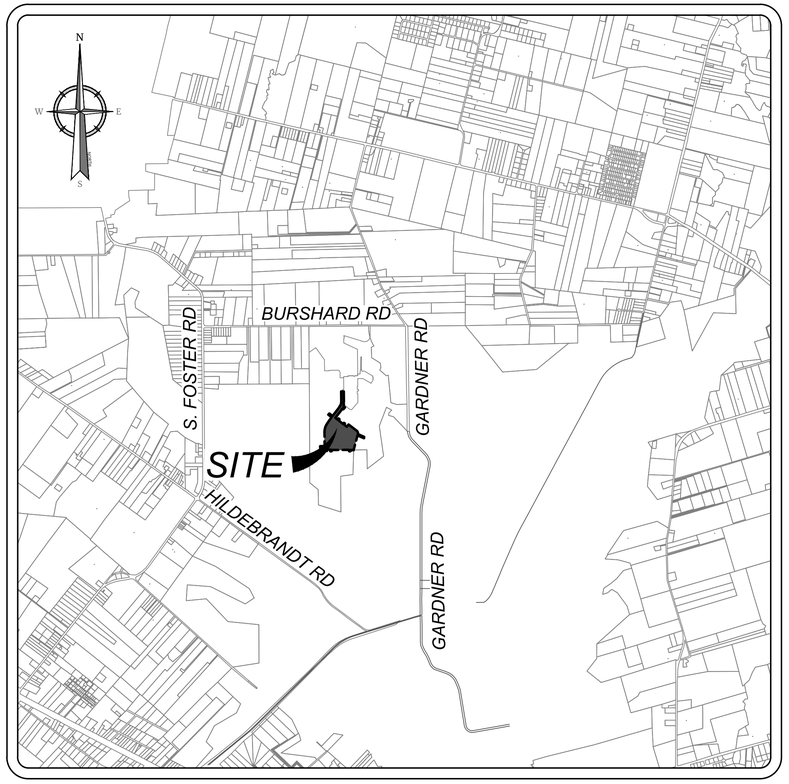
NORTHLAKE PHASE 2A

BEXAR COUNTY, TEXAS

UTILITY, DRAINAGE, STREET, SANITARY SEWER AND WATER IMPROVEMENTS



LOCATION MAP

SCALE: NOT-TO-SCALE

OWNER/DEVELOPER:
LENNAR HOMES OF TEXAS LAND AND CONSTRUCTION, LTD
100 NE LOOP 410, SUITE 1155
SAN ANTONIO, TEXAS 78216
(210) 403-6200

Sheet List Table

Sheet Title	Sheet Number
COVER SHEET	0.0
OVERALL UTILITY PLAN (1 OF 3)	1.0
OVERALL UTILITY PLAN (2 OF 3)	1.1
OVERALL UTILITY PLAN (3 OF 3)	1.2
MASTER DRAINAGE PLAN (1 OF 3)	2.0
MASTER DRAINAGE PLAN (2 OF 3)	2.1
MASTER DRAINAGE PLAN (3 OF 3)	2.2
OVERALL GRADING PLAN (1 OF 3)	3.0
OVERALL GRADING PLAN (2 OF 3)	3.1
OVERALL GRADING PLAN (3 OF 3)	3.2
DRAIN "A" PLAN & PROFILE	4.0
DRAIN "B" PLAN & PROFILE	4.1
DRAIN "C" PLAN & PROFILE	4.2
DRAIN "D" PLAN & PROFILE	4.3
DRAIN DETAILS (1 OF 4)	4.4
DRAIN DETAILS (2 OF 4)	4.5
DRAIN DETAILS (3 OF 4)	4.6
DRAIN DETAILS (4 OF 4)	4.7
CALAVERAS VIEW PLAN AND PROFILES	5.0
CALAVERAS VIEW PLAN AND PROFILES	5.1
THING TERRACE PLAN AND PROFILES	5.2
SHINING ROAD PLAN AND PROFILES	5.3
GHOST GROVE PLAN AND PROFILES	5.4
LAGO ESCONDIDO & DUSK HILL PLAN AND PROFILES	5.5
DUSK HILL & ZOMBIE RIDGE PLAN AND PROFILES	5.6
HAUNTING HOLLOW PLAN AND PROFILES	5.7
STREET DETAIL SHEET (1 OF 2)	5.8
STREET DETAIL SHEET (2 OF 2)	5.8A
WHEELCHAIR RAMP DETAIL SHEET	5.9
CONCRETE DRIVEWAY DETAIL SHEET	5.10
PEDESTRIAN FACILITIES CURB RAMP DETAILS	5.11
TRAFFIC SIGNAGE & SIDEWALK PLAN (1 OF 3)	5.12
TRAFFIC SIGNAGE & SIDEWALK PLAN (2 OF 3)	5.13
TRAFFIC SIGNAGE & SIDEWALK PLAN (3 OF 3)	5.14
TRAFFIC SIGNAGE DETAIL (1 OF 2)	5.15
TRAFFIC SIGNAGE DETAIL (2 OF 2)	5.16
PAVEMENT MARKING DETAILS (1 OF 2)	5.17
PAVEMENT MARKING DETAILS (2 OF 2)	5.18
SANITARY SEWER COVER SHEET	6.0
OVERALL SANITARY SEWER PLAN (1 OF 2)	6.1
OVERALL SANITARY SEWER PLAN (2 OF 2)	6.2
LINE 'A' PLAN AND PROFILES	6.3
LINE 'B' PLAN AND PROFILES	6.4
LINE 'C' PLAN AND PROFILES	6.5
LINE 'D' PLAN AND PROFILES	6.6
LINE 'D' & 'E' PLAN AND PROFILES	6.7
LINE 'F' PLAN AND PROFILES	6.8
LINE 'G' PLAN AND PROFILES	6.9
LINE 'H' PLAN AND PROFILES	6.10
WATER DISTRIBUTION COVER SHEET	7.0
OVERALL WATER PLAN (1 OF 3)	7.1
OVERALL WATER PLAN (2 OF 3)	7.2
OVERALL WATER PLAN (3 OF 3)	7.3
WATER DETAIL SHEET (1 OF 3)	7.4
WATER DETAIL SHEET (2 OF 3)	7.5
WATER DETAIL SHEET (3 OF 3)	7.6
STORMWATER POLLUTION PREVENTION PLAN (1 OF 3)	8.0
STORMWATER POLLUTION PREVENTION PLAN (2 OF 3)	8.1
STORMWATER POLLUTION PREVENTION PLAN (3 OF 3)	8.2
STORMWATER POLLUTION PREVENTION DETAILS	8.3

Colliers
Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW

PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
7/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14809
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

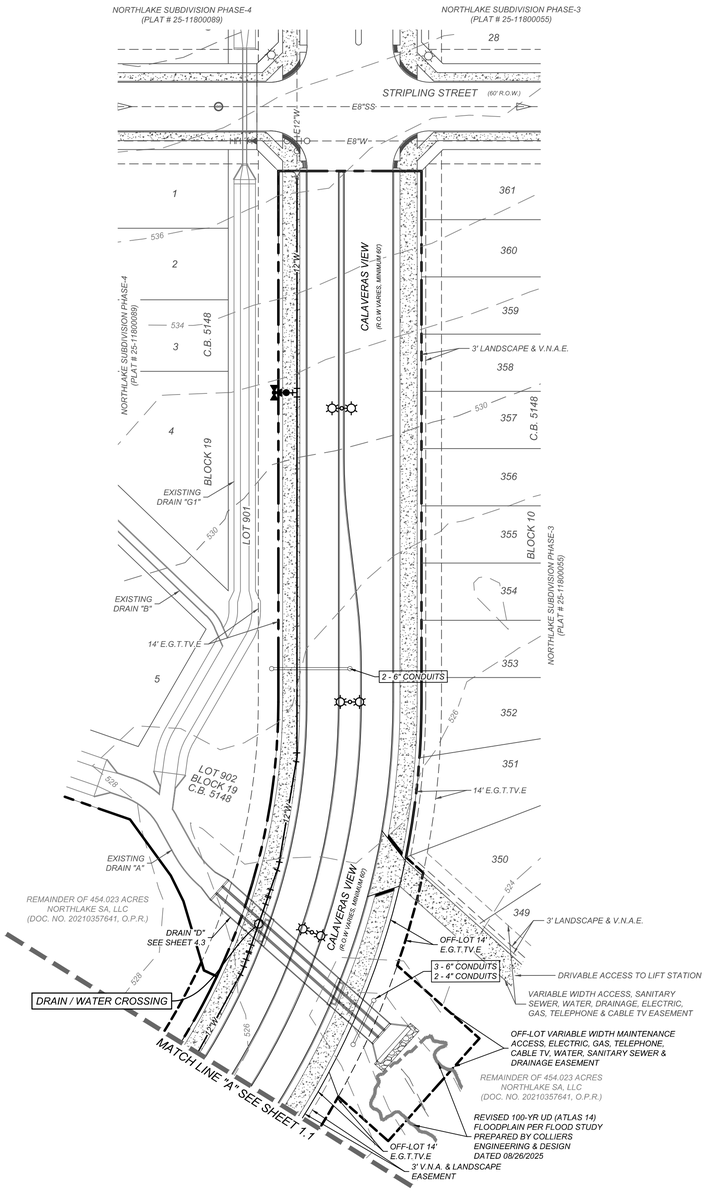
PROJECT NUMBER:	DRAWING NAME:
314-65-03	CV3146503

SHEET TITLE: COVER SHEET

SHEET NUMBER: 0.0

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

\\ATX\Y\146503.dwg\0.0 By: ABEL.MONTALVO



COMPACTION NOTE:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING 98% COMPACTION ON ALL TRENCH BACKFILL AND PAYING FOR THE TESTS TO BE PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED OR AS INDICATED BY THE SAWS INSPECTOR/TEST ADMINISTRATOR, PER EACH 12 INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. PERMITS AND/OR WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

CAUTION!!:

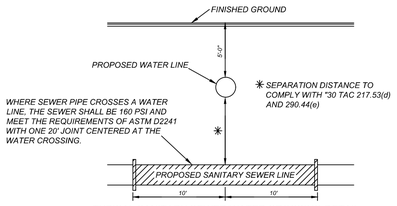
THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCTBANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. ANY UTILITY CONFLICTS THAT 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

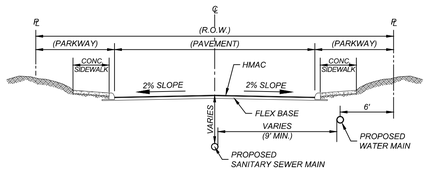
CONTRACTOR AND/ OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S 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.

DRY UTILITY CONDUIT NOTE:

CONDUIT LOCATIONS SHOWN ON PLAN ARE FOR GEOGRAPHICAL PURPOSES ONLY AND ARE APPROXIMATE. CONTRACTOR TO INSTALL PROPOSED CONDUITS IN ACCORDANCE WITH DRY UTILITY PURVEYOR'S SPECIFICATIONS. CONTRACTOR TO VERIFY THE CONDUIT LOCATIONS AND SIZES BASED ON THE DRY UTILITY PURVEYOR'S PLAN.

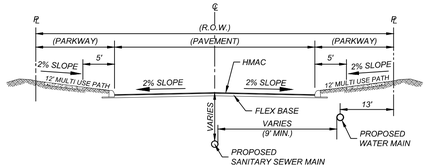


TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
N.T.S.



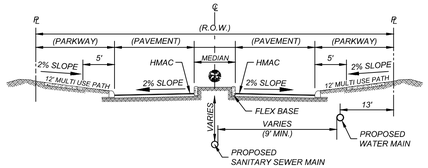
TYPE	PAVEMENT WIDTH	PARKWAY WIDTH	SIDEWALK WIDTH
50' R.O.W.	30'	10'	4'
60' R.O.W.	34'	13'	4'/6'

TYPICAL STREET SECTION
N.T.S.



TYPE	PAVEMENT WIDTH	PARKWAY WIDTH	SIDEWALK WIDTH
80' R.O.W.	34'	23'	12'

COLLECTOR TYPE "C" STREET SECTION
N.T.S.



TYPE	PAVEMENT WIDTH	MEDIAN WIDTH	PARKWAY WIDTH
100' R.O.W.	34' MAX, 22' MIN	16' MAX, 4' MIN	20'

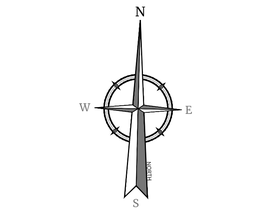
COLLECTOR TYPE "C" STREET SECTION
N.T.S.

LEGEND

PROPOSED WATER MAIN	=	W
PROPOSED WATER SERVICE & METER BOX	=	W
PROPOSED WATER 3/4" IRRIGATION SERVICE & METER BOX	=	IRRIG
PROPOSED FIRE HYDRANT	=	
PROPOSED WATER VALVE	=	
PROPOSED 100 WATT STREETLIGHT	=	
PROPOSED 250 WATT STREETLIGHT	=	
PROPOSED SANITARY SEWER MAIN	=	SS
PROPOSED SANITARY SEWER MANHOLE	=	
PROPOSED SANITARY SEWER LATERAL	=	
PROPOSED ELECTRIC, GAS, TELEPHONE, & CABLE TV EASEMENT	=	E.G.T.TV.E
VEHICULAR NON-ACCESS EASEMENT	=	V.N.A.E.
EXISTING WATER MAIN	=	E.W
EXISTING FIRE HYDRANT	=	
EXISTING WATER VALVE	=	
EXISTING SANITARY SEWER MAIN	=	E.SS
EXISTING SANITARY SEWER MANHOLE	=	
EXISTING 100 WATT STREET LIGHT	=	
EXISTING 250 WATT STREET LIGHT	=	

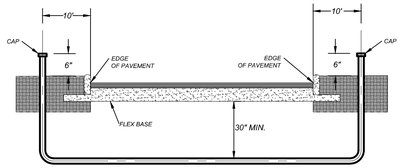


LOCATION MAP
SCALE: NOT-TO-SCALE





SCALE : 1" = 50'
Linear unit of measure: US Survey Foot (1 ft = 1200/3937 m)



TYPICAL CONDUIT DETAIL
N.T.S.

NOTE:
CONTRACTOR SHALL BE RESPONSIBLE FOR PLACING CONDUIT SLEEVES FOR EACH CPS FACILITY AT ALL STREETS AND DRAIN CROSSING IF BUILT AHEAD OF CPS CONSTRUCTION. SLEEVES MUST ALSO BE LOCATED FOR CPS CREWS DURING CONSTRUCTION. (SEPARATE ITEM) SEE THIS SHEET FOR CONDUIT CROSSING DETAIL AND SCHEDULE.

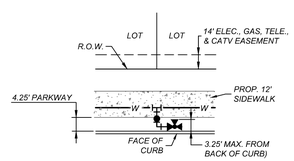
CONDUIT NOTES:

1. CONTRACTOR SHALL INSTALL PERMANENT MARKERS IN PROPOSED CURB WHERE CONDUITS CROSS THE ROADWAY (BOTH SIDES).

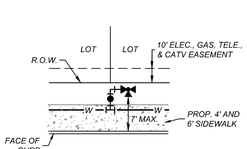
2. CONDUITS SHALL BE PVC WITH MINIMUM BURY OF 36 INCHES BELOW PROPOSED FINISHED GRADE. SCHEDULE 80 TO BE USED FOR CPS CONDUITS, ALL OTHER CONDUITS ARE SCHEDULE 40.

3. ALL CONDUITS SHALL BE EXTENDED BEHIND CURBS OR PROPOSED SIDEWALKS A MINIMUM OF 3 FEET AND CAPPED FOR FUTURE USE.

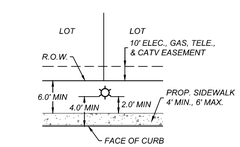
4. ALL CONDUIT SLEEVES TO BE USED FOR ELECTRIC, GAS, OR TELECOMMUNICATION UTILITY CROSSINGS SHALL BE INSTALLED TO MEET OR EXCEED DESIGN REQUIREMENTS FOR THE UTILITY AGENCY WHICH THEY ARE SERVING, INCLUDING BUT NOT LIMITED TO THE DEPTH, TRENCH PLACEMENT, AND PROXIMITY TO OTHER UTILITIES. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR VERIFYING AND INSTALLING THE CONDUIT SLEEVES TO MEET THESE SPECIFICATIONS INCLUDING COORDINATING WITH THE UTILITY AGENCY FOR ANY REQUIRED INSPECTIONS



TYPICAL FIRE HYDRANT DETAIL
(CALAVERAS VIEW)
N.T.S.



TYPICAL FIRE HYDRANT DETAIL
N.T.S.



TYPICAL STREETLIGHT DETAIL
N.T.S

Colliers
Engineering & Design

www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, revised, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 Know what's below. Call before you dig.
PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125960
LICENSED PROFESSIONAL ENGINEER
9/22/25

NORTHLAKE PHASE 10
PLAT# 25-11800371

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: P-1-6909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

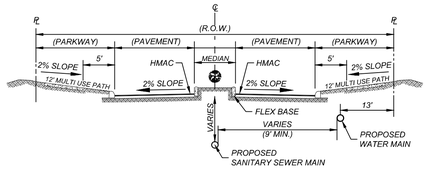
PROJECT NUMBER: 314-65-03
DRAWING NAME: OU3146503-PH2A

SHEET TITLE:
OVERALL UTILITY PLAN
(1 OF 3)

SHEET NUMBER:
1.0

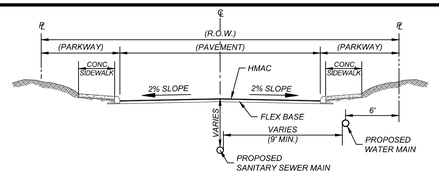
NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

\\ff\OU3146503-PH2A.dwg\1.0 By: ABEL.MONTALVO



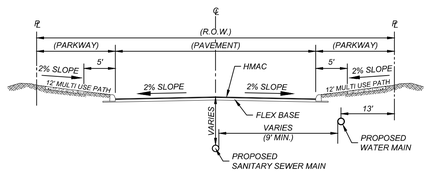
TYPE	PAVEMENT WIDTH	MEDIAN WIDTH	PARKWAY WIDTH
100' R.O.W.	34' MAX, 22' MIN	16' MAX, 4' MIN	20'

COLLECTOR TYPE "C" STREET SECTION
N.T.S.



TYPE	PAVEMENT WIDTH	PARKWAY WIDTH	SIDEWALK WIDTH
50' R.O.W.	30'	10'	4'
60' R.O.W.	34'	13'	4'/6'

TYPICAL STREET SECTION
N.T.S.



TYPE	PAVEMENT WIDTH	PARKWAY WIDTH	SIDEWALK WIDTH
80' R.O.W.	34'	23'	12'

COLLECTOR TYPE "C" STREET SECTION
N.T.S.

COMPACTION NOTE:
THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING 98% COMPACTION ON ALL TRENCH BACKFILL AND PAYING FOR THE TESTS TO BE PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED OR AS INDICATED BY THE SAWS INSPECTOR/TEST ADMINISTRATOR, PER EACH 12 INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. PERMITS AND/OR WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

CAUTION!!:
THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED 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.

DRY UTILITY CONDUIT NOTE:
CONDUIT LOCATIONS SHOWN ON PLAN ARE FOR GEOGRAPHICAL PURPOSES ONLY AND ARE APPROXIMATE. CONTRACTOR TO INSTALL PROPOSED CONDUITS IN ACCORDANCE WITH DRY UTILITY PURVEYOR'S SPECIFICATIONS. CONTRACTOR TO VERIFY THE CONDUIT LOCATIONS AND SIZES BASED ON THE DRY UTILITY PURVEYOR'S PLAN.

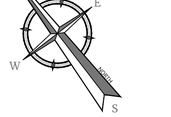
REFER SHEET 1.0 FOR CONDUIT DETAIL AND NOTES

LEGEND

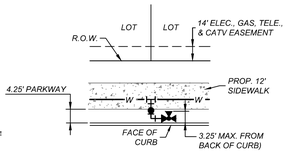
PROPOSED WATER MAIN	=	W
PROPOSED WATER SERVICE & METER BOX	=	W METER
PROPOSED WATER 3/4" IRRIGATION SERVICE & METER BOX	=	W IRRIG
PROPOSED FIRE HYDRANT	=	
PROPOSED WATER VALVE	=	
PROPOSED 100 WATT STREETLIGHT	=	
PROPOSED 250 WATT STREETLIGHT	=	
PROPOSED SANITARY SEWER MAIN	=	SS
PROPOSED SANITARY SEWER MANHOLE	=	
PROPOSED SANITARY SEWER LATERAL	=	
PROPOSED ELECTRIC, GAS, TELEPHONE, & CABLE TV EASEMENT	=	E.G.T.TV.E
VEHICULAR NON-ACCESS EASEMENT	=	V.N.A.E.
EXISTING WATER MAIN	=	E.W
EXISTING FIRE HYDRANT	=	
EXISTING WATER VALVE	=	
EXISTING SANITARY SEWER MAIN	=	E.SS
EXISTING SANITARY SEWER MANHOLE	=	
EXISTING 100 WATT STREET LIGHT	=	
EXISTING 250 WATT STREET LIGHT	=	



LOCATION MAP
SCALE: NOT-TO-SCALE



SCALE : 1" = 50'
Linear unit of measure: US Survey Foot (1 ft = 1200/3937 m)

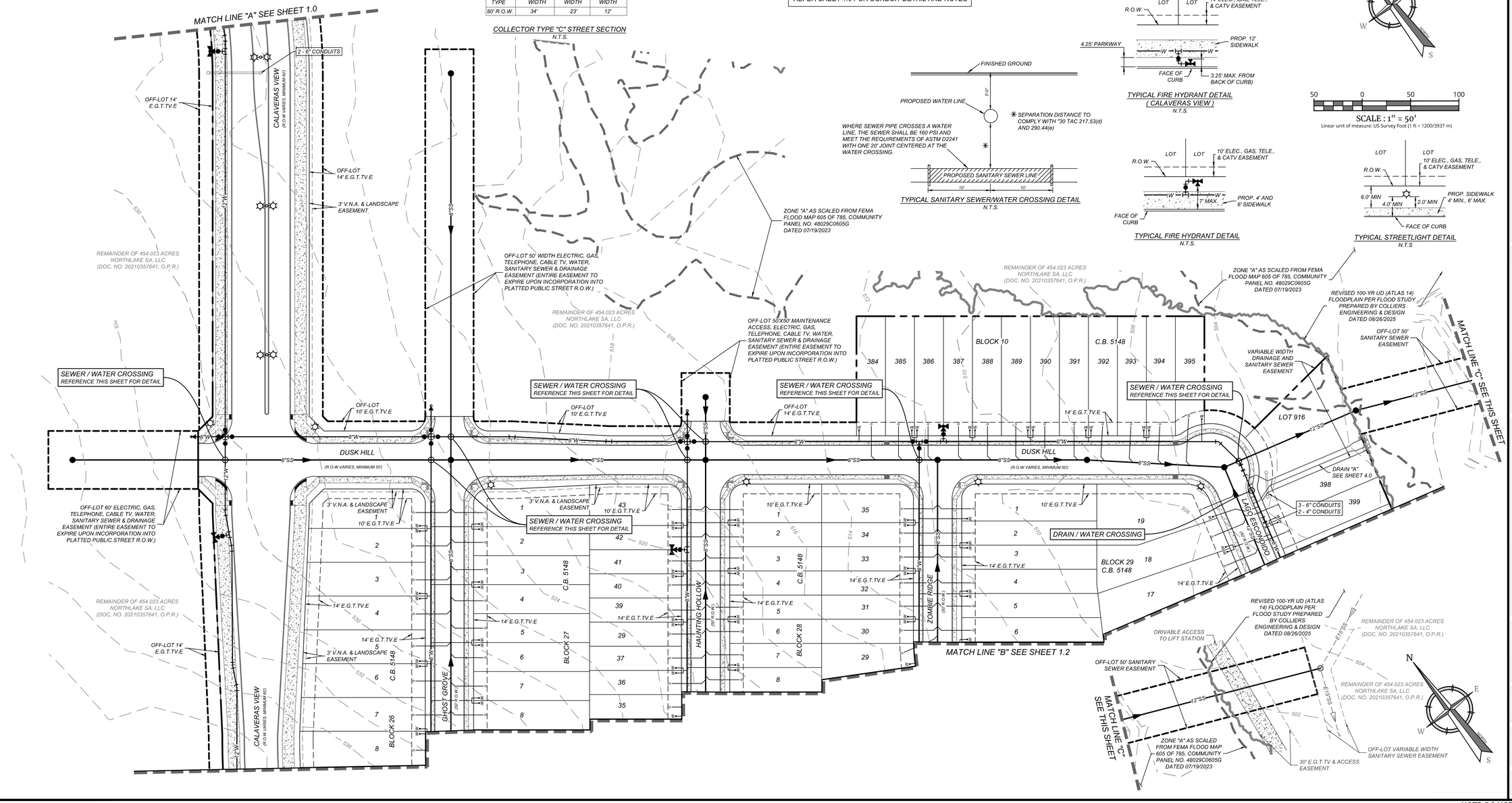


TYPICAL FIRE HYDRANT DETAIL
(CALAVERAS VIEW)
N.T.S.

TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
N.T.S.

TYPICAL FIRE HYDRANT DETAIL
N.T.S.

TYPICAL STREETLIGHT DETAIL
N.T.S



Colliers
Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, revised, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
7/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14309
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER:	DRAWING NAME:
314-65-03	OU3146503-PH2A

SHEET TITLE:
OVERALL UTILITY PLAN (2 OF 3)

SHEET NUMBER:
1.1

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

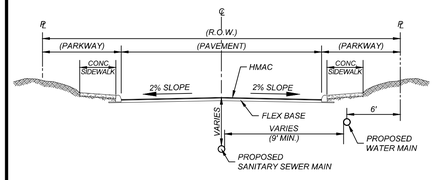
I:\PROJ\314-65\03-PH2A.dwg\1.1 By: ABEL MONTALVO

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.

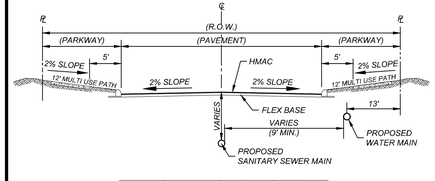
DRY UTILITY CONDUIT NOTE:

CONDUIT LOCATIONS SHOWN ON PLAN ARE FOR GEOGRAPHICAL PURPOSES ONLY AND ARE APPROXIMATE. CONTRACTOR TO INSTALL PROPOSED CONDUITS IN ACCORDANCE WITH DRY UTILITY PURVEYOR'S SPECIFICATIONS. CONTRACTOR TO VERIFY THE CONDUIT LOCATIONS AND SIZES BASED ON THE DRY UTILITY PURVEYOR'S PLAN.



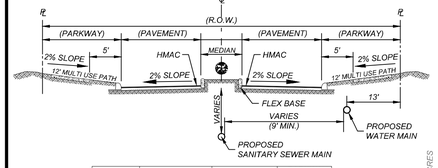
TYPE	PAVEMENT WIDTH	PARKWAY WIDTH	SIDEWALK WIDTH
50' R.O.W.	30'	10'	4'
60' R.O.W.	34'	13'	4'/6'

TYPICAL STREET SECTION
N.T.S.



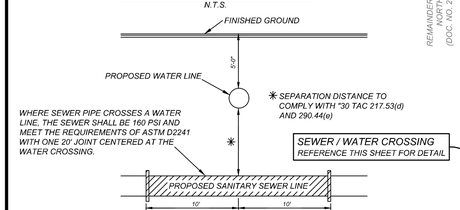
TYPE	PAVEMENT WIDTH	PARKWAY WIDTH	SIDEWALK WIDTH
80' R.O.W.	34'	23'	12'

COLLECTOR TYPE "C" STREET SECTION
N.T.S.



TYPE	PAVEMENT WIDTH	MEDIAN WIDTH	PARKWAY WIDTH
100' R.O.W.	34' MAX, 22' MIN	16' MAX, 4' MIN	20'

COLLECTOR TYPE "C" STREET SECTION
N.T.S.



TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
N.T.S.

COMPACTION NOTE:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING 98% COMPACTION ON ALL TRENCH BACKFILL AND PAYING FOR THE TESTS TO BE PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED OR AS INDICATED BY THE SAWS INSPECTOR/TEST ADMINISTRATOR, PER EACH 12 INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. PERMITS AND/OR WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

CAUTION!!:

THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED 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.

REFER SHEET 1.0 FOR CONDUIT DETAIL AND NOTES

TYPICAL FIRE HYDRANT DETAIL
N.T.S.

TYPICAL STREETLIGHT DETAIL
N.T.S

LEGEND

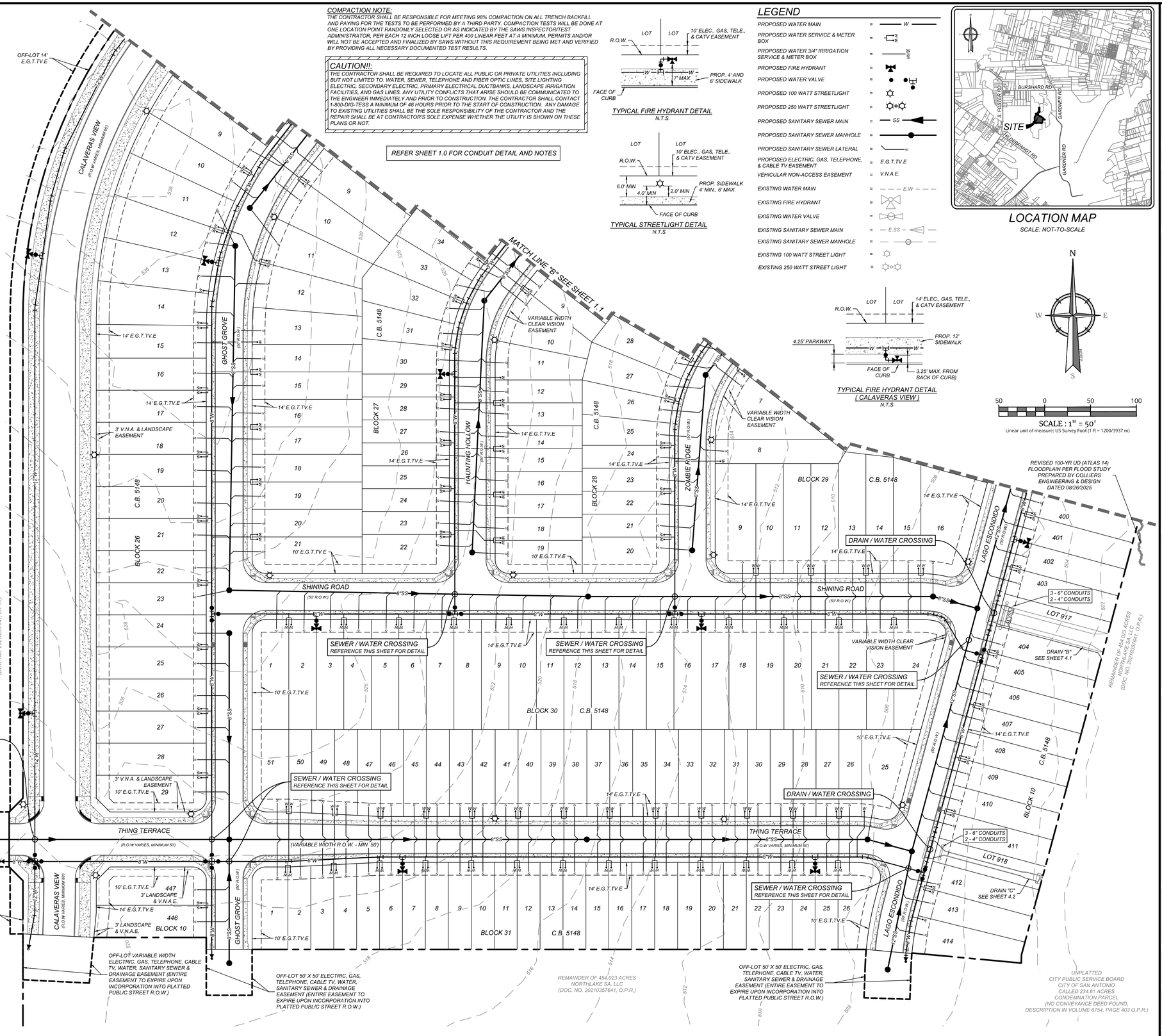
PROPOSED WATER MAIN	=	W
PROPOSED WATER SERVICE & METER BOX	=	W
PROPOSED WATER 3/4" IRRIGATION SERVICE & METER BOX	=	IRRR
PROPOSED FIRE HYDRANT	=	
PROPOSED WATER VALVE	=	
PROPOSED 100 WATT STREETLIGHT	=	
PROPOSED 250 WATT STREETLIGHT	=	
PROPOSED SANITARY SEWER MAIN	=	SS
PROPOSED SANITARY SEWER MANHOLE	=	
PROPOSED SANITARY SEWER LATERAL	=	
PROPOSED ELECTRIC, GAS, TELEPHONE, & CABLE TV EASEMENT	=	E.G.T.TV.E
VEHICULAR NON-ACCESS EASEMENT	=	V.N.A.E.
EXISTING WATER MAIN	=	E.W
EXISTING FIRE HYDRANT	=	
EXISTING WATER VALVE	=	
EXISTING SANITARY SEWER MAIN	=	E.SS
EXISTING SANITARY SEWER MANHOLE	=	
EXISTING 100 WATT STREET LIGHT	=	
EXISTING 250 WATT STREET LIGHT	=	

LOCATION MAP
SCALE: NOT-TO-SCALE

TYPICAL FIRE HYDRANT DETAIL (CALAVERAS VIEW)
N.T.S.

SCALE : 1" = 50'
Linear unit of measure: US Survey Foot (1 ft = 1200/3937 m)

REVISED 100-YR UD (ATLAS 14) FLOODPLAIN PER FLOOD STUDY PREPARED BY COLLIERS ENGINEERING & DESIGN DATED 08/26/2025



Colliers
Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DIGTURB THE EARTH'S SUIRFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
9/24/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: OU3146503-PH2A

SHEET TITLE:
OVERALL UTILITY PLAN (3 OF 3)

SHEET NUMBER:
1.2

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

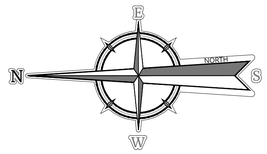
I:\OU3146503-PH2A.dwg\1.2 By: SDSEPH

LEGEND

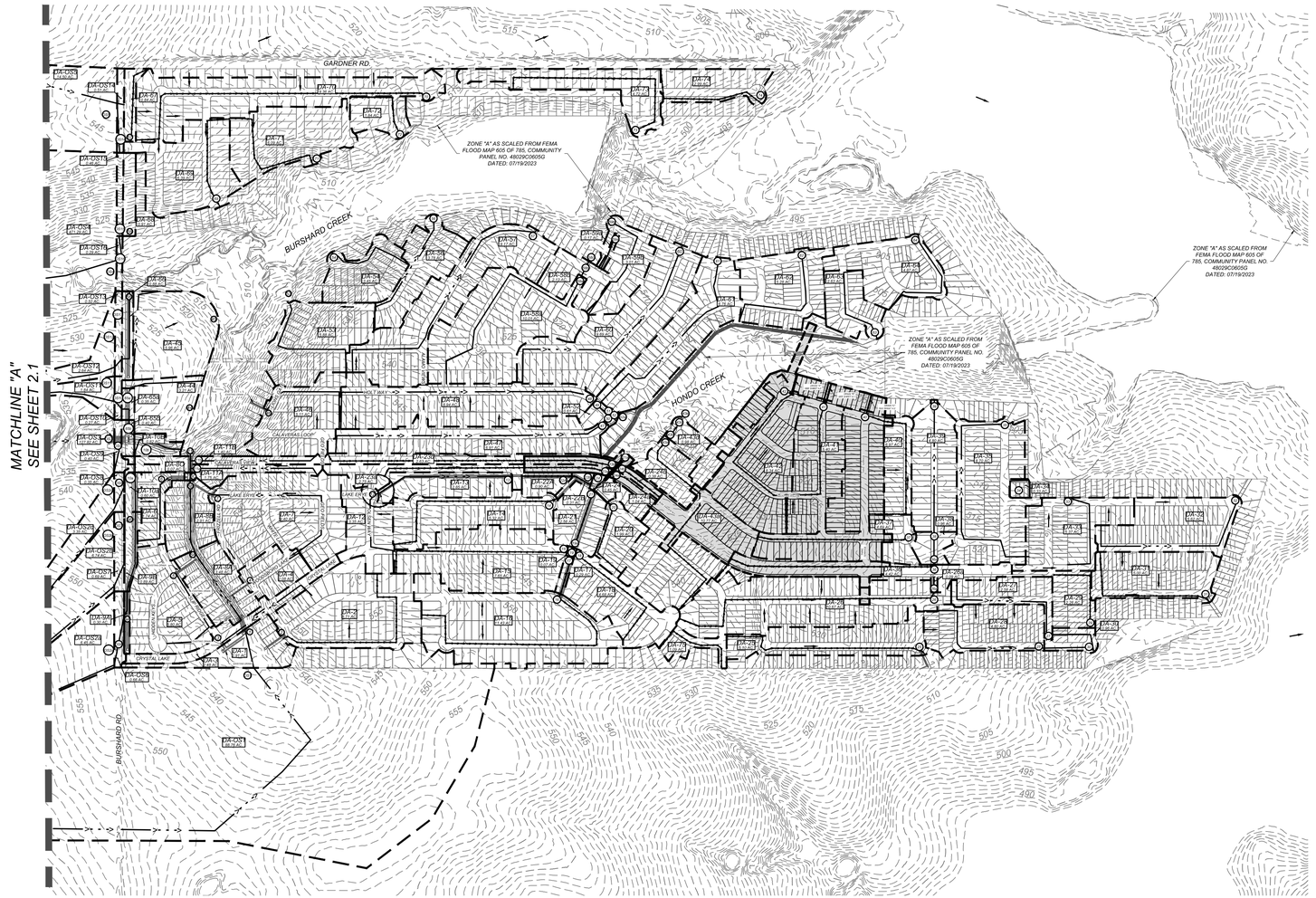
- = MDP BOUNDARY
- 980 = LIDAR CONTOURS
- = 100 YEAR FEMA FLOODPLAIN BOUNDARY
- = FLOW ARROW
- = DRAINAGE AREA
- = FLOW PATH
- 1 = STUDY POINT



LOCATION MAP
SCALE: NOT-TO-SCALE



400 0 400 800
SCALE : 1" = 400'
SELECT LINEAR UNIT OF MEASURE



MATCHLINE "A"
SEE SHEET 2.1

Colliers
Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, revised, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
Know what's below. Call before you dig.
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
7/11/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER:	DRAWING NAME:
314-65-03	MD3146502-PH2A

SHEET TITLE:
MASTER DRAINAGE PLAN (1 OF 3)

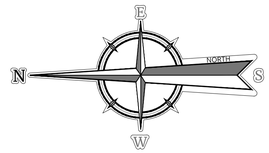
SHEET NUMBER:
2.0

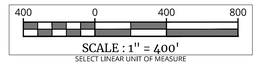
NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

H:\MD3146502-PH2A.dwg v2.0 By: ROGELIO.BERRONES

LEGEND

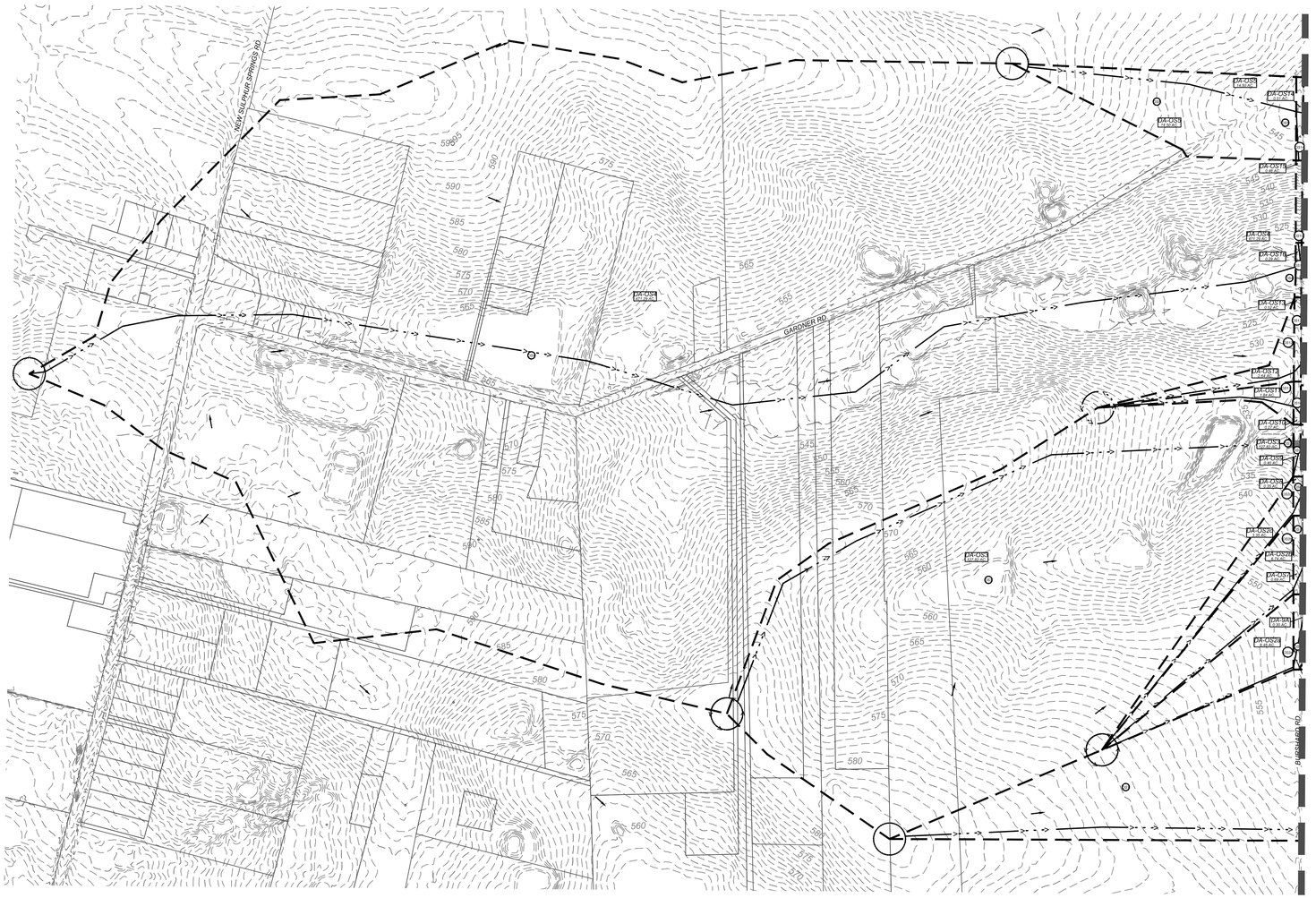
- = MDP BOUNDARY
- 980 = LIDAR CONTOURS
- = 100 YEAR FEMA FLOODPLAIN BOUNDARY
- = FLOW ARROW
- = DRAINAGE AREA
- = FLOW PATH
- 1 = STUDY POINT







LOCATION MAP
SCALE: NOT-TO-SCALE



MATCHLINE "A"
SEE SHEET 2.0

Colliers
Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
Know what's below. Call before you dig.
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED
PROFESSIONAL ENGINEER
7/1/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14309
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER:	DRAWING NAME:
314-65-03	MD3146502-PHZA

SHEET TITLE:
MASTER DRAINAGE PLAN (2 OF 3)

SHEET NUMBER:
2.1

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

M:\MD3314650\5-PHZA.dwg(2.1 By: ABEL.MONTALVO

ULTIMATE CONDITIONS

STUDY POINT	AREA	(Acres)	C		Tovrl (min)	Tsc (min)	Tch (min)	Ttot (min)	I5 (in/hr)	I25 (in/hr)	I100 (in/hr)	Q5 (ft3/s)	Q25 (ft3/s)	Q100 (ft3/s)
OS1	DA-OS1	85.72	0.70		12	17	51	80	2.41	3.35	4.19	144.61	201.01	251.42
OS2A	DA-OS2A	6.45	0.70		11	14	3	28	3.81	5.22	6.48	17.20	23.57	29.26
OS2B	DA-OS2B	6.74	0.70		11	15	6	32	3.56	4.87	6.04	16.80	22.98	28.50
OS2C	DA-OS2C	3.35	0.70		11	15	9	35	3.39	4.65	5.77	7.95	10.90	13.53
OS3	DA-OS3	127.82	0.70		12	17	49	78	2.41	3.35	4.19	215.63	299.74	374.90
OS4	DA-OS4	471.29	0.70		SEE FLOOD STUDY NORTHLAKE PHASE 1									
OS5	DA-OS5	14.50	0.70		11	8	3	22	4.30	5.91	7.34	43.65	59.99	74.50
	DA-OS6	0.66	0.96											
OS6	PT.OS2A + DA-OS6	7.11	0.72		28	0	3	31	3.62	4.96	6.14	18.53	25.39	31.43
	DA-OS7	0.69	0.96											
OS7	PT.OS2B + DAOS7	7.43	0.72		32	0	1	33	3.50	4.80	5.95	18.83	25.83	32.01
	DA-OS8	0.35	0.96											
OS8	PT.OS2C + DA-OS8	3.70	0.72		35	0	1	36	3.34	4.58	5.68	8.95	12.28	15.23
OS9	DA-OS9	0.40	0.96		7	1	0	8	6.75	9.48	11.85	2.59	3.64	4.55
	DA-OS10	0.27	0.96											
OS10	PT.OS11 + DA-OS10	2.11	0.73		26	0	1	27	3.88	5.32	6.60	6.00	8.23	10.21
OS11	DA-OS11	1.84	0.70		9	15	2	26	3.96	5.42	6.73	5.10	6.98	8.67
OS12	DA-OS12	2.64	0.70		9	15	2	26	3.96	5.42	6.73	7.32	10.02	12.44
	DA-OS13	0.52	0.96											
OS13	PT.OS12 + DA-OS13	3.16	0.74		26	0	1	27	3.88	5.32	6.60	9.11	12.49	15.49
OS14	DA-OS14	0.51	0.96	CARRYOVER PT. OS5	22	0	3	25	4.04	5.53	6.86	1.98	2.71	3.36
OS15	DA-OS15	0.46	0.96	CARRYOVER PT. OS14	25	0	5	30	3.68	5.04	6.25	1.63	2.23	2.76
OS16	DA-OS16	0.29	0.96	CARRYOVER PT.OS15	30	0	2	32	3.56	4.87	6.04	0.99	1.36	1.68
	DA-1	2.91	0.67											
1	PT.OS1 +PT.2 + PT.3 + DA-1	99.82	0.70	CARRYOVER PT.OS1	80	0	10	90	2.41	3.35	4.19	169.11	235.07	294.01
2	DA-2	8.71	0.67		10	0	12	22	4.30	5.91	7.34	25.09	34.49	42.83
3	DA-3	2.48	0.96		7	0	3	10	6.24	8.76	10.95	14.86	20.86	26.07
4	DA-4	2.08	0.67		10	0	1	11	6.02	8.43	10.54	8.39	11.75	14.69
5	DA-5	5.80	0.67		10	2	3	15	5.24	7.24	9.03	20.36	28.13	35.09
6	DA-6	1.74	0.67		10	0	2	12	5.81	8.12	10.14	6.77	9.47	11.82
7	DA-7	9.40	0.67		10	0	5	15	5.24	7.24	9.03	33.00	45.60	56.87
	DA-8A	3.48	0.67											
8A	PT.1 + PT.4 + PT. 5 + DA-8A	111.18	0.70	CARRYOVER PT. 1	90	0	4	94	2.41	3.35	4.19	187.45	260.57	325.90
	DA-8B	2.91	0.67											
8B	PT.7 + PT.8A + DA-8B	123.49	0.70	CARRYOVER PT.8A	94	0	1	95	2.41	3.35	4.19	207.33	288.20	360.46
	DA-8C	0.07	0.67											
8C	PT.6 + PT.8B + DA-8C	125.30	0.70	CARRYOVER PT.8B	95	0	2	97	2.41	3.35	4.19	210.25	292.26	365.54
	DA-9A	0.30	0.67											
9A	PT.OS6 + DA-9A	7.41	0.72		31	0	2	33	3.50	4.80	5.95	18.62	25.54	31.66
	DA-9B	0.89	0.67											
9B	PT.OS7 + PT.9A + DA-9B	15.73	0.72		33	0	3	36	3.34	4.58	5.68	37.73	51.74	64.17
	DA-10A	0.60	0.67											
10a	PT.OS8 + PT. 9B + DA-10A	20.03	0.72		36	0	3	39	3.20	4.39	5.44	46.02	63.13	78.23
	DA-10B	0.82												
10B	PT.OS3 + PT.OS9 + PT.10A + PT.65B + DA-10B	151.93	0.67		39	0	5	44	2.98	4.10	5.09	303.34	417.35	518.13
11a	DA-11a	1.75	0.96		7	0	3	10	6.24	8.76	10.95	10.48	14.72	18.40
11b	DA-11b	1.40	0.96		5	0	3	8	6.75	9.48	11.85	9.07	12.74	15.93
11	PT. 8C + DA-11a + 11b	128.45	0.70	CARRYOVER PT.8C	97	0	5	102	2.41	3.35	4.19	217.54	302.39	378.21
12	DA-12	3.35	0.67		10	1	3	14	5.42	7.53	9.39	12.17	16.90	21.08
	DA-13	2.85	0.77											
13	PT.12 + DA13	6.20	0.72	CARRYOVER PT.12	14	0	5	19	4.63	6.37	7.93	20.55	28.28	35.20
14	DA-14	5.32	0.77		10	0	8	18	4.76	6.56	8.16	19.50	26.87	33.43
15	DA-15	7.65	0.77		10	1	9	20	4.51	6.21	7.71	26.57	36.58	45.42
16	DA-16	11.43	0.77		10	0	13	23	4.21	5.77	7.17	37.05	50.78	63.10
	DA-17	0.29	0.77											
17	PT.16 + DA-17	11.72	0.77	CARRYOVER PT.16	23	0	2	25	4.04	5.53	6.86	36.46	49.90	61.91
18	DA-18	4.68	0.77		10	1	5	16	5.06	6.99	8.71	18.23	25.19	31.39
	DA-19	0.07	0.96											
19	PT.15 + PT.18 + DA-19	12.40	0.77	CARRYOVER PT.18	20	0	0	20	4.51	6.21	7.71	43.12	59.38	73.72
19A	PT. 17 + PT. 19	24.12	0.77	CARRYOVER PT.19	25	0	2	27	3.88	5.32	6.60	72.11	98.88	122.67
20	DA-20	2.48	0.77		10	1	2	13	5.61	7.82	9.76	10.71	14.93	18.64
	DA-21	2.56	0.77											
21	PT.19A + DA-21	26.68	0.77	CARRYOVER PT.19a	27	0	4	31	3.62	4.96	6.14	74.42	101.96	126.22
21A	PT. 23a + PT.23b + PT.24 + PT.24a + PT.24b	49.14	0.79	CARRYOVER PT.24	32	0	2	34	3.45	4.72	5.86	133.11	182.12	226.10
	DA-22A	0.90	0.71											
22A	PT.13 + DA-22A	7.10	0.72	CARRYOVER PT.13	19	0	3	22	4.30	5.91	7.34	21.84	30.01	37.27
	DA-22B	0.31	0.71											
22B	PT. 14 + PT.22A + DA-22B	12.73	0.74	CARRYOVER PT.22A	22	0	1	23	4.21	5.77	7.17	39.55	54.21	67.36
23a	DA-23a	2.75	0.96		6	0	9	15	5.24	7.24	9.03	13.83	19.11	23.84
23b	DA-23b	2.63	0.96		6	0	12	18	4.76	6.56	8.16	12.02	16.56	20.60
	DA-24	0.45	0.71											
24	PT. 20 + PT.21 + PT.22b + DA-24	42.34	0.76	CARRYOVER PT.21	31	0	1	32	3.56	4.87	6.04	114.56	156.72	194.37
24a	DA-24a	1.04	0.84	CARRYOVER PT.23	6	0	2	8	6.75	9.48	11.85	5.90	8.28	10.35
24b	DA-24b	0.38	0.96		5	0	2	7	7.05	9.89	12.37	2.57	3.61	4.51
25	DA-25	5.10	0.77		10	1	7	18	4.76	6.56	8.16	18.69	25.76	32.04
26	DA-26	10.67	0.77		10	2	12	24	4.12	5.65	7.01	33.85	46.42	57.59
	DA-26a	0.09	0.77											
26a	PT.26 + DA-26a	10.76	0.77	CARRYOVER PT.26	24	0	1	25	4.04	5.53	6.86	33.47	45.82	56.84
27	DA-27	2.58	0.77		10	0	5	15	5.24	7.24	9.03	10.41	14.38	17.94
28	DA-28	4.80	0.77		10	1	6	17	4.91	6.76	8.42	18.15	24.98	31.12
29	DA-29	2.26	0.77		10	1	1	12	5.81	8.12	10.14	10.11	14.13	17.65
	DA-30	0.96	0.81											
30	PT.27 + PT. 28 + PT.29 + DA-30	10.60	0.77	CARRYOVER PT.28	17	0	2	19	4.63	6.37	7.93	37.97	52.24	65.03
31	DA-31	5.00	0.77		10	1	6	17	4.91	6.76	8.42	18.90	26.03	32.42
32	DA-32	5.62	0.77		10	0	9	19	4.63	6.37	7.93	20.04	27.57	34.32
33	DA-33	5.37	0.77		10	0	3	13	5.61	7.82	9.76	23.20	32.33	40.36
34	DA-34	0.33	0.77		10	1	0	11	6.02	8.43	10.54	1.53	2.14	2.68
35	DA-35	8.70	0.77		10	0	5	15	5.24	7.24	9.03	35.10	48.50	60.49
36	DA-36	4.42	0.77		10	1	8	19	4.63	6.37	7.93	15.76	21.68	26.99
36a	PT.26a + PT. 36	15.18	0.77		25	0	2	27	3.88	5.32	6.60	45.35	62.18	77.14
37	DA-37	4.69	0.77		10	0	7	17	4.91	6.76	8.42	17.73	24.41	30.41
	DA-38	0.96	0.77											
38	PT.36A + PT.37 + DA-38	20.83	0.77	CARRYOVER PT. 36A	27	0	2	29	3.74	5.13	6.36	59.99	82.28	102.01
	DA-39	4.80	0.77											
39	PT.38 + PT. 40 + DA-39	25.63	0.77	CARRYOVER PT.38	29	0	8	37	3.29	4.51	5.60	64.93	89.01	110.52
40	DA-40	6.97	0.77		10	1	7	18	4.76	6.56	8.16	25.55	35.21	43.79
41	DA-41	5.40	0.77		10	1	5	16	5.06	6.99	8.71	21.04	29.06	36.22
42	DA-42	8.34	0.77		10	1	6	17	4.91	6.76	8.42	31.53	43.41	54.07
43a	DA-43a	10.77	0.77		10	1	10	21	4.40	6.05	7.52	36.49	50.17	62.36
43b	PT.43b	4.28	0.96		RUNOFF CAPTURED FROM 2-10' CURB INLET							16.64	19.96	22.16
43c	PT.43c	6.49	0.77		REMAINING RUNOFF FROM CURB INLETS ON GRADE							19.85	30.21	40.20
	DA-43d	0.98	0.77											
43d	PT.43c + DA-43d	7.47	0.77	CARRYOVER PT.43a	21	0	1	22	4.30	5.91	7.34	24.73	33.99	42.22
43e	PT43d + PT.43b	11.75	0.84	CARRYOVER PT.43d	22	0	0	22	4.30	5.91	7.34	42.40	58.28	72.38
44	DA-44	3.21	0.77		10	2	0	12	5.81	8.12	10.14	14.37	20.08	25.07
45	DA-45	5.96	0.77		10	4	0	14	5.42	7.53	9.39	24.87	34.56	43.09
46	DA-46	5.11	0.77		10	1	3	14	5.42	7.53	9.39	21.33	29.63	36.95
47	DA-47	6.91	0.77		10	0	11	21	4.40	6.05	7.52	23.41	32.19	40.01
48	DA-48	8.94	0.77		10	1	13	24	4.12	5.65	7.01	28.36	38.89	48.26
49	PT. 48	4.05	0.77		RUNOFF CAPTURED FROM 2-10' CURB INLET							15.06	17.64	19.62
49a	PT. 49a	4.89	0.77		REMAINING RUNOFF FROM CURB INLETS ON GRADE							13.30	21.25	28.64
50	PT. 47	3.44	0.77		RUNOFF CAPTURED FROM 2-10' CURB INLET							13.64	16.06	17.90
50a	PT. 50a	3.47	0.77		REMAINING RUNOFF FROM CURB INLETS ON GRADE							9.77	16.13	22.11
51	PT. 49a + PT. 50a	8.36	0.77		CAPTURED RUNOFF JUNCTION							24.83	33.70	37.52
	DA-52	0.61	0.77											
52	PT.49a + PT.50a + DA-52	8.97	0.77	CARRYOVER PT.48	24	0	2	26	3.96	5.42	6.73	27.35	37.44	46.48
52a	PT. 52 + PT. 51	17.33	0.77	CARRYOVER PT. 52	26	0	0	26	3.96	5.42	6.73	52.84	72.33	89.81
53	DA-53	5.88	0.77		10	0	4	14	5.42	7.53	9.39	24.54	34.09	42.51
54	DA-54	3.45	0.77		10	1	2	13	5.61	7.82	9.76	14.90	20.77	25.93
56	DA-56	3.78	0.77		10	0	6	16	5.06	6.99	8.71	14.73	20.35	25.35
57	DA-57	9.17	0.77		10	0	9	19	4.63	6.37	7.93	32.69	44.98	55.99
	DA-58a	9.61	0.77											
58aa	DA-58aa	0.41	0.77									1.90	2.66	3.33
58a	DA-58a + DA-58aa	10.02	0.77									36.73	50.61	62.96
				CAPTURED RUNOFF FROM 2 ~ 10' CURB INLET ON GRADE								10.48	12.32	13.74
	DA-58a-1	7.58	0.77	REMAINING RUNOFF FROM 2 ~ 10' CURB INLET ON GRADE								26.25	38.29	49.22
	DA-58b	2.13	0.77											
58b	DA-58a-1 + DA-58b	9.71	0.77		18	0	0	18	4.76	6.56	8.16	35.59	49.05	61.01
58c	DA-58a + DA-58b	12.15	0.77		18	0	0	18	4.76	6.56	8.16	44.53	61.37	76.34
59a	DA-59a	0.17	0.77		7	0	1	8	6.75	9.48	11.85	0.88	1.24	1.55
	DA-59b	3.01	0.77											
59b	DA-59a + DA-59b	3.18	0.77		10	1	5	16	5.06	6.99	8.71	12.39	17.12	21.33
60	DA-60	9.69	0.77		10	1	8	19	4.63	6.37	7.93	34.55	47.53	59.17
61	DA-61	6.76	0.77		10	1	8	19	4.63	6.37	7.93	24.10	33.16	41.28
62	DA-62	5.28	0.77		10	0	6	16	5.06	6.99	8.71	20.57	28.42	35.41
63	DA-63	2.63	0.77		10	0	4	14	5.42	7.53	9.39	10.98	15.25	19.02
64	DA-64	4.87	0.77		10	0	5	15	5.24	7.24	9.03	19.65	27.15	33.86
65A	DA-65a	0.35	0.67		27	0	1	28	3.81	5.22	6.48	0.89	1.22	1.52
	DA-65b	0.40	0.67											
65B	PT.OS10 + DA65a + DA65b	2.86	0.72		28	0	2	30	3.68	5.04	6.25	7.54	10.33	12.81
	DA-66	0.88	0.67											
66	PT.OS13 + DA66	4.04	0.73		27	0	5	32	3.56	4.87	6.04	10.46	14.30	17.74
67	DA-67	0.84	0.41		10	3	0	13	5.61	7.82	9.76	1.93	2.69	3.36
68	DA-68	0.91	0.41		13	4	6	23	4.21	5.77	7.17	1.57	2.15	2.68
69	DA-69	6.39	0.67		10	0	3	13	5.61	7.82	9.76	24.02	33.48	41.79
70	DA-70	9.36	0.67		10	0	14	24	4.12	5.65	7.01	25.84	35.43	43.96
71	DA-71	6.09	0.67		10	0	4	14	5.42	7.53	9.39	22.12	30.72	38.31
72	DA-72	1.84	0.67		10	1	1	12	5.81	8.12	10.14	7.16	10.01	12.50
73	DA-73	4.72	0.77		8	9	2	19	4.63	6.37	7.93	16.83	23.15	28.82
74	DA-74	2.99	0.77		10	1	4	15	5.24	7.24	9.03	12.06	16.67	20.79

Colliers
Engineering & Design
www.colliersengineering.com

Copyright © 2025. Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, revised, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS + SURVEYING

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
7/11/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: MD3146502-PH2A

SHEET TITLE: MASTER DRAINAGE PLAN (3 OF 3)

SHEET NUMBER: 2.2

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

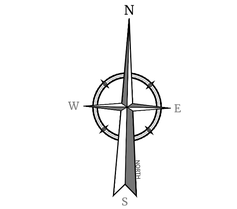
By: ABEL MONTALVO
n:\MD3146502-PH2A.dwg(2.2

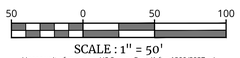
GENERAL NOTES:

1. ELEVATION SHOWN ON FOUNDATION IS FOR FINISHED FLOOR.
2. CONTRACTOR SHALL PROVIDE OWNER ALL NECESSARY DENSITY TESTS FOR FILL LOTS AS REQUIRED BY HUD SPECIFICATIONS.
3. HOME BUILDER SHALL REFER TO THE APPROVED SUBDIVISION PLAT TO CONFIRM ALL BUILDING SETBACKS PRIOR TO ANY FOUNDATION WORK.
4. AS SOON AS PRACTICAL HOME BUILDER SHALL ESTABLISH VEGETATION (HYDROMULCH, SEEDING, SODDING, ETC...) TO PREVENT EROSION FROM OCCURRING.
5. CONTRACTOR SHALL CONTACT ENGINEER REGARDING ANY QUESTIONS ON THE INTENT OF THIS PLAN.
6. POSITIVE DRAINAGE SHALL BE MAINTAINED ON ALL SURFACE AREAS WITHIN THE SCOPE OF THIS PROJECT. DRAINAGE SHALL BE DIRECTED AWAY FROM ALL BUILDING FOUNDATIONS AND TOWARDS THE PROPER DRAINAGE EASEMENT OR STREET RIGHT OF WAY ACCORDING TO THE MASTER DRAINAGE PLAN FOR THE PROJECT. CONTRACTOR SHOULD TAKE PRECAUTIONS NOT TO ALLOW PONDING OF WATER.
7. ALL ELEVATIONS AND CONTOURS SHOWN ON THIS GRADING PLAN REFLECT FINISHED GRADES. THE THICKNESS OF PAVEMENT, CURBS, AND SIDEWALKS MUST BE SUBTRACTED TO OBTAIN SUBGRADE ELEVATIONS.
8. GRADING PLAN IS INTENDED FOR USE IN LOT GRADING ONLY. CONTRACTOR SHOULD REFER TO CONSTRUCTION DRAWINGS FOR ALL OTHER GRADES, INCLUDING, BUT NOT LIMITED TO, CHANNELS, ROADS, AND DETENTION PONDS.
9. CONTRACTOR SHALL ENSURE POSITIVE DRAINAGE ALL SWALES.

LEGEND

E.G.T.TV.E	=	ELECTRIC, GAS, TELEPHONE, CABLE T.V. EASEMENT
C.B.	=	COUNTY BLOCK
V.N.A.E.	=	VEHICULAR NON-ACCESS EASEMENT
	=	FLOW ARROW
(A)	=	LOT GRADE TYPE
H.P.	=	HIGH POINT
F.F. MIN= 598.0'	=	FINISHED FLOOR MINIMUM ELEVATION AS REQUIRED PER FLOODPLAIN (SEE NOTE THIS SHEET)
735	=	EXISTING CONTOUR
735	=	PROPOSED CONTOUR
735	=	EXISTING CONTOUR
+ 731.69	=	SPOT ELEVATION





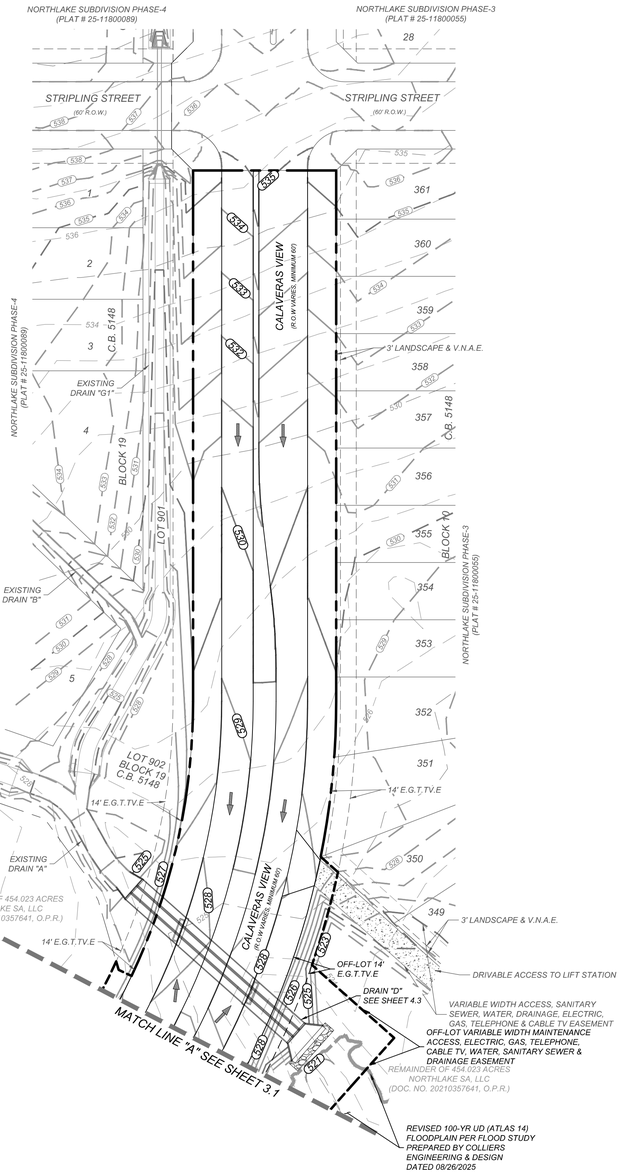
SCALE : 1" = 50'

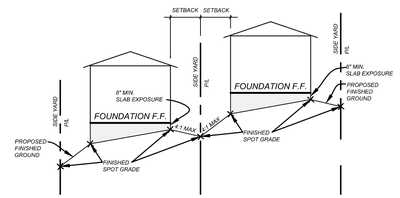
Linear unit of measure: US Survey Foot (1 ft = 1200/3937 m)



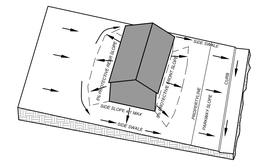
LOCATION MAP

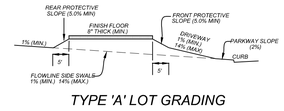
SCALE: NOT-TO-SCALE



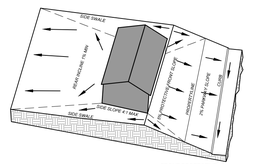


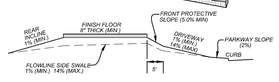
TYPICAL SIDE YARD GRADING
N.T.S.



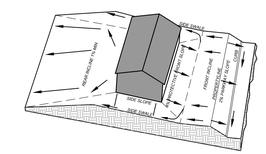


TYPE 'A' LOT GRADING





TYPE 'B' LOT GRADING



TYPE 'C' LOT GRADING

Colliers Engineering & Design

www.colliersengineering.com

Copyright © 2025. Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
Know what's below. Call before you dig.
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
9/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03

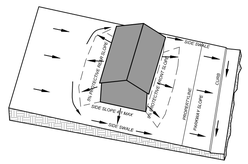
DRAWING NAME: GR3146503 - DETAILED

SHEET TITLE: OVERALL GRADING PLAN (1 OF 3)

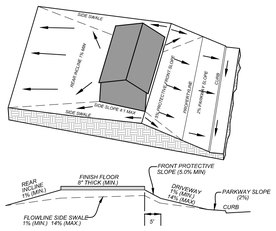
SHEET NUMBER: 3.0

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

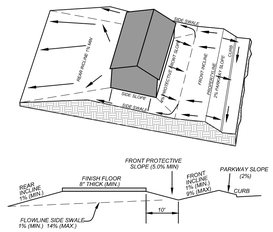
\\R\GR3146503 - Detailed.dwg\3.0 By: ABEL.MONTALVO



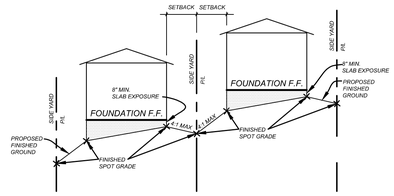
TYPE 'A' LOT GRADING



TYPE 'B' LOT GRADING



TYPE 'C' LOT GRADING



TYPICAL SIDE YARD GRADING
N.T.S.

GENERAL NOTES:

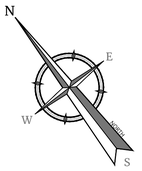
1. ELEVATION SHOWN ON FOUNDATION IS FOR FINISHED FLOOR.
2. CONTRACTOR SHALL PROVIDE OWNER ALL NECESSARY DENSITY TESTS FOR FILL LOTS AS REQUIRED BY HUD SPECIFICATIONS.
3. HOME BUILDER SHALL REFER TO THE APPROVED SUBDIVISION PLAT TO CONFIRM ALL BUILDING SETBACKS PRIOR TO ANY FOUNDATION WORK.
4. AS SOON AS PRACTICAL HOME BUILDER SHALL ESTABLISH VEGETATION (HYDROMULCH, SEEDING, SODDING, ETC...) TO PREVENT EROSION FROM OCCURRING.
5. CONTRACTOR SHALL CONTACT ENGINEER REGARDING ANY QUESTIONS ON THE INTENT OF THIS PLAN.
6. POSITIVE DRAINAGE SHALL BE MAINTAINED ON ALL SURFACE AREAS WITHIN THE SCOPE OF THIS PROJECT. DRAINAGE SHALL BE DIRECTED AWAY FROM ALL BUILDING FOUNDATIONS AND TOWARDS THE PROPER DRAINAGE EASEMENT OR STREET RIGHT OF WAY ACCORDING TO THE MASTER DRAINAGE PLAN FOR THE PROJECT. CONTRACTOR SHOULD TAKE PRECAUTIONS NOT TO ALLOW PONDING OF WATER.
7. ALL ELEVATIONS AND CONTOURS SHOWN ON THIS GRADING PLAN REFLECT FINISHED GRADES. THE THICKNESS OF PAVEMENT, CURBS, AND SIDEWALKS MUST BE SUBTRACTED TO OBTAIN SUBGRADE ELEVATIONS.
8. GRADING PLAN IS INTENDED FOR USE IN LOT GRADING ONLY. CONTRACTOR SHOULD REFER TO CONSTRUCTION DRAWINGS FOR ALL OTHER GRADES, INCLUDING, BUT NOT LIMITED TO, CHANNELS, ROADS, AND DETENTION PONDS.
9. CONTRACTOR SHALL ENSURE POSITIVE DRAINAGE ALL SWALES.

LEGEND

E.G.T.TV.E	=	ELECTRIC, GAS, TELEPHONE, CABLE T.V. EASEMENT
C.B.	=	COUNTY BLOCK
V.N.A.E.	=	VEHICULAR NON-ACCESS EASEMENT
➡	=	FLOW ARROW
(A)	=	LOT GRADE TYPE
H.P.	=	HIGH POINT
F.F. MIN= 598.0'	=	FINISHED FLOOR MINIMUM ELEVATION AS REQUIRED PER FLOODPLAIN (SEE NOTE THIS SHEET)
735	=	EXISTING CONTOUR
735	=	PROPOSED CONTOUR
735	=	EXISTING CONTOUR
+ 731.69	=	SPOT ELEVATION

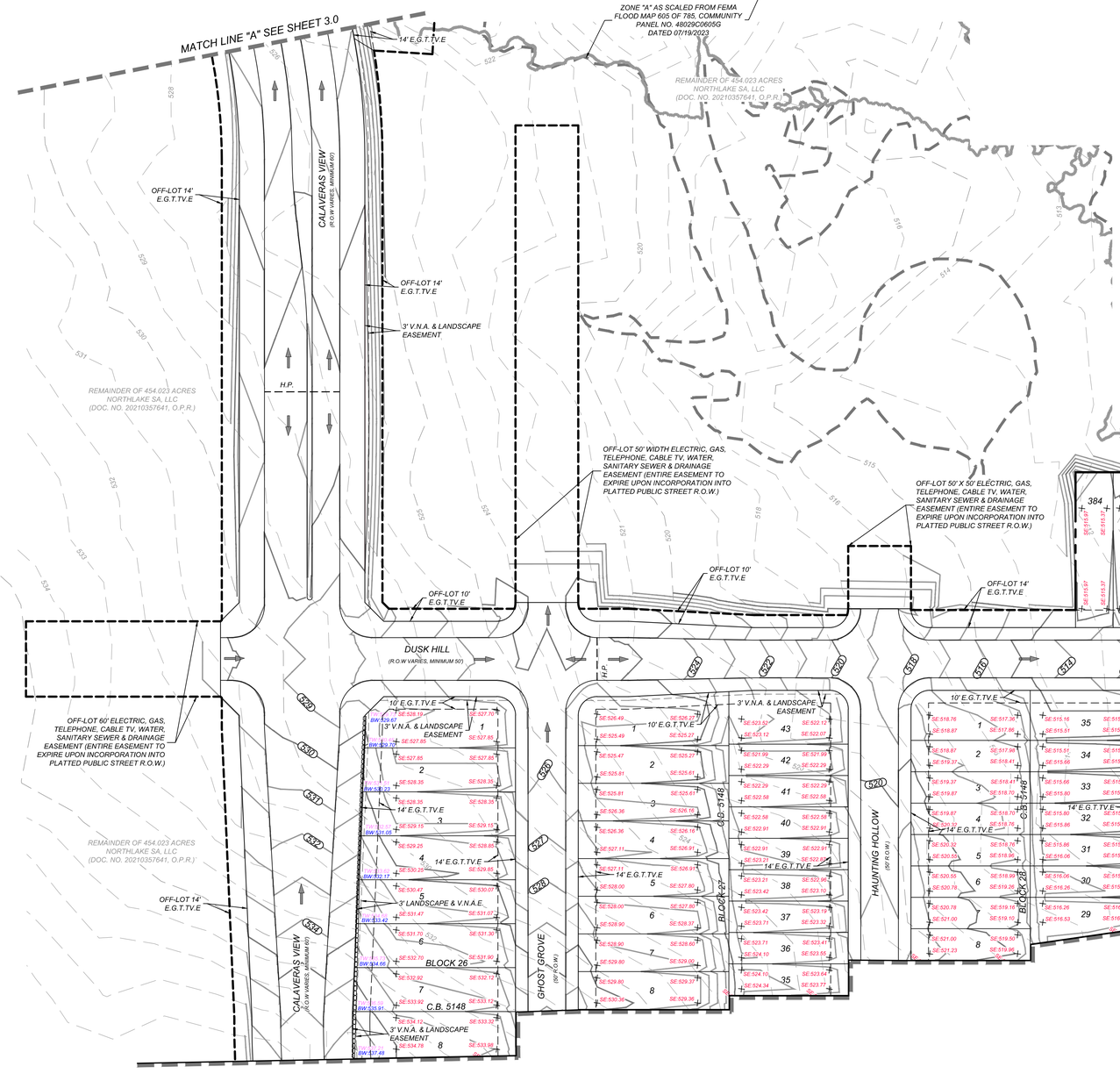


LOCATION MAP
SCALE: NOT-TO-SCALE



50 0 50 100

SCALE : 1" = 50'
Linear unit of measure: US Survey Foot (1 ft = 1200/3937 m)



Colliers
Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
7/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194500

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

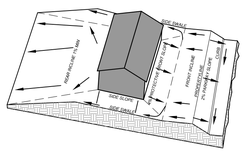
PROJECT NUMBER: 314-65-03
DRAWING NAME: GR314650 3 - DETAILED

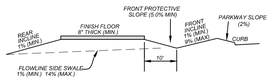
SHEET TITLE:
OVERALL GRADING PLAN (2 OF 3)

SHEET NUMBER:
3.1

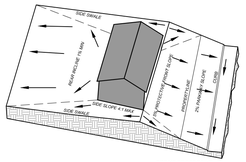
NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

I:\GR\314650\3 - Detailed.dwg\3.1 By: ABEL.MONTALVO

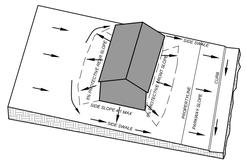




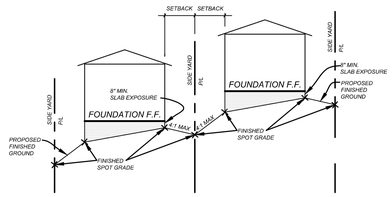
TYPE 'C' LOT GRADING



TYPE 'B' LOT GRADING



TYPE 'A' LOT GRADING



TYPICAL SIDE YARD GRADING
N.T.S.

GENERAL NOTES:

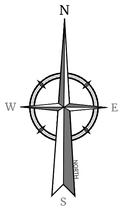
1. ELEVATION SHOWN ON FOUNDATION IS FOR FINISHED FLOOR.
2. CONTRACTOR SHALL PROVIDE OWNER ALL NECESSARY DENSITY TESTS FOR FILL LOTS AS REQUIRED BY HUD SPECIFICATIONS.
3. HOME BUILDER SHALL REFER TO THE APPROVED SUBDIVISION PLAT TO CONFIRM ALL BUILDING SETBACKS PRIOR TO ANY FOUNDATION WORK.
4. AS SOON AS PRACTICAL HOME BUILDER SHALL ESTABLISH VEGETATION (HYDROMULCH, SEEDING, SODDING, ETC...) TO PREVENT EROSION FROM OCCURRING.
5. CONTRACTOR SHALL CONTACT ENGINEER REGARDING ANY QUESTIONS ON THE INTENT OF THIS PLAN.
6. POSITIVE DRAINAGE SHALL BE MAINTAINED ON ALL SURFACE AREAS WITHIN THE SCOPE OF THIS PROJECT. DRAINAGE SHALL BE DIRECTED AWAY FROM ALL BUILDING FOUNDATIONS AND TOWARDS THE PROPER DRAINAGE EASEMENT OR STREET RIGHT OF WAY ACCORDING TO THE MASTER DRAINAGE PLAN FOR THE PROJECT. CONTRACTOR SHOULD TAKE PRECAUTIONS NOT TO ALLOW PONDING OF WATER.
7. ALL ELEVATIONS AND CONTOURS SHOWN ON THIS GRADING PLAN REFLECT FINISHED GRADES. THE THICKNESS OF PAVEMENT, CURBS, AND SIDEWALKS MUST BE SUBTRACTED TO OBTAIN SUBGRADE ELEVATIONS.
8. GRADING PLAN IS INTENDED FOR USE IN LOT GRADING ONLY. CONTRACTOR SHOULD REFER TO CONSTRUCTION DRAWINGS FOR ALL OTHER GRADES, INCLUDING, BUT NOT LIMITED TO, CHANNELS, ROADS, AND DETENTION PONDS.
9. CONTRACTOR SHALL ENSURE POSITIVE DRAINAGE ALL SWALES.

LEGEND

E.G.T.TV.E	=	ELECTRIC, GAS, TELEPHONE, CABLE T.V. EASEMENT
C.B.	=	COUNTY BLOCK
V.N.A.E.	=	VEHICULAR NON-ACCESS EASEMENT
➡	=	FLOW ARROW
(A)	=	LOT GRADE TYPE
H.P. F.F. MIN= 598.0'	=	HIGH POINT = FINISHED FLOOR MINIMUM ELEVATION AS REQUIRED PER FLOODPLAIN (SEE NOTE THIS SHEET)
735	=	EXISTING CONTOUR
735	=	PROPOSED CONTOUR
735	=	EXISTING CONTOUR
+ 731.69	=	SPOT ELEVATION



LOCATION MAP
SCALE: NOT-TO-SCALE



50 0 50 100

SCALE : 1" = 50'
Linear unit of measure: US Survey Foot (1 ft = 1200/3937 m)

REVISED 100-YR UD (ATLAS 14) FLOODPLAIN PER FLOOD STUDY PREPARED BY COLLIERS ENGINEERING & DESIGN DATED 08/26/2025

OFF-LOT 60' ELECTRIC, GAS, TELEPHONE, CABLE TV, WATER, SANITARY SEWER & DRAINAGE EASEMENT (ENTIRE EASEMENT TO EXPIRE UPON INCORPORATION INTO PLATTED PUBLIC STREET R.O.W.)

OFF-LOT 14' E.G.T.TV.E

OFF-LOT VARIABLE WIDTH ELECTRIC, GAS, TELEPHONE, CABLE TV, WATER, SANITARY SEWER & DRAINAGE EASEMENT (ENTIRE EASEMENT TO EXPIRE UPON INCORPORATION INTO PLATTED PUBLIC STREET R.O.W.)

OFF-LOT 50' X 50' ELECTRIC, GAS, TELEPHONE, CABLE TV, WATER, SANITARY SEWER & DRAINAGE EASEMENT (ENTIRE EASEMENT TO EXPIRE UPON INCORPORATION INTO PLATTED PUBLIC STREET R.O.W.)

OFF-LOT 50' X 50' ELECTRIC, GAS, TELEPHONE, CABLE TV, WATER, SANITARY SEWER & DRAINAGE EASEMENT (ENTIRE EASEMENT TO EXPIRE UPON INCORPORATION INTO PLATTED PUBLIC STREET R.O.W.)

REMAINDER OF 454.023 ACRES NORTHLAKE SA, LLC (DOC. NO. 20210357641, O.P.R.)

REMAINDER OF 454.023 ACRES NORTHLAKE SA, LLC (DOC. NO. 20210357641, O.P.R.)

UNPLATTED CITY PUBLIC SERVICE BOARD CITY OF SAN ANTONIO CALLED 234.61 ACRES CONDEMNATION PARCEL (NO CONVEYANCE DEED FOUND, DESCRIPTION IN VOLUME 6754, PAGE 403 O.P.R.)

Colliers Engineering & Design

www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
7/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: GR3146503 - DETAILED

SHEET TITLE:
OVERALL GRADING PLAN (3 OF 3)

SHEET NUMBER:
3.2

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

gr3146503 - Detailed.dwg 3.2 By: ABEL.MONTALVO

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 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. THE CONTRACTOR'S IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLIES 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.

CAUTION!!:

THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED 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.

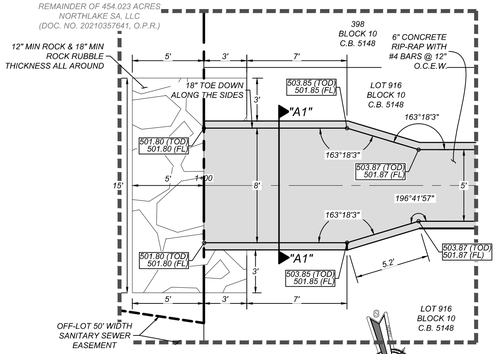
CHANNEL LINING:

PLEASE SEE SHEET 4.7 FOR TABLE 9.3.8.1 - RETARDATION CLASS FOR LINING MATERIALS AND TABLE 9.3.8.2 - PERMISSIBLE SHEAR STRESSES FOR VARIOUS LININGS

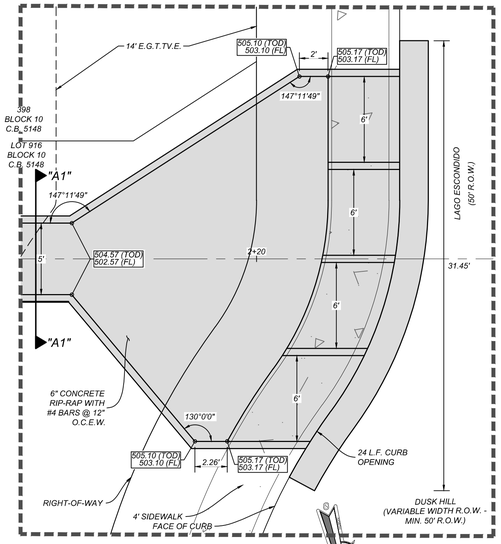
AREA'S EXCEEDING CITY OF SAN ANTONIO PERMISSIBLE SHEAR STRESS WILL BE REINFORCED WITH PROPOSED RETARDANCE CLASS D OR TURF REINFORCEMENT MAT (TRM) AS APPROVED BY CITY OF SAN ANTONIO STANDARD SPECIFICATIONS UNDER CONSTRUCTION ITEM 554.

BEXAR COUNTY R.O.W. NOTE:

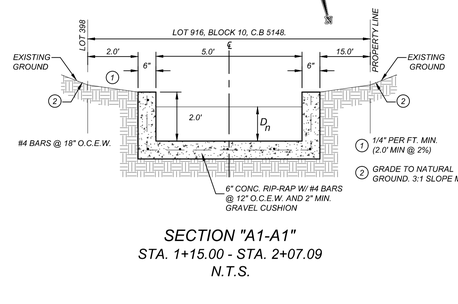
A BEXAR COUNTY PERMIT MUST BE OBTAINED BEFORE WORKING IN BEXAR COUNTY R.O.W.



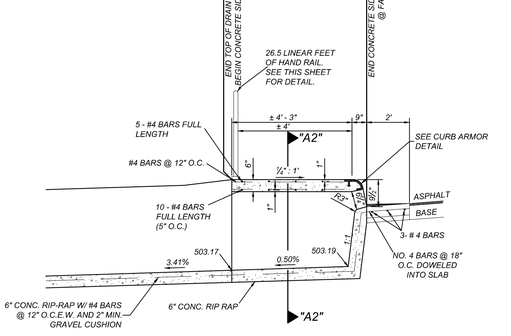
DETAIL "A1"
SCALE: 1"=5'



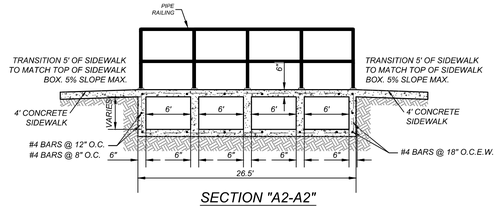
DETAIL "A2"
SCALE: 1"=5'



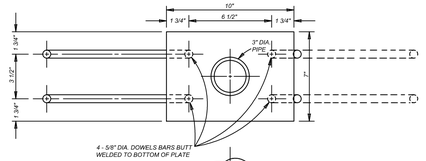
SECTION "A1-A1"
STA. 1+15.00 - STA. 2+07.09
N.T.S.



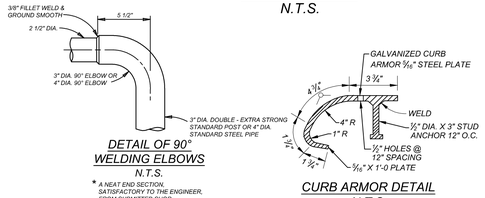
SIDEWALK BOX DETAIL
N.T.S.



SECTION "A2-A2"
N.T.S.



PIPE ANCHORAGE DETAILS
N.T.S.



TYPICAL SIDEWALK BRIDGE & SIDEWALK PIPE RAILING SECTION
N.T.S.

DETAIL OF 90° WELDING ELBOWS
N.T.S.

* A NEAT END SECTION, SATISFACTORY TO THE ENGINEER, FROM SUBMITTED SHOP DRAWINGS, MAY BE USED IN LIEU OF THE 90° WELDING ELBOW SHOWN.

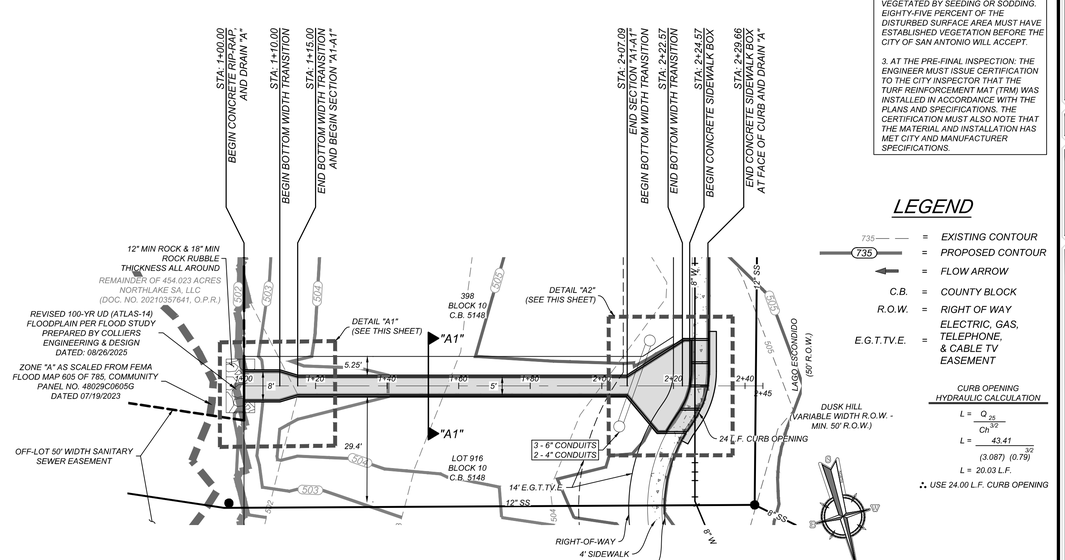
CURB ARMOR DETAIL
N.T.S.

NOTE:

1. ALL CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF NOT LESS THAN 3000 PSI IN 28 DAYS.

2. ANY DISTURBED AREAS WILL BE VEGETATED BY SEEDING OR SODDING. EIGHTY-FIVE PERCENT OF THE DISTURBED SURFACE AREA MUST HAVE ESTABLISHED VEGETATION BEFORE THE CITY OF SAN ANTONIO WILL ACCEPT.

3. AT THE PRE-FINAL INSPECTION: THE ENGINEER MUST ISSUE CERTIFICATION TO THE CITY INSPECTOR THAT THE TURF REINFORCEMENT MAT (TRM) WAS INSTALLED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. THE CERTIFICATION MUST ALSO NOTE THAT THE MATERIAL AND INSTALLATION HAS MET CITY AND MANUFACTURER SPECIFICATIONS.



DRAIN "A"
STA: 1+00.00 - END

HORZ SCALE: 1"=20'
VERT SCALE: 1"=5'

LEGEND

735	=	EXISTING CONTOUR
735	=	PROPOSED CONTOUR
	=	FLOW ARROW
C.B.	=	COUNTY BLOCK
R.O.W.	=	RIGHT OF WAY
E.G.T.TV.E.	=	ELECTRIC, GAS, TELEPHONE, & CABLE TV EASEMENT

CURB OPENING HYDRAULIC CALCULATION

$L = \frac{Q_{25}}{Cn^{3/2}}$

$L = \frac{43.41}{(3.087)\ (0.79)^{3/2}}$

$L = 20.03$ L.F.

∴ USE 24.00 L.F. CURB OPENING

Colliers Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
7/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: DR3146503 - ABC

SHEET TITLE: DRAIN "A" PLAN & PROFILE

SHEET NUMBER: 4.0

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

In:\ROJ\proj\DR3146503 - ABC.dwg/4.0 By: ABEL.MONTALVO

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 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. THE CONTRACTOR'S IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLIES 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.

CAUTION!!:

THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED 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.

CHANNEL LINING:

PLEASE SEE SHEET 4.7 FOR TABLE 9.3.8.1 - RETARDATION CLASS FOR LINING MATERIALS AND TABLE 9.3.8.2 - PERMISSIBLE SHEAR STRESSES FOR VARIOUS LININGS

AREA'S EXCEEDING CITY OF SAN ANTONIO PERMISSIBLE SHEAR STRESS WILL BE REINFORCED WITH PROPOSED RETARDANCE CLASS D OR TURF REINFORCEMENT MAT (TRM) AS APPROVED BY CITY OF SAN ANTONIO STANDARD SPECIFICATIONS UNDER CONSTRUCTION ITEM 554.

BEXAR COUNTY R.O.W. NOTE

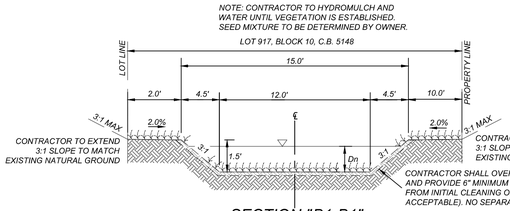
A BEXAR COUNTY PERMIT MUST BE OBTAINED BEFORE WORKING IN BEXAR COUNTY R.O.W.

NOTE:

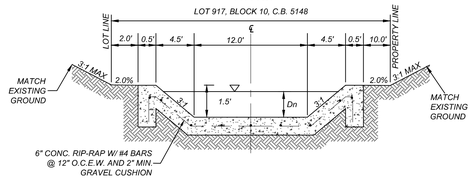
1. ALL CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF NOT LESS THAN 3000 PSI IN 28 DAYS.

2. ANY DISTURBED AREAS WILL BE VEGETATED BY SEEDING OR SODDING. EIGHTY-FIVE PERCENT OF THE DISTURBED SURFACE AREA MUST HAVE ESTABLISHED VEGETATION BEFORE THE CITY OF SAN ANTONIO WILL ACCEPT.

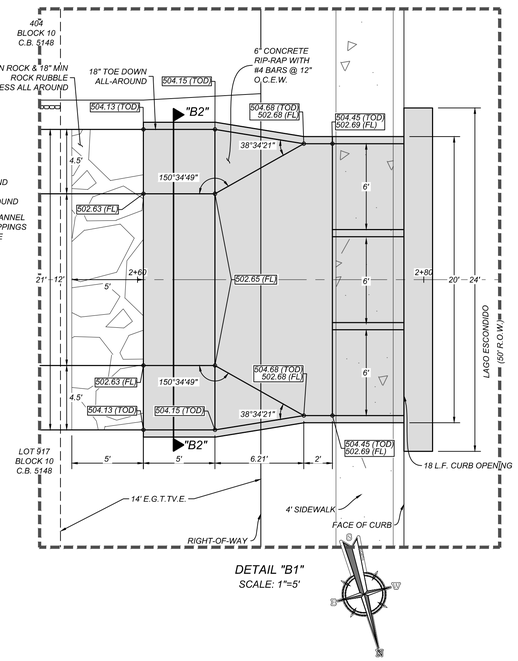
3. AT THE PRE-FINAL INSPECTION: THE ENGINEER MUST ISSUE CERTIFICATION TO THE CITY INSPECTOR THAT THE TURF REINFORCEMENT MAT (TRM) WAS INSTALLED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. THE CERTIFICATION MUST ALSO NOTE THAT THE MATERIAL AND INSTALLATION HAS MET CITY AND MANUFACTURER SPECIFICATIONS.



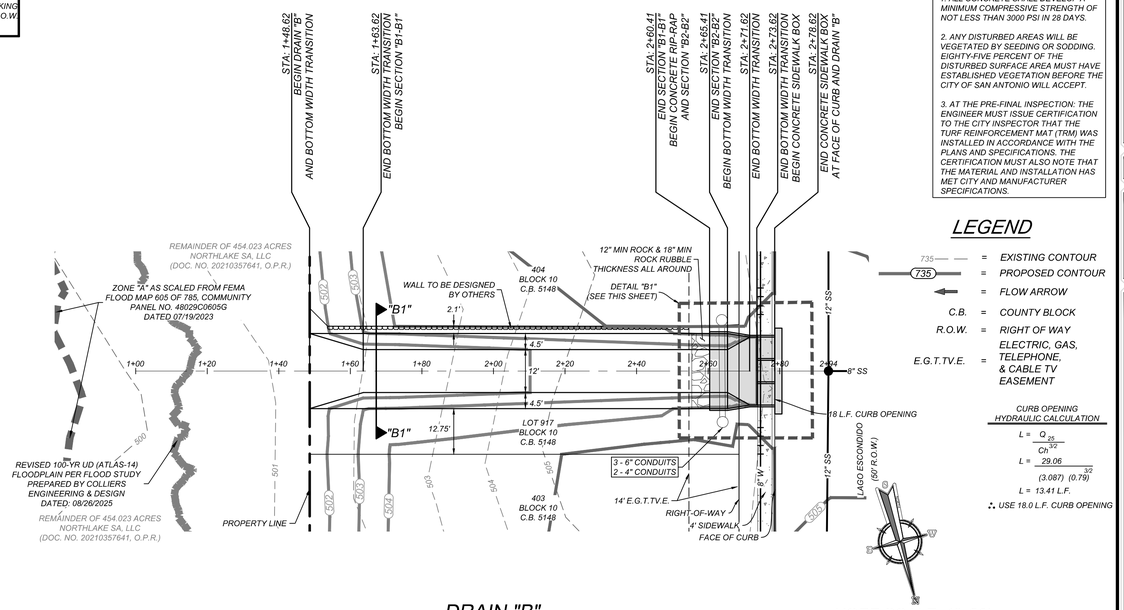
SECTION "B1-B1"
STA. 1+63.62 - STA. 2+60.41
N.T.S.



SECTION "B2-B2"
STA. 2+60.41 - STA. 2+65.41
N.T.S.



DETAIL "B1"
SCALE: 1"=5'



DRAIN "B"
STA: 1+48.62 - END

HORZ SCALE: 1"=20'
VERT SCALE: 1"=5'

LEGEND

- 735 — = *EXISTING CONTOUR*
- 735 = *PROPOSED CONTOUR*
- = *FLOW ARROW*
- C.B. = *COUNTY BLOCK*
- R.O.W. = *RIGHT OF WAY*
- E.G.T.TV.E. = *ELECTRIC, GAS, TELEPHONE, & CABLE TV EASEMENT*

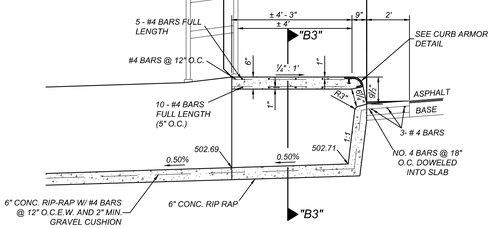
CURB OPENING HYDRAULIC CALCULATION

$L = \frac{Q_{25}}{Ch^{3/2}}$

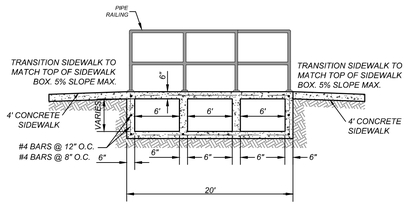
$L = \frac{29.06}{(3.087)\ (0.79)^{3/2}}$

$L = 13.41$ L.F.

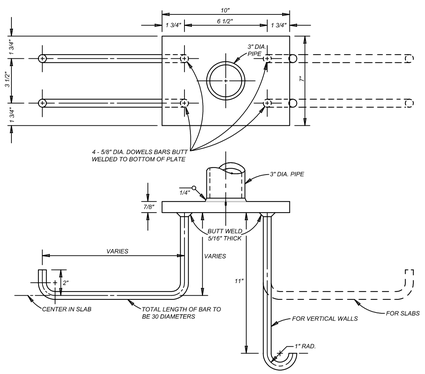
∴ USE 18.0 L.F. CURB OPENING



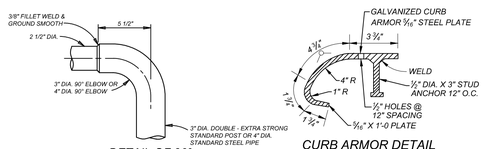
SIDEWALK BOX DETAIL
N.T.S.



SECTION "B3-B3"
N.T.S.



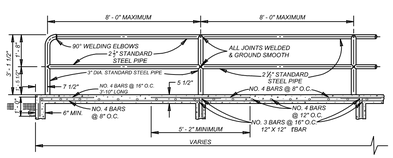
PIPE ANCHORAGE DETAILS
N.T.S.



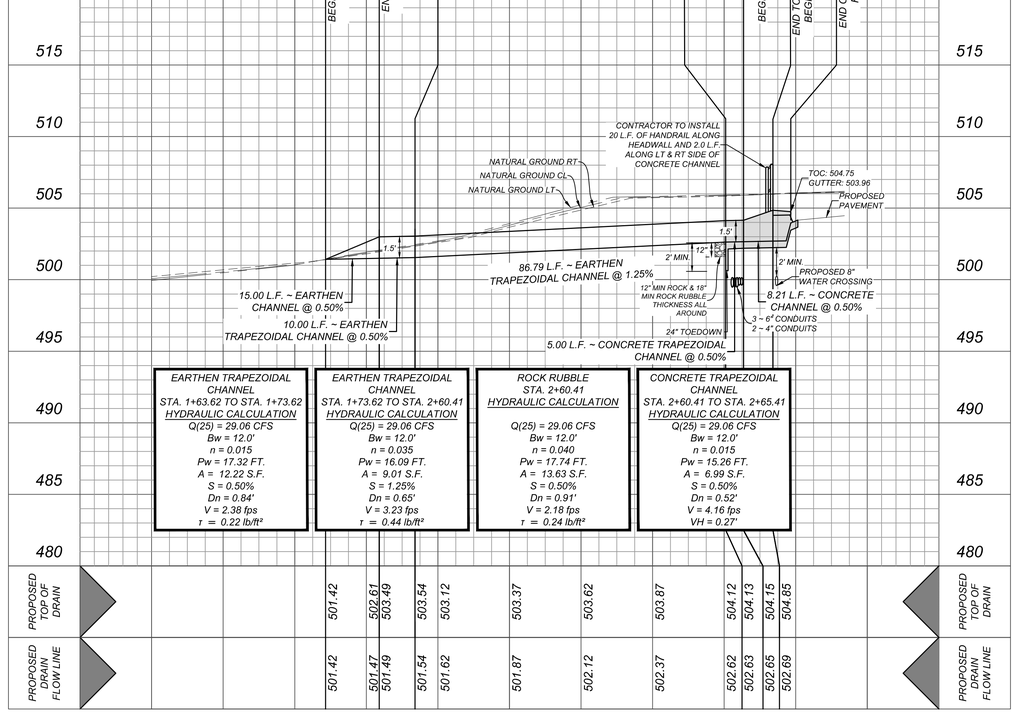
DETAIL OF 90° WELDING ELBOWS
N.T.S.

★ *A NEAT END SECTION, SATISFACTORY TO THE ENGINEER, FROM SUBMITTED SHOP DRAWINGS, MAY BE USED IN LIEU OF THE 90° WELDING ELBOW SHOWN.*

CURB ARMOR DETAIL
N.T.S.



TYPICAL SIDEWALK BRIDGE & SIDEWALK PIPE RAILING SECTION
N.T.S.



Colliers Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
7/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#:F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: DR3146503 - ABC

SHEET TITLE: DRAIN "B" PLAN & PROFILE

SHEET NUMBER: 4.1

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

\\ftDrains\2025\146503 - ABC.dwg\4.1 By:ABEL.MONTALVO

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 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. THE CONTRACTOR'S IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLIES 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.

CAUTION!!:

THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED 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.

CHANNEL LINING:

PLEASE SEE SHEET 4.7 FOR TABLE 9.3.8.1 - RETARDATION CLASS FOR LINING MATERIALS AND TABLE 9.3.8.2 - PERMISSIBLE SHEAR STRESSES FOR VARIOUS LININGS

AREA'S EXCEEDING CITY OF SAN ANTONIO PERMISSIBLE SHEAR STRESS WILL BE REINFORCED WITH PROPOSED RETARDANCE CLASS D OR TURF REINFORCEMENT MAT (TRM) AS APPROVED BY CITY OF SAN ANTONIO STANDARD SPECIFICATIONS UNDER CONSTRUCTION ITEM 554.

NOTE:

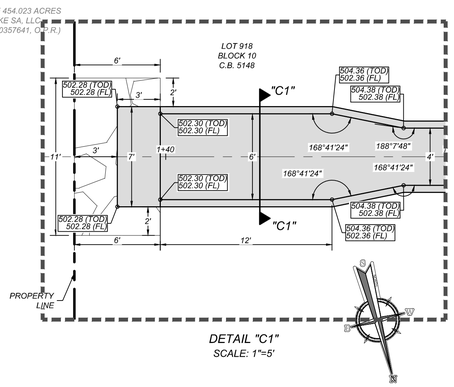
1. ALL CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF NOT LESS THAN 3000 PSI IN 28 DAYS.

2. ANY DISTURBED AREAS WILL BE VEGETATED BY SEEDING OR SODDING. EIGHTY-FIVE PERCENT OF THE DISTURBED SURFACE AREA MUST HAVE ESTABLISHED VEGETATION BEFORE THE CITY OF SAN ANTONIO WILL ACCEPT.

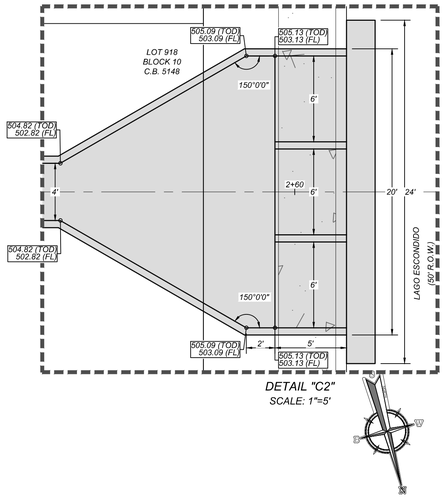
3. AT THE PRE-FINAL INSPECTION: THE ENGINEER MUST ISSUE CERTIFICATION TO THE CITY INSPECTOR THAT THE TURF REINFORCEMENT MAT (TRM) WAS INSTALLED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. THE CERTIFICATION MUST ALSO NOTE THAT THE MATERIAL AND INSTALLATION HAS MET CITY AND MANUFACTURER SPECIFICATIONS.

BEXAR COUNTY R.O.W. NOTE

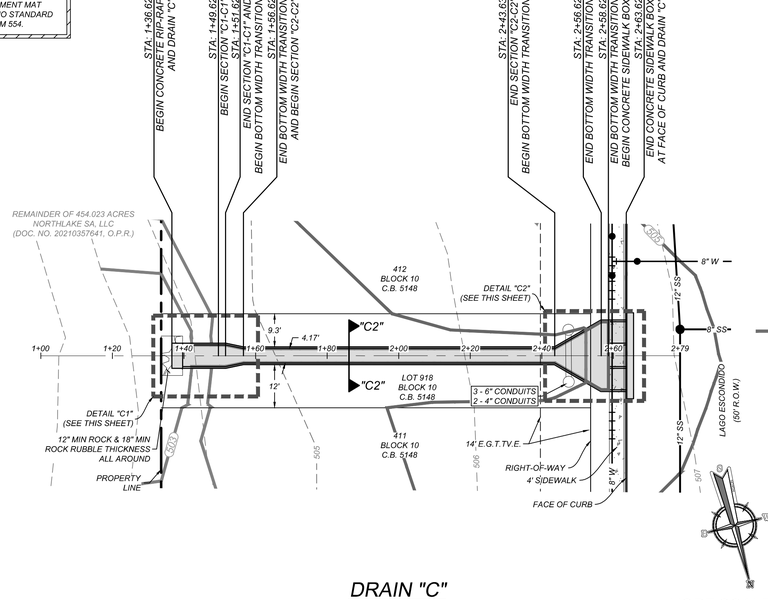
A BEXAR COUNTY PERMIT MUST BE OBTAINED BEFORE WORKING IN BEXAR COUNTY R.O.W.



DETAIL "C1"
SCALE: 1"=5'



DETAIL "C2"
SCALE: 1"=5'



LEGEND

- 735 — — = *EXISTING CONTOUR*
- 735 = *PROPOSED CONTOUR*
- = *FLOW ARROW*
- C.B. = *COUNTY BLOCK*
- R.O.W. = *RIGHT OF WAY*
- E.G.T.TV.E. = *ELECTRIC, GAS, TELEPHONE, & CABLE TV EASEMENT*

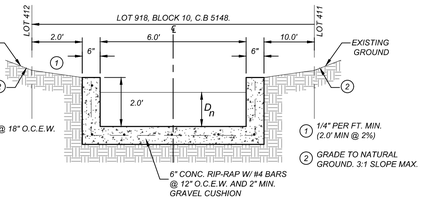
CURB OPENING HYDRAULIC CALCULATION

$L = \frac{Q_{25}}{Ch^{3/2}}$

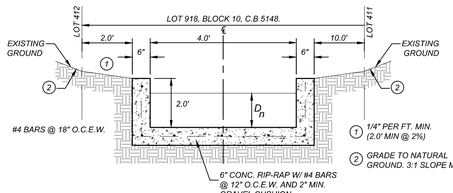
$L = \frac{35.21}{(3.087)\ (0.79)^{3/2}}$

$L = 16.24$ L.F.

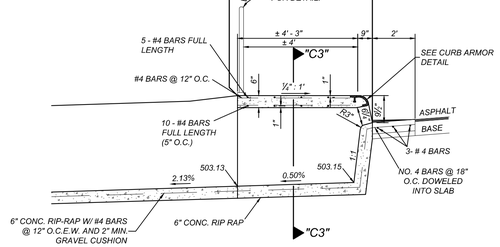
∴ *USE 18.0 L.F. CURB OPENING*



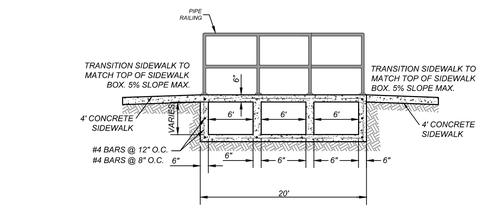
SECTION "C1-C1"
STA. 1+49.62 - STA. 1+51.62
N.T.S.



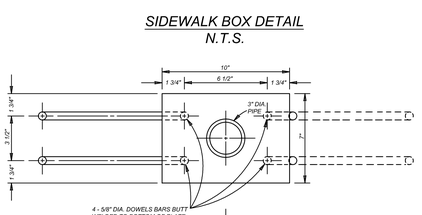
SECTION "C2-C2"
STA. 1+56.62 - STA. 2+43.63
N.T.S.



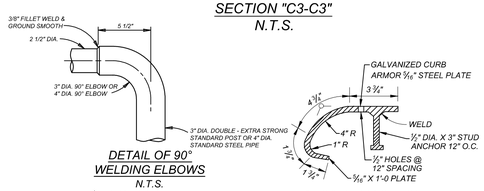
SIDEWALK BOX DETAIL
N.T.S.



SECTION "C3-C3"
N.T.S.



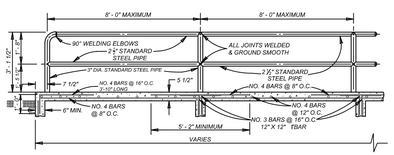
PIPE ANCHORAGE DETAILS
N.T.S.



DETAIL OF 90° WELDING ELBOWS
N.T.S.

* *A NEAT END SECTION, SATISFACTORY TO THE ENGINEER, FROM SUBMITTED SHOP DRAWINGS, MAY BE USED IN LIEU OF THE 90° WELDING ELBOW SHOWN.*

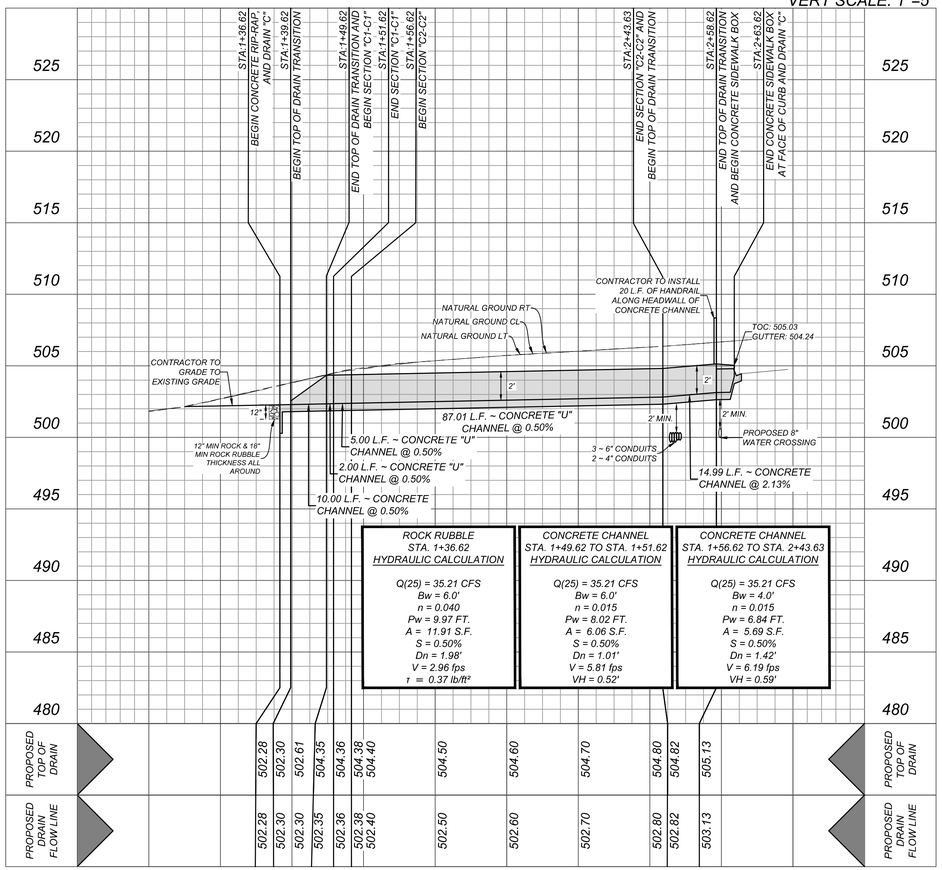
CURB ARMOR DETAIL
N.T.S.



TYPICAL SIDEWALK BRIDGE & SIDEWALK PIPE RAILING SECTION
N.T.S.

DRAIN "C"
STA: 1+00.00 - END

HORZ SCALE: 1"=20'
VERT SCALE: 1"=5'



ROCK RUBBLE STA. 1+36.62 HYDRAULIC CALCULATION	CONCRETE CHANNEL STA. 1+49.62 TO STA. 1+51.62 HYDRAULIC CALCULATION	CONCRETE CHANNEL STA. 1+56.62 TO STA. 2+43.63 HYDRAULIC CALCULATION
Q(25) = 35.21 CFS	Q(25) = 35.21 CFS	Q(25) = 35.21 CFS
Bw = 6.0'	Bw = 6.0'	Bw = 4.0'
n = 0.040	n = 0.015	n = 0.015
Pw = 9.97 FT.	Pw = 8.02 FT.	Pw = 6.84 FT.
A = 11.91 S.F.	A = 6.06 S.F.	A = 5.69 S.F.
S = 0.50%	S = 0.50%	S = 0.50%
Dn = 1.98'	Dn = 1.01'	Dn = 1.42'
V = 2.96 fps	V = 5.81 fps	V = 6.19 fps
τ = 0.37 lb/ft²	VH = 0.52'	VH = 0.59'

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

Colliers Engineering & Design

www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION
-	-	-	-

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
7/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

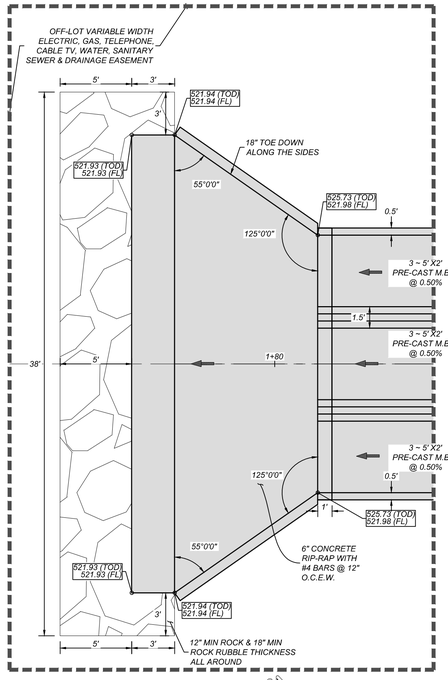
SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: DR3146503 - ABC

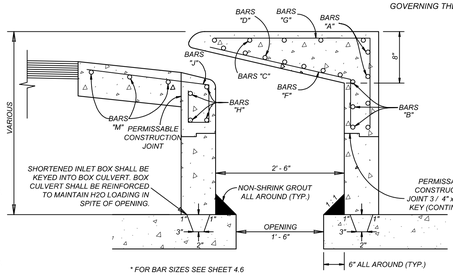
SHEET TITLE: DRAIN "C" PLAN & PROFILE

SHEET NUMBER: 4.2

\\ROData\DR3146503 - ABC.dwg\4.2 By: ABEL.MONTALVO



DETAIL "D1"
SCALE: 1"=5'



* FOR BAR SIZES SEE SHEET 4.6

TYPE "C" INLET OVER PRECAST BOX CULVERT
N.T.S.

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 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. THE CONTRACTOR'S IMPLEMENTATION OF THESE SYSTEMS, PROGRAMS AND/OR PROCEDURES SHALL PROVIDE FOR ADEQUATE TRENCH EXCAVATION SAFETY PROTECTION THAT COMPLIES 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.

CAUTION!!

THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED 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.

CHANNEL LINING:

PLEASE SEE SHEET 4.7 FOR TABLE 9.3.8.1 - RETARDATION CLASS FOR LINING MATERIALS AND TABLE 9.3.8.2 - PERMISSIBLE SHEAR STRESSES FOR VARIOUS LININGS

AREA'S EXCEEDING CITY OF SAN ANTONIO PERMISSIBLE SHEAR STRESS WILL BE REINFORCED WITH PROPOSED RETARDANCE CLASS D OR TURF REINFORCEMET MAT (TRM) AS APPROVED BY CITY OF SAN ANTONIO STANDARD SPECIFICATIONS UNDER CONSTRUCTION ITEM 554.

NOTE:

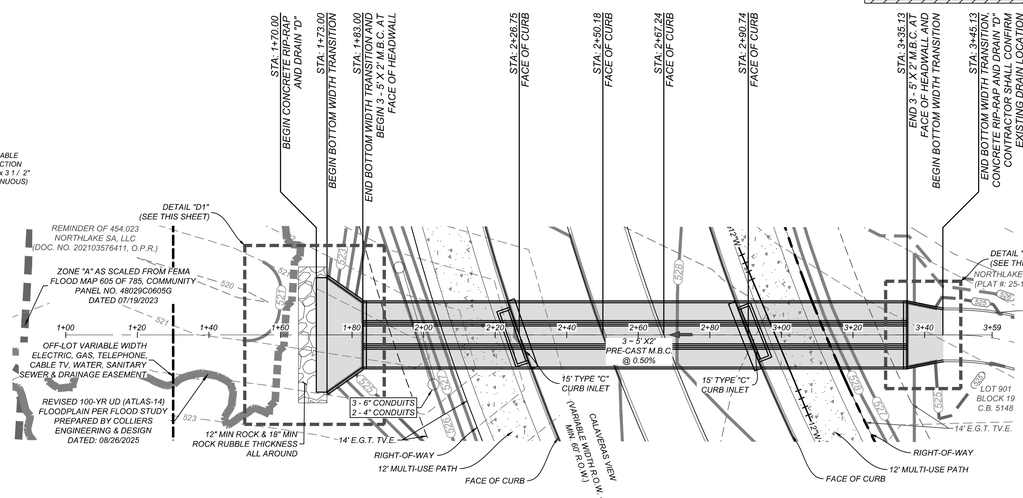
1. ALL CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF NOT LESS THAN 3000 PSI IN 28 DAYS.

2. ANY DISTURBED AREAS WILL BE VEGETATED BY SEEDING OR SODDING. EIGHTY-FIVE PERCENT OF THE DISTURBED SURFACE AREA MUST HAVE ESTABLISHED VEGETATION BEFORE THE CITY OF SAN ANTONIO WILL ACCEPT.

3. AT THE PRE-FINAL INSPECTION, THE ENGINEER MUST ISSUE CERTIFICATION TO THE CITY INSPECTOR THAT THE TURF REINFORCEMENT MAT (TRM) WAS INSTALLED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS. THE CERTIFICATION MUST ALSO NOTE THAT THE MATERIAL AND INSTALLATION HAS MET CITY AND MANUFACTURER SPECIFICATIONS.

BEXAR COUNTY R.O.W. NOTE

A BEXAR COUNTY PERMIT MUST BE OBTAINED BEFORE WORKING IN BEXAR COUNTY R.O.W.



DRAIN "D"
STA: 1+00.00 - END

HORZ SCALE: 1"=20'
VERT SCALE: 1"=5'

LEGEND

735	=	EXISTING CONTOUR
735	=	PROPOSED CONTOUR
	=	FLOW ARROW
C.B.	=	COUNTY BLOCK
R.O.W.	=	RIGHT OF WAY
E.G.T.TV.E.	=	ELECTRIC, GAS, TELEPHONE, & CABLE TV EASEMENT

CURB OPENING (DOWNSTREAM) HYDRAULIC CALCULATION

$L = \frac{Q_{25}}{Ch^{3/2}}$

$L = \frac{20.17}{(0.087)\ (0.79)^{3/2}}$

L = 9.31 L.F.

∴ USE 15.0 L.F. CURB OPENING

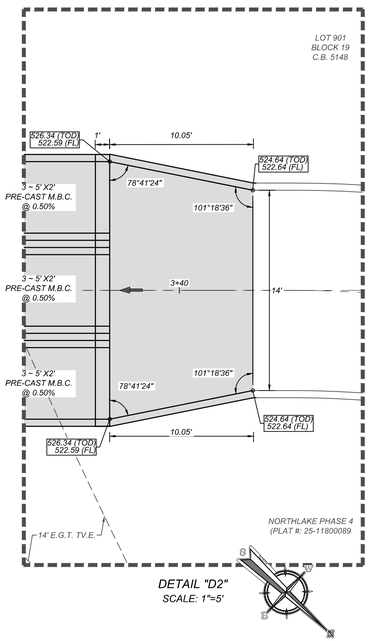
CURB OPENING (UPSTREAM) HYDRAULIC CALCULATION

$L = \frac{Q_{25}}{Ch^{3/2}}$

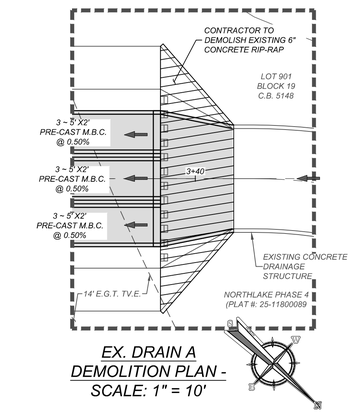
$L = \frac{27.39}{(0.087)\ (0.79)^{3/2}}$

L = 12.64 L.F.

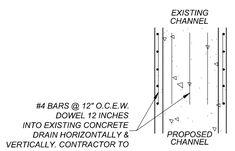
∴ USE 15.0 L.F. CURB OPENING



DETAIL "D2"
SCALE: 1"=5'

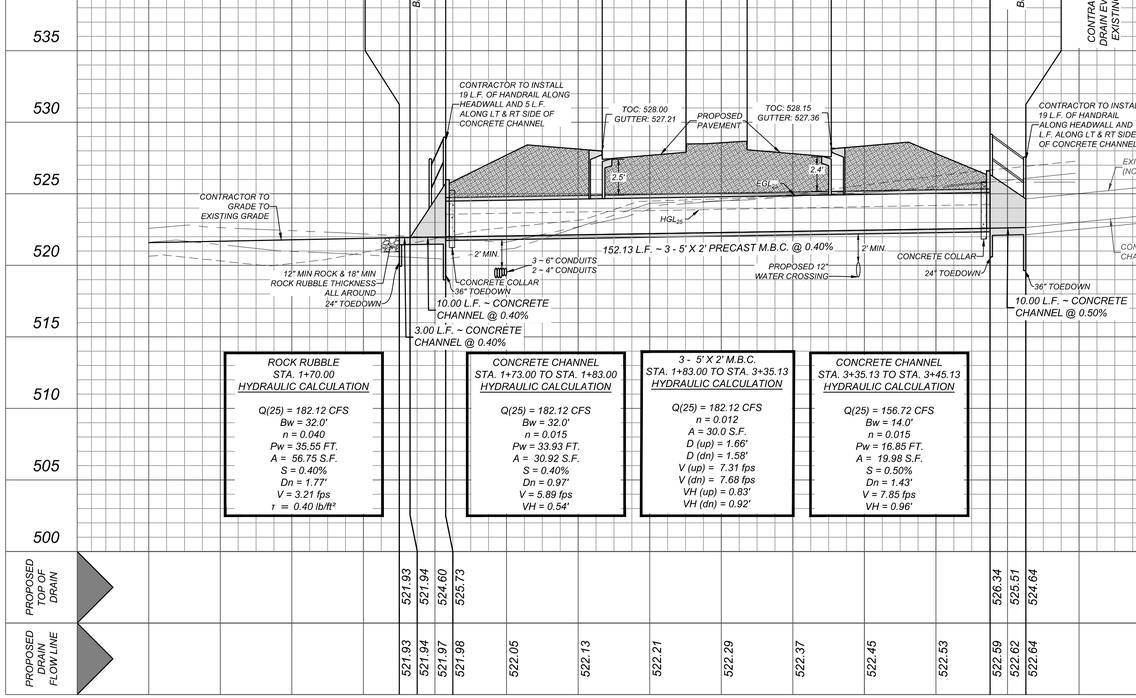


EX. DRAIN A
DEMOLITION PLAN -
SCALE: 1" = 10'



CONCRETE TIE-IN DETAIL
N.T.S.

MATERIAL	UNITS	QUANTITIES
6"" CONCRETE RIP-RAP	S.Y.	34.83
BAFFLE BLOCKS	C.Y.	0.25



Colliers
Engineering & Design
www.colliersengineering.com
Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.
Formerly Known as KFW ENGINEERS & SURVEYING
PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
126560
LICENSED PROFESSIONAL ENGINEER
9/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#:F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: DR3146503 - D

SHEET TITLE: DRAIN "D" PLAN & PROFILE

SHEET NUMBER: 4.3

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

W:\Drain\03\314503 - D.dwg\4.3 By: ABEL.MONTALVO

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for errors or omissions that may appear in this standard or in any electronic files derived therefrom. In no event shall TxDOT be liable for damages arising from its use. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

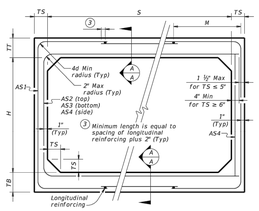
DATE:
FILE:

BOX DATA

SECTION DIMENSIONS						Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)		(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
5	2	8	7	6	< 2	-	-	0.19	0.27	0.18	0.14	0.19	0.19	0.17	6.0
5	2	6	6	6	2 < 3	44		0.22	0.20	0.16	0.14	-	-	-	5.1
5	2	6	6	6	3 - 5	44		0.16	0.14	0.14	0.14	-	-	-	5.1
5	2	6	6	6	5 - 10	36		0.15	0.14	0.14	0.14	-	-	-	5.1
5	2	6	6	6	15	36		0.20	0.18	0.18	0.14	-	-	-	5.1
5	2	6	6	6	20	36		0.26	0.23	0.24	0.14	-	-	-	5.1
5	2	6	6	6	25	36		0.33	0.29	0.29	0.14	-	-	-	5.1
5	2	6	6	6	30	36		0.39	0.34	0.35	0.14	-	-	-	5.1
5	3	8	7	6	< 2	-		0.19	0.31	0.21	0.14	0.19	0.19	0.17	6.6
5	3	6	6	6	2 < 3	45		0.18	0.24	0.19	0.14	-	-	-	5.7
5	3	6	6	6	3 - 5	36		0.14	0.17	0.16	0.14	-	-	-	5.7
5	3	6	6	6	10	36		0.14	0.16	0.17	0.14	-	-	-	5.7
5	3	6	6	6	15	35		0.16	0.21	0.22	0.14	-	-	-	5.7
5	3	6	6	6	20	35		0.21	0.27	0.28	0.14	-	-	-	5.7
5	3	6	6	6	25	35		0.26	0.34	0.34	0.14	-	-	-	5.7
5	3	6	6	6	30	35		0.31	0.41	0.41	0.14	-	-	-	5.7
5	4	8	7	6	< 2	-		0.19	0.33	0.24	0.14	0.19	0.19	0.17	7.2
5	4	6	6	6	2 < 3	45		0.16	0.27	0.22	0.14	-	-	-	6.3
5	4	6	6	6	3 - 5	45		0.14	0.19	0.18	0.14	-	-	-	6.3
5	4	6	6	6	10	36		0.14	0.18	0.18	0.14	-	-	-	6.3
5	4	6	6	6	15	35		0.14	0.23	0.24	0.14	-	-	-	6.3
5	4	6	6	6	20	35		0.17	0.30	0.31	0.14	-	-	-	6.3
5	4	6	6	6	25	35		0.21	0.37	0.38	0.14	-	-	-	6.3
5	4	6	6	6	30	35		0.25	0.44	0.45	0.14	-	-	-	6.3
5	5	8	7	6	< 2	-		0.19	0.35	0.26	0.14	0.19	0.19	0.17	7.8
5	5	6	6	6	2 < 3	45		0.14	0.29	0.24	0.14	-	-	-	6.9
5	5	6	6	6	3 - 5	45		0.14	0.21	0.20	0.14	-	-	-	6.9
5	5	6	6	6	10	45		0.14	0.19	0.20	0.14	-	-	-	6.9
5	5	6	6	6	15	36		0.14	0.24	0.25	0.14	-	-	-	6.9
5	5	6	6	6	20	35		0.15	0.31	0.32	0.14	-	-	-	6.9
5	5	6	6	6	25	35		0.18	0.38	0.39	0.14	-	-	-	6.9
5	5	6	6	6	30	35		0.21	0.46	0.47	0.14	-	-	-	6.9

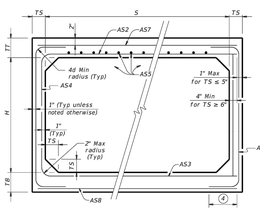
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

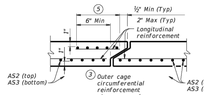
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

(4) Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ).



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:
Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.
Provide Class H concrete (f'c = 5,000 psi).

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)"

HL93 LOADING

Texas Department of Transportation — Bridge Division Standard

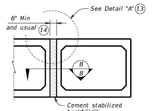
SINGLE BOX CULVERTS PRECAST 5'-0" SPAN

SCP-5

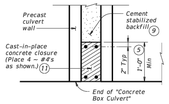
FILE: CD-SCP05-20.dgn		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020		CONT	SECT	JOB	HIGHWAY
REVISIONS		DIST	COUNTY		SHEET NO.

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for errors or omissions that may appear in this standard or in any electronic files derived therefrom. In no event shall TxDOT be liable for damages arising from its use.

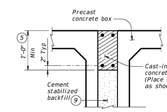
DATE:
FILE:



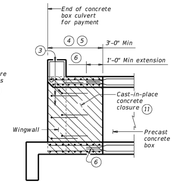
MULTIPLE UNIT PLACEMENT



SECTION B-B

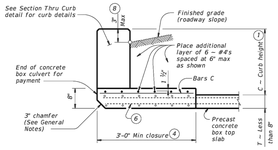


DETAIL "A" (13)

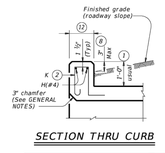


WINGWALL CONNECTION

(Also applies to safety end treatment.)

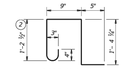


SECTION THRU TOP SLABS LESS THAN 8"



SECTION THRU CURB

QUANTITIES PER FOOT OF CURB (10)	
Reinforcing Steel	4.12 Lb
Concrete	0.037 CY



BARS C (#4)
(Spa = 1'-0" Max)

BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

(1) 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail, or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

(2) For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

(3) Extend curb, wingwall, or safety end treatment reinforcing into concrete closure. Bend or trim, as necessary, any reinforcing that does not fit into closure area.

(4) Provide a 3'-0" Min cast-in-place concrete closure. Break back boxes in the field or cast boxes short. Provide bends of reinforcing in the closure that are the same size and spacing as in the precast box section. Provide #4 longitudinal reinforcement spaced at 12 inches Max within the closure. Except where shown otherwise, construct the cast-in-place closure flush with the inside and outside faces of the precast box section.

(5) For multiple unit placements, adjust the length of the closure for the interior walls as necessary. Provide a 3'-0" Min cast-in-place closure in the top slab, bottom slab, and exterior wall. See Section B-B detail when interior walls are cast full length.

(6) Extend precast box reinforcing a minimum of 1'-0" into concrete closure (Typ).

(7) Place bands of reinforcing matching the inside and outside face reinforcing in the gaps of the top and bottom slabs. Place a band matching the outside face reinforcing of the wall in the gaps of the walls (placed in the outside face only). Tack weld the bands to the exposed reinforcing at each point of contact.

(8) For vehicle safety, the following requirements must be met:
- For structures without bridge rail, construct curbs no more than 3" above finished grade.
- For structures with bridge rail, construct curbs flush with finished grade. Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

(9) Cement stabilized backfill between boxes is considered part of the box culvert for payment.

(10) All curb concrete and reinforcing is considered part of the box culvert for payment.

(11) Any additional concrete and reinforcing required for the closures will be considered subsidiary to the box culvert for payment.

(12) 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elsewhere in the plans.

(13) For multiple unit placement with overlay, with 1 to 2 course surface treatment, or with the top slab as the final riding surface, provide wall closure as shown in Detail "A".

(14) This dimension may be increased with approval of the Engineer to allow the precast boxes to be tunneled or jacked in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box." No payment will be made for any additional material in the gap between adjacent boxes.

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide ASTM A1064 welded wire reinforcement.
Provide Class C concrete (f'c = 3,600 psi) for the closures.
Provide cement stabilized backfill meeting the requirements of Item 400, "Excavation and Backfill for Structures."
Any additional concrete required for the closures will be considered subsidiary to the box culvert.

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Refer to Box Culverts Precast (SCP) standard sheets for details and notes not shown.
Chamfer the bottom edge of the top slab closure 3 inches at culvert closure ends.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions are out-to-out of bars.

HL93 LOADING

Texas Department of Transportation — Bridge Division Standard

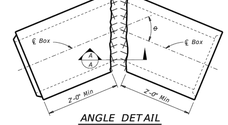
BOX CULVERTS PRECAST MISCELLANEOUS DETAILS

SCP-MD

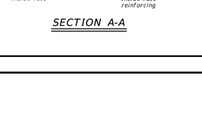
FILE: CD-SCP-MD-20.dgn		DN: GAF	CK: CRW	DW: BWH/TxDOT	CK: GAF
©TxDOT February 2020		CONT	SECT	JOB	HIGHWAY
REVISIONS		DIST	COUNTY		SHEET NO.

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for errors or omissions that may appear in this standard or in any electronic files derived therefrom. In no event shall TxDOT be liable for damages arising from its use.

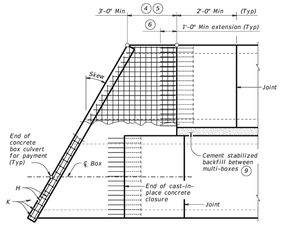
DATE:
FILE:



ANGLE DETAIL

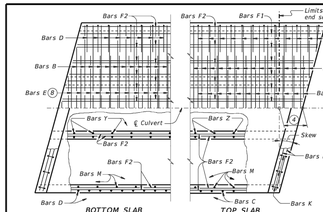


SECTION A-A



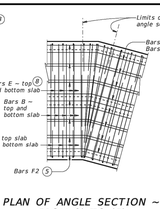
PLAN OF SKEWED ENDS

(Showing multi-box placement.)

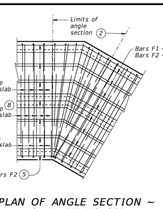


BOTTOM SLAB

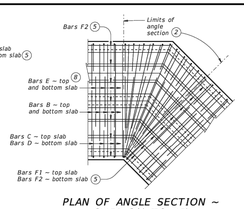
PLAN OF SKEWED ENDS ~ FROM 0° TO 15° (7)



PLAN OF ANGLE SECTION ~ FROM 0° TO 15°



PLAN OF ANGLE SECTION ~ OVER 15° TO 30°



PLAN OF ANGLE SECTION ~ OVER 30° TO 45°

(1) For skewed box culverts with less than 2'-0" of fill, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension.
For non-skewed box culverts with less than 2'-0" of fill and for skewed or non-skewed culverts with a fill depth of 2'-0" or greater, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension. Alternatively, if the box is non-skewed, embed #6 anchor bars with a Type III, Class C, D, E, or F anchor adhesive into the existing walls, top and bottom slab at 1'-0" centers-center spacing. Minimum embedment depth is 8". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 26.4 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop the Nba to the Engineer for approval prior to use. Anchor installation, including hole size, drilling and clean out, must be in accordance with Item 450, "Railing." Test adhesive anchors in accordance with Item 450.3.3, "Tests." Test 3 anchors per 100 anchors installed.
Break back wings and apron as necessary to install the extension. Clean and extend the exposed wingwall and apron reinforcing into the extension. When lengthening existing box culverts with dimensions different than current standard dimensions, form horizontal and vertical transitions as directed by the Engineer. Match bottom slabs to maintain an uninterrupted flow line. Field bend existing and new reinforcing into transitions and maintain specified cover requirements. For top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface, adjust the "H" dimension to provide a smooth riding surface.

(2) When the spacing between Bars B or Bars E becomes less than half of the normal spacing, cut bars to avoid conflict.

(3) The length of Bars B and Bars E will vary in the skewed end sections.

(4) (one half of overall width) x [tangent of the skew angle]

(5) Place Bars F1 and F2 continuously through the angle section. Bend Bars F1 and F2 to remain parallel to the walls of the box culvert.

(6) When necessary to avoid conflict in acute corners, shorten the slab extension leg of Bars C and Bars D to a minimum of 1'-0" for skews of 30° thru 45°.

(7) At the Contractor's option, for skews of 15° or less, place Bars B, C, D, and E parallel to the skewed end while maintaining spacing along centerline of box. Increase lengths of Bars B and Bars E shown on the Multiple Box Culverts Cast-In-Place (MC) standard sheets to accommodate the skew.

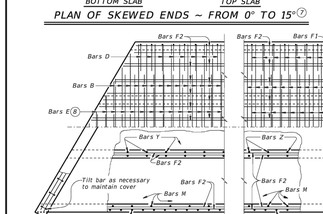
(8) Extend Bars E as shown on the MC standard sheet for direct traffic culverts.

CONSTRUCTION NOTES:
Do not use permanent forms.
When required, lap Bars H 1'-8" for uncoated or galvanized bars.
Provide a minimum of 1 ½" clear cover.

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel, if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) with these exceptions:
provide Class S concrete (f'c = 4,000 psi) for top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface.

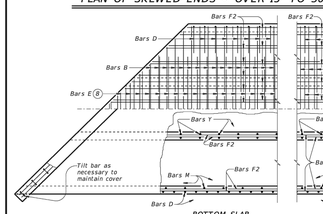
GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Refer to Multiple Box Culverts Cast-in-Place (MC) standard sheets for details of straight sections of culvert.
For skewed sections and angle sections, refer to Multiple Box Culverts Cast-in-Place (MC) standard sheets for slab and wall dimensions, bar sizes, maximum bar spacing, and any other details not shown.
For skewed ends with curbs, adjust length of Bars H, number of Bars K, curb concrete volume, and reinforcing steel weight by dividing the values shown on the Multiple Box Culverts Cast-In-Place (MC) standard sheets by the cosine of the skew angle.

Cover dimensions are clear dimensions, unless noted otherwise.



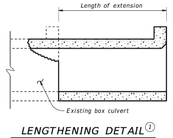
BOTTOM SLAB TOP SLAB

PLAN OF SKEWED ENDS ~ OVER 15° TO 30°



BOTTOM SLAB TOP SLAB

PLAN OF SKEWED ENDS ~ OVER 30° TO 45°



LENGTHENING DETAIL (1)

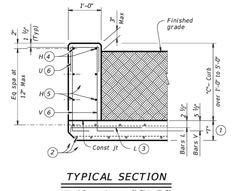
HL93 LOADING

Texas Department of Transportation — Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE MISCELLANEOUS DETAILS

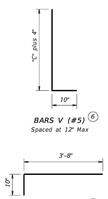
MC-MD

FILE: CD-MC-MD-20.dgn		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020		CONT	SECT	JOB	HIGHWAY
REVISIONS		DIST	COUNTY		SHEET NO.



TYPICAL SECTION

Used for curbs over 1'-0" to 5'-0"

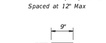


BARS V (#5) (6)
Spaced at 12" Max

BARS L (#5) (3)
Spaced at 12" Max



OPTIONAL BARS L (#5) (3) (7)
Spaced at 12" Max



BARS U (#4) (6)
Spaced at 12" Max

TABLE OF ESTIMATED CURB QUANTITIES (8)

Curb Height "C"	Conc (CY/LF)	Reinf Steel (LB/LF)
1'-0"	0.037	10.4
1'-6"	0.056	14.5
2'-0"	0.074	15.6
2'-6"	0.093	18.0
3'-0"	0.111	19.0
3'-6"	0.130	21.3
4'-0"	0.148	22.4
4'-6"	0.167	24.8
5'-0"	0.185	25.9

(1) "T" is equal to the culvert top slab thickness. For precast boxes with slabs less than 8" thick, see SCP-MD standard for additional details.

(2) Adjust normal culvert slab bars as necessary to clear obstructions.

(3) Place bars L as shown. Tilt hook as necessary to maintain cover.

(4) Place normal culvert curb bars H(#4) as shown. Adjust as necessary to clear obstructions.

(5) Additional bars H(#4) as required to maintain 12" Max spacing.

(6) Replace normal culvert curb bars K with one bar U and two bars V as shown spaced at 12" Max. Adjust length of bars V as necessary to maintain clear cover.

(7) Optional bars L are to be used only for precast box culverts with 3'-0" closure pour.

(8) Quantities shown are for Contractor's information only. Quantities are per linear foot of curb length. The value in table can be interpolated for intermediate values of curb height, "C". Quantity includes bars K (when applicable).

CONSTRUCTION NOTES:
Adjust reinforcing steel as necessary to provide 1 ½" cover.
For vehicle safety, top of the curb must not project more than 3" above the finished grade.

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class "C" concrete (f'c = 3,600 psi) minimum for curbs.
Provide bar laps, where required, as follows:
• Uncoated or galvanized – #4 = 1'-8" Min

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
These extended curb details have sufficient strength to allow for future retrofit of Type T631 or T631LS railing. These details are suitable for use with PR11, PR22 and PR3 type rails. These details are not suitable for the mounting of other rail types. For new construction using T631 or T631LS railing, use the T631-CM standard.
This Curb is considered as part of the Box Culvert for payment.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

Texas Department of Transportation — Bridge Division Standard

EXTENDED CURB DETAILS FOR BOX CULVERTS WITH CURBS OVER 1'-0" TO 5'-0" TALL

ECD

FILE: CD-ECD-20.dgn		DN: GAF	CK: TxDOT	DW: TxDOT	CK: GAF
©TxDOT February 2020		CONT	SECT	JOB	HIGHWAY
REVISIONS		DIST	COUNTY		SHEET NO.

Colliers Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all of the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, revised, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
Texas One Call System, Inc. Call before you dig!
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
126560
LICENSED
PROFESSIONAL ENGINEER
9/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: DRDT3146503

SHEET TITLE:
DRAIN DETAILS (1 OF 4)

SHEET NUMBER:
4.4

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

I:\ROdrain\DRDT3146503.dwg\4.4 By: ABEL.MONTALVO

TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

Maximum Wingwall Height Hw	W	X	Y	Z	Bars J1 Size	Bars J1 Spa	Bars J2 Size	Bars J2 Spa	Estimated Quantities per ft of wing (2-wings) ④ Reinf (Lb/Ft)	Reinf (Lb/Ft)	Conc (CY/Ft)	Estimated Quantities per ft of toewall (1-toewall) Conc (CY/Ft)
2'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	48.64	0.406	6.85	0.071
2'-9"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.31	0.424	6.85	0.071
3'-0"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.98	0.444	6.85	0.071
3'-3"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.32	0.462	6.85	0.071
3'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.98	0.480	6.85	0.071
3'-9"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	55.77	0.532	6.85	0.071
4'-6"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	59.77	0.568	6.85	0.071
5'-0"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	63.45	0.632	6.96	0.075
5'-6"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	67.46	0.668	6.96	0.075
6'-0"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	80.67	0.730	7.07	0.078
6'-6"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	85.05	0.768	7.07	0.078
7'-0"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	92.15	0.864	8.07	0.093
7'-6"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	96.54	0.902	8.07	0.093
8'-0"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	139.04	0.962	8.13	0.095
8'-6"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	144.47	1.000	8.13	0.095
9'-0"	6'-0"	2'-10"	2'-2"	9"	#5	6"	#5	6"	158.51	1.136	8.41	0.110
10'-6"	6'-5"	3'-0"	2'-5"	9"	#6	6"	#5	6"	346.72	1.204	8.57	0.117
11'-6"	7'-2"	3'-6"	2'-8"	11"	#6	6"	#6	6"	230.13	1.438	9.52	0.140
12'-6"	7'-8"	3'-9"	2'-11"	11"	#6	6"	#6	6"	238.41	1.592	9.74	0.153
13'-6"	8'-2"	4'-0"	3'-2"	1'-2"	#8	6"	#6	6"	348.72	1.804	10.02	0.186
14'-6"	8'-10"	4'-5"	3'-5"	1'-4"	#9	6"	#6	6"	432.94	2.046	10.30	0.218
15'-6"	9'-6"	4'-10"	3'-8"	1'-6"	#9	6"	#7	6"	489.52	2.302	11.24	0.253
16'-0"	9'-11"	5'-0"	3'-11"	1'-3"	#9	less than 8"	#7	6"	505.72	2.448	11.47	0.279

TABLE OF WINGWALL REINFORCING (2-wings)

Bar	Size	No.	Spa
D1	#6	–	1'-0"
D2	#6	–	1'-0"
E1	#4	–	1'-0"
F	#4	–	1'-0"
G	#6	–	8"
H1	#4	4	–
P	#4	–	1'-0"
V	#4	–	1'-0"

TABLE OF TOEWALL REINFORCING

Bar	Size	No.	Spa
J3	#4	–	1'-0"
M2	#4	2	–
E2	#4	–	1'-0"



BARS D1



BARS D2

WING DIMENSION FORMULAS:
(All values are in feet.)

$Hw = H + T + C$
$Lw = (Hw) (SL) < cosine (θ) for Type PW-1$
$= (Hw - 1') (SL) < cosine (θ) for Type PW-2 and Hw ≥ 4'$
$= (Hw - 0.5') (SL) > cosine (θ) for Type PW-2 and Hw < 4'$

For cast-in-place culverts:
$Ltw = (N) (S) + (N + 1) (U) > cosine (θ)$

For precast culverts:
$Ltw = [(N) (2 U + S) + (N - 1) (0.5')] > cosine (θ)$
Total Wingwall Area (two wings – SF)
$= (2)(Hw)(Lw)$ for Type PW-1
$= (2)(Hw)(Lw) - 6$ SF for Type PW-2 and $Hw ≥ 4'$
$= (2)(Hw)(Lw) - 1.5$ SF for Type PW-2 and $Hw < 4'$

Hw = Height of wingwall
Lw = Length of wingwall
Ltw = Culvert toewall length
S = Number of culvert spans
SL:1 = Channel slope ratio (horizontal: 1 vertical, usual value is 2:1)
θ = Culvert skew

See applicable box culvert standard sheet for S, H, T, and U values.



BARS J1 BARS J2 BARS J3 BARS V

1. Skew = 0°
2. At discharge end, chamfer may be ¾" minimum.
3. For 15° skew – 1"
   For 30° skew – 2"
   For 45° skew – 3"
4. Quantities shown are for two Type PW-1 wings. Adjust concrete volume for Type PW-2 wings. To determine estimated quantities for two wings, multiply the tabulated values by Lw. Quantities shown do not include weight of Bars D.
5. Provide weepholes for Hw = 5'-0" and greater. Fill around weepholes with coarse gravel.
6. Extend Bars E2 1'-6" minimum into the wingwall footing.
7. Lap Bars M1 1'-6" minimum with Bars M2.
8. Place Bars G as shown, equally spaced at 8" maximum. Provide at least two pairs of Bars G per wing.
9. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
10. For vehicle safety, the following requirements must be met:
    - For structures without bridge rail, construct curbs no more than 3" above finished grade.
    - For structures with bridge rail, construct curbs flush with finished grade.

    Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
11. 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elsewhere in the plans.
12. 3'-0" for Hw < 4'.
13. 6" for Hw < 4'.

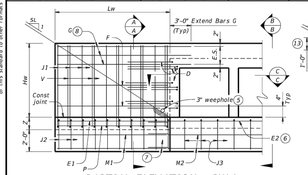
Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing dimensions are out-to-out of bars.

Texas Department of Transportation — Bridge Division Standard

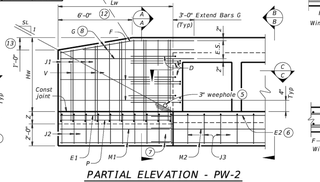
CONCRETE WINGWALLS
WITH PARALLEL WINGS FOR BOX CULVERTS TYPES PW-1 AND PW-2

PW

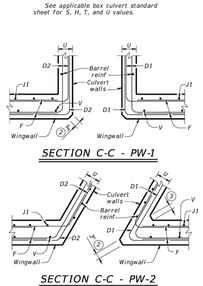
FILE: pwstd01-20.dgn	DN: GAI	CK: CAE	DW: TxDOT	CK: TxDOT
©TxDOT February 2020 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.



PARTIAL ELEVATION - PW-1

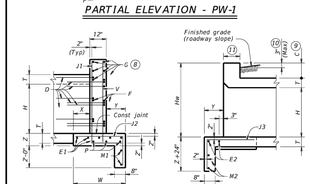


PARTIAL ELEVATION - PW-2



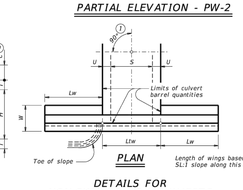
SECTION C-C - PW-1

SECTION C-C - PW-2

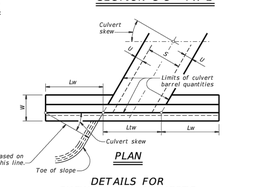


SECTION A-A (Showing wing reinforcement.)

SECTION B-B (Showing wing reinforcement.)



PLAN
DETAILS FOR NON-SKEWED BOX CULVERTS



PLAN
DETAILS FOR SKEWED BOX CULVERTS (Showing 30° skew.)

DESIGNER NOTES:
Type PW-1 can be used for all applications and must be used if railing is to be mounted to the wingwall. Type PW-2 can only be used for applications without a railing mounted to the wingwall.

MATERIAL NOTES:
Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.

GENERAL NOTES:
Designed in accordance with AASHTO LRFD Bridge Design Specifications.
Depth of toewalls for wingwalls and culverts may be reduced or eliminated when founded on solid rock, when directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for wingwall type and additional dimensions and information.
Quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for the Contractor's information only.

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE FILED:

TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

Maximum Wingwall Height Hw	W	X	Y	Z	Bars J1 Size	Bars J1 Spa	Bars J2 Size	Bars J2 Spa	Estimated Quantities per ft of wing length (2-wings) ③ Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	33.73	0.248
3'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.07	0.261
3'-6"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	37.74	0.273
4'-0"	2'-5"	1'-0"	9"	7"	#4	1'-0"	#4	1'-0"	38.41	0.285
4'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	41.75	0.330
5'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.09	0.343
5'-6"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	45.75	0.355
6'-0"	3'-2"	1'-6"	1'-0"	7"	#4	1'-0"	#4	1'-0"	46.42	0.367
7'-0"	3'-8"	1'-9"	1'-3"	7"	#4	1'-0"	#4	1'-0"	52.77	0.414
8'-0"	4'-2"	2'-0"	1'-6"	8"	#5	1'-0"	#4	1'-0"	60.19	0.486
9'-0"	4'-8"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	81.49	0.535
10'-0"	5'-2"	2'-6"	2'-0"	8"	#5	6"	#4	6"	97.25	0.584
11'-0"	5'-8"	2'-9"	2'-3"	8"	#6	6"	#5	6"	133.65	0.634
12'-0"	6'-2"	3'-0"	2'-6"	9"	#7	6"	#5	6"	162.29	0.721
13'-0"	6'-8"	3'-3"	2'-9"	11"	#7	6"	#5	6"	178.80	0.856
14'-0"	7'-2"	3'-6"	3'-0"	1'-0"	#8	6"	#5	6"	216.78	0.959
15'-0"	7'-8"	4'-0"	3'-0"	1'-1"	#9	6"	#6	6"	283.06	1.068
16'-0"	8'-2"	4'-0"	3'-0"	1'-3"	#9	6"	#6	6"	297.02	1.234

TABLE OF WINGWALL REINFORCING (2-wings)

Bar	Size	No.	Spa
D	#5	–	1'-0"
E	#4	–	1'-0"
F	#4	–	1'-0"
G	#6	4	–
H	#4	4	–
P	#4	–	1'-0"
R	#5	6	–
V	#4	–	1'-0"

TABLE OF ESTIMATED CULVERT TOEWALL QUANTITIES

Bar	Size	No.	Spa
L	#4	–	1'-0"
Q	#4	1	–
Reinf (Lb/Ft)			2.45
Conc (CY/Ft)			0.037

WING DIMENSION FORMULAS:
(All values are in feet.)

$Hw = H + T + C - 0.250'$
$A = (Hw - 0.333') (SL)$
$B = (A)$ tangent $(30°)$
$Lw = (A) <$ cosine $(30°)$

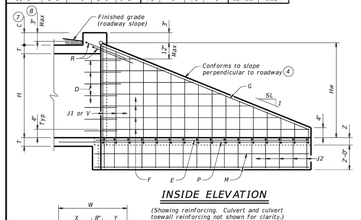
For cast-in-place culverts:
$Ltw = (N) (S) + (N + 1) (U)$

For precast culverts:
$Ltw = (N) (2V + S) + (N - 1) (0.5')$

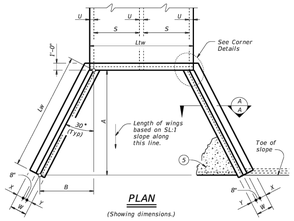
Total wingwall area (two wings – SF) = $(Hw + 0.333') (Lw)$

Hw = Height of wingwall
SL:1 = Side slope ratio (horizontal:1 vertical)
Lw = Length of wingwall
Ltw = Culvert toewall length
N = Number of culvert spans

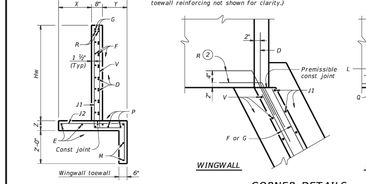
See applicable box culvert standard sheet for H, S, T, and U values.



INSIDE ELEVATION
(Showing reinforcing. Culvert and culvert toewall reinforcing not shown for clarity.)

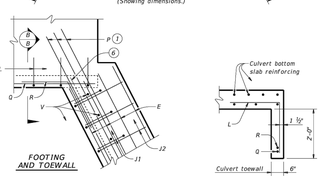


PLAN
(Showing dimensions.)



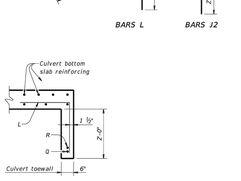
SECTION A-A

WINGWALL



FOOTING AND TOEWALL

CORNER DETAILS
(Culvert and culvert toewall reinforcing not shown for clarity.)



SECTION B-B ⑤

1. Extend Bars P 3'-0" minimum into bottom slab of box culvert.
2. Adjust as necessary to maintain 1 1#2" clear cover and 4" minimum between bars.
3. Quantities shown are based on an average wing height for two wings (one structure end). To determine total quantities for two wings, multiply the tabulated values by Lw.
4. Recommended values of side slope are: 2:1, 3:1, 4:1, and 6:1.
5. When shown elsewhere on the plans, construct 5" deep concrete riprap. Payment for riprap is as required by Item 432, "Riprap." Unless otherwise shown on the plans or directed by the Engineer, provide a 6" wide by 1'-6" deep reinforced concrete sawmill along all edges of the riprap adjacent to natural ground; reinforce the toewall by extending the reinforcing steel from the toewall; and extend construction joints at grooved joints oriented in the direction of flow across the full distance of the riprap at intervals of approximately 20'. When such riprap is provided, the culvert toewall shown in SECTION B-B will not be required.
6. At Contractor's option, culvert toewall may be ended flush with wingwall toewall. Adjust reinforcing as needed.
7. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
8. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, construct curbs no more than 3" above finished grade.
   - For structures with bridge rail, construct curbs flush with finished grade.

   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

MATERIAL NOTES:
Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
In riprap concrete synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing unless noted otherwise.

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
When structure is founded on solid rock, depth of toewalls for culverts and wingwalls may be reduced or eliminated as directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.
The quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for Contractor's information only.

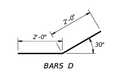
Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing dimensions are out-to-out of bars.

Texas Department of Transportation — Bridge Division Standard

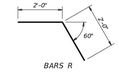
CONCRETE WINGWALLS
WITH FLARED WINGS FOR 0° SKEW BOX CULVERTS

FW-0

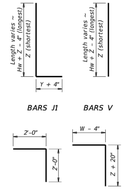
FILE: CD-FW0-20.dgn	DN: GAI	CK: CAE	DW: TxDOT	CK: TxDOT
©TxDOT February 2020 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.



BARS D



BARS R



BARS J1 BARS V

BARS L BARS J2

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE FILED:

Colliers
Engineering & Design
www.colliersengineering.com
Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.
Formerly Known as KFW

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DESCRIPTION	DRAWN BY	DATE



NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

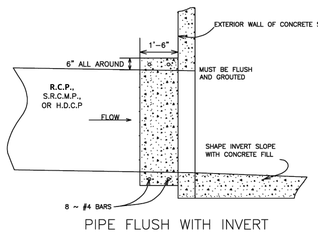
PROJECT NUMBER: 314-65-03
DRAWING NAME: DRDT3146503

SHEET TITLE: DRAIN DETAILS (2 OF 4)

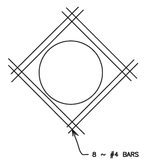
SHEET NUMBER: 4.5

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

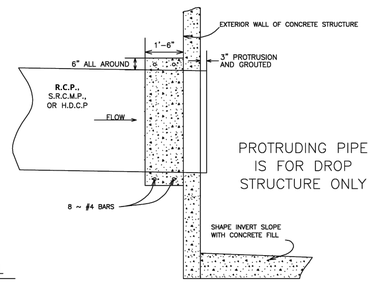
1. CONCRETE FOR STRUCTURE SHALL BE CLASS "A," 3,000 P.S.I. AT 28 DAYS.
2. ALL EXPOSED EDGES SHALL BE CHAMFERED 3/4".
3. REINFORCING STEEL SHALL BE NEW BILLET STEEL, INTERMEDIATE GRADE, ASTM. A-15. THE DEFORMATION SHALL CONFORM TO ASTM. A-305.
4. ALL DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS.
5. ALL BARS INTERCEPTING MANHOLE OPENING AND REINFORCED CONCRETE PIPE SHALL BE FIELD-CUT.
6. WHERE LAPPING OF BARS IS REQUIRED, A MINIMUM LAP OF 33 DIAMETERS SHALL BE USED.
7. INVERT OF JUNCTION BOX TO BE SHAPED WITH CONCRETE FILL (3,000 P.S.I. MIN.) TO EFFECT DRAINAGE TO OUTLET PIPE. COST SUBSIDIARY TO CLASS "A" CONCRETE (JUNCTION BOXES).



PIPE FLUSH WITH INVERT



CONCRETE COLLAR DETAIL
(NOT TO SCALE)



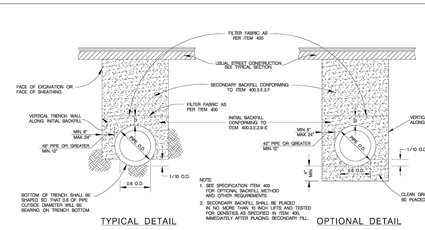
PROTRUDING PIPE IS FOR DROP STRUCTURE ONLY

JANUARY 2006

STANDARD PLANS
CITY OF SAN ANTONIO, TEXAS
DEVELOPMENT SERVICES

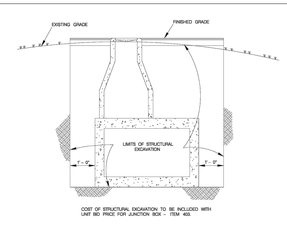
CONCRETE COLLAR DETAIL

DRAWN BY: ANDREW WINTER, P.E.	DATE	REVISIONS	SCALE: SEE ABOVE
CHECKED BY: SAM BENT, P.E.			DATE: 29 JANUARY 2006
			SHEET: 1 OF 1

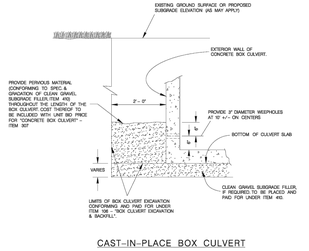


TYPICAL DETAIL OPTIONAL DETAIL

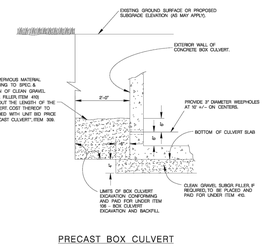
PIPE BEDDING & BACKFILL DETAILS



STRUCTURAL EXCAVATION AT JUNCTION BOXES
NO SCALE
COST OF STRUCTURAL EXCAVATION TO BE INCLUDED WITH UNIT BID PRICE FOR JUNCTION BOX – ITEM 465

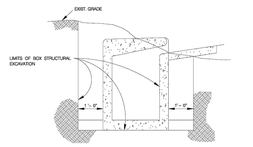


CAST-IN-PLACE BOX CULVERT

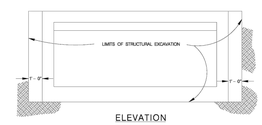


PRECAST BOX CULVERT

CONCRETE BOX CULVERT



SIDE VIEW



ELEVATION

COST OF STRUCTURAL EXCAVATION TO BE INCLUDED WITH UNIT BID PRICE FOR INLETS – ITEM 465

STRUCTURAL EXCAVATIONS AT DRAINAGE INLETS
NO SCALE

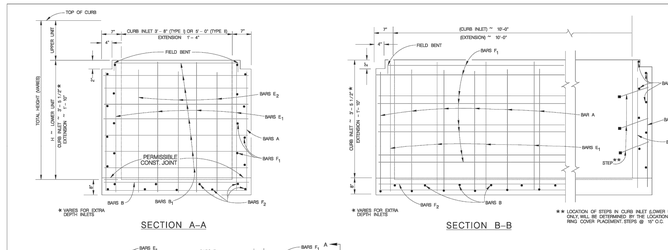
MAY 2009

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

PIPE BEDDING & MISCELLANEOUS DRAINAGE DETAILS

N SUBMITTAL	PROJECT NO.:	DATE:
DRAWN BY:	DSGN BY:	CHKD. BY:
		SHEET NO. OF

i:\ROnorvs\09031\3146503.dwg\v4.5 By: ABEL.MONTALVO



★ VARIES FOR EXTRA DEPTH INLETS

★★ LOCATION OF STEPS IN CURB INLET (LOWER UNIT) ONLY WILL BE DETERMINED BY THE LOCATION OF RING COVER PLACEMENT. STEPS @ 16" O.C.

REINFORCING STEEL

LOWER UNIT 10' X 3'- 8" (TYPE I)

BAR	NO.	SIZE	SPAC	LENGTH
A	12	#4	12"	VARIES
B	11	#4	12"	4'-6"
B_1	VARIES	#4	12"	4'-6"
E_1	20	#4	10"±	VARIES
E_2	6	#4	18"±	VARIES
F_1	VARIES	#4	12"±	10'-10"
F_2	9	#4	——	10'-10"

LOWER UNIT 10' X 5'- 0" (TYPE II)

BAR	NO.	SIZE	SPAC.	LENGTH
A	12	#4	12"	VARIES
B	11	#4	12"	5'-10"
B_1	VARIES	#4	12"	5'-10"
E_1	22	#4	10"±	VARIES
E_2	8	#4	18"±	VARIES
F_1	VARIES	#4	12"±	10'-10"
F_2	11	#4	——	10'-10"

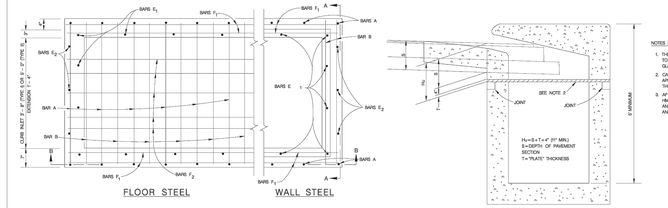
GENERAL NOTES

1. S' INLETS AND 'S' EXTENSIONS MUST BE IN ACCORDANCE WITH THE LATEST TXDOT CURB INLET TYPE "C" AND EXTENSION TYPE E (L-C).
2. TYPE C-A INLET TO BE USED ONLY WHEN STORM DRAIN PIPE IS IN-LINE WITH CURB INLET AND APPROVED BY THE ENGINEER.
3. QUANTITIES SHOWN ARE FOR CONTRACTORS INFORMATION ONLY.
4. CONCRETE FOR STRUCTURES SHALL BE CLASS "A", 3000 PSI IN 28 DAYS.
5. ALL DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER OF BARS.
6. ALL REINFORCING STEEL SHALL HAVE A MINIMUM COVER OF 1 1/2".
7. ALL REINFORCING STEEL SHALL CONFORM TO A.S.T.M. A-615 GRADE 60 REQUIREMENTS.
8. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3 / 4".
9. DEPRESSION SLAB SHALL RECEIVE A WOOD FLOAT FINISH.
10. FACE OF INLET TO CONFORM TO FACE OF CURB LINE.
11. ALL SWRI INTERCEPTING MANHOLE RING & COVER SHALL BE CUT ON SKINT.
12. PAYMENT FOR ALL EXCAVATION, BACK-FILLING, CONCRETE, REINFORCING STEEL, RING AND COVER, CURB ARMOR AND STEPS SHALL BE INCLUDED IN THE UNIT COST OF ITEM 465 "STORM SEWER JUNCTION BOXES AND INLETS".
13. CAST IRON MANHOLE RING AND COVER TO BE PLACED NEXT TO OUTLET PIPE, EXCEPT FOR VERTICAL OUTLET PIPE IN WHICH CASE MANHOLE RING AND COVER WILL BE OFFSET.
14. GALVANIZED BOLTS, NUTS, WASHERS, PLATES AND GASKETS ARE SUBSIDIARY TO INLETS.
15. THE CONTRACTOR SHALL PROVIDE AN ADEQUATE MEANS TO LIFT AND PLACE THE INLETS, WHEN USING PRECAST UNITS.
16. ALL SWRI AT PIPE BLOCKOUT LOCATIONS SHALL BE CUT OR BEND.
17. ALL LOWER UNITS SHALL RECEIVE INVERT MORTAR SHAPING.
18. PIPE BLOCKOUTS IN INLET WALLS SHOULD NOT EXCEED 3' BEYOND THE OUTER SHELL OF THE PIPE, TAKING INTO ACCOUNT THE SHOW OF THE PIPE AS NECESSARY. CONSTRUCTION JOINT MAY BE PARGED A MAXIMUM OF 6".

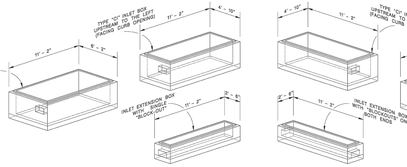
PHASE CONSTRUCTION

NOTES FOR PHASE CONSTRUCTION (WHEN DIRECTED BY THE ENGINEER):

1. THE CURB INLET AND EXTENSION SHALL BE CONSTRUCTED TO A DEPTH "Hu" BELOW THE INLET AND EXTENSION GUTTER LINE ELEVATION.
2. CAP THE CURB INLET AND EXTENSION WITH A STEEL PLATE APPROVED BY THE ENGINEER AND CONSTRUCT THE ROADWAY OVER THE PLATE.
3. AFTER THE ROADWAY IS COMPLETED, BUT PRIOR TO THE FINAL HMAC OVERLAY, SAW CUT THE PAVEMENT, REMOVE THE PLATE AND COMPLETE THE UPPER PORTION OF THE CURB INLET AND / OR EXTENSION.







CONCRETE INLET BOX CONFIGURATIONS (LOWER UNITS)

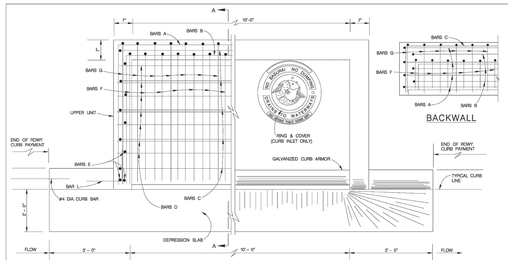
MAY 2009

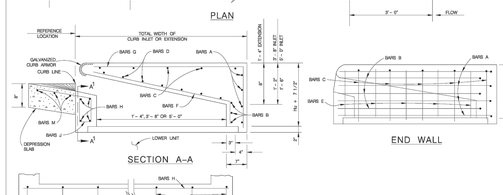
CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

TYPE "C" INLET (TYPE I & II) & INLET EXTENSION STANDARDS
SHEET 1 OF 3

% SUBMITTAL PROJECT NO.: DATE:

DRAWN BY V. VASQUEZ DESIGN BY L.E. MALTOS, P.E. CHKD. BY B.S. HOSSEINI, P.E. SHEET NO.: OF





MANHOLE LID & RING DETAIL (ITEM 409)

NOTES FOR MANHOLE LID AND RING

1. FOR LID DESIGN OUTSIDE OF CITY OF SAN ANTONIO, DELETE "SAN ANTONIO PUBLIC WORKS DEPT."
2. CASTING NUMBER AND MANUFACTURER'S I.D. ON LID AND RING.
3. LOAD BEARING CAPABILITY OF HS-20 MINIMUM.
4. THE LOAD BEARING SURFACES SHALL BE MACHINE GROUND.
5. THE COMBINED WEIGHT OF THE MANHOLE RING AND COVER MUST BE AT LEAST 300 LBS.

SEE SHEET 1 OF 3 FOR GENERAL NOTES.

REINFORCING STEEL (FOR Hu = 11")

UPPER UNIT 10' X 3'-8" (TYPE I)

BAR	NO.	SIZE	SPAC.	LENGTH	WEIGHT
A	4	#4	——	18'-10"	50
B	3	#4	——	18'-10"	38
C	5	#4	11"	13'-2"	44
D	7	#4	6"	10'-10"	51
E	12	#4	11"	11'-2"	9
F	21	#6	6"	4'-8"	147
G	22	#6	6"	5'-8"	187
H	4	#4	——	10'-10"	29
J	12	#4	12"	2'-8"	21
L	4	#4	——	2'-0"	5
M	3	#4	——	14'-8"	29
TOTAL WEIGHT					620 LBS.

UPPER UNIT 10' X 5' (TYPE II)

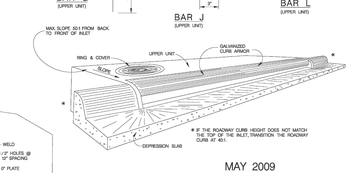
BAR	NO.	SIZE	SPAC.	LENGTH	WEIGHT
A	4	#4	——	20'-4"	60
B	3	#4	——	21'-6"	43
C	7	#4	11"	13'-2"	62
D	11	#4	6"	10'-10"	81
E	16	#4	11"	11'-2"	13
F	25	#6	6"	5'-8"	178
G	22	#6	6"	7'-0"	231
H	4	#4	——	10'-10"	29
J	12	#4	12"	2'-8"	28
L	4	#4	——	2'-0"	5
M	3	#4	——	14'-8"	39
TOTAL WEIGHT					769 LBS.

CLASS "A" CONCRETE QUANTITIES (FOR Hu = 11")

DEPRESSION SLAB	C.Y.
10' INLET	0.7
10' EXTENSION	0.7

UPPER UNIT (ONLY)	C.Y.
10' X 3'-8" CURB INLET	1.9
10' X 5'-0" CURB INLET	2.7
10' EXTENSION	1.0





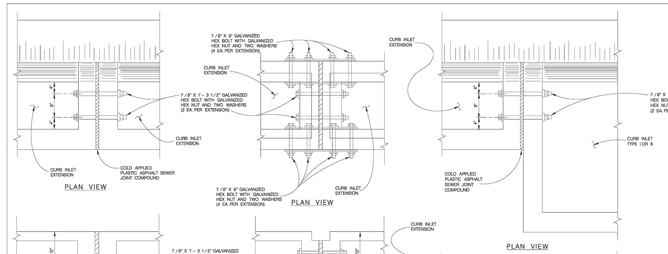
MAY 2009

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

TYPE "C" INLET (TYPE I & II) & INLET EXTENSION STANDARDS
SHEET 2 OF 3

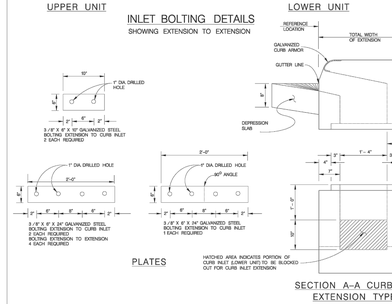
% SUBMITTAL PROJECT NO.: DATE:

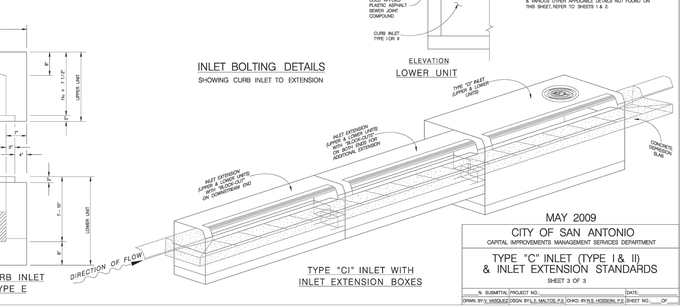
DRAWN BY V. VASQUEZ DESIGN BY L.E. MALTOS, P.E. CHKD. BY B.S. HOSSEINI, P.E. SHEET NO.: OF



INLET BOLTING DETAILS

SHOWING EXTENSION TO EXTENSION





UPPER UNIT EXTENSION (FOR Hu = 11")					
BAR	NO.	SIZE	SPAC.	LENGTH	WEIGHT
A	4	#4	——	19'- 2"	41
B	3	#4	——	14'- 2"	28
C	9	#4	11"	13'- 2"	26
D	3	#4	6"	10'- 10"	22
E	8	#4	11"	11'- 2"	6
F	21	#6	6"	5'- 0"	63
G	22	#6	6"	5'- 4"	110
H	4	#4	——	10'- 10"	29
J	12	#4	12"	2'- 8"	21
L	4	#4	——	2'- 0"	5
M	3	#4	——	14'- 8"	29
REINFORCING STEEL				LBS.	387
CLASS "A" CONCRETE				C.Y.	1.0

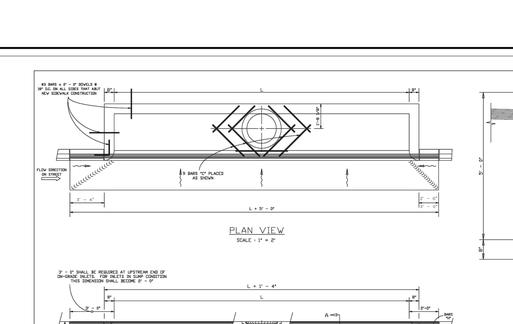
LOWER UNIT EXTENSION					
BAR	NO.	SIZE	SPAC.	LENGTH	WEIGHT
A	12	#4	12"	9'- 2"	49
B	11	#4	12"	2'- 2"	16
B_1	3	#4	——	2'- 2"	4
E_1	18	#4	18" ±	2'- 2"	27
E_2	4	#4	18" ±	2'- 1"	6
F_1	18	#4	12" ±	10'- 10"	118
F_2	5	#4	——	10'- 10"	36
REINFORCING STEEL				LBS.	254
CLASS "A" CONCRETE				C.Y.	1.4

GENERAL NOTES

1. WHEN INLET EXTENSIONS ARE REQUIRED FOR ON GRADE INLETS THE EXTENSIONS SHALL BE PLACED ON THE UPSTREAM END OF THE INLET.
2. FOR CURB INLET EXTENSION REINFORCING STEEL, NOTES & VARIOUS OTHER APPLICABLE DETAILS NOT FOUND ON THIS SHEET, REFER TO SHEETS 1 & 2.

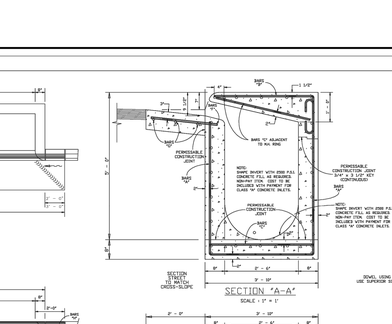
INLET BOLTING DETAILS

SHOWING CURB INLET TO EXTENSION



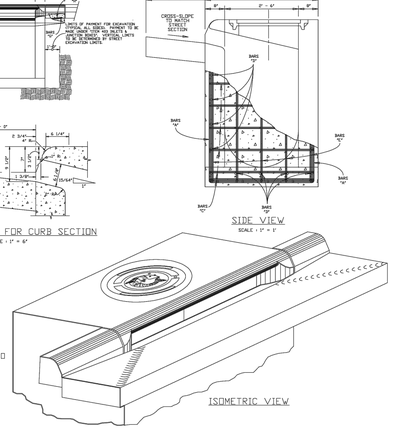
NOTES FOR MANHOLE LID AND RING

1. FOR LID DESIGN OUTSIDE OF CITY OF SAN ANTONIO, DELETE "SAN ANTONIO PUBLIC WORKS DEPT."
2. CASTING NUMBER AND MANUFACTURER'S I.D. ON LID AND RING.
3. LOAD BEARING CAPABILITY OF HS-20 MINIMUM.
4. THE LOAD BEARING SURFACES SHALL BE MACHINE GROUND.
5. THE COMBINED WEIGHT OF THE MANHOLE RING AND COVER MUST BE AT LEAST 260 LBS.



GENERAL NOTES

1. ALL BARS INTERSECTING MANHOLE RING & REINFORCING CONCRETE PIPE SHALL BE FIELD CUT.
2. CONCRETE FOR STRUCTURES SHALL BE CLASS "A", 3000 PSI IN 28 DAYS.
3. ALL DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTER BARS.
4. ALL EXPOSED CORNERS SHALL BE CHAMFERED TO 3 / 4".
5. CONSTRUCTION JOINT SHOWN AT FLOWLINE MAY BE PLACED A MAXIMUM OF 6" AT THE DISCRETION OF THE ENGINEER. ALL JOINTS SHALL BE KEYED OR DOWELED.
6. ALL REINFORCING STEEL SHALL CONFORM TO A.S.T.M. A-615, GRADE 60 REQUIREMENTS.
7. SHORT OR SKOP INLET TO BE SHAPED WITH CONCRETE FILL TO AFFECT DRAINAGE TO OUTLET PIPE.
8. SEE LID & TOP BARS FROM SCHEDULE QUANTITIES IF MANHOLE RING AND COVER ARE PLACED ON INLET.
9. SHORT SKOP MANHOLE RING AND COVER TO BE PLACED MIDWAY BETWEEN TOP AND BOTTOM OF INLET. FOR VERTICAL OUTLET PIPE THE WHOLE CASE, MANHOLE RING AND COVER WILL BE OFFSET.
10. PAYMENT FOR ALL EXCAVATION, BACK-FILLING, CONCRETE, REINFORCING STEEL, RING AND COVER SHALL BE INCLUDED IN THE UNIT COST OF ITEM 465 "STORM SEWER JUNCTION BOXES AND INLETS".



JANUARY 2005

STANDARD PLANS
CITY OF SAN ANTONIO, TEXAS
DEPARTMENT OF PUBLIC WORKS

TYPE "C" INLET DETAILS

DRAWN BY: V. VASQUEZ	DATE:	REVISIONS	SCALE: SEE ABOVE
CHECKED BY: MAT HARDY, P.E.			DATE:
			SHEET:

Colliers
Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 Texas811.org Call before you dig.

PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE

FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DESCRIPTION	DRAWN BY	DATE

STATE OF TEXAS
OMAR A. ESPINOSA
126560
LICENSED PROFESSIONAL ENGINEER
9/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: DRDT3146503

SHEET TITLE: DRAIN DETAILS (3 OF 4)

SHEET NUMBER: 4.6

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

I:\RDrawings\DRDT3146503.dwg\4.6 By: ABEL.MONTALVO

TABLE 9.3.8.1 - RETARDATION CLASS FOR LINING MATERIALS

Retardance Class	Cover	Condition
B	Bermuda grass	Good stand, tall (average 12 in. or 305 mm)
-	Native grass mixture little bluestem, bluestem, blue gamma, other short and long stem midwest grasses	Good stand, unmowed
-	Lespedeza 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 13 in. or 330 mm)
-	Crabgrass	Fair stand, uncut (10-to-48 in. or 55-to-1220 mm)
C	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	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)
-	Lespedeza sericea	After cutting to 2 in. or 50 mm (very good before cutting)
E	Bermuda grass	Good stand, cut to 1.5 in. or 40 mm
-	Bermuda grass	Burned stubble

TABLE 9.3.8.2 - PERMISSIBLE SHEAR STRESSES FOR VARIOUS LININGS

Protective Cover	τ_d(lb./sq.ft.)	τ_d(N/m^2)
Retardance Class B Vegetation (See the "Retardation Class for Lining Materials" table above)	2.1	101
Retardance Class C Vegetation (See the "Retardation Class for Lining Materials" table above)	1	48
Retardance Class D Vegetation (See the "Retardation Class for Lining Materials" table above)	0.6	29
Retardance Class E Vegetation (See the "Retardation Class for Lining Materials" table above)	0.35	17
Woven Paper	0.15	7
Jute Net	0.45	22
Single Fiberglass	0.6	29
Double Fiberglass	0.85	41
Straw W/Net	1.45	69
Curled Wood Mat	1.55	74
Synthetic Mat	2	96
Gravel, D50 = 1 in. or 25 mm	0.4	19
Gravel, D50 = 2 in. or 50 mm	0.8	38
Rock, D50 = 6 in. or 150 mm	2.5	120
Rock, D50 = 12 in. or 300 mm	5	239
6-in. or 50-mm Gabions	35	1675
4-in. or 100-mm Geoweb	10	479
Soil Cement (8% cement)	>45	>2154
Dycel w/out Grass	>7	>335
Petraflex w/out Grass	>32	>1532
Armorflex w/out Grass	12-20	574-957
Erikamat w/3-in or 75-mm Asphalt	13-16	622-766
Erikamat w/1-in. or 25 mm Asphalt	<5	<239
Armorflex Class 30 with longitudinal and lateral cables, no grass	<5	>1628
Dycel 100, longitudinal cables, cells filled with mortar	<12	<574
Concrete construction blocks, granular filter underlayer	>20	>957
Wedge-shaped blocks with drainage slot	>25	>1197

Colliers
Engineering & Design
www.colliersengineering.com
Copyright © 2025. Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 Know what's below. Call before you dig.
PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION
-	-	-	-

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED
PROFESSIONAL ENGINEER
9/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER:	DRAWING NAME:
314-65-03	DRDT3146503

SHEET TITLE:
DRAIN DETAILS (4 OF 4)

SHEET NUMBER:
4.7

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

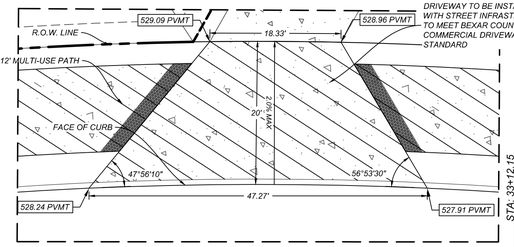
By: ABEL.MONTALVO
n:\fb2\civil\DRDT3146503.dwg\v4.7

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.

CAUTION!!:

THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCT BANKS, 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.

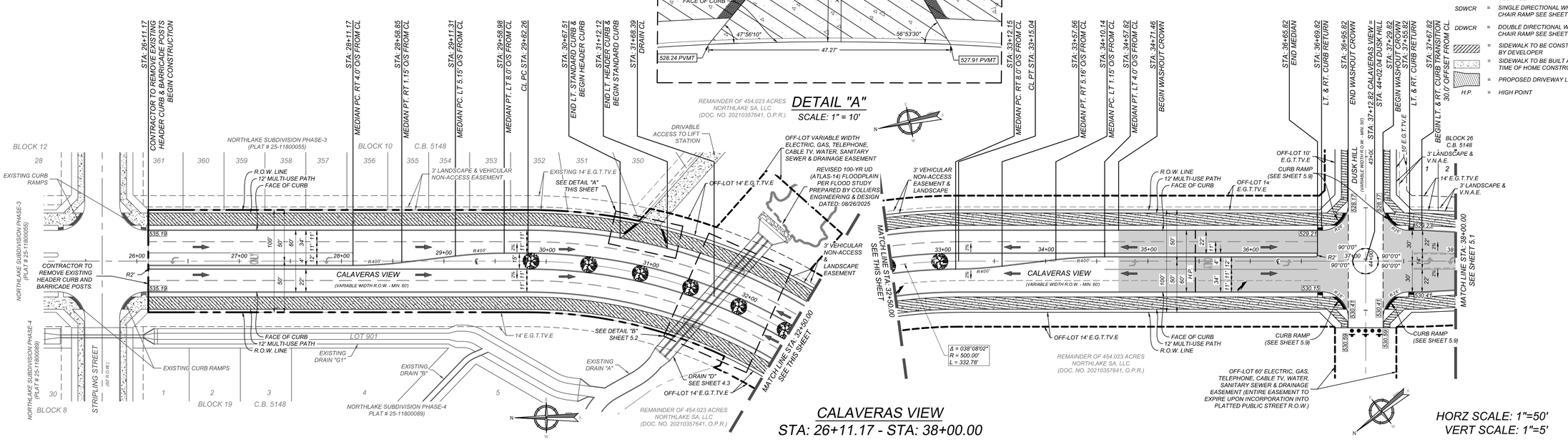


BEXAR COUNTY R.O.W. NOTE

A BEXAR COUNTY PERMIT MUST BE OBTAINED BEFORE WORKING IN BEXAR COUNTY R.O.W.

LEGEND

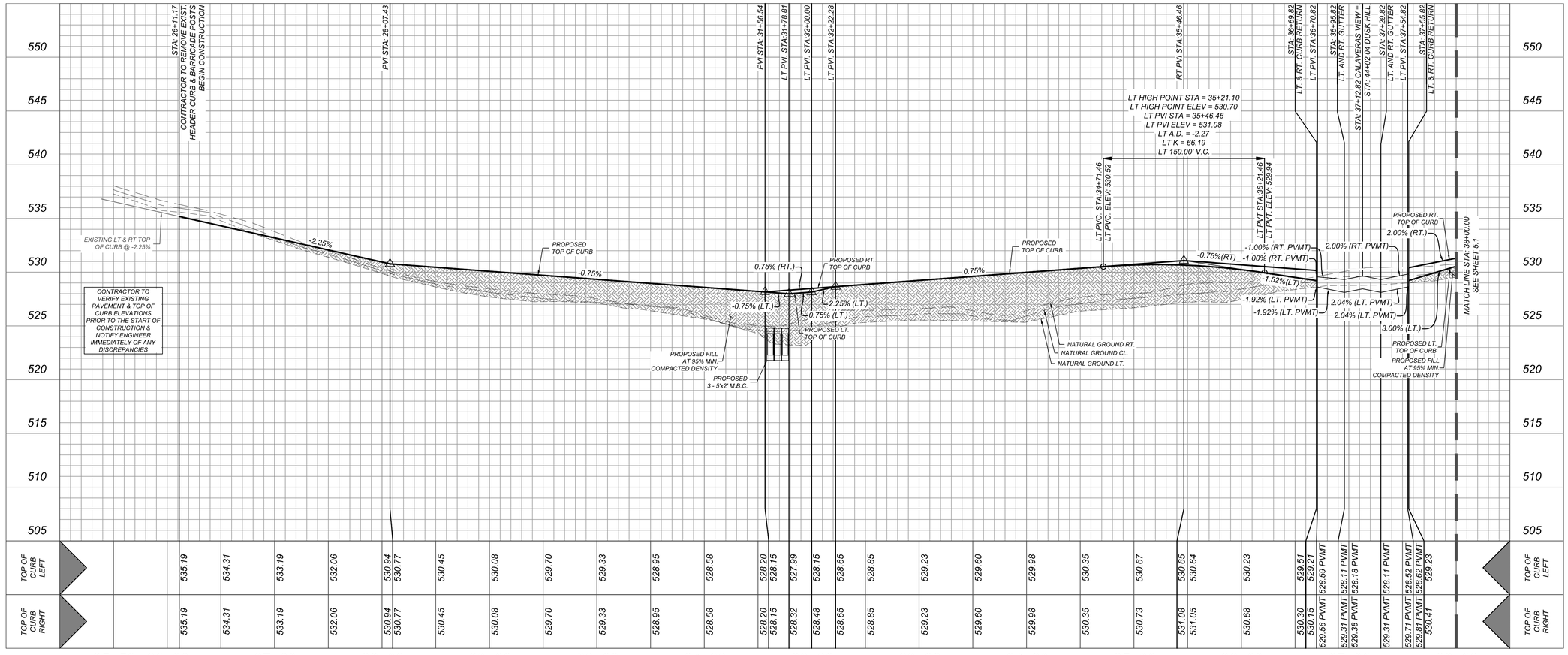
R.O.W.	=	RIGHT OF WAY
E.G.T.TV.E.	=	ELECTRIC, GAS, TELEPHONE & CABLE EASEMENT
	=	FLOW ARROW
	=	WASHOUT CROWN
I	=	WHEELCHAIR RAMP TYPE I SEE SHEET 5.9
II	=	WHEELCHAIR RAMP TYPE II SEE SHEET 5.9
SDWCR	=	SINGLE DIRECTIONAL WHEEL CHAIR RAMP SEE SHEET 5.9
DDWCR	=	DOUBLE DIRECTIONAL WHEEL CHAIR RAMP SEE SHEET 5.9
	=	SIDEWALK TO BE CONSTRUCTED BY DEVELOPER
	=	SIDEWALK TO BE BUILT AT THE TIME OF HOME CONSTRUCTION
	=	PROPOSED DRIVEWAY LOCATION
H.P.	=	HIGH POINT



DETAIL "A"
SCALE: 1" = 10'

CALAVERAS VIEW
STA: 26+11.17 - STA: 38+00.00

HORZ SCALE: 1"=50'
VERT SCALE: 1"=5'



	25+50	26+00	27+00	28+00	29+00	30+00	31+00	32+00	33+00	34+00	35+00	36+00	37+00	38+00
TOP OF CURB LEFT		535.19	534.31	533.19	532.06	530.94	530.77	530.45	530.08	529.70	529.33	528.95	528.58	528.20	528.15	527.99	528.15	528.65	528.85	529.23	529.60	529.98	530.35	530.67	530.65	530.64	530.23	529.51	529.21	528.59 PVMT	528.11 PVMT	528.18 PVMT	528.11 PVMT	528.62 PVMT	528.62 PVMT	529.23	
TOP OF CURB RIGHT		535.19	534.31	533.19	532.06	530.94	530.77	530.45	530.08	529.70	529.33	528.95	528.58	528.20	528.15	526.32	528.48	528.65	528.85	529.23	529.60	529.98	530.35	530.73	531.08	531.05	530.68	530.30	530.15	529.56 PVMT	529.31 PVMT	529.38 PVMT	529.31 PVMT	529.71 PVMT	529.61 PVMT	530.41	

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

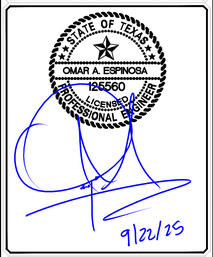
Colliers Engineering & Design
www.colliersengineering.www

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, revised, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DESCRIPTION	DRAWN BY



NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: STPP3146503

SHEET TITLE:
CALAVERAS VIEW
PLAN AND PROFILES

SHEET NUMBER:
5.0

I:\ATSTREETS\STPP3146503.dwg\5.0 By: ABEL.MONTALVO

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.

CAUTION!!:

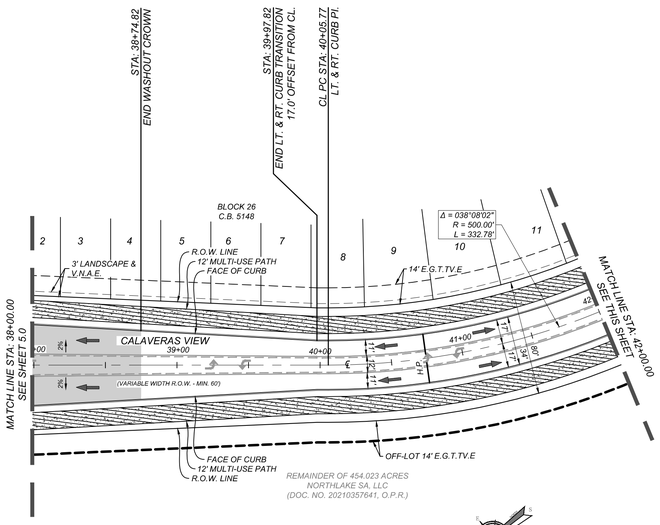
THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCT BANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. ANY UTILITY CONFLICTS THAT 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.

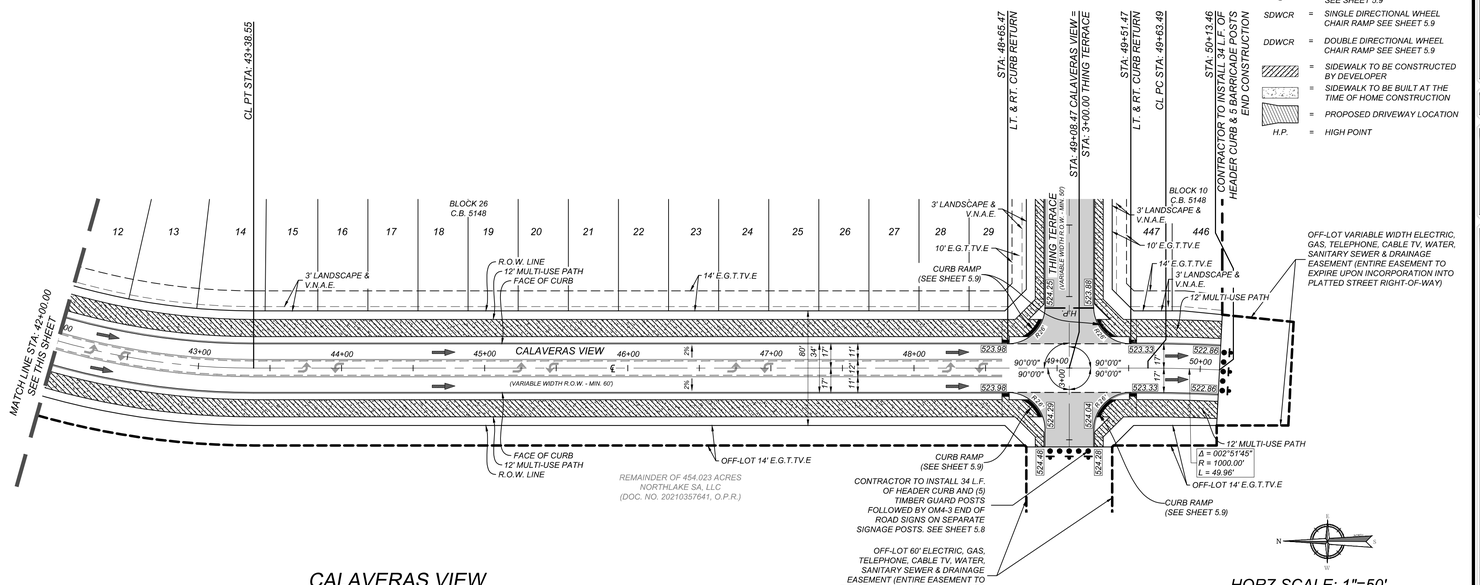
BEXAR COUNTY R.O.W. NOTE:

A BEXAR COUNTY PERMIT MUST BE OBTAINED BEFORE WORKING IN BEXAR COUNTY R.O.W.

LEGEND

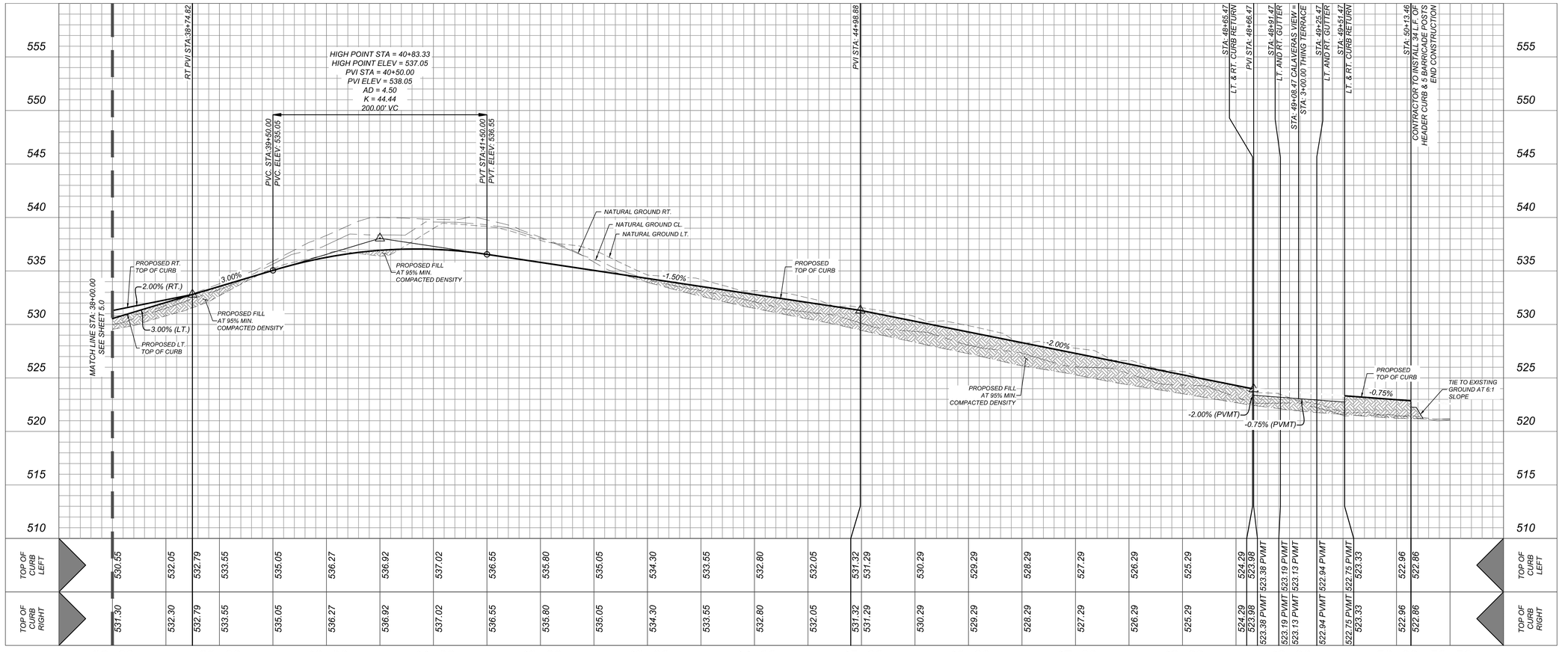
R.O.W.	=	RIGHT OF WAY
E.G.T.TV.E.	=	ELECTRIC, GAS, TELEPHONE & CABLE EASEMENT
	=	FLOW ARROW
	=	WASHOUT CROWN
(I)	=	WHEELCHAIR RAMP TYPE I SEE SHEET 5.9
(II)	=	WHEELCHAIR RAMP TYPE II SEE SHEET 5.9
SDWCR	=	SINGLE DIRECTIONAL WHEEL CHAIR RAMP SEE SHEET 5.9
DDWCR	=	DOUBLE DIRECTIONAL WHEEL CHAIR RAMP SEE SHEET 5.9
	=	SIDEWALK TO BE CONSTRUCTED BY DEVELOPER
	=	SIDEWALK TO BE BUILT AT THE TIME OF HOME CONSTRUCTION
	=	PROPOSED DRIVEWAY LOCATION
H.P.	=	HIGH POINT





CALAVERAS VIEW
STA: 38+00.00 - END

HORZ SCALE: 1"=50'
VERT SCALE: 1"=5'



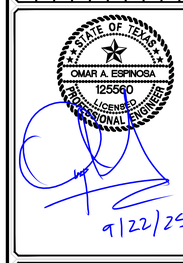
Colliers Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DESCRIPTION	DRAWN BY



NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14309
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: STP93146503

SHEET TITLE: CALAVERAS VIEW PLAN AND PROFILES

SHEET NUMBER: 5.1

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

I:\STREETS\STP93146503.dwg(S.1 By: ABEL.MONTALVO

TRENCH EXCAVATION SAFETY PROTECTION

CONTRACTOR AND/ OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETYEQUIPMENT 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.

CAUTION!!:

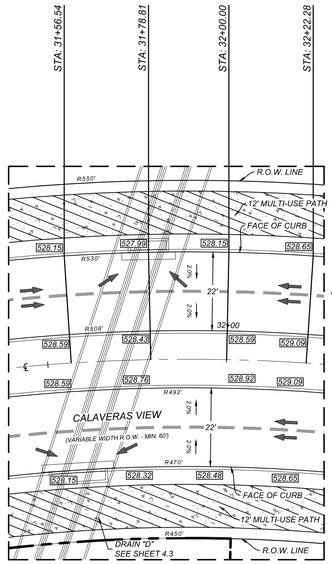
THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCT BANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. ANY UTILITY CONFLICTS THAT 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.

BEXAR COUNTY R.O.W. NOTE:

A BEXAR COUNTY PERMIT MUST BE OBTAINED BEFORE WORKING IN BEXAR COUNTY R.O.W.

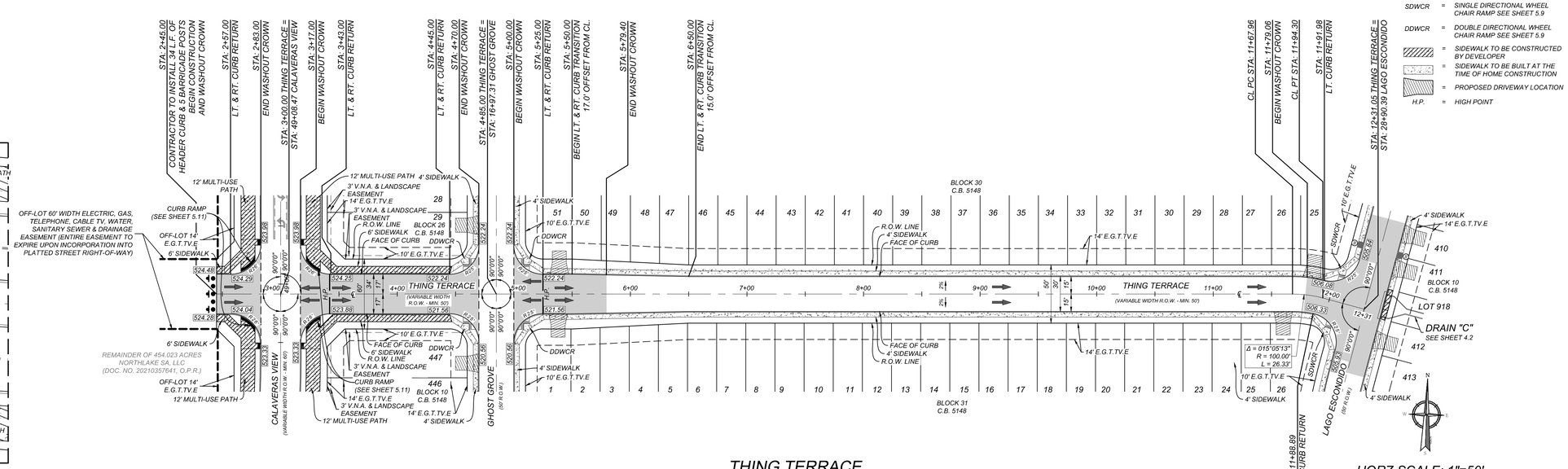
LEGEND

- R.O.W. = RIGHT OF WAY
- E.G.T.TV.E. = ELECTRIC, GAS, TELEPHONE & CABLE EASEMENT
- = FLOW ARROW
- = WASHOUT CROWN
- (I) = WHEELCHAIR RAMP TYPE I SEE SHEET 5.9
- (II) = WHEELCHAIR RAMP TYPE II SEE SHEET 5.9
- SDWCR = SINGLE DIRECTIONAL WHEEL CHAIR RAMP SEE SHEET 5.9
- DDWCR = DOUBLE DIRECTIONAL WHEEL CHAIR RAMP SEE SHEET 5.9
- = SIDEWALK TO BE CONSTRUCTED BY DEVELOPER
- = SIDEWALK TO BE BUILT AT THE TIME OF HOME CONSTRUCTION
- = PROPOSED DRIVEWAY LOCATION
- H.P. = HIGH POINT



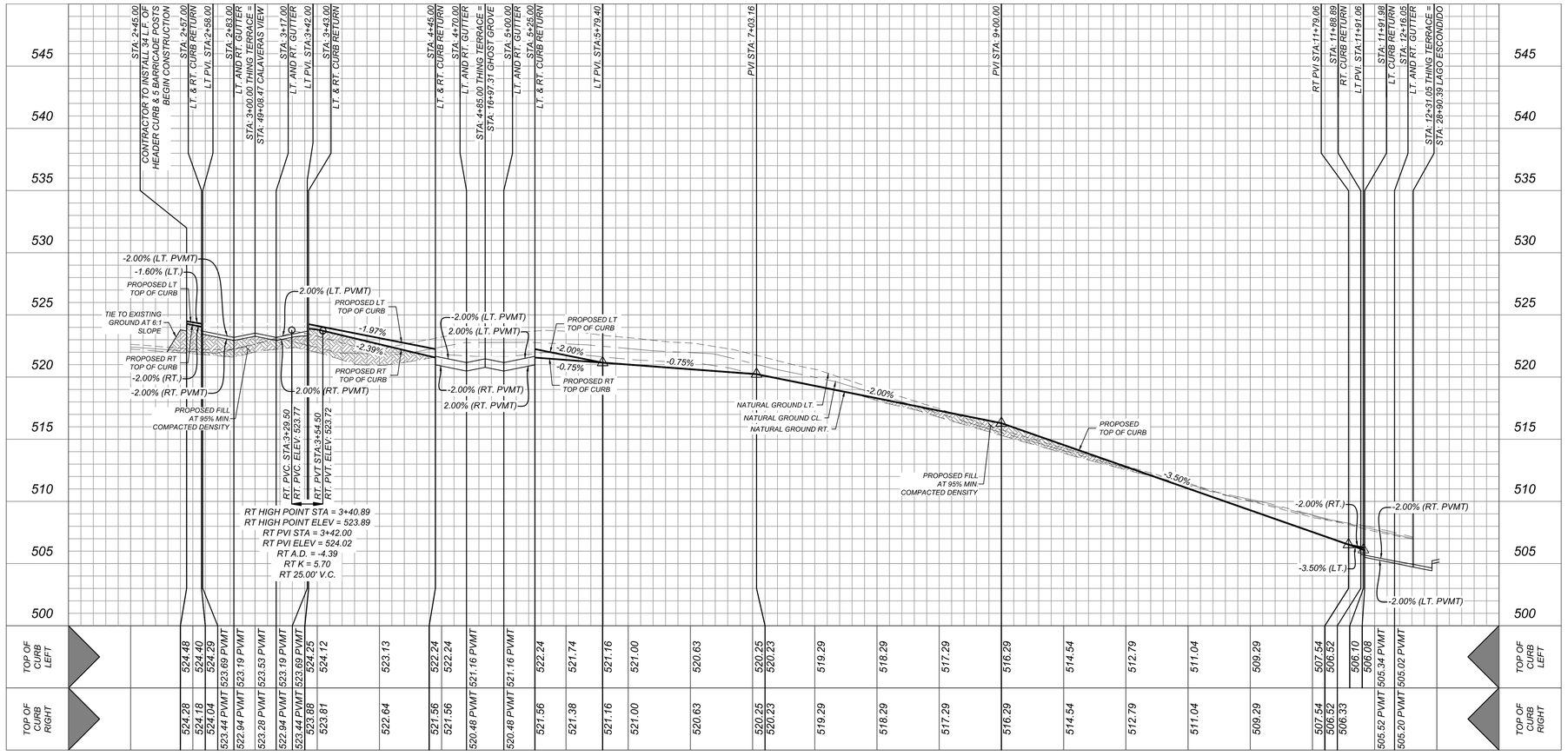
DETAIL "B"

SCALE: 1" = 10'



THING TERRACE
STA: 2+45.00 - END

HORZ SCALE: 1"=50'
VERT SCALE: 1"=5'



Colliers Engineering & Design

www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design. All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 PROTECT YOURSELF

ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE

FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED
PROFESSIONAL ENGINEER

9/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design

SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03

DRAWING NAME: STPP3146503

SHEET TITLE: THING TERRACE PLAN AND PROFILES

SHEET NUMBER: 5.2

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

I:\ATX\TREET\STPP3146503.dwg\S.2 By: ABEL.MONTALVO

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.

CAUTION!!:

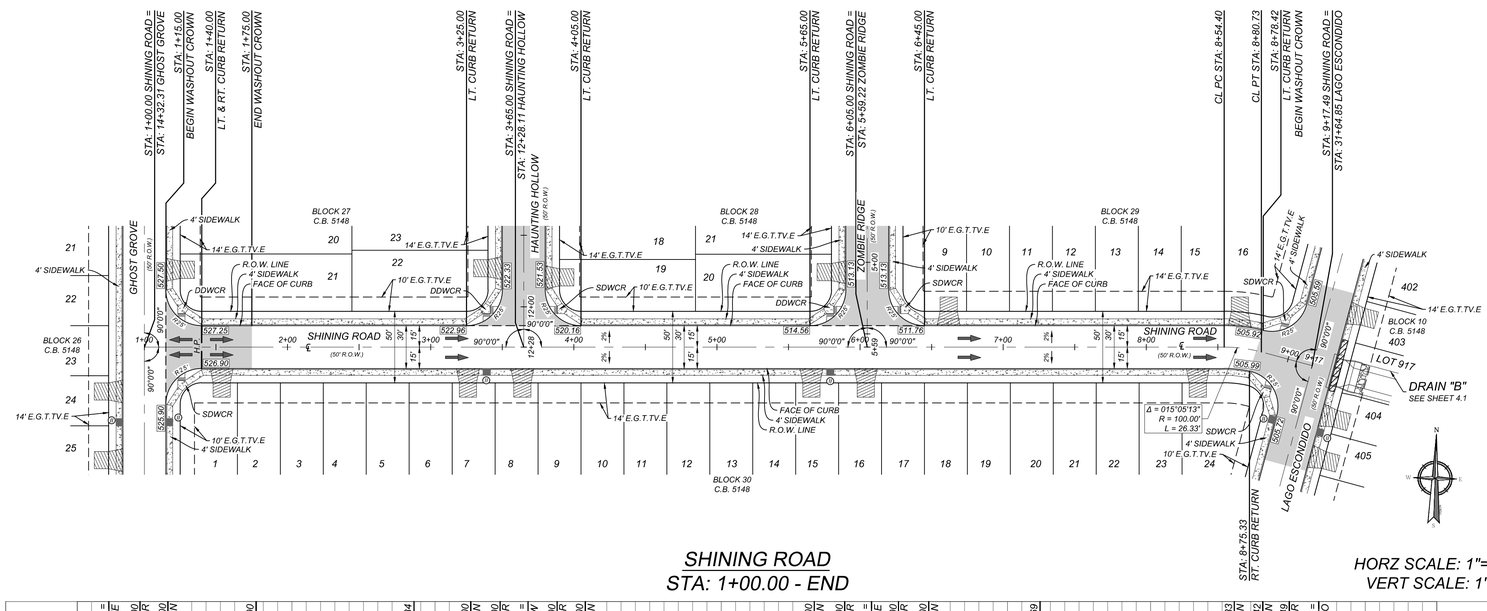
THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCT BANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. ANY UTILITY CONFLICTS THAT 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.

BEXAR COUNTY R.O.W. NOTE

A BEXAR COUNTY PERMIT MUST BE OBTAINED BEFORE WORKING IN BEXAR COUNTY R.O.W.

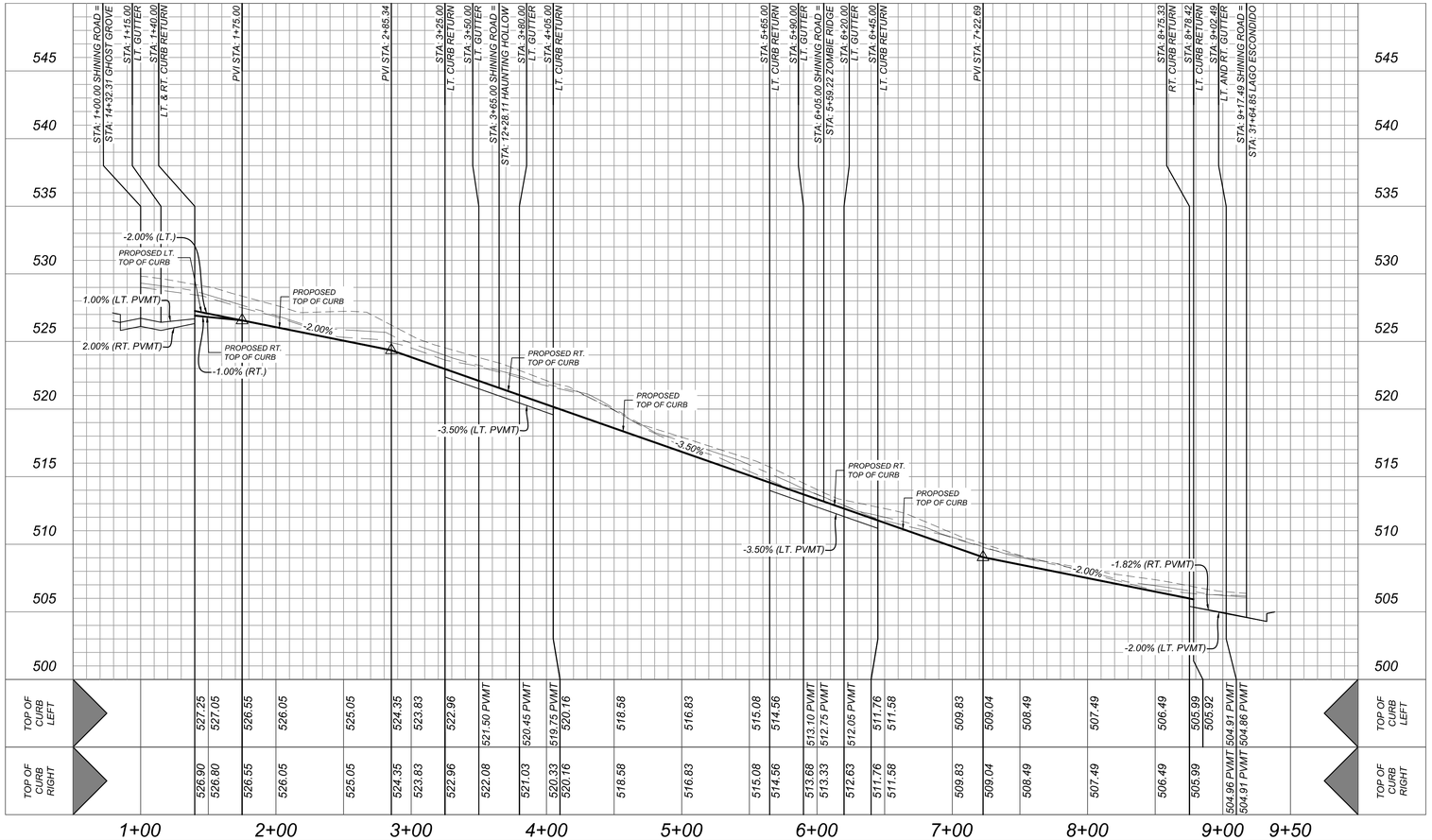
LEGEND

R.O.W.	=	RIGHT OF WAY
E.G.T.TV.E.	=	ELECTRIC, GAS, TELEPHONE & CABLE EASEMENT
	=	FLOW ARROW
	=	WASHOUT CROWN
I	=	WHEELCHAIR RAMP TYPE I SEE SHEET 5.9
II	=	WHEELCHAIR RAMP TYPE II SEE SHEET 5.9
SDWCR	=	SINGLE DIRECTIONAL WHEEL CHAIR RAMP SEE SHEET 5.9
DDWCR	=	DOUBLE DIRECTIONAL WHEEL CHAIR RAMP SEE SHEET 5.9
	=	SIDEWALK TO BE CONSTRUCTED BY DEVELOPER
	=	SIDEWALK TO BE BUILT AT THE TIME OF HOME CONSTRUCTION
	=	PROPOSED DRIVEWAY LOCATION
H.P.	=	HIGH POINT



SHINING ROAD
STA: 1+00.00 - END

HORZ SCALE: 1"=50'
VERT SCALE: 1"=5'



Colliers Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, revised, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
9/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: STPP3146503

SHEET TITLE: SHINING ROAD PLAN AND PROFILES

SHEET NUMBER: 5.3

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

I:\STREETS\STPP3146503.dwg\C5.3 By: ABEL.MONTALVO

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.

CAUTION!!:

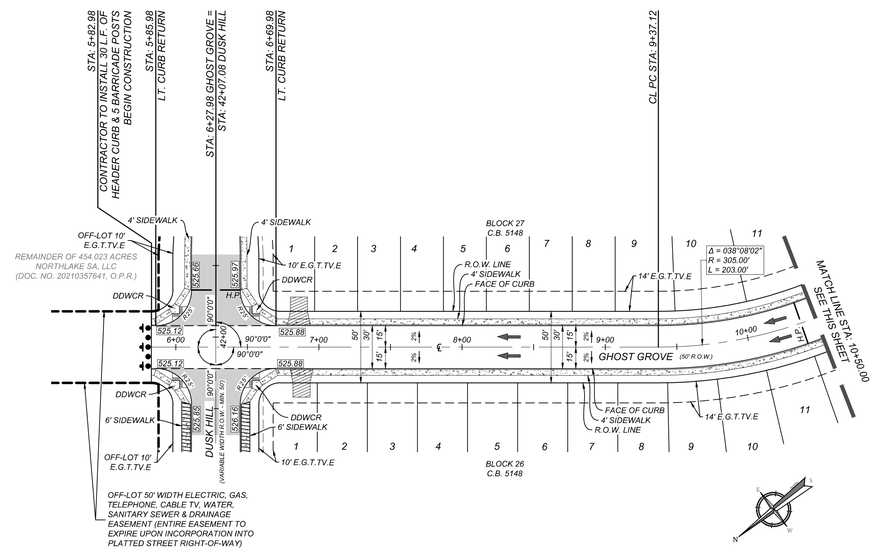
THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCT BANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. ANY UTILITY CONFLICTS THAT 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.

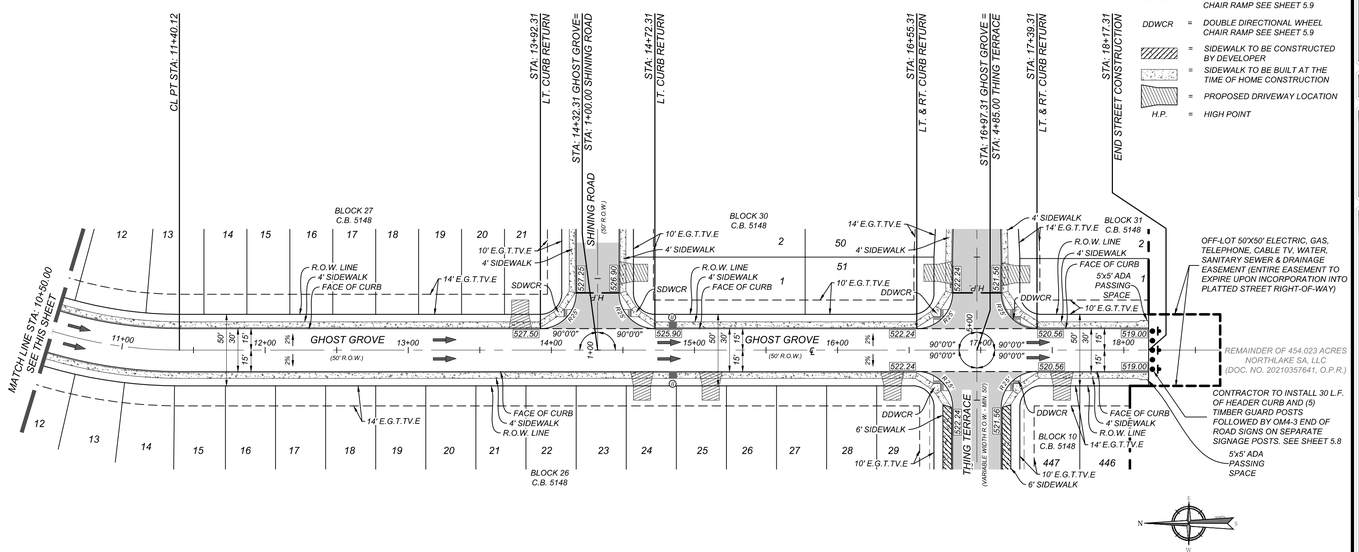
BEXAR COUNTY R.O.W. NOTE

A BEXAR COUNTY PERMIT MUST BE OBTAINED BEFORE WORKING IN BEXAR COUNTY R.O.W.

LEGEND

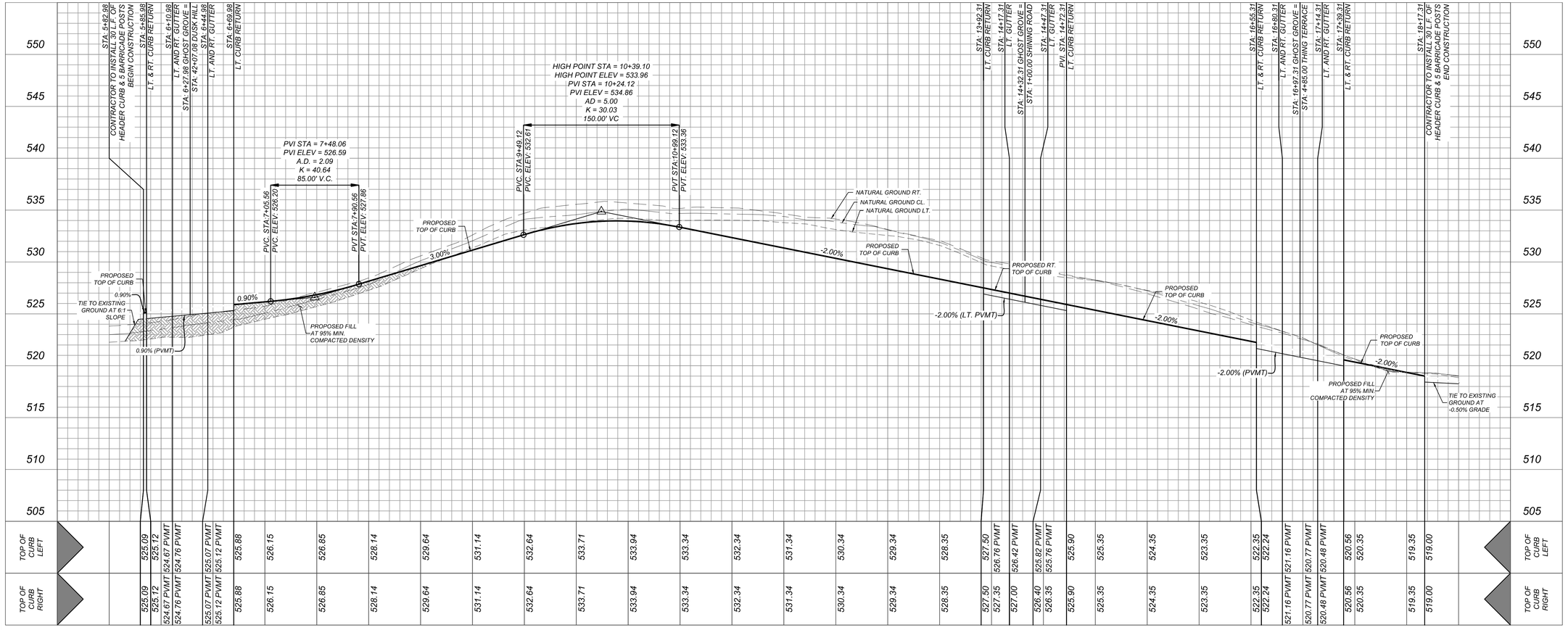
R.O.W.	=	RIGHT OF WAY
E.G.T.TV.E.	=	ELECTRIC, GAS, TELEPHONE & CABLE EASEMENT
	=	FLOW ARROW
	=	WASHOUT CROWN
(I)	=	WHEELCHAIR RAMP TYPE I SEE SHEET 5.9
(II)	=	WHEELCHAIR RAMP TYPE II SEE SHEET 5.9
SDWCR	=	SINGLE DIRECTIONAL WHEEL CHAIR RAMP SEE SHEET 5.9
DDWCR	=	DOUBLE DIRECTIONAL WHEEL CHAIR RAMP SEE SHEET 5.9
	=	SIDEWALK TO BE CONSTRUCTED BY DEVELOPER
	=	SIDEWALK TO BE BUILT AT THE TIME OF HOME CONSTRUCTION
	=	PROPOSED DRIVEWAY LOCATION
H.P.	=	HIGH POINT





GHOST GROVE
STA: 5+82.98 - STA: 18+17.31

HORZ SCALE: 1"=50'
VERT SCALE: 1"=5'



Colliers Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
126560
LICENSED PROFESSIONAL ENGINEER
9/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14309
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: STPP3146503

SHEET TITLE: GHOST GROVE PLAN AND PROFILES

SHEET NUMBER: 5.4

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

w:\STREETS\STPP3146503.dwg\5.4 By: ABEL.MONTALVO

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.

CAUTION!!:

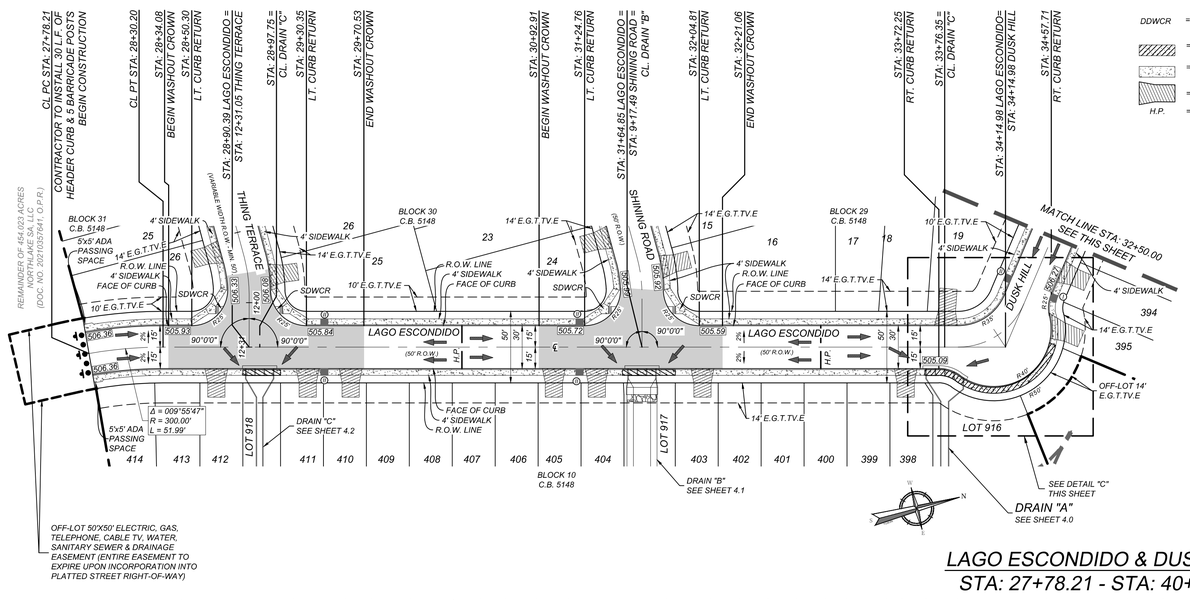
THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCT BANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. ANY UTILITY CONFLICTS THAT 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.

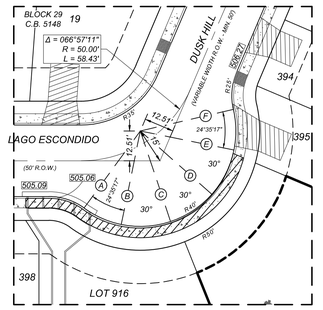
BEXAR COUNTY R.O.W. NOTE:

A BEXAR COUNTY PERMIT MUST BE OBTAINED BEFORE WORKING IN BEXAR COUNTY R.O.W.

LEGEND

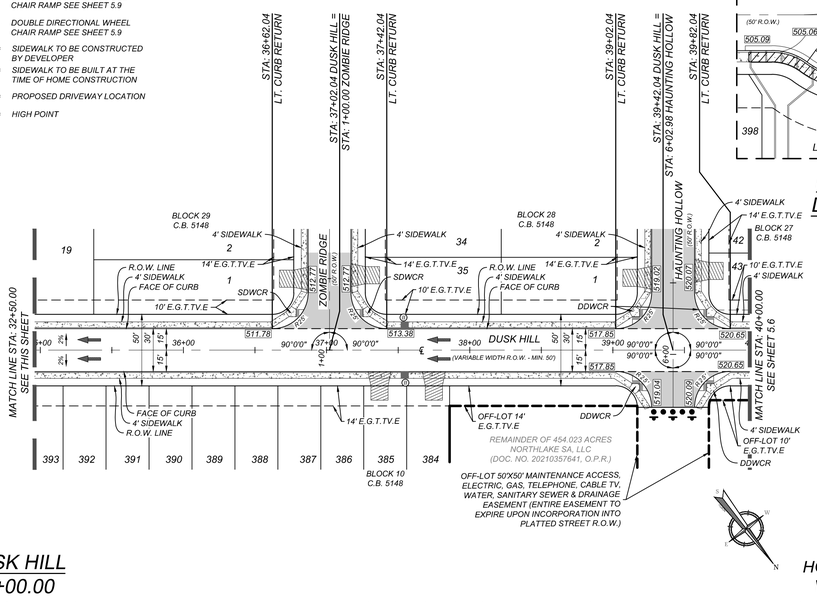
- R.O.W. = RIGHT OF WAY
- E.G.T.TV.E. = ELECTRIC, GAS, TELEPHONE & CABLE EASEMENT
- = FLOW ARROW
- = WASHOUT CROWN
- (I) = WHEELCHAIR RAMP TYPE I SEE SHEET 5.9
- (II) = WHEELCHAIR RAMP TYPE II SEE SHEET 5.9
- SDWCR = SINGLE DIRECTIONAL WHEEL CHAIR RAMP SEE SHEET 5.9
- DDWCR = DOUBLE DIRECTIONAL WHEEL CHAIR RAMP SEE SHEET 5.9
- = SIDEWALK TO BE CONSTRUCTED BY DEVELOPER
- = SIDEWALK TO BE BUILT AT THE TIME OF HOME CONSTRUCTION
- = PROPOSED DRIVEWAY LOCATION
- H.P. = HIGH POINT





KNUCKLE DETAIL "C"

SCALE: 1" = 30'

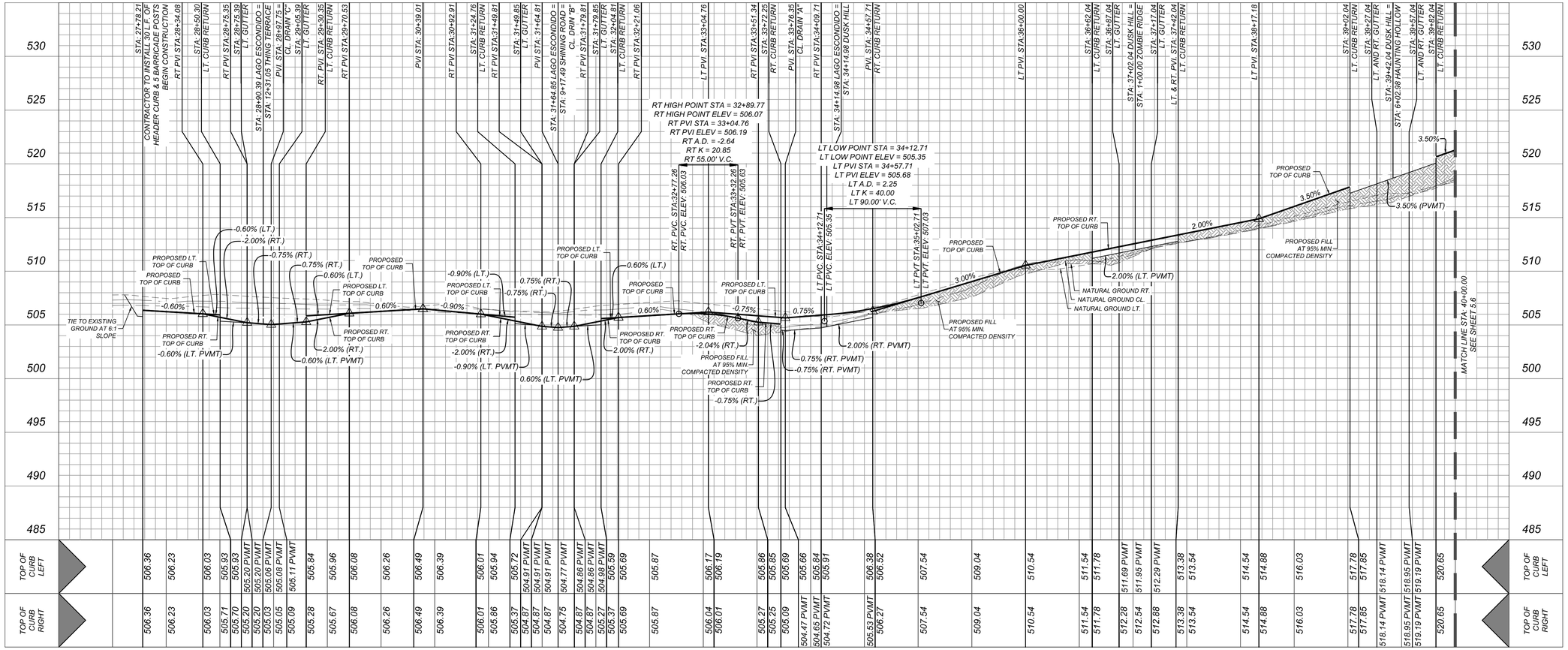


KNUCKLESAC ELEVATIONS	
STATION	TOP OF CURB ELEVATIONS
A	505.24
B	505.48
C	505.68
D	505.92
E	506.05
F	506.08

LAGO ESCONDIDO & DUSK HILL

STA: 27+78.21 - STA: 40+00.00

HORZ SCALE: 1"=50'
VERT SCALE: 1"=5'



Colliers Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, revised, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
9/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: STPP3146503

SHEET TITLE: LAGO ESCONDIDO & DUSK HILL PLAN AND PROFILES

SHEET NUMBER: 5.5

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

I:\STREETS\STPP3146503\.dwg\5.5 By: ABEL.MONTALVO

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.

CAUTION!!:

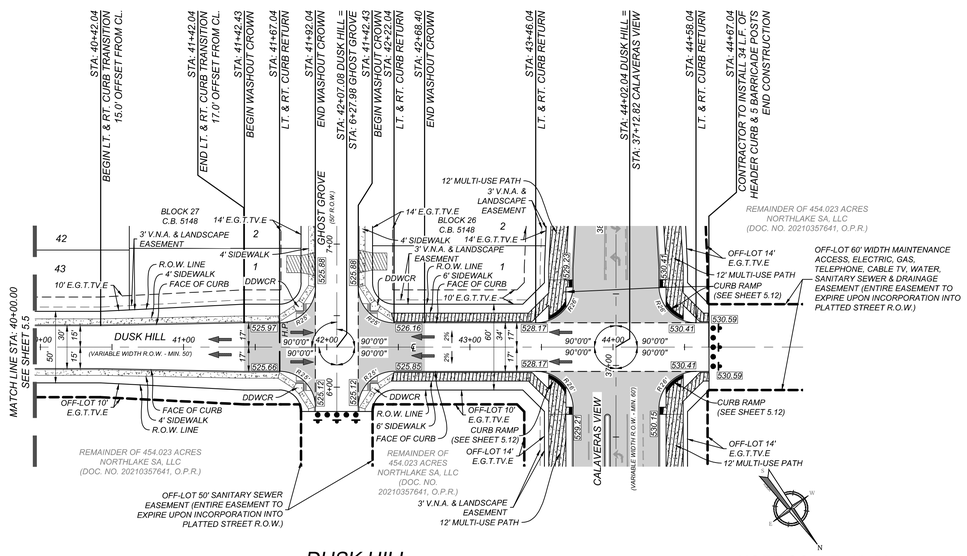
THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCT BANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. ANY UTILITY CONFLICTS THAT 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.

BEXAR COUNTY R.O.W. NOTE

A BEXAR COUNTY PERMIT MUST BE OBTAINED BEFORE WORKING IN BEXAR COUNTY R.O.W.

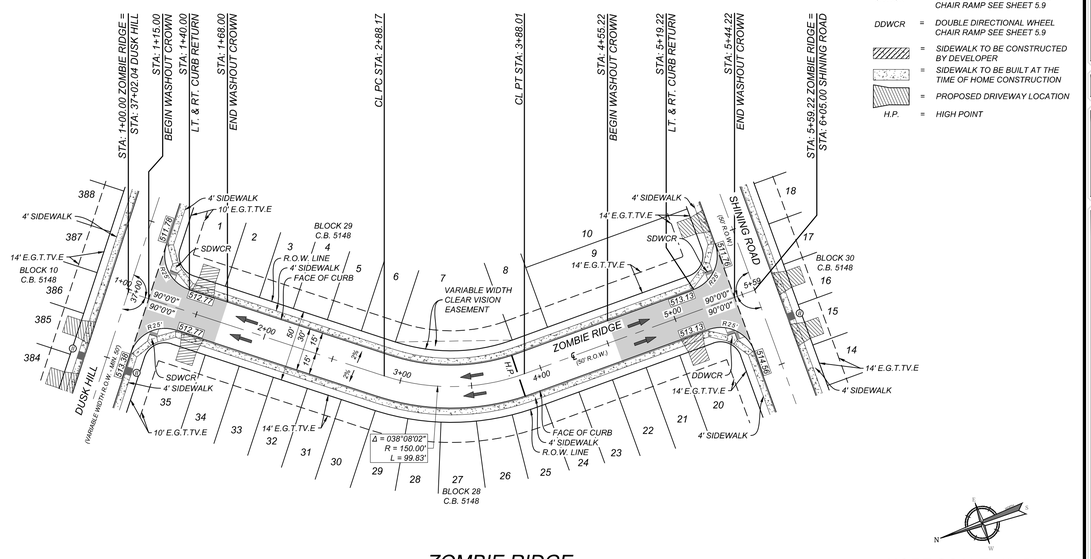
LEGEND

R.O.W.	=	RIGHT OF WAY
E.G.T.TV.E.	=	ELECTRIC, GAS, TELEPHONE & CABLE EASEMENT
	=	FLOW ARROW
	=	WASHOUT CROWN
I	=	WHEELCHAIR RAMP TYPE I SEE SHEET 5.9
II	=	WHEELCHAIR RAMP TYPE II SEE SHEET 5.9
SDWCR	=	SINGLE DIRECTIONAL WHEEL CHAIR RAMP SEE SHEET 5.9
DDWCR	=	DOUBLE DIRECTIONAL WHEEL CHAIR RAMP SEE SHEET 5.9
	=	SIDEWALK TO BE CONSTRUCTED BY DEVELOPER
	=	SIDEWALK TO BE BUILT AT THE TIME OF HOME CONSTRUCTION
	=	PROPOSED DRIVEWAY LOCATION
H.P.	=	HIGH POINT



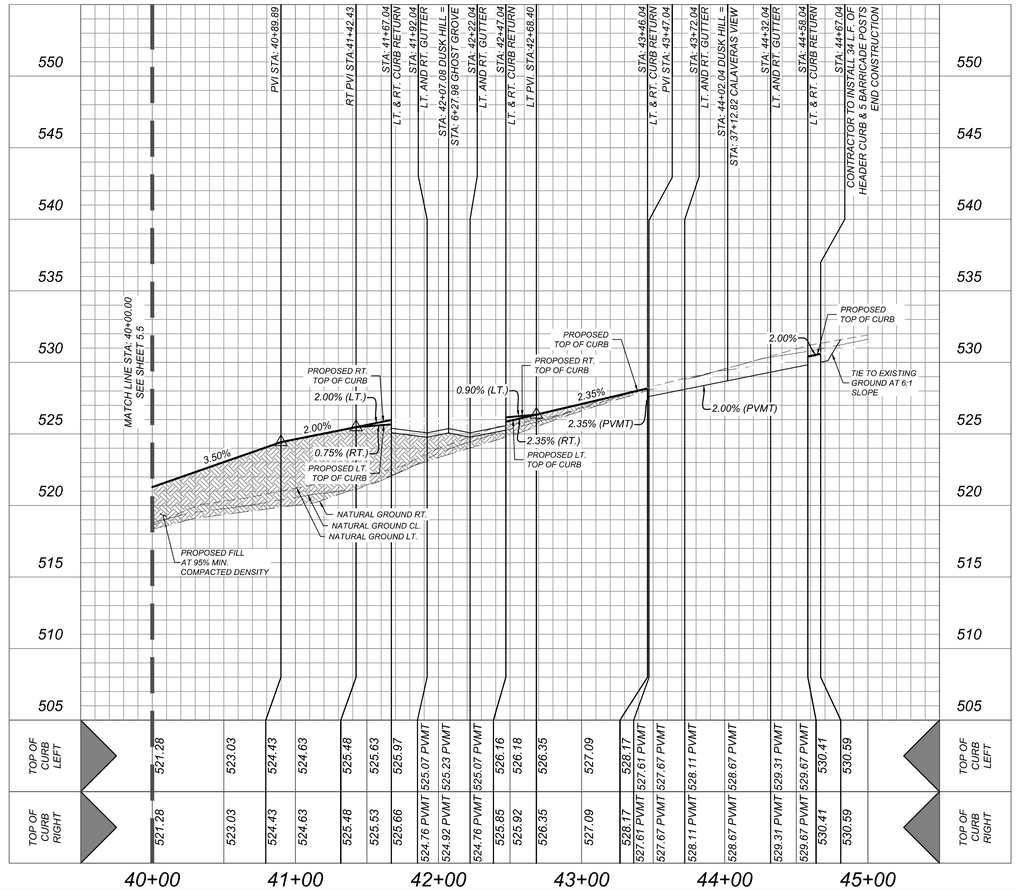
DUSK HILL
STA: 40+00.00 - END

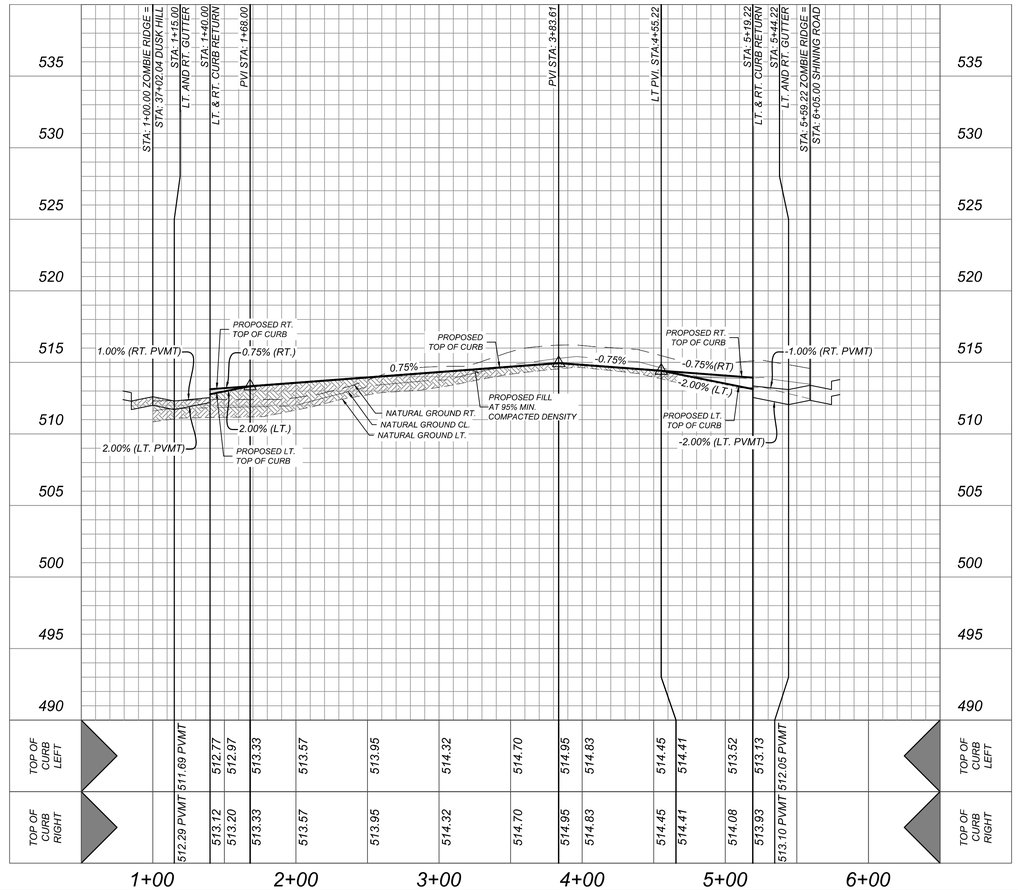
HORZ SCALE: 1"=50'
VERT SCALE: 1"=5'



ZOMBIE RIDGE
STA: 1+00.00 - END

HORZ SCALE: 1"=50'
VERT SCALE: 1"=5'





| | | |

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.

CAUTION!!:

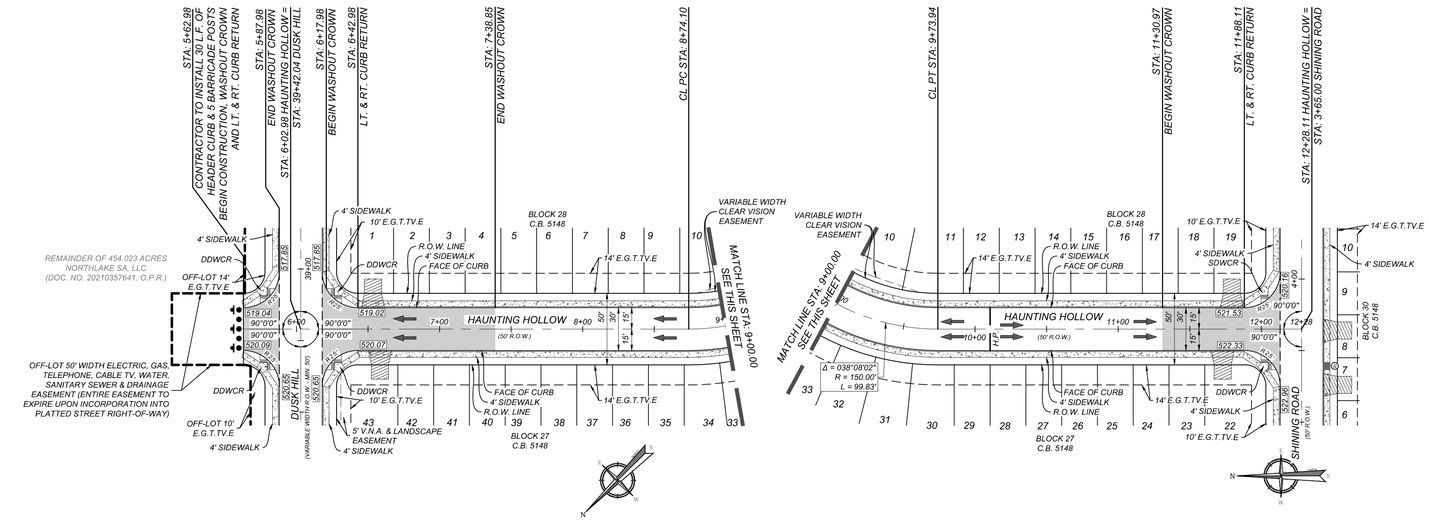
THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCT BANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. ANY UTILITY CONFLICTS THAT 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.

BEXAR COUNTY R.O.W. NOTE:

A BEXAR COUNTY PERMIT MUST BE OBTAINED BEFORE WORKING IN BEXAR COUNTY R.O.W.

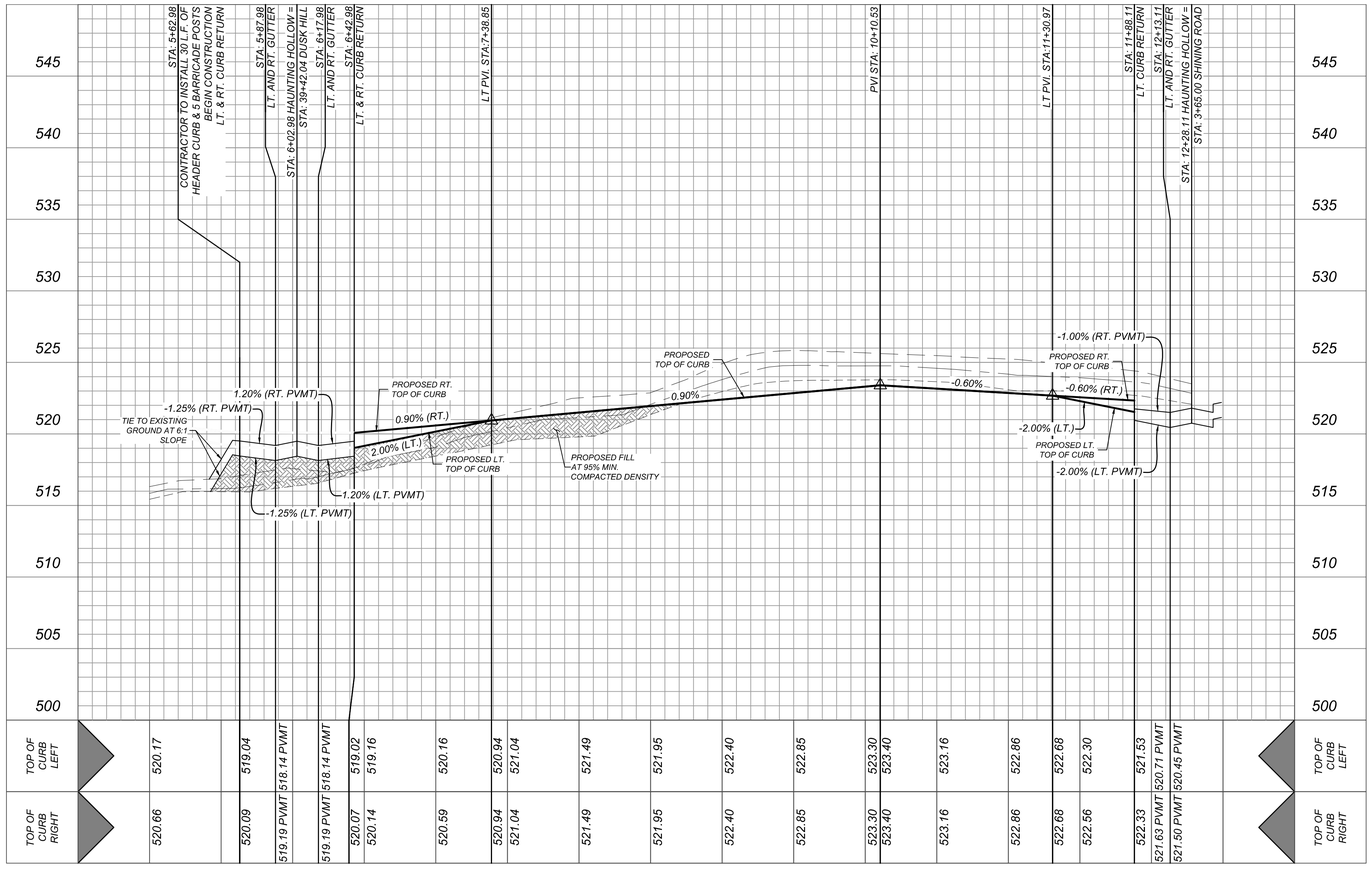
LEGEND

R.O.W.	=	RIGHT OF WAY
E.G.T.TV.E.	=	ELECTRIC, GAS, TELEPHONE & CABLE EASEMENT
	=	FLOW ARROW
	=	WASHOUT CROWN
(I)	=	WHEELCHAIR RAMP TYPE I SEE SHEET 5.9
(II)	=	WHEELCHAIR RAMP TYPE II SEE SHEET 5.9
SDWCR	=	SINGLE DIRECTIONAL WHEEL CHAIR RAMP SEE SHEET 5.9
DDWCR	=	DOUBLE DIRECTIONAL WHEEL CHAIR RAMP SEE SHEET 5.9
	=	SIDEWALK TO BE CONSTRUCTED BY DEVELOPER
	=	SIDEWALK TO BE BUILT AT THE TIME OF HOME CONSTRUCTION
	=	PROPOSED DRIVEWAY LOCATION
H.P.	=	HIGH POINT



HAUNTING HOLLOW
STA: 5+62.98 - END

HORZ SCALE: 1"=50'
VERT SCALE: 1"=5'



Colliers Engineering & Design

www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

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

PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE

FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DESCRIPTION	DRAWN BY

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED
PROFESSIONAL ENGINEER

9/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design

SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14309
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

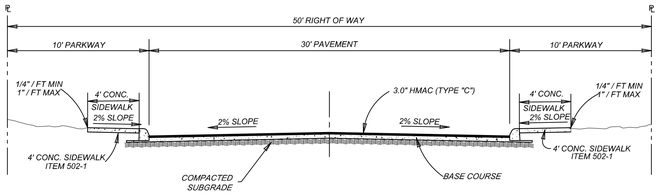
PROJECT NUMBER: 314-65-03
DRAWING NAME: STPP3146503

SHEET TITLE: HAUNTING HOLLOW PLAN AND PROFILES

SHEET NUMBER: 5.7

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

I:\STREETS\STPP3146503.dwg\S5.7 By: ABEL.MONTALVO

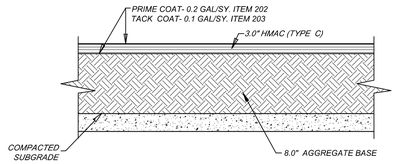


TYPICAL LOCAL "A" STREET SECTION

NOT TO SCALE

THING TERRACE: STA: 6+50.00 - END
SHINING ROAD: STA: 1+00.00 - END
GHOST GROVE: STA: 5+82.98 - 6+10.98
GHOST GROVE: STA: 6+44.98 - 16+80.31
GHOST GROVE: STA: 17+14.31 - 18+17.31
LAGO ESCONDIDO: STA: - 27+78.21 - 34+14.98

DUSK HILL: STA: 34+14.98 - 40+42.04
ZOMBIE RIDGE: STA: 1+00.00 - END
HAUNTING HOLLOW: STA: 5+62.98 - END



ASPHALT PAVEMENT DETAIL

NOT-TO-SCALE

DETAIL FOR ALL LOCAL TYPE A

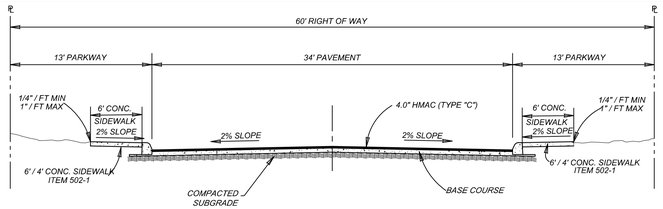
Pavement Section
3.0" HMAC (TYPE "C")
8.0" FLEXBASE COURSE (TYPE "A" GRADE 1)
8.0" COMPACTED SUBGRADE
Total: 19.0"
Structural No: 4.2
C.B.R = 4.9

NOTES:
1. PAVEMENT DESIGN THICKNESS BASED ON GEOTECHNICAL REPORT BY PROFESSIONAL SERVICE INDUSTRIES, INC. PROJECT NO. 0312-3490-R1 DATED 09/19/25.

2. REFERENCE PROJECT GEOTECHNICAL REPORT AND PROJECT SPECIFICATION FOR ADDITIONAL REQUIREMENTS AND ALTERNATE PAVEMENT SECTIONS.

3. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING MATERIAL TESTING. TESTING TO BE PAID BY OWNER.

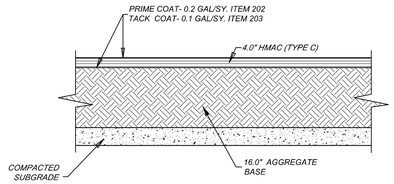
4. CONTRACTOR MAY LEAVE VERTICAL CUT BANKS AT R.O.W. LINE AND MEDIANS PROVIDED PROJECT GEOTECHNICAL ENGINEER DETERMINES ROCK IS COMPETENT TO STAND ON ITS OWN.



TYPICAL LOCAL "B" STREET SECTION

NOT TO SCALE

THING TERRACE: STA: 2+45.00 - 2+83.00
THING TERRACE: STA: 3+17.00 - 6+50.00
DUSK HILL: STA: 40+42.04 - 43+72.04
DUSK HILL: STA: 44+32.04 - 44+67.04



ASPHALT PAVEMENT DETAIL

NOT-TO-SCALE

DETAIL FOR ALL LOCAL TYPE B

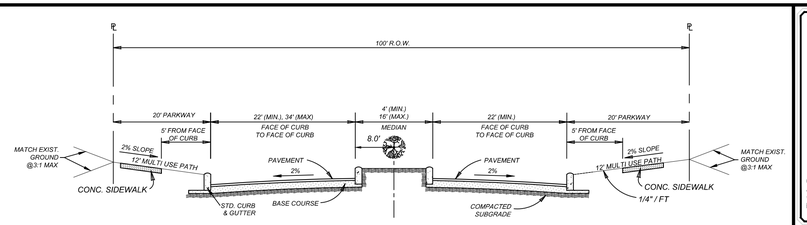
Pavement Section
4.0" HMAC (TYPE "C")
16" FLEXBASE COURSE (TYPE "A" GRADE 1)
8.0" COMPACTED SUBGRADE
Total: 28.0"
Structural No: 4.2
C.B.R = 4.9

NOTES:
1. PAVEMENT DESIGN THICKNESS BASED ON GEOTECHNICAL REPORT BY PROFESSIONAL SERVICE INDUSTRIES, INC. PROJECT NO. 0312-3490-R1 DATED 09/19/25.

2. REFERENCE PROJECT GEOTECHNICAL REPORT AND PROJECT SPECIFICATION FOR ADDITIONAL REQUIREMENTS AND ALTERNATE PAVEMENT SECTIONS.

3. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING MATERIAL TESTING. TESTING TO BE PAID BY OWNER.

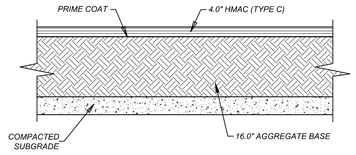
4. CONTRACTOR MAY LEAVE VERTICAL CUT BANKS AT R.O.W. LINE AND MEDIANS PROVIDED PROJECT GEOTECHNICAL ENGINEER DETERMINES ROCK IS COMPETENT TO STAND ON ITS OWN.



R.O.W. STREET SECTION - COLLECTOR

NOT TO SCALE

CALAVERAS VIEW: STA: 26+11.17 - 37+67.82



ASPHALT PAVEMENT DETAIL

NOT-TO-SCALE

DETAIL FOR MODIFIED ARTERIAL

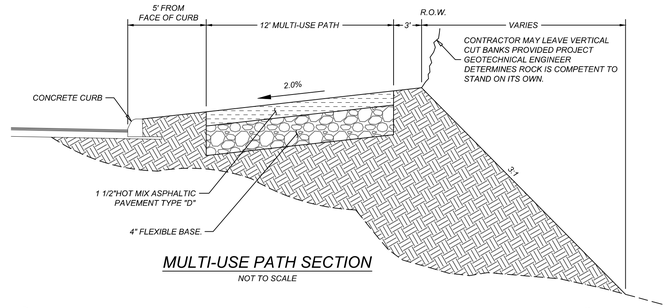
Pavement Section
4.0" HMAC TYPE "C"
16.0" AGGREGATED BASE (TYPE A, GRADE 1)
8.0" COMPACTED SUBGRADE
Total: 28.0"
Structural No: 4.2
CBR: 4.9

NOTES:
1. PAVEMENT DESIGN THICKNESS BASED ON GEOTECHNICAL REPORT BY PROFESSIONAL SERVICE INDUSTRIES, INC. PROJECT NO. 0312-3490-R1 DATED 09/19/25.

2. REFERENCE PROJECT GEOTECHNICAL REPORT AND PROJECT SPECIFICATION FOR ADDITIONAL REQUIREMENTS AND ALTERNATE PAVEMENT SECTIONS.

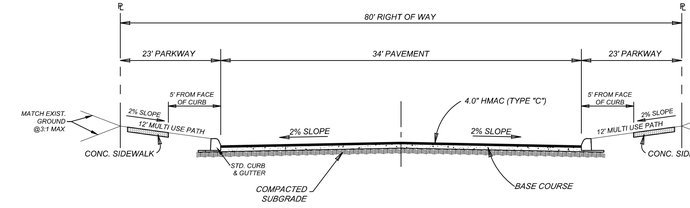
3. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING MATERIAL TESTING. TESTING TO BE PAID BY OWNER.

4. CONTRACTOR MAY LEAVE VERTICAL CUT BANKS AT R.O.W. LINE AND MEDIANS PROVIDED PROJECT GEOTECHNICAL ENGINEER DETERMINES ROCK IS COMPETENT TO STAND ON ITS OWN.



MULTI-USE PATH SECTION

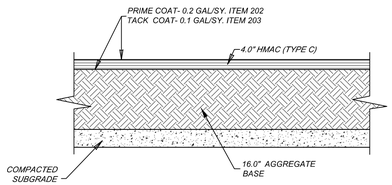
NOT TO SCALE



TYPICAL COLLECTOR "B" STREET SECTION

NOT TO SCALE

CALAVERAS VIEW: STA: 37+67.82 - 50+13.46



ASPHALT PAVEMENT DETAIL

NOT-TO-SCALE

DETAIL FOR ALL LOCAL TYPE B

Pavement Section
4.0" HMAC TYPE "C"
16.0" AGGREGATED BASE (TYPE A, GRADE 1)
8.0" COMPACTED SUBGRADE
Total: 28.0"
Structural No: 4.2
CBR: 4.9

NOTES:
1. PAVEMENT DESIGN THICKNESS BASED ON GEOTECHNICAL REPORT BY PROFESSIONAL SERVICE INDUSTRIES, INC. PROJECT NO. 0312-3490-R1 DATED 09/19/25.

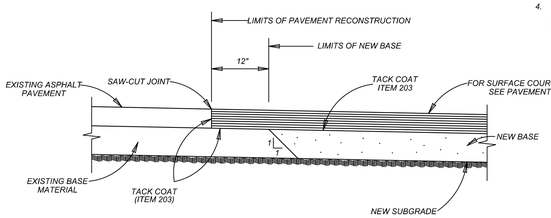
2. REFERENCE PROJECT GEOTECHNICAL REPORT AND PROJECT SPECIFICATION FOR ADDITIONAL REQUIREMENTS AND ALTERNATE PAVEMENT SECTIONS.

3. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING MATERIAL TESTING. TESTING TO BE PAID BY OWNER.

4. CONTRACTOR MAY LEAVE VERTICAL CUT BANKS AT R.O.W. LINE AND MEDIANS PROVIDED PROJECT GEOTECHNICAL ENGINEER DETERMINES ROCK IS COMPETENT TO STAND ON ITS OWN.

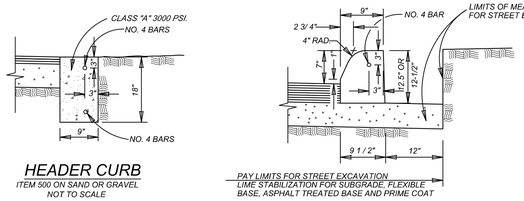
STREETSCAPE TREE PLANTING NOTES

- MEDIUM TREES (PER UDC) TO BE PLANTED EVERY 50 FEET ALONG CALAVERAS VIEW. MEDIAN PER "NEW TREE PLANTING DETAIL" ON THIS SHEET
1. SPECIES OF TREES TO BE DETERMINED BY DEVELOPER'S PROJECT LANDSCAPE ARCHITECT TO CONFIRM WITH THE STREETSCAPE PLANTING STANDARDS.
2. DEVELOPER TO PROVIDE MAINTENANCE ON PLANTED STREET TREES FOR A MINIMUM OF 3 YEARS.
3. ALL LANDSCAPE SHALL COMPLY WITH THE CLEAR VISION AREA AS DEFINED BY THE LATEST VERSION OF AASHTO's "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS."
4. TYPES OF TREES AND SPACING ARE BASED ON UNDERGROUND ELECTRIC. IF OVERHEAD ELECTIRC IS REQUIRED BY CPS, PLANS WILL BE REVISED TO REFLECT CHANGES IN SIZE, TYPE, AND SPACING OF TREE, PER THE UDC.



PAVEMENT JUNCTION DETAILS

NOT TO SCALE

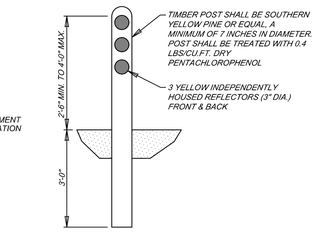


HEADER CURB

ITEM 500 ON SAND OR GRAVEL
NOT TO SCALE

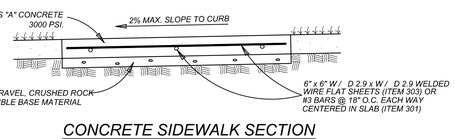
CONCRETE CURB

ITEM 500 ON FLEXIBLE BASE MATERIAL
NOT TO SCALE



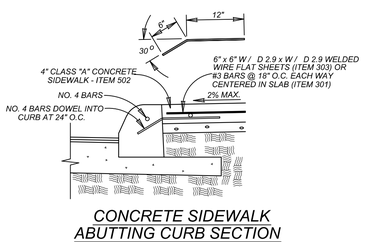
TIMBER GUARD POST DETAIL

NOT-TO-SCALE



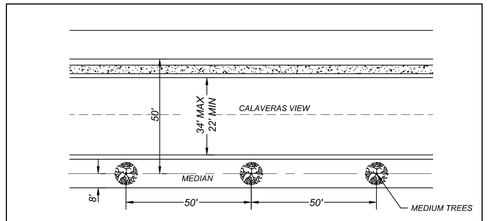
CONCRETE SIDEWALK SECTION

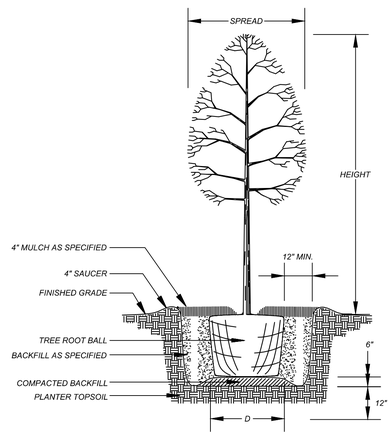
ITEM 502
NOT TO SCALE



CONCRETE SIDEWALK ABUTTING CURB SECTION

ITEM 502
NOT TO SCALE





NEW TREE PLANTING DETAIL

N. T. S.

*"NOTE: CONTRACTOR TO REFERENCE GEOTECH REPORT PREPARED BY INTERTEK PSI PROJECT NO. 0312-3490-R1 DATED SEPTEMBER 19, 2025

PAVEMENT DESIGN AND CONSTRUCTION RECOMMENDATIONS:

- ***MINIMUM UNDERCUT DEPTH***: 6 INCHES OR AS NEEDED TO REMOVE ROOTS.
- ***LOW-DENSITY SOIL TREATMENT***: AFTER CLEARING AND GRUBBING, REMOVE/REPLACE UPPER 12 INCHES OF EXPOSED SOILS IN MAXIMUM 9-INCH LOOSE LIFTS, MOISTURE-CONDITION AND COMPACT AS SUBGRADE IN TABLE 4.5.
- ***REUSE EXCAVATED SOILS***: MUST BE FREE OF ROOTS AND DEBRIS AND MEET MATERIAL REQUIREMENTS OF INTENDED USE.
- ***EXPOSE SUBGRADE TREATMENT***: AFTER MOISTURE CONDITIONING AND RECOMPACTING THE LOW DENSITY SUBGRADE SOILS, PROOF-ROLL WITH RUBBER-TIRED VEHICLE WEIGHING AT LEAST 20 TONS. A REPRESENTATIVE OF THE GEOTECHNICAL ENGINEER SHOULD BE PRESENT DURING PROOF-ROLL.
- ***PROOF-ROLLED PUMPING AND RUTTING AREAS***: EXCAVATE TO FIRMER MATERIALS AND REPLACE WITH COMPACTED GENERAL OR SELECT FILL UNDER DIRECTION OF A REPRESENTATIVE OF THE GEOTECHNICAL ENGINEER.
- ***GENERAL FILL***: MATERIALS FREE OF ROOTS, DEBRIS, AND OTHER DELETERIOUS MATERIALS WITH A MAXIMUM ROCK SIZE OF 4 INCHES WITH A CBR GREATER THAN 4.9.
- MINIMUM GENERAL FILL THICKNESS: AS REQUIRED TO ACHIEVE GRADE.
- ***MAXIMUM GENERAL FILL LOOSE THICKNESS***: 9 INCHES.
- ***GEOGRID NOTE***: GEOGRID SHOULD MEET TxDOT ITEMS DMS - 6240 AND BE PULLED AND PUNCHED. THE SUBGRADE SHOULD BE LEVELED AND SMOOTHED PRIOR TO GEOGRID PLACEMENT ON COMPACTED SUBGRADE. GEOGRID SHOULD BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND CONSTRUCTED IN ACCORDANCE WITH COSA ITEM 234. GEOGRID SHOULD BE PLACED ON TOP OF THE PREPARED SUBGRADE IN INSTANCES THAT THE TOTAL THICKNESS OF THE OVERLYING COMPACTED BASE MATERIALS IS 10 INCHES OR LESS. IN INSTANCES THAT THE TOTAL THICKNESS OF THE COMPACTED BASE MATERIAL LAYER IS GREATER THAN 10 INCHES THE GEOGRID SHOULD BE PLACED AT THE MID-SECTION OF THE COMPACTED BASE MATERIAL LAYER.
- ***FLEXIBLE BASE:*** COSA ITEM 200.
- ***MAXIMUM FLEXIBLE BASE LOOSE LIFT THICKNESS:*** 9 INCHES.
- ***HOT MIX ASPHALTIC CONCRETE:*** COSA ITEM 205 C, COSA ITEM 205 TYPE D, COSA ITEM 205 TYPE D.

SUBGRADE PREPARATION FOR NON-STRUCTURAL - GENERAL FILL:

- ***MINIMUM UNDERCUT DEPTH***: 6 INCHES OR AS NEEDED TO REMOVE ROOTS, ORGANIC AND/OR DELETERIOUS MATERIALS.
- ***EXPOSED SUBGRADE TREATMENT:*** PROOF-ROLL SUBGRADE WITH RUBBER-TIRED 20-LOAD (LOADED) CONSTRUCTION EQUIPMENT. ALTERNATE EQUIPMENT CAN BE USED WITH GEOTECHNICAL ENGINEER APPROVAL.
- ***PROOF-ROLLED PUMPING AND RUTTING AREAS:*** EXCAVATE TO FIRMER MATERIALS AND REPLACE WITH COMPACTED GENERAL OR SELECT FILL UNDER DIRECTION OF A REPRESENTATIVE OF THE GEOTECHNICAL ENGINEER.
- ***GENERAL FILL TYPE:*** ANY CLEAN MATERIAL FREE OF ROOTS, DEBRIS AND OTHER DELETERIOUS MATERIAL WITH A MAXIMUM PARTICLE SIZE OF 4 INCHES.
- ***MAXIMUM GENERAL FILL LOOSE LIFT THICKNESS:*** 8 INCHES.

Colliers
Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, revised, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
9/25/25

NORTHLAKE PHASE 10
PLAT# 25-11800371

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#:F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

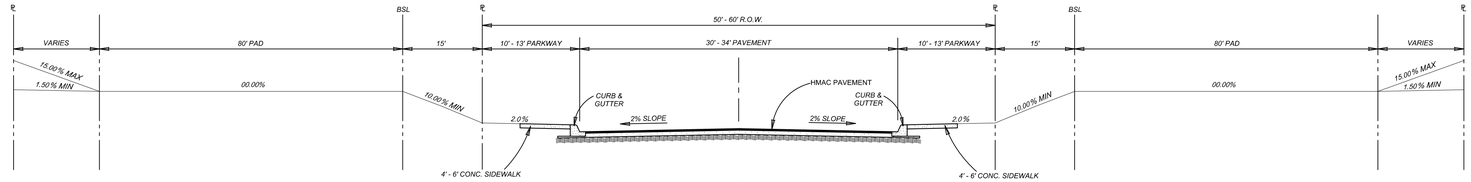
PROJECT NUMBER:	DRAWING NAME:
314-65-03	STDT3146503

SHEET TITLE:
STREET DETAIL SHEET (1 OF 2)

SHEET NUMBER:
5.8

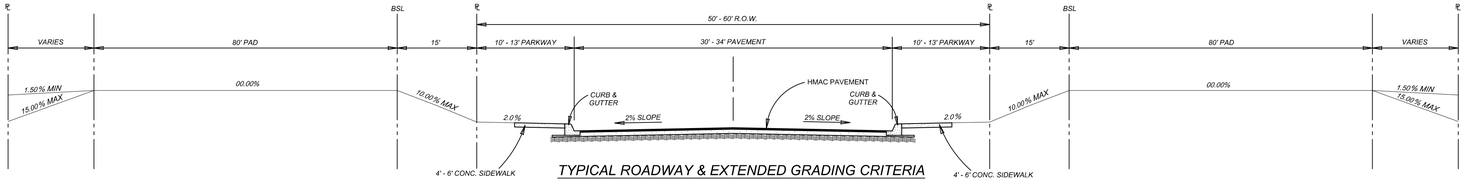
\\R\STREETS\STDT3146503.dwg\5.8 By: ABEL.MONTALVO

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.



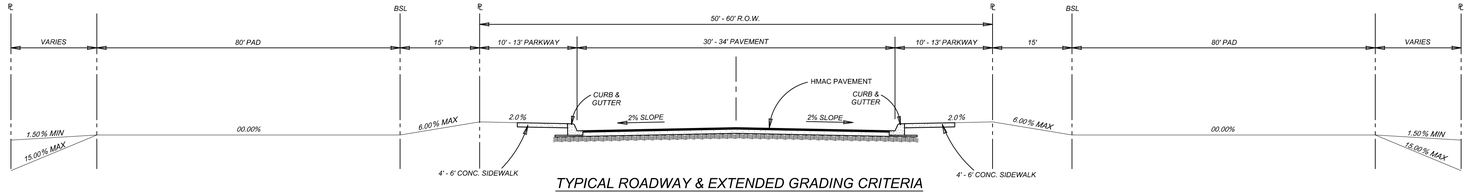
TYPICAL ROADWAY & EXTENDED GRADING CRITERIA

SCALE : NOT TO SCALE



TYPICAL ROADWAY & EXTENDED GRADING CRITERIA

SCALE : NOT TO SCALE



TYPICAL ROADWAY & EXTENDED GRADING CRITERIA

SCALE : NOT TO SCALE

Colliers
Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

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

PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE

FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED
PROFESSIONAL ENGINEER
9/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

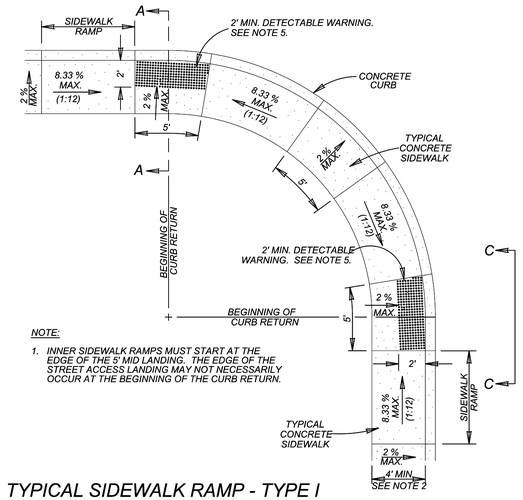
PROJECT NUMBER: 314-65-03
DRAWING NAME: STDT3146503

SHEET TITLE:
STREET DETAIL SHEET
(2 OF 2)

SHEET NUMBER:
5.8A

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

n:\STREETS\STDT3146503.dwg|5.8A By: ABEL.MONTALVO



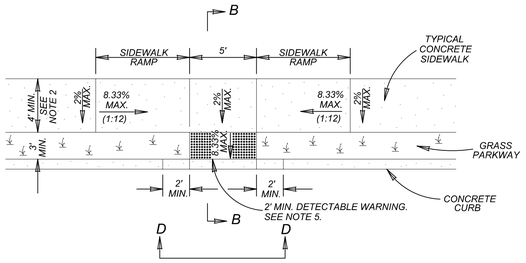
NOTE:

1. INNER SIDEWALK RAMPS MUST START AT THE EDGE OF THE 5' MID LANDING. THE EDGE OF THE STREET ACCESS LANDING MAY NOT NECESSARILY OCCUR AT THE BEGINNING OF THE CURB RETURN.

TYPICAL SIDEWALK RAMP - TYPE I

SIDEWALK ABUTS THE CURB

SCALE : 1"=10'



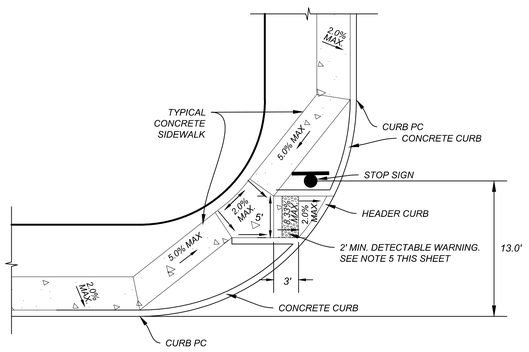
TYPICAL SIDEWALK RAMP - TYPE IV

USED AT TEE INTERSECTIONS WHERE SIDEWALK IS SEPARATED FROM CURB

SCALE : 1"=10'

GENERAL NOTES

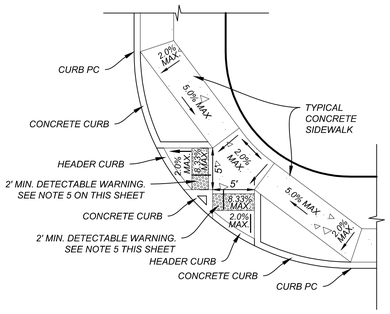
1. WHEN POSSIBLE SIDEWALKS SHOULD BE PLACED NEXT TO THE PROPERTY LINE, ALLOWING A MINIMUM OF 1 FOOT BUFFER. DEVIATION OF THE PATHWAY FROM A STRAIGHT LINE IS ENCOURAGED TO AVOID TREES OR OTHER OBSTRUCTIONS.
2. FOR LOCAL TYPE "A" STREETS, SIDEWALKS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF 4' AND IF SEPARATED FROM THE CURB, THE SIDEWALK SHALL BE LOCATED A MINIMUM OF 3' FROM THE BACK OF CURB.
3. FOR OTHER THAN LOCAL TYPE "A" STREETS, SIDEWALKS SHALL HAVE A MINIMUM UNOBSTRUCTED WIDTH OF 4' AND SEPARATED A MINIMUM OF 3' FROM THE BACK OF CURB OR AS AN OPTION, THE SIDEWALK SHALL HAVE A MINIMUM WIDTH OF 6' WHEN LOCATED AT THE BACK OF CURB.
4. SIDEWALK RAMP LENGTHS PRESENTED IN TABLE 1 ARE GUIDELINES ONLY. SIDEWALK RAMP LENGTHS SHALL BE OF SUFFICIENT LENGTH TO MAINTAIN 8.33% (1:12) MAXIMUM SLOPE.
5. ALL CURB-RAMPS OR LANDINGS ABUTTING THE CROSSWALK SHALL HAVE A DETECTABLE WARNING 24 INCHES DEEP (IN THE DIRECTION OF PEDESTRIAN TRAVEL) AND EXTENDING THE FULL WIDTH OF THE CURB RAMP OR LANDING. THE DETECTABLE WARNING SHALL CONSIST OF RAISED TRUNCATED DOMES, ALIGNED IN A GRID PATTERN WITH A DIAMETER OF A NOMINAL 0.9 INCHES (23 MM), A HEIGHT OF NOMINAL 0.2 INCHES (5 MM) AND A CENTER-TO-CENTER SPACING OF NOMINAL 2.35 INCHES (60 MM). THE DETECTABLE WARNING SURFACE SHALL BE PAVERS CONFORMING TO TXDOT STANDARD PED-05, PEDESTRIAN FACILITIES.
6. DETECTABLE WARNINGS SHALL CONTRAST VISUALLY WITH ADJOINING SURFACES, EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT. THE MATERIAL USED TO PROVIDE CONTRAST SHALL BE AN INTEGRAL PART OF THE WALKING SURFACE.
7. SIDEWALK RAMP TYPE V SHALL BE USED ONLY WHERE THERE IS SIGNIFICANT RESTRICTION WITHIN THE PARKWAY TO CONSTRUCT TYPE I OR TYPE III RAMPS.
8. CONSTRUCTION OF ALL WHEELCHAIR RAMPS TO BE INCLUDED UNDER ITEMS "500 - CONCRETE CURB, GUTTER, AND CONCRETE CURB AND GUTTER" AND / OR "502 - CONCRETE SIDEWALKS". RAMP SURFACE SHALL BE BRUSH FINISHED.
9. THESE DETAILS ARE FOR REFERENCE ONLY. ACTUAL LOCATIONS OF WHEELCHAIR RAMPS TO BE SHOWN ON CONSTRUCTION PLANS. CITY CONSTRUCTION INSPECTOR CAN ADJUST LOCATIONS FOR SAFETY OR UTILITY CLEARANCE.
10. SIDEWALKS LESS THAN 5 FEET IN WIDTH SHALL BE PROVIDED WITH A PASSING SPACE AT A MAXIMUM SPACING OF 200 FEET.
11. WHEELCHAIR RAMP SHALL BE CONSTRUCTED WITH 4" CLASS "A" CONCRETE AND 2" MINIMUM GRAVEL, CRUSHED ROCK OR FLEXIBLE BASE MATERIAL.
12. REINFORCING STEEL SHALL BE #3 BARS AT 18" O.C.E.W. OR 6" x 6" - W2.9 x W2.9 WIRE MESH.
13. SIDEWALK GRADES SHALL NOT EXCEED THE GRADE ESTABLISHED FOR THE ADJACENT ROADWAY. ANY SIDEWALK CONSTRUCTION THAT DEVIATES FROM THE NATURAL GRADE OF THE ROADWAY TO CREATE A GRADE STEEPER THAN THE EXISTING ROADWAY WILL REQUIRE RAMPS, HANDRAILS AND RESTING PLATFORMS TO BE CONSTRUCTED IN ACCORDANCE WITH ADA AND TAS STANDARDS.
14. SIDEWALK CROSS GRADE SHALL HAVE A MAXIMUM SLOPE OF 2%. LANDINGS SHALL HAVE A MAXIMUM SLOPE OF 2% IN ANY DIRECTION.
15. THE CHANGE OF GRADE BETWEEN ADJACENT SURFACES SHALL BE LESS THAN 11%. THE CHANGE OF GRADE SHALL BE DEFINED AS THE ALGEBRAIC DIFFERENCE OF THE ADJACENT SURFACE SLOPES. IN THE CASE OF A STREET ACCESS RAMP DESIGNED AT THE 8.33% MAXIMUM SLOPE, THE ADJACENT PAVEMENT CROSS SLOPE SHALL BE LESS THAN 2.67% (I.E. 8.33-(-2.67)=11). IN ADDITION, THE ADJACENT PAVEMENT CROSS SLOPE SHALL BE LESS THAN OR EQUAL TO 5%.
16. IF THE CHANGE OF GRADE BETWEEN ADJACENT SURFACES IS GREATER THAN OR EQUAL TO 11%, A LEVELING STRIP, 2 FEET IN LENGTH, SHALL BE PROVIDED TO TRANSITION THE ADJACENT SURFACES.
17. ADA COMPLIANCE IN ALTERATIONS INCLUDE ONLY THAT WORK WITHIN THE LIMITS, BOUNDARIES OR SCOPE OF A PLANNED PROJECT.



SINGLE DIRECTIONAL WHEEL CHAIR RAMP (SDWCR)

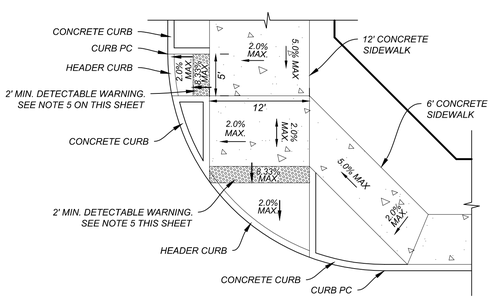
NOT TO SCALE

* *REFERENCE TxDOT PEDESTRIAN DETAILS. SEE SHEET 5.11*



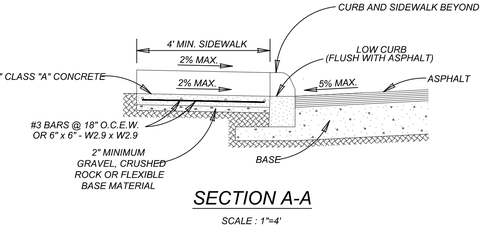
DOUBLE DIRECTIONAL WHEEL CHAIR RAMP (DDWCR)

NOT TO SCALE



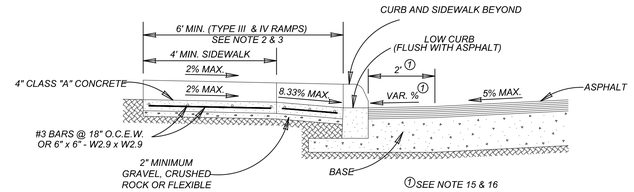
CALAVERAS VIEW & STRIPLING STREET CROSSING DOUBLE DIRECTIONAL WHEEL CHAIR RAMP (DDWCR)

NOT TO SCALE



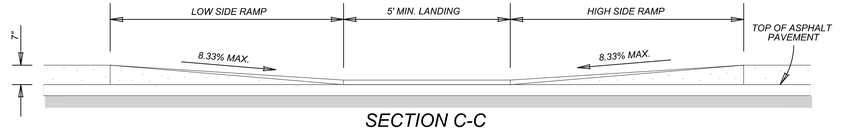
SECTION A-A

SCALE : 1"=4'



SECTION B-B

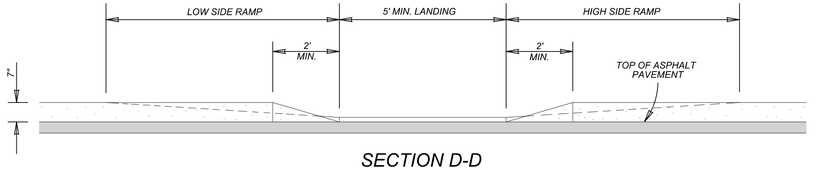
SCALE : 1"=4'



SECTION C-C

CURB PROFILE WHERE SIDEWALK ABUTS CURB

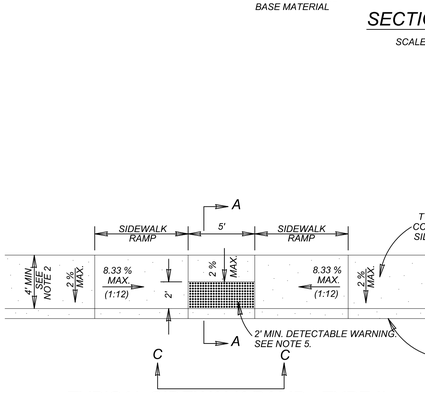
SCALE : 1"=4'



SECTION D-D

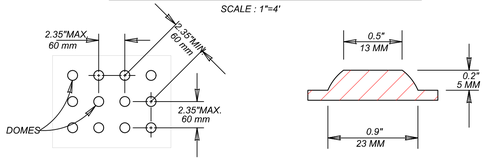
CURB PROFILE WHERE SIDEWALK IS SEPARATED FROM CURB

SCALE : 1"=4'



DETECTABLE WARNING SURFACE

SCALE : 1"=4'

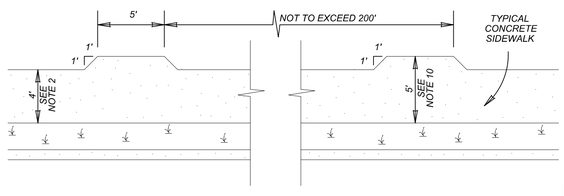


PLAN DETAIL

NO SCALE

DOME SECTION

NO SCALE



SIDEWALK PASSING SPACE

SCALE : 1"=10'

NOTE:

STAMPED CONCRETE TRUNCATED DOMES WILL NOT BE ALLOWED TO BE USED FOR DETECTABLE WARNING ON WHEELCHAIR RAMPS. CONTRACTOR MUST SUBMIT TRUNCATED DOME INFORMATION THAT IS TO BE USED ON WHEELCHAIR RAMPS TO THE PROJECT MANAGER FOR APPROVAL AT LEAST 30 DAYS PRIOR TO INSTALLATION.

TABLE 1 (SEE NOTE 4)		
GUTTER SLOPE	SIDEWALK RAMP LENGTH (1:12)	
	LOW SIDE	HIGH SIDE
1%	5'-6"	7'-2"
2%	5'-0"	8'-4"
3%	4'-6"	10'-0"
4%	4'-2"	12'-6"
5%	3'-10"	16'-8"

Colliers Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, revised, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
7/1/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: STDT3146503

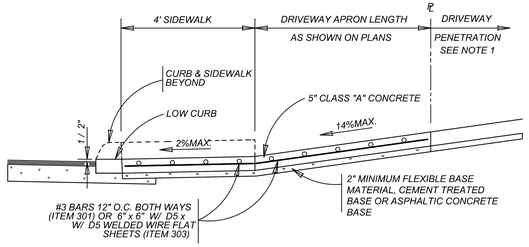
SHEET TITLE: WHEELCHAIR RAMP DETAIL SHEET

SHEET NUMBER: 5.9

WHEELCHAIR RAMP STANDARDS

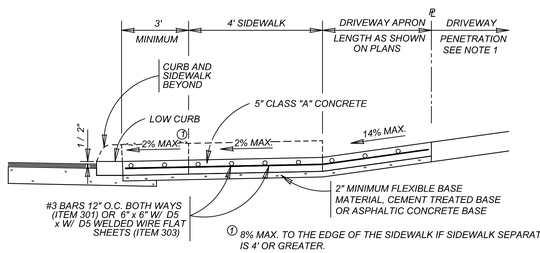
NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

I:\STREETS\STDT3146503.dwg\CS-9 By: ABODNIGLEZ



TYPICAL RESIDENTIAL DRIVEWAY SECTION

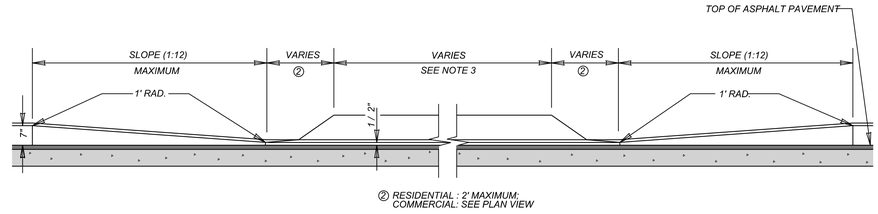
WITH SIDEWALK ABUTTING CURB
ITEM 503.1



TYPICAL RESIDENTIAL DRIVEWAY SECTION

WITH SIDEWALK SEPARATED FROM CURB
ITEM 503.1

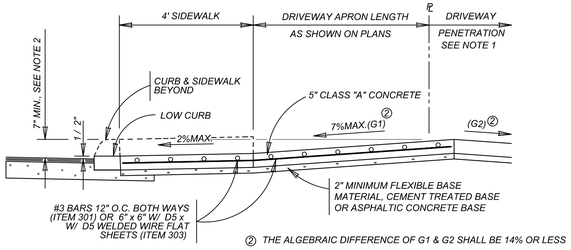
① 8% MAX. TO THE EDGE OF THE SIDEWALK IF SIDEWALK SEPARATION IS 4' OR GREATER.



② RESIDENTIAL : 2' MAXIMUM;
COMMERCIAL: SEE PLAN VIEW

CURB PROFILE AT DRIVEWAY

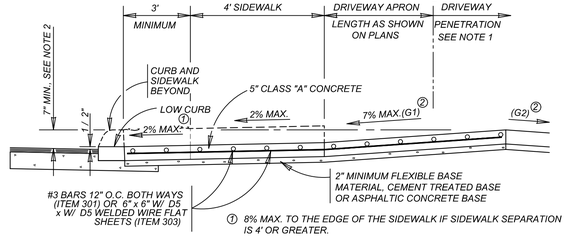
WITH SIDEWALK ABUTTING CURB



② THE ALGEBRAIC DIFFERENCE OF G1 & G2 SHALL BE 14% OR LESS

TYPICAL RESIDENTIAL DRIVEWAY SECTION

WHERE PROPERTY IS LOWER THAN STREET & SIDEWALK IS ABUTTING CURB
ITEM 503.1

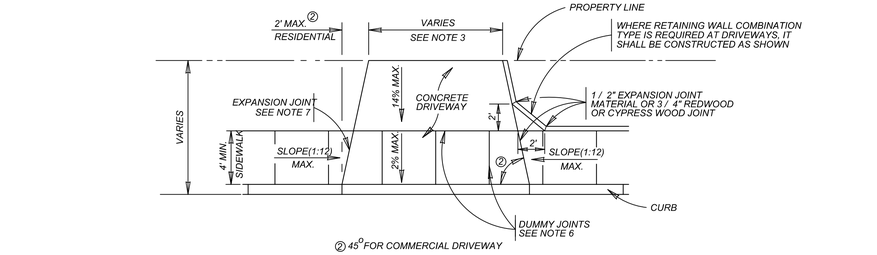


① 8% MAX. TO THE EDGE OF THE SIDEWALK IF SIDEWALK SEPARATION IS 4' OR GREATER.

② THE ALGEBRAIC DIFFERENCE OF G1 & G2 SHALL BE 14% OR LESS

TYPICAL RESIDENTIAL DRIVEWAY SECTION

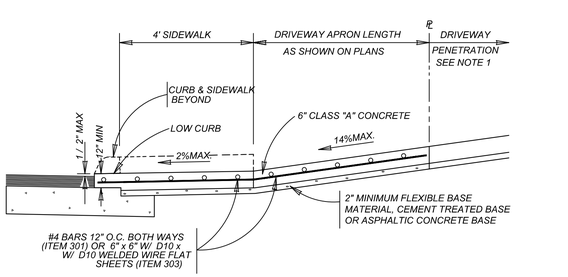
WHERE PROPERTY IS LOWER THAN STREET & SIDEWALK IS SEPARATED FROM CURB
ITEM 503.1



② 45° FOR COMMERCIAL DRIVEWAY

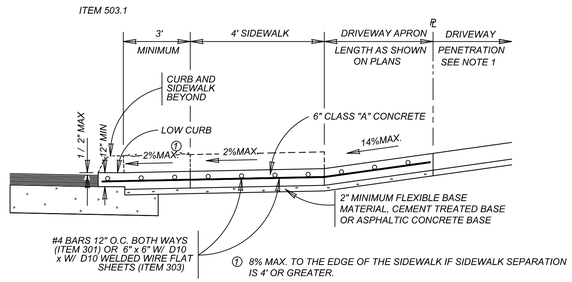
TYPICAL DRIVEWAY PLAN VIEW

WITH SIDEWALK ABUTTING CURB



TYPICAL COMMERCIAL DRIVEWAY SECTION

WITH SIDEWALK ABUTTING CURB
ITEM 503.2



① 8% MAX. TO THE EDGE OF THE SIDEWALK IF SIDEWALK SEPARATION IS 4' OR GREATER.

TYPICAL COMMERCIAL DRIVEWAY SECTION

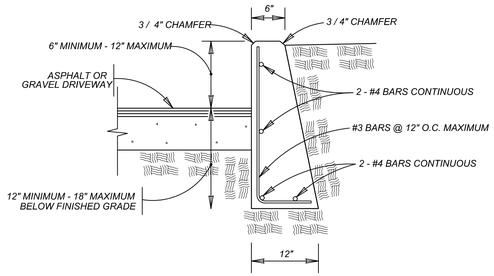
WITH SIDEWALK SEPARATED FROM CURB
ITEM 503.2

CONCRETE DRIVEWAY NOTES

1. DRIVEWAY PENETRATION REFERS TO A PORTION OF THE DRIVEWAY THAT MAY BE NECESSARY TO RECONSTRUCT WITHIN PRIVATE PROPERTY TO COMPLY WITH A MAXIMUM DRIVEWAY SLOPE. THIS PORTION OF THE DRIVEWAY SHALL BE PAID FOR UNDER THE FOLLOWING ITEMS AS MAY APPLY:
   A.) CONCRETE DRIVEWAY PAID FOR UNDER ITEM NO. 503.1 OR 503.2.
   B.) ASPHALTIC CONCRETE DRIVEWAY PAID FOR UNDER ITEM NO. 503.4 AND SHALL INCLUDE A MINIMUM OF 1" ASPHALT TYPE 'D' & 6" FLEXIBLE BASE
   C.) GRAVEL DRIVEWAY PAID FOR UNDER ITEM NO. 503.5 AND SHALL INCLUDE A MINIMUM OF 6" FLEXIBLE BASE
2. 7" MINIMUM HEIGHT WILL NOT NECESSARILY OCCUR AT THE PROPERTY LINE. IT MAY OCCUR WITHIN THE RIGHT OF WAY OR WITHIN THE DRIVEWAY PENETRATION ON PRIVATE PROPERTY.
3. THE PROPOSED DRIVEWAY SHOULD MATCH THE EXISTING WIDTH AT THE PROPERTY LINE BUT UNLESS AUTHORIZED BY THE CITY TRAFFIC ENGINEER, THE WIDTH SHALL BE WITHIN THE FOLLOWING VALUES:

TYPE	MINIMUM	MAXIMUM
RESIDENTIAL	10'	20'
COMMERCIAL - ONE WAY	12'	20'
COMMERCIAL - TWO WAY	24'	30'

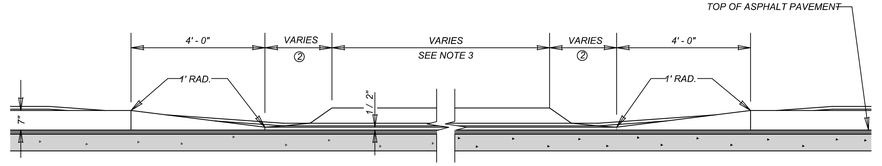
4. FOR LOCAL TYPE "A" STREETS, SIDEWALK SHALL HAVE A MINIMUM WIDTH OF 4' AND IF SEPARATED FROM THE CURB, THE SIDEWALK SHALL BE LOCATED A MINIMUM OF 3' FROM THE BACK OF CURB.
5. FOR OTHER THAN LOCAL TYPE "A" STREETS, THE SIDEWALK SHALL HAVE A MINIMUM WIDTH OF 4' AND SEPARATED A MINIMUM OF 3' FROM THE BACK OF CURB OR, AS AN OPTION, THE SIDEWALK SHALL HAVE A MINIMUM WIDTH OF 6' WHEN LOCATED AT THE BACK OF CURB.
6. DUMMY JOINTS PARALLEL TO THE CURB SHALL BE PLACED WHERE THE SIDEWALK MEETS THE DRIVEWAY. DUMMY JOINTS PERPENDICULAR TO THE CURB, AND WITHIN THE BOUNDARIES OF THE PARALLEL DUMMY JOINTS, SHALL BE PLACED AT INTERVALS EQUAL TO THE WIDTH OF THE SIDEWALK.
7. A MINIMUM OF TWO ROUND AND SMOOTH DOWEL BARS 3 /8" IN DIAMETER AND 18" IN LENGTH SHALL BE SPACED 18" APART AT EACH EXPANSION JOINT.
8. SIDEWALK RAMP LENGTHS SHALL BE OF SUFFICIENT LENGTH TO MAINTAIN 8.33% (1:12) MAXIMUM SLOPE. WHERE SIDEWALKS CROSS DRIVEWAYS, SIDEWALK CROSS SLOPE SHALL NOT EXCEED 2%.
9. SIDEWALK RAMP SURFACE SHALL BE BRUSH FINISHED.



NOTE:
1. COST OF REINFORCEMENT TO BE INCLUDED IN UNIT COST OF ITEM 307.1.
2. CONCRETE RETAINING WALL COMBINATION TYPE SHALL BE USED FOR CONCRETE DRIVEWAYS.

DRIVEWAY - CONCRETE RETAINING WALL

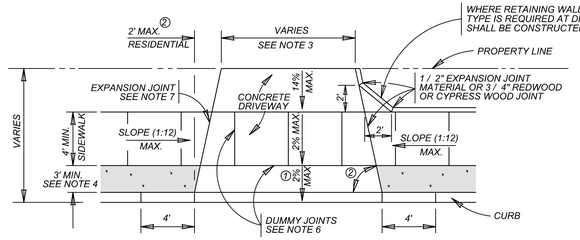
ON COMPACTED SUBGRADE
ITEM 307.1



② RESIDENTIAL : 2' MAXIMUM;
COMMERCIAL: SEE PLAN VIEW

CURB PROFILE AT DRIVEWAY

WITH SIDEWALK SEPARATED FROM CURB



① 8% MAX. TO THE EDGE OF THE SIDEWALK IF SIDEWALK SEPARATION IS 4' OR GREATER.

② 45° FOR COMMERCIAL DRIVEWAY

TYPICAL DRIVEWAY PLAN VIEW

WITH SIDEWALK SEPARATED FROM CURB

MAY 2009

CITY OF SAN ANTONIO

CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

CONCRETE DRIVEWAY STANDARDS

_____% SUBMITTAL	PROJECT NO.:_____	DATE:_____
DRWN. BY: V. VASQUEZ	DSGN. BY:_____	CHKD. BY: R.S. HOSSEINI, P.E.	SHEET NO.:____OF__

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

Colliers Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED
PROFESSIONAL ENGINEER
7/1/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: STDT314650S

SHEET TITLE: CONCRETE DRIVEWAY DETAIL SHEET

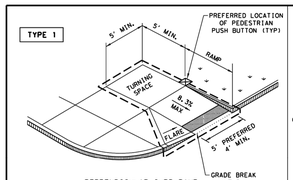
SHEET NUMBER: 5.10

I:\KFX\TBPE\TS\STDT314650S.dwg\S.10 By: AROSPADA7

DISCLAIMER:
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

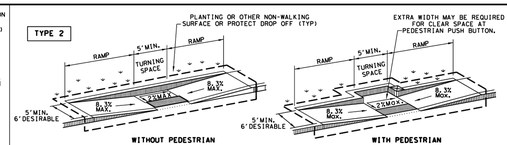
DATE:
FILE:

TYPE 1



PERPENDICULAR CURB RAMP

TYPE 2

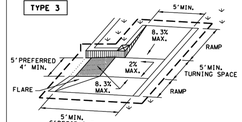


WITHOUT PEDESTRIAN PUSH BUTTON

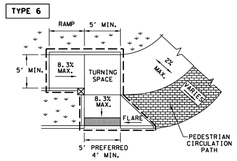
WITH PEDESTRIAN PUSH BUTTON

PARALLEL CURB RAMP

TYPE 3

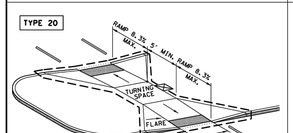


TYPE 6



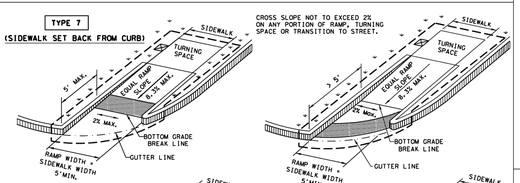
COMBINATION CURB RAMPS

TYPE 20

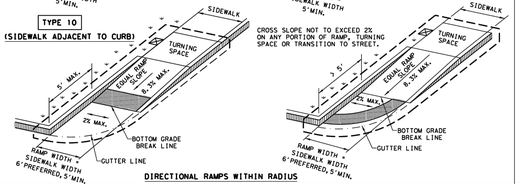


CURB RAMPS AT MEDIAN ISLANDS

TYPE 7
(SIDEWALK SET BACK FROM CURB)

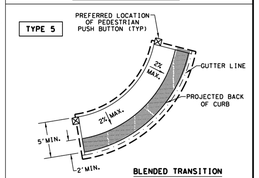


TYPE 10
(SIDEWALK ADJACENT TO CURB)



DIRECTIONAL RAMPS WITHIN RADIUS

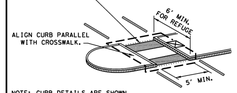
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

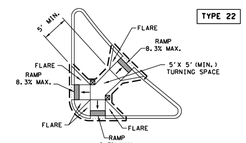
INSTALL DETECTABLE WARNING SURFACE AT EACH END OF THE CUT-THROUGH RAMP WITH A MINIMUM 2' USUAL SIDEWALK SURFACE BETWEEN. IF MEDIAN IS LESS THAN 5' WIDE, ELIMINATE DETECTABLE WARNING SURFACES.

TYPE 21

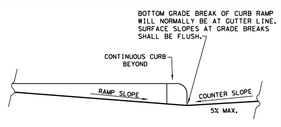


NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS



TYPICAL SECTION OF PERPENDICULAR CURB RAMP AT CONNECTION TO ROADWAY

NOTES / LEGEND:

SEE GENERAL NOTES ON SHEET 2 OF 4 FOR MORE INFORMATION.

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

DETECTABLE WARNING SURFACE

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

GUTTER LINE

GRADE BREAK

RAMP LIMITS OF PAYMENT

SHEET 1 OF 4

Texas Department of Transportation — Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN:TxDOT	CK:	DW:	CK:
©TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
09/2005:	DIST	COUNTY		SHEET NO.
05/2010:				
07/2013:				

GENERAL NOTES

CURB RAMPS

1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Cross slopes of 1.5% and lesser running should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
4. The minimum sidewalk width is 5'. Where the sidewalk is adjacent to the back of curb, a 6' sidewalk width is desirable. Where a 5' sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4' for short distances. 5'x 5' passing areas at intervals not to exceed 200' are required.
5. Turning Spaces shall be 5'x 5' minimum. Cross slope shall be maximum 2%.
6. Clear space at the bottom of curb ramps shall be a minimum of 4'x 4' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
8. Additional information on curb ramp location, design, light reflective value and texture may be found in the latest draft of the Proposed Guidelines for Pedestrian Facilities in the Public Right of Way (PROWAG) as published by the U.S. Architectural and Transportation Barriers Compliance Board (Access Board).
9. To serve as a pedestrian refuge area, the median should be a minimum of 6' wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.
10. Small channelization islands, which do not provide a minimum 5'x 5' landing at the top of curb ramps, shall be cut through level with the surface of the street.
11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.
12. Provide curb ramps to connect the pedestrian access route at each pedestrian street crossing. Handrails are not required on curb ramps.
13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
15. Furnish and install No. 3 reinforcing steel bars at 18" o.c. both ways, unless otherwise directed.
16. Provide a smooth transition where the curb ramps connect to the street.
17. Curbs shown on Sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.
18. Existing features that comply with applicable standards may remain in place unless otherwise shown on the plans.

DETECTABLE WARNING MATERIAL

19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
20. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
21. Detectable warning surfaces must be firm, stable and slip resistant.
22. Detectable warning surfaces shall be a minimum of 24 inches in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
23. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb and neither end of that edge is greater than 5 feet from the back of curb. Detectable warning surfaces may be curved along the corner radius.
24. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.

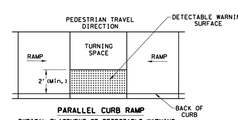
DETECTABLE WARNING PAVERS (IF USED)

25. Furnish detectable warning paver units meeting all requirements of ASTM C-936, C-33. Lay in a two by two unit basket weave pattern or as directed.
26. Lay full-size units first followed by closure units consisting of at least 25 percent (25%) of a full unit. Cut detectable warning paver units using a power saw.

SIDEWALKS

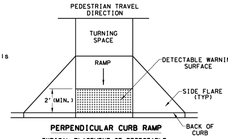
27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.
28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
29. Street grades and cross slopes shall be as shown elsewhere in the plans.
30. Changes in level greater than 1/4 inch are not permitted.
31. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than five percent (5%) must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with PROWAG R409.
32. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
33. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".
34. Sidewalk details are shown elsewhere in the plans.

DETECTABLE WARNING SURFACE DETAILS



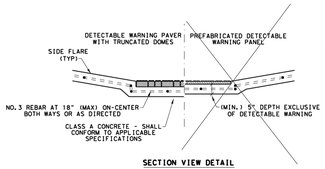
PARALLEL CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON LANDING AT STREET EDGE.

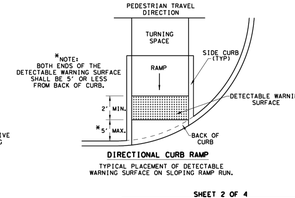


PERPENDICULAR CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.



SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS



*NOTE: BOTH ENDS OF THE DETECTABLE WARNING SURFACE SHALL BE 5' OR LESS FROM BACK OF CURB.

DIRECTIONAL CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.

SHEET 2 OF 4

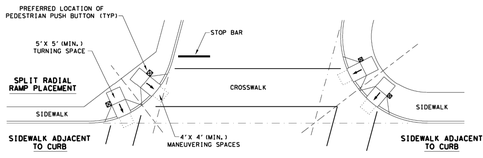
Texas Department of Transportation — Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

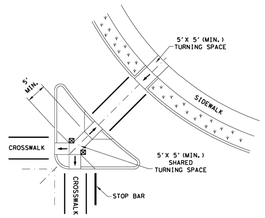
FILE: ped18	DN:TxDOT	CK:	DW:	CK:
©TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
09/2005:	DIST	COUNTY		SHEET NO.
05/2010:				
07/2013:				

TYPICAL CROSSING LAYOUTS
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS

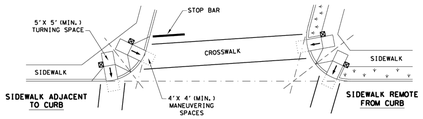


SPLIT RADIAL RAMP PLACEMENT

SKEWED INTERSECTION WITH "LARGE" RADIUS



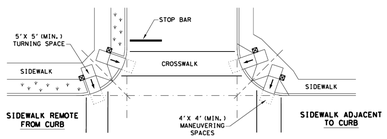
AT INTERSECTION W/FREE RIGHT TURN & ISLAND



SKEWED INTERSECTION WITH "SMALL" RADIUS



MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS



NORMAL INTERSECTION WITH "SMALL" RADIUS

LEGEND:

SHOWS DOWNWARD SLOPE.

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON (IF APPLICABLE).

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

SHEET 4 OF 4

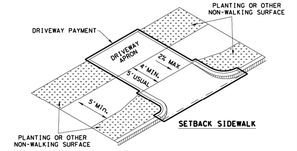
Texas Department of Transportation — Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

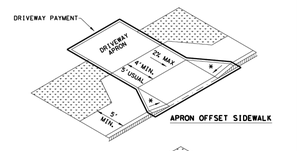
PED-18

FILE: ped18	DN:TxDOT	CK:	DW:	CK:
©TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
09/2005:	DIST	COUNTY		SHEET NO.
05/2010:				
07/2013:				

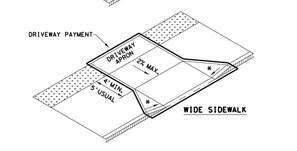
SIDEWALK TREATMENT AT DRIVEWAYS



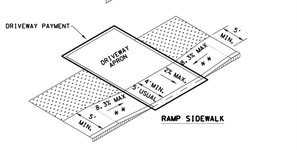
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



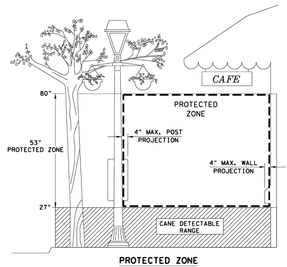
WIDE SIDEWALK



RAMP SIDEWALK

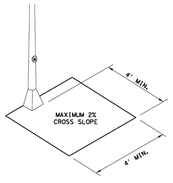
NOTES:
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

* * IF CURB HEIGHT IS GREATER THAN 6 INCHES, USE GRADE LESS THAN OR EQUAL TO 5%. HANDRAIL AND DETECTABLE WARNING ARE NOT REQUIRED.

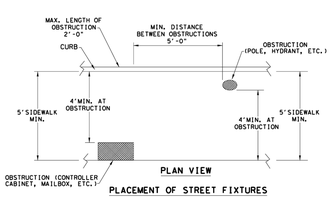


PROTECTED ZONE

NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.

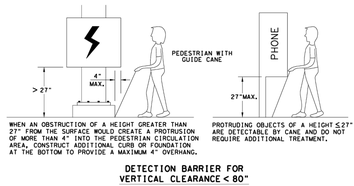


CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



PLAN VIEW
PLACEMENT OF STREET FIXTURES

NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.



WHEN AN OBSTRUCTION OF A HEIGHT GREATER THAN 27" FROM THE SURFACE WOULD CREATE A PROTRUSION OF MORE THAN 4" INTO THE PEDESTRIAN CIRCULATION AREA, CONSTRUCT ADDITIONAL CURB OR FOUNDATION AT THE BOTTOM TO PROVIDE A MAXIMUM 4" OVERHANG.

PROTRUDING OBJECTS OF A HEIGHT ≤27" ARE DETECTABLE BY CANE AND DO NOT REQUIRE ADDITIONAL TREATMENT.

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

SHEET 3 OF 4

Texas Department of Transportation — Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN:TxDOT	CK:	DW:	CK:
©TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
09/2005:	DIST	COUNTY		SHEET NO.
05/2010:				
07/2013:				

The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

Colliers
Engineering & Design
www.colliersengineering.com
Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authored for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.
Formerly Known as KFW
811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE.
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DESCRIPTION	DRAWN BY	DATE

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
7/1/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194500

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: STDT3146503

SHEET TITLE: PEDESTRIAN FACILITIES CURB RAMP DETAILS

SHEET NUMBER: 5.11

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

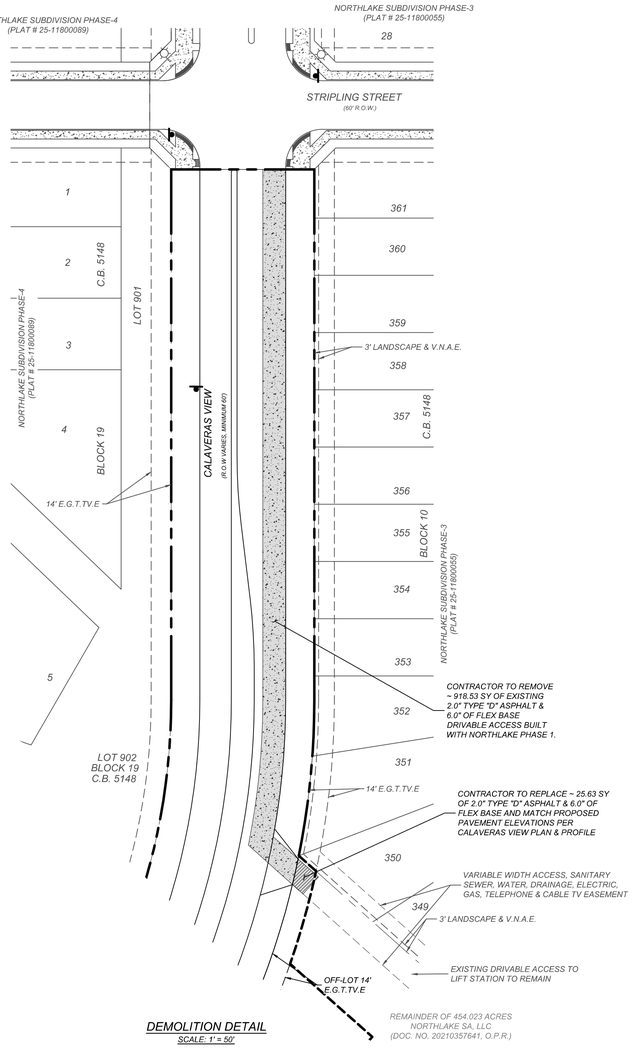
I:\ROTHETT\STDT3146503.dwg\5.11 By: ARODRIGUEZ

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.

BEXAR COUNTY R.O.W. NOTE:

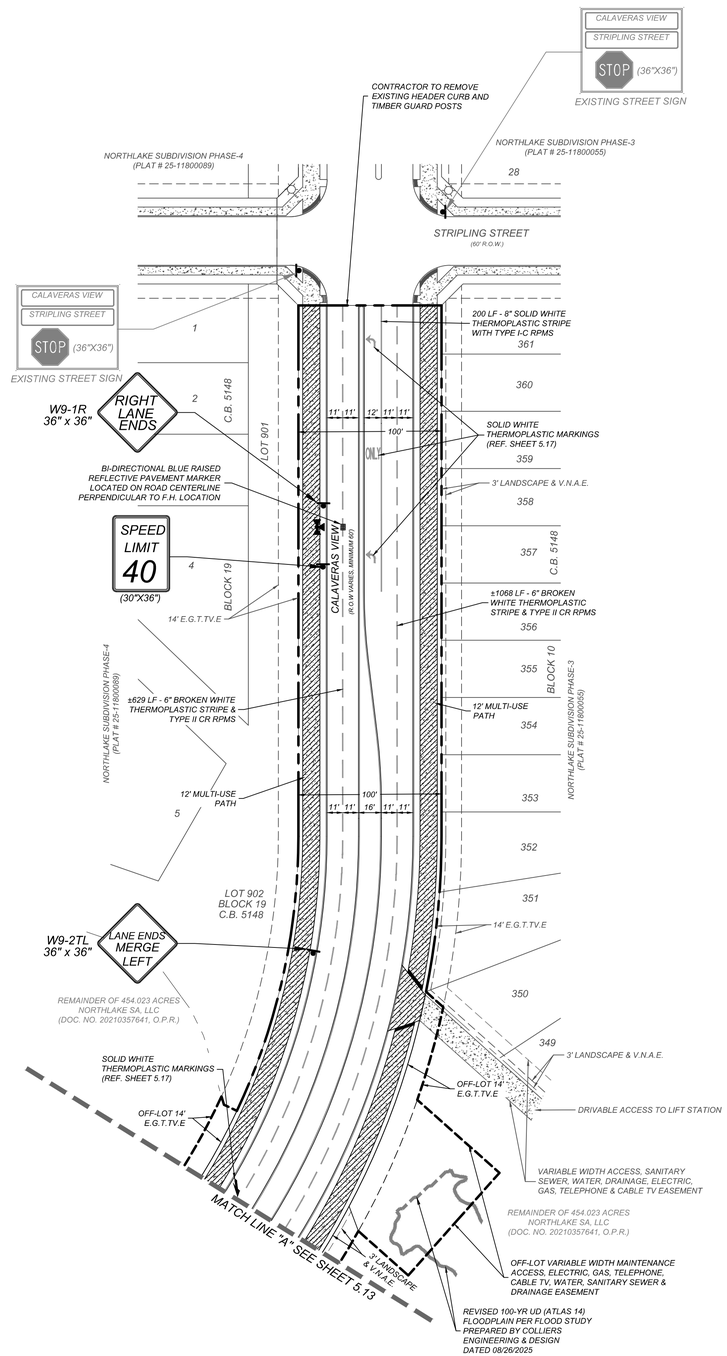
A BEXAR COUNY PERMIT MUST BE OBTAINED BEFORE WORKING IN BEXAR COUNTY R.O.W.



DEMOLITION DETAIL

SCALE: 1" = 50'

MATERIAL	UNITS	QUANTITIES
2.0" TYPE "D" ASPHALT & 6.0" FLEX BASE	S.Y.	919



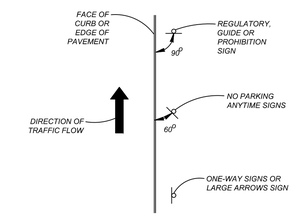
LEGEND

- = WASHOUT CROWN
- E.G.T.TV.E. = ELECTRIC, GAS, TELEPHONE & CABLE EASEMENT
- V.N.A.E. = VEHICULAR NON-ACCESS EASEMENT
- W.C.R. = WHEELCHAIR RAMPS SEE SHEET 5.9
- (I) = WHEELCHAIR RAMP TYPE I SEE SHEET 5.9
- (II) = WHEELCHAIR RAMP TYPE II SEE SHEET 5.9
- S.D.W.C.R. = SINGLE DIRECTIONAL WHEEL CHAIR RAMP SEE SHEET 5.9
- D.D.W.C.R. = DOUBLE DIRECTIONAL WHEEL CHAIR RAMP SEE SHEET 5.9
- = SIDEWALK TO BE CONSTRUCTED BY DEVELOPER.
- = SIDEWALK TO BE BUILT AT THE TIME OF HOME CONSTRUCTION
- = PROPOSED DRIVEWAY LOCATIONS
- = PROPOSED FIRE HYDRANRT
- = EXISTING FIRE HYDRANRT

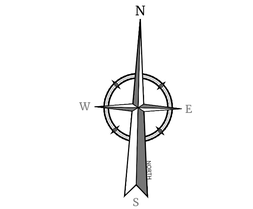


LOCATION MAP

SCALE: NOT-TO-SCALE



TYPICAL GROUND MOUNTED SIGN PLACEMENT



NOTES:
1) WITHIN THE CITY'S EXTRATERRITORIAL JURISDICTION, STREET NAME SIGNS SHALL BE INSTALLED AT ALL INTERSECTIONS WITHIN AND ABUTTING THE SUBDIVISION. SUCH SIGNS SHALL BE MANUFACTURED AND INSTALLED BY THE SUBDIVIDER IN ACCORDANCE TO SPECIFICATIONS OF, AND SUBJECT TO PLAN REVIEWS AND INSPECTIONS BY THE COUNTY DEPARTMENT OF PUBLIC WORKS.

2) REGULATORY AND WARNING TRAFFIC SIGNS SHALL BE INSTALLED WITHIN AND ABUTTING THE SUBDIVISION IN ACCORDANCE WITH THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD)," AS REQUIRED BY THE CITY'S DEVELOPMENT SERVICES DEPARTMENT OR COUNTY'S DEPARTMENT OF PUBLIC WORKS. SUCH SIGNS SHALL BE MANUFACTURED AND INSTALLED BY THE SUBDIVIDER IN ACCORDANCE TO SPECIFICATIONS OF, AND SUBJECT TO PLAN REVIEWS AND INSPECTIONS BY THE CITY'S DEVELOPMENT SERVICES DEPARTMENT OR COUNTY'S DEPARTMENT OF PUBLIC WORKS. WARNING AND REGULATORY SIGNS SHALL NOT BE ACCEPTED BY THE CITY UNTIL THE STREET HAS BEEN ACCEPTED FOR MAINTENANCE BY THE CITY.

STREET SIGN SYMBOL	DESCRIPTION	ITEM NUMBER
STOP	R1-1 30" X 30" (SINGLE LANE) 36" X 36" (MULTI LANE)	531.3
STREET NAME #####	STANDARD BEXAR COUNTY STREET NAME SIGN STD X 9"	531.57
	OM4-3 END-OF-ROADWAY MARKER 18" X 18"	531.56
	TYPE II BLUE PAVEMENT MARKER	537.8
ROAD ENDS	W14 - 1T 30" X 30"	531.53
500 FT.	XXX FT W16-2 30" X 18"	531.63
RIGHT LANE ENDS	W9-1R 36" X 36"	531.49
LANE ENDS MERGE LEFT	W9-2TL 36" X 36"	531.49
KEEP RIGHT	R4-7 24" X 30"	531.17

Colliers
Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, revised, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
Texas One-Call System, Inc.
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED
PROFESSIONAL ENGINEER
9/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

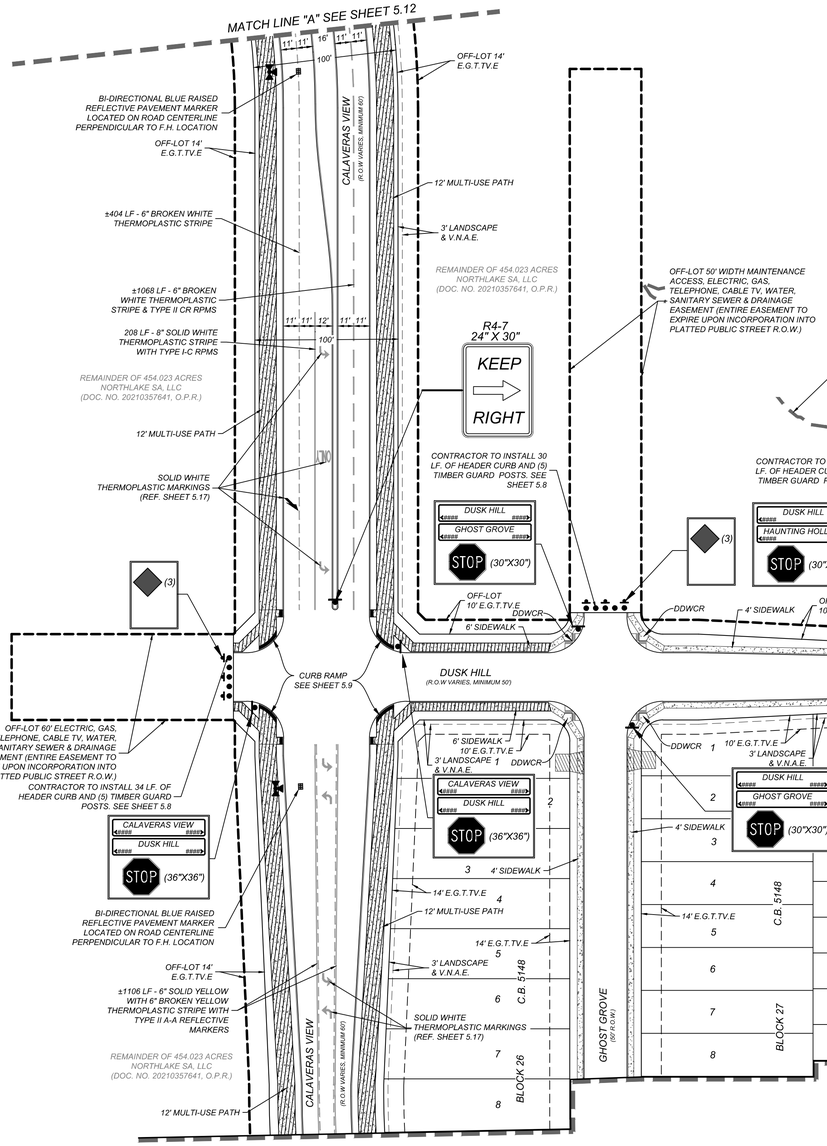
PROJECT NUMBER: 314-65-03
DRAWING NAME: TS3146503-PH2A

SHEET TITLE: TRAFFIC SIGNAGE & SIDEWALK PLAN (1 OF 3)

SHEET NUMBER: 5.12

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

\\#TSTRETS\TS3146503-PH2A.dwg(5.12 By: ABEL.MONTALVO



REFER SHEET 5.12 FOR STREET SIGN SYMBOL AND ITEM NUMBER LEGEND

NOTES:
1) WITHIN THE CITY'S EXTRATERRITORIAL JURISDICTION, STREET NAME SIGNS SHALL BE INSTALLED AT ALL INTERSECTIONS WITHIN AND ABUTTING THE SUBDIVISION. SUCH SIGNS SHALL BE MANUFACTURED AND INSTALLED BY THE SUBDIVIDER IN ACCORDANCE TO SPECIFICATIONS OF, AND SUBJECT TO PLAN REVIEWS AND INSPECTIONS BY THE COUNTY DEPARTMENT OF PUBLIC WORKS.

2) REGULATORY AND WARNING TRAFFIC SIGNS SHALL BE INSTALLED WITHIN AND ABUTTING THE SUBDIVISION IN ACCORDANCE WITH THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD)," AS REQUIRED BY THE CITY'S DEVELOPMENT SERVICES DEPARTMENT OR COUNTY'S DEPARTMENT OF PUBLIC WORKS. SUCH SIGNS SHALL BE MANUFACTURED AND INSTALLED BY THE SUBDIVIDER IN ACCORDANCE TO SPECIFICATIONS OF, AND SUBJECT TO PLAN REVIEWS AND INSPECTIONS BY THE CITY'S DEVELOPMENT SERVICES DEPARTMENT OR COUNTY'S DEPARTMENT OF PUBLIC WORKS. WARNING AND REGULATORY SIGNS SHALL NOT BE ACCEPTED BY THE CITY UNTIL THE STREET HAS BEEN ACCEPTED FOR MAINTENANCE BY THE CITY.

TRENCH EXCAVATION SAFETY PROTECTION

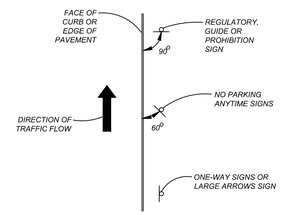
CONTRACTOR AND/ OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND ANY AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES WITHIN THE PROJECT WORK AREA IN ORDER TO IMPLEMENT CONTRACTOR'S 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.

BEXAR COUNTY R.O.W. NOTE:

A BEXAR COUNY PERMIT MUST BE OBTAINED BEFORE WORKING IN BEXAR COUNTY R.O.W.

LEGEND

	=	WASHOUT CROWN
E.G.T.TV.E.	=	ELECTRIC, GAS, TELEPHONE & CABLE EASEMENT
V.N.A.E.	=	VEHICULAR NON-ACCESS EASEMENT
W.C.R.	=	WHEELCHAIR RAMPS SEE SHEET 5.9
(I)	=	WHEELCHAIR RAMP TYPE I SEE SHEET 5.9
(II)	=	WHEELCHAIR RAMP TYPE II SEE SHEET 5.9
S.D.W.C.R.	=	SINGLE DIRECTIONAL WHEEL CHAIR RAMP SEE SHEET 5.9
D.D.W.C.R.	=	DOUBLE DIRECTIONAL WHEEL CHAIR RAMP SEE SHEET 5.9
	=	SIDEWALK TO BE CONSTRUCTED BY DEVELOPER.
	=	SIDEWALK TO BE BUILT AT THE TIME OF HOME CONSTRUCTION
	=	PROPOSED DRIVEWAY LOCATIONS
	=	PROPOSED FIRE HYDRANRT
	=	EXISTING FIRE HYDRANRT

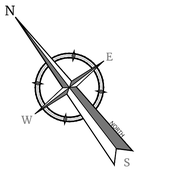


TYPICAL GROUND MOUNTED SIGN PLACEMENT



LOCATION MAP

SCALE: NOT-TO-SCALE



50 0 50 100

Linear unit of measure: US Survey Foot (1 ft = 1200/3937 m)

Colliers Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
Texas811.org Call before you dig.
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
7/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: TS3146503-PH2A

SHEET TITLE: TRAFFIC SIGNAGE & SIDEWALK PLAN (2 OF 3)

SHEET NUMBER: 5.13

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

W:\STREETS\TS3146503-PH2A.dwg\S.13 By: ABEL.MONTALVO

NOTES:
1) WITHIN THE CITY'S EXTRATERRITORIAL JURISDICTION, STREET NAME SIGNS SHALL BE INSTALLED AT ALL INTERSECTIONS WITHIN AND ABUTTING THE SUBDIVISION. SUCH SIGNS SHALL BE MANUFACTURED AND INSTALLED BY THE SUBDIVIDER IN ACCORDANCE TO SPECIFICATIONS OF, AND SUBJECT TO PLAN REVIEWS AND INSPECTIONS BY THE COUNTY DEPARTMENT OF PUBLIC WORKS.

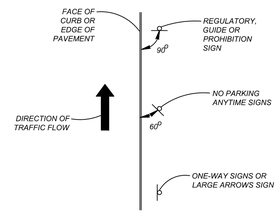
2) REGULATORY AND WARNING TRAFFIC SIGNS SHALL BE INSTALLED WITHIN AND ABUTTING THE SUBDIVISION IN ACCORDANCE WITH THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD)," AS REQUIRED BY THE CITY'S DEVELOPMENT SERVICES DEPARTMENT OR COUNTY'S DEPARTMENT OF PUBLIC WORKS. SUCH SIGNS SHALL BE MANUFACTURED AND INSTALLED BY THE SUBDIVIDER IN ACCORDANCE TO SPECIFICATIONS OF, AND SUBJECT TO PLAN REVIEWS AND INSPECTIONS BY THE CITY'S DEVELOPMENT SERVICES DEPARTMENT OR COUNTY'S DEPARTMENT OF PUBLIC WORKS. WARNING AND REGULATORY SIGNS SHALL NOT BE ACCEPTED BY THE CITY UNTIL THE STREET HAS BEEN ACCEPTED FOR MAINTENANCE BY THE CITY.

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.

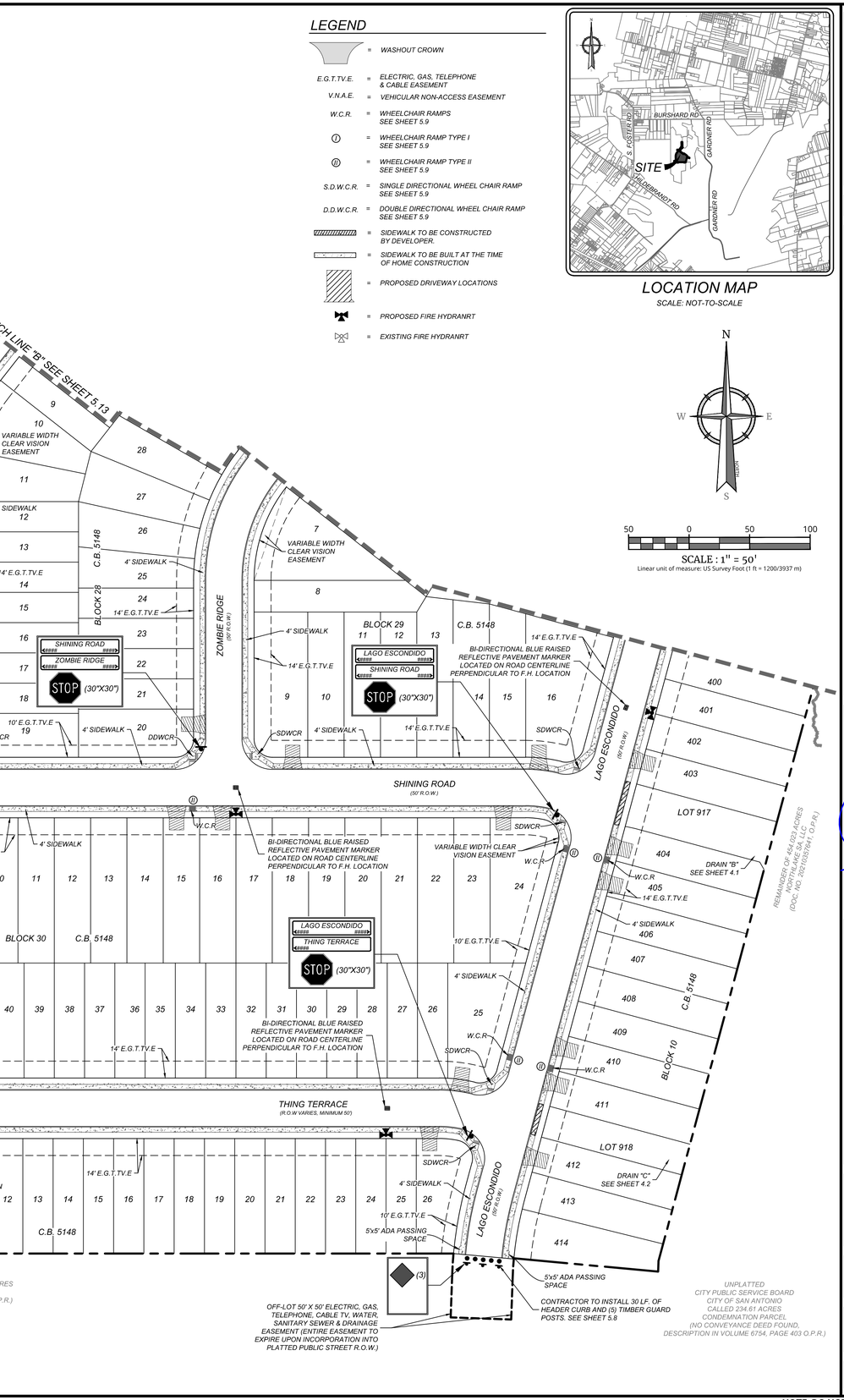
BEXAR COUNTY R.O.W. NOTE:

A BEXAR COUNY PERMIT MUST BE OBTAINED BEFORE WORKING IN BEXAR COUNTY R.O.W.



TYPICAL GROUND MOUNTED SIGN PLACEMENT

REFER SHEET 5.12 FOR STREET SIGN SYMBOL AND ITEM NUMBER LEGEND



LEGEND

- WASHOUT CROWN
- E.G.T.TV.E. = ELECTRIC, GAS, TELEPHONE & CABLE EASEMENT
- V.N.A.E. = VEHICULAR NON-ACCESS EASEMENT
- W.C.R. = WHEELCHAIR RAMPS SEE SHEET 5.9
- Ⓘ = WHEELCHAIR RAMP TYPE I SEE SHEET 5.9
- Ⓘⓘ = WHEELCHAIR RAMP TYPE II SEE SHEET 5.9
- S.D.W.C.R. = SINGLE DIRECTIONAL WHEEL CHAIR RAMP SEE SHEET 5.9
- D.D.W.C.R. = DOUBLE DIRECTIONAL WHEEL CHAIR RAMP SEE SHEET 5.9
- = SIDEWALK TO BE CONSTRUCTED BY DEVELOPER.
- = SIDEWALK TO BE BUILT AT THE TIME OF HOME CONSTRUCTION
- = PROPOSED DRIVEWAY LOCATIONS
- = PROPOSED FIRE HYDRANRT
- = EXISTING FIRE HYDRANRT

LOCATION MAP
SCALE: NOT-TO-SCALE

50 0 50 100
SCALE : 1" = 50'
Linear unit of measure: US Survey Foot (1 ft = 1200/3937 m)

Colliers
Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, revised, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED
PROFESSIONAL ENGINEER
9/26/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

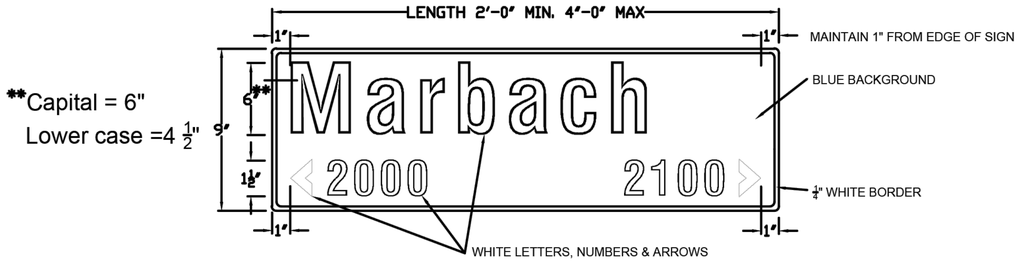
PROJECT NUMBER: 314-65-03
DRAWING NAME: TS3146503-PH2A

SHEET TITLE:
TRAFFIC SIGNAGE & SIDEWALK PLAN (3 OF 3)

SHEET NUMBER:
5.14

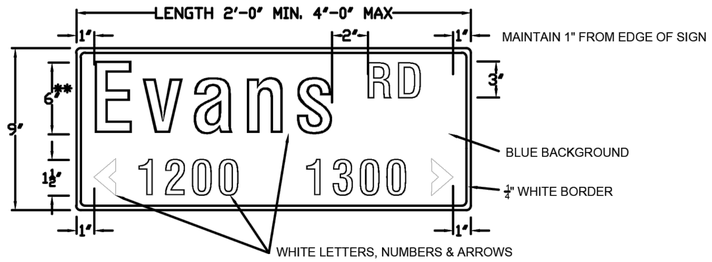
NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

I:\RSTREETS\TS3146503-PH2A.dwg|S.14 By: ABEL MONTALVO



**Capital = 6"
Lower case =4 ½"

9" GROUND MOUNT STREET NAME SIGNS

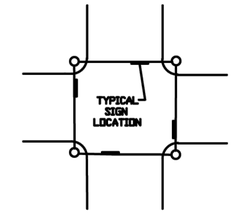


**Capital = 6"
Lower case =4 ½"

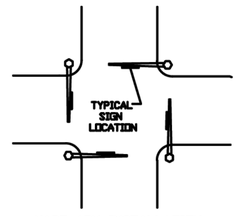
9" GROUND MOUNT STREET NAME SIGNS
WITH STREET DESIGNATION

	18" OVERHEAD SIGN	9" GROUND MOUNT SIGNS
HEIGHT	18" (381 mm)	9" (228 mm)
LENGTH	48" (1200 mm) MIN. 72" (1800 mm) MAX. 1' (300mm) INCREMENTS OF LENGTH	24" (600 mm) MIN. 48" (1200 mm) MAX. 6" (150mm) INCREMENTS OF LENGTH
THICKNESS	0.125" (3 mm)	
SUBSTRATE	ALUMINUM ALLOY, 5052-H38 (ASTM B-209 GOLD CHROMATE FINISH	
SIGN FACE MATERIALS	BLUE FILM ✱ OVER DIAMOND GRADE - ASTM Type XI Non-Fluorescent	BLUE FILM ✱ OVER HIGH INTENSITY PRISMATIC- ASTM Type IV
LEGENDS AND SYMBOLS	SERIES D, B OR C IF NAME OTHERWISE EXCEEDS MAXIMUM SIGN LENGTH	
COLOR	WHITE LEGEND ON BLUE BACKGROUND	
LETTER TRACKING	17% (USUAL) 10% (MIN.)	10%

✱ ACRYLIC ELECTRONIC CUTTABLE FILM



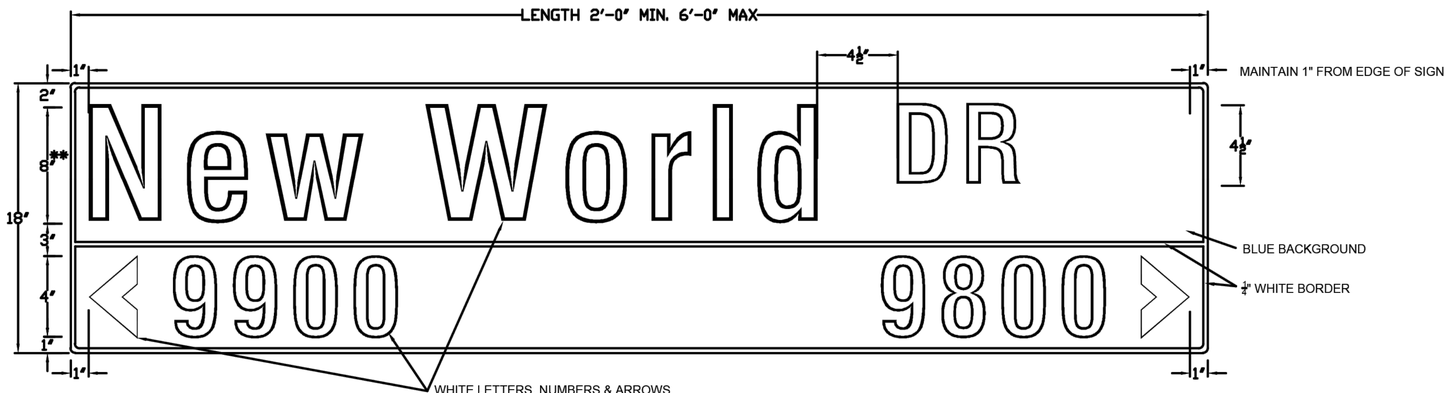
SPAN WIRE INSTALLATION



MAST ARM INSTALLATION

SIGN FACE MATERIALS
SHALL CONFORM TO:

1. STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS & BRIDGES ON FEDERAL HIGHWAY PROJECTS - FP-03 U.S. CUSTOMARY UNITS SECTION 718
2. GENERAL SERVICES ADMINISTRATION FEDERAL SPECIFICATIONS L-S-300C
3. ASTM D 4956 - 09ε1



**Capital = 8"
Lower case =6"

18" OVERHEAD STREET NAME SIGNS

Bexar County Public Works

Street Name Sign Details

DESIGN BY: | DRAWN BY:
CHECKED BY: | DATE:
FILE NO.:
SHEET 1

Colliers
Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED
PROFESSIONAL ENGINEER
7/1/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: TSDT3146503

SHEET TITLE: TRAFFIC SIGNAGE DETAIL (1 OF 2)

SHEET NUMBER: 5.15

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

By: ARDORADAZ
I:\PROJECTS\TSDT3146503.dwg\5.15

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by the Texas Department of Transportation for any purpose whatsoever. The Texas Department of Transportation assumes no responsibility for the use of this standard other than for signs specifically designed in accordance with engineering practices required by the Texas Department of Transportation.

SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP)-11 to CLSP-31)
TWB = 12 GA Tubing (see SMD(TWB)-11 to CLSP-31)
TWU = 12 GA Tubing (see SMD(TWU)-11 to CLSP-31)
SBD = Schedule 80 Pipe (see SMD(SLIP-11 to CLSP-31)

Number of Posts (1 or 2)

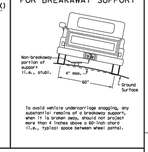
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWU))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWU))
W = Wedge Anchor (see SMD(FRP))
H = High Density Polyethylene (HDPE) (see SMD(FRP))
SA = Slipbase - Concreted (see SMD(SLIP-11 to CLSP-31)
SB = Slipbase - Bolted Down (see SMD(SLIP-11 to CLSP-31)

Sign Mounting Designation

P = Prefab. "Pipper" (see SMD(SLIP-11 to CLSP-31, (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-11 to CLSP-31, (TWT))
A = Attached (see SMD(SLIP-11 to CLSP-31)
(X)XX OR ZXXT = Number of Extensions (see SMD(SLIP-11 to CLSP-31, (TWT))
BAR = Bracket Arm Mounted (see SMD(SLIP-11 to CLSP-31)
BWT = Bracket Wind Turbine (see SMD(SLIP-11 to CLSP-31)
EAL = Extruded Aluminum Sign Panels (see SMD(SLIP-31)

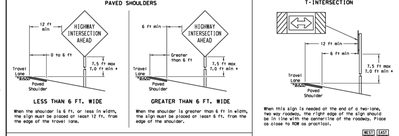
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any non-breakaway portion of support, encountered when 11 in. is broken away, should not project more than 4 inches above a 60-inch chord.

11-in. typical space between wheel pathes.

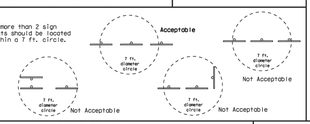
SIGN LOCATION



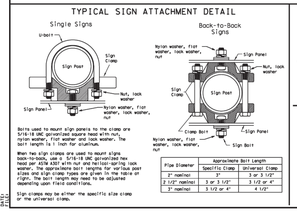
*Sign clearance based on clearance required for proper guard rail or concrete barrier performance.

- Signs shall be mounted using the following condition that results in the greatest sign elevation:
  (1) a minimum of 7 ft a maximum of 8.5 feet above the edge of the travel lane or
  (2) a minimum of 7 ft a maximum of 7.5 feet above the grade of the base of the support when sign is mounted on the backside.
- The maximum values may be increased when directed by the Engineer.
- See the Traffic Operations Division website for detailed drawings of sign clamps, Telespar Slipbase System components and Wedge Anchor System components.
- The website address is: https://www.txdot.gov/business/resources/traffic.html

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL



Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized hex bolts with nylon washer, Flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex bolt with nylon washer, Flat washer, lock washer and nut. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

Sign clamps may be either the specific slip clamp or the universal clamp.

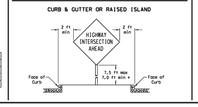
Post Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES

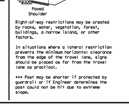


When a supplemental plaque is used with a warning sign, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY (When 6 ft min. is not possible.)



Sign clearance restrictions may be created by roadway curvature, vegetation, fences, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance to the face of the sign, the sign post should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

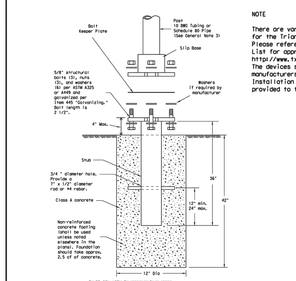
Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
GENERAL NOTES & DETAILS
SMD(GEN)-08

©TxDOT July 2002	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
9-08 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.

250

TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer, Methods, design, and insertion of marking are subject to approval of the TxDOT Traffic Standards Engineers.
2. Material used as post with this system shall conform to the following specifications:
   Tubular Steel Posts: Schedule 40 pipe per ASTM A53 or ASTM A500 Grade B structural steel tubing.
   Seamless or electric-resistance welded steel tubing or pipe
   Sheet shall be HSLAS TY 50 per ASTM A1011 or ASTM A1008
   Other shapes may be used if they meet the following minimums:
   50,000 PSI minimum yield strength
   70,000 PSI minimum tensile strength
   20% minimum elongation in 2"
   Wall thickness (unspecified) shall be within the range of 0.122" to 0.138"
   Outside diameter (unspecified) shall be within the range of 2.067" to 2.193"
   Galvanization per ASTM A123 or ASTM A653 G210, for prepainted steel tubing (ASTM A653), reapply paint to damaged areas after galvanizing by painting with zinc rich paint per ASTM D6513.
   Schedule 80 Pipe (2.875" outside diameter):
   0.276" nominal wall thickness
   Steel tubing per ASTM A500 Gr C
   Other materials or alternate shapes may be used if they meet the following minimums:
   70,000 PSI minimum yield strength
   82,000 PSI minimum tensile strength
   20% minimum elongation in 2"
   Wall thickness (unspecified) shall be within the range of 0.248" to 0.304"
   Outside diameter (unspecified) shall be within the range of 2.850" to 2.995"
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/business/resources/traffic.html
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. Place the slip base, shub, and reinforcing steel in the hole. Fill the hole with Class A concrete, vibrate to consolidate concrete when placing. For small assemblies less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Insert the 5/8" diameter anchor bolt with nut and washer through the slip base and shub. Form will be pushing it down into the concrete to assure good contact between the concrete and shub. Continue to work the shub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the shub. Allow a minimum of 4 days to cure, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure that all signs maintain clearance between each sign as restrictions. See SMD(SLIP-21) for clearances based on sign types.

GENERAL NOTES:

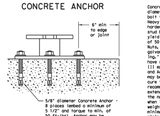
1. Slip base shall be permanently marked to indicate manufacturer, Methods, design, and insertion of marking are subject to approval of the TxDOT Traffic Standards Engineers.
2. Material used as post with this system shall conform to the following specifications:
   Tubular Steel Posts: Schedule 40 pipe per ASTM A53 or ASTM A500 Grade B structural steel tubing.
   Seamless or electric-resistance welded steel tubing or pipe with equivalent properties per ASTM A1085
   Other shapes may be used if they meet the following minimums:
   50,000 PSI minimum yield strength
   70,000 PSI minimum tensile strength
   20% minimum elongation in 2"
   Wall thickness (unspecified) shall be within the range of 0.248" to 0.304"
   Outside diameter (unspecified) shall be within the range of 2.850" to 2.995"
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/business/resources/traffic.html
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. Place the slip base, shub, and reinforcing steel in the hole. Fill the hole with Class A concrete, vibrate to consolidate concrete when placing. For small assemblies less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Insert the 5/8" diameter anchor bolt with nut and washer through the slip base and shub. Form will be pushing it down into the concrete to assure good contact between the concrete and shub. Continue to work the shub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the shub. Allow a minimum of 4 days to cure, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure that all signs maintain clearance between each sign as restrictions. See SMD(SLIP-21) for clearances based on sign types.

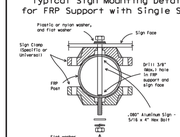
CONCRETE ANCHOR



SM RD SGN ASSM TY XXXXX(1)(A)(X-XXXX)

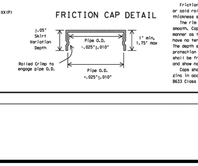
Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end, a heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 55 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Concrete anchor is 3 3/8" minimum and have stud bolts concreted with type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of nut when the nut when installed. The anchor, when installed in 4000 psi normal weight concrete with a 3 3/8" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

TYPICAL SIGN MOUNTING DETAIL FOR FRP SUPPORT WITH SINGLE SIGN



TYPICAL SIGN MOUNTING DETAIL FOR FRP SUPPORT WITH BACK-TO-BACK SIGNS

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel. Caps shall be galvanized and minimum thickness shall be 14 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a driven friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive frictional engagement. Caps shall be sound and shall be free of sharp crevices or indentations and show no evidence of metal fracture.

Caps shall have an environmentally coating of zinc in accordance with the requirements of ASTM B633 Class Fe/Zn 8.

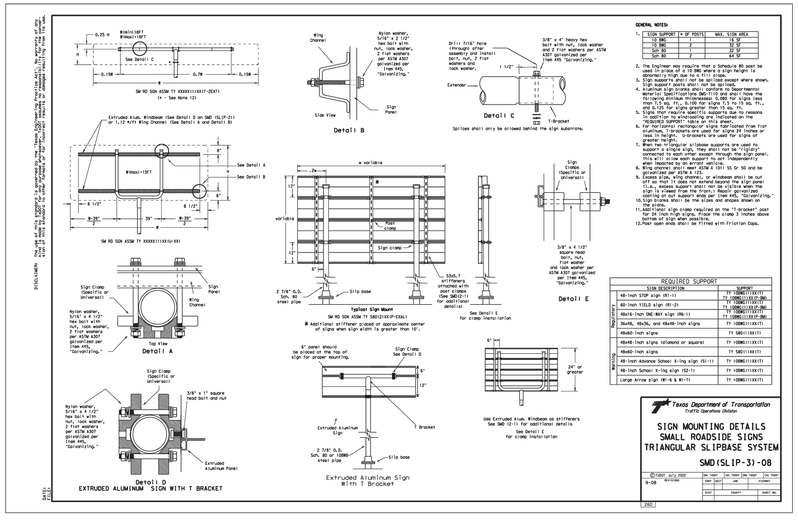
REQUIRED SUPPORT	
SIGN DESCRIPTION	SUPPORT
48-Inch STOP sign (R1-1)	TY 10BWT(11)(TY)
60-Inch YIELD sign (R1-2)	TY 10BWT(11)(TY)BR
48x18-Inch ONE-WAY sign (R6-1)	TY 10BWT(11)(TY)BR
36x48, 48x36, and 48x48-Inch signs	TY 10BWT(11)(TY)
48x60-Inch signs	TY 5BD(11)(TY)
48x48-Inch signs (diamond or square)	TY 10BWT(11)(TY)
48x60-Inch signs	TY 10BWT(11)(TY)
48-Inch Advance School Xing sign (S1-1)	TY 10BWT(11)(TY)
48-Inch School Xing sign (S2-1)	TY 10BWT(11)(TY)
Large Arrow sign (W1-6 & W1-7)	TY 10BWT(11)(TY)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM
SMD(SLIP-21)-08

©TxDOT July 2002	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
9-08 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.

250

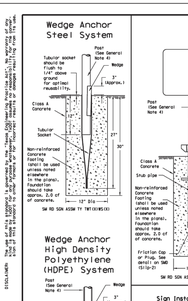


GENERAL NOTES:

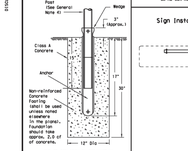
1. The Engineer may require that a Schedule 80 post be used in place of a TP-TWB when a sign height is greater than 15 ft. or a TP-TWB when a sign height is greater than 20 ft.
2. The Engineer may require that a Schedule 80 post be used in place of a TP-TWB when a sign height is greater than 15 ft. or a TP-TWB when a sign height is greater than 20 ft.
3. Sign supports shall not be spliced except where shown.
4. Aluminum sign blanks shall conform to Department Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 1.5 sq. ft., 0.100 for signs 1.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs shall require specific supports due to reasons "REQUIRED SUPPORT" table on this sheet.
6. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. TxDOT will allow each support to move independently when impacted by an errant vehicle.
7. Sign supports shall conform to Item 1011 SS 5r 50 and be galvanized per ASTM A 123.
8. Excess plug, wing channel, or windsown shall be cut off so that it does not extend beyond the sign panel. In addition, mounted support shall not be visible when the sign is viewed from the front. Repair galvanized coating per Item 445, "Galvanizing." or DMS-6100, "Epoxies and Adhesives." Nuts exposed may be added when installed, provided the total sign drop does not exceed the maximum allowable sign drop by more than 1".
9. Sign clamps and associated hardware are the "T-bracket post" for 24 inch height signs. Place the clamp 3 inches above the top of the post for these signs.
10. Post open ends shall be fitted with Friction Caps.
11. Sign brakes shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT	
SIGN DESCRIPTION	SUPPORT
48-Inch STOP sign (R1-1)	TY 10BWT(11)(TY)
60-Inch YIELD sign (R1-2)	TY 10BWT(11)(TY)BR
48x18-Inch ONE-WAY sign (R6-1)	TY 10BWT(11)(TY)BR
36x48, 48x36, and 48x48-Inch signs	TY 10BWT(11)(TY)
48x60-Inch signs	TY 5BD(11)(TY)
48x48-Inch signs (diamond or square)	TY 10BWT(11)(TY)
48x60-Inch signs	TY 10BWT(11)(TY)
48-Inch Advance School Xing sign (S1-1)	TY 10BWT(11)(TY)
48-Inch School Xing sign (S2-1)	TY 10BWT(11)(TY)
Large Arrow sign (W1-6 & W1-7)	TY 10BWT(11)(TY)

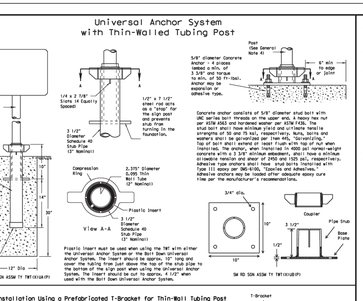
WEDGE ANCHOR STEEL SYSTEM



WEDGE ANCHOR HIGH DENSITY POLYETHYLENE (HDPE) SYSTEM

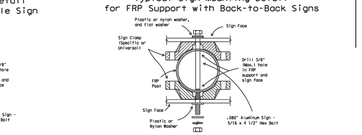


UNIVERSAL ANCHOR SYSTEM WITH THIN-WALLED TUBING POST



Plastic insert must be used when using the TWT with either the Universal Anchor System or the Bolt Down Universal Anchor System. The plastic insert shall be placed in the post over the holding from just above the top of the stub pipe to the bottom of the sign post when using the Universal Anchor System. The plastic insert should not be used when used with the Bolt Down Universal Anchor System.

SIGN INSTALLATION USING A PREFABRICATED T-BRACKET FOR THIN-WALL TUBING POST



NOTE

The devices shall be installed per manufacturer's recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. The Wedge Anchor System and the Universal Anchor System with thin wall tubing post may be used to support up to 10 square feet of sign area.
2. Tubular steel posts, anchors, and hardware components shall be permanently marked to indicate manufacturer. Method, design, and insertion of marking are subject to the approval of the TxDOT Traffic Standards Engineer.
3. Except for posts 11 GA TWB, tubing, slides, nuts and bolts, all components shall be prequalified. A list of prequalified vendors may be obtained from the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm
4. Material used as post with this system shall conform to the following specifications:
   Tubular Steel Posts: Schedule 40 pipe per ASTM A53 or ASTM A500 Grade B structural steel tubing.
   Seamless or electric-resistance welded steel tubing
   Sheet shall be HSLAS TY 50 per ASTM A1011 or ASTM A1008
   Other shapes may be used if they meet the following minimums:
   50,000 PSI minimum yield strength
   70,000 PSI minimum tensile strength
   20% minimum elongation in 2"
   Wall thickness (unspecified) shall be within the range of .083" to .099"
   Outside diameter (unspecified) shall be within the range of 2.067" to 2.193"
   Galvanization per ASTM 123 or ASTM A653 G210, for prepainted steel tubing (ASTM A653), reapply paint to damaged areas after galvanizing by painting with zinc rich paint per ASTM D6513.
5. Sign brakes shall be the sizes and shapes shown on the plans.
6. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
7. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
8. See the Traffic Operations Division website for detailed drawings of sign clamps and Wedge Anchor System components. The website address is: http://www.txdot.gov/business/resources/traffic.html

WEDGE ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/shub may be reduced in length as required to a minimum length of 18", any material removed from the socket/shub shall be from the bottom and the clearances requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/shub must remain free of concrete or other debris.
2. The Engineer may permit bothes of concrete less than 2 cubic yards to be mixed with a portable, motor driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Insert tubular socket into concrete until top of socket is approximately 1/4 " above the concrete footing.
4. Plumb the socket. Allow a minimum 4 days for concrete to set, unless otherwise directed by Engineer.
5. Insert sign post into socket and align sign face with roadway.
6. Plumb the sign post. Allow a minimum 4 days for concrete to set, unless otherwise directed by Engineer.
7. Insert sign post into socket and align sign face with roadway.
8. Drive the wedge into the socket to assure post. This will leave approximately 3 inches of the wedge exposed.

UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/shub may be reduced in length as required to a minimum length of 18", any material removed from the socket/shub shall be from the bottom and the clearances requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/shub must remain free of concrete or other debris.
2. The Engineer may permit bothes of concrete less than 2 cubic yards to be mixed with a portable, motor driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Insert tubular socket into concrete until top of socket is approximately 1/4 " above the concrete footing.
4. Plumb the socket. Allow a minimum 4 days for concrete to set, unless otherwise directed by Engineer.
5. Insert sign post into socket and align sign face with roadway.
6. Plumb the sign post. Allow a minimum 4 days for concrete to set, unless otherwise directed by Engineer.
7. Insert sign post into socket and align sign face with roadway.
8. Drive the wedge into the socket to assure post. This will leave approximately 3 inches of the wedge exposed.

UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/shub may be reduced in length as required to a minimum length of 18", any material removed from the socket/shub shall be from the bottom and the clearances requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/shub must remain free of concrete or other debris.
2. The Engineer may permit bothes of concrete less than 2 cubic yards to be mixed with a portable, motor driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Insert tubular socket into concrete until top of socket is approximately 1/4 " above the concrete footing.
4. Plumb the socket. Allow a minimum 4 days for concrete to set, unless otherwise directed by Engineer.
5. Insert sign post into socket and align sign face with roadway.
6. Plumb the sign post. Allow a minimum 4 days for concrete to set, unless otherwise directed by Engineer.
7. Insert sign post into socket and align sign face with roadway.
8. Drive the wedge into the socket to assure post. This will leave approximately 3 inches of the wedge exposed.
9. Check sign to ensure there is no twist. If twist, loosen the tightening of coupler.

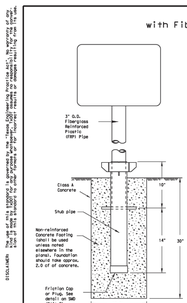
Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
WEDGE & UNIVERSAL ANCHOR WITH THIN WALL TUBING POST
SMD(TWT)-08

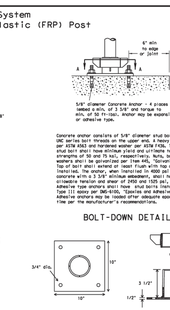
©TxDOT July 2002	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
9-08 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.

250

UNIVERSAL ANCHOR SYSTEM WITH FIBERGLASS REINFORCED PLASTIC (FRP) POST



BOLT-DOWN DETAILS



GENERAL NOTES:

1. FRP sign supports for a single type sign support may be used for signs up to and including 32 square feet. Dual post installation may be used for signs up to and including 32 square feet.
2. All steel hardware components shall be galvanized per Item 445, "Galvanizing."
3. See the Traffic Operations Division website for detailed drawings of sign clamps. The website address is: http://www.txdot.gov/business/resources/traffic.html

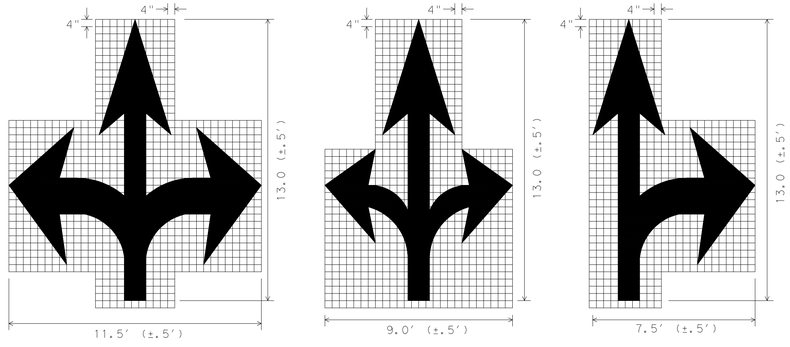
FRP POST REQUIREMENTS

1. Materials shall conform to the requirements of Departmental Material Specification DMS-7130. Test reports shall be furnished in a yellow or gray color as specified elsewhere in the plans.
2. Thickness of FRP sign support is 0.125" + 0.031", - 0.0".
3. FRP sign supports shall be manufactured by a Texas Universal Triangular Slipbase System Producer. Production procedures are approved by writing:
   Texas Department of Transportation
   Traffic Operations Division
   125 East 11th Street
   Austin, Texas 78701-2483

UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURES

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/shub may be reduced in length as required to a minimum length of 18", any material removed from the socket/shub shall be from the bottom and the clearances requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/shub must remain free of concrete or other debris.
2. The Engineer may permit bothes of concrete less than 2 cubic yards to be mixed with a portable, motor driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by the Texas Department of Transportation for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



GENERAL NOTES:

1. Minimum 8 foot white markings should be used, unless otherwise noted. If message consists of more than one word, it should be placed with first word nearest the driver.
2. These details are standard size for normal installations. Sizes may be reduced approximately one-third for low speed urban conditions; larger sizes may be needed for freeways, above average speed conditions or other critical locations.
3. The longitudinal space between markings should be at least four times the height of the markings, on low speed roads, but should not exceed ten times the height under any condition.
4. Markings considered appropriate for use when warranted include the followings
   A. Regulatory
      STOP
      RIGHT (LEFT) TURN ONLY
      25 MPH
      SYMBOL ARROWS
   B. Warning
      STOP AHEAD
      SIGNAL AHEAD
      SCHOOL
      SCHOOL X-ING
      PED X-ING
      R X R (see RDPM standard)
   C. Guide
      US XXX
      ROUTE XXX
      STATE XXX
      Other words or symbols may be necessary under certain conditions
5. Uncontrolled use of pavement markings can result in driver confusion. Word and symbol markings should be no more than three lines.
6. The word "STOP" shall not be used on the pavement unless accompanied by a Stop line and Stop sign. The word "STOP" shall not be placed on the pavement in advance to a stop line, unless every vehicle is required to stop at all times.
7. Pavement markings should generally be no more than one lane in width, with School messages being the exception. For details of School and School crossing pavement markings, refer to Part VII of the "Texas Manual on Uniform Traffic Control Devices".
8. Spacing between letters should be approximately 4 inches. The width of letters may vary depending on the width of the travel lanes.
9. Lane-Use arrow markings may be used to convey either guidance or mandatory messages. Arrows used to convey a mandatory movement must be accompanied by standard signs and the pavement marking word "ONLY".
10. Pavement markings are to be located as specified elsewhere in the plans.

SPACING BETWEEN LINES OF PAVEMENT MARKINGS	
MPH	SPACING
≤45	MINIMUM 4 TIMES THE LETTER HEIGHT
>45	MINIMUM - 4 TIMES THE LETTER HEIGHT MAXIMUM - 10 TIMES THE LETTER HEIGHT

Texas Department of Transportation
Traffic Operations Division

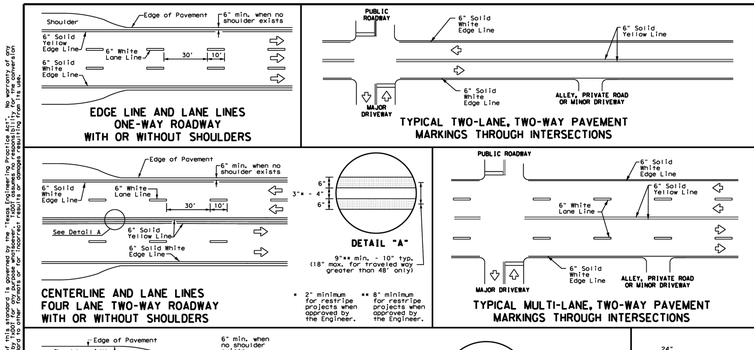
STANDARD PAVEMENT MARKINGS (ARROWS)

PM(6)-01

©TxDOT March 2001	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.

22H

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by the Texas Department of Transportation for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

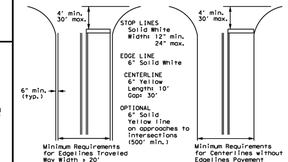


GENERAL NOTES

1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways

NOTES

1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50' or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines shall only be used with yield signs.
3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

Texas Department of Transportation — Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

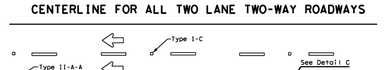
PM(1)-22

FILE:	pm1-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022		CONT	SECT	JOB	HIGHWAY
REVISIONS					
11-78 8-00 6-10		DIST	COUNTY		SHEET NO.
8-95 3-03 12-22					
5-00 2-12					

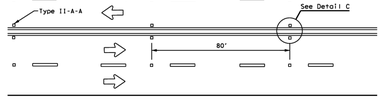
22H

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by the Texas Department of Transportation for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

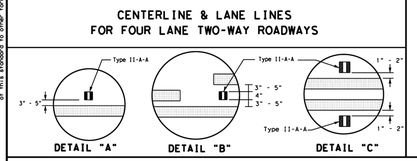
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE

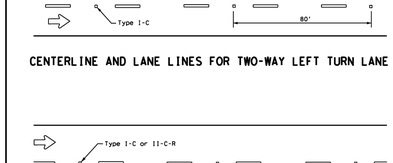


CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS

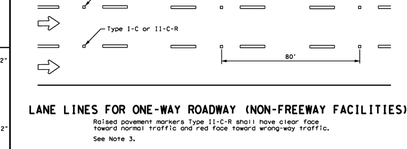


CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS





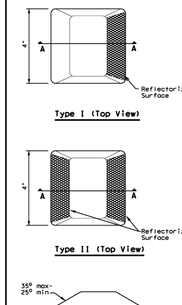
CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



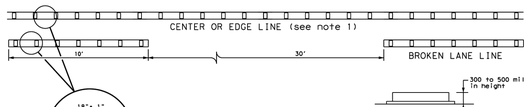
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

See Note 3.



RAISED PAVEMENT MARKERS



REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

6" EDGE LINE, 6" CENTERLINE OR 6" LANE LINE

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTES

1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements, the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians, and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.

Texas Department of Transportation — Traffic Safety Division Standard

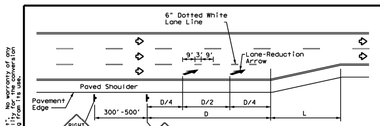
POSITION GUIDANCE USING RAISED MARKERS REFLECTORIZED PROFILE MARKINGS

PM(2)-22

FILE:	pm2-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022		CONT	SECT	JOB	HIGHWAY
REVISIONS					
4-77 8-00 6-20		DIST	COUNTY		SHEET NO.
4-98 2-10 12-22					
5-00 2-12					

22H

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by the Texas Department of Transportation for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

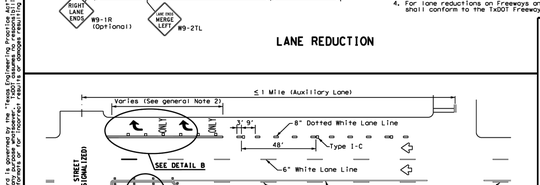


LANE REDUCTION

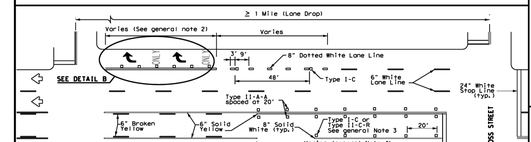
NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional RIGHT LANE ENDS (W9-1R) sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.

ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
30 MPH	460	L = WS * 60
35 MPH	565	
40 MPH	670	
45 MPH	775	
50 MPH	885	
55 MPH	990	L=WS
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	



TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP

GENERAL NOTES

1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer. See Chapter 3 of the Roadway Design Manual for additional information on turning lanes or storage lengths.

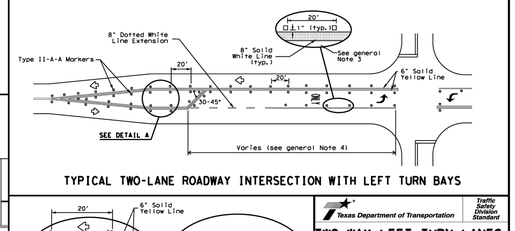
MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.

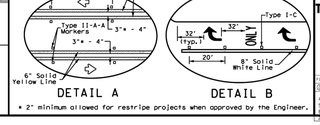


A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY



TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



* 2" minimum allowed for restripe projects when approved by the Engineer.

Texas Department of Transportation — Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS

PM(3)-22

FILE:	pm3-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022		CONT	SECT	JOB	HIGHWAY
REVISIONS					
4-98 3-03 6-20		DIST	COUNTY		SHEET NO.
5-00 2-10 12-22					
8-20 2-12					

22H

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

Colliers Engineering & Design

www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 PROTECT YOURSELF

ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE

FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DESCRIPTION	DRAWN BY	DATE

STATE OF TEXAS — OMAR A. ESPINOSA — 125560 — LICENSED PROFESSIONAL ENGINEER

7/1/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14309
TBPLS Firm#: 10194500

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

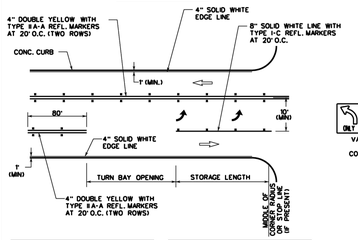
PROJECT NUMBER: 314-65-03
DRAWING NAME: TSDT3146503

SHEET TITLE: PAVEMENT MARKING DETAILS (1 OF 2)

SHEET NUMBER: 5.17

M:\STREETS\TSDT3146503.dwg\5.17 By: ARODRIGUEZ

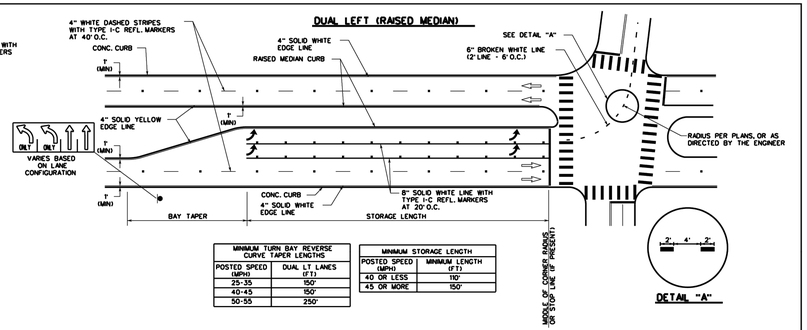
LEFT-TURN LANE



MINIMUM TURN BAY OPENINGS	
POSTED SPEED (MPH)	MINIMUM OPENING (FT)
25-35	60'
≥ 40	100'

MINIMUM STORAGE LENGTH	
POSTED SPEED (MPH)	MINIMUM OPENING (FT)
40 OR LESS	110'
45 OR MORE	150'

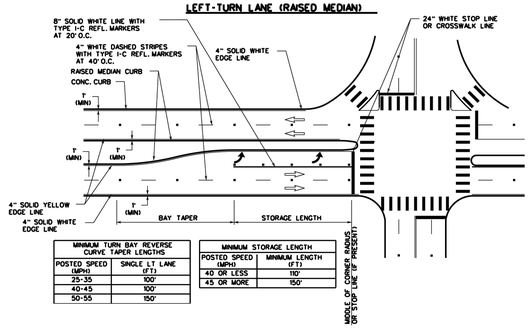
DUAL LEFT (RAISED MEDIAN)



MINIMUM TURN BAY REVERSE CURVE TAPER LENGTHS	
POSTED SPEED (MPH)	DUAL LT LANES (FT)
25-35	150'
40-45	150'
50-55	250'

MINIMUM STORAGE LENGTH	
POSTED SPEED (MPH)	MINIMUM LENGTH (FT)
40 OR LESS	110'
45 OR MORE	150'

LEFT-TURN LANE (RAISED MEDIAN)



MINIMUM TURN BAY REVERSE CURVE TAPER LENGTHS	
POSTED SPEED (MPH)	SINGLE LT LANE (FT)
25-35	100'
40-45	100'
50-55	150'

MINIMUM STORAGE LENGTH	
POSTED SPEED (MPH)	MINIMUM LENGTH (FT)
40 OR LESS	110'
45 OR MORE	150'

NOTES:

1. THE POSTED SPEED LIMIT IS TYPICALLY EQUAL TO THE DESIGN SPEED MINUS 5 MPH.
2. THE DIMENSIONS GIVEN FOR DUAL LEFT (RAISED MEDIAN) IN THE MINIMUM LENGTH TABLES ON THIS SHEET ARE ALSO APPLICABLE FOR DUAL RIGHT-TURN LANES.
3. STORAGE LENGTHS LONGER THAN THE MINIMUMS LISTED ON THIS DRAWING MAY BE DETERMINED USING TRAFFIC ENGINEERING ANALYSIS OR APPROXIMATE CALCULATIONS.
4. FOR THE PLACEMENT OF PAVEMENT ARROWS AND WORDS SEE LEFT-TURN "ONLY" AND ARROW SPACING WORKSHEET.
5. REFER TO APPLICABLE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE AND LEFT-TURN & RIGHT-TURN LANE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKINGS.
6. REFER TO BICYCLE LANE PAVEMENT MARKINGS STANDARD FOR TYPE AND PLACEMENT.
7. 4" SOLID WHITE AND YELLOW EDGE LINES ARE OPTIONAL AS DIRECTED BY THE CITY TRAFFIC ENGINEER.

SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC ENGINEERING STANDARDS

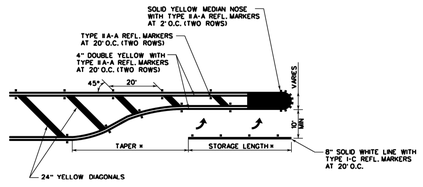
LEFT-TURN LANE & RIGHT-TURN LANE DESIGN WORKSHEET 1

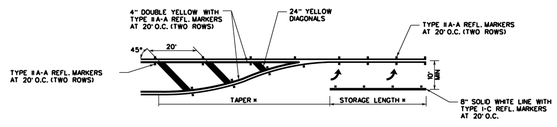
SHEET 10 OF 16

% SUBMITTAL	PROJECT NO.	---	DATE:	---
DRAWN BY:	DESIGN BY:	CHKD BY:	SHEET NO.	OF

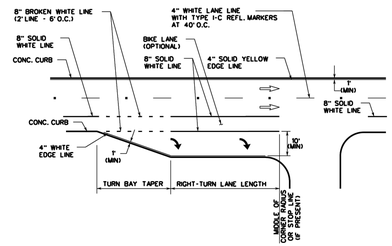
PAINTED MEDIAN LEFT TURN BAY DETAILS

* - USE MINIMUM TURN BAY REVERSE CURVE TAPER LENGTH AND MINIMUM STORAGE LENGTH TABLES FOR "LEFT-TURN LANE (RAISED MEDIAN)" ON SHEET 10 OF 16.





UNSIGNALIZED RIGHT-TURN LANE



MINIMUM TURN BAY TAPER LENGTH	
POSTED SPEED (MPH)	LENGTH (FT)
30 OR LESS	90'
35 OR MORE	120'

MINIMUM RIGHT-TURN LANE LENGTH	
POSTED SPEED (MPH)	LENGTH (FT)
40 OR LESS	110'
45 OR MORE	150'

NOTES:

1. THE POSTED SPEED LIMIT IS TYPICALLY EQUAL TO THE DESIGN SPEED MINUS 5 MPH.
2. THE DIMENSIONS GIVEN FOR DUAL LEFT (RAISED MEDIAN) IN THE MINIMUM LENGTH TABLES ON THIS SHEET ARE ALSO APPLICABLE FOR DUAL RIGHT-TURN LANES.
3. STORAGE LENGTHS LONGER THAN THE MINIMUMS LISTED ON THIS DRAWING MAY BE DETERMINED USING TRAFFIC ENGINEERING ANALYSIS OR APPROXIMATE CALCULATIONS.
4. FOR THE PLACEMENT OF PAVEMENT ARROWS AND WORDS SEE LEFT-TURN "ONLY" AND ARROW SPACING WORKSHEET.
5. REFER TO APPLICABLE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE AND LEFT-TURN & RIGHT-TURN LANE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKINGS.
6. REFER TO BICYCLE LANE PAVEMENT MARKINGS STANDARD FOR TYPE AND PLACEMENT.
7. 4" SOLID WHITE AND YELLOW EDGE LINES ARE OPTIONAL AS DIRECTED BY THE CITY TRAFFIC ENGINEER.

SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC ENGINEERING STANDARDS

LEFT-TURN LANE & RIGHT-TURN LANE DESIGN WORKSHEET 2

SHEET 11 OF 16

% SUBMITTAL	PROJECT NO.	---	DATE:	---
DRAWN BY:	DESIGN BY:	CHKD BY:	SHEET NO.	OF

Colliers
Engineering & Design
www.colliersengineering.com
Copyright © 2025. Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, revised, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.
Formerly Known as KFW
811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE.
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
7/1/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER:	DRAWING NAME:
314-65-03	TSDT3146503

SHEET TITLE:
PAVEMENT MARKING DETAILS (2 OF 2)

SHEET NUMBER:
5.18

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

I:\STREETS\TSDT3146503.dwg|5.18 By: ABOORGUEZ

NORTHLAKE PHASE 2A

BEXAR COUNTY, TEXAS

SANITARY SEWER IMPROVEMENTS



LOCATION MAP

SCALE: NOT-TO-SCALE

SAWS STANDARD GENERAL CONSTRUCTION NOTES
ASSOCIATED WITH 2021 SAWS STANDARD SPECS
Updated January 2022

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 Inspection Division at (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 pipe 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.*
11. *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. 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.*

Sewer Notes

1. *The Contractor is responsible for ensuring that no Sanitary Sewer Overflow (SSO) occurs as a result of their work. All contractor personnel responsible for SSO prevention and control shall be trained on proper response. Should an SSO occur, the contractor shall:*
   - *A. Identify the source of the SSO and notify SAWS Emergency Operations Center (EOC) immediately at (210) 233-2014. Provide the address of the spill and an estimated volume or flow.*
   - *B. Attempt to eliminate the source of the SSO.*
   - *C. Contain sewage from the SSO to the extent of preventing a possible contamination of waterways.*
   - *D. Clean up spill site (return contained sewage to the collection system if possible) and properly dispose of contaminated soil/materials.*
   - *E. Clean the affected sewer mains and remove any debris.*
   - *F. Meet all post-SSO requirements as per the EPA Consent Decree, including line cleaning and televising the affected sewer mains (at SAWS direction) within 24 hours. Should the Contractor fail to address an SSO immediately and to SAWS satisfaction, they will be responsible for all costs incurred by SAWS, including any fines from EPA, TCEQ and/or any other Federal, State or Local Agencies. No separate measurement or payment shall be made for this work. All work shall be done according to guidelines set by the TCEQ and SAWS.*
2. *If bypass pumping is required, the Contractor shall perform such work in accordance with SAWS Standard Specification for Water and Sanitary Sewer Construction, Item No. 864, "Bypass Pumping".*
3. *Prior to tie-ins, any shutdowns of existing force mains of any size must be coordinated with the SAWS Construction Inspection Division at (210) 233-2973 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.*
4. *Sewer pipe where water line crosses shall be 160 psi and meet the requirements of ASTM D2241, TAC 217.53 and TCEQ 290.44(e)(4)(B). Contractor shall center a 20' joint of 160 psi pressure rated PVC at the proposed water crossing.*
5. *ELEVATIONS POSTED FOR TOP OF MANHOLES ARE FOR REFERENCE ONLY: It shall be the responsibility of the Contractor to make allowances and adjustments for top of manholes to match the finished grade of the project's improvements. (NSPI)*
6. *Spills, Overflows, or Discharges of Wastewater: All spills, overflows, or discharges of wastewater, recycled water, petroleum products, or chemicals must be reported immediately to the SAWS Inspector assigned to the Counter Permit or General Construction Permit (GCP). This requirement applies to every spill, overflow, or discharge regardless of size.*
7. *Manhole and all pipe testing (including the TV inspection) must be performed and passed prior to Final Field Acceptance by SAWS Construction Inspection Division, as per the SAWS Specifications For Water and Sanitary Sewer Construction.*
8. *All PVC pipe over 14 feet of cover shall be extra strength with minimum pipe stiffness of 115 psi.*

OWNER/DEVELOPER:
LENNAR HOMES OF TEXAS LAND AND CONSTRUCTION, LTD
100 NE LOOP 410, SUITE 1155
SAN ANTONIO, TEXAS 78216
(210) 403-6200

Sheet List Table

SHEET TITLE	SHEET NUMBER
SANITARY SEWER COVER SHEET	6.0
OVERALL SANITARY SEWER PLAN (1 OF 2)	6.1
OVERALL SANITARY SEWER PLAN (2 OF 2)	6.2
LINE 'A' PLAN AND PROFILES	6.3
LINE 'B' PLAN AND PROFILES	6.4
LINE 'C' PLAN AND PROFILES	6.5
LINE 'D' PLAN AND PROFILES	6.6
LINE 'D' & 'E' PLAN AND PROFILES	6.7
LINE 'F' PLAN AND PROFILES	6.8
LINE 'G' & 'H' PLAN AND PROFILES	6.9
LINE 'I' PLAN AND PROFILES	6.10

LOWER - EAST SEWERSHED - SALADO CREEK

DEVELOPER'S NAME:	*LENNAR HOMES OF TEXAS LAND AND CONSTRUCTION, LTD.*		
DEVELOPER'S ADDRESS:	*100 NE LOOP 410, SUITE 1155*		
CITY:	*SAN ANTONIO*	*STATE:* *TEXAS*	*ZIP:* *78216*
PHONE#:		*FAX#:*	*TOTAL ACREAGE:* *32.14 ACRES*
SAWS BLOCK MAP#:	*210546,212546,212544,212542,212540*		*TOTAL EDU'S:* *234*
TOTAL LINEAR FOOTAGE OF PIPE:	*1,133 LF ~ 12" SDR 26* *5,707 LF ~ 8" SDR 26*		*PLAT NO.:* *25-11800192*
NUMBER OF LOTS: *234*		*SAWS JOB#:* *25-1558*	

Colliers
Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED
PROFESSIONAL ENGINEER
9/24/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER:	DRAWING NAME:
314-65-03	CVO53146503

SHEET TITLE:
SANITARY SEWER COVER SHEET

SHEET NUMBER:
6.0

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

By: SDSEPH
I:\KFW\TBPE\CVO\53146503.dwg\6.0

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.

COMPACTION NOTE:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING 98% COMPACTION ON ALL TRENCH BACKFILL AND PAYING FOR THE TESTS TO BE PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED OR AS IND/CATED BY THE SAWS INSPECTOR/TEST ADMINISTRATOR. PER EACH 12 INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. PERMITS AND/OR WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

MANHOLE NOTE:

ALL MANHOLES MUST BE WATERTIGHT, WITH WATERTIGHT RINGS AND COVERS. THESE MANHOLES MUST BE VENTED PER SAWS STANDARD SPECIFICATIONS

NOTES:

1. *SEWER PIPE WHERE WATER LINE CROSSES SHALL BE MEET THE REQUIREMENTS OF ASTM D2241. CONTRACTOR SHALL CENTER A 20 FOOT JOINT OF 160 P.S.I. PRESSURE RATED P.V.C. AT THE PROPOSED WATER CROSSING (NO SEPARATE PAY ITEM). REFERENCE SHEET 6.0, SANITARY SEWER GENERAL NOTES, S.A.W.S. CRITERIA FOR SEWER MAIN CONSTRUCTION IN THE VICINITY OF WATER MAINS.*
2. *REF. THIS SHEET FOR BENCHMARK INFORMATION.*
3. *PIPE TYPE DESIGNATIONS ARE SDR 26.*
4. *REF. THIS SHEET FOR TYPICAL SANITARY SEWER / WATER CROSSING DETAIL.*
5. *ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT SHALL BE IN ACCORDANCE WITH THE SAN ANTONIO WATER SYSTEM (SAWS) STANDARD SPECIFICATIONS.*

CAUTION!!:

THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED 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.

LEGEND

PROPOSED WATER MAIN	=	W
PROPOSED FIRE HYDRANT	=	
PROPOSED WATER VALVE	=	
PROPOSED SANITARY SEWER MAIN	=	SS
PROPOSED SANITARY SEWER MANHOLE	=	SS
PROPOSED SANITARY SEWER LATERAL	=	
ELECTRIC, GAS, TELEPHONE, & CABLE TV EASEMENT (PLAT NUMBER	=	*E.G.T.TV.E*
EXISTING WATER MAIN	=	EW
EXISTING FIRE HYDRANT	=	
EXISTING WATER VALVE	=	
EXISTING SANITARY SEWER MAIN	=	ESS
EXISTING SANITARY SEWER MANHOLE	=	ESS

BENCHMARKS

BM # 12
DESC: SIR 3" IR ORANGE CAP
N:13673087.91
E:2183389.95
ELEV: 540.88

BM # 13
DESC: SIR 3" IR ORANGE CAP
N:13669082.81
E:2183437.35
ELEV: 502.00

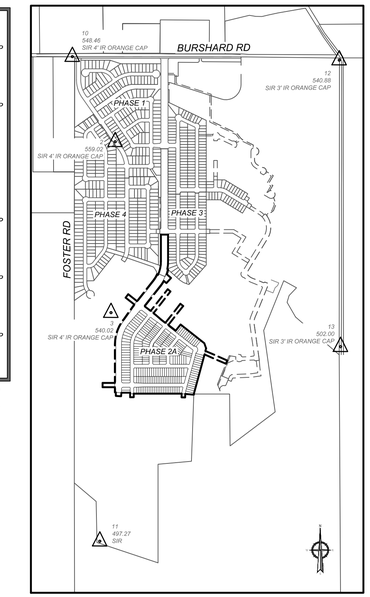
BM # 11
DESC: SIR
N:13666339.65
E:2180093.31
ELEV: 497.27

BM # 3
DESC: SIR 4" IR ORANGE CAP
N:13669534.66
E:2180226.14
ELEV: 540.02

BM # 2
DESC: SIR 4" IR ORANGE CAP
N:13671923.18
E:2180267.19
ELEV: 559.02

BM # 10
DESC: SIR 4" IR ORANGE CAP
N:13673108.57
E:2179660.24
ELEV: 548.46

★ *CONTRACTOR TO RUN LEVEL LOOP THROUGH BM'S PROVIDED TO CONFIRM BEFORE CONSTRUCTION. CONTACT ENGINEER/SURVEYOR IMMEDIATELY IF ELEVATIONS DO NOT MATCH THOSE SHOWN.*

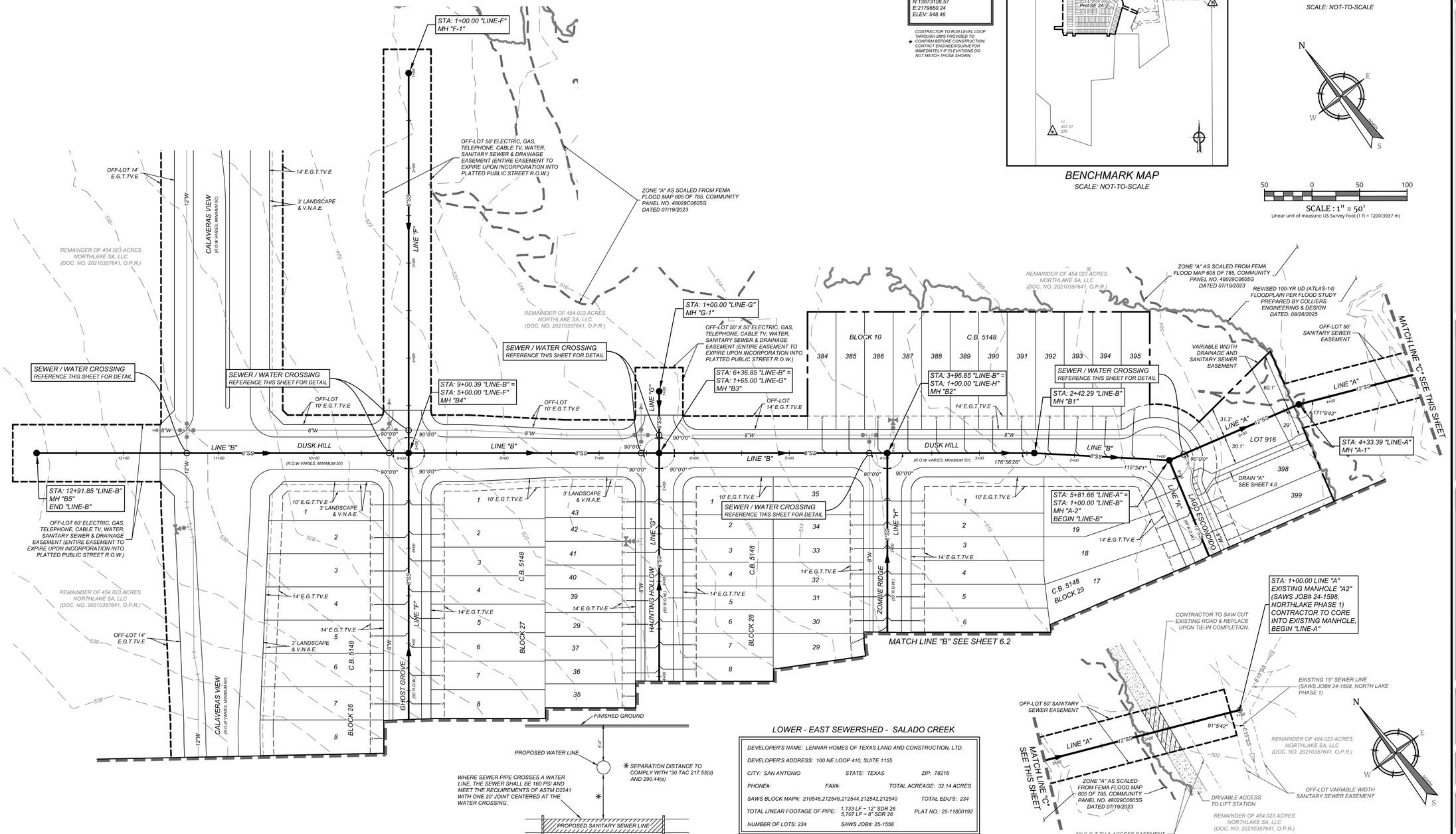


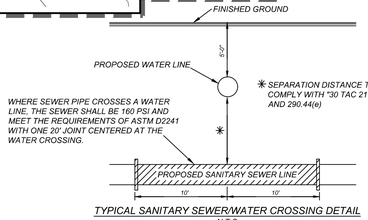
BENCHMARK MAP
SCALE: NOT-TO-SCALE



LOCATION MAP
SCALE: NOT-TO-SCALE

50 0 50 100
SCALE : 1" = 50'
Linear unit of measure: US Survey Foot (1 ft = 1200/3937 m)





TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
N.T.S.

LOWER - EAST SEWERSHED - SALADO CREEK

DEVELOPER'S NAME: LENNAR HOMES OF TEXAS LAND AND CONSTRUCTION, LTD.			
DEVELOPER'S ADDRESS: 100 NE LOOP 410, SUITE 1155			
CITY: SAN ANTONIO	*STATE: TEXAS*	*ZIP: 78216*	
PHONE#:	*FAX#:*	*TOTAL ACREAGE: 32.14 ACRES*	
SAWS BLOCK MAP#: 210546,212546,212544,212542,212540		*TOTAL EDU'S: 234*	
TOTAL LINEAR FOOTAGE OF PIPE:	*1,133 LF – 12" SDR 26 5,707 LF – 8" SDR 26*	*PLAT NO.: 25-11800192*	
NUMBER OF LOTS: 234	*SAWS JOB#: 25-1558*		

Colliers Engineering & Design

www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
Texas811.org Call before you dig.
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
9/24/25

NORTHLAKE PHASE 10
PLAT# 25-11800371

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#:F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: 053146503-PH2A

SHEET TITLE:
OVERALL SANITARY SEWER PLAN (1 OF 2)

SHEET NUMBER:
6.1

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

I:\RESEWER\053146503-PH2A.dwg\6.1 By: ABEL.MONTALVO

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.

COMPACTION NOTE:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING 98% COMPACTION ON ALL TRENCH BACKFILL AND PAYING FOR THE TESTS TO BE PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED OR AS INDICATED BY THE SAWS INSPECTOR/TEST ADMINISTRATOR, PER EACH 12 INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. PERMITS AND/OR WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

NOTES:

1. *SEWER PIPE WHERE WATER LINE CROSSES SHALL BE MEET THE REQUIREMENTS OF ASTM D2241. CONTRACTOR SHALL CENTER A 20 FOOT JOINT OF 160 P.S.I. PRESSURE RATED P.V.C. AT THE PROPOSED WATER CROSSING (NO SEPARATE PAY ITEM). REFERENCE SHEET 6.0, SANITARY SEWER GENERAL NOTES, S.A.W.S. CRITERIA FOR SEWER MAIN CONSTRUCTION IN THE VICINITY OF WATER MAINS.*
2. *REF. SHEET 6.1 FOR BENCHMARK INFORMATION.*
3. *PIPE TYPE DESIGNATIONS ARE SDR 26.*
4. *REF. THIS SHEET FOR TYPICAL SANITARY SEWER / WATER CROSSING DETAIL.*
5. *ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT SHALL BE IN ACCORDANCE WITH THE SAN ANTONIO WATER SYSTEM (SAWS) STANDARD SPECIFICATIONS.*

CAUTION!!:

THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED 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.

MANHOLE NOTE:

ALL MANHOLES MUST BE WATERTIGHT, WITH WATERTIGHT RINGS AND COVERS. THESE MANHOLES MUST BE VENTED PER SAWS STANDARD SPECIFICATIONS

LOWER - EAST SEWERSHED - SALADO CREEK

DEVELOPER'S NAME: LENNAR HOMES OF TEXAS LAND AND CONSTRUCTION, LTD.		
DEVELOPER'S ADDRESS: 100 NE LOOP 410, SUITE 1155		
CITY: SAN ANTONIO	STATE: TEXAS	ZIP: 78216
PHONE#:	FAX#:	TOTAL ACREAGE: 32.14 ACRES
SAWS BLOCK MAP#: 210546,212546,212544,212542,212540		TOTAL EDUS: 234
TOTAL LINEAR FOOTAGE OF PIPE:	1,133 LF ~ 12" SDR 26 5,707 LF ~ 8" SDR 26	PLAT NO.: 25-11800192
NUMBER OF LOTS: 234	SAWS JOB#: 25-1558	

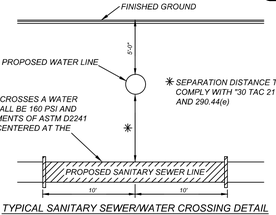
LEGEND

PROPOSED WATER MAIN	=	W
PROPOSED FIRE HYDRANT	=	
PROPOSED WATER VALVE	=	
PROPOSED SANITARY SEWER MAIN	=	SS
PROPOSED SANITARY SEWER MANHOLE	=	SS
PROPOSED SANITARY SEWER LATERAL	=	
ELECTRIC, GAS, TELEPHONE, & CABLE TV EASEMENT (PLAT NUMBER	=	E.G.T.TV.E
EXISTING WATER MAIN	=	EW
EXISTING FIRE HYDRANT	=	
EXISTING WATER VALVE	=	
EXISTING SANITARY SEWER MAIN	=	ESS
EXISTING SANITARY SEWER MANHOLE	=	ESS



LOCATION MAP

SCALE: NOT-TO-SCALE

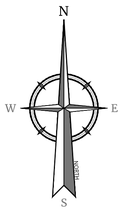


WHERE SEWER PIPE CROSSES A WATER LINE, THE SEWER SHALL BE 160 PSI AND MEET THE REQUIREMENTS OF ASTM D2241 WITH ONE 20' JOINT CENTERED AT THE WATER CROSSING.

✳ *SEPARATION DISTANCE TO COMPLY WITH "30 TAC 217.53(d) AND 290.44(e)*

TYPICAL SANITARY SEWER/WATER CROSSING DETAIL

N.T.S.



50 0 50 100

SCALE : 1" = 50'

Linear unit of measure: US Survey Foot (1 ft = 1200/3937 m)

REVISED 100-YR UD (ATLAS-14) FLOODPLAIN PER FLOOD STUDY PREPARED BY COLLIERS ENGINEERING & DESIGN DATED: 08/26/2025

Colliers Engineering & Design

www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, revised, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

PROTECT YOURSELF

ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE

FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION



NORTHLAKE PHASE 10
PLAT# 25-11800371

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design

SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER:	DRAWING NAME:
314-65-03	05314650 3-PH2A

SHEET TITLE:

OVERALL SANITARY SEWER PLAN (2 OF 2)

SHEET NUMBER:

6.2

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

By: ABEL.MONTALVO

\\R2\SWRO\05314650\3-PH2A.dwg\6.2

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.

COMPACTION NOTE:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING 98% COMPACTION ON ALL TRENCH BACKFILL AND PAYING FOR THE TESTS TO BE PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED OR AS INDICATED BY THE SAWS INSPECTOR/TEST ADMINISTRATOR, PER EACH 12 INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. PERMITS AND/OR WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

CAUTION!!:

THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED 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.

NOTE:

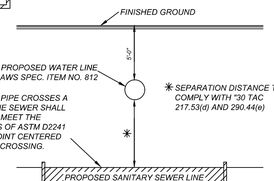
M.H. EXCEEDING 20 FT DEPTH WILL BE SUBJECTED TO GET REVISED WITH FUTURE DEVELOPMENT TO ENSURE SAWS DEPTH CRITERIA IS MET.

NOTES:

1. *SEWER PIPE WHERE WATER LINE CROSSES SHALL BE MEET THE REQUIREMENTS OF ASTM D2241. CONTRACTOR SHALL CENTER A 20 FOOT JOINT OF 160 P.S.I. PRESSURE RATED P.V.C. AT THE PROPOSED WATER CROSSING (NO SEPARATE PAY ITEM). REFERENCE SHEET 6.0, SANITARY SEWER GENERAL NOTES, S.A.W.S. CRITERIA FOR SEWER MAIN CONSTRUCTION IN THE VICINITY OF WATER MAINS.*
2. *PIPE TYPE DESIGNATIONS ARE SDR 26.*
3. *REF. THIS SHEET FOR TYPICAL SANITARY SEWER / WATER CROSSING DETAIL.*
4. *ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT SHALL BE IN ACCORDANCE WITH THE SAN ANTONIO WATER SYSTEM (SAWS) STANDARD SPECIFICATIONS.*

MANHOLE NOTE:

ALL MANHOLES MUST BE WATERTIGHT, WITH WATERTIGHT RINGS AND COVERS. THESE MANHOLES MUST BE VENTED PER SAWS DETAIL DD852-02.



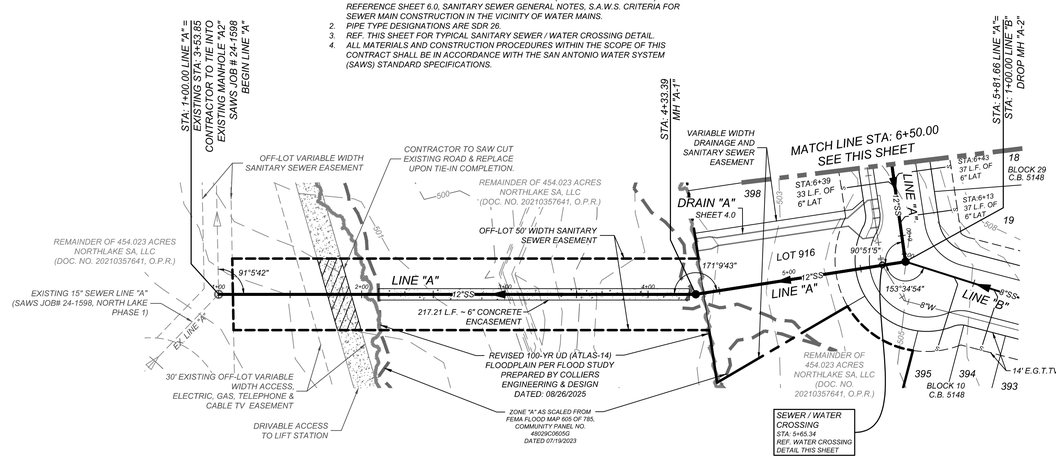
TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
N.T.S.

LOWER - EAST SEWERSHED - SALADO CREEK

DEVELOPER'S NAME: LENNAR HOMES OF TEXAS LAND AND CONSTRUCTION, LTD.			
DEVELOPER'S ADDRESS: 100 NE LOOP 410, SUITE 1155			
CITY: SAN ANTONIO	STATE: TEXAS	ZIP: 78216	
PHONE#:	FAX#:	TOTAL ACREAGE: 32.14 ACRES	
SAWS BLOCK MAP#: 210546,212546,212544,212542,212540		TOTAL EDU'S: 234	
TOTAL LINEAR FOOTAGE OF PIPE:	1,133 LF ~ 12" SDR 26 5,707 LF ~ 8" SDR 26	PLAT NO.: 25-11800192	
NUMBER OF LOTS: 234	SAWS JOB#: 25-1558		

LEGEND

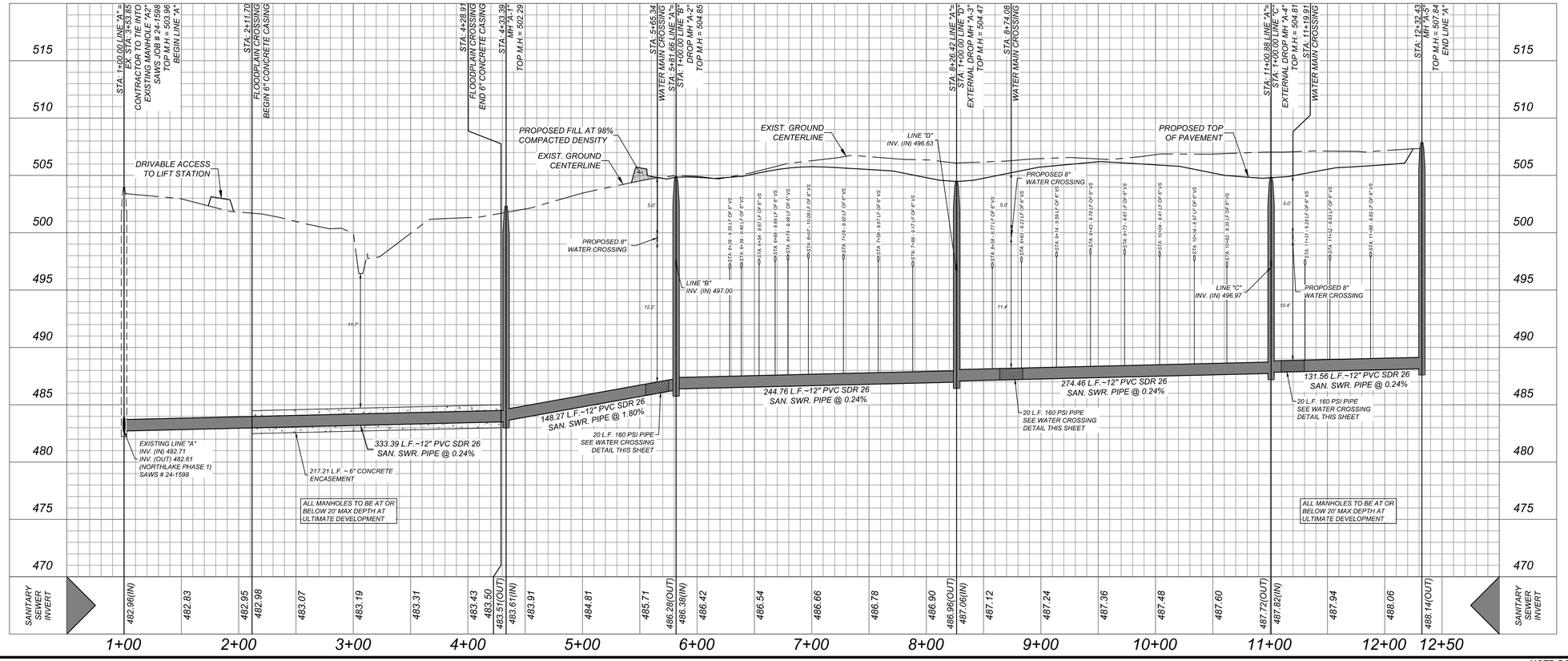
RIGHT OF WAY	=	R.O.W.
COUNTY BLOCK	=	C.B.
EXISTING SANITARY SEWER	=	ESS
PROPOSED SANITARY SEWER	=	SS
EXISTING WATER	=	EW
PROPOSED WATER	=	W
ELECTRIC, GAS, TELEPHONE & CABLE TV EASEMENT	=	E.G.T.TV.E
LINEAR FEET	=	LF
LATERAL	=	LAT
VERTICAL STACK	=	VS
VEHICULAR NON ACCESS EASEMENT	=	V.N.A.E.



SCALE : 1" = 5'
VERTICAL

SCALE : 1" = 50'
HORIZONTAL

LINE "A"
STA: 1+00.00 - END



Colliers Engineering & Design

www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
9/24/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: SSPP3146503

SHEET TITLE: LINE 'A' PLAN AND PROFILES

SHEET NUMBER: 6.3

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

I:\RS\SEWER\SSPP3146503.dwg[6.3 By: ABEL.MONTALVO

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.

COMPACTION NOTE:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING 98% COMPACTION ON ALL TRENCH BACKFILL AND PAYING FOR THE TESTS TO BE PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED OR AS INDICATED BY THE SAWS INSPECTOR/TEST ADMINISTRATOR, PER EACH 12 INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. PERMITS AND/OR WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

NOTES:

1. SEWER PIPE WHERE WATER LINE CROSSES SHALL BE MEET THE REQUIREMENTS OF ASTM D2241. CONTRACTOR SHALL CENTER A 20 FOOT JOINT OF 160 P.S.I. PRESSURE RATED P.V.C. AT THE PROPOSED WATER CROSSING (NO SEPARATE PAY ITEM). REFERENCE SHEET 6.0, SANITARY SEWER GENERAL NOTES, S.A.W.S. CRITERIA FOR SEWER MAIN CONSTRUCTION IN THE VICINITY OF WATER MAINS.
2. PIPE TYPE DESIGNATIONS ARE SDR 26.
3. REF. THIS SHEET FOR TYPICAL SANITARY SEWER / WATER CROSSING DETAIL.
4. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT SHALL BE IN ACCORDANCE WITH THE SAN ANTONIO WATER SYSTEM (SAWS) STANDARD SPECIFICATIONS.

CAUTION!!:

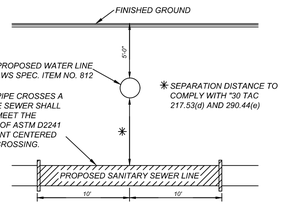
THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCTBANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. ANY UTILITY CONFLICTS THAT 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.

NOTE:

M.H. EXCEEDING 20 FT DEPTH WILL BE SUBJECTED TO GET REVISED WITH FUTURE DEVELOPMENT TO ENSURE SAWS DEPTH CRITERIA IS MET.

MANHOLE NOTE:

ALL MANHOLES MUST BE WATERTIGHT, WITH WATERTIGHT RINGS AND COVERS. THESE MANHOLES MUST BE VENTED PER SAWS DETAIL DD852-02.



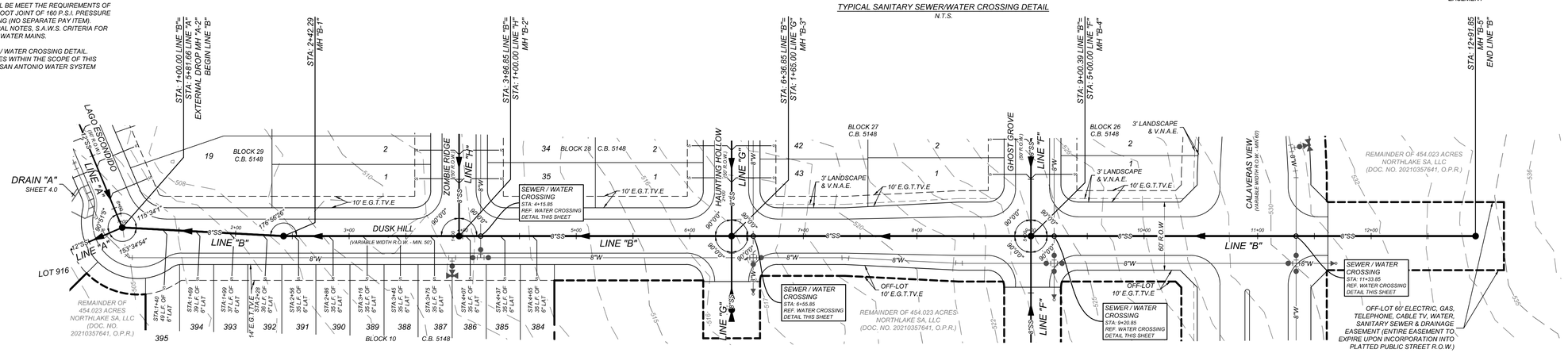
TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
N.T.S.

LOWER - EAST SEWERSHED - SALADO CREEK

DEVELOPER'S NAME: LENNAR HOMES OF TEXAS LAND AND CONSTRUCTION, LTD.	
DEVELOPER'S ADDRESS: 100 NE LOOP 410, SUITE 1155	
CITY: SAN ANTONIO STATE: TEXAS ZIP: 78216	
PHONE#: FAX#: TOTAL ACREAGE: 32.14 ACRES	
SAWS BLOCK MAP#: 210546,212546,212544,212542,212540	TOTAL EDU'S: 234
TOTAL LINEAR FOOTAGE OF PIPE: 1,133 LF ~ 12" SDR 26 5,707 LF ~ 8" SDR 26	PLAT NO.: 25-11800192
NUMBER OF LOTS: 234	SAWS JOB#: 25-1558

LEGEND

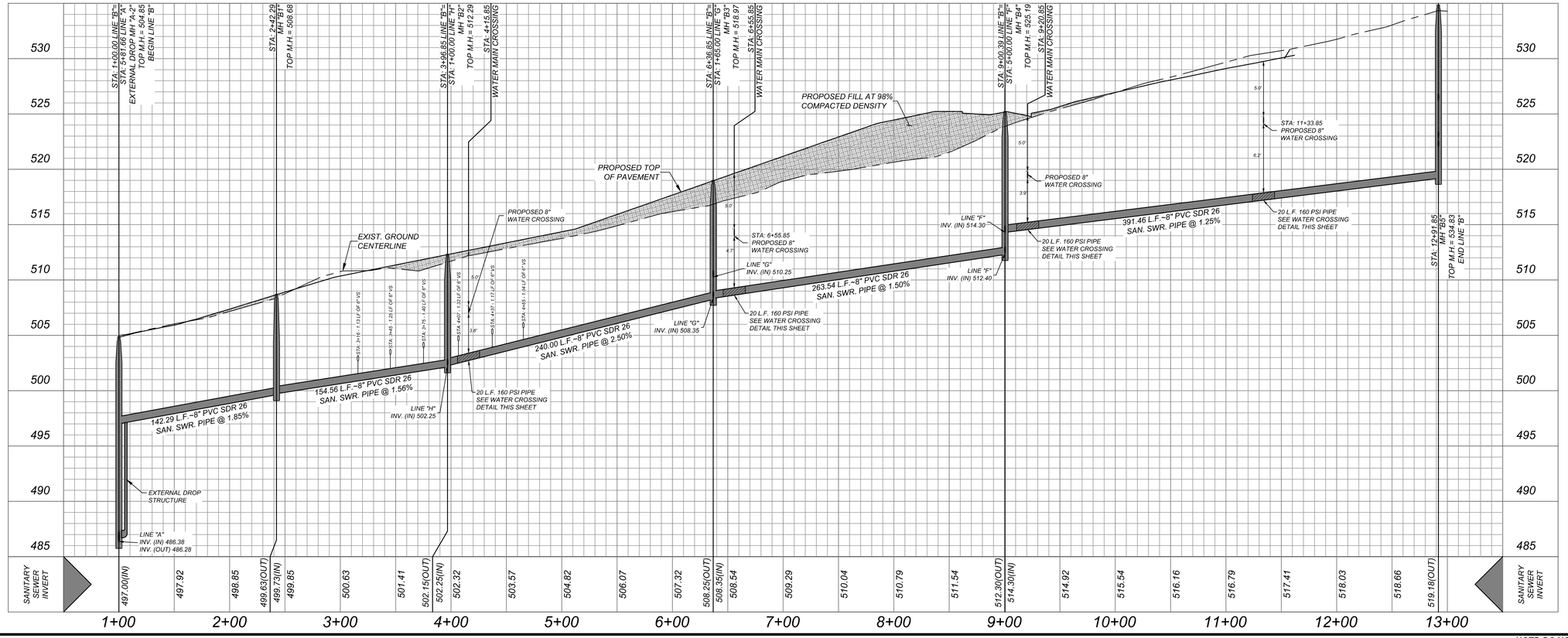
RIGHT OF WAY	=	R.O.W.
COUNTY BLOCK	=	C.B.
EXISTING SANITARY SEWER	=	ESS
PROPOSED SANITARY SEWER	=	SS
EXISTING WATER	=	EW
PROPOSED WATER	=	W
ELECTRIC, GAS, TELEPHONE & CABLE TV EASEMENT	=	E.G.T.TV.E
LINEAR FEET	=	LF
LATERAL	=	LAT
VERTICAL STACK	=	VS
VEHICULAR NON ACCESS EASEMENT	=	V.N.A.E.



SCALE : 1" = 5'
VERTICAL

SCALE : 1" = 50'
HORIZONTAL

LINE "B"
STA: 1+00.00 - END



Colliers Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
9/24/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER:	DRAWING NAME:
314-65-03	SSPP3146503

SHEET TITLE:
LINE 'B' PLAN AND PROFILES

SHEET NUMBER:
6.4

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

I:\KSTWER\SSPP3146503.dwg[6.4 By: ABEL.MONTALVO

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.

COMPACTION NOTE:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING 98% COMPACTION ON ALL TRENCH BACKFILL AND PAYING FOR THE TESTS TO BE PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED OR AS INDICATED BY THE SAWS INSPECTOR/TEST ADMINISTRATOR, PER EACH 12 INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. PERMITS AND/OR WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

NOTES:

1. *SEWER PIPE WHERE WATER LINE CROSSES SHALL BE MEET THE REQUIREMENTS OF ASTM D2241. CONTRACTOR SHALL CENTER A 20 FOOT JOINT OF 160 P.S.I. PRESSURE RATED P.V.C. AT THE PROPOSED WATER CROSSING (NO SEPARATE PAY ITEM). REFERENCE SHEET 6.0, SANITARY SEWER GENERAL NOTES, S.A.W.S. CRITERIA FOR SEWER MAIN CONSTRUCTION IN THE VICINITY OF WATER MAINS.*
2. *PIPE TYPE DESIGNATIONS ARE SDR 26.*
3. *REF. THIS SHEET FOR TYPICAL SANITARY SEWER / WATER CROSSING DETAIL.*
4. *ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT SHALL BE IN ACCORDANCE WITH THE SAN ANTONIO WATER SYSTEM (SAWS) STANDARD SPECIFICATIONS.*

CAUTION!!:

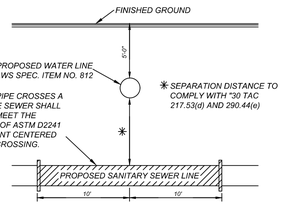
THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCTBANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. ANY UTILITY CONFLICTS THAT 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.

NOTE:

M.H. EXCEEDING 20 FT DEPTH WILL BE SUBJECTED TO GET REVISED WITH FUTURE DEVELOPMENT TO ENSURE SAWS DEPTH CRITERIA IS MET.

MANHOLE NOTE:

ALL MANHOLES MUST BE WATERTIGHT, WITH WATERTIGHT RINGS AND COVERS. THESE MANHOLES MUST BE VENTED PER SAWS DETAIL DD852-02.



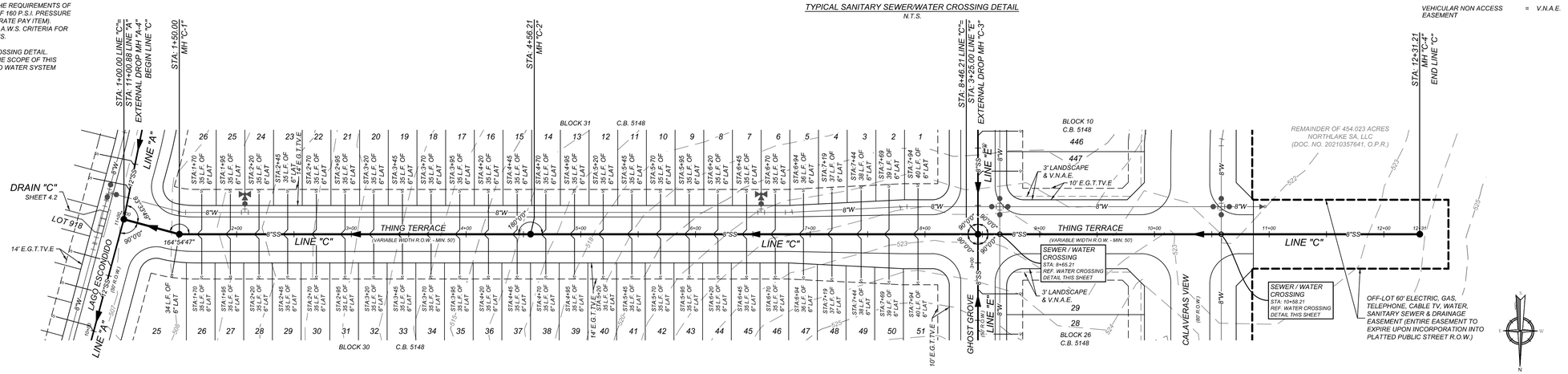
TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
N.T.S.

LOWER - EAST SEWERSHED - SALADO CREEK

DEVELOPER'S NAME: LENNAR HOMES OF TEXAS LAND AND CONSTRUCTION, LTD.			
DEVELOPER'S ADDRESS: 100 NE LOOP 410, SUITE 1155			
CITY: SAN ANTONIO	STATE: TEXAS	ZIP: 78216	
PHONE#:	FAX#:	TOTAL ACREAGE: 32.14 ACRES	
SAWS BLOCK MAP#: 210546,212546,212544,212542,212540		TOTAL EDU'S: 234	
TOTAL LINEAR FOOTAGE OF PIPE:	1,133 LF ~ 12" SDR 26 5,707 LF ~ 8" SDR 26	PLAT NO.: 25-11800192	
NUMBER OF LOTS: 234	SAWS JOB#: 25-1558		

LEGEND

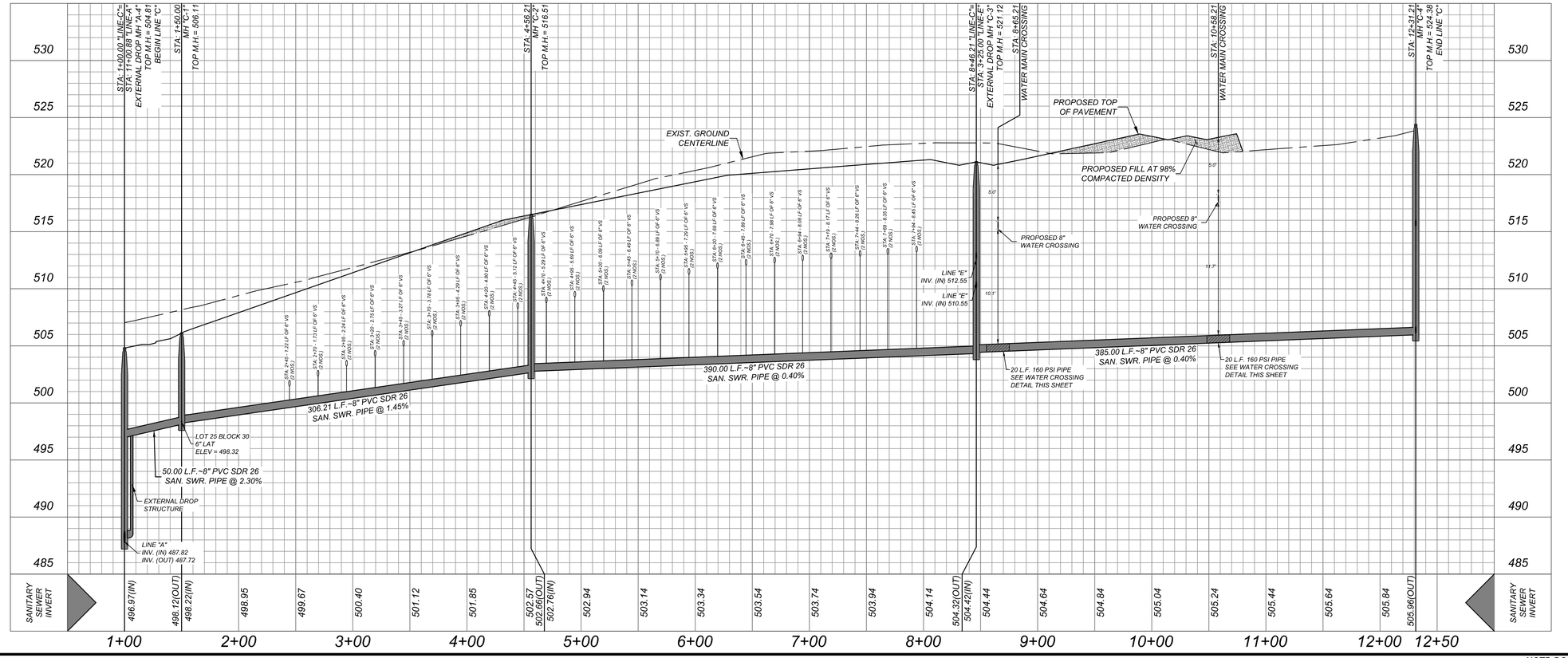
RIGHT OF WAY	=	R.O.W.
COUNTY BLOCK	=	C.B.
EXISTING SANITARY SEWER	=	ESS
PROPOSED SANITARY SEWER	=	SS
EXISTING WATER	=	EW
PROPOSED WATER	=	W
ELECTRIC, GAS, TELEPHONE & CABLE TV EASEMENT	=	E.G.T.TV.E
LINEAR FEET	=	LF
LATERAL	=	LAT
VERTICAL STACK	=	VS
VEHICULAR NON ACCESS EASEMENT	=	V.N.A.E.



SCALE : 1" = 5'
VERTICAL

SCALE : 1" = 50'
HORIZONTAL

LINE "C"
STA: 1+00.00 - END



Colliers Engineering & Design
www.colliersengineering.com
Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
9/24/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER:	DRAWING NAME:
314-65-03	SSPP3146503

SHEET TITLE:
LINE 'C' PLAN AND PROFILES

SHEET NUMBER:
6.5

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

I:\RSTWR\SSPP3146503.dwg[6.5 By: ABEL.MONTALVO

TRENCH EXCAVATION SAFETY PROTECTION

CONTRACTOR AND/ OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGNGEOTECHNICAL/SAFETYEQUIPMENT 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.

COMPACTION NOTE:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING 98% COMPACTION ON ALL TRENCH BACKFILL AND PAYING FOR THE TESTS TO BE PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED OR AS INDICATED BY THE SAWS INSPECTOR/TEST ADMINISTRATOR, PER EACH 12 INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. PERMITS AND/OR WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

NOTES:

1. SEWER PIPE WHERE WATER LINE CROSSES SHALL BE MEET THE REQUIREMENTS OF ASTM D2241. CONTRACTOR SHALL CENTER A 20 FOOT JOINT OF 160 P.S.I. PRESSURE RATED P.V.C. AT THE PROPOSED WATER CROSSING (NO SEPARATE PAY ITEM). REFERENCE SHEET 6.0, SANITARY SEWER GENERAL NOTES, S.A.W.S. CRITERIA FOR SEWER MAIN CONSTRUCTION IN THE VICINITY OF WATER MAINS.
2. PIPE TYPE DESIGNATIONS ARE SDR 26.
3. REF. THIS SHEET FOR TYPICAL SANITARY SEWER / WATER CROSSING DETAIL.
4. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT SHALL BE IN ACCORDANCE WITH THE SAN ANTONIO WATER SYSTEM (SAWS) STANDARD SPECIFICATIONS.

CAUTION!!:

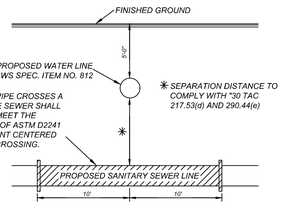
THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCTBANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. ANY UTILITY CONFLICTS THAT 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.

NOTE:

M.H. EXCEEDING 20 FT DEPTH WILL BE SUBJECTED TO GET REVISED WITH FUTURE DEVELOPMENT TO ENSURE SAWS DEPTH CRITERIA IS MET.

MANHOLE NOTE:

ALL MANHOLES MUST BE WATERTIGHT, WITH WATERTIGHT RINGS AND COVERS. THESE MANHOLES MUST BE VENTED PER SAWS DETAIL DD852-02.



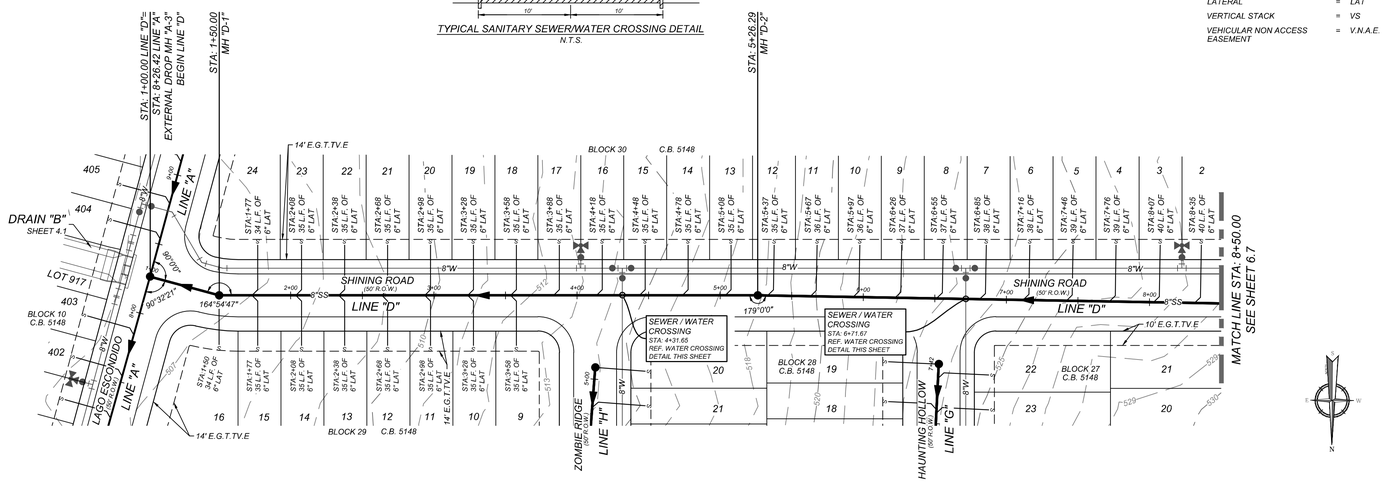
TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
N.T.S.

LOWER - EAST SEWERSHED - SALADO CREEK

DEVELOPER'S NAME: LENNAR HOMES OF TEXAS LAND AND CONSTRUCTION, LTD.
DEVELOPER'S ADDRESS: 100 NE LOOP 410, SUITE 1155
CITY: SAN ANTONIO STATE: TEXAS ZIP: 78216
PHONE#: FAX#: TOTAL ACREAGE: 32.14 ACRES
SAWS BLOCK MAP#: 210546,212546,212544,212542,212540 TOTAL EDU'S: 234
TOTAL LINEAR FOOTAGE OF PIPE: 1,133 LF ~ 12" SDR 26; 5,707 LF ~ 8" SDR 26 PLAT NO.: 25-11800192
NUMBER OF LOTS: 234 SAWS JOB#: 25-1558

LEGEND

RIGHT OF WAY	=	R.O.W.
COUNTY BLOCK	=	C.B.
EXISTING SANITARY SEWER	=	ESS
PROPOSED SANITARY SEWER	=	SS
EXISTING WATER	=	EW
PROPOSED WATER	=	W
ELECTRIC, GAS, TELEPHONE & CABLE TV EASEMENT	=	E.G.T.TV.E
LINEAR FEET	=	LF
LATERAL	=	LAT
VERTICAL STACK	=	VS
VEHICULAR NON ACCESS EASEMENT	=	V.N.A.E.

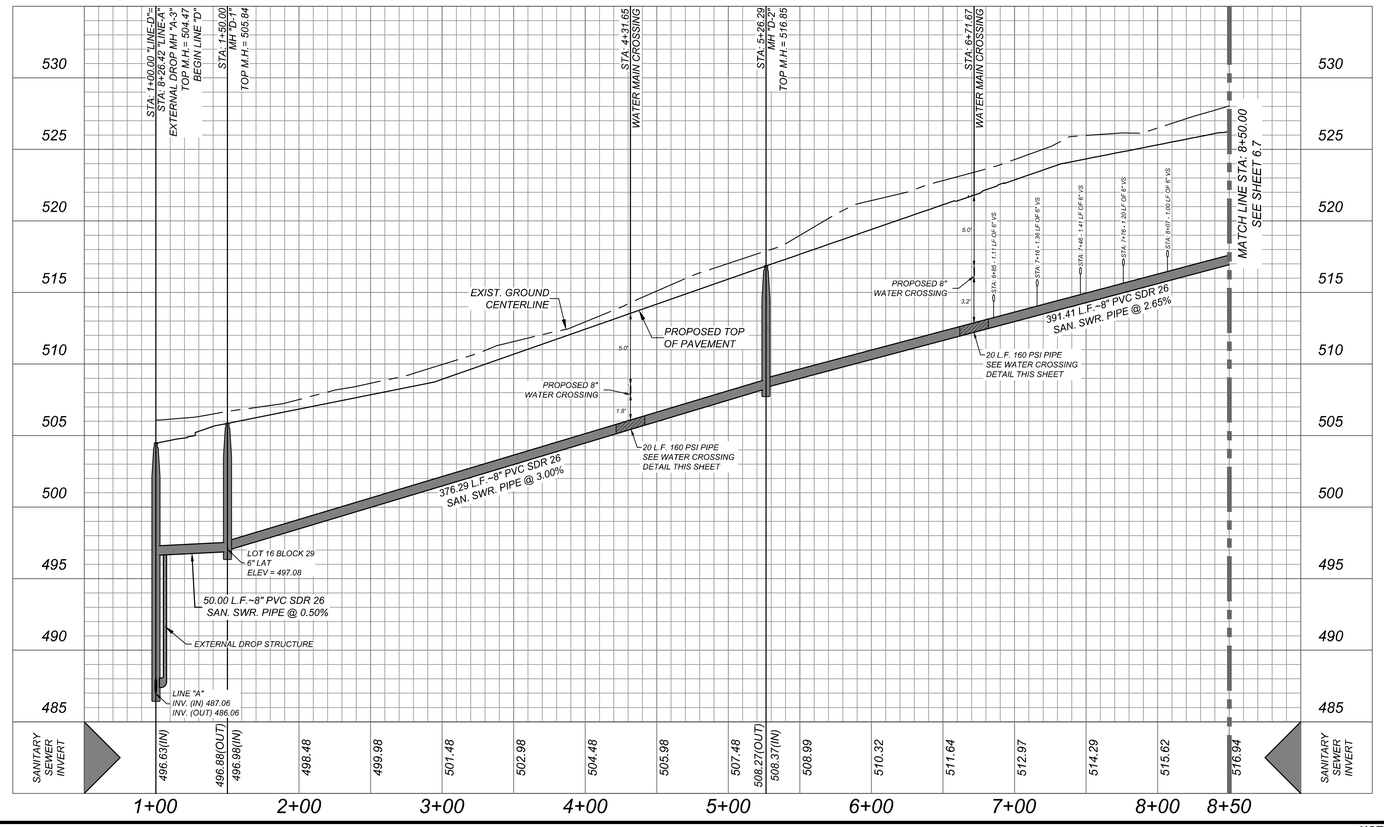


SCALE : 1" = 5'
VERTICAL

SCALE : 1" = 50'
HORIZONTAL

LINE "D"

STA: 1+00.00 - 8+50.00



Colliers Engineering & Design
www.colliersengineering.com
Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, revised, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DIGTURB THE EARTH-T SUIFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DESCRIPTION	DRAWN BY	DATE

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
9/24/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: SSPP3146503

SHEET TITLE: LINE 'D' PLAN AND PROFILES

SHEET NUMBER: 6.6

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

m:\AR\SEWER\SSPP3146503.dwg|6.6 By: SPOSEPH

TRENCH EXCAVATION SAFETY PROTECTION

CONTRACTOR AND/ OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGNGEOTECHNICAL/SAFETYEQUIPMENT 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.

COMPACTION NOTE:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING 98% COMPACTION ON ALL TRENCH BACKFILL AND PAYING FOR THE TESTS TO BE PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED OR AS INDICATED BY THE SAWS INSPECTOR/TEST ADMINISTRATOR, PER EACH 12 INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. PERMITS AND/OR WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

NOTES:

1. *SEWER PIPE WHERE WATER LINE CROSSES SHALL BE MEET THE REQUIREMENTS OF ASTM D2241. CONTRACTOR SHALL CENTER A 20 FOOT JOINT OF 160 P.S.I. PRESSURE RATED P.V.C. AT THE PROPOSED WATER CROSSING (NO SEPARATE PAY ITEM). REFERENCE SHEET 6.0, SANITARY SEWER GENERAL NOTES, S.A.W.S. CRITERIA FOR SEWER MAIN CONSTRUCTION IN THE VICINITY OF WATER MAINS.*
2. *PIPE TYPE DESIGNATIONS ARE SDR 26.*
3. *REF. THIS SHEET FOR TYPICAL SANITARY SEWER / WATER CROSSING DETAIL.*
4. *ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT SHALL BE IN ACCORDANCE WITH THE SAN ANTONIO WATER SYSTEM (SAWS) STANDARD SPECIFICATIONS.*

CAUTION!!:

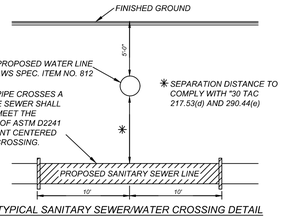
THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCTBANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. ANY UTILITY CONFLICTS THAT 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.

NOTE:

M.H. EXCEEDING 20 FT DEPTH WILL BE SUBJECTED TO GET REVISED WITH FUTURE DEVELOPMENT TO ENSURE SAWS DEPTH CRITERIA IS MET.

MANHOLE NOTE:

ALL MANHOLES MUST BE WATERTIGHT, WITH WATERTIGHT RINGS AND COVERS. THESE MANHOLES MUST BE VENTED PER SAWS DETAIL DD852-02.



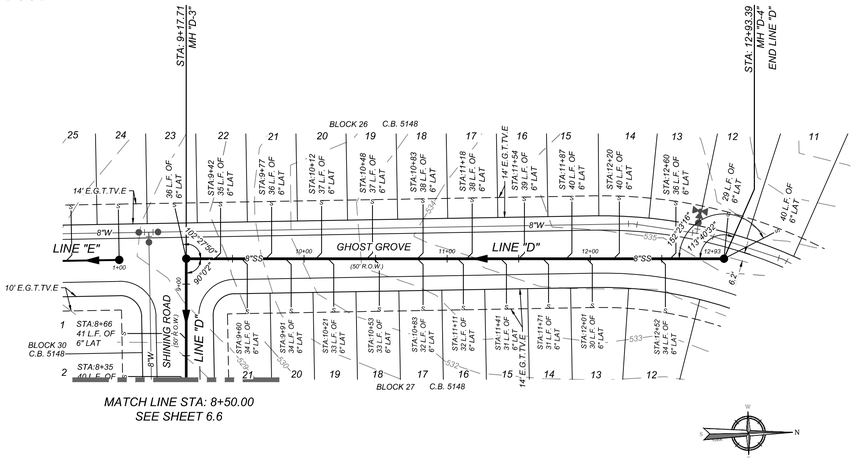
TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
N.T.S.

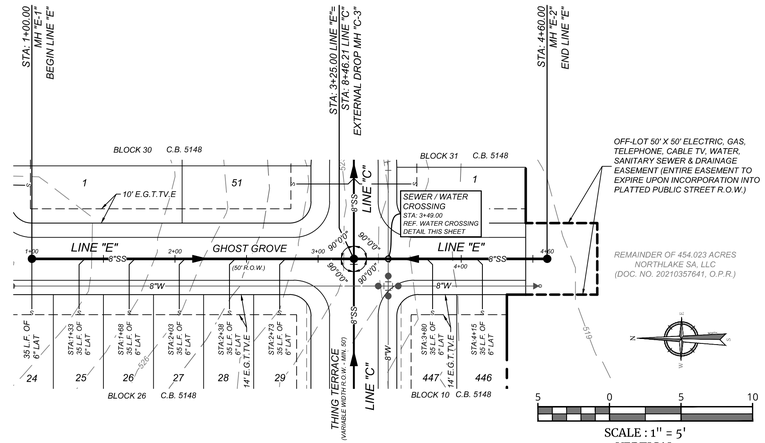
LOWER - EAST SEWERSHED - SALADO CREEK

DEVELOPER'S NAME: LENNAR HOMES OF TEXAS LAND AND CONSTRUCTION, LTD.			
DEVELOPER'S ADDRESS: 100 NE LOOP 410, SUITE 1155			
CITY: SAN ANTONIO	STATE: TEXAS	ZIP: 78216	
PHONE#:	FAX#:	TOTAL ACREAGE: 32.14 ACRES	
SAWS BLOCK MAP#: 210546,212546,212544,212542,212540		TOTAL EDU'S: 234	
TOTAL LINEAR FOOTAGE OF PIPE:	1,133 LF ~ 12" SDR 26 5,707 LF ~ 8" SDR 26	PLAT NO.: 25-11800192	
NUMBER OF LOTS: 234	SAWS JOB#: 25-1558		

LEGEND

RIGHT OF WAY	=	R.O.W.
COUNTY BLOCK	=	C.B.
EXISTING SANITARY SEWER	=	ESS
PROPOSED SANITARY SEWER	=	SS
EXISTING WATER	=	EW
PROPOSED WATER	=	W
ELECTRIC, GAS, TELEPHONE & CABLE TV EASEMENT	=	E.G.T.TV.E
LINEAR FEET	=	LF
LATERAL	=	LAT
VERTICAL STACK	=	VS
VEHICULAR NON ACCESS EASEMENT	=	V.N.A.E.



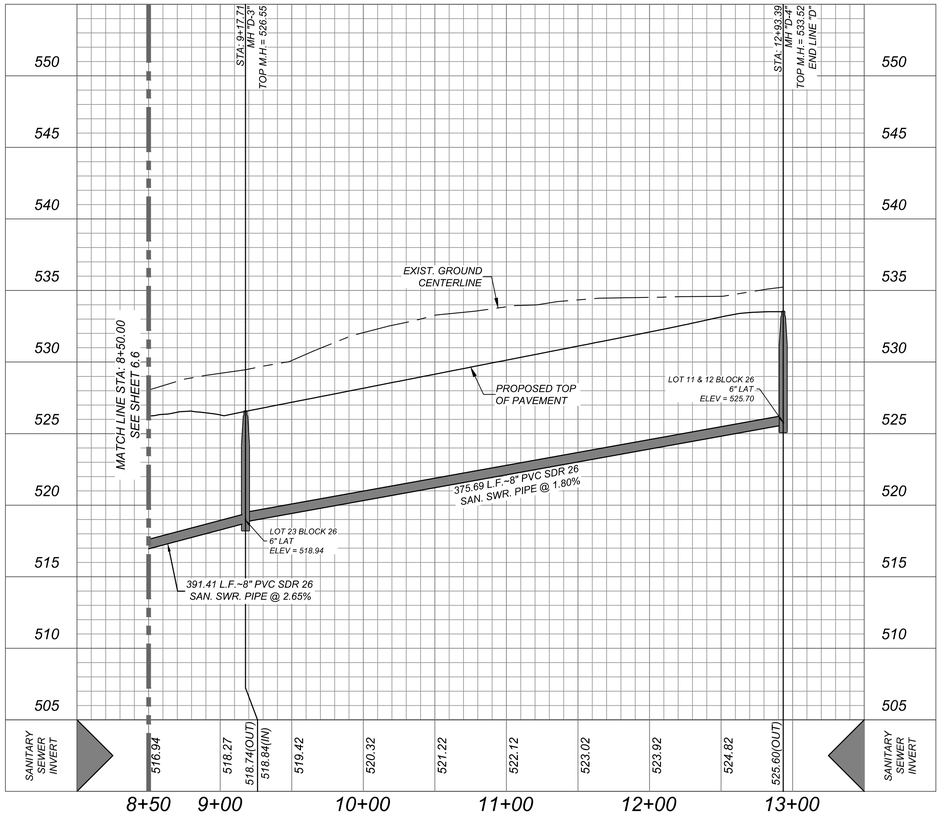


SCALE : 1" = 5'
VERTICAL

SCALE : 1" = 50'
HORIZONTAL

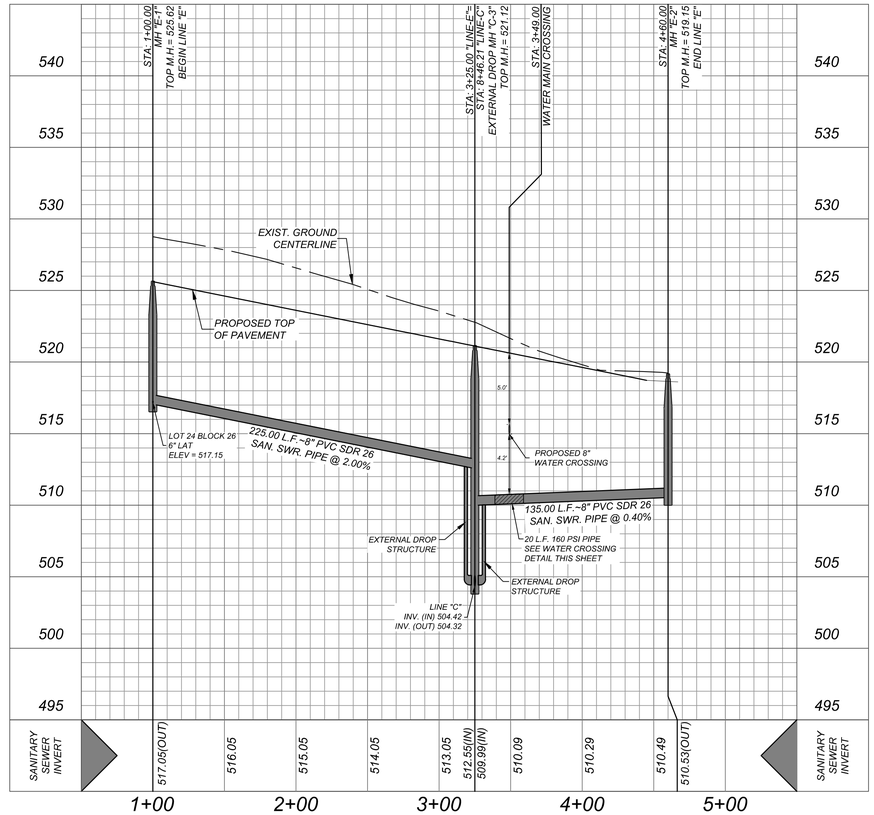
LINE "D"
STA: 8+50.00 - END

HORZ SCALE: 1"=50'
VERT SCALE: 1"=5'



LINE "E"
STA: 1+00.00 - END

SCALE : 1" = 50'
HORIZONTAL



Colliers Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
9/24/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: SSPP3146503

SHEET TITLE: LINE 'D' & 'E' PLAN AND PROFILES

SHEET NUMBER: 6.7

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

I:\RSTWER\SSPP3146503.dwg[6.7 By: ABEL.MONTALVO

TRENCH EXCAVATION SAFETY PROTECTION

CONTRACTOR AND/ OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGNGEOTECHNICAL/SAFETYEQUIPMENT 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.

COMPACTION NOTE:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING 98% COMPACTION ON ALL TRENCH BACKFILL AND PAYING FOR THE TESTS TO BE PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED OR AS INDICATED BY THE SAWS INSPECTOR/TEST ADMINISTRATOR, PER EACH 12 INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. PERMITS AND/OR WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

CAUTION!!:

THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED 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.

NOTE:

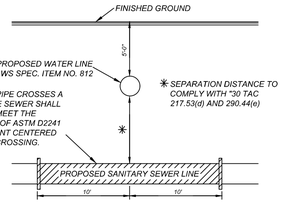
M.H. EXCEEDING 20 FT DEPTH WILL BE SUBJECTED TO GET REVISED WITH FUTURE DEVELOPMENT TO ENSURE SAWS DEPTH CRITERIA IS MET.

NOTES:

1. *SEWER PIPE WHERE WATER LINE CROSSES SHALL BE MEET THE REQUIREMENTS OF ASTM D2241. CONTRACTOR SHALL CENTER A 20 FOOT JOINT OF 160 P.S.I. PRESSURE RATED P.V.C. AT THE PROPOSED WATER CROSSING (NO SEPARATE PAY ITEM). REFERENCE SHEET 6.0, SANITARY SEWER GENERAL NOTES, S.A.W.S. CRITERIA FOR SEWER MAIN CONSTRUCTION IN THE VICINITY OF WATER MAINS.*
2. *PIPE TYPE DESIGNATIONS ARE SDR 26.*
3. *REF. THIS SHEET FOR TYPICAL SANITARY SEWER / WATER CROSSING DETAIL.*
4. *ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT SHALL BE IN ACCORDANCE WITH THE SAN ANTONIO WATER SYSTEM (SAWS) STANDARD SPECIFICATIONS.*

MANHOLE NOTE:

ALL MANHOLES MUST BE WATERTIGHT, WITH WATERTIGHT RINGS AND COVERS. THESE MANHOLES MUST BE VENTED PER SAWS DETAIL DD852-02.



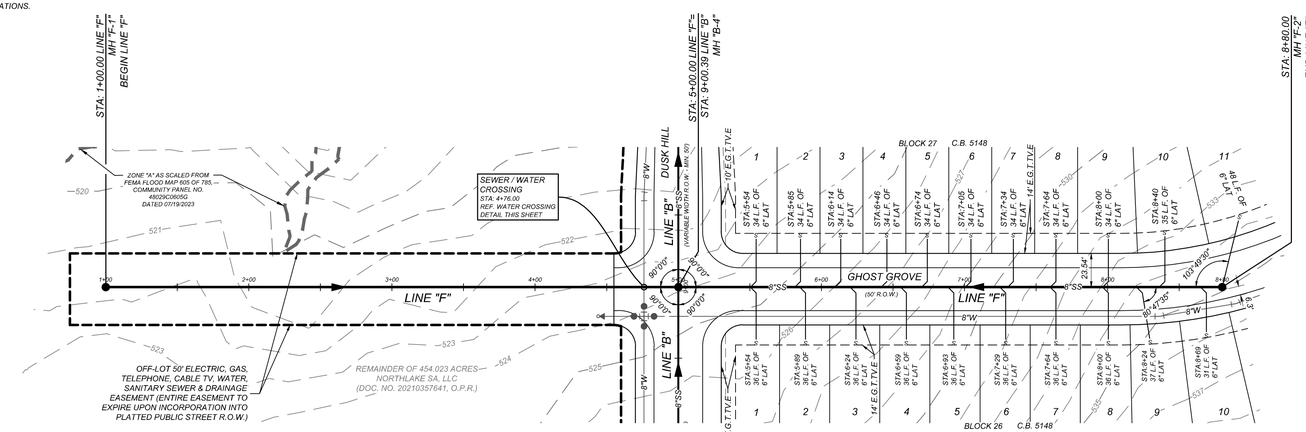
TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
N.T.S.

LOWER - EAST SEWERSHED - SALADO CREEK

DEVELOPER'S NAME: LENNAR HOMES OF TEXAS LAND AND CONSTRUCTION, LTD.			
DEVELOPER'S ADDRESS: 100 NE LOOP 410, SUITE 1155			
CITY: SAN ANTONIO	STATE: TEXAS	ZIP: 78216	
PHONE#:	FAX#:	TOTAL ACREAGE: 32.14 ACRES	
SAWS BLOCK MAP#: 210546,212546,212544,212542,212540		TOTAL EDU'S: 234	
TOTAL LINEAR FOOTAGE OF PIPE:	1,133 LF ~ 12" SDR 26 5,707 LF ~ 8" SDR 26	PLAT NO.: 25-11800192	
NUMBER OF LOTS: 234	SAWS JOB#: 25-1558		

LEGEND

RIGHT OF WAY	=	R.O.W.
COUNTY BLOCK	=	C.B.
EXISTING SANITARY SEWER	=	ESS
PROPOSED SANITARY SEWER	=	SS
EXISTING WATER	=	EW
PROPOSED WATER	=	W
ELECTRIC, GAS, TELEPHONE & CABLE TV EASEMENT	=	E.G.T.TV.E
LINEAR FEET	=	LF
LATERAL	=	LAT
VERTICAL STACK	=	VS
VEHICULAR NON ACCESS EASEMENT	=	V.N.A.E.

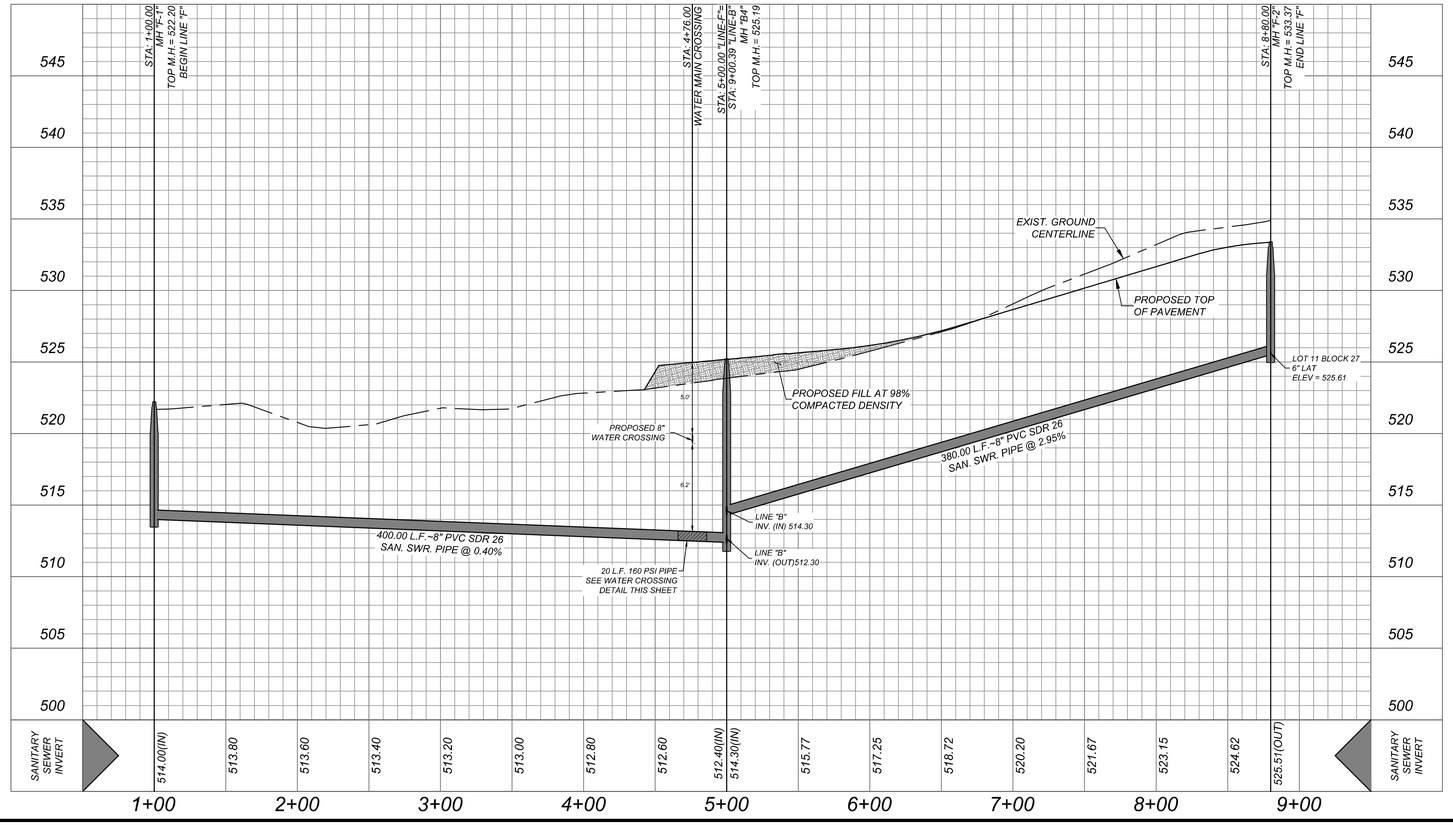




SCALE : 1" = 5'
VERTICAL

SCALE : 1" = 50'
HORIZONTAL

LINE "F"
STA: 1+00.00 - END



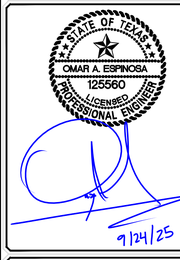
Colliers
Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is to authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, revised, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DESCRIPTION	DRAWN BY	DATE



NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: SSPP3146503

SHEET TITLE: LINE 'F' PLAN AND PROFILES

SHEET NUMBER: 6.8

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

I:\AR\SEWER\SSPP3146503.dwg|6.8 By: SOSEPHI

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.

COMPACTION NOTE:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING 98% COMPACTION ON ALL TRENCH BACKFILL AND PAYING FOR THE TESTS TO BE PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED OR AS INDICATED BY THE SAWS INSPECTOR/TEST ADMINISTRATOR, PER EACH 12 INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. PERMITS AND/OR WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

CAUTION!!:

THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED 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.

NOTE:

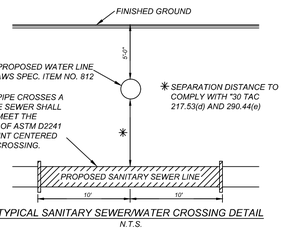
M.H. EXCEEDING 20 FT DEPTH WILL BE SUBJECTED TO GET REVISED WITH FUTURE DEVELOPMENT TO ENSURE SAWS DEPTH CRITERIA IS MET.

MANHOLE NOTE:

ALL MANHOLES MUST BE WATERTIGHT, WITH WATERTIGHT RINGS AND COVERS. THESE MANHOLES MUST BE VENTED PER SAWS DETAIL DD852-02.

NOTES:

1. *SEWER PIPE WHERE WATER LINE CROSSES SHALL BE MEET THE REQUIREMENTS OF ASTM D2241. CONTRACTOR SHALL CENTER A 20 FOOT JOINT OF 160 P.S.I. PRESSURE RATED P.V.C. AT THE PROPOSED WATER CROSSING (NO SEPARATE PAY ITEM). REFERENCE SHEET 6.0, SANITARY SEWER GENERAL NOTES, S.A.W.S. CRITERIA FOR SEWER MAIN CONSTRUCTION IN THE VICINITY OF WATER MAINS.*
2. *PIPE TYPE DESIGNATIONS ARE SDR 26.*
3. *REF. THIS SHEET FOR TYPICAL SANITARY SEWER / WATER CROSSING DETAIL.*
4. *ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT SHALL BE IN ACCORDANCE WITH THE SAN ANTONIO WATER SYSTEM (SAWS) STANDARD SPECIFICATIONS.*



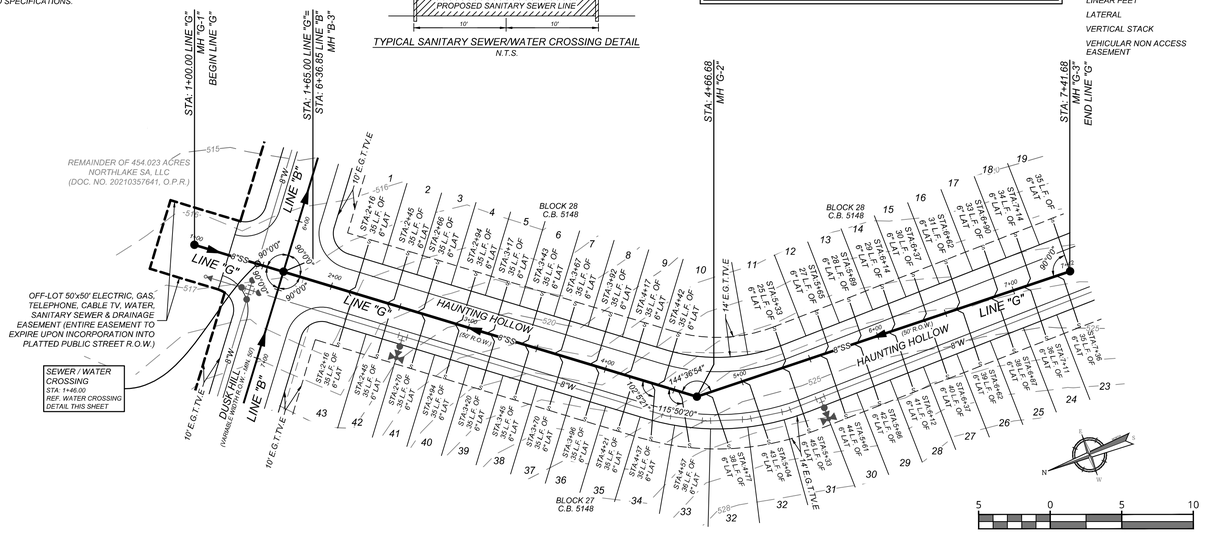
TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
N.T.S.

LOWER - EAST SEWERSHED - SALADO CREEK

DEVELOPER'S NAME: LENNAR HOMES OF TEXAS LAND AND CONSTRUCTION, LTD.			
DEVELOPER'S ADDRESS: 100 NE LOOP 410, SUITE 1155			
CITY: SAN ANTONIO	STATE: TEXAS	ZIP: 78216	
PHONE#:	FAX#:	TOTAL ACREAGE: 32.14 ACRES	
SAWS BLOCK MAP#: 210546,212546,212544,212542,212540		TOTAL EDU'S: 234	
TOTAL LINEAR FOOTAGE OF PIPE:	1,133 LF ~ 12" SDR 26 5,707 LF ~ 8" SDR 26	PLAT NO.: 25-11800192	
NUMBER OF LOTS: 234	SAWS JOB#: 25-1558		

LEGEND

RIGHT OF WAY	=	R.O.W.
COUNTY BLOCK	=	C.B.
EXISTING SANITARY SEWER	=	ESS
PROPOSED SANITARY SEWER	=	SS
EXISTING WATER	=	EW
PROPOSED WATER	=	W
ELECTRIC, GAS, TELEPHONE & CABLE TV EASEMENT	=	E.G.T.TV.E
LINEAR FEET	=	LF
LATERAL	=	LAT
VERTICAL STACK	=	VS
VEHICULAR NON ACCESS EASEMENT	=	V.N.A.E.


STA: 1+00.00 LINE "G"
MH "G-1"
BEGIN LINE "G"
STA: 1+65.00 LINE "G"=
STA: 6+36.85 LINE "B"
MH "B-3"
STA: 4+66.68
MH "G-2"
STA: 7+41.68
MH "G-3"
END LINE "G"
REMAINDER OF 454.023 ACRES
NORTHLAKE SA, LLC
(DOC. NO. 20210357641, O.P.R.)
LINE "B"
LINE "G"
HAUNTING HOLLOW
(VARIABLE WIDTH R.O.W.)
DUSK HILL
(VARIABLE WIDTH R.O.W.)
OFF-LOT 50'x50' ELECTRIC, GAS, TELEPHONE, CABLE TV, WATER, SANITARY SEWER & DRAINAGE EASEMENT (ENTIRE EASEMENT TO EXPIRE UPON INCORPORATION INTO PLATTED PUBLIC STREET R.O.W.)
SEWER / WATER CROSSING
STA: 1+46.00
REF. WATER CROSSING DETAIL THIS SHEET
BLOCK 28
C.B. 5148
BLOCK 27
C.B. 5148
8"W
8"SS
144°36'54"
115°50'20"
90°07'
90°07'
90°07'

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.

COMPACTION NOTE:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING 98% COMPACTION ON ALL TRENCH BACKFILL AND PAYING FOR THE TESTS TO BE PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED OR AS INDICATED BY THE SAWS INSPECTOR/TEST ADMINISTRATOR, PER EACH 12 INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. PERMITS AND/OR WILL NOT BE ACCEPTED AND FINALIZED BY SAWS WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

NOTES:

1. SEWER PIPE WHERE WATER LINE CROSSES SHALL BE MEET THE REQUIREMENTS OF ASTM D2241. CONTRACTOR SHALL CENTER A 20 FOOT JOINT OF 160 P.S.I. PRESSURE RATED P.V.C. AT THE PROPOSED WATER CROSSING (NO SEPARATE PAY ITEM). REFERENCE SHEET 6.0, SANITARY SEWER GENERAL NOTES, S.A.W.S. CRITERIA FOR SEWER MAIN CONSTRUCTION IN THE VICINITY OF WATER MAINS.
2. PIPE TYPE DESIGNATIONS ARE SDR 26.
3. REF. THIS SHEET FOR TYPICAL SANITARY SEWER / WATER CROSSING DETAIL.
4. ALL MATERIALS AND CONSTRUCTION PROCEDURES WITHIN THE SCOPE OF THIS CONTRACT SHALL BE IN ACCORDANCE WITH THE SAN ANTONIO WATER SYSTEM (SAWS) STANDARD SPECIFICATIONS.

CAUTION!!:

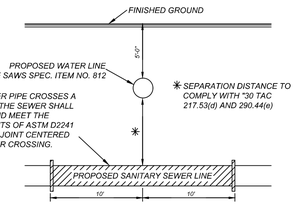
THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCTBANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. ANY UTILITY CONFLICTS THAT 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.

NOTE:

M.H. EXCEEDING 20 FT DEPTH WILL BE SUBJECTED TO GET REVISED WITH FUTURE DEVELOPMENT TO ENSURE SAWS DEPTH CRITERIA IS MET.

MANHOLE NOTE:

ALL MANHOLES MUST BE WATERTIGHT, WITH WATERTIGHT RINGS AND COVERS. THESE MANHOLES MUST BE VENTED PER SAWS DETAIL DD852-02.



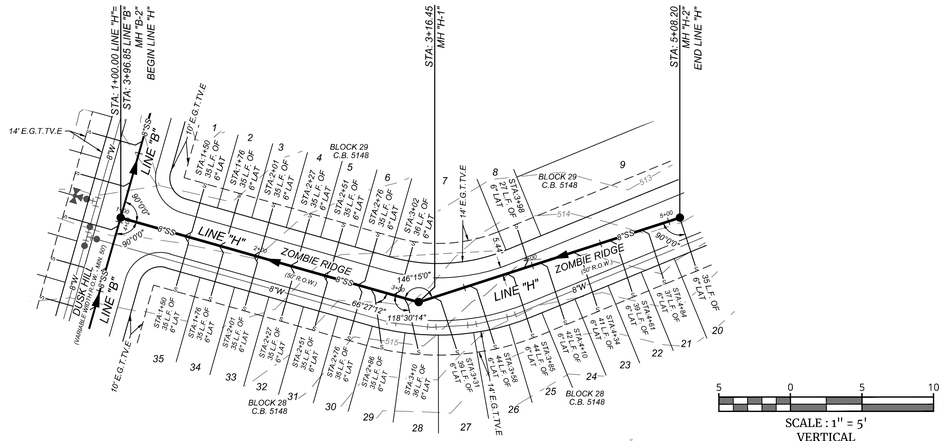
TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
N.T.S.

LOWER - EAST SEWERSHED - SALADO CREEK

DEVELOPER'S NAME: LENNAR HOMES OF TEXAS LAND AND CONSTRUCTION, LTD.			
DEVELOPER'S ADDRESS: 100 NE LOOP 410, SUITE 1155			
CITY: SAN ANTONIO	STATE: TEXAS	ZIP: 78216	
PHONE#:	FAX#:	TOTAL ACREAGE: 32.14 ACRES	
SAWS BLOCK MAP#: 210546,212546,212544,212542,212540		TOTAL EDU'S: 234	
TOTAL LINEAR FOOTAGE OF PIPE:	1,133 LF ~ 12" SDR 26 5,707 LF ~ 8" SDR 26	PLAT NO.: 25-11800192	
NUMBER OF LOTS: 234	SAWS JOB#: 25-1558		

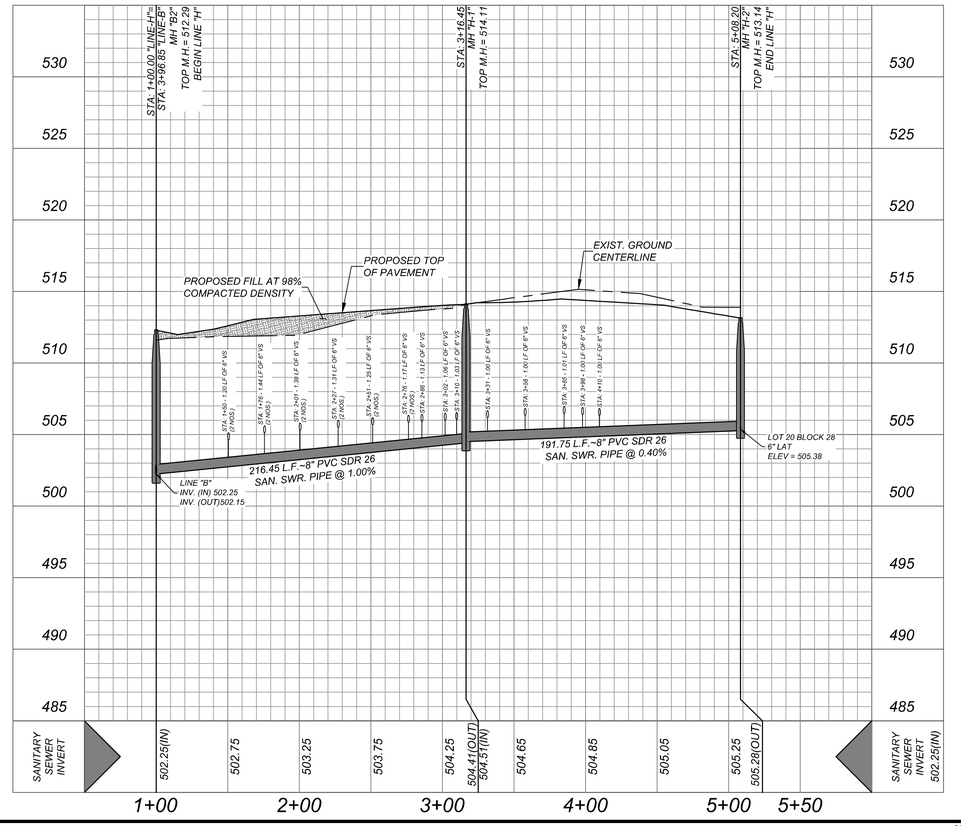
LEGEND

RIGHT OF WAY	=	R.O.W.
COUNTY BLOCK	=	C.B.
EXISTING SANITARY SEWER	=	ESS
PROPOSED SANITARY SEWER	=	SS
EXISTING WATER	=	EW
PROPOSED WATER	=	W
ELECTRIC, GAS, TELEPHONE & CABLE TV EASEMENT	=	E.G.T.TV.E
LINEAR FEET	=	LF
LATERAL	=	LAT
VERTICAL STACK	=	VS
VEHICULAR NON ACCESS EASEMENT	=	V.N.A.E.



LINE "H"

STA: 1+00.00 - END



Colliers Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, revised, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 Texas One Call

PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE

FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DESCRIPTION	DRAWN BY	DATE

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
9/24/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194500

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: SSPP3146503

SHEET TITLE: LINE 'H' PLAN AND PROFILES

SHEET NUMBER: 6.10

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

I:\ARCHIVE\SSPP3146503.dwg[6.10 By: SOSEPH

NORTHLAKE PHASE 2A

BEXAR COUNTY, TEXAS

WATER IMPROVEMENTS

GENERAL NOTES

1. ALL VALVES SHALL REMAIN CLOSED UNTIL MAINS HAVE BEEN DISINFECTED, FLUSHED, AND RELEASED FOR PUBLIC USE BY THE ENGINEER.

2. EXISTING UTILITIES SHOWN ARE TAKEN FROM VARIOUS UTILITY COMPANY RECORDS. CONTRACTORS SHALL VERIFY THE EXACT LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES AND DRAINAGE STRUCTURES, WHETHER SHOWN ON THE PLANS OR NOT, PRIOR TO BEGINNING CONSTRUCTION. CONTRACTORS SHALL BE RESPONSIBLE FOR THE PROTECTION OF EXISTING UTILITIES AND DRAINAGE STRUCTURES DURING CONSTRUCTION.

3. ALL EXCAVATION SHALL BE UNCLASSIFIED REGARDLESS OF MATERIAL ENCOUNTERED.

4. BIDDERS ARE NOTIFIED TO MAKE SUBSURFACE INVESTIGATIONS AS THEY DEEM NECESSARY. NO ADDITIONAL PAYMENT WILL BE MADE FOR WATER, SAND, GRAVEL OR OTHER UNSTABLE CONDITIONS ENCOUNTERED IN EXCAVATIONS.

5. DETOUR OF TRAFFIC AROUND WORK ACTIVITIES, MAINTENANCE OF TRAFFIC CONTROL SIGNS, AND FLAGMEN ARE THE CONTRACTOR'S RESPONSIBILITY. NO SEPARATE PAYMENT WILL BE MADE.

6. THE CONTRACTOR SHALL PROTECT ALL OPEN EXCAVATIONS AND EQUIPMENT FROM CHILDREN, PEDESTRIANS, AND VEHICLES IN THE AREA.

7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE RESTORATION OF ALL FENCES IN THE WORK AREA TO THEIR ORIGINAL CONDITION PRIOR TO COMPLETION OF THE CONTRACT. THIS SHALL APPLY TO ALL FENCES IN THE WORK AREA WHETHER THEY ARE SHOWN ON THE PLANS OR NOT.

8. CONTRACTOR SHALL PRESERVE ALL CONSTRUCTION STAKES, MARKS, ETC. ANY CONSTRUCTION STAKES, MARKS, ETC., DESTROYED OR REMOVED BY THE CONTRACTOR OR HIS EMPLOYEES SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

9. THE CONTRACTOR SHALL CONFER WITH EACH INDIVIDUAL PROPERTY OWNER AS TO THE LOCATION OF EACH INDIVIDUAL METER BOX.

10. CONTRACTOR SHALL DISINFECT ALL NEW WATER MAINS BEFORE TYING INTO EXISTING WATER MAINS.

11. ALL VALVES SHALL BE PERMANENTLY MARKED BY THE USE OF A VALVE MARKER. NO SEPARATE PAY ITEM.

12. CONTRACTOR AND/OR CONTRACTOR'S INDEPENDENTLY RETAINED EMPLOYEE OR STRUCTURAL DESIGN/GEOTECHNICAL/SAFETY/EQUIPMENT CONSULTANT, IF ANY, SHALL REVIEW THESE PLANS AND AVAILABLE GEOTECHNICAL INFORMATION AND THE ANTICIPATED INSTALLATION SITES(S) 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.

13. CONTRACTOR SHALL MAINTAIN FENCING FOR THE CONTAINMENT OF LIVESTOCK DURING CONSTRUCTION. ALL FENCES REMOVED FOR CONSTRUCTION SHALL BE REPLACED. ALL REQUIRED FENCING SHALL BE INCIDENTAL TO CONSTRUCTION AND NOT A SEPARATE PAY ITEM.

14. ALL DRIVEWAYS, INCLUDING DRAIN PIPES, CULVERTS AND HEADWALLS, DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED BY THE CONTRACTOR TO EQUAL OR BETTER THAN PRECONSTRUCTION CONDITION. ASPHALT DRIVES ARE NOT ALLOWED TO BE CUT WITHOUT OWNERS PERMISSION. INSTALLATION OF WATER MAINS CROSSING CONCRETE DRIVES WILL BE BORED. ALL DRAIN PIPE, CULVERT AND HEADWALL REPAIR SHALL BE INCIDENTAL TO CONSTRUCTION AND NOT A SEPARATE PAY ITEM. DRIVEWAY PAVEMENT REPAIR SHALL BE PAID FOR AS PER ITEM NO. 02950, "CUTTING AND PATCHING ASPHALT PAVEMENT, ASPHALT DRIVES, CONCRETE DRIVES, OR GRAVEL ROADS AND DRIVES". PAYMENT FOR BORES UNDER CONCRETE DRIVES DRIVES SHALL BE PAID FOR AS PER ITEM 02445 "BORING AND CASING PIPE UNDER HIGHWAYS, RAILROADS, OR OTHER AREAS".

15. LOCATIONS OF COMBINATION AIR VALVES WHERE SHOWN ON PLANS ARE APPROXIMATE. FINAL LOCATIONS TO BE ADJUSTED IN FIELD AT TIME OF CONSTRUCTION AT THE DIRECTION OF THE ENGINEER.

16. ALL WORK SHALL BE SCHEDULED TO TAKE PLACE ON MONDAY THROUGH FRIDAY, DURING NORMAL WORK HOURS. CONTRACTOR SHALL NOTIFY MWSC 48 HOURS PRIOR TO SERVICE SHUT OFF AFFECTING CUSTOMERS. SERVICE SHALL NOT BE SHUT OFF FOR MORE THAN EIGHT (8) HOURS AT A TIME.

17. THE CONTRACTOR SHALL IMMEDIATELY REPAIR OR REPLACE ANY PHYSICAL DAMAGE TO PROPERTY, INCLUDING, BUT NOT LIMITED TO, FENCES, PAVEMENT, DRIVEWAYS, LAWNS, CULVERTS, AND TREES, AT NO COST TO THE OWNER.

18. THE CONTRACTOR SHALL PROVIDE EROSION CONTROL AT ALL CULVERT, STREAM AND DRAINAGE SWALES CROSSINGS. EROSION CONTROL MEASURES SHALL INCLUDE AS A MINIMUM SILT FENCES. SILT FENCES SHALL BE INSTALLED PRIOR TO DISTURBANCE OF THE WORK AREAS AND SHALL REMAIN IN PLACE UNTIL FINAL STABILIZATION OF THE DISTURBED AREAS UPSTREAM. EROSION CONTROL SHALL BE COORDINATED WITH THE ENGINEER.

19. THE CONTRACTOR SHALL REMOVE AND REPLACE ANY MAILBOXES, TRAFFIC OR ROAD SIGNS ENCOUNTERED. NO SEPARATE PAY ITEM.

20. CONTRACTOR SHALL SUBMIT TO ENGINEER PROPOSED CONSTRUCTION SEQUENCE PRIOR TO BEGINNING CONSTRUCTION.

21. ALL FITTINGS ARE TO BE DUCTILE IRON, MECHANICAL JOINT TYPE, UNLESS OTHERWISE NOTED ON PLANS.

22. ALL THRUST BLOCKS SHALL BE INSPECTED BY OWNER AND/OR ENGINEER PRIOR TO BACKFILLING.

23. ALL EXISTING VALVES SHOWN ON PLANS TO BE ABANDONED, SHALL HAVE BOXES REMOVED AND SHALL BE BACKFILLED ACCORDING TO SPECIFICATIONS. NO SEPARATE PAY ITEM.

24. CONTRACTOR SHALL CONTAIN ALL CONSTRUCTION AND STAGING WITHIN EXISTING UTILITY EASEMENTS, UNLESS OTHER ARRANGEMENTS ARE MADE WITH OWNER AND/OR TxDOT.

25. WHERE THE NEW WATER MAIN SHOWN ON THE PLANS REQUIRES CROSSING AN EXISTING WATER MAIN OR OTHER UTILITY, THE CONTRACTOR SHALL VERTICALLY DEFLECT THE PROPOSED WATER MAIN. DEFLECTION SHALL BE IN ACCORDANCE WITH THE PIPE MANUFACTURE'S RECOMMENDATIONS. FITTINGS ARE NOT PERMISSIBLE, UNLESS OTHERWISE SHOWN ON THE PLANS. NO SEPARATE PAY ITEM.

26. WATER MAINS SHALL BE INSTALLED WITH 48" MINIMUM COVER OVER THE TOP OF THE PIPE AND A MAXIMUM DEPTH OF BURY OF 60", UNLESS OTHERWISE NOTED ON THE PLANS OR DIRECTED BY THE ENGINEER.

27. CONTRACTOR TO PROVIDE POSITIVE DRAINAGE AWAY FROM ALL CONCRETE FOUNDATIONS, VAULT BOXES AND OVERFLOW BOXES THROUGHOUT THE PROJECT SITE.

28. BUY AMERICAN STANDARDS SHALL BE ADHERED TO CONCERNING ALL STEEL OR IRON BASED MATERIALS.

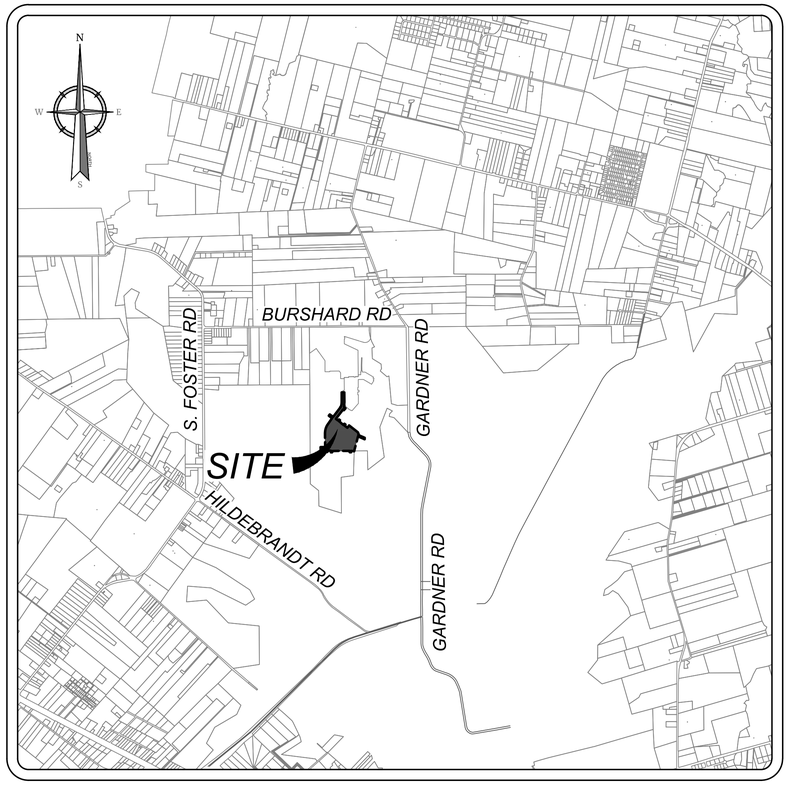
29. ALL GATE VALVES SHALL "OPEN RIGHT".

30. AN AIR RELEASE VALVE SHALL BE INSTALLED AT THE HIGHEST ELEVATION POINT(S) OF THE WATER DISTRIBUTION SYSTEM LOCATED WITHIN A DEVELOPMENT. THE EXACT LOCATION SHALL BE COORDINATED IN THE FIELD AND VERIFIED AGAINST THE FINAL GRADING PLAN. INSTALLATION SHALL BE IN ACCORDANCE WITH THE ECSUD STANDARDS AND THE MANUFACTURER'S RECOMMENDATIONS. PROVIDE A VALVE BOX OR APPROVED ENCLOSURE FOR ACCESS AND MAINTENANCE.

31. A MINIMUM OF ONE (1) WATER SAMPLE STATION SHALL BE INSTALLED WITHIN A DEVELOPMENT TO ALLOW FOR ROUTINE WATER QUALITY MONITORING. THE SAMPLE STATION SHALL BE LOCATED NEAR THE SUBDIVISION ENTRANCE OFF A WATER MAIN IN A PUBLICLY ACCESSIBLE AREA, OR AT A REPRESENTATIVE LOCATION APPROVED BY ECSUD. THE STATION SHALL BE INSTALLED PER ECSUD STANDARDS, MANUFACTURER'S SPECIFICATIONS AND IN COMPLIANCE WITH ALL APPLICABLE HEALTH AND SAFETY REGULATIONS. COORDINATE FINAL LOCATION WITH ECSUD PRIOR TO INSTALLATION. ALL COMPONENTS SHALL BE SUITABLE FOR POTABLE WATER USE, AND THE STATION SHALL BE PROTECTED FROM FREEZING, TAMPERING, AND OTHER ENVIRONMENTAL FACTORS.

32. WHEN INSTALLING A CUT-IN TEE TO TIE INTO AN EXISTING WATER MAIN, MECHANICAL BELL JOINT RESTRAINTS SHALL BE PROVIDED ON ALL ADJACENT EXISTING PIPE JOINTS TO PREVENT SEPARATION DUE TO THRUST FORCES. RESTRAINTS SHALL BE INSTALLED ON A MINIMUM OF ONE FULL LENGTH OF PIPE ON EACH SIDE OF THE NEW TEE, OR AS REQUIRED BY ECSUD STANDARDS. ALL RESTRAINT DEVICES SHALL BE COMPATIBLE WITH THE EXISTING PIPE MATERIAL AND PRESSURE CLASS, AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. COORDINATE WITH ECSUD FOR FINAL APPROVAL OF RESTRAINT TYPE AND EXTENT.

33. ALL CONNECTIONS TO EXISTING WATER MAINS SHALL BE PERFORMED USING THE HIGH TEST HYPOCHLORITE (HTH) METHOD IN ACCORDANCE WITH AWWA C651 DISINFECTION PROCEDURES. THE HTH METHOD SHALL INVOLVE THE APPLICATION OF A CHLORINE SOLUTION DIRECTLY TO ALL INTERIOR SURFACES OF THE NEW FITTINGS, PIPE, AND APPURTENANCES IMMEDIATELY PRIOR TO INSTALLATION. THIS INCLUDES SWABBING OR SPRAYING WITH A MINIMUM 1% CHLORINE SOLUTION. NO OTHER DISINFECTION METHOD WILL BE ACCEPTED FOR TIE-INS. ALL WORK SHALL BE PERFORMED UNDER THE SUPERVISION OF ECSUD AND IN COMPLIANCE WITH THEIR STANDARDS. PROPER FLUSHING AND BACTERIOLOGICAL TESTING SHALL FOLLOW PRIOR TO PLACING THE MAIN INTO SERVICE.



LOCATION MAP

SCALE: NOT-TO-SCALE

OWNER/DEVELOPER:
LENNAR HOMES OF TEXAS LAND AND CONSTRUCTION, LTD
100 NE LOOP 410, SUITE 1155
SAN ANTONIO, TEXAS 78216
(210) 403-6200

SHEET INDEX

SHEET TITLE	SHEET NUMBER
WATER DISTRIBUTION COVER SHEET	7.0
OVERALL WATER PLAN (1 OF 3)	7.1
OVERALL WATER PLAN (2 OF 3)	7.2
OVERALL WATER PLAN (3 OF 3)	7.3
WATER DETAIL SHEET (1 OF 3)	7.4
WATER DETAIL SHEET (2 OF 3)	7.5
WATER DETAIL SHEET (3 OF 3)	7.6

Colliers Engineering & Design

www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE.
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED
PROFESSIONAL ENGINEER
9/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#:F-14809
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

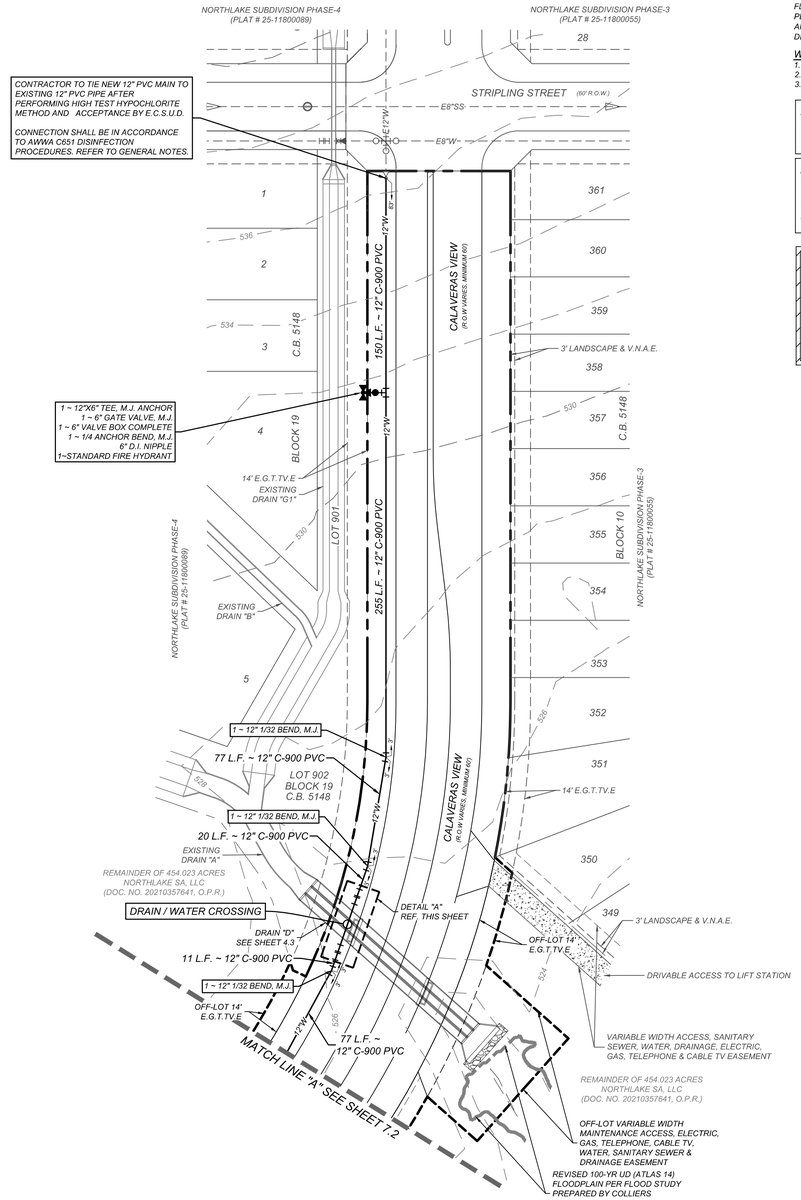
PROJECT NUMBER: 314-65-03
DRAWING NAME: CVOW3146503

SHEET TITLE: WATER DISTRIBUTION COVER SHEET

SHEET NUMBER: 7.0

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

N:\WATER\CVOW3146503.dwg(7.0 By: ABEL.MONTALVO



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.

COMPACTION NOTE:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING 98% COMPACTION ON ALL TRENCH BACKFILL AND PAYING FOR THE TESTS TO BE PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED OR AS INDICATED BY THE E.C.S.U.D. & SAWS INSPECTOR/TEST ADMINISTRATOR, PER EACH 12 INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. PERMITS AND/OR WILL NOT BE ACCEPTED AND FINALIZED BY ECSUD & SARA WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

JOINT RESTRAINT NOTE:

CONTRACTOR SHALL INSTALL RETAINER GLANDS AT ALL FITTINGS AND PROVIDE JOINT RESTRAINING HARNESS 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 ECSUD APPROVED PROGRAMS. THERE WILL BE NO SEPARATE PAY ITEM FOR RETAINER GLANDS AND OTHER JOINT RESTRAINING HARNESS AND GASKETS, BUT SHALL BE SUBSIDIARY TO THE UNIT COST PER LINEAL FOOT OF PIPE INSTALLED.

FIRE FLOW NOTE:

IN AN EFFORT TO MEET THE CITY OF SAN ANTONIO'S FIRE FLOW REQUIREMENTS FOR THE PROPOSED RESIDENTIAL DEVELOPMENT, THE PUBLIC WATER MAIN SYSTEM HAS BEEN DESIGNED FOR A MINIMUM FIRE FLOW DEMAND OF 1,500 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 CITY OF SAN ANTONIO DIRECTOR OF DEVELOPMENT SERVICES DEPARTMENT AND THE SAN ANTONIO FIRE DEPARTMENT FIRE MARSHAL.

WATER PLAN NOTES:

1. *ALL VALVES SHALL READ "OPEN RIGHT"*
2. *ALL PVC PIPE SHALL BE C-900 CLASS 150.*
3. *LONG WATER SERVICES REQUIRE 2" PVC CASING*

NOTE:
PRESSURE REDUCING VALVES TO BE THE RESPONSIBILITY OF THE HOME BUILDER WHERE REQUIRED

NOTE:
CONTRACTOR SHALL COORDINATE WITH EAST CENTRAL SPECIAL UTILITY DISTRICT TO VERIFY THE LOCATION OF ISOLATION VALVES. OPERATION OF ISOLATION VALVES SHALL ONLY BE MADE WITH THE APPROVAL AND PRESENCE OF EAST CENTRAL WATER DISTRICT PERSONNEL

CAUTION!!:
THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED 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.

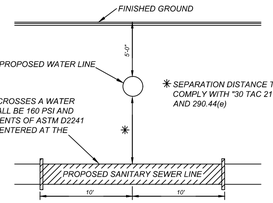
LEGEND

PROPOSED WATER MAIN	=	W
PROPOSED 1" WATER SERVICE WITH 5/8" METER & BOX	=	W
PROPOSED WATER 1" IRRIGATION SERVICE WITH 1" METER & BOX	=	IRR
PROPOSED FIRE HYDRANT	=	
PROPOSED WATER VALVE	=	
PROPOSED SANITARY SEWER MAIN	=	SS
PROPOSED SANITARY SEWER MANHOLE	=	
PROPOSED ELECTRIC, GAS, TELEPHONE & CABLE TV EASEMENT	=	*E.G.T.TV.E*
PROPOSED VEHICULAR NON-ACCESS EASEMENT	=	*V.N.A.E*
PROPOSED CLEAR VISION EASEMENT	=	*C.V.E*
EXISTING WATER MAIN	=	EW
EXISTING FIRE HYDRANT	=	
EXISTING WATER VALVE	=	
EXISTING SANITARY SEWER MAIN	=	ESS
EXISTING SANITARY SEWER MANHOLE	=	
RESTRAINED LENGTH (TOTAL)	=	⊗



LOCATION MAP

SCALE: NOT-TO-SCALE

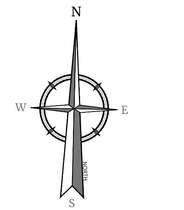


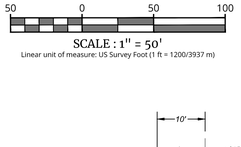
WHERE SEWER PIPE CROSSES A WATER LINE, THE SEWER SHALL BE 160 PSI AND MEET THE REQUIREMENTS OF ASTM D2241 WITH ONE 20' JOINT CENTERED AT THE WATER CROSSING.

✳ *SEPARATION DISTANCE TO COMPLY WITH "30 TAC 217.53(d) AND 290.44(e)*

TYPICAL SANITARY SEWER/WATER CROSSING DETAIL

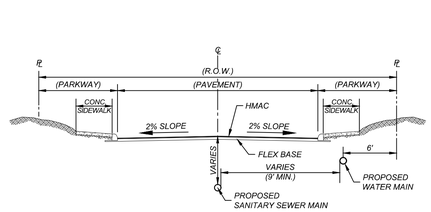
N.T.S.





SCALE : 1'' = 50'

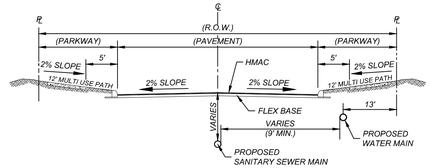
Linear unit of measure: US Survey Foot (1 ft = 1200/3937 m)



TYPE	PAVEMENT WIDTH	PARKWAY WIDTH	SIDEWALK WIDTH
50' R.O.W.	30'	10'	4'
60' R.O.W.	34'	13'	4'

TYPICAL STREET SECTION

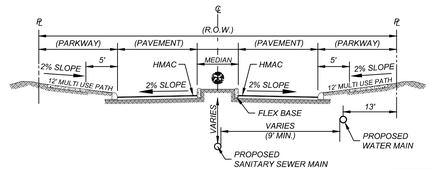
N.T.S.



TYPE	PAVEMENT WIDTH	PARKWAY WIDTH	SIDEWALK WIDTH
80' R.O.W.	34'	23'	12'

COLLECTOR TYPE "C" STREET SECTION

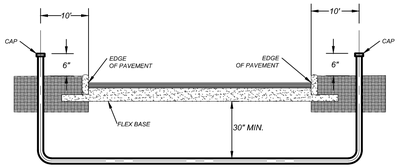
N.T.S.



TYPE	PAVEMENT WIDTH	MEDIAN WIDTH	PARKWAY WIDTH
100' R.O.W.	34' MAX, 22' MIN	16' MAX, 4' MIN	20'

COLLECTOR TYPE "C" STREET SECTION

N.T.S.



TYPICAL CONDUIT DETAIL

N.T.S.

NOTE:
CONTRACTOR SHALL BE RESPONSIBLE FOR PLACING CONDUIT SLEEVES FOR EACH CPS FACILITY AT ALL STREETS AND DRAIN CROSSING 9' BUILT AHEAD OF CPS CONSTRUCTION. SLEEVES MUST ALSO BE LOCATED FOR CPS CREWS DURING CONSTRUCTION. (SEPARATE ITEM) SEE THIS SHEET FOR CONDUIT CROSSING DETAIL AND SCHEDULE.

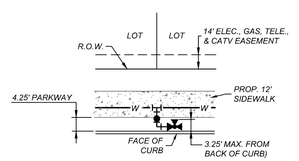
CONDUIT NOTES:

1. CONTRACTOR SHALL INSTALL PERMANENT MARKERS IN PROPOSED CURB WHERE CONDUITS CROSS THE ROADWAY (BOTH SIDES).

2. CONDUITS SHALL BE PVC WITH MINIMUM BURY OF 36 INCHES BELOW PROPOSED FINISHED GRADE. SCHEDULE 80 TO BE USED FOR CPS CONDUITS, ALL OTHER CONDUITS ARE SCHEDULE 40.

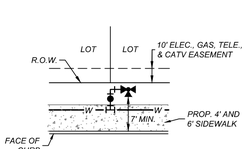
3. ALL CONDUITS SHALL BE EXTENDED BEHIND CURBS OR PROPOSED SIDEWALKS A MINIMUM OF 3 FEET AND CAPPED FOR FUTURE USE.

4. ALL CONDUIT SLEEVES TO BE USED FOR ELECTRIC, GAS, OR TELECOMMUNICATION UTILITY CROSSINGS SHALL BE INSTALLED TO MEET OR EXCEED DESIGN REQUIREMENTS FOR THE UTILITY AGENCY WHICH THEY ARE SERVING, INCLUDING BUT NOT LIMITED TO THE DEPTH, TRENCH PLACEMENT, AND PROXIMITY TO OTHER UTILITIES. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR VERIFYING AND INSTALLING THE CONDUIT SLEEVES TO MEET THESE SPECIFICATIONS INCLUDING COORDINATING WITH THE UTILITY AGENCY FOR ANY REQUIRED INSPECTIONS



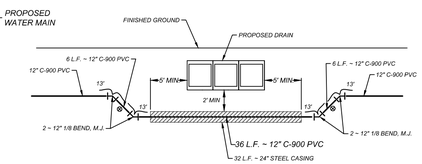
TYPICAL FIRE HYDRANT DETAIL
(CALAVERAS VIEW)

N.T.S.



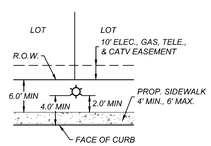
TYPICAL FIRE HYDRANT DETAIL

N.T.S.



DETAIL "A"
VERTICAL OFFSET

N.T.S.



TYPICAL STREETLIGHT DETAIL

N.T.S

Colliers Engineering & Design

www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, revised, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
Texas811.com
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED
PROFESSIONAL ENGINEER
9/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025		OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: OW3146503-PH2A

SHEET TITLE:
OVERALL WATER PLAN
(1 OF 3)

SHEET NUMBER:
7.1

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

%#WATERON\314650\3-PH2A.dwg(7.1 By: ABEL.MONTALVO

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.

COMPACTION NOTE:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING 98% COMPACTION ON ALL TRENCH BACKFILL AND PAYING FOR THE TESTS TO BE PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED OR AS INDICATED BY THE E.C.S.U.D. & SAWS INSPECTOR/TEST ADMINISTRATOR, PER EACH 12 INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. PERMITS AND/OR WILL NOT BE ACCEPTED AND FINALIZED BY ECSUD & SARA WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

JOINT RESTRAINT NOTE:

CONTRACTOR SHALL INSTALL RETAINER GLANDS AT ALL FITTINGS AND PROVIDE JOINT RESTRAINING HARNESS 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 ECSUD APPROVED PROGRAMS. THERE WILL BE NO SEPARATE PAY ITEM FOR RETAINER GLANDS AND OTHER JOINT RESTRAINING HARNESS AND GASKETS, BUT SHALL BE SUBSIDIARY TO THE UNIT COST PER LINEAL FOOT OF PIPE INSTALLED.

FIRE FLOW NOTE:

IN AN EFFORT TO MEET THE CITY OF SAN ANTONIO'S FIRE FLOW REQUIREMENTS FOR THE PROPOSED RESIDENTIAL DEVELOPMENT, THE PUBLIC WATER MAIN SYSTEM HAS BEEN DESIGNED FOR A MINIMUM FIRE FLOW DEMAND OF 1,500 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 CITY OF SAN ANTONIO DIRECTOR OF DEVELOPMENT SERVICES DEPARTMENT AND THE SAN ANTONIO FIRE DEPARTMENT FIRE MARSHAL.

WATER PLAN NOTES:

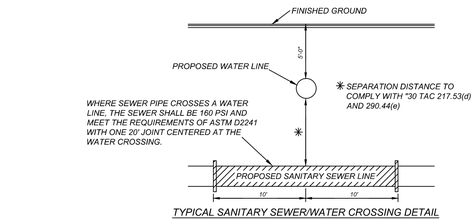
1. *ALL VALVES SHALL READ "OPEN RIGHT"*
2. *ALL PVC PIPE SHALL BE C-900 CLASS 150.*
3. *LONG WATER SERVICES REQUIRE 2" PVC CASING*

NOTE:
PRESSURE REDUCING VALVES TO BE THE RESPONSIBILITY OF THE HOME BUILDER WHERE REQUIRED

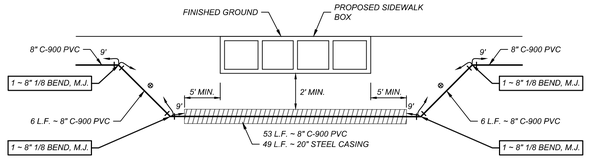
NOTE:
CONTRACTOR SHALL COORDINATE WITH EAST CENTRAL SPECIAL UTILITY DISTRICT TO VERIFY THE LOCATION OF ISOLATION VALVES. OPERATION OF ISOLATION VALVES SHALL ONLY BE MADE WITH THE APPROVAL AND PRESENCE OF EAST CENTRAL WATER DISTRICT PERSONNEL

CAUTION!!:
THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED 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.

REFER SHEET 7.0 FOR STREET SECTION



TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
N.T.S.



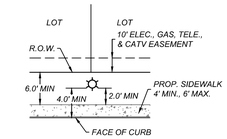
DETAIL "B"
VERTICAL OFFSET
N.T.S.

LEGEND

PROPOSED WATER MAIN	=	W
PROPOSED 1" WATER SERVICE WITH 5/8" METER & BOX	=	W
PROPOSED WATER 1" IRRIGATION SERVICE WITH 1" METER & BOX	=	1"IRR
PROPOSED FIRE HYDRANT	=	
PROPOSED WATER VALVE	=	
PROPOSED SANITARY SEWER MAIN	=	SS
PROPOSED SANITARY SEWER MANHOLE	=	
PROPOSED ELECTRIC, GAS, TELEPHONE & CABLE TV EASEMENT	=	E.G.T.TV.E
PROPOSED VEHICULAR NON-ACCESS EASEMENT	=	V.N.A.E
PROPOSED CLEAR VISION EASEMENT	=	C.V.E
EXISTING WATER MAIN	=	EW
EXISTING FIRE HYDRANT	=	
EXISTING WATER VALVE	=	
EXISTING SANITARY SEWER MAIN	=	ESS
EXISTING SANITARY SEWER MANHOLE	=	
RESTRAINED LENGTH (TOTAL)	=	



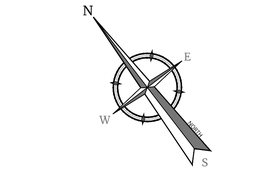
LOCATION MAP
SCALE: NOT-TO-SCALE

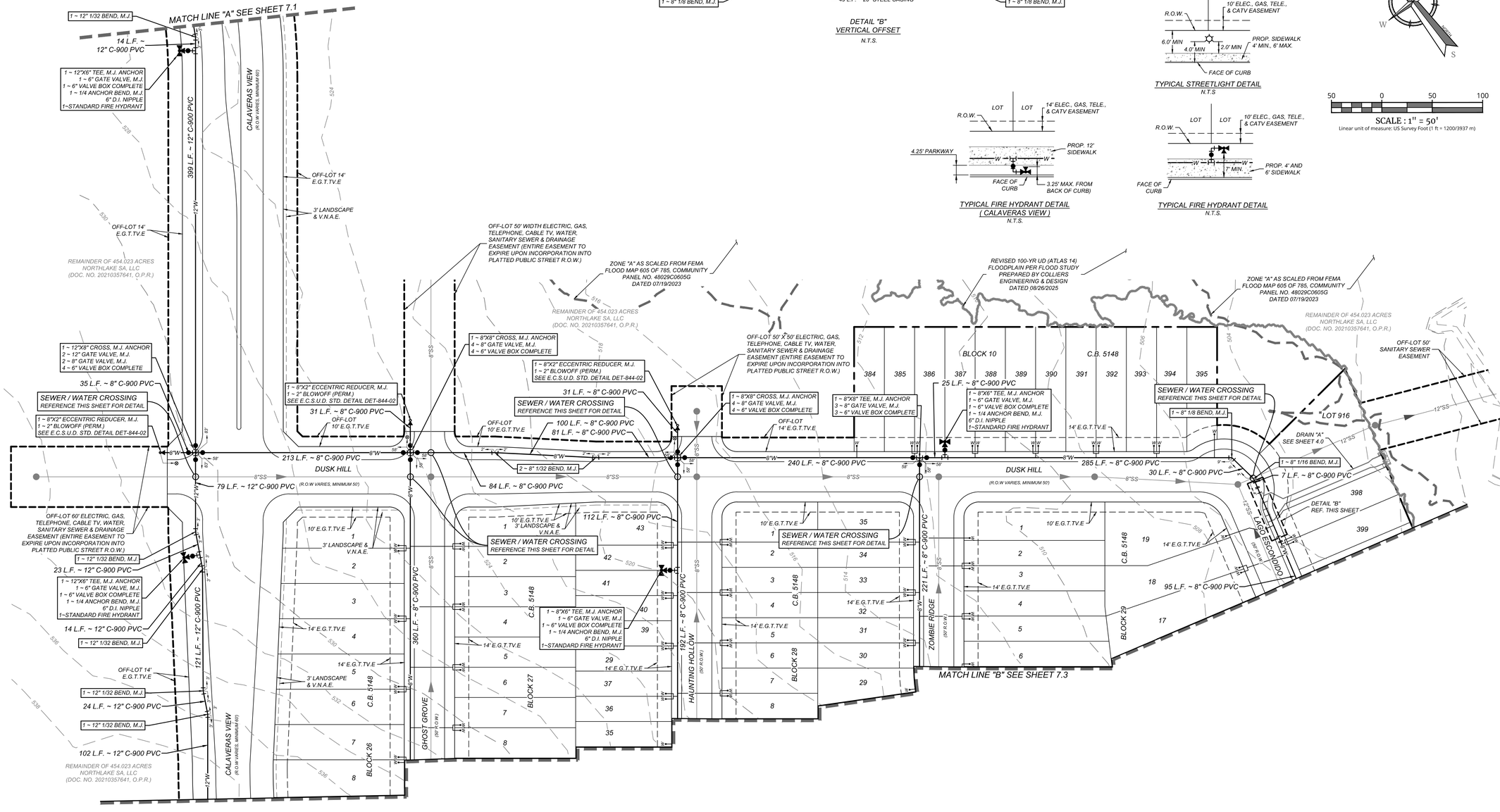


TYPICAL STREETLIGHT DETAIL
N.T.S

TYPICAL FIRE HYDRANT DETAIL
(CALAVERAS VIEW)
N.T.S.

TYPICAL FIRE HYDRANT DETAIL
N.T.S.





Colliers
Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, revised, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DESCRIPTION	DRAWN BY	DATE

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
9/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14959
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: OW3146503-PH2A

SHEET TITLE:
OVERALL WATER PLAN (2 OF 3)

SHEET NUMBER:
7.2

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

I:\WATER\OW3146503-PH2A.dwg7.2 By: ABEL.MONTALVO

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.

COMPACTION NOTE:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MEETING 98% COMPACTION ON ALL TRENCH BACKFILL AND PAYING FOR THE TESTS TO BE PERFORMED BY A THIRD PARTY. COMPACTION TESTS WILL BE DONE AT ONE LOCATION POINT RANDOMLY SELECTED OR AS INDICATED BY THE E.C.S.U.D. & SAWS INSPECTOR/TEST ADMINISTRATOR, PER EACH 12 INCH LOOSE LIFT PER 400 LINEAR FEET AT A MINIMUM. PERMITS AND/OR WILL NOT BE ACCEPTED AND FINALIZED BY ECSUD & SAWA WITHOUT THIS REQUIREMENT BEING MET AND VERIFIED BY PROVIDING ALL NECESSARY DOCUMENTED TEST RESULTS.

JOINT RESTRAINT NOTE:

CONTRACTOR SHALL INSTALL RETAINER GLANDS AT ALL FITTINGS AND PROVIDE JOINT RESTRAINING HARNESS 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 ECSUD APPROVED PROGRAMS. THERE WILL BE NO SEPARATE PAY ITEM FOR RETAINER GLANDS AND OTHER JOINT RESTRAINING HARNESS AND GASKETS, BUT SHALL BE SUBSIDIARY TO THE UNIT COST PER LINEAL FOOT OF PIPE INSTALLED.

FIRE FLOW NOTE:

IN AN EFFORT TO MEET THE CITY OF SAN ANTONIO'S FIRE FLOW REQUIREMENTS FOR THE PROPOSED RESIDENTIAL DEVELOPMENT, THE PUBLIC WATER MAIN SYSTEM HAS BEEN DESIGNED FOR A MINIMUM FIRE FLOW DEMAND OF 1,500 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 CITY OF SAN ANTONIO DIRECTOR OF DEVELOPMENT SERVICES DEPARTMENT AND THE SAN ANTONIO FIRE DEPARTMENT FIRE MARSHAL.

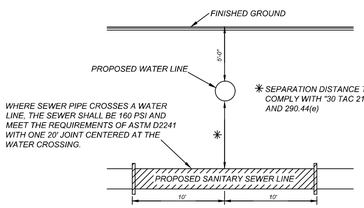
WATER PLAN NOTES:

1. ALL VALVES SHALL READ "OPEN RIGHT"
2. ALL PVC PIPE SHALL BE C-900 CLASS 150.
3. LONG WATER SERVICES REQUIRE 2" PVC CASING

NOTE:
PRESSURE REDUCING VALVES TO BE THE RESPONSIBILITY OF THE HOME BUILDER WHERE REQUIRED

NOTE:
CONTRACTOR SHALL COORDINATE WITH EAST CENTRAL SPECIAL UTILITY DISTRICT TO VERIFY THE LOCATION OF ISOLATION VALVES. OPERATION OF ISOLATION VALVES SHALL ONLY BE MADE WITH THE APPROVAL AND PRESENCE OF EAST CENTRAL WATER DISTRICT PERSONNEL

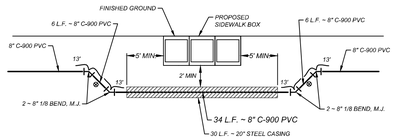
CAUTION!!:
THE CONTRACTOR SHALL BE REQUIRED TO LOCATE ALL PUBLIC OR PRIVATE UTILITIES INCLUDING BUT NOT LIMITED TO: WATER, SEWER, TELEPHONE AND FIBER OPTIC LINES, SITE LIGHTING ELECTRIC, SECONDARY ELECTRIC, PRIMARY ELECTRICAL DUCTBANKS, LANDSCAPE IRRIGATION FACILITIES, AND GAS LINES. ANY UTILITY CONFLICTS 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.



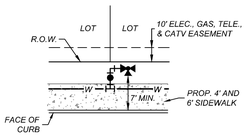
WHERE SEWER PIPE CROSSES A WATER LINE, THE SEWER SHALL BE 160 PSI AND MEET THE REQUIREMENTS OF ASTM D2241 WITH ONE 20' JOINT CENTERED AT THE WATER CROSSING.

TYPICAL SANITARY SEWER/WATER CROSSING DETAIL
N.T.S.

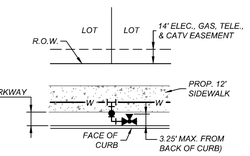
REFER SHEET 7.0 FOR STREET SECTION



DETAIL "C"
VERTICAL OFFSET
N.T.S.



TYPICAL FIRE HYDRANT DETAIL
N.T.S.



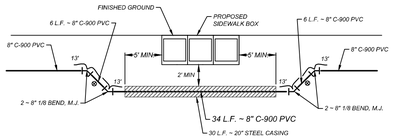
TYPICAL FIRE HYDRANT DETAIL
(CALAVERAS VIEW)
N.T.S.

LEGEND

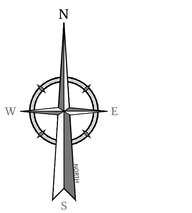
PROPOSED WATER MAIN	=	W
PROPOSED 1" WATER SERVICE WITH 5/8" METER & BOX	=	W
PROPOSED WATER 1" IRRIGATION SERVICE WITH 1" METER & BOX	=	IRRI
PROPOSED FIRE HYDRANT	=	
PROPOSED WATER VALVE	=	
PROPOSED SANITARY SEWER MAIN	=	SS
PROPOSED SANITARY SEWER MANHOLE	=	
PROPOSED ELECTRIC, GAS, TELEPHONE & CABLE TV EASEMENT	=	E.G.T.TV.E
PROPOSED VEHICULAR NON-ACCESS EASEMENT	=	V.N.A.E
PROPOSED CLEAR VISION EASEMENT	=	C.V.E
EXISTING WATER MAIN	=	EW
EXISTING FIRE HYDRANT	=	
EXISTING WATER VALVE	=	
EXISTING SANITARY SEWER MAIN	=	ESS
EXISTING SANITARY SEWER MANHOLE	=	
RESTRAINED LENGTH (TOTAL)	=	⊗

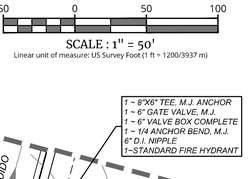


LOCATION MAP
SCALE: NOT-TO-SCALE



DETAIL "D"
VERTICAL OFFSET
N.T.S.





SCALE : 1" = 50'
Linear unit of measure: US Survey Foot (1 ft = 1200/3937 m)

Colliers
Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is to authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DIG/TUNNEL THE EARTH'S SUIFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DESCRIPTION	DRAWN BY



NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#:F-1909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: OW3146503-PH2A

SHEET TITLE:
OVERALL WATER PLAN (3 OF 3)

SHEET NUMBER:
7.3

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

M:\WATER\OW3146503-PH2A.dwg[7.3 By:3DSPH

TESTING OF PRESSURE PIPELINES

1.0 DESCRIPTION

This item shall govern the furnishing of all labor, materials, tools, equipment and related items required to perform hydrostatic testing of Ductile Iron and Polyvinyl Chloride (PVC) pressure pipelines for integrity and leakage.

2.0 MATERIALS

Not applicable.

3.0 CONSTRUCTION METHODS

A. For Ductile Iron Pipe, make hydrostatic pressure and leakage tests on entire pipeline in accordance with AWWA Standard C600-99, Section 5.2.

B. For PVC Pipe, make hydrostatic pressure and leakage tests on entire pipeline in accordance with AWWA Standard C605-94, Section 7.3.

C. Furnish all labor equipment, including test pump with regulated by-pass meters and gauges required for conducting pipeline tests. Furnish equipment and necessary piping as required to transport water used in testing from source to test location.

D. Schedule time and sequence of testing, subject to observation and approval by the Owner or Owner's Representative. Provide adequate labor, tools and equipment to operate valves and to locate and repair leaks discovered during the initial filling of the pipeline prior to actual testing or during the course of the tests.

E. After the pipe has been laid and backfilled and the backfill has been jetted or otherwise consolidated, subject all newly laid pipe or valved section thereof to the hydrostatic pressure specified below for the particular type of pipe. The duration of each pressure test shall be at least four hours, unless otherwise specified or noted on the plans. Disconnect all meters, fixtures, devices or appliances which are connected to the pipeline system and which might be damaged if subjected to the specified test pressure. Cap or plug the ends of the branch lines during the testing procedures.

F. Fill each valved (capped or plugged) section of pipe slowly with water and expel all air. If permanent air vents are not located at all high points, install corporation or blow-of cocks at such points so that the air can be expelled as filling takes place. After verification that all air has been expelled, close the cocks and keep the pipe filled until tested. Examine uncovered pipe, fittings, valves, hydrants and joints while under test pressure. Visible leaks shall be stopped. Remove and replace cracked or defective pipe, fittings, valves or hydrants discovered during testing. Replacement shall be with sound material. Repeat the test until specified requirements are achieved.

G. Where any section of a pipeline is proved with concrete thrust blocking, do not make hydrostatic pressure test until at least five days have elapsed after installation of the blocking.

H. Pressure/Leakage Tests

1. The duration of the hydrostatic test shall be a minimum of four (4) hours.
2. The pipeline shall be tested so that the pressure at the highest point in the test section is not less than 200 psi.
3. The maximum allowable leakage is the number of gallons per hour as determined by the following formulas.

a. For Ductile Iron Pipe:

$$L = \frac{SD\sqrt{P}}{133{,}200}$$

Where:
L = allowable leakage, in gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of the pipe, in inches
P = 200, in psig

b. For PVC Pipe:

$$L = \frac{ND\sqrt{P}}{7{,}400}$$

Where:
L = allowable leakage, in gallons per hour
N= number of joints in the length of pipeline tested
D= nominal diameter of the pipe, in inches
P = 200, in psig

H. Final Acceptance

1. No pipe installation will be accepted until known leaks have been repaired, whether or not leakage is within allowable limits. Locate and repair leaks at no additional cost to the Owner.
2. The Contractor will certify that all required pressure and leakage tests have been successfully completed before the pipeline is accepted.

I. Special Project Requirements

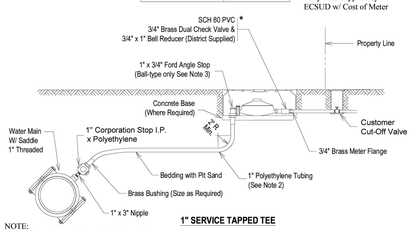
Water Source. Obtaining water for testing purposes shall be the responsibility of the Contractor. The Contractor shall provide all equipment and labor required to transport water from the source to the test point.

4.0 MEASUREMENT AND PAYMENT

No direct measurement or payment will be made for the work to be done or the equipment to be furnished under this item, but shall be considered subsidiary to the particular items of work for which unit prices are required in the proposal.

East Central Stone	TESTING FOR PRESSURE PIPELINES	APPROVED	REVISED
		JULY 2022	
		DET-100-Ø1	SHEET 1 OF 1

PIPE TAPPING SCHEDULE	
PIPE DIAMETER	SERVICE SIZE
	1"
6" A.C.	Tap With Service Saddle
6" C.I. or D.I.	Tap With Service Saddle
8" A.C.	Tap With Service Saddle
8" C.I. or D.I.	Tap With Service Saddle
8" PVC	Tap With Service Saddle
10" A.C.	Tap With Service Saddle
10" C.I. or D.I.	Tap With Service Saddle
10" PVC	Tap With Service Saddle
12" A.C.	Tap With Service Saddle
12" C.I. or D.I.	Tap With Service Saddle
12" PVC	Tap With Service Saddle
16" A.C.	Tap With Service Saddle
16" C.I. or D.I.	Tap With Service Saddle

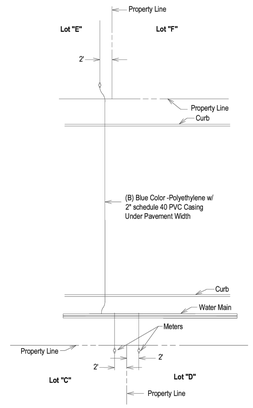


1" SERVICE TAPPED TEE

NOTE:
1. No Direct Tap to Main, Saddle Required
2. Polyethylene Shall be 250 psi Rated - Color Blue
3. FORD Angle Stop BA43-342-WNL
4. Meter Box Shall be DFW 36C
5. 2" HDPE Main Will Use FORD 2" CT's x 1" FIPT Tee (T441-774NL)

FOR PERFERED MANUFACTURERS SEE STANDARD SPECIFICATIONS

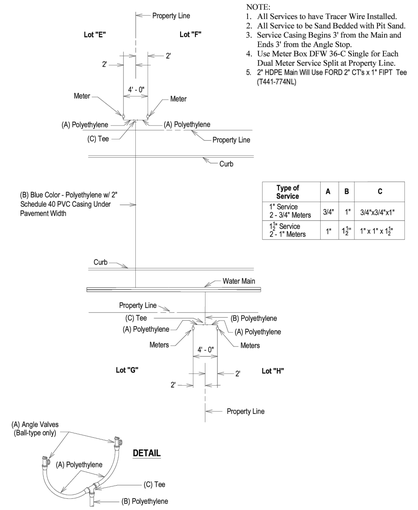
East Central Stone	1" SERVICE INSTALLATION TAPPING SCHEDULE	APPROVED	REVISED
		FEBRUARY 2025	
		DET-824-Ø1	SHEET 1 OF 1



NOTE:
1. All Services to have Tracer Wire Installed.
2. All Service to be Sand Bedded with Pit Sand.
3. Service Casing Begins 3' from the Main and Ends 3' from the Angle Stop.
4. Use Meter Box DFW 36-C for Single Services
5. 2" HDPE Main Will Use FORD 2" CT's x 1" FIPT Tee (T441-774NL)

SINGLE SERVICE LINE - SINGLE METER

East Central Stone	TYPICAL SERVICE ARRANGEMENT	APPROVED	REVISED
		FEBRUARY 2025	
		DET-824-Ø5	SHEET 1 OF 4

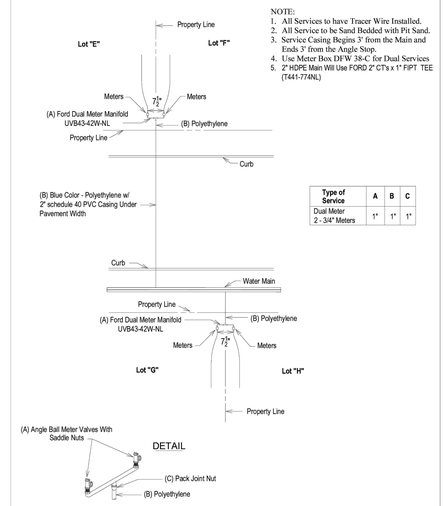


Type of Service	A	B	C
1" Service 2 - 3/4" Meters	3/4"	1"	3/4"x3/4"x1"
1½" Service 2 - 1" Meters	1"	1½"	1" x 1" x 1½"

NOTE:
1. All Services to have Tracer Wire Installed.
2. All Service to be Sand Bedded with Pit Sand.
3. Service Casing Begins 3' from the Main and Ends 3' from the Angle Stop.
4. Use Meter Box DFW 36-C Single for Each Dual Meter Service Split at Property Line.
5. 2" HDPE Main Will Use FORD 2" CT's x 1" FIPT Tee (T441-774NL)

SINGLE SERVICE LINE - DUAL METER

East Central Stone	TYPICAL RURAL SERVICE ARRANGEMENT	APPROVED	REVISED
		FEBRUARY 2025	
		DET-824-Ø5	SHEET 2 OF 4

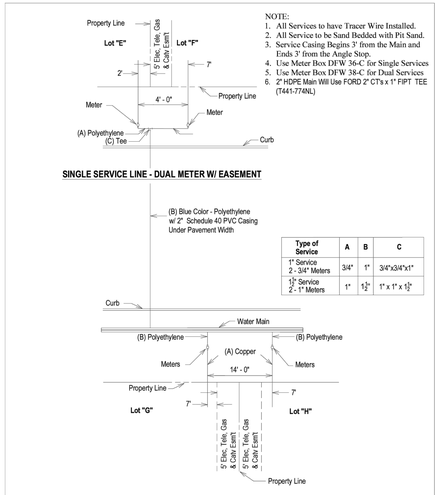


Type of Service	A	B	C
Dual Meter 2 - 3/4" Meters	1"	1"	1"

NOTE:
1. All Services to have Tracer Wire Installed.
2. All Service to be Sand Bedded with Pit Sand.
3. Service Casing Begins 3' from the Main and Ends 3' from the Angle Stop.
4. Use Meter Box DFW 38-C for Dual Services
5. 2" HDPE Main Will Use FORD 2" CT's x 1" FIPT TEE (T441-774NL)

SINGLE SERVICE LINE - DUAL METER

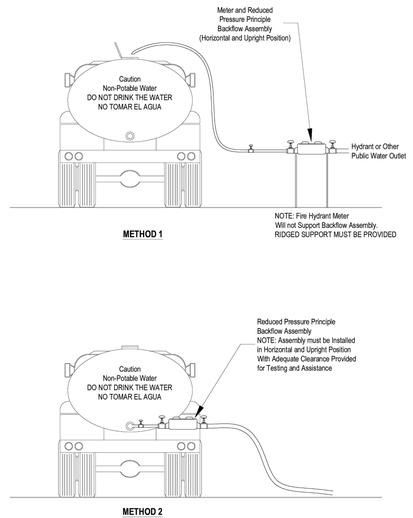
East Central Stone	TYPICAL HIGH DENSITY RESIDENTIAL SERVICE ARRANGEMENT	APPROVED	REVISED
		FEBRUARY 2025	
		DET-824-Ø5	SHEET 3 OF 4



NOTE:
1. All Services to have Tracer Wire Installed.
2. All Service to be Sand Bedded with Pit Sand.
3. Service Casing Begins 3' from the Main and Ends 3' from the Angle Stop.
4. Use Meter Box DFW 36-C for Dual Services
5. 2" HDPE Main Will Use FORD 2" CT's x 1" FIPT TEE (T441-774NL)
6. Single Service Line Will Use FORD 1" CT's x 1" FIPT Tee (T441-774NL)

SINGLE SERVICE LINE W/ EASEMENT

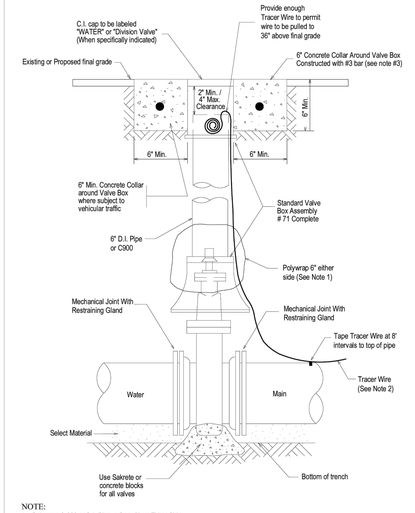
East Central Stone	TYPICAL SERVICE ARRANGEMENT	APPROVED	REVISED
		FEBRUARY 2025	
		DET-824-Ø5	SHEET 4 OF 4



METHOD 1

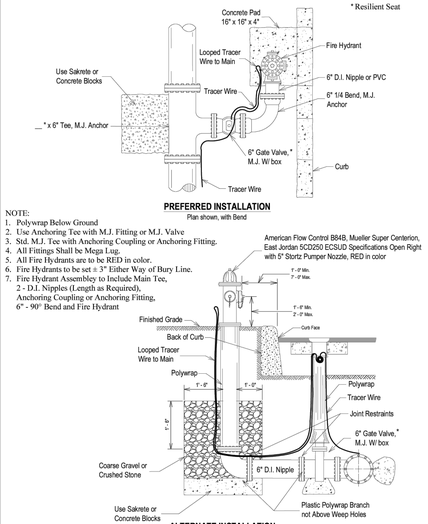
METHOD 2

East Central Stone	BACKFLOW PREVENTION PREVENTION FOR WATER HAULING EQUIPMENT AND/OR MIXING TANKS	APPROVED	REVISED
		FEBRUARY 2025	
		DET-826-Ø1	SHEET 1 OF 1



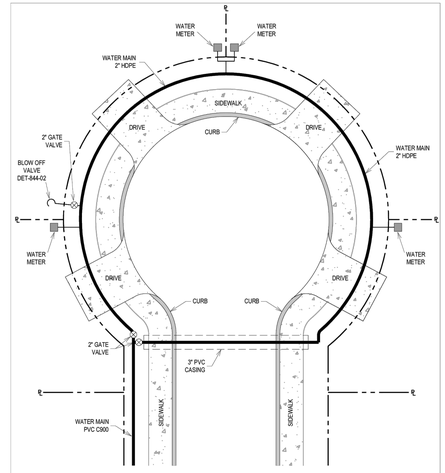
NOTE:
1. Polywrap C-900 or D.I. Pipe to Boot 6" on Either Side.
2. Tracer Wire to be Outside the Pipe Till Valve Box Top Section.
3. Min. 18" Concrete Form Tube Centered Around Valve Box for Concrete Collar W/ #3 Bar.

East Central Stone	INSTALLATION OF NON-GEARED GATE VALVE WITH VALVE BOX AND EXTENSION	APPROVED	REVISED
		JULY 2022	
		DET-828-Ø1	SHEET 1 OF 1



NOTE:
1. Polywrap Below Ground
2. Use Anchoring Tee with M.J. Fitting or M.J. Valve
3. Std. M.J. Tee with Anchoring Coupling or Anchoring Fitting.
4. All Fittings Shall be Mega Lug.
5. All Fire Hydrants are to be RED in color.
6. Fire Hydrants to be set ± 3" Either Way of Bury Line.
7. Fire Hydrant Assembley to Include Main Tee, 2 - D.I. Nipples (Length as Required), Anchoring Coupling or Anchoring Fitting, 6" - 90° Bend and Fire Hydrant

East Central Stone	FIRE HYDRANT INSTALLATION	APPROVED	REVISED
		FEBRUARY 2025	
		DET-834-Ø1	SHEET 1 OF 1



2" HDPE LINE - FOR CUL-DE-SAC'S

NOTE:
1. 2" HDPE Main Will Use FORD 2" CT's x 1" FIPT Tee (T441-774NL)
2. 2" HDPE Main Will Use FORD 2" CT's Tee w/ FIPT Branch (T771-777-AWTNL) for Blow-Off

East Central Stone	TYPICAL CUL-DE-SAC LAYOUT WITH 2" HDPE WATER LINE	APPROVED	REVISED
		JUNE 2025	
		DET-835-Ø1	SHEET 1 OF 1

Colliers Engineering & Design

www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DESCRIPTION	DRAWN BY	DATE

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
9/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: DTOW3146503

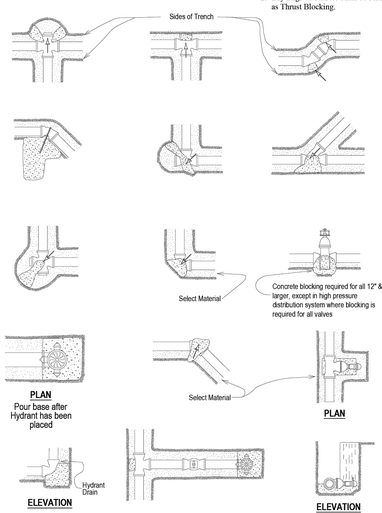
SHEET TITLE: WATER DETAIL SHEET (1 OF 3)

SHEET NUMBER: 7.4

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

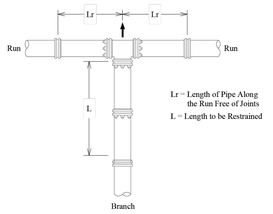
By:ROGELIO.BERBONES
n:\WATER\DTOW\314653.dwg\7.4

NOTE:
1. All Fittings Shall be Mega Lug
2. Dry Bags of Sakrete Shall be Placed as Thrust Blocking.



East Central — THRUST BLOCKS FOR FITTINGS (WATER ONLY)

APPROVED	REVISED
FEBRUARY 2025	
DET-839-Ø1	SHEET 1 OF 1



RESTRAINED LENGTH FOR TEES			
PIPE SIZE (Inch)	BRANCH SIZE (Inch)	LENGTH OF RUN (Feet)	RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE=200 psi
6	4	0	42
6	4	5	7
6	4	10	1
6	6	0	59
6	6	5	35
6	6	10	11
8	4	0	42
8	4	5	1
8	6	0	59
8	6	5	28
8	6	10	1
8	8	0	77
8	8	5	53
8	8	10	30
8	8	15	6

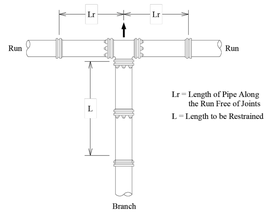
RESTRAINED LENGTH DESIGN

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 Min. and 5 Feet Max.

NOTE:
1. These Calculations are Provided for Reference. The Restrained Length Shall be Designed Based Upon the Conditions Encountered During Installation.
2. All joints within the calculated length must be restrained.
3. If your distance between fittings is less than or equal to the calculated restraint length, restrain all joints between those fittings.
4. When a valve is added see DET-893-03 for restrained length from a valve.

East Central — RESTRAINED LENGTHS FOR TEES INSTALLED ON 6" TO 8" MAINS

APPROVED	REVISED
FEBRUARY 2025	
DET-839-02	SHEET 1 OF 4



RESTRAINED LENGTH FOR TEES			
PIPE SIZE (Inch)	BRANCH SIZE (Inch)	LENGTH OF RUN (Feet)	RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE=200 psi
12	4	0	42
12	4	5	1
12	6	0	59
12	6	5	13
12	6	10	1
12	8	0	77
12	8	5	42
12	8	10	7
12	8	15	1
12	12	0	109
12	12	5	86
12	12	10	63
12	12	15	39

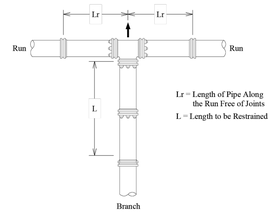
RESTRAINED LENGTH DESIGN

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 Min. and 5 Feet Max.

NOTE:
1. These Calculations are Provided for Reference. The Restrained Length Shall be Designed Based Upon the Conditions Encountered During Installation.
2. All joints within the calculated length must be restrained.
3. If your distance between fittings is less than or equal to the calculated restraint length, restrain all joints between those fittings.
4. When a valve is added see DET-893-03 for restrained length from a valve.

East Central — RESTRAINED LENGTHS FOR TEES INSTALLED ON 12" MAINS

APPROVED	REVISED
FEBRUARY 2025	
DET-839-02	SHEET 2 OF 4



RESTRAINED LENGTH FOR TEES			
PIPE SIZE (Inch)	BRANCH SIZE (Inch)	LENGTH OF RUN (Feet)	RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE=200 psi
16	6	0	50
16	6	5	2
16	6	10	1
16	6	15	1
16	8	0	64
16	8	5	28
16	8	10	1
16	8	15	1
16	12	0	94
16	12	5	69
16	12	10	45
16	12	15	21
16	16	0	117
16	16	5	97
16	16	10	78
16	16	15	59

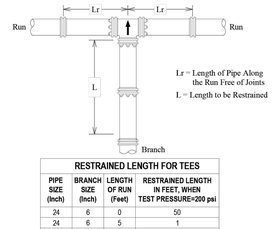
RESTRAINED LENGTH DESIGN

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 Min. and 5 Feet Max.

NOTE:
1. These Calculations are Provided for Reference. The Restrained Length Shall be Designed Based Upon the Conditions Encountered During Installation.
2. All joints within the calculated length must be restrained.
3. If your distance between fittings is less than or equal to the calculated restraint length, restrain all joints between those fittings.
4. When a valve is added see DET-893-03 for restrained length from a valve.

East Central — RESTRAINED LENGTHS FOR TEES INSTALLED ON 16" MAINS

APPROVED	REVISED
FEBRUARY 2025	
DET-839-02	SHEET 3 OF 4



RESTRAINED LENGTH FOR TEES			
PIPE SIZE (Inch)	BRANCH SIZE (Inch)	LENGTH OF RUN (Feet)	RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE=200 psi
24	6	0	50
24	6	5	1
24	6	10	1
24	6	15	1
24	8	0	64
24	8	5	7
24	8	10	1
24	8	15	1
24	12	0	94
24	12	5	56
24	12	10	18
24	12	15	1
24	16	0	117
24	16	5	87
24	16	10	57
24	16	15	27
24	20	0	145
24	20	5	121
24	20	10	97
24	20	15	73
24	24	0	172
24	24	5	152
24	24	10	133
24	24	15	113

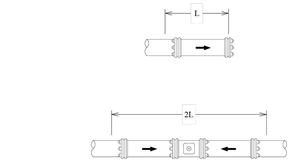
RESTRAINED LENGTH DESIGN

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 Min. and 5 feet Max.

NOTE:
1. These Calculations are Provided for Reference. The Restrained Length Shall be Designed Based Upon the Conditions Encountered During Installation.
2. All joints within the calculated length must be restrained.
3. If your distance between fittings is less than or equal to the calculated restraint length, restrain all joints between those fittings.
4. When a valve is added see DET-893-03 for restrained length from a valve.

East Central — RESTRAINED LENGTHS FOR TEES INSTALLED ON 24" MAINS

APPROVED	REVISED
FEBRUARY 2025	
DET-839-02	SHEET 4 OF 4



L = Length to be Restrained

PIPE SIZE (Inch)	RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE=200 psi
6	59
8	77
10	93
12	109
16	117
20	145
24	172

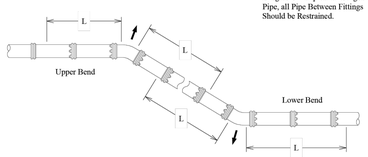
RESTRAINED LENGTH DESIGN

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 Min. and 5 feet Max.

NOTE:
1. These Calculations are Provided for Reference. The Restrained Length Shall be Designed Based Upon the Conditions Encountered During Installation.
2. All joints within the calculated length must be restrained.
3. If your distance between fittings is less than or equal to the calculated restraint length, restrain all joints between those fittings.

East Central — RESTRAINED LENGTHS FOR DEAD ENDS / INLINE VALVES ON 6" THRU 24" MAINS

APPROVED	REVISED
FEBRUARY 2025	
DET-839-03	SHEET 1 OF 1



L = Length to be Restrained on Both Sides of Fitting. When Restrained Lengths Overlap on the Diagonal Pipe, all Pipe Between Fittings Should be Restrained.

PIPE SIZE (Inch)	BEND ANGLE (deg.)	LOW SIDE DEPTH	UPPER BEND RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE=200 psi	LOWER BEND RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE=200 psi
6	45	5	24	8
6	22.5	5	12	4
6	11.25	5	6	2
6	45	10	24	5
6	22.5	10	12	2
6	11.25	10	6	1
8	45	5	32	11
8	22.5	5	15	5
8	11.25	5	8	3
8	45	10	32	7
8	22.5	10	15	3
8	11.25	10	8	2
12	45	5	45	16
12	22.5	5	22	7
12	11.25	5	11	4
12	45	10	45	10
12	22.5	10	22	5
12	11.25	10	11	2

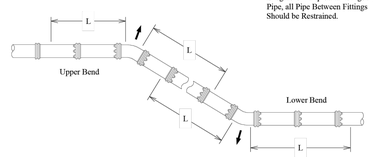
RESTRAINED LENGTH DESIGN

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 Min. and 5 feet Max.

NOTE:
1. These Calculations are Provided for Reference. The Restrained Length Shall be Designed Based Upon the Conditions Encountered During Installation.
2. All joints within the calculated length must be restrained.
3. If your distance between fittings is less than or equal to the calculated restraint length, restrain all joints between those fittings.
4. When a valve is added see DET-893-03 for restrained length from a valve.

East Central — RESTRAINED LENGTHS VERTICAL OFFSETS INSTALLED ON 6" THRU 12" MAINS

APPROVED	REVISED
FEBRUARY 2025	
DET-839-04	SHEET 1 OF 2



L = Length to be Restrained on Both Sides of Fitting. When Restrained Lengths Overlap on the Diagonal Pipe, all Pipe Between Fittings Should be Restrained.

PIPE SIZE (Inch)	BEND ANGLE (deg.)	LOW SIDE DEPTH	UPPER BEND RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE=200 psi	LOWER BEND RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE=200 psi
16	45	5	70	22
16	22.5	5	34	11
16	11.25	5	17	6
16	45	10	70	14
16	22.5	10	34	7
16	11.25	10	17	4
24	45	5	102	32
24	22.5	5	49	16
24	11.25	5	25	8
24	45	10	102	21
24	22.5	10	49	10
24	11.25	10	25	5

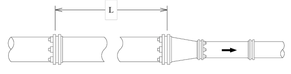
RESTRAINED LENGTH DESIGN

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 Min. and 5 feet Max.

NOTE:
1. These Calculations are Provided for Reference. The Restrained Length Shall be Designed Based Upon the Conditions Encountered During Installation.
2. All joints within the calculated length must be restrained.
3. If your distance between fittings is less than or equal to the calculated restraint length, restrain all joints between those fittings.
4. When a valve is added see DET-893-03 for restrained length from a valve.

East Central — RESTRAINED LENGTHS VERTICAL OFFSETS INSTALLED ON 16" THRU 24" MAINS

APPROVED	REVISED
FEBRUARY 2025	
DET-839-04	SHEET 2 OF 2



L = Length to be Restrained

PIPE SIZE (Inch)	SMALL SIZE (Inch)	RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE=200 psi
6	4	30
8	4	55
8	6	32
12	4	95
12	6	80
12	8	58
16	6	97
16	8	83
16	12	43
24	6	159
24	8	150
24	12	124
24	16	96
24	20	53

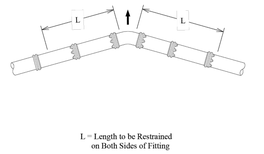
RESTRAINED LENGTH DESIGN

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 Min. and 5 feet Max.

NOTE:
1. These Calculations are Provided for Reference. The Restrained Length Shall be Designed Based Upon the Conditions Encountered During Installation.
2. All joints within the calculated length must be restrained.
3. If your distance between fittings is less than or equal to the calculated restraint length, restrain all joints between those fittings.
4. When a valve is added see DET-893-03 for restrained length from a valve.

East Central — RESTRAINED LENGTHS FOR REDUCERS ON 6" THRU 24" MAINS

APPROVED	REVISED
FEBRUARY 2025	
DET-839-05	SHEET 1 OF 1



L = Length to be Restrained on Both Sides of Fitting

PIPE SIZE (Inch)	BEND ANGLE (deg)	RESTRAINED LENGTH IN FEET, WHEN TEST PRESSURE=200 psi
6	90	23
6	45	9
6	22.5	5
6	11.25	2
8	90	30
8	45	12
8	22.5	6
8	11.25	3
12	90	43
12	45	18
12	22.5	8
12	11.25	4
16	90	59
16	45	25
16	22.5	12
16	11.25	6
24	90	86
24	45	36
24	22.5	17
24	11.25	9

RESTRAINED LENGTH DESIGN

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 Min. and 5 feet Max.

NOTE:
1. These Calculations are Provided for Reference. The Restrained Length Shall be Designed Based Upon the Conditions Encountered During Installation.
2. All joints within the calculated length must be restrained.
3. If your distance between fittings is less than or equal to the calculated restraint length, restrain all joints between those fittings.
4. When a valve is added see DET-893-03 for restrained length from a valve.

East Central — RESTRAINED LENGTHS FOR HORIZONTAL BENDS ON 6" THRU 24" MAINS

APPROVED	REVISED
FEBRUARY 2025	
DET-839-06	SHEET 1 OF 1

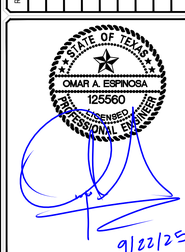
Colliers Engineering & Design
www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION



NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

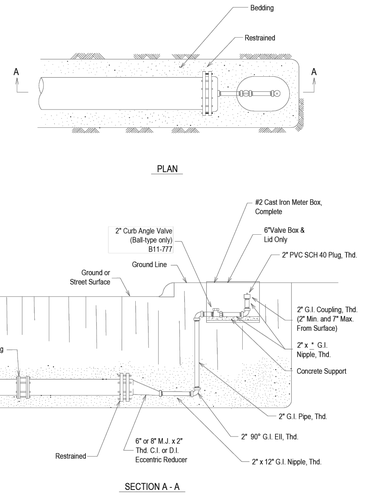
PROJECT NUMBER:	DRAWING NAME:
314-65-03	DTOW3146503

SHEET TITLE:
WATER DETAIL SHEET (2 OF 3)

SHEET NUMBER:
7.5

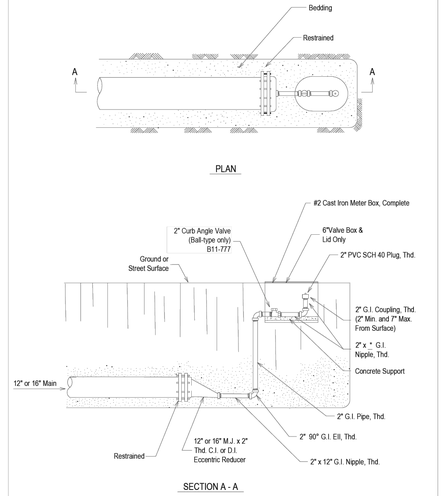
NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

By:ROGELIO.BERRONES
n:\WATERDOT\0314\65\03.dwg7.5



2" PERMANENT BLOW-OFF ASSEMBLY ON 6" AND 8" MAINS

APPROVED	REVISED
JANUARY 2025	JULY 2025
DET-844-02	SHEET 1 OF 2



2" PERMANENT BLOW-OFF ASSEMBLY ON 12" AND 16" MAINS

APPROVED	REVISED
JANUARY 2025	JULY 2025
DET-844-02	SHEET 2 OF 2

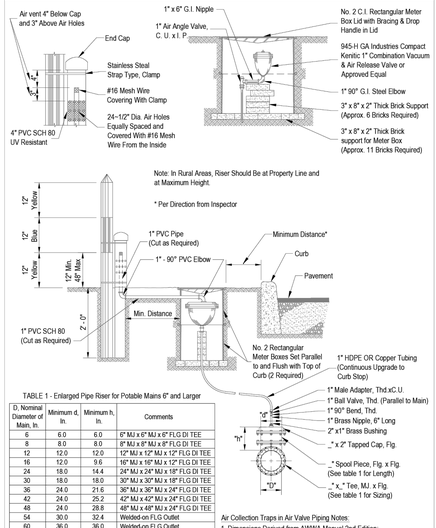


TABLE 1 - Enlarged Pipe Riser for Potable Mains 6" and Larger

D, Nominal Diameter of Main, In.	Minimum d, In.	Minimum h, In.	Comments
6	6.0	6.0	6" MJ x 6" MJ x 6" FLG DI TEE
8	8.0	8.0	8" MJ x 8" MJ x 8" FLG DI TEE
12	12.0	12.0	12" MJ x 12" MJ x 12" FLG DI TEE
16	12.0	9.6	16" MJ x 16" MJ x 12" FLG DI TEE
24	18.0	14.4	24" MJ x 24" MJ x 18" FLG DI TEE
30	18.0	18.0	30" MJ x 30" MJ x 18" FLG DI TEE
36	24.0	21.6	36" MJ x 36" MJ x 24" FLG DI TEE
42	24.0	25.2	42" MJ x 42" MJ x 24" FLG DI TEE
48	24.0	28.8	48" MJ x 48" MJ x 24" FLG DI TEE
54	30.0	32.4	Welded-on FLG Outlet
60	36.0	36.0	Welded-on FLG Outlet
66	24.0	23.1	Welded-on FLG Outlet
72	24.0	25.2	Welded-on FLG Outlet

INSTALLATION OF 1" AIR RELEASE VALVE

APPROVED	REVISED
FEBRUARY 2025	
DET-846-Ø1	SHEET 1 OF 1

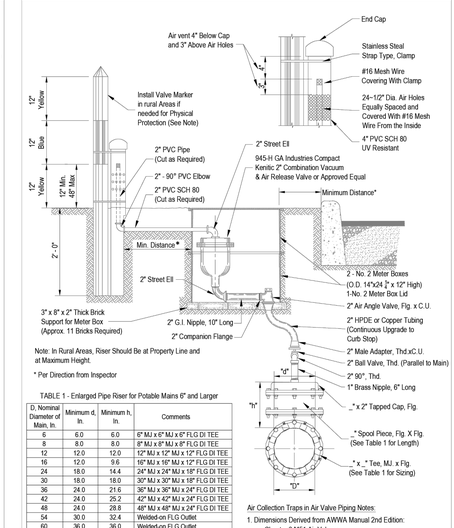
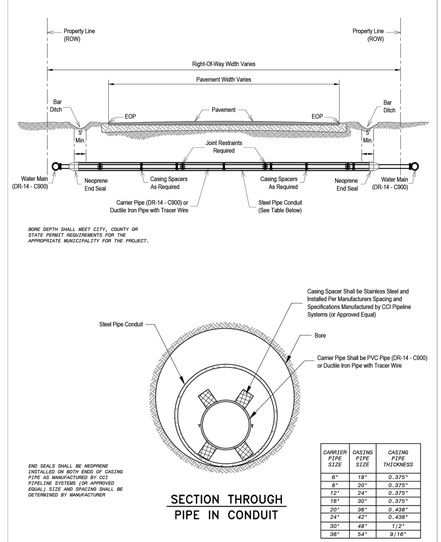


TABLE 1 - Enlarged Pipe Riser for Potable Mains 6" and Larger

D, Nominal Diameter of Main, In.	Minimum d, In.	Minimum h, In.	Comments
6	6.0	6.0	6" MJ x 6" MJ x 6" FLG DI TEE
8	8.0	8.0	8" MJ x 8" MJ x 8" FLG DI TEE
12	12.0	12.0	12" MJ x 12" MJ x 12" FLG DI TEE
16	12.0	9.6	16" MJ x 16" MJ x 12" FLG DI TEE
24	18.0	14.4	24" MJ x 24" MJ x 18" FLG DI TEE
30	18.0	18.0	30" MJ x 30" MJ x 18" FLG DI TEE
36	24.0	21.6	36" MJ x 36" MJ x 24" FLG DI TEE
42	24.0	25.2	42" MJ x 42" MJ x 24" FLG DI TEE
48	24.0	28.8	48" MJ x 48" MJ x 24" FLG DI TEE
54	30.0	32.4	Welded-on FLG Outlet
60	36.0	36.0	Welded-on FLG Outlet
66	24.0	23.1	Welded-on FLG Outlet
72	24.0	25.2	Welded-on FLG Outlet

INSTALLATION OF 2" AIR RELEASE VALVE

APPROVED	REVISED
FEBRUARY 2025	
DET-846-Ø2	SHEET 1 OF 1

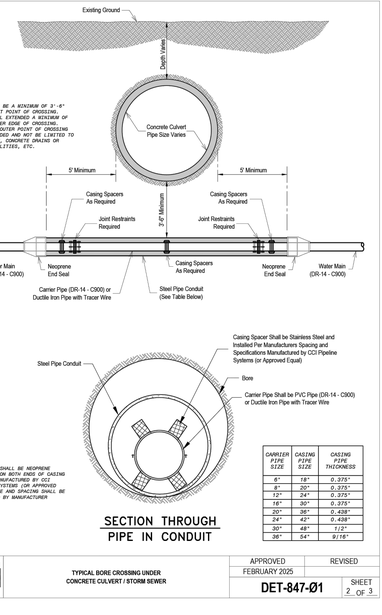


CARRIER PIPE SIZE	CASING PIPE SIZE	CASING PIPE THICKNESS
6"	18"	0.375"
8"	20"	0.375"
12"	24"	0.375"
16"	30"	0.375"
20"	36"	0.438"
24"	42"	0.438"
30"	48"	1/2"
36"	54"	9/16"

SECTION THROUGH PIPE IN CONDUIT

TYPICAL ROAD BORE DETAIL

APPROVED	REVISED
FEBRUARY 2025	
DET-847-Ø1	SHEET 1 OF 3

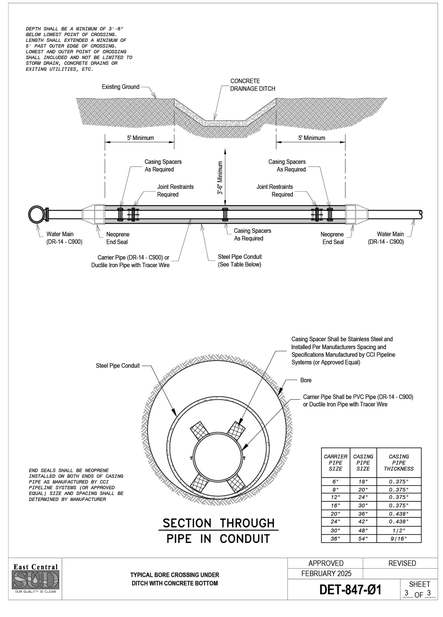


CARRIER PIPE SIZE	CASING PIPE SIZE	CASING PIPE THICKNESS
6"	18"	0.375"
8"	20"	0.375"
12"	24"	0.375"
16"	30"	0.375"
20"	36"	0.438"
24"	42"	0.438"
30"	48"	1/2"
36"	54"	9/16"

SECTION THROUGH PIPE IN CONDUIT

TYPICAL BORE CROSSING UNDER CONCRETE CULVERT / STORM SEWER

APPROVED	REVISED
FEBRUARY 2025	
DET-847-Ø1	SHEET 2 OF 3

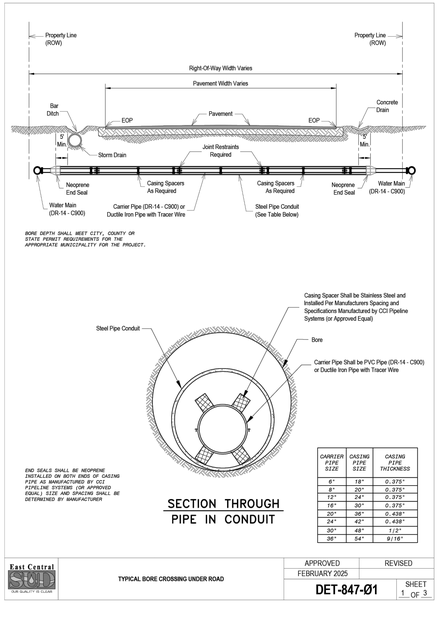


CARRIER PIPE SIZE	CASING PIPE SIZE	CASING PIPE THICKNESS
6"	18"	0.375"
8"	20"	0.375"
12"	24"	0.375"
16"	30"	0.375"
20"	36"	0.438"
24"	42"	0.438"
30"	48"	1/2"
36"	54"	9/16"

SECTION THROUGH PIPE IN CONDUIT

TYPICAL BORE CROSSING UNDER DITCH WITH CONCRETE BOTTOM

APPROVED	REVISED
FEBRUARY 2025	
DET-847-Ø1	SHEET 3 OF 3

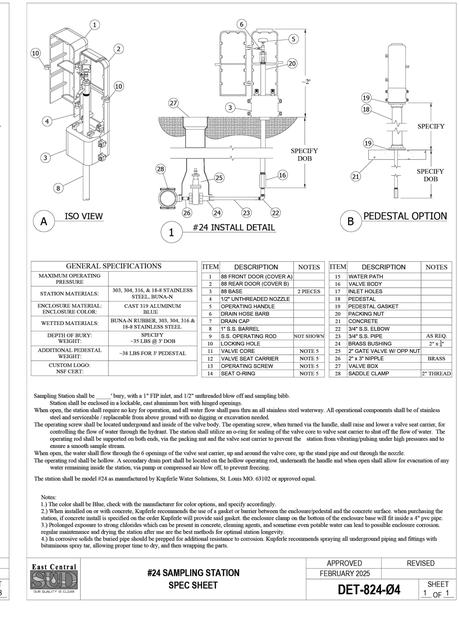


CARRIER PIPE SIZE	CASING PIPE SIZE	CASING PIPE THICKNESS
6"	18"	0.375"
8"	20"	0.375"
12"	24"	0.375"
16"	30"	0.375"
20"	36"	0.438"
24"	42"	0.438"
30"	48"	1/2"
36"	54"	9/16"

SECTION THROUGH PIPE IN CONDUIT

TYPICAL BORE CROSSING UNDER ROAD

APPROVED	REVISED
FEBRUARY 2025	
DET-847-Ø1	SHEET 3 OF 3



GENERAL SPECIFICATIONS	
MAXIMUM OPERATING PRESSURE:	
STATION MATERIALS:	303, 304, 316, & 18-8 STAINLESS STEEL, BUNA-N
ENCLOSURE MATERIAL: ENCLOSURE COLOR:	CAST 319 ALUMINUM BLUE
WETTED MATERIALS:	BUNA-N RUBBER, 303, 304, 316 & 18-8 STAINLESS STEEL
DEPTH OF BURY: WEIGHT:	SPECIFY ~35 LBS @ 3' DOB
ADDITIONAL PEDESTAL WEIGHT:	~30 LBS FOR 3' PEDESTAL
CUSTOM LOGO: NSF CERT:	

ITEM	DESCRIPTION	NOTES
1	8ß FRONT DOOR (COVER A)	
2	8ß REAR DOOR (COVER B)	
3	8ß BASE	2 PIECES
4	1/2" UNTHREADED NOZZLE	
5	OPERATING HANDLE	
6	DRAIN HOSE BARB	
7	DRAIN CAP	
8	1" S.S. BARREL	
9	S.S. OPERATING ROD	NOT SHOWN
10	LOCKING HOLE	
11	VALVE CORE	NOTE 5
12	VALVE SEAT CARRIER	NOTE 5
13	OPERATING SCREW	NOTE 5
14	SEAT O-RING	NOTE 5

ITEM	DESCRIPTION	NOTES
15	WATER PATH	
16	VALVE BODY	
17	INLET HOLES	
18	PEDESTAL	
19	PEDESTAL GASKET	
20	PACKING NUT	
21	CONCRETE	
22	3/4" S.S. ELBOW	
23	3/4" S.S. PIPE	AS REQ.
24	BRASS BUSHING	2" x ¾"
25	2" GATE VALVE W/ OPP NUT	
26	2" x 3" NIPPLE	BRASS
27	VALVE BOX	
28	SADDLE CLAMP	2" THREAD

Sampling Station shall be _____' bury, with a 1" FIP inlet, and 1/2" unthreaded blow off and sampling bibb.

Station shall be enclosed in a lockable, cast aluminum box with hinged openings.

When open, the station shall require no key for operation, and all water flow shall pass thru an all stainless steel waterway. All operational components shall be of stainless steel and serviceable / replaceable from above ground with no digging or excavation needed.

The operating screw shall be located underground and inside of the valve body. The operating screw, when turned via the handle, shall raise and lower a valve seat carrier, for controlling the flow of water through the hydrant. The station shall utilize an o-ring for sealing of the valve core to valve seat carrier to shut off the flow of water. The operating rod shall be supported on both ends, via the packing nut and the valve seat carrier to prevent the station from vibrating/pulsing under high pressures and to ensure a smooth sample stream.

When open, the water shall flow through the 6 openings of the valve seat carrier, up and around the valve core, up the stand pipe and out through the nozzle.

The operating rod shall be hollow. A secondary drain port shall be located on the hollow operating rod, underneath the handle and when open shall allow for evacuation of any water remaining inside the station, via pump or compressed air blow off, to prevent freezing.

The station shall be model #24 as manufactured by Kupferle Water Solutions, St. Louis MO. 63102 or approved equal.

Notes:

1.) The color shall be Blue, check with the manufacturer for color options, and specify accordingly.

2.) When installed on or with concrete, Kupferle recommends the use of a gasket or barrier between the enclosure/pedestal and the concrete surface, when purchasing the station, if concrete install is specified on the order Kupferle will provide said gasket. the enclosure clamp on the bottom of the enclosure base will fit inside a 4" pvc pipe.

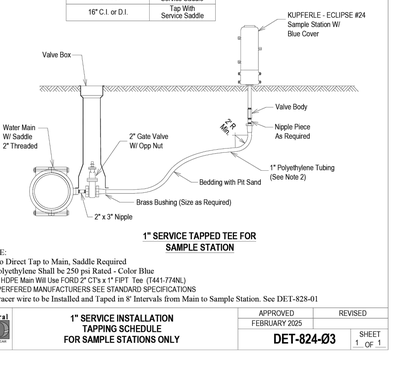
3.) Prolonged exposure to strong chlorides which can be present in concrete, cleaning agents, and sometime even potable water can lead to possible enclosure corrosion. regular maintenance and drying the station after use are the best methods for optimal station longevity.

4.) In corrosive solids the buried pipe should be prepped for additional resistance to corrosion. Kupferle recommends spraying all underground piping and fittings with bituminous spray tar, allowing proper time to dry, and then wrapping the parts.

#24 SAMPLING STATION SPEC SHEET

APPROVED	REVISED
FEBRUARY 2025	
DET-824-Ø4	SHEET 1 OF 1

PIPE TAPPING SCHEDULE	
PIPE DIAMETER	SERVICE SIZE
6" A.C.	1" Tap With Service Saddle
6" C.I. or D.I.	Tap With Service Saddle
8" A.C.	Tap With Service Saddle
8" C.I. or D.I.	Tap With Service Saddle
8" PVC	Tap With Service Saddle
10" A.C.	Tap With Service Saddle
10" C.I. or D.I.	Tap With Service Saddle
10" PVC	Tap With Service Saddle
12" A.C.	Tap With Service Saddle
12" C.I. or D.I.	Tap With Service Saddle
12" PVC	Tap With Service Saddle
16" A.C.	Tap With Service Saddle
16" C.I. or D.I.	Tap With Service Saddle



1" SERVICE TAPPED TEE FOR SAMPLE STATION

NOTE:
1. No Direct Tap to Main, Saddle Required
2. Polyethylene Shall be 250 psi Rated - Color Blue
3. 2" HDPE Main Will Use FORD 2" CTs x 1" FIPT Tee (T441-7T4NL) FOR PERFERED MANUFACTURERS SEE STANDARD SPECIFICATIONS
5. Tracer wire to be Installed and Taped in 8' Intervals from Main to Sample Station. See DET-828-01

1" SERVICE INSTALLATION TAPPING SCHEDULE FOR SAMPLE STATIONS ONLY

APPROVED	REVISED
FEBRUARY 2025	
DET-824-Ø3	SHEET 1 OF 1

Colliers Engineering & Design

www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW

PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DESCRIPTION	DRAWN BY	DATE

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
9/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

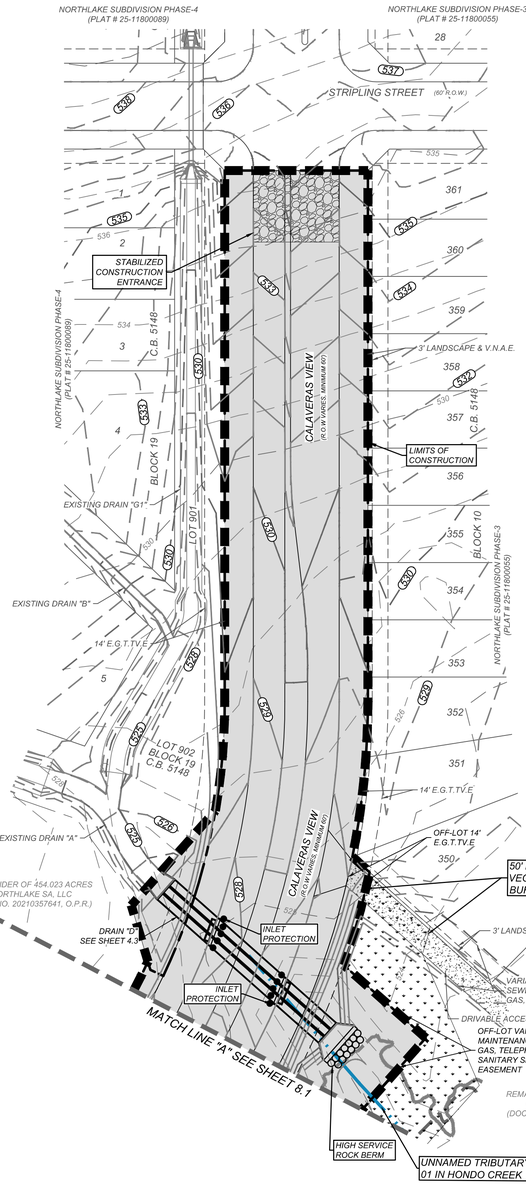
PROJECT NUMBER: 314-65-03
DRAWING NAME: DTOW3146503

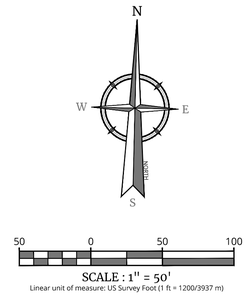
SHEET TITLE: WATER DETAIL SHEET (3 OF 3)

SHEET NUMBER: 7.6

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

I:\INWATER\DTOW3146503.dwg7.6 By:ROGELIO.BERRONES







LOCATION MAP

SCALE: NOT-TO-SCALE

LEGEND

LIMITS OF CONSTRUCTION	=	
EXISTING CONTOURS	=	570
PROPOSED CONTOURS	=	1008
FLOW ARROW	=	
SILT FENCE PHASE I	=	
SILT FENCE PHASE II	=	
TYPE 4 SACK GABIONS	=	
DISTURBED AREA	=	
STABILIZED CONSTRUCTION ENTRANCE/EXIT	=	
CONSTRUCTION EQUIPMENT, VEHICLE & MATERIALS STORAGE AREA.	=	
NATURAL VEGETATIVE BUFFER	=	
CONCRETE TRUCK WASHOUT PIT	=	
ROCK BERM	=	
INLET WITH PROTECTION (GRAVEL FILTERS BAGS)	=	
ELECTRIC, GAS, TELEPHONE, & CABLE TV EASEMENT	=	E.G.T.TV.E
VEHICULAR NON-ACCESS EASEMENT	=	V.N.A.E.

INSTALLATION:

1. ALL OPERATORS SHALL SUBMIT A NOTICE OF INTENT (NOI) AT LEAST 48 HOURS IN ADVANCE AND ALL BEST MANAGEMENT PRACTICES (BMP'S) SHALL BE IN PLACE PRIOR TO STARTING CONSTRUCTION ACTIVITIES.
2. CONTRACTOR TO ENSURE THAT STRUCTURAL BMP'S ARE INSTALLED WITHIN THE LIMITS OF THE SITE BOUNDARY.
3. CONTRACTOR MAY INSTALL THE BEST MANAGEMENT PRACTICES IN PHASES THAT COINCIDE WITH THE DISTURBANCE OF UP GRADIENT AREAS. THIS PHASING SHOULD BE NOTED WITHIN THE MODIFICATIONS SECTION WITH THE SIGNATURE AND DATE OF THE RESPONSIBLE PARTY.
4. CONTRACTOR TO VERIFY SUFFICIENT VEGETATION IN AREAS DENOTED AS VEGETATED FILTER STRIP. IF INSUFFICIENT VEGETATION EXISTS, CONTRACTOR SHALL IMPLEMENT A DIFFERENT BEST MANAGEMENT PRACTICE AND WILL SHOW IT ON THIS PLAN WITH NOTATION IN THE MODIFICATIONS SECTION WITH THE SIGNATURE AND DATE OF THE RESPONSIBLE PARTY.

MAINTENANCE AND INSPECTION:

1. CONTRACTOR SHOULD LIMIT CONSTRUCTION ACTIVITIES TO ONLY THOSE AREAS SHOWN TO BE DISTURBED ON THIS PLAN. IF ADDITIONAL VEGETATED AREAS ARE DISTURBED, THEY SHOULD BE PROTECTED WITH APPROPRIATE BEST MANAGEMENT PRACTICES UNTIL THE AREAS HAVE BEEN STABILIZED AS PER THE SPECIFICATIONS OF THE SWPPP. THE AREAS OF THIS ADDITIONAL SOIL DISTURBANCE AND THE MEASURES USED SHOULD BE SHOWN ON THE SITE PLAN AND NOTED WITHIN THE MODIFICATIONS SECTION WITH THE SIGNATURE AND DATE OF THE RESPONSIBLE PARTY.
2. CONTRACTOR IS RESPONSIBLE FOR MAINTENANCE AND INSPECTION OF BMP'S AS PER THE SPECIFICATIONS OF THE SWPPP. THE CONTRACTOR MAY MODIFY THE CONTROLS AS NECESSARY TO PREVENT SEDIMENT RUNOFF. THESE MODIFICATIONS SHOULD BE SHOWN AND THE SITE PLAN AND NOTED WITHIN THE MODIFICATIONS SECTION WITH THE SIGNATURE AND DATE OF THE RESPONSIBLE PARTY.
3. LOCATION OF CONSTRUCTION ENTRANCE/EXIT, CONCRETE WASHOUT PIT, AND EQUIPMENT AND STORAGE ARE TO BE FIELD DETERMINED. LOCATIONS SHALL BE UPDATED ON THIS PLAN.

GENERAL:

1. THIS EXHIBIT IS TO BE USED FOR THE PURPOSES OF STORMWATER POLLUTION PREVENTION ONLY. ALL OTHER CIVIL ENGINEERING INFORMATION SHOULD BE OBTAINED FROM THE APPROPRIATE CONSTRUCTION DOCUMENTS.
2. THE PURPOSE OF THE SIGNATURE AND SEAL OF THE ENGINEER ON THIS DOCUMENT IS TO DEMONSTRATE COMPLIANCE WITH THE TPDES STORMWATER POLLUTION PREVENTION PLAN REGULATIONS ONLY.
3. ALL OWNERS/OPERATORS ARE RESPONSIBLE FOR FAMILIARIZING THEMSELVES WITH THE STORMWATER POLLUTION PREVENTION PLAN AND COMPLYING WITH THE REGULATIONS CONTAINED WITHIN IT.

PROJECT COMPLETION:

1. ALL DISTURBED AREAS ARES NOT COVERED BY IMPERVIOUS COVER ARE TO BE STABILIZED PER THE SWPPP AND PROJECT SPECIFICATIONS PRIOR TO REMOVAL OF ANY BMP'S AND/OR PRIOR TO FILING A NOTICE OF TERMINATION (NOT).
2. BEST MANAGEMENT PRACTICES MAY BE REMOVED IN PHASES IF ALL UPGRADIENT AREAS HAVE BEEN STABILIZED PER SWPPP AND PROJECT SPECIFICATIONS. THIS PHASING SHOULD BE NOTED WITHIN THE MODIFICATIONS SECTION WITH THE SIGNATURE AND DATE OF THE RESPONSIBLE PARTY.
3. CONTRACTOR TO ENSURE THEY HAVE MET ALL REQUIREMENTS OF THE SWPPP BEFORE FILING A NOTICE OF TERMINATION (NOT).

COORDINATION NOTE:

1. CONTACT TIME WARNER TO COORDINATE CABLE TV SERVICE. (210) 244-0500
2. CONDUIT FOR ELECTRICAL SERVICE. CONFIRM REQUIREMENTS AND COORDINATE WITH CPS FOR INSPECTION. (210) 353-2246.
3. CONTACT AT&T TO COORDINATE TELEPHONE SERVICE. 1-800-449-7928.
4. CONTRACTOR TO COORDINATE WITH CPS PRIOR TO CONSTRUCTION TO PLAN ELECTRIC SERVICE.
5. CONTRACTOR TO COORDINATE WITH SAWS TO PLAN WATER AND SANITARY SEWER SERVICES (210) 704-7297
6. CONTRACTOR SHALL CONTACT 1-800-DIG-TESS A MINIMUM OF 48 HOURS PRIOR TO THE START OF CONSTRUCTION.

SW3P MODIFICATIONS

DATE	SIGNATURE	DESCRIPTION

Colliers Engineering & Design

www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
9/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194500

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER: 314-65-03
DRAWING NAME: SW3P3146503-PH2A

SHEET TITLE: STORMWATER POLLUTION PREVENTION PLAN (1 OF 3)

SHEET NUMBER: 8.0

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

M:\SW3P\3146503-PH2A.dwg\8.0 By: ABEL.MONTALVO

INSTALLATION:

1. ALL OPERATORS SHALL SUBMIT A NOTICE OF INTENT (NOI) AT LEAST 48 HOURS IN ADVANCE AND ALL BEST MANAGEMENT PRACTICES (BMP'S) SHALL BE IN PLACE PRIOR TO STARTING CONSTRUCTION ACTIVITIES.
2. CONTRACTOR TO ENSURE THAT STRUCTURAL BMP'S ARE INSTALLED WITHIN THE LIMITS OF THE SITE BOUNDARY.
3. CONTRACTOR MAY INSTALL THE BEST MANAGEMENT PRACTICES IN PHASES THAT COINCIDE WITH THE DISTURBANCE OF UP GRADIENT AREAS. THIS PHASING SHOULD BE NOTED WITHIN THE MODIFICATIONS SECTION WITH THE SIGNATURE AND DATE OF THE RESPONSIBLE PARTY.
4. CONTRACTOR TO VERIFY SUFFICIENT VEGETATION IN AREAS DENOTED AS VEGETATED FILTER STRIP. IF INSUFFICIENT VEGETATION EXISTS, CONTRACTOR SHALL IMPLEMENT A DIFFERENT BEST MANAGEMENT PRACTICE AND WILL SHOW IT ON THIS PLAN WITH NOTATION IN THE MODIFICATIONS SECTION WITH THE SIGNATURE AND DATE OF THE RESPONSIBLE PARTY.

MAINTENANCE AND INSPECTION:

1. CONTRACTOR SHOULD LIMIT CONSTRUCTION ACTIVITIES TO ONLY THOSE AREAS SHOWN TO BE DISTURBED ON THIS PLAN. IF ADDITIONAL VEGETATED AREAS ARE DISTURBED, THEY SHOULD BE PROTECTED WITH APPROPRIATE BEST MANAGEMENT PRACTICES UNTIL THE AREAS HAVE BEEN STABILIZED AS PER THE SPECIFICATIONS OF THE SWPPP. THE AREAS OF THIS ADDITIONAL SOIL DISTURBANCE AND THE MEASURES USED SHOULD BE SHOWN ON THE SITE PLAN AND NOTED WITHIN THE MODIFICATIONS SECTION WITH THE SIGNATURE AND DATE OF THE RESPONSIBLE PARTY.
2. CONTRACTOR IS RESPONSIBLE FOR MAINTENANCE AND INSPECTION OF BMP'S AS PER THE SPECIFICATIONS OF THE SWPPP. THE CONTRACTOR MAY MODIFY THE CONTROLS AS NECESSARY TO PREVENT SEDIMENT RUNOFF. THESE MODIFICATIONS SHOULD BE SHOWN AND THE SITE PLAN AND NOTED WITHIN THE MODIFICATIONS SECTION WITH THE SIGNATURE AND DATE OF THE RESPONSIBLE PARTY.
3. LOCATION OF CONSTRUCTION ENTRANCE/EXIT, CONCRETE WASHOUT PIT, AND EQUIPMENT AND STORAGE ARE TO BE FIELD DETERMINED. LOCATIONS SHALL BE UPDATED ON THIS PLAN.

GENERAL:

1. THIS EXHIBIT IS TO BE USED FOR THE PURPOSES OF STORMWATER POLLUTION PREVENTION ONLY. ALL OTHER CIVIL ENGINEERING INFORMATION SHOULD BE OBTAINED FROM THE APPROPRIATE CONSTRUCTION DOCUMENTS.
2. THE PURPOSE OF THE SIGNATURE AND SEAL OF THE ENGINEER ON THIS DOCUMENT IS TO DEMONSTRATE COMPLIANCE WITH THE TPDES STORMWATER POLLUTION PREVENTION PLAN REGULATIONS ONLY.
3. ALL OWNERS/OPERATORS ARE RESPONSIBLE FOR FAMILIARIZING THEMSELVES WITH THE STORMWATER POLLUTION PREVENTION PLAN AND COMPLYING WITH THE REGULATIONS CONTAINED WITHIN IT.

PROJECT COMPLETION:

1. ALL DISTURBED AREAS ARES NOT COVERED BY IMPERVIOUS COVER ARE TO BE STABILIZED PER THE SWPPP AND PROJECT SPECIFICATIONS PRIOR TO REMOVAL OF ANY BMP'S AND/OR PRIOR TO FILING A NOTICE OF TERMINATION (NOT).
2. BEST MANAGEMENT PRACTICES MAY BE REMOVED IN PHASES IF ALL UPGRADIENT AREAS HAVE BEEN STABILIZED PER SWPPP AND PROJECT SPECIFICATIONS. THIS PHASING SHOULD BE NOTED WITHIN THE MODIFICATIONS SECTION WITH THE SIGNATURE AND DATE OF THE RESPONSIBLE PARTY.
3. CONTRACTOR TO ENSURE THEY HAVE MET ALL REQUIREMENTS OF THE SWPPP BEFORE FILING A NOTICE OF TERMINATION (NOT).

COORDINATION NOTE:

1. CONTACT TIME WARNER TO COORDINATE CABLE TV SERVICE. (210) 244-0500
2. CONDUIT FOR ELECTRICAL SERVICE. CONFIRM REQUIREMENTS AND COORDINATE WITH CPS FOR INSPECTION. (210) 353-2246.
3. CONTACT AT&T TO COORDINATE TELEPHONE SERVICE. 1-800-449-7928.
4. CONTRACTOR TO COORDINATE WITH CPS PRIOR TO CONSTRUCTION TO PLAN ELECTRIC SERVICE.
5. CONTRACTOR TO COORDINATE WITH SAWS TO PLAN WATER AND SANITARY SEWER SERVICES (210) 704-7297
6. CONTRACTOR SHALL CONTACT 1-800-DIG-TESS A MINIMUM OF 48 HOURS PRIOR TO THE START OF CONSTRUCTION.

LEGEND

LIMITS OF CONSTRUCTION	=	
EXISTING CONTOURS	=	570
PROPOSED CONTOURS	=	1008
FLOW ARROW	=	
SILT FENCE PHASE I	=	
SILT FENCE PHASE II	=	
TYPE 4 SACK GABIONS	=	
DISTURBED AREA	=	
STABILIZED CONSTRUCTION ENTRANCE/EXIT	=	
CONSTRUCTION EQUIPMENT, VEHICLE & MATERIALS STORAGE AREA.	=	
NATURAL VEGETATIVE BUFFER	=	
CONCRETE TRUCK WASHOUT PIT	=	
ROCK BERM	=	
INLET WITH PROTECTION (GRAVEL FILTERS BAGS)	=	
ELECTRIC, GAS, TELEPHONE, & CABLE TV EASEMENT	=	E.G.T.TV.E
VEHICULAR NON-ACCESS EASEMENT	=	V.N.A.E.



LOCATION MAP

SCALE: NOT-TO-SCALE

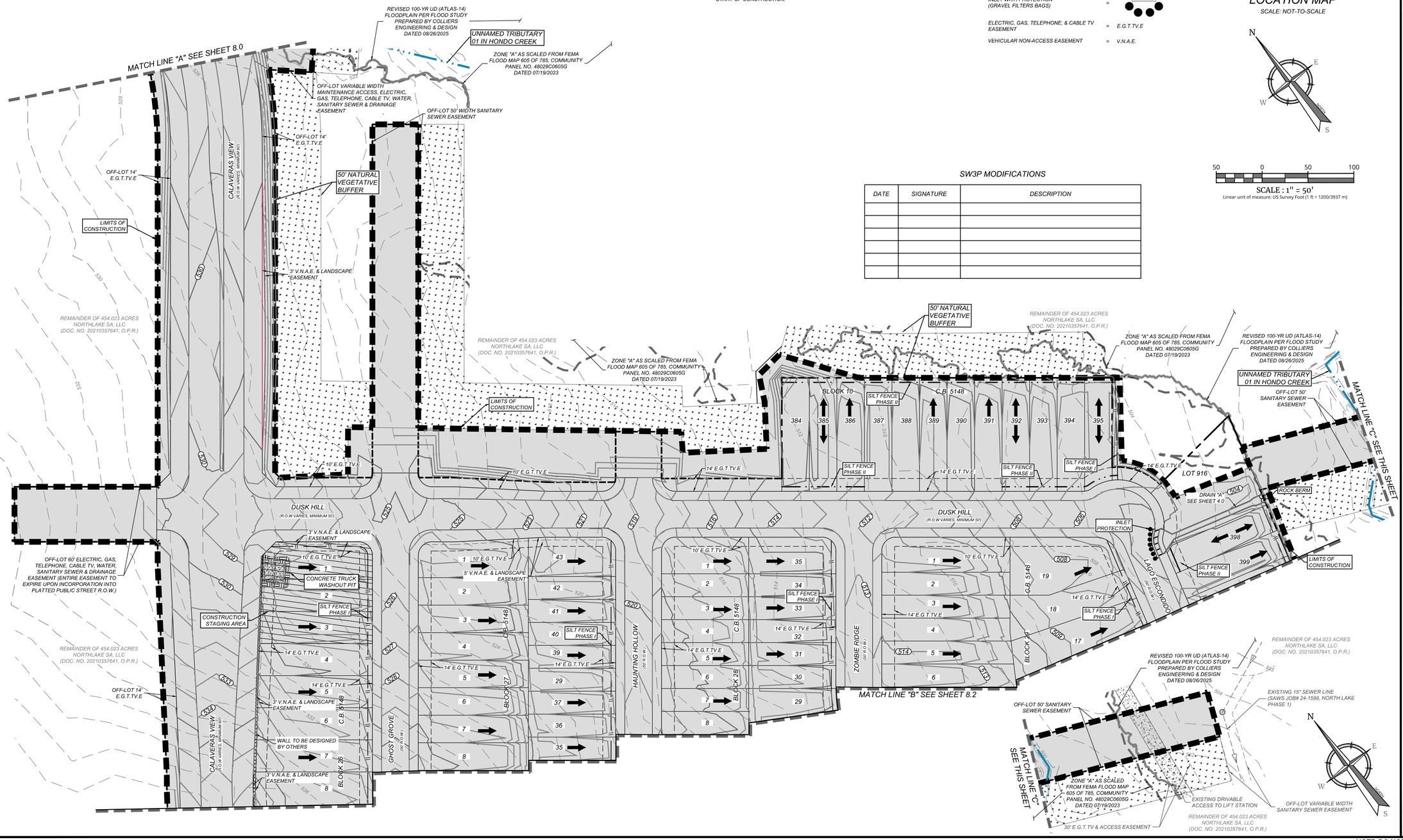
50 0 50 100

SCALE : 1" = 50'

Linear unit of measure: US Survey Foot (1 ft = 1200/3937 m)

SW3P MODIFICATIONS

DATE	SIGNATURE	DESCRIPTION



Colliers Engineering & Design

www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, revised, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERS & SURVEYING

811 PROTECT YOURSELF

ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE

FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
9/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design

SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER:	DRAWING NAME:
314-65-03	SW3P3146503-PH2A

SHEET TITLE:

STORMWATER POLLUTION PREVENTION PLAN (2 OF 3)

SHEET NUMBER:

8.1

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

I:\SW3P3146503-PH2A.dwg[8.1 By: ABE.MONTALVO

INSTALLATION:

1. ALL OPERATORS SHALL SUBMIT A NOTICE OF INTENT (NOI) AT LEAST 48 HOURS IN ADVANCE AND ALL BEST MANAGEMENT PRACTICES (BMP'S) SHALL BE IN PLACE PRIOR TO STARTING CONSTRUCTION ACTIVITIES.
2. CONTRACTOR TO ENSURE THAT STRUCTURAL BMP'S ARE INSTALLED WITHIN THE LIMITS OF THE SITE BOUNDARY.
3. CONTRACTOR MAY INSTALL THE BEST MANAGEMENT PRACTICES IN PHASES THAT COINCIDE WITH THE DISTURBANCE OF UP GRADIENT AREAS. THIS PHASING SHOULD BE NOTED WITHIN THE MODIFICATIONS SECTION WITH THE SIGNATURE AND DATE OF THE RESPONSIBLE PARTY.
4. CONTRACTOR TO VERIFY SUFFICIENT VEGETATION IN AREAS DENOTED AS VEGETATED FILTER STRIP. IF INSUFFICIENT VEGETATION EXISTS, CONTRACTOR SHALL IMPLEMENT A DIFFERENT BEST MANAGEMENT PRACTICE AND WILL SHOW IT ON THIS PLAN WITH NOTATION IN THE MODIFICATIONS SECTION WITH THE SIGNATURE AND DATE OF THE RESPONSIBLE PARTY.

MAINTENANCE AND INSPECTION:

1. CONTRACTOR SHOULD LIMIT CONSTRUCTION ACTIVITIES TO ONLY THOSE AREAS SHOWN TO BE DISTURBED ON THIS PLAN. IF ADDITIONAL VEGETATED AREAS ARE DISTURBED, THEY SHOULD BE PROTECTED WITH APPROPRIATE BEST MANAGEMENT PRACTICES UNTIL THE AREAS HAVE BEEN STABILIZED AS PER THE SPECIFICATIONS OF THE SWPPP. THE AREAS OF THIS ADDITIONAL SOIL DISTURBANCE AND THE MEASURES USED SHOULD BE SHOWN ON THE SITE PLAN AND NOTED WITHIN THE MODIFICATIONS SECTION WITH THE SIGNATURE AND DATE OF THE RESPONSIBLE PARTY.
2. CONTRACTOR IS RESPONSIBLE FOR MAINTENANCE AND INSPECTION OF BMP'S AS PER THE SPECIFICATIONS OF THE SWPPP. THE CONTRACTOR MAY MODIFY THE CONTROLS AS NECESSARY TO PREVENT SEDIMENT RUNOFF. THESE MODIFICATIONS SHOULD BE SHOWN AND THE SITE PLAN AND NOTED WITHIN THE MODIFICATIONS SECTION WITH THE SIGNATURE AND DATE OF THE RESPONSIBLE PARTY.
3. LOCATION OF CONSTRUCTION ENTRANCE/EXIT, CONCRETE WASHOUT PIT, AND EQUIPMENT AND STORAGE ARE TO BE FIELD DETERMINED. LOCATIONS SHALL BE UPDATED ON THIS PLAN.

GENERAL:

1. THIS EXHIBIT IS TO BE USED FOR THE PURPOSES OF STORMWATER POLLUTION PREVENTION ONLY. ALL OTHER CIVIL ENGINEERING INFORMATION SHOULD BE OBTAINED FROM THE APPROPRIATE CONSTRUCTION DOCUMENTS.
2. THE PURPOSE OF THE SIGNATURE AND SEAL OF THE ENGINEER ON THIS DOCUMENT IS TO DEMONSTRATE COMPLIANCE WITH THE TPDES STORMWATER POLLUTION PREVENTION PLAN REGULATIONS ONLY.
3. ALL OWNERS/OPERATORS ARE RESPONSIBLE FOR FAMILIARIZING THEMSELVES WITH THE STORMWATER POLLUTION PREVENTION PLAN AND COMPLYING WITH THE REGULATIONS CONTAINED WITHIN IT.

PROJECT COMPLETION:

1. ALL DISTURBED AREAS ARES NOT COVERED BY IMPERVIOUS COVER ARE TO BE STABILIZED PER THE SWPPP AND PROJECT SPECIFICATIONS PRIOR TO REMOVAL OF ANY BMP'S AND/OR PRIOR TO FILING A NOTICE OF TERMINATION (NOT).
2. BEST MANAGEMENT PRACTICES MAY BE REMOVED IN PHASES IF ALL UPGRADIENT AREAS HAVE BEEN STABILIZED PER SWPPP AND PROJECT SPECIFICATIONS. THIS PHASING SHOULD BE NOTED WITHIN THE MODIFICATIONS SECTION WITH THE SIGNATURE AND DATE OF THE RESPONSIBLE PARTY.
3. CONTRACTOR TO ENSURE THEY HAVE MET ALL REQUIREMENTS OF THE SWPPP BEFORE FILING A NOTICE OF TERMINATION (NOT).

COORDINATION NOTE:

1. CONTACT TIME WARNER TO COORDINATE CABLE TV SERVICE. (210) 244-0500
2. CONDUIT FOR ELECTRICAL SERVICE. CONFIRM REQUIREMENTS AND COORDINATE WITH CPS FOR INSPECTION. (210) 353-2246.
3. CONTACT AT&T TO COORDINATE TELEPHONE SERVICE. 1-800-449-7928.
4. CONTRACTOR TO COORDINATE WITH CPS PRIOR TO CONSTRUCTION TO PLAN ELECTRIC SERVICE.
5. CONTRACTOR TO COORDINATE WITH SAWS TO PLAN WATER AND SANITARY SEWER SERVICES (210) 704-7297.
6. CONTRACTOR SHALL CONTACT 1-800-DIG-TESS A MINIMUM OF 48 HOURS PRIOR TO THE START OF CONSTRUCTION.

SW3P MODIFICATIONS

DATE	SIGNATURE	DESCRIPTION

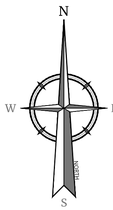
LEGEND

- LIMITS OF CONSTRUCTION =
- EXISTING CONTOURS = 570
- PROPOSED CONTOURS = 1008
- FLOW ARROW =
- SILT FENCE PHASE I =
- SILT FENCE PHASE II =
- TYPE 4 SACK GABIONS =
- DISTURBED AREA =
- STABILIZED CONSTRUCTION ENTRANCE/EXIT =
- CONSTRUCTION EQUIPMENT, VEHICLE & MATERIALS STORAGE AREA =
- NATURAL VEGETATIVE BUFFER =
- CONCRETE TRUCK WASHOUT PIT =
- ROCK BERM =
- INLET WITH PROTECTION (GRAVEL FILTERS BAGS) =
- ELECTRIC, GAS, TELEPHONE, & CABLE TV EASEMENT = E.G.T.TV.E
- VEHICULAR NON-ACCESS EASEMENT = V.N.A.E.



LOCATION MAP

SCALE: NOT-TO-SCALE



SCALE : 1" = 50'

Linear unit of measure: US Survey Foot (1 ft = 1200/3937 m)

REVISED 100-YR UD (ATLAS-14) FLOODPLAIN PER FLOOD STUDY PREPARED BY COLLIERS ENGINEERING & DESIGN DATED 08/26/2025

Colliers Engineering & Design

www.colliersengineering.com

Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, revised, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.

Formerly Known as KFW ENGINEERING & SURVEYING

PROTECT YOURSELF

ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE

FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER

9/22/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design

SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444

COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14305
TBPLS Firm#: 10194500

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER:	DRAWING NAME:
314-65-03	SW3P3146503-PH2A

SHEET TITLE:

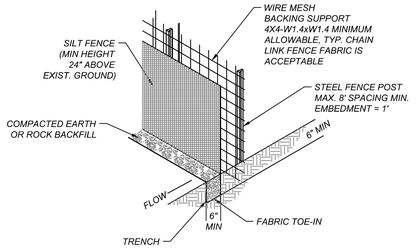
STORMWATER POLLUTION PREVENTION PLAN (3 OF 3)

SHEET NUMBER:

8.2

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

W:\SW3P3146503-PH2A.dwg\8.2 By: ABEL.MONTALVO



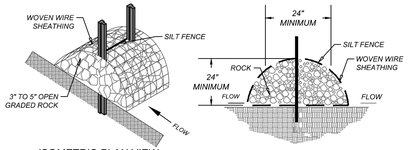
ISOMETRIC PLAN VIEW

Materials:
(1) Silt fence material should be polypropylene, polyethylene or polyamide woven or nonwoven fabric. The fabric width 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 No. 30.
(2) Fence posts should be made of hot rolled steel, at least 4 feet long with Tee or Ybar cross section, surface painted or galvanized, minimum nominal weight 1.25 lb/ft2, and Brindell 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. Post 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\ 60 feet of fence.
(3) The toe of the silt fence should be trenched in with a spade or mechanical trencher, so that the down- slope face of the trench is flat and perpendicular to the line of flow. Where fence cannot be trenched in (e.g., pavement or rock outcrop), weight fabric flap with 3 inches of pea gravel on uphill side to prevent flow from seeping under fence.
(4) The trench must be a minimum of 6 inches deep and 6 inches wide to allow for the silt fence fabric to be laid in the ground and backfilled with compacted material.
(5) Silt fence should be securely fastened to each steel support post or to woven wire, which is in turn attached to the steel fence post. There should be a 3-foot overlap, securely fastened where ends of fabric meet.
(6) Silt fence should be removed when the site is completely stabilized so as not to block or impede stone flow or drainage.

Inspection and Maintenance Guidelines:
(1) Inspect all fencing weekly.
(2) Remove sediment when buildup reaches 6 inches.
(3) Replace any torn fabric or install a second line of fencing parallel to the torn section.
(4) Replace or repair any sections crushed or collapsed in the course of construction activity. If a section of fence is obstructing vehicular access, consider relocating it to a spot where it will provide equal protection, but will not obstruct vehicles. A triangular filter dike may be preferable to a silt fence at common vehicle access points.
(5) When construction is complete, the sediment should be disposed of in a manner that will not cause additional siltation and the prior location of the silt fence should be revegetated. The fence itself should be disposed of in an approved landfill.

SILT FENCE



ISOMETRIC PLAN VIEW

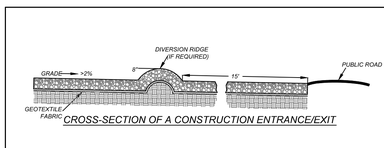
CROSS SECTION

MATERIALS:
(1) SILT FENCE MATERIAL SHOULD BE POLYPROPYLENE, POLYETHYLENE OR POLYAMIDE WOVEN OR NONWOVEN FABRIC. THE FABRIC WIDTH 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 NO. 30.
(2) FENCE POSTS SHOULD BE MADE OF HOT ROLLED STEEL, AT LEAST 4 FEET LONG WITH TEE OR YBAR CROSS SECTION, SURFACE PAINTED OR GALVANIZED, MINIMUM NOMINAL WEIGHT 1.25 LB/FL2, AND BRINDELL HARDNESS EXCEEDING 140. REBAR (EITHER #5 OR #6) MAY ALSO BE USED TO ANCHOR THE BERM.
(3) WOVEN WIRE BACKING TO SUPPORT THE FABRIC SHOULD BE GALVANIZED 2" X 4" WELDED WIRE, 12 GAUGE MINIMUM.
(4) 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.
(5) CLEAN, OPEN GRADED 3- TO 5-INCH DIAMETER ROCK SHOULD BE USED, EXCEPT IN AREAS WHERE HIGH VELOCITIES OR LARGE VOLUMES OF FLOW ARE EXPECTED, WHERE 5- 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) INSTALL THE SILT FENCE ALONG THE CENTER OF THE PROPOSED BERM PLACEMENT, AS WITH A NORMAL SILT FENCE DESCRIBED IN SECTION 2.4.3.
(3) PLACE THE ROCK ALONG THE SHEATHING ON BOTH SIDES OF THE SILT FENCE AS SHOWN IN THE DIAGRAM (FIGURE 1-29), TO A HEIGHT NOT LESS THAN 24 INCHES. CLEAN, OPEN GRADED 3- 5" DIAMETER ROCK SHOULD BE USED, EXCEPT IN AREAS WHERE HIGH VELOCITIES OR LARGE VOLUMES OF FLOW ARE EXPECTED, WHERE 5- TO 8-INCH DIAMETER ROCK MAY BE USED.
(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) THE HIGH SERVICE ROCK BERM SHOULD BE REMOVED WHEN THE SITE IS REVEGETATED OR OTHERWISE STABILIZED OR IT MAY REMAIN IN PLACE AS A PERMANENT BMP IF DRAINAGE IS ADEQUATE.

INSPECTION AND MAINTENANCE GUIDELINES:
(1) INSPECTION SHOULD BE MADE WEEKLY BY THE RESPONSIBLE PARTY. FOR INSTALLATIONS IN STREAMBEDS, ADDITIONAL DAILY INSPECTIONS SHOULD BE MADE ON ROCK BERM.
(2) REMOVE SEDIMENT AND OTHER DEBRIS WHEN BUILDUP REACHES 6 INCHES AND DISPOSE OF THE ACCUMULATED SILT OF IN AN APPROVED MANNER.
(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.

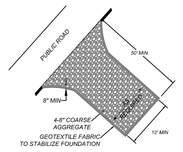
HIGH SERVICE ROCK BERM



CROSS-SECTION OF A CONSTRUCTION ENTRANCE/EXIT

Materials:

(1) The aggregate should consist of 4 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 rack should be included in the plans. Divert wastewater to a sediment trap or basin.

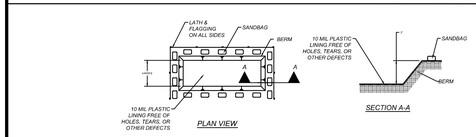


TEMPORARY CONSTRUCTION ENTRANCE/EXIT

Installation: (North Carolina, 1993)
(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 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.

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.

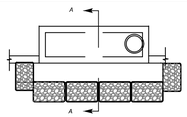
STABILIZED CONSTRUCTION ENTRANCE / EXIT



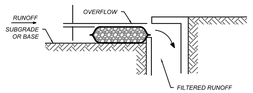
PLAN VIEW

SECTION A-A

TYPE "BELOW GRADE"



PLAN VIEW

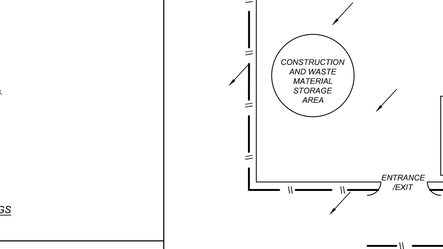


SECTION A-A

GENERAL NOTES:

- *ALL STORM DRAINAGE SYSTEMS INLETS SHOULD FILTER RUNOFF BEFORE THE WATER IS DISCHARGED INTO STREAMS OR ONTO ADJACENT PROPERTIES, UNLESS TREATMENT IS PROVIDED ELSEWHERE.*
- *IF NO ADDITIONAL DOWNSTREAM TREATMENT EXISTS, THE MAXIMUM DRAINAGE AREA TRIBUTARY TO AN AREA DRAIN INSTALLED WITH A GRAVEL FILTER SHOULD BE ONE ACRE.*
- *ALL CURB INLET GRAVEL FILTERS SHOULD BE INSPECTED AND REPAIRED WEEKLY. SEDIMENT SHOULD BE REMOVED WHEN MATERIAL IS WITHIN THREE INCHES OF THE TOP OF THE CONCRETE BLOCKS. PERIODICALLY, THE GRAVEL SHOULD BE RAKED TO INCREASE INFILTRATION AND FILTERING OF RUNOFF WATERS.*

CURB INLET PROTECTION GRAVEL FILTER BAGS



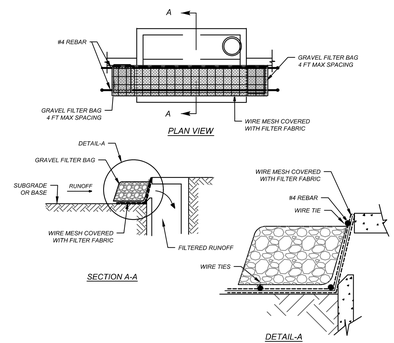
TYPICAL CONSTRUCTION STAGING AREA

SECTION A-A

GENERAL NOTES:

- *THE FILTER BAG MATERIAL SHALL BE MADE OF POLYPROPYLENE, POLYETHYLENE OR POLYAMIDE WOVEN FABRIC, MIN UNIT WEIGHT OF 4 OUNCES/SY, MULLEN BURST STRENGTH EXCEEDING 300 PSI AND ULTRAVIOLET STABILITY EXCEEDING 70%.*
- *THE FILTER BAG SHALL BE FILLED WITH CLEAN, MEDIUM TO COARSE GRAVEL (0.31 TO 0.75 INCH DIAMETER).*

GRAVEL FILTER BAG DETAIL

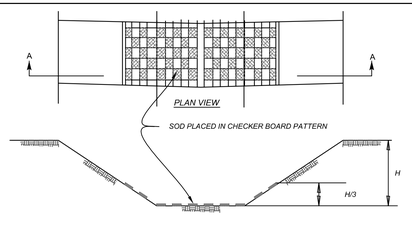


PLAN VIEW

SECTION A-A

DETAIL-A

CURB INLET PROTECTION (ALTERNATE)

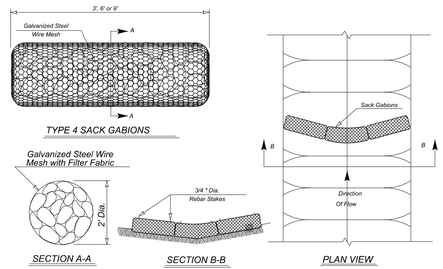


PLAN VIEW

SECTION A-A

- *CHANNEL TO BE STABILIZED WITH SOD PLACED IN A CHECKER BOARD PATTERN TON THE CHANNEL BOTTOM AND ON THE SIDES UP TO 1/3 THE DEPTH OF CHANNEL.*

CHANNEL LINING



TYPE 4 SACK GABIONS

SECTION A-A

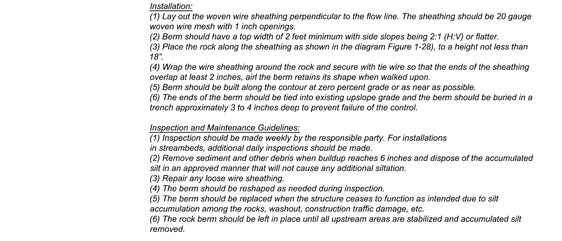
SECTION B-B

PLAN VIEW

GENERAL NOTES:

- *THE TOP OF THE SACK GABIONS SHOULD BE LEVEL AND ORIENTED PERPENDICULAR TO THE DIRECTION OF FLOW.*
- *FILTER FABRIC MATERIAL SHALL BE FASTENED TO WOVEN WIRE SUPPORT.*
- *FILTER FABRIC MATERIAL SHOULD MEET THE FOLLOWING SPECIFICATIONS: RESISTANT TO ULTRAVIOLET LIGHT, FABRIC SHOULD BE NON-WOVEN GEOTEXTILE WITH MINIMUM WEIGHT OF 3.5 OUNCES PER SQUARE YARD, MINIMUM MULLEN BURST STRENGTH OF 200 POUNDS PER SQUARE INCH AND A FLOW THRU RATE OF 120 GALLONS PER MINUTE PER SQUARE FOOT OF FRONTAL AREA.*
- *STONE SIZE: #4"-8" OPEN GRADED CRUSHED LIMESTONE.*
- *INSPECT WEEKLY AND REPAIR OR REPLACE AS NEEDED.*
- *WHEN SILT REACHES A DEPTH OF 50% OR MORE ABOVE NATURAL GROUND, SILT SHALL BE REMOVED AND DISPOSED IN AN APPROVED MANNER THAT WILL NOT CONTRIBUTE TO RESULTATION. CONTAMINATED SEDIMENT MUST BE REMOVED AND DISPOSED OF OFF-SITE IN ACCORDANCE WITH APPLICABLE REGULATIONS.*

TYPE 4 SACK GABIONS



ISOMETRIC PLAN VIEW

CROSS SECTION

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- to 5-inch diameter rock should be used, except in areas where high velocities or large volumes of flow are expected, where 5- 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 Figure 1-26), 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, ain 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.

Inspection and Maintenance Guidelines:
(1) Inspection should be made weekly 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

Colliers
Engineering & Design
www.colliersengineering.com
Copyright © 2025, Colliers Engineering & Design All Rights Reserved. This drawing and all the information contained herein is authorized for use only by the party for whom the services were contracted or to whom it is certified. This drawing may not be copied, reused, disclosed, distributed or relied upon for any other purpose without the express written consent of Colliers Engineering & Design.
Formerly Known as KFW ENGINEERS & SURVEYING
811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

REV	DATE	DRAWN BY	DESCRIPTION

STATE OF TEXAS
OMAR A. ESPINOSA
125560
LICENSED PROFESSIONAL ENGINEER
7/1/25

NORTHLAKE PHASE 2A
PLAT# 25-11800192

SAN ANTONIO
BEXAR COUNTY
TEXAS

Colliers Engineering & Design
SAN ANTONIO (KFW)
3421 Paesanos Parkway
San Antonio, TX 78231
Phone: 210.979.8444
COLLIERS ENGINEERING & DESIGN, INC.
TBPE Firm#: F-14909
TBPLS Firm#: 10194550

SCALE:	DATE:	DRAWN BY:	CHECKED BY:
AS SHOWN	JAN 2025	-	OE

PROJECT NUMBER:	DRAWING NAME:
314-65-03	SW3PDT3146503

SHEET TITLE:
STORMWATER POLLUTION PREVENTION DETAILS

SHEET NUMBER:
8.3

NOTE: DO NOT SCALE DRAWINGS FOR CONSTRUCTION.

By: ROGELIO.BERBOMES
I:\R\SW3PDT\314653_dwg\8.3