SILVER MOUNTAIN DR.
12-INCH WATER MAIN
100% PLANS

Civil Engineer

Kimley»Horn

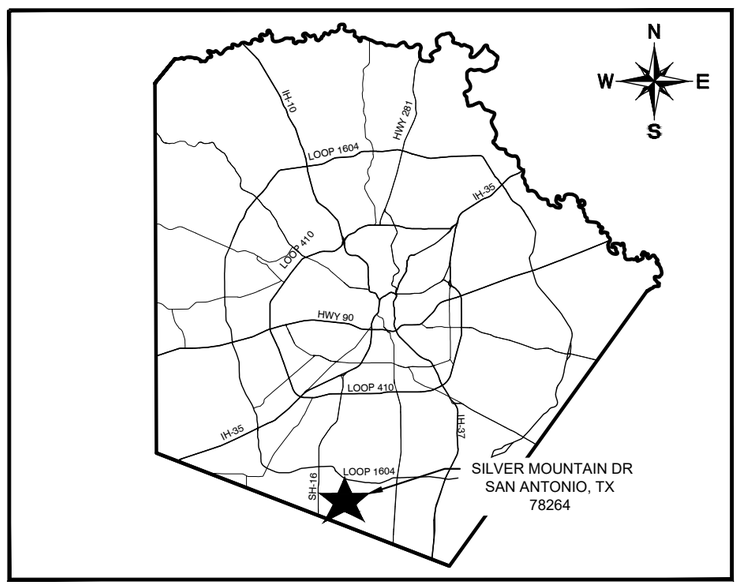
TBPE Firm Registration No. F-928
10101 Reunion Place, Suite 400, San Antonio, TX 78216 210-541-9166

San Antonio Water System

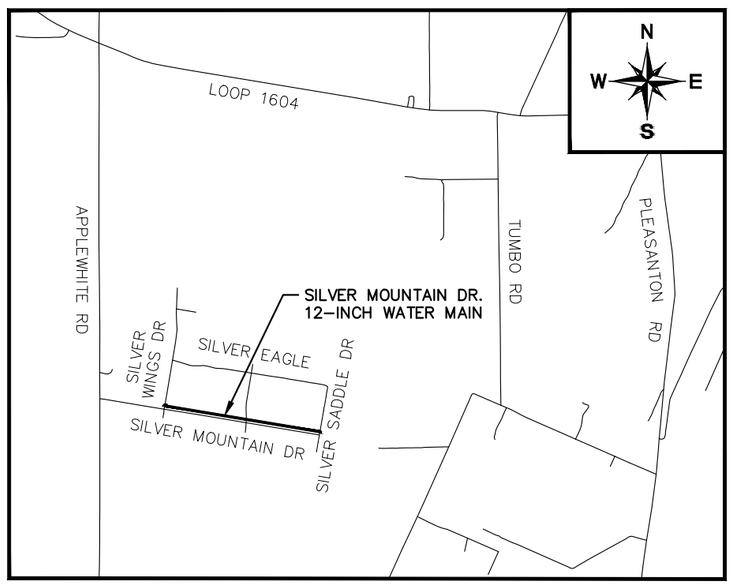
JOB No. 24-6007 & 25-7001

SAWS SOLICITATION No. CO-00803

JULY 2025



LOCATION MAP
SCALE: NTS



SITE MAP
SCALE: NTS

STATE OF TEXAS
V. RYAN SOWA
91171
REGISTERED
PROFESSIONAL ENGINEER
07/01/2025

G1

KHA NO. 068665067

SAWS (JOB NO. 24-6007 AND 25-7001) - SILVER MOUNTAIN DR. 12-INCH WATER MAIN

K:\SNA_Utilities\068665076 - Silver Mountain PS\CAD\PLANSHEETS - WATER ALIGNMENT\068665076 - COVER SHEET-Waterline.dwg 6/26/25 2:08pm

SHEET INDEX

ABBREVIATIONS

FG	FINISHED GRADE
FL	FLOW LINE
EG	EXISTING GRADE
TOP	TOP OF PIPE
ROW	RIGHT OF WAY

JOB NO.
24-6007

STATE OF TEXAS
V. RYAN SONA
91171
REGISTERED
PROFESSIONAL ENGINEER
07/01/2025

REVISIONS

No.	Description	Drn.	Approved	Date

INFORMATION

Date: JUNE 2025
Drawn by:KML
Designed by: AIG
Checked by: VRS
Scale: SHOWN ON SHEET

Kimley»Horn
TEXAS REGISTERED FIRM, NO. F-928

San Antonio Water System

SAN ANTONIO WATER SYSTEM
SILVER MOUNTAIN DR. 12-INCH WATER MAIN
SHEET INDEX

DRAWING NO.
G2

General Notes

1. WITHIN THE LIMITS OF CONSTRUCTION AND/OR ACCESS TO THE PROJECT, THE CONTRACTOR WILL ENCOUNTER TRASH, DEBRIS, DUMPED OBJECTS, AND OTHER WASTE MATERIAL. THE CONTRACTOR WILL BE REQUIRED TO PROPERLY DISPOSE OF THESE MATERIALS AT AN APPROVED LOCATION. THIS WORK SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST.

2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING ANY DAMAGES DONE TO EXISTING FENCES, CURBS, STREETS, DRIVEWAYS, SIDEWALKS, LANDSCAPING AND STRUCTURES TO THE ORIGINAL OR BETTER CONDITION AT NO ADDITIONAL COST TO SAWS. THIS EXCLUDES ITEMS IDENTIFIED FOR DEMOLITION IN THESE PLANS.

3. THE CONTRACTOR SHALL AVOID CUTTING ROOTS LARGER THAN ONE INCH IN DIAMETER WHEN EXCAVATING NEAR EXISTING TREES. EXCAVATION IN VICINITY OF TREES SHALL PROCEED WITH CAUTION. THE CONTRACTOR SHALL CONTACT THE CITY ARBORIST AT (210) 207-0278 FOR GUIDANCE. THE INSPECTOR SHALL ALSO BE NOTIFIED.

4. CONTRACTOR AGREES THAT THEY SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD SAWS AND THE CONSULTANT HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF THE WORK ON THIS PROJECT, EXCEPT FROM LIABILITY ARISING FROM SOLE NEGLIGENCE OF SAWS OR CONSULTANT.

5. CONTRACTOR IS REQUIRED TO VERIFY PROJECT ELEVATIONS. "MATCH EXISTING" SHALL BE UNDERSTOOD TO SIGNIFY VERTICAL AND HORIZONTAL ALIGNMENT.

6. ANY DISCREPANCY OR CONFLICT WITHIN THE DRAWINGS AND SPECIFICATIONS SHALL BE BROUGHT TO THE ATTENTION OF THE CONSULTANT. NEW DISCREPANCIES OR CONFLICTS NOT BROUGHT TO CONSULTANT'S ATTENTION AND CLARIFIED DURING THE BIDDING OF THE PROJECT WILL BE DEEMED TO HAVE BEEN BID OR PROPOSED IN THE MORE COSTLY OR DIFFICULT MANNER, AND THE BETTER QUALITY OR GREATER QUANTITY OF THE WORK SHALL BE PROVIDED BY THE CONTRACTOR IN ACCORDANCE WITH THE CONSULTANT'S INTERPRETATION. ALL ITEMS, WORK, AND IMPROVEMENTS SHOWN OR INDICATED IN THE CONSTRUCTION DOCUMENTS SHALL BE COMPLETED FOR THE PRICES BID, WHETHER OR NOT A SEPARATE PAY ITEM IS INCLUDED IN THE CONTRACT.

7. THE CONTRACTOR SHALL FURNISH ALL ASSISTANCE REQUIRED OF THEM BY ALL INSPECTORS IN OBTAINING SAMPLES AT THE EXPENSE OF THE CONTRACTOR.

8. THE CONTRACTOR SHALL MAINTAIN ALL EXISTING WATER LINES IN SERVICE AT ALL TIMES DURING CONSTRUCTION (UNLESS OTHERWISE INDICATED IN THESE PLANS).

9. ELECTRICAL LINES ARE LOCATED IN THE PROJECT AREA. THE ATTENTION OF THE CONTRACTOR IS DIRECTED TO STATE LAW (HEALTH AND SAFETY CODE, TITLE 9, SUBTITLE A, CHAPTER 752) CONCERNING CONSTRUCTION OPERATIONS IN THE VICINITY OF ELECTRICAL LINES AND THE NEED FOR EFFECTIVE PRECAUTIONARY MEASURES.

10. THESE PLANS, PREPARED BY KIMLEY-HORN AND ASSOCIATES, INC. DO NOT EXTEND TO OR INCLUDE DESIGNS OR SYSTEMS PERTAINING TO THE SAFETY OF THE CONSTRUCTION CONTRACTOR OR ITS EMPLOYEES, AGENTS OR REPRESENTATIVES IN THE PERFORMANCE OF THE WORK. THE SEAL OF KIMLEY-HORN AND ASSOCIATES, INC.'S LICENSED PROFESSIONAL ENGINEER(S) HEREON DOES NOT EXTEND TO ANY SUCH SAFETY SYSTEMS THAT MAY NOW OR HEREAFTER BE INCORPORATED INTO THE WORK. THE CONSTRUCTION CONTRACTOR SHALL PREPARE OR OBTAIN THE APPROPRIATE SAFETY SYSTEMS.

11. CONTRACTOR MUST ASSURE THEMSELVES THAT ALL CONSTRUCTION PERMITS HAVE BEEN OBTAINED PRIOR TO COMMENCEMENT OF WORK. REQUIRED PERMITS THAT CAN ONLY BE ISSUED TO THE CONTRACTOR ARE TO BE OBTAINED AT THE CONTRACTOR'S EXPENSE.

12. CONTRACTOR SHALL COORDINATE INTERRUPTIONS OF ALL UTILITIES AND SERVICES WITH APPLICABLE UTILITY COMPANY OR COMPANIES. ALL WORK TO BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE APPLICABLE UTILITY COMPANY OR AGENCY INVOLVED.

13. CONTRACTOR SHALL LOCATE, PROTECT AND MAINTAIN BENCHMARKS, MONUMENTS AND CONTROL POINTS. THE CONTRACTOR SHALL RE-ESTABLISH ANY PROPERTY MARKER, BENCHMARK, ETC. DISTURBED DURING CONSTRUCTION TO ITS ORIGINAL LOCATION AND ELEVATION. NO ADDITIONAL COMPENSATION SHALL BE ALLOWED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE VERTICAL AND HORIZONTAL CONTROL SHOWN ON THE PLANS THROUGHOUT THE PROJECT.

14. CONTRACTOR SHALL PLACE A MINIMUM OF TWO (2) NEW BRASS SURVEY CAPS (CAPS PROVIDED BY SAWS) WITHIN THE TANK SITE TO SERVE AS BENCHMARK MONUMENTS. LOCATION FOR THE TWO SAWS BENCHMARK MONUMENTS SHALL BE DETERMINED IN THE FIELD BY A SAWS REPRESENTATIVE. CONTRACTOR'S COST FOR INSTALLATION OF THE MONUMENTS SHALL INCLUDE ASSIGNMENT OF HORIZONTAL AND VERTICAL DATA TO EACH MONUMENT BY A TEXAS REGISTERED LAND SURVEYOR APPROVED BY SAWS. NO SEPARATE PAY ITEM, CONTRACTOR TO INCLUDE COST IN PREPARATION OF ROW ITEM.

15. EXISTING PAVING, BUILDINGS, AND OTHER ITEMS SHOWN ON PLANS NOT SPECIFICALLY RELATED TO THE WORK OF THE CONTRACT ARE FOR INFORMATIONAL PURPOSES ONLY.

16. ANY CHANGES OR REVISIONS TO THESE PLANS MUST FIRST BE SUBMITTED TO SAWS FOR REVIEW AND WRITTEN APPROVAL.

17. NO SEPARATE PAY FOR ITEMS (N.S.P.I.) REQUIRED BY NOTES ON THIS SHEET, UNLESS INCLUDED ON PROPOSAL FORM.

18. CONTRACTOR SHALL MECHANICALLY RESTRAIN ALL PRESSURE PIPE, INCLUDING DUCTILE IRON FITTING CONNECTIONS TO ALL PRESSURE PIPE, UNLESS OTHERWISE NOTED (N.S.P.I.).

19. ALL PIPE INSTALLED SHALL CONFORM TO SAWS STANDARDS AND REQUIREMENTS. PIPE PRESSURE CLASS SHALL BE PER THE SPECIFICATIONS. ANY MECHANICAL AND PUSH-ON PIPE SHALL BE FULLY RESTRAINED.

20. THE CONTRACTOR SHALL PROVIDE A COURSE OF ACTION PLAN FOR THE OCCURRENCE OF AN ACCIDENTAL SPILL OF FUEL OR OTHER SUBSTANCE DURING CONSTRUCTION. THE ACTION PLAN SHALL BE SUBMITTED FOR REVIEW TO SAWS AND NO CONSTRUCTION OR MOBILIZATION SHALL OCCUR PRIOR TO ACCEPTANCE OF THE ACTION PLAN.

21. THE CONTRACTOR SHALL MAINTAIN THE INTEGRITY OF EXISTING WATER LINES AND THRUST BLOCKING WHEN EXCAVATING NEAR OR BENEATH EXISTING FACILITIES. UTILITIES AND PIPELINES TO BE DISTURBED BY NEW WORK SHALL BE PROTECTED. CONTRACTOR SHALL VERIFY WHETHER EXISTING PIPE IS OR IS NOT RESTRAINED PRIOR TO CONSTRUCTION.

22. FIELD VERIFY LOCATION, DEPTH, JOINT LOCATIONS AND TYPE OF PIPE MATERIAL AND SIZE OF ALL UNKNOWN PIPES TO BE CONNECTED TO, CROSSED, ETC., PRIOR TO ORDERING MATERIAL OR DOING ANY NEW PIPE WORK. IN SITUATIONS WHERE THE PLANS INDICATE POSSIBLE SPACE CONFLICTS BETWEEN NEW BURIED PIPING AND EXISTING UTILITY PIPING, ELECTRICAL CONDUITS, ETC., INCLUDING LOCATIONS WHERE THE EXISTING PIPING WILL BE WITHIN THE LIMITS OF TRENCHING FOR THE NEW PIPE, THE CONTRACTOR SHALL DO THE FOLLOWING:
    A. FIELD LOCATE EXISTING PIPING AND DETERMINE THE ACTUAL EXTENT OF THE CONFLICT.
    B. IF CONTRACTOR CAN "WORK AROUND" THE EXISTING PIPING IN THE CONSULTANT'S OPINION, THE EXISTING PIPING SHALL BE SUPPORTED AND PROTECTED AND KEPT IN SERVICE AS SPECIFIED ELSEWHERE.
    C. IF THERE IS AN UNWORKABLE CONFLICT, THE CONTRACTOR SHALL PROPOSE A SOLUTION ACCEPTABLE TO THE CONSULTANT AND ADJUST OR REROUTE THE NEW OR EXISTING PIPE AS NECESSARY TO ELIMINATE THE CONFLICT.
    D. THIS WORK WILL BE CONSIDERED TO BE PART OF THE BASIC CONTRACT AND NO ADDITIONAL PAYMENT WILL BE MADE FOR ADJUSTMENTS/REROUTES OF EXISTING PIPING SHOWN ON THE PLANS.

23. THE CONTRACTOR SHALL NOTIFY THE OWNER AND CONSULTANT AND ALL RESPECTIVE GOVERNMENTAL OR UTILITY AGENCIES AFFECTED BY CONSTRUCTION 72 HOURS PRIOR TO STARTING CONSTRUCTION.

24. CONTRACTOR SHALL SUBMIT PRE-CONSTRUCTION SITE VIDEO, AT OR BEFORE THE PRE-CONSTRUCTION MEETING, TO THE OWNER AND CONSULTANT.

25. IF IN THE OPINION OF THE INSPECTOR, BASED ON TESTING SERVICE REPORTS AND INSPECTION, MATERIALS OR COMPACTION ARE BELOW THE SPECIFIED REQUIREMENTS, THE CONTRACTOR SHALL CORRECT THE DEFICIENCY AND RE-TEST TO OBTAIN THE SPECIFIED PARAMETERS AT NO ADDITIONAL EXPENSE TO THE OWNER.

26. THE CONTRACTOR SHALL TAKE ALL AVAILABLE PRECAUTIONS TO CONTROL DUST. THE CONTRACTOR SHALL CONTROL DUST BY SPRINKLING WATER, OR AN ALTERNATIVE METHOD, AS APPROVED BY THE OWNER AND CONSULTANT, AT THE SOLE EXPENSE OF THE CONTRACTOR.

27. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PERFORMING ALL CONSTRUCTION LAYOUTS FROM THE SITE LAYOUT CONTROL POINTS, AND FROM THE DIMENSIONS AND CENTERLINES SHOWN. THE CONTRACTOR MUST NOTIFY THE OWNER AND CONSULTANT OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK.

28. CONTRACTOR SHALL DISINFECT ALL PIPING IN ACCORDANCE WITH SAWS STANDARD SPECIFICATION FOR CONSTRUCTION ITEM NO. 847. ALL TEMPORARY SHUTDOWNS, CONNECTIONS, FITTINGS, AND PIPING REQUIRED FOR CHLORINATION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE CONSIDERED SUBSIDIARY TO THE COST OF THE PROJECT.

29. THE CONTRACTOR SHALL BE RESPONSIBLE TO OBTAIN COUNTY AND CITY INSPECTION AND LETTER OF ACCEPTANCE FOR ANY APPLICABLE IMPROVEMENTS WITHIN DEDICATED EASEMENTS AND PUBLIC RIGHT-OF-WAY.

30. A TESTING LABORATORY SHALL BE EMPLOYED BY THE CONTRACTOR TO CHECK THE SUITABILITY OF MATERIAL SELECTED FOR CONTROLLED FILLS, TO TEST AND DETERMINE IF THE REQUIRED DENSITY IS BEING OBTAINED, AND TO TEST COMPACTION OF EXPOSED SUBGRADES. LABORATORY REPORTS ON TESTS PERFORMED SHALL INCLUDE LOCATIONS OF FIELD TESTS. SAMPLING AND TESTING OF MATERIALS AND LABORATORY INSPECTION OF MATERIALS AND PROCESSES SHALL BE PERFORMED AT THE EXPENSE OF THE CONTRACTOR UNLESS OTHERWISE PROVIDED BY OWNER. TESTING SHALL BE IN ACCORDANCE WITH SAWS CURRENT STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION. FIRMS PROVIDING CONSTRUCTION MATERIALS TESTING SERVICES MUST HAVE AN ESTABLISHED IN-HOUSE LABORATORY MEETING THE STANDARDS OF THE ASTM REQUIREMENTS. TESTING RESULTS SHALL BE PROVIDED TO THE CONSULTANT AND INSPECTOR DIRECTLY FROM THE TESTING LABORATORY. (N.S.P.I.)

31. WHEN TESTS INDICATE COMPACTION DOES NOT MEET REQUIREMENTS, FILL AND BACKFILL SHALL BE DRIED OUT OR MOISTENED AS NECESSARY, SCARIFIED, AND RECOMPACTED. RECOMPACTED AREAS SHALL BE RETESTED AT NO COST TO THE OWNER.

32. IF EXISTING VALVES, PIPELINES AND STRUCTURES LEAK WHEN VALVES ARE IN THE CLOSED POSITION. CONTRACTOR SHALL PROVIDE MEANS AND EQUIPMENT NECESSARY TO CONTROL WATER DURING CONSTRUCTION.

33. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING, SUPPORTING, AND PROTECTING THE INTEGRITY OF UNDERGROUND UTILITIES, THRUST BLOCKING AND POWER POLES DURING CONSTRUCTION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO EXCAVATE OVER, UNDER AND AROUND SUCH UTILITY AND IF NECESSARY, PROVIDE TEMPORARY BRIDGING DURING CONSTRUCTION SO AS TO MAINTAIN CONTINUOUS SERVICE WHILE CONSTRUCTING THE PROPOSED FACILITIES. IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO BACKFILL AROUND THE UTILITY FACILITY AND TO COMPLETE CONSTRUCTION IN A MANNER SUCH AS TO LEAVE THE UTILITY FACILITY SECURELY BEDDED IN ITS POSITION. ALL THIS WORK SHALL CONSIDERED SUBSIDIARY TO THE COST OF THE PROJECT.

34. DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALES SHOWN ON THE DRAWINGS.

35. UNLESS DETAILED, SPECIFIED, OR INDICATED OTHERWISE, CONSTRUCTION SHALL BE AS INDICATED IN THE APPLICABLE TYPICAL DETAILS AND THESE GENERAL NOTES. TYPICAL DETAILS ARE MEANT TO APPLY EVEN THOUGH NOT REFERENCED AT SPECIFIC LOCATIONS ON DRAWINGS WHERE THEY OCCUR.

36. ALL NUTS AND BOLTS USED MUST HAVE AN ANTI-SEIZE COMPOUND APPLIED.

EXCAVATION AND BACKFILL

37. PROVIDE THE REQUIRED MINIMUM DENSITY AND MOISTURE CONTENT OF COMPACTED FILL IN ACCORDANCE WITH THE SOILS REPORT AND THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

38. WHEN THE SUBGRADE OR LAYER OF SOIL MATERIAL MUST BE MOISTURE CONDITIONED BEFORE COMPACTION, CONTRACTOR SHALL UNIFORMLY APPLY THE REQUIRED AMOUNT OF WATER TO THE SURFACE OF SUBGRADE, OR LAYER OF SOIL MATERIAL, IN SUCH A MANNER AS TO PREVENT FREE WATER FROM APPEARING ON THE SURFACE DURING OR SUBSEQUENT TO COMPACTION OPERATIONS.

39. ALL EXCAVATION SHALL BE UNCLASSIFIED REGARDLESS OF MATERIAL ENCOUNTERED. NO ADDITIONAL PAYMENT WILL BE MADE FOR WATER, SAND, GRAVEL, OR OTHER UNSTABLE CONDITIONS ENCOUNTERED IN THE EXCAVATION. NO ADDITIONAL PAYMENT WILL BE MADE FOR ROCK EXCAVATION.

40. CONTRACTOR SHALL SUBMIT A TRENCH SAFETY PLAN SIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF TEXAS. PLAN SHALL ACCOUNT FOR THE ONSITE MATERIAL AND METHODS TO SECURE TRENCHES TO AVOID IMPACTS TO THE ADJACENT ROADWAY PAVEMENT SECTION. DAMAGE TO EXISTING PAVEMENT SECTION SHALL BE REPAIRED TO THE SATISFACTION OF BEXAR COUNTY PUBLIC WORKS AT THE CONTRACTOR'S EXPENSE.

RECORDS

41. THE CONTRACTOR SHALL MAINTAIN A NEAT AND ACCURATE RECORD OF CONSTRUCTION FOR THE CONSULTANT'S RECORDS. THE CONTRACTOR SHALL PROVIDE CONSULTANT WITH FULL SIZE REPRODUCIBLE MARKUPS THAT RECORD ALL CONSTRUCTION DEVIATING FROM THE PLANS. THE CONTRACTOR SHALL SUBMIT THE MARKUPS AS AN ATTACHMENT WITH THE MONTHLY PAY ESTIMATE.

CPS ENERGY NOTE:

42. CALL CPS LOCATOR AT 978-3500 48 HOURS BEFORE BEGINNING ANY EXCAVATION.

43. DUE TO FEDERAL REGULATION TITLE 49, PART 192.181, CPS MUST MAINTAIN ACCESS TO GAS VALVES AT ALL TIMES. THE CONTRACTOR MUST PROTECT AND WORK AROUND ANY GAS VALVES THAT ARE IN THE PROJECT AREA.

44. THE CONTRACTOR WILL BE RESPONSIBLE FOR PROTECTING CPS ENERGY OVERHEAD AND UNDERGROUND ELECTRIC FACILITIES IF ADJACENT TO WORK AREAS.

AT&T:

45. THE CONTRACTOR SHOULD CALL FOR LOCATES THROUGH THE "ONE CALL" UTILITY LOCATE SERVICE (1-800-344-8377) 48 HOURS PRIOR TO CONSTRUCTION/EXCAVATION WORK. CONTRACTORS HAVE THE RESPONSIBILITY TO PROTECT AND SUPPORT TELEPHONE COMPANY INFRASTRUCTURE DURING CONSTRUCTION.

REVEGETATION

46. ALL UNPAVED DISTURBED AREAS, LIMITS NOT TO EXCEED THE PROPERTY BOUNDARY, SHALL BE VEGETATED IN ACCORDANCE WITH SAWS STANDARD CONSTRUCTION SPECIFICATION 103.

GRADING

47. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DISPOSE OF ANY EXCESS FILL MATERIAL RESULTING FROM THE SITE MASS GRADING OFF OF THE PROJECT SITE. THE CONTRACTOR SHALL NOT PLACE FILL OR WASTE MATERIAL ON ANY PRIVATE PROPERTY WITHOUT PRIOR WRITTEN AGREEMENT WITH PROPERTY OWNER.

48. FILL SHALL BE EARTH, FREE OF DEBRIS, CINDERS, COMBUSTIBLES, FROST, ICE, BOULDERS LARGER THAN ONE FOOT IN ANY DIMENSION, ROOTS, SOD, WOOD, CELLULOSE, ORGANIC MATERIALS, AND MATERIALS THAT MAY BE SUBJECT TO TERMITE ATTACK AND AS INDICATED IN THE CONTRACT DOCUMENTS.

49. EXCAVATED MATERIAL THAT IS SUITABLE MAY BE USED FOR FILLS AND BACKFILLS. PROVIDE ANY ADDITIONAL FILL MATERIAL FROM OFF-SITE AS MAY BE REQUIRED TO PRODUCE DESIGNATED LINES AND GRADES OF FILLS, BACKFILLS AND ROUGH GRADES. MATERIAL BROUGHT FROM OFF-SITE SHALL BE TESTED FOR COMPLIANCE WITH THE CONTRACT DOCUMENTS.

50. GRADING, INCLUDING EXCAVATING AND FILLED SECTIONS AND ADJACENT TRANSITION AREAS SHALL BE REASONABLY SMOOTH, COMPACTED AND FREE FROM IRREGULAR SURFACE CHANGES. DEGREES OF FINISH SHALL BE THAT ORDINARILY OBTAINABLE FROM BLADE GRADER OPERATIONS, EXCEPT AS OTHERWISE SPECIFIED. SUBGRADE SHALL BE EVENLY SLOPED TO PROVIDE DRAINAGE AWAY FROM STRUCTURES IN ALL DIRECTIONS AT A GRADE NOT LESS THAN 1/4" (21 MM PER M) PER FOOT. REDRESS AND RECOMPACT ANY AREAS THAT SETTLE BELOW REQUIRED GRADES BECAUSE OF TRAFFIC, PRECIPITATION, OR STORAGE LOADING BEFORE EXECUTION OF OTHER WORK REQUIRED.

51. PERFORM EARTHWORK AND SITE GRADING IN A MANNER TO PREVENT SURFACE WATER AND SUBGRADE OR GROUND WATER FROM FLOWING INTO EXCAVATIONS, AND TO PREVENT WATER AND SEDIMENTATION FROM FLOODING THE PROJECT SITE AND SURROUNDING AREA. REMOVE ALL WATER FROM EXCAVATIONS USING DEWATERING METHODS WHICH WILL PREVENT SOFTENING OF FOUNDATIONS.

52. THE CONTRACTOR SHALL FOLLOW THE GENERAL INTENT OF THE GRADING PLANS. MINOR ADJUSTMENTS TO THE ACTUAL ELEVATIONS SHOWN ON THE PLANS MAY BE REQUIRED TO MATCH EXISTING GROUND ELEVATIONS.

53. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL VEGETATION, TREES, AND STUMPS PER THE TREE PROTECTION PLAN WITHIN THE CONTRACT DOCUMENTS.

PAVEMENT

54. PAVEMENT RECONSTRUCTION CONTRACTOR TO MAINTAIN EXISTING PAVEMENT GRADES AND MATCH EXISTING GRADES AT PAVEMENT JUNCTIONS.

55. ALL PAVEMENT CUTS ARE TO BE NEAT SAWCUT LINES. ALL PAVEMENT SHALL BE SAWCUT PRIOR TO EXCAVATION.

SUPPLEMENTARY

56. INSPECTOR MUST BE CALLED FOR BACKFILL INSPECTIONS.

57. DENSITY REPORTS MUST BE SUBMITTED TO THE INSPECTOR WITHIN 24 HOURS OF TESTING.

WORKING HOURS

58. NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR WORK OUTSIDE OF STANDARD WORKING HOURS. WORK OUTSIDE OF STANDARD WORKING HOURS SHALL BE CONSIDERED SUBSIDIARY TO THE COST OF THE PROJECT.

TRAFFIC CONTROL

59. BARRICADES AND WARNING SIGNS SHALL CONFORM TO THE CURRENT TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND ARE TO BE GENERALLY LOCATED TO AFFORD MAXIMUM PROTECTION TO THE PUBLIC AS WELL AS CONSTRUCTION PERSONNEL AND EQUIPMENT AND TO ASSURE AN EXPEDITIOUS TRAFFIC FLOW AT ALL TIMES. DURING THE PROGRESS OF WORK, THE CONTRACTOR SHALL PROVIDE ACCESS FOR LOCAL TRAFFIC.

MAILBOX NOTES

60. MAILBOXES FOUND TO BE SET ON ORNAMENTAL IRON, MASONRY, OR OTHER SPECIAL POSTS, OR WITHIN BRICK, STONE, OR OTHER STRUCTURES, SHALL BE RETURNED TO THEIR RESPECTIVE OWNERS. CONTRACTOR SHALL MAKE A REASONABLE ATTEMPT TO SALVAGE.

61. CONTRACTOR TO FURNISH AND INSTALL TEMPORARY MAILBOXES USING COSA SPECIFICATION ITEM 513 – REMOVING AND RELOCATING MAILBOXES. THE TEMPORARY MAILBOXES SHALL BE SET IN A SERVICEABLE LOCATION DURING CONSTRUCTION. SHOULD A PROPERTY OWNER ELECT TO REMOVE THEIR EXISTING MAILBOX THEMSELVES, THE CONTRACTOR SHALL IMMEDIATELY FURNISH THE TEMPORARY MAILBOX IN ITS PLACE.

62. FOLLOWING CONSTRUCTION, THE CONTRACTOR SHALL FURNISH AND INSTALL PERMANENT BREAKAWAY-TYPE REPLACEMENT MAILBOXES IN COMPLIANCE WITH TXDOT REQUIREMENTS.

DISINFECTION NOTES

63. CONTRACTOR SHALL INSTALL MACHINE CHLORINATION INJECTION PORTS IN ACCORDANCE WITH TCEQ CH 290, LENGTH BETWEEN PORTS SHALL NOT EXCEED 1,000 LINEAR FEET. MACHINE INJECTION PORTS SHALL CONSIST OF THE FOLLOWING COMPONENTS:
    2-1" CORP. STOP, CC x IP.
    2-1 1/4" SOLID CAPS, THR.
    2-1" COPPER TUBING, CUT AS REQ'D
    2-1" COMP. x 1 1/4" COUPLING, CURB STOP
    (SEE SAWS STD DWB DD-847-01)

JOB NO. 24-6007

STATE OF TEXAS · RYAN SONA · 91171 · REGISTERED · PROFESSIONAL ENGINEER
07/01/2025

REVISIONS

No.	Description	Drn.	Approved	Date

INFORMATION

Date: JULY 2025
Drawn by: KML
Designed by: AIG
Checked by: VRS
Scale: SHOWN ON SHEET

Kimley»Horn
TEXAS REGISTERED FIRM, NO. F-928

San Antonio Water System

SAN ANTONIO WATER SYSTEM
SILVER MOUNTAIN DR. 12-INCH WATER MAIN
GENERAL NOTES (SHEET 1 OF 2)

DRAWING NO. G3

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General Notes

TEMPORARY FACILITIES NOTES

62. CONTRACTOR SHALL STORE MATERIALS ONLY IN AREAS DESIGNATED FOR STORAGE BY THE OWNER.

63. CONTRACTOR SHALL DIRECT ALL PERSONNEL, DELIVERIES, AND TRAFFIC THROUGH THE CONTRACTOR'S CONSTRUCTION ENTRANCE, ENTRANCE FROM SEASCAPE DRIVE.

64. CONTRACTOR SHALL FURNISH SANITARY FACILITIES FOR HIS PERSONNEL. CONTRACTOR'S PERSONNEL SHALL NOT, AT ANY TIME, USE THE OWNER'S FACILITIES.

STORMWATER POLLUTION PREVENTION PLAN (SWPPP) NOTES

65. CONTRACTOR SHALL OBTAIN A STORMWATER POLLUTION PREVENTION PERMIT FOR THE SILVER MOUNTAIN WATERLINE SITE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, AT THEIR EXPENSE.

66. STORM WATER POLLUTION PREVENTION MEASURES SHOWN ARE THE MINIMUM REQUIREMENTS OF THE CONTRACT. IF ADDITIONAL MEASURES THAN THOSE SHOWN ARE REQUIRED AS A CONDITION OF THE PERMIT OR TO CONTROL RUN-OFF FROM SPECIFIC CONSTRUCTION ACTIVITIES, SUCH MEASURES SHALL BE IMPLEMENTED AT NO ADDITIONAL COST TO THE OWNER.

67. SILT FENCING SHALL BE INSTALLED AROUND ALL DIRT STOCKPILE AREAS, ON ALL SIDES AND ALONG BOTH SIDES OF ALL TRENCHES.

68. ROCK BEDDING SHALL BE INSTALLED AT ONSITE ENTRANCES FROM PAVED SECTIONS.

69. ALL GROUNDWATER REMOVED DURING EXCAVATION SHALL BE PUMPED IN ACCORDANCE WITH THE SWPPP PERMIT.

BEXAR COUNTY NOTES

70. ALL CONSTRUCTION WITHIN PUBLIC R.O.W. SHALL CONFORM TO BEXAR COUNTY STANDARD SPECIFICATIONS AND REQUIREMENTS. IF A CONFLICT EXISTS BETWEEN THESE STANDARDS AND SAWS OR CITY OF SAN ANTONIO STANDARDS, BEXAR COUNTY STANDARDS SHALL GOVERN.

Benchmarks

THE BEARINGS SHOWN HEREON ARE BASED ON THE TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE (FIPS 4204)(NAD'83), AS DETERMINED BY THE GLOBAL POSITIONING SYSTEM (GPS). ALL DISTANCES SHOWN HEREON ARE ON THE SURFACE. TO CONVERT SURFACE DISTANCES TO GRID, APPLY THE COMBINED SURFACE TO GRID SCALE FACTOR OF 1.00016. THE UNIT IF LINEAR MEASUREMENT IS U.S. SURVEY FEET.

THESE DRAWINGS SHOW EXISTING SPOT ELEVATIONS AND CONTOUR LINES BASED UPON A FIELD SURVEY BY SURVEY PERSONNEL. THE CONTOUR INTERVAL IS 1 FOOT. ALL ELEVATIONS SHOWN HEREON ARE TIED TO THE NORTH AMERICAN DATUM OF 1988 (NAVD'88) BASED ON GPS OBSERVATIONS.

Required Permits & Work Orders

SAWS SHALL OBTAIN ALL NECESSARY COSA AND BEXAR COUNTY PERMITS REQUIRED FOR CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY OTHER REQUIRED PERMITS. KNOWN PERMIT AND WORK ORDER PROCURED AT THE TIME OF CONSTRUCTION CONTRACT EXECUTED ARE DESCRIBED AS FOLLOWS:

BEXAR COUNTY STORM WATER QUALITY PERMIT
BEXAR COUNTY PUBLIC WORKS DEPARTMENT
1948 PROBANDT ST.
SAN ANTONIO, TX 78214
PH: (210)335-6700

BEXAR COUNTY CONSTRUCTION ACTIVITIES WITHIN THE BEXAR COUNTY ROW PERMIT
BEXAR COUNTY PUBLIC WORKS DEPARTMENT
1948 PROBANDT ST.
SAN ANTONIO, TX 78214
PH: (210)335-6700

BEXAR COUNTY PRE/POST CONSTRUCTION STORM WATER CONTROL
BEXAR COUNTY PUBLIC WORKS DEPARTMENT
1948 PROBANDT ST.
SAN ANTONIO, TX 78214
PH: (210)335-6700

SAWS General Construction Notes

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 TEXAS DEPARTMENT OF TRANSPORTATION (TXDOT) "STANDARD SPECIFICATIONS FOR CONTRUCTION 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"
2. THE CONTRACTOR SHALL OBTAIN SAWS STANDARD DETAILS FROM SAWS WEBSITE, https: apps.saws.org/business_center/specs/constspecs/ UNLESS OTHERWISE NOTED WITHIN THE DESIGN PLANS.
3. THE CONTRACTOR IS TO NOTIFY AND MAKE ARRANGEMENTS WITH THE SAWS CONSTRUCTION INSPECTION DIVISION AT (210) 233-3500 (DURING REGULAR SAWS WORKING HOURS) AND PROVIDE NOTIFICATION PROCEDURES THE CONTRACTOR WILL USE TO NOTIFY AFFECTED HOME RESIDENTS AND/OR PROPERTY OWNERS TWO (2) WEEKS PRIOR TO EXCAVATION. OUTSIDE OF REGULAR SAWS WORKING HOURS THE SAWS EOC SHOULD BE CONTACTED AT 210-704-7297.
4. IF NECESSARY, CONTRACTOR WILL COORDINATE USE OF SAWS PREMISES AT NO ADDITIONAL COST TO SAWS. SUCH EFFORTS INCLUDE, BUT ARE NOT LIMITED TO, OBTAINING SECURITY IDENTIFICATION BADGES REQUIRED FOR ACCESS TO SAWS FACILITIES.
5. LOCATIONS AND DEPTHS 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 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 NOT COST TO SAWS.
6. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF UNDERGROUND UTILITIES AND DRAINAGE STRUCTURES PRIOR TO CONSTRUCTION WHETHER SHOWN ON PLANS OR NOT. AS-BUILTS FOR SAWS INFRASTRUCTURE CAN BE OBTAINED AT WEBSITE BELOW. CONTRACTOR SHALL COORDINATE PHYSICAL LOCATES FOR SAWS INFRASTRUCTURE THROUGH THE SAWS INSPECTOR. PLEASE ALLOW UP TO 7 BUSINESS DAYS FOR LOCATES REQUESTING PIPE LOCATION MARKERS ON SAWS INFRASTRUCTURE. THE FOLLOWING CONTACT INFORMATION ARE SUPPLIED FOR VERIFICATION PURPOSES:

   SAWS UTILITY LOCATES:
   https: //www.saws.org/service/locates-service/

COSA DRAINAGE:	(210) 206-8433
COSA TRAFFIC SIGNAL OPERATIONS:	(210) 207-7720
TEXAS STATEWIDE 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 CONDITIONS A RESULT OF DAMAGES DONE BY THE PROJECT'S CONSTRUCTION.
8. CONTRACTOR SHALL NOT MAKE USE OF DUMPSTERS OR WASTE BINS THAT ARE INTENDED TO SERVE RESIDENTS AND/OR BUSINESSES.
9. ALL WORK IN TEXAS DEPARTMENT OF TRANSPORTATION AND BEXAR COUNTY RIGHT-OF-WAY SHALL BE DONE IN ACCORDANCE WITH RESPECTIVE CONSTRUCTIONS SPECIFICATIONS AND PERMIT.
10. THE CONTRACTOR SHALL COMPLY WITH CITY OF SAN ANTONIO OR OTHER GOVERNING MUNICIPALITY'S TREE ORDINANCES WHEN EXCAVATING NEAR TREES.
11. ALL WORK WITHIN THE 100-YEAR FLOODPLAIN SHALL BE DONE IN ACCORDANCE WITH FLOODPLAIN DEVELOPMENT PERMIT.
12. ANY WORK COMPLETED WITHOUT PRIOR WRITTEN AUTHORIZATION WHICH IS NOT INCLUDED IN THESE PLANS AND SPECIFICATIONS WILL NOT BE COMPENSATED BY THE SAN ANTONIO WATER SYSTEM.
13. HOLIDAY WORK: CONTRACTORS WILL NOT BE ALLOWED TO PERFORM SAWS WORK ON SAWS RECOGNIZED HOLIDAYS.

    WEEKEND WORK: CONTRACTORS ARE REQUIRED TO SUBMIT REQUEST TO THE SAWS INSPECTION CONSTRUCTION DEPARTMENT BY 12:00PM ON THE WEDNESDAY PRIOR TO THE WEEKEND BEING REQUESTED. REQUEST SHOULD BE SENT TO CONSTWORKREQ@SAWS.ORG

    ANY AND ALL SAWS UTILITY WORK INSTALLED WITHOUT WEEKEND APPROVAL WILL BE SUBJECT TO BE UNCOVERED FOR PROPER INSPECTION AT NO COST TO SAWS.
14. PRE-CON SITE VIDEO: BEFORE THE START OF ANY CONSTRUCTION, THE SITE MUST BE VIDEO RECORDED BY THE CONTRACTOR WITH ONE COPY SUBMITTED TO SAWS INSPECTIONS. A PRE-SITE VIDEO WILL PROVIDE ACCURATE DOCUMENTATION OF THE EXISTING CONDITIONS (NSPI).
15. POWER POLE BRACING: CONTRACTORS SHOULD BE ADVISED THAT THERE ARE EXISTING OVERHEAD UTILITY POLES ALONG THE PROJECT CORRIDOR. CONTRACTORS SHOULD FURTHER BE ADVISED THAT IF THE DISTANCE FROM THE OUTSIDE FACE OF A UTILITY TRENCH TO THE FACE OF A UTILITY POLE IS LESS THAN 5 FEET, SAID UTILITY POLE IS SUBJECT TO BRACING, BASED ON A DETERMINATION MADE BY UTILITY POLE OWNER. COSTS INCURRED BY CONTRACTOR FOR BRACING OF THESE UTILITY POLES IS SUBSIDIARY TO THAT RESPECTIVE UTILITY COMPANY'S WORK. IT IS ADVISABLE FOR THE CONTRACTOR TO REVIEW THE CONSTRUCTION DOCUMENTS AND VISIT THE CONSTRUCTION SITE TO DETERMINE POTENTIAL IMPACTS.
16. CONSTRUCTION SEQUENCING: IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO SCHEDULE SEQUENCING FOR REMOVAL AND INSTALLATION OF EXISTING AND PROPOSED SAWS UTILITIES IN CONJUNCTION WITH GENERAL PROJECT CONSTRUCTION. SEQUENCE OF CONSTRUCTION ACTIVITIES SHALL BE CONSIDERED IN ORDER TO MINIMIZE THE EXTENT AND DURATION OF DISTURBANCES.
17. CONTRACTOR SHALL COMPLY WITH APPLICABLE REGULATIONS INCLUDING, BUT NOT LIMITED TO, THOSE OVERSEEN BY THE U.S. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA). OSHA INFORMATION AND RELATED MATERIALS MAY BE OBTAINED AT https: //osha.gov/ OR AT THE OSHA SAN ANTONIO OFFICE LOCATED AT FOUNTAINHEAD TOWER, SUITE 605 8200 W. INTERSTATE 10 SAN ANTONIO, TX 78230 WHICH IS ALSO REACHABLE BY PHONE AT (210) 472-5040.
18. 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 SITE(S) WITHIN THE PROJECT WORK AREAS IN ORDER TO IMPLEMENT CONTRACTOR'S 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.

WATER

19. PRIOR TO TIE-INS, ANY SHUTDOWNS OF EXISTING MAINS OF ANY SIZE MUST BE COORDINATED WITH THE SAWS INSPECTION AND/OR SAWS PRODUCTION GROUPS AT LEAST TWO WEEKS OR MORE 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.
    SAWS PRODUCTION CONTROL CENTER 210-233-2016
20. ASBESTOS CEMENT (AC) PIPE, ALSO KNOWN AS TRANSITE PIPE WHICH IS KNOWN TO CONTAINS ASBESTOS-CONTAINING MATERIAL (ACM), MAYBE LOCATED WITHIN THE PROJECT LIMITS. SPECIAL WASTE MANAGEMENT PROCEDURES AND HEALTH AND SAFETY REQUIREMENTS WILL BE APPLICABLE WHEN REMOVAL AND/OR DISTURBANCE OF THIS PIPE OCCURS, PAYMENT FOR SUCH WORK IS TO BE MADE UNDER SAWS SPECIFICATION ITEM NO. 3000, "HANDLING ASBESTOS CEMENT PIPE".

    AC PIPE REMOVED ON CONSTRUCTION PROJECTS FOR TIE-IN(S) SHOULD BE IN LENGTH OF 26 LINEAR FEET (LF). LENGTHS OF 13 LF SHOULD BE REMOVED WHERE AC PIPE IS BEING REMOVED AND CROSSING PIPES, CONDUITS, OR BOXES.
21. VALVE REMOVAL: WHERE THE CONTRACTOR IS TO ABANDON A WATER MAIN, THE CONTROL VALVE LOCATED ON THE ABANDONING BRANCH WILL BE REMOVED AND REPLACED WITH A CAP/PLUG. (NSPI)
22. DIVISION VALVES: DIVISION VALVES SHOWN ON PLANS OR NOT SHOWN ON PLANS BUT FOUND IN THE FIELD SHALL ONLY BE OPERATED BY SAWS DISTRIBUTION AND COLLECTION STAFF AND ONLY WITH PRIOR WRITTEN APPROVAL OF THE SAWS DIRECTOR OF PRODUCTION AND OPERATIONS AND PROPER COORDINATION WITH ALL SAWS DEPARTMENTS. CONTRACTOR SHALL PROVIDE WRITTEN NOTIFICATION TO THE INSPECTOR A MINIMUM OF TWO WEEKS IN ADVANCE TO START THE COORDINATION PROCESS AND WILL BE INFORMED BY THE INSPECTOR WHEN THE DIVISION VALVE WILL BE OPERATED BY THE SAWS DISTRIBUTION AND COLLECTION STAFF. THE DIVISION VALVE CAN ONLY BE OPERATED BY SAWS DISTRIBUTION AND COLLECTION STAFF MEMBER, NOT THE INSPECTOR OR THE CONTRACTOR. OPERATION OF A DIVISION VALVE WITHOUT THE EXPRESS PRIOR WRITTEN APPROVAL OF THE SAWS DISTRIBUTION AND COLLECTION STAFF WILL CONSTITUTE A MATERIAL BREACH OF AN WRITTEN SAWS CONTRACT OR PERMIT IN ADDITION TO SUBJECTING THE CONTRACTOR TO LIABILITY FOR ANY AND ALL FINES, FEES, OR OTHER DAMAGES, DIRECT OR CONSEQUENTIAL, THAT MAY ARISE FROM OR BE CAUSED BY THE OPERATION OF THE VALVE WITHOUT PRIOR WRITTEN PERMISSION. PLEASE BE INFORMED THAT THE APPROVAL OF THE OPERATION OR OPENING OR CLOSING OF A DIVISION VALVE CAN TAKE SEVERAL WEEKS FOR APPROVAL. DIVISION VALVES WILL ALSO HAVE A VALVE LID LABELED DIVISION VALVE AND A LOCKING MECHANISM INSTALLED WITH A KEY. THE LOCK AND KEY MECHANISM WILL BE PAID FOR BY THE CONTRACTOR BUT WILL BE INSTALLED BY SAWS DISTRIBUTION AND COLLECTION STAFF.

Construction Notes

GENERAL RESPONSIBILITIES: ALL CONSTRUCTION ACTIVITIES, TEMPORARY STRUCTURES, PARKING, STORAGE OF MATERIALS AND EQUIPMENT, AND TEMPORARY SECURITY FENCES MUST BE CONFINED TO THE LOT UNDER CONSTRUCTION AND BEHIND THE BUILDING/PAVING SETBACKS UNLESS SPECIFIC EXCEPTIONS ARE APPROVED BY THE ACC.

CONSTRUCTION ACCESS: STREETS SOILED BY CONSTRUCTION WORK MUST BE CLEANED DAILY. THE ACC MAY REQUIRE CONTRACTORS TO PROVIDE DIRT DROP-OFF AND TIRE-WASHING AREAS FOR CONSTRUCTION AREAS.

SITE MAINTENANCE: CONTRACTOR MUST KEEP CONSTRUCTION SITE IN A SAFE, CLEAN, AND NEAT CONDITION. CONTRACTOR MUST DESIGNATE A PLACE ON SITE FOR WASHOUT OF CONCRETE TRUCKS. CONTRACTOR MUST REMOVE DEBRIS AND UNNEEDED CONSTRUCTION MATERIALS DAILY.

CONSTRUCTION TIMES: CONSTRUCTION WORK MAY NOT BEGIN BEFORE 7:00 A.M. OR CONTINUE AFTER 7:00 P.M. UNLESS APPROVED BY THE ACC. RADIO AND OTHER SOURCES OF AMPLIFIED SOUND MUST NOT DISTURB ADJACENT PROPERTY OWNERS OR TENANTS.

JOB NO.
24-6007

STATE OF TEXAS
RYAN SONA
91171
REGISTERED
PROFESSIONAL ENGINEER
07/01/2025

REVISIONS

No.	Description	Drn.	Approved	Date

INFORMATION

Date: JULY 2025
Drawn by: KML
Designed by: AIG
Checked by: VRS
Scale: SHOWN ON SHEET

Kimley»Horn
TEXAS REGISTERED FIRM, NO. F-928

San Antonio Water System

SAN ANTONIO WATER SYSTEM
SILVER MOUNTAIN DR. 12-INCH WATER MAIN
GENERAL NOTES
(SHEET 2 OF 2)

DRAWING NO.
G4

TOTAL ESTIMATED QUANTITIES

Item No.	Spec. No.	Item Description	Quantity	Unit
1	103	REVEGETATION	3765	SY
2	202.1	PRIME COAT (0.20 GAL/SY) (COSA SPEC)	46	GAL
3	203.1	TACK COAT (0.10 GAL/SY) (COSA SPEC)	23	GAL
4	205.2	HMAC TYPE B (10" COMPACTED) (COSA SPEC)	167	SY
5	205.4	HMAC TYPE D (2" COMPACTED) (COSA SPEC)	228	SY
6	208.1	CHIP SEAL, CRSP EMULSION, GR 5 TRAP ROCK	975	SY
7	299	FLOWABLE FILL	37	CY
8	307	REMOVE AND REPLACE CONCRETE 36" SAFETY END TREATMENT	1	EA
9	401.1	REINFORCED CONCRETE PIPE (CLASS III) (18") (COSA SPEC)	261	LF
10	401.4	SAFETY END TREATMENT (TYPE 1) (COSA SPEC)	14	EA
11	503.4	OPEN CUT AND RESTORE EXISTING DRIVEWAY (ASPHALTIC) (COSA SPEC)	38	SY
12	503.5	OPEN CUT AND RESTORE EXISTING DRIVEWAY (GRAVEL) (COSA SPEC)	524	SY
13	513.1	REMOVE AND RELOCATE MAILBOX (ALL TYPES) (COSA SPEC)	12	EA
14	515	TOPSOIL	419	CY
15	520.1	HYDROMULCHING (COSA SPEC)	3765	SY
16	530.1	BARRICADES, SIGNS AND TRAFFIC HANDLING (COSA SPEC)	1	LS
17	531.3	REMOVE AND REPLACE TRAFFIC SIGNAGE (R1-1) (COSA SPEC)	1	EA
18	531.55	INSTALL TRAFFIC SIGNAGE (OM-3) (COSA SPEC)	17	EA
19	531.6	REMOVE AND REPLACE TRAFFIC SIGNAGE (R2-1) (COSA SPEC)	1	EA
20	540.1	TEMPORARY EROSION, SEDIMENT, AND WATER POLLUTION PREVENTION CONTROL	1	LS
21	550.1	TRENCH EXCAVATION SAFETY AND PROTECTION	4252	LF
22	760	CLEANING RESHAPING DITCHES (TxDOT SPEC)	4004	LF
23	812	REMOVE AND DISCARD EXISTING 6" PVC WATER MAIN	123	LF
24	815	6" HDPE WATER LINE (DR-11)	138	LF
25	815	12" HDPE WATER LINE (DR-11)	4004	LF
26	824	RELAY SHORT SERVICE	3	EA
27	828	6" GATE VALVE ASSEMBLY	4	EA
28	828	12" GATE VALVE ASSEMBLY	5	EA
29	831	12"x12" CUT-IN TEE	1	EA
30	840	12" WATER TIE-IN	2	EA
31	840	6" WATER TIE-IN	3	EA
32	841	HYDROSTATIC TESTING	2	EA
33	844	2" BLOWOFF (TEMPORARY)	3	EA
34	846	1" COMBINATION AIR VALVE ASSEMBLY	3	EA
35	856.1	12" HDPE CARRIER PIPE (DR-11)	275	LF
36	856.2	24" STEEL CASING (BORE)	165	LF
37	856.2	24" STEEL CASING (OPEN CUT)	110	LF
38	844	2" PERMANENT BLOW-OFF ASSEMBLY	2	EA
39	858	CONCRETE ENCASEMENT	7	CY
100	100	MOBILIZATION AND DEMOBILIZATION, MAX 10% OF LINE ITEMS 1-33	1	LS
101	101	PREPARING ROW, MAX 5% OF LINE ITEMS 1-33	1	LS
102	102	INTERMEDIATE DEMOBILIZATION AND REMOBILIZATION	1	EA
3001	3001	CPS POLE BRACING ALLOWANCE	1	ALW

K:\SNA_Utilities\068665076 - Silver Mountain PS\CAD\PLANSHEETS - WATER ALIGNMENT\068665076 - GENERAL NOTES-Waterline.dwg 6/26/25 2:08pm

JOB NO.
24-6007

STATE OF TEXAS
V. RYAN SOWA
91171
REGISTERED
PROFESSIONAL ENGINEER
07/01/2025

REVISIONS

No.	Description	Drn.	Approved	Date

INFORMATION

Kimley»Horn
TEXAS REGISTERED FIRM, NO. F-928

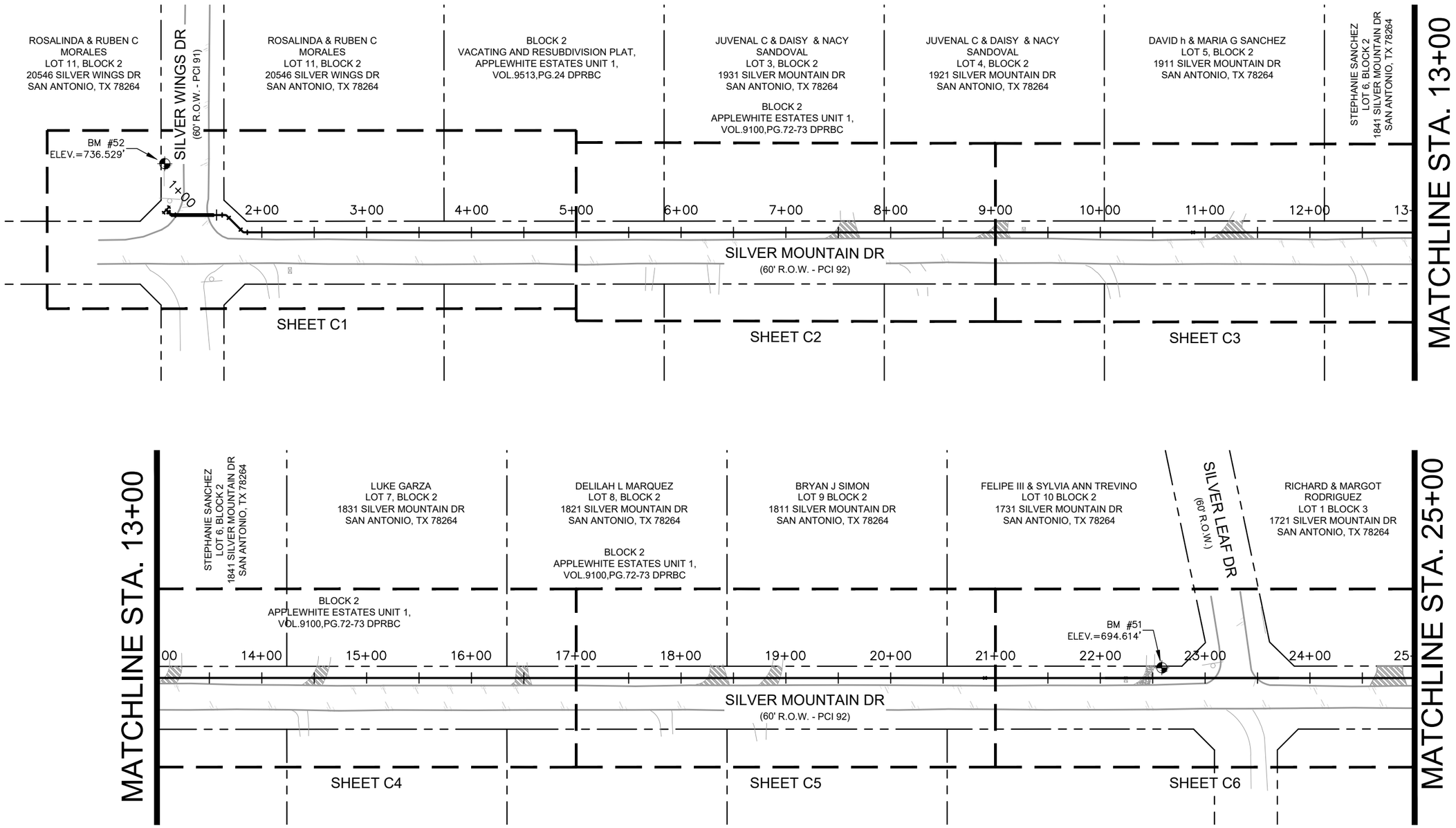
Date: JULY 2025
Drawn by:KML
Designed by: AIG
Checked by: VRS
Scale: SHOWN ON SHEET

San Antonio Water System

SAN ANTONIO WATER SYSTEM

SILVER MOUNTAIN DR. 12-INCH WATER MAIN
QUANTITIES

DRAWING NO.
G5



BENCHMARK TABLE

Point #	Elevation	Northing	Easting	Description
52	736.53	13620067.20	2114884.20	BM COTTON SPINDLE IN PP
51	694.61	13619658.31	2116997.04	BM RR SPIKE IN PP
50	671.45	13619289.74	2119022.21	BM COTTON SPINDAL IN PP

N
W E
S
0 100' 200'
GRAPHIC SCALE 100'
FULL SIZE (22" x 34") 1" = 50'
HALF SIZE (11" x 17") 1" = 100'

JOB NO.
24-6007

STATE OF TEXAS
RYAN SONA
91171
REGISTERED
PROFESSIONAL ENGINEER
07/01/2025

REVISIONS

No.	Description	Drn.	Approved	Date

INFORMATION

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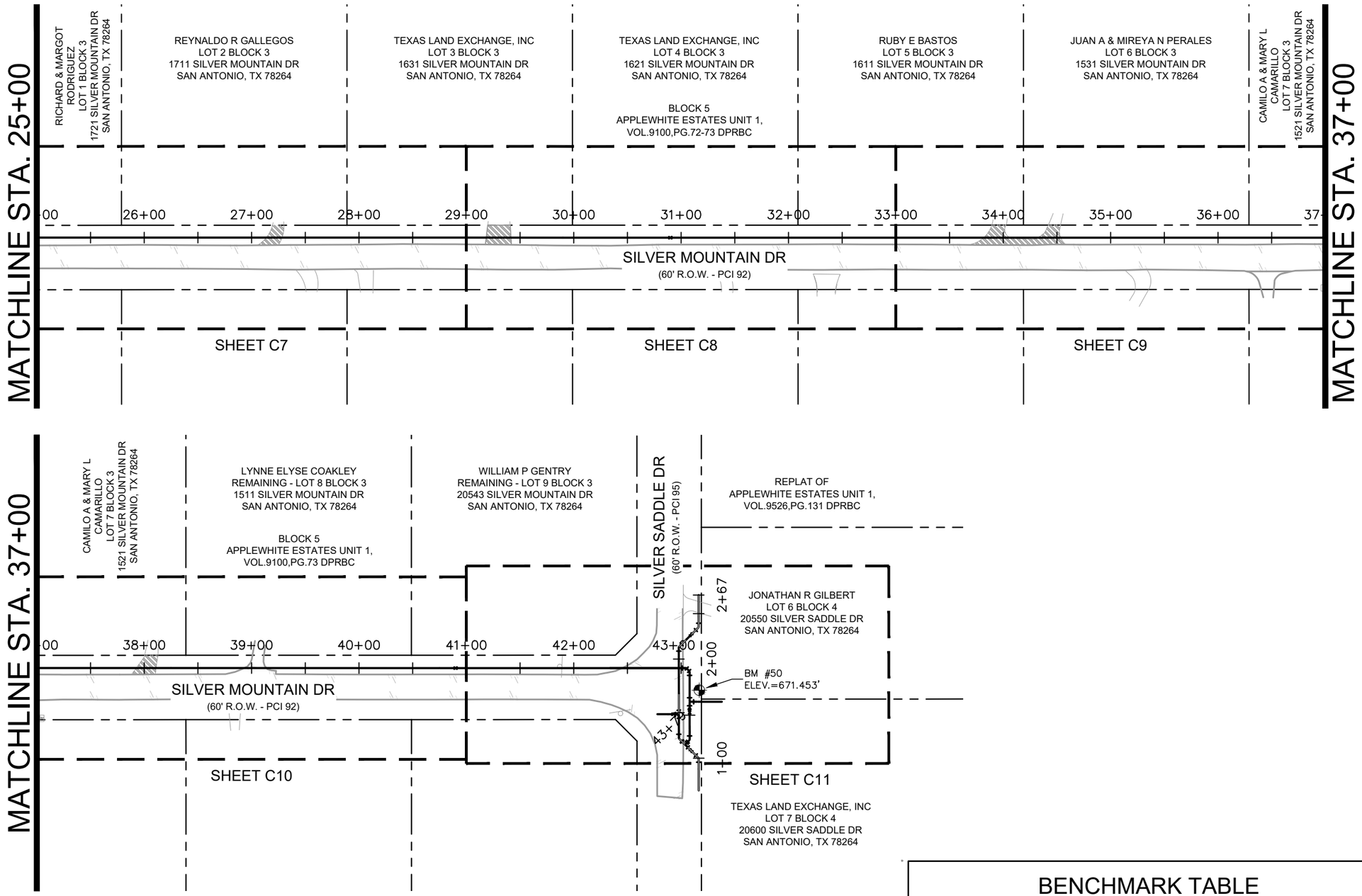
Kimley»Horn
TEXAS REGISTERED FIRM, NO. F-928

San Antonio Water System

SAN ANTONIO WATER SYSTEM
SILVER MOUNTAIN DR. 12-INCH WATER MAIN
PROJECT LOCATION STA. 1+00 TO STA. 25+00

DRAWING NO.
G6

K:\SNA_Utilities\068665076 - Silver Mountain PS\CAD\PLANSHEETS - WATER ALIGNMENT\068665076 - Water Main Overall.dwg 6/26/25 2:08pm



BENCHMARK TABLE

Point #	Elevation	Northing	Easting	Description
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51	694.61	13619658.31	2116997.04	BM RR SPIKE IN PP
50	671.45	13619289.74	2119022.21	BM COTTON SPINDAL IN PP

JOB NO.
24-6007

STATE OF TEXAS
RYAN SONA
91171
REGISTERED
PROFESSIONAL ENGINEER
07/01/2025

REVISIONS

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Kimley»Horn
TEXAS REGISTERED FIRM, NO. F-928

San Antonio Water System

SAN ANTONIO WATER SYSTEM

SILVER MOUNTAIN DR. 12-INCH WATER MAIN
PROJECT LOCATION STA. 25+00 TO END

DRAWING NO.
G7

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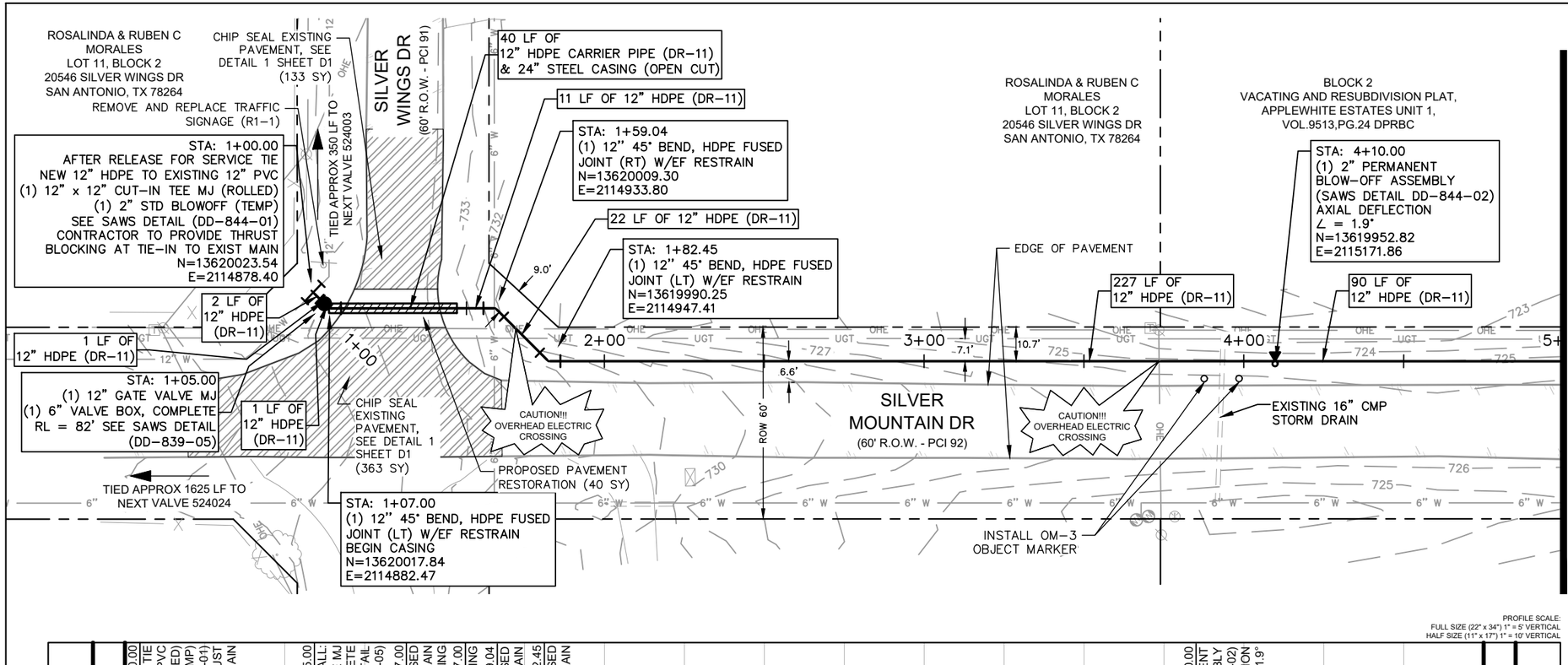
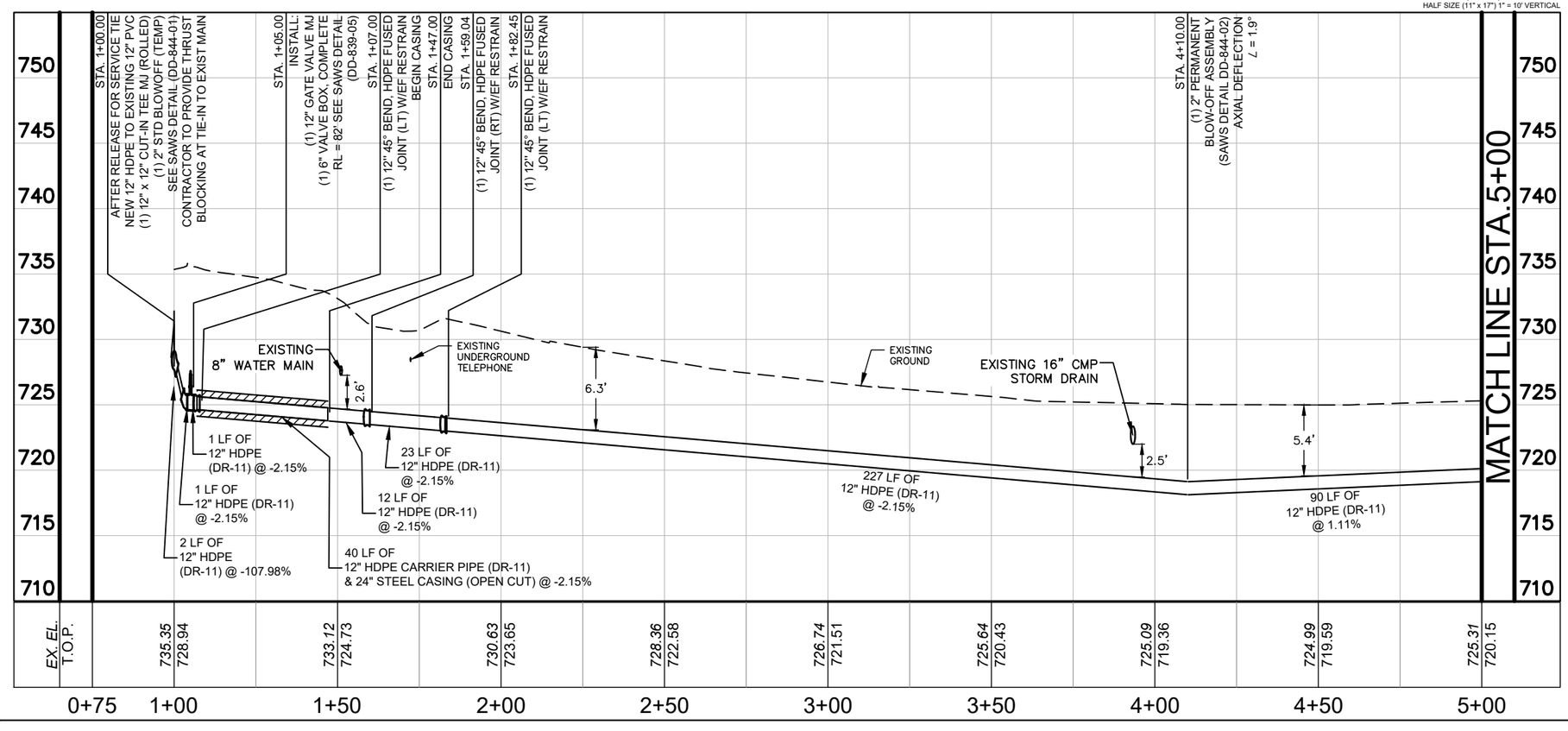




ITEM NO.	DESCRIPTION	UNIT	QUANTITY
103	REVEGETATION	SY	356
202.1	PRIME COAT (0.20 GAL/SY) (COSA SPEC)	GAL	8
203.1	TACK COAT (0.10 GAL/SY) (COSA SPEC)	GAL	4
205.2	HMAC TYPE B (10" COMPACTED) (COSA SPEC)	SY	27
205.4	HMAC TYPE D (2" COMPACTED) (COSA SPEC)	SY	40
208.1	CHIP SEAL, CRSP EMULSION, GR 5 TRAP ROCK	SY	496
299	FLOWABLE FILL	CY	13
515	TOPSOIL	CY	40
520.1	HYDROMULCHING (COSA SPEC)	SY	356
531.3	REMOVE AND REPLACE TRAFFIC SIGNAGE (R1-1) (COSA SPEC)	EA	1
531.55	INSTALL TRAFFIC SIGNAGE (OM-3) (COSA SPEC)	EA	2
550.1	TRENCH EXCAVATION SAFETY AND PROTECTION	LF	400
760	CLEANING RESHAPING DITCHES (TxDOT SPEC)	LF	360
815	12" HDPE WATER LINE (DR-11)	LF	360
828	12" GATE VALVE ASSEMBLY	EA	1
831	12"x12" CUT-IN TEE	EA	1
840	12" WATER TIE-IN	EA	1
844	2" BLOWOFF (TEMPORARY)	EA	1
856.1	12" HDPE CARRIER PIPE (DR-11)	LF	40
856.2	24" STEEL CASING (OPEN CUT)	LF	40
844	2" PERMANENT BLOW-OFF ASSEMBLY	EA	1

LEGEND

- PROPOSED WATER LINE
- PROPERTY LINE
- EASEMENT BOUNDARY
- ASPHALT PAVEMENT
- FENCE
- EXISTING STORM DRAIN
- OHE — OVERHEAD ELECTRIC
- UGT — UNDERGROUND TELEPHONE
- 6" W — EXISTING WATER MAIN
- BENCH MARK
- EXIST. POWER POLE
- EXIST. GUY ANCHOR
- EXIST. STOP/SPEED SIGN
- EXIST. FIRE HYDRANT
- EXIST. WATER VALVE
- EXIST. IRRIGATION VALVE
- PROPOSED WATER VALVE
- EXIST. WATER METER
- EXIST. TELEPHONE PEDESTAL
- EXISTING TREES TO REMAIN
- AIR RELEASE VALVE
- COMBINATION AIR RELEASE VALVE
- BLOW-OFF VALVE
- EXISTING DRIVEWAY TO BE REMOVED AND REPLACED
- PROPOSED MILL AND OVERLAY EXISTING HMAC
- PROPOSED PAVEMENT RESTORATION

NOTES:

1. CONTRACTOR SHALL RECONSTRUCT DRIVEWAYS AND CULVERTS TO EQUAL OR BETTER CONDITION.
2. CONTRACTOR SHALL PROVIDE NOTICE TO SAWS AT LEAST 45 DAYS PRIOR TO ANY CONSTRUCTION ACTIVITIES WITHIN THE ROW OF SILVER MOUNTAIN DR. SAWS SHALL COORDINATE WITH PROPERTY OWNERS FOR THE REMOVAL OF OBSTRUCTIONS, INCLUDING TRASH CONTAINERS AND LANDSCAPING, CONFLICTING WITH PROPOSED CONSTRUCTION ACTIVITIES WITHIN THE ROW. SHOULD PROPERTY OWNERS FAIL TO REMOVE OBSTRUCTIONS PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL AT THEIR OWN EXPENSE REMOVE AND RETURN THESE OBSTRUCTIONS TO THE RESPECTIVE PROPERTY OWNER.
3. EXISTING WATER SERVICE LINES TO REMAIN ACTIVE DURING CONSTRUCTION.
4. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE AN APPROPRIATE SECTION OF PIPING TO SUCCESSFULLY CUT IN A TEE.
5. CONTRACTOR IS NOT TO LEAVE OPEN TRENCHES UNATTENDED AT ANY TIME. CONTRACTOR TO INSTALL STEEL PLATES TO ALLOW RESIDENTS ACCESS DURING CONSTRUCTION.
6. CONTRACTOR TO RELOCATE TRASH BINS TO ALLOW ACCESS AND RETURN TRASH BINS TO RESIDENTS.
7. SAWS SHALL MACHINE CHLORINATE NEW WATER MAIN. REFER TO SAWS CONSTRUCTION SPECIFICATION ITEM NO. 847.

GRAPHIC SCALE 20'
FULL SIZE (22" x 34") 1" = 20'
HALF SIZE (11" x 17") 1" = 40'

JOB NO. 24-6007

STATE OF TEXAS · RYAN SONA · 91171 · REGISTERED · PROFESSIONAL ENGINEER
07/01/2025

No.	Description	Drn.	Approved	Date

REVISIONS

INFORMATION

Date: JULY 2025
Drawn by: KML
Designed by: AIG
Checked by: VRS
Scale: SHOWN ON SHEET

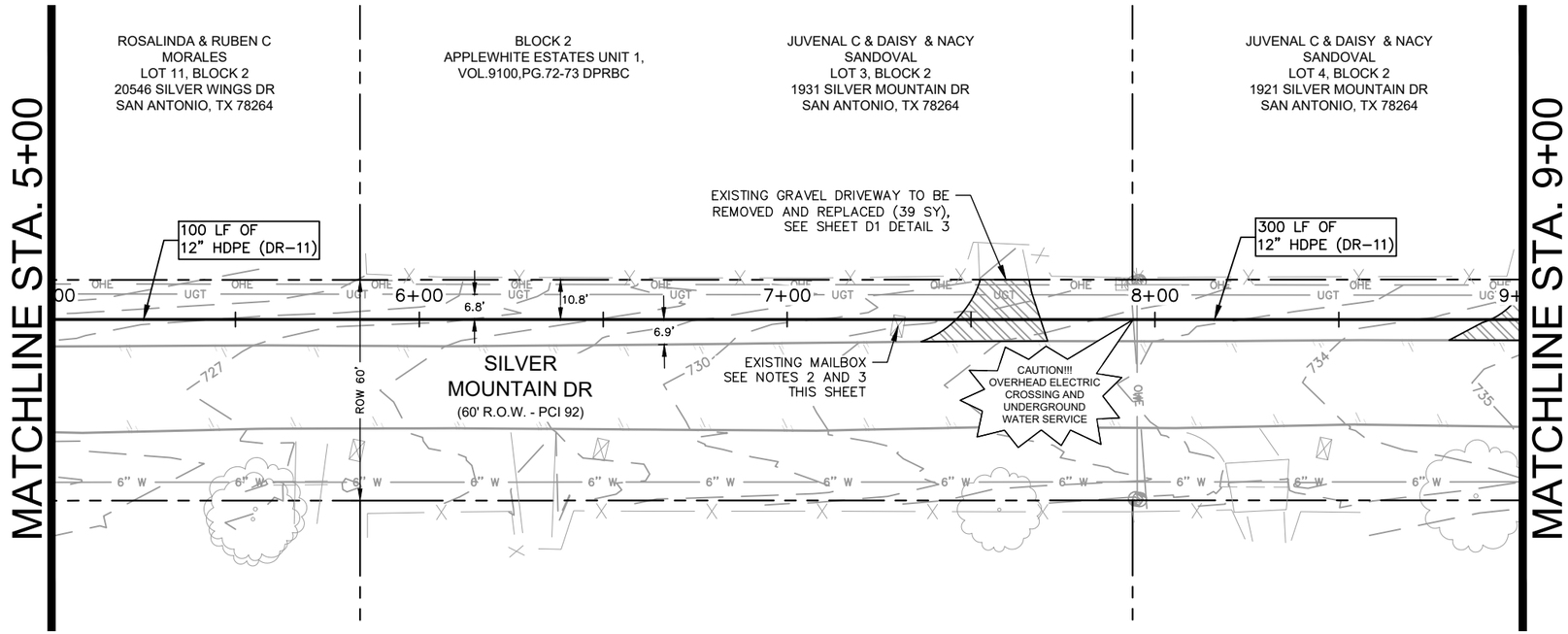
Kimley»Horn
TEXAS REGISTERED FIRM. NO. F-928

San Antonio Water System

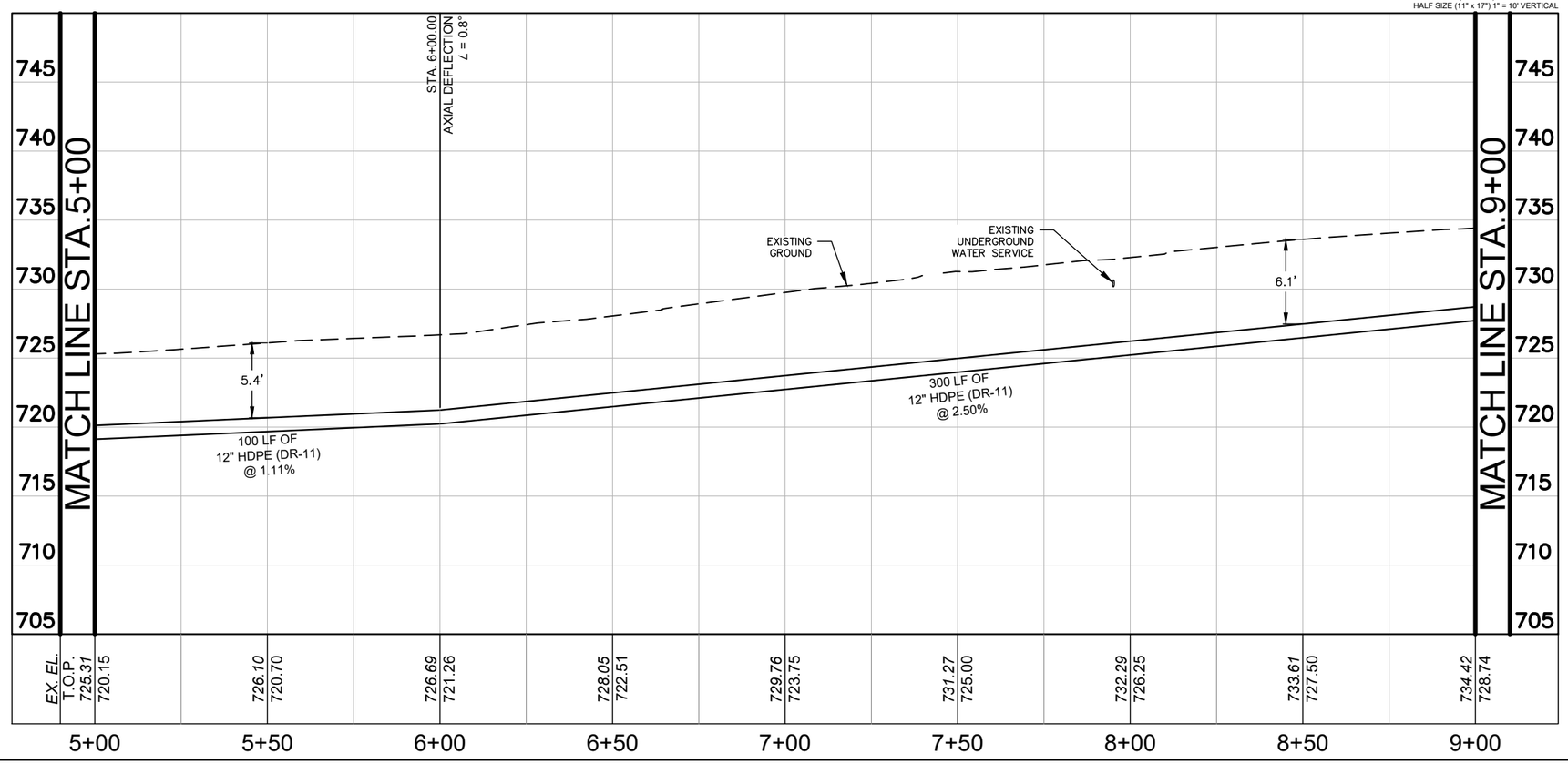
SAN ANTONIO WATER SYSTEM
SILVER MOUNTAIN DR. 12-INCH WATER MAIN
12-INCH WATER MAIN
PLAN AND PROFILE STA
1+00 TO STA 5+00

DRAWING NO.
C1

K:\SNA_Utilities\068665076 - Silver Mountain PS\CAD\PLANSHEETS - WATER ALIGNMENT\068665076 - Water Main P&P Sheet-1.dwg 6/26/25 2:08pm



PROFILE SCALE:
FULL SIZE (22" x 34") 1" = 5' VERTICAL
HALF SIZE (11" x 17") 1" = 10' VERTICAL



ITEM NO.	DESCRIPTION	UNIT	QUANTITY
103	REVEGETATION	SY	405
503.5	OPEN CUT AND RESTORE EXISTING DRIVEWAY (GRAVEL) (COSA SPEC)	SY	39
513.1	REMOVE AND RELOCATE MAILBOX (ALL TYPES) (COSA SPEC)	EA	1
515	TOPSOIL	CY	45
520.1	HYDROMULCHING (COSA SPEC)	SY	405
550.1	TRENCH EXCAVATION SAFETY AND PROTECTION	LF	400
760	CLEANING RESHAPING DITCHES (TxDOT SPEC)	LF	400
815	12" HDPE WATER LINE (DR-11)	LF	400

GRAPHIC SCALE 10'
FULL SIZE (22" x 34") 1" = 20'
HALF SIZE (11" x 17") 1" = 40'

LEGEND

- PROPOSED WATER LINE
- PROPERTY LINE
- EASEMENT BOUNDARY
- ASPHALT PAVEMENT
- FENCE
- EXISTING STORM DRAIN
- OHE — OVERHEAD ELECTRIC
- UGT — UNDERGROUND TELEPHONE
- 6" W — EXISTING WATER MAIN
- BENCH MARK
- EXIST. POWER POLE
- EXIST. GUY ANCHOR
- EXIST. STOP/SPEED SIGN
- EXIST. FIRE HYDRANT
- EXIST. WATER VALVE
- EXIST. IRRIGATION VALVE
- PROPOSED WATER VALVE
- EXIST. WATER METER
- EXIST. TELEPHONE PEDESTAL
- EXISTING TREES TO REMAIN
- AIR RELEASE VALVE
- COMBINATION AIR RELEASE VALVE
- BLOW-OFF VALVE
- EXISTING DRIVEWAY TO BE REMOVED AND REPLACED
- PROPOSED MILL AND OVERLAY EXISTING HMAC
- PROPOSED PAVEMENT RESTORATION

NOTES:

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JOB NO. 24-6007

STATE OF TEXAS
V. RYAN SOSNA
91171
REGISTERED
PROFESSIONAL ENGINEER
07/01/2025

REVISIONS

No.	Description	Drn.	Approved	Date

INFORMATION

Date: JULY 2025
Drawn by: KML
Designed by: AIG
Checked by: VRS
Scale: SHOWN ON SHEET

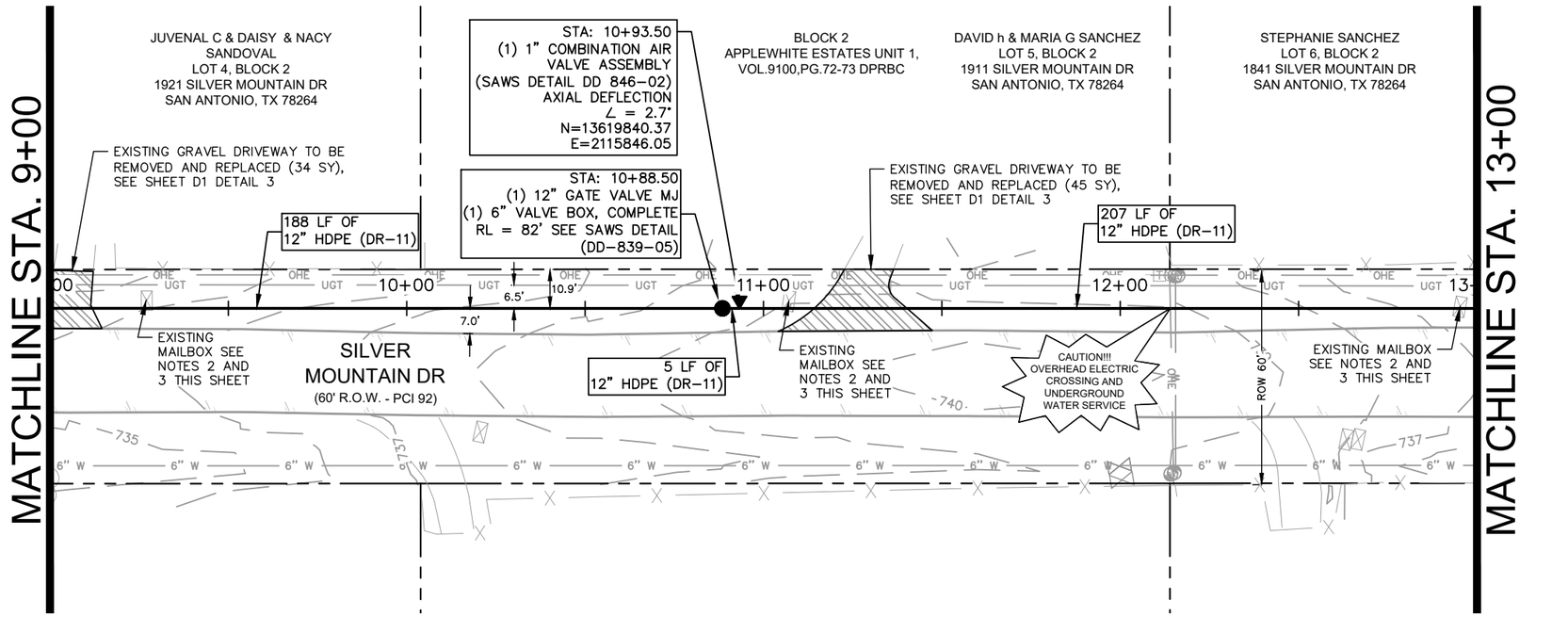
Kimley»Horn
TEXAS REGISTERED FIRM, NO. F-928

San Antonio Water System

SAN ANTONIO WATER SYSTEM
SILVER MOUNTAIN DR. 12-INCH WATER MAIN
12-INCH WATER MAIN
PLAN AND PROFILE STA
5+00 TO STA 9+00

DRAWING NO. C2

K:\SNA_Utilities\068665076 - Silver Mountain PS\CAD\PLANSHEETS - WATER ALIGNMENT\068665076 - Water Main P&P Sheet-1.dwg 6/26/25 2:08pm



PROFILE SCALE:
FULL SIZE (22" x 34") 1" = 5' VERTICAL
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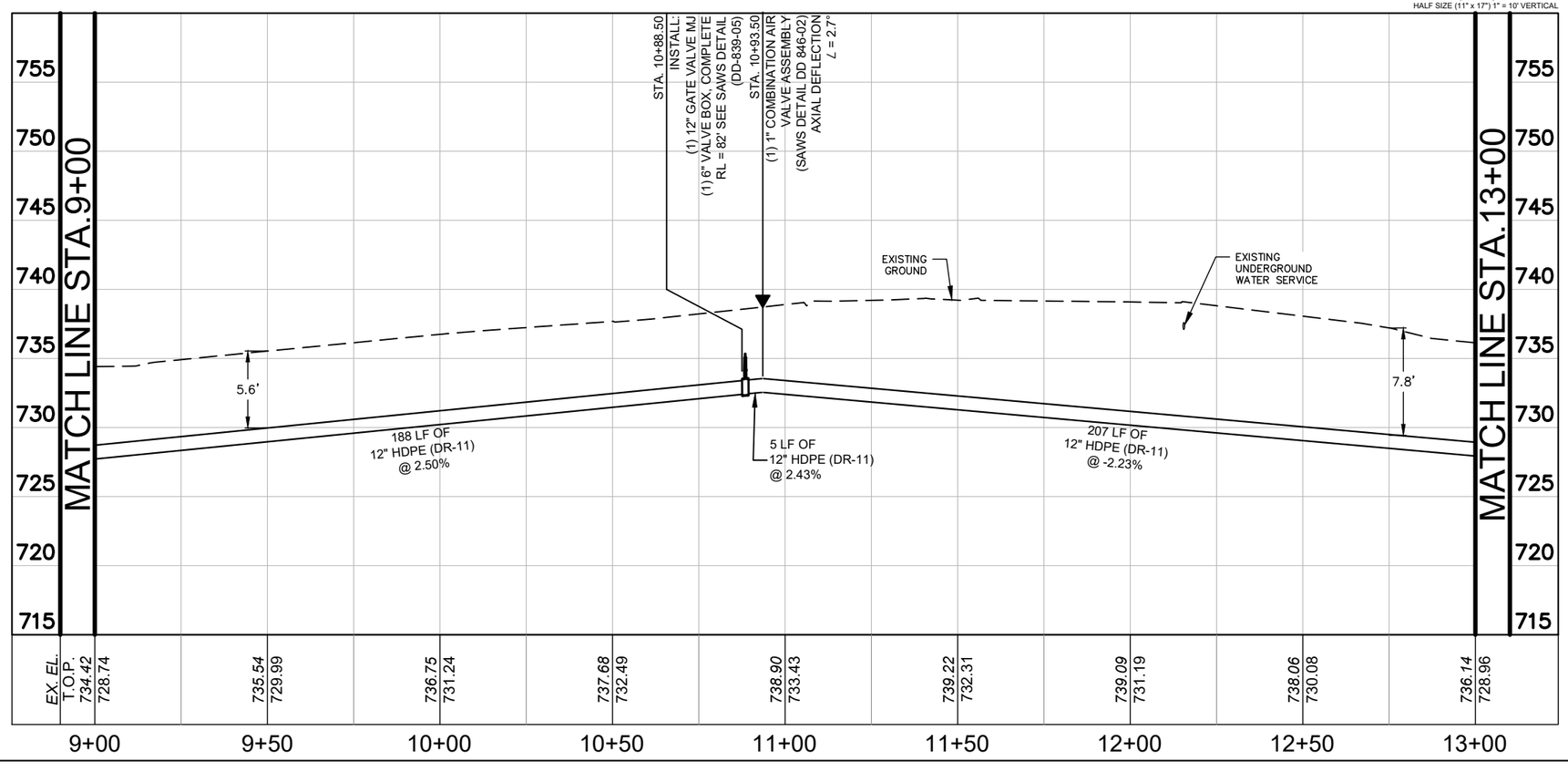

ITEM NO.	DESCRIPTION	UNIT	QUANTITY
103	REVEGETATION	SY	365
503.5	OPEN CUT AND RESTORE EXISTING DRIVEWAY (GRAVEL) (COSA SPEC)	SY	79
513.1	REMOVE AND RELOCATE MAILBOX (ALL TYPES) (COSA SPEC)	EA	3
515	TOPSOIL	CY	41
520.1	HYDROMULCHING (COSA SPEC)	SY	365
550.1	TRENCH EXCAVATION SAFETY AND PROTECTION	LF	400
760	CLEANING RESHAPING DITCHES (TxDOT SPEC)	LF	400
815	12" HDPE WATER LINE (DR-11)	LF	400
828	12" GATE VALVE ASSEMBLY	EA	1
846	1" COMBINATION AIR VALVE ASSEMBLY	EA	1

LEGEND

- PROPOSED WATER LINE
- PROPERTY LINE
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- ASPHALT PAVEMENT
- FENCE
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- OHE — OVERHEAD ELECTRIC
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GRAPHIC SCALE 10'
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JOB NO.
24-6007

STATE OF TEXAS
V. RYAN SONA
91171
REGISTERED
PROFESSIONAL ENGINEER
07/01/2025

REVISIONS

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INFORMATION

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Scale: SHOWN ON SHEET

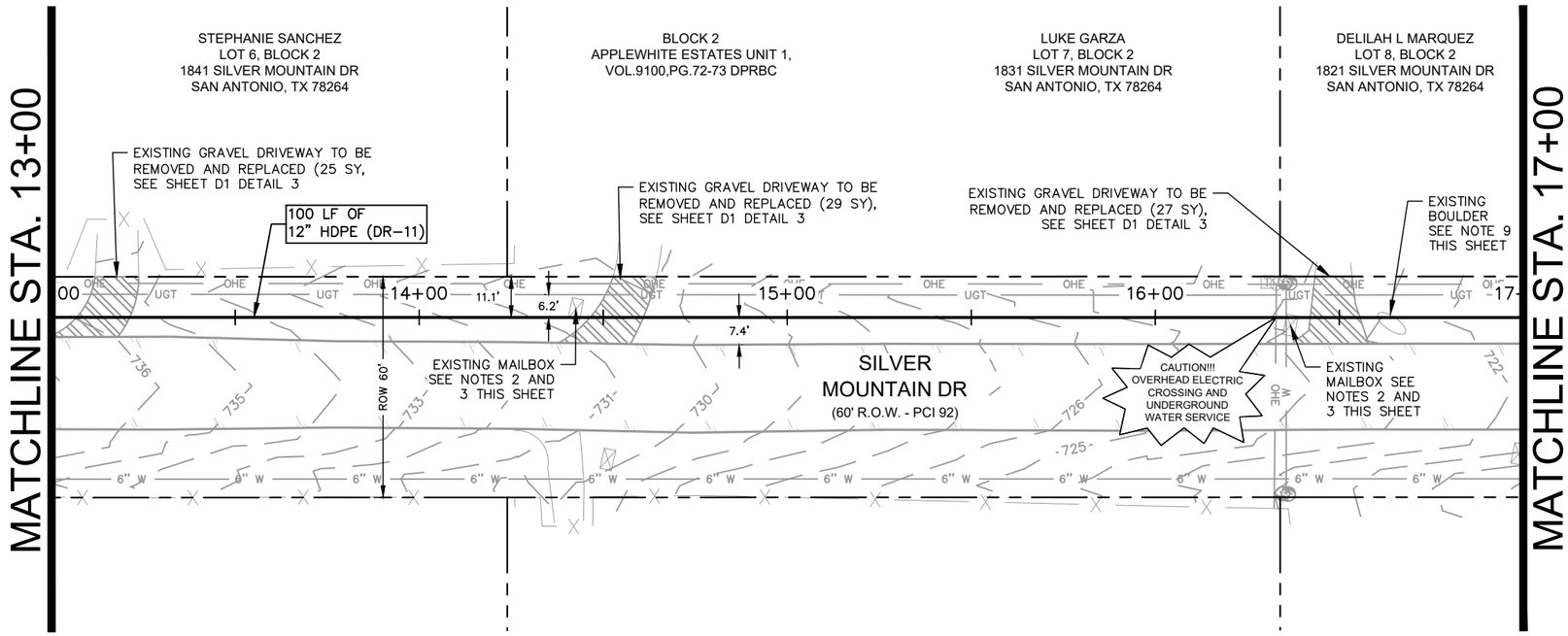
Kimley»Horn
TEXAS REGISTERED FIRM, NO. F-928

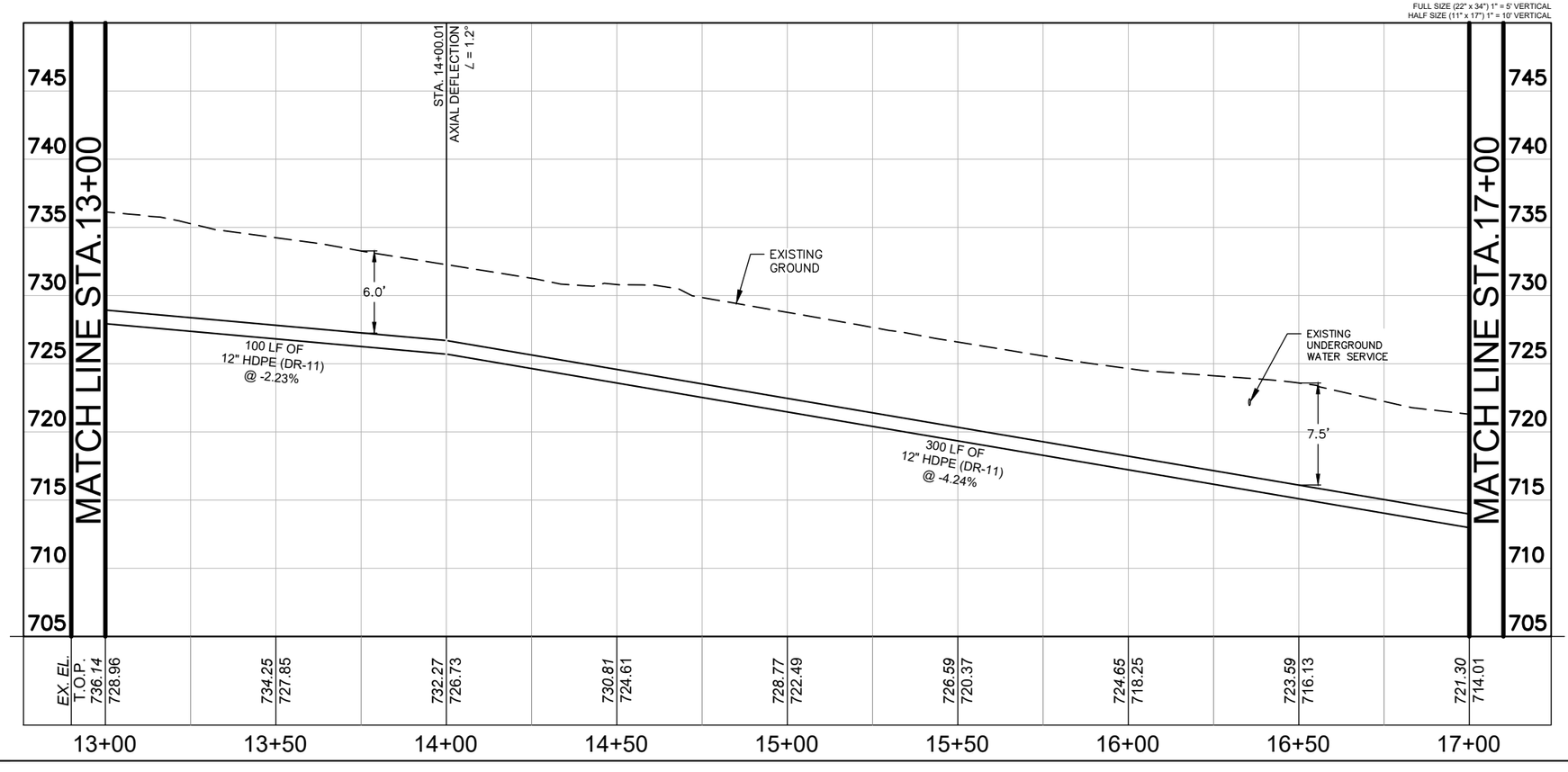
San Antonio Water System

SAN ANTONIO WATER SYSTEM
SILVER MOUNTAIN DR. 12-INCH WATER MAIN
12-INCH WATER MAIN
PLAN AND PROFILE STA
9+00 TO STA 13+00

DRAWING NO.
C3

K:\SNA_Utilities\068665076 - Silver Mountain PS\CAD\PLANSHEETS - WATER ALIGNMENT\068665076 - Water Main P&P Sheet-1.dwg 6/26/25 2:08pm





ITEM NO.	DESCRIPTION	UNIT	QUANTITY
103	REVEGETATION	SY	363
503.5	OPEN CUT AND RESTORE EXISTING DRIVEWAY (GRAVEL) (COSA SPEC)	SY	81
513.1	REMOVE AND RELOCATE MAILBOX (ALL TYPES) (COSA SPEC)	EA	2
515	TOPSOIL	CY	40
520.1	HYDROMULCHING (COSA SPEC)	SY	363
550.1	TRENCH EXCAVATION SAFETY AND PROTECTION	LF	400
760	CLEANING RESHAPING DITCHES (TxDOT SPEC)	LF	400
815	12" HDPE WATER LINE (DR-11)	LF	400

LEGEND

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GRAPHIC SCALE 20'
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JOB NO. 24-6007

STATE OF TEXAS · RYAN SONA · 91171 · REGISTERED PROFESSIONAL ENGINEER · 07/01/2025

REVISIONS

No.	Description	Drn.	Approved	Date

INFORMATION

Date: JULY 2025
Drawn by:KML
Designed by: AIG
Checked by: VRS
Scale: SHOWN ON SHEET

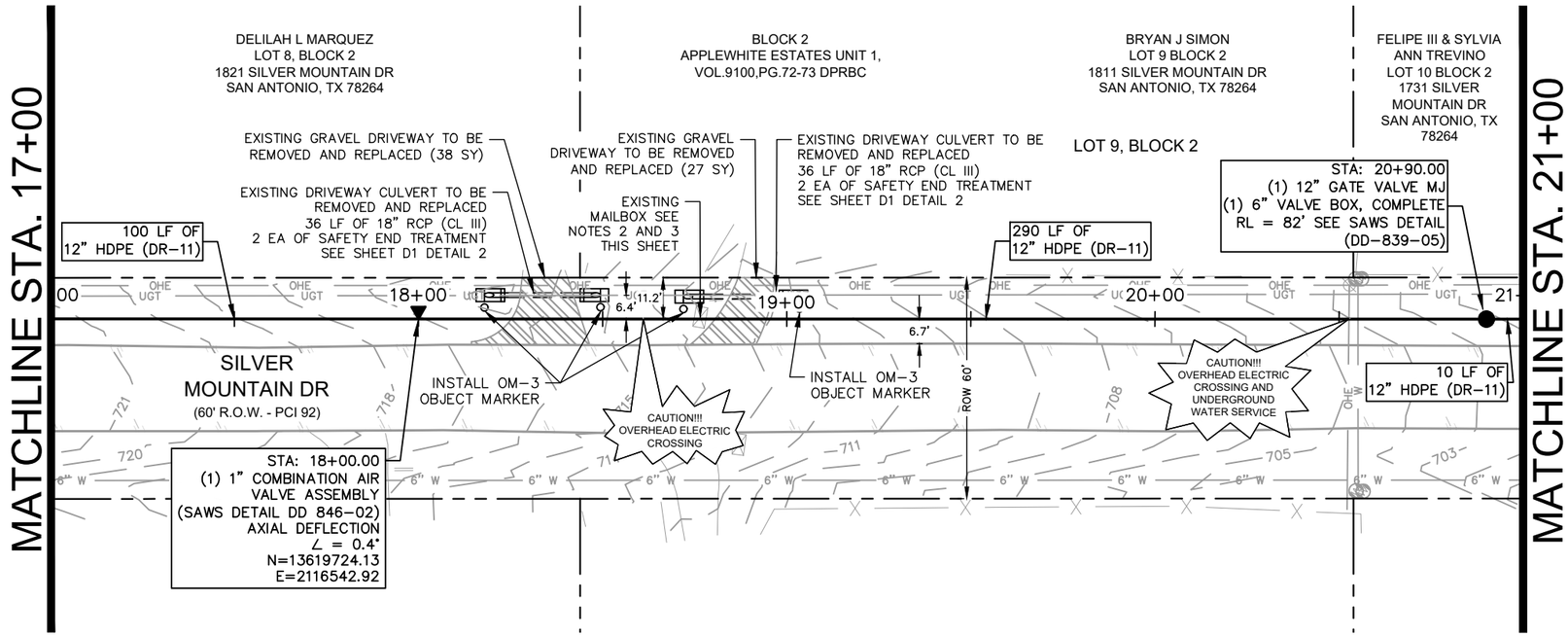
Kimley»Horn
TEXAS REGISTERED FIRM, NO. F-928

San Antonio Water System

SAN ANTONIO WATER SYSTEM

SILVER MOUNTAIN DR. 12-INCH WATER MAIN
12-INCH WATER MAIN
PLAN AND PROFILE STA
13+00 TO STA 17+00

DRAWING NO. C4



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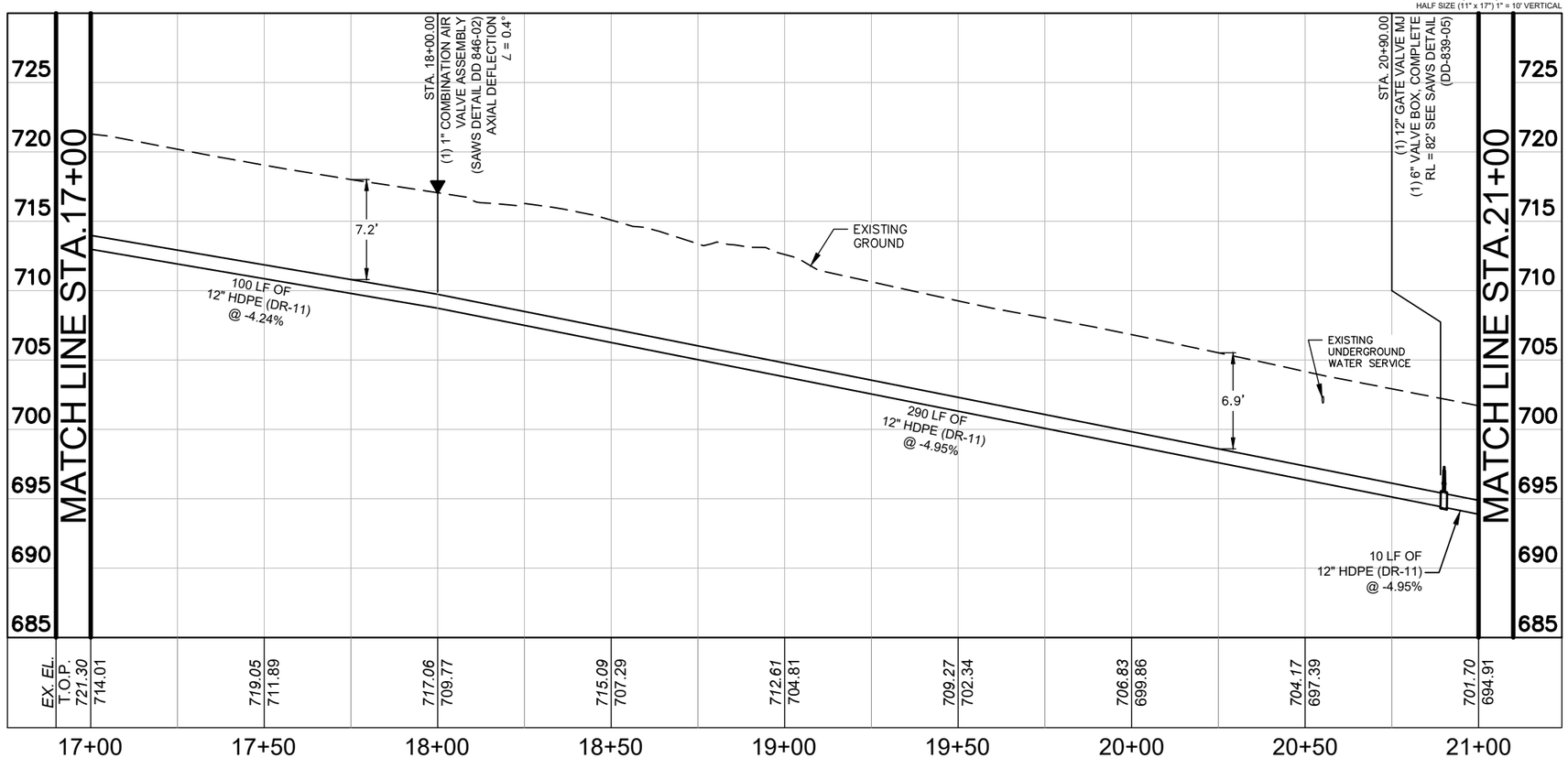

ITEM NO.	DESCRIPTION	UNIT	QUANTITY
103	REVEGETATION	SY	379
401.1	REINFORCED CONCRETE PIPE (CLASS III) (18") (COSA SPEC)	LF	72
401.4	SAFETY END TREATMENT (TYPE 1) (COSA SPEC)	EA	4
503.5	OPEN CUT AND RESTORE EXISTING DRIVEWAY (GRAVEL) (COSA SPEC)	SY	65
513.1	REMOVE AND RELOCATE MAILBOX (ALL TYPES) (COSA SPEC)	EA	1
515	TOPSOIL	CY	42
520.1	HYDROMULCHING (COSA SPEC)	SY	379
531.55	INSTALL TRAFFIC SIGNAGE (OM-3) (COSA SPEC)	EA	4
550.1	TRENCH EXCAVATION SAFETY AND PROTECTION	LF	400
760	CLEANING RESHAPING DITCHES (TxDOT SPEC)	LF	400
815	12" HDPE WATER LINE (DR-11)	LF	400
828	12" GATE VALVE ASSEMBLY	EA	1
846	1" COMBINATION AIR VALVE ASSEMBLY	EA	1

GRAPHIC SCALE 20'
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LEGEND

- PROPOSED WATER LINE
- PROPERTY LINE
- EASEMENT BOUNDARY
- ASPHALT PAVEMENT
- FENCE
- EXISTING STORM DRAIN
- OVERHEAD ELECTRIC
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JOB NO.
24-6007

STATE OF TEXAS · RYAN SONA · 91171 · REGISTERED PROFESSIONAL ENGINEER
07/01/2025

REVISIONS

No.	Description	Drn.	Approved	Date

INFORMATION
Date: JULY 2025
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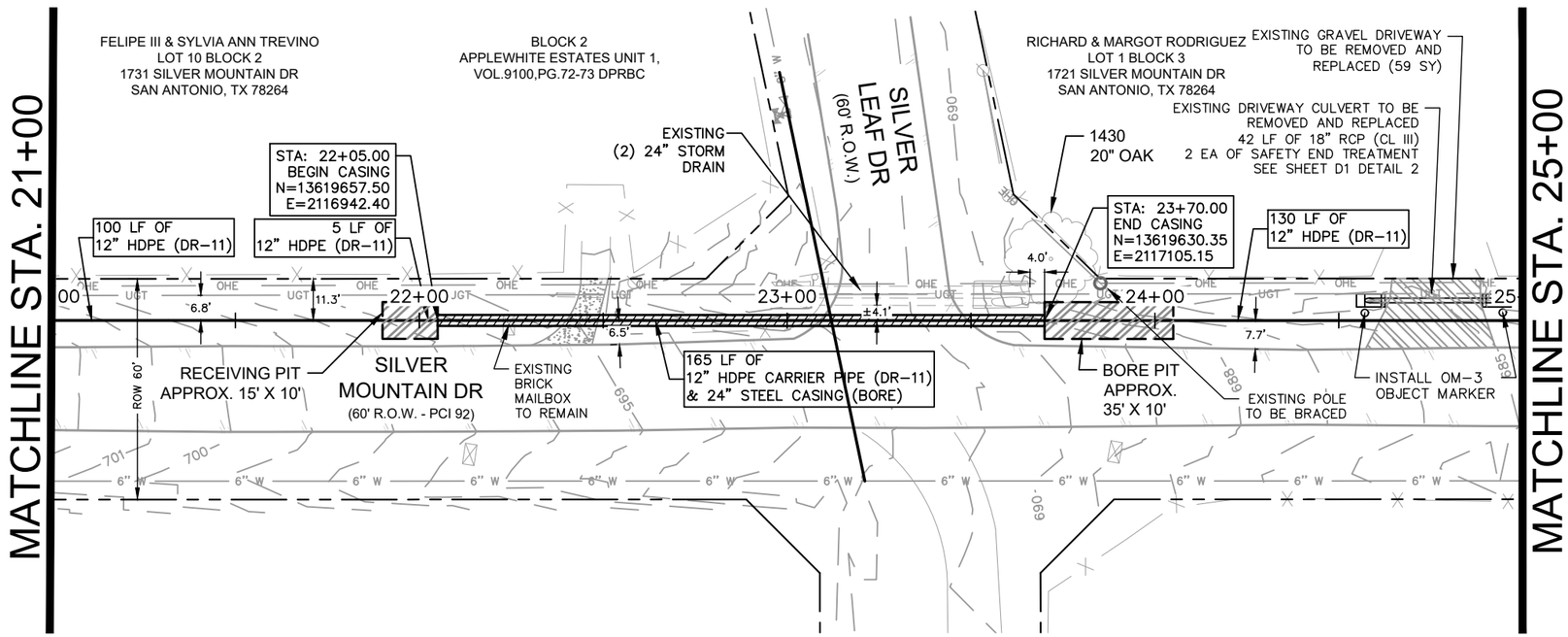
Checked by: VRS
Scale: SHOWN ON SHEET

Kimley»Horn
TEXAS REGISTERED FIRM, NO. F-928

San Antonio Water System

SAN ANTONIO WATER SYSTEM
SILVER MOUNTAIN DR. 12-INCH WATER MAIN
12-INCH WATER MAIN
PLAN AND PROFILE STA 17+00 TO STA 21+00

DRAWING NO.
C5



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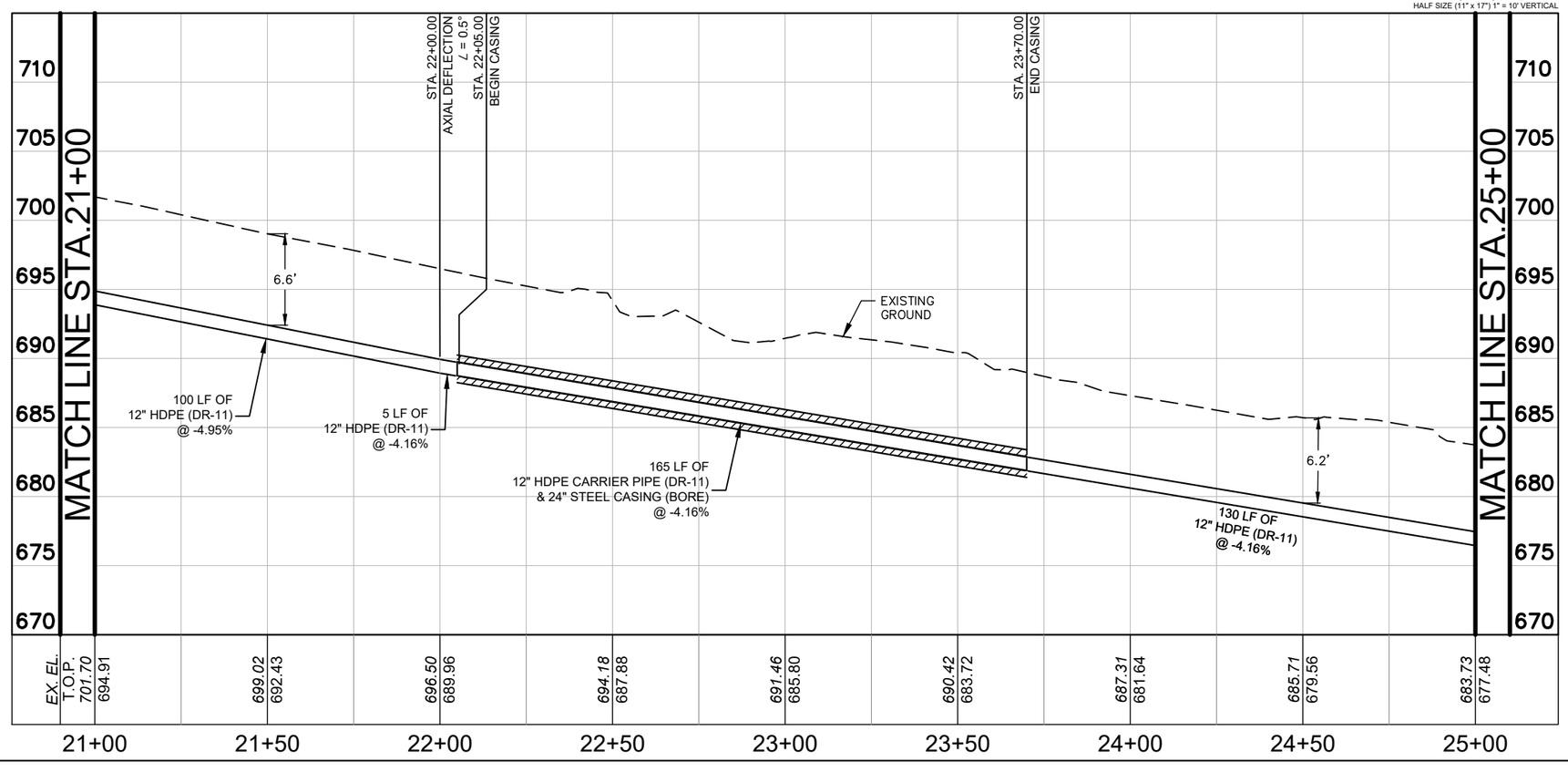

GRAPHIC SCALE 20'
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ITEM NO.	DESCRIPTION	UNIT	QUANTITY
103	REVEGETATION	SY	202
401.1	REINFORCED CONCRETE PIPE (CLASS III) (18") (COSA SPEC)	LF	42
401.4	SAFETY END TREATMENT (TYPE 1) (COSA SPEC)	EA	2
503.5	OPEN CUT AND RESTORE EXISTING DRIVEWAY (GRAVEL) (COSA SPEC)	SY	59
515	TOPSOIL	CY	22
520.1	HYDROMULCHING (COSA SPEC)	SY	202
531.55	INSTALL TRAFFIC SIGNAGE (OM-3) (COSA SPEC)	EA	2
550.1	TRENCH EXCAVATION SAFETY AND PROTECTION	LF	235
760	CLEANING RESHAPING DITCHES (TxDOT SPEC)	LF	235
815	12" HDPE WATER LINE (DR-11)	LF	235
856.1	12" HDPE CARRIER PIPE (DR-11)	LF	165
856.2	24" STEEL CASING (BORE)	LF	165

LEGEND

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- FENCE
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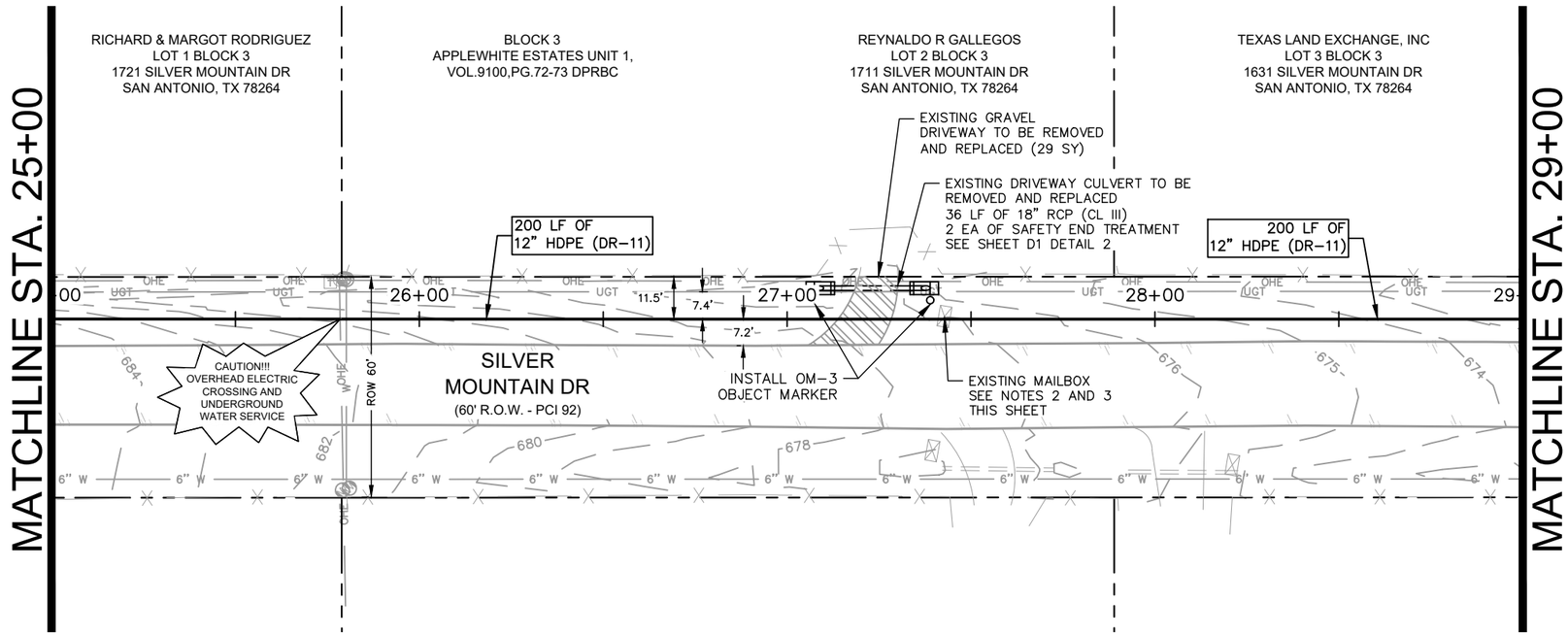
San Antonio Water System

SAN ANTONIO WATER SYSTEM
SILVER MOUNTAIN DR. 12-INCH WATER MAIN
12-INCH WATER MAIN
PLAN AND PROFILE STA
21+00 TO STA 25+00

DRAWING NO.
C6



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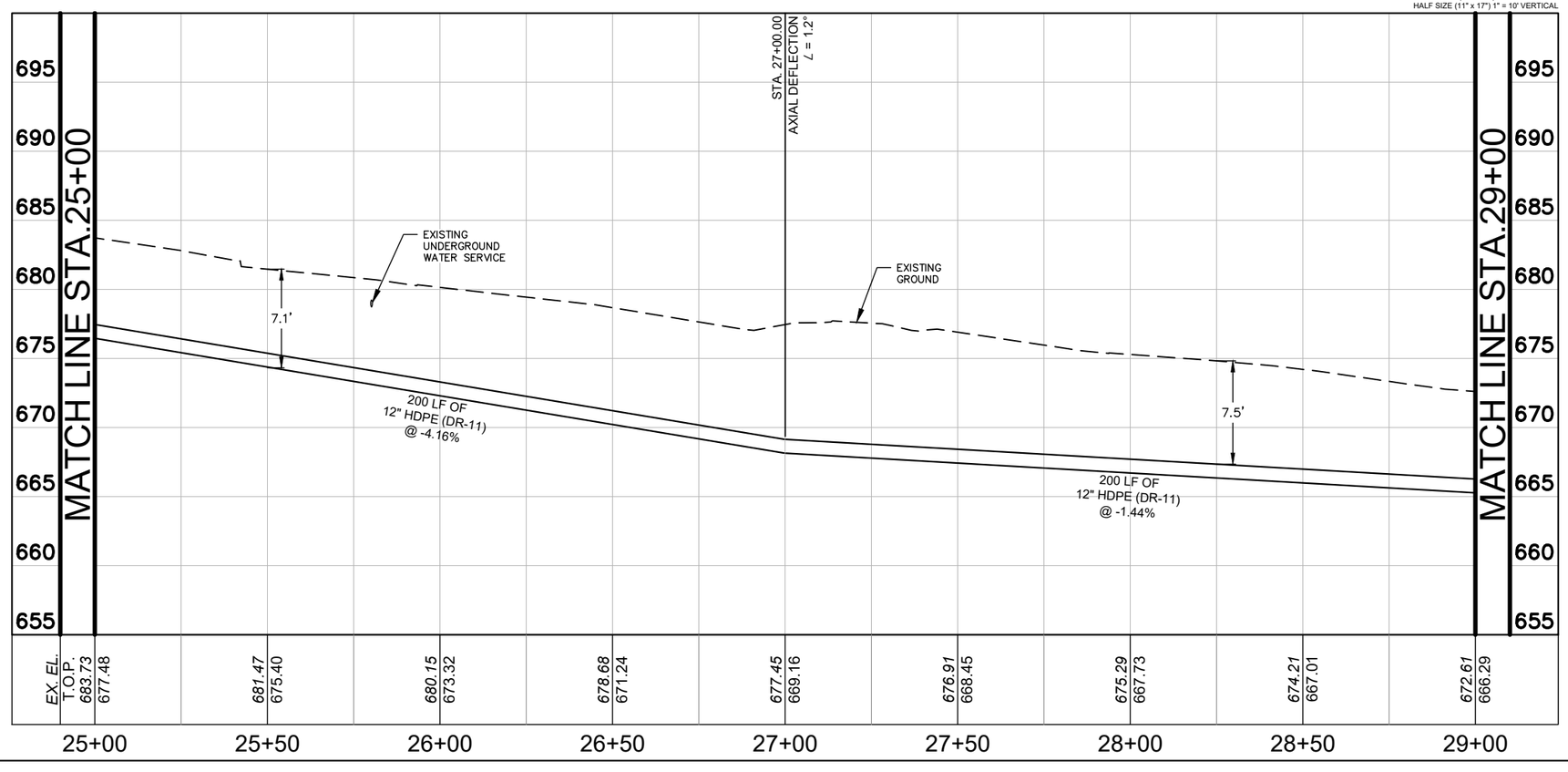

ITEM NO.	DESCRIPTION	UNIT	QUANTITY
103	REVEGETATION	SY	415
401.1	REINFORCED CONCRETE PIPE (CLASS III) (18") (COSA SPEC)	LF	36
401.4	SAFETY END TREATMENT (TYPE 1) (COSA SPEC)	EA	2
503.5	OPEN CUT AND RESTORE EXISTING DRIVEWAY (GRAVEL) (COSA SPEC)	SY	29
513.1	REMOVE AND RELOCATE MAILBOX (ALL TYPES) (COSA SPEC)	EA	1
515	TOPSOIL	CY	46
520.1	HYDROMULCHING (COSA SPEC)	SY	415
531.55	INSTALL TRAFFIC SIGNAGE (OM-3) (COSA SPEC)	EA	2
550.1	TRENCH EXCAVATION SAFETY AND PROTECTION	LF	400
760	CLEANING RESHAPING DITCHES (TxDOT SPEC)	LF	400
815	12" HDPE WATER LINE (DR-11)	LF	400

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WARNING: CONTRACTOR TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

JOB NO.
24-6007

STATE OF TEXAS
V. RYAN SOSNA
91171
REGISTERED
PROFESSIONAL ENGINEER
07/01/2025

REVISIONS

No.	Description	Drn.	Approved	Date

INFORMATION

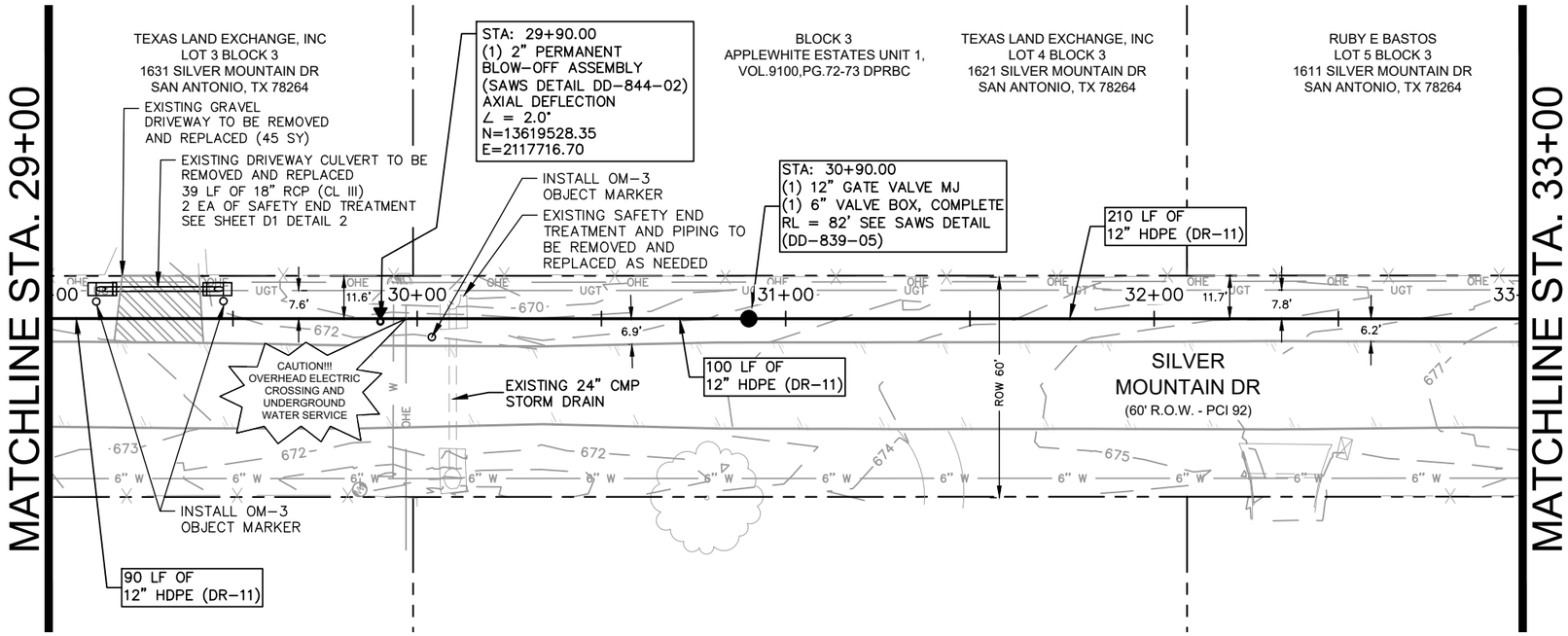
Date: JULY 2025
Drawn by: KML
Designed by: AIG
Checked by: VRS
Scale: SHOWN ON SHEET

Kimley»Horn
TEXAS REGISTERED FIRM, NO. F-928

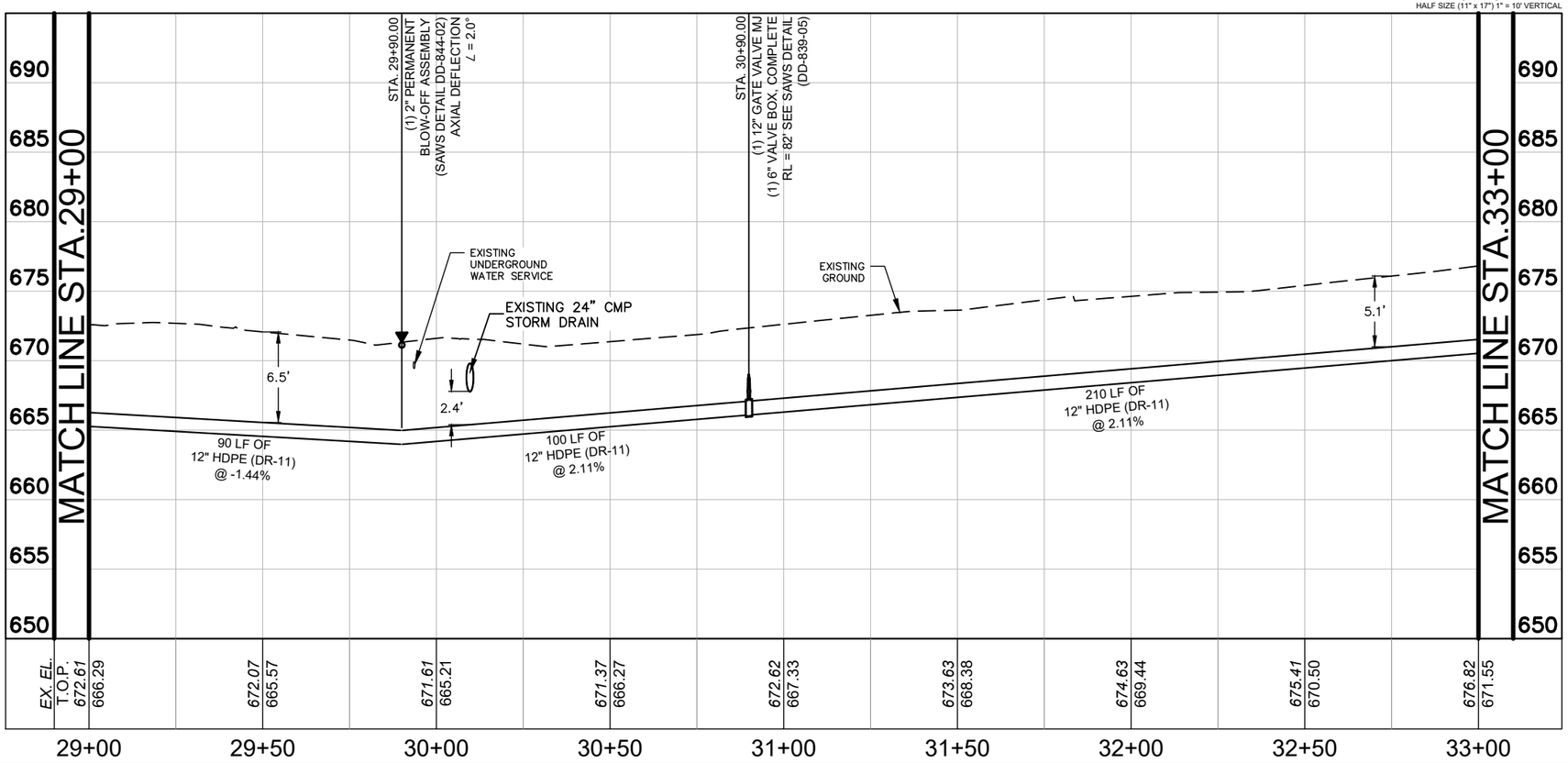
San Antonio Water System

SAN ANTONIO WATER SYSTEM
SILVER MOUNTAIN DR. 12-INCH WATER MAIN
12-INCH WATER MAIN
PLAN AND PROFILE STA
25+00 TO STA 29+00

DRAWING NO.
C7



PROFILE SCALE:
FULL SIZE (22" x 34") 1" = 5' VERTICAL
HALF SIZE (11" x 17") 1" = 10' VERTICAL



ITEM NO.	DESCRIPTION	UNIT	QUANTITY
103	REVEGETATION	SY	399.44
307	REMOVE AND REPLACE CONCRETE 36" SAFETY END TREATMENT	EA	1
401.1	REINFORCED CONCRETE PIPE (CLASS III) (18") (COSA SPEC)	LF	39
401.4	SAFETY END TREATMENT (TYPE 1) (COSA SPEC)	EA	2
503.5	OPEN CUT AND RESTORE EXISTING DRIVEWAY (GRAVEL) (COSA SPEC)	SY	45
515	TOPSOIL	CY	44
520.1	HYDROMULCHING (COSA SPEC)	SY	399
531.55	INSTALL TRAFFIC SIGNAGE (OM-3) (COSA SPEC)	EA	2
550.1	TRENCH EXCAVATION SAFETY AND PROTECTION	LF	400
760	CLEANING RESHAPING DITCHES (TxDOT SPEC)	LF	400
815	12" HDPE WATER LINE (DR-11)	LF	400
828	12" GATE VALVE ASSEMBLY	EA	1
844	2" PERMANENT BLOW-OFF ASSEMBLY	EA	1

GRAPHIC SCALE 10'
FULL SIZE (22" x 34") 1" = 20'
HALF SIZE (11" x 17") 1" = 40'

LEGEND

- PROPOSED WATER LINE
- PROPERTY LINE
- EASEMENT BOUNDARY
- ASPHALT PAVEMENT
- FENCE
- EXISTING STORM DRAIN
- OVERHEAD ELECTRIC
- UNDERGROUND TELEPHONE
- EXISTING WATER MAIN
- BENCH MARK
- EXIST. POWER POLE
- EXIST. GUY ANCHOR
- EXIST. STOP/SPEED SIGN
- EXIST. FIRE HYDRANT
- EXIST. WATER VALVE
- EXIST. IRRIGATION VALVE
- PROPOSED WATER VALVE
- EXIST. WATER METER
- EXIST. TELEPHONE PEDESTAL
- EXISTING TREES TO REMAIN
- AIR RELEASE VALVE
- COMBINATION AIR RELEASE VALVE
- BLOW-OFF VALVE
- EXISTING DRIVEWAY TO BE REMOVED AND REPLACED
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- PROPOSED PAVEMENT RESTORATION

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STATE OF TEXAS
K. RYAN SONA
91171
REGISTERED
PROFESSIONAL ENGINEER
07/01/2025

REVISIONS

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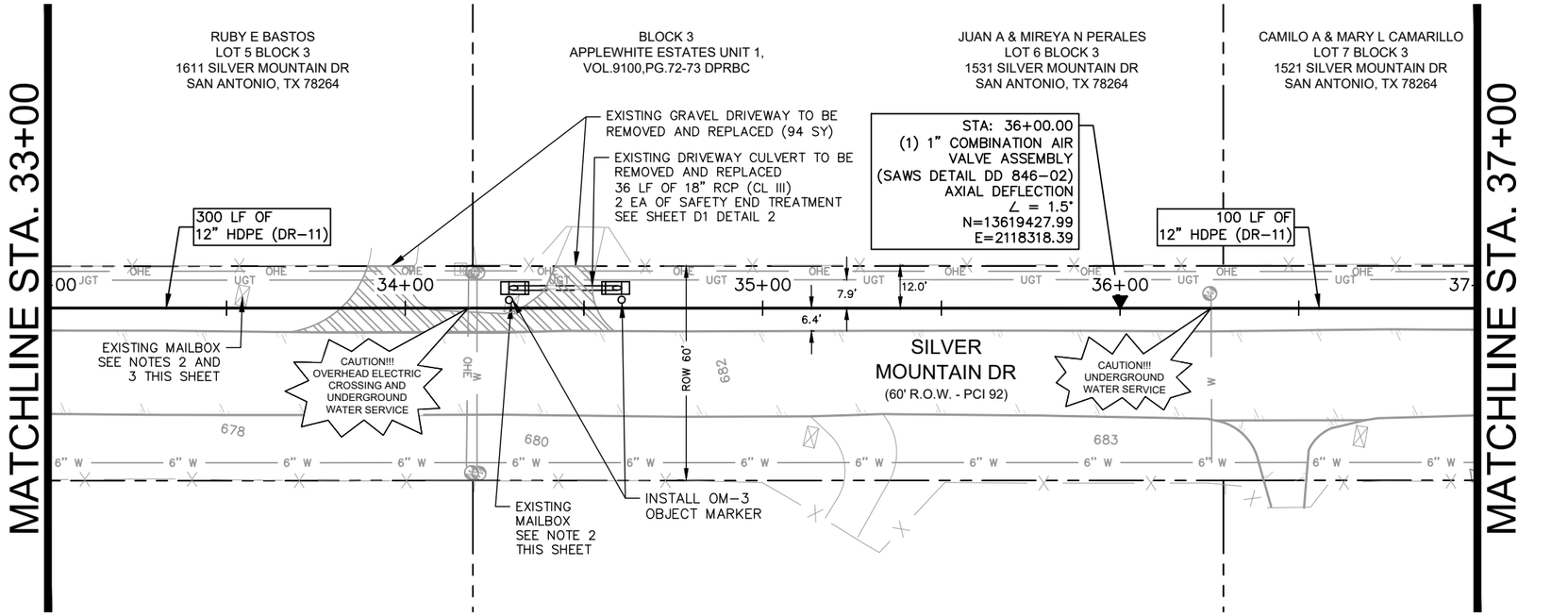
Kimley»Horn
TEXAS REGISTERED FIRM, NO. F-928

San Antonio Water System

SAN ANTONIO WATER SYSTEM
SILVER MOUNTAIN DR. 12-INCH WATER MAIN
12-INCH WATER MAIN
PLAN AND PROFILE STA
29+00 TO STA 33+00

DRAWING NO.
C8



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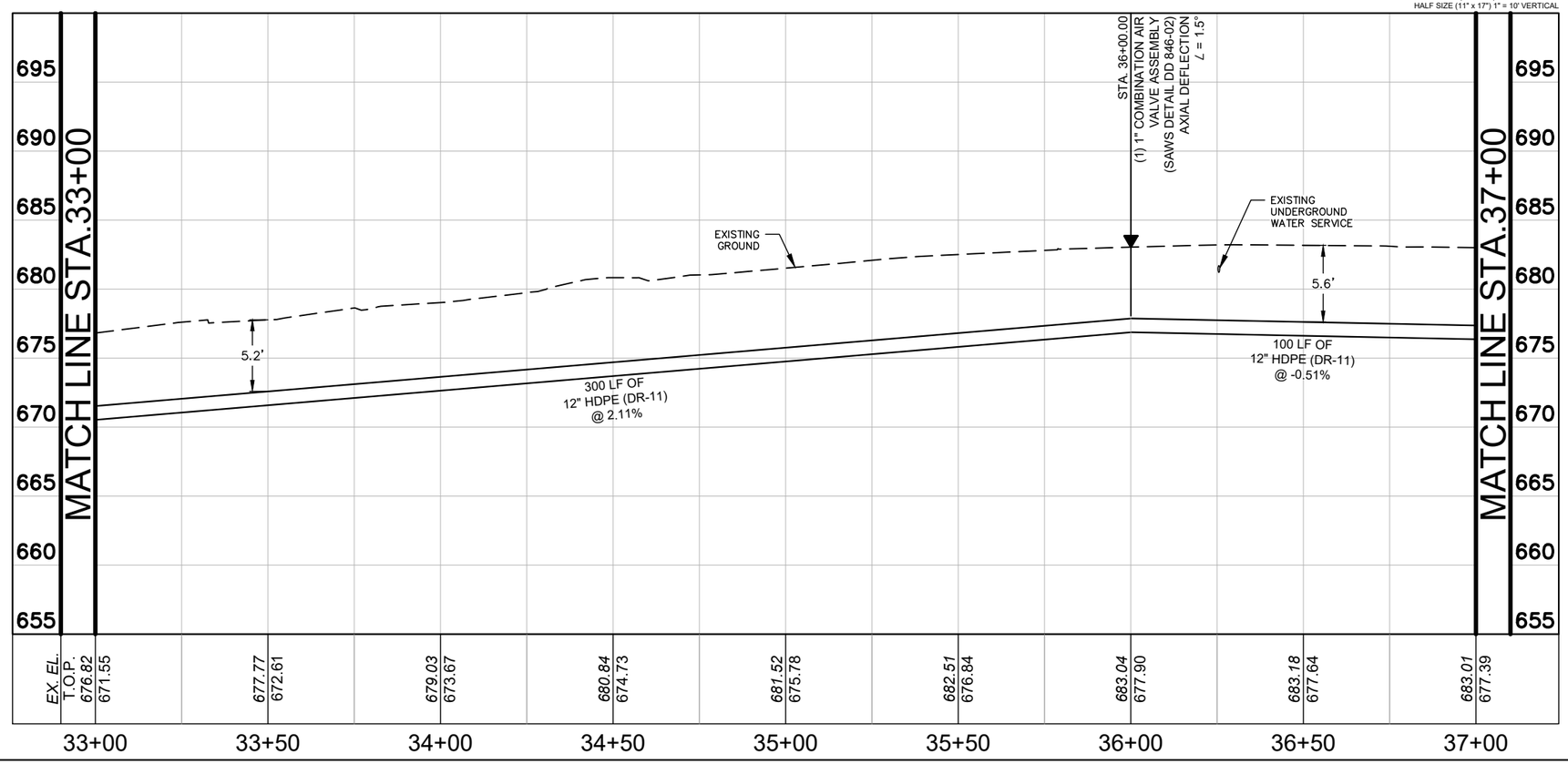

ITEM NO.	DESCRIPTION	UNIT	QUANTITY
103	REVEGETATION	SY	350
401.1	REINFORCED CONCRETE PIPE (CLASS III) (18") (COSA SPEC)	LF	36
401.4	SAFETY END TREATMENT (TYPE 1) (COSA SPEC)	EA	2
503.5	OPEN CUT AND RESTORE EXISTING DRIVEWAY (GRAVEL) (COSA SPEC)	SY	94
513.1	REMOVE AND RELOCATE MAILBOX (ALL TYPES) (COSA SPEC)	EA	2
515	TOPSOIL	CY	39
520.1	HYDROMULCHING (COSA SPEC)	SY	350
531.55	INSTALL TRAFFIC SIGNAGE (OM-3) (COSA SPEC)	EA	3
550.1	TRENCH EXCAVATION SAFETY AND PROTECTION	LF	400
760	CLEANING RESHAPING DITCHES (TxDOT SPEC)	LF	400
815	12" HDPE WATER LINE (DR-11)	LF	400
846	1" COMBINATION AIR VALVE ASSEMBLY	EA	1

LEGEND

- PROPOSED WATER LINE
- PROPERTY LINE
- EASEMENT BOUNDARY
- ASPHALT PAVEMENT
- FENCE
- EXISTING STORM DRAIN
- OHE — OVERHEAD ELECTRIC
- UGT — UNDERGROUND TELEPHONE
- 6" W — EXISTING WATER MAIN
- BENCH MARK
- EXIST. POWER POLE
- EXIST. GUY ANCHOR
- EXIST. STOP/SPEED SIGN
- EXIST. FIRE HYDRANT
- EXIST. WATER VALVE
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- EXIST. WATER METER
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GRAPHIC SCALE 20'
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JOB NO. 24-6007

STATE OF TEXAS · RYAN L. SONA · 91171 · REGISTERED PROFESSIONAL ENGINEER
07/01/2025

REVISIONS

No.	Description	Drn.	Approved	Date

INFORMATION

Date: JULY 2025
Drawn by: KML
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Scale: SHOWN ON SHEET

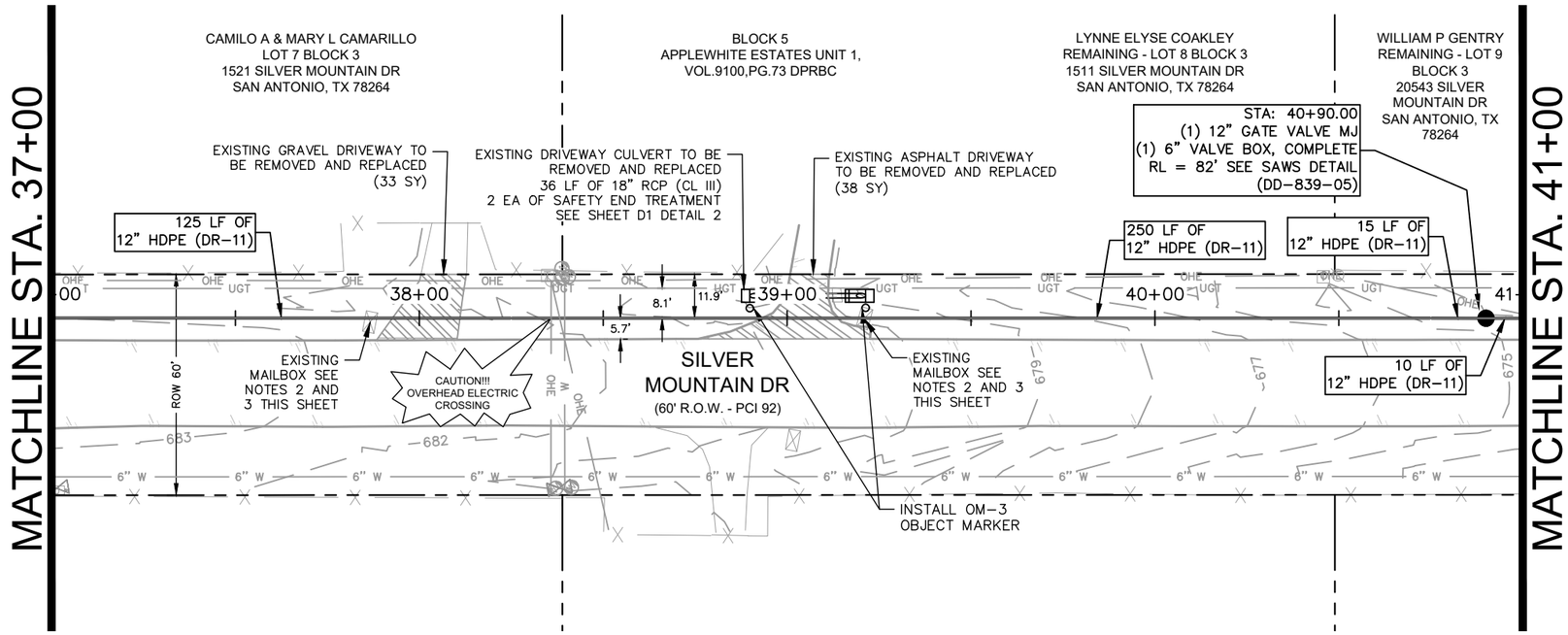
Kimley»Horn
TEXAS REGISTERED FIRM, NO. F-928

San Antonio Water System

SAN ANTONIO WATER SYSTEM
SILVER MOUNTAIN DR. 12-INCH WATER MAIN
12-INCH WATER MAIN
PLAN AND PROFILE STA
33+00 TO STA 37+00

DRAWING NO. C9

K:\SNA_Utilities\068665076 - Silver Mountain PS\CAD\PLANSHEETS - WATER ALIGNMENT\068665076 - Water Main P&P Sheet-3.dwg 6/26/25 2:09pm



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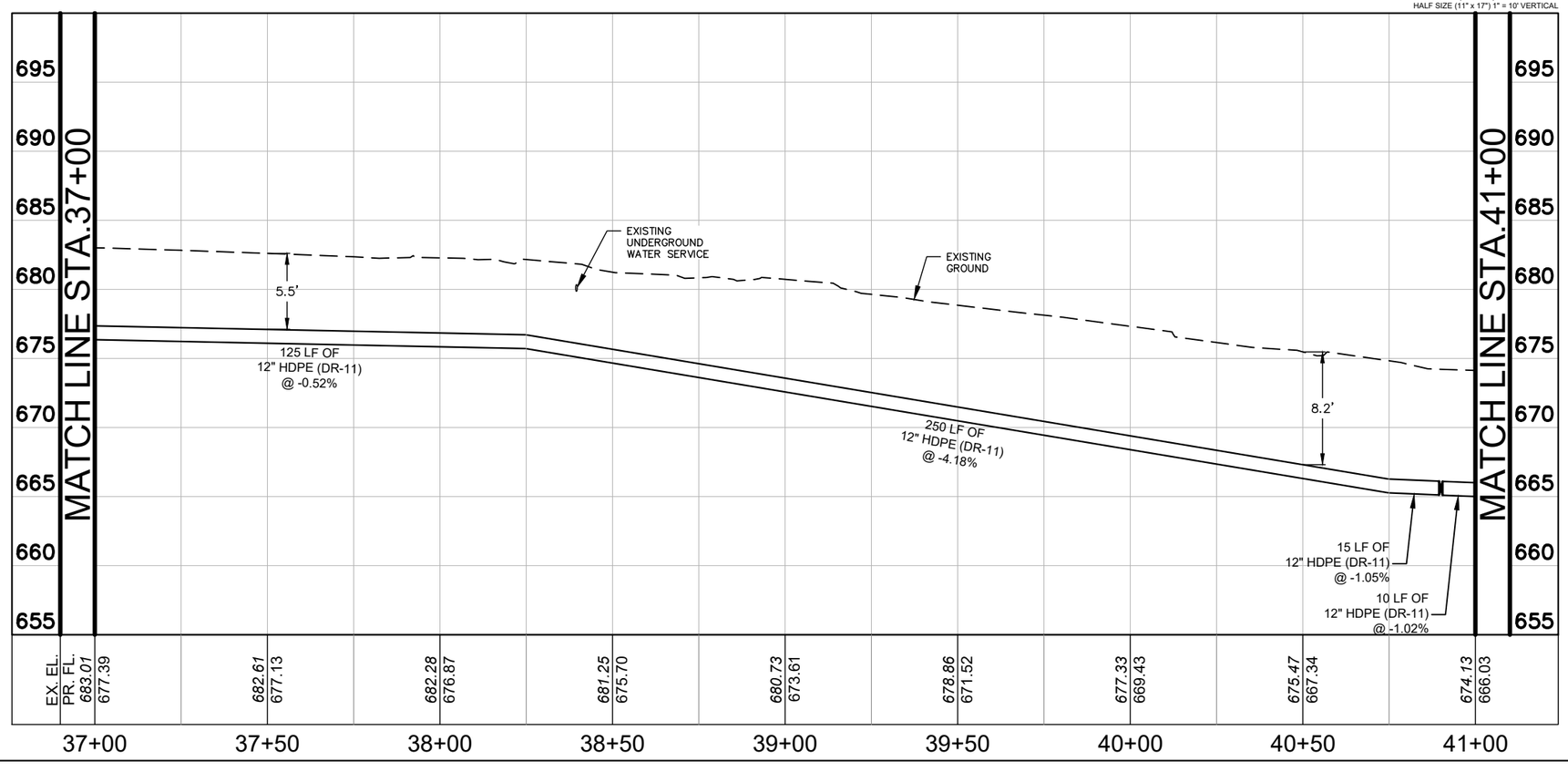

ITEM NO.	DESCRIPTION	UNIT	QUANTITY
103	REVEGETATION	SY	373
401.1	REINFORCED CONCRETE PIPE (CLASS III) (18") (COSA SPEC)	LF	36
401.4	SAFETY END TREATMENT (TYPE 1) (COSA SPEC)	EA	2
503.4	OPEN CUT AND RESTORE EXISTING DRIVEWAY (ASPHALTIC) (COSA SPEC)	SY	38
503.5	OPEN CUT AND RESTORE EXISTING DRIVEWAY (GRAVEL) (COSA SPEC)	SY	33
513.1	REMOVE AND RELOCATE MAILBOX (ALL TYPES) (COSA SPEC)	EA	2
515	TOPSOIL	CY	41
520.1	HYDROMULCHING (COSA SPEC)	SY	373
531.55	INSTALL TRAFFIC SIGNAGE (OM-3) (COSA SPEC)	EA	2
550.1	TRENCH EXCAVATION SAFETY AND PROTECTION	LF	400
760	CLEANING RESHAPING DITCHES (TxDOT SPEC)	LF	400
815	12" HDPE WATER LINE (DR-11)	LF	400
828	12" GATE VALVE ASSEMBLY	EA	1

LEGEND

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GRAPHIC SCALE 20'
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JOB NO. 24-6007

STATE OF TEXAS · RYAN SONA · 91171 · REGISTERED PROFESSIONAL ENGINEER
07/01/2025

REVISIONS

No.	Description	Drn.	Approved	Date

INFORMATION

Date: JULY 2025
Drawn by: KML
Designed by: AIG
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Scale: SHOWN ON SHEET

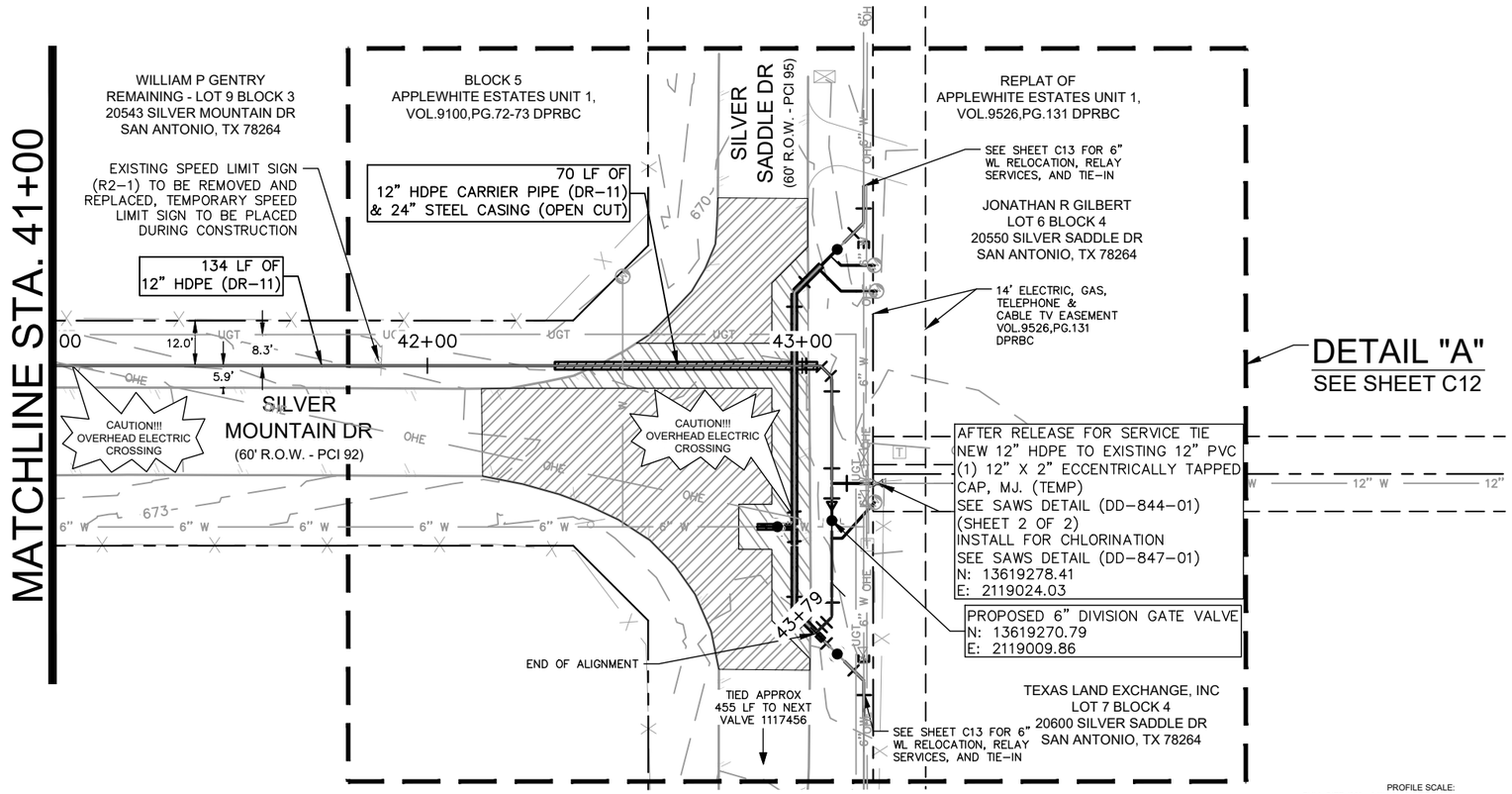
Kimley»Horn
TEXAS REGISTERED FIRM, NO. F-928

San Antonio Water System

SAN ANTONIO WATER SYSTEM
SILVER MOUNTAIN DR. 12-INCH WATER MAIN
12-INCH WATER MAIN
PLAN AND PROFILE STA
37+00 TO STA 41+00

DRAWING NO. C10

K:\SNA_Utilities\068665076 - Silver Mountain PS\CAD\PLANSHEETS - WATER ALIGNMENT\068665076 - Water Main P&P Sheet-4.dwg 6/26/25 2:09pm



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ITEM NO.	DESCRIPTION	UNIT	QUANTITY
103	REVEGETATION	SY	154
202.1	PRIME COAT (0.20 GAL/SY) (COSA SPEC)	GAL	38
203.1	TACK COAT (0.10 GAL/SY) (COSA SPEC)	GAL	19
205.2	HMAC TYPE B (10" COMPACTED) (COSA SPEC)	SY	140
205.4	HMAC TYPE D (2" COMPACTED) (COSA SPEC)	SY	188
208.1	CHIP SEAL, CRSP EMULSION, GR 5 TRAP ROCK	SY	479
299	FLOWABLE FILL	CY	23
515	TOPSOIL	CY	17
520.1	HYDROMULCHING (COSA SPEC)	SY	154
531.6	REMOVE AND REPLACE TRAFFIC SIGNAGE (R2-1) (COSA SPEC)	EA	1
550.1	TRENCH EXCAVATION SAFETY AND PROTECTION	LF	279
760	CLEANING RESHAPING DITCHES (TxDOT SPEC)	LF	209
815	12" HDPE WATER LINE (DR-11)	LF	209
828	6" GATE VALVE ASSEMBLY	EA	1
840	12" WATER TIE-IN	EA	1
844	2" BLOWOFF (TEMPORARY)	EA	1
856.1	12" HDPE CARRIER PIPE (DR-11)	LF	70
856.2	24" STEEL CASING (OPEN CUT)	LF	70

LEGEND

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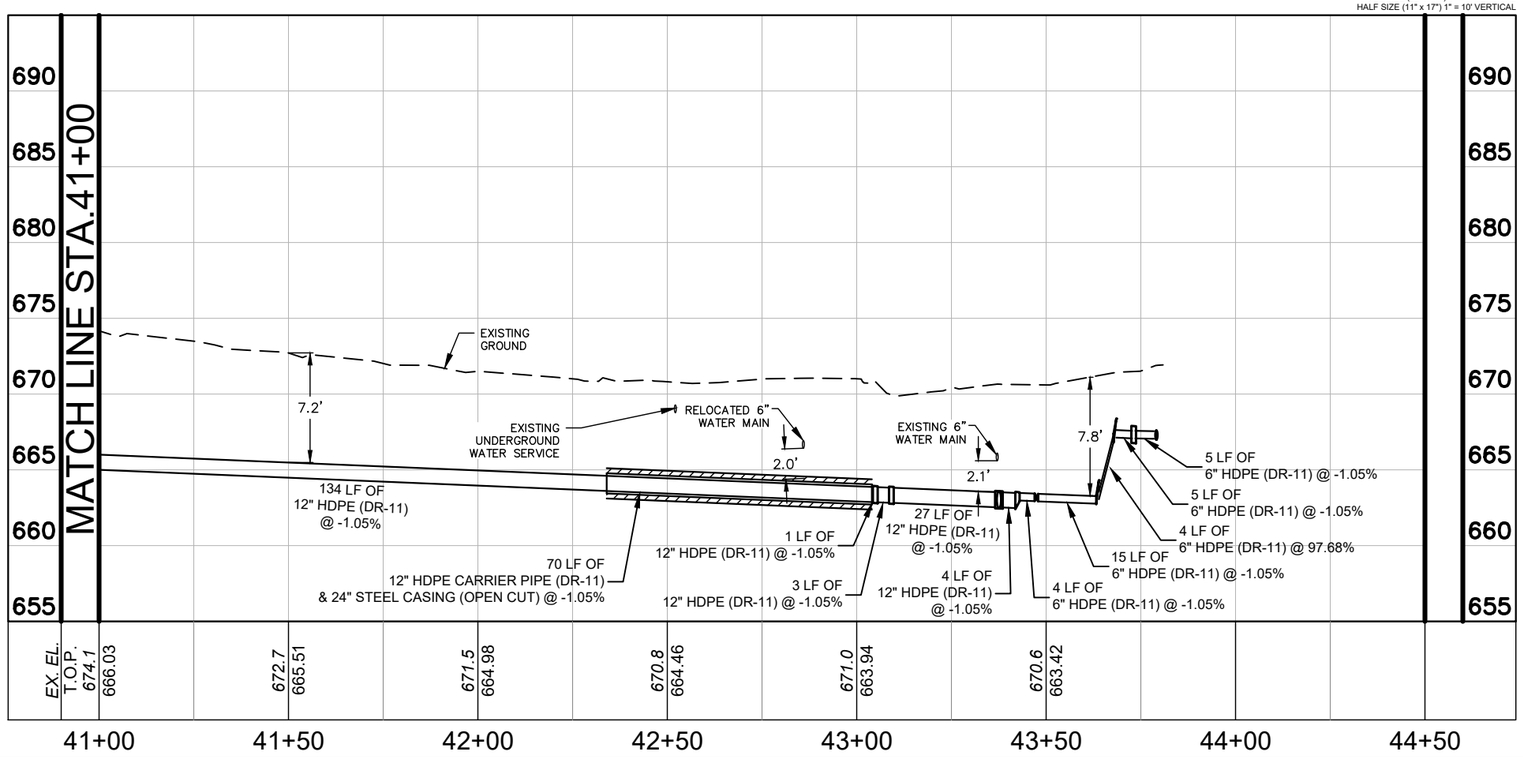

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TEXAS REGISTERED FIRM, NO. F-928

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San Antonio Water System

SAN ANTONIO WATER SYSTEM
SILVER MOUNTAIN DR. 12-INCH WATER MAIN
12-INCH WATER MAIN
PLAN AND PROFILE STA 41+00 TO END

DRAWING NO.
C11

BLOCK 5
APPLEWHITE ESTATES UNIT 1,
VOL.9100,PG.72-73 DPRBC

WILLIAM P GENTRY
REMAINING - LOT 9 BLOCK 3
20543 SILVER MOUNTAIN DR
SAN ANTONIO, TX 78264

SILVER SADDLE DR
(60' R.O.W. - PCI 95)

REPLAT OF
APPLEWHITE ESTATES UNIT 1,
VOL.9526,PG.131 DPRBC

JONATHAN R GILBERT
LOT 6 BLOCK 4
20550 SILVER SADDLE DR
SAN ANTONIO, TX 78264

SILVER
MOUNTAIN DR
(60' R.O.W. - PCI 92)

STA: 2+27.36
(1) 6" GATE VALVE MJ
(1) 6" VALVE BOX, COMPLETE
RL=44' SEE SAWS DETAIL
(DD-839-05)
N:13619341.88
E: 2119023.15

6 LF OF
6" HDPE (DR-11)

5 LF OF
6" HDPE (DR-11)
CONCRETE ENCASEMENT

5 LF OF
6" HDPE (DR-11)
CONCRETE ENCASEMENT

STA: 2+11.19
(1) 6" 45° BEND, HDPE
FUSED JOINT W/EF RESTRAIN
N=13619332.49
E=2119010.00

CHIP SEAL EXISTING
PAVEMENT, SEE
DETAIL 1 SHEET D1
(107 SY)

70 LF OF
12" HDPE CARRIER PIPE (DR-11)
& 24" STEEL CASING (OPEN CUT)

134 LF OF
12" HDPE (DR-11)

PROPOSED
PAVEMENT
RESTORATION
(188 SY)

42+00

CHIP SEAL EXISTING
PAVEMENT, SEE
DETAIL 1 SHEET D1
(372 SY)

10 LF OF
6" HDPE (DR-11)

STA: 2+37.36
AFTER RELEASE FOR SERVICE
TIE NEW 6" HDPE
TO EXISTING 6" PVC
SEE SHEET C13

14' ELECTRIC, GAS,
TELEPHONE &
CABLE TV EASEMENT
VOL.9526,PG.131
DPRBC

CAUTION!!!
UNDERGROUND
FIBER CROSSING

2+00

43+00

1 LF OF
12" HDPE (DR-11)

STA: 43+04.90
(1) 12" 45° BEND,
HDPE FUSED JOINT
W/EF RESTRAIN
N=13619312.02
E=2119013.69

3 LF OF
12" HDPE (DR-11)

STA: 43+09.14
(1) 12" 45° BEND,
HDPE FUSED JOINT
W/EF RESTRAIN
N=13619308.57
E=2119016.15

STA: 43+37.51
EXISTING 12" GATE VALVE
TO REMAIN. AFTER RELEASE
FOR SERVICE CONNECT
PROPOSED 12" WATER MAIN
CONTRACTOR TO PROVIDE THRUST
BLOCKING AT TIE-INTO EXIST MAIN
N=13619278.56
E=2119023.64

27 LF OF
12" HDPE (DR-11)

5' X 30' ANCHOR
EASEMENT
APPROXIMATE LOCATION
VOL.9526,PG.131 DPRBC

10' TELEPHONE, ELECTRIC
& CABLE TV EASEMENT
VOL.9526,PG.131 DPRBC

19 LF OF
6" HDPE (DR-11)
CONCRETE ENCASEMENT

CAUTION!!!
OVERHEAD ELECTRIC
CROSSING

4 LF OF
6" HDPE (DR-11)
CONCRETE ENCASEMENT

STA: 1+48.68
AFTER RELEASE FOR SERVICE TIE
NEW 6" HDPE TO EXISTING 6" PVC
(1) 6"x6"x6" BUTT FUSION TEE,
HDPE FUSED JOINT W/EF RESTRAIN
(1) 6" GATE VALVE MJ
(1) 6" VALVE BOX, COMPLETE
RL=44' SEE SAWS DETAIL
(DD-839-05)
±20' HDPE CUT AS REQUIRED
(1) 6" HDPE CONNECTION
(1) 2" STD BLOWOFF (TEMP)
SEE SAWS DETAIL (DD-844-01)
CONTRACTOR TO PROVIDE THRUST
BLOCKING AT TIE-IN TO EXISTING MAIN
N=13619270.82
E=2118999.73

STA: 1+26.16
(1) 6" 45° BEND, HDPE
FUSED JOINT W/EF RESTRAIN
N=13619248.61
E=2118996.04

RELAY 3/4" SHORT SERVICE
EXISTING METER TO REMAIN
N: 13619273.70
E: 2119021.91

TEXAS LAND EXCHANGE, INC
LOT 7 BLOCK 4
20600 SILVER SADDLE DR
SAN ANTONIO, TX 78264

STA: 43+37.51
AFTER RELEASE FOR SERVICE TIE
NEW 12" HDPE TO EXISTING 12" PVC
(1) 12"x12"x12" BUTT FUSION TEE,
HDPE FUSED JOINT W/EF RESTRAIN
±30' HDPE CUT AS REQUIRED
CONTRACTOR TO PROVIDE THRUST
BLOCKING AT TIE-IN TO EXIST MAIN
N=13619280.58
E=2119011.49

4 LF OF
12" HDPE (DR-11)

STA: 43+42.44
(1) 12"x6" ECCENTRIC REDUCER
BUTT WELD FITTING,
HDPE FUSED JOINT W/EF
RESTRAIN & THRUST BLOCKING
N=13619275.72
E=2119010.69

6 LF OF
6" HDPE (DR-11)
CONCRETE ENCASEMENT

STA: 43+79.10
(1) 6"x6"x6" BUTT FUSION TEE,
HDPE FUSED JOINT W/EF
RESTRAIN & THRUST BLOCKING
N=13619241.98
E=2119000.77

2 LF OF
6" HDPE (DR-11)
CONCRETE ENCASEMENT

3 LF OF
6" HDPE (DR-11)
CONCRETE ENCASEMENT

5 LF OF
6" HDPE (DR-11)

43+79

4 LF OF
6" HDPE (DR-11)

16 LF OF
6" HDPE (DR-11)

STA: 43+47.44
(1) 6" GATE VALVE MJ
(1) 6" VALVE BOX, COMPLETE
RL = 44' SEE SAWS DETAIL
(DD-839-05)
N:13619270.79
E: 2119009.86

STA: 1+10.00
(1) 6" GATE VALVE MJ
(1) 6" VALVE BOX, COMPLETE
RL=44' SEE SAWS DETAIL
(DD-839-05)
N:13619235.46
E: 2119005.43

STA: 1+00.00
AFTER RELEASE FOR SERVICE
TIE NEW 6" HDPE
TO EXISTING 6" PVC
SEE SHEET C13

10 LF OF
6" HDPE (DR-11)

CAUTION!!!
UNDERGROUND
FIBER CROSSING

1+00

5 LF OF
6" HDPE (DR-11)

STA: 43+73.11
(1) 6" 45° BEND, HDPE FUSED
JOINT (RT) W/EF RESTRAIN
N=13619245.47
E=2119005.65

70

DETAIL "A"
SCALE: 1" = 20'

N
W E
S

0 10' 20'
GRAPHIC SCALE 10'
FULL SIZE (22" x 34") 1" = 10'
HALF SIZE (11" x 17") 1" = 20'

LEGEND

- PROPOSED WATER LINE
- PROPERTY LINE
- EASEMENT BOUNDARY
- ASPHALT PAVEMENT
- FENCE
- EXISTING STORM DRAIN
- OHE — OVERHEAD ELECTRIC
- UGT — UNDERGROUND TELEPHONE
- 6" W — EXISTING WATER MAIN
- BENCH MARK
- EXIST. POWER POLE
- EXIST. GUY ANCHOR
- EXIST. STOP/SPEED SIGN
- EXIST. FIRE HYDRANT
- EXIST. WATER VALVE
- EXIST. IRRIGATION VALVE
- PROPOSED WATER VALVE
- EXIST. WATER METER
- EXIST. TELEPHONE PEDESTAL
- EXISTING TREES TO REMAIN
- AIR RELEASE VALVE
- COMBINATION AIR RELEASE VALVE
- BLOW-OFF VALVE
- EXISTING DRIVEWAY TO BE REMOVED AND REPLACED
- PROPOSED MILL AND OVERLAY EXISTING HMAC
- PROPOSED PAVEMENT RESTORATION

NOTES:

1. CONTRACTOR SHALL RECONSTRUCT DRIVEWAYS AND CULVERTS TO EQUAL OR BETTER CONDITION.
2. CONTRACTOR SHALL PROVIDE NOTICE TO SAWS AT LEAST 45 DAYS PRIOR TO ANY CONSTRUCTION ACTIVITIES WITHIN THE ROW OF SILVER MOUNTAIN DR. SAWS SHALL COORDINATE WITH PROPERTY OWNERS FOR THE REMOVAL OF OBSTRUCTIONS, INCLUDING TRASH CONTAINERS AND LANDSCAPING, CONFLICTING WITH PROPOSED CONSTRUCTION ACTIVITIES WITHIN THE ROW. SHOULD PROPERTY OWNERS FAIL TO REMOVE OBSTRUCTIONS PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL AT THEIR OWN EXPENSE REMOVE AND RETURN THESE OBSTRUCTIONS TO THE RESPECTIVE PROPERTY OWNER.
3. EXISTING WATER SERVICE LINES TO REMAIN ACTIVE DURING CONSTRUCTION.
4. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE AN APPROPRIATE SECTION OF PIPING TO SUCCESSFULLY CUT IN A TEE.
5. CONTRACTOR IS NOT TO LEAVE OPEN TRENCHES UNATTENDED AT ANY TIME. CONTRACTOR TO INSTALL STEEL PLATES TO ALLOW RESIDENTS ACCESS DURING CONSTRUCTION.
6. CONTRACTOR TO RELOCATE TRASH BINS TO ALLOW ACCESS AND RETURN TRASH BINS TO RESIDENTS.
7. CONTRACTOR TO NOTIFY RESIDENTS AND PROVIDE DEADLINE TO CLEAR AREA. ANY AREA NOT CLEARED WILL BE REMOVED BY CONTRACTOR AT NO COST TO SAWS.

WARNING: CONTRACTOR TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

JOB NO.
24-6007

STATE OF TEXAS
V. RYAN SONA
91171
REGISTERED
PROFESSIONAL ENGINEER
07/01/2025

REVISIONS

No.	Description	Date	Drn.	Approved	Date

INFORMATION

Date: JULY 2025
Drawn by: KML
Designed by: AIG
Checked by: VRS
Scale: SHOWN ON SHEET

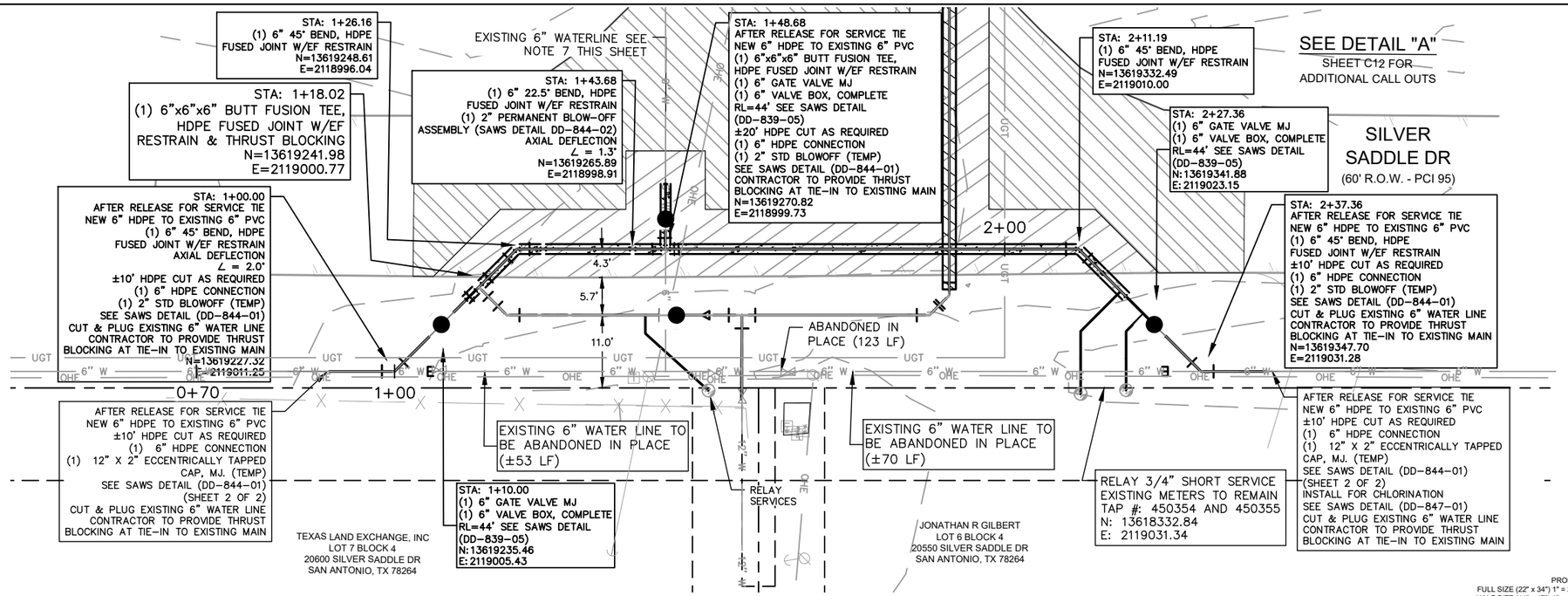
Kimley»Horn
TEXAS REGISTERED FIRM, NO. F-928

San Antonio Water System

SAN ANTONIO WATER SYSTEM
SILVER MOUNTAIN DR. 12-INCH WATER MAIN
12-INCH WATER MAIN
DETAIL "A"

DRAWING NO.
C12

K:\SNA_Utilities\068665076 - Silver Mountain PS\CAD\PLANSHEETS - WATER ALIGNMENT\068665076 - Water Main P&P Sheet-4.dwg 6/26/25 2:09pm



ITEM NO.	DESCRIPTION	UNIT	QUANTITY
550.1	TRENCH EXCAVATION SAFETY AND PROTECTION	LF	138
812	REMOVE AND DISCARD EXISTING 6" PVC WATER MAIN	LF	123
815	6" HDPE WATER LINE (DR-11)	LF	138
824	RELAY SHORT SERVICE	EA	3
828	6" GATE VALVE ASSEMBLY	EA	3
840	6" WATER TIE-IN	EA	3
844	2" BLOWOFF (TEMPORARY)	EA	1
858	CONCRETE ENCASEMENT	CY	7

LEGEND

- PROPOSED WATER LINE
- PROPERTY LINE
- EASEMENT BOUNDARY
- ASPHALT PAVEMENT
- FENCE
- EXISTING STORM DRAIN
- OHE — OVERHEAD ELECTRIC
- UGT — UNDERGROUND TELEPHONE
- 6" W — EXISTING WATER MAIN
- BENCH MARK
- EXIST. POWER POLE
- EXIST. GUY ANCHOR
- EXIST. STOP/SPEED SIGN
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- EXIST. IRRIGATION VALVE
- PROPOSED WATER VALVE
- EXIST. WATER METER
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- EXISTING TREES TO REMAIN
- AIR RELEASE VALVE
- COMBINATION AIR RELEASE VALVE
- BLOW-OFF VALVE
- EXISTING DRIVEWAY TO BE REMOVED AND REPLACED
- PROPOSED MILL AND OVERLAY EXISTING HMAC
- PROPOSED PAVEMENT RESTORATION

GRAPHIC SCALE 10'
FULL SIZE (22" x 34") 1" = 10'
HALF SIZE (11" x 17") 1" = 20'

NOTES:

1. CONTRACTOR SHALL RECONSTRUCT DRIVEWAYS AND CULVERTS TO EQUAL OR BETTER CONDITION.
2. CONTRACTOR SHALL PROVIDE NOTICE TO SAWS AT LEAST 45 DAYS PRIOR TO ANY CONSTRUCTION ACTIVITIES WITHIN THE ROW OF SILVER MOUNTAIN DR. SAWS SHALL COORDINATE WITH PROPERTY OWNERS FOR THE REMOVAL OF OBSTRUCTIONS, INCLUDING TRASH CONTAINERS AND LANDSCAPING, CONFLICTING WITH PROPOSED CONSTRUCTION ACTIVITIES WITHIN THE ROW. SHOULD PROPERTY OWNERS FAIL TO REMOVE OBSTRUCTIONS PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL AT THEIR OWN EXPENSE REMOVE AND RETURN THESE OBSTRUCTIONS TO THE RESPECTIVE PROPERTY OWNER.
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4. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE AN APPROPRIATE SECTION OF PIPING TO SUCCESSFULLY CUT IN A TEE.
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6. CONTRACTOR TO RELOCATE TRASH BINS TO ALLOW ACCESS AND RETURN TRASH BINS TO RESIDENTS.
7. CONTRACTOR TO NOTIFY RESIDENTS AND PROVIDE DEADLINE TO CLEAR AREA. ANY AREA NOT CLEARED WILL BE REMOVED BY CONTRACTOR AT NO COST TO SAWS.
8. CONTRACTOR SHALL LOCATE ALL EXISTING WATER LINES PRIOR TO STARTING WORK IN THE AREA.
9. SAWS SHALL MACHINE CHLORINATE NEW WATER MAIN. REFER TO SAWS CONSTRUCTION SPECIFICATION ITEM NO. 847.
10. CONCRETE ENCASEMENT SHALL EXTEND A MINIMUM OF 5' BEYOND EDGE OF PAVEMENT.

WARNING: CONTRACTOR TO VERIFY PRESENCE AND EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.

JOB NO. 24-6007

STATE OF TEXAS · RYAN SONA · 91171 · REGISTERED · PROFESSIONAL ENGINEER
07/01/2025

REVISIONS

No.	Description	Drn.	Approved	Date

INFORMATION

Kimley»Horn
TEXAS REGISTERED FIRM, NO. F-928

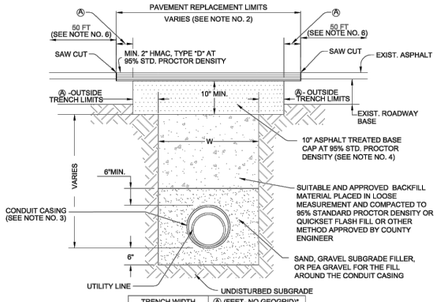
Date: JULY 2025
Drawn by:KML
Designed by: AIG
Checked by: VRS
Scale: SHOWN ON SHEET

San Antonio Water System

SAN ANTONIO WATER SYSTEM
SILVER MOUNTAIN DR. 12-INCH WATER MAIN
6-INCH WATER MAIN
PLAN AND PROFILE
BEGIN TO END

DRAWING NO.
C13

STREET CUT REPAIR DETAIL CHIP SEAL



TRENCH WIDTH	Ⓐ (FEET- NO GEOGRID)*
<3'	1
>3' - <6'	2
>6' - <9'	3
>9'	W / 3 **

*SEE NOTE 7
**ROUNDED TO NEAREST FOOT

NOTES:

1. ALL UTILITIES WILL BE BORED UNDER EXISTING PAVEMENT. ONLY AT THOSE LOCATIONS AT WHICH IT IS PHYSICALLY IMPOSSIBLE TO BORE WILL THE PAVEMENT BE ALLOWED TO BE CUT AND RESTORED ACCORDING TO THIS DETAIL.

2. THE LIMITS OF THE PAVEMENT REPLACEMENT WILL BE DETERMINED AT THE TIME A PERMIT IS REVIEWED AND MUST BE SAW CUT STRAIGHT. TACK OIL AT A RATE OF 0.10 GAL/SY SHALL BE PLACED PRIOR TO PLACEMENT OF 2" HMAC TYPE "D" FINISHED SURFACE. LONGITUDINAL ROADWAY CUTS WILL BE PAVED WITH THE CLOSEST LINE EXTENSION OF THE EXISTING PAVEMENT EDGE AS A MINIMUM.

3. CONDUIT CASING TO BE PROVIDED AND INSTALLED BY UTILITY COMPANY FOR ALL UTILITIES, EXCEPT FOR SANITARY SEWER GRAVITY LINES AND NATURAL GAS SERVICE LINES. MATERIAL TO BE USED SHALL BE DUCTILE IRON (FOR DEPTHE LESS THAN OR EQUAL TO 36"),SCHEDULE 40 PVC PIPE (GREATER THAN 36" DEEP), OR APPROVED EQUAL BY COUNTY ENGINEER. THE CONDUIT CASING SHALL EXTEND A MINUMUM OF FIVE FEET OUTSIDE THE EDGE OF SHOULDER OR CURBING DEPENDING ON FUTURE EXPANSION OF STREET WIDTH.

4. A 10" THICKNESS OF ASPHALT TREATED BASE, BENCHED A FEET EACH SIDE OF TRENCH, WILL BE USED FOR THE FINAL LIFT OF THE TRENCH REPAIR. THE ASPHALT TREATED BASE, PLACED IN 5" LIFTS, SHALL BE BROUGHT UP TO WITHIN 2 INCHES OF THE EXISTING PAVEMENT SURFACE.

5. THE UTILITY COMPANY WILL BE RESPONSIBLE FOR THE MAINTENANCE OF OF THE STREET CUT THEREAFTER UNTIL AND IF THE COUNTY REMOVES THE STREET CUT THROUGH RECONSTRUCTION.

6. CHIP SEAL SHALL BE EXTENDED A MINIMUM 50 FEET EACH DIRECTION FROM THE EDGE OF PAVEMENT REPLACEMENT FOR THE FULL WIDTH OF THE STREET. CRSP OR CRS2P EMULSION & GR 5 TRAP ROCK SHALL BE USED.

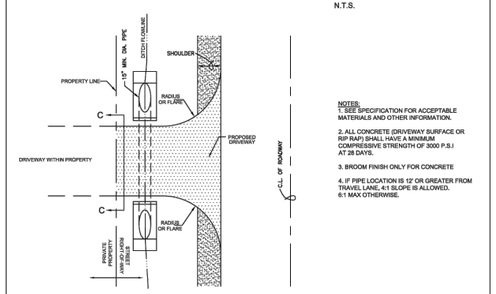
7. WHEN GEOGRID OR OTHER GEOSYNTHETIC SUBGRADE/BASE REINFORCEMENT IS PRESENT, THE CONTRACTOR SHALL CONDUCT EXCAVATION TO PROVIDE APPROPRIATE OVERLAP (2' MIN.) AND TIE TO EXISTING UNDISTURBED REINFORCEMENT AS REQUIRED BY MANUFACTURER FOR EACH LAYER OF REINFORCEMENT ENCOUNTERED.

PREPARED BY: BEXAR COUNTY PUBLIC WORKS DIVISION — FEBRUARY 09, 2011

1 STREET CUT REPAIR / CHIP SEAL DETAIL
SCALE: NTS

TYPICAL RURAL DRIVEWAY WITH CULVERT

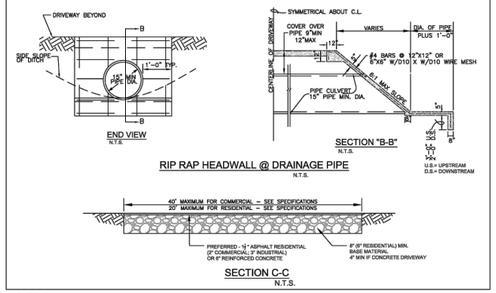
N.T.S.



NOTES:
1. SEE SPECIFICATION FOR ACCEPTABLE MATERIALS AND OTHER INFORMATION.
2. ALL CONCRETE (DRIVEWAY SURFACE OR RIP RAP) SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 P.S.I AT 28 DAYS.
3. BROOM FINISH ONLY FOR CONCRETE
4. IF PIPE LOCATION IS 12' OR GREATER FROM TRAVEL LANE, 4:1 SLOPE IS ALLOWED. 6:1 MAX OTHERWISE.

DRIVEWAY INTERSECTION WITH CULVERT - PLAN

N.T.S.



RIP RAP HEADWALL @ DRAINAGE PIPE

N.T.S.

SECTION C-C

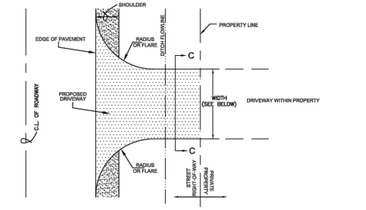
N.T.S.

NOTES:
1. PIPE MATERIAL SHALL BE RCP CLASS III.

2 TYPICAL RURAL DRIVEWAY WITH CULVERT DETAIL
SCALE: NTS

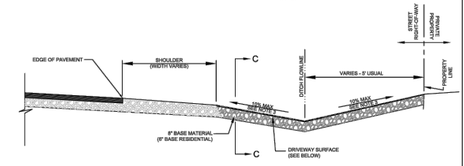
TYPICAL RURAL DRIVEWAY WITHOUT CULVERT

N.T.S.



DRIVEWAY INTERSECTION - PLAN

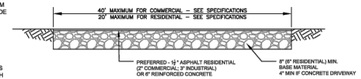
N.T.S.



TYPICAL PROFILE

N.T.S.

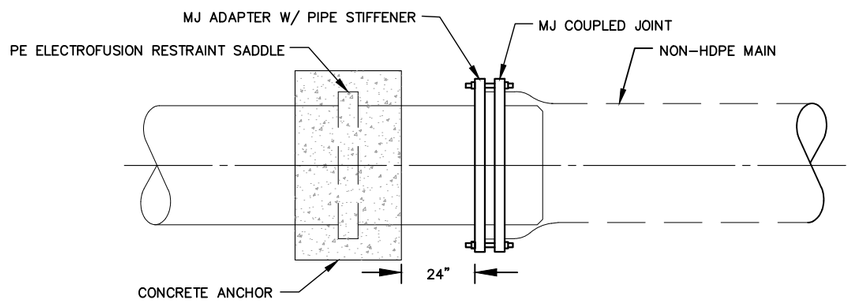
NOTES:
1. SEE SPECIFICATION FOR ACCEPTABLE MATERIALS AND OTHER INFORMATION.
2. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 P.S.I AT 28 DAYS.
3. PROFILE TO CONFORM TO BAR DITCH (ROAD SIDE DITCH, IF PRESENT) WITHIN RIGHT-OF-WAY
4. BROOM FINISH ONLY FOR CONCRETE
5. MAXIMUM GRADE CHANGE OF THE SLOPES ADJACENT TO THE DITCH CENTERLINE IS NOT TO EXCEED 12%

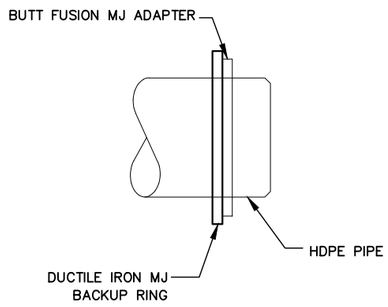


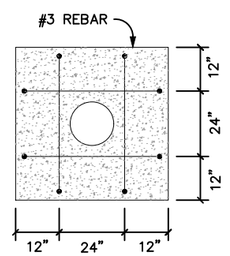
SECTION C-C

N.T.S.

3 TYPICAL RURAL DRIVEWAY WITHOUT CULVERT DETAIL
SCALE: NTS







NOTES:
1. THIS DETAIL APPLIES TO ALL CONNECTIONS BETWEEN HDPE PIPE AND NON–HDPE PIPING.
2. CONCRETE ANCHOR TO EXTEND 12" ALONG PIPE LENGTH.
3. BEARING AREAS SHOWN ARE BASED ON 225 PSI TEST PRESSURE AND 2500 PSF ALLOWABLE SOIL BEARING PRESSURE.
4. WRAP ALL BELOW GROUND IRON ASSEMBLIES IN POLYETHYLENE ACCORDING TO AWWA C105.

4 HDPE CONNECTION DETAIL
SCALE: NTS

CEMENT STABILIZED BACKFILL DETAIL

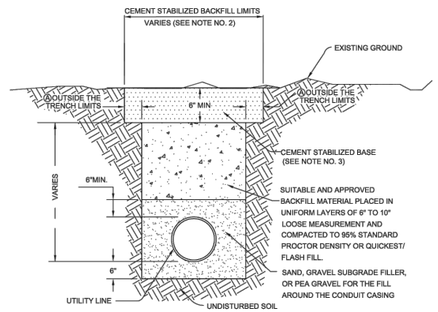


TABLE I: TRENCH BENCH

TRENCH WIDTH	Ⓐ (FEET)*
≤ 3'	1
>3' - ≤6'	2
>6' - ≤9'	3
>9'	W/3**

NOTES:
1. All UTILITIES WITHIN 2 FEET OF THE EDGE OF A PAVED SHOULDER, OR 4 FEET IF NO PAVED SHOULDER EXISTS, OR WHERE EXISTING SURFACE GRADE EXCEEDS 5% SHALL BE REQUIRED TO BE CAPPED WITH CEMENT STABILIZED BASE OR APPROVED EQUIVALENT.
2. THE LIMITS CEMENT STABILIZED BACKFILL WILL BE DETERMINED AT THE TIME A PERMIT IS REVIEWED.
3. A 6" THICKNESS OF CEMENT STABILIZED BASE, BENCHED AS NOTED IN TABLE I ON EACH SIDE OF THE TRENCH WILL BE USED FOR THE FINAL LIFT OF THE TRENCH REPAIR.

PREPARED BY: BEXAR COUNTY PUBLIC WORKS — DECEMBER 2014

5 CEMENT STABILIZED BACKFILL DETAIL
SCALE: NTS

JOB NO. 24-6007

STATE OF TEXAS — RYAN SONA — 91171 — REGISTERED PROFESSIONAL ENGINEER — 07/01/2025

REVISIONS

No.	Description	Drn.	Approved	Date

INFORMATION

Kimley»Horn
TEXAS REGISTERED FIRM, NO. F-928

Date: JULY 2025
Drawn by:KML
Designed by: AIG
Checked by: VRS
Scale: SHOWN ON SHEET

San Antonio Water System

SAN ANTONIO WATER SYSTEM
SILVER MOUNTAIN DR. 12–INCH WATER MAIN
CIVIL DETAILS
(SHEET 1 OF 1)

DRAWING NO. D1

K:\SNA_Utilities\068665076 – Silver Mountain PS\CAD\PLANSHEETS – WATER ALIGNMENT\068665076 – Water Details.dwg 6/26/25 2:10pm

TRAFFIC CONTROL PLAN NOTES

1. TEMPORARY CONSTRUCTION ENTRANCE LOCATIONS ARE SUGGESTED. INTENT OF TRAFFIC CONTROL PLAN IS TO ALLOW CONSTRUCTION TRAFFIC ENTRY/EXIT TO AND FROM THE PROJECT SITE. CONTRACTOR TO DETERMINE CONSTRUCTION ENTRANCE LOCATIONS IN ACCORDANCE WITH CONTRACTOR'S TRAFFIC CONTROL AND SEQUENCING PLANS (NSPI).
   - CONTRACTOR TO NOTIFY CITY OF SAN ANTONIO PUBLIC WORKS DEPARTMENT PRIOR TO INSTALLATION OF TRAFFIC CONTROL DEVICES IN THE VICINITY OF A TRAFFIC SIGNAL.
   - CONTRACTOR TO NOTIFY BEXAR METRO AREA OF TXDOT SAN ANTONIO DISTRICT 210-633-1401 SEVEN (7) DAYS IN ADVANCE FOR CLOSURES IN TXDOT RIGHT-OF-WAY.
2. CONTRACTOR'S TRAFFIC CONTROL PLAN TO BE IN ACCORDANCE WITH ACCESS AND STAGING AREAS SHOWN ON SHEETS G6 – G7.

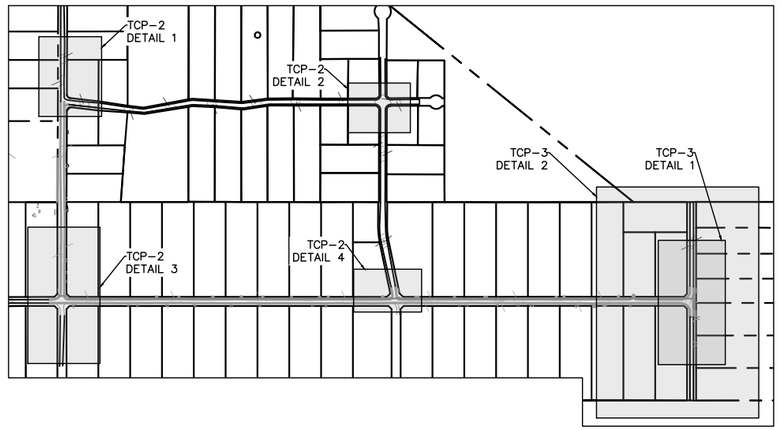
   PHASE A: SILVER WINGS DR.
3. THROUGH TRAFFIC TO FOLLOW DETOUR SIGNS ALONG SILVER MOUNTAIN DR.
4. TAKE DOWN TEMPORARY TRAFFIC CONTROL SIGNAGE AND PREPARE FOR PHASE B.

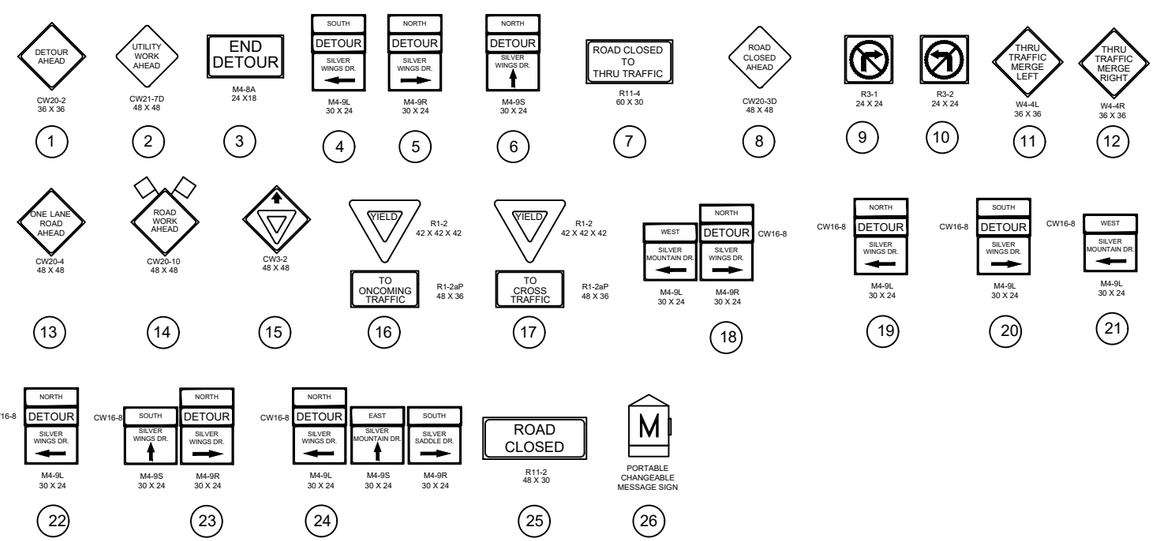
   PHASE B: SILVER SADDLE DR.
5. DURING THE CONSTRUCTION OF THE 12" WATERLINE ALONG SILVER MOUNTAIN, REFER TO DETAIL 1 ON TCP-3 FOR TRAFFIC CONTROL PLAN.
6. CONTRACTOR IS NOT TO LEAVE OPEN TRENCH UNATTENDED AT ANY TIME. DURING CONSTRUCTION CONTRACTOR TO INSTALL STEEL PLATES TO ALLOW RESIDENTS ACCESS.
7. CONTRACTOR SHALL MAINTAIN REQUIRED LATERAL BUFFER SPACE AND TRAFFIC SPACE ALONG SILVER SADDLE DR. AND SILVER MOUNTAIN DR. CONTRACTOR SHALL USE TRAFFIC PLATES AS NEEDED DURING IMPACTED CONSTRUCTION TO MAINTAIN ACCESS TO ADJOINING PROPERTIES.
8. DURING THE CONSTRUCTION THE 6" WATERLINE ALONG SILVER SADDLE, REFER TO DETAIL 2 ON TCP-3 FOR TRAFFIC CONTROL PLAN.

SPACING REQUIREMENTS ALONG SILVER MOUNTAIN DR. (POSTED SPEED LIMIT 30 MPH):

SPEED LIMIT (MPH)	MERGING TAPER	SHIFTING TAPER	SHOULDER TAPER	DOWNSTREAM TAPER	MAX CHANNELIZING DEVICE SPACING		SIGN SPACING
					TAPER	TANGENT	
30	90'-0"	45'-0"	30'-0"	50'-0"	30'-0"	60'-0"	120'-0"

NOTE: SPACING OF DEVICES MAY VARY WHERE CONSTRAINTS IMPACT ABILITY TO ACCOMMODATE DESIGN SPACING.





LEGEND

- PROPERTY LINE
- TRAFFIC DIRECTION FLOW ARROW
- TRAFFIC SIGN
- TYPE III BARRICADE (8')
- CHANNELIZING DEVICE
- WORK AREA

JOB NO. 24-6007

STATE OF TEXAS — CHRISTOPHER G. URA — 152008 — LICENSED PROFESSIONAL ENGINEER
06/03/2025

REVISIONS

No.	Description	Drn.	Approved	Date

INFORMATION

Date: JULY 2025
Drawn by:KML
Designed by: AIG
Checked by: VRS
Scale: SHOWN ON SHEET

Kimley»Horn
TEXAS REGISTERED FIRM, NO. F-928

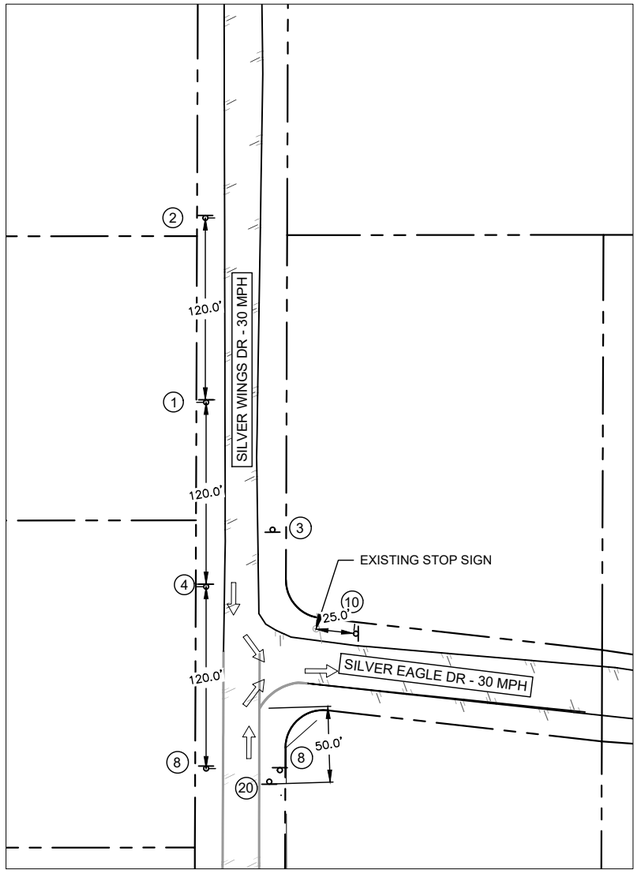
San Antonio Water System

SAN ANTONIO WATER SYSTEM

SILVER MOUNTAIN DR. 12-INCH WATER MAIN
TRAFFIC CONTROL PLAN
GENERAL NOTES

DRAWING NO. TCP-1

K:\SNA_Utilities\068665076 - Silver Mountain PS\CAD\PLANSHEETS - WATER ALIGNMENT\068665076 - TCP.dwg 6/25/25 2:10pm



DETOUR INTERSECTION - SILVER WINGS DR AND SILVER EAGLE DR
DETAIL
SCALE: 1"=100'

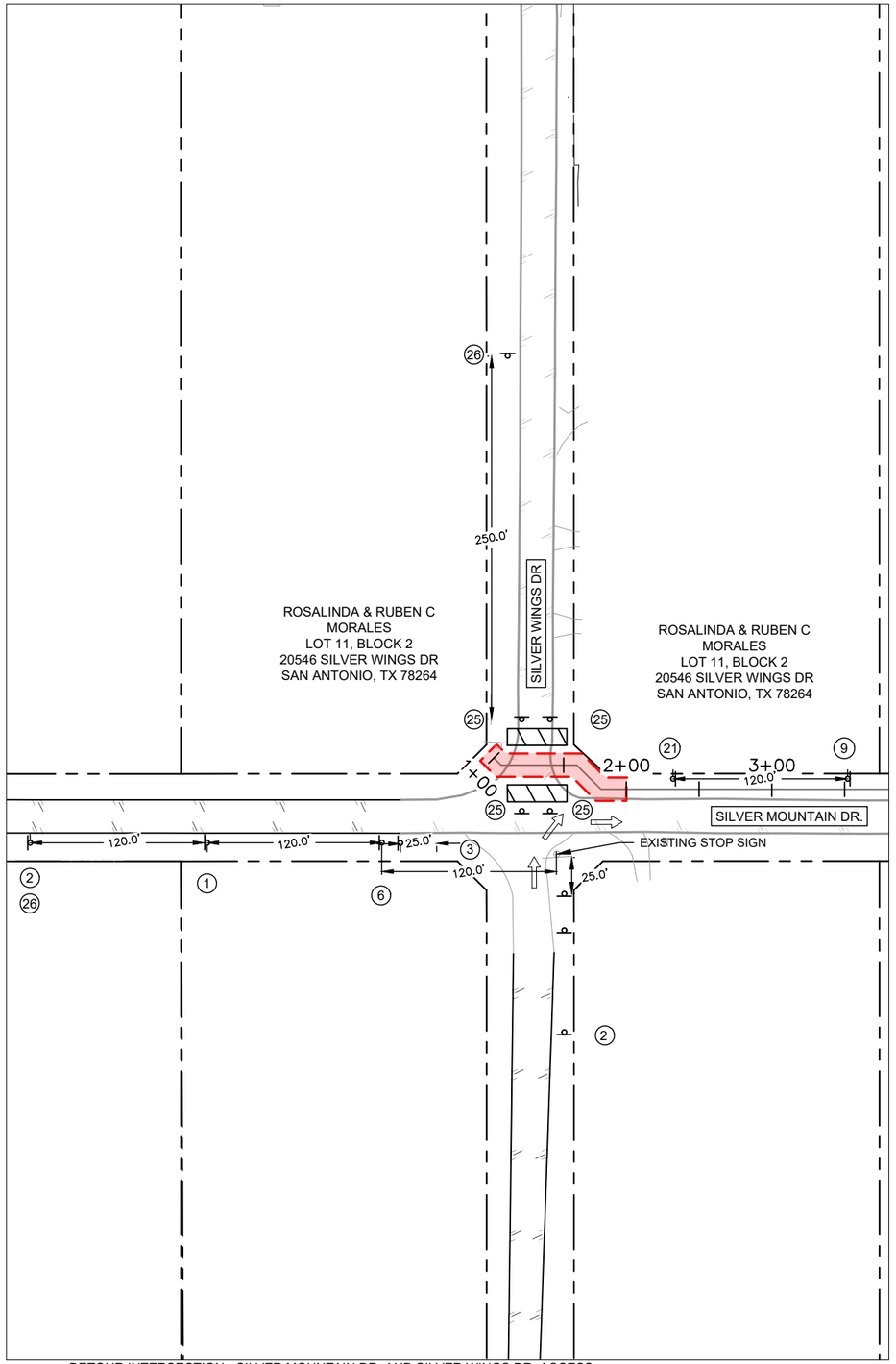
TRAFFIC CONTROL PLAN NOTES

1. CONSTRUCTION PROJECTED TO BEGIN OCTOBER 2025 AND END AUGUST 2026

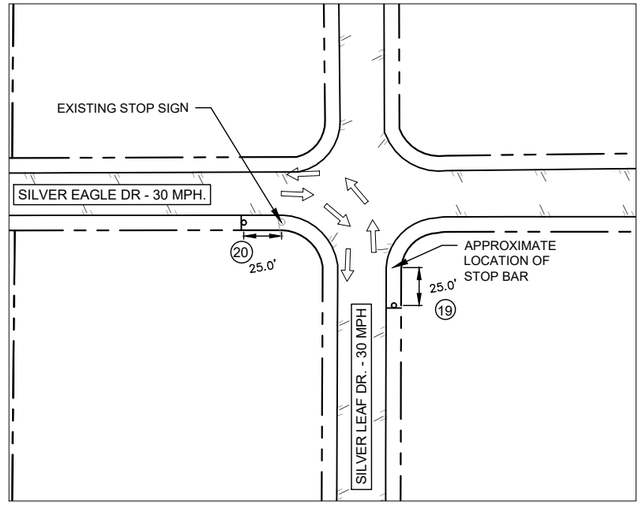
2. CONTRACTOR TO PROVIDE ELECTRONIC DISPLAY SIGNS AT THE BEGINNING AND END OF THE ROAD CLOSURE AREA BEGINNING A MINIMUM OF TWO WEEKS PRIOR TO THE ROAD CLOSURE
AND ENDING AT THE END OF THE ROAD CLOSURE,

3. PORTABLE CHANGING MESSAGE SIGNS TO READ:

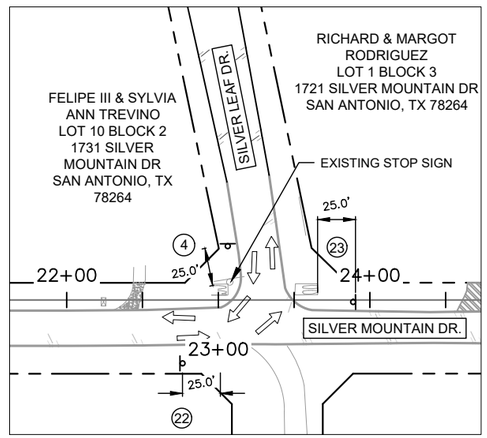
SCREEN 1:	ROAD CLOSED AHEAD
SCREEN 2:	SILVER WINGS DR
SCREEN 3:	XX/XX UNTIL XX/XX



DETOUR INTERSECTION - SILVER MOUNTAIN DR. AND SILVER WINGS DR. ACCESS
DETAIL
SCALE: 1" = 100'



DETOUR INTERSECTION - SILVER EAGLE DR SILVER LEAF DR
DETAIL
SCALE: 1"=100'



DETOUR INTERSECTION - SILVER LEAF DR. AND SILVER MOUNTAIN DR.
DETAIL
SCALE: 1"=100'

JOB NO.
24-6007

STATE OF TEXAS
CHRISTOPHER G. LIRA
152008
LICENSED
PROFESSIONAL ENGINEER
06/03/2025

REVISIONS

No.	Description	Drn.	Approved	Date

INFORMATION
Date: JULY 2025
Drawn by: KML
Designed by: AIG
Checked by: VRS
Scale: SHOWN ON SHEET

Kimley»Horn
TEXAS REGISTERED FIRM, NO. F-928

San Antonio Water System

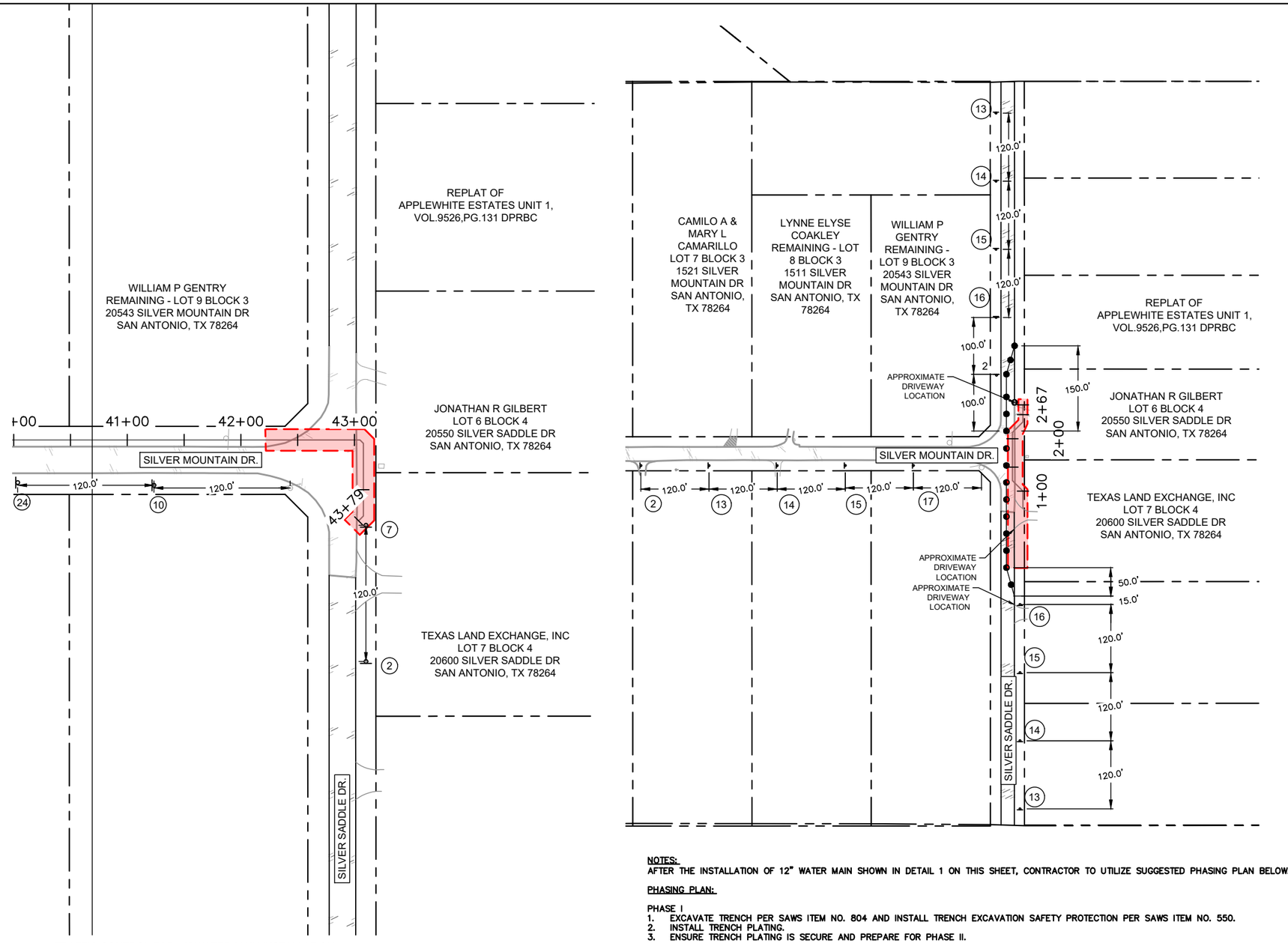
SAN ANTONIO WATER SYSTEM
SILVER MOUNTAIN DR. 12-INCH WATER MAIN
SILVER MOUNTAIN DR
DETOUR

DRAWING NO.
TCP–2

K:\SNA_Utilities\068665076 – Silver Mountain PS\CAD\PLANSHEETS – WATER ALIGNMENT\068665076 – TCP.dwg 6/26/25 2:10pm

TRAFFIC CONTROL PLAN NOTES

1. DURING THE CONSTRUCTION OF THE 12" WATERLINE ALONG SILVER MOUNTAIN, REFER TO DETAIL 1 ON TCP-3 FOR TRAFFIC CONTROL PLAN.
2. CONTRACTOR IS NOT TO LEAVE OPEN TRENCH UNATTENDED AT ANY TIME. DURING CONSTRUCTION CONTRACTOR TO INSTALL STEEL PLATES TO ALLOW RESIDENTS ACCESS.
3. CONTRACTOR SHALL MAINTAIN REQUIRED LATERAL BUFFER SPACE AND TRAFFIC SPACE ALONG SILVER SADDLE DR. AND SILVER MOUNTAIN DR. CONTRACTOR SHALL USE TRAFFIC PLATES AS NEEDED DURING IMPACTED CONSTRUCTION TO MAINTAIN ACCESS TO ADJOINING PROPERTIES.
4. DURING THE CONSTRUCTION OF THE 6" WATERLINE ALONG SILVER SADDLE, REFER TO DETAIL 2 ON TCP-3 FOR TRAFFIC CONTROL PLAN.
5. CONTRACTOR TO COMPLETE CONSTRUCTION OF 12" WATERLINE IN AFFECTED WORK AREA BEFORE BEGINNING CONSTRUCTION OF 6" WATERLINE.
6. REFER TO TCP-16 FOR ADDITIONAL INFORMATION ON TRAFFIC CONTROL FOR THE TEMPORARY ONE-LANE TWO-WAY TRAFFIC CONTROL SHOWN IN DETAIL 2.
7. SIGNS ARE DIMENSIONED TO STOP BAR UNLESS OTHERWISE NOTED.



TRAFFIC CONTROL FOR 12" WATER MAIN INSTALLATION
DETAIL 1
SCALE: 1"=100'

NOTES:
AFTER THE INSTALLATION OF 12" WATER MAIN SHOWN IN DETAIL 1 ON THIS SHEET, CONTRACTOR TO UTILIZE SUGGESTED PHASING PLAN BELOW.

PHASING PLAN:

PHASE I
1. EXCAVATE TRENCH PER SAWS ITEM NO. 804 AND INSTALL TRENCH EXCAVATION SAFETY PROTECTION PER SAWS ITEM NO. 550.
2. INSTALL TRENCH PLATING.
3. ENSURE TRENCH PLATING IS SECURE AND PREPARE FOR PHASE II.

PHASE II
4. TEMPORARILY REMOVE TRENCH PLATING TO INSTALL 6" WATER MAIN.
5. REPLACE TRENCH PLATING.
6. CLEAN AND PREPARE FOR PHASE III.

PHASE III
7. REMOVE TRENCH PLATING.
8. BACKFILL AND COMPACT PER SAWS ITEM NO. 804.

TRAFFIC CONTROL FOR 6" WATER MAIN INSTALLATION
DETAIL 2
SCALE: 1"=200'

JOB NO.
24-6007

STATE OF TEXAS
CHRISTOPHER G. LIRA
152008
LICENSED
PROFESSIONAL ENGINEER
06/03/2025

REVISIONS

No.	Description	Drn.	Approved	Date

INFORMATION

Kimley»Horn
TEXAS REGISTERED FIRM, NO. F-928

Date: JULY 2025
Drawn by:KML
Designed by: AIG
Checked by: VRS
Scale: SHOWN ON SHEET

San Antonio Water System

SAN ANTONIO WATER SYSTEM

SILVER MOUNTAIN DR. 12-INCH WATER MAIN
SILVER SADDLE DR CLOSURES AND TRAFFIC PLATING

DRAWING NO.
TCP-3

K:\SNA_Utilities\068665076 - Silver Mountain FPS\CAD\PLANSHEETS - WATER ALIGNMENT\068665076 - TCP.dwg 6/26/25 2:10pm

DATE:
FILE:

BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).

2. The development and design of the Traffic Control Plan (TCP)is the responsibility of the Engineer.

3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.

4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.

5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.

6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.

7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.

8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.

10. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.

11. Traffic control devices should be in place only while work is actually in progress or a definite need exists.

12. The Engineer has the final decision on the location of all traffic control devices.

13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY NOTES:

1. Workers on foot who are exposed to traffic or to construction equipment within the right-of-way shall wear high-visibility safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel," or equivalent revisions, and labeled as ANSI 107-2004 standard performance for Class 2 or 3 risk exposure. Class 3 garments should be considered for high traffic volume work areas or night time work.

2. Except in emergency situations, flagger stations shall be illuminated when flagging is used at night.

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

1. Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.

2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)
TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD)
TRAFFIC ENGINEERING STANDARD SHEETS

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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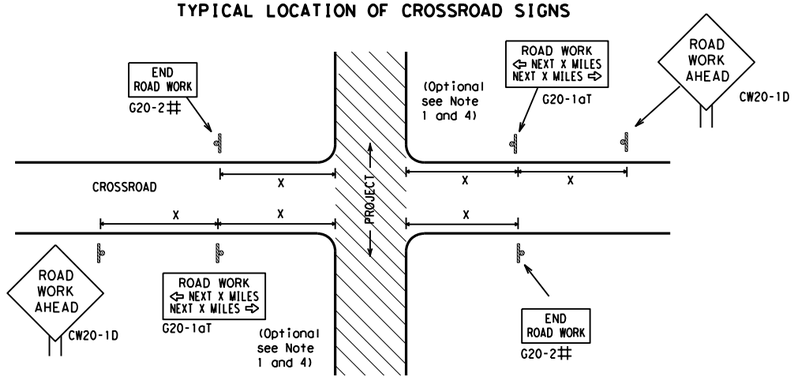
REVISIONS 4-03 7-13 9-07 8-14 5-10 5-21	DIST	COUNTY		SHEET NO.

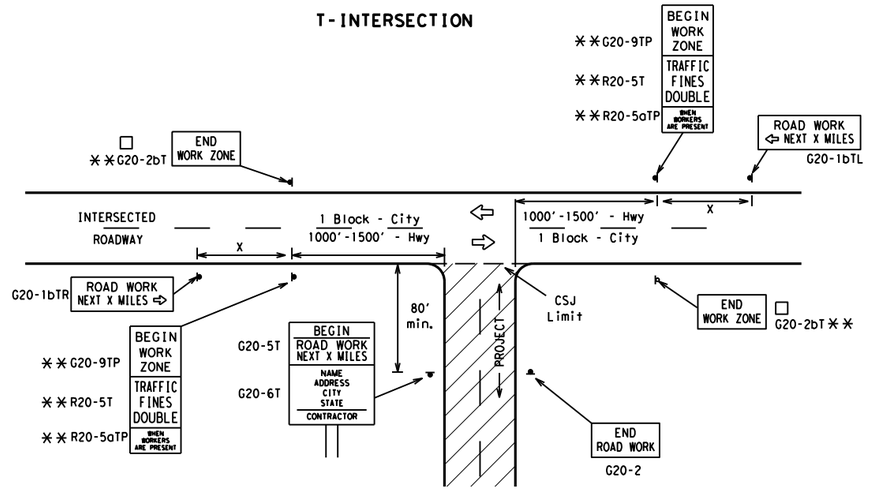
TYPICAL LOCATION OF CROSSROAD SIGNS



May be mounted on back of "ROAD WORK AHEAD"(CW20-1D) sign with approval of Engineer. (See note 2 below)

1. The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D)sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
2. The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK"(G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume as per TMUTCD Part 5. This information shall be shown in the plans.
3. Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
4. The "ROAD WORK NEXT X MILES"(G20-1aT)sign shall be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether a roadway is considered high volume.
5. Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
6. When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shall be in place.

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

1. The Engineer will determine the types and location of any additional traffic control devices, such as a flagger and accompanying signs, or other signs, that should be used when work is being performed at or near an intersection.
2. If construction closes the road at a T-intersection, the Contractor shall place the "CONTRACTOR NAME"(G20-6T) sign behind the Type 3 Barricades for the road closure (see BC(10) also). The "ROAD WORK NEXT X MILES" left arrow(G20-1bTL) and "ROAD WORK NEXT X MILES" right arrow (G20-1bTR)" signs shall be replaced by the detour signing called for in the plans.

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING[1,5,6]

SIZE

Sign Number or Series	Conventional Road	Expressway/ Freeway
CW20[4] CW21 CW22 CW23 CW25	48" x 48"	48" x 48"
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"

SPACING

Posted Speed	Sign △ Spacing "X"
MPH	Feet (Apprx.)
30	120
35	160
40	240
45	320
50	400
55	500[2]
60	600[2]
65	700[2]
70	800[2]
75	900[2]
80	1000[2]
*	*[3]

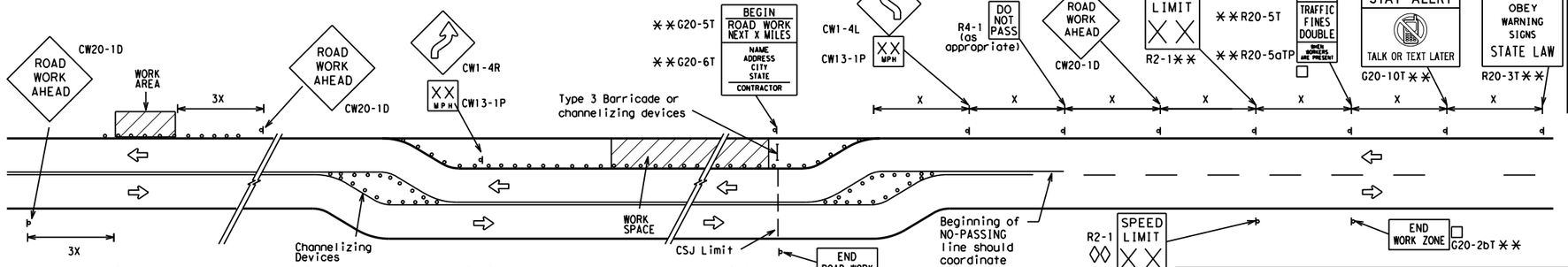
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

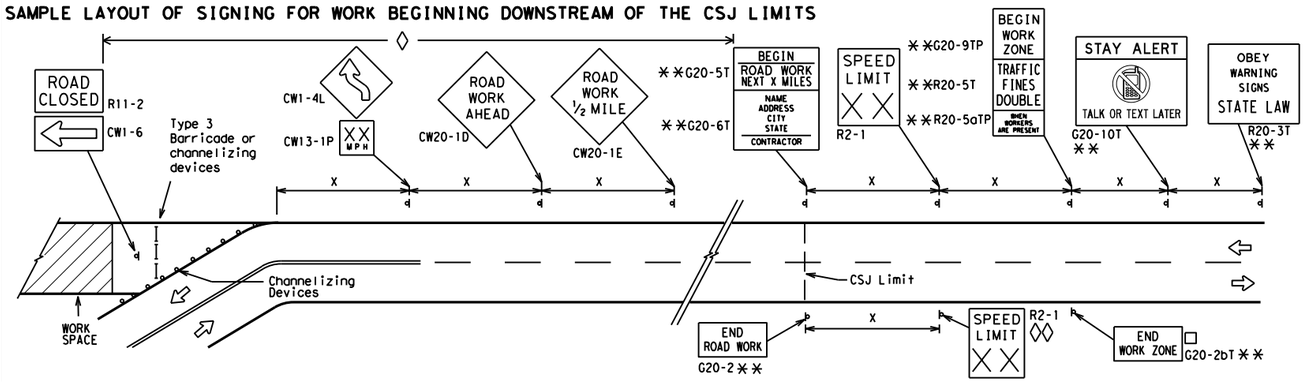
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may be used on low volume crossroads at the discretion of the Engineer as per TMUTCD Part 5. See Note 2 under "Typical Location of Crossroad Signs".
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing of signs and channelizing devices.

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING DOWNSTREAM OF THE CSJ LIMITS



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

NOTES

The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES"(G20-5T)sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.

□ The "BEGIN WORK ZONE"(G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.

** CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.

◊ Area for placement of "ROAD WORK AHEAD" (CW20-1D)sign and other signs or devices as called for on the Traffic Control Plan.

◊◊ Contractor will install a regulatory speed limit sign at the end of the work zone.

LEGEND	
⊢⊣	Type 3 Barricade
○ ○ ○	Channelizing Devices
▬	Sign
X	See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21				

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DATE:
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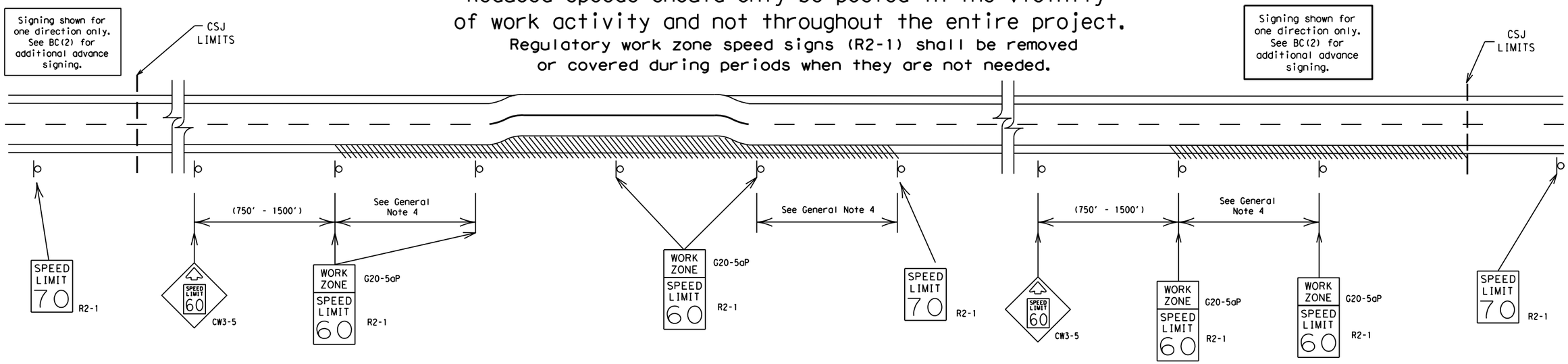
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

Work zone speed limits shall be regulatory, established in accordance with the "Procedures for Establishing Speed Zones," and approved by the Texas Transportation Commission, or by City Ordinance when within Incorporated City Limits.

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project.

Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit should be included on the design of the traffic control plans when restricted geometrics with a lower design speed are present in the work zone and modification of the geometrics to a higher design speed is not feasible.

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present. Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

a) rough road or damaged pavement surface
b) substantial alteration of roadway geometrics (diversions)
c) construction detours
d) grade
e) width
f) other conditions readily apparent to the driver

As long as any of these conditions exist, the work zone speed limit signs should remain in place.

SHORT TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit may be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 10 feet of the traveled way or actually in the traveled way.

Short Term Work Zone Speed Limit signs should be posted and visible to the motorists only when work activity is present. When work activity is not present, signs shall be removed or covered.
(See Removing or Covering on BC(4)).

GENERAL NOTES

1. Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
2. Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
3. Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
4. Frequency of work zone speed limit signs should be:
   40 mph and greater 0.2 to 2 miles
   35 mph and less 0.2 to 1 mile
5. Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
6. Fabrication, erection and maintenance of the"ADVANCE SPEED LIMIT"(CW3-5)sign, "WORK ZONE"(G20-5aP) plaque and the "SPEED LIMIT"(R2-1)signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
7. Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
8. Techniques that may help reduce traffic speeds include but are not limited to:
   A. Law enforcement.
   B. Flagger stationed next to sign.
   C. Portable changeable message sign (PCMS).
   D. Low-power (drone) radar transmitter.
   E. Speed monitor trailers or signs.
9. Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
10. For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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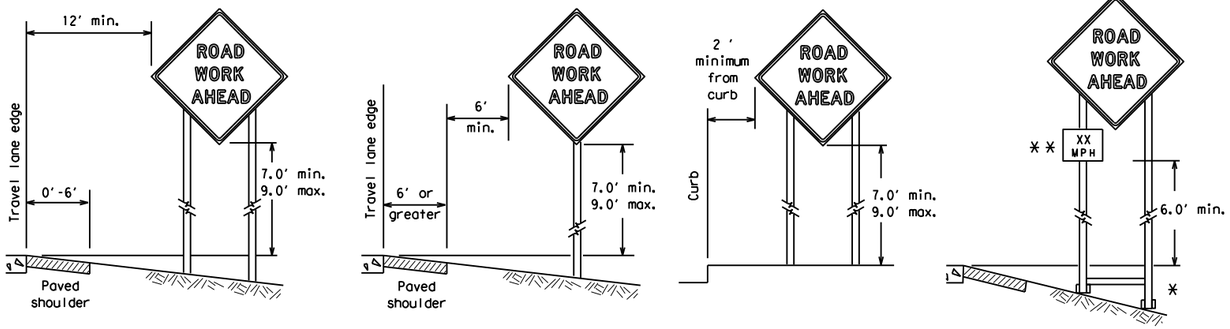
REVISIONS 9-07 8-14 7-13 5-21	DIST	COUNTY		SHEET NO.

DATE:
FILE:

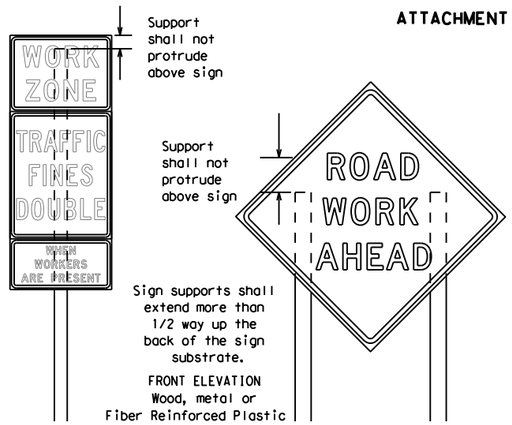
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

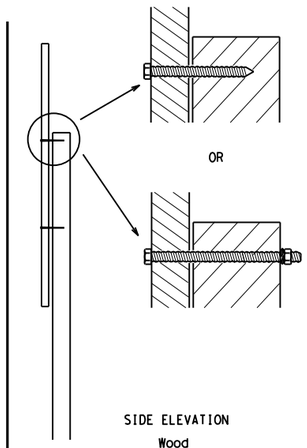


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS





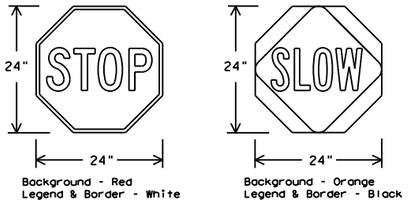
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

Nails shall NOT be allowed. Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by any means. Wood supports shall not be extended or repaired by splicing or other means.

Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the spice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

STOP/SLOW PADDLES

1. STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24".
2. STOP/SLOW paddles shall be retroreflectorized when used at night.
3. STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
4. Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDER	WHITE	TYPE B OR C SHEETING
LEGEND & BORDER	BLACK	ACRYLIC NON-REFLECTIVE FILM

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

1. Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, specific service (LOGO), or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
2. When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition. For details for covering large guide signs see the TS-CD standard.
3. When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
4. If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
5. If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC standard sheets, TLRS standard sheets or the CWZTCD list. The signs shall meet the required mounting heights shown on the BC, or the SMD standard sheets during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
6. Any sign or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
5. The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
6. The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD) for small roadside signs. Supports for temporary large roadside signs shall meet the requirements detailed on the Temporary Large Roadside Signs (TLRS) standard sheets. The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
7. The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
8. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
9. The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

DURATION OF WORK (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6)

1. The types of sign supports, sign mounting height, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
   a. Long-term stationary - work that occupies a location more than 3 days.
   b. Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
   c. Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
   d. Short, duration - work that occupies a location up to 1 hour.
   e. Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

1. The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface, except as shown for supplemental plaques mounted below other signs.
2. The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
3. Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
4. Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday or raised to appropriate Long-term/Intermediate sign height.
5. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

SIZE OF SIGNS

1. The Contractor shall furnish the sign sizes shown on BC (2) unless otherwise shown in the plans or as directed by the Engineer.

SIGN SUBSTRATES

1. The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CWZTCD lists each substrate that can be used on the different types and models of sign supports.
2. "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
3. All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the color and retro-reflectivity requirements of DMS-8300 for rigid signs or DMS-8310 for roll-up signs. The web address for DMS specifications is shown on BC(1).
2. White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
3. Orange sheeting, meeting the requirements of DMS-8300 Type B_{FL} or Type C_{FL}, shall be used for rigid signs with orange backgrounds.

SIGN LETTERS

1. All sign letters and numbers shall be clear, and open rounded type uppercase alphabet letters as approved by the Federal Highway Administration (FHWA) and as published in the "Standard Highway Sign Design for Texas" manual. Signs, letters and numbers shall be of first class workmanship in accordance with Department Standards and Specifications.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
2. Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
3. Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
4. When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
5. Burlap shall NOT be used to cover signs.
6. Duct tape or other adhesive material shall NOT be affixed to a sign face.
7. Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

1. Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
4. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
5. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall NOT be used.
6. Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
7. Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
8. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

1. Flags may be used to draw attention to warning signs. When used, the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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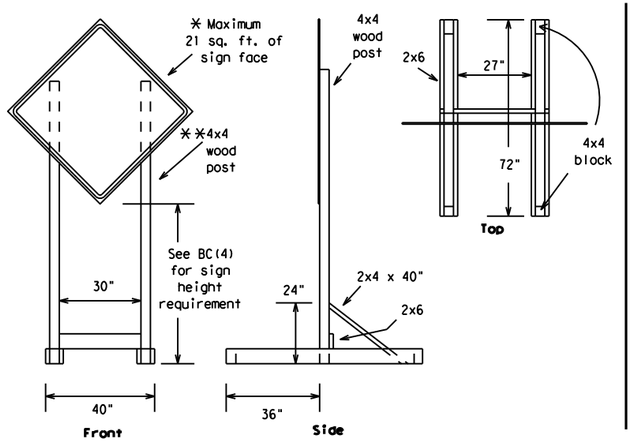
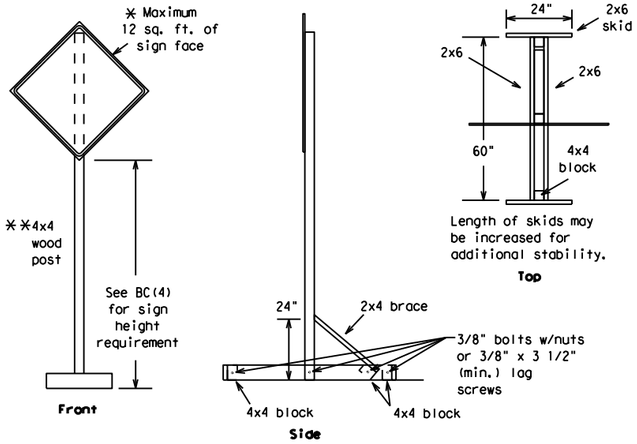
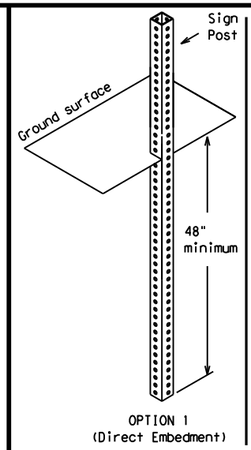
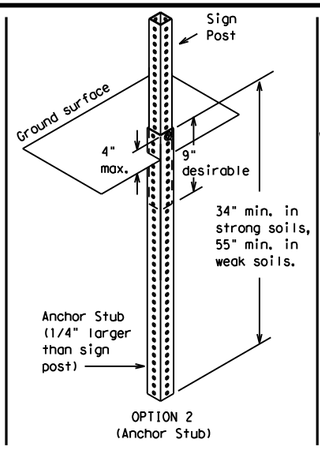


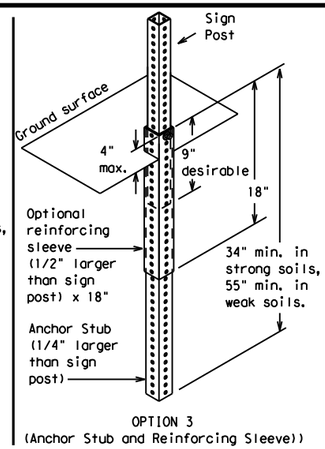


SKID MOUNTED WOOD SIGN SUPPORTS

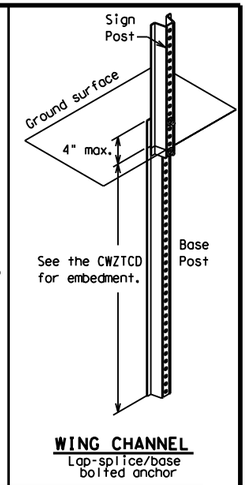
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS







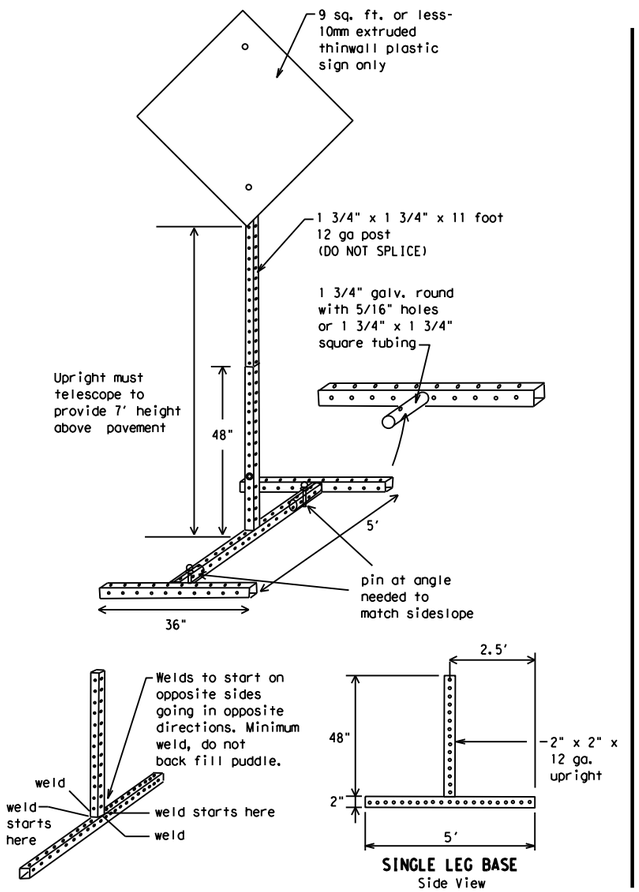
PERFORATED SQUARE METAL TUBING

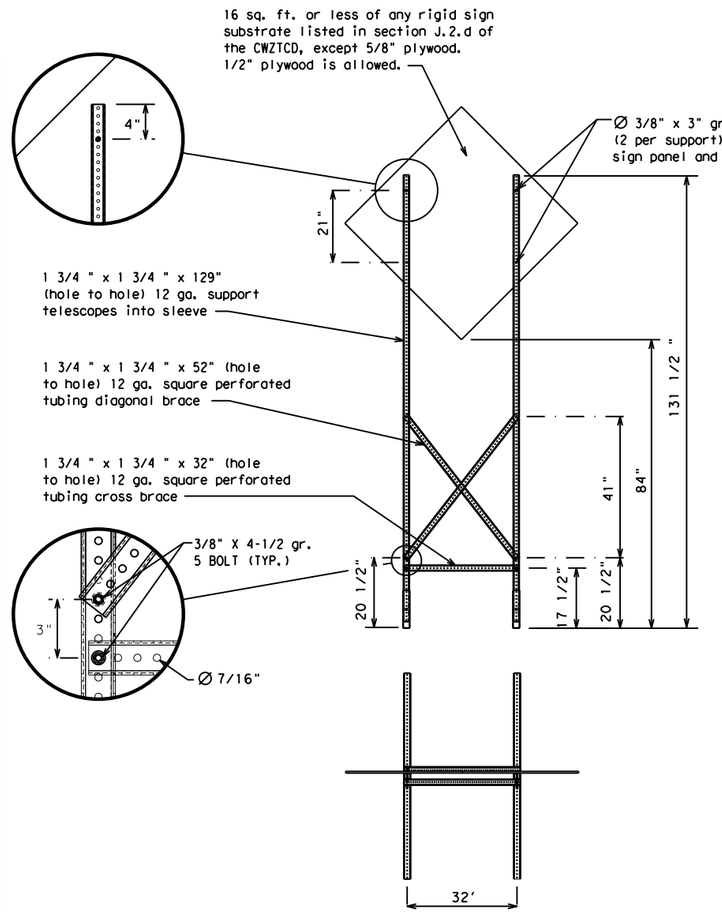


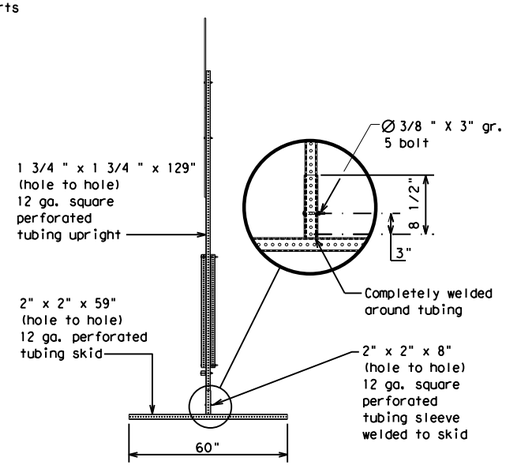
WING CHANNEL
Lap-splice/base bolted anchor

GROUND MOUNTED SIGN SUPPORTS

Refer to the CWZTCD and the manufacturer's installation procedure for each type sign support.
The maximum sign square footage shall adhere to the manufacturer's recommendation.
Two post installations can be used for larger signs.







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

WEDGE ANCHORS

Both steel and plastic Wedge Anchor Systems as shown on the SMD Standard Sheets may be used as temporary sign supports for signs up to 10 square feet of sign face. They may be set in concrete or in sturdy soils if approved by the Engineer. (See web address for "Traffic Engineering Standard Sheets" on BC(1)).

OTHER DESIGNS

MORE DETAILS OF APPROVED LONG/INTERMEDIATE AND SHORT TERM SUPPORTS CAN BE FOUND ON THE CWZTCD LIST. SEE BC(1) FOR WEBSITE LOCATION.

GENERAL NOTES

1. Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
2. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
3. When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

* See BC(4) for definition of "Work Duration."

** Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.

☐ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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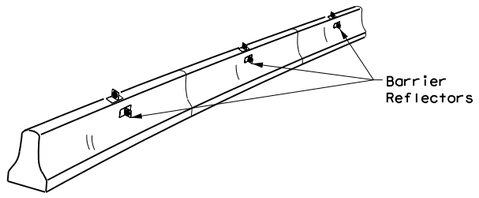
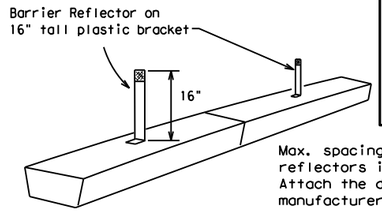
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



CONCRETE TRAFFIC BARRIER (CTB)

3. Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. The Barrier Reflector mounted on the side of the CTB shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
4. Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each section of CTB. The reflector unit on top shall have two yellow reflective faces (Bi-Directional)while the reflectors on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
5. When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
6. Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
7. Maximum spacing of Barrier Reflectors is forty (40) feet.
8. Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
9. Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
10. Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
11. Single slope barriers shall be delineated as shown on the above detail.

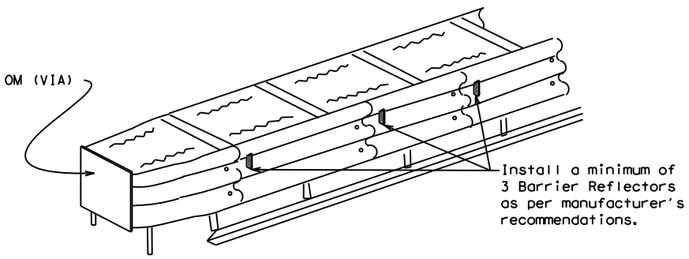


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

LOW PROFILE CONCRETE BARRIER (LPCB)

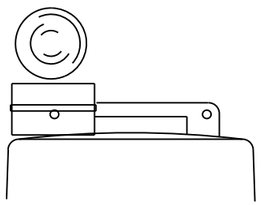


DELINEATION OF END TREATMENTS

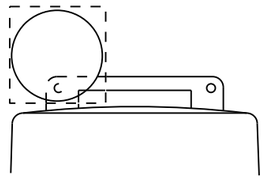
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet the apppropriate crashworthy standards as defined in the Manual for Assessing Safety Hardware (MASH). Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



Warning reflector may be round or square.Must have a yellow reflective surface area of at least 30 square inches

WARNING LIGHTS

1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall not be used with signs manufactured with Type B_{FL} or C_{FL} Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
4. Type-C and Type D 360 degree Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "SB".
5. The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
6. When required by the Engineer, the Contractor shall furnish a copy of the warning lights certification. The warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
7. When used to delineate curves, Type-C and Type D Steady Burn Lights should only be placed on the outside of the curve, not the inside.
8. The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

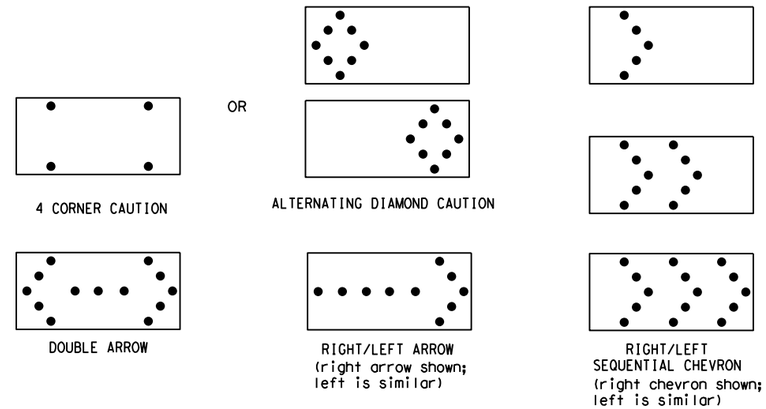
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights should occur from the beginning of the taper to the end of the merging taper in order to identify the desired vehicle path. The rate of flashing for each light shall be 65 flashes per minute, plus or minus 10 flashes.
4. Type C and D steady-burn warning lights are intended to be used in a series to delineate the edge of the travel lane on detours, on lane changes, on lane closures, and on other similar conditions.
5. Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
6. Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
7. The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

WARNING REFLECTORS MOUNTED ON PLASTIC DRUMS AS A SUBSTITUTE FOR TYPE C (STEADY BURN) WARNING LIGHTS

1. A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
2. The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CWZTCD.
3. The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
4. Round reflectors shall be fully reflectorized, including the area where attached to the drum.
5. Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it attaches to the drum.
6. The side of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for DMS 8300-Type B or Type C.
7. When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
8. The warning reflector should be mounted on the side of the handle nearest approaching traffic.
9. The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.

Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

1. The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
2. Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (see detail below) is used.
3. The Engineer/Inspector shall choose all appropriate signs, barricades and/or other traffic control devices that should be used in conjunction with the Flashing Arrow Board.
4. The Flashing Arrow Board should be able to display the following symbols:



5. The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
6. The straight line caution display is NOT ALLOWED.
7. The Flashing Arrow Board shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
8. Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
9. The sequential arrow display is NOT ALLOWED.
10. The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
11. The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
12. A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
13. A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
14. Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

REQUIREMENTS			
TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE
B	30 x 60	13	3/4 mile
C	48 x 96	15	1 mile

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

WHEN NOT IN USE, REMOVE THE ARROW BOARD FROM THE RIGHT-OF-WAY OR PLACE THE ARROW BOARD BEHIND CONCRETE TRAFFIC BARRIER OR GUARDRAIL.

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR

BC(7)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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GENERAL NOTES

1. For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
2. For intermediate term stationary work zones on freeways, drums should be used as the primary channelizing device but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections, one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
3. For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
4. Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
5. Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
6. The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

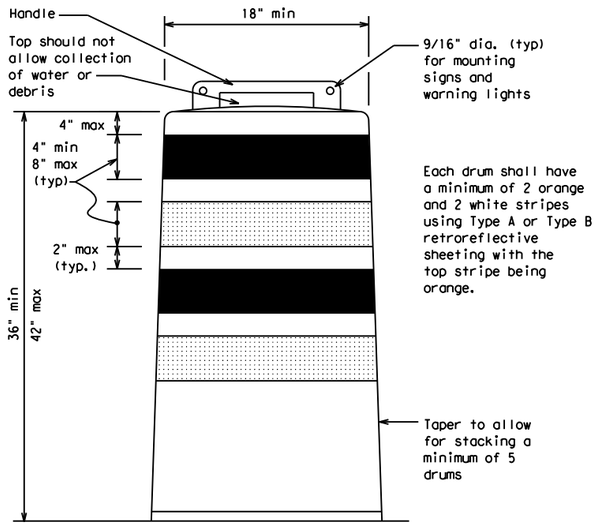
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
3. Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
4. Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
5. The top of the drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 9/16 inch diameter holes to allow attachment of a warning light, warning reflector unit or approved compliant sign.
6. The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectorized space between any two adjacent stripes shall not exceed 2 inches in width.
7. Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be held down while separating the drum body from the base.
8. Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
9. Drum body shall have a maximum unballasted weight of 11 lbs.
10. Drum and base shall be marked with manufacturer's name and model number.

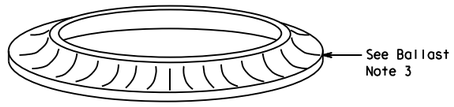
RETROREFLECTIVE SHEETING

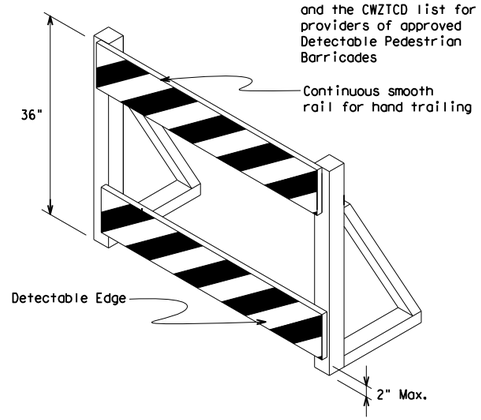
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

BALLAST

1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
2. Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
3. Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
4. The ballast shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle.
5. When used in regions susceptible to freezing, drums shall have drainage holes in the bottoms so that water will not collect and freeze becoming a hazard when struck by a vehicle.
6. Ballast shall not be placed on top of drums.
7. Adhesives may be used to secure base of drums to pavement.

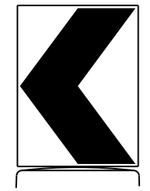




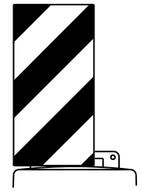


DETECTABLE PEDESTRIAN BARRICADES

1. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. Refer to WZ(BTS-2) for Pedestrian Control requirements for Sidewalk Diversions, Sidewalk Detours and Crosswalk Closures.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a Detectable Pedestrian Barricade shall be placed across the full width of the closed sidewalk instead of a Type 3 Barricade.
3. Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
4. Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines (ADAAG)" and should not be used as a control for pedestrian movements.
5. Warning lights shall not be attached to detectable pedestrian barricades.
6. Detectable pedestrian barricades should use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



18" x 24" Sign
(Maximum Sign Dimension)
Chevron CW1-8, Opposing Traffic Lane Divider, Driveway sign D70a, Keep Right R4 series or other signs as approved by Engineer



12" x 24"
Vertical Panel
mount with diagonals sloping down towards travel way

Plywood, Aluminum or Metal sign substrates shall NOT be used on plastic drums

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

1. Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
2. Chevrons and other work zone signs with an orange background shall be manufactured with Type B_{FL} or Type C_{FL} Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
3. Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A or Type B. Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
4. Other sign messages (text or symbolic) may be used as approved by the Engineer. Sign dimensions shall not exceed 18 inches in width or 24 inches in height, except for the R9 series signs discussed in note 8 below.
5. Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
6. Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
7. Chevrons may be placed on drums on the outside of curves, on merging tapers or on shifting tapers. When used in these locations, they may be placed on every drum or spaced not more than on every third drum. A minimum of three (3) should be used at each location called for in the plans.
8. R9-9, R9-10, R9-11 and R9-11a Sidewalk Closed signs which are 24 inches wide may be mounted on plastic drums, with approval of the Engineer.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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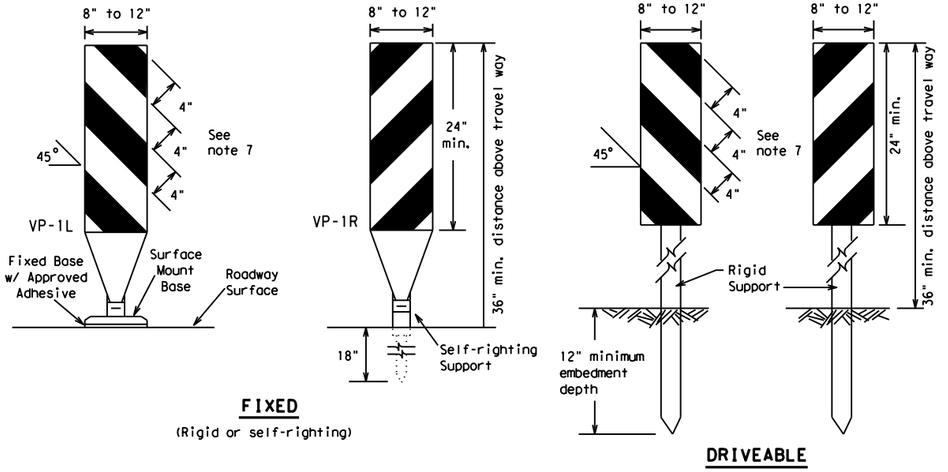
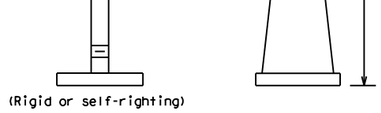


FIXED
(Rigid or self-righting)

DRIVEABLE

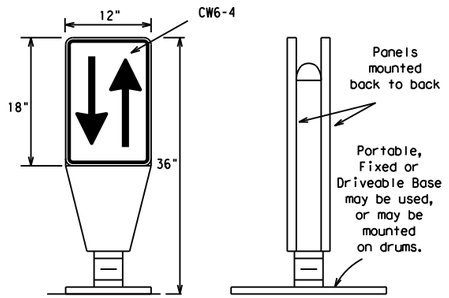


(Rigid or self-righting)

PORTABLE

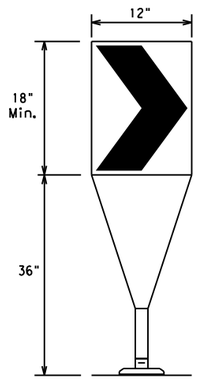
VERTICAL PANELS (VPs)

1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual for additional requirements on the use VP's for drop-offs.
3. VP's should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
4. VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
5. Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
6. Sheeting for the VP's shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
7. Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.



1. Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
2. The OTLD may be used in combination with 42" cones or VPs.
3. Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
4. The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



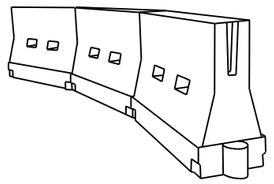
Fixed Base w/ Approved Adhesive
(Driveable Base, or Flexible Support can be used)

1. The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
2. Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
3. Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
4. To be effective, the chevron should be visible for at least 500 feet.
5. Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
6. For Long Term Stationary use on tapers or transitions on freeways and divided highways, self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

CHEVRONS

GENERAL NOTES

1. Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
3. Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
4. The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
5. Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
6. Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
7. The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.



LONGITUDINAL CHANNELIZING DEVICES (LCD)

1. LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10). Place reflective sheeting near the top of the LCD along the full length of the device.

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate Manual for Assessing Safety Hardware (MASH) crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall not be less than 32 inches in height.

HOLLOW OR WATER BALLASTED SYSTEMS USED AS LONGITUDINAL CHANNELIZING DEVICES OR BARRIERS

Posted Speed	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'
35		205'	225'	245'	35'	70'
40		265'	295'	320'	40'	80'
45	L = WS	450'	495'	540'	45'	90'
50		500'	550'	600'	50'	100'
55		550'	605'	660'	55'	110'
60		600'	660'	720'	60'	120'
65		650'	715'	780'	65'	130'
70		700'	770'	840'	70'	140'
75		750'	825'	900'	75'	150'
80		800'	880'	960'	80'	160'

** Taper lengths have been rounded off.
L=Length of Taper (FT.) W=Width of Offset (FT.)
S=Posted Speed (MPH)

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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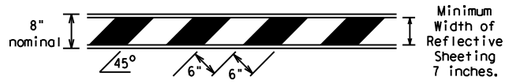
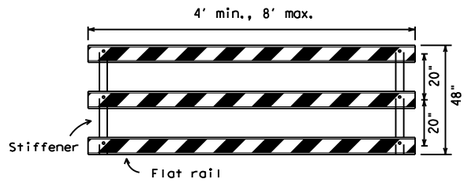
TYPE 3 BARRICADES

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
2. Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may slope downward in both directions from the center of the barricade. Where no turns are provided at a closed road, striping should slope downward in both directions toward the center of roadway.
4. Striping of rails, for the right side of the roadway, should slope downward to the left. For the left side of the roadway, striping should slope downward to the right.
5. Identification markings may be shown only on the back of the barricade rails. The maximum height of letters and/or company logos used for identification shall be 1".
6. Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
7. Warning lights shall NOT be installed on barricades.
8. Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight. Sand bags shall not be stacked in a manner that covers any portion of a barricade rails reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall not be used for sandbags. Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.
9. Sheeting for barricades shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



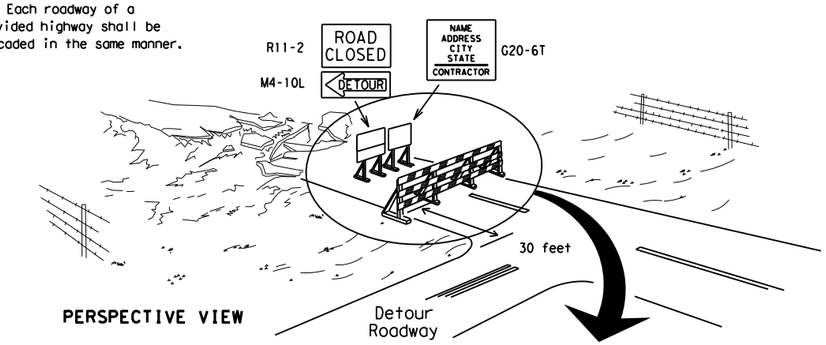
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

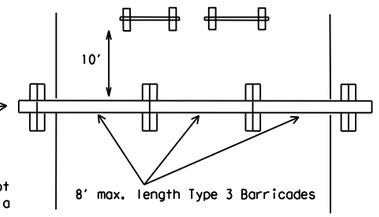
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

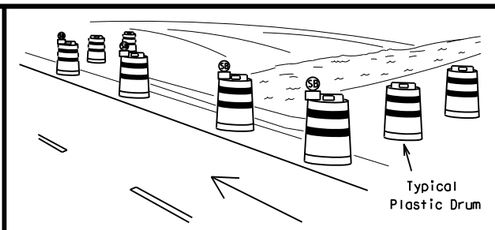
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

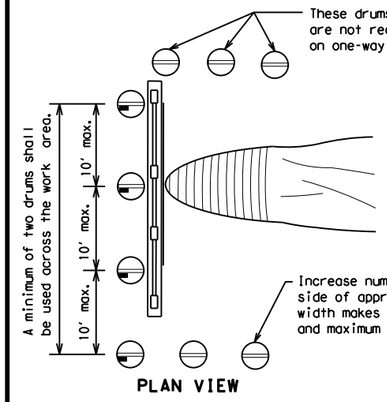
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

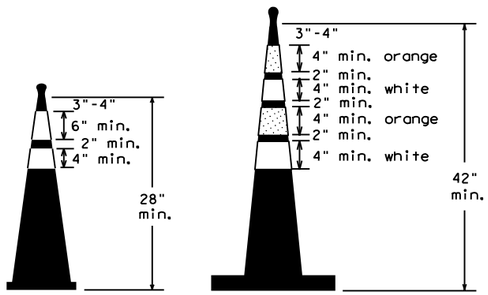
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
5. Drums must extend the length of the culvert widening.



LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

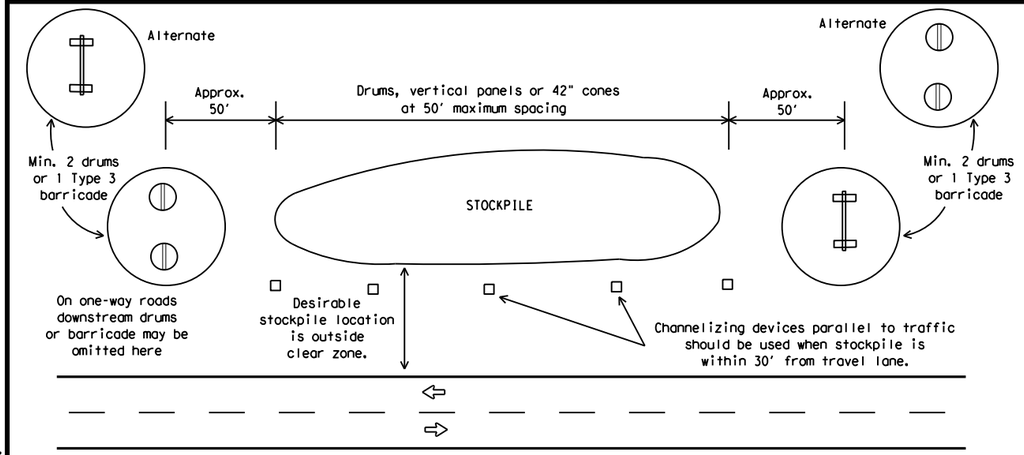
PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



28" Cones shall have a minimum weight of 9 1/2 lbs.
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, sealed outer surface and meet the requirements of Departmental Material Specification DMS-8300 Type A or Type B.
5. 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined on BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
6. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
7. Cones or tubular markers used on each project should be of the same size and shape.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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WORK ZONE PAVEMENT MARKINGS

GENERAL

1. The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
2. Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
3. Additional supplemental pavement marking details may be found in the plans or specifications.
4. Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
5. When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet WZ(STPM).
6. When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs at the beginning of sections where passing is permitted.
7. All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

1. Raised pavement markers are to be placed according to the patterns on BC(12).
2. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and Departmental Material Specification DMS-4200 or DMS-4300.

PREFABRICATED PAVEMENT MARKINGS

1. Removable prefabricated pavement markings shall meet the requirements of DMS-8241.
2. Non-removable prefabricated pavement markings (foil back) shall meet the requirements of DMS-8240.

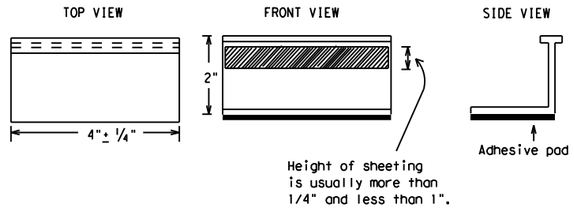
MAINTAINING WORK ZONE PAVEMENT MARKINGS

1. The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
2. Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 599.
3. The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 160 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
4. Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

REMOVAL OF PAVEMENT MARKINGS

1. Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway shall be removed or obliterated before the roadway is opened to traffic.
2. The above shall not apply to detours in place for less than three days, where flaggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route.
3. Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernable marking. This shall be by any method approved by TxDOT Specification Item 677 for "Eliminating Existing Pavement Markings and Markers".
4. The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
5. Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
6. Blast cleaning may be used but will not be required unless specifically shown in the plans.
7. Over-painting of the markings SHALL NOT BE permitted.
8. Removal of raised pavement markers shall be as directed by the Engineer.
9. Removal of existing pavement markings and markers will be paid for directly in accordance with Item 677, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS," unless otherwise stated in the plans.
10. Black-out marking tape may be used to cover conflicting existing markings for periods less than two weeks when approved by the Engineer.

Temporary Flexible-Reflective Roadway Marker Tabs



STAPLES OR NAILS SHALL NOT BE USED TO SECURE TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS TO THE PAVEMENT SURFACE

1. Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
2. Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
   A. Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
   B. Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
3. Small design variances may be noted between tab manufacturers.
4. See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

1. Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
2. All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
3. Adhesive for guidemarks shall be bituminous material hot applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.

Guidemarks shall be designated as:
YELLOW - (two amber reflective surfaces with yellow body).
WHITE - (one silver reflective surface with white body).

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
TRAFFIC BUTTONS	DMS-4300
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS	DMS-8241
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS	DMS-8242

A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(1).

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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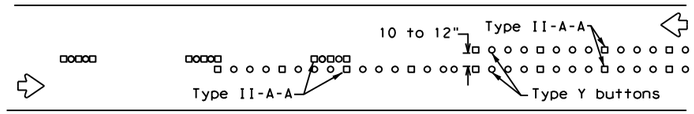
REVISIONS 2-98 9-07 5-21 1-02 7-13 11-02 8-14	DIST	COUNTY		SHEET NO.
105				

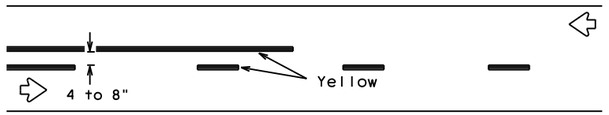
DATE:
FILE:

PAVEMENT MARKING PATTERNS

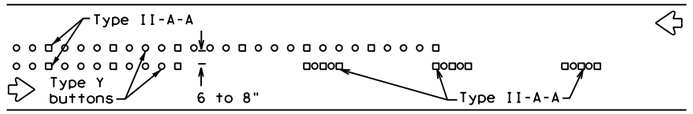
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



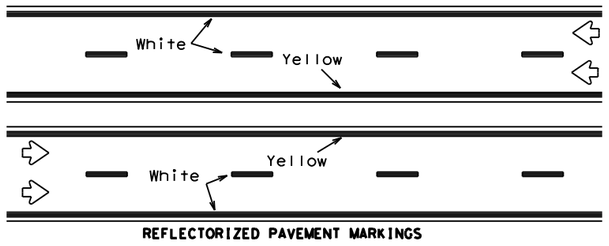
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



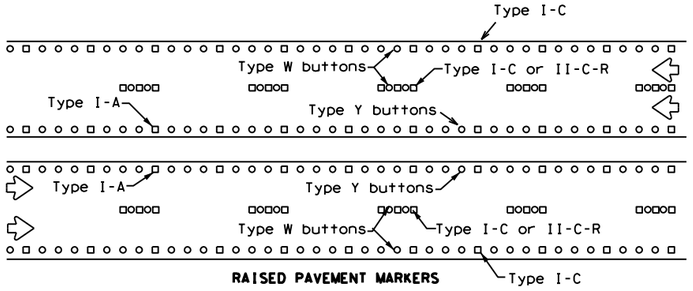
RAISED PAVEMENT MARKERS - PATTERN B

Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer.
Prefabricated markings may be substituted for reflectorized pavement markings.

CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY HIGHWAYS



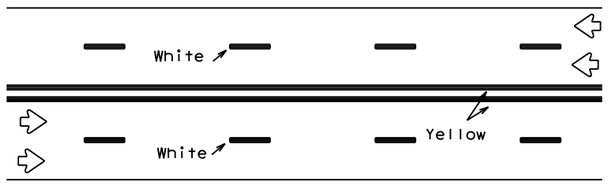
REFLECTORIZED PAVEMENT MARKINGS



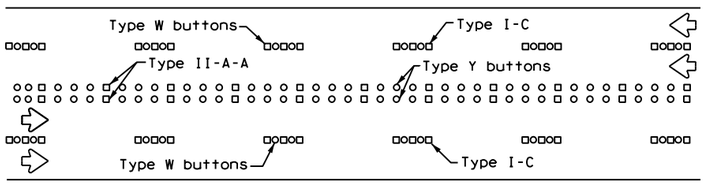
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



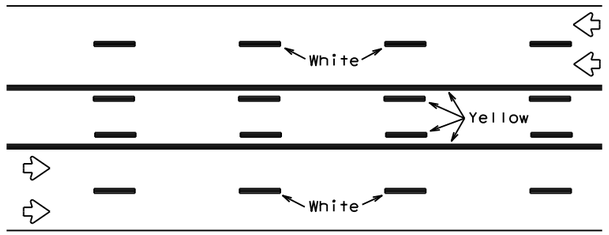
REFLECTORIZED PAVEMENT MARKINGS



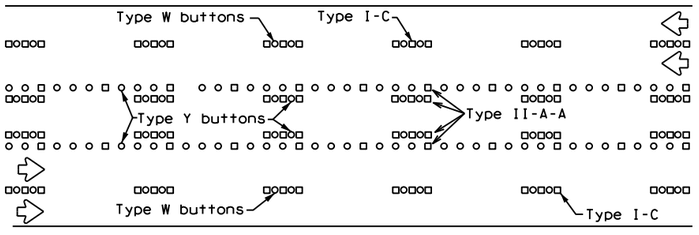
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

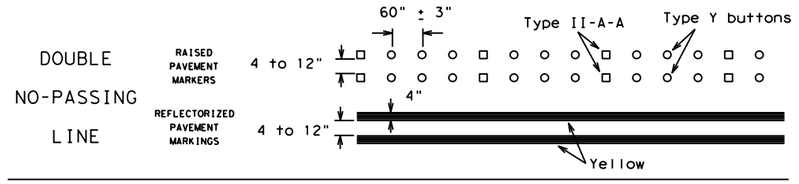
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

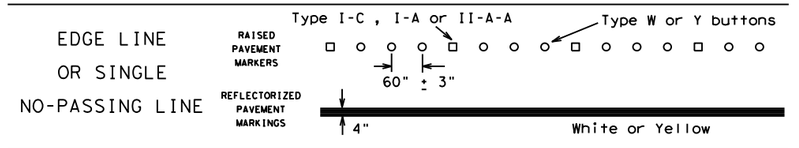
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

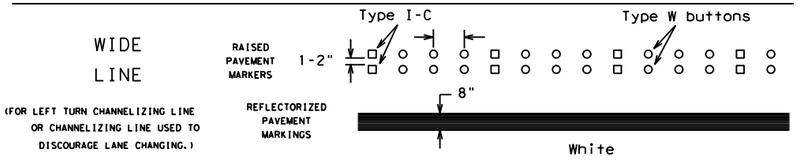


EDGE LINE OR SINGLE NO-PASSING LINE



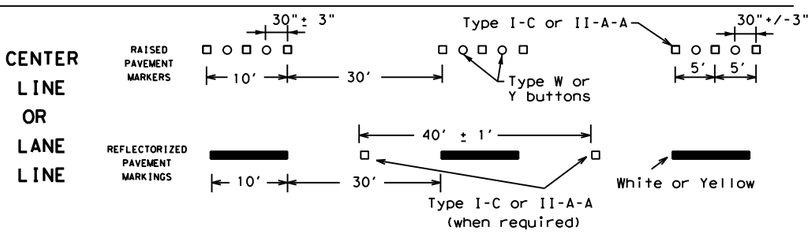
WIDE LINE

(FOR LEFT TURN CHANNELIZING LINE OR CHANNELIZING LINE USED TO DISCOURAGE LANE CHANGING.)

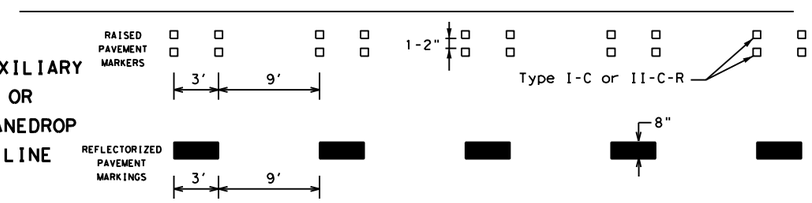


BROKEN LINES

CENTER LINE OR LANE LINE

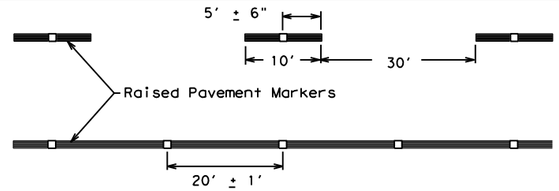


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement REMOVABLE markings, the markers shall be applied to the top of the tape at the approximate mid length of tape used for broken lines or at 20 foot spacing for solid lines. This allows an easier removal of raised pavement markers and tape.



Centerline only - not to be used on edge lines

Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

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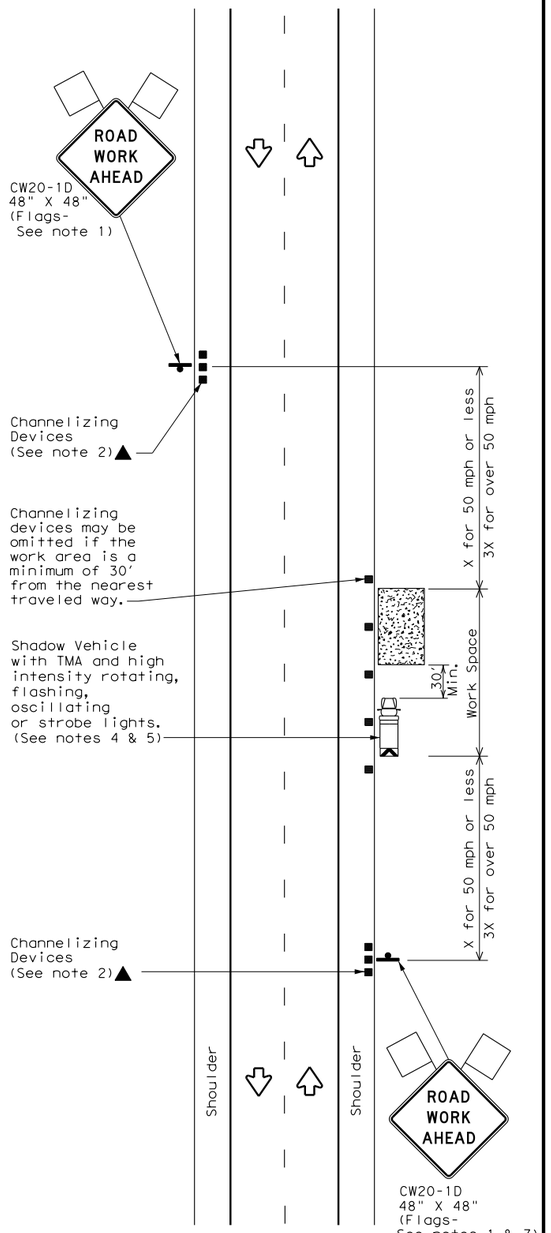
REVISIONS 1-97 9-07 5-21 2-98 7-13 11-02 8-14	DIST	COUNTY		SHEET NO.

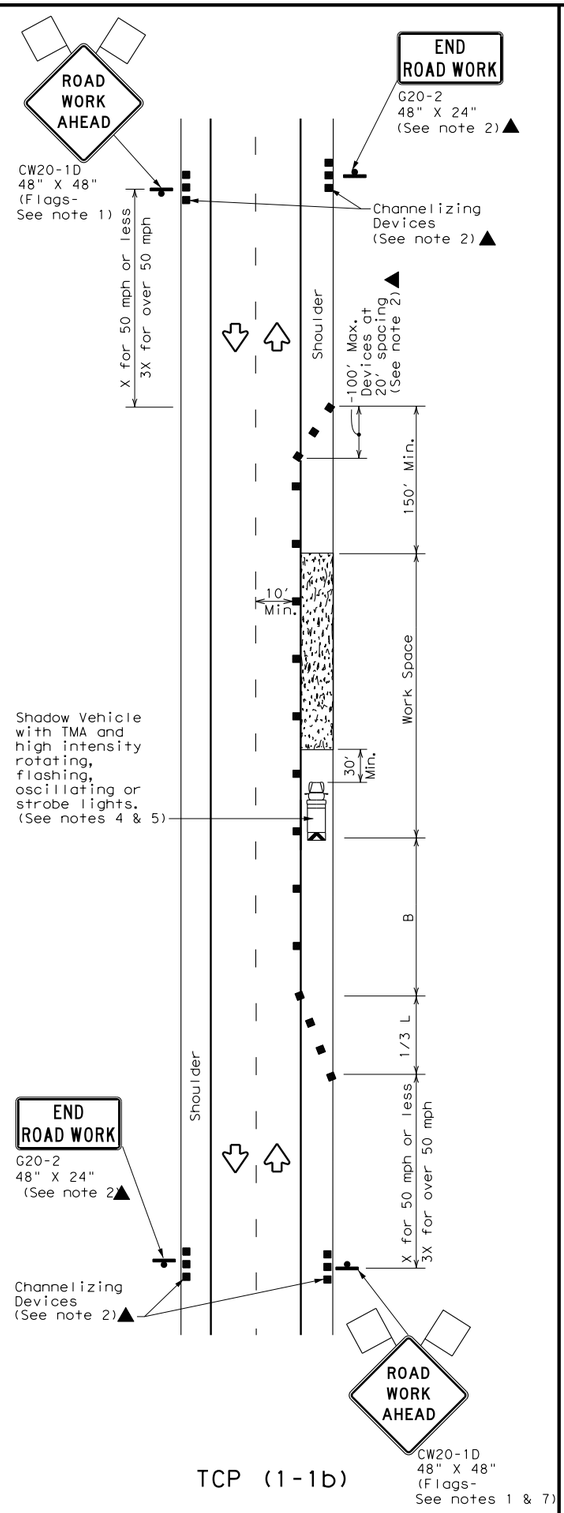
106

DATE:
FILE:



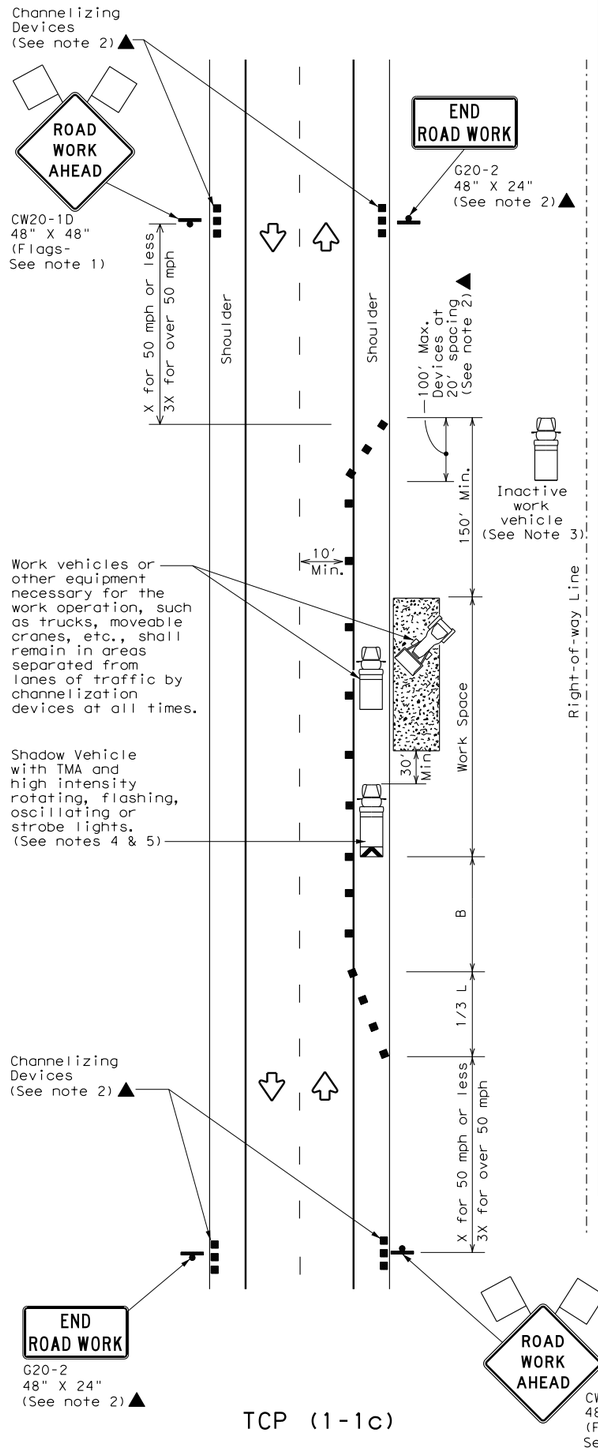
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
6. See TCP(5-1)for shoulder work on divided highways, expressways and freeways.
7. CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
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REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	DIST	COUNTY		SHEET NO.

DATE:
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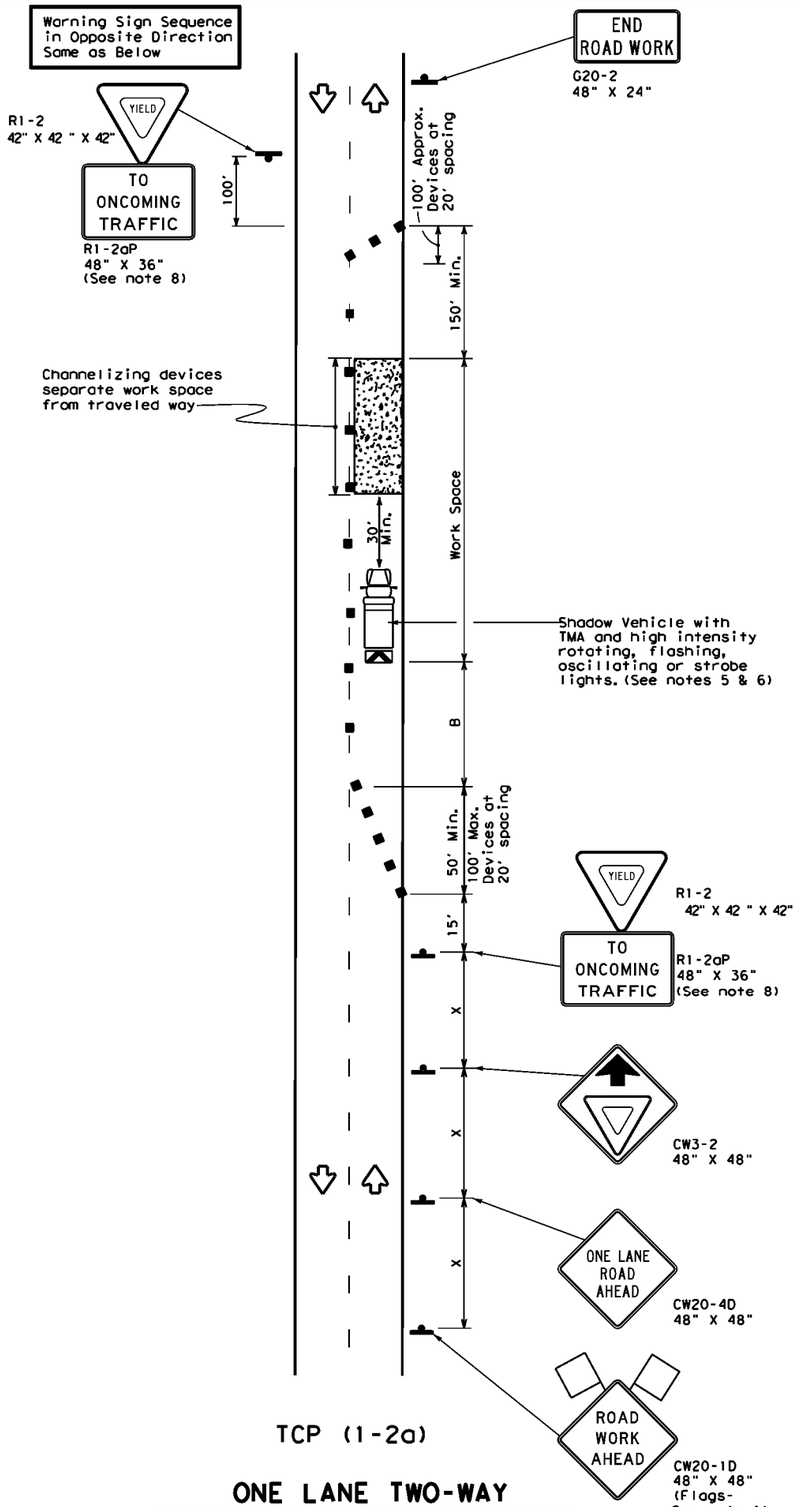
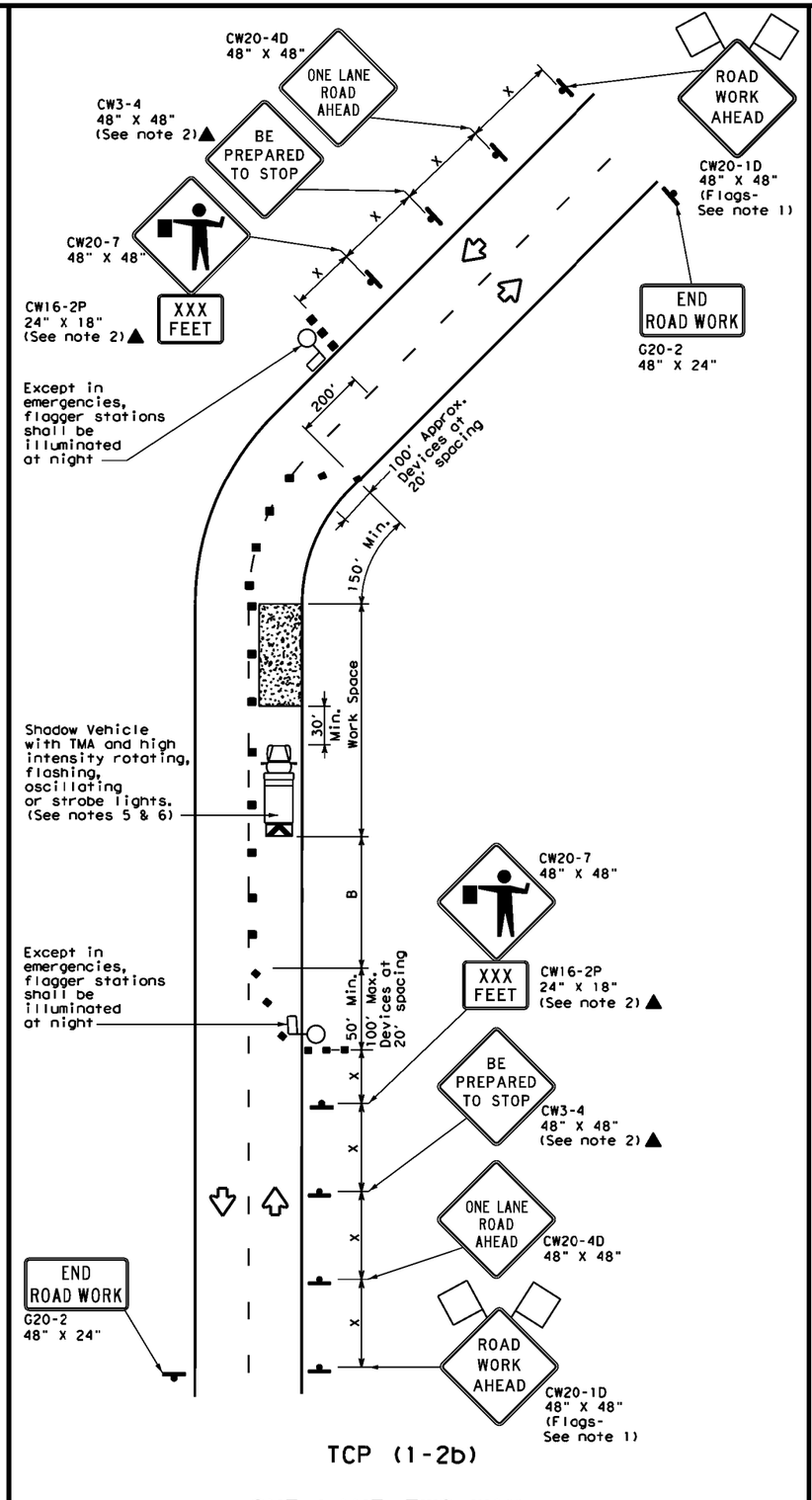


TCP (1-2a)

ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See note 7)



TCP (1-2b)

ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

LEGEND

	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE

MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
4. Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-2a)

7. R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work spaces should be no longer than one half city block. In rural areas on roadways with less than 2000 ADT, work spaces should be no longer than 400 feet.
8. R1-2 "YIELD" sign with R1-2aP "TO ONCOMING TRAFFIC" plaque shall be placed on a support at a 7 foot minimum mounting height.

TCP (1-2b)

9. Flaggers should use two-way radios or other methods of communication to control traffic.
10. Length of work space should be based on the ability of flaggers to communicate.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
12. Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
13. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(1-2)-18

FILE: tcp1-2-18.dgn	DN:	CK:	DW:	CK:
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REVISIONS				
4-90 4-98	DIST	COUNTY		SHEET NO.
2-94 2-12				
1-97 2-18				

DATE:
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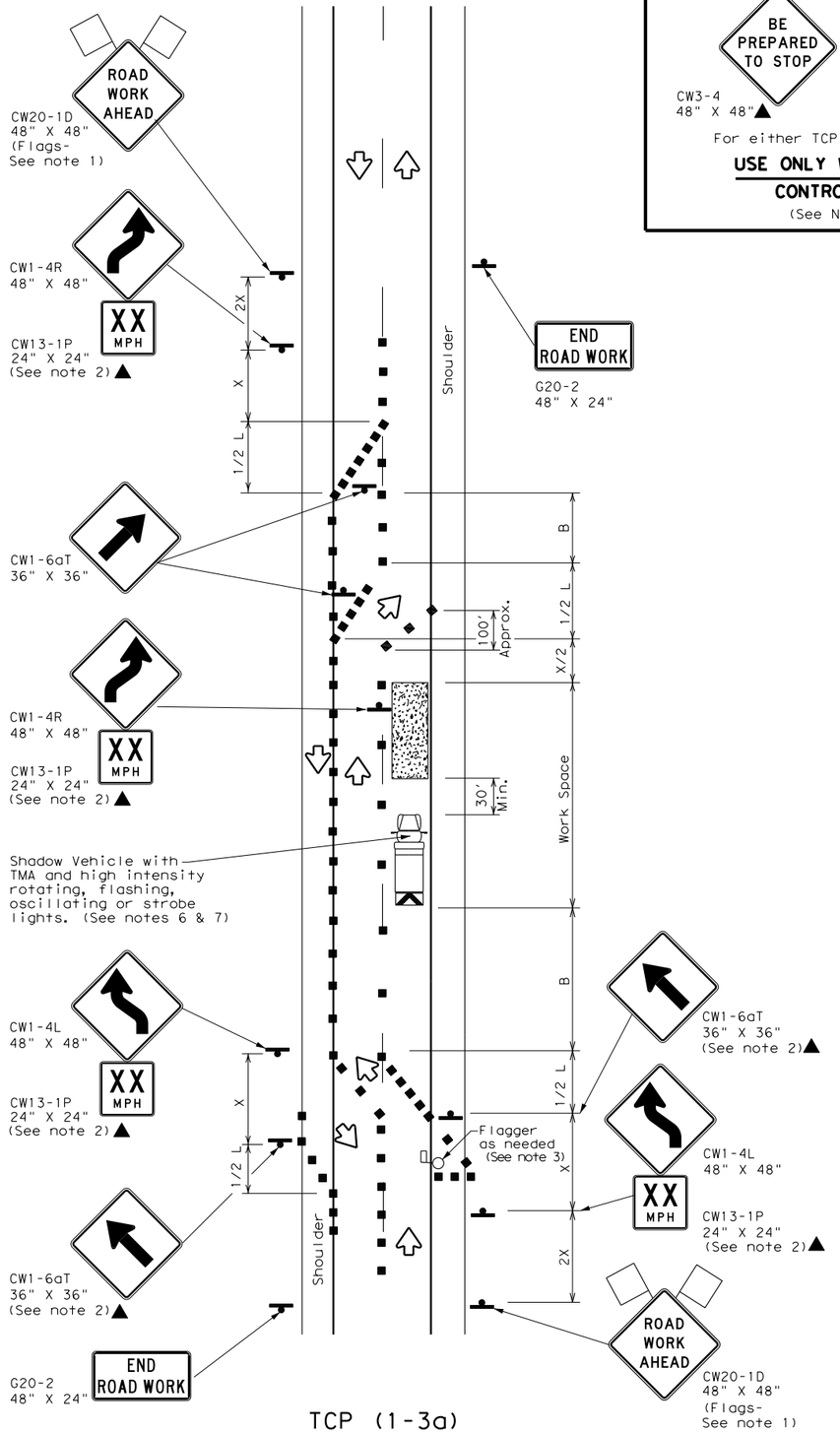
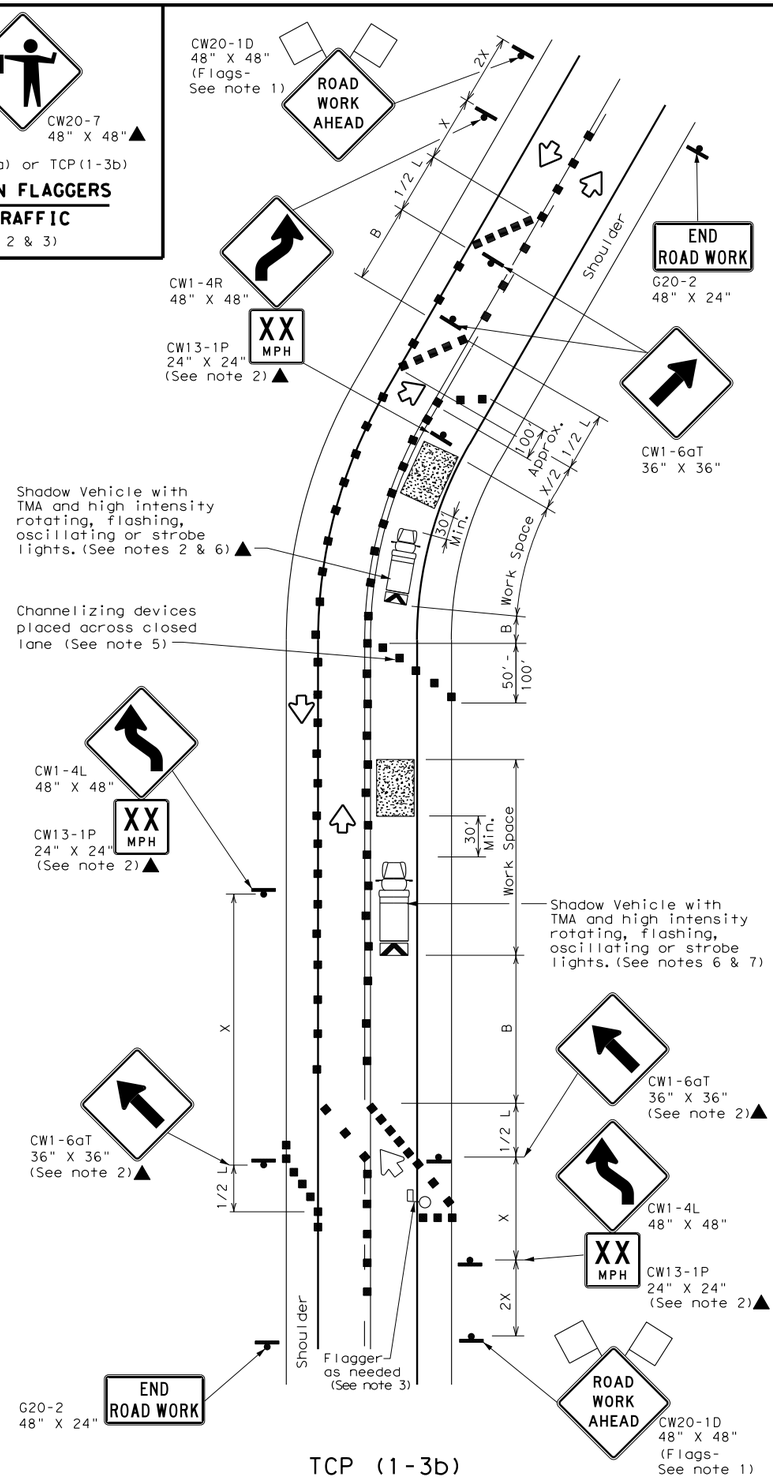


TCP (1-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



TCP (1-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L = WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Additional flaggers may be positioned in advance of traffic queues to alert traffic to reduce speed.
4. DO NOT PASS, PASS WITH CARE and construction regulatory speed zone signs may be installed downstream of the ROAD WORK AHEAD signs.
5. When the work zone is made up of several work spaces, channelizing devices should be placed laterally across the closed lane to re-emphasize closure. Laterally placed channelizing devices should be repeated every 500 to 1000 feet in urban areas and every 1/4 to 1/2 mile in rural areas.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
8. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20', or 15' if posted speed are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the area of conflicting markings not the entire work zone.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
TRAFFIC SHIFTS ON TWO LANE ROADS

TCP(1-3)-18

FILE: tcp1-3-18.dgn	DN:	CK:	DW:	CK:
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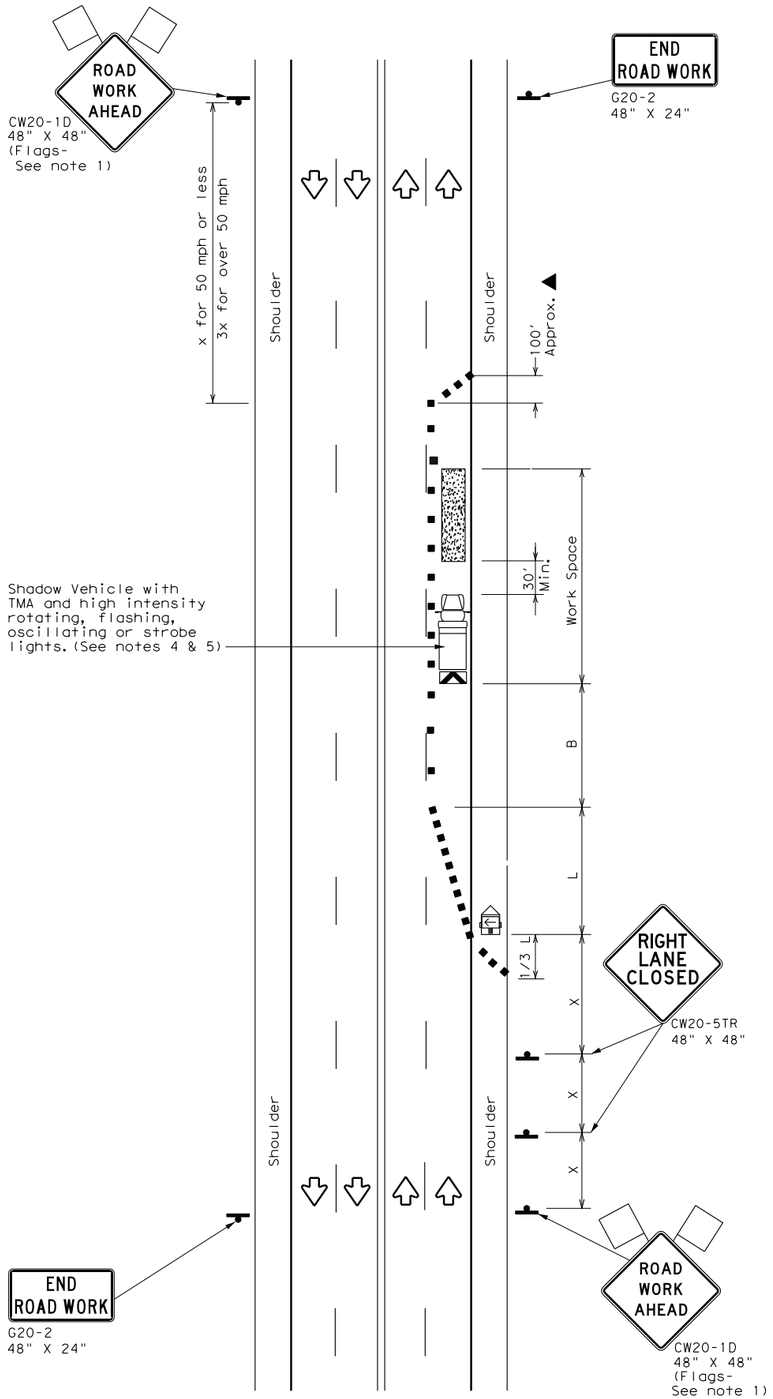
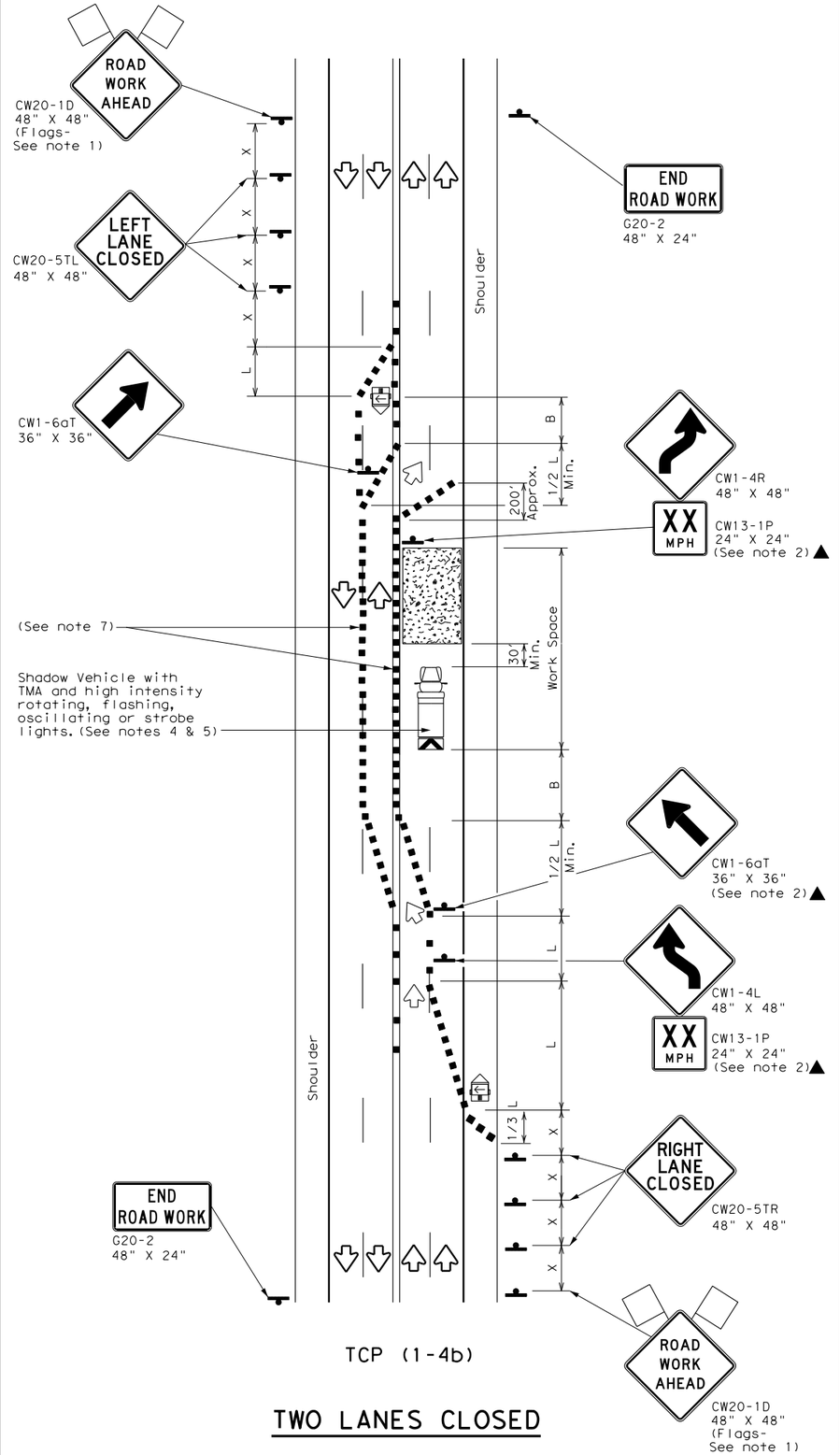


TCP (1-4a)

ONE LANE CLOSED



TCP (1-4b)

TWO LANES CLOSED

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L = WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW20-1D "ROAD WORK AHEAD" sign may be repeated if the visibility of the work zone is less than 1500 feet.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-4a)

6. If this TCP is used for a left lane closure , CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline where needed to protect the work space from opposing traffic with the arrow panel placed in the closed lane near the end of the merging taper.

TCP (1-4b)

7. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the areas of conflicting markings, not the entire work zone.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(1-4)-18

FILE: tcp1-4-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS				
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12				
1-97 2-18				

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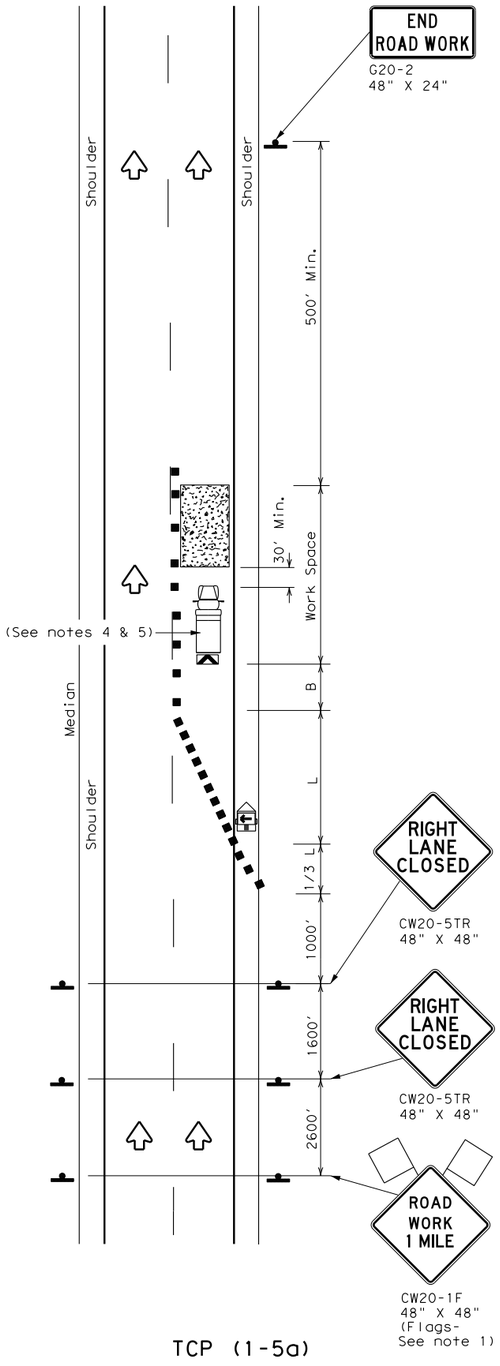
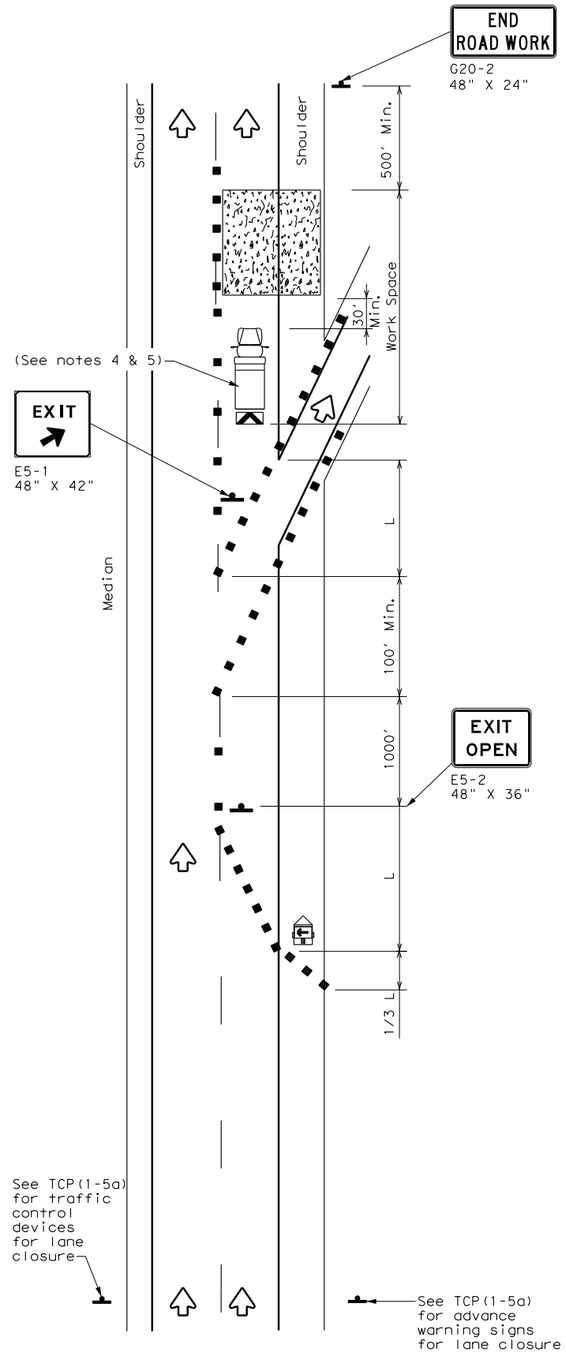


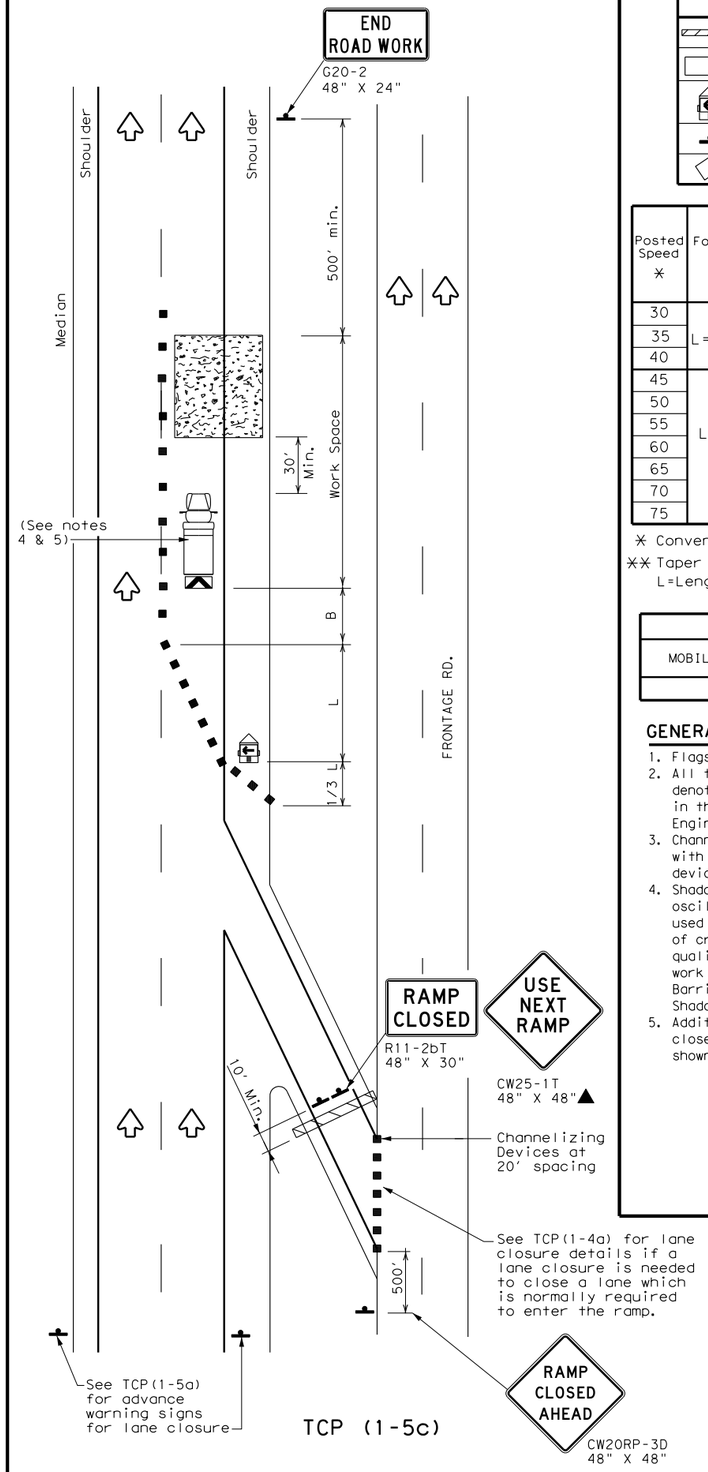
TCP (1-5a)

ONE LANE CLOSURE



TCP (1-5b)

LANE CLOSURE NEAR EXIT RAMPS



TCP (1-5c)

LANE CLOSURE NEAR ENTRANCE RAMPS

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
		✓		

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Channelizing devices used to close lanes may be supplemented with the Chevron Alignment Sign placed on every other channelizing device. Chevrons may be attached to plastic drums as per BC Standards.
4. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES FOR DIVIDED HIGHWAYS

TCP(1-5)-18

FILE: tcp1-5-18.dgn	DN:	CK:	DW:	CK:
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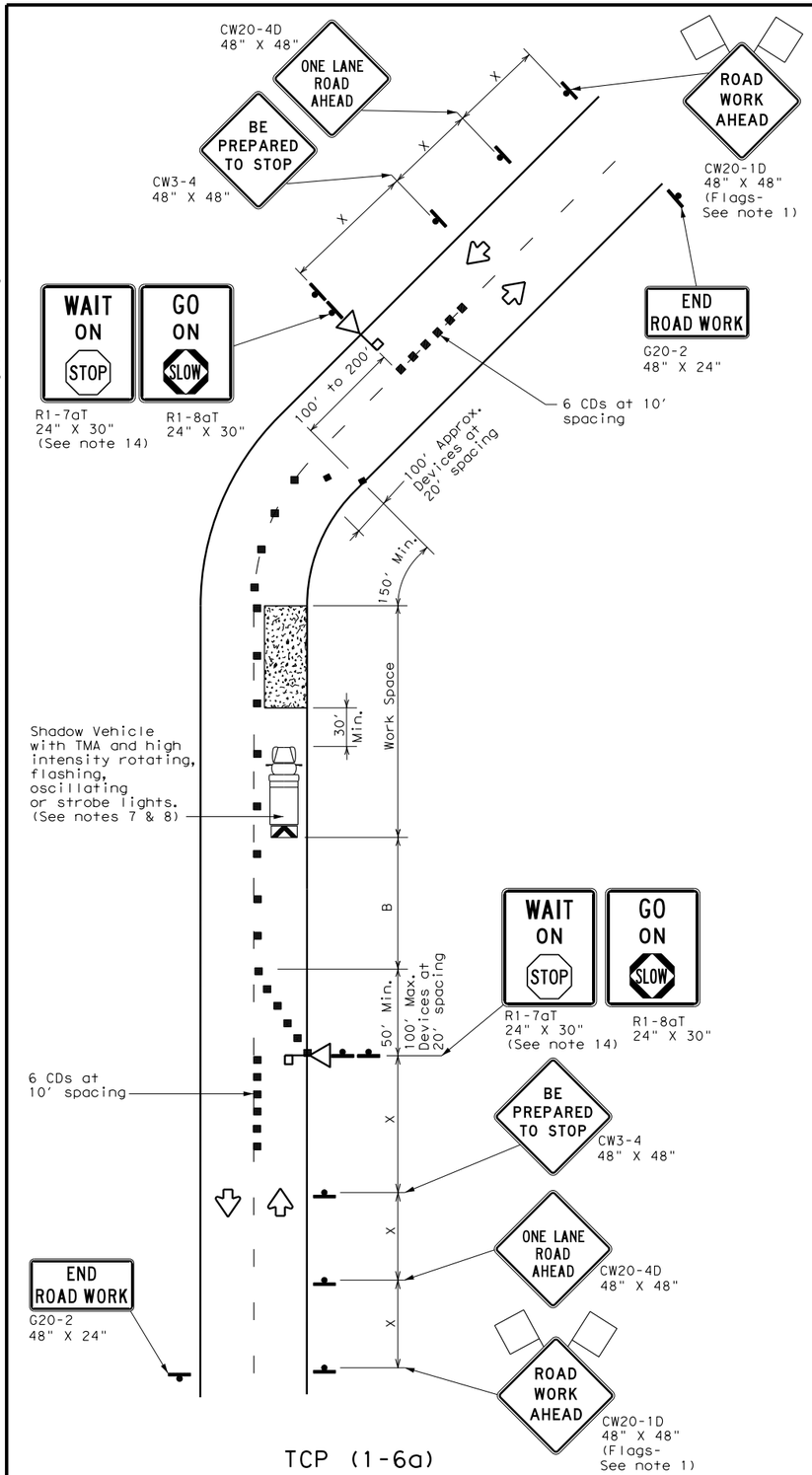
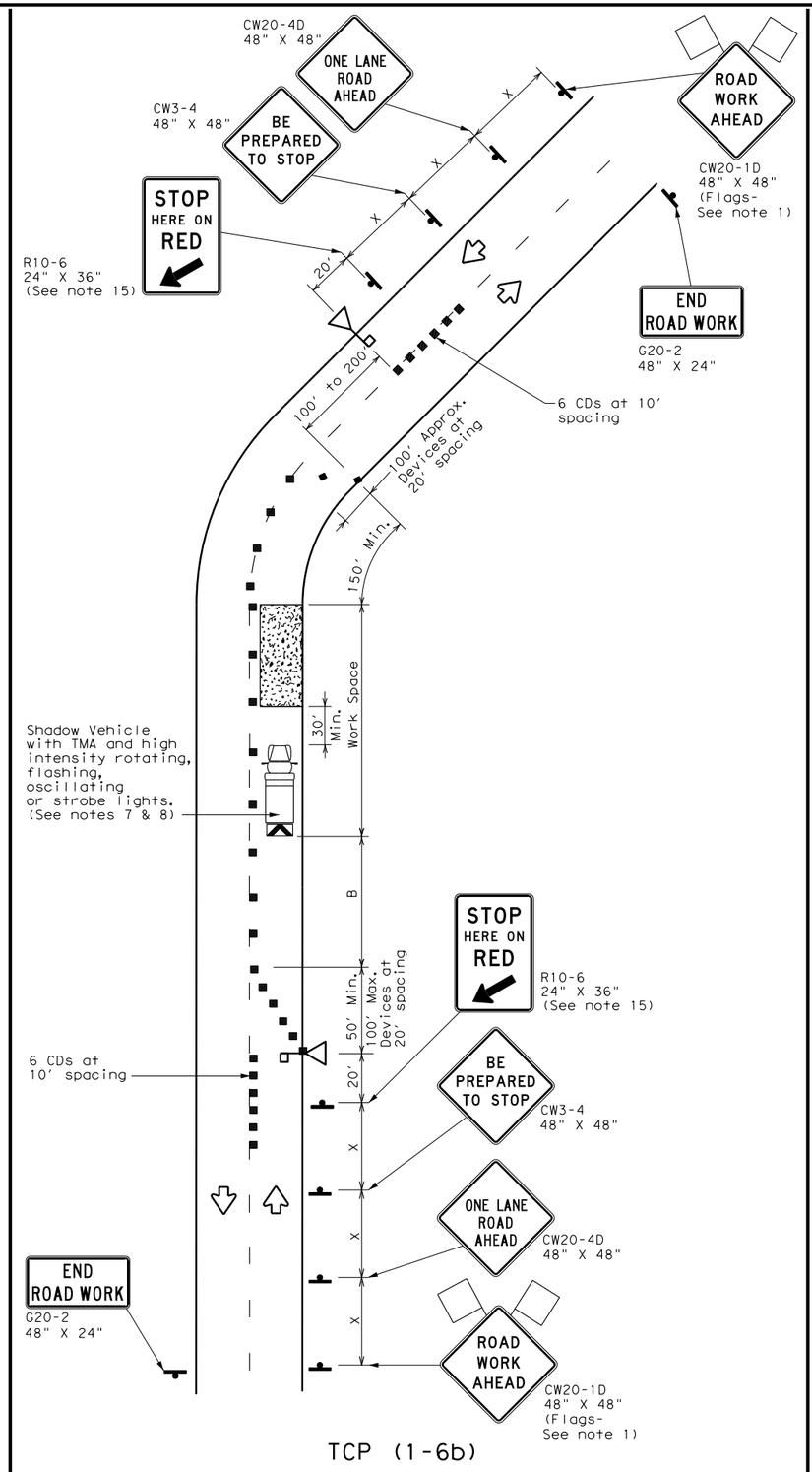
REVISIONS 2-18	DIST	COUNTY		SHEET NO.

DATE:
FILE:



TCP (1-6a)

ONE LANE TWO-WAY CONTROL WITH STOP/SLOW AFADs



TCP (1-6b)

ONE LANE TWO-WAY CONTROL WITH RED/YELLOW LENS AFADs

LEGEND			
	Type 3 Barricade		Channelizing Devices (CDs)
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Automated Flagger Assistance Device (AFAD)	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. AFADs shall only be used in situations where there is one lane of approaching traffic in the direction to be controlled.
3. Adequate stopping sight distance must be provided to each AFAD location for approaching traffic. (See table above).
4. Each AFAD shall be operated by a qualified/certified flagger. Flaggers operating AFADs shall not leave them unattended while they are in use.
5. One flagger may operate two AFADs only when the flagger has an unobstructed view of both AFADs and of the approaching traffic in both directions.
6. When pilot cars are used, a flagger controlling traffic shall be located on each approach. AFADs shall not be operated by the pilot car operator.
7. All AFADs shall be equipped with gate arms with an orange or fluorescent red-orange flag attached to the end of the gate arm. The flag shall be a minimum of 16" square.
8. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
9. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
10. Flaggers should use two-way radios or other methods of communication to control traffic.
11. Length of work space should be based on the ability of flaggers to communicate.
12. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the AFAD.
13. Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
14. The R1-7aT "WAIT ON STOP" sign and the R1-8aT "GO ON SLOW" sign shall be installed at the AFAD location on separate supports or they may be fabricated as one 48" x 30" sign. They shall not obscure the face of the STOP/SLOW AFAD.
15. The R10-6 "STOP HERE ON RED" arrow sign shall be offset so as not to obscure the lenses of the AFAD.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
AUTOMATED FLAGGER ASSISTANCE DEVICES (AFADS)

TCP(1-6)-18

FILE: tcp1-6-18.dgn	DN:	CK:	DW:	CK:
©TxDOT February 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-18	DIST	COUNTY		SHEET NO.

DATE:
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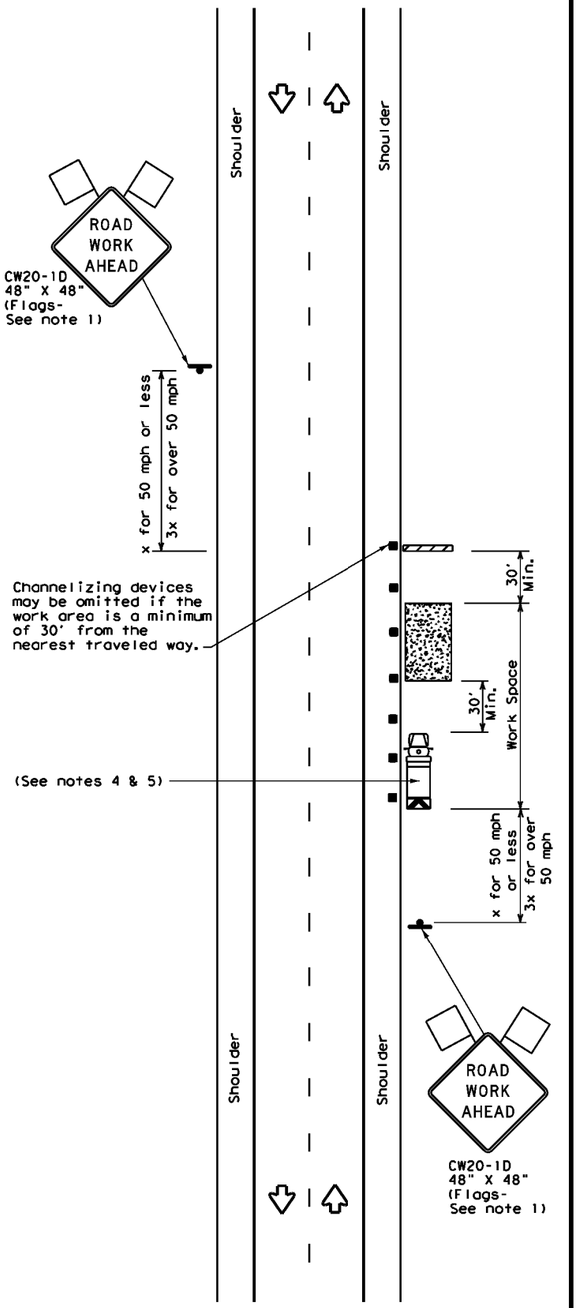
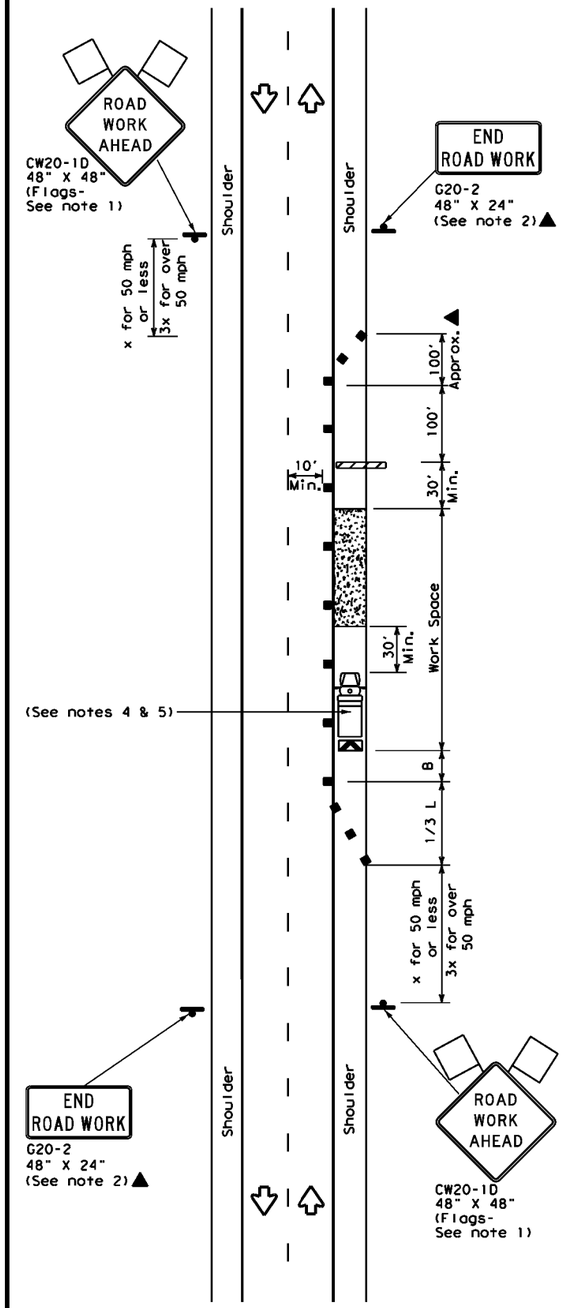


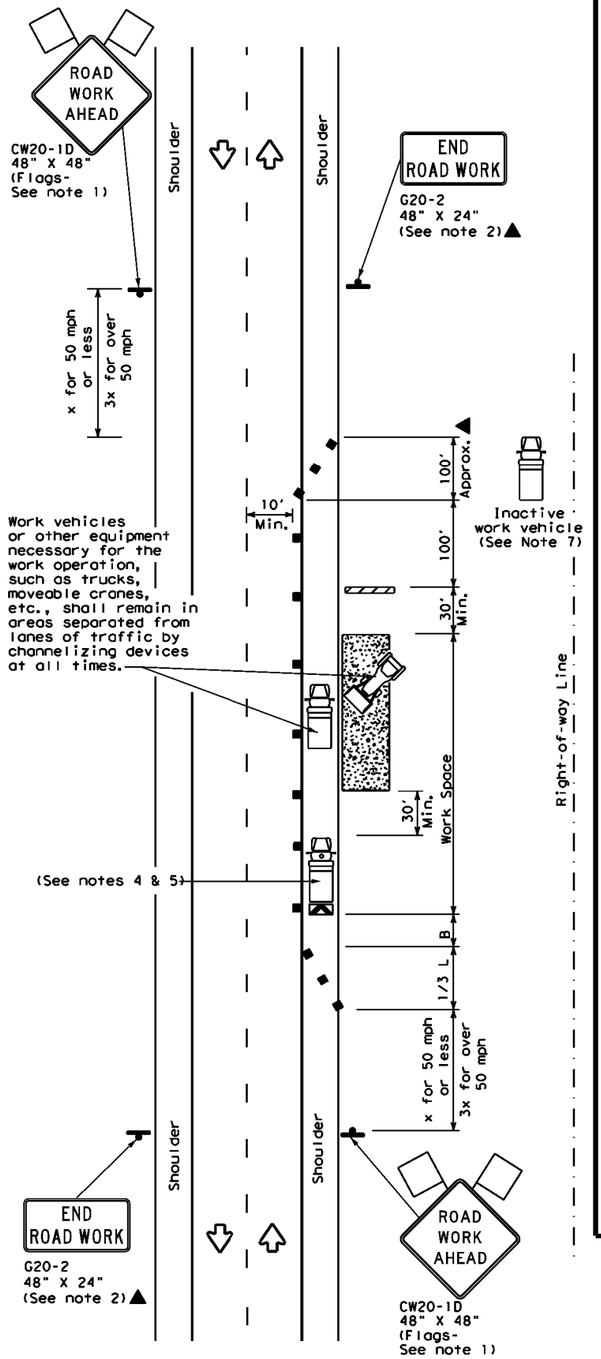
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

LEGEND			
	Type 3 Barricade	▪▪	Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	✓

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated in the plans, or for routine maintenance work, when approved by the Engineer.
3. Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
4. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
6. See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
7. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
8. CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation

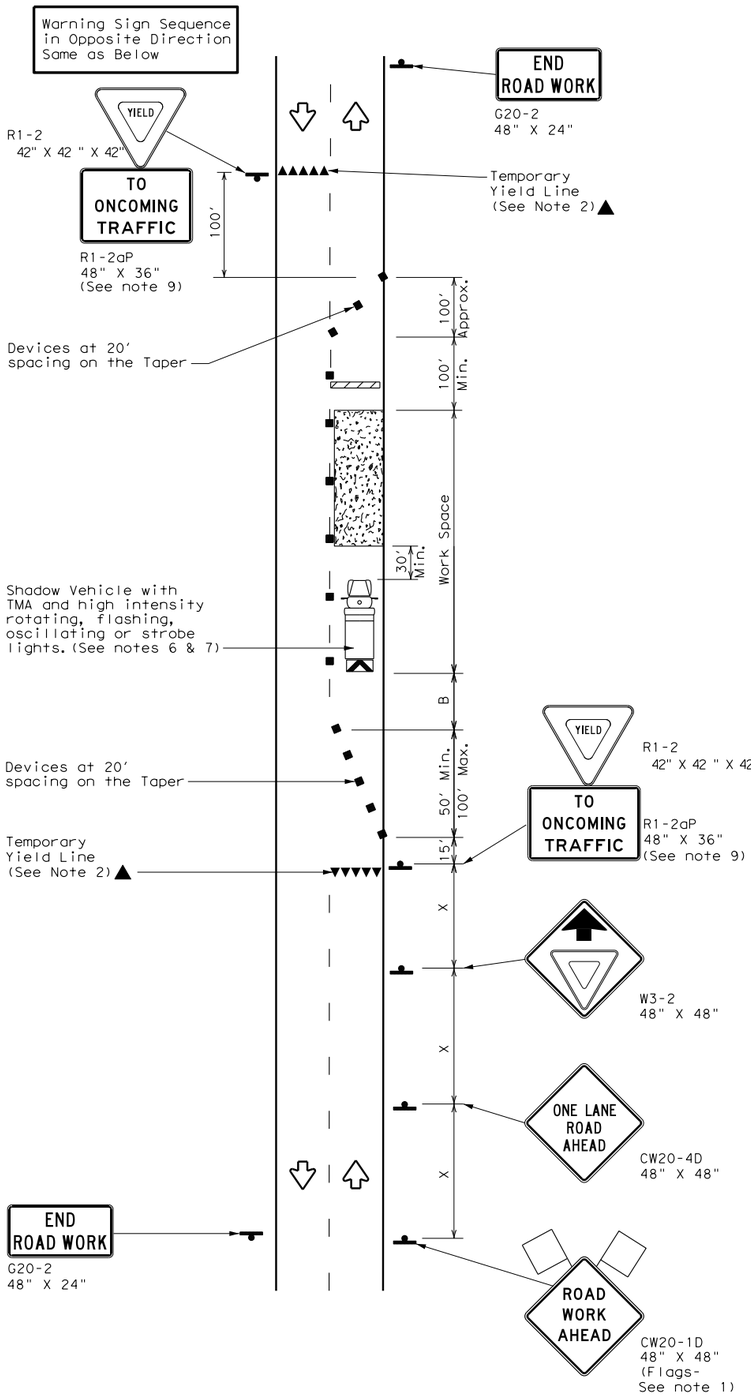
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

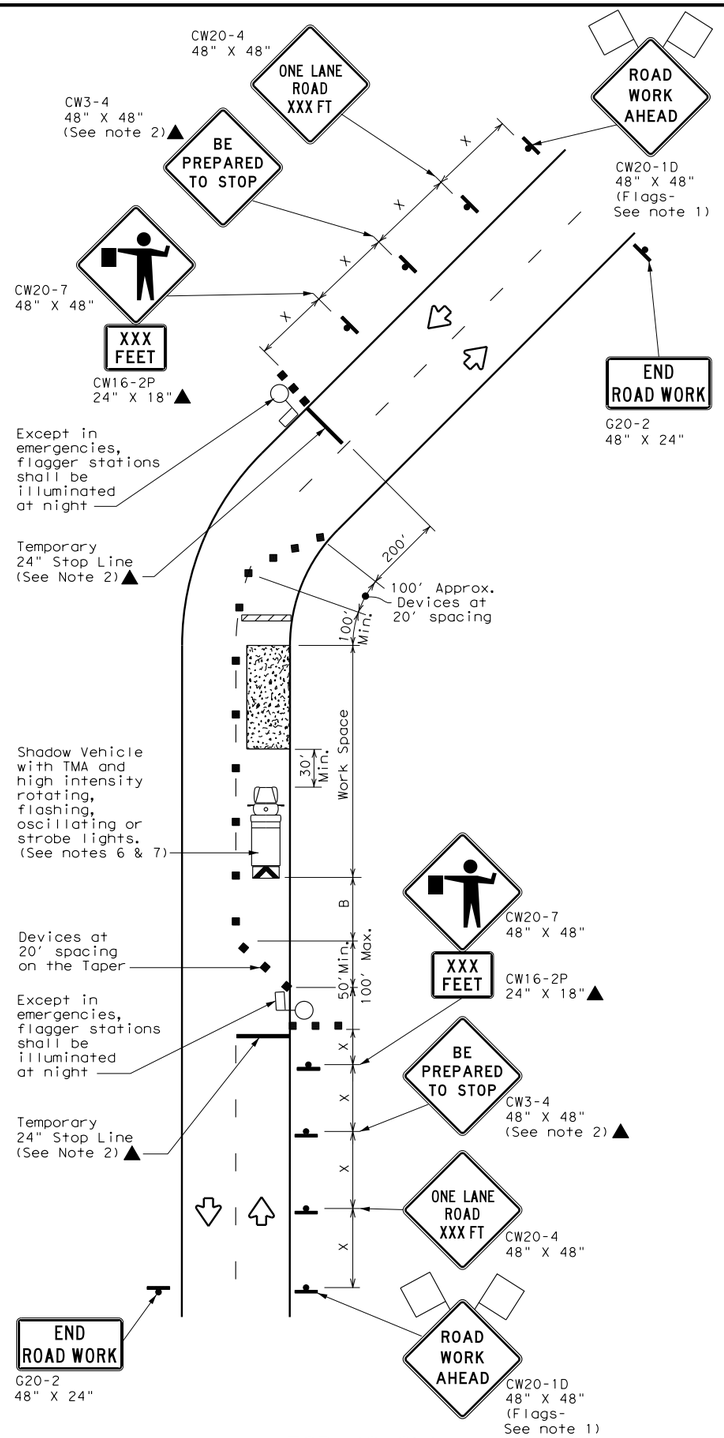
TCP(2-1)-18

FILE: tcp2-1-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18	DIST	COUNTY		SHEET NO.

DATE:
FILE:



TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



TCP (2-2b)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

LEGEND

	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L = WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE

MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
4. Flaggers should use two-way radios or other methods of communication to control traffic.
5. Length of work space should be based on the ability of flaggers to communicate.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-2a)

8. The R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work space should be no longer than one half city block. In rural areas, roadways with less than 2000 ADT, work space should be no longer than 400 feet.
9. The R1-2aP "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support at a 7 foot minimum mounting height.

TCP (2-2b)

10. Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the flagger and a queue of stopped vehicles. (See table above).
12. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situtations.

Texas Department of Transportation
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP(2-2)-18

FILE: tcp2-2-18.dgn	DN:	CK:	DW:	CK:
© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 8-95 3-03				
1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18				

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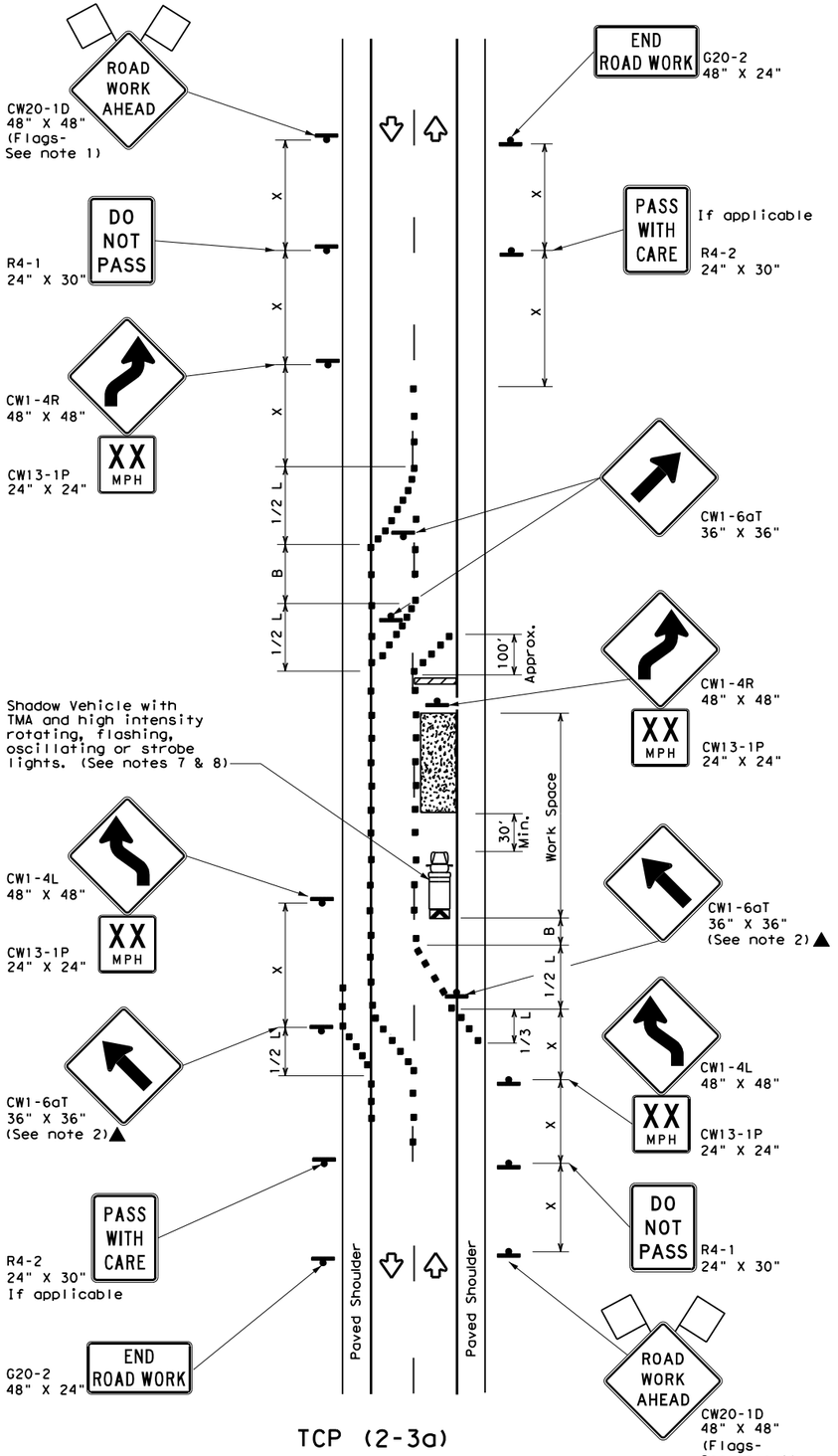
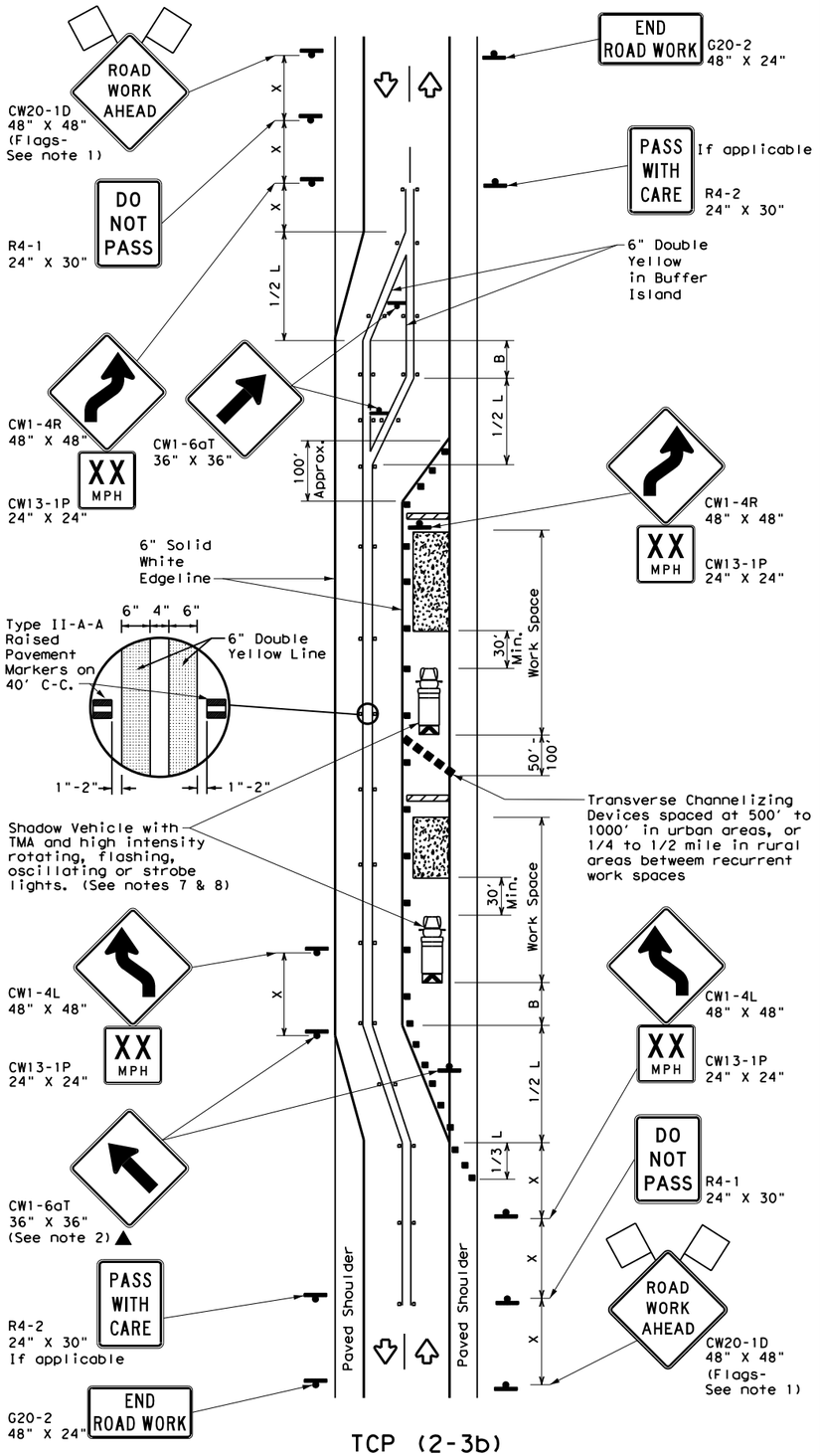


TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



TCP (2-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

LEGEND			
	Type 3 Barricade	■ ■	Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	• • • •	Raised Pavement Markers Ty II-AA
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
				TCP(2-3b)ONLY
			✓	✓

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
4. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
5. The R4-1 "DO NOT PASS," R4-2 " PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
6. Conflicting pavement marking shall be removed for long term projects.
7. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted.
8. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-3a)

9. Conflicting pavement markings shall be removed for long-term projects. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter device spacing is intended for the area of the conflicting markings, not the entire work zone.

Texas Department of Transportation

Traffic Safety Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

TCP(2-3)-23

FILE: tcp(2-3)-23.dgn	DN:	CK:	DW:	CK:
© TxDOT April 2023	CONT	SECT	JOB	HIGHWAY
REVISIONS 12-85 4-98 2-18 8-95 3-03 4-23 1-97 2-12	DIST	COUNTY		SHEET NO.

LEGEND

- PROPOSED WATER LINE
- PROPERTY LINE
- EASEMENT BOUNDARY
- ASPHALT PAVEMENT
- FENCE
- EXISTING STORM DRAIN
- OHE — OVERHEAD ELECTRIC
- UGT — UNDERGROUND TELEPHONE
- 6" W — EXISTING WATER MAIN
- BENCH MARK
- EXIST. POWER POLE
- EXIST. GUY ANCHOR
- EXIST. STOP/SPEED SIGN
- EXIST. FIRE HYDRANT
- EXIST. WATER VALVE
- EXIST. IRRIGATION VALVE
- PROPOSED WATER VALVE
- EXIST. WATER METER
- EXIST. TELEPHONE PEDESTAL
- AIR RELEASE VALVE
- BLOW-OFF VALVE
- EXISTING TREES TO REMAIN
- EXISTING DRIVEWAY TO BE REMOVED AND REPLACED
- PROPOSED MILL AND OVERLAY EXISTING HMAC
- PROPOSED PAVEMENT RESTORATION
- EXISTING TREE TO BE REMOVED
- RB — ROCK BERM
- SF — SILT FENCE

NOTE:
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3. ALL DEBRIS FROM THE TREE REMOVAL(TRUNKS, BRANCHES, ROOTS, ETC.) SHALL BE REMOVED AND DISPOSED OF OFF-SITE BY THE CONTRACTOR.
4. CONTRACTOR SHALL CLEAR CUT THE ENTIRE LIMITS OF PERMANENT EASEMENTS, EXCEPT WHERE NOTED OTHERWISE.
5. PROPOSED SILT FENCING TO BE INSTALLED IN PUBLIC R.O.W.

N W E S

0 60' 120'
GRAPHIC SCALE 60'
FULL SIZE (22" x 34") 1" = 30'
HALF SIZE (11" x 17") 1" = 60'

ROSALINDA & RUBEN C MORALES
LOT 11, BLOCK 2
20546 SILVER WINGS DR
SAN ANTONIO, TX 78264

SILVER WINGS DR
(60' R.O.W. - PCI 91)

BM #52
ELEV.=736.53'

ROSALINDA & RUBEN C MORALES
LOT 11, BLOCK 2
20546 SILVER WINGS DR
SAN ANTONIO, TX 78264

BLOCK 2
VACATING AND RESUBDIVISION PLAT,
APPLEWHITE ESTATES UNIT 1,
VOL.9513,PG.24 DPRBC

BLOCK 2
APPLEWHITE ESTATES UNIT 1,
VOL.9100,PG.72-73 DPRBC

JUVENAL C & DAISY & NACY SANDOVAL
LOT 3, BLOCK 2
1931 SILVER MOUNTAIN DR
SAN ANTONIO, TX 78264

JUVENAL C & DAISY & NACY SANDOVAL
LOT 4, BLOCK 2
1921 SILVER MOUNTAIN DR
SAN ANTONIO, TX 78264

1+00 2+00 3+00 4+00 5+00 6+00 7+00 8+00 9+

SILVER MOUNTAIN DR
(60' R.O.W. - PCI 92)

MATCHLINE STA. 9+00

SHEET C1

SHEET C2

JUVENAL C & DAISY & NACY SANDOVAL
LOT 4, BLOCK 2
1921 SILVER MOUNTAIN DR
SAN ANTONIO, TX 78264

DAVID H & MARIA G SANCHEZ
LOT 5, BLOCK 2
1911 SILVER MOUNTAIN DR
SAN ANTONIO, TX 78264

BLOCK 2
APPLEWHITE ESTATES UNIT 1,
VOL.9100,PG.72-73 DPRBC

STEPHANIE SANCHEZ
LOT 6, BLOCK 2
1841 SILVER MOUNTAIN DR
SAN ANTONIO, TX 78264

LUKE GARZA
LOT 7, BLOCK 2
1831 SILVER MOUNTAIN DR
SAN ANTONIO, TX 78264

DELILAH L MARQUEZ
LOT 8, BLOCK 2
1821 SILVER MOUNTAIN DR
SAN ANTONIO, TX 78264

MATCHLINE STA. 9+00

10+00 11+00 12+00 13+00 14+00 15+00 16+00 17

SILVER MOUNTAIN DR
(60' R.O.W. - PCI 92)

MATCHLINE STA. 17+00

SHEET C3

SHEET C4

JOB NO.
24-6007

STATE OF TEXAS
V. RYAN SOSNA
91171
REGISTERED
PROFESSIONAL ENGINEER
07/01/2025

REVISIONS				
No.	Description	Drn.	Approved	Date

INFORMATION

Kimley»Horn
TEXAS REGISTERED FIRM, NO. F-928

Date: JULY 2025
Drawn by:KML
Designed by: AIG
Checked by: VRS
Scale: SHOWN ON SHEET

San Antonio Water System

SAN ANTONIO WATER SYSTEM

SILVER MOUNTAIN DR. 12-INCH WATER MAIN
TREE PROECTION & EROSION CONTROL PLANS
(1 OF 3)

DRAWING NO.
TP-EC1

K:\SNA_Utilities\068665076 - Silver Mountain PS\CAD\PLANSHEETS - WATER ALIGNMENT\068665076 - Tree Protection Erosion Control.dwg 6/26/25 2:11pm

LEGEND

- PROPOSED WATER LINE
- PROPERTY LINE
- EASEMENT BOUNDARY
- ASPHALT PAVEMENT
- FENCE
- EXISTING STORM DRAIN
- OHE — OVERHEAD ELECTRIC
- UGT — UNDERGROUND TELEPHONE
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- EXIST. POWER POLE
- EXIST. GUY ANCHOR
- EXIST. STOP/SPEED SIGN
- EXIST. FIRE HYDRANT
- EXISTING TREES TO REMAIN
- EXIST. WATER VALVE
- EXIST. IRRIGATION VALVE
- PROPOSED WATER VALVE
- EXIST. WATER METER
- EXIST. TELEPHONE PEDESTAL
- AIR RELEASE VALVE
- BLOW-OFF VALVE
- EXISTING DRIVEWAY TO BE REMOVED AND REPLACED
- PROPOSED MILL AND OVERLAY EXISTING HMAC
- PROPOSED PAVEMENT RESTORATION
- EXISTING TREE TO BE REMOVED
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N E S W

0 60' 120'
GRAPHIC SCALE 60'
FULL SIZE (22" x 34") 1" = 30'
HALF SIZE (11" x 17") 1" = 60'

TREES REMAINING	
Point #	Description
1430	20" OAK

DELILAH L MARQUEZ
LOT 8, BLOCK 2
1821 SILVER MOUNTAIN DR
SAN ANTONIO, TX 78264

BLOCK 2
APPLEWHITE ESTATES UNIT 1,
VOL.9100,PG.72-73 DPRBC

BRYAN J SIMON
LOT 9 BLOCK 2
1811 SILVER MOUNTAIN DR
SAN ANTONIO, TX 78264

FELIPE III & SYLVIA ANN TREVINO
LOT 10 BLOCK 2
1731 SILVER MOUNTAIN DR
SAN ANTONIO, TX 78264

RICHARD & MARGOT
RODRIGUEZ
LOT 1 BLOCK 3
1721 SILVER MOUNTAIN DR
SAN ANTONIO, TX 78264

MATCHLINE STA. 17+00

MATCHLINE STA. 25+00

BM #51
ELEV.=694.61'

1430
20" OAK

18+00 19+00 20+00 21+00 22+00 23+00 24+00

SILVER MOUNTAIN DR
(60' R.O.W. - PCI 92)

SHEET C5

SHEET C6

RICHARD & MARGOT
RODRIGUEZ
LOT 1 BLOCK 3
1721 SILVER MOUNTAIN DR
SAN ANTONIO, TX 78264

REYNALDO R GALLEGOS
LOT 2 BLOCK 3
1711 SILVER MOUNTAIN DR
SAN ANTONIO, TX 78264

BLOCK 3
APPLEWHITE ESTATES UNIT 1,
VOL.9100,PG.72-73 DPRBC

TEXAS LAND EXCHANGE, INC
LOT 3 BLOCK 3
1631 SILVER MOUNTAIN DR
SAN ANTONIO, TX 78264

TEXAS LAND EXCHANGE, INC
LOT 4 BLOCK 3
1621 SILVER MOUNTAIN DR
SAN ANTONIO, TX 78264

RUBY E BASTOS
LOT 5 BLOCK 3
1611 SILVER MOUNTAIN DR
SAN ANTONIO, TX 78264

MATCHLINE STA. 25+00

MATCHLINE STA. 33+00

26+00 27+00 28+00 29+00 30+00 31+00 32+00

SILVER MOUNTAIN DR
(60' R.O.W. - PCI 92)

SHEET C7

SHEET C8

JOB NO.
24-6007

STATE OF TEXAS
J. RYAN SONA
91171
REGISTERED
PROFESSIONAL ENGINEER
07/01/2025

REVISIONS				
No.	Description	Drn.	Approved	Date

INFORMATION

Kimley»Horn
TEXAS REGISTERED FIRM, NO. F-928

Date: JULY 2025
Drawn by: KML
Designed by: AIG
Checked by: VRS
Scale: SHOWN ON SHEET

San Antonio Water System

SAN ANTONIO WATER SYSTEM
SILVER MOUNTAIN DR. 12-INCH WATER MAIN
TREE PROECTION & EROSION CONTROL PLANS
(2 OF 3)

DRAWING NO.
TP-EC2

K:\SNA_Utilities\068665076 - Silver Mountain PS\CAD\PLANSHEETS - WATER ALIGNMENT\068665076 - Tree Protection Erosion Control.dwg 6/25/25 2:11pm

LEGEND

- PROPOSED WATER LINE
- PROPERTY LINE
- EASEMENT BOUNDARY
- ASPHALT PAVEMENT
- FENCE
- EXISTING STORM DRAIN
- OHE — OVERHEAD ELECTRIC
- UGT — UNDERGROUND TELEPHONE
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- EXIST. STOP/SPEED SIGN
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- EXIST. WATER VALVE
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- EXIST. TELEPHONE PEDESTAL
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N E S W

0 60' 120'
GRAPHIC SCALE 60'
FULL SIZE (22" x 34") 1" = 30'
HALF SIZE (11" x 17") 1" = 60'

RUBY E BASTOS
LOT 5 BLOCK 3
1611 SILVER MOUNTAIN DR
SAN ANTONIO, TX 78264

JUAN A & MIREYA N PERALES
LOT 6 BLOCK 3
1531 SILVER MOUNTAIN DR
SAN ANTONIO, TX 78264

BLOCK 3
APPLEWHITE ESTATES UNIT 1,
VOL.9100,PG.73 DPRBC

CAMILO A & MARY L CAMARILLO
LOT 7 BLOCK 3
1521 SILVER MOUNTAIN DR
SAN ANTONIO, TX 78264

LYNNE ELYSE COAKLEY
REMAINING - LOT 8 BLOCK 3
1511 SILVER MOUNTAIN DR
SAN ANTONIO, TX 78264

MATCHLINE STA. 33+00

34+00 35+00 36+00 37+00 38+00 39+00 40+00 41

SILVER MOUNTAIN DR
(60' R.O.W. - PCI 92)

MATCHLINE STA. 41+00

SHEET C9

SHEET C10

WILLIAM P GENTRY
REMAINING - LOT 9 BLOCK 3
20543 SILVER MOUNTAIN DR
SAN ANTONIO, TX 78264

REPLAT OF
APPLEWHITE ESTATES UNIT 1,
VOL.9526,PG.131 DPRBC

10' TELEPHONE, ELECTRIC & CABLE TV EASEMENT VOL.9526,PG.131 DPRBC

JONATHAN R GILBERT
LOT 6 BLOCK 4
20550 SILVER SADDLE DR
SAN ANTONIO, TX 78264

14' ELECTRIC, GAS, TELEPHONE & CABLE TV EASEMENT VOL.9526,PG.131 DPRBC

10' TELEPHONE, ELECTRIC & CABLE TV EASEMENT VOL.9526,PG.131 DPRBC

BM #50
ELEV.=671.45'

5' X 30' ANCHOR EASEMENT APPROXIMATE LOCATION VOL.9526,PG.131 DPRBC

MATCHLINE STA. 41+00

42+00 43+00

SILVER MOUNTAIN DR
(60' R.O.W. - PCI 92)

SILVER SADDLE DR
(60' R.O.W. - PCI 95)

43+79

SHEET C11

TEXAS LAND EXCHANGE, INC
LOT 7 BLOCK 4
20600 SILVER SADDLE DR
SAN ANTONIO, TX 78264

JOB NO.
24-6007

STATE OF TEXAS
J. RYAN SORNA
91171
REGISTERED
PROFESSIONAL ENGINEER
07/01/2025

REVISIONS				
No.	Description	Drn.	Approved	Date

INFORMATION

Kimley»Horn
TEXAS REGISTERED FIRM, NO. F-928

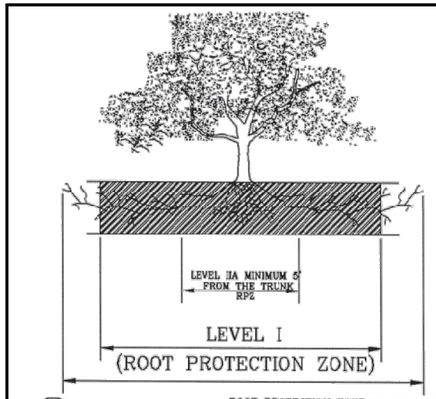
Date: JULY 2025
Drawn by:KML
Designed by: AIG
Checked by: VRS
Scale: SHOWN ON SHEET

San Antonio Water System

SAN ANTONIO WATER SYSTEM
SILVER MOUNTAIN DR. 12-INCH WATER MAIN
TREE PROTECTION & EROSION CONTROL PLANS (3 OF 3)

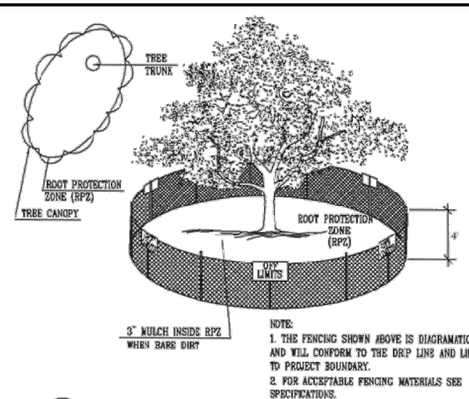
DRAWING NO.
TP-EC3

K:\SNA_Utilities\068665076 - Silver Mountain PS\CAD\PLANSHEETS - WATER ALIGNMENT\068665076 - Tree Protection Erosion Control.dwg 6/26/25 2:11pm



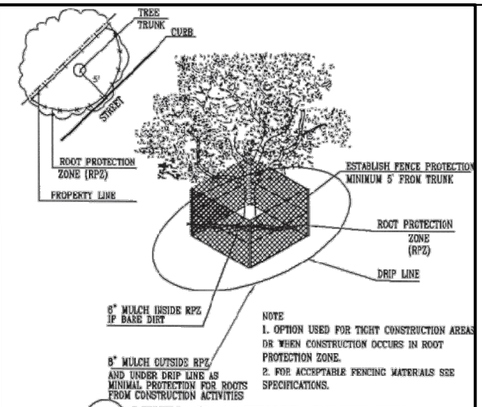
1.1.1 ELEVATION
N. T. S.

ROOT PROTECTION ZONE-THE ROOT PROTECTION ZONE IS A CIRCULAR AREA AROUND A TREE THAT IS BASED ON THE DIAMETER OF THE TREE. EACH 1 INCH DIAMETER OF THE TREE EQUALS 1 FOOT RADIUS FOR ROOT PROTECTION ZONE.



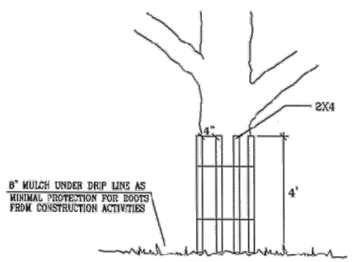
NOTE:
1. THE FENCING SHOWN ABOVE IS DIAGRAMATIC ONLY AND WILL CONFORM TO THE DRIP LINE AND LIMITED TO PROJECT BOUNDARY.
2. FOR ACCEPTABLE FENCING MATERIALS SEE SPECIFICATIONS.

1.1.2 LEVEL I & FENCE PROTECTION
N. T. S.



NOTE
1. OPTION USED FOR TIGHT CONSTRUCTION AREAS OR WHEN CONSTRUCTION OCCURS IN ROOT PROTECTION ZONE.
2. FOR ACCEPTABLE FENCING MATERIALS SEE SPECIFICATIONS.

1.1.3 LEVEL II A FENCE PROTECTION
N. T. S.

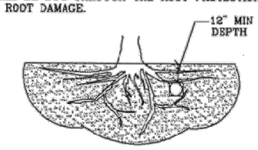


NOTE
WRAP TREE TRUNK WITH 2"X4" STUDS AND ROPE OR BAND IN PLACE AS NEEDED TO PROTECT TREES IN WORK AREAS.

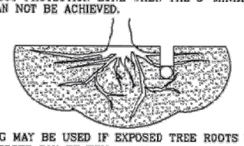
1.1.4 LEVEL II B FENCE PROTECTION
N. T. S.

TREES THAT ARE MARKED TO BE PRESERVED ON A SITE PLAN AND FOR WHICH UTILITIES MUST PASS TROUGH THEIR ROOT PROTECTION ZONES MAY REQUIRE TUNNELINC AS OPPOSED TO OPEN TRENCHES. THE DECISION TO TUNNEL WILL BE DETERMINED ON A CASE BY CASE BASIS BY THE ENGINEER.

TUNNELS SHALL BE DUG THROUGH THE ROOT PROTECTION ZONE IN ORDER TO MINIMIZE ROOT DAMAGE.

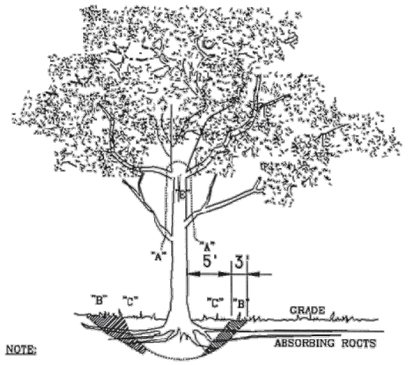


TUNNEL TO MINIMIZE ROOT DAMAGE (TOP) AS OPPOSED TO SURFACE-DUG TRENCHES IN ROOT PROTECTION ZONE WHEN THE 5' MINIMUM DISTANCE FROM TRUNK CAN NOT BE ACHIEVED.



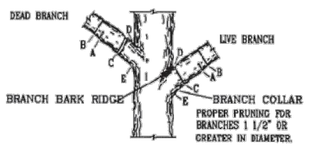
OPEN TRENCHING MAY BE USED IF EXPOSED TREE ROOTS DO NOT EXCEED 3" OR ROOTS CAN BE BENT BACK.

1.2 BORING THRU TREE ROOT ZONE
N. T. S.



NOTE:
"A" REMOVE BULKY TREE PARTS "SHRED" AND/OR HAUL SEPARATELY.
"B" BEGIN EXCAVATION APPROX. 8' FROM THE TRUNK - CUT THRU ANCHOR ROOTS AT AN ANGLE - 3' TO 4' DSEP
"C" USING TREE TRUNK AS A LEVER PUSH AT POINT "E" TO REMOVE TREE BOLE AND LARGE FEEDER ROOTS (4" TO 10" IN DIAM.)
"D" BACKFILL HOLE AND CLEAN UP.

1.3 TREE REMOVAL DIAGRAM
N. T. S.



NOTE: DO NOT CUT FROM D to E.

A. FIRST CUT - TO PREVENT THE BARK FROM BEING PEELED WHEN THE BRANCH FALLS.
B. SECOND CUT - TO REDUCE THE WEIGHT OF BRANCH.
C. FINAL CUT - ALLOW FOR HEALING COLLAR BUT NO STUBS
D. BRANCH RIDGES - INDENT PROPERLY BRANCH RIDGES WHICH ARE SITE FOR DECAY.

FOR OAKS ONLY: PAINT ALL WOUNDS OR CUTS WITH PRUNING PAINT WITHH 20 MIN TO PREVENT THE SPREAD OF OAK WILT.

1.4 BRANCH PRUNING DETAIL
N. T. S.

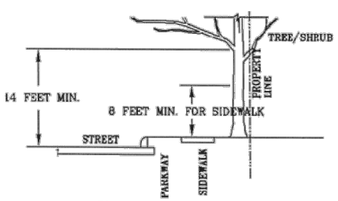
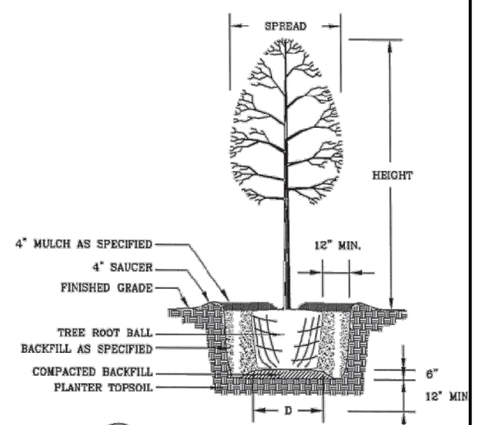


FIGURE No.2:

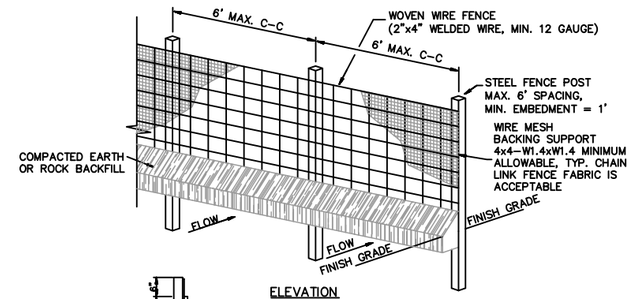
A MINIMUM BRANCH CLEARANCE OF 14 FEET ABOVE STREET ELEVATION MUST BE MAINTAINED FROM THE PROPERTY LINE TO THE CURB LINE AS PRESCRIBED BY PROJECT MANAGER.

1.5 BRANCH CLEARANCE DETAIL
N. T. S.

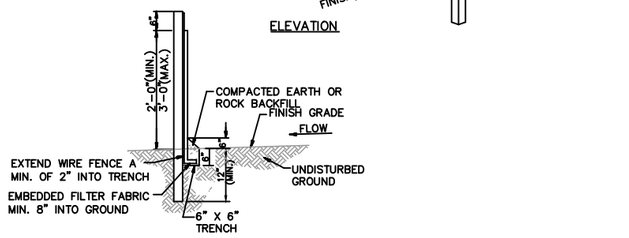


1.6 NEW TREE PLANTING DETAIL
N. T. S.

1 TREE PROTECTION DETAILS
SCALE: NTS



ELEVATION



CROSS-SECTION

SEDIMENTATION/SILT FENCE WITH WIRE SUPPORT

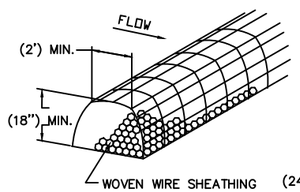
SILT FENCE GENERAL NOTES

A SEDIMENT CONTROL FENCE MAY BE CONSTURCTED NEAR THE DOWNSTREAM PERIMETER OF A DISTURBED AREA ALONG A CONTOUR TO INTERCEPT SEDIMENT FROM OVERLAND RUNOFF. A 2 YEAR STORM FREQUENCY MAY BE USED TO CALCULATE THE FLOW RATE TO BE FILTERED.

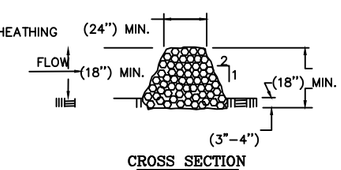
SEDIMENT CONTROL FENCE SHOULD BE SIZED TO FILTER A MAXIMUM FLOW THRU RATE OF 100 GPM/FT SQUARED. SEDIMENT CONTROL FENCE IS NOT RECOMMENDED TO CONTROL EROSION FROM A DRAINAGE AREA LARGER THAN 2 ACRES.

1. THE GUIDELINES HEREON ARE SUGGESTIONS ONLY AND MAY BE MODIFIED BY THE ENGINEER.

2 SILT FENCE DETAIL
SCALE: NTS



ROCK BERM



CROSS SECTION

NOTES:

1. USE ONLY OPEN GRADED ROCK 100 to 200 mm (5 to 8") DIAMETER FOR STREAM FLOW CONDITIONS. USE OPEN GRADED ROCK 75 to 125 mm (3 to 5") DIAMETER FOR OTHER CONDITIONS.
2. THE ROCK BERM SHALL BE SECURED WITH A WOVEN WIRE SHEATHING HAVING MAXIMUM 25 mm (1") OPENING AND MINIMUM WIRE DIAMETER OF 12.9 mm (20 GAUGE). ROCK BERMS IN CHANNEL APPLICATIONS SHALL BE ANCHORED FIRMLY INTO THE SUBSTRATE A MINIMUM OF 150 mm (6 ") WITH T-POSTS OR WITH 15M OR 20M (#5 OR #6) REBAR, WITH MAXIMUM SPACING APART OF 1.2 m (48") ON CENTER.
3. THE ROCK BERM SHALL BE INSPECTED WEEKLY OR AFTER EACH RAIN, AND THE STONE AND/OR FABRIC CORE-WOVEN SHEATHING SHALL BE REPLACED WHEN THE STRUCTURE CEASES TO FUNCTION AS INTENDED, DUE TO SILT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.
4. WHEN SILT REACHES A DEPTH EQUAL TO ONE-THIRD THE HEIGHT OF THE BERM OR 150 mm (6"), WHICHEVER IS LESS, THE SILT SHALL BE REMOVED AND DISPOSED OF ON AN APPROVED SITE AND IN A MANNER THAT WILL NOT CREATE A SILTATION PROBLEM.
5. DAILY INSPECTION SHALL BE MADE ON SEVERE-SERVICE ROCK BERMS; SILT SHALL BE REMOVED WHEN ACCUMULATION REACHES 150 mm (6").
6. WHEN THE SITE IS COMPLETELY STABILIZED,THE BERM AND ACCUMULATED SILT SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED MANNER.

3 ROCK BERM DETAIL
SCALE: NTS

JOB NO.
24-6007

STATE OF TEXAS
RYAN SONA
91171
REGISTERED PROFESSIONAL ENGINEER
06/17/2025

REVISIONS

No.	Description	Drn.	Approved	Date

INFORMATION

Date: JULY 2025
Drawn by: KML
Designed by: AIG
Checked by: VRS
Scale: SHOWN ON SHEET

Kimley»Horn
TEXAS REGISTERED FIRM. NO. F-928

San Antonio Water System

SAN ANTONIO WATER SYSTEM
SILVER MOUNTAIN DR. 12-INCH WATER MAIN
TREE PROTECTION DETAILS & EROSION CONTROL DETAILS

DRAWING NO.
TP-EC4