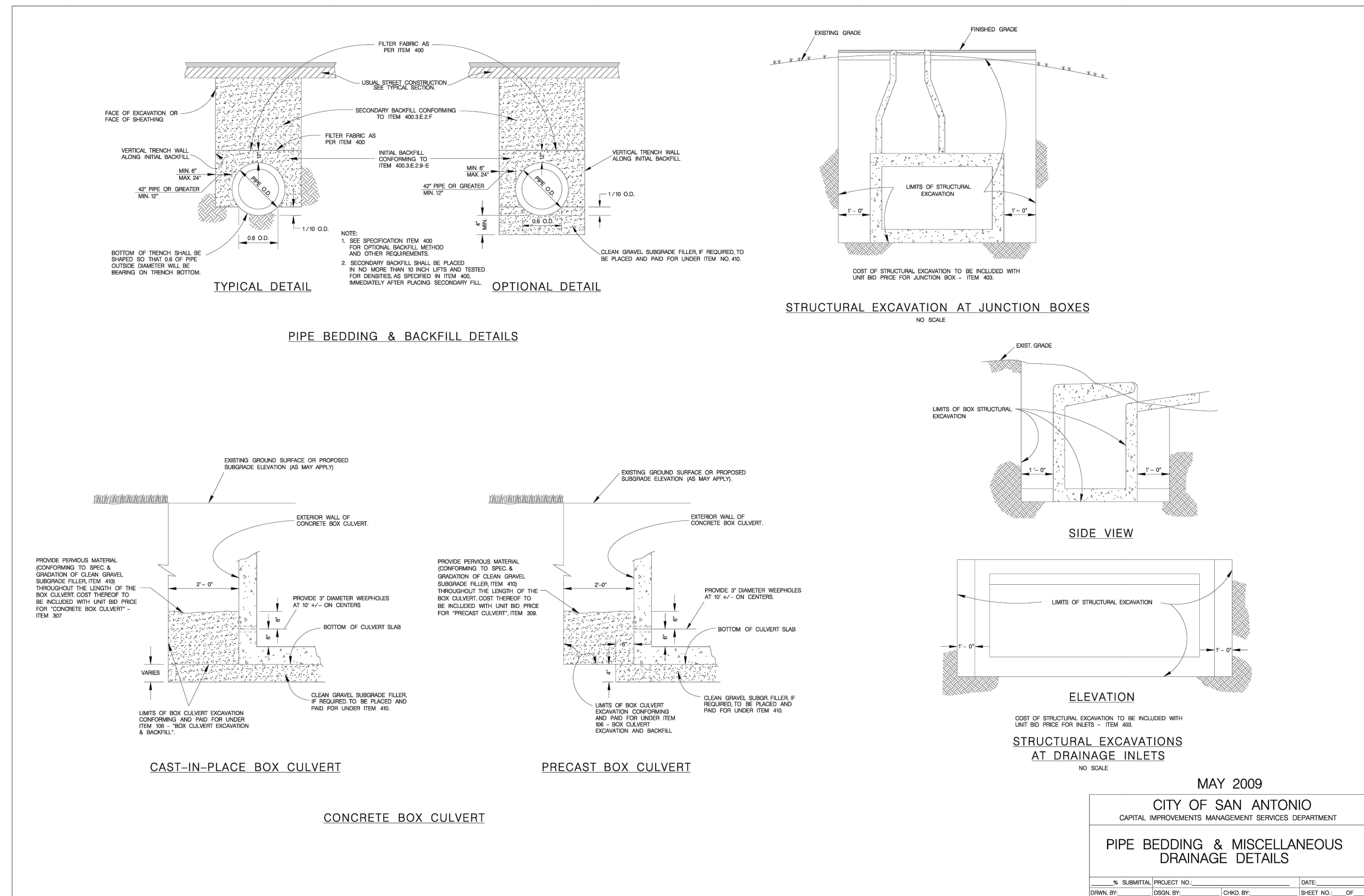
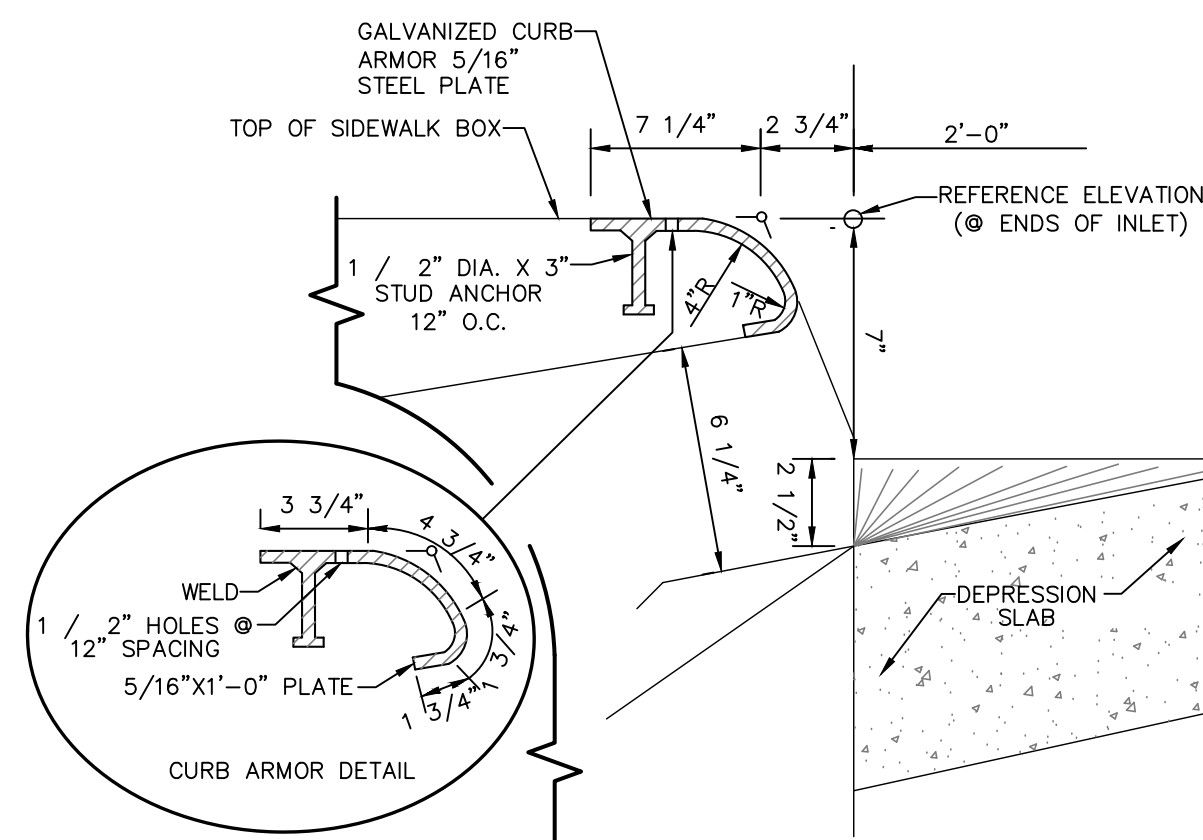
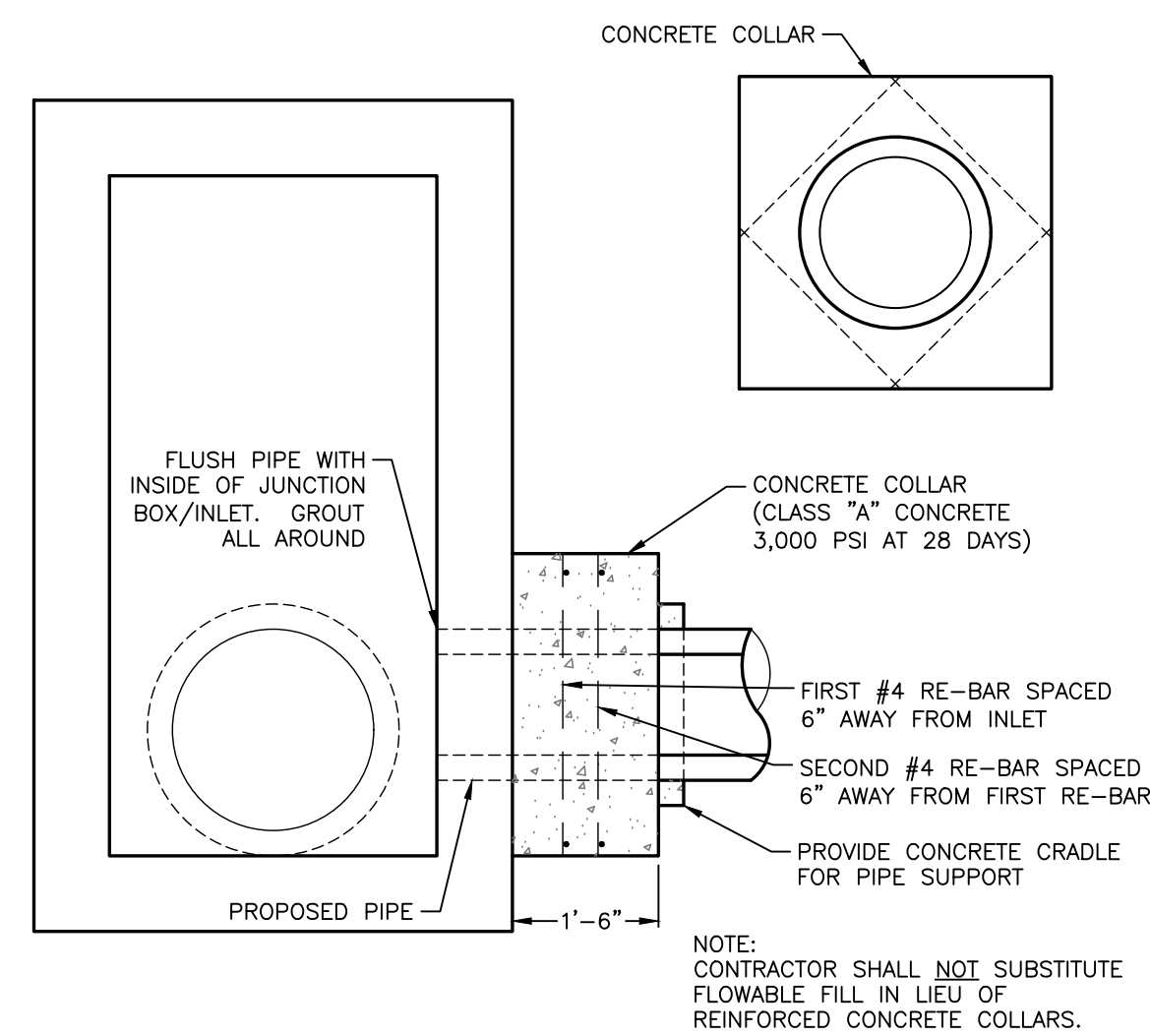
**PAPE-DAWSON
ENGINEERS**

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

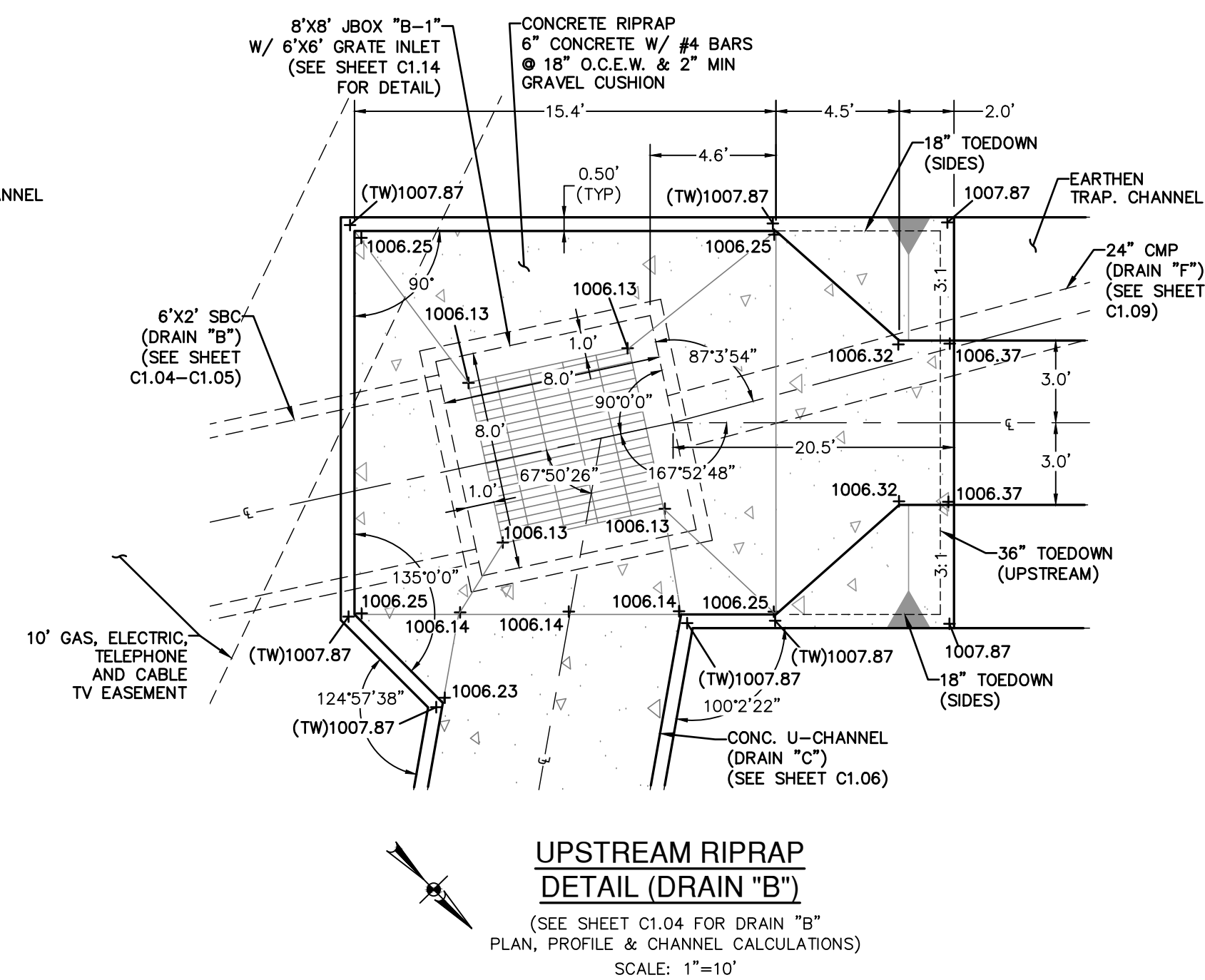
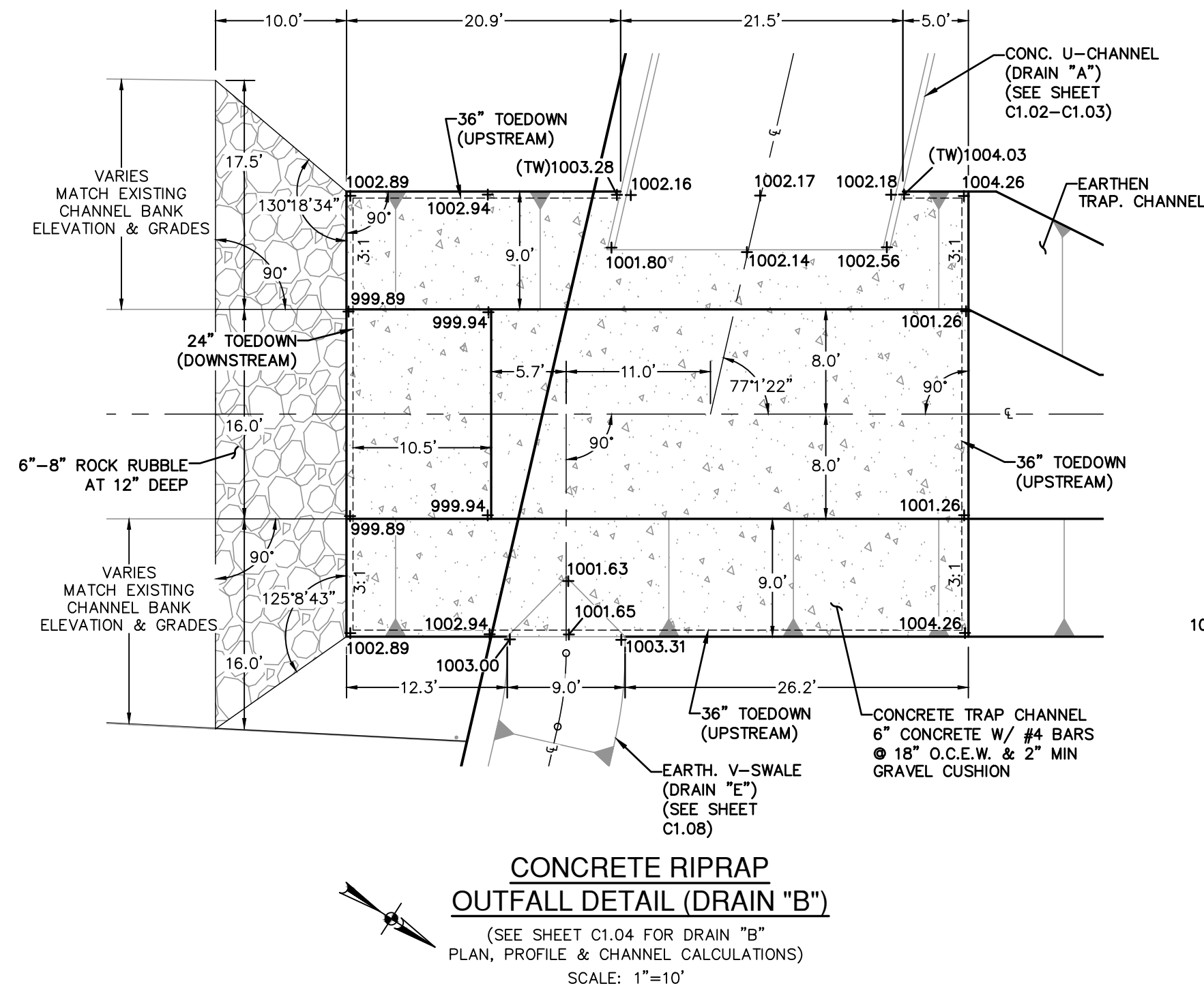
APOLLO OAKS
BEXAR COUNTY, TEXAS

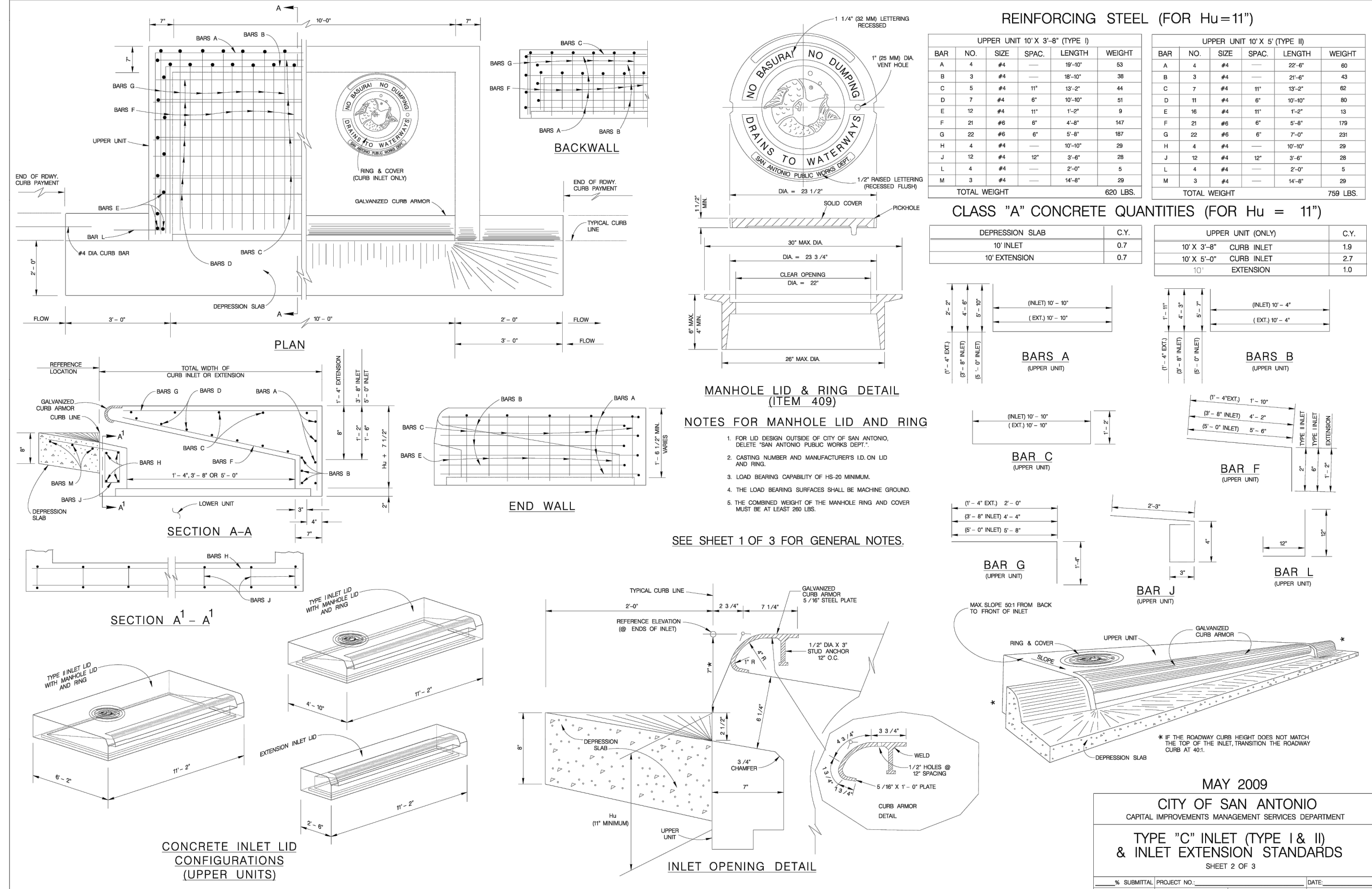
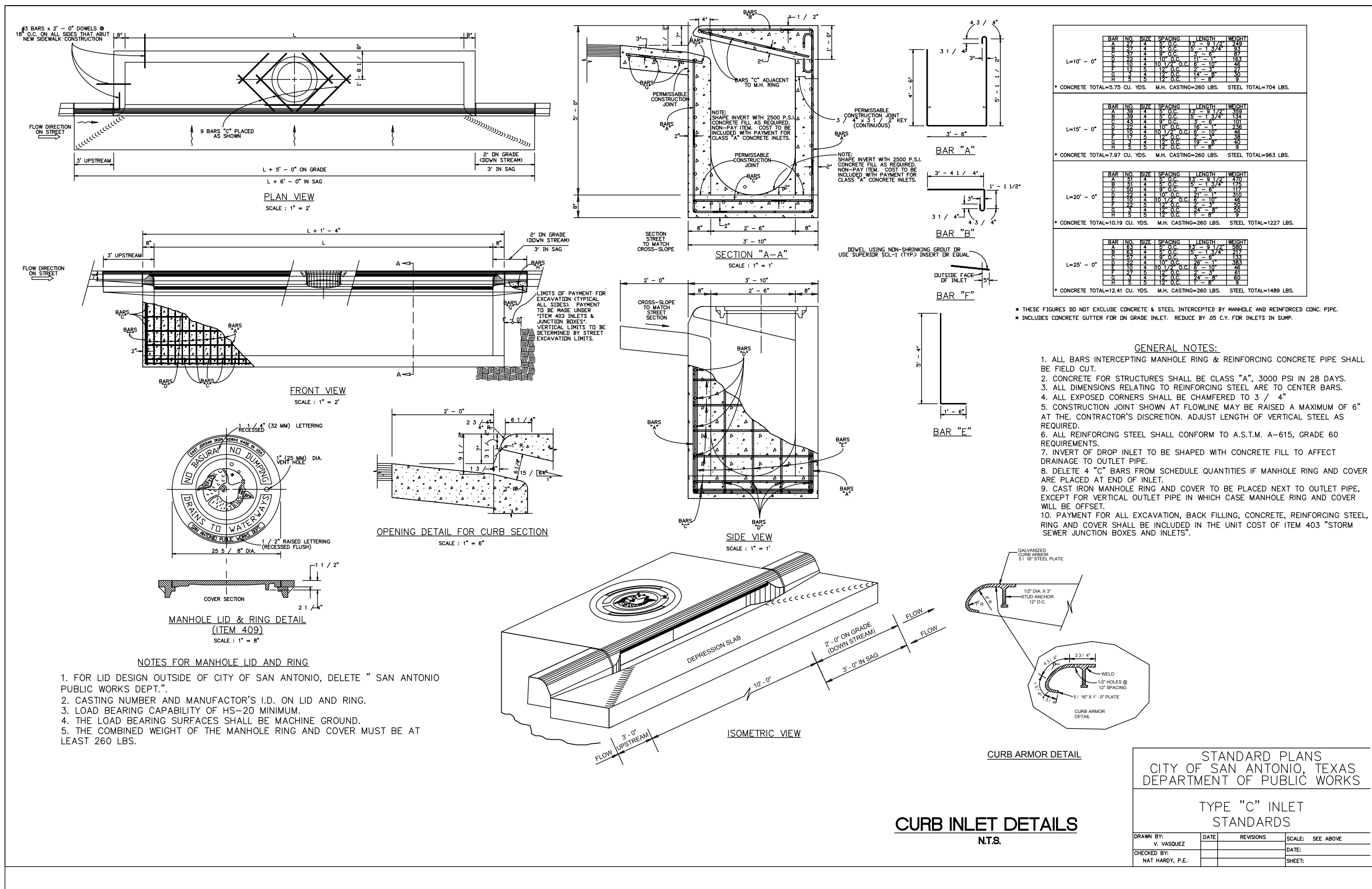
DRAIN "D" ~ STA. 1+00.00 TO END
DRAIN PLAN & PROFILE

PLAT NO. CP202506
JOB NO. 13657-00
DATE SEPTEMBER 2025
DESIGNER CB
CHECKED JA DRAWN CB
SHEET C1.07



Retardance Class	Permissible Shear Stress (t) (lbs./sq.ft.)	Cover	Condition
B	2.1	Bermuda grass	Good stand, tall (average 12 in. or 305 mm)
		Native grass mixture	Good stand, unmowed
		little bluestem, bluestem, blue gamma, other short and long stem midwest grasses	
		Lepedeza sericea	Good stand, not woody, tall (Average 19 in. or 480 mm)
		Alfalfa	Good stand, uncut (Average 11 in. or 280 mm)
		Blue gamma	Good stand, uncut (Average 11 in. or 280 mm)
C	1.1	Orabgrass	Fair stand, uncut (10-to-48 in. or 55-to- 1220 mm)
		Bermuda grass	Good stand, mowed (average 6 in. or 150 mm)
		Common lespedeza	Good Stand, uncut (average 11 in. Or 280 mm)
		Grass-legume mixture: summer (orchard grass redtop, Italian ryegrass, and common lespedeza)	Good Stand, uncut (6-8 in. or 150-200 mm)
		Centipede grass	Very dense cover (average 6 in. or 150 mm)
		Kentucky bluegrass	Good stand, headed (6-12 in. or 150- 305 mm)
D	0.6	Bermuda grass	Good stand, cut to 2.5 in. or 65 mm
		Common lespedeza	Excellent stand, uncut (average 4.5 in. or 115 mm)
		Buffalo grass	Good stand, uncut (3-6 in. or 75-150 mm)
		Grass-legume mixture: fall, spring (orchard grass Italian ryegrass, and common lespedeza	Good stand, uncut (4-5 in. or 100-125 mm)
		Lepedeza sericea	After cutting to 2 in. or 50 mm (very good before cutting)
E	0.35	Bermuda grass	Good stand, cut to 1.5 in. or 40 mm
		Bermuda grass	Burned Bubble
	2.5	Rock D50 = 6 in. or 150 mm	
	6.0	Rock D50 = 12 in. or 300 mm	
	2.5	Type III Curlex Soil Retention Blanket	





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DATE: 01/15/2020 FILE: 1365700.dwg

	Size	MAX DEPTH = 15 ft. to top of BASE SLAB												MAX DEPTH = 25 ft. to top of BASE SLAB												BH MIN	HOLE DIA	Max HOLE DIA (See Note 2)	Max HO DIA (See Note 2)						
		Base Slab						Base Unit or Riser Walls						Base Slab						Base Unit or Riser Walls															
		Short Span Rein Steel Area	Long Span Rein Steel Area	Thickness	Short Span Rein Steel Area	Long Span Rein Steel Area	Thickness	Reduced Riser Size	Short Span Rein Steel Area	Long Span Rein Steel Area	Thickness	Reduced Riser Size	Short Span Rein Steel Area	Long Span Rein Steel Area	Thickness	Reduced Riser Size	Short Span Rein Steel Area	Long Span Rein Steel Area	Thickness	Reduced Riser Size	Short Span Rein Steel Area	Long Span Rein Steel Area	Thickness	Reduced Riser Size											
X x Y	Ashort	Along	BS	Bshort	Blong	W	RWS/RWL or ID	Dshort	Dlong	TS	Ashort	Along	BS	Bshort	Blong	W	RWS/RWL or ID	Dshort	Dlong	TS	Ashort	Along	BS	Bshort	Blong	W	RWS/RWL or ID	Dshort	Dlong	TS	BH MIN	HOLE DIA	KO DIA		
Precast Junction Box (PJB)	ft.	in./ft	in./ft	in./ft	in./ft	in./ft	in.	ft. **	in./ft	in./ft	in.	ft./ft	in./ft	in./ft	in.	ft.	in. **	in./ft	in./ft	in.	ft./ft	in./ft	in./ft	in.	ft./ft	in./ft	in.	ft.	in. **	in./ft	in./ft	in.	ft.	in.	in.
	3x3	0.23	0.23	6	0.19	0.19	6	N/A	0.37	0.37	9	0.29	0.29	6	0.24	0.24	6	N/A	0.37	0.37	9	3.5	36	36	36	36	36	36	36	36	36	36	36	36	
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	0.41	0.41	9	0.47	0.47	6	0.38	0.38	6	N/A	0.41	0.41	9	4.5	48	48	48	48	48	48	48	48	48	48	48	48	
	3x5	0.29	0.18	6	0.19	0.35	6	N/A	0.48	0.48	9	0.39	0.18	6	0.23	0.59	6	N/A	0.48	0.48	9	3.5	36/60	36/60	36/60	36/60	36/60	36/60	36/60	36/60	36/60	36/60	36/60	36/60	
	4x5	0.36	0.18	6	0.22	0.34	6	N/A	0.42	0.42	9	0.53	0.26	6	0.39	0.59	6	N/A	0.42	0.42	9	4.5	48/60	48/60	48/60	48/60	48/60	48/60	48/60	48/60	48/60	48/60	48/60	48/60	
	5x5	0.36	0.36	6	0.34	0.34	6	N/A	0.43	0.43	9	0.62	0.62	6	0.59	0.59	6	N/A	0.43	0.43	9	5.5	60	60	60	60	60	60	60	60	60	60	60	60	
	5x6	0.27	0.27	9	0.34	0.45	6	N/A	0.48	0.48	9	0.47	0.45	9	0.38	0.54	8	N/A	0.48	0.48	9	5.5	60/72	60/72	60/72	60/72	60/72	60/72	60/72	60/72	60/72	60/72	60/72	60/72	
	6x6	0.27	0.27	9	0.45	0.45	6	N/A	0.56	0.56	9	0.52	0.52	9	0.54	0.54	8	N/A	0.56	0.56	9	6.5	72	72	72	72	72	72	72	72	72	72	72	72	
	8x8	0.46	0.46	9	0.51	0.51	8	N/A	0.45	0.45	12	0.87	0.87	9	0.59	0.59	10	N/A	0.45	0.45	12	8.5	96	96	96	96	96	96	96	96	96	96	96	96	
	3x3	0.23	0.23	6	0.19	0.19	6	N/A	N/A	N/A	N/A	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	3.5	36	36	36	36	36	36	36	36	36	36	36	36	
Precast Base (PB)	4x4	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	0.47	0.47	6	0.38	0.38	6	N/A	N/A	N/A	N/A	4.5	48	48	48	48	48	48	48	48	48	48	48	48	
	3x5	0.29	0.18	6	0.19	0.35	6	3x3	0.30	0.34	9	0.39	0.18	6	0.23	0.59	6	3x3	0.40	0.40	9	3.5	36/60	36/60	36/60	36/60	36/60	36/60	36/60	36/60	36/60	36/60	36/60	36/60	
	4x5	0.36	0.18	6	0.22	0.34	6	3x3	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	3x3	0.46	0.37	9	4.5	48/60	48/60	48/60	48/60	48/60	48/60	48/60	48/60	48/60	48/60	48/60	48/60	
	4x5	0.36	0.18	6	0.22	0.34	6	4x4	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	4x4	0.39	0.39	9	4.5	48/60	48/60	48/60	48/60	48/60	48/60	48/60	48/60	48/60	48/60	48/60	48/60	
	4x5	0.36	0.18	6	0.22	0.34	6	48"	0.39	0.39	9	0.53	0.26	6	0.39	0.59	6	48"	0.47	0.47	9	4.5	48/60	48/60	48/60	48/60	48/60	48/60	48/60	48/60	48/60	48/60	48/60	48/60	
	4x5	0.36	0.18	6	0.22	0.34	6	3x5	0.33	0.40	9	0.53	0.26	6	0.39	0.59	6	3x5	0.48	0.48	9	4.5	48/60	48/60	48/60	48/60	48/60	48/60	48/60	48/60	48/60	48/60	48/60	48/60	
	5x5	0.36	0.36	6	0.34	0.34	6	3x3	0.34	0.34	9	0.62	0.62	6	0.59	0.59	6	3x3	0.53	0.53	9	5.5	60	60	60	60	60	60	60	60	60	60	60	60	
	5x5	0.36	0.36	6	0.34	0.34	6	4x4	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	4x4	0.64	0.64	9	5.5	60	60	60	60	60	60	60	60	60	60	60	60	
	5x5	0.36	0.36	6	0.34	0.34	6	48"	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	48"	0.64	0.64	9	5.5	60	60	60	60	60	60	60	60	60	60	60	60	
	5x5	0.36	0.36	6	0.34	0.34	6	3x5	0.34	0.40	9	0.62	0.62	6	0.59	0.59	6	3x5	0.53	0.53	9	5.5	60	60	60	60	60	60	60	60	60	60	60	60	
	5x6	0.31	0.31	9	0.34	0.45	6	3x3	0.34	0.34	9	0.47	0.45	9	0.38	0.54	8	3x3	0.61	0.50	9	5.5	60/72	60/72	60/72	60/72	60/72	60/72	60/72	60/72	60/72	60/72	60/72	60/72	
	5x6	0.27	0.27	9	0.34	0.45	6	4x4	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	4x4	0.74	0.57	9	5.5	60/72	60/72	60/72	60/72	60/72	60/72	60/72	60/72	60/72	60/72	60/72	60/72	
	5x6	0.29	0.29	9	0.34	0.45	6	48"	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	48"	0.74	0.57	9	5.5	60/72	60/72	60/72	60/72	60/72	60/72	60/72	60/72	60/72	60/72	60/72	60/72	
	5x6	0.29	0.29	9	0.34	0.45	6	3x5	0.45	0.45	9	0.47	0.45	9	0.38	0.54	8	3x5	0.61	0.61	9	5.5	60/72	60/72	60/72	60/72	60/72	60/72	60/72	60/72	60/72	60/72	60/72	60/72	
	6x6	0.29	0.29	9	0.45	0.45	6	4x4	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	4x4	0.87	0.87	9	6.5	72	72	72	72	72	72	72	72	72	72	72	72	
	6x6	0.29	0.29	9	0.45	0.45	6	48"	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	48"	0.87	0.87	9	6.5	72	72	72	72	72	72	72	72	72	72	72	72	
	6x6	0.29	0.29	9	0.45	0.45	6	3x5	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	3x5	0.87	0.87	9	6.5	72	72	72	72	72	72	72	72	72	72	72	72	
	8x8	0.52	0.52	9	0.51	0.51	8	3x3	0.61	0.61	12	0.91	0.91	9	0.70	0.70	10	3x3	0.85	0.85	12	8.5	96	96	96	96	96	96	96	96	96	96	96	96	
8x8	0.52	0.52	9	0.51	0.51	8	4x4	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	4x4	1.01	1.01	12	8.5	96	96	96	96	96	96	96	96	96	96	96	96	96	
8x8	0.52	0.52	9	0.51	0.51	8	48"	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	48"	1.01	1.01	12	8.5	96	96	96	96	96	96	96	96	96	96	96	96	96	
8x8	0.52	0.52	9	0.51	0.51	8	3x5	0.70	0.85	12	0.87	0.87	9	0.70	0.70	10	3x5	1.01	1.01	12	8.5	96	96	96	96	96	96	96	96	96	96	96	96	96	

** Unless otherwise indicated.

FABRICATION NOTES:

- Maximum spacing of reinforcement is 8".
- At manufacturer's option, provide cast or cored holes or thin wall panels (KO) to the maximum diameter shown for each. When no penetration is required, it is acceptable to provide a wall with no sectional reduction.

GENERAL NOTES:

- Precast Junction Box consists of base slab, base unit, risers (as required), and below grade slab. See sheet PJB for details.
- Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PB for details.
- Min Height shown is for stock base units. Use stock base units whenever practical. Smaller height base units can be used in special installation circumstances, when noted elsewhere in the plans. Absolute minimum height of base units is 2'-6".

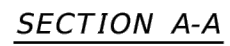
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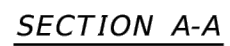
DESIGN DATA FOR PRECAST BASE AND JUNCTION BOX

PDD

FILE: CD-PDD-20.dgn	DATE: TxDOT	CHK: TxDOT	DATE: TxDOT	CHK: TxDOT
TxDOT February 2020	CONT	SECT	JOB	NUMBER
REVISIONS				
	DATE	COUNTY		SHEET NO.



GENERAL NOTES:
 Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.
 See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.
 In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)."



GENERAL NOTES:
 Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.
 See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.
 In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)"

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Curlex® Blankets

Heavy Duty Excelsior Erosion Control Blankets

SUGGESTED SPECIFICATIONS

Choosing the Right Heavy Duty Curlex Product

Heavy Duty Excelsior Blankets are available in various fiber weights and netting combinations to match the appropriate job site requirements. Eighty percent of the Curlex fibers are six-inches or longer with consistent thickness and are evenly distributed over its entire area. Both the top and bottom side of the blankets are covered with black, extruded plastic mesh designed to provide strength beyond the service life of standard blankets. Curlex Excelsior blankets are naturally seed free and do not contain any chemical additives or foreign matter.

Curlex III Specifications

Recommended Use:

Slopes to 1H:1V, channel bottom applications,
Shear stress 120 Pa (2.5 lb/ft²) (unvegetated)
40 yd² (4' x 90'), 80 yd² (8' x 90'), 160 yd² (16' x 90')
Roll Sizes:
Weight*: 0.98 lb/yd²
Netting:
Color: Black or FibreNet™, top and bottom
Natural Aspen or QuickGRASS Green

Curlex Enforcer Specifications

Recommended Use:

Slopes to .5H:1V, channel bottom applications,
Shear stress 156 Pa (3.25 lb/ft²) (unvegetated),
480 Pa (10.0 lb/ft²) (vegetated)
60 yd² (8' x 67.5')
Roll Sizes:
Weight*: 1.25 lb/yd²
Netting:
Color: Extra Heavy Duty Black, top and bottom
Natural Aspen or QuickGRASS Green

Curlex HV Specifications

Recommended Use:

Slopes to .75H:1V, channel bottom applications,
Shear stress 156 Pa (3.25 lb/ft²) (unvegetated),
44.4 yd² (8' x 50')
Roll Sizes:
Weight*: 1.62 lb/yd²
Netting:
Color: Heavy Duty Black or FibreNet™, top and bottom

*Weight is based on a dry fiber weight basis at time of manufacture. Baseline moisture content of Great Lakes Aspen Excelsior is 22%.

Installation

Before installing Curlex blankets, the seedbed shall be inspected by the Owner's Representative to ensure it has been properly compacted and fine graded to remove any existing rills. It shall be free of obstructions, such as tree roots, projections such as stones, and other foreign objects. Grass seed shall match soil conditions to allow for maximum germination, dense vegetation, and a structural root system. Contractor shall proceed when satisfactory conditions are present. After the area has been properly shaped, seeded, fertilized, and compacted, locate the start of the roll, making sure the roll is facing toward the area to be covered, and then roll out the blanket. Blankets shall be rolled out flat, even, and smooth without stretching the material then anchored to the subgrade.

Slopes: It is recommended that the blankets be installed in the same direction as the water flow; however, on short slopes it may be more practical to install horizontally across the width of the application. If more than one width is required, simply abut the edges together and secure the blankets with a common row of biodegradable staples, steel staples, or stakes. Overlapping of Curlex excelsior blankets is not required or recommended. An exception is waterway slopes.

Channels: Curlex blankets shall be centered to offset a seam in the middle of the waterway. They shall be installed in the same direction as the water flow. The adjoining blankets shall be installed away from the center of channel and concentrated water flow. They shall be secured by a common row of staples. It is usually not necessary to overlap Curlex blankets; however, a 2" shingle type installation shall be used in waterway slopes applications. Curlex blanket installation should continue up the side slopes 3' above the anticipated high water elevation. Flanks exposed to runoff, or sheet flow, must be protected by a check slot or trenched. Curlex blankets shall be trenched at the start of the channel and anchored using a staggered staple pattern at end of roll overlaps and end of roll terminations.

Disclaimer: Curlex III, Curlex Enforcer, and Curlex HV is a system for erosion control and re-vegetation on slopes and channels. American Excelsior Company (AEC) believes that the information contained herein to be reliable and accurate for use in erosion control and re-vegetation applications. However, since physical conditions vary from job site to job site and even within a given job site, AEC makes no performance guarantee and assumes no obligation or liability for the reliability or accuracy of information contained herein for the results, safety, or suitability of using Curlex, or for damages occurring in connection with the installation of any erosion control product whether or not made by AEC or its affiliates, except as separately and specifically made in writing by AEC. These specifications are subject to change without notice.

If you would like to receive more information or consult with one of our Customer Care Center Specialists, please call us toll free at (888-352-9582)

PDF download specifications available in the Technical Support Library at www.curlex.com



Proud Participant in NTPEP and Proud Member of:



Product Participant of:



PRODUCT DATA SHEET CURLEX® ENFORCER®

DESCRIPTION

Curlex Enforcer a biocomposite Turf Reinforcement Mat (TRM) that consists of a specific cut of naturally seed free Great Lakes Aspen curled wood excelsior with 80% six-inch fibers or greater fiber length. It is of consistent thickness with fibers evenly distributed throughout the entire area of the blanket. The top and bottom of each blanket is covered with extra heavy duty black net. Curlex Enforcer is also available as QuickGRASS® (green pigment). Curlex Enforcer shall be manufactured in the U.S.A.

Curlex Enforcer has a design soil loss ratio (event-based RUSLE C factor) of .022 and is typically suitable for slopes up to .5H:1V. Curlex Enforcer is rated for channel flows up to 11 ft/s (3.4 m/s), 3.25 lb/ft² (156 Pa) shear stress unvegetated or 17 ft/s (5.2 m/s), 10.0 lb/ft² (480 Pa) shear stress vegetated.

PHYSICAL PROPERTIES

Curlex Enforcer measurements at time of manufacturing:

Width	8.0 ft (2.4 m)
Length	67.5 ft (20.6 m)
Area	60.0 yd ² (50.2 m ²)
Weight*	75.0 lb (34.1 kg)
Fiber Count	≈12,000 per yd ²
Fiber Length (80% min.)	≈14,400 per m ²
Mass per Unit Area (± 10%)	≥6.0 in (≥15.2 cm)
Net Openings	1.25 lb/yd ² (0.68 kg/m ²)
	0.75 in x 1.0 in (19.1 mm x 25.4 mm)

TYPICAL INDEX VALUES

Index Property	Test Method	Value
Thickness	ASTM D 6525	0.419 in (10.64 mm)
Light Penetration	ASTM D 6567	12.7%
Resiliency	ASTM D 1777/ECTC	55%
Mass per Unit Area	ASTM D 6475	0.98 lb/yd ² (0.532 kg/m ²)
MD-Tensile Strength Max.	ASTM D 6818	612.0 lb/ft (8.93 kN/m)
TD-Tensile Strength Max.	ASTM D 6818	460.8 lb/ft (6.72 kN/m)
MD-Elongation	ASTM D 6818	19.5%
TD-Elongation	ASTM D 6818	27.3%
Swell	ECTC Procedure	33%
Water Absorption	ASTM D 1117/ECTC	170%
UV Stability	ASTM D 4355 (1,000 hr)	90% minimum
Bench-Scale Rain Splash	ASTM D 7101	SLR = 10.24 @ 2 in/hr ^{bc}
Bench-Scale Rain Splash	ASTM D 7101	SLR = 10.51 @ 4 in/hr ^{bc}
Bench-Scale Rain Splash	ASTM D 7101	SLR = 10.86 @ 6 in/hr ^{bc}
Bench-Scale Shear	ASTM D 7207	3.55 lb/ft ² @ 0.5 in soil loss ^a
Germination Improvement	ASTM D 7322	486%

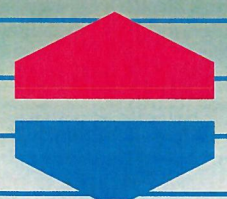
* Weight is based on a dry fiber weight basis at time of manufacture. Baseline moisture content of Great Lakes Aspen excelsior is 22%.

^b SLR is the Soil Loss Ratio, as reported by NTPEP/AASHTO. ^c Bench-scale index values should not be used for design purposes.



850 Avenue H East | Arlington, Texas 76011
Phone 1-800-777-SOIL | Fax 817-385-3585 | www.Curlex.com

W0516R1116



Curlex® Blankets

Heavy Duty Excelsior Erosion Control Blankets

Product Description

Heavy Duty Curlex Blankets, for long-term protection against wind and water erosion, are a natural choice in place of stone or riprap in swales, ditch bottoms, and on long, steep slopes.

MATERIAL CHARACTERISTICS

Curlex III

0.98 lb/yd² of Great Lakes Aspen Excelsior Wood Fibers and two layers of netting designed to provide protection for grass seed and topsoil from wind and water erosion for up to 36 months, while simultaneously promoting ideal growing conditions.

Curlex Enforcer

1.25 lb/yd² of Great Lakes Aspen Excelsior Wood Fibers and two layers of extra heavy duty UV stabilized netting designed to provide permanent service life and reinforcement between established vegetation and root systems on slopes and in channel bottoms. Curlex Enforcer is a biocomposite turf reinforcement mat (TRM).

Curlex High Velocity

1.62 lb/yd² of Great Lakes Aspen Excelsior Wood Fibers and two layers of heavy duty netting designed to provide extended protection for grass seed and topsoil from wind and water erosion for approximately 36+ months, while simultaneously promoting ideal growing conditions on steep, long slopes and/or in channel applications.

Curlex heavy duty excelsior blankets are available individually wrapped or in master packs to allow for mechanical unloading and stacking.

PERFORMANCE CAPABILITIES

Curlex heavy duty blankets can handle wind and water shear even on steep slopes. These heavy duty blankets provide long-term protection in critical areas where vegetation requires additional time and protection to develop.

Curlex III

Channels Shear Stress: 120 Pa (2.5 lb/ft²) (unvegetated)
Slopes Grade: up to 1H:1V

Curlex Enforcer

Channels Shear Stress: 156 Pa (3.25 lb/ft²) (unvegetated)
Slopes Grade: 480 Pa (10.0 lb/ft²) (vegetated)
up to .5H:1V

Curlex HV

Channels Shear Stress: 156 Pa (3.25 lb/ft²) (unvegetated)
Slopes Grade: up to .75H:1V

TYPICAL APPLICATIONS

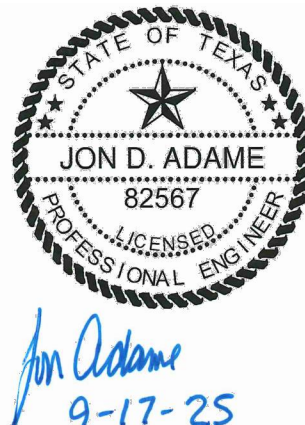
Channel bottoms, swales, steep slopes, let down structures, drop structures, and other areas associated with concentrated water flow exceeding the performance capability and service life of a standard biodegradable blanket.



Arlington, Texas (800) 777-SOIL • www.curlex.com



DATE	
NO.	
REVISION	



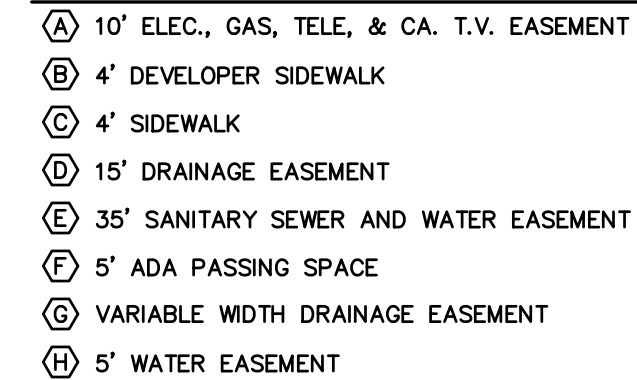
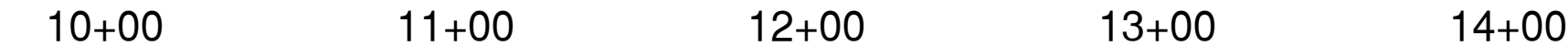
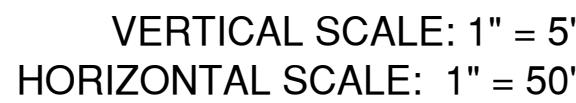
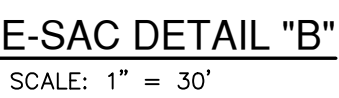
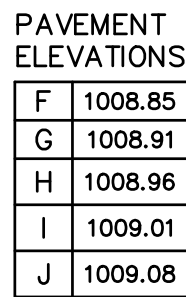
**PAPE-DAWSON
ENGINEERS**

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028900

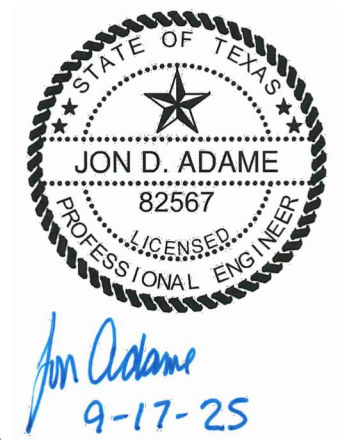
**APOLLO OAKS
BEXAR COUNTY, TEXAS**

DRAIN DETAILS

PLAT NO.	CP202506
JOB NO.	13657-00
DATE	SEPTEMBER 2025
DESIGNER	-
CHECKED	-
DRAWN	-
SHEET	C1.15



1. CONTRACTOR SHALL MATCH EXISTING PAVEMENT AT TIE-IN. IF EXISTING PAVEMENT ELEVATION DIFFERS SIGNIFICANTLY, CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO CONTINUING WORK.
2. SIDEWALKS SHALL BE CONSTRUCTED 3-FT FROM THE BACK OF CURB FOR ALL LOCATIONS WHERE THE SIDEWALK IS SHOWN OFFSET. REFER TO STREET DETAIL SHEET FOR SIDEWALK AND RAMP DETAILS.
3. NO PERMANENT STRUCTURES HIGHER THAN 3 FEET, AND LOWER THAN 8 FEET ABOVE THE PAVEMENT, INCLUDING STRUCTURES, WALLS, FENCES, AND VEGETATION, SHALL BE CONSTRUCTED OR ALLOWED WITHIN THE CLEAR VISION EASEMENT. CONTRACTOR SHALL GRADE AREAS WITHIN CLEAR VISION EASEMENTS SUCH THAT THE ELEVATION WITHIN THE CLEAR VISION EASEMENT IS NOT HIGHER THAN 3 FEET ABOVE THE ADJACENT TOP OF PAVEMENT.
4. DRIVEWAYS SHOWN ON THIS PLAN ARE FOR THE SOLE PURPOSE OF INDICATING A POTENTIAL CONFLICT WITH CURB RAMP, DRAINAGE INFRASTRUCTURE, OR OTHER CONFLICT. DRIVEWAY LOCATION IS SUBJECT TO CHANGE BASED ON HOME SELECTION AND FINAL LOT DESIGN.
5. CHANGES IN THE SIDEWALK LOCATION FOR A MAXIMUM LINEAR DISTANCE OF ONE HUNDRED (200) FEET ARE PERMITTED TO BE APPROVED BY THE FIELD INSPECTOR WITHOUT AMENDING THE STREET PLAN OR UTILITY LAYOUT PER UDC SECTION 35-506 (Q)(6).

[illegible]

**PAPE-DAWSON
ENGINEERS**

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

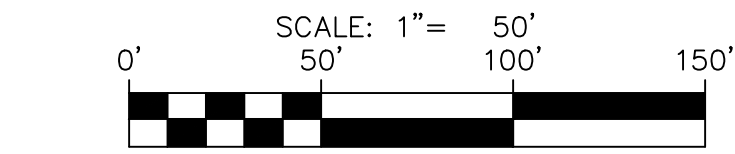
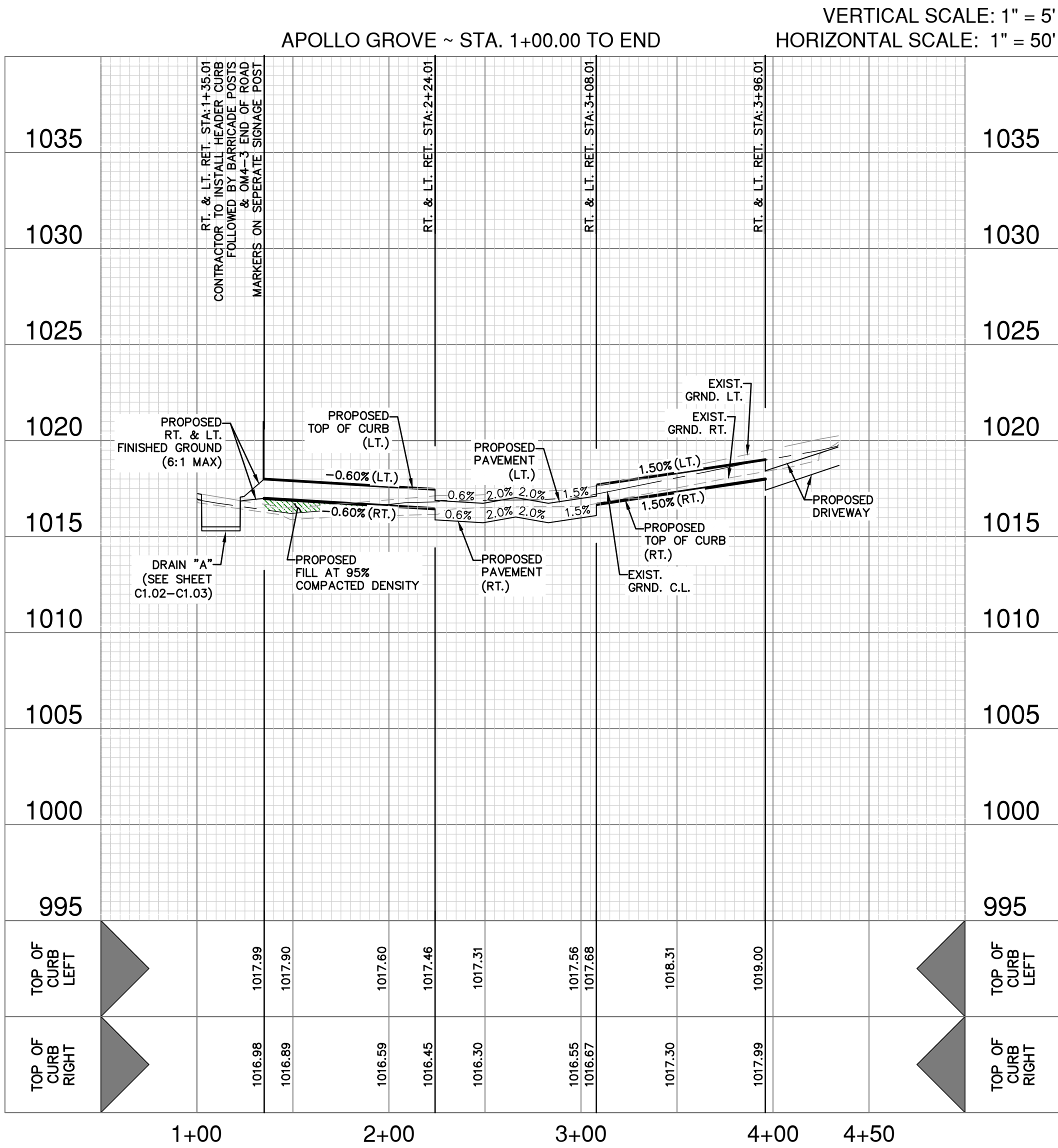
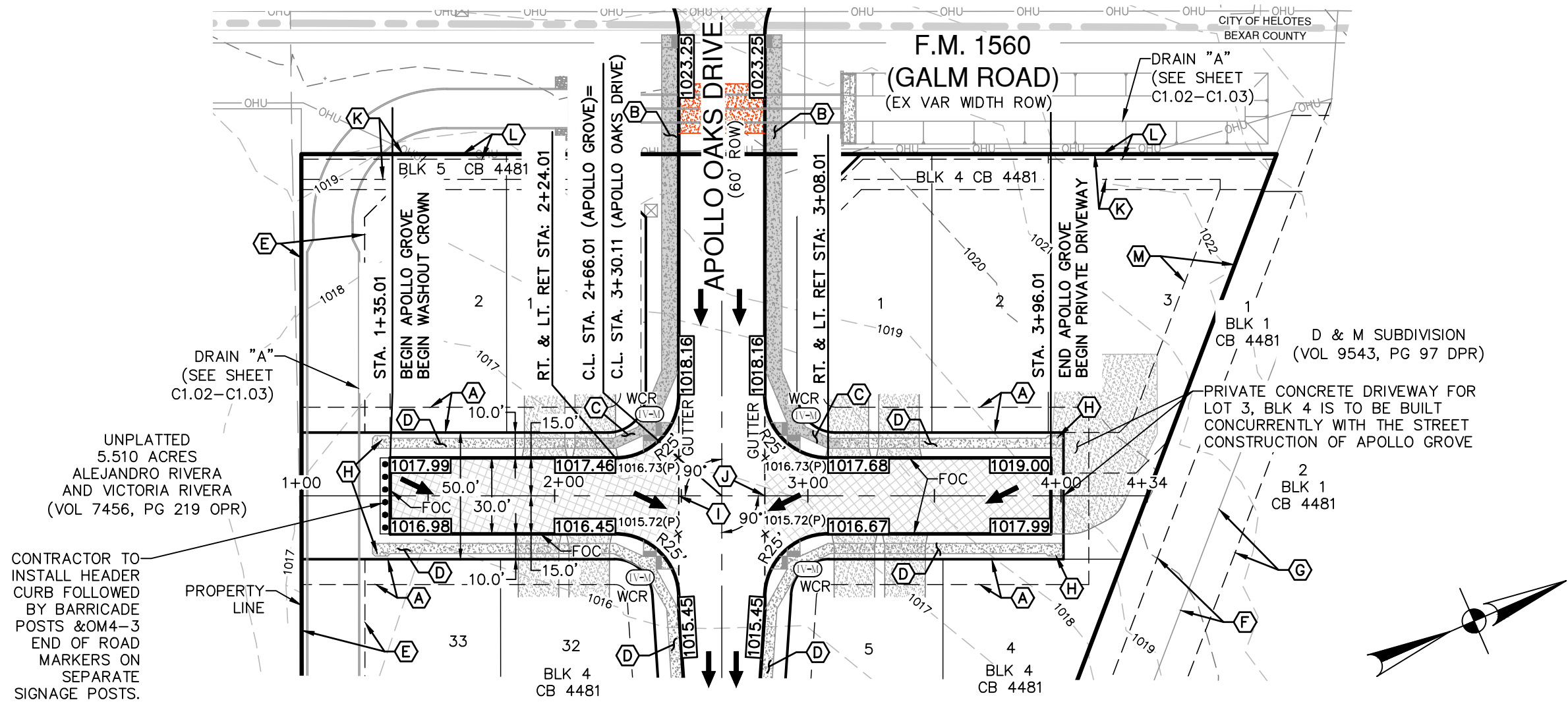
APOLLO OAKS
BEXAR COUNTY, TEXAS

APOLLO OAKS DRIVE ~ STA. 10+00.00 TO END
STREET PLAN & PROFILE

PLAT NO. CP202506
 JOB NO. 13657-00
 DATE SEPTEMBER 2025
 DESIGNER CB
 CHECKED JA DRAWN CB
 SHEET C2.01

Date: Sep 17, 2025, 1:50pm, User: D:\csc\p\0422
File: P:\136\137\03\Design\Civil\STA-13657\03.dwg

THIS DOCUMENT HAS BEEN PRODUCED FROM MATERIAL THAT WAS STORED AND/OR TRANSMITTED ELECTRONICALLY AND MAY HAVE BEEN INADVERTENTLY ALTERED. RELY ONLY ON FINAL HARDCOPY MATERIALS BEARING THE CONSULTANT'S ORIGINAL SIGNATURE AND SEAL. AERIAL IMAGERY PROVIDED BY GOOGLE® UNLESS OTHERWISE NOTED. Imagery © 2016, CAPCOO, Digital Globe, Texas Orthomography Program, USDA Farm Service Agency.



STREET LEGEND

PROJECT LIMITS	---
MAINTAIN GUTTER	→
EXISTING CONTOUR	---
WHEELCHAIR RAMP	⊕
CENTERLINE	CL
RADIUS POINT	RP
POINT OF CURVATURE	PC
POINT OF TANGENCY	PT
RETURN	RET
DRAINAGE FLOW ARROW	→
TOP OF CURB SPOT ELEVATION	[857.30]
PAVEMENT ELEVATION	857.00(P) ×
WASHOUT CROWN SECTION	
SIDEWALK (DEVELOPER'S RESPONSIBILITY)	
SIDEWALK (HOMEOWNER'S RESPONSIBILITY)	
DRIVEWAY	

KEY LEGEND:

- (A) 10' ELEC., GAS, TELE, & CA. T.V. EASEMENT
- (B) 6' DEVELOPER SIDEWALK
- (C) 4' DEVELOPER SIDEWALK
- (D) 4' SIDEWALK
- (E) VARIABLE WIDTH DRAINAGE EASEMENT
- (F) 16' ELECTRIC, GAS, TELEPHONE AND CABLE TV EASEMENT (VOL 9543, PG 97, DPR)
- (G) 12' ELECTRIC, GAS, TELEPHONE AND CABLE TV EASEMENT (VOL 9543, PG 97, DPR)
- (H) 5' ADA PASSING SPACE
- (I) STA: 2+49.01 END WASHOUT CROWN
- (J) STA: 2+83.01 BEGIN WASHOUT CROWN
- (K) 10' WATER EASEMENT
- (L) 1' VEHICULAR NON ACCESS EASEMENT (NOT TO SCALE)
- (M) VARIABLE WIDTH WATER EASEMENT

TxDOT ROW NOTES:

A TxDOT ROW PERMIT MUST BE OBTAINED BEFORE WORKING IN TxDOT ROW. CONTRACTOR SHALL COORDINATE A TRAFFIC CONTROL PLAN FOR ALL WORK WITHIN THE ROW. ADDITIONAL WARNING SIGNS MAY BE RECOMMENDED BY THE ENGINEER ONCE THE ROADWAYS ARE CONSTRUCTED.

SIDEWALK NOTE:

THE CONSTRUCTION OF SIDEWALKS ADJACENT TO ALL 900 SERIES LOTS WILL BE THE RESPONSIBILITY OF THE DEVELOPER AS SHOWN ON THE OVERALL SIGNAGE PLAN (SHEET C3.00). REFER TO SHEET C3.00 FOR LOCATIONS OF SIDEWALK CONSTRUCTION WHERE SIDEWALKS ARE NOT SHOWN

STREET SELECT FILL NOTE:

ANY FILL PLACED TO RAISE THE GRADE SHOULD BE APPROVED BY THE GEOTECHNICAL ENGINEER. APPROVED FILL MATERIAL SHOULD BE FREE OF DELETERIOUS MATERIAL WITH A MINIMUM CBR VALUE OF 5.0 AND A MAXIMUM PLASTICITY INDEX VALUE OF 45. THE GRAVEL SIZE SHOULD NOT EXCEED 3 INCHES IN DIAMETER. USE CRUSHED Limestone WITH LL < 40, PI = 5 - 20, AND < 30% PASSING NO. 200 SIEVE. MAX PARTICLE SIZE: 3 INCHES. PLACE IN 6-INCH COMPACTED LIFTS AND COMPACT AS DESCRIBED IN THE VERTICAL MOVEMENTS SECTION. EACH LIFT MUST BE TESTED AND APPROVED BY THE GEOTECH ENGINEER (INTEC). THE MATERIAL SHOULD BE PLACED AS PER APPLICABLE BEXAR COUNTY GUIDELINES. CONTRACTOR TO VERIFY EXACT SPECIFICATIONS WITH THE PROJECT GEOTECHNICAL ENGINEERING REPORT.

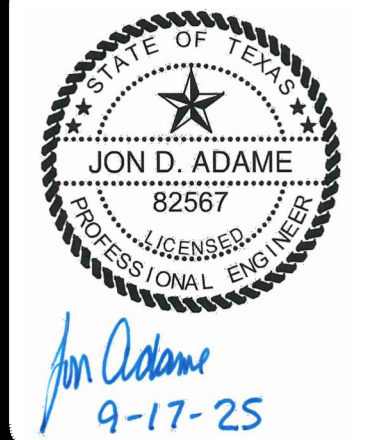
WHEEL CHAIR NOTE:

WHEEL CHAIR RAMPS (WCR) TO BE CENTERED ON STATION NOTED BELOW. ELEVATION SHOWN ARE TOP OF CURB AND NOT GUTTER

STREET NOTES:

- CONTRACTOR SHALL MATCH EXISTING PAVEMENT AT TIE-IN. IF EXISTING PAVEMENT ELEVATION DIFFERS SIGNIFICANTLY, CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO CONTINUING WORK.
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- NO PERMANENT STRUCTURES HIGHER THAN 3 FEET, AND LOWER THAN 8 FEET ABOVE THE PAVEMENT, INCLUDING STRUCTURES, WALLS, FENCES, AND VEGETATION, SHALL BE CONSTRUCTED OR ALLOWED WITHIN THE CLEAR VISION EASEMENT. CONTRACTOR SHALL GRADE AREAS WITHIN CLEAR VISION EASEMENTS SUCH THAT THE ELEVATION WITHIN THE CLEAR VISION EASEMENT IS NOT HIGHER THAN 3 FEET ABOVE THE ADJACENT TOP OF PAVEMENT.
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- CHANGES IN THE SIDEWALK LOCATION FOR A MAXIMUM LINEAR DISTANCE OF TWO HUNDRED (200) FEET ARE PERMITTED TO BE APPROVED BY THE FIELD INSPECTOR WITHOUT AMENDING THE STREET PLAN OR UTILITY LAYOUT PER UDC SECTION 35-506 (Q)(6).

NO.	REVISION	DATE



PAPE-DAWSON
ENGINEERS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028600

APOLLO OAKS
BEXAR COUNTY, TEXAS
APOLLO GROVE ~ STA. 1+00.00 TO END
STREET PLAN & PROFILE

PLAT NO.	CP202506
JOB NO.	13657-00
DATE	SEPTEMBER 2025
DESIGNER	CB
CHECKED	JA
DRAWN	CB
SHEET	C2.02

PAVEMENT SECTION DETAIL										
STREET NAME	STATION	TYPE "D" HMAC	TYPE "C" HMAC	CONCRETE	AGGREGATE BASE	SUBGRADE	GEOGRID	STREET TYPE	CBR	STRUCTURAL NUMBER
APOLLO OAKS DRIVE	1+18.06 TO 1+67.36	3.00"	—	—	20.50"	6.0"	NO	LOCAL B	2.5	4.67
APOLLO OAKS DRIVE	1+67.36 TO 1+86.86	**3.00"	**3.00"	—	CULVERT	BOX CULVERT	NO	LOCAL B	2.5	4.64
APOLLO OAKS DRIVE	1+86.86 TO 4+05.11	3.00"	—	—	20.50"	6.0"	NO	LOCAL B	2.5	4.67
APOLLO OAKS DRIVE	4+05.11 TO END	2.00	—	—	9.50"	6.0"	NO	LOCAL A	2.5	2.69
APOLLO GROVE	1+35.01 TO END	2.00	—	—	9.50"	6.0"	NO	LOCAL A	2.5	2.69

*STREET TRANSITIONS FROM STREET CLASSIFICATIONS OF DIFFERING PAVEMENT WIDTHS SHALL BE CONSTRUCTED WITH PAVEMENT SECTION OF STREET CLASSIFICATION WITH WIDER PAVEMENT SECTION

**COVER OVER CULVERT WILL VARY; RECOMMENDED MINIMUM TYPE "C" ASPHALT THICKNESS OF 2 INCHES AND MINIMUM TYPE "D" THICKNESS OF 2 INCHES. MAXIMUM TYPE "D" THICKNESS OF 3 INCHES IS RECOMMENDED. REFERENCE GEOTECH REPORT FOR MINIMUM FLEXIBLE PAVEMENT RECOMMENDATION OVER DIRECT TRAFFIC RATED MULTI-BOX CULVERT.

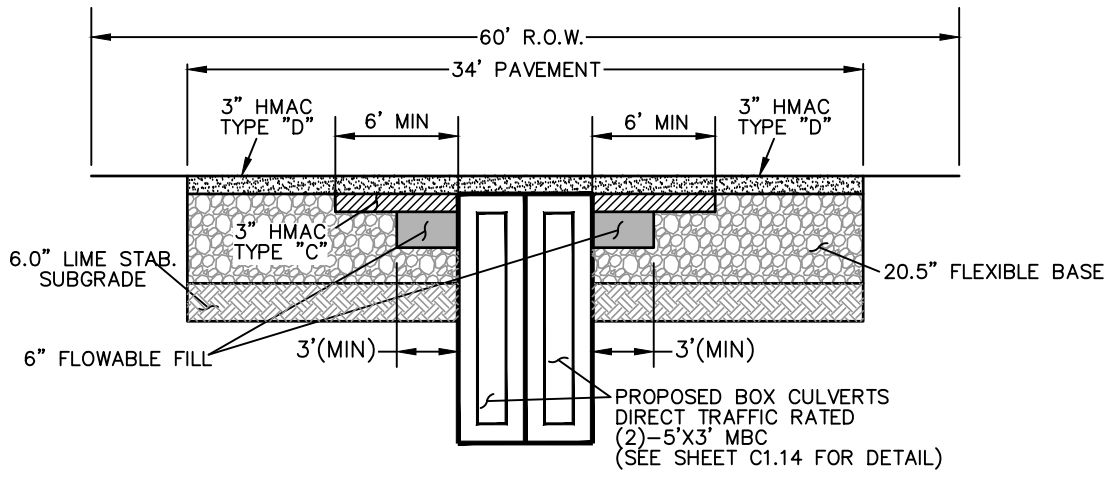
GENERAL NOTES:

- CONTRACTOR SHALL REFERENCE THE PROJECT GEOTECHNICAL REPORT PREPARED BY **INTEC OF SAN ANTONIO, L.P.**, (ATTN. MURALI SUBRAMANIAM, PH.D, P.E.) DATED **AUGUST 05, 2025**.
- CONTRACTOR SHALL REFERENCE THE GEOTECHNICAL ADDENDUM (MODIFIED SECTION OVER BOX CULVERT) PREPARED BY **INTEC OF SAN ANTONIO, L.P.**, (ATTN. MURALI SUBRAMANIAM, PH.D, P.E.) DATED **AUGUST 15, 2025**.
- CONTRACTOR SHALL CONSULT WITH THE PROJECT GEOTECHNICAL ENGINEER TO VERIFY THE SUBGRADE CONDITION PRIOR TO PLACING ANY BASE MATERIAL. GEOTECHNICAL ENGINEER SHALL DETERMINE THE SUBGRADE CONDITION AND IF LIME STABILIZATION IS REQUIRED.
- GEOTECHNICAL ENGINEER SHOULD VERIFY THE STREET SUBGRADE AT THE TIME OF CONSTRUCTION PRIOR TO PLACEMENT OF AGGREGATE BASE.
- THE FLEXIBLE BASE COURSE SHOULD BE CRUSHED LIMESTONE CONFORMING TO TxDOT STANDARD SPECIFICATIONS, ITEM 247, TYPE A, GRADE 1-2.
- THE MOISTURE CONTENT OF THE FILL SHOULD BE MAINTAINED WITHIN THE RANGE OF OPTIMUM WATER CONTENT TO 3 PERCENTAGE POINTS ABOVE THE OPTIMUM WATER CONTENT UNTIL PERMANENTLY COVERED.
- IN THE EVENT THAT THE CLAY FILL USED IS DIFFERENT THAN THE EXISTING SUBGRADE, THE RECOMMENDATIONS IN THE GEOTECHNICAL REPORT COULD BE INVALIDATED AND THE PROJECT GEOTECHNICAL ENGINEER MUST BE CONSULTED TO DETERMINE IF ADDITIONAL CBR TESTING AND THICKER PAVEMENT SECTIONS ARE REQUIRED.
- WHERE PAVEMENT SUBGRADE IS LOCATED WITHIN 2'-FEET OF THE EXISTING GROUND SURFACE (STRATUM I CLAYS), MOISTURE CONDITIONED SUBGRADE WILL REQUIRE GEOTECHNICAL ENGINEER SHOULD VERIFY THE STREET SUBGRADE AT THE TIME OF CONSTRUCTION PRIOR TO PLACEMENT OF AGGREGATE BASE TO DETERMINE WHERE THE MOISTURE CONDITIONED SUBGRADE IS NEEDED. REFERENCE GEOTECHNICAL ENGINEERING REPORT FOR MORE INFORMATION.
- THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL MATERIAL TESTING WITH THE PROJECT GEOTECHNICAL ENGINEER. TESTING SHALL BE PAID FOR BY THE OWNER/DEVELOPER.
- ANY FILL PLACED TO RAISE THE GRADE SHOULD BE APPROVED BY THE GEOTECHNICAL ENGINEER. APPROVED FILL MATERIAL SHOULD BE FREE OF DELETERIOUS MATERIAL WITH A MINIMUM CBR VALUE OF 5.0 AND A MAXIMUM PLASTICITY INDEX VALUE OF 45. THE GRAVEL SIZE SHOULD NOT EXCEED 3 INCHES IN DIAMETER. USE CRUSHED LIMESTONE WITH LL < 40, PI = 5 - 20, AND < 30% PASSING NO. 200 SIEVE. MAX PARTICLE SIZE: 3 INCHES. PLACE IN 6-INCH COMPACTED LIFTS AND COMPACT AS DESCRIBED IN THE VERTICAL MOVEMENTS SECTION. EACH LIFT MUST BE TESTED AND APPROVED BY THE GEOTECH ENGINEER (INTEC). THE MATERIAL SHOULD BE PLACED AS PER APPLICABLE BEXAR COUNTY GUIDELINES. CONTRACTOR TO VERIFY EXACT SPECIFICATIONS WITH THE PROJECT GEOTECHNICAL ENGINEERING REPORT.
- A TxDOT AND/OR BEXAR COUNTY PERMIT MUST BE OBTAINED BEFORE WORKING IN THE TxDOT AND/OR BEXAR COUNTY ROW. CONTRACTOR SHALL COORDINATE A TRAFFIC CONTROL PLAN FOR ALL WORK WITHIN THE ROW. ADDITIONAL WARNING SIGNS MAY BE RECOMMENDED BY THE ENGINEER ONCE THE ROADWAYS ARE CONSTRUCTED.

LIME STABILIZATION NOTES:

FOR LIME STABILIZATION CONSTRUCTION VERIFICATION THE FOLLOWING SHALL BE CONDUCTED ON THE FIELD:

- AFTER INITIAL MIXING THE SOIL-LIME MIXTURE SHALL MELLOW FOR A PERIOD OF TWO TO THREE (2-3) DAYS. MAINTAIN MOISTURE DURING MELLOWING.
- AFTER MELLOWING AND FINAL MIXING, THE PULVERIZATION SHALL BE CHECKED USING THE FOLLOWING CRITERIA (REMOVE NON-SLAKING AGGREGATES RETAINED ON THE 3/4 INCH SIEVE FROM THE SAMPLE):
 - MINIMUM PASSING 1 1/2" SIEVE 100
 - MINIMUM PASSING 3/4" SIEVE 85
 - MINIMUM PASSING NO. 4 SIEVE 60
- SAMPLE SOIL-LIME MIXTURE FOR DETERMINATION OF MAXIMUM DRY DENSITY (MDD). IN THE LABORATORY, MOLD SPECIMENS TO 95% OF MDD AT OPTIMUM MOISTURE CONTENT AND VERIFY UCS TO BE AT LEAST 160 PSI IN ACCORDANCE WITH PROCEDURE OUTLINED IN THE BEXAR COUNTY FLEXIBLE PAVEMENT DESIGN CRITERIA GUIDE FOR MIXTURE DESIGN.
- COMPACT AND CHECK FIELD DENSITY (MINIMUM OF 95% OF MDD REQUIRED).
- CURE FOR AN ADDITIONAL 2 TO 5 DAYS (TOTAL MELLOWING AND CURING TIME SHOULD TOTAL AT LEAST 5 DAYS).
- VERIFY DEPTH OF LIME STABILIZED LAYER TO DEPTH AS NOTED ON PLAN TO WITHIN +/- 1.0 INCH.



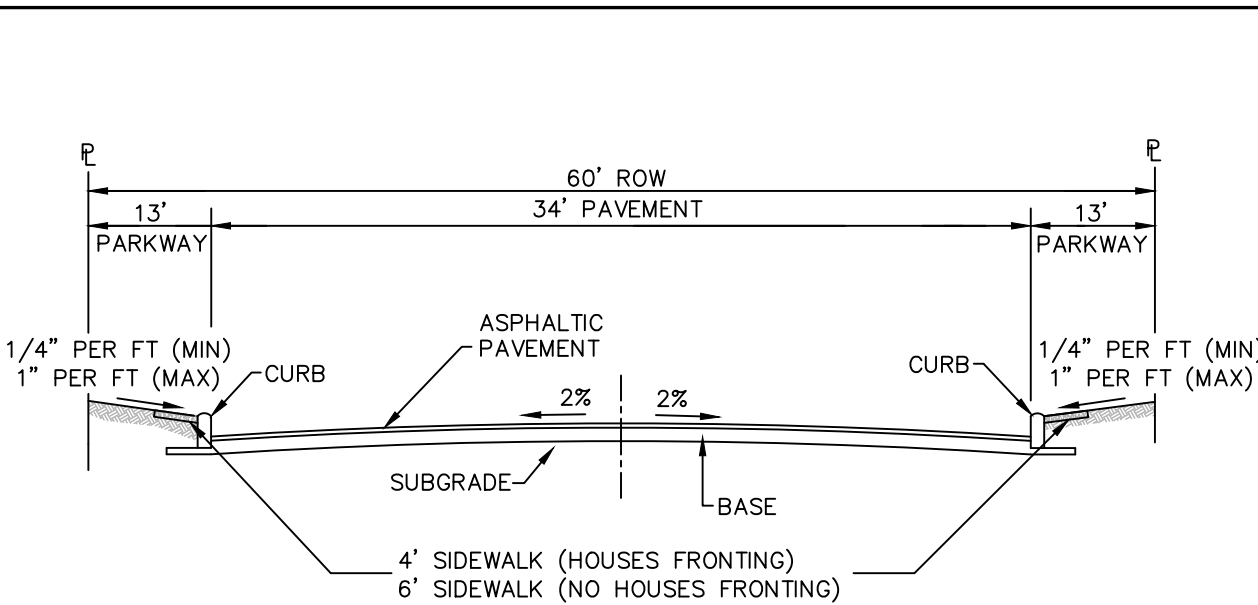
MODIFIED PAVEMENT SECTION
NOT-TO-SCALE

***REFERENCE THIS SHEET FOR PAVEMENT SECTION DETAIL FOR PAVEMENT AND FLEXIBLE BASE THICKNESS.

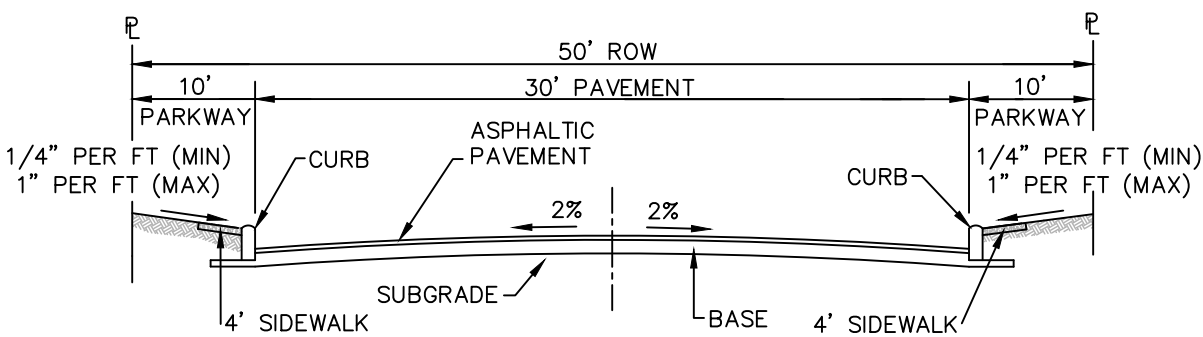
NOTE: CONTRACTOR SHALL OBTAIN A LETTER FROM DRAINAGE BOX/PIPE MANUFACTURER CONFIRMING THE PROPOSED DRAINAGE BOX/PIPE CAN HANDLE ANTICIPATED TRAFFIC LOAD PRIOR TO FINAL INSPECTION.

GEOTECHNICAL REPORT NOTES:

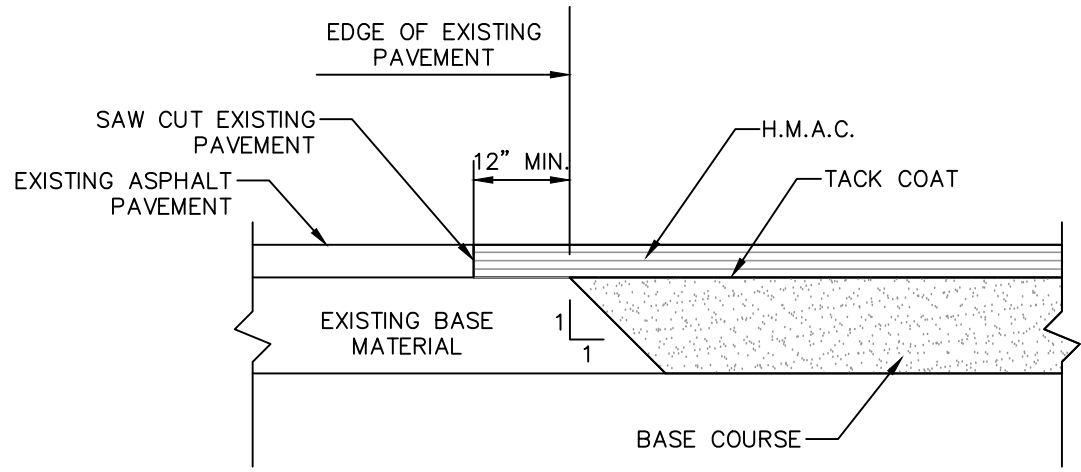
- ANY FILL PLACED TO RAISE THE GRADE SHOULD BE APPROVED BY THE GEOTECHNICAL ENGINEER. APPROVED FILL MATERIAL SHOULD BE FREE OF DELETERIOUS MATERIAL WITH A MINIMUM CBR VALUE OF 5.0 AND A MAXIMUM PLASTICITY INDEX VALUE OF 45. THE GRAVEL SIZE SHOULD NOT EXCEED 3 INCHES IN DIAMETER. THE MATERIAL SHOULD BE PLACED AS PER APPLICABLE BEXAR COUNTY GUIDELINES.
- BASED ON THE SOILS ENCOUNTERED IN THE BORINGS, THE GEOTECH ENGINEER ANTICIPATES THE FINAL PAVEMENT SUBGRADE PLASTICITY INDEX (PI) VALUES TO BE LESS THAN OR EQUAL TO 20 OR GREATER THAN 20.
- AS PER BEXAR COUNTY REQUIREMENTS, SUBGRADE STABILIZATION IS REQUIRED IF THE FINAL SUBGRADE PLASTICITY INDEX VALUES ARE GREATER THAN 20.
- SUBGRADE STABILIZED WITH LIME. AN APPLICATION RATE OF 30 LBS PER SQ YARD FOR 6 INCH DEPTH OF MAY BE USED. THE GEOTECH ENGINEER RECOMMENDS THAT THE APPLICATION RATE BE DETERMINED AT THE TIME OF CONSTRUCTION.
- SOIL SULFATE CONTENT SHOULD BE TESTED PRIOR TO LIME APPLICATION.
- FIELD MIXED LIME SAMPLES SHOULD BE TESTED FOR COMPRESSIVE STRENGTH. A MINIMUM COMPRESSIVE STRENGTH VALUE OF 160 PSI IS REQUIRED.
- SUBGRADE MAY BE STABILIZED WITH CEMENT IN-LIEU OF LIME. CEMENT APPLICATION RATE SHOULD BE DETERMINED AT THE TIME OF CONSTRUCTION WITH THE GEOTECH ENGINEER.
- AS PER BEXAR COUNTY REQUIREMENTS, SUBGRADE STABILIZATION IS NOT NEEDED IF THE FINAL SUBGRADE PLASTICITY INDEX VALUES ARE LESS THAN EQUAL TO 20.
- FINAL PAVEMENT SUBGRADE SHOULD BE VERIFIED BY THE GEOTECH ENGINEER AT THE TIME OF CONSTRUCTION.
- A DESIGN CALIFORNIA BEARING RATIO VALUE OF 2.5 WAS USED. THE CALIFORNIA BEARING RATIO FOR STRATUM II SOILS WERE ALSO PERFORMED AND IS HIGHER THAN 5.0.
- INPUT PARAMETERS USED IN PAVEMENT SECTION CALCULATIONS ARE SHOWN IN THE GEOTECHNICAL REPORT, TABLE NO. 3 (SUMMARY TABLE B). PLEASE CALL THE GEOTECHNICAL ENGINEER TO PROVIDE PAVEMENT RECOMMENDATIONS, IF NEEDED, FOR DIFFERENT INPUT VALUES.
- IF REPETITIVE TRUCK OR HEAVY TRUCK TRAFFIC IS ANTICIPATED, PLEASE CONTACT THE GEOTECHNICAL ENGINEER FOR REVISED PAVEMENT RECOMMENDATIONS.
- PAVEMENT SECTION RECOMMENDATIONS ARE BASED ON A SUBGRADE CBR VALUE OF 2.5. THE PAVEMENT RECOMMENDATIONS ARE NOT BASED ON THE SHRINK/SWELL CHARACTERISTICS OF THE UNDERLYING SOILS. THE PAVEMENT CAN EXPERIENCE CRACKING AND DEFORMATION DUE TO SHRINKAGE AND SWELLING CHARACTERISTICS OF THE SOILS AS DESCRIBED IN THE VERTICAL MOVEMENTS SECTION OF THE GEOTECHNICAL REPORT. USE OF GEOGRID WILL HELP REDUCE THE SHRINK/SWELL RELATED REFLECTIVE CRACKING.
- IF WATER IS ALLOWED TO GET UNDERNEATH THE ASPHALT/CONCRETE OR IF MOISTURE CONTENT OF THE BASE OR SUBGRADE CHANGES SIGNIFICANTLY, THEN PAVEMENT DISTRESS WILL OCCUR. MOISTURE PENETRATION UNDERNEATH THE ASPHALT PAVEMENT SURFACE SHOULD BE REDUCED. ONE OF THE FOLLOWING METHODS SHOULD BE USED:
 - DEEPER CURBS, SUCH AS CURBS EXTENDING A MINIMUM OF 3 INCHES INTO SUBGRADE.
 - COMPACTED CLAYS BACKFILLED AGAINST THE CURBS.
- IN ADDITION, WATER SHOULD NOT BE ALLOWED TO GET UNDERNEATH THE PAVEMENT SECTION AT THE TIME OF HOME CONSTRUCTION.
- GEOGRID: ONE LAYER OF GEOGRID, TENSAR TRIAX TX130 OR BETTER, INSTALLED ON TOP OF COMPACTED (COMPACTED OR STABILIZED) SUBGRADE AS PER MANUFACTURER'S GUIDELINES.
- SUBGRADE DELINEATION: AT THE TIME OF CONSTRUCTION, THE FINAL PAVEMENT SUBGRADE SHOULD BE VERIFIED/DELINEATED BY THE GEOTECHNICAL ENGINEER.



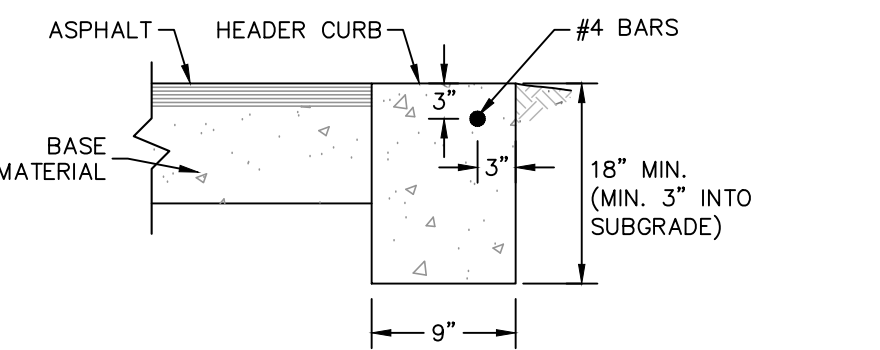
LOCAL B STREET SECTION
NOT-TO-SCALE



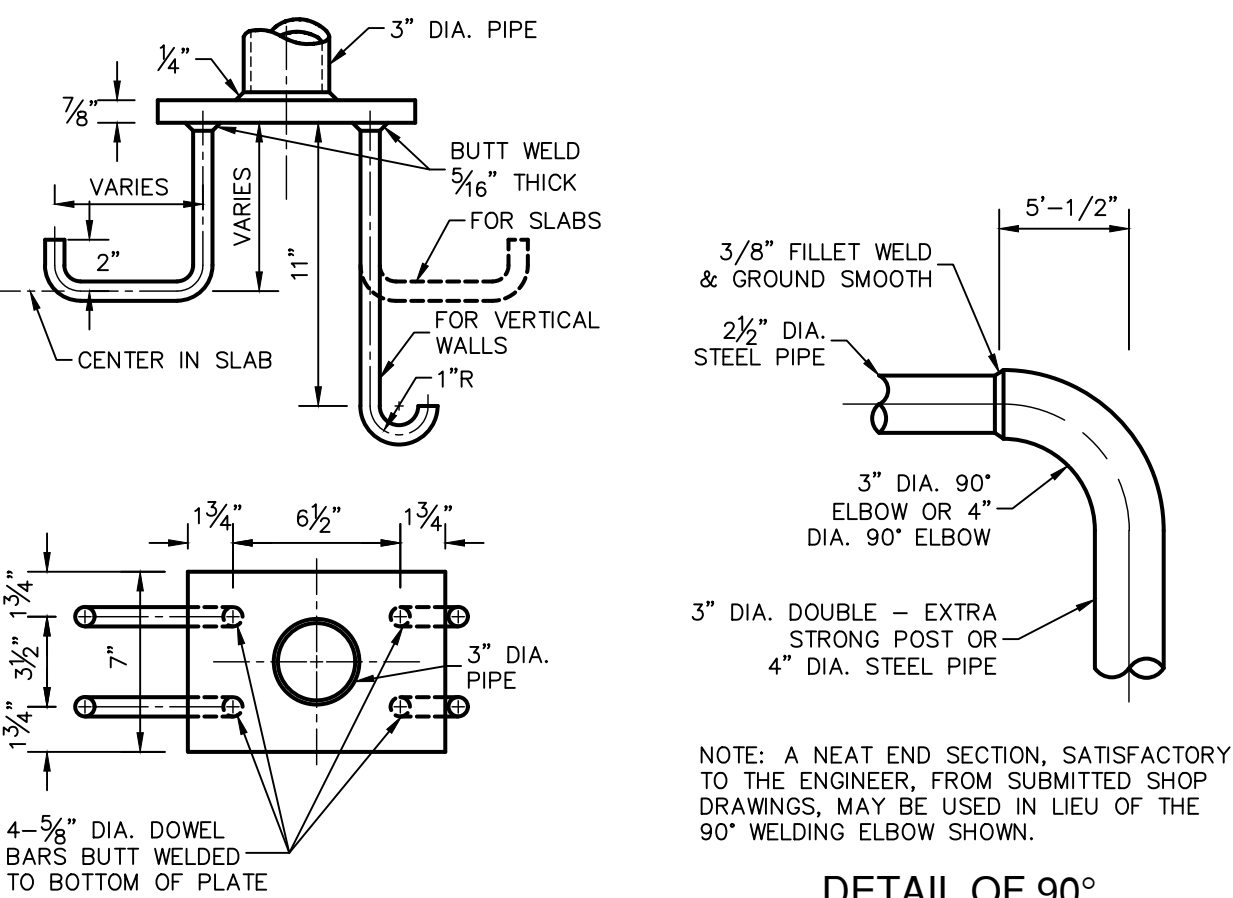
LOCAL A STREET SECTION
NOT-TO-SCALE



ASPHALT/ASPHALT JUNCTURE DETAIL
NOT-TO-SCALE

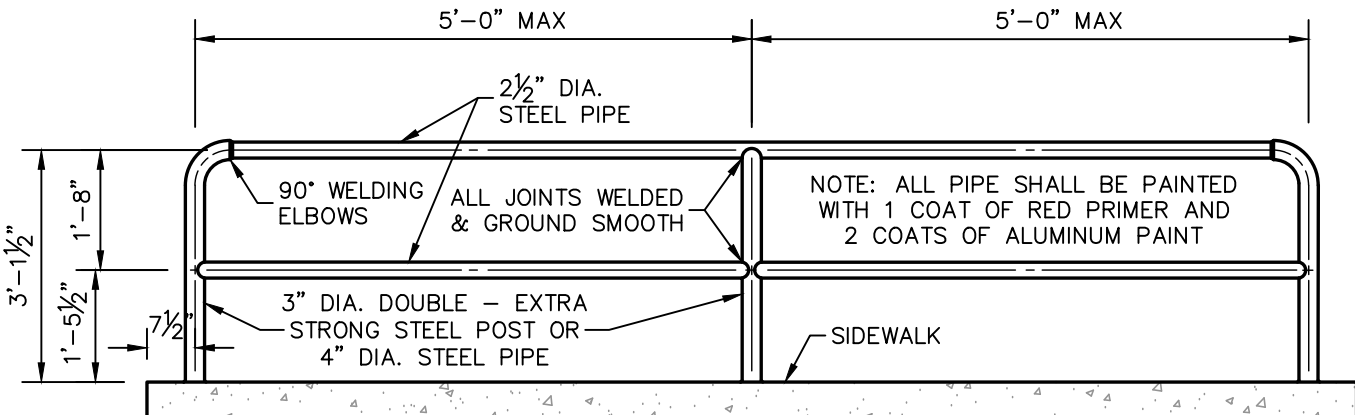


HEADER CURB DETAIL
NOT-TO-SCALE



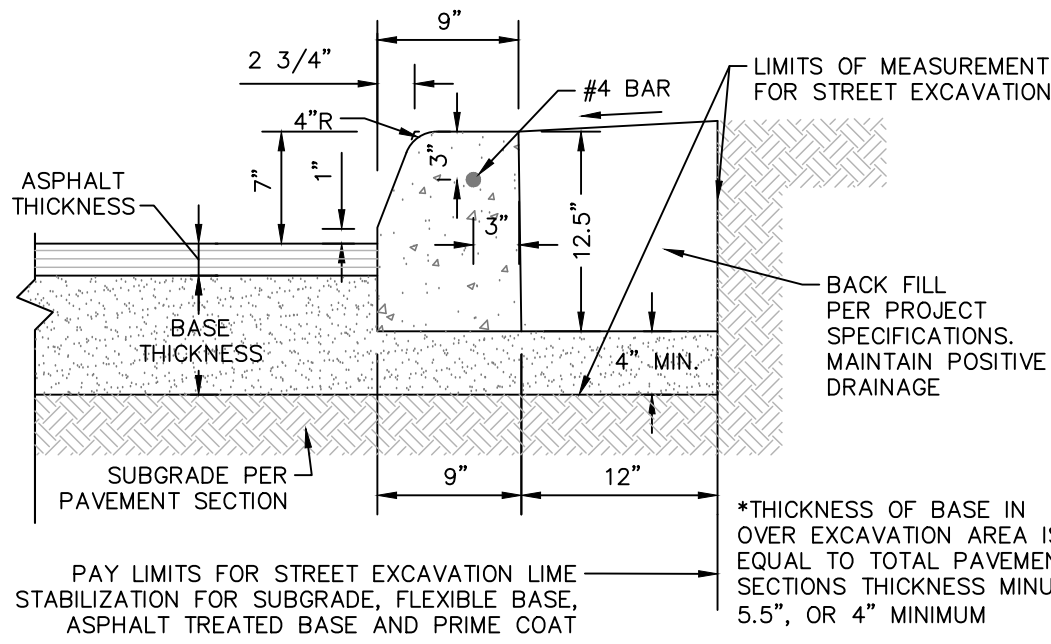
PIPE ANCHORAGE DETAIL
NOT-TO-SCALE

DETAIL OF 90° WELDING ELBOW
NOT-TO-SCALE

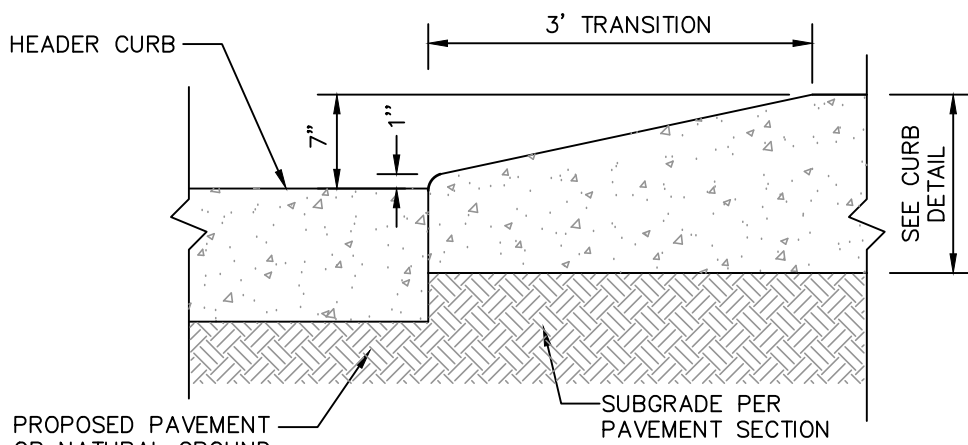


NOTE: ALL CONSTRUCTION OF HANDRAIL SHALL FOLLOW THE CITY OF SAN ANTONIO STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.

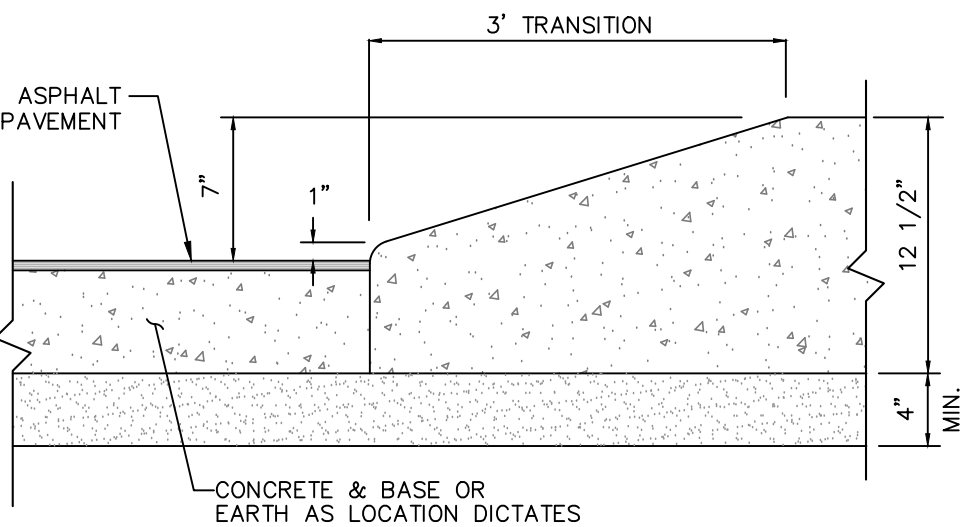
PIPE RAILING DETAIL
NOT-TO-SCALE



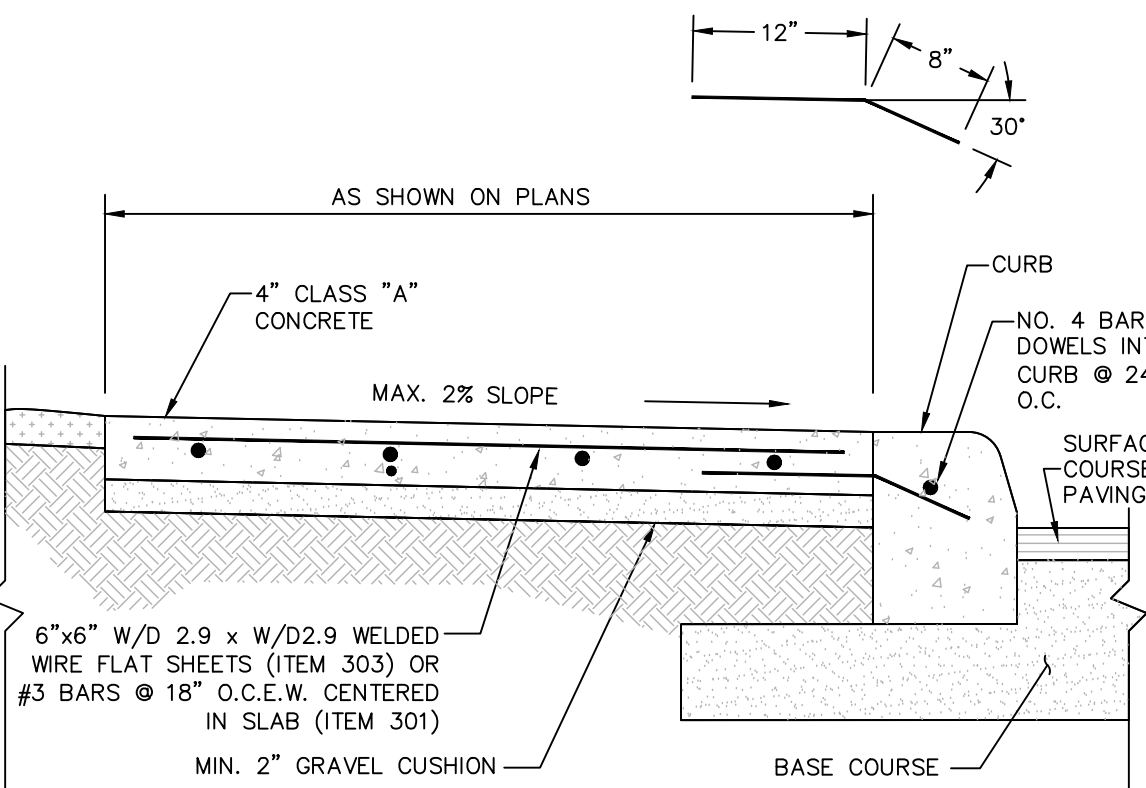
CONCRETE CURB DETAIL
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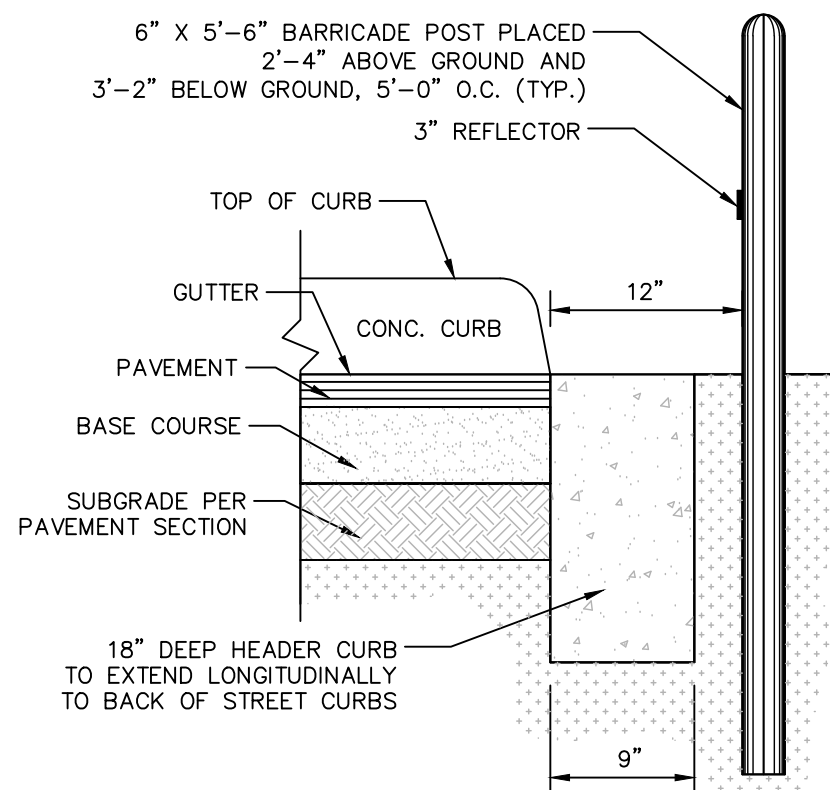
**CURB TRANSITION DETAIL
(FROM HEADER CURB TO STANDARD CURB)**
NOT-TO-SCALE



**CURB TRANSITION DETAIL
(FROM PAVEMENT TO STANDARD CURB)**
NOT-TO-SCALE

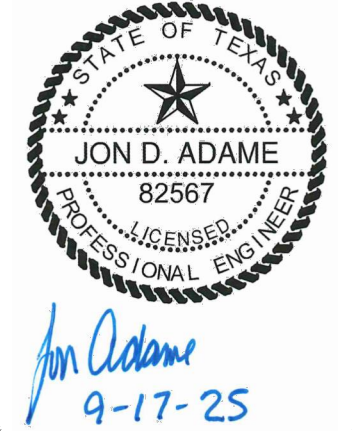


SIDEWALK DETAIL
NOT-TO-SCALE



HEADER CURB & BARRICADE POST DETAIL
NOT-TO-SCALE

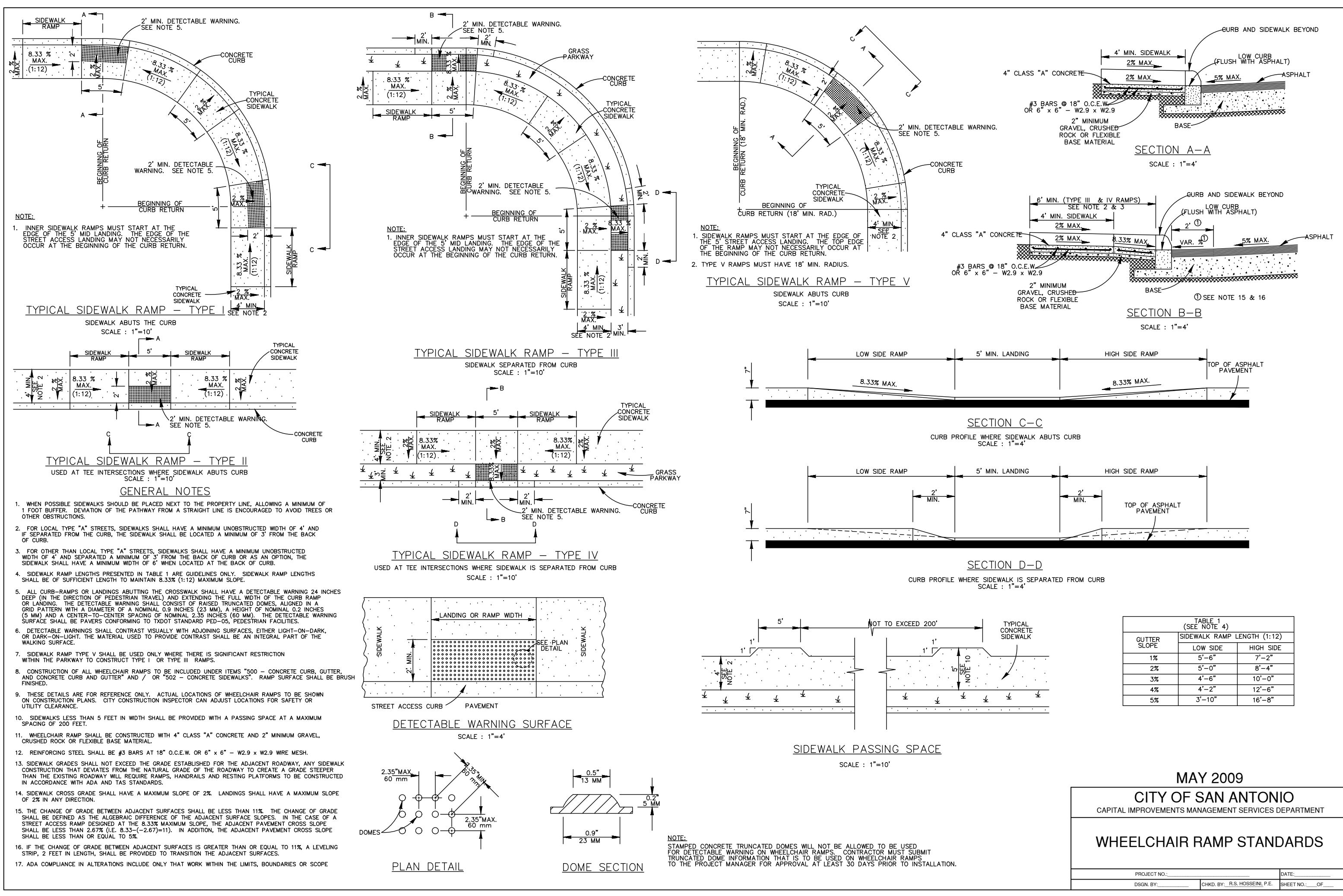
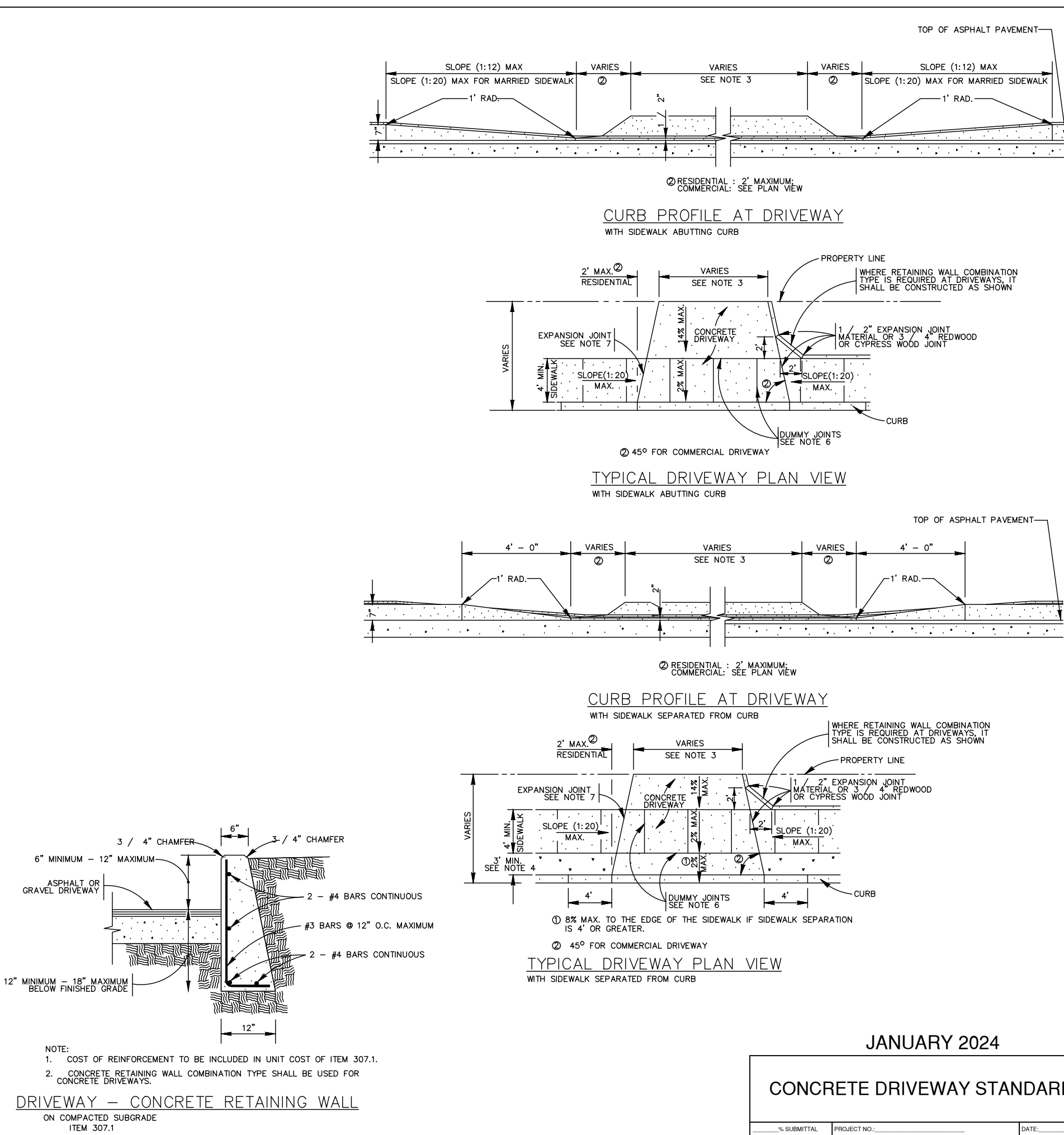
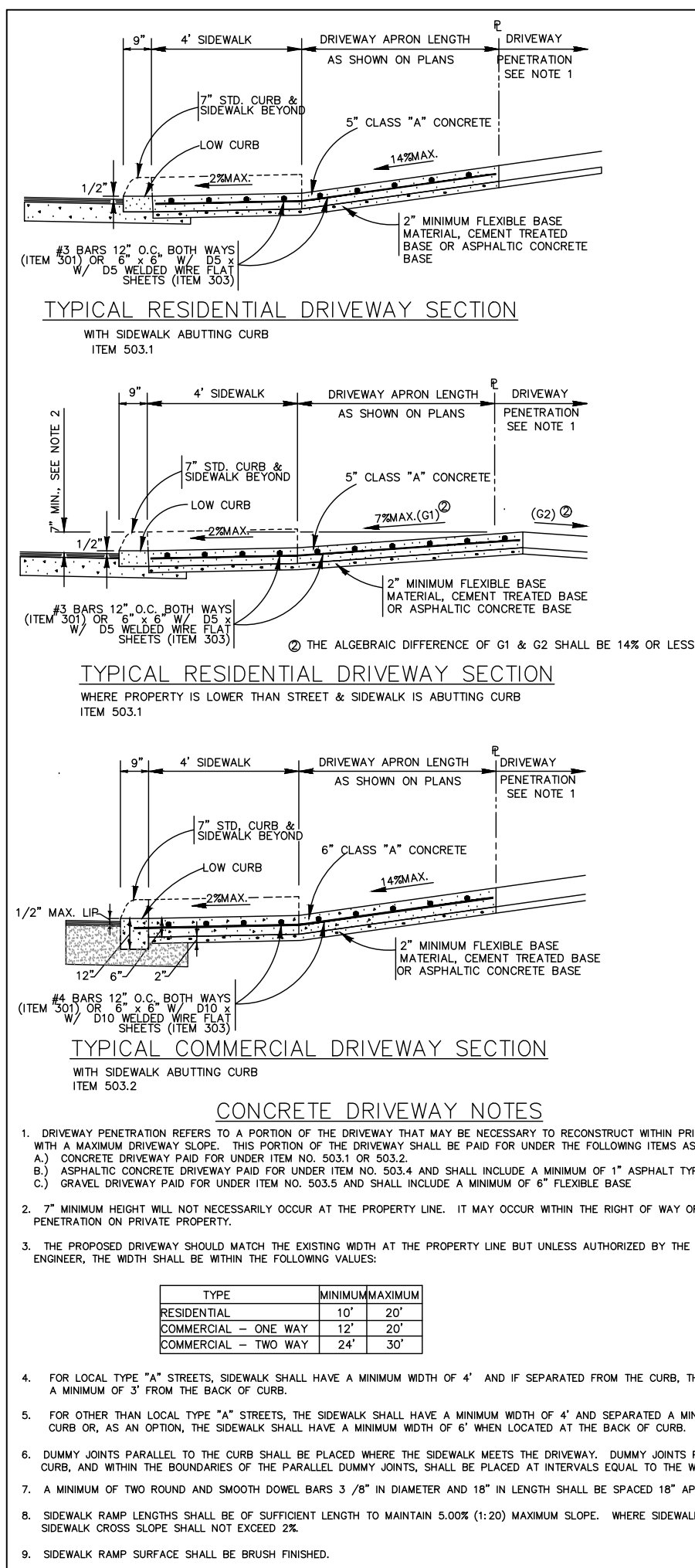
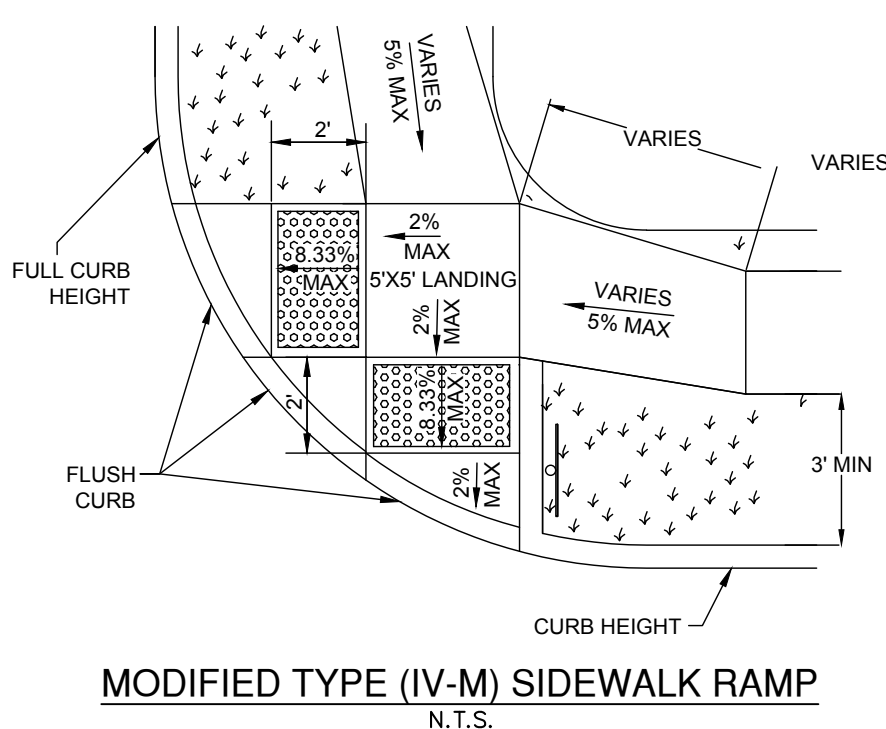
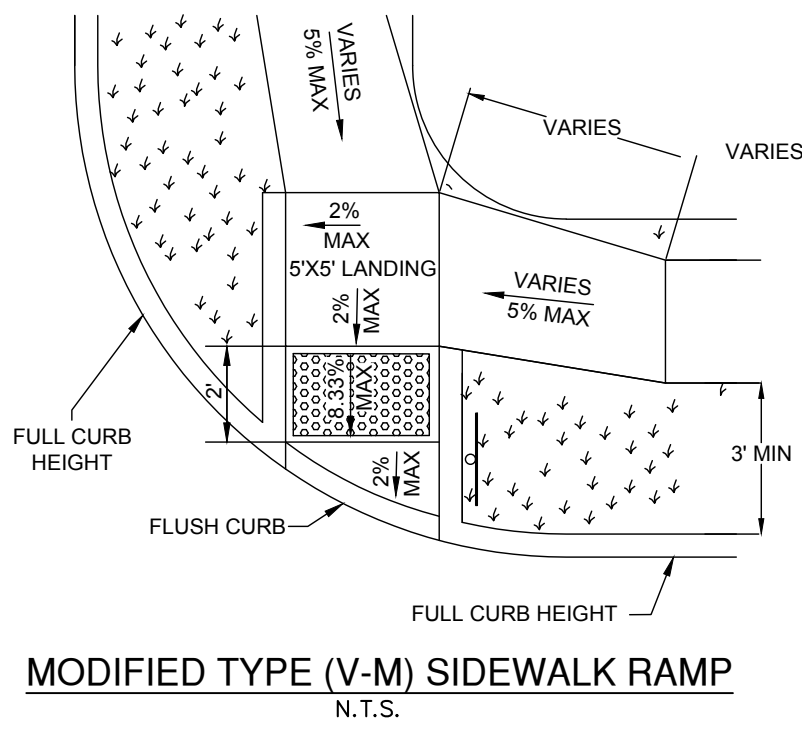
DATE	
NO.	
REVISION	



**PAPE-DAWSON
ENGINEERS**
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028600

**APOLLO OAKS
BEXAR COUNTY, TEXAS**
STREET DETAILS

PLAT NO.	CP202506
JOB NO.	13657-00
DATE	SEPTEMBER 2025
DESIGNER	—
CHECKED	—
DRAWN	—
SHEET	C2.10



PAPE-DAWSON ENGINEERS

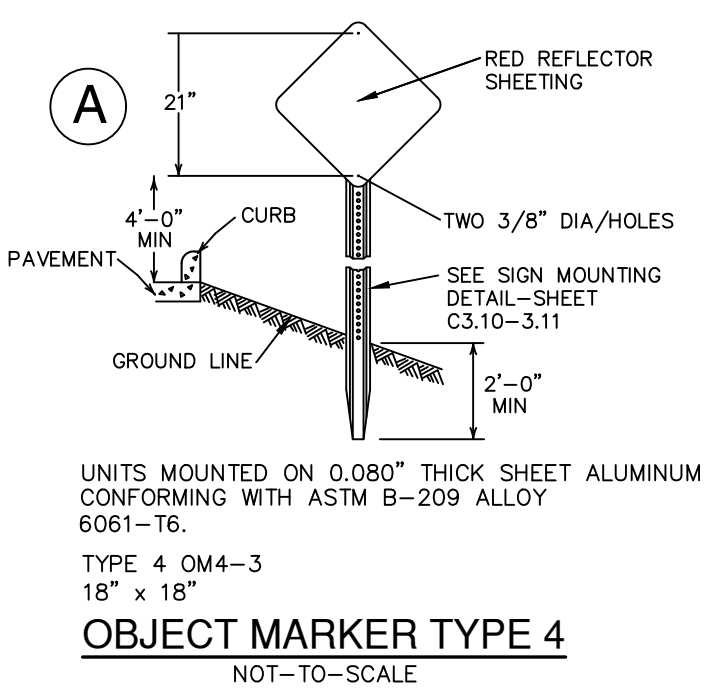
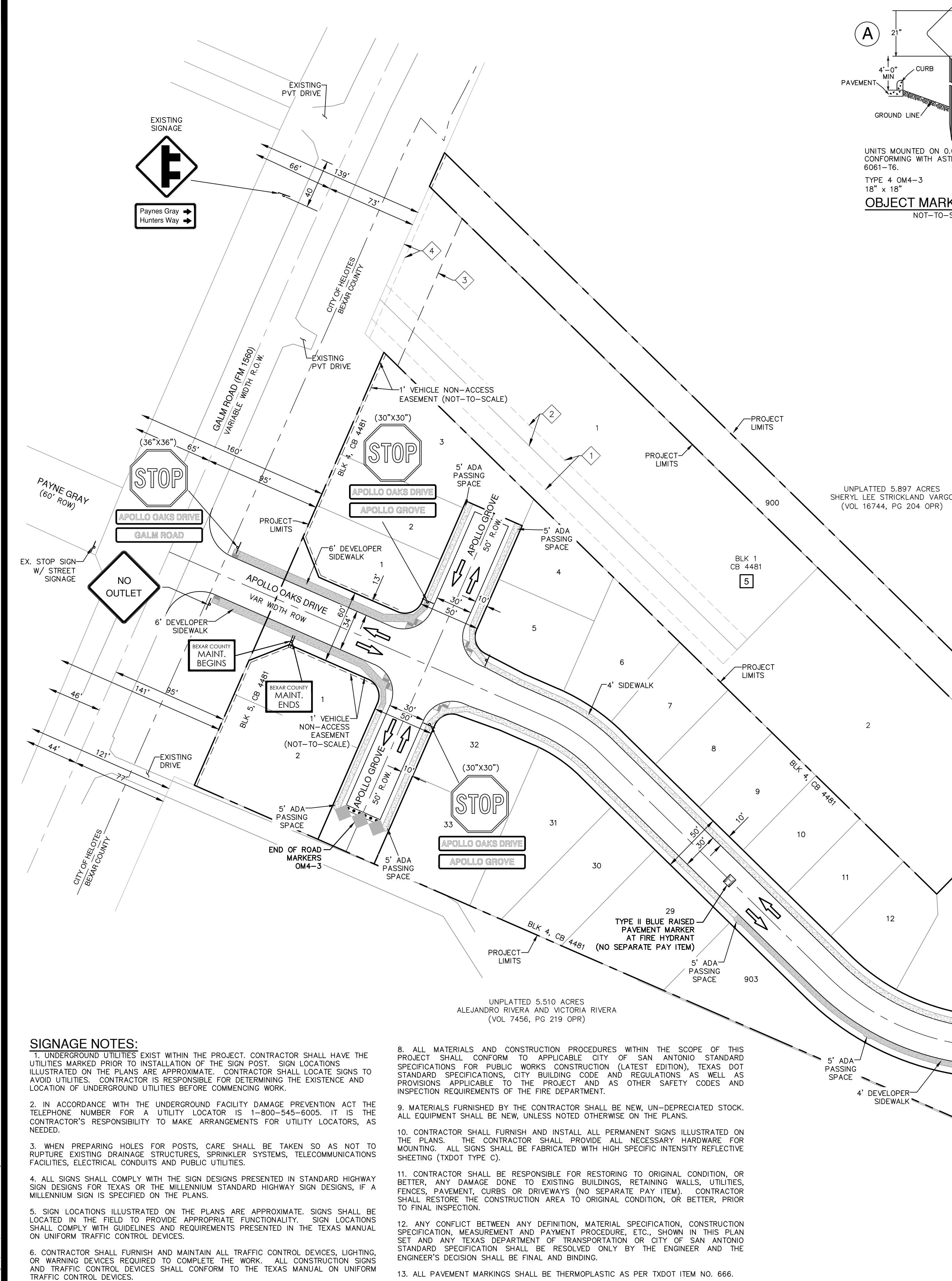
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1008900

APOLLO OAKS
BEXAR COUNTY, TEXAS

STREET DETAILS

PLAT NO. CP202506
JOB NO. 13657-00
DATE SEPTEMBER 2025
DESIGNER -
CHECKED - DRAWN -
SHEET C2.11

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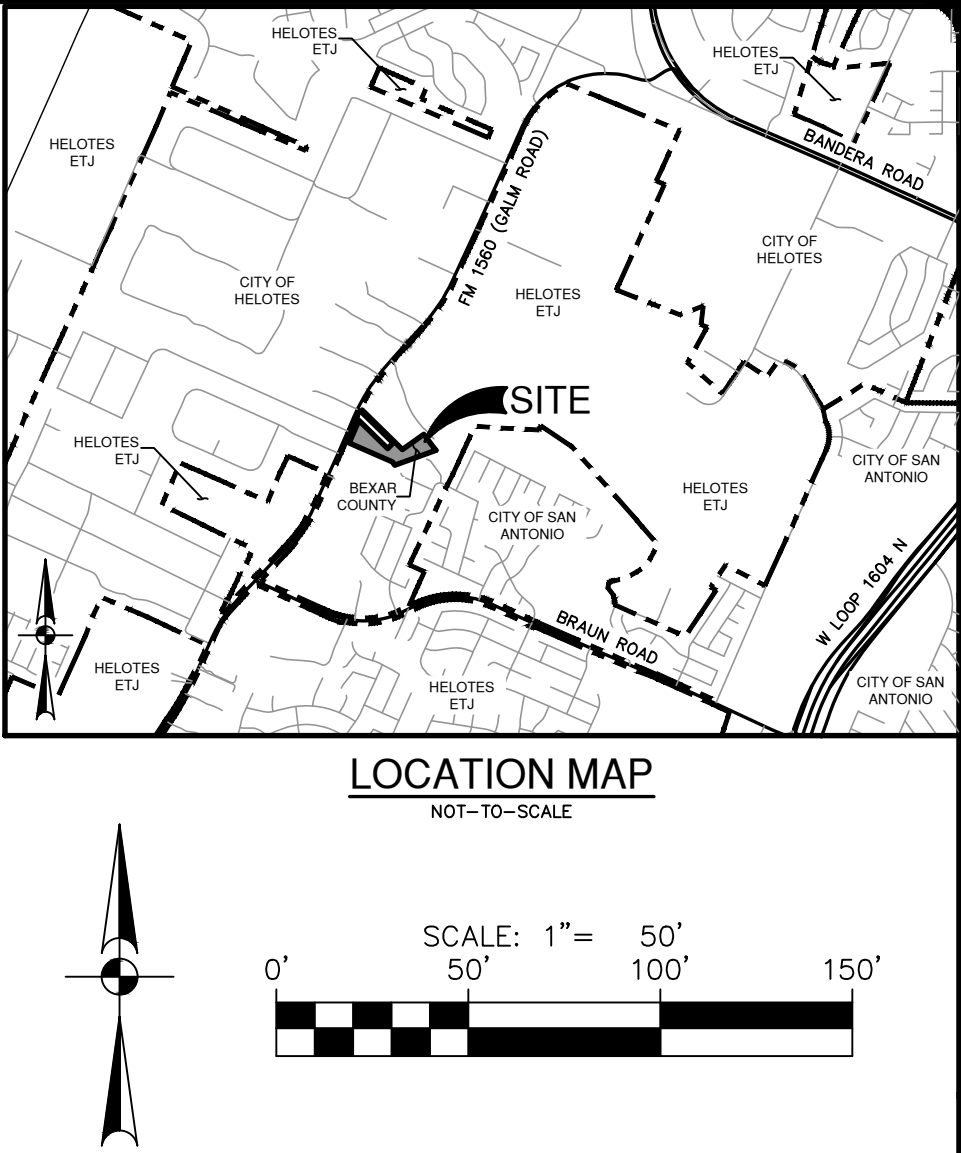


SYMBOL	ITEM NUMBER	SYMBOL	ITEM NUMBER
	UNIT BOUNDARY —		W14-2 30"x30" 531.54
	PROPOSED DRIVEWAY —		END OF ROAD MARKER OM4-3 NO SEPARATE PAY ITEM 531.56
	TRAFFIC FLOW ARROW —		R1-1 30"x30" 531.3
	SIDEWALK (HOMEBUILDER RESPONSIBILITY) 502.1		R1-1 36"x36"
	SIDEWALK (SITETWORK CONTRACTOR RESPONSIBILITY) 537.8		
	TYPE II BLUE RAISED PAVEMENT MARKERS — NO SEPARATE PAY ITEM (N.T.S.) 531.57		
	STREET SIGN		

KEY TABLE

	16' ELECTRIC, GAS TELEPHONE AND CABLE TV EASEMENT (VOL 9543, PG 97, DPR)		(EXISTING) W2-BR 30"x30"
	12' ELECTRIC, GAS TELEPHONE AND CABLE TV EASEMENT (VOL 9543, PG 97, DPR)		
	50' BUILDING SETBACK LINE (VOL 9543, PG 97, DPR)		
	20' GAS, TELEPHONE, CABLE TV, WATER AND SANITARY SEWER EASEMENT (VOL 9543, PG 97, DPR)		
	10' PERMANENT SANITARY SEWER EASEMENT (DOC NO 20250003397)		(EXISTING) W16-8oP 15"x30"
	21' WATER, ELECTRIC, GAS, TELEPHONE, CABLE TV AND ACCESS EASEMENT (VOL 9711, PG 110 DPR)		
	20' BUILDING SETBACK LINE (VOL 9711, PG 110, DPR)		
	10' ELECTRIC, GAS, TELEPHONE AND CABLE TV EASEMENT (VOL 9711, PG 110, DPR)		MAINTENANCE SIGN (24"x18")
	20' X 10' SANITARY SEWER EASEMENT (VOL 9711, PG 110, DPR)		
	LOT 902 (OPEN SPACE, WATER, DRAIN, ELECTRIC, GAS, TELEPHONE AND CABLE TV EASEMENT)		

- KEY TABLE**
- 16' ELECTRIC, GAS TELEPHONE AND CABLE TV EASEMENT (VOL 9543, PG 97, DPR)
 - 12' ELECTRIC, GAS TELEPHONE AND CABLE TV EASEMENT (VOL 9543, PG 97, DPR)
 - 50' BUILDING SETBACK LINE (VOL 9543, PG 97, DPR)
 - 20' GAS, TELEPHONE, CABLE TV, WATER AND SANITARY SEWER EASEMENT (VOL 9543, PG 97, DPR)
 - 10' PERMANENT SANITARY SEWER EASEMENT (DOC NO 20250003397)
 - 21' WATER, ELECTRIC, GAS, TELEPHONE, CABLE TV AND ACCESS EASEMENT (VOL 9711, PG 110 DPR)
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 - 10' ELECTRIC, GAS, TELEPHONE AND CABLE TV EASEMENT (VOL 9711, PG 110, DPR)
 - 20' X 10' SANITARY SEWER EASEMENT (VOL 9711, PG 110, DPR)
 - LOT 902 (OPEN SPACE, WATER, DRAIN, ELECTRIC, GAS, TELEPHONE AND CABLE TV EASEMENT)
 - REPLAT AND SUBDIVISION PLAT LANTANA II EXTENSION (VOL 9711, PG 110, DPR)
 - OUR LADY OF GUADALUPE SUBDIVISION (VOL 9598, PG 137 DPR)
 - D & M SUBDIVISION (VOL 9543, PG 97 DPR)



TxDOT ROW NOTES:
A TxDOT ROW PERMIT MUST BE OBTAINED BEFORE WORKING IN TxDOT ROW. CONTRACTOR SHALL COORDINATE A TRAFFIC CONTROL PLAN FOR ALL WORK WITHIN THE ROW. ADDITIONAL WARNING SIGNS MAY BE RECOMMENDED BY THE ENGINEER ONCE THE ROADWAYS ARE CONSTRUCTED.

DRIVEWAY NOTE:
DRIVEWAYS SHOWN ON THIS PLAN ARE FOR THE SOLE PURPOSE OF INDICATING A POTENTIAL CONFLICT WITH CURB RAMP. DRAINAGE INFRASTRUCTURE, OR OTHER CONFLICT. DRIVEWAY LOCATION IS SUBJECT TO CHANGE BASED ON HOME SELECTION AND FINAL LOT DESIGN.

DATE

NO. REVISION

PAPE-DAWSON ENGINEERS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10028800

APOLLO OAKS
BEXAR COUNTY, TEXAS

OVERALL SIGNAGE PLAN

PLAT NO. CP202506

JOB NO. 13657-00

DATE SEPTEMBER 2025

DESIGNER JF

CHECKED CR DRAWN JF

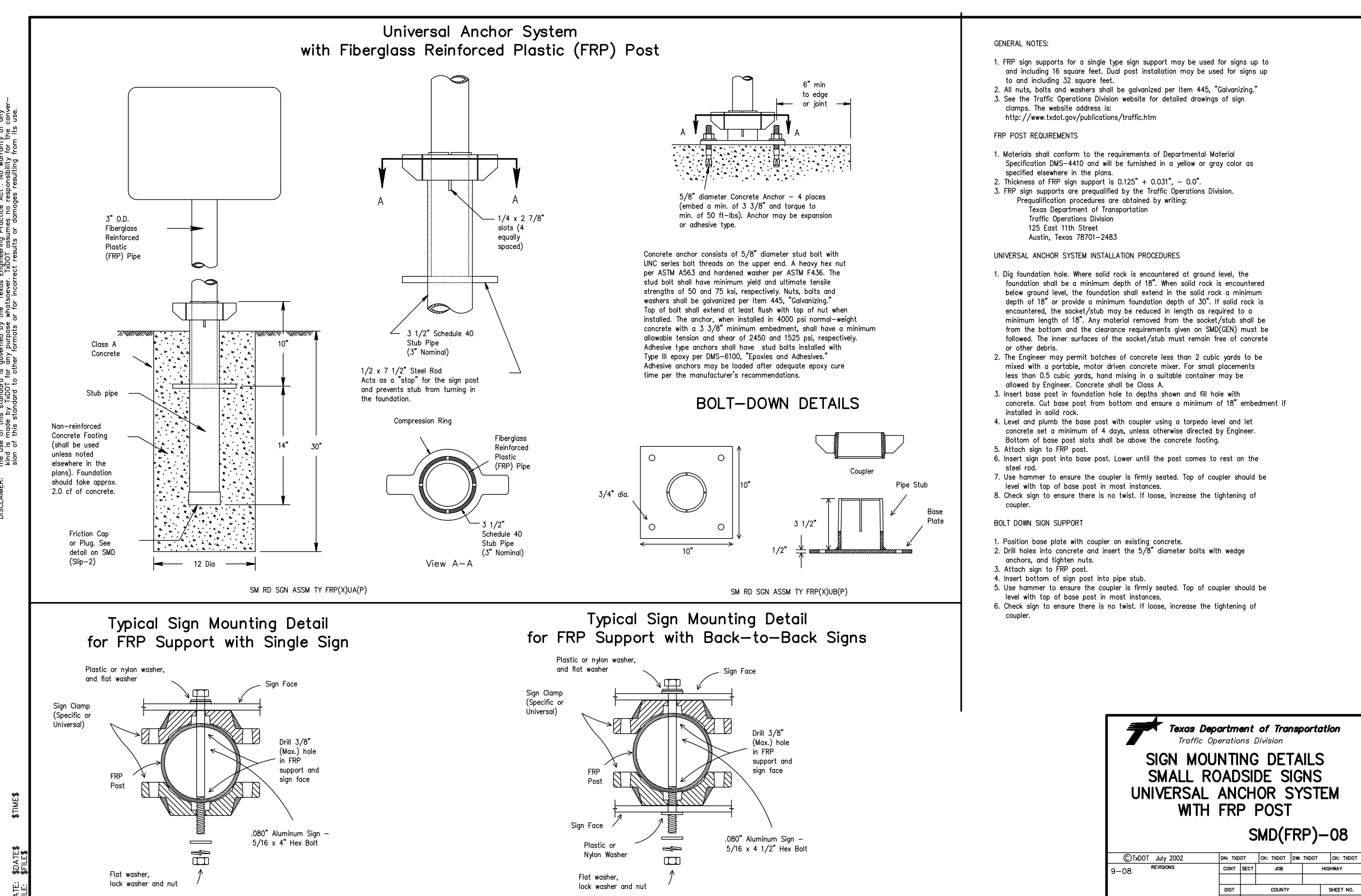
SHEET C3.00

SIGNAGE NOTES:

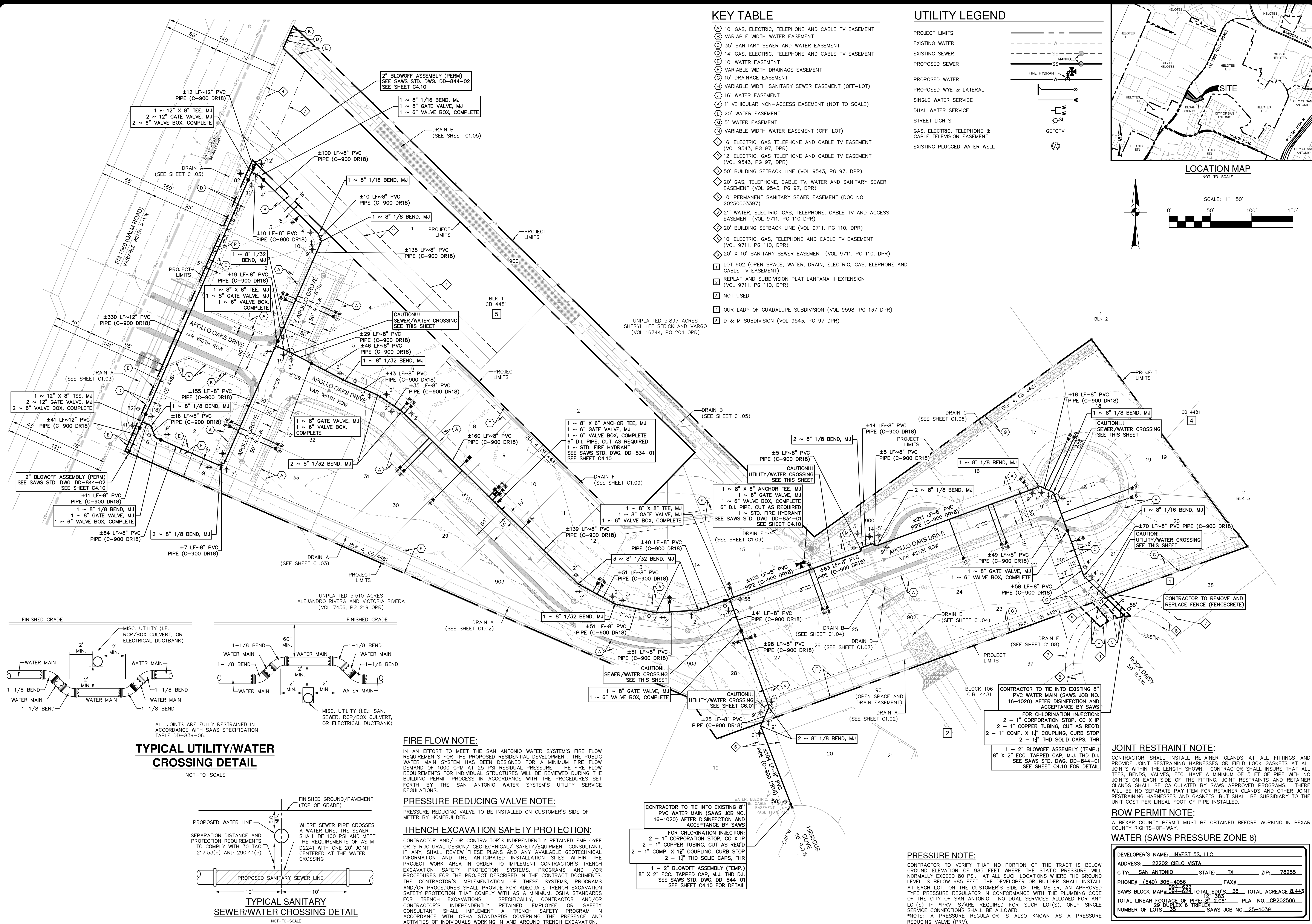
- UNDERGROUND UTILITIES EXIST WITHIN THE PROJECT. CONTRACTOR SHALL HAVE THE UTILITIES MARKED PRIOR TO INSTALLATION OF THE SIGN POST. SIGN LOCATIONS ILLUSTRATED ON THE PLANS ARE APPROXIMATE. CONTRACTOR SHALL LOCATE SIGNS TO AVOID UTILITIES. CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXISTENCE AND LOCATION OF UNDERGROUND UTILITIES BEFORE COMMENCING WORK.
- IN ACCORDANCE WITH THE UNDERGROUND FACILITY DAMAGE PREVENTION ACT THE TELEPHONE NUMBER FOR A UTILITY LOCATOR IS 1-800-545-6005. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAKE ARRANGEMENTS FOR UTILITY LOCATORS, AS NEEDED.
- WHEN PREPARING HOLES FOR POSTS, CARE SHALL BE TAKEN SO AS NOT TO RUPTURE EXISTING DRAINAGE STRUCTURES, SPRINKLER SYSTEMS, TELECOMMUNICATIONS FACILITIES, ELECTRICAL CONDUITS AND PUBLIC UTILITIES.
- ALL SIGNS SHALL COMPLY WITH THE SIGN DESIGNS PRESENTED IN STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS OR THE MILLENNIUM STANDARD HIGHWAY SIGN DESIGNS, IF A MILLENNIUM SIGN IS SPECIFIED ON THE PLANS.
- SIGN LOCATIONS ILLUSTRATED ON THE PLANS ARE APPROXIMATE. SIGNS SHALL BE LOCATED IN THE FIELD TO PROVIDE APPROPRIATE FUNCTIONALITY. SIGN LOCATIONS SHALL COMPLY WITH GUIDELINES AND REQUIREMENTS PRESENTED IN THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
- CONTRACTOR SHALL FURNISH AND MAINTAIN ALL TRAFFIC CONTROL DEVICES, LIGHTING, OR WARNING DEVICES REQUIRED TO COMPLETE THE WORK. ALL CONSTRUCTION SIGNS AND TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
- THREE (3) COPIES OF EQUIPMENT SUBMITTALS FOR ALL TRAFFIC SIGN COMPONENTS SHALL BE SENT TO THE ENGINEER. SUBMITTALS SHALL CONSIST OF THE APPROPRIATE COMBINATION OF CATALOG SHEETS, MATERIAL LISTS, MANUFACTURER'S BROCHURES, TECHNICAL BULLETINS, SPECIFICATIONS, DIAGRAMS, OR PRODUCT SAMPLES NECESSARY TO DESCRIBE A SYSTEM, PRODUCT, OR ITEM. SPECIFIC ITEM NUMBERS AND PRODUCT CODES WILL BE CLEARLY IDENTIFIED WHEN MULTIPLE PRODUCTS ARE LISTED ON THE SAME SHEET.
- ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS PROJECT SHALL CONFORM TO APPLICABLE CITY OF SAN ANTONIO STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (LATEST EDITION), TEXAS DOT STANDARD SPECIFICATIONS, CITY BUILDING CODE AND REGULATIONS AS WELL AS PROVISIONS APPLICABLE TO THE PROJECT AND AS OTHER SAFETY CODES AND INSPECTION REQUIREMENTS OF THE FIRE DEPARTMENT.
- MATERIALS FURNISHED BY THE CONTRACTOR SHALL BE NEW, UN-DEPRECIATED STOCK. ALL EQUIPMENT SHALL BE NEW, UNLESS NOTED OTHERWISE ON THE PLANS.
- CONTRACTOR SHALL FURNISH AND INSTALL ALL PERMANENT SIGNS ILLUSTRATED ON THE PLANS. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY HARDWARE FOR MOUNTING. ALL SIGNS SHALL BE FABRICATED WITH HIGH SPECIFIC INTENSITY REFLECTIVE SHEETING (TxDOT TYPE C).
- CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING TO ORIGINAL CONDITION, OR BETTER, ANY DAMAGE DONE TO EXISTING BUILDINGS, RETAINING WALLS, UTILITIES, FENCES, PAVEMENT, CURBS OR DRIVEWAYS (NO SEPARATE PAY ITEM). CONTRACTOR SHALL RESTORE THE CONSTRUCTION AREA TO ORIGINAL CONDITION, OR BETTER, PRIOR TO FINAL INSPECTION.
- ANY CONFLICT BETWEEN ANY DEFINITION, MATERIAL SPECIFICATION, CONSTRUCTION SPECIFICATION, MEASUREMENT AND PAYMENT PROCEDURE, ETC., SHOWN IN THIS PLAN SET AND ANY TEXAS DEPARTMENT OF TRANSPORTATION OR CITY OF SAN ANTONIO STANDARD SPECIFICATION SHALL BE RESOLVED ONLY BY THE ENGINEER AND THE ENGINEER'S DECISION SHALL BE FINAL AND BINDING.
- ALL PAVEMENT MARKINGS SHALL BE THERMOPLASTIC AS PER TxDOT ITEM NO. 666.

TRENCH EXCAVATION SAFETY PROTECTION:

CONTRACTOR AND/ OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/ GEOTECHNICAL/ SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND /OR PROCEDURES FOR THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR'S IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLY WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.



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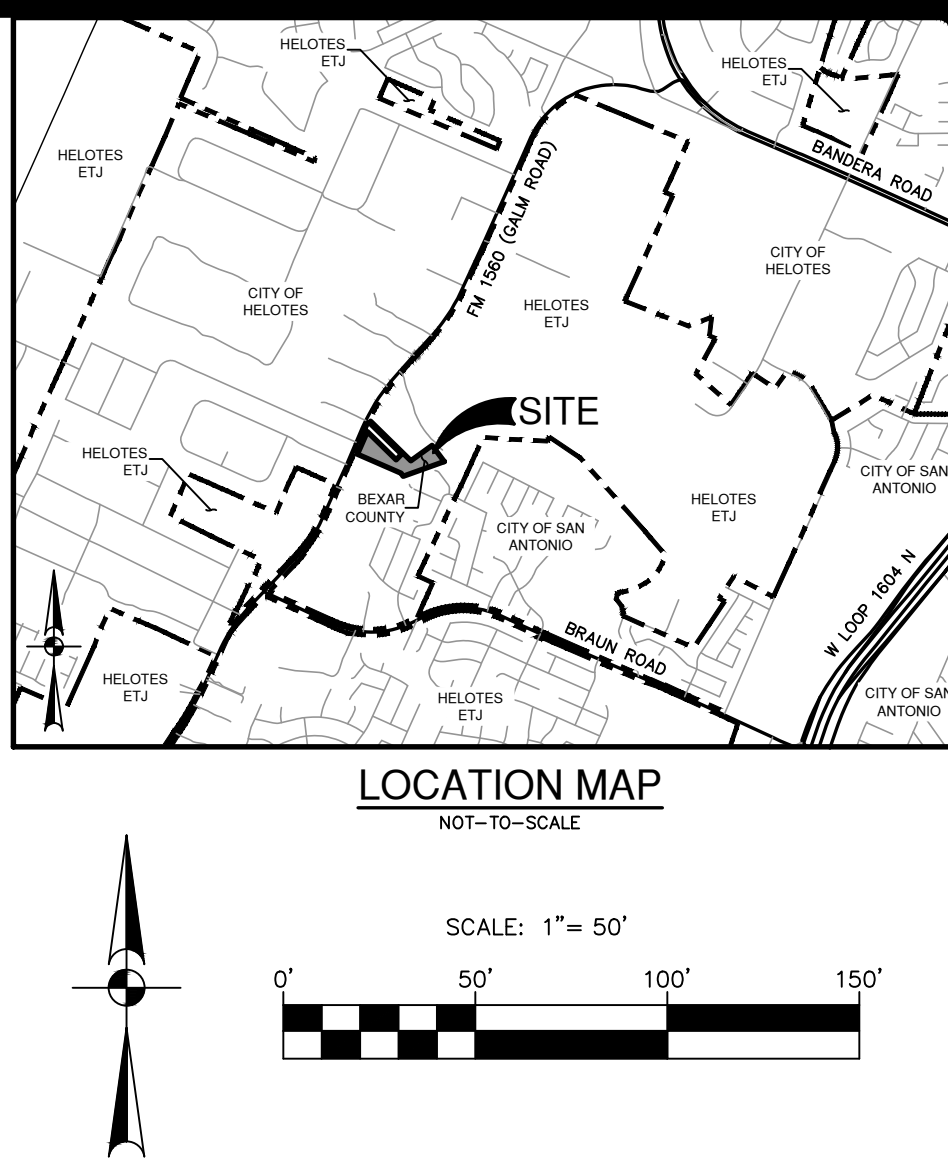
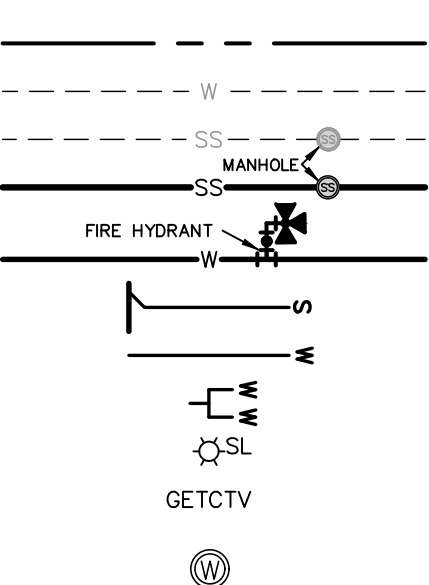


KEY TABLE

- (A) 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT
(B) VARIABLE WIDTH WATER EASEMENT
(C) 35' SANITARY SEWER AND WATER EASEMENT
(D) 14' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT
(E) 10' WATER EASEMENT
(F) VARIABLE WIDTH DRAINAGE EASEMENT
(G) 15' DRAINAGE EASEMENT
(H) VARIABLE WIDTH SANITARY SEWER EASEMENT (OFF-LOT)
(J) 16' WATER EASEMENT
(K) 1' VEHICULAR NON-ACCESS EASEMENT (NOT TO SCALE)
(L) 20' WATER EASEMENT
(M) 5' WATER EASEMENT
(N) VARIABLE WIDTH WATER EASEMENT (OFF-LOT)
(O) 16' ELECTRIC, GAS TELEPHONE AND CABLE TV EASEMENT (VOL 9543, PG 97, DPR)
(P) 12' ELECTRIC, GAS TELEPHONE AND CABLE TV EASEMENT (VOL 9543, PG 97, DPR)
(Q) 10' PERMANENT SANITARY SEWER EASEMENT (DOC NO 20250003397)
(R) 21' WATER, ELECTRIC, GAS, TELEPHONE, CABLE TV AND ACCESS EASEMENT (VOL 9711, PG 110 DPR)
(S) 20' BUILDING SETBACK LINE (VOL 9711, PG 110, DPR)
(T) 10' ELECTRIC, GAS, TELEPHONE AND CABLE TV EASEMENT (VOL 9711, PG 110, DPR)
(U) 20' X 10' SANITARY SEWER EASEMENT (VOL 9711, PG 110, DPR)
(V) LOT 902 (OPEN SPACE, WATER, DRAIN, ELECTRIC, GAS, ELEPHONE AND CABLE TV EASEMENT)
(W) REPLAT AND SUBDIVISION PLAT LANTANA II EXTENSION (VOL 9711, PG 110, DPR)
(X) NOT USED
(Y) OUR LADY OF GUADALUPE SUBDIVISION (VOL 9598, PG 137 DPR)
(Z) D & M SUBDIVISION (VOL 9543, PG 97 DPR)

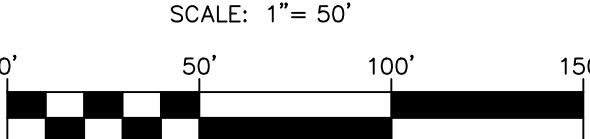
UTILITY LEGEND

- PROJECT LIMITS
EXISTING WATER
EXISTING SEWER
PROPOSED SEWER
PROPOSED WATER
PROPOSED WYE & LATERAL
SINGLE WATER SERVICE
DUAL WATER SERVICE
STREET LIGHTS
GAS, ELECTRIC, TELEPHONE & CABLE TELEVISION EASEMENT
EXISTING PLUGGED WATER WELL



LOCATION MAP

NOT-TO-SCALE



DATE	
NO.	
REVISION	

Jon D. Adame
9-4-25

PAPE-DAWSON
ENGINEERS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10038600

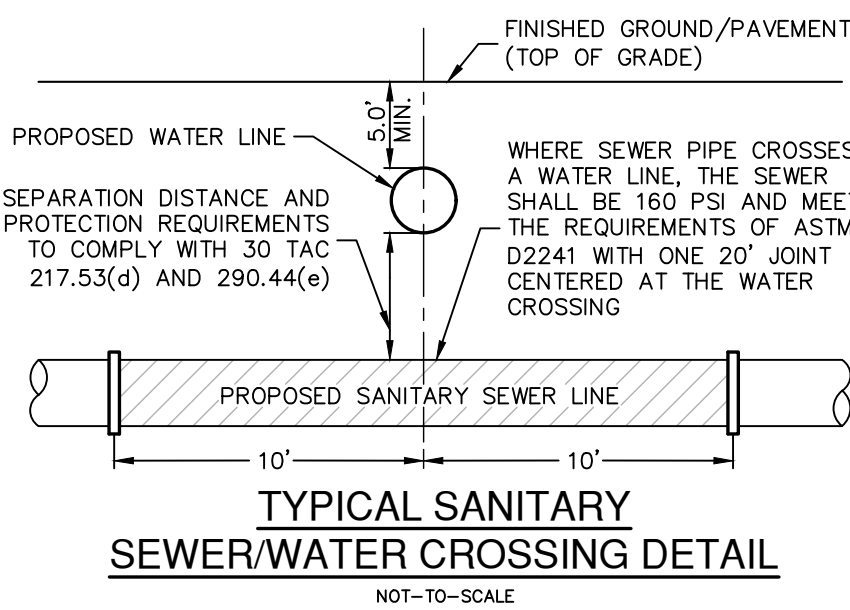
APOLLO OAKS
BEXAR COUNTY, TEXAS

OVERALL WATER DISTRIBUTION PLAN

PLAT NO.	CP202506
JOB NO.	13657-00
DATE	SEPTEMBER 2025
DESIGNER	CR
CHECKED	JA
DRAWN	JF
SHEET	C4.00

TYPICAL UTILITY/WATER CROSSING DETAIL

NOT-TO-SCALE



FIRE FLOW NOTE:

IN AN EFFORT TO MEET THE SAN ANTONIO WATER SYSTEM'S FIRE FLOW REQUIREMENTS FOR THE PROPOSED RESIDENTIAL DEVELOPMENT, THE PUBLIC WATER MAIN SYSTEM HAS BEEN DESIGNED FOR A MINIMUM FIRE FLOW DEMAND OF 1000 GPM AT 25 PSI RESIDUAL PRESSURE. THE FIRE FLOW REQUIREMENTS FOR INDIVIDUAL STRUCTURES WILL BE REVIEWED DURING THE BUILDING PERMIT PROCESS IN ACCORDANCE WITH THE PROCEDURES SET FORTH BY THE SAN ANTONIO WATER SYSTEM'S UTILITY SERVICE REGULATIONS.

PRESSURE REDUCING VALVE NOTE:

PRESSURE REDUCING VALVE TO BE INSTALLED ON CUSTOMER'S SIDE OF METER BY HOMEOWNER.

TRENCH EXCAVATION SAFETY PROTECTION:

CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/ GEOTECHNICAL/ SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES FOR THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR'S IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLY WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

CONTRACTOR TO TIE INTO EXISTING 8" PVC WATER MAIN (SAWS JOB NO. 16-1020) AFTER DISINFECTION AND ACCEPTANCE BY SAWS

FOR CHLORINATION INJECTION:
2 - 1" CORPORATION STOP, CC X IP
2 - 1" COPPER TUBING, CUT AS REQ'D
2 - 1" COMP. X 1 1/2" COUPLING, CURB STOP
2 - 1 1/2" THD SOLID CAPS, THR

1 - 2" BLOWOFF ASSEMBLY (TEMP.)
8" X 2" ECC. TAPPED CAP, M.J. THD D.I.
SEE SAWS STD. DWG. DD-844-01
SEE SHEET C4.10 FOR DETAIL

PRESSURE NOTE:

CONTRACTOR TO VERIFY THAT NO PORTION OF THE TRACT IS BELOW GROUND ELEVATION OF 985 FEET WHERE THE STATIC PRESSURE WILL NORMALLY EXCEED 80 PSI. AT ALL SUCH LOCATIONS WHERE THE GROUND LEVEL IS BELOW 985 FEET, THE DEVELOPER OR BUILDER SHALL INSTALL AT EACH LOT, ON THE CUSTOMER'S SIDE OF THE METER, AN APPROVED TYPE PRESSURE REGULATOR IN CONFORMANCE WITH THE PLUMBING CODE OF THE CITY OF SAN ANTONIO. NO DUAL SERVICES ALLOWED FOR ANY LOT(S) IF *PRV IS/ARE REQUIRED FOR SUCH LOT(S). ONLY SINGLE SERVICE CONNECTIONS SHALL BE ALLOWED.
*NOTE: A PRESSURE REGULATOR IS ALSO KNOWN AS A PRESSURE REDUCING VALVE (PRV).

JOINT RESTRAINT NOTE:

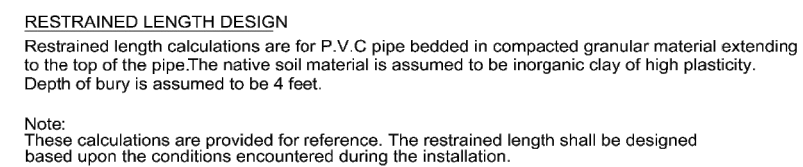
CONTRACTOR SHALL INSTALL RETAINER GLANDS AT ALL FITTINGS AND PROVIDE JOINT RESTRAINING HARNESSES OR FIELD LOCK GASKETS AT ALL JOINTS WITHIN THE LENGTH SHOWN. CONTRACTOR SHALL INSURE THAT ALL TEES, BENDS, VALVES, ETC. HAVE A MINIMUM OF 5 FT OF PIPE WITH NO JOINTS ON EACH SIDE OF THE FITTING. JOINT RESTRAINTS AND RETAINER GLANDS SHALL BE CALCULATED BY SAWS APPROVED PROGRAMS. THERE WILL BE NO SEPARATE PAY ITEM FOR RETAINER GLANDS AND OTHER JOINT RESTRAINING HARNESSES AND GASKETS, BUT SHALL BE SUBSIDIARY TO THE UNIT COST PER LINEAL FOOT OF PIPE INSTALLED.

ROW PERMIT NOTE:

A BEXAR COUNTY PERMIT MUST BE OBTAINED BEFORE WORKING IN BEXAR COUNTY RIGHTS-OF-WAY.

WATER (SAWS PRESSURE ZONE 8)

DEVELOPER'S NAME: INVEST 55, LLC			
ADDRESS: 22202 CIELO VISTA			
CITY: SAN ANTONIO	STATE: TX	ZIP: 78255	
PHONE# (540) 305-4056	FAX#		
SAWS BLOCK MAP# 094-624 TOTAL EDU'S 38 TOTAL ACREAGE 8.443			
TOTAL LINEAR FOOTAGE OF PIPE 8' 2.061 PLAT NO. CP202506			
NUMBER OF LOTS 35 SAWS JOB NO. 25-1039			

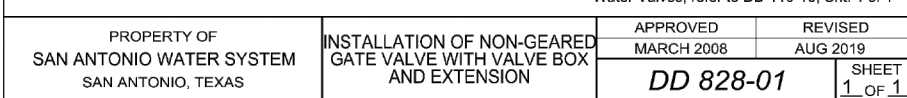


PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	RESTRAINED LENGTHS FOR DEAD ENDS / INLINE VALVES	APPROVED	REVISED
		MARCH 2008	AUG 2019
		<i>DD-839-05</i>	SHEET 1 OF 1



Restrained length calculations are for P.V.C. pipe bedded in compacted granular material extending to the top of the pipe. The native soil material is assumed to be inorganic clay of high plasticity. Depth of bury is assumed to be 4 feet.

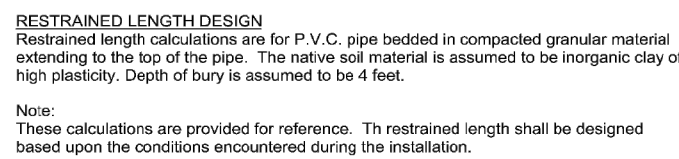
Note:
These calculations are provide for reference. The restrained length shall be designed based upon the conditions encountered during the installation.



Restraint length calculations are for P.V.C. pipe bedded in compacted granular material extending to the top of the pipe. The native soil material is assumed to be inorganic clay of high plasticity. Depth of bury is assumed to be 4 feet.

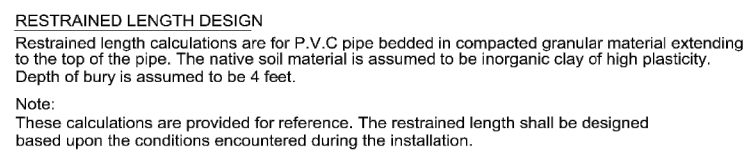
Note:
These calculations are provided for reference. The restrained length shall be designed based upon the conditions encountered during the installation.

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	VALVE MARKER	APPROVED	REVISED
		MARCH 1 2008	AUG 2019
DD-828-04			SHEET 1 OF 1

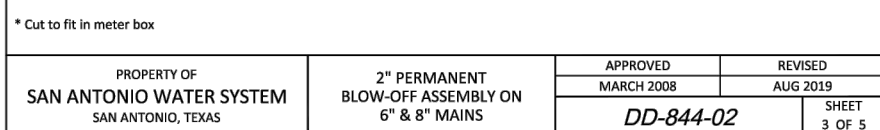


Note:
These calculations are provided for reference. The restrained length shall be designed based upon the conditions encountered during the installation.

PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	FIRE HYDRANT INSTALLATION (JOINT RESTRAINT)	APPROVED	REVISED
		MAY 2013	AUG 2019
		DD-834-01	SHEET 1 OF 3

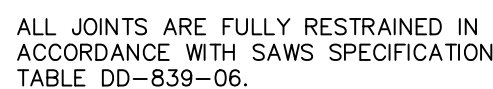


PROPERTY OF SAN ANTONIO WATER SYSTEM SAN ANTONIO, TEXAS	SERVICE INSTALLATION WITH PRESSURE REDUCING VALVE	APPROVED	REVISED
		MARCH 2008	APRIL 2014
		DD-833-03	SHEET 1 OF 1

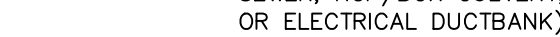
WATER (SAWS PRESSURE ZONE 8)

WATER (SAWS PRESSURE ZONE 8)

DEVELOPER'S NAME: INVEST 55, LLC
ADDRESS: 22202 CIELO VISTA
CITY: SAN ANTONIO STATE: TX ZIP: 78255
PHONE# (540) 305-4056 FAX# 12-383
SAWS BLOCK MAP# 094-822 TOTAL EDU'S 38 TOTAL ACREAGE 8.4
TOTAL LINEAR FOOTAGE OF PIPE: 87,206.1 PLAT NO. CP202506
29 DUEX 6 TRIPLES
NUMBER OF LOTS 5 SAWS JOB NO. 25-1039



NOT-TO-SCALE



Out as required to extend beyond accounting.

WATER (SAWS PRESSURE ZONE 8)

WATER (SAWS PRESSURE ZONE 8)

DEVELOPER'S NAME: INVEST 55, LLC
ADDRESS: 22202 CIELO VISTA
CITY: SAN ANTONIO STATE: TX ZIP: 78255
PHONE# (540) 305-4056 FAX# 12-383
SAWS BLOCK MAP# 094-822 TOTAL EDU'S 38 TOTAL ACREAGE 8.4
TOTAL LINEAR FOOTAGE OF PIPE: 87,206.1 PLAT NO. CP202506
29 DUEX 6 TRIPLES
NUMBER OF LOTS 5 SAWS JOB NO. 25-1039

SAWS CONSTRUCTION NOTES
(LAST REVISED JANUARY 2022)

SAWS GENERAL SECTION

1. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT SHALL BE APPROVED BY THE SAN ANTONIO WATER SYSTEM (SAWS) AND COMPLY WITH THE PLANS, SPECIFICATIONS, GENERAL CONDITIONS AND WITH THE FOLLOWING AS APPLICABLE:

- A.CURRENT TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) "DESIGN CRITERIA FOR DOMESTIC WASTEWATER SYSTEM" TEXAS ADMINISTRATIVE CODE (TAC) TITLE 30 PART 1 CHAPTER 217 AND "PUBLIC DRINKING WATER" TAC TITLE 30 PART 1 CHAPTER 290.
B.CURRENT TXDOT "STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND DRAINAGE".
C.CURRENT "SAN ANTONIO WATER SYSTEM STANDARD SPECIFICATIONS FOR WATER AND SANITARY SEWER CONSTRUCTION".
D.CURRENT CITY OF SAN ANTONIO "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION".
E.CURRENT CITY OF SAN ANTONIO "UTILITY EXCAVATION CRITERIA MANUAL" (UECM).

2. THE CONTRACTOR SHALL NOT PROCEED WITH ANY PIPE INSTALLATION WORK UNTIL THEY OBTAIN A COPY OF THE APPROVED COUNTER PERMIT OR GENERAL CONSTRUCTION PERMIT (GCP) FROM THE CONSULTANT AND HAS BEEN NOTIFIED BY SAWS CONSTRUCTION INSPECTION DIVISION TO PROCEED WITH THE WORK AND HAS ARRANGED A MEETING WITH THE INSPECTOR AND CONSULTANT FOR THE WORK REQUIREMENTS. WORK COMPLETED BY THE CONTRACTOR WITHOUT AN APPROVED COUNTER PERMIT AND/OR A GCP WILL BE SUBJECT TO REMOVAL AND REPLACEMENT AT THE EXPENSE OF THE CONTRACTORS AND/OR THE DEVELOPER.

3. THE CONTRACTOR SHALL OBTAIN THE SAWS STANDARD DETAILS FROM THE SAWS WEBSITE, HTTP://WWW.SAWS.ORG/BUSINESS_CENTER/SPECS. UNLESS OTHERWISE NOTED WITHIN THE DESIGN PLANS.

4. THE CONTRACTOR IS TO MAKE ARRANGEMENTS WITH THE SAWS CONSTRUCTION (210) 233-2973, ON NOTIFICATION PROCEDURES THAT WILL BE USED TO NOTIFY AFFECTED HOME RESIDENTS AND/OR PROPERTY OWNERS 48 HOURS PRIOR TO BEGINNING ANY WORK.

5. LOCATION AND DEPTH OF EXISTING UTILITIES AND SERVICE LATERALS SHOWN ON THE PLANS ARE UNDERSTOOD TO BE APPROXIMATE. ACTUAL LOCATIONS AND DEPTHS MUST BE FIELD VERIFIED BY THE CONTRACTOR AT LEAST 1 WEEK PRIOR TO CONSTRUCTION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE UTILITY SERVICE LINES AS REQUIRED FOR CONSTRUCTION AND TO PROTECT THEM DURING CONSTRUCTION AT NO COST TO SAWS.

6. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF UNDERGROUND UTILITIES AND DRAINAGE STRUCTURES AT LEAST 1-2 WEEKS PRIOR TO CONSTRUCTION WHETHER SHOWN ON PLANS OR NOT. PLEASE ALLOW UP TO 7 BUSINESS DAYS FOR LOCATES. REQUESTING MARKERS LOCATION MARKERS ON SAWS FACILITIES. THE FOLLOWING CONTACT INFORMATION ARE SUPPLIED FOR VERIFICATION PURPOSES:

- SAWS UTILITY LOCATES: HTTP://WWW.SAWS.ORG/SERVICE/LOCATES
- COSA DRAINAGE (210) 207-0724 OR (210) 207-6026
- COSA TRAFFIC SIGNAL OPERATIONS (210) 206-8480
- COSA TRAFFIC SIGNAL DAMAGES (210) 207-3951
- TEXAS STATE WIDE ONE CALL LOCATOR 1-800-545-6005 OR 811

7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING EXISTING FENCES, CURBS, STREETS, DRIVEWAYS, SIDEWALKS, LANDSCAPING AND STRUCTURES TO ITS ORIGINAL OR BETTER CONDITION IF DAMAGES ARE MADE AS A RESULT OF THE PROJECT'S CONSTRUCTION.

8. ALL WORK IN TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT) AND/OR BEXAR COUNTY RIGHT-OF-WAY SHALL BE DONE IN ACCORDANCE WITH RESPECTIVE CONSTRUCTION SPECIFICATIONS AND PERMIT REQUIREMENTS.

9. THE CONTRACTOR SHALL COMPLY WITH CITY OF SAN ANTONIO OR OTHER GOVERNING MUNICIPALITY'S TREE ORDINANCES WHEN EXCAVATING NEAR TREES.

10. THE CONTRACTOR SHALL NOT PLACE ANY WASTE MATERIALS IN THE 100-YEAR FLOOD PLAIN WITHOUT FIRST OBTAINING AN APPROVED FLOOD PLAIN PERMIT.

HOLIDAY WORK: CONTRACTORS WILL NOT BE ALLOWED TO PERFORM SAWS WORK ON SAWS RECOGNIZED HOLIDAYS. REQUEST SHOULD BE SENT TO CONSTWORKREQ@SAWS.ORG.

WEEKEND WORK: CONTRACTORS ARE REQUIRED TO NOTIFY THE SAWS INSPECTION CONSTRUCTION DEPARTMENT 48 HOURS IN ADVANCE TO REQUEST WEEKEND WORK. REQUEST SHOULD BE SENT TO CONSTWORKREQ@SAWS.ORG.

11. ANY AND ALL SAWS UTILITY WORK INSTALLED WITHOUT HOLIDAY/WEEKEND APPROVAL WILL BE SUBJECT TO BE UNCOVERED FOR PROPER INSPECTION.

12. COMPACTION NOTE (ITEM 804): THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING THE COMPACTION REQUIREMENTS ON ALL TRENCH BACKFILL AND FOR PAYING FOR THE TESTS PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED, OR AS INDICATED BY THE SAWS INSPECTOR AND/OR THE TEST ADMINISTRATOR, PER EACH 12-INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. THIS PROJECT WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

13. A COPY OF ALL TESTING REPORTS SHALL BE FORWARDED TO SAWS CONSTRUCTION INSPECTION DIVISION.

SAWS WATER NOTES

1. PRIOR TO TIE-INS, ANY SHUTDOWNS OF EXISTING MAINS OF ANY SIZE MUST BE COORDINATED WITH THE SAWS CONSTRUCTION INSPECTION DIVISION AT LEAST ONE WEEK IN ADVANCE OF THE SHUTDOWN. THE CONTRACTOR MUST ALSO PROVIDE A SEQUENCE OF WORK AS RELATED TO THE TIE-INS. THIS IS AT NO ADDITIONAL COST TO SAWS OR THE PROJECT AND IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO SEQUENCE THE WORK ACCORDINGLY.

- FOR WATER MAINS 12" OR HIGHER: SAWS EMERGENCY OPERATIONS CENTER (210) 233-2014

2. ASBESTOS CEMENT (AC) PIPE, ALSO KNOWN AS TRANSITE PIPE WHICH IS KNOWN TO CONTAIN ASBESTOS-CONTAINING MATERIAL (ACM), MAY BE LOCATED WITHIN THE PROJECT LIMITS. SPECIAL WASTE MANAGEMENT PROCEDURES AND HEALTH AND SAFETY REQUIREMENTS WILL BE APPLICABLE WHEN REMOVAL AND/OR DISTURBANCE OF THIS PIPE OCCURS. SUCH WORK IS TO BE MADE UNDER SPECIAL SPECIFICATION ITEM NO. 3000, "SPECIAL SPECIFICATION FOR HANDLING ASBESTOS CEMENT PIPE".

3. VALVE REMOVAL: WHERE THE CONTRACTOR IS TO ABANDON A WATER MAIN, THE CONTROL VALVE LOCATED ON THE ABANDONING BRANCH WILL BE REMOVED AND REPLACED WITH A CAP/PLUG. (NSP)

4. SUITABLE ANCHORAGE/THRUST BLOCKING OR JOINT RESTRAINT SHALL BE PROVIDED AT ALL OF THE FOLLOWING MAIN LOCATIONS: DEAD ENDS, PLUGS, CAPS, TEES, CROSSES, VALVES, AND BENDS, IN ACCORDANCE WITH THE STANDARD DRAWINGS DD-839 SERIES AND ITEM NO. 839, IN THE SAWS STANDARD SPECIFICATIONS FOR CONSTRUCTION.

5. ALL VALVES SHALL READ "OPEN RIGHT".

6. PRVS REQUIRED: CONTRACTOR TO VERIFY THAT NO PORTION OF THE TRACT IS BELOW GROUND ELEVATION OF 920 FEET WHERE THE STATIC PRESSURE WILL NORMALLY EXCEED 80 PSI. AT ALL SUCH LOCATIONS WHERE THE GROUND LEVEL IS BELOW 920 FEET, THE DEVELOPER OR BUILDER SHALL INSTALL AT EACH LOT, ON THE CUSTOMER'S SIDE OF THE METER, AN APPROVED TYPE PRESSURE REGULATOR IN CONFORMANCE WITH THE PLUMBING CODE OF THE CITY OF SAN ANTONIO. NO DUAL SERVICES ALLOWED FOR ANY LOT(S) IF *PRV IS/ARE REQUIRED FOR SUCH LOT(S), ONLY SINGLE SERVICE CONNECTIONS SHALL BE ALLOWED. *NOTE: A PRESSURE REGULATOR IS ALSO KNOWN AS A PRESSURE REDUCING VALVE (PRV).

7. PIPE DISINFECTION WITH DRY HTH FOR PROJECTS LESS THAN 800 LINEAR FEET. (ITEM NO. 847.3): MAINS SHALL BE DISINFECTED WITH DRY HTH WHERE SHOWN IN THE CONTRACT DOCUMENTS OR AS DIRECTED BY THE INSPECTOR, AND SHALL NOT EXCEED A TOTAL LENGTH OF 800 FEET. THIS METHOD OF DISINFECTION WILL ALSO BE FOLLOWED FOR MAIN REPAIRS. THE CONTRACTOR SHALL UTILIZE ALL APPROPRIATE SAFETY MEASURE TO PROTECT HIS PERSONNEL DURING DISINFECTION OPERATIONS.

8. BACKFLOW PREVENTION DEVICES:

- ALL IRRIGATION SERVICES WITHIN RESIDENTIAL AREAS ARE REQUIRED TO HAVE BACKFLOW PREVENTION DEVICES.
- ALL COMMERCIAL BACKFLOW PREVENTION DEVICES MUST BE APPROVED BY SAWS PRIOR TO INSTALLATION.

9. FINAL CONNECTION TO THE EXISTING WATER MAIN SHALL NOT BE MADE UNTIL THE WATER MAIN HAS BEEN PRESSURE TESTED, CHLORINATED, AND SAWS HAS RELEASED THE MAIN FOR TIE-IN AND USE.

10. DIVISION VALVES: DIVISION VALVES SHOWN ON PLANS OR NOT SHOWN ON PLANS BUT FOUND IN THE FIELD SHALL ONLY BE OPERATED BY SAWS DISTRIBUTION AND COLLECTION STAFF AND ONLY WITH PRIOR WRITTEN APPROVAL OF THE SAWS DIRECTOR OF PRODUCTION AND OPERATIONS AND PROPER COORDINATION WITH ALL SAWS DEPARTMENTS. CONTRACTOR SHALL PROVIDE WRITTEN NOTIFICATION TO THE INSPECTOR A MINIMUM OF TWO WEEKS IN ADVANCE TO START THE COORDINATION PROCESS AND WILL BE INFORMED BY THE INSPECTOR WHEN THE DIVISION VALVE WILL BE OPERATED BY THE SAWS DISTRIBUTION AND COLLECTION STAFF. THE DIVISION VALVE CAN ONLY BE OPERATED BY SAWS DISTRIBUTION AND COLLECTION STAFF MEMBER NOT THE INSPECTOR OR THE CONTRACTOR. OPERATION OF A DIVISION VALVE WITHOUT THE EXPRESS PRIOR WRITTEN APPROVAL OF THE SAWS DISTRIBUTION AND COLLECTION STAFF WILL CONSTITUTE A MATERIAL BREACH OF ANY WRITTEN SAWS CONTRACT OR PERMIT IN ADDITION TO SUBJECTING THE CONTRACTOR TO LIABILITY FOR ANY AND ALL FINES, FEES, OR OTHER DAMAGES, DIRECT OR CONSEQUENTIAL, THAT MAY ARISE FROM OR BE CAUSED BY THE OPERATION OF THE VALVE WITHOUT PRIOR WRITTEN PERMISSION. PLEASE BE INFORMED THAT THE APPROVAL OF THE OPERATION OR OPENING OR CLOSING OF A DIVISION VALVE CAN TAKE SEVERAL WEEKS FOR APPROVAL. DIVISION VALVES WILL ALSO HAVE A VALVE LID LABELED DIVISION VALVE AND A LOCKING MECHANISM INSTALLED WITH A KEY. THE LOCK AND KEY MECHANISM WILL BE PAID FOR BY THE CONTRACTOR BUT WILL BE INSTALLED BY SAWS DISTRIBUTION AND COLLECTION STAFF.

PROJECT WATER NOTES

1. MACHINE CHLORINATION BY THE S.A.W.S.

2. ALL 8" AND 12" PIPE SHALL BE P.V.C. C-900 CLASS 235 DR 18.

3. ALL MAINS SHALL BE HYDROSTATICALLY TESTED BY THE CONTRACTOR, AS PROVIDED FOR IN THE SPECIAL CONDITIONS.

4. THE WATER LINES WILL BE SET FROM THE STREET HUBS BEFORE THIS CONTRACT BEGINS. STREET CUT SHEETS WILL BE SUPPLIED TO THE CONTRACTOR. THERE SHOULD BE NO ADDITIONAL STAKES REQUIRED, AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO INSPECT THE SITE AND VERIFY THAT ALL STAKES REQUIRED FOR HIS WORK ARE IN PLACE AT THE TIME THE CONSTRUCTION BEGINS. IF ANY STAKES ARE MISSING THE ENGINEER SHOULD BE NOTIFIED IMMEDIATELY. AFTER CONSTRUCTION BEGINS, ALL CONSTRUCTION STAKES, MARKS, ETC., SHALL BE CAREFULLY PRESERVED BY THE CONTRACTOR, AND IN CASE OF DESTRUCTION OR REMOVAL BY THE CONTRACTOR, HIS EMPLOYEE OR ANY OTHER MEANS, SUCH STAKES, MARKS, ETC., SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

5. THE CONTRACTOR SHALL FURNISH THE ENGINEER WITH ALL THE FINAL MEASUREMENTS, TAPS AND LENGTH OF SERVICE CONNECTIONS.

6. THE LOT CORNERS WILL BE SET BY THE ENGINEER FOR INSTALLATION OF ALL WATER SERVICES. THESE LOT CORNERS SHALL BE CAREFULLY PRESERVED BY THE CONTRACTOR SO THE METER BOXES CAN BE SET IN PHASE II. ANY LOT CORNER DESTROYED OR REMOVED BY THE CONTRACTOR, HIS EMPLOYEES, OR BY ANY OTHER MEANS SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

7. STREETS WILL HAVE BEEN EXCAVATED DOWN TO SUBGRADE AND THE PARKWAY WILL BE CUT DOWN TO TOP OF CURB BY THE STREET CONTRACTOR, PRIOR TO CONSTRUCTION OF THE WATER MAINS. IT WILL BE THE UTILITY CONTRACTOR'S RESPONSIBILITY TO PROVIDE A PAD FOR HIS EQUIPMENT.

8. WATER METER BOXES IF APPLICABLE SHALL BE INSTALLED NINE FEET FROM FACE OF CURB TO CENTER OF THE METER BOX.

9. ALL GARBAGE OR SPOIL MATERIAL FROM THIS WORK SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR, AT HIS EXPENSE.

10. FINAL CONNECTION TO THE EXISTING WATER MAIN SHALL NOT BE MADE UNTIL WATER MAIN HAS BEEN PRESSURE TESTED, CHLORINATED AND THE S.A.W.S. RELEASES THE MAIN FOR TIE-IN AND USE.

11. UNIT PRICE BID FOR "STANDARD FIRE HYDRANT ASSEMBLY" SHALL INCLUDE FIRE HYDRANT, 6-INCH GATE VALVE AND 6-INCH VALVE BOX COMPLETE, ANCHOR BEND, AND ALL 6-INCH DI PIPE REQUIRED (DI PIPE REQUIRED SHALL INCLUDE ALL PIPE FROM THE TEE ON THE MAIN LINE TO THE FIRE HYDRANT).

12. WHEN SEWER LINES ARE INSTALLED IN THE VICINITY OF WATER MAINS, SUCH INSTALLATION SHALL BE IN STRICT ACCORDANCE WITH THE TEXAS NATURAL RESOURCE CONSERVATION COMMISSION "RULES AND REGULATIONS FOR PUBLIC WATER SYSTEMS" (1988 OR ANY REVISIONS THERETO).

13. A CLEAR SPACE SHALL BE PROVIDED AROUND ALL FIRE HYDRANTS. THIS AREA SHOULD HAVE A MINIMUM DIAMETER OF 3.0' AND BE CLEAN OF VERTICAL OBSTRUCTIONS, VALVES, AND METER BOXES.

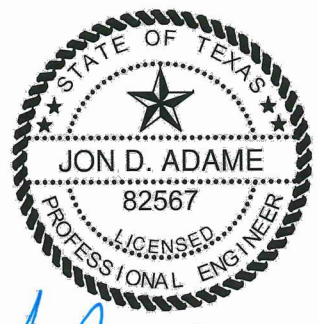
14. SAWS REQUIRES LEAD FREE (< 0.25%) FIRE HYDRANTS.

15. UNLESS OTHERWISE NOTED ALL SERVICES SHALL BE 3/4" WITH 5/8" METER.

WATER (SAWS PRESSURE ZONE 8)

DEVELOPER'S NAME: <u>INVEST 5S, LLC</u>	
ADDRESS: <u>22202 CIELO VISTA</u>	
CITY: <u>SAN ANTONIO</u>	STATE: <u>TX</u> ZIP: <u>78255</u>
PHONE# <u>(540) 305-4056</u>	FAX# <u>084-822</u>
SAWS BLOCK MAP# <u>094-624</u> TOTAL EDU'S <u>38</u> TOTAL ACREAGE <u>8.443</u>	
TOTAL LINEAR FOOTAGE OF PIPE: <u>8' 12"</u> <u>383</u> PLAT NO. <u>CP202506</u>	
NUMBER OF LOTS <u>35</u> SAWS JOB NO. <u>25-1039</u>	

DATE									
NO.									
REVISION									



Jon Adame
9-4-25

**PAPE-DAWSON
ENGINEERS**

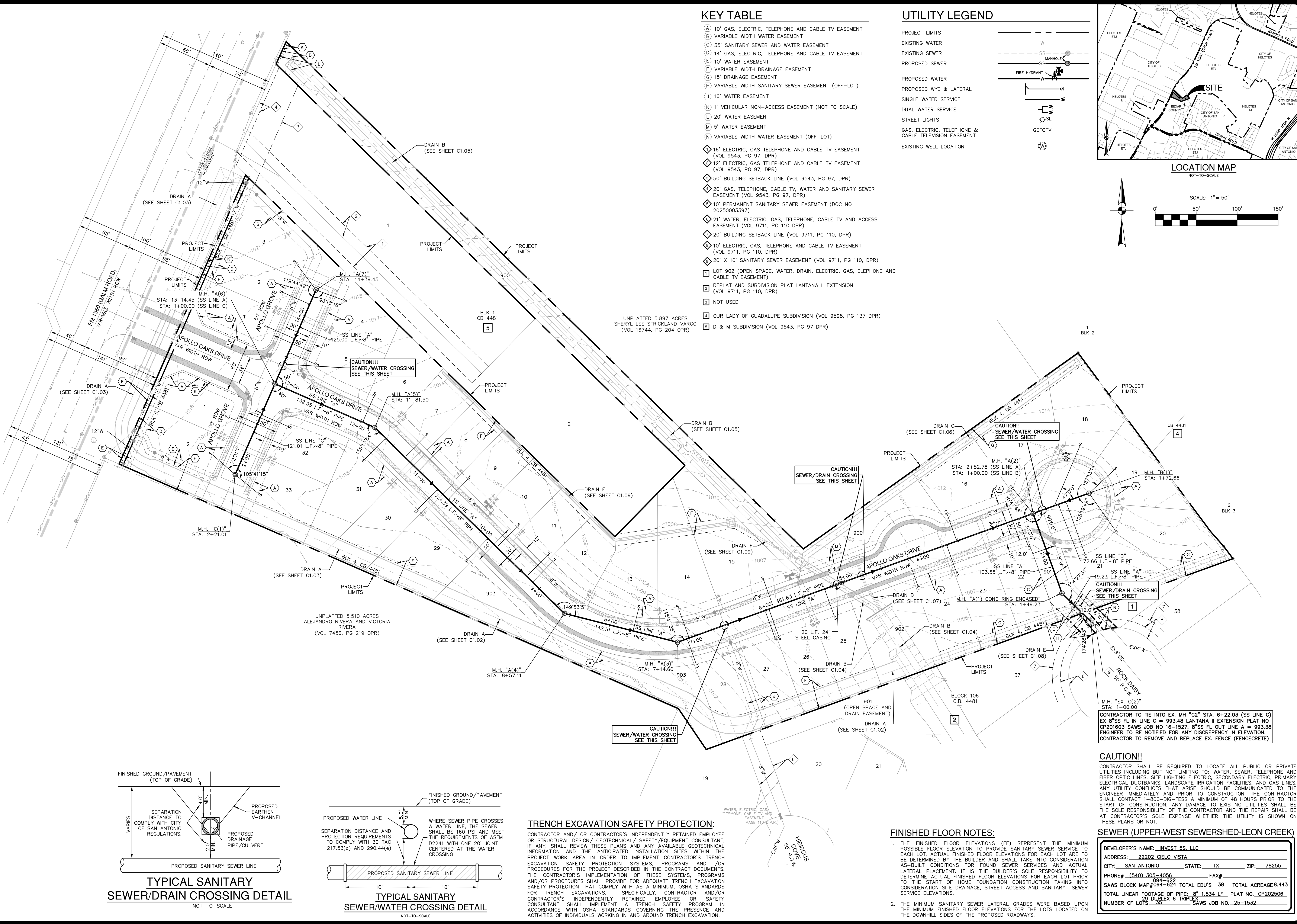
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10088600

APOLLO OAKS
BEXAR COUNTY, TEXAS

WATER DISTRIBUTION PLAN NOTES

PLAT NO.	CP202506
JOB NO.	13657-00
DATE	SEPTEMBER 2025
DESIGNER	-
CHECKED	-
DRAWN	-
SHEET	C4.11

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DATE

NO. REVISION

Jon D. Adame
9-4-25

PAPE-DAWSON ENGINEERS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10038600

APOLLO OAKS
BEXAR COUNTY, TEXAS
OVERALL SANITARY SEWER PLAN

PLAT NO. CP202506

JOB NO. 13657-00

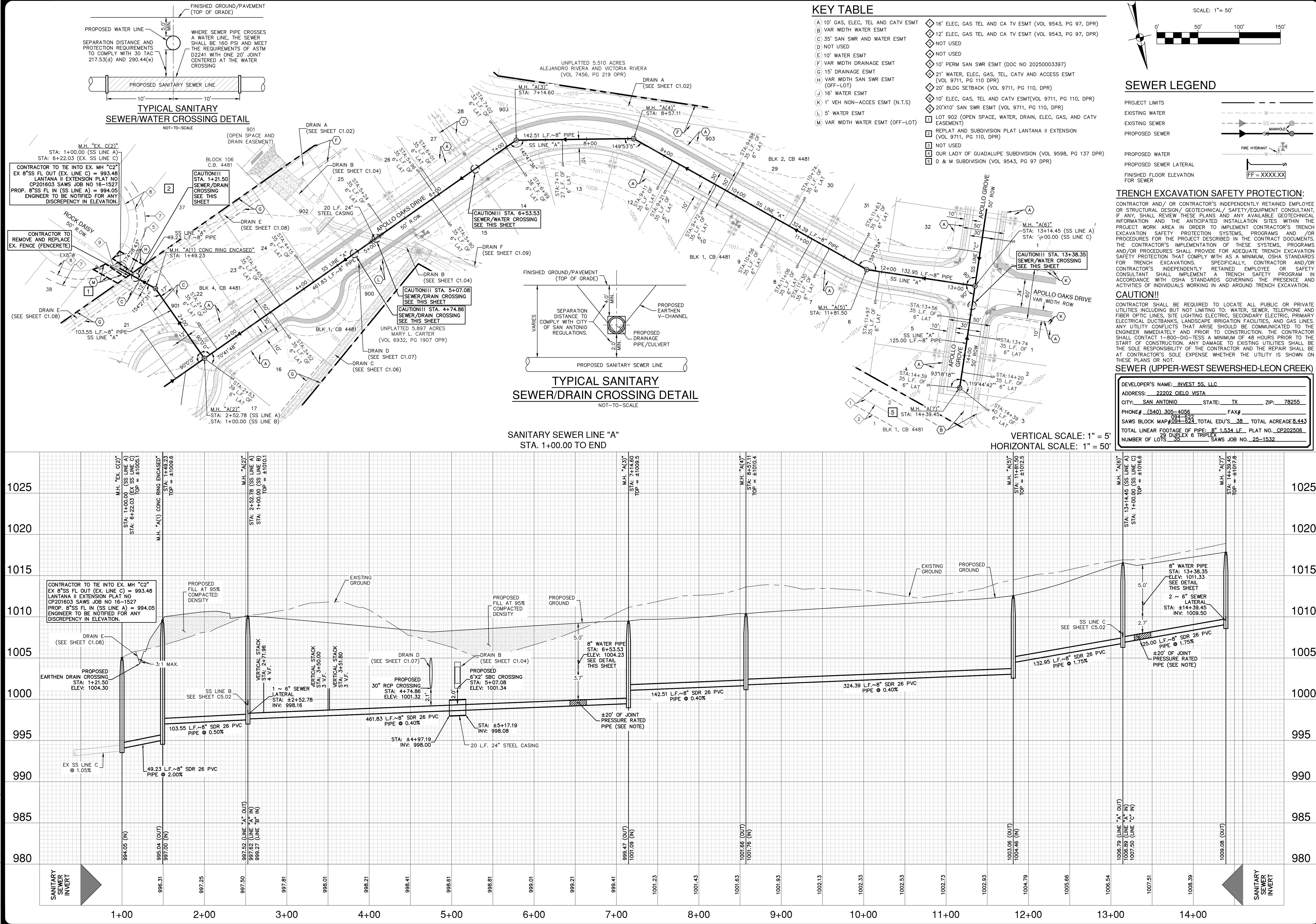
DATE SEPTEMBER 2025

DESIGNER CR

CHECKED JA DRAWN JF

SHEET C5.00

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DATE	
NO.	
REVISION	

DATE OF TEXAS PROFESSIONAL ENGINEER
JON D. ADAMS
82567
9-4-25

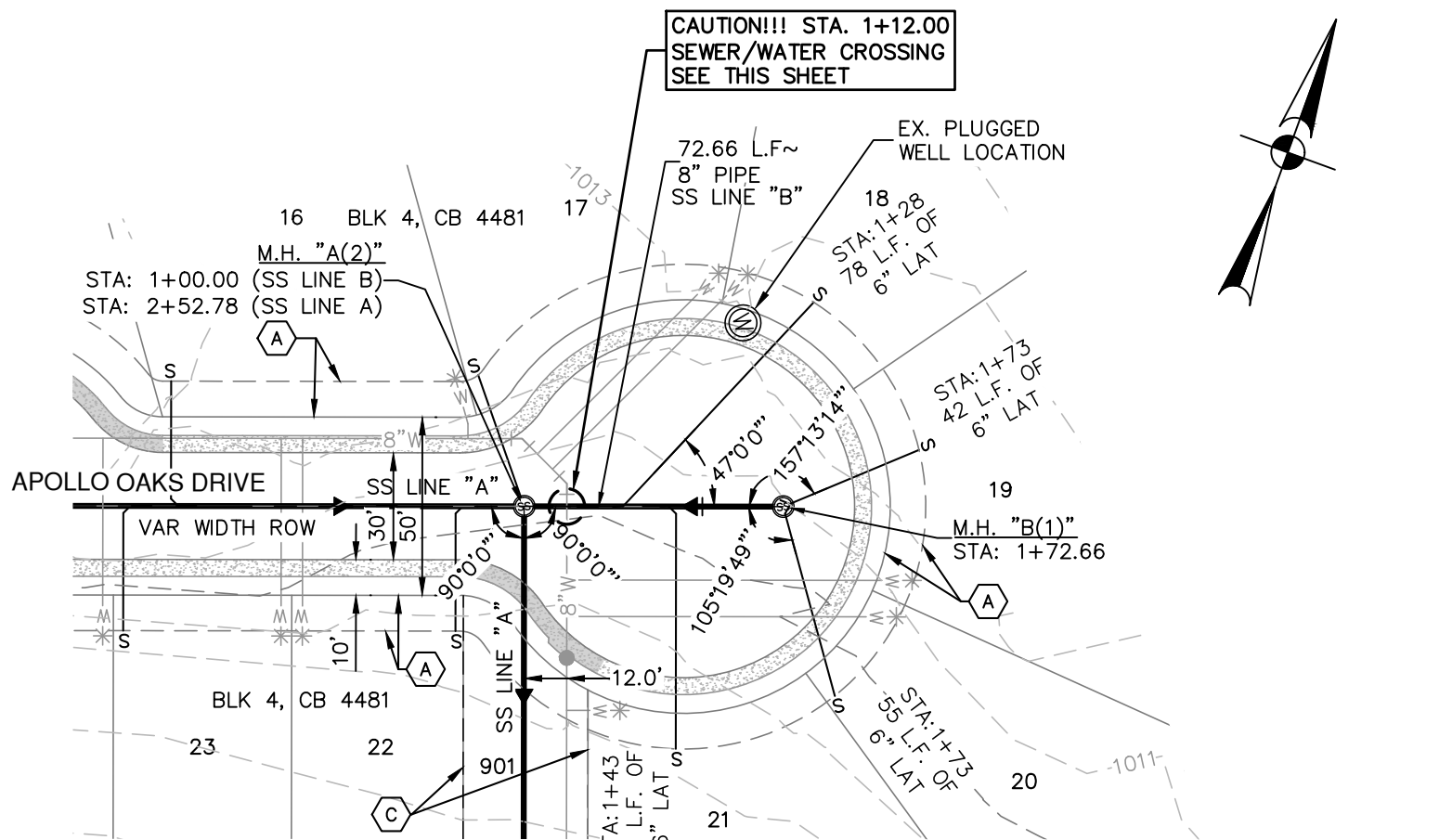
PAPE-DAWSON ENGINEERS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #1003800

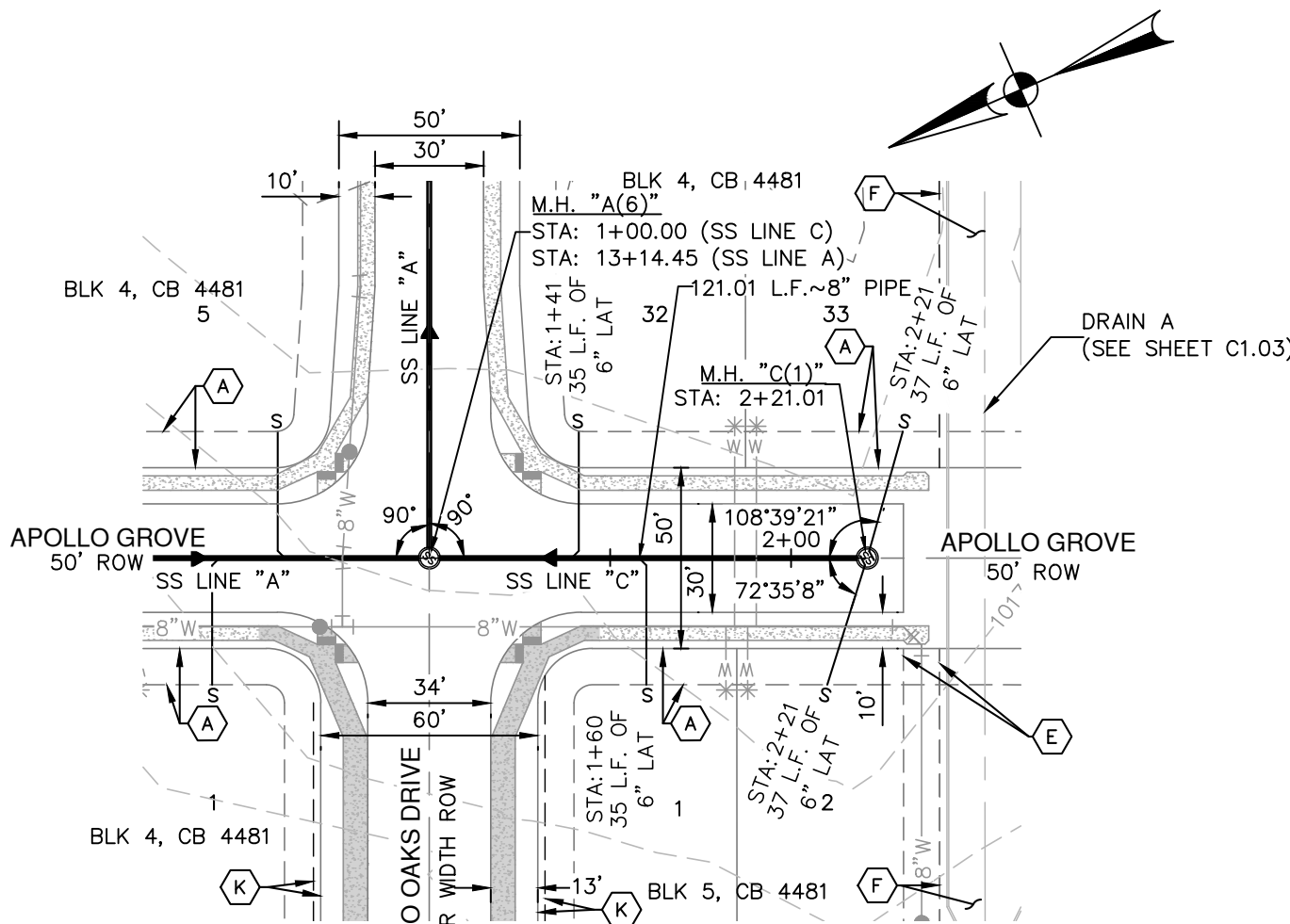
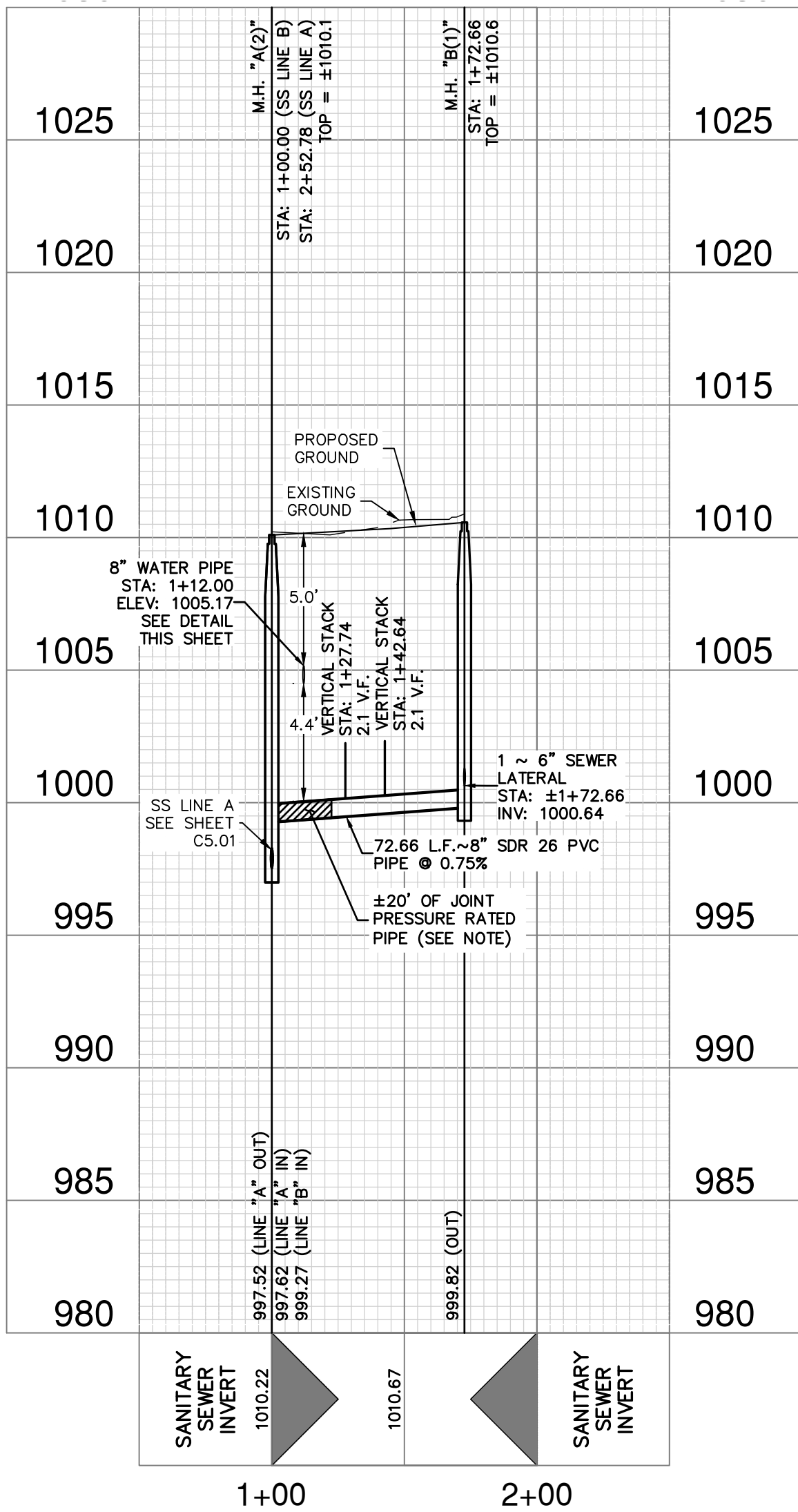
APOLLO OAKS
BEXAR COUNTY, TEXAS

SANITARY SEWERLINE A PLAN & PROFILE
STA. 1+00.00 TO END

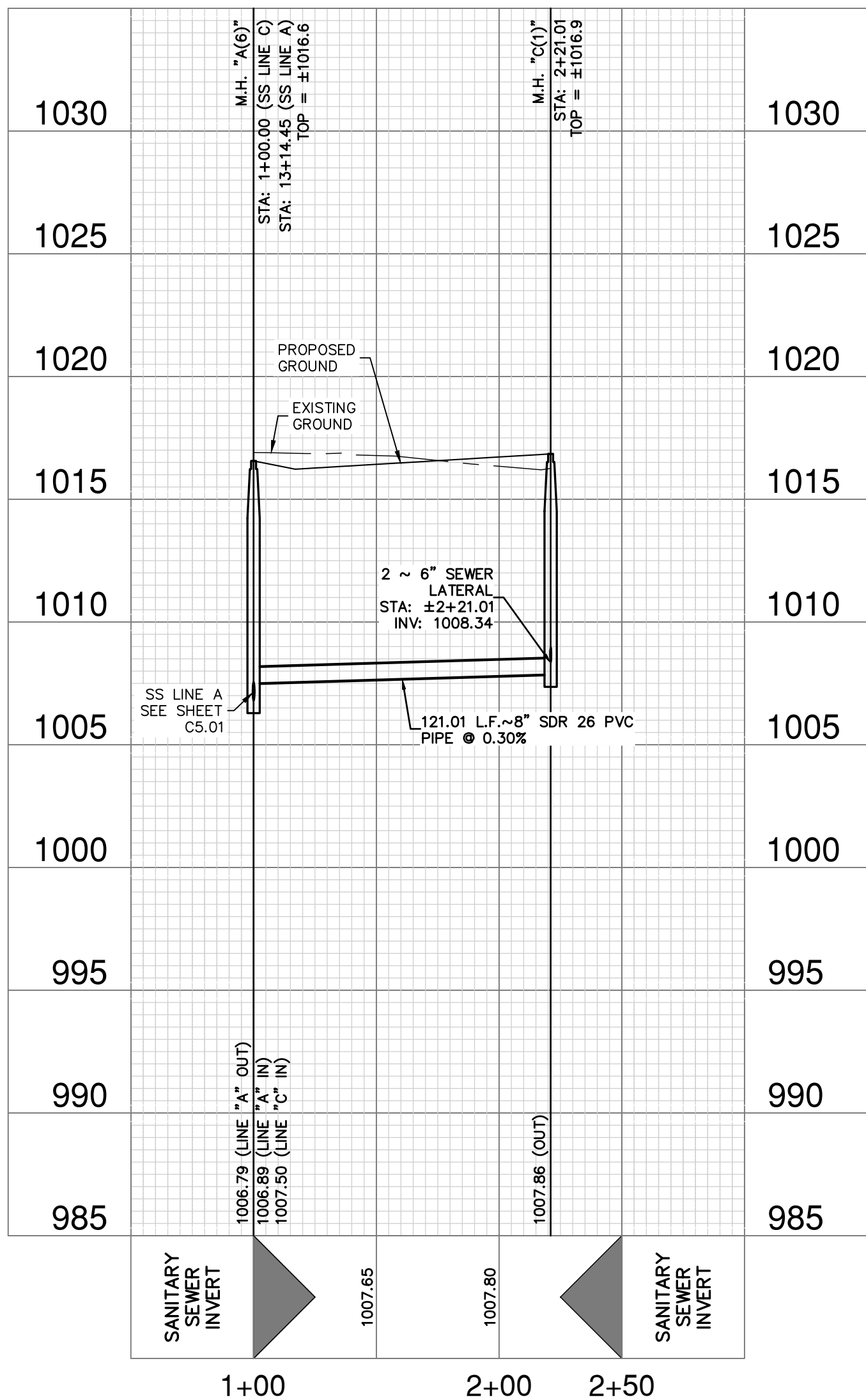
PLAT NO. CP202506
JOB NO. 13657-00
DATE SEPTEMBER 2025
DESIGNER CR
CHECKED JA DRAWN JF
SHEET C5.01



SANITARY SEWER LINE "B"
STA. 1+00.00 TO END
VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 50'



SANITARY SEWER LINE "C"
STA. 1+00.00 TO END
VERTICAL SCALE: 1" = 5'
HORIZONTAL SCALE: 1" = 50'



KEY TABLE

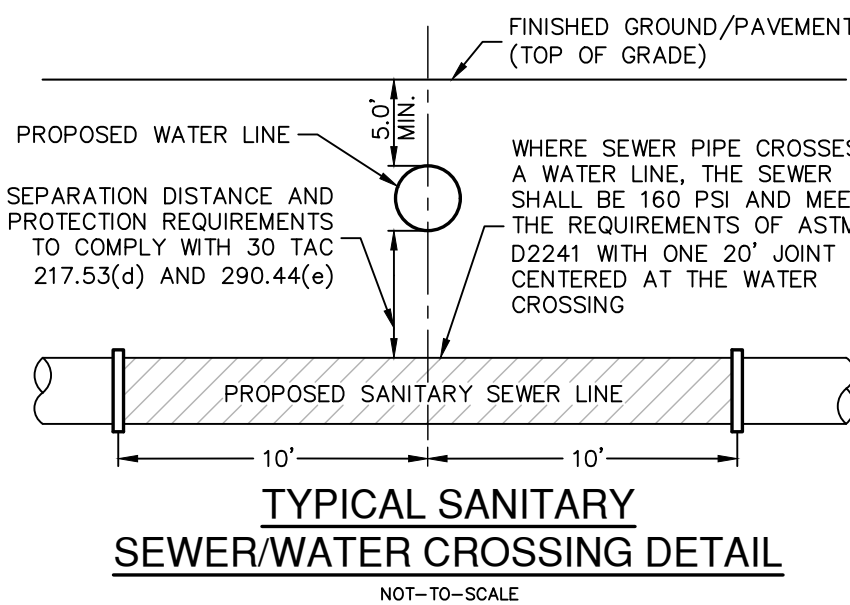
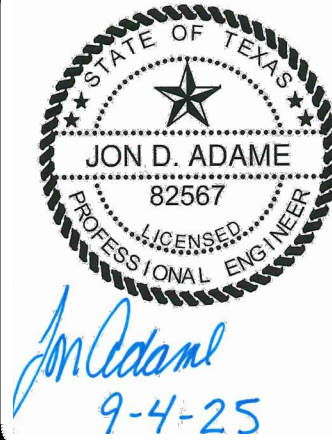
(A) 10' GAS, ELEC, TEL AND CATV ESMT	◇ 16' ELEC, GAS TEL AND CA TV ESMT (VOL 9543, PG 97, DPR)
(B) VAR WIDTH WATER ESMT	◇ 12' ELEC, GAS TEL AND CA TV ESMT (VOL 9543, PG 97, DPR)
(C) 35' SAN SWR AND WATER ESMT	◇ NOT USED
(D) NOT USED	◇ NOT USED
(E) 10' WATER ESMT	◇ 10' PERM SAN SWR ESMT (DOC NO 20250003397)
(F) VAR WIDTH DRAINAGE ESMT	◇ 21' WATER, ELEC, GAS, TEL, CATV AND ACCESS ESMT (VOL 9711, PG 110 DPR)
(G) 15' DRAINAGE ESMT	◇ 20' BLDG SETBACK (VOL 9711, PG 110, DPR)
(H) VAR WIDTH SAN SWR AND WATER ESMT (OFF-LOT)	◇ 10' ELEC, GAS, TEL AND CATV ESMT(VOL 9711, PG 110, DPR)
(J) 16' WATER ESMT	◇ 20'X10' SAN SWR ESMT (VOL 9711, PG 110, DPR)
(K) 1' VEH NON-ACCES ESMT (N.T.S)	□ REPLAT AND SUBDIVISION PLAT LANTANA II EXTENSION (VOL 9711, PG 110, DPR)
	□ NOT USED
	□ OUR LADY OF GUADALUPE SUBDIVISION (VOL 9598, PG 137 DPR)
	□ D & M SUBDIVISION (VOL 9543, PG 97 DPR)

SCALE: 1"= 50'



SEWER LEGEND

PROJECT LIMITS	---
EXISTING WATER	---
EXISTING SEWER	---
PROPOSED SEWER	---
PROPOSED WATER	---
PROPOSED SEWER LATERAL	---
FINISHED FLOOR ELEVATION FOR SEWER	FF = XXXX.XX



CAUTION!!

CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITING TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCTBANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. ANY UTILITY CONFLICTS THAT ARISE SHOULD BE COMMUNICATED TO THE ENGINEER IMMEDIATELY AND PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL CONTACT 1-800-DIG-TESS A MINIMUM OF 48 HOURS PRIOR TO THE START OF CONSTRUCTION. ANY DAMAGE TO EXISTING UTILITIES SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND THE REPAIR SHALL BE AT CONTRACTOR'S SOLE EXPENSE WHETHER THE UTILITY IS SHOWN ON THESE PLANS OR NOT.

TRENCH EXCAVATION SAFETY PROTECTION:

CONTRACTOR AND/ OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/ GEOTECHNICAL/ SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S TRENCH EXCAVATION SAFETY PROTECTION SYSTEMS, PROGRAMS AND/OR PROCEDURES FOR THE PROJECT DESCRIBED IN THE CONTRACT DOCUMENTS. THE CONTRACTOR'S IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLY WITH AS A MINIMUM, OSHA STANDARDS FOR TRENCH EXCAVATIONS. SPECIFICALLY, CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR SAFETY CONSULTANT SHALL IMPLEMENT A TRENCH SAFETY PROGRAM IN ACCORDANCE WITH OSHA STANDARDS GOVERNING THE PRESENCE AND ACTIVITIES OF INDIVIDUALS WORKING IN AND AROUND TRENCH EXCAVATION.

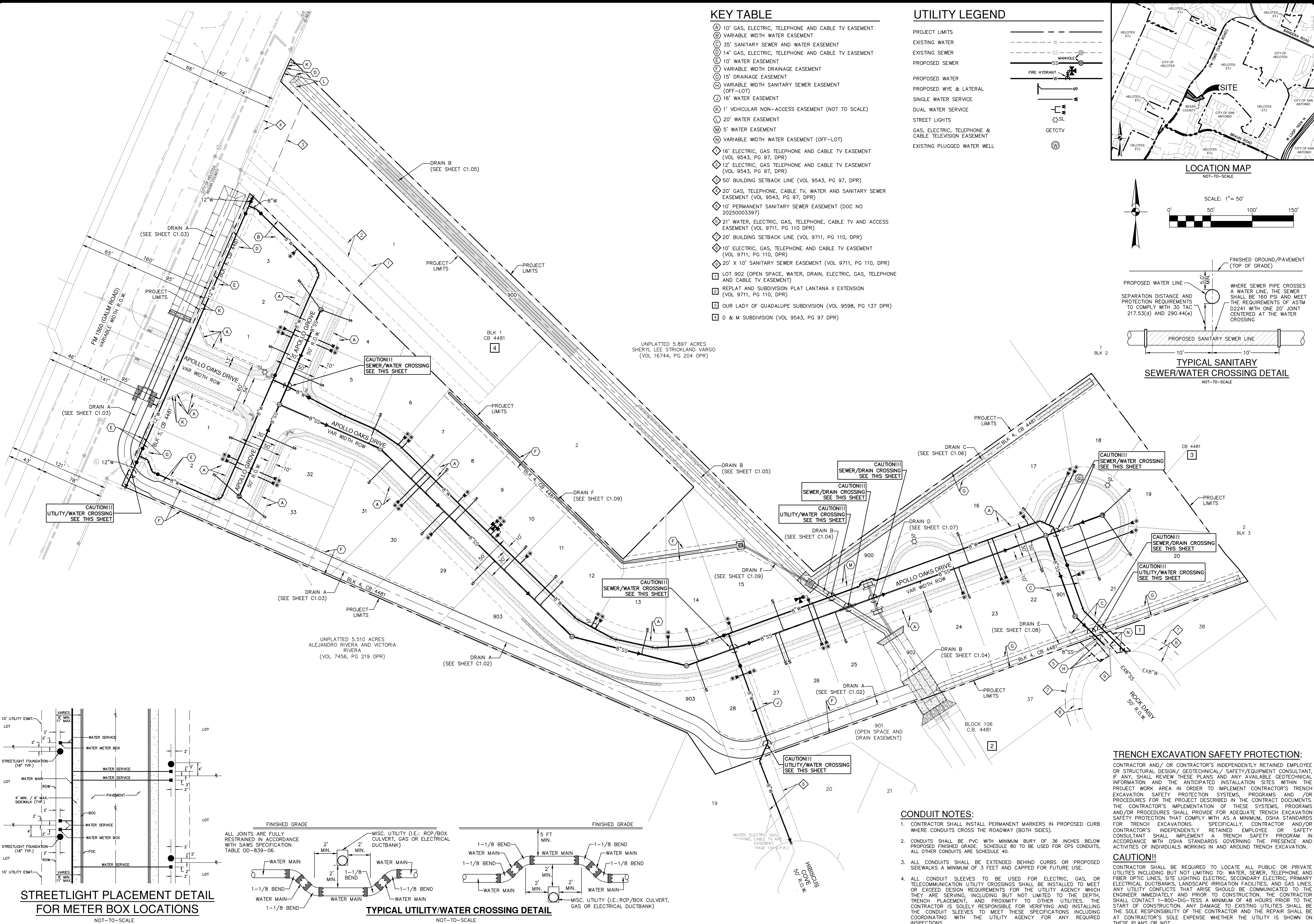
SEWER (UPPER-WEST SEWERSHED-LEON CREEK)

DEVELOPER'S NAME: INVEST 5S, LLC
ADDRESS: 22202 CIELO VISTA
CITY: SAN ANTONIO STATE: TX ZIP: 78255
PHONE# (540) 305-4056 FAX# 094-622
SAWS BLOCK MAP#094-622 TOTAL EDU'S 38 TOTAL ACREAGE 8.443
TOTAL LINEAR FOOTAGE OF PIPE: 8' 1,534 LF PLAT NO. CP202508
NUMBER OF LOTS 35 SAWS JOB NO. 25-1532

APOLLO OAKS
BEXAR COUNTY, TEXAS
SANITARY SEWER LINE B & C PLAN & PROFILE
LINE B - STA. 1+00.00 TO END
LINE C - STA. 1+00.00 TO END

PLAT NO.	CP202506
JOB NO.	13657-00
DATE	SEPTEMBER 2025
DESIGNER	CR
CHECKED	JA DRAWN
SHEET	C5.02

Date: Sep 04, 2025 3:17pm User ID: JF-6103
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DATE	NO.	REVISION
9-4-25		

PAPE-DAWSON ENGINEERS

2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10038600

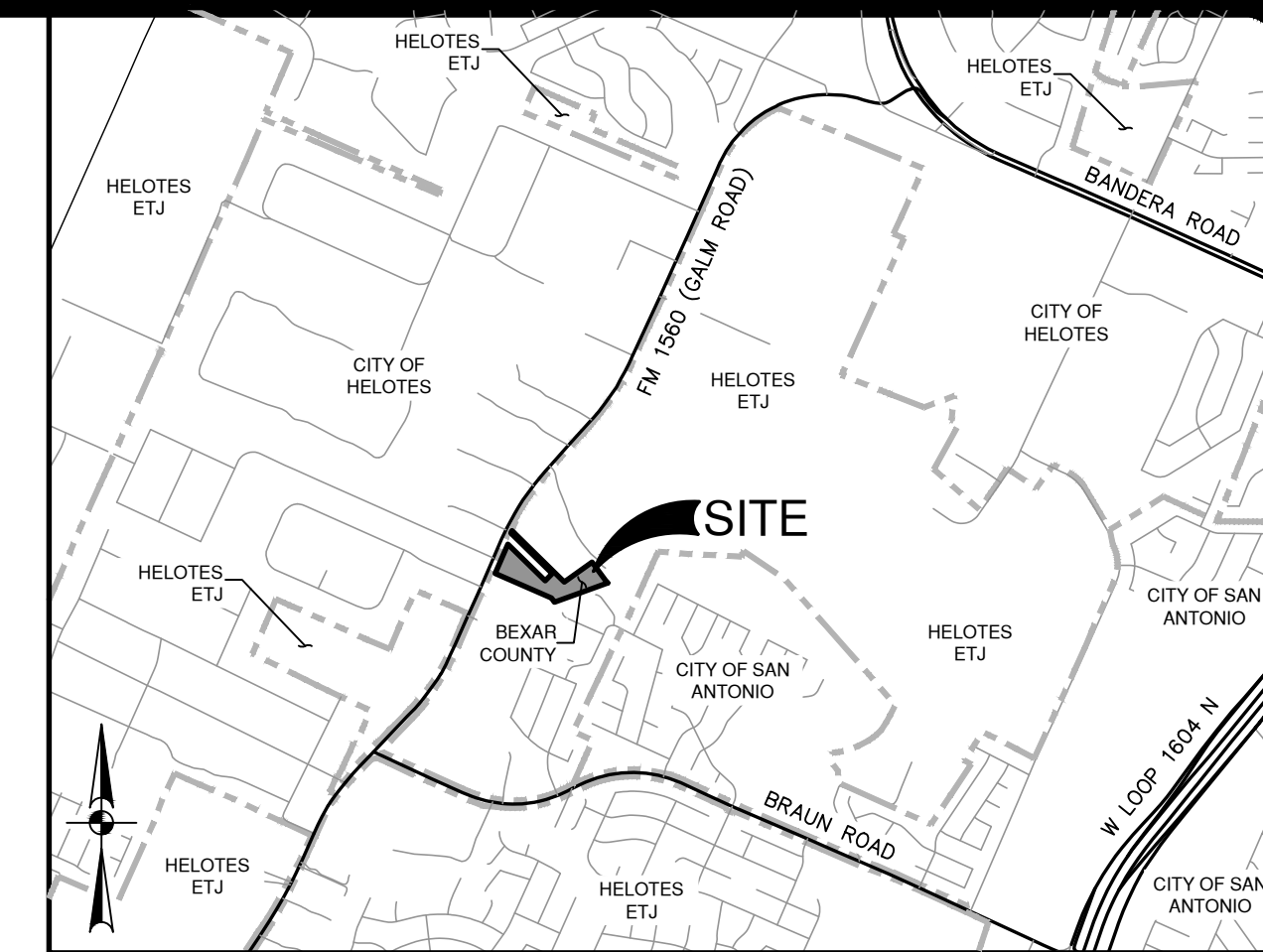
APOLLO OAKS
BEXAR COUNTY, TEXAS
OVERALL UTILITY PLAN

PLAT NO. CP202506
JOB NO. 13657-00
DATE SEPTEMBER 2025
DESIGNER CR
CHECKED JA DRAWN JF
SHEET C6.00

1. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THIS SCOPE OF WORK WHERE NOT SPECIFICALLY COVERED IN THE SPECIFICATIONS OR GEOTECHNICAL REPORT SHALL CONFORM TO ALL APPLICABLE CITY, STATE AND TxDOT STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (LATEST EDITION).
2. SITE PREPARATION, GRADING, EXCAVATION AND FILL SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT GEOTECHNICAL REPORT AND SPECIFICATIONS.
3. ALL SELECT FILL MATERIAL PROVIDED SHALL BE APPROVED BY THE GEOTECHNICAL ENGINEER PRIOR TO PLACING AND COMPACTING.
4. ALL ELEVATIONS AND PROPOSED CONTOURS SHOWN ON THIS GRADING PLAN REFLECT FINISHED GRADES. THE THICKNESS OF PAVING, BASE, GRASS, TOPSOIL, AND MULCH MUST BE SUBTRACTED TO OBTAIN SUBGRADE ELEVATIONS.
5. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY QUESTIONS THAT MAY ARISE CONCERNING THE INTENT, PLACEMENT, OR LIMITS OF DIMENSIONS OR GRADES NECESSARY FOR CONSTRUCTION OF THIS PROJECT.
6. THE CONTRACTOR SHALL VERIFY THE SUITABILITY OF ALL EXISTING AND PROPOSED SITE CONDITIONS INCLUDING GRADES AND DIMENSIONS BEFORE COMMENCEMENT OF CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES.

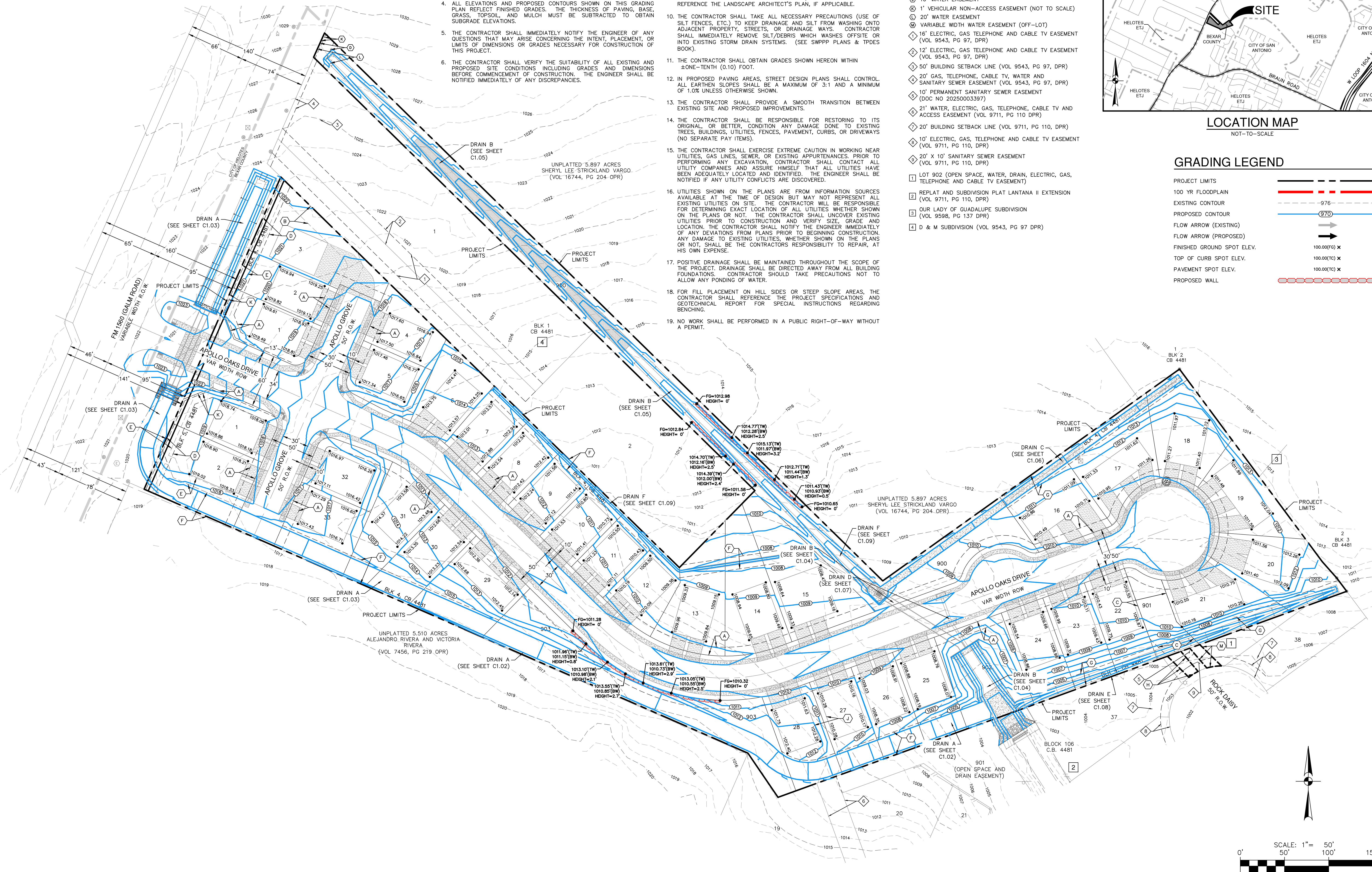
- ## KEY TABLE

- ④ 10' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT
- ⑤ VARIABLE WIDTH WATER EASEMENT
- ⑥ 35' SANITARY SEWER AND WATER EASEMENT
- ⑦ 14' GAS, ELECTRIC, TELEPHONE AND CABLE TV EASEMENT
- ⑧ 10' WATER EASEMENT
- ⑨ VARIABLE WIDTH DRAINAGE EASEMENT
- ⑩ 15' DRAINAGE EASEMENT
- ⑪ VARIABLE WIDTH SANITARY SEWER EASEMENT (OFF-LOT)
- ⑫ 16' WATER EASEMENT
- ⑬ 1' VEHICULAR NON-ACCESS EASEMENT (NOT TO SCALE)
- ⑭ 20' WATER EASEMENT
- ⑮ VARIABLE WIDTH WATER EASEMENT (OFF-LOT)
- ⑯ 16' ELECTRIC, GAS, TELEPHONE AND CABLE TV EASEMENT (VOL 9543, PG 97, DPR)
- ⑰ 12' ELECTRIC, GAS, TELEPHONE AND CABLE TV EASEMENT (VOL 9543, PG 97, DPR)
- ⑱ 50' BUILDING SETBACK LINE (VOL 9543, PG 97, DPR)
- ⑲ 20' GAS, TELEPHONE, CABLE TV, WATER AND SANITARY SEWER EASEMENT (VOL 9543, PG 97, DPR)
- ⑳ 10' PERMANENT SANITARY SEWER EASEMENT (DOC NO 20250003397)
- ㉑ 21' WATER, ELECTRIC, GAS, TELEPHONE, CABLE TV AND ACCESS EASEMENT (VOL 9711, PG 110 DPR)
- ㉒ 20' BUILDING SETBACK LINE (VOL 9711, PG 110, DPR)
- ㉓ 10' ELECTRIC, GAS, TELEPHONE AND CABLE TV EASEMENT (VOL 9711, PG 110, DPR)
- ㉔ 20' X 10' SANITARY SEWER EASEMENT (VOL 9711, PG 110, DPR)
- ㉕ LOT 902 (OPEN SPACE, WATER, DRAIN, ELECTRIC, GAS, TELEPHONE AND CABLE TV EASEMENT)
- ㉖ REPLAT AND SUBDIVISION PLAT LANTANA II EXTENSION (VOL 9711, PG 110, DPR)
- ㉗ OUR LADY OF GUADALUPE SUBDIVISION (VOL 9598, PG 137 DPR)
- ㉘ D & M SUBDIVISION (VOL 9543, PG 97 DPR)



LOCATION MAP
NOT-TO-SCALE

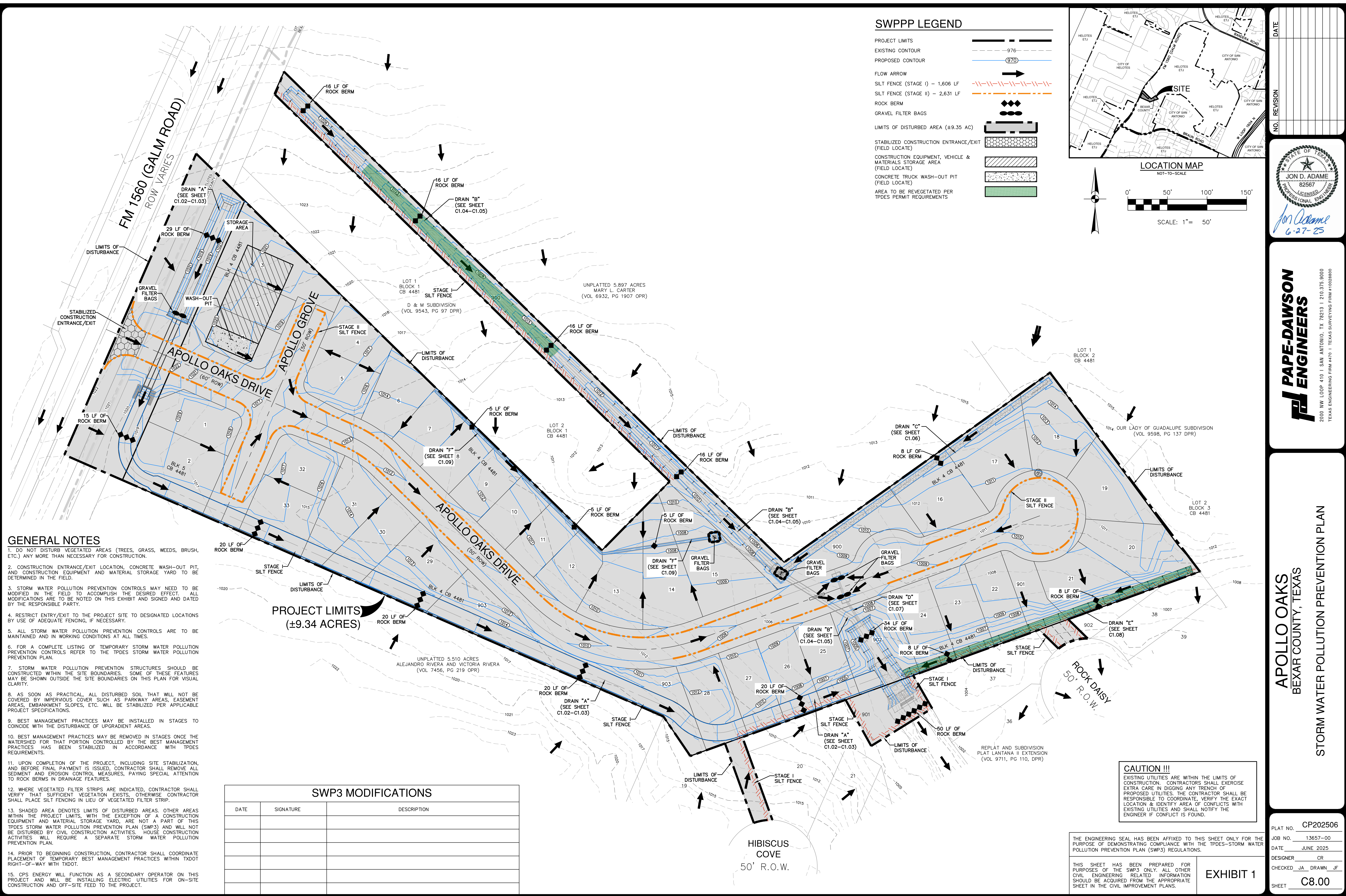
PROJECT LIMITS	
100 YR FLOODPLAIN	
EXISTING CONTOUR	
PROPOSED CONTOUR	
FLOW ARROW (EXISTING)	
FLOW ARROW (PROPOSED)	
FINISHED GROUND SPOT ELEV.	100.00(F) X
TOP OF CURB SPOT ELEV.	100.00(TC) X
PAVEMENT SPOT ELEV.	100.00(TC) X
PROPOSED WALL	

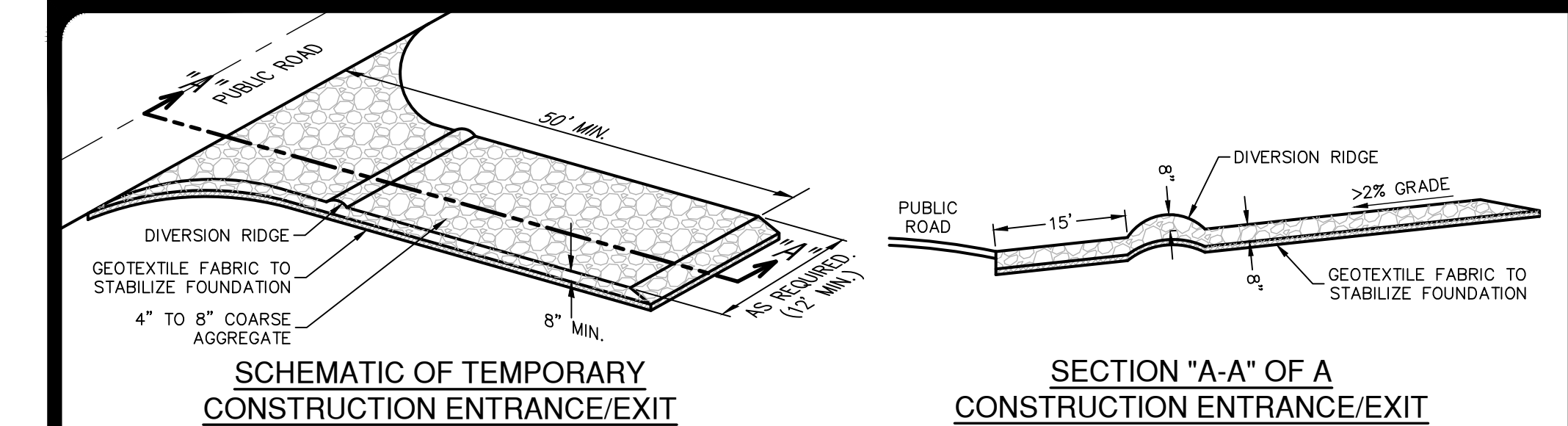


**PAPE-DAWSON
ENGINEERS**

APOLLO OAKS
BEXAR COUNTY, TEXAS
GRADING PLAN

PLAT NO. CP202506
JOB NO. 13657-00
DATE SEPTEMBER 2025
DESIGNER CB
CHECKED JA DRAWN CB
SHEET C7.00



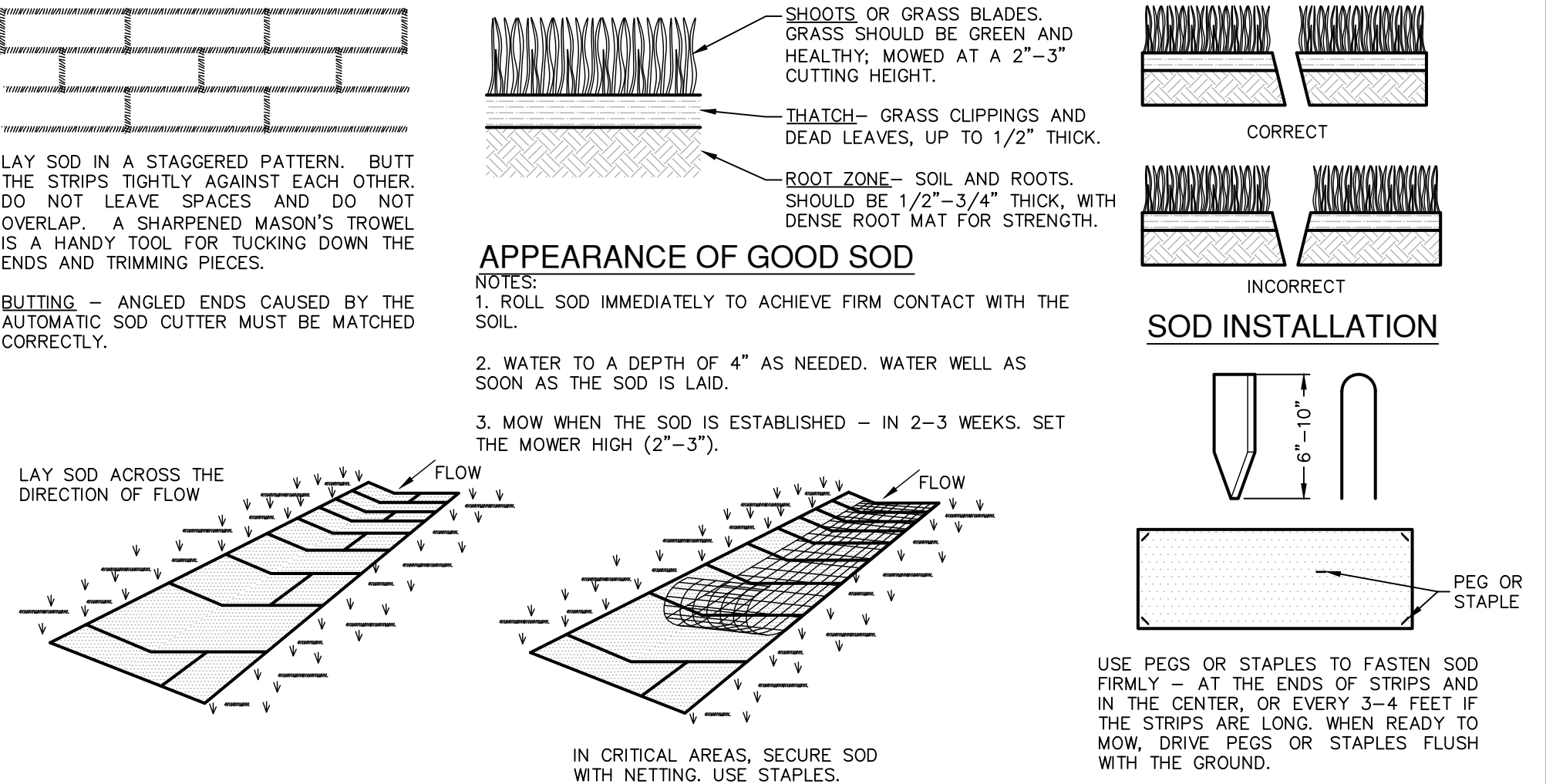


- MATERIALS**
1. THE AGGREGATE SHOULD CONSIST OF 4-INCH TO 8-INCH WASHED STONE OVER A STABLE FOUNDATION AS SPECIFIED IN THE PLAN.
 2. THE AGGREGATE SHOULD BE PLACED WITH A MINIMUM THICKNESS OF 8-INCHES.
 3. THE GEOTEXTILE FABRIC SHOULD BE DESIGNED SPECIFICALLY FOR USE AS A SOIL FILTRATION MEDIA WITH AN APPROXIMATE WEIGHT OF 6 OZ/YD², A MULLEN BURST RATING OF 140 LB/IN², AND AN EQUIVALENT OPENING SIZE GREATER THAN A NUMBER 50 SIEVE.
 4. IF A WASHING FACILITY IS REQUIRED, A LEVEL AREA WITH A MINIMUM OF 4-INCH DIAMETER WASHED STONE OR COMMERCIAL ROCK SHOULD BE INCLUDED IN THE PLANS. DIVERT WASTEWATER TO A SEDIMENT TRAP OR BASIN.

- INSTALLATION**
1. AVOID CURVES ON PUBLIC ROADS AND STEEP SLOPES. REMOVE VEGETATION AND OTHER OBJECTIONABLE MATERIAL FROM THE FOUNDATION AREA. GRADE CROWN FOUNDATION FOR POSITIVE DRAINAGE.
 2. THE MINIMUM WIDTH OF THE ENTRANCE/EXIT SHOULD BE 12 FEET OR THE FULL WIDTH OF EXIT ROADWAY, WHICHEVER IS GREATER.
 3. THE CONSTRUCTION ENTRANCE SHOULD BE AT LEAST 50 FEET LONG.
 4. IF THE SLOPE TOWARD THE ROAD EXCEEDS 2%, CONSTRUCT A RIDGE, 6-INCHES TO 8-INCHES HIGH WITH 3:1 (H:V) SIDE SLOPES, ACROSS THE FOUNDATION APPROXIMATELY 15 FEET FROM THE ENTRANCE TO DIVERT RUNOFF AWAY FROM THE PUBLIC ROAD.
 5. PLACE GEOTEXTILE FABRIC AND GRADE FOUNDATION TO IMPROVE STABILITY, ESPECIALLY WHERE WET CONDITIONS ARE ANTICIPATED.
 6. PLACE STONE TO DIMENSIONS AND GRADE SHOWN ON PLANS. LEAVE SURFACE SMOOTH AND SLOPE FOR DRAINAGE.
 7. DIVERT ALL SURFACE RUNOFF AND DRAINAGE FROM THE STONE PAD TO A SEDIMENT TRAP OR BASIN.
 8. INSTALL PIPE UNDER PAD AS NEEDED TO MAINTAIN PROPER PUBLIC ROAD DRAINAGE.

STABILIZED CONSTRUCTION ENTRANCE/EXIT DETAIL

NOT-TO-SCALE



- MATERIALS**
1. SOD SHOULD BE MACHINE CUT AT A UNIFORM SOIL THICKNESS OF 3/4" INCH (± 1/4" INCH) AT THE TIME OF CUTTING. THIS THICKNESS SHOULD EXCLUDE SHOOT GROWTH AND THATCH.
 2. PIECES OF SOD SHOULD BE CUT TO THE SUPPLIER'S STANDARD WIDTH AND LENGTH, WITH A MAXIMUM ALLOWABLE DEVIATION IN ANY DIMENSION OF 5% TORN OR UNEVEN PADS SHOULD NOT BE ACCEPTABLE.
 3. STANDARD SIZE SECTIONS OF SOD SHOULD BE STRONG ENOUGH TO SUPPORT THEIR OWN WEIGHT AND RETAIN THEIR SIZE AND SHAPE WHEN SUSPENDED FROM A FIRM GRASP ON ONE END OF THE SECTION.
 4. SOD SHOULD BE HARVESTED, DELIVERED, AND INSTALLED WITHIN A PERIOD OF 36 HOURS.

SITE PREPARATION

1. PRIOR TO SOD PREPARATION, AREAS TO BE SODDED SHOULD BE BROUGHT TO FINAL GRADE IN ACCORDANCE WITH THE APPROVED PLAN.
2. THE SURFACE SHOULD BE CLEARED OF ALL TRASH, DEBRIS AND OF ALL ROOTS, BRUSH, WIRE, GRADE STAKES AND OTHER OBJECTS THAT WOULD INTERFERE WITH PLANTING, FERTILIZING OR MAINTENANCE OPERATIONS.
3. FERTILIZE ACCORDING TO SOIL TESTS. FERTILIZER NEEDS CAN BE DETERMINED BY A SOIL TESTING LABORATORY OR REGIONAL RECOMMENDATIONS CAN BE MADE BY COUNTY AGRICULTURAL EXTENSION AGENTS. FERTILIZER SHOULD BE WORKED INTO THE SOIL TO A DEPTH OF 3 INCHES WITH A DISC, SPRINGTOOTH HARROW OR OTHER SUITABLE EQUIPMENT ON SLOPING LAND, THE FINAL HARROWING OR DISCING OPERATION SHOULD BE ON THE CONTOUR.

INSTALLATION IN CHANNELS

1. SOD STRIPS IN WATERWAYS SHOULD BE LAID PERPENDICULAR TO THE DIRECTION OF FLOW. CARE SHOULD BE TAKEN TO BUTT ENDS OF STRIPS TIGHTLY (SEE FIGURE ABOVE).
2. AFTER ROLLING OR TAMPING, SOD SHOULD BE PEGGED OR STAPLED TO RESIST WASHOUT DURING THE ESTABLISHMENT PERIOD. MESH OR OTHER NETTING MAY BE PEGGED OVER THE SOD FOR EXTRA PROTECTION IN CRITICAL AREAS.

SOD INSTALLATION DETAIL

NOT-TO-SCALE

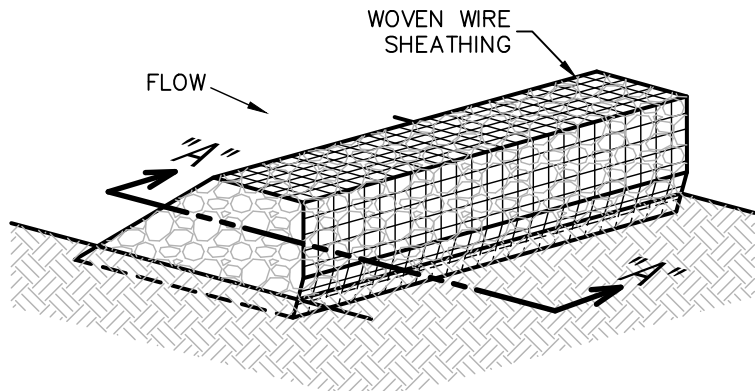
COMMON TROUBLE POINTS

1. INADEQUATE RUNOFF CONTROL-SEDIMENT WASHES ONTO PUBLIC ROAD.
2. STONE TOO SMALL OR GEOTEXTILE FABRIC ABSENT, RESULTS IN MUDDY CONDITION AS STONE IS PRESSED INTO SOIL.
3. PAD TOO SHORT FOR HEAVY CONSTRUCTION TRAFFIC-EXTEND PAD BEYOND THE MINIMUM 50-FOOT LENGTH AS NECESSARY.
4. PAD NOT FLARED SUFFICIENTLY AT ROAD SURFACE, RESULTS IN MUD BEING TRACKED ON TO ROAD AND POSSIBLE DAMAGE TO ROAD.

INSPECTION AND MAINTENANCE GUIDELINES

1. THE ENTRANCE SHOULD BE MAINTAINED IN A CONDITION, WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY SHOULD BE REMOVED IMMEDIATELY BY CONTRACTOR.
3. WHEN NECESSARY, WHEELS SHOULD BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
4. WHEN WASHING IS REQUIRED, IT SHOULD BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.
5. ALL SEDIMENT SHOULD BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATER COURSE BY USING APPROVED METHODS.

ISOMETRIC PLAN VIEW



ROCK BERMS

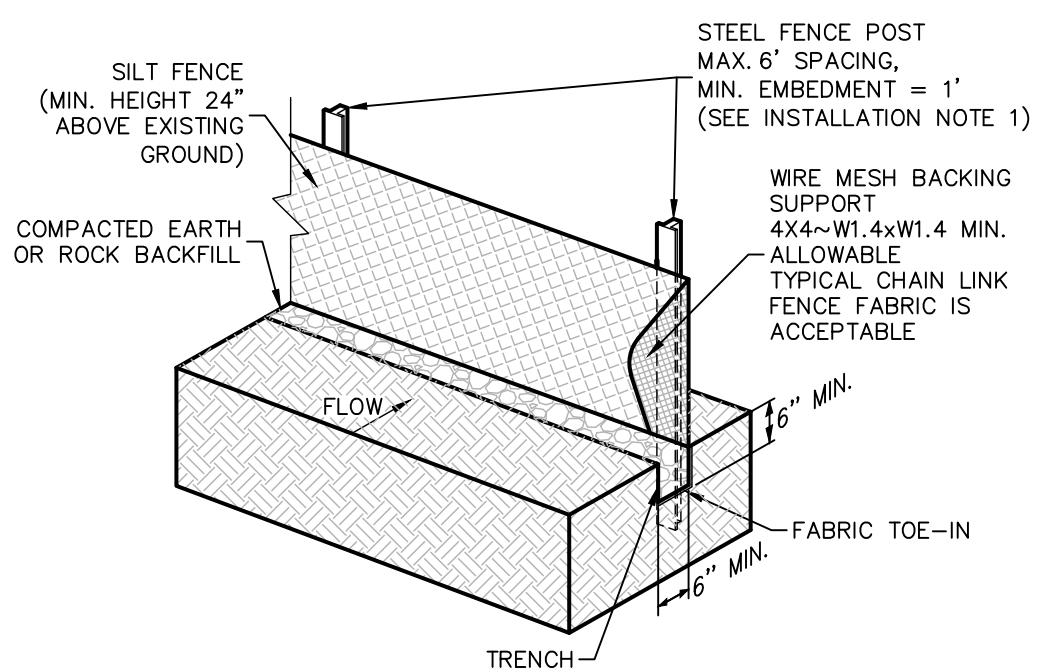
THE PURPOSE OF A ROCK BERM IS TO SERVE AS A CHECK DAM IN AREAS OF CONCENTRATED FLOW, TO INTERCEPT SEDIMENT-LADEN RUNOFF, DETAIN THE SEDIMENT AND RELEASE THE WATER IN SHEET FLOW. THE ROCK BERM SHOULD BE USED WHEN THE CONTRIBUTING DRAINAGE AREA IS LESS THAN 5 ACRES. ROCK BERMS ARE USED IN AREAS WHERE THE VOLUME OF RUNOFF IS TOO GREAT FOR A SILT FENCE TO CONTAIN. THEY ARE LESS EFFECTIVE FOR SEDIMENT REMOVAL THAN SILT FENCES, PARTICULARLY FOR FINE PARTICLES, BUT ARE ABLE TO WITHSTAND HIGHER FLOWS THAN A SILT FENCE. AS SUCH, ROCK BERMS ARE OFTEN USED IN AREAS OF CHANNEL FLOWS (DITCHES, GULLIES, ETC.). ROCK BERMS ARE MOST EFFECTIVE AT REDUCING BED LOAD IN CHANNELS AND SHOULD NOT BE SUBSTITUTED FOR OTHER EROSION AND SEDIMENT CONTROL MEASURES FARTHER UP THE WATERSHED.

INSPECTION AND MAINTENANCE GUIDELINES

1. INSPECTION SHOULD BE MADE WEEKLY AND AFTER EACH RAINFALL BY THE RESPONSIBLE PARTY. FOR INSTALLATIONS IN STREAMBEDS, ADDITIONAL DAILY INSPECTIONS SHOULD BE MADE.
2. REMOVE SEDIMENT AND OTHER DEBRIS WHEN BUILDUP REACHES 6 INCHES AND DISPOSE OF THE ACCUMULATED SILT IN AN APPROVED MANNER THAT WILL NOT CAUSE ANY ADDITIONAL SILTATION.
3. REPAIR ANY LOOSE WIRE SHEATHING.
4. THE BERM SHOULD BE RESHAPED AS NEEDED DURING INSPECTION.
5. THE BERM SHOULD BE REPLACED WHEN THE STRUCTURE CEASES TO FUNCTION AS INTENDED DUE TO SILT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.
6. THE ROCK BERM SHOULD BE LEFT IN PLACE UNTIL ALL UPSTREAM AREAS ARE STABILIZED AND ACCUMULATED SILT REMOVED.

ROCK BERM DETAIL

NOT-TO-SCALE



ISOMETRIC PLAN VIEW

SILT FENCE

A SILT FENCE IS A BARRIER CONSISTING OF GEOTEXTILE FABRIC SUPPORTED BY METAL POSTS TO PREVENT SOIL AND SEDIMENT LOSS FROM A SITE. WHEN PROPERLY USED SILT FENCES CAN BE HIGHLY EFFECTIVE AT CONTROLLING SEDIMENT FROM DISTURBED AREAS. THEY CAUSE RUNOFF TO POND, ALLOWING HEAVIER SOLIDS TO SETTLE OUT. IF NOT PROPERLY INSTALLED, SILT FENCES ARE NOT LIKELY TO BE EFFECTIVE.

THE PURPOSE OF A SILT FENCE IS TO INTERCEPT AND DETAIN WATER-BORN SEDIMENT FROM UNPROTECTED AREAS OF A LIMITED EXTENT. SILT FENCE IS USED DURING THE PERIOD OF CONSTRUCTION NEAR THE PERIMETER OF A DISTURBED AREA TO INTERCEPT SEDIMENT WHILE ALLOWING WATER TO PERCOLATE THROUGH. THIS FENCE SHOULD REMAIN IN PLACE UNTIL THE DISTURBED AREA IS PERMANENTLY STABILIZED. SILT FENCE SHOULD NOT BE USED WHERE THERE IS A CONCENTRATION OF WATER IN A CHANNEL OR DRAINAGE WAY. IF CONCENTRATED FLOW OCCURS AFTER INSTALLATION, CORRECTIVE ACTION MUST BE TAKEN SUCH AS PLACING A ROCK BERM IN THE AREAS OF CONCENTRATED FLOW.

SILT FENCING WITHIN THE SITE MAY BE TEMPORARILY MOVED DURING THE DAY TO ALLOW CONSTRUCTION ACTIVITY PROVIDED IT IS REPLACED AND PROPERLY ANCHORED TO THE GROUND AT THE END OF THE DAY. SILT FENCES ON THE PERIMETER OF THE SITE OR AROUND DRAINAGE WAYS SHOULD NOT BE MOVED AT ANY TIME.

MATERIALS

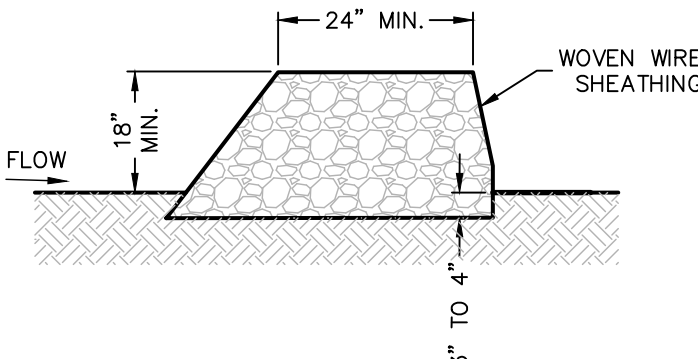
1. SILT FENCE MATERIAL SHOULD BE POLYPROPYLENE, POLYETHYLENE, OR POLYAMIDE WOVEN OR NONWOVEN FABRIC. THE FABRIC SHOULD BE 36 INCHES, WITH A MINIMUM UNIT WEIGHT OF 4.5 OZ/YD, MULLEN BURST STRENGTH EXCEEDING 190 LB/IN², ULTRAVIOLET STABILITY EXCEEDING 70%, AND MINIMUM APPARENT OPENING SIZE OF U.S. SIEVE NUMBER 30.
2. FENCE POSTS SHOULD BE MADE OF HOT ROLLED STEEL, AT LEAST 4 FEET LONG WITH TEE OR Y-BAR CROSS SECTION, SURFACE PAINTED OR GALVANIZED, MINIMUM WEIGHT 1.25 LB/FT, AND BRINELL HARDNESS EXCEEDING 140.
3. WOVEN WIRE BACKING TO SUPPORT THE FABRIC SHOULD BE GALVANIZED 2" X 4" WELDED WIRE, 12 GAUGE MINIMUM.

INSTALLATION

1. STEEL POSTS, WHICH SUPPORT THE SILT FENCE, SHOULD BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POSTS MUST BE EMBEDDED A MINIMUM OF 1-FOOT DEEP AND SPACED NOT MORE THAN 8 FEET ON CENTER. WHERE WATER CONCENTRATES, THE MAXIMUM SPACING SHOULD BE 6 FEET.
2. LAY OUT FENCING DOWN-SLOPE OF DISTURBED AREA, FOLLOWING THE CONTOUR AS CLOSELY AS POSSIBLE. THE FENCE SHOULD BE SITED SO THAT THE MAXIMUM DRAINAGE AREA IS ¼ ACRE/100 FEET OF FENCE.

SILT FENCE DETAIL

NOT-TO-SCALE



SECTION "A-A"

MATERIALS

1. THE BERM STRUCTURE SHOULD BE SECURED WITH A WOVEN WIRE SHEATHING HAVING MAXIMUM OPENING OF 1 INCH AND A MINIMUM WIRE DIAMETER OF 20 GAUGE GALVANIZED AND SHOULD BE SECURED WITH SHOAT RINGS.

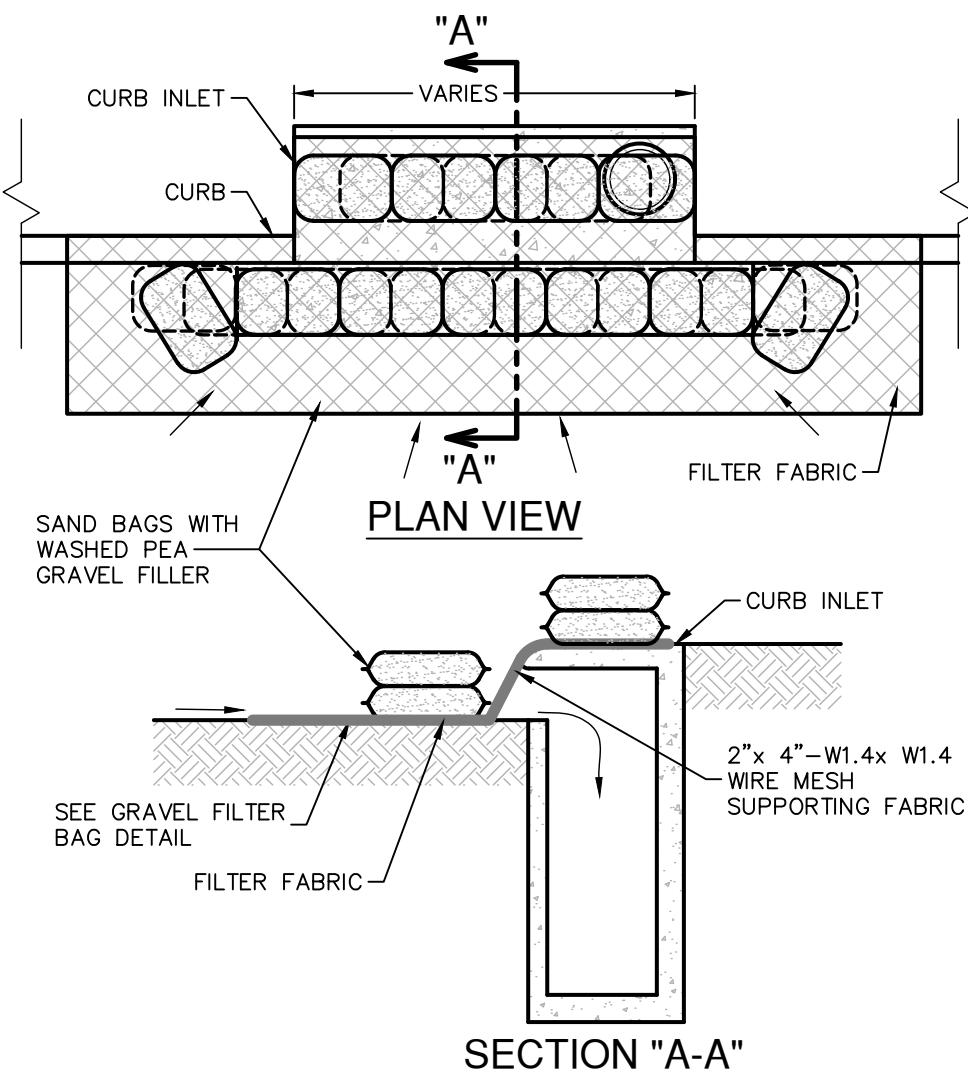
2. CLEAN, OPEN GRADED 3-INCH TO 5-INCH DIAMETER ROCK SHOULD BE USED, EXCEPT IN AREAS WHERE HIGH VELOCITIES OR LARGE VOLUMES OF FLOW ARE EXPECTED, WHERE 5-INCH TO 8-INCH DIAMETER ROCKS MAY BE USED.

INSTALLATION

1. LAY OUT THE WOVEN WIRE SHEATHING PERPENDICULAR TO THE FLOW LINE. THE SHEATHING SHOULD BE 20 GAUGE WOVEN WIRE MESH WITH 1 INCH OPENINGS.
2. BERM SHOULD HAVE A TOP WIDTH OF 2 FEET MINIMUM WITH SIDE SLOPES BEING 2:1 (H:V) OR FLATTER.
3. PLACE THE ROCK ALONG THE SHEATHING AS SHOWN IN THE DIAGRAM TO A HEIGHT NOT LESS THAN 18".
4. WRAP THE WIRE SHEATHING AROUND THE ROCK AND SECURE WITH TIE WIRE SO THAT THE ENDS OF THE SHEATHING OVERLAP AT LEAST 2 INCHES, AND THE BERM RETAINS ITS SHAPE WHEN WALKED UPON.
5. BERM SHOULD BE BUILT ALONG THE CONTOUR AT ZERO PERCENT GRADE OR AS NEAR AS POSSIBLE.
6. THE ENDS OF THE BERM SHOULD BE TIED INTO EXISTING UPSLOPE GRADE AND THE BERM SHOULD BE BURIED IN A TRENCH APPROXIMATELY 3 TO 4 INCHES DEEP TO PREVENT FAILURE OF THE CONTROL.

COMMON TROUBLE POINTS

1. INSUFFICIENT BERM HEIGHT OR LENGTH (RUNOFF QUICKLY ESCAPES OVER THE TOP OR AROUND THE SIDES OF BERM).
2. BERM NOT INSTALLED PERPENDICULAR TO FLOW LINE (RUNOFF ESCAPING AROUND ONE SIDE).

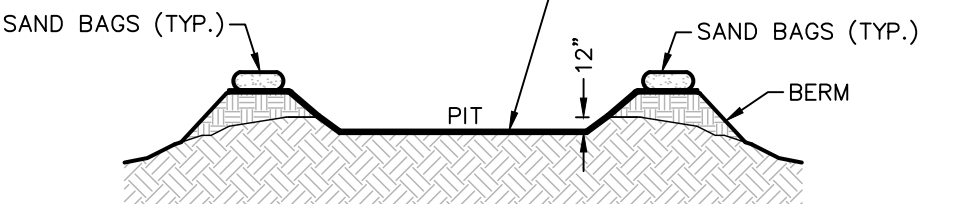
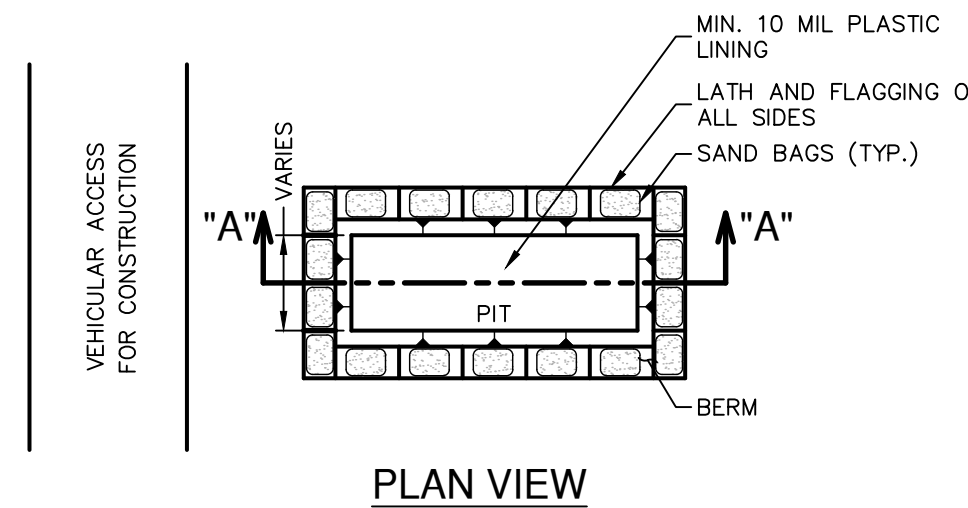


GENERAL NOTES

1. CONTRACTOR TO INSTALL 2"x4"-W1.4xW1.4 WIRE MESH SUPPORTING FILTER FABRIC OVER THE INLET OPENING. FABRIC MUST BE SECURED TO WIRE BACKING WITH CUPS OR WIRE TIES AT THIS LOCATION. SAND BAGS FILLED WITH WASHED PEA GRAVEL SHOULD BE PLACED ON TOP OF WIRE MESH ON TOP OF THE INLET AS SHOWN ON THIS DETAIL TO HOLD WIRE MESH IN PLACE. SANDBAGS FILLED WITH WASHED PEA GRAVEL SHOULD ALSO BE PLACED ALONG THE GUTTER AS SHOWN ON THIS DETAIL TO HOLD WIRE MESH IN PLACE. SAND BAGS TO BE STACKED TO FORM A CONTINUOUS BARRIER AROUND INLETS.
2. THE BAGS SHOULD BE TIGHTLY ABUTTED AGAINST EACH OTHER TO PREVENT RUNOFF FROM FLOWING BETWEEN THE BAGS.
3. CHECK PLACEMENT OF DEVICE TO PREVENT GAPS BETWEEN DEVICE AND CURB.
4. INSPECT FILTER FABRIC AND PATCH OR REPLACE IF TORN OR MISSING.
5. STRUCTURES SHOULD BE REMOVED AND THE AREA STABILIZED ONLY AFTER THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

BAGGED GRAVEL CURB INLET PROTECTION DETAIL

NOT-TO-SCALE



SECTION "A-A"

GENERAL NOTES

1. DETAIL ABOVE ILLUSTRATES MINIMUM DIMENSIONS. PIT CAN BE INCREASED IN SIZE DEPENDING ON EXPECTED FREQUENCY OF USE.
2. WASHOUT PIT SHALL BE LOCATED IN AN AREA EASILY ACCESSIBLE TO CONSTRUCTION TRAFFIC.
3. WASHOUT PIT SHALL NOT BE LOCATED IN AREAS SUBJECT TO INUNDATION FROM STORM WATER RUNOFF.
4. LOCATE WASHOUT AREA AT LEAST 50 FEET FROM SENSITIVE FEATURES, STORM DRAINS, OPEN DITCHES OR WATER BODIES.
5. TEMPORARY CONCRETE WASHOUT FACILITY SHOULD BE CONSTRUCTED WITH SUFFICIENT QUANTITY AND VOLUME TO CONTAIN ALL LIQUID AND CONCRETE WASTE GENERATED BY WASHOUT OPERATIONS.

MATERIALS

PLASTIC LINING MATERIAL SHOULD BE A MINIMUM OF 10 MIL IN POLYETHYLENE SHEETING AND SHOULD BE FREE OF HOLES, TEARS, OR OTHER DEFECTS THAT COMPROMISE THE IMPERMEABILITY OF THE MATERIAL.

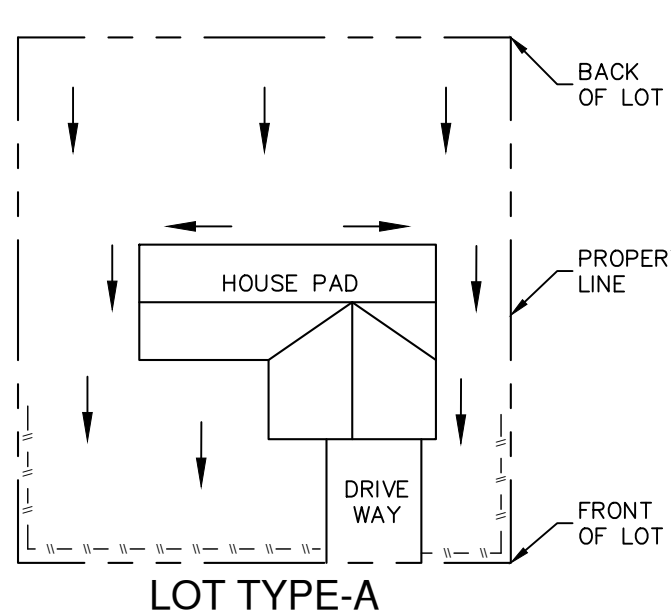
MAINTENANCE

1. WHEN TEMPORARY CONCRETE WASHOUT FACILITIES ARE NO LONGER REQUIRED FOR THE WORK, THE HARDENED CONCRETE SHOULD BE REMOVED AND DISPOSED OF.
2. MATERIALS USED TO CONSTRUCT TEMPORARY CONCRETE WASHOUT FACILITIES SHOULD BE REMOVED FROM THE SITE OF THE WORK AND DISPOSED OF.
3. HOLES, DEPRESSIONS OR OTHER GROUND DISTURBANCES CAUSED BY THE REMOVAL OF THE TEMPORARY CONCRETE WASHOUT FACILITIES SHOULD BE BACKFILLED AND REPAIRED.

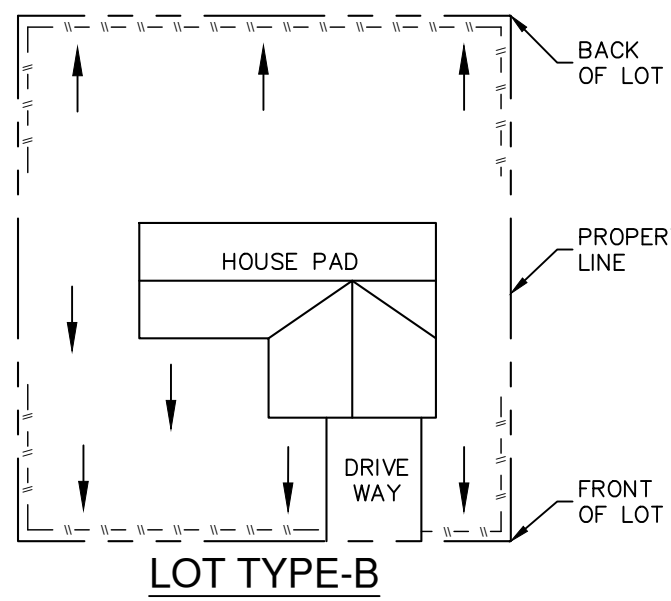
CONCRETE TRUCK WASHOUT

PIT DETAIL

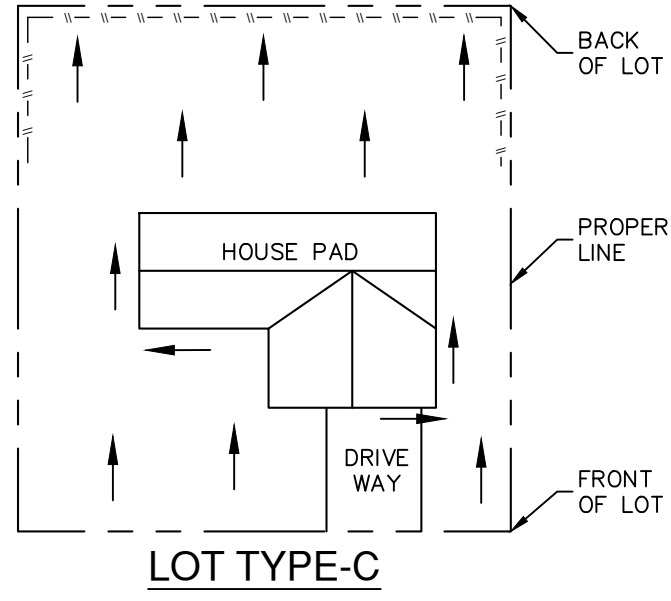
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LOT TYPE-A



LOT TYPE-B



LOT TYPE-C

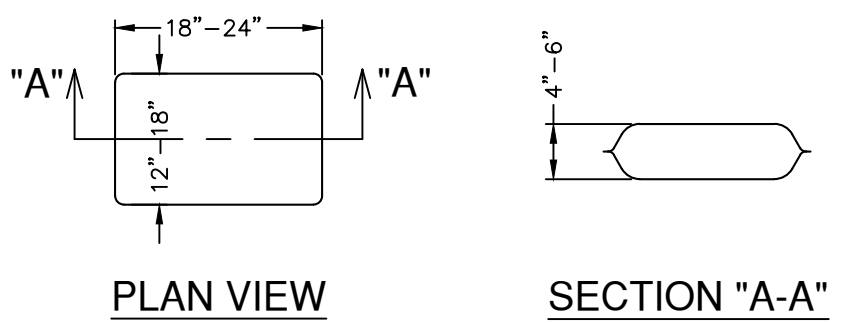
NOTE: SILT FENCE TO BE INSTALLED PER THESE DETAILS AND LOCATED ON THE DOWNGRADED SIDE OF EACH LOT LINE OR LIMITS OF CLEARING AS GENERALLY SHOWN ON THE OVERALL SITE PLAN.

LEGEND

SILT FENCE DRAINAGE FLOW

TYPICAL HOUSE LOT LAYOUTS

NOT-TO-SCALE



PLAN VIEW

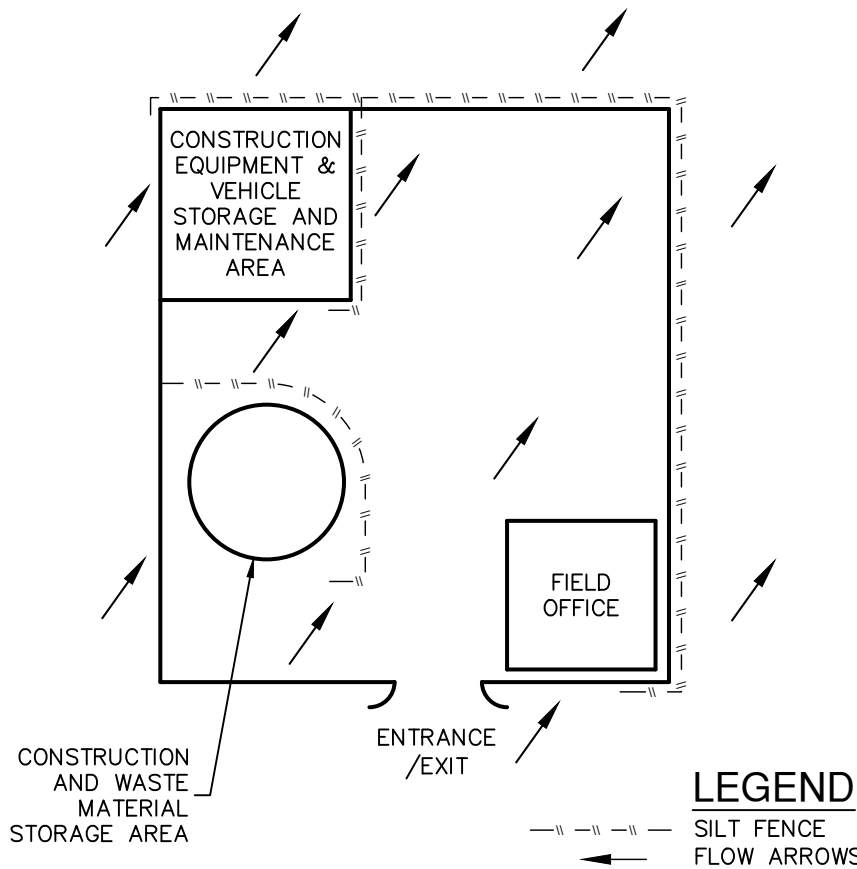
SECTION "A-A"

NOTES:
1. THE FILTER BAG MATERIAL SHALL BE MADE OF POLYPROPYLENE, POLYETHYLENE OR POLYAMIDE WOVEN FABRIC, MIN. UNIT WIGHT OF 4 OUNCES/SY, HAVE A MULLEN BURST STRENGTH EXCEEDING 300 PSI AND ULTRAVIOLET STABILITY EXCEEDING 70%.

2. THE FILTER BAG SHALL BE FILLED WITH CLEAN, MEDIUM WASHED PEA GRAVEL TO COARSE GRAVEL (0.31 TO 0.75 INCH DIAMETER).
3. SAND SHALL NOT BE USED TO FILL THE FILTER BAGS.

GRAVEL FILTER BAG DETAIL

NOT-TO-SCALE



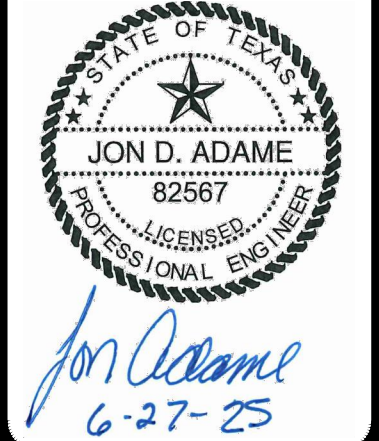
CONSTRUCTION STAGING AREA

NOT-TO-SCALE

LEGEND

SILT FENCE FLOW ARROWS

DATE	
NO.	
REVISION	



PAPE-DAWSON ENGINEERS
2000 NW LOOP 410 | SAN ANTONIO, TX 78213 | 210.375.9000
TEXAS ENGINEERING FIRM #470 | TEXAS SURVEYING FIRM #10038600

APOLLO OAKS
BEXAR COUNTY, TEXAS
STORM WATER POLLUTION PREVENTION PLAN DETAILS

PLAT NO.	CP202506
JOB NO.	13657-00
DATE	JUNE 2025
DRAWN	XX
CHECKED	XX
SHEET	C8.10