CITY OF SAN ANTONIO

DEPARTMENT OF PUBLIC WORKS

2012 ASPHALT OVERLAY W/RUBBER/HOT PAVER LAID (PKG 4)

PROJECT NO: 23-01269

MAYOR
JULIAN CASTRO

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Dean Bayer, P.E.

CITY OF SAN ANTONIO

PAVEMENT ENGINEERING

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STATE OF TEXAS
F. D. BAYER
78304
REGISTERED PROFESSIONAL ENGINEER
7/21/11

F. D. Bayer, P.E.

DB/tu

City General Notes

1. ALL CONSTRUCTION SHALL CONFORM TO THE CITY OF SAN ANTONIO STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION.

2. THE CONTRACTOR SHALL PROVIDE ACCESS FOR RESIDENTS, BUSINESSES, AND FOR THE DELIVERY OF MAIL BY THE U.S. POSTAL SERVICE AT ALL TIMES. THE CONTRACTOR SHALL COORDINATE WITH THE INSPECTOR FOR SOLID WASTE COLLECTION.

3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING TO ITS ORIGINAL OR BETTER CONDITION IF ANY DAMAGE DONE TO EXISTING FENCES, CONCRETE ISLANDS, STREET PAVING, CURBS, SHRUBS, BUSHES, DRIVEWAYS, OR ANY OTHER EXISTING ITEM. (NO SEPARATE PAY ITEM).

4. THE CONTRACTOR SHALL PRESERVE ALL CONSTRUCTION STAKES, MARKS, ETC. IF ANY ARE DESTROYED OR REMOVED BY THE CONTRACTOR OR HIS EMPLOYEES, THEY SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

5. DO NOT PLACE ANY WASTE MATERIAL IN THE 100-YEAR FLOOD PLAIN WITHOUT FIRST OBTAINING AN APPROVED FLOOD PLAIN DEVELOPMENT PERMIT. ALL WASTE MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND IT SHALL BE HIS SOLE RESPONSIBILITY TO DISPOSE OF THESE MATERIALS OFF THE LIMITS OF THE PROJECT AND RIGHT-OF-WAY. NO WASTE MATERIALS SHALL BE PLACED IN DESIGNATED FLOOD PLAINS OR IN LOW AREAS THAT WILL BLOCK OR ALTER FLOW OF EXISTING NATURAL OR ENGINEERED DRAINAGE.

6. IF THE CONTRACTOR ENCOUNTERS ANY ARCHAEOLOGICAL DEPOSITS DURING CONSTRUCTION OPERATIONS, THE CONTRACTOR MUST STOP EXCAVATION IMMEDIATELY, CONTACT THE CITY INSPECTOR, AND CALL THE CITY HISTORIC PRESERVATION OFFICE AT 207-7306 FOR AN ARCHAEOLOGICAL INVESTIGATION. THE CONTRACTOR CANNOT BEGIN EXCAVATION AGAIN WITHOUT WRITTEN PERMISSION FROM THE CITY.

   IF MORE THAN THREE (3) DAYS ARE REQUIRED FOR INVESTIGATION (NOT INCLUDING HOLIDAY AND WEEKENDS) AND IF THE CONTRACTOR IS UNABLE TO WORK IN OTHER AREAS, THEN THE CONTRACTOR WILL BE ALLOWED TO NEGOTIATE FOR ADDITIONAL CONSTRUCTION TIME UPON WRITTEN REQUEST WITHIN TEN (10) DAYS AFTER THE FIRST NOTICE TO THE CITY ARCHAEOLOGICAL INVESTIGATION FOR EACH EVENT.

   IF THE TIME REQUIRED FOR INVESTIGATION IS LESS THAN OR EQUAL TO THREE (3) DAYS FOR EACH EVENT, CONTRACT DURATION WILL BE EXTENDED.

7. PROJECT LOCATIONS AND LIMITS HAVE BEEN IDENTIFIED IN THE PLANS, HOWEVER, ADDITIONS, DELETIONS AND MODIFICATIONS TO THE LOCATIONS AND LIMITS MAY OCCUR,

8. AS DIRECTED BY THE ENGINEER, THE STREET PAVEMENT, ADJACENT DRIVEWAYS, SIDEWALKS, AND WALKWAYS SHALL BE SWEPT AND ALL DEBRIS REMOVED FROM THE WORK AREA.

   - SUBSEQUENT TO MILLING OPERATIONS
   - PRIOR TO LAYING A SURFACE COURSE
   - AS OFTEN AS NECESSARY TO REMOVE LOOSE MATERIAL
   - AT THE END OF EACH WORKDAY

9. THE CONTRACTOR SHALL PROVIDE THE CITY AN EMERGENCY TELEPHONE NUMBER FOR EVENINGS, WEEKENDS AND HOLIDAYS BY THE FIRST WORKING DAY FOR THE PROJECT. THIS TELEPHONE NUMBER MUST BE A COMMERCIAL ANSWERING SERVICE. THE ANSWERING SERVICE MUST BE ABLE TO CONTACT THE CONTRACTOR AND HAVE THE CONTRACTOR RESPOND TO THE CITY STAFF WITHIN TWO (2) HOURS OF THE INTITIAL CONTACT.

10. IF THE CONTRACTOR WISHES TO WORK WEEKENDS, HE SHALL SUBMIT A REQUEST TO THE ENGINEER AND CITY INSPECTOR FOR APPROVAL SEVENTY TWO (72) HOURS PRIOR TO WORKING THE WEEKEND THEY WISH TO WORK.

11. WHEN PERFORMING WORK OPERATIONS AT NIGHT. THE CONTRACTOR SHALL PROVIDE ADEQUATE LIGHTING TO PERFORM THE NECESSARY OPERATIONS. IN ADDITION, ALL VEHICLES MUST BE EQUIPPED WITH ONE OR MORE HIGH INTENSITY YELLOW FLASHING LIGHTS. (NO SEPARATE PAY ITEM).

12. UPON COMPLETION OF ALL WORK PROVIDED FOR IN THE CONTRACT FOR ANY INDIVIDUAL STREET, THE ENGINEER WILL MAKE AN INSPECTION. AND, IF THE WORK IS FOUND TO BE SATISFACTORY, THE CONTRACTOR WILL BE RELEASED FROM FURTHER MAINTENANCE OF THAT STREET AND WILL BE CONSIDERED A "PARTIAL ACCEPTANCE" OF THE WORK. SAID ACCEPTANCE WILL BE MADE IN WRITING AND SHALL IN NO WAY VOID OR ALTER ANY TERMS OF THE CONTRACT.

13. THE CONTRACTOR SHALL NOTIFY THE CITY INSPECTOR AND Q.A. DEPARTMENT TWENTY FOUR (24) HOURS IN ADVANCE OF EACH DAY'S WORK. THIS NOTIFICATION SHALL INCLUDE THE MAERIAL SOURCE LOCATION AND THE LOCATION AT WHICH THE MATERIAL WILL BE PLACED. PHONE NUMBERS WILL BE PROVIDED AT THE PRECONSTRUCTION MEETING.

14. ALL COSTS ASSOCIATED WITH THE FOLLOWING ITEMS SHALL BE INCLUDED IN THE VARIOUS PAY ITEMS, AND SHALL NOT BE SEPARATELY COMPENSATED.

100	"MOBILIZATION"
100.1	"INSURANCE AND BOND"
100	"PREPARE RIGHT OF WAY"
530	"BARRICADES, SIGNS & TRAFFIC HANDLING"

15. PROVIDE NEXT CONSTRUCTION SCHEDULE EVERY FRIDAY BY CLOSE OF BUSINESS, VIA E-MAIL FOR THE DURATION OF THE CONTRACT USING SMP TEMPLATE. THE CITY RESERVES THE RIGHT TO DIRECT THE CONTRACTOR WHERE TO WORK WHEN NECESSARY.

16. PLAN QUANTITIES ARE FOR ESTIMATING PURPOSES ONLY AND ARE SUBJECT TO CHANGE PENDING APPROVAL OF THE ENGINEER.

17. THE CONTRACTOR IS RESPONSIBLE FOR OBEYING ALL FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS.

18. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING CITY RIGHT OF WAY PERMITS FOR CONSTRUCTION. ALL RIGHT OF WAY PERMIT FEES WILL BE RELATED TO THIS PROJECT WILL BE WAIVED

19. THE CONTRACTOR SHALL CONDUCT HIS OPERATIONS IN A MANNER SUCH THAT TRUCKS AND OTHER VEHICLES DO NOT CREATE A DIRT NUISANCE OR SAFETY HAZARD IN ANY STREETS, PUBLIC OR PRIVATE. CLEAN UP OF STREETS SHALL BE DONE DAILY AT A MINIMUM.

20. CONSTRUCTION ON MORE THAN ONE STREET AT A TIME WILL NOT BE PERMITTED IF SATISFACTOY CONFORMANCE TO PLANS AND SPECIFICATIONS ARE NOT MAINTAINED.

21. THE CONTRACTOR IS MADE AWARE THAT THE BID QUANTITIES SHOWN IN THE BID PROPOSAL ARE APPROXIMATE AND MAY CHANGE. THE CITY RESERVES THE RIGHT TO MAKE ADJUSTMENTS IN THE FIELD. PAYMENT FOR PERFORMING THE WORK SHALL BE MADE AT THE ESTABLISHED BID UNIT PRICE IN THE CONTRACT.

22. THE CITY WILL PROVIDE A TEMPLATE/VERBAGE FOR THE DOOR HANGER. CONTRACTOR SHALL PLACE HANGERS ON EVERY BUSINESS OR RESIDENCE WITHIN EACH SEGEMENT LIMITS AND ANY OTHER LOCATIONS AS SPECIFIED BY THE INSPECTOR. AN ADDITIONAL DOOR HANGER SHALL BE PLACED AT ALL CORNER LOTS THAT WILL BE RECEIVING CURB RAMPS PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE A REVIEW COPY OF THE DOOR HANGER TO THE CITY SEVEN (7) DAYS PRIOR TO DISTIRIBUTION. PAY ITEM SP1000.

23. INCLUDE A MAILBOX POST BLOCKOUT FOR VACANT LOTS AND ALL RESIDENCES WHICH DO NOT HAVE MAILBOXES AT THE CURB. BLOCKOUTS ARE PROVIDED FOR FUTURE USE BY THE POST OFFICE.

24. THE CONTRACTOR SHALL NOT MILL OR OVERLAY A STREET BEYOND THE LONGITUDINAL LIMITS OF WHICH HE CANNOT MILL OR OVERLAY FOR ITS FULL WIDTH THAT SAME DAY UNLESS DIRECTED OTHERWISE BY THE ENGINEER.

25. THE CONTRACTOR SHALL APPLY FINAL ASPHALT NO LATER THAN FOURTEEN (14) DAYS AFTER MILLING OR BASE REPAIRS. SHOULD EXISTING BASE MATERIALS BECOME EXPOSED DUE TO MILLING, THE CONTRACTOR SHALL PROTECT AND MAINTAIN THE EXISTING COMPACTED BASE UNTIL WHICH TIME IT CAN BE OVERLAID (WITHIN 14 DAYS MAX). EXPOSED FLEX BASE SHALL BE ROLLED AND PRIME COATED AS DIRECTED BY THE ENGINEER. (NO SEPARATE PAY ITEM)

26. AS DIRECTED BY THE ENGINEER, "FEATHER" H.M.A.C. INTO DRIVEWAYS TO PREVENT SURFACE PONDING. (NO SEPARATE PAY ITEM)

27. ALL AGGREGATE FOR SEAL COAT SHALL BE DELIVERED TO THE JOB SITE AT ATMOSPHERIC TEMPERATURES AND SHALL BE ADEQUATELY DRIED TO THE SATISFACTION OF THE ENGINEER.

    SEAL COAT MATERIAL DATA:

ASPHALT – TYPE/GRADE	BINDER OIL: AC5 OR AC10
ASPHALT – RATE	0.28 – 0.32 GAL/SY
AGGREGATE – TYPE/GRADE	CRUSHED LIMESTONE, GRADE 4, TYPE B NON-PRECOAT
AGGREGATE – RATE	18 – 20 LBS/SY

    IT IS THE INTENT THAT ASPHALT CEMENT BINDER OIL BE USED FOR ALL SEAL COATING; HOWEVER, IF WEATHER CONDITIONS ARE NOT CONDUCIVE FOR ITS APPLICATION, THEN AN EMULSION MAY BE USED AT NO EXTRA PAY.

28. THE PERCENT WEAR OF THE SEAL COAT AGGREGATE (TEST METHOD TEX-410-A) SHALL NOT EXCEED 25%.

29. THE CONTRACTOR SHALL MAINTAIN SEAL COAT (NO SEPARATE PAY ITEM)

30. OVERLAYING OF STREET SURFACES MAY COMMENCE AFTER AN ACCEPTABLE APPLICATION OF SEAL COAT HAS BEEN APPLIED AS DETERMINED BY THE ENGINEER.

31. COARSE AGGREGATE FOR ALL STREETS SHALL BE CLASS (B) UNLESS OTHERWISE NOTED WITHIN THESE PLANS.

MK	DESCRIPTION	DATE	DWN.	CHK.

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32. ALL CONCRETE SURFACES AND CONSTRUCTION JOINTS THAT WILL CONTACT THE PROPOSED H.M.A.C. SHALL BE PAINTED WITH A THIN UNIFORM COAT OF SS-1H TACK COAT. TACK COAT SHALL MEET THE REQUIREMENTS OF ITEM 203 AND SHALL BE AT NO DIRECT PAY.

33. AT INTERSECTIONS WITH SIDEWALKS, THE FOLLOWING GUIDELINES WILL BE USED FOR THE PLACEMENT OF CURB RAMPS;
    - ALL CURB RAMPS SHALL HAVE TRUNCATED DOMES INSTALLED.
    - DESIGN DECISIONS ON CURB RAMPS WILL BE MADE IN THE FIELD WITH THE CITY INSPECTOR.
      - TYPE I (1) SHALL BE PAID AS TWO (2) RAMPS
      - TYPE II, III, IV, &V (2, 3, 4, &5) SHALL BE PAID AS ONE (1) RAMP AS PER CITY OF SAN ANTONIO STANDARD DETAILS. EACH CURB RAMP SHALL INCLUDE THE LANDING PLUS WINGS UP TO TWENTY-FOUR (24) FEET TOTAL LENGTH.

    THE BID PRICE FOR THE CURB RAMPS SHALL INCLUDE ALL NECESSARY SUBSIDIARY WORK TO CONSTRUCT AND COMPLETE THE FOLLOWING:
    - SIDEWALK AND CURB DEMOLITION AND REMOVAL.
    - WHEN CURB RAMP LANDINGS PLUS WINGS TOTAL LENGTH EXCEEDS TWENTY-FOUR (24) L.F., ANY ADDITIONAL LENGTH OF WINGS REQUIRED TO ACHIEVE MINIMUM SLOPE SHALL BE PAID AS SIDEWALK ITEM 502.1.
    - DETECTABLE ADA APPROVED WARNINGS, SHALL BE CAST IN PLACE 24"X 60" MANUFACTURED BY ARMOR-TILE MODEL NUMBER 465C2460RD UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
    - NEW CURB INSTALLATION UP TO 24 L.F. THE ADDITIONAL CURB LENGTH ABOVE 24 FEET SHALL BE PAID AS CURB ITEM 501.
    - CONCRETE RETAINING WALL UP TO 6" HIGH AS NECESSARY. RETAINING WALLS EXCEEDING 6" WILL BE PAID AS SIDEWALK.
    - SIGN ADJUSTMENT.
    - IRRIGATION RELOCATION AS NECESSARY.
    - LANDSCAPE RELOCATION AS NECESSARY.

34. SOME STREETS MAY HAVE EXISTING SPEED HUMPS. ALL EXISTING SPEED HUMPS SHALL BE REPLACED IN ACCORDANCE WITH THE DETAILS IN THE PLANS.

35. UNLESS OTHERWISE NOTED, CONTRACTOR SHALL USE 64-22 ASPHALT MIX ON ALL PROJECTS AS NOTED IN REVISED SPECIFICATIONS 205.

36. USE VACUUM OR REGENERATIVE AIR SWEEPERS ONLY WHEN SWEEPING WORK AREA.

37. ALL ASPHALT CUTTINGS AND AGGREGATE SHALL BE CONFINED TO THE STREET SURFACE WHERE THEY SHALL BE SWEPT UP AND REMOVED FROM THE RIGHT-OF-WAY BY THE END OF EACH WORK DAY.

38. ALL BASE FAILURE REPLACEMENTS SHALL BE MARKED AND APPROVED BY THE ENGINEER.

39. PAVEMENT CUTS SHALL BE PERFORMED BY EQUIPMENT APPROVED BY THE ENGINEER. IT SHALL NOT PRESENT A HAZARD TO TRAFFIC. ALL SAW CUTS SHALL BE FULL DEPTH SAWCUTS.

40. THE DEPTH OF PAVEMENT FOR ITEM 230 (BASE AND PAVEMENT) SHALL BE TO THE SPECIFIED DEPTH UNLESS DIRECTED OTHERWISE BY THE ENGINEER. PRIOR TO EXCAVATION, DESIGNATED BASE FAILURES SHALL BE CUT VERTICALLY FOR THE FULL DEPTH SPECIFIED WITH A ROCK SAW OR OTHER APPROVED EQUALLY CAPABLE EQUIPMENT. THE EDGES OF THE EXISTING ASPHALT WHICH ARE CUT BY THE ROCK SAW MUST BE VERTICAL, STRAIGHT, AND UNIFORM TO ENSURE THAT THE NEW ASPHALT ABUTS TO A SOLID, CLEAN VERTICAL SURFACE. ASPHALT TREATED BASE SHALL BE PLACED IN FOUR (4) INCH MAXIMUM LIFTS – COMPACT EACH LIFT AND DOCUMENT DENSITY READING. TOP MAT REQUIRES APPROVAL/ACCEPTANCE OF THE ENGINEER.

41. ALL DAILY BASE REPLACEMENTS SHALL BE PROPERLY EXCAVATED, BARRICADED, AND OPEN TO TRAFFIC THE SAME DAY. DO NOT EXCAVATE FOR BASE REPAIRS IF THE WORK CAN NOT BE COMPLETED THAT DAY.

42. PLACE FLEXIBLE BASE AS DIRECTED BY THE ENGINEER WHERE BASE FAILURE EXCAVATION NECESSITATES EXCEEDING THE SPECIFIED DEPTH FOR ITEM 230 (BASE AND PAVEMENT). (NO SEPARATE PAY ITEM)

43. ASPHALT TREATED "BASE AND PAVEMENT" MIXTURES SHALL BE AT A TEMPERATURE BETWEEN 225° F AND 350° F WHEN PLACED IN EXCAVATED CUTS. WHEN THE ASPHALT TEMPERATURES FALL BELOW 225° F, THE ASPHALT MUST BE DISCARDED AND PAYMENT WILL NOT BE MADE FOR THE DISCARDED MATERIAL.

44. FOR STREETS WITHOUT CURB AND GUTTER, THE CONTRACTOR SHALL INSTALL SHOULDER BACKING PER "SHOULDER BACKING DETAIL" PROVIDED ON MILLING DETAIL SHEET. (NO SEPARATE PAY ITEM)

City General Notes

45. MILLING OF ASPHALTIC PAVEMENT SHALL BE PERFORMED THROUGHOUT TURNOUTS AND CUL DE SACS WHICH ARE ADJACENT TO STREETS WHICH HAVE BEEN IDENTIFIED IN THE PLANS TO BE MILLED.

46. ACTUAL DEPTHS OF MILLING ALONG CURB LINES AND ON BRIDGE DECKS SHALL BE AS DIRECTED BY THE ENGINEER. CONCRETE BRIDGE DECKS SHALL NOT BE MILLED.

47. EACH STREET SHALL BE SEAL COATED IN ITS ENTIRETY, INCLUDING ADJACENT TURNOUTS AND CUL DE SACS, UNLESS DIRECTED OTHERWISE BY THE ENGINEER.

48. TYPE "D" H.M.A.C. SHALL BE APPLIED AT AN AVERAGE RATE OF 190 LBS./S.Y. WITH A MINIMUM RATE OF 165 LBS./S.Y. A LEVEL UP H.M.A.C. COURSE MATERIAL MAY ALSO BE REQUIRED TO BE PLACED ON STREETS AT LOCATIONS AND DEPTHS AS DIRECTED BY THE ENGINEER TO REMOVE LOW SPOTS. THIS WORK WILL BE PAID BT THE S.Y. UNDER ITEM 205.4

49. TO DETERMINE THE S.Y. TO BE PAID ON EACH STREET. THE TICKET FOR THAT STREET SHOWING THE TONNAGE PLACED WILL BE CONVERTED TO A S.Y. AMOUNT BASED ON THE 190 LBS./S.Y. APPLICATION RATE WITH THE FOLLOWING EQUATION: (___TONS x 2000/190). FOR EXAMPLE, IF 200 TONS WERE PLACED ON A STREET, THE PAY WOULD BE (200 TONS)(2000 LBS/TONS)(SY/190 LBS) = 2105.3 S.Y.

50. ALL QUANTITIES SHALL BE PRE-APPROVED BY THE ENGINEER.

51. CARE SHOULD BE TAKEN TO PREVENT MILLINGS FROM ENTERING INLETS AND STORM SEWERS. ALL MATERIAL ENTERING INLETS AND STORM SEWERS SHALL BE REMOVED BY THE CONTRACTOR AT NO ADDITIONAL COST.

52. WHEN THE CONTRACTOR PLACES A STOCKPILE OF HMAC MATERIAL ON SITE, THE MATERIAL SHALL BE USED PRIOR TO THE END OF THE WORK DAY. IF THE MATERIAL IS NOT USED, IT SHALL NOT BE USED ON ANY STREET.

53. ALL TRUCK TICKETS SHALL HAVE THE NAME OF THE STREET THE MATERIAL WAS PLACED ON.

54. WHEN A RUBBER ADDITIVE IS REQUIRED, THE ASPHALT BINDER SHALL MEET THE REQUIREMENTS OF PG 64-22 G.T.R. 10 AS SPECIFIED IN THE SPECIAL PROVISIONS OF THE SPECIFICATIONS.

55. THE CONTRACTOR SHALL VIDEO TAPE ALL PROJECTS PRIOR TO ANY CONSTRUCTION. A BACK UP COPY WILL BE SUBMITTED TO THE CITY OF SAN ANTONIO PAVEMENT ENGINEERING DIVISION BEFORE PROJECTS COMMENCE. ITEMS TO BE VIDEOTAPED NEED TO BE IDENTIFIED BY ADDRESS:
    - FENCES
    - MAILBOX FROM ALL SIDES
    - DRIVEWAY ENTRIES
    - CURBS, SIDEWALK, AND PEDESTRIAN WALKWAYS
    - ANY FORM OF LANDSCAPING ON RIGHT OF WAY (TREES, PLANTS, ETC.)

56. THE CONTRACTOR SHALL PROVIDE A SCHEDULE OF WORK FOR THE ENTIRE PROJECT WITHIN FOURTEEN (14) DAYS OF THE NOTICE TO PROCEED. THE CONTRACTOR SHALL NOT SCHEDULE MORE THAN A ONE WEEK GAP IN BASE REPAIR OR PAVING OPERATIONS WITHOUT PRIOR APPROVAL OR WEATHER LIMITATIONS.

57. THE CONTRACTOR SHALL UTILIZE AND MAINTAIN ITEM 1000-WEB PORTAL. PAYMENT IS SUBSIDIARY TO OTHER ITEMS.

58. COARSE AGGREGATE FOR FINAL WEARING COURSES SHALL BE CLASS A FOR ALL STREETS WITHIN THESE PLANS.

59. ALL WORK TO BE PERFORMED ON THE DOWNTOWN STREETS SHALL BE PERFORMED BETWEEN THE HOURS OF 8:00 PM AND 6:00 AM.

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UTILITY GENERAL NOTES

1. DUE TO FEDERAL REGULATIONS TITLE 49, PART 192.181. THIS REQUIRES THAT C.P.S. MUST MAINTAIN ACCESS TO GAS VALVES AT ALL TIMES. THEO DIRECT PAY. THE CONTRACTOR MUST WORK AROUND ANY GAS VALVES THAT ARE IN THE PROJECT AREA.

SAN ANTONIO WATER SYSTEM	233-2010/2009
COSA DRAINAGE	207-8048
COSA SIGNAL OPERATIONS	207-7720
TEXAS STATE WIDE ONE CALL LOCATOR	1-800-545-6005

- CITY PUBLIC SERVICE
- TIME WARNER
- SOUTHWESTERN BELL TELEPHONE
- SBC
- AT&T
- MCI

2. CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES PRIOR TO EXCAVATION TO DETERMINE THE LOCATION OF EXISTING UTILITIES. THE CONTRACTOR SHALL NOTIFY THE FOLLOWING AT LEAST FORTY-EIGHT (48) HOURS PRIOR TO EXCAVATION OPERATION.

3. THE CONTRACTOR SHALL PROTECT TELEPHONE COMPANY EQUIPMENT AND OPERATIONS DURING CONSTRUCTION.

4. THE EXISTENCE AND LOCATION OF UNDERGROUND UTILITIES INDICATED ON THE PLANS ARE TAKEN FROM AVAILABLE RECORDS AND ARE NOT GUARANTEED. CONTRACTOR SHALL INVESTIGATE AND VERIFY BEFORE STARTING WORK. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY DAMAGE TO AND FOR THE MAINTENANCE OF THE EXISTING UTILITIES, EVEN IF THEY ARE NOT SHOWN ON THE PLANS. LOCATION AND DEPTH OF UTILITIES SHOWN HERE ARE APPROXIMATE ONLY. ACTUAL LOCATIONS AND DEPTHS MUST BE VERIFIED PRIOR TO CONSTRUCTION AND THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF THE SAME DURING CONSTRUCTION.

5. IF SPLIT CONSTRUCTION IS SHOWN. THEN THE SANITARY SEWER SHALL BE COMPLETED PRIOR TO BEGINNING STREET AND DRAINAGE CONSTRUCTION, AND TRAFFIC SHALL BE MAINTAINED OR DETOURED AS DIRECTED BY THE TRAFFIC ENGINEER. THERE WILL BE NO ADDITIONAL PAYMENT FOR THE MAINTAINING OF TRAFFIC OR DETOURS.

6. ALL AT&T MANHOLE ADJUSTMENTS WILL BE PAID FOR UNDER ITEM 512.1B. ALL MATERIALS INCLUDING RING RISERS SHALL BE PROVIDED BY AT&T.

7. IF ANY WORK IS REQUIRED WITHIN THE RAILROAD RIGHT-OF-WAY, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING THE REQUIRED INSURANCE. (LUMP SUM) PAY ITEM: SP2000

8. ALL MANHOLES AND OTHER UTILITY STRUCTURES IN THE CONSTRUCTION AREA SHALL BE ADJUSTED TO THE FINISHED GRADE. THIS ADJUSTMENT SHALL BE COMPLETED WITHIN ONE (1) WEEK AFTER PLACEMENT OF ASPHALT. ALL PAY ITEMS INCLUDED IN BID PROPOSAL SHALL BE ADJUSTED WITHI SEVEN (7) DAYS.

9. BUILDING PAPER SHALL BE PLACED OVER ALL MANHOLES, VALVE BOXES, GRATES, ETC., SO AS TO PROTECT THE SURFACES FROM ASPHALTIC MATERIALS DURING APPLICATION OF SEAL COAT OR TACK COAT. ASPHALT MATERIALS SHALL NOT BE PLACED, LAPPED, OR SPLASHED ONTO ADJACENT STRUCTURES OR SURFACES. FOR STREETS THAT RECEIVE A FULL MILL APPLICATION, STREET SURFACES ADJACENT TO MANHOLES, WATER/GAS VALVES, DRAIN GATES, BRIDGE JOINTS, CURBS, ETC., SHALL BE COMPLETELY MILLED TO DEPTH AS SPECIFIED FOR THE STREET UNLESS OTHERWISE DIRECTED BY THE ENGINEER. ALL MANHOLES AND VALVES SHALL BE ADJUSTED SO THAT THE RING AND COVER ARE WITHIN ½" MAXIMUM OF THE FINISHED GRADE OF THE NEW PAVEMENT. A SINGLE PAYMENT AT THE CONTRACTOR'S UNIT BID PRICE SHALL BE MADE FOR EACH MANHOLE ADJUSTED TO THE FINISHED GRADE OF NEW PAVEMENT. ALL UTILITY ADJUSTMENTS SHALL BE PERFORMED WITHIN 24 HOURS OF PAVING. ALL ADJUSTMENTS SHALL CONFORM TO THE "MANHOLE AND VALVE ADJUSTMENT" STANDARD DETAIL INCLUDED IN THE UTILITY EXCAVATION MANUAL GENERAL REQUIREMENTS AND PROCEDURES FOR EXCAVATION IN CITY OF SAN ANTONIO PUBLIC RIGHTS OF WAY, LATEST EDITION. DETAIL IS REVISED TO INSTALL A CIRCULAR CONCRETE COLLAR IN PLACE OF SQUARE CONCRETE COLLAR. CIRCULAR CONCRETE COLLAR TO BE 8-INCHES THICK CENTERED ON VALVE OR MANHOLE WITH FOUR RADIAL ½-INCH SCORE MARKS. COLLAR DIAMETER TO BE O.D. OF RING PLUS 12".

EROSION CONTROL AND SEDIMENTATION / STORM WATER POLLUTION PREVENTION PLAN GENERAL NOTESL

1. THE CONTRACTOR IS RESPONSIBLE FOR DEVELOPING, IMPLEMENTING AND MAINTAINING A STORM WATER POLLUTION PREVENTION PLAN (SW3P) FOR THE DURATION OF THE CONSTRUCTION AS DESCRIBED IN ITEM NO. 553. COST OF PREPARING SW3P PLAN AND ALL COSTS FOR FURNISHING, IMPLEMENTING AND MAINTAINING ANY ON SITE POLLUTION CONTROL MEASURES REQUIRED BY THE SW3P (EG. SILT FENCING, CONSTRUCTION EXITS, GRAVEL FILTERS, ETC.) SHALL BE AT NO DIRECT PAY.

2. CONTRACTOR WILL BE RESPONSIBLE FOR COMPLETING WITH TCEQ'S TPDES PROGRAM FOR CONTROL OF SILT AND EROSION. CONTRACTOR SHALL PREPARE A SW3P AND SHALL UPDATE THE SW3P AS NECESSARY BASED ON FIELD CONDITIONS.

3. ALL EROSION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO ANY CONSTRUCTION ACTIVITIES. THE EROSION CONTROL MEASURES SHALL REMAIN IN PLACE AND FUNCTIONAL UNTIL AFTER THE PROPOSED IMPROVEMENTS ARE IN PLACE.

4. THE CONTRACTOR IS RESPONSIBLE FOR KEEPING STREETS AND SIDEWALKS ADJACENT TO THE PROJECT FREE OF MUD AND DEBRIS FROM CONSTRUCTION AT ALL TIMES.

5. SEDIMENT CONTROL DEVICES SHALL BE INSTALLED PRIOR TO ANY EMBANKMENT OR EXCAVATION WORK BEING DONE. WHEN THE PROJECT IS COMPLETE AND THE ENTIRE SITE IS COMPLETELY STABILIZED, THE SEDIMENT CONTROL DEVICES AND ACCUMULATED SEDIMENT SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED MANNER. THE CONTRACTOR HAS THE ULTIMATE RESPONSIBILITY FOR THE EFFECTIVE CONTROL OF EROSION AND SEDIMENTATION.

6. THE CONTRACTOR SHALL SEED OR SOD A COMPLETED EMBANKMENT AS SOON AS PRACTICABLE, BUT NO LATER THAN 14 DAYS AFTER AN EMBANKMENT IS COMPLETE. ALL SODDING SHALL BE PAID FOR UNDER ITEM NO. 516.1, "BERMUDA SODDING" AND AT THE SINGLE UNIT PRICE AS BID PER THE CONTRACT.

7. THE SITE SHALL BE REVIEWED WEEKLY AND AFTER ANY MAJOR STORM EVENTS. ADJUSTMENTS AND REPAIRS TO THE EROSION CONTROL DEVICES SHALL BE MADE AS NEEDED.

8. PROVIDE A COPY OF ANY REQUIRED SW3P TO THE CITY PRIOR TO BEGINNING CONSTRUCTION.

TREE PROTECTION AND PRESERVATION NOTES

1. NO UTILITY OR STREET EXCAVATION WORK SHALL BEGIN IN AREAS WHERE TREE PRESERVATION AND TREATMENT MEASURES HAVE NOT BEEN COMPLETED AND APPROVED.

2. TREE PROTECTION FENCING SHALL BE REQUIRED AND TREE PROTECTION FENCING SHALL BE INSTALLED, MAINTAINED AND REPAIRED BY THE CONTRACTOR DURING SITE CONSTRUCTION (NO SEPARATE PAY ITEM).

3. EXPOSED ROOTS SHALL BE COVERED AT THE END OF THE DAY USING TECHNIQUES SUCH AS COVERING WITH SOIL, MULCH OR WET BURLAP.

4. NO EQUIPMENT, VEHICLES OR MATERIALS SHALL OPERATE OR BE STORED WITHIN THE ROOT PROTECTION ZONE OF ANY TREE NEAR THE PROJECT. ROOT PROTECTION ZONE IS ONE (1) FOOT PER DIAMETER INCH OF THE TREE RADIUS. A 10-INCH DIAMETER TREE WOULD HAVE A 10-FOOT RADIUS ROOT PROTECTION ZONE AROUND THE TREE. ROOTS OR BARRICADES IN CONFLICT WITH THE CONSTRUCTION SHALL BE CUT CLEANLY ACCORDING TO PROPER PRUNING METHODS. ALL OAK WOUNDS SHALL BE PAINTED OVER WITHIN 30 MINUTES TO PREVENT OAK WILT.

5. THE CITY ARBORIST SHALL APPROVE ANY TREE REMOVAL, 207-0278.

6. TREES, WHICH ARE DAMAGED OR LOST DUE TO THE CONTRACTOR'S NEGLIGENCE DURING CONSTRUCTION, SHALL BE MITIGATED TO THE CITY'S SATISFACTION.

7. TREES, TREE LIMBS, BUSHES AND SHRUBS LOCATED IN THE CITY STREET OR ALLEY RIGHT OF WAY OR PERMANENT EASEMENTS WHICH INTERFERE WITH PROPOSED CONSTRUCTION ACTIVITIES MAY BE NEATLY TRIMMED BY THE CONTRACTOR ONLY AFTER APPROVAL FROM THE PAVEMENT ENGINEERING MANAGEMENT THROUGH THE INSPECTOR.

8. NO EXCESSIVE TREE TRIMMING WILL BE PERMITTED.

9. SAPLINGS, SHRUBS OR BUSHES TO BE CLEARED FROM THE PROTECTED ROOT ZONE AREA OF A LARGE TREE SHALL BE REMOVED BY HAND AS DESIGNATED BY THE INSPECTOR.

10. ALL DEBRIS GENERATED BY THE PRUNING AND TRIMMING OF THE TREES AND/OR BUSHES SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF PROPERLY (NO SEPARATE PAY ITEM)

MK.	DESCRIPTION	DATE	DWN.	CHK.

F. D. Bayer, P.E
F. D. BAYER
78304
REGISTERED PROFESSIONAL ENGINEER
7/21/11

City of San Antonio

Street Maintenance

2012 Asphalt Overlay W/Rubber/ Hot Paver General Notes/Sheet Index

JOB NO.:	SHEET
DATE:	4

TRAFFIC NOTES AND SPECIAL CONDITIONS

1. WORK AROUND SCHOOLS SHALL BE SCHEDULED TO ELIMINATE IMPACTS TO THE SCHOOL. LANES SHALL NOT BE CLOSED DURING THE TIME STUDENTS ARE BEING DROPPED OFF AND PICKED UP FROM SCHOOL. WORK WITHIN A SCHOOL ZONE CAN ONLY OCCUR BETWEEN THE HOURS OF 9 AM AND 2 PM.

2. IT IS THE CONTRACTORS RESPONSIBILITY TO SEE THAT ALL SIGNS AND BARRICADES ARE PROPERLY INSTALLED AND MAINTAINED. ALL LOCATIONS AND DISTANCES WILL BE DECIDED UPON IN THE FIELD BY THE CONTRACTOR, USING THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
   - MULTI LANE USE TXDOT TOP'S
   - LOCALE STREET CLOSURES USE CITY STANDARDS
   - UNIQUE SITUATIONS USE TMUTCD, NEED PRIOR APPROVAL

   THE CITY'S CONSTRUCTION INSPECTOR AND TRAFFIC ENGINEERING REPRESENTATIVE WILL ONLY BE RESPONSIBLE TO INSPECT BARRICADES AND SIGNS. IF, IN THE OPINION OF THE TRAFFIC ENGINEERING REPRESENTATIVE AND THE CONSTRUCTION INSPECTOR, THE BARRICADES AND SIGNS DO NOT CONFORM TO ESTABLISH STANDARDS OR ARE INCORRECTLY PLACED OR ARE INSUFFICIENT IN QUANTITY TO PROTECT THE GENERAL PUBLIC, THE CONSTRUCTION INSPECTOR SHALL HAVE THE OPINION TO STOP OPERATIONS UNTIL SUCH TIME AS THE CONDITIONS ARE CORRECTED.
   IF THE NEED ARISES, ADDITIONAL BARRICADES AND DIRECTIONAL DEVICES MAY BE ORDERED BY THE TRAFFIC ENGINEERING REPRESENTATIVE AT THE CONTRACTORS EXPENCE.

3. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO SEE THAT ALL TRAFFIC CONTROL DEVICES ARE PROPERLY INSTALLED AND MAINTAINED AT THE JOB SITE IN ACCORDANCE WITH THE PLANS, SPECIFICATIONS AND RELATED INDUSTRY STANDARDS AND REGULATIONS. THESE NOTES, DO NOT, IN AND OF THEMSELVES CONSTITUTE A TRAFFIC CONTROL PLAN. IN THE EVENT THAT THESE PLANS DO NOT INCLUDE TRAFFIC CONTROL, OR THAT THE CONTRACTOR WISHES TO VARY FROM TRAFFIC CONTROL INCLUDED WITH THESE PLANS, HE SHALL SUBMIT FOR REVIEW A TRAFFIC CONTROL PLAN SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF TEXAS, INCLUDING A SIGN AND BARRICADE PLAN CONFORMING TO THE REQUIREMENTS OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES. THE CITY'S CONSTRUCTION OBSERVER/INSPECTOR (COI) AND THE TRAFFIC ENGINEERING REPRESENTATIVE WILL ONLY BE RESPONSIBLE TO INSPECT THE TRAFFIC CONTROL DEVICES BEING DEPLOYED. IF, IN THE OPINION OF THE TRAFFIC ENGINEERING REPRESENTATIVE AND THE COI, THE TRAFFIC CONTROL DEVICES DO NOT CONFORM TO ESTABLISHED STANDARDS OR ARE INCORRECTLY PLACED OR ARE INSUFFICIENT IN QUANTITY TO PROTECT THE GENERAL PUBLIC, THE COI SHALL HAVE THE OPTION TO STOP CONSTRUCTION OPERATIONS AT NO EXPENSE TO THE CITY UNTIL SUCH TIME AS THE CONDITIONS ARE CORRECTED BY THE CONTRACTOR.

4. FOR STREETS LISTED ON THE CITY OF SAN ANTONIO'S MAJOR THOROUGHFARE PLAN, THE CONTRACTOR SHALL SUBMIT AN ENGINEERED TRAFFIC CONTROL PLAN TO THE CITY OF SAN ANTONIO TWO WEEKS PRIOR TO COMMENCING WORK.

5. PRIOR TO STARTING CONSTRUCTION, THE CONTRACTOR SHALL CONTACT THE CITY OF SAN ANTONIO TRAFFIC OPERATIONS SECTION AT 207-7765 FOR A TRAFFIC SIGN AND TRAFFIC SIGNAL INVENTORY, PRIOR TO COMPLETION OF THE CONTRACT AND REMOVAL OF THE BARRICADES, THE CONTRACTOR SHALL AGAIN CONTACT THE TRAFFIC OPERATIONS SECTION. THE BARRICADES SHALL NOT BE REMOVED UNTIL ALL APPLICABLE PERMANENT TRAFFIC SIGNS AND SIGNALS ARE IN PLACE.

6. IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN AND MAINTAIN TEMPORARY STOP SIGNS AND ALL OTHER TRAFFIC CONTROL DEVICES REQUIRED PROTECTING THE GENERAL PUBLIC. IF THE CITY OF SAN ANTONIO HAS REMOVED PERMANENT STOP SIGNS, THE CONTRACTOR SHALL REQUEST THAT THE SIGNS BE RETURNED TO THE CONSTRUCTION SITE TO BE REINSTALLED BY THE CONTRACTOR. ALL PERMANENT SIGNS OR TRAFFIC CONTROL DEVICES MISSING OR DAMAGED UPON COMPLETION OF CONSTRUCTION SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

7. THE CONTRACTOR SHALL MAINTAIN TRAFFIC ON THE PROJECT STREETS THROUGHOUT CONSTRUCTION. IN THE EVENT THE CONTRACTORMUST CLOSE A STREET TO TRAFFIC, HE SHALL OBTAIN PERMISION FROM THE PUBLIC WORKS DEPARTMENTANS SHALL PROVIDE A MINIMUM FORTY EIGHT (48) HOURS NOTICE TO THE FIRE DEPARTMENT AND POLICE DEPARTMENT.

8. AS WORK PROGRESSES, LOCATION OF TEMPORARY TRAFFIC CONTROL DEVICES WILL BE ADJUSTED AND MODIFIED, AS NECESSARY BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE. THE CONTRACTOR SHALL SUPPLY TWO CARRIABLE MESSAGE SIGN BOARDS FOR USE THROUGHOUT THE CONTRACT.

9. IF THE NEED ARISES, ADDITIONAL TEMPORARY TRAFFIC CONTROL DEVICES, SPECIAL DIRECTIONAL DEVICES, AND/OR BUSINESS NAME SIGNS MAY BE ORDERED BY THE TRAFFIC ENGINEERING REPRESENTATIVE AT THE CONTRACTOR'S EXPENSE. THE CONTRACTOR SHALL SUPPLY TWO VARIABLE MESSAGE SIGN BOARDS FOR USE THROUGHOUT THE DURATION OF THE CONTRACT.

10. THE CONTRACTOR MUST MAINTAIN ALL STREETS WITHIN PROJECT LIMITS OPEN TO THROUGH TRAFFIC BY REPAIRING TRENCHES, POTHOLES, LEVELING UP WITH ASPHALT, ETC. AT NO DIRECT PAYMENT, WITH THE COST TO BE INCLUDED IN OTHER ITEMS.

11. WHEN CONSTRUCTION WORK NECESSITATES THE UTILIZATION OF VEHICLE PATHS OTHER THAN THE LANES NORMALLY USED, TRAFFIC CONTROL MARKINGS NO LONGER APPLICABLE SHALL BE REMOVED AND APPROVED TEMPORARY PAVEMENT MARKINGS AND SIGNS INSTALLED IN ACCORDANCE WITH PART VI-D OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

12. PERMANENT PAVEMENT MARKINGS SHALL BE APPLIED PRIOR TO THE OPENING OF THE COMPLETED STREET TO TRAFFIC. TEMPORARY ADDITIONAL SHORT-TERM EXPENDABLE PAVEMENT MARKINGS MAY BE PROVIDED PRIOR TO THE APPLICATION OF PERMANENT MARKINGS IN MINIMUM LENGTHS OF 36", OR RAISED PAVEMENT MARKINGS TO DELINEATE CONTINUITY UNTIL SUCH TIME AS STANDARD PAVEMENT MARKINGS IN NORMAL LENGTHS CAN BE PLACED AT NO DIRECT PAYMENT.

13. ALL TEMPORARY TRAFFIC CONTROL DEVICES, ECT. SHALL BE PROVIDED BY TH CONTRACTOR WITHOUT DIRECT PAYMENT, UNLESS OTHERWISE NOTED OR STATED. TEMPORARY TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE CITY'S "TYPICAL SIGN AND BARRICADE STANDARDS" SHEETS AND TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES

14. THE COI WILL MONITOR THE CONTRACTOR'S TRAFFIC CONTROL DEVICES AND WILL BE RESPONSIBLE TO FURNISH ALL RESIDENTS AND BUSINESSES WITH AN INFORMATION FLYER ON ALL JOBS DURING CONSTRUCTION.

15. ANY UNAUTHORIZED DAMAGE TO PERMANENT TRAFFIC SIGNALS, THE CONTROLLER BOX, LOOPS OR CONDUITS DURING OR UPON COMPLETION OF THE PROJECT SHALL BE REPAIRED OR REPLACED AT THE CONTRACTOR'S EXPENSE. THE DECISION TO REPAIR, AS OPPOSED TO REPLACE, THE DAMAGED EQUIPMENT SHALL BE MADE BY THE CITY'S TRAFFIC ENGINEER.

16. CONTRACTOR SHALL MAINTAIN AT LEAST ONE LANE OPEN TO TRAFFIC AT ALL TIMES. UNIFORMED OFF-DUTY POLICE OFFICER SHALL BE ON SITE IF ONE LANE CANNOT REMAIN OPEN.

17. OFF-DUTY POLICE OFFICERS WILL BE REQUIRED AS DIRECTED BY THE TRAFFIC ENGINEER AT NO DIRECT PAYMENT, COST TO BE INCLUDED IN OTHER BID ITEMS. THIS WILL BE A REQUIREMENT WHERE TWO-WAY TRAFFIC IS TO BE MAINTAINED. ALL OFF DUTY OFFICERS AND CONTRACTOR CREWS HANDLING TRAFFIC MUST BE LISTED AS CERTIFIED OR QUALIFIED FLAGGERS BY CONTRACTOR.

18. CONTRACTOR SHALL SCHEDULE HIS WORK SUCH THAT EACH STREET WILL BE SUBSTANTIALLY COMPLETE PRIOR TO MOVING HIS CONSTRUCTION OPERATION TO ANOTHER STREET. MORE THAN ONE STREET CAN BE UNDER CONSTRUCTION WITH THE PRIOR APPROVAL FROM THE CITY AND EACH STREET HAS CONTINUOUS, ACTIVE AND UNINTERUPTED CONSTRUCTION OPERATION ON THAT STREET.

19. CONTACT THE CITY TRAFFIC OPERATIONS AT 210-207-7765 PRIOR TO ANY MILLING.

20. ALL EXISTING PAVEMENT MARKERS SHALL BE REMOVED BY THE CONTRACTOR ONLY AS THE WORK PROGRESSES AND AS APPROVED BY THE ENGINEER. THIS WORK WILL NOT BE PAID FOR SEPERATELY, BUT SHALL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS. MATERIALS REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR.

21. THE CONTRACTOR SHALL NOT COMENCE WORK ON A STREET PRIOR TO 8 AM. THE PLACEMENT AND MOVEMENT OF SIGNS AND BARRICADES CONSTITUTES WORK AND SHALL NOT BE STARTED UNTIL AFTER THE 8 AM TIME FRAME.

22. THE CONTRACTOR SHALL MAINTAIN CONTINUOUS ACCESS TO ALL INTERSECTING STREETS UNLESS OTHERWISE SHOWN ON THESE PLANS. WHEN CONTINUOUS ACCESS IS SCHEDULED TO BE BLOCKED, THE CONTRACTOR SHALL CONTACT THE DISPATCHERS FOR THE FIRE DEPARTMENT AND EMS AT (210) 227-8341 AND THE POLICE DEPARTMENT AT (210) 207-2257, TO APPRISE THEM OF THE PENDING STREET CLOSURE AT LEAST FORTY-EIGHT (48) HOURS IN ADVANCE. IF THE CLOSURE FALLS ALONG A BUS ROUTE, THE CONTRACTOR SHALL ALSO CONTACT VIA AT (210) 362-5220 THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING SUITABLE ACCESS ACCOMMODATIONS FOR SCHOOL CHILDREN AND PEDESTRIANS.

    THE CONTRACTOR SHALL MAINTAIN EITHER THE EXISTING OR TEMPORARY STREET NAME SIGN AT EACH INTERSECTION ONSITE THROUGHOUT CONSTRUCTION. IF THE EXISTING STREET NAME SIGNS ARE USED, THEY MUST BE MAINTAINED IN THE CONDITION ENCOUNTERED PRIOR TO THE BEGINNING OF CONSTRUCTION, AND THEN BE TURNED IN TO THE CITY INSPECTOR AT THE END OF THE PROJECT. IF TEMPORARY SIGNS ARE USED DURING CONSTRUCTION, THEY SHALL HAVE A MINIMUM OF 4-INCH LETTERS, AND MAY BE FABRICATED WITH CONSTRUCTION ZONE MATERIAL (BLACK LEGEND ON ORANGE BACKGROUND, USING PLYWOOD SUBSTRATE, ETC.).

24. AFTER UTILITIES HAVE MADE THEIR REQUIRED MANHOLE AND VALVE ADJUSTMENTS, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROPERLY BARRICADE AND MAINTAIN THE BARRICADES TO ENSURE THAT THE PUBLIC IS SAFEGUARDED WHILE TRAVELING WITHIN THE CONSTRUCTION AREA. THE CONTRACTOR SHALL CONTACT THE TRAFFIC ENGINEER FOR A REVIEW OF THE ADEQUACY OF THE BARRICADES. THERE WILL BE NO SEPARATE **PAVEMENT** FOR THIS ITEM.

MK.	DESCRIPTION	DATE	DWN.	CHK.

STATE OF TEXAS
F. D. BAYER
78304
REGISTERED PROFESSIONAL ENGINEER
F. D. Bayer P.E.
7/21/11

City of San Antonio

Street Maintenance

2012 Asphalt Overlay W/Rubber/ Hot Paver General Notes/Sheet Index

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TRAFFIC NOTES AND SPECIAL CONDITIONS

25. ALL TRAFFIC CONTROL DEVICES, PLACEMENT AND ACTIVITIES SHALL BE AS PER THE LATEST EDITION OF THE TEXAS MANUAL OF UNIFORM TRAFIC CONTROL DEVICES (TXMUTCD). IF THERE IS ANY CONFLICT BETWEEN THE TXMUTCD AND TRAFFIC CONTROLREQUIREMENTS WITHIN THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATLEY.

27. FOR STREETS, WHICH ACCOMMODATE FOUR (4) OR MORE TRAFFIC LANES, THE FOLLOWING RESTRICTIONS WILL APPLY:
    A. TWO-WAY TRAFFIC SHALL BE MAINTAINED.
    B. A MINIMUM OF TWO LANES SHALL REMAIN OPEN FOR TRAFFIC.
    C. NO MORE THAN 1,000 LINEAR FEET OF A ROADWAY LANE MAY BE CLOSED DURING CONSTRUCTION OPERATION.
    D. A MINIMUM OF ONE (1) OFF DUTY POLICE OFFICER SHALL BE REQUIRED ON SITE DURING BASE FAILURE REPAIR, SLURRY SEALING, MILLING, AND H.M.A.C. OVERLAY OPERATIONS

28. FLASHING WARNING LIGHTS AND/OR FLAGS SHALL BE USED TO CALL ATTENTION TO ALL ADVANCE WARNING SIGNS.

29. SIGNS WHICH READ "FRESH OIL" SHALL BE PLACED AT EACH END OF WORK AREA AND ALL TURNOUTS ADJACENT TO WORK AREAS WHERE SLURRY SEALING IS BEING PERFORMED UNTIL SUCH TIME THAT THE ENGINEER GIVES PERMISSION TO THEIR REMOVAL

30. SIGNS, WHICH READ "CONSTRUCTION AHEAD. TRAFFIC DELAYS TO BE EXPECTED" SHALL BE PLACED AT EACH END OF WORK AREA. SAID SIGNS SHALL BE 60" X 30" AND SHALL BE ORANGE WITH BLACK LETTERING.

31. ALL TRAFFIC MARKINGS SHALL BE PLACED IN ACCORDANCE WITH THE CITY TRAFFIC ENGINEER. HE SHALL BE GIVEN A MINIMUM OF SEVENTY-TWO (72) HOURS NOTICE PRIOR TO THE APPLICATION OF ANY MARKINGS.

32. THE CONTRACTOR SHALL NOTIFY THE TEXAS DEPARTMENT OF TRANSPORTATION PRIOR TO WORKING AT THEINTERSECTION OF ANY STATE OWNED OR MAINTAINED ROADWAY.

33. ALL STREETS, FOR THEIR FULL WIDTH, SHALL BE OPENED TO TRAFFIC AT THE END OF EACH WORK PERIOD.

34. AT NO DIRECT PAYMENT, APPROVED TEMPORARY SHORT-TERM EXPENDABLE PAVEMENT MARKINGS SHALL BE PROVIDED TO DELINEATE LANE CONTINUITY PRIOR TO THE APPLICATION OF STANDARD MARKINGS BY THE USE OF FLEXIBLE REFLECTIVE ROAD MARKER TABS/. ONCE THE EXISTING STANDARD PAVEMENT MARKINGS HAVE BEEN OBLITERATED, SUCH TABS SHALL REMAIN IN PLACE FOR A MAXIMUM OF FOURTEEN (14) DAYS AFTER WHICH TIME STANDARD THERMOPLASTIC PAVEMENT MARKINGS MUST BE APPLIED. AT THE CONTRACTOR'S OPTION, THE CONTRACTOR MAY APPLY STANDARD PAINTED MARKINGS PRIOR TO THE APPLICATION OF THE THERMOPLASTIC MARKINGS FOR AN INTERIM PERIOD OF TIME. SUBSEQUENT TO AN INITIAL APPLICATION OF STANDARD PAINTED MARKING, REPEATED APPLICATIONS OF SUCH MAY BECOME NECESSARY UNTIL STANDARD THERMOPLASTIC TRAFFIC MARKINGS ARE IN PLACE. AS A FUNCTION OF THE MARKING'S EFFECTIVE VISIBILITY, THE ENGINEER WILL DETERMINE WHEN RE-APPLICATION OF THE PAINTED MARKING ARE NECESSARY. PAINTED MARKINGS SHALL BE APPLIED TO DELINEATE FULL CENTERLINES AND LANE LINES AND WILL REQUIRE GLASS BEADS, PAVEMENT OF INITIAL PAINTED MARKING APPLICATION WILL BE MADE UNDER PAY ITEM NOS. 532 AND 534. ALL REPEATED APPLICATIONS OF PAINTED MARKINGS SHALL BE AT NO DIRECT PAYMENT.

35. CONTRACTOR TO CONTACT THE CITY TRAFFIC ENGINEER OFFICE AT 207-7758 48 HOURS PRIOR TO SIDEWALK AND CURB CONSTRUCTION WHERE CITY OWNED TRAFFIC FACILITIES EXIST. CONTRACTOR SHALL SECURE APPROVAL FOR ENGINEER PRIOR TO SUCH CONSTRUCTION. NO WIRE SPLICES SHALL BE MADE OUTSIDE THE PULL BOX. IF WIRES SHOULD BE CUT OUTSIDE THEN PULL BOX BY THE CONTRACTOR, SAID CONTRACTOR SHALL THEN REPLACE THE ENTIRE WIRE AT NO EXTRA PAY.

36. LOCATION AND LAYOUTS OF DETECTOR LOOP REPLACEMENTS SHALL BE VERIFIED BY THE CITY ENGINEER PRIOR TO THEIR REMOVAL AND INSTALLATION

37. PAVEMENT MARKINGS ARE TO BE COMPLETED NO LATER THAN FOURTEEN (14) DAYS AFTER MAINTENANCE APPLICATION IS PLACED. PERMANENT PAVEMENT MARKINGS SHALL BE APPLIED PRIOR TO THE OPENING OF THE COMPLETED STREET TO TRAFFIC. TEMPORARY ADDITIONAL SHORT-TERM EXPENDABLE PAVEMENT MARKINGS MAY BE PROVIDED PRIOR TO THE APPLICATION OF PERMANENT MARKINGS IN MINIMUM LENGTHS OF 36", OR RAISED PAVEMENT MARKINGS TO DELINEATE CONTINUITY UNTIL SUCH TIME AS STANDARD PAVEMENT MARKINGS IN NORMAL LENGTHS CAN BE PLACED AT NO DIRECT PAYMENT.

38. CONTRACTOR TO CONTACT CITY TRAFFIC ENGINEER SEVEN (7) DAYS PRIOR TO COMMENCING WORK ON STREETS WITH BIKE LANES. BIKE LANE MARKING LAYOUT SHALL BE PROVIDED TO THE CONTRACTOR BY THE CITY TRAFFIC ENGINEER.

38. DURING ASPHALT OVERLAY, THE CONTRACTOR SHALL ALLOW RESIDENTS TRAFFIC ACCESS TO THE STREET WITH PROPER GUIDENCE, DIRECTION, FLAGMEN AND TRAFFIC CONTROL. AND ONLY AT SUCH TIME THAT DAMAGE WILL NOT OCCUR TO THE NEW ASPHALT OVERLLAY OR TO THE VEHICLES. THIS INCLUDES BU IS NOT LIMITED TO DAMAGE RESULTING FROM TACK COAT ON THE VEHICLES PAINTED SURFACES.

39. IN SO FAR AS POSSIBLE, THE CONTRACTOR SHALL SCHEDULE AND CONDUCT STREET OPERATIONS IN THE INTERSECTIONS AS RAPIDLY AS POSSIBLE TO MINIMIZE THE LENGTH OF TIME THE INTERSECTIONS WILL BE CLOSED TO TRAFFIC.

40. THE CONTRACTOR IS RESPONSIBLE FOR REPAIRING ALL STREETS OUTSIDE OF THE PROJECT LIMITS, WHICH ARE DAMAGED DUE TO CONSTRUCTION ACTIVITIES. THE CITY'S STREET ENGINEER MUST APPROVE THE REPLACED SECTION. THERE WILL BE NO DIRECT PAYMENT FOR THIS WORK. THE COST IS TO BE INCLUDED IN OTHER ITEMS.

41. IF REQUIRED, A BARRICADE COMPANY SHALL SUPPLY THE CONTRACTOR WITH A SUFFICIENT NUMBER OF QUALITY STANDARD BARRICADES AND OTHER TRAFFIC CONTROL DEVICES BY M.U.T.C.D. STANDARDS AS NEEDED. THE BARRICADE COMPANY SHALL ALSO SUPPLY THE CONTRACTOR WITH TWO (2) FULL TIME QUALIFIED PERSONNEL WHOLE SOLE RESPONSIBILITIES PERTAINING TO THIS PROJECT ARE TO ESTABLISH AND MAINTAIN PROPER CONSTRUCTION WORK ZONE TRAFFIC CONTROL AND RELATED DEVICES. THESE PERSONS SHALL PROVIDE DOCUMENTED EVIDENCE THEY HAVE RECEIVED SPECIALIZED TRAINING IN CONSTRUCTION WORK ZONE TRAFFIC CONTROL WITHIN TWO YEARS ON THE CONTRACT DATE. ANY AND ALL TRAFFIC CONTROL DEVICES NEEDED AND NECESSARY PERSONNEL WILL BE AT THE CONTRACTOR'S EXPENSE.

42. THE CONTRACTOR MUST CONTACT THE CITY'S COI 48 HOURS IN ADVANCE (NOT INCLUDING WEEKENDS) OF ANY MINOR STREET CLOSURE. IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO ADVISE THE COI TEN (10) DAYS IN ADVANCE OF ARTERIAL TOTAL STREET CLOSURE. THIS MUCH TIME IS NECESSARY TO INSTALL ADVISORY SIGNS AND GIVE THE MOTORISTS A MINIMUM OF SEVEN (7) DAYS NOTICE OF THE STREET CLOSURE. THE COI AFTER BEING NOTIFIED WILL CONTACT THE TRAFFIC ENGINEERING OFFICE TO MAKE THE NECESSARY ARRANGEMENTS.

MK.	DESCRIPTION	DATE	DWN.	CHK.

F. D. Bayer P.E.
F. D. BAYER
78304
REGISTERED PROFESSIONAL ENGINEER
7/21/11

City of San Antonio

Street Maintenance

2012 Asphalt Overlay W/Rubber/ Hot Paver General Notes/Sheet Index

JOB NO.:	SHEET
DATE:	6

2012 PACKAGE 4 ASPHALT OVERLAY WITH RUBBER BID ITEM SUMMARY

					CD 1	CD 6				CD7	CD 8		CD 9		CD 10		
					15149	15411	15596	16466		15165	15304	15900	15927	15647	15056	15698	17381
Item	Description		UNIT OF MEASURE	TOTAL APPROX. QUANTITIES	Basse	Pinn Rd	S General McMullen	Woodland Hills		City View Dr	Fred May Dr	Glencrest	Pin Oak Dr	Babcock Rd	Huebner Rd	E Lawndale Dr	E Olmos
					McCullough Ave	US Hwy 90 W Access Rd	Castroville Rd	Forest Village		E Sunshine	Baywater Dr	NW Loop 410 Access Rd	Nw Loop 410 Access Rd	Hamilton Wolfe	Floyd Curl	Everest Ave	US hwy 281 N Access Rd
					San Pedro Ave	Westfield Blvd	US Hwy 90 W Access Rd	Dead End		Hillcrest	Summit Pkwy	Oakridge	Oaklawn	Medical Dr	Golden Quail	N New Braunfels Ave	COSA City Limits
103.1	Remove Concrete Curb		LF	312	16	8	52	16		8	16	10	8	40	24	32	0
103.3	Remove Sidewalks and Driveways		SY	167	8	4	26	8		4	8	5	4	20	12	16	0
203.0	Tack Coat		GAL	1,746	128	80	186	105		60	80	115	80	182	204	180	46
205.4A	Hot Mix Asphaltic Pavement Type D with Rubber		SY	194,487	13445	5919	30059	11052		3644	5610	12000	7774	19089	21376	17626	5853
205.4B	Hot Mix Asphaltic Pavement Type D (level up)* with Rubber		SY	8,938	640	282	1431	526		174	267	552	370	909	1018	840	279
208.2	Milling of Asphalt Pavement		CY	787	50	50	15	15		15	15	15	15	15	15	15	15
209.1	Concrete Pavement		SY	1,998			1998	0		0	0	0	0	0	0	0	0
230.	Replacing Base & Pvmt With Type A Pvmt (6" Compacted Depth)		SY	47,550	3822	1800	12978	2127		333	800	1298	1800	5850	5090	3500	500
230.1A	Replacing Base & Pvmt With ATB & Pvmt (8" Compacted Depth)		SY	100			100	0		0	0	0	0	0	0	0	0
230.1B	Replacing Base & Pvmt With Type A Pvmt (12" Compacted Depth)		SY	100			100	0		0	0	0	0	0	0	0	0
250.	Seal Coat		SY	185,549	12805	5637	28628	10526		3470	5343	11448	7404	18180	20358	16786	5574
500.	Concrete Curb		LF	316	16	8	52	16		8	16	10	8	40	24	32	0
502.1	Concrete Sidewalks		SY	161	8	4	26	8		4	8	5	4	20	12	16	0
502.1A	Handicamp Ramps (Type 1 thru 5)		EA	75	4	2	13	4		2	4	0	2	10	6	8	0
502.2	Concrete Driveway		SY	74	4	2	13	4		2	3	3	0	8	6	7	0
512.1	Adjusting Existing Manholes (Storm Sewer)		EA	20	1	0	2	2		0	0	2	0	2	2	0	2
512.1B	Adjusting AT&T Manholes		EA	31	2	0	3	1		0	0	1	0	8	1	0	2
515.	Top Soil		CY	58	3	2	6	3		2	3	0	0	7	5	6	0
516.1	Sodding		SY	71	3	2	6	3		2	3	0	0	7	5	6	0
535 A	4" Wide Yellow Line		LF	27,282	6800	2114	5000	0		0	0	0	0	0	5660	0	2508
535 B	4" Wide White Line		LF	13,627	1200	1057	3500	0		0	0	0	0	3000	3000	0	0
535 D	8" Solid White Line		LF	8,330	5000	0	450	0		0	0	0	0	900	300	0	0
535 F	16" Wide White Line		LF	736	300	0	100	0		0	0	0	0	150	150	0	0
535 G	24" Wide White Line		LF	4,800	1400	400	1300	0		0	0	0	100	400	400	0	0
535 I	Left White Arrow		EA	47	2	0	12	0		0	0	0	0	7	14	0	0
535H	Right White Arrow		EA	11	2	0	3	0		0	0	0	0	4	2	0	0
535 L	Word "ONLY"		EA	16	0	0	4	0		0	0	0	0	2	4	0	0
535.17	Bicycle Rider Symbol		EA	6	0	0	0	0		0	0	0	0	0		0	0
537.3	Traffic Button (Type I-C)		EA	350	50	0	50	0		0	0	0	0	150	100	0	0
537.5	Traffic Button (Type II A-A)		EA	2,752	220	0	250	0		0	0	0	0	0	300	0	600
537.16	Pavement Marker (Type II C-R)		EA	2,245	220	0	250	0		8	0	0	0	400	300	0	0
537.1	Traffic Button (Type W)		EA	40	10	0	10	0		0	0	0	0	10	10	0	0
537.2	Traffic Button (Type Y)		EA	260	10	0	10	0		0	0	0	0	10	10	0	0
799.	Speed Hump, Type II, Modular Rubber Cushions		EA	14	0	0	0	0		6	0	0	0	0	0	8	0
826.	Adjusting Existing Water Valve Boxes (SAWS)		EA	150	0	0	0	0		0	0	0	0	0	0	0	0
826.A	Valve Box Locate and Adjustments (SAWS)		EA	20	0	0	0	0		0	0	0	0	0	0	0	0
851.	Adjusting Existing Manholes (SAWS)		EA	135	0	0	0	0		0	0	0	0	0	0	0	0
851.A	Locating and Adjusting Existing Manholes (SAWS)		EA	6	0	0	0	0		0	0	0	0	0	0	0	0
SP100	Door Hangers		LS	1	0	0	0	0		0	0	0	0	0	0	0	0
SP2000	Railroad Insurance		LS	1	0	0	0	0		0	0	0	0	0	0	0	0

*** ITEM 205.4B IS INDICATED ON THE PLANS FOR APROXIMATE LEVEL UP QUANTITIES AND SHALL BE BID IN THE BID PROPOSAL AT A PRICE NOT TO EXCEED 10% MORE THAN THE PRICE OF ITEM 205.4A**

STATE OF TEXAS
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City of San Antonio

Street Maintenance

2012 Asphalt Overlay W/Rubber/Hot Paver Pkg 4

JOB NO.:
DATE:
SHEET 7

DB/tu

2012 PACKAGE 4 ASPHALT OVERLAY WITH RUBBER BID ITEM SUMMARY

				CD9	CD 10				CD 6,7	CD2
				16528	15897	15799	16601	15725	15024	25962
Item	Description	UNIT OF MEASURE	APPROX. QUANTITIES	Everest Ave	Naco Pass	Nona Kay	Norwich	O'Connor Rd	Ingram Rd	S. Bowie St
				Conway	Nacogdoches Rd	Bitters Rd	Hitching Post	IH 35 N Access Rd	Oakhill Rd	E.Market St.
				Empire	Uhr Ln	Ilse	NE Loop 410 Access Rd	Robards Row	Quiver Dr	IH 37 S.Access Rd.
103.1	Remove Concrete Curb	LF	82	0	0	8	8	40	10	16
103.3	Remove Sidewalks and Driveways	SY	52	0	0	4	4	20	5	19
203.0	Tack Coat	GAL	300	0	37	63	46	101	28	25
205.4A	Hot Mix Asphaltic Pavement Type D with Rubber	SY	41,040	4182	3891	6628	4781	10618	2951	7,989
205.4B	Hot Mix Asphaltic Pavement Type D (level up)* with Rubber	SY	1,650	199	185	315	227	505	140	79
208.2	Milling of Asphalt Pavement	CY	537	50	50	50	50	50	50	237
209.1	Concrete Pavement	SY	0	0	0	0	0	0	0	0
230.	Replacing Base & Pvmt With Type A Pvmt (6" Compacted Depth)	SY	7,652	1000	1350	1340	660	1412	703	1187
230.1A	Replacing Base & Pvmt With ATB & Pvmt (8" Compacted Depth)	SY	0	0	0	0	0	0	0	0
230.1B	Replacing Base & Pvmt With Type A Pvmt (12" Compacted Depth)	SY	0	0	0	0	0	0	0	0
250.	Seal Coat	SY	39,390	3983	3706	6313	4554	10113	2811	7910
500.	Concrete Curb	LF	86	0	0	10	10	40	10	16
502.1	Concrete Sidewalks	SY	46	0	0	5	5	20	5	11
502.1A	Handicamp Ramps (Type 1 thru 5)	EA	20	0	0	2	2	10	2	4
502.2	Concrete Driveway	SY	22	0	0	2	2	8	2	8
512.1	Adjusting Existing Manholes (Storm Sewer)	EA	7	0	1	2	1	2	1	0
512.1B	Adjusting AT&T Manholes	EA	13	0	0	0	0	1	0	12
515.	Top Soil	CY	21	0	0	1	1	2	1	16
516.1	Sodding	SY	34	0	0	1	1	1	1	30
535 A	4" Wide Yellow Line	LF	5,200	0	0	0	0	3000	2200	0
535 B	4" Wide White Line	LF	1,870	0	0	0	0	1100	270	500
535 D	8" Solid White Line	LF	1,680	0	0	0	0	450	1230	0
535 F	16" Wide White Line	LF	36	0	0	0	0	0	0	36
535 G	24" Wide White Line	LF	800	0	0	0	0	600	200	0
535 I	Left White Arrow	EA	12	0	0	0	0	9	3	0
535H	Right White Arrow	EA	0	0	0	0	0	0	0	0
535 L	Word "ONLY"	EA	6	0	0	0	0	5	1	0
535.17	Bicycle Rider Symbol	EA	6	0	0	0	0	0	6	0
537.3	Traffic Button (Type I-C)	EA	0	0	0	0	0	0	0	0
537.5	Traffic Button (Type II A-A)	EA	1,382	0	0	0	0	600	150	632
537.16	Pavement Marker (Type II C-R)	EA	1,067	0	0	0	0	600	120	347
537.1	Traffic Button (Type W)	EA	0	0	0	0	0	0	0	0
537.2	Traffic Button (Type Y)	EA	220	0	0	0	0	0	0	220
799.	Speed Hump, Type II, Modular Rubber Cushions	EA	0	0	0	0	0	0	0	0
826.	Adjusting Existing Water Valve Boxes (SAWS)	EA	0	0	0	0	0	0	0	0
826.A	Valve Box Locate and Adjustments (SAWS)	EA	0	0	0	0	0	0	0	0
851.	Adjusting Existing Manholes (SAWS)	EA	0	0	0	0	0	0	0	0
851.A	Locating and Adjusting Existing Manholes (SAWS)	EA	0	0	0	0	0	0	0	0
SP100	Door Hangers	LS	0	0	0	0	0	0	0	0
SP2000	Railroad Insurance	LS	0	0	0	0	0	0	0	0

*** ITEM 205.4B IS INDICATED ON THE PLANS FOR APROXIMATE LEVEL UP QUANTITIES AND SHALL BE BID IN THE BID PROPOSAL AT A PRICE NOT TO EXCEED 10% MORE THAN THE PRICE OF ITEM 205.4A**

STATE OF TEXAS
F. D. BAYER
78304
REGISTERED PROFESSIONAL ENGINEER

MK.	DESCRIPTION	DAT.	DWN.	CHK.

City of San Antonio

Street Maintenance

2012 Asphalt Overlay
W/Rubber/Hot Paver Pkg 4

JOB NO.:
DATE:
SHEET 8

DB/tu

2012 PACKAGE 4 SUBSTITUTE ALT. HOT PAVER LAID MICROSURFACE WITH RUBBER BID ITEM SUMMARY

				CD 1	CD 6			CD 7				CD 8		CD 9	
				15149	15411	15596	16466	15165	15304	15900	15927	15647	15056	15698	17381
Item	Description	UNIT OF MEASURE	TOTAL APPROX. QUANTITIES	Basse	Pinn Rd	S General McMullen	Woodland Hills	City View Dr	Fred May Dr	Glencrest	Pin Oak Dr	Babcock Rd	Huebner Rd	E Lawndale Dr	E Olmos
				McCullough Ave	US Hwy 90 W Access Rd	Castroville Rd	Forest Village	E Sunshine	Baywater Dr	NW Loop 410 Access Rd	Nw Loop 410 Access Rd	Hamilton Wolfe	Floyd Curl	Everest Ave	US hwy 281 N Access Rd
				San Pedro Ave	Westfield Blvd	US Hwy 90 W Access Rd	Dead End	Hillcrest	Summit Pkwy	Oakridge	Oaklawn	Medical Dr	Golden Quail	N New Braunfels Ave	COSA City Limits
103.1	Remove Concrete Curb	LF	312	16	8	52	16	8	16	10	8	40	24	32	0
103.3	Remove Sidewalks and Driveways	SY	167	8	4	26	8	4	8	5	4	20	12	16	0
203.0	Tack Coat	GAL	1,746	128	80	186	105	60	80	115	80	182	204	180	46
205.4A	Hot Mix Asphaltic Pavement Type D with Rubber	SY	8,938	640	282	1431	526	174	267	552	370	909	1018	840	279
205.4B	Hot Mix Asphaltic Pavement Type D (level up)* with Rubber	SY	8,938	640	282	1431	526	174	267	552	370	909	1018	840	279
208.2	Milling of Asphalt Pavement	CY	285	15	15	15	15	15	15	15	15	15	15	15	15
209.1	Concrete Pavement	SY	1,998	0	0	1998	0	0	0	0	0	0	0	0	0
230.	Replacing Base & Pvmt With Type A Pvmt (6" Compacted Depth)	SY	47,550	3822	1800	12978	2127	333	800	1298	1800	5850	5090	3500	500
230.1A	Replacing Base & Pvmt With ATB & Pvmt (8" Compacted Depth)	SY	0	0	0	0	0	0	0	0	0	0	0	0	0
230.1B	Replacing Base & Pvmt With Type A Pvmt (12" Compacted Depth)	SY	0	0	0	0	0	0	0	0	0	0	0	0	0
250.	Seal Coat	SY	18,555	1280	564	2863	1053	347	534	1145	740	1818	2036	1679	558
260.	Ultra -Thin Bonded Wearing Course (Type A) with Rubber	SY	185,549	12805	5637	28628	10526	3470	5343	11448	7404	18180	20358	16786	5574
500.	Concrete Curb	LF	316	16	8	52	16	8	16	10	8	40	24	32	0
502.1	Concrete Sidewalks	SY	161	8	4	26	8	4	8	5	4	20	12	16	0
502.1A	Handicamp Ramps (Type 1 thru 5)	EA	75	4	2	13	4	2	4	0	2	10	6	8	0
502.2	Concrete Driveway	SY	74	4	2	13	4	2	3	3	0	8	6	7	0
512.1	Adjusting Existing Manholes (Storm Sewer)	EA	20	1	0	2	2	0	0	2	0	2	2	0	2
512.1B	Adjusting AT&T Manholes	EA	31	2	0	3	1	0	0	1	0	8	1	0	2
515.	Top Soil	CY	58	3	2	6	3	2	3	0	0	7	5	6	0
516.1	Sodding	SY	71	3	2	6	3	2	3	0	0	7	5	6	0
535 A	4" Wide Yellow Line	LF	27,282	6800	2114	5000	0	0	0	0	0	0	5660	0	2508
535 B	4" Wide White Line	LF	13,627	1200	1057	3500	0	0	0	0	0	3000	3000	0	0
535 D	8" Solid White Line	LF	8,330	5000	0	450	0	0	0	0	0	900	300	0	0
535 F	16" Wide White Line	LF	736	300	0	100	0	0	0	0	0	150	150	0	0
535 G	24" Wide White Line	LF	4,800	1400	400	1300	0	0	0	0	100	400	400	0	0
535 I	Left White Arrow	EA	47	2	0	12	0	0	0	0	0	7	14	0	0
535H	Right White Arrow	EA	11	2	0	3	0	0	0	0	0	4	2	0	0
535 L	Word "ONLY"	EA	16	0	0	4	0	0	0	0	0	2	4	0	0
535.17	Bicycle Rider Symbol	EA	6	0	0	0	0	0	0	0	0	0		0	0
537.3	Traffic Button (Type I-C)	EA	350	50	0	50	0	0	0	0	0	150	100	0	0
537.5	Traffic Button (Type II A-A)	EA	2,752	220	0	250	0	0	0	0	0	0	300	0	600
537.16	Pavement Marker (Type II C-R)	EA	2,245	220	0	250	0	8	0	0	0	400	300	0	0
537.1	Traffic Button (Type W)	EA	40	10	0	10	0	0	0	0	0	10	10	0	0
537.2	Traffic Button (Type Y)	EA	260	10	0	10	0	0	0	0	0	10	10	0	0
799.	Speed Hump, Type II, Modular Rubber Cushions	EA	14	0	0	0	0	6	0	0	0	0	0	8	0
826.	Adjusting Existing Water Valve Boxes (SAWS)	EA	150	0	0	0	0	0	0	0	0	0	0	0	0
826.A	Valve Box Locate and Adjustments (SAWS)	EA	20	0	0	0	0	0	0	0	0	0	0	0	0
851.	Adjusting Existing Manholes (SAWS)	EA	135	0	0	0	0	0	0	0	0	0	0	0	0
851.A	Locating and Adjusting Existing Manholes (SAWS)	EA	6	0	0	0	0	0	0	0	0	0	0	0	0
SP100	Door Hangers	LS	1	0	0	0	0	0	0	0	0	0	0	0	0
SP2000	Railroad Insurance	LS	1	0	0	0	0	0	0	0	0	0	0	0	0

*** ITEM 205.4B IS INDICATED ON THE PLANS FOR APROXIMATE LEVEL UP QUANTITIES AND SHALL BE BID IN THE BID PROPOSAL AT A PRICE NOT TO EXCEED 10% MORE THAN THE PRICE OF ITEM 205.4A**

STATE OF TEXAS
F. D. BAYER
78304
REGISTERED PROFESSIONAL ENGINEER
7/21/11

NO.	DESCRIPTION	DATE	BY	CHK.

City of San Antonio

Street Maintenance

2012 Asphalt Overlay W/Rubber/Hot Paver Pkg 4

JOB NO.:
DATE:
SHEET 8A

DB/tu

2012 PACKAGE 4 SUBSTITUTE ALT. HOT PAVER LAID MICROSURFACE WITH RUBBER BID ITEM SUMMARY

				CD9	CD 10				CD 6,7	CD2
				16528	15897	15799	16601	15725	15024	25962
Item	Description	UNIT OF MEASURE	APPROX. QUANTITIES	Everest Ave	Naco Pass	Nona Kay	Norwich	O'Connor Rd	Ingram Rd	S. Bowie St
				Conway	Nacogdoches Rd	Bitters Rd	Hitching Post	IH 35 N Access Rd	Oakhill Rd	E.Market St.
				Empire	Uhr Ln	Ilse	NE Loop 410 Access Rd	Robards Row	Quiver Dr	IH 37 S.Access Rd.
103.1	Remove Concrete Curb	LF	82	0	0	8	8	40	10	16
103.3	Remove Sidewalks and Driveways	SY	52	0	0	4	4	20	5	19
203.0	Tack Coat	GAL	300	0	37	63	46	101	28	25
205.4A	Hot Mix Asphaltic Pavement Type D with Rubber	SY	1,650	199	185	315	227	505	140	79
205.4B	Hot Mix Asphaltic Pavement Type D (level up)* with Rubber	SY	1,650	199	185	315	227	505	140	79
208.2	Milling of Asphalt Pavement	CY	105	15	15	15	15	15	15	15
209.1	Concrete Pavement	SY	0	0	0	0	0	0	0	0
230.	Replacing Base & Pvmt With Type A Pvmt (6" Compacted Depth)	SY	7,652	1000	1350	1340	660	1412	703	1187
230.1A	Replacing Base & Pvmt With ATB & Pvmt (8" Compacted Depth)	SY	0	0	0	0	0	0	0	0
230.1B	Replacing Base & Pvmt With Type A Pvmt (12" Compacted Depth)	SY	0	0	0	0	0	0	0	0
250.	Seal Coat	SY	3,938	398	371	631	455	1011	281	791
260.	Ultra -Thin Bonded Wearing Course (Type A) wiyh Rubber	SY	39,390	3983	3706	6313	4554	10113	2811	7910
500.	Concrete Curb	LF	86	0	0	10	10	40	10	16
502.1	Concrete Sidewalks	SY	46	0	0	5	5	20	5	11
502.1A	Handicamp Ramps (Type 1 thru 5)	EA	20	0	0	2	2	10	2	4
502.2	Concrete Driveway	SY	22	0	0	2	2	8	2	8
512.1	Adjusting Existing Manholes (Storm Sewer)	EA	7	0	1	2	1	2	1	0
512.1B	Adjusting AT&T Manholes	EA	13	0	0	0	0	1	0	12
515.	Top Soil	CY	21	0	0	1	1	2	1	16
516.1	Sodding	SY	34	0	0	1	1	1	1	30
535 A	4" Wide Yellow Line	LF	5,200	0	0	0	0	3000	2200	0
535 B	4" Wide White Line	LF	1,870	0	0	0	0	1100	270	500
535 D	8" Solid White Line	LF	1,680	0	0	0	0	450	1230	0
535 F	16" Wide White Line	LF	36	0	0	0	0	0	0	36
535 G	24" Wide White Line	LF	800	0	0	0	0	600	200	0
535 I	Left White Arrow	EA	12	0	0	0	0	9	3	0
535H	Right White Arrow	EA	0	0	0	0	0	0	0	0
535 L	Word "ONLY"	EA	6	0	0	0	0	5	1	0
535.17	Bicycle Rider Symbol	EA	6	0	0	0	0	0	6	0
537.3	Traffic Button (Type I-C)	EA	0	0	0	0	0	0	0	0
537.5	Traffic Button (Type II A-A)	EA	1,382	0	0	0	0	600	150	632
537.16	Pavement Marker (Type II C-R)	EA	1,067	0	0	0	0	600	120	347
537.1	Traffic Button (Type W)	EA	0	0	0	0	0	0	0	0
537.2	Traffic Button (Type Y)	EA	220	0	0	0	0	0	0	220
799.	Speed Hump, Type II, Modular Rubber Cushions	EA	0	0	0	0	0	0	0	0
826.	Adjusting Existing Water Valve Boxes (SAWS)	EA	0	0	0	0	0	0	0	0
826.A	Valve Box Locate and Adjustments (SAWS)	EA	0	0	0	0	0	0	0	0
851.	Adjusting Existing Manholes (SAWS)	EA	0	0	0	0	0	0	0	0
851.A	Locating and Adjusting Existing Manholes (SAWS)	EA	0	0	0	0	0	0	0	0
SP100	Door Hangers	LS	0	0	0	0	0	0	0	0
SP2000	Railroad Insurance	LS	0	0	0	0	0	0	0	0

*** ITEM 205.4B IS INDICATED ON THE PLANS FOR APROXIMATE LEVEL UP QUANTITIES AND SHALL BE BID IN THE BID PROPOSAL AT A PRICE NOT TO EXCEED 10% MORE THAN THE PRICE OF ITEM 205.4A**

STATE OF TEXAS
F. D. BAYER
78304
REGISTERED PROFESSIONAL ENGINEER
7/21/11

MK.	DESCRIPTION	DATE	DWN.	CHK.

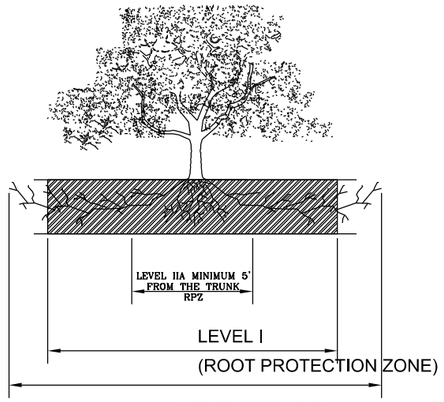
City of San Antonio

Street Maintenance

2012 Asphalt Overlay W/Rubber/Hot Paver Pkg 4

JOB NO.:
DATE:
SHEET 8B

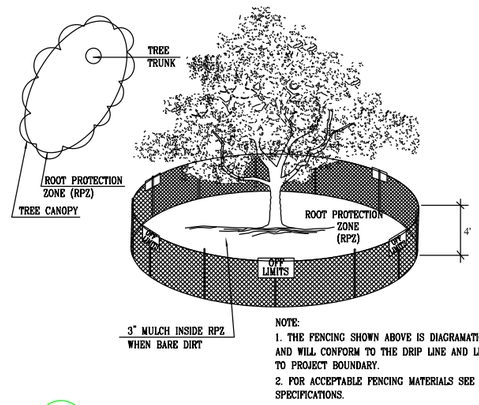
DB/tu



1.1.1 ELEVATION

N. T. S.

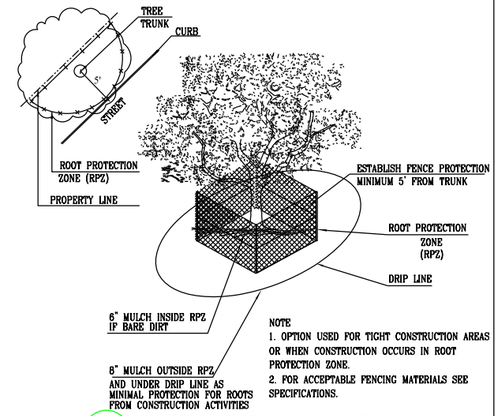
ROOT PROTECTION ZONE–THE ROOT PROTECTION ZONE IS A CIRCULAR AREA AROUND A TREE THAT IS BASED ON THE DIAMETER OF THE TREE. EACH 1 INCH DIAMETER OF THE TREE EQUALS 1 FOOT RADIUS FOR ROOT PROTECTION ZONE.



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.

GENERAL NOTES

1. ALL THE TREES WITH A DIAMETER GREATER THAN 3 INCHES AFFECTED BY CONSTRUCTION SHALL HAVE THE LIMBS AND ROOTS TRIMMED AND PRUNED ACCORDING TO ITEM No. 802. TREE PRUNING, SOIL AMENDING AND FERTILIZATION, UNLESS SPECIFIED TREES SHALL RECEIVE LEVEL 2 PROTECTION AS PER ITEM No. 802. TREES TO RECEIVE LEVEL 1 PROTECTION AS PER ITEM No. 802 ARE SHOWN ON TREE PROTECTION TABLE ON THIS SHEET.

2. ALL TREES SHALL REMAIN UNLESS NOTED ON THE PLANS.

3. NO SITE PREPARATION WORK SHALL BEGIN IN AREAS WHERE TREE PRESERVATION AND TREATMENT MEASURES HAVE NOT BEEN COMPLETED AND APPROVED.

4. TREE PROTECTION FENCING SHALL BE REQUIRED. TREE PROTECTION FENCING SHALL BE INSTALLED, MAINTAINED AND REPAIRED BY THE CONTRACTOR DURING SITE CONSTRUCTION.

5. THE CONTRACTOR SHALL AVOID CUTTING ROOTS LARGER THAN THREE INCHES IN DIAMETER WHEN EXCAVATING NEAR EXISTING TREES. EXCAVATION IN THE VICINITY OF TREES SHALL PROCEED WITH CAUTION. THE CONTRACTOR SHALL CONTACT THE CITY INSPECTOR.

6. THE ROOT PROTECTION ZONE IS THAT AREA SURROUNDING A TREE, AS MEASURED BY A RADIUS FROM THE TREE TRUNK, IN WHICH NO EQUIPMENT, VEHICLES OR MATERIALS MAY OPERATE OR BE STORED. THE REQUIRED RADIUS LENGTH IS 1 FOOT PER DIAMETER INCH OF THE TREE. FOR EXAMPLE, A 10-INCH DIAMETER TREE WOULD HAVE A 5-FOOT RADIUS ROOT PROTECTION ZONE AROUND THE TREE. ROOTS OR BRANCHES THAT ARE IN CONFLICT WITH THE CONSTRUCTION SHALL BE CUT CLEANLY ACCORDING TO PROPER PRUNING METHODS. LIVE OAK WOUNDS SHALL BE PAINTED OVER, WITHIN 20 MINUTES TO PREVENT OAK WILT.

7. ACCESS TO FENCED AREAS WILL BE PERMITTED ONLY WITH THE APPROVAL OF THE ENGINEER OR CITY INSPECTOR.

8. GRADING, IF REQUIRED, SHALL BE LIMITED TO A 3 INCH CUT OR FILL WITHIN THE FENCED ROOT ZONE AREAS.

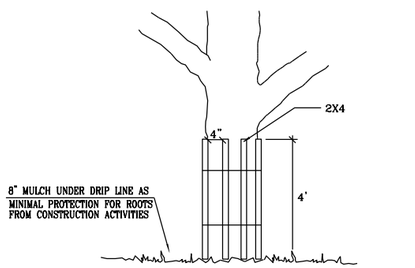
9. TREES, SHRUBS OR BUSHES TO BE CLEARED FROM PROTECTED ROOT ZONE AREAS SHALL BE REMOVED BY HAND AS DIRECTED BY THE PROJECT MANAGER OR CITY INSPECTOR.

10. TREES DAMAGED OR LOST DUE TO CONTRACTOR'S NEGLIGENCE DURING CONSTRUCTION SHALL BE MITIGATED TO THE ENGINEER'S SATISFACTION.

11. EXPOSED ROOTS SHALL BE COVERED AT THE END OF EACH DAY USING TECHNIQUES SUCH AS COVERING WITH SOIL, MULCH OR WET BURLAP.

12. ANY TREE REMOVAL SHALL BE APPROVED BY THE CITY ARBORIST PRIOR TO ITS REMOVAL.

1.3 GENERAL NOTES



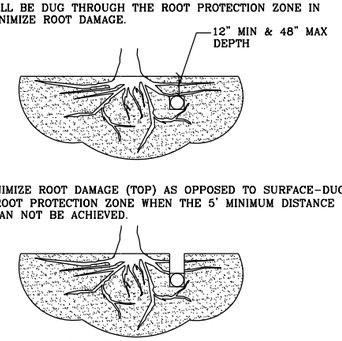
NOTE
WRAP TREE TRUNK WITH 2"X4" STUDS AND ROPE OR BAND IN PLACE AS NEEDED TO PROTECT TREES IN WORK AREAS.

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 TUNNELING 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.

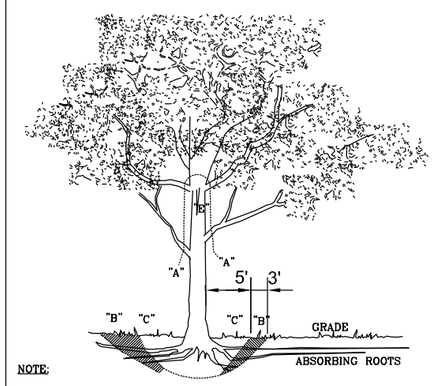


TUNNEL TO MINIMIZE ROOT DAMAGE (TOP) AS OPPOSED TO SURFACE-DUG TRENCHES IN ROOT PROTECTION ZONE WHEN THE 5' MINIMUM DISTANCE FROM TRUNK CAN NOT BE ACHIEVED.

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' DEEP

"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.

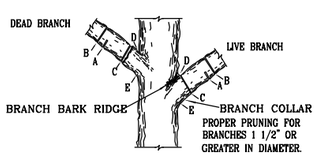
1.3 TREE REMOVAL DIAGRAM

N. T. S.

TREE PROTECTION TABLE

PROTECTION MEASURE						
TREE SHEET #	TREE/CALIPER SHEET #	STATION OR NUMBER	LOCATION	ITEM 801	ITEM 802 MAINTENCE/ TREATMENTS/ PROTECTION	REMOVAL SEE GENERAL NOTE No. 2

1.3 TREE PROTECTION TABLE



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 WITHIN 20 MIN TO PREVENT THE SPREAD OF OAK WILT.

1.4 BRANCH PRUNING DETAIL

N. T. S.

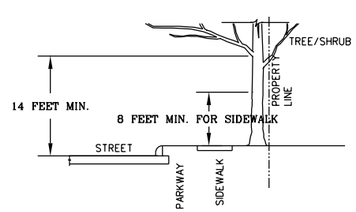
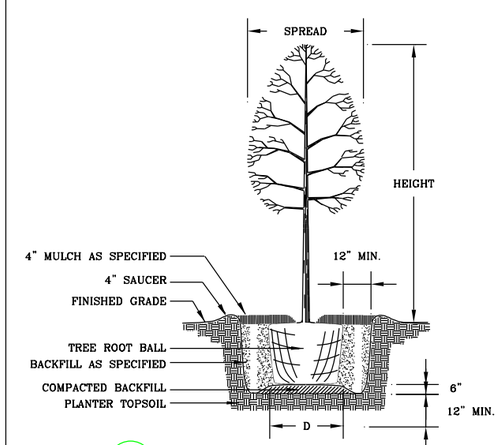


FIGURE No.2:

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.

TREE INVENTORY SUMMARY
(8" DIAMETER AND LARGER)

TOTAL DIAMETER INCHES, R.O.W _____

TOTAL DIAMETER INCHES REMOVED _____

TOTAL DIAMETER INCHES PRESERVED _____

TOTAL PERCENTAGE INCHES PRESERVED _____

TOTAL INCHES TO BE MITIGATED _____

1.3 TREE INVENTORY SUMMARY

PREPARED BY: FERNANDEZ FRAZER WHITE & ASSOC. INC. & C. F. ZAVALA GROUP

CITY OF SAN ANTONIO

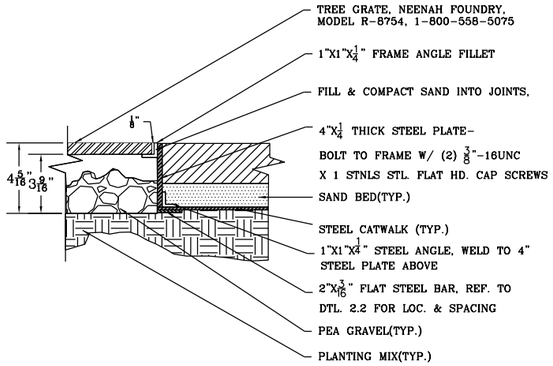
DEPARTMENT OF PUBLIC WORKS

CITY OF SAN ANTONIO
TREE PROTECTION DETAILS

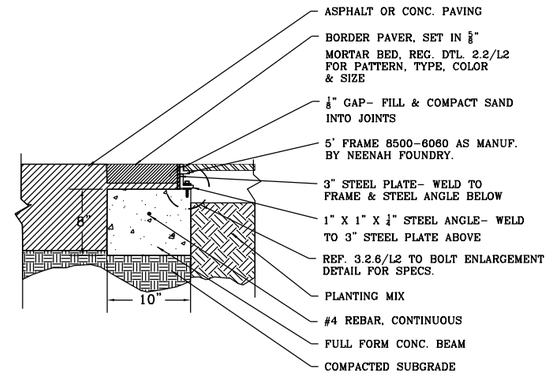
TREE PRESERVATION

DESIGNED:	FED. RD. DIV. NO.	STATE				SHT. NO.
CHECKED:		TEXAS				9
DRAWN:	STATE DIST. NO.	COUNTY	CONTROL NO.	SECT. NO.	JOB NO.	HIGHWAY NO.
CHECKED:		BEXAR				

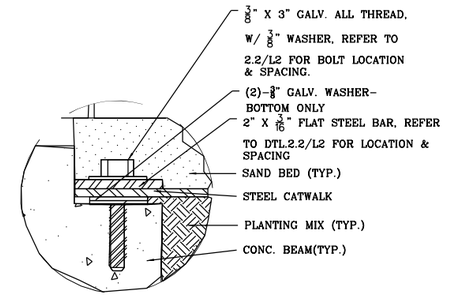
NOTES:
1. 5' FRAME 8500-6060 AS MANUFACTURED BY NEENAH FOUNDRY.
2. REMOVE CROSSBAR FROM FRAME BEFORE INSTALLATION.



3.2.4 TREE GRATE/FRAME @ PAVERS
N. T. S.

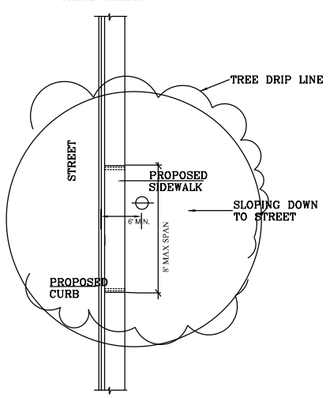


3.2.5 SECTION: PAVER @ TREE GRATE
N. T. S.



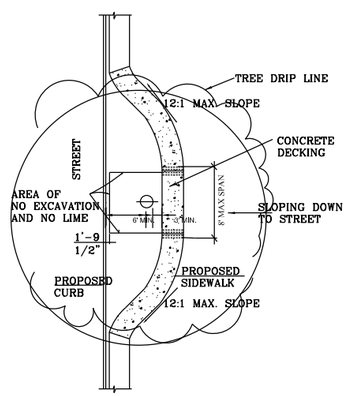
3.2.6 DETAIL: BOLT/CONC. CONNECTION
N. T. S.

AREA BENEATH PROPOSED SIDEWALKS IN THE DRIP LINE OF AN EXISTING TREE SHALL RECEIVE TREE VENTING AS PER OPTIONS ON THESE SHEETS.



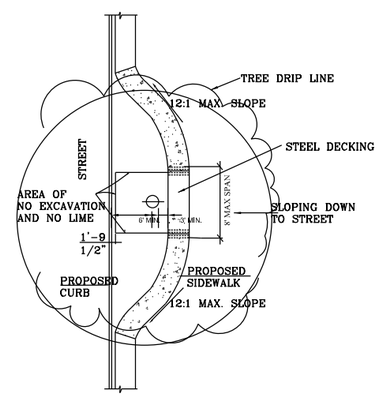
3.3 ELEVATED WALKWAY
N. T. S.

AREA BENEATH PROPOSED SIDEWALKS IN THE DRIP LINE OF AN EXISTING TREE SHALL RECEIVE TREE VENTING AS PER OPTIONS ON THESE SHEETS.



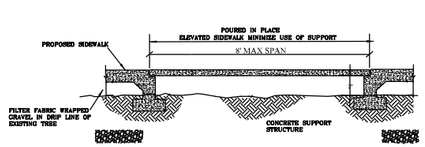
3.3.1 ELEVATED WALKWAY /CONCRETE DECKING
N. T. S.

AREA BENEATH PROPOSED SIDEWALKS IN THE DRIP LINE OF AN EXISTING TREE SHALL RECEIVE TREE VENTING AS PER OPTIONS ON THESE SHEETS.



3.3.2 ELEVATED WALKWAY /STEEL DECKING
N. T. S.

NOTE:
DESIGN STEEL PLATE SUPPORT ACCORDING TO SPECIFIED WIDTH AND LENGTH.



3.3.4 ELEVATED WALKWAY SECTION
N. T. S.

NOTE:
FOR THOSE TREES THAT DO NOT MEET THE TREE PRESERVATION ORDINANCE REQUIREMENTS PRESERVATION SHALL BE DETERMINED ON A CASE BY CASE BASIS

NOTE: FOR TREE AERATION SYSTEMS LOCATED UNDER A PRIVATE OR PUBLIC ROADWAY - THE PROJECT ENGINEER SHALL SUBMIT FOR APPROVAL, A PAVEMENT DESIGN SUPPORTED BY A GEOTECHNICAL REPORT THAT MEETS THE REQD. STRUCTURAL NUMBERS AND COMPACTION OF THE SUBGRADE, ABOVE THE PROPOSED SYSTEM OF TREE AERATION, IN ACCORDANCE WITH UDC 35-506(P) PAVEMENT STANDARDS, AND CITY OF SAN ANTONIO'S STANDARD SPECS. FOR PUBLIC WORKS CONSTRUCTION.

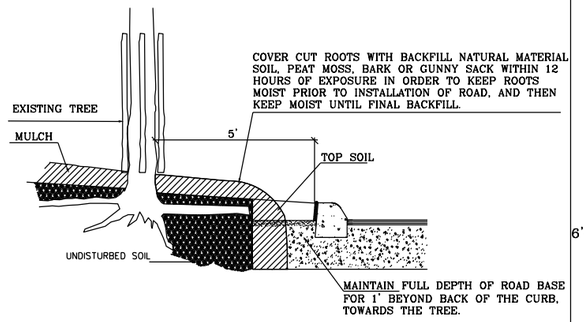
PREPARED BY: FERNANDEZ FRAZER WHITE & ASSOC. INC. & C. F. ZAVALA GROUP

CITY OF SAN ANTONIO

DEPARTMENT OF PUBLIC WORKS

CITY OF SAN ANTONIO
TREE PROTECTION

DESIGNED: ABFJR	FED. RD. DIV. NO.	STATE				SHT. NO.
CHECKED:		TEXAS				11
DRAWN: ABFJR	STATE DIST. NO.	COUNTY	CONTROL NO.	SECT. NO.	JOB NO.	HIGHWAY NO.
CHECKED:		BEXAR				

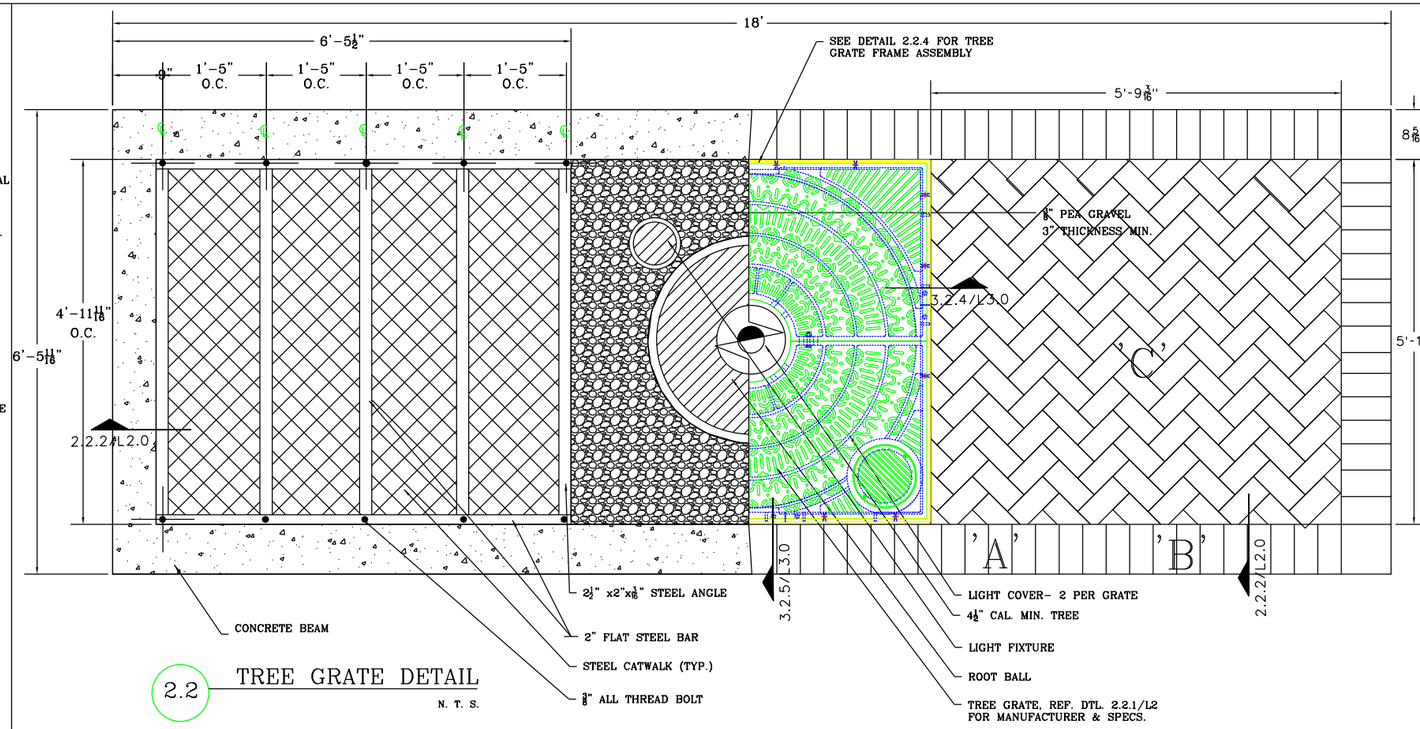


NOTE: ROOT ZONE OUTSIDE OF TREE PROTECTION BARRIER SHOULD BE COVERED AT ALL TIMES WITH 8" OF BARK MULCH THROUGHOUT THE CONSTRUCTION PHASE. EXISTING TREES SHOULD BE DEEP WATERED AS SPECIFIED IN ITEM 801 & 802

2.1 EXPOSED ROOT PROTECTION DETAIL

N. T. S.

NOTE:
FOR THOSE TREES THAT DO NOT MEET THE TREE PRESERVATION ORDINANCE REQUIREMENTS PRESERVATION SHALL BE DETERMINED ON A CASE BY CASE BASIS



2.2 TREE GRATE DETAIL

N. T. S.

NOTES:

1. PAVER 'A': $8\frac{5}{16}$" $-2\frac{3}{8}$"

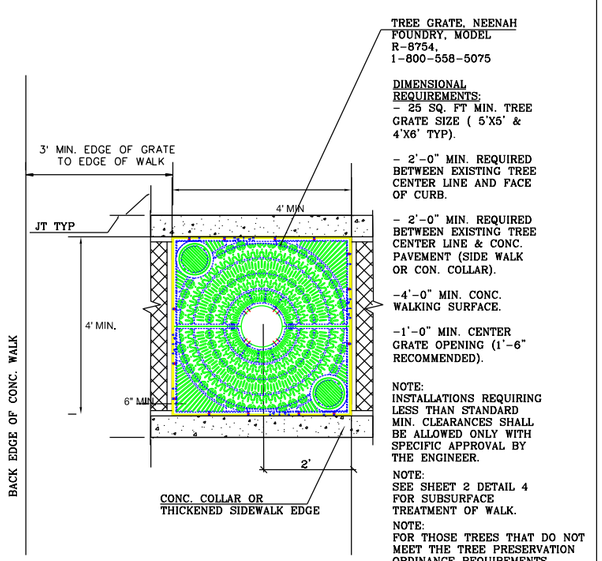
THICKNESS CONC. PAVER(CITY STONE II) CASTONE COLOR, BY PAVESTONE. 1-800-580-PAVE.

2. PAVER 'B': $4\frac{5}{16}$" X $8\frac{5}{16}$" $-2\frac{3}{8}$"

THICKNESS, PATTERN AS SHOWN ON PLAN, CONC. PAVER(HOLLAND STONE) CAST STONE COLOR, MANUF. BY PAVESTONE.

3. PAVER 'C': $4\frac{5}{16}$" X $8\frac{5}{16}$" $-2\frac{3}{8}$"

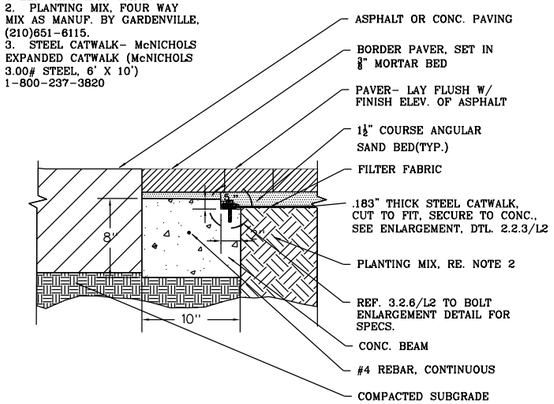
THICKNESS, 45° HERRINGBONE PATTERN, CONC. PAVER(HOLLAND STONE), ANTIQUE COLOR, MANUF. BY PAVESTONE.



2.2.1 TREE GRATE PLAN VIEW

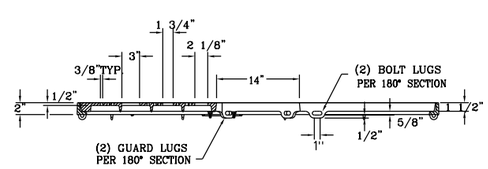
N. T. S.

NOTES:
1. COMPACT, VIBRATE & SWEEP SAND INTO JOINTS.
2. PLANTING MIX, FOUR WAY MIX AS MANUF. BY GARDENVILLE, (210)651-6115.
3. STEEL CATWALK- McNICHOLS EXPANDED CATWALK (McNICHOLS 3.00# STEEL, 6' X 10') 1-800-237-3820



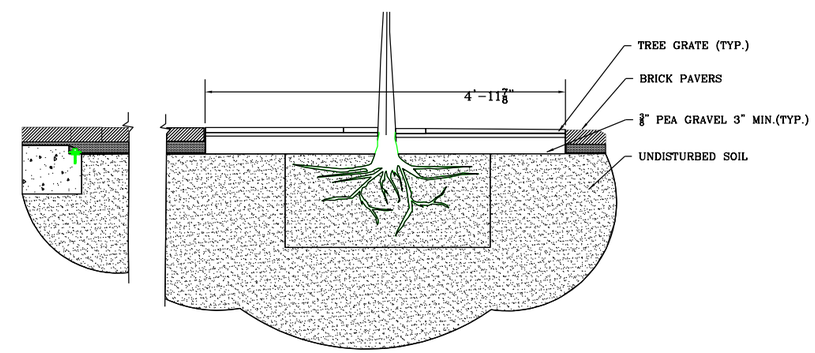
2.2.2 SECTION: PAVER @ ASPHALT

N. T. S.



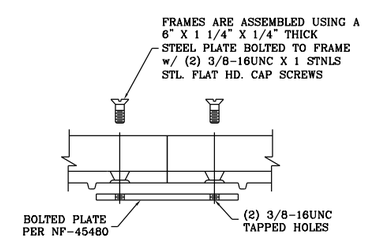
2.2.4 SECTION: TREE GRATE FRAME

N. T. S.



2.2.3 TREE WELL SECTION

N. T. S.



2.2.5 SECTION: GRATE FRAME ASSEMBLY

N. T. S.

PREPARED BY: FERNANDEZ FRAZER WHITE & ASSOC. INC. & C. F. ZAVALA GROUP

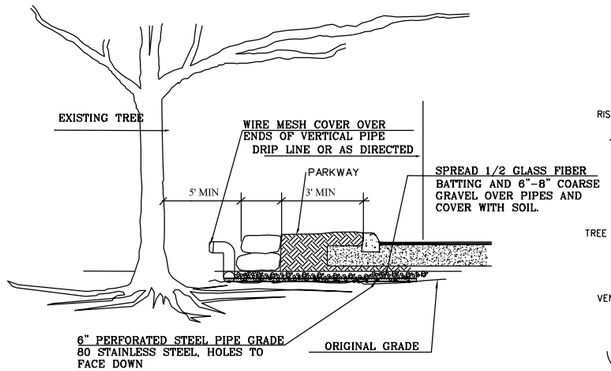
CITY OF SAN ANTONIO

DEPARTMENT OF PUBLIC WORKS

CITY OF SAN ANTONIO
TREE PROTECTION DETAILS

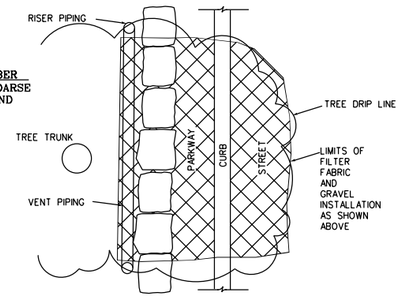
TREE PRESERVATION

DESIGNED:	FED. RD. DIV. NO.	STATE				SHT. NO.
CHECKED:		TEXAS				10
DRAWN:	STATE DIST. NO.	COUNTY	CONTROL NO.	SECT. NO.	JOB NO.	HIGHWAY NO.
CHECKED:		BEXAR				



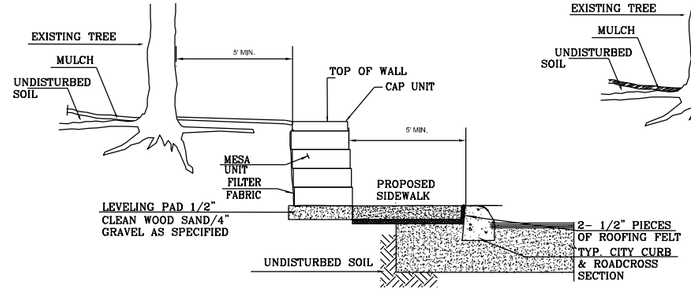
4.2 TREE AERATION DETAIL B

N. T. S.



4.2.2 PLAN VIEW B

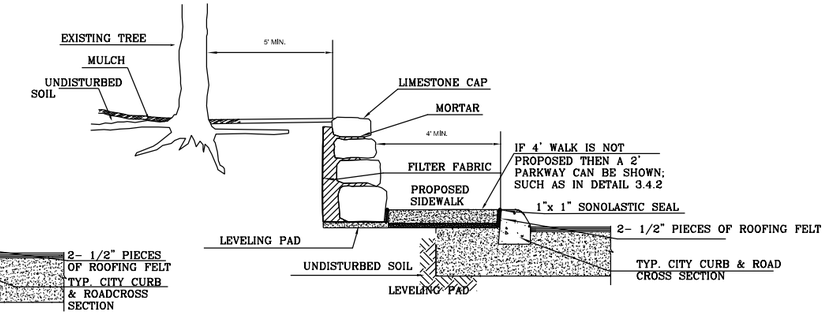
N. T. S.



4.3 SEGMENTAL GRAVITY WALL

ADJACENT TO CURB N. T. S.

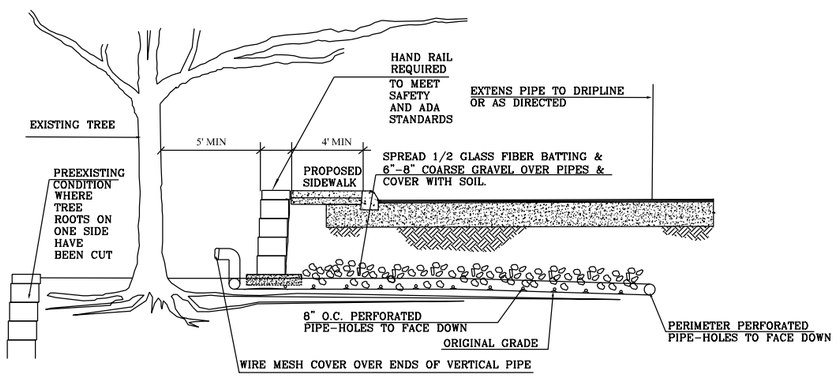
NOTE-
THIS TYPE OF WALL CAN BE USED ON OTHER APPLICATIONS
TREES CANNOT BE PRESERVED IF THEY ARE CLOSER THAN 5 FEET TO THE WALL



4.3.2 LIMESTONE BOULDER GRAVITY WALL

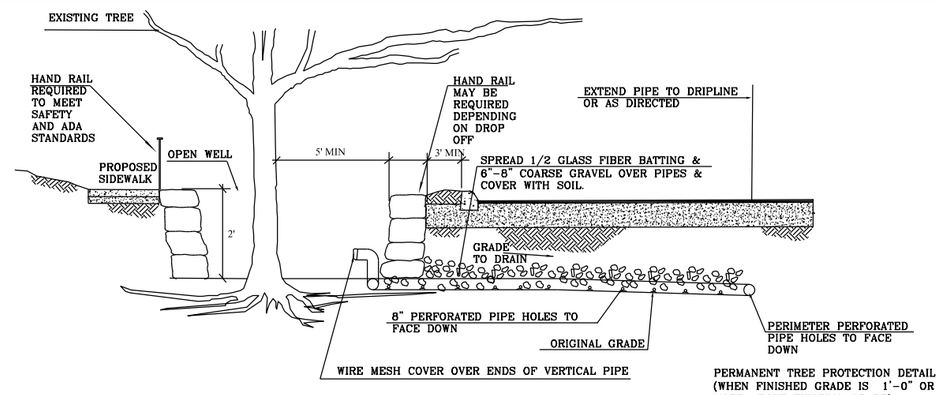
ADJACENT TO CURB N. T. S.

NOTE-
THIS TYPE OF WALL CAN BE USED ON OTHER APPLICATIONS
TREES CANNOT BE PRESERVED IF THEY ARE CLOSER THAN 5 FEET TO THE WALL



4.4 TREE AERATION DETAIL C

N. T. S.



4.4.2 TREE AERATION DETAIL C

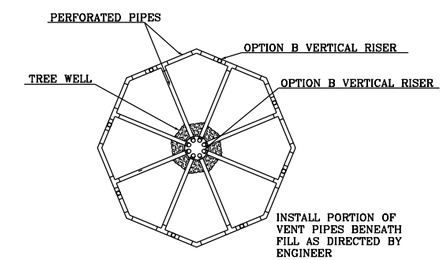
N. T. S.

NOTE: THIS AERATION SYSTEM CAN BE USED FOR NEW PROJECTS WHERE FILL IS OCCURRING SUCH AS PARKING LOTS OR CONSTRUCTION. DRAIN AWAY FROM EXISTING TREE.

PERMANENT TREE PROTECTION DETAIL (WHEN FINISHED GRADE IS 1'-0" OR MORE ABOVE EXISTING GRADE)

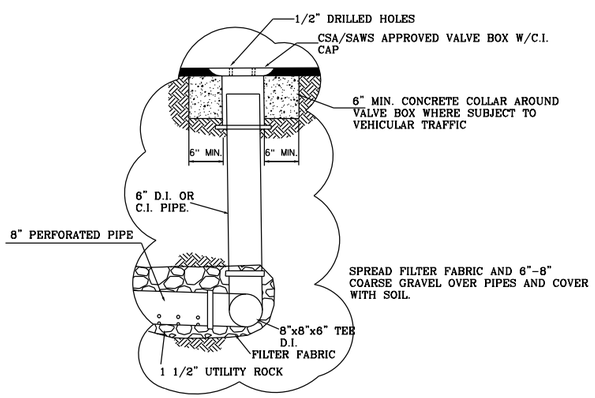
NOTE:

WELL TO BE CONSTRUCTED OF STONE, BLOCK OR BRICK. IF BRICK IS USED, VERTICAL JOINTS LEFT OPEN FOR DRAINAGE 1/2" MAXIMUM INSIDE FACE OF WALL.



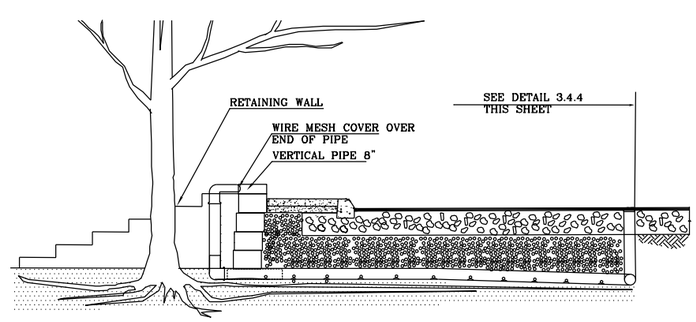
4.4.3 PLAN VIEW C

N. T. S.



4.4.4 TREE AERATION SECTION C

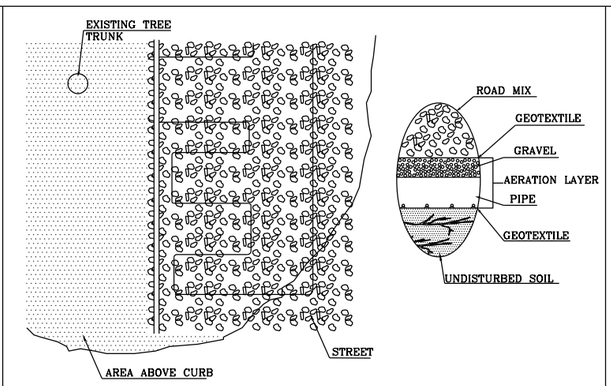
N. T. S.



4.4.5 TREE AERATION DETAIL D

N. T. S.

NOTE: THIS AERATION SYSTEM CAN BE USED FOR NEW PROJECTS WHERE FILL IS OCCURRING SUCH AS PARKING LOTS OR ROADWAY CONSTRUCTION. DRAIN AWAY FROM EXISTING TREE.



4.4.1 TREE AERATION PLAN VIEW D

N. T. S.

PREPARED BY: FERNANDEZ FRAZER WHITE & ASSOC. INC. & C. F. ZAVALA GROUP

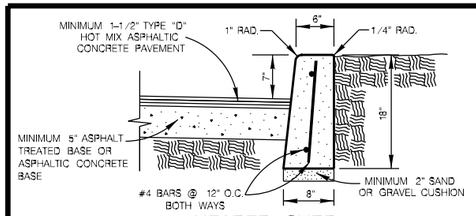
CITY OF SAN ANTONIO

DEPARTMENT OF PUBLIC WORKS

CITY OF SAN ANTONIO
TREE PROTECTION DETAILS

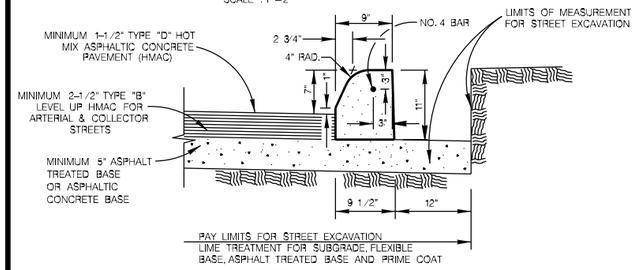
TREE PRESERVATION

DESIGNED: ABF,JR	FED. RD. DIV. NO.	STATE					SHT. NO.
CHECKED:		TEXAS					12
DRAWN:	STATE DIST. NO.	COUNTY	CONTROL NO.	SECT. NO.	JOB NO.		HIGHWAY NO.
CHECKED:		BEXAR					



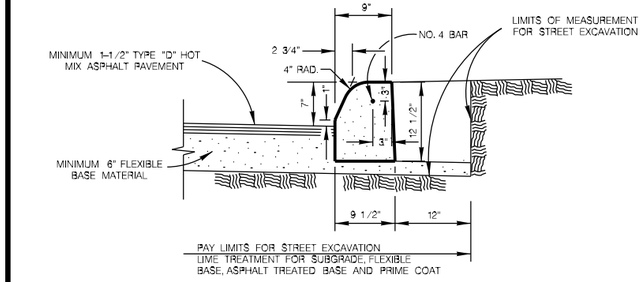
HEADER CURB

ITEM 500 ON SAND OR GRAVEL
SCALE : 1"=2'



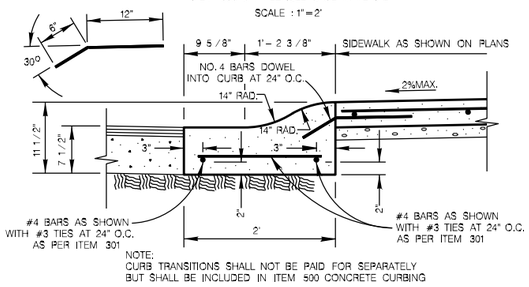
CONCRETE CURB

ITEM 500 ON ASPHALT TREATED BASE OR ASPHALTIC CONCRETE BASE
SCALE : 1"=2'



CONCRETE CURB

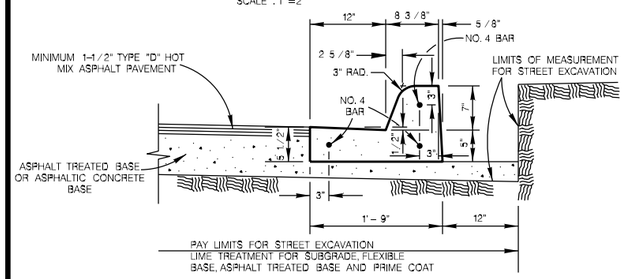
ITEM 500 ON FLEXIBLE BASE MATERIAL
SCALE : 1"=2'



NOTE:
CURB TRANSITIONS SHALL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN ITEM 500 CONCRETE CURBING

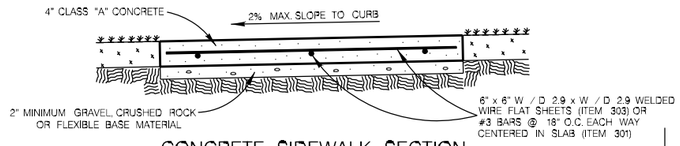
MOUNTABLE CURB

ITEM 500 ON COMPACTED SUBGRADE
SCALE : 1"=2'



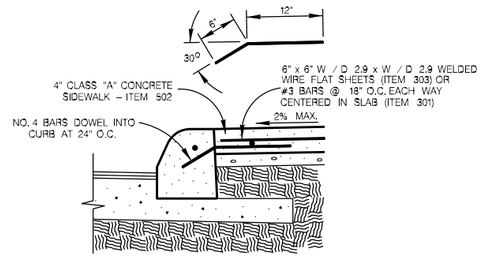
TYPICAL CURB & GUTTER DETAIL

ITEM 500 ON ASPHALT TREATED BASE OR ASPHALTIC CONCRETE BASE
SCALE : 1"=2'



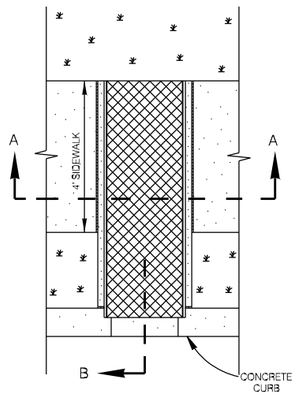
CONCRETE SIDEWALK SECTION

ITEM 502
SCALE : 1"=2'



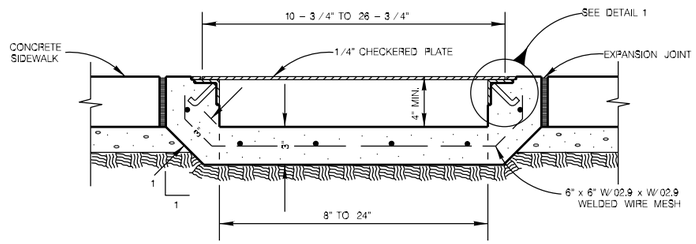
CONCRETE SIDEWALK ABUTTING CURB SECTION

ITEM 502
SCALE : 1"=2'



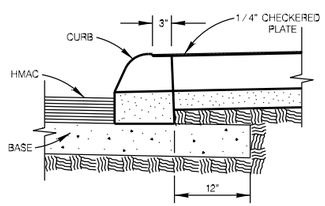
CONCRETE SIDEWALK DRAIN DETAIL

SCALE : 1"=4'



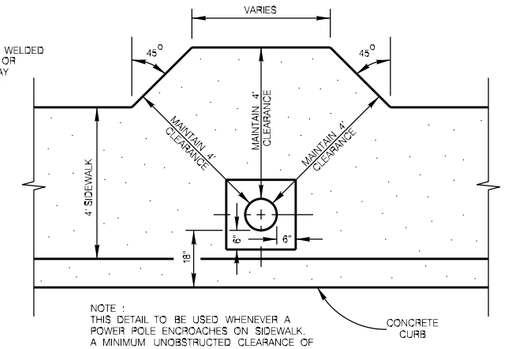
SECTION A–A

SCALE=1 : 12



SECTION B

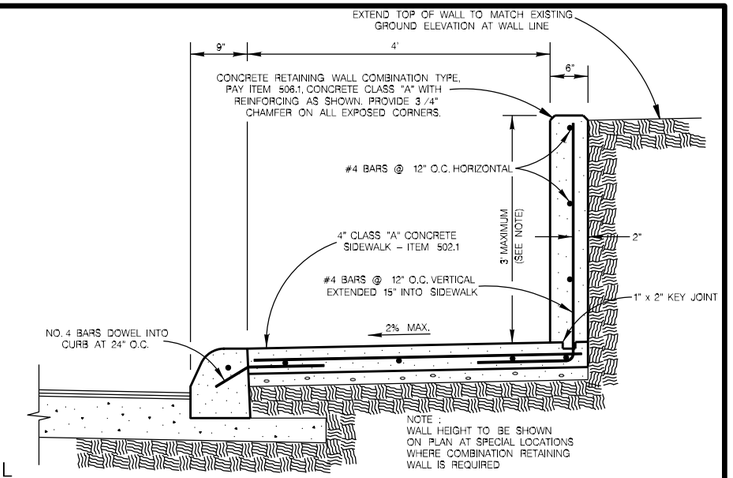
SCALE : 1"=2'



NOTE :
THIS DETAIL TO BE USED WHENEVER A POWER POLE ENCROACHES ON SIDEWALK. A MINIMUM UNOBSTRUCTED CLEARANCE OF 4' IS TO BE MAINTAINED AROUND THE POLE AT THE LOCATIONS.

CONCRETE SIDEWALK @ UTILITY POWER POLE DETAIL

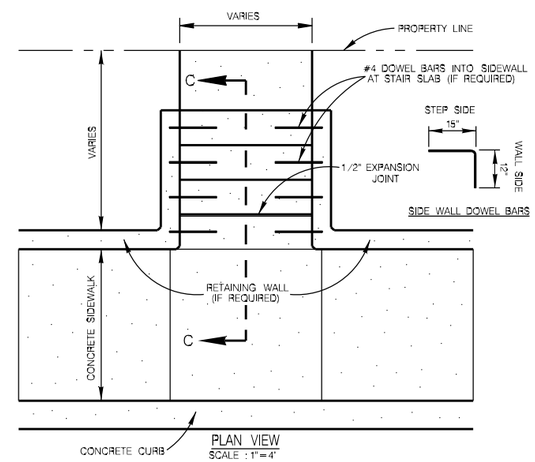
SCALE : 1"=4'



NOTE :
WALL HEIGHT TO BE SHOWN ON PLAN AT SPECIAL LOCATIONS WHERE COMBINATION RETAINING WALL IS REQUIRED

CONCRETE RETAINING WALL – COMBINATION TYPE

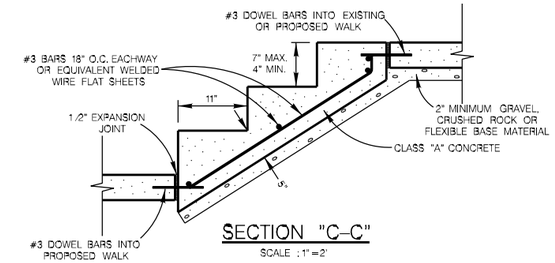
ITEM 506
SCALE : 1"=2'



PLAN VIEW
SCALE : 1"=4'

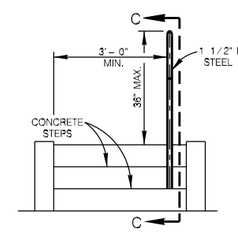
CONCRETE STEPS

ITEM 524



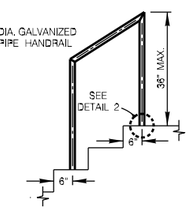
SECTION "C–C"

SCALE : 1"=2'



PIPE HANDRAIL DETAIL

PROFILE VIEW
SCALE : 1"=4'



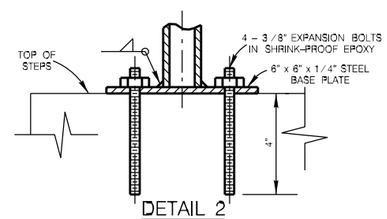
SECTION "D–D"

FRONT VIEW
SCALE : 1"=4'

NOTES :
1. PLACE STEPS TO CONFORM WITH PROPOSED PARKWAY GRADING.
2. 1-1/2" DIA. GALVANIZED STEEL PIPE HANDRAIL REQUIRED ON ONE SIDE OF THE STEPS WHEN 3 OR MORE RISERS ARE USED, OR AS DESIGNED BY ENGINEER, TO BE PAID UNDER ITEM 522

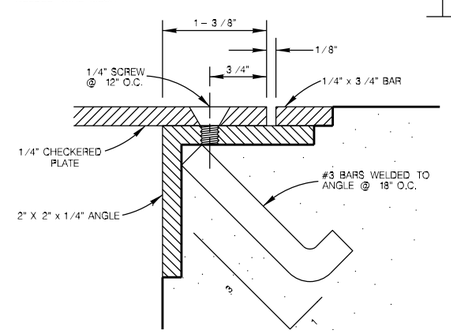
HANDRAIL FOR CONCRETE STEPS

ITEM 522



DETAIL 2

SCALE = 1 : 6



DETAIL 1

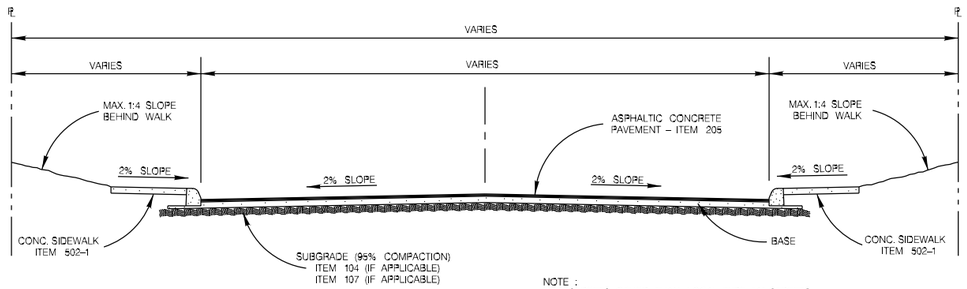
SCALE=1 : 1

MAY 2009

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

MISCELLANEOUS CONSTRUCTION STANDARDS I

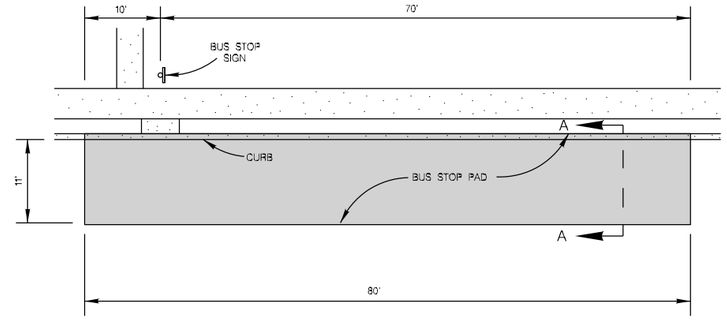
% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: V. VASQUEZ	DSGN. BY:	CHKD. BY: R.S. HOSSEINI, P.E. / SHEET NO.: 13 OF 60



NOTE :
FOR STREETS OTHER THAN LOCAL TYPE "A" STREETS, THE EDGE OF THE SIDEWALK MUST BE LOCATED A MINIMUM OF TWO FEET AWAY FROM THE BACK OF THE CURB.

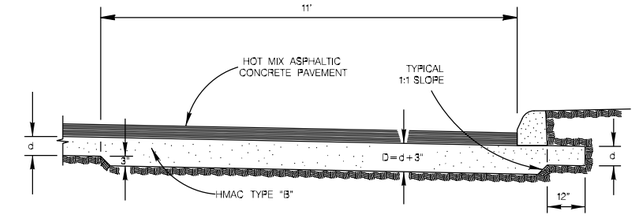
TYPICAL STREET SECTION

SCALE : 1" = 8'



PLAN VIEW

SCALE : 1" = 20'



SECTION "A–A"

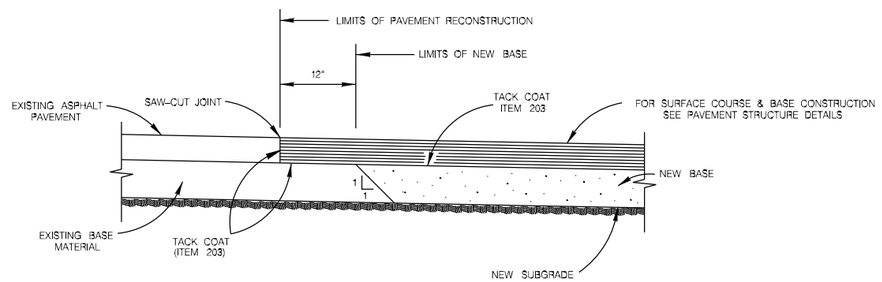
SCALE : 1" = 4'

NOTES :
1. EXCAVATION FOR THICKENED PAVEMENT SECTION WILL BE PAID UNDER ITEM NO. 104 "STREET EXCAVATION".

2. BASE MATERIALS :
   A.) IF THE MEASUREMENT FOR THE HMAC MATERIAL IS PER TON, THICKENED PAVEMENT SECTION WILL BE PAID FOR UNDER ITEM NO. 205, TYPE "B" – PER TON.
   B.) IF THE MEASUREMENT FOR THE HMAC MATERIAL IS PER SQUARE YARD, NO EXTRA PAYMENT WILL BE MADE FOR THE THICKENED PAVEMENT.

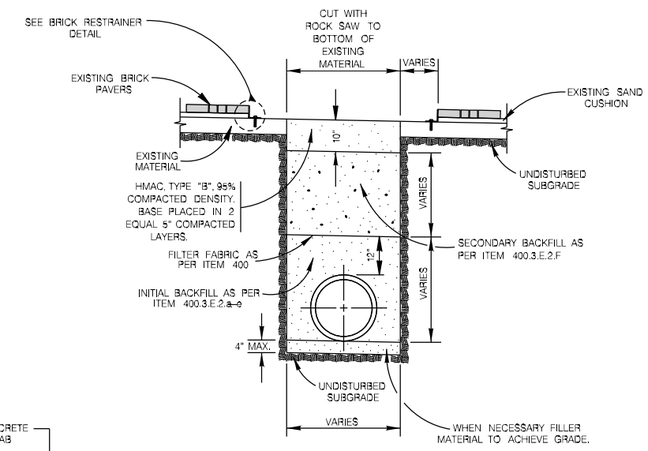
HMAC BUS STOP PAD

NEED CITY ENGINEER'S APPROVAL TO USE HMAC BUS PAD



PAVEMENT JUNCTION DETAILS

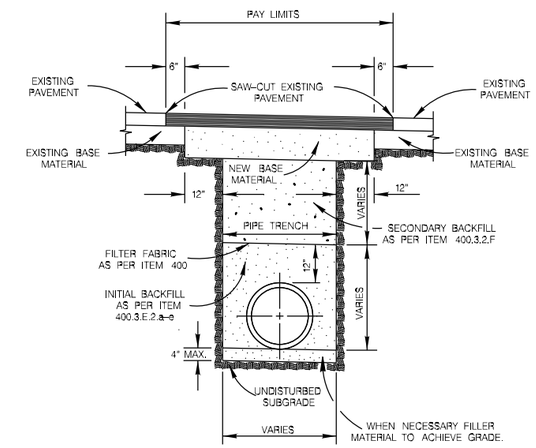
SCALE : 1" = 2'



TYPICAL BASE REPLACEMENT FOR BRICK SURFACED STREET SECTION

ITEM 511.3

SCALE : 1" = 4'



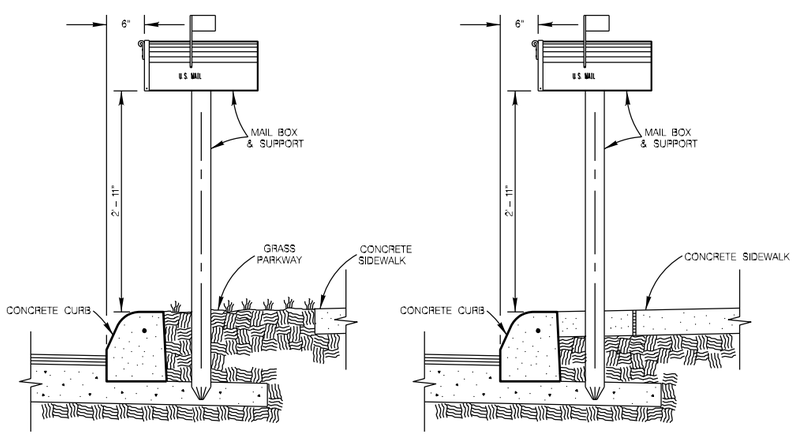
NOTES :
1. FOR LOCAL TYPE "A" & "B" STREETS (RESIDENTIAL) USE 6" ASPHALT CONCRETE BASE TYPE "B" WITH 1–1/2" TYPE "D" HOT MIX ASPHALTIC CONCRETE PAVEMENT.

2. FOR ARTERIAL & SECONDARY STREETS (COMMERCIAL) USE 12.5" TYPE "B" HOT MIX ASPHALTIC CONCRETE PAVEMENT LEVELING–UP COURSE & 1–1/2" TYPE "D" HOT MIX ASPHALTIC CONCRETE PAVEMENT SURFACE COURSE.

TYPICAL PAVEMENT REPLACEMENT

ITEM 511

SCALE : 1" = 4'



MAIL BOX PERPENDICULAR TO CURB

WHEN SIDEWALK IS DETACHED FROM CURB

SCALE : 1" = 2'

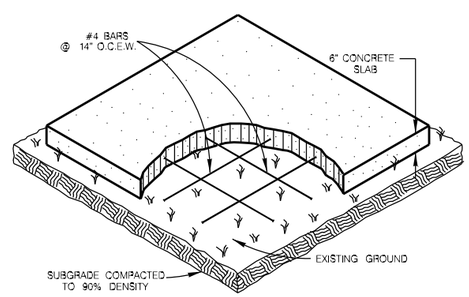
MAIL BOX PERPENDICULAR TO CURB

WHEN SIDEWALK IS ATTACHED TO CURB

SCALE : 1" = 2'

MAIL BOX LOCATION

ITEM 513.1



MAIL BOX PAD NOTES :
1. THE CONTRACTOR WILL CONSTRUCT SLABS FOR "TEMPORARY MAIL BOX COLLECTION PAD" FOR THE UNITED STATES POSTAL SERVICE WITH LOCATIONS AND SIZES SPECIFIED BY THE CITY ENGINEER DURING CONSTRUCTION.

2. THE CONSTRUCTION OF SLABS SHALL CONFORM TO ITEM 513 "REMOVING AND RELOCATING MAILBOXES".

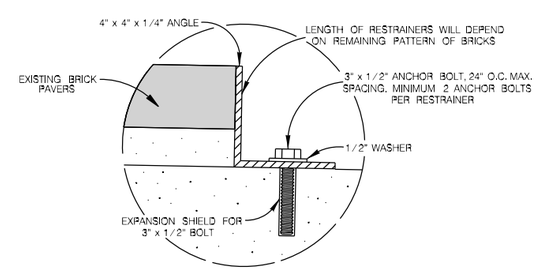
3. PAYMENT WILL BE MADE UNDER ITEM 513.2 "COMMUNITY MAILBOX SLAB – PER SQUARE YARD".

4. UNIT PRICE WILL INCLUDE REMOVAL OF "TEMPORARY MAIL BOX COLLECTION PAD" SLABS AT THE END OF THE PROJECT. NO SEPARATE PAY ITEM.

COMMUNITY MAIL BOX SLAB

ITEM 513.2

SCALE : 1" = 4'



BRICK RESTRAINER DETAIL

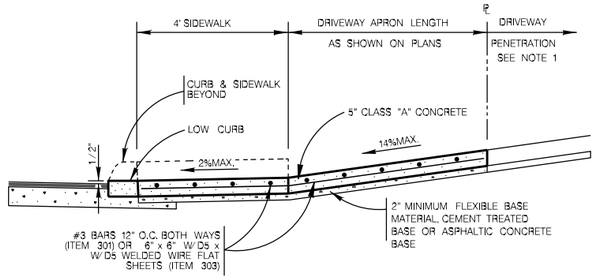
SCALE = 1 : 6

FEBRUARY 2010

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

MISCELLANEOUS CONSTRUCTION STANDARDS II

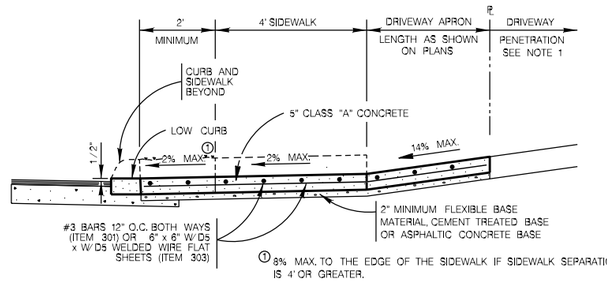
% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: V. VASQUEZ	DSGN. BY:	CHKD. BY: R.S. HOSSEINI, P.E.	SHEET NO.: 14 OF 40



TYPICAL RESIDENTIAL DRIVEWAY SECTION

WITH SIDEWALK ABUTTING CURB

ITEM 503.1

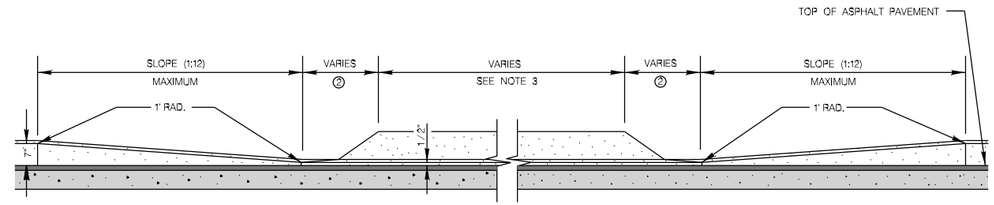


① 8% MAX. TO THE EDGE OF THE SIDEWALK IF SIDEWALK SEPARATION IS 4' OR GREATER.

TYPICAL RESIDENTIAL DRIVEWAY SECTION

WITH SIDEWALK SEPARATED FROM CURB

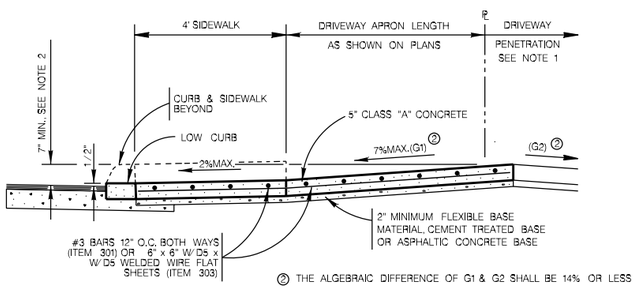
ITEM 503.1



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

CURB PROFILE AT DRIVEWAY

WITH SIDEWALK ABUTTING CURB

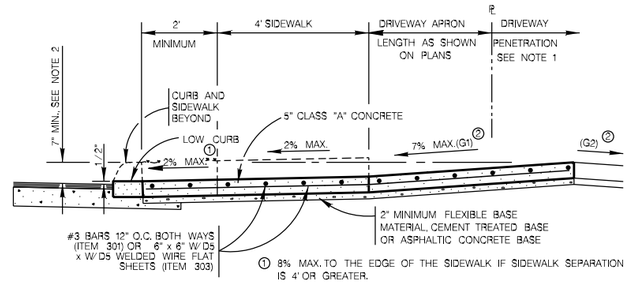


② THE ALGEBRAIC DIFFERENCE OF G1 & G2 SHALL BE 14% OR LESS

TYPICAL RESIDENTIAL DRIVEWAY SECTION

WHERE PROPERTY IS LOWER THAN STREET & SIDEWALK IS ABUTTING CURB

ITEM 503.1



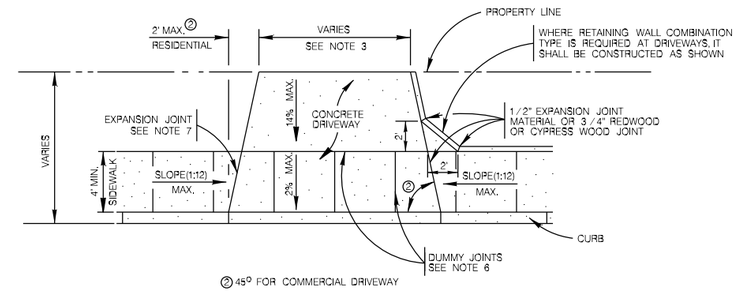
① 8% MAX. TO THE EDGE OF THE SIDEWALK IF SIDEWALK SEPARATION IS 4' OR GREATER.

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

TYPICAL RESIDENTIAL DRIVEWAY SECTION

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

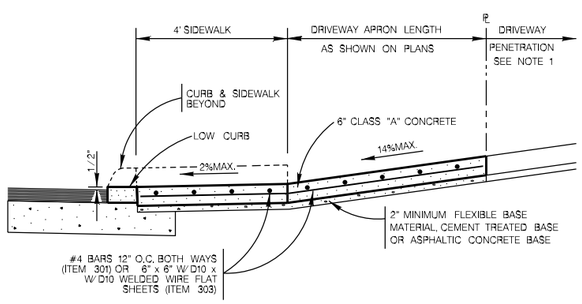
ITEM 503.1



② 45° FOR COMMERCIAL DRIVEWAY

TYPICAL DRIVEWAY PLAN VIEW

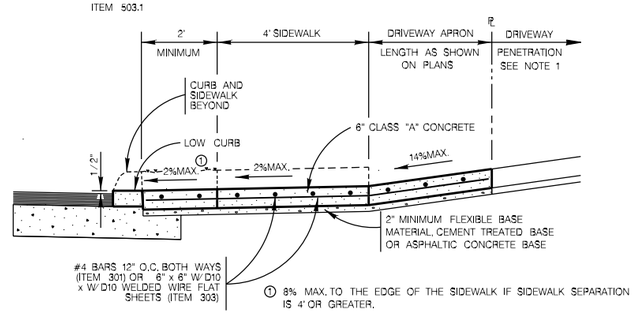
WITH SIDEWALK ABUTTING CURB



TYPICAL COMMERCIAL DRIVEWAY SECTION

WITH SIDEWALK ABUTTING CURB

ITEM 503.2

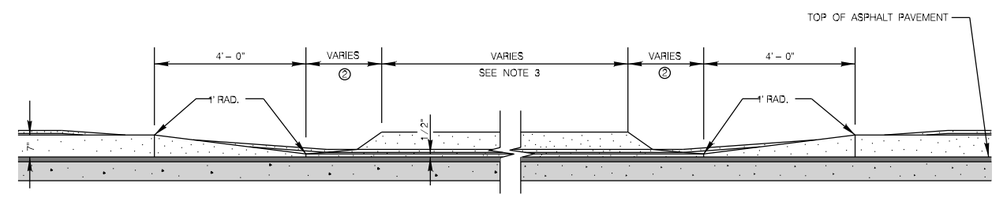


① 8% MAX. TO THE EDGE OF THE SIDEWALK IF SIDEWALK SEPARATION IS 4' OR GREATER.

TYPICAL COMMERCIAL DRIVEWAY SECTION

WITH SIDEWALK SEPARATED FROM CURB

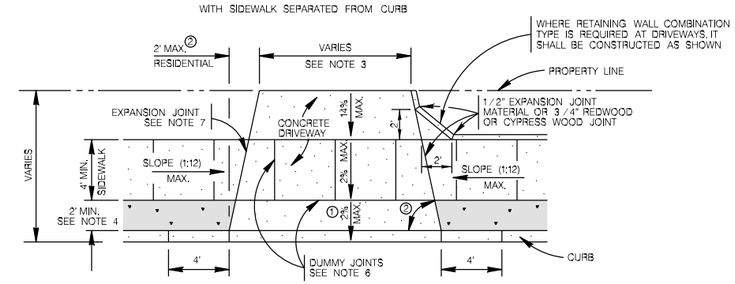
ITEM 503.2



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

CURB PROFILE AT DRIVEWAY

WITH SIDEWALK SEPARATED FROM CURB



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

② 45° FOR COMMERCIAL DRIVEWAY

TYPICAL DRIVEWAY PLAN VIEW

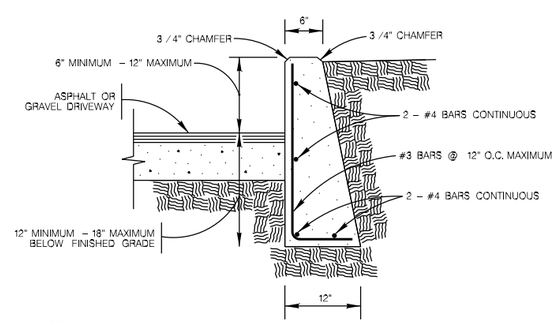
WITH SIDEWALK SEPARATED FROM CURB

CONCRETE DRIVEWAY NOTES

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

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

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



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

DRIVEWAY – CONCRETE RETAINING WALL

ON COMPACTED SUBGRADE

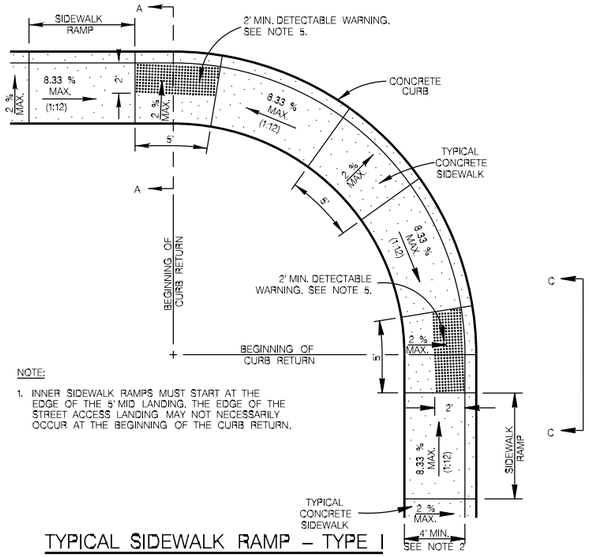
ITEM 307.1

MAY 2009

CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

CONCRETE DRIVEWAY STANDARDS

% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: V. VASQUEZ	DSGN. BY:	CHKD. BY: R.S. HOSSEINI, P.E.	SHEET NO.: 15 OF 40



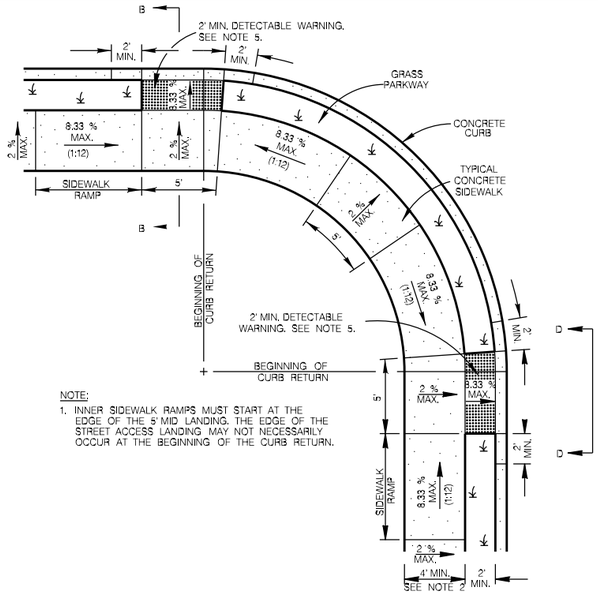
NOTE:

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

TYPICAL SIDEWALK RAMP – TYPE I

SIDEWALK ABUTS THE CURB

SCALE : 1" = 10'



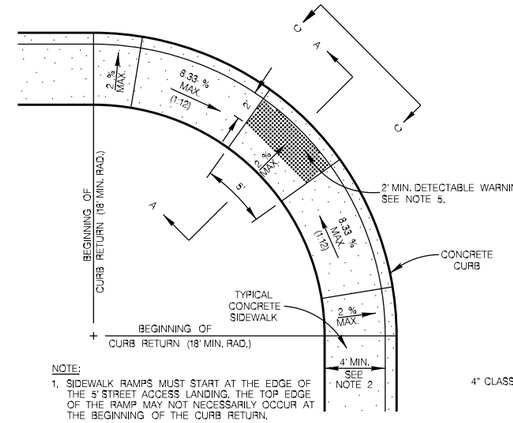
NOTE:

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

TYPICAL SIDEWALK RAMP – TYPE III

SIDEWALK SEPARATED FROM CURB

SCALE : 1" = 10'



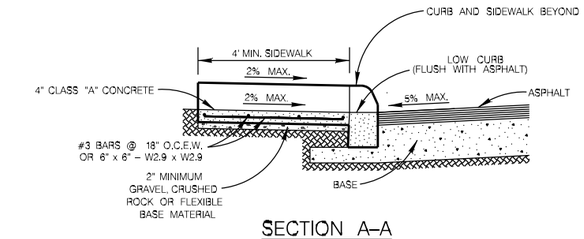
NOTE:

1. SIDEWALK RAMPS MUST START AT THE EDGE OF THE 5' STREET ACCESS LANDING. THE TOP EDGE OF THE RAMP MAY NOT NECESSARILY OCCUR AT THE BEGINNING OF THE CURB RETURN.
2. TYPE V RAMPS MUST HAVE 18' MIN. RADIUS.

TYPICAL SIDEWALK RAMP – TYPE V

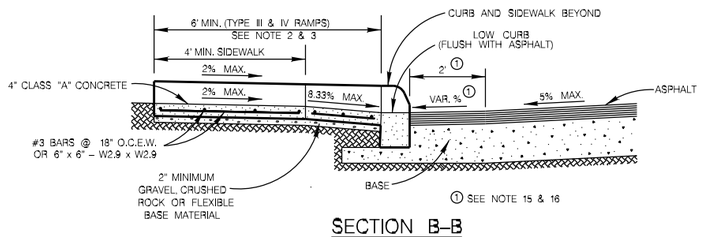
SIDEWALK ABUTS CURB

SCALE : 1" = 10'



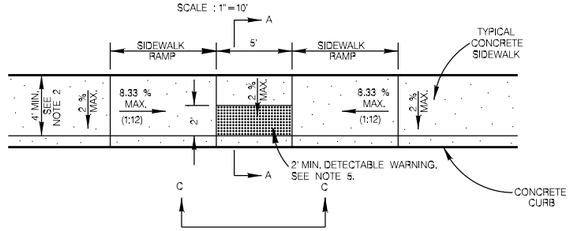
SECTION A–A

SCALE : 1" = 4'



SECTION B–B

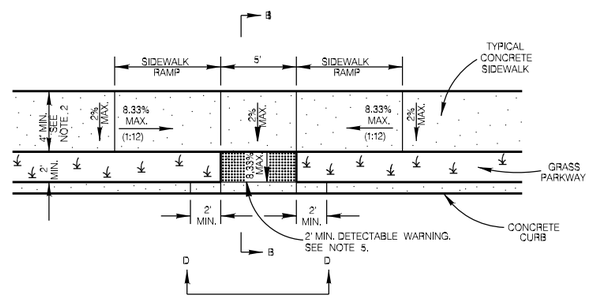
SCALE : 1" = 4'



TYPICAL SIDEWALK RAMP – TYPE II

USED AT TEE INTERSECTIONS WHERE SIDEWALK ABUTS CURB

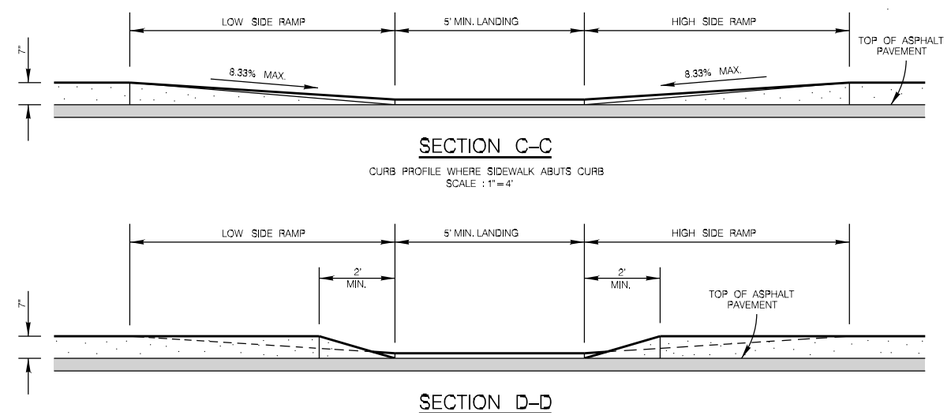
SCALE : 1" = 10'



TYPICAL SIDEWALK RAMP – TYPE IV

USED AT TEE INTERSECTIONS WHERE SIDEWALK IS SEPARATED FROM CURB

SCALE : 1" = 10'



SECTION C–C

CURB PROFILE WHERE SIDEWALK ABUTS CURB

SCALE : 1" = 4'

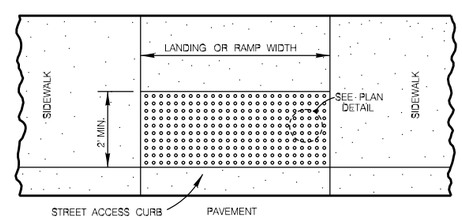
SECTION D–D

CURB PROFILE WHERE SIDEWALK IS SEPARATED FROM CURB

SCALE : 1" = 4'

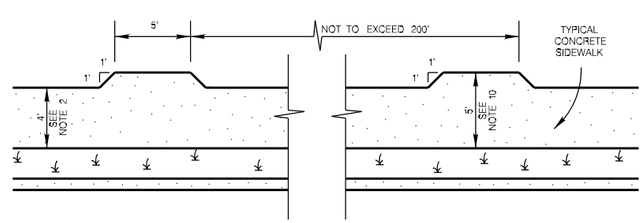
GENERAL NOTES

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



DETECTABLE WARNING SURFACE

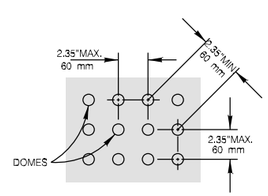
SCALE : 1" = 4'



SIDEWALK PASSING SPACE

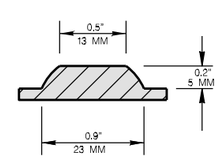
SCALE : 1" = 10'

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



PLAN DETAIL

NO SCALE



DOME SECTION

NO SCALE

NOTE:

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

MAY 2009

CITY OF SAN ANTONIO

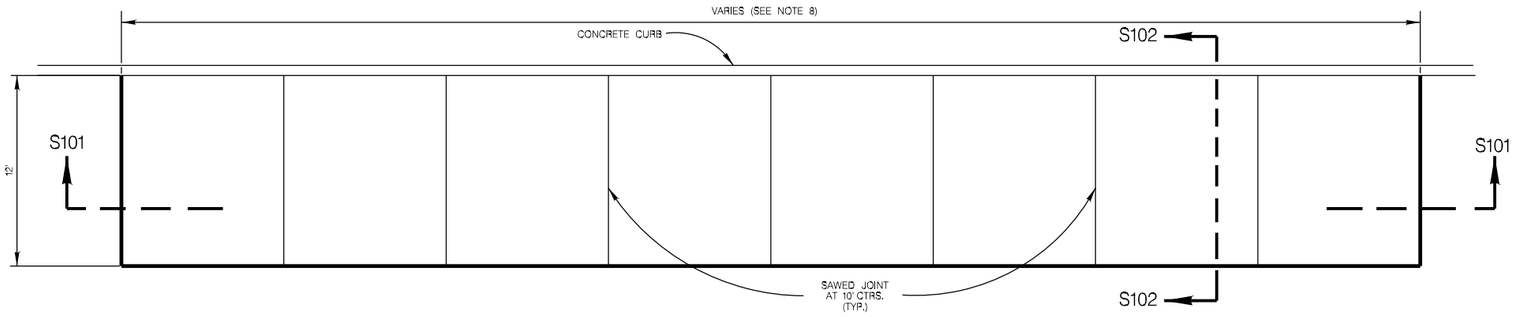
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

WHEELCHAIR RAMP STANDARDS

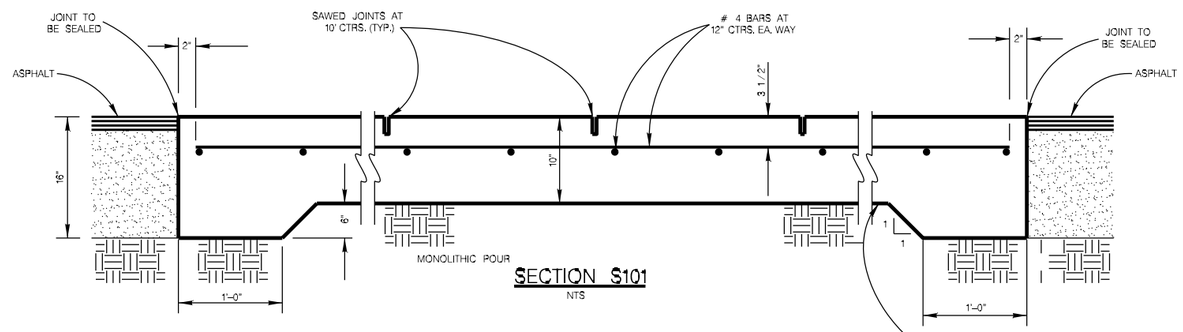
% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: V. VASQUEZ	DSGN. BY:	CHKD. BY: R.S. HOSSEINI, P.E.	SHEET NO.: 16 OF 60

GENERAL NOTES

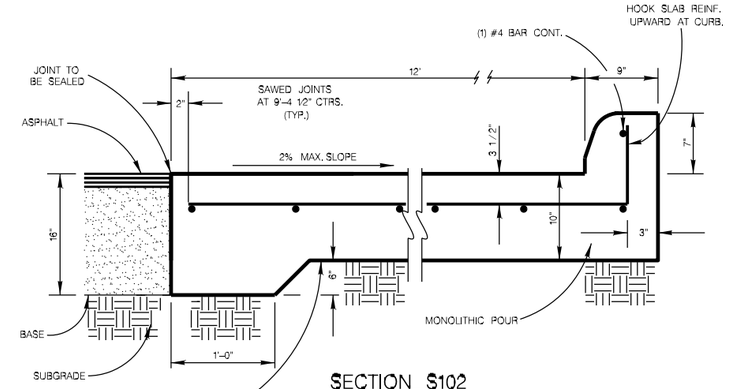
1. ALL CONCRETE SHALL TEST 4,000 P.S.I. AT 28 DAYS.
2. BUS STOP CONCRETE PAD CONSTRUCTION SHALL BE PAID UNDER ITEM 209 AT THE UNIT PRICE BID, WHICH PRICE SHALL BE FULL COMPENSATION FOR ALL DEMOLITION, REMOVAL OF EXISTING CURB, EXCAVATION, HAULING, CRUSHED LIMESTONE, REINFORCING STEEL, CONCRETE, CONCRETE CURB, JOINTS, AND INCIDENTALS NECESSARY TO COMPLETE THE WORK.
3. BUS PAD AND CURB SHALL BE MONOLITHICALLY POURED. ALL EXISTING CURBING SHALL BE REMOVED AND REPLACED AS PER STANDARD DETAILS.
4. THE CONTRACTOR SHALL CONSTRUCT AN EXPANSION JOINT MIDWAY IF THE "CONCRETE BUS STOP PAD" IS LONGER THAN 150 FEET. NO DIRECT PAYMENT SHALL BE MADE FOR CONSTRUCTION OF AN EXPANSION JOINT.
5. ACTUAL BUS PAD LENGTH AND WIDTH TO BE FIELD DETERMINED BY CITY ENGINEER OR HIS DESIGNATED REPRESENTATIVE.
6. DO NOT DRIVE ON PAD UNTIL CONCRETE HAS REACHED A STRENGTH OF 2,800 P.S.I.
7. BREAK TEST CYLINDERS AS FOLLOWS:
   2 AT 3 DAYS
   2 AT 7 DAYS
   2 AT 28 DAYS
8. CONCRETE BUS PAD LENGTH (OR AS SHOWN ON THE PLANS):
   30 M.P.H. – 100'
   35 M.P.H. – 160'
   40 M.P.H. – 160'
   45 M.P.H. – 200'



PLAN VIEW
NTS

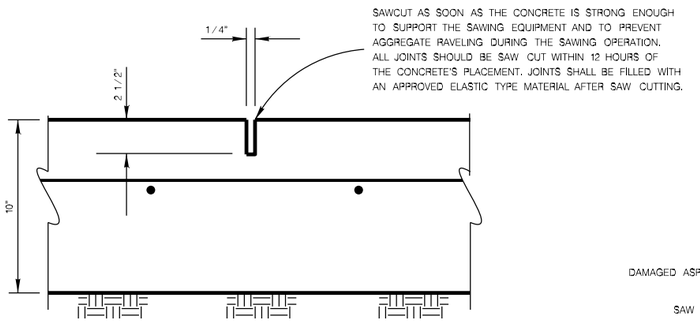


SECTION S101
NTS



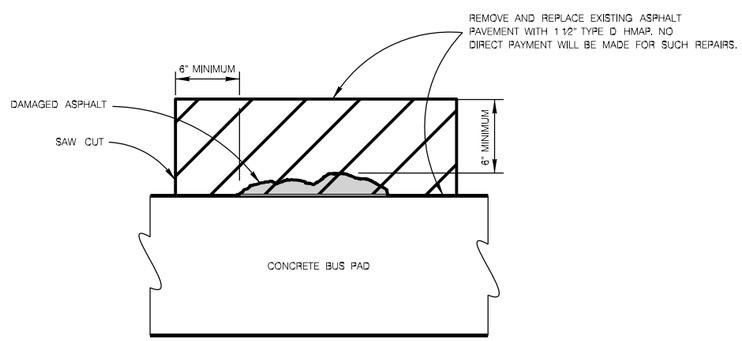
SECTION S102
NTS

PROOFROLL EXISTING SUBGRADE WITH BACKHOE OR SIMILAR EQUIPMENT TO LOCATE POTENTIAL SOFT REGIONS OF SUBGRADE . REPLACE SOFT AREAS WITH 12" OF SUITABLE MATERIAL.

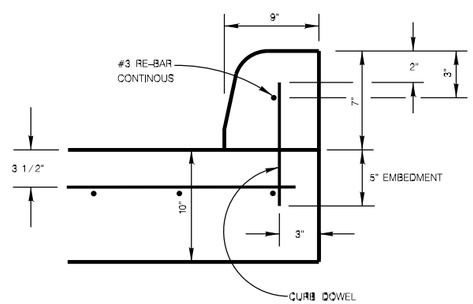


SAWCUT AS SOON AS THE CONCRETE IS STRONG ENOUGH TO SUPPORT THE SAWING EQUIPMENT AND TO PREVENT AGGREGATE RAVELING DURING THE SAWING OPERATION. ALL JOINTS SHOULD BE SAW CUT WITHIN 12 HOURS OF THE CONCRETE'S PLACEMENT. JOINTS SHALL BE FILLED WITH AN APPROVED ELASTIC TYPE MATERIAL AFTER SAW CUTTING.

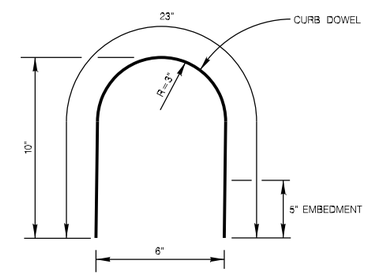
SAWED JOINT DETAIL
NTS



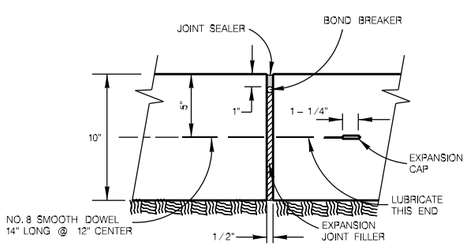
REPAIR OF DAMAGED ASPHALT
NTS



CONCRETE CURB OPTION
NEED CITY ENGINEER'S APPROVAL
NTS



CURB DOWEL
NO. 3 RE-BAR @ 30" C-C
NTS



NOTE:
THE CONTRACTOR SHALL CONSTRUCT AN EXPANSION JOINT MIDWAY IF THE "CONCRETE BUS STOP PAD" IS LONGER THAN 150 FEET. NO DIRECT PAYMENT SHALL BE MADE FOR CONSTRUCTION OF AN EXPANSION JOINT.

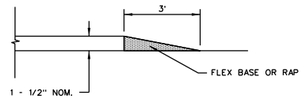
EXPANSION JOINT DETAIL
SCALE : 1" = 1'

MAY 2009

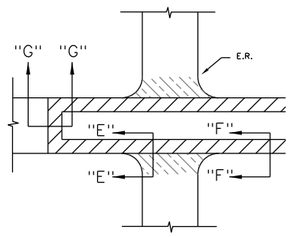
CITY OF SAN ANTONIO
CAPITAL IMPROVEMENTS MANAGEMENT SERVICES DEPARTMENT

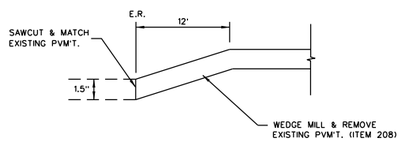
CONCRETE
BUS STOP PAD

% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: V. VASQUEZ	DSGN. BY: L. MALTOS	CHKD. BY: R.S. HOSSEINI, P.E.	SHEET NO.: 17 OF 60

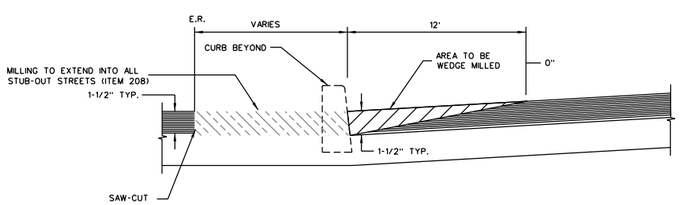


SHOULDER BACKING DETAIL
NSPI

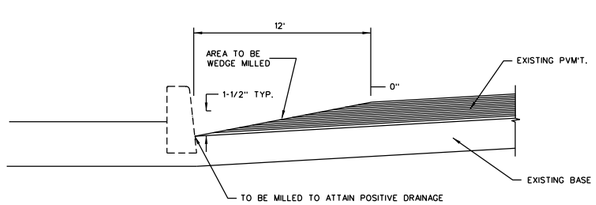




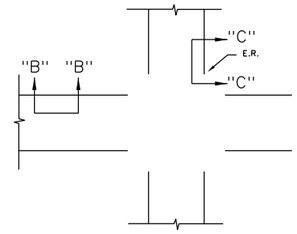
SECTION "C"-"C"
TYPICAL WEDGE MILL



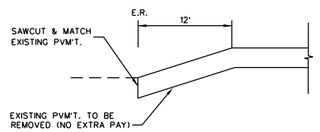
SECTION "E"-"E"



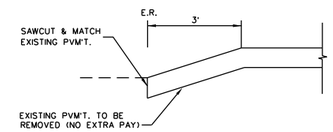
SECTION "F"-"F"
PAVEMENT MILLING
(ITEM 240)



CROSS STREET

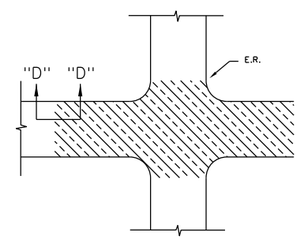


SECTION "C"-"C"

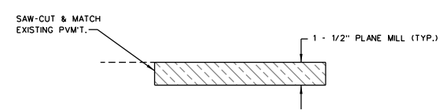


SECTION "C"-"C"

TYPICAL BUTT JOINT



CROSS STREET



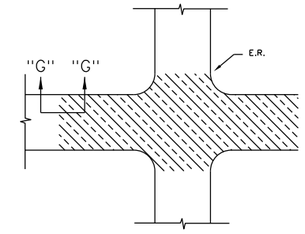
SECTION "D"-"D"
TYPICAL PLANE MILL

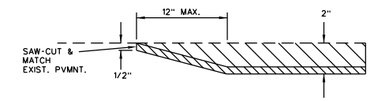
LEGEND

- OVERLAY
- WEDGE MILL (ITEM 208)
- PLANE MILL (ITEM 208)

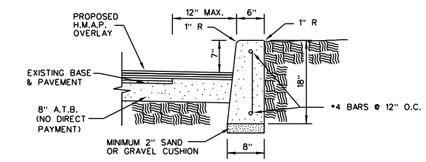
NOTES

1. FOR RECYCLE PROJECT, MILL DEPTH IS 1"
2. HOT PAVER LAID MICRO SURFACE MILL ONLY FOR DRAINAGE AND BUTT JOINTS.

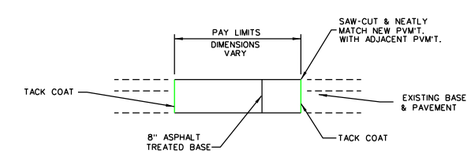




SECTION "G-G"



CONCRETE CURB
(ITEM 500)



BASE & PAVEMENT REPLACEMENT
(ITEM 257)

CITY OF SAN ANTONIO, TEXAS
DEPARTMENT OF PUBLIC WORKS
ENGINEERING DIVISION

DETAIL SHEET

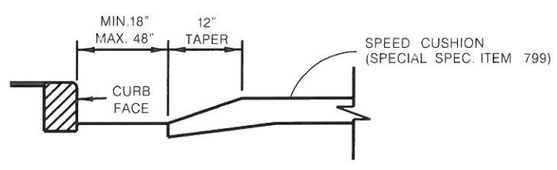
DRAWN BY:	DATE	REVISIONS	SCALE: SEE ABOVE
CHECKED BY:			DATE:
			SHEET: 18 OF 60

GENERAL NOTES

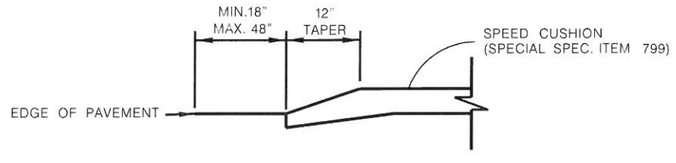
1. SPEED HUMPS WILL BE CONSTRUCTED AT LOCATIONS DESIGNATED BY THE TRAFFIC ENGINEERING DIVISION.
2. SPEED HUMPS, TYPE II SHALL BE COMPRISED OF MODULAR RUBBER CUSHIONS AS OUTLINED IN SPECIAL SPECIFICATION ITEM 799.
3. CONTRACTOR SHALL CONTACT THE CONSTRUCTION COORDINATOR AT 207-2075 BEFORE ANY STREET IS TEMPORARILY CLOSED FOR CONSTRUCTION.
4. THE DISTANCE BETWEEN SPEED HUMPS WILL BE DETERMINED BY THE TRAFFIC ENGINEERING DIVISION.
5. TRAFFIC ENGINEERING DIVISION WILL IDENTIFY THE LOCATIONS OF ALL SIGNS RELATED TO THE SPEED HUMPS.
6. NO PART OF A SPEED HUMP SHALL BE LOCATED IN FRONT OF A DRIVEWAY APPROACH, RATHER THEY SHOULD BE A MINIMUM OF 6 FEET FROM THE EDGE OF DRIVEWAY, WHEN PRACTICAL.
7. SEE TRAFFIC SIGN DETAILS FOR INFORMATION ON 1 2 3
8. SPEED HUMPS SHOULD BE PLACED AS CLOSE AS POSSIBLE TO PROPERTY LINES INSTEAD OF MID-LOT, WHERE PRACTICAL.
9. SPEED HUMPS SHOULD BE INSTALLED AT A RIGHT ANGLE TO THE CENTERLINE TANGENT OF THE ROADWAY.
10. TRAFFIC CONTROL CONSISTING OF SIGNS AND MARKINGS SHALL BE PROVIDED TO ADVISE ROADWAY USERS OF A SPEED HUMP'S PRESENCE AND TO GUIDE THERE SUBSEQUENT ACTIONS. TRAFFIC SIGNS AND PAVEMENT MARKINGS SHALL CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES(TMUTCD).
11. ALL SIGNS AND MARKINGS WILL BE PROVIDED AND INSTALLED BY THE CONTRACTOR AS PER ITEM 531, 533, 536.2, 536.5.
12. CONTRACTOR SHALL NOT OPEN SPEED HUMP TO TRAFFIC UNTIL ALL REQUIRED WARNING SIGNS AND MARKINGS ARE COMPLETE.
13. CONTRACTOR WILL MAINTAIN TEMPORARY MARKINGS UNTIL PERMANENT MARKINGS ARE INSTALLED.
14. CONTRACTOR WILL CHECK WITH TRAFFIC OPERATIONS FOR THE SPECIFICATIONS ON THE SIGN EMBLEM AND THE SPEED HUMP MARKINGS AT 207-3951.
15. CONTRACTOR SHALL COMPLETE THE CUSHION INSTALLATION TO FORM ONE COMPLETE HUMP BEFORE LEAVING THE JOBSITE.
16. CONTRACTOR SHALL WORK ONE HALF OF THE STREET AT A TIME AND MAINTAIN TWO-WAY TRAFFIC WITH CERTIFIED FLAGGERS.
17. ROADWAYS 36' WIDE OR WIDER, MINIMUM CURB TO CUSHION EDGE SHALL BE 48"

EDGE DETAIL

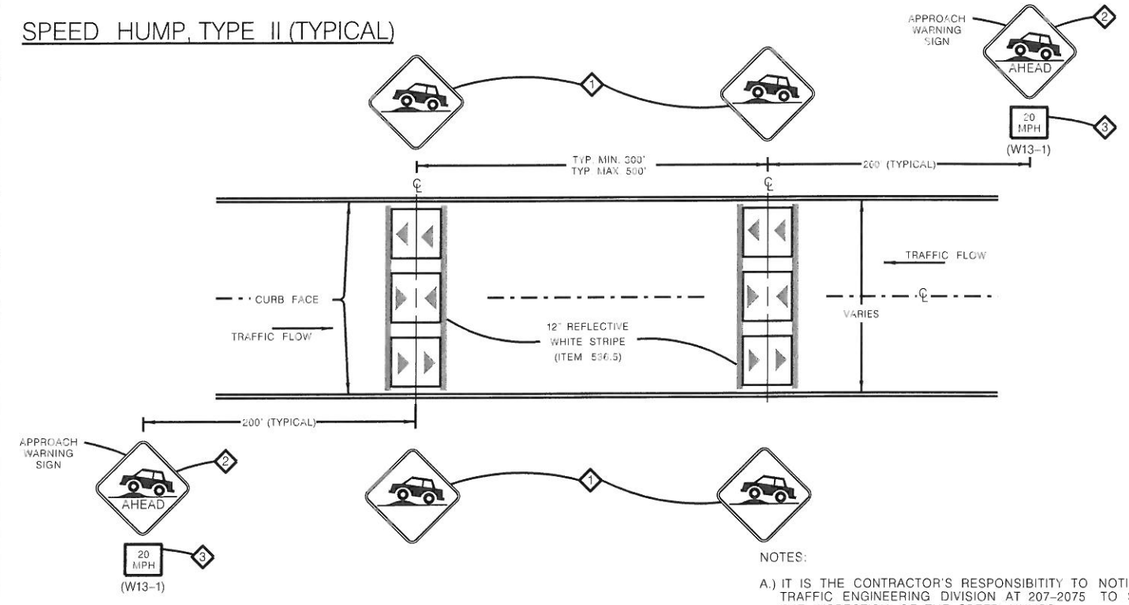
STANDARD CURB



NO CURB

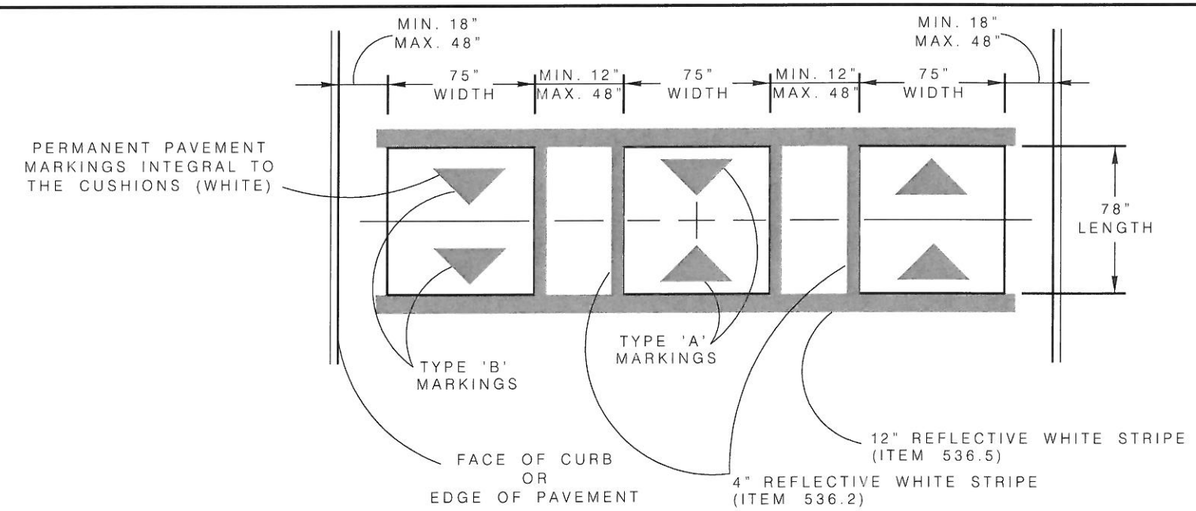


SPEED HUMP, TYPE II (TYPICAL)



NOTES:

A.) IT IS THE CONTRACTOR'S RESPONSIBITITY TO NOTIFY THE TRAFFIC ENGINEERING DIVISION AT 207-2075 TO SCHEDULE THE INSPECTION OF THE SPEED HUMPS.



PAVEMENT WIDTH (FT)	NO. OF CUSHIONS	GAP (IN)	CUSHION (IN)	GAP (IN)	CUSHION (IN)	GAP (IN)	CUSHION (IN)	GAP (IN)	CUSHION (IN)	GAP (IN)	CUSHION (IN)	GAP (IN)
30	3	33.5	75	34	75	34	75	33.5	–	–	–	–
36	4	48	75	12	75	12	75	12	75	48	–	–
40	4	48	75	28	75	28	75	28	75	48	–	–
44	4	48	75	44	75	44	75	44	75	48	–	–

* REFER TO SHEET 2 OF 2 FOR ADDITIONAL STREET WIDTHS

No:	DATE:	REVISION:	DRWN:	CHKD:	APPR:
1	12.5.02	MARKINGS	JB	KB	KB
2	2.21.03	LOCATION DETAIL	JB	KB	KB
3	8.26.03	GENERAL NOTES	JB	KB	KB
4	6.30.05	DETAIL	DM	KB	KB
5	3.22.11	SPACING CHARTS	BT	BT	KB

CITY OF SAN ANTONIO, TEXAS
DEPARTMENT OF PUBLIC WORKS TRAFFIC ENGINEERING DIVISION
SPEED HUMP, TYPE II

UPDATE BY: W. THORPE MAR 2011
DSGN.BY: K.M. BUCKALEW JAN 2002
CHKD.BY: K. BUCKALEW MAR 2011
APPR.BY: K.M. BUCKALEW JAN 2002
TRAFFIC DESIGN ENGINEER
APPR.BY: JAN 2002

REF.NO: SCALE: NTS
PLAN NO. 19

1 of 2

TYPICAL INSTALLATION PROCEDURE FOR MODULAR RUBBER CUSHION

1. LAY OUT PIECES FOR THE CUSHION (REFER TO MODULAR RUBBER CUSHION SPEED HUMP MARKINGS SHEETS AND TO SPEED HUMP CUSHION SPACING CHART). PLACE THE ANGLE IRONS IN THE INDENTATION/GROOVE OF THE CUSHION. ALL JOINTS BETWEEN PIECES SHOULD BE TIGHTLY JOINED. THE ARROW MARKINGS ON THE RAMP PIECES SHOULD FACE THE CORRECT DIRECTION ON THE STREET (ARROWS POINT IN THE DIRECTION OF TRAFFIC)
2. SLIDE THE CORNER AND THE TWO CENTER RAMP PIECES OUT TO EXPOSE THE HOLES IN THE ANGLE IRONS.
3. DRILL THROUGH THE ANGLE IRON HOLES TO A DEPTH OF 4 INCHES INTO THE PAVEMENT.
4. BLOW ALL DEBRIS OUT OF HOLES.
5. INSERT TWO (2) PUMPS OF RESIN INTO EACH HOLE FOLLOWED BY A FLAT, TORQUE HEAD BOLT AND PLASTIC ANCHOR (ASSEMBLE THE BOLT AND ANCHOR AND HAMMER IN IMMEDIATELY AFTER PLACING RESIN BECAUSE THE RESIN WILL SET QUICKLY IN BOTH THE HOLE AND RESIN GUN - APPROX. 2-4 MINUTES)
6. USE IMPACT WRENCH TO DRILL BOLTS INTO THE ANGLE IRON. DO NOT OVER IMPACT BOLTS BECAUSE STRIPPING WILL OCCUR.
7. REPLACE CORNER PIECES AND TWO CENTER RAMP PIECES.
8. DRILL THE PAVEMENT APPROX. 7 INCHES THROUGH EACH OF THE HOLES IN THE CUSHION PIECES (4 INCHES INTO PAVEMENT).
9. BLOW ALL DEBRIS OUT OF HOLES.
10. INSERT TWO (2) PUMPS OF RESIN INTO EACH HOLE FOLLOWED BY A HEX HEAD BOLT, WASHER AND PLASTIC ANCHOR (ASSEMBLE THE WASHER, BOLT, AND ANCHOR THEN HAMMER IN THE HOLE IMMEDIATELY AFTER PLACING RESIN BECAUSE THE RESIN WILL SET QUICKLY IN BOTH THE HOLE AND RESIN GUN - APPROX. 2-4 MINUTES)
11. USE IMPACT WRENCH TO DRILL BOLTS INTO THE CUSHION PIECES. DO NOT OVER TIGHTEN BOLTS BECAUSE STRIPPING WILL OCCUR.
12. INSERT RUBBER PLUGS.
13. BOLT INSTALLATIONS SHALL BE VERIFIED BY THE INSPECTOR BEFORE THE RUBBER PLUGS ARE INSTALLED.

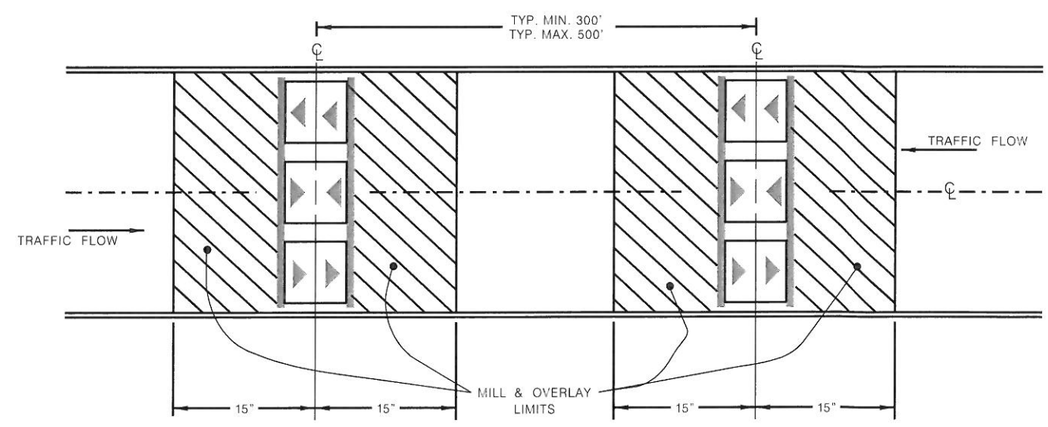
PROCEDURE FOR PICKING UP SPEED HUMP MATERIAL AT COSA FACILITY

1. THE SPEED HUMP MATERIAL WILL BE STORED AT THE TRAFFIC OPERATIONS FACILITY AT 223 S. CHERRY ST., SAN ANTONIO, TX 78203.
2. SPEED HUMP MATERIAL MAY ONLY BE COLLECTED DURING THE WEEKDAY BETWEEN THE HOURS OF 7:30AM AND 4:30PM.
3. CONTRACTOR WILL CONTACT SPEED HUMP COORDINATOR, KENNARD GIVENS AT 215-5127 AT LEAST 24 HOURS IN ADVANCE TO SCHEDULE A TIME TO PICK UP THE MATERIAL.
4. INSPECTOR MUST BE PRESENT WHEN MATERIAL IS COLLECTED.

SPEED CUSHION SPACING

Pavement Width (ft)	Pavement Width (in)	No. of Cushions	Gap (in)	Cushion (in)	Gap (in)	Cushion (in)	Gap (in)	Cushion (in)	Gap (in)	Cushion (in)	Gap (in)	Cushion (in)	Gap (in)
20	240	2	30	75	30	75	30						
21	252	2	34	75	34	75	34						
22	264	2	39	75	36	75	39						
23	276	2	45	75	36	75	45						
24	288	2	48	75	42	75	48						
25	300	2	51	75	48	75	51						
26	312	3	21.5	75	22	75	22	75	21.5				
27	324	3	24	75	25.5	75	25.5	75	24				
28	336	3	27.5	75	28	75	28	75	27.5				
29	348	3	30.5	75	31	75	31	75	30.5				
30	360	3	33.5	75	34	75	34	75	33.5				
31	372	3	37.5	75	36	75	36	75	37.5				
32	384	3	40.5	75	39	75	39	75	40.5				
33	396	3	42.5	75	43	75	43	75	42.5				
34	408	3	45.5	75	46	75	46	75	45.5				
35	420	3	48	75	49.5*	75	49.5*	75	48				
36	432	4	48	75	12	75	12	75	12	75	48		
37	444	4	48	75	16	75	16	75	16	75	48		
38	456	4	48	75	20	75	20	75	20	75	48		
39	468	4	48	75	24	75	24	75	24	75	48		
40	480	4	48	75	28	75	28	75	28	75	48		
41	492	4	48	75	32	75	32	75	32	75	48		
42	504	4	48	75	36	75	36	75	36	75	48		
43	516	4	48	75	40	75	40	75	40	75	48		
44	528	4	48	75	44	75	44	75	44	75	48		

* INDICATES THAT MEASUREMENTS ARE ABOVE MAX. SPACING



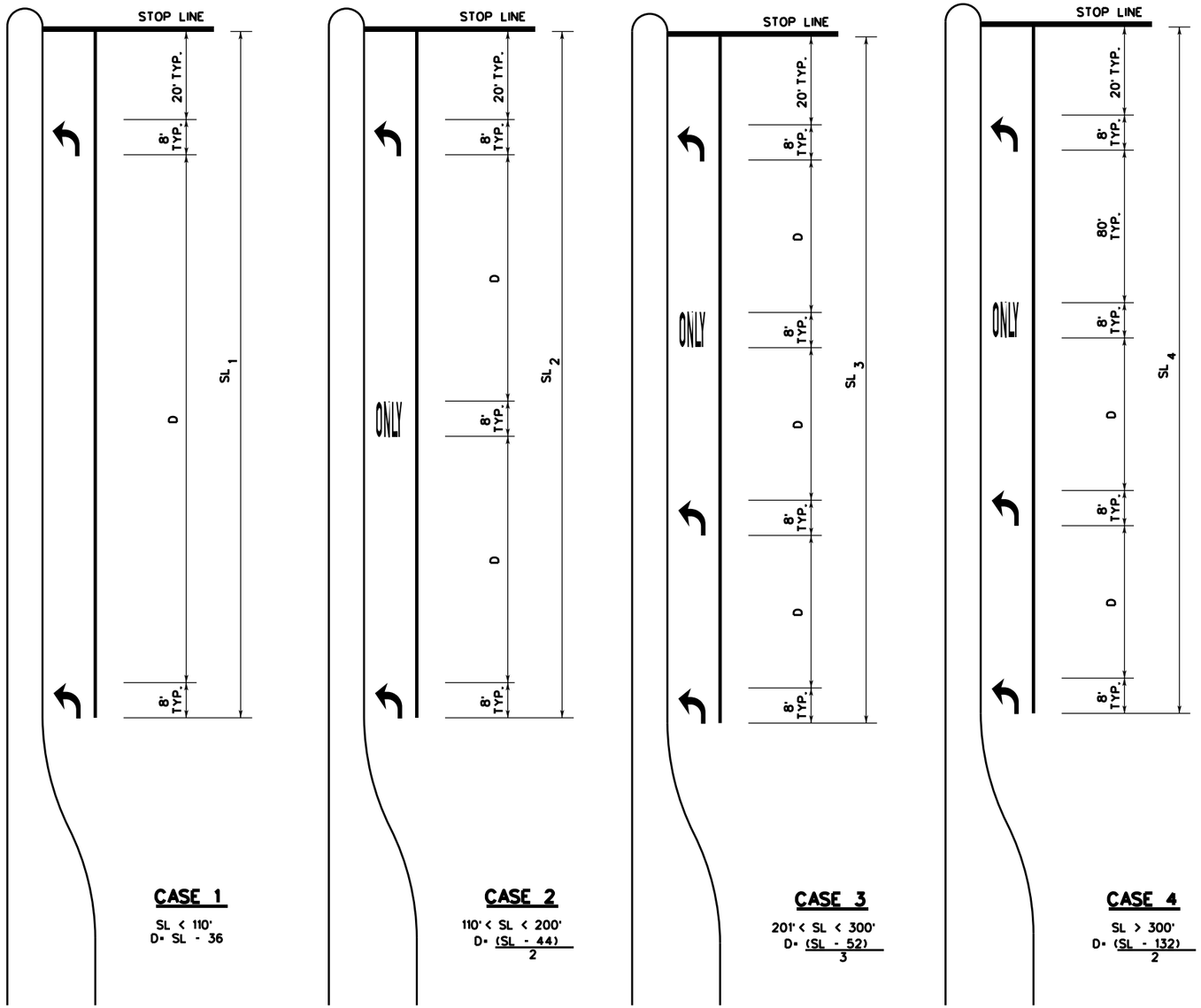
MILL AND OVERLAY LIMITS

CITY OF SAN ANTONIO, TEXAS
DEPARTMENT OF PUBLIC WORKS TRAFFIC ENGINEERING DIVISION

SPEED HUMP, TYPE II

2 of 2

DRWN.BY: RC MAY 2004
DSGN.BY:
CHKD.BY:
APPR.BY: TRAFFIC DESIGN ENGINEER
APPR.BY:
REF.NO: SCALE: NTS
PLAN NO. 20



KEY:

SL - STORAGE LENGTH (FEET)

D - DISTANCE BETWEEN ARROWS AND LEGENDS (FEET)

GENERAL NOTES:

1. THESE DETAILS ALSO APPLY TO RIGHT-TURN LANES.
2. FOR DUAL-TURN LANES, DIMENSIONS SHALL BE THE SAME FOR EACH LANE.
3. SL DIMENSION IS FROM STOP LINE TO END OF TURN LANE, WHICH DOES NOT INCLUDE TAPER LENGTH.
4. PAVEMENT ARROWS AND "ONLY" LEGEND MARKINGS ARE TYPICALLY USED AT SIGNALIZED INTERSECTIONS AND AT UNSIGNALIZED INTERSECTIONS WHERE A DEMONSTRATED NEED EXISTS.
5. MINIMUM SL= 110'. SL MAY BE LESS THAN 110 FEET AS DIRECTED BY THE CITY TRAFFIC ENGINEER.

SEPTEMBER 2009

CITY OF SAN ANTONIO

DEPARTMENT OF PUBLIC WORKS

TRAFFIC ENGINEERING STANDARDS

LEFT-TURN "ONLY" AND ARROW SPACING WORKSHEET

SHEET 1 OF 16

___% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: LAN	DSGN. BY: C.R.V.	CHKD. BY: M.E.	SHEET NO.: 21 OF 60

SEPTEMBER 2009

CITY OF SAN ANTONIO

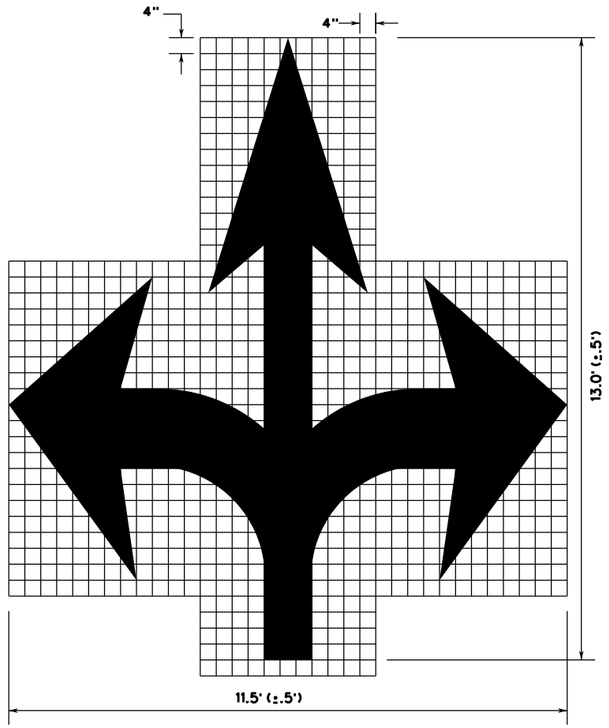
DEPARTMENT OF PUBLIC WORKS

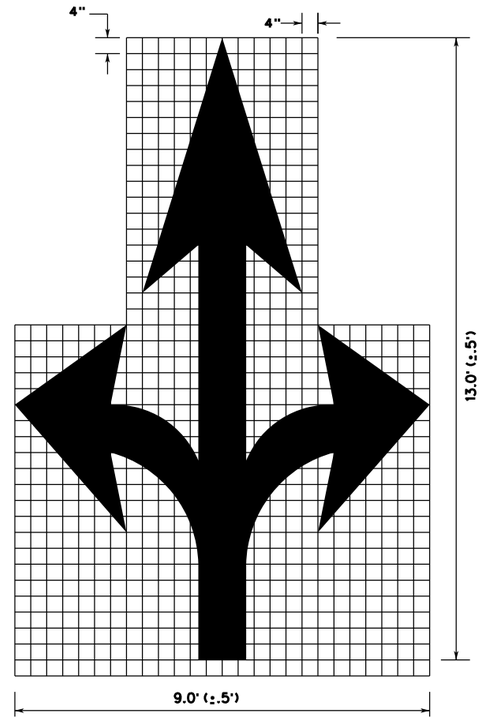
TRAFFIC ENGINEERING STANDARDS

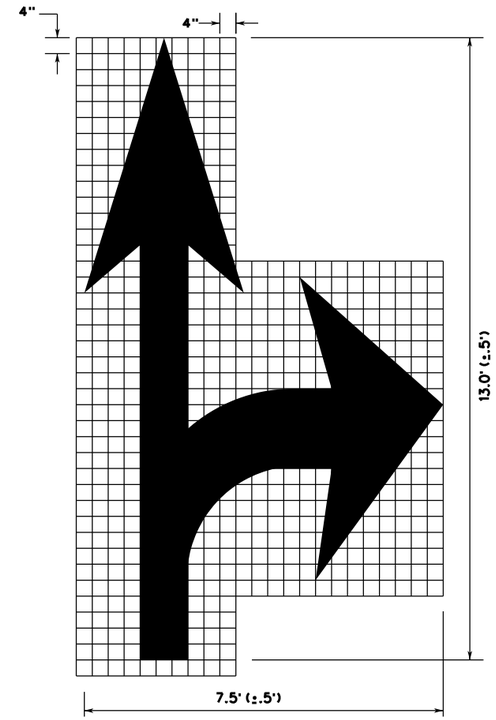
STANDARD PAVEMENT MARKINGS (WORDS)

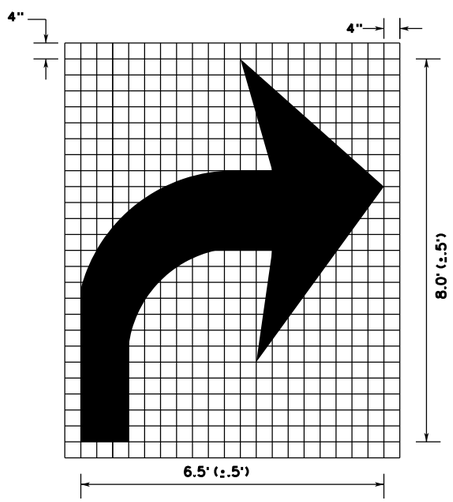
SHEET 2 OF 16

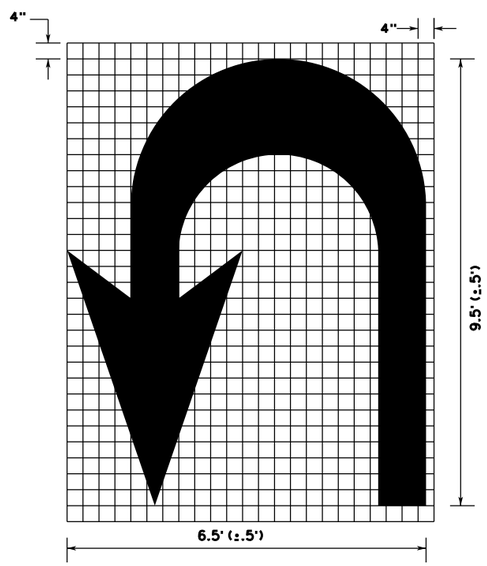
___% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.	SHEET NO.: 22 OF 60

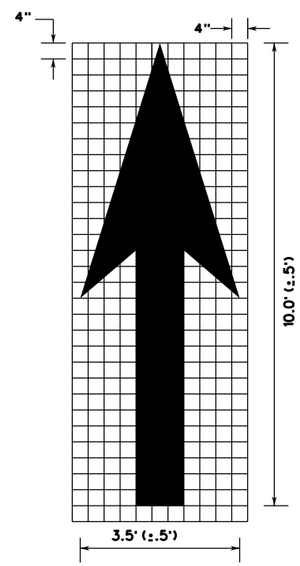


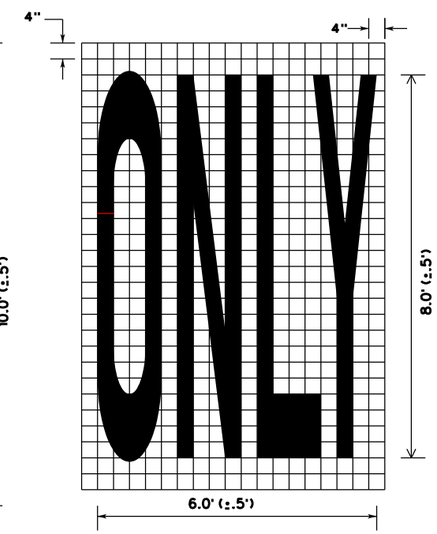












NOTES:

1. MINIMUM 8 FOOT WHITE MARKINGS SHALL BE USED, UNLESS OTHERWISE NOTED. IF MESSAGE CONSISTS OF MORE THAN ONE WORD, IT SHOULD BE PLACED WITH FIRST WORD NEAREST THE DRIVER.

2. THESE DETAILS ARE STANDARD SIZE FOR NORMAL INSTALLATION; SIZES MAY BE REDUCED APPROXIMATELY ONE-THIRD DEPENDING ON CONDITIONS.

3. THE LONGITUDINAL SPACE BETWEEN MARKINGS SHOULD BE 30 FEET.

4. MARKINGS CONSIDERED APPROPRIATE FOR USE WHEN WARRANTED INCLUDE THE FOLLOWING:

   A. REGULATORY
      - STOP
      - RIGHT (LEFT) TURN ONLY
      - 25 MPH
      - SYMBOL ARROWS

   B. WARNING
      - STOP AHEAD
      - SIGNAL AHEAD
      - SCHOOL
      - SCHOOL X-ING
      - PED X-ING
      - R X R (SEE RCPM DETAIL)
      - OTHER WORDS OR SYMBOLS MAY BE NECESSARY UNDER CERTAIN CONDITIONS

5. UNCONTROLLED USE OF PAVEMENT MARKINGS CAN RESULT IN DRIVER CONFUSION. WORD AND SYMBOL MARKINGS SHOULD BE NO MORE THAN THREE LINES.

6. THE WORD "STOP" SHALL NOT BE USED ON THE PAVEMENT UNLESS ACCOMPANIED BY A STOP LINE AND STOP SIGN. THE WORD "STOP" SHALL NOT BE PLACED ON THE PAVEMENT IN ADVANCE TO A STOP LINE, UNLESS EVERY VEHICLE IS REQUIRED TO STOP AT ALL TIMES.

7. PAVEMENT MARKINGS SHOULD GENERALLY BE NO MORE THAN ONE LANE IN WIDTH, WITH SCHOOL MESSAGES BEING THE EXCEPTION. FOR DETAILS OF SCHOOL AND SCHOOL CROSSING PAVEMENT MARKINGS, REFER TO PART VII OF THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

8. SPACING BETWEEN LETTERS SHOULD BE APPROXIMATELY 4 INCHES. THE WIDTH OF LETTERS MAY VARY DEPENDING ON THE WIDTH OF THE TRAVEL LANES.

9. LANE-USE ARROW MARKINGS MAY BE USED TO CONVEY EITHER GUIDANCE OR MANDATORY MESSAGES. ARROWS USED TO CONVEY A MANDATORY MOVEMENT MUST BE ACCOMPANIED BY STANDARD SIGNS AND THE PAVEMENT MARKING WORD "ONLY".

10. PAVEMENT MARKINGS ARE TO BE LOCATED AS SPECIFIED ELSEWHERE IN THE PLANS.

SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

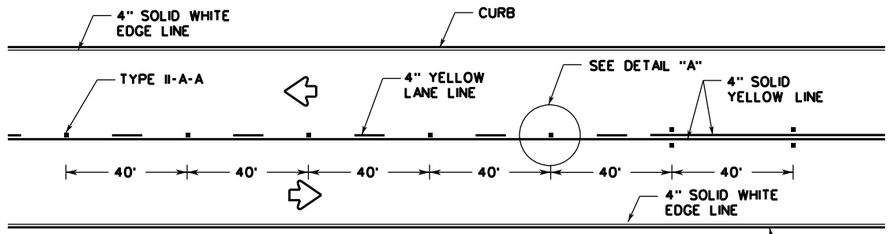
TRAFFIC ENGINEERING STANDARDS

STANDARD PAVEMENT MARKINGS (ARROWS)

SHEET 3 OF 16

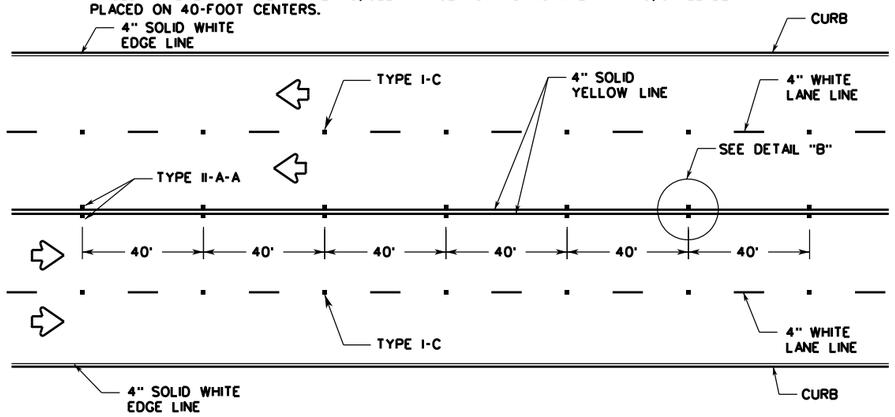
% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: LAN	DSGN. BY: C.R.V.	CHKD. BY: M.E.	SHEET NO.: 23 OF 60

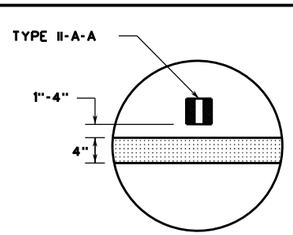
CENTERLINE & EDGE FOR ALL TWO LANE STREETS WITH PASSING ZONE



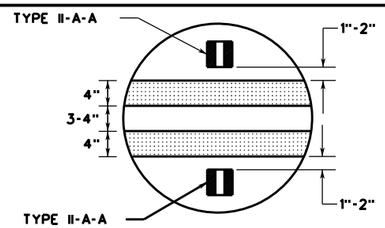
CENTERLINE, LANE LINES & EDGE LINES FOR FOUR LANE TWO-WAY STREETS

RAISED PAVEMENT MARKER TYPE I-C, CLEAR FACE TOWARD NORMAL TRAFFIC, SHALL BE PLACED ON 40-FOOT CENTERS.



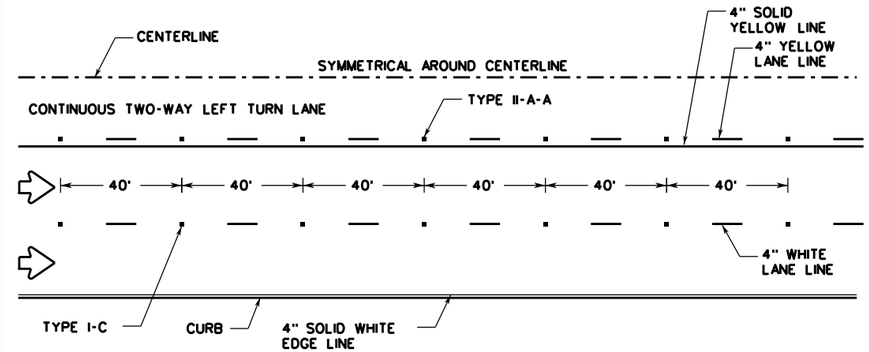


DETAIL "A"



DETAIL "B"

CENTERLINE, LANE LINES, & EDGE LINES FOR TWO-WAY LEFT TURN LANE



LANE LINES & EDGE LINES FOR ONE-WAY MULTILANE STREET

RAISED PAVEMENT MARKERS TYPE II-C-R SHALL HAVE CLEAR FACE TOWARD NORMAL TRAFFIC AND RED FACE TOWARD WRONG-WAY TRAFFIC.

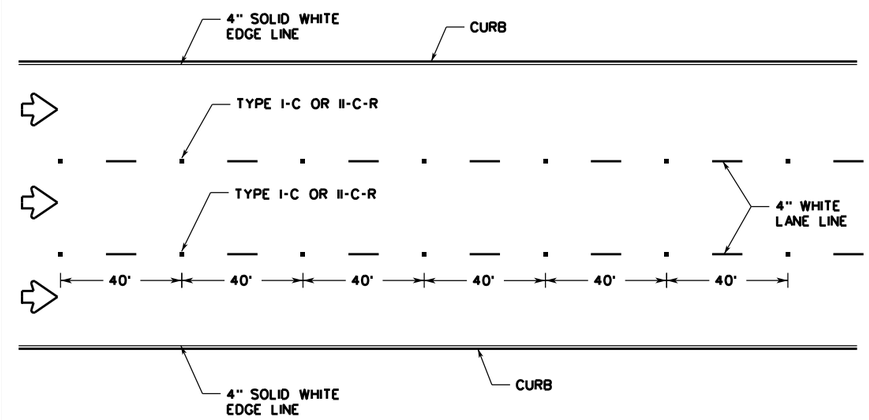


TABLE 1 - TYPICAL LENGTH (L)

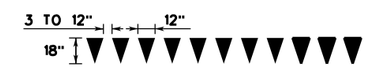
* POSTED SPEED	FORMULA
45>	$L = \frac{WS^2}{60}$
≥45	L = WS

* 85TH PERCENTILE SPEED MAY BE USED ON ROADS WHERE TRAFFIC SPEEDS NORMALLY EXCEED THE POSTED SPEED LIMIT. CROSSHATCHING LENGTH SHOULD BE ROUNDED UP TO NEAREST 5 FOOT INCREMENT.

L = LENGTH OF CROSSHATCHING (FT)
W = WIDTH OF OFFSET (FT)
S = POSTED SPEED (MPH)

EXAMPLES:
AN 8 FOOT SHOULDER IN ADVANCE OF A BRIDGE REDUCES TO 4 FEET ON A 70 MPH ROADWAY. THE LENGTH OF THE CROSS-HATCHING SHOULD BE:
L=8X70=560 FT
A 4 FOOT SHOULDER IN ADVANCE OF A BRIDGE REDUCES TO 2 FEET ON A 40 MPH ROADWAY. THE LENGTH OF THE CROSS-HATCHING SHOULD BE:
$L = 4(40)^2 / 60 = 106.67$ FT ROUNDED TO 110 FT

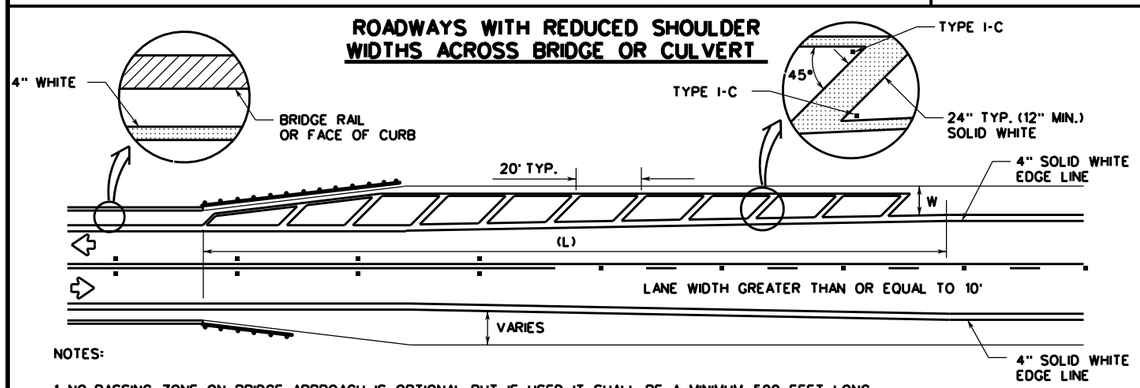
YIELD LINES



GENERAL NOTES:

1. EDGELINE ADJACENT TO CURB AND GUTTER IS NOT REQUIRED IN ALL CASES, HOWEVER SHALL BE PLACED AS DIRECTED BY CITY TRAFFIC ENGINEER.
2. THE TRAVELED WAY INCLUDES ONLY THAT PORTION OF THE ROADWAY USED FOR VEHICULAR TRAVEL AND NOT THE PARKING LANES, SIDEWALKS, BERMS AND SHOULDERS. THE TRAVELED WAYS SHALL BE MEASURED FROM THE INSIDE OF EDGELINE TO INSIDE OF EDGELINE OF A TWO LANE ROADWAY.
3. ALL RAISED PAVEMENT MARKERS PLACED IN BROKEN LINES SHALL BE PLACED IN LINE WITH AND MIDWAY BETWEEN THE STRIPES.
4. ON CONCRETE PAVEMENTS THE RAISED PAVEMENT MARKERS SHOULD BE PLACED TO ONE SIDE OF THE LONGITUDINAL JOINTS.
5. ALL PAVEMENT MARKING MATERIAL SHALL MEET THE REQUIRED MATERIAL SPECIFICATIONS AS SPECIFIED BY CITY OF SAN ANTONIO STANDARD SPECIFICATIONS.
6. 4" SOLID WHITE EDGE LINES ARE OPTIONAL AS DIRECTED BY THE CITY TRAFFIC ENGINEER.

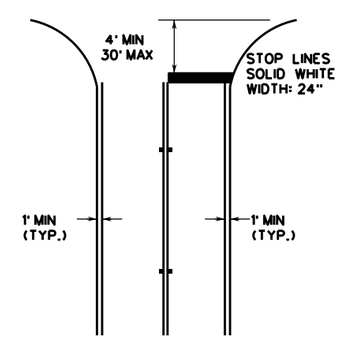
ROADWAYS WITH REDUCED SHOULDER WIDTHS ACROSS BRIDGE OR CULVERT



NOTES:

1. NO-PASSING ZONE ON BRIDGE APPROACH IS OPTIONAL BUT IF USED, IT SHALL BE A MINIMUM 500 FEET LONG.
2. FOR CROSSHATCHING LENGTH (L) SEE TABLE 1.
3. THE WIDTH OF THE OFFSET (W) AND THE REQUIRED CROSSHATCHING WIDTH IS THE FULL SHOULDER WIDTH IN ADVANCE OF THE BRIDGE.
4. THE CROSSHATCHING SHOULD BE REQUIRED IF THE SHOULDER WIDTH IN ADVANCE OF THE BRIDGE IS 4 FOOT OR WIDER AND ANY REDUCTION IN SHOULDER WIDTH ACROSS THE BRIDGE OCCURS.

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE



SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

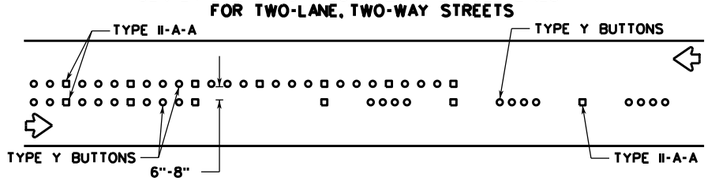
TRAFFIC ENGINEERING STANDARDS
STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE 1
SHEET 4 OF 16

% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.	SHEET NO.: 24 OF 60

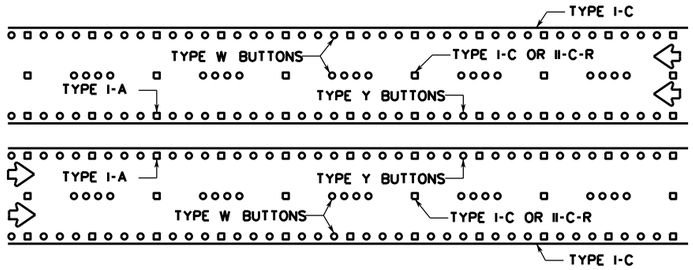
RAISED PAVEMENT MARKING PLACEMENT PATTERNS

PLACED W/ REFLECTION PAVEMENT MARKERS (OPTIONAL)

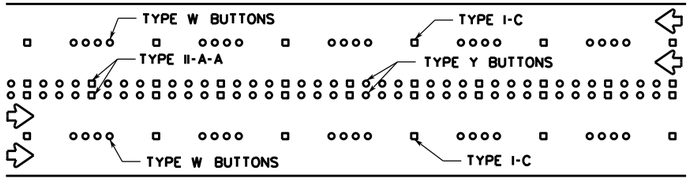
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY STREETS



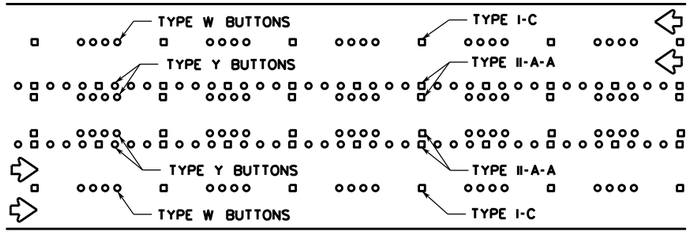
EDGE & LANE LINES FOR DIVIDED STREET



LANE & CENTER LINES FOR MULTILANE UNDIVIDED STREETS

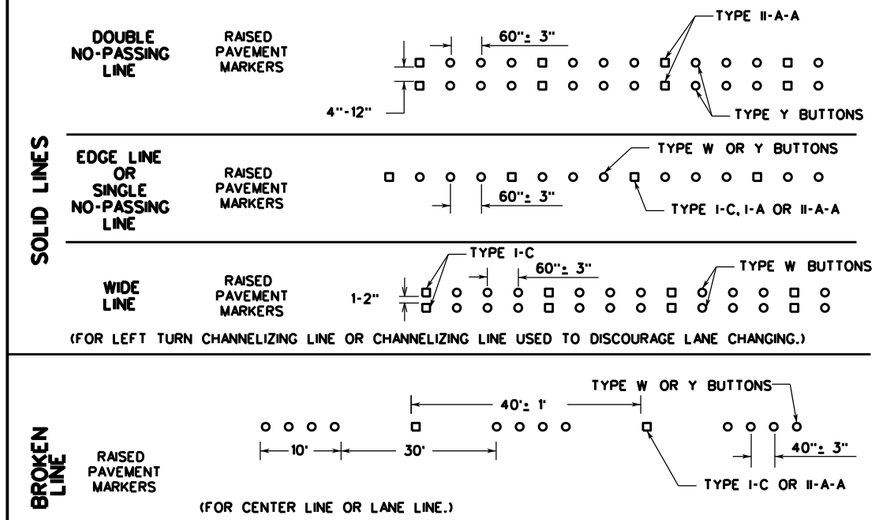


TWO-WAY LEFT TURN LANE



RAISED PAVEMENT MARKINGS PLACEMENT DETAILS

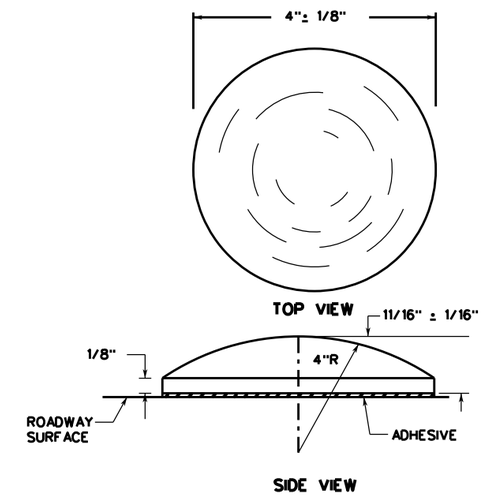
PLACED W/ REFLECTION PAVEMENT MARKERS (OPTIONAL)



TRAFFIC BUTTONS

(NON-REFLECTORIZED)

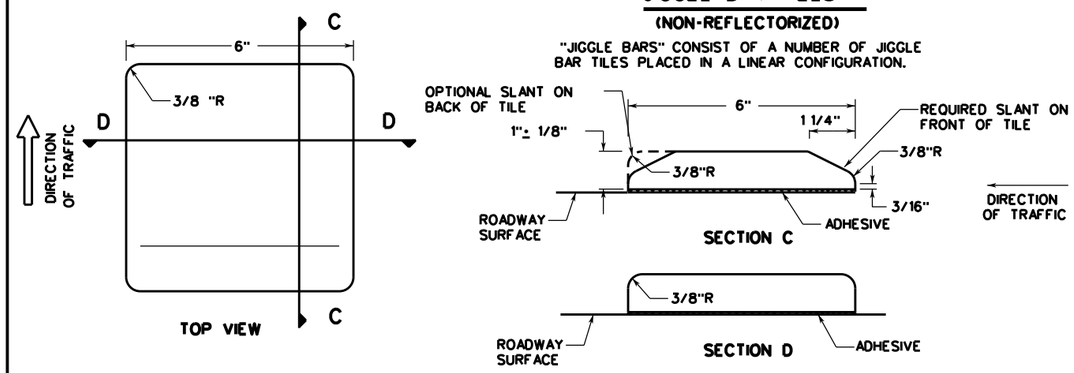
NOTE: MINIMUM AREA OF MARKERS SHALL BE NOT LESS THAN 12.5 SQUARE INCHES.



JIGGLE BAR TILES

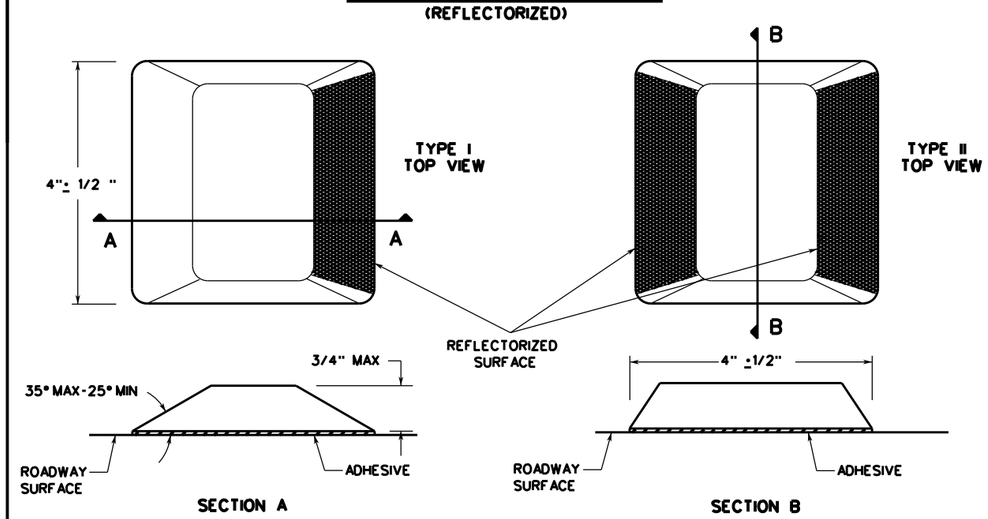
(NON-REFLECTORIZED)

"JIGGLE BARS" CONSIST OF A NUMBER OF JIGGLE BAR TILES PLACED IN A LINEAR CONFIGURATION.



RAISED PAVEMENT MARKERS

(REFLECTORIZED)



NOTES:

1. RAISED PAVEMENT MARKERS (RPMs) MAY CONSIST OF TRAFFIC BUTTONS, PAVEMENT MARKERS AND/OR JIGGLE BAR TILES. PAVEMENT SURFACE SHALL BE PREPARED AND CLEANED SUBJECT TO APPROVAL OF THE CITY TRAFFIC ENGINEER BEFORE ADHESIVE AND RPMs ARE PLACED.
2. JIGGLE BARS SHALL BE ORIENTED PERPENDICULAR TO ROADWAY. JIGGLE BARS SHALL ALSO BE PLACED AT SUCH OTHER LOCATIONS AS SHOWN IN PLANS OR AS DIRECTED BY THE CITY TRAFFIC ENGINEER.
3. MARKERS, BUTTONS AND JIGGLE BAR TILES SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY AND NOT INTENDED TO SPECIFY ANY PARTICULAR PRODUCT. ALL PAVEMENT MARKERS PROVIDED SHALL BE OF THE SAME MANUFACTURER.
4. ALL DIMENSIONS ARE +/- 1/8" UNLESS OTHERWISE NOTED.
5. ALL PAVEMENT MARKING MATERIALS SHALL MEET MATERIAL SPECIFICATIONS AS SPECIFIED BY CITY OF SAN ANTONIO STANDARD SPECIFICATIONS.
6. TRAFFIC BUTTONS AND JIGGLE BAR TILES ARE TO BE USED ONLY FOR TEMPORARY TRAFFIC CONTROL OR AS DIRECTED BY THE CITY TRAFFIC ENGINEER.

SEPTEMBER 2009

CITY OF SAN ANTONIO

DEPARTMENT OF PUBLIC WORKS

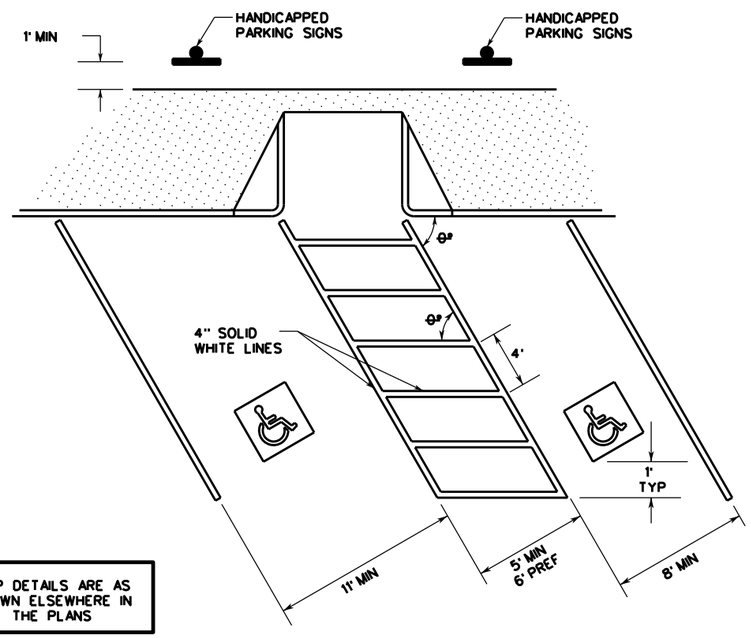
TRAFFIC ENGINEERING STANDARDS

RAISED PAVEMENT MARKERS, REFLECTIVE PAVEMENT MARKERS, TRAFFIC BUTTONS & JIGGLE BAR TILES 2

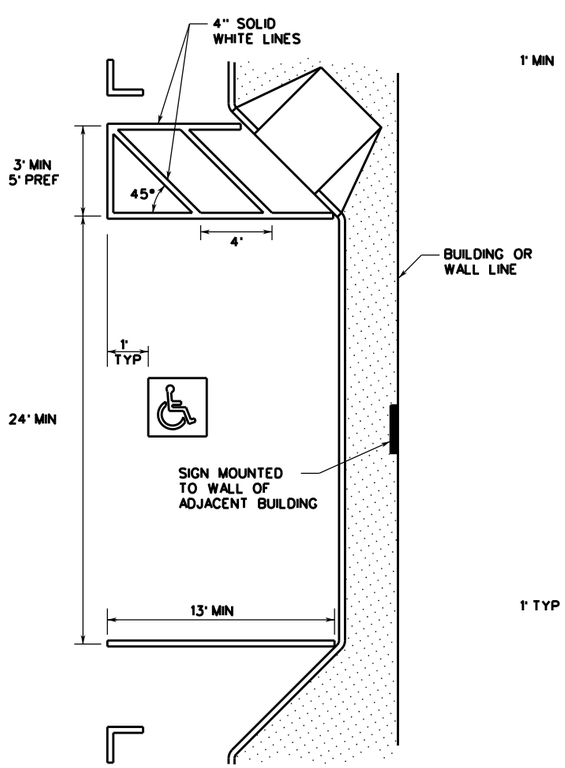
SHEET 5 OF 16

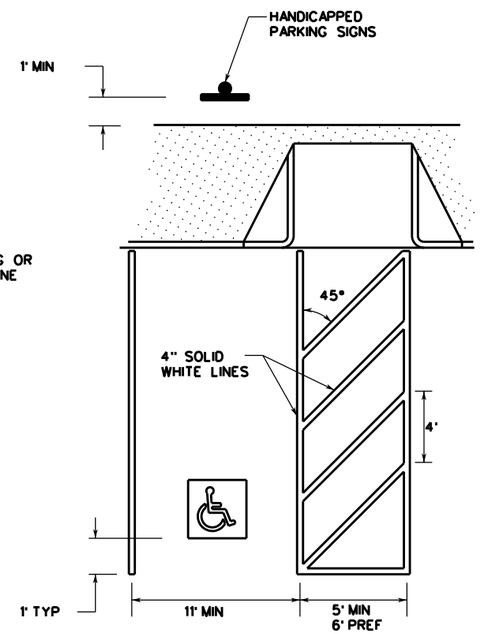
% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: LAN	DSGN. BY: C.R.V.	CHKD. BY: M.E.	SHEET NO.: 25 OF 60

TYPICAL ACCESSIBLE PARKING SPACE DIMENSIONS

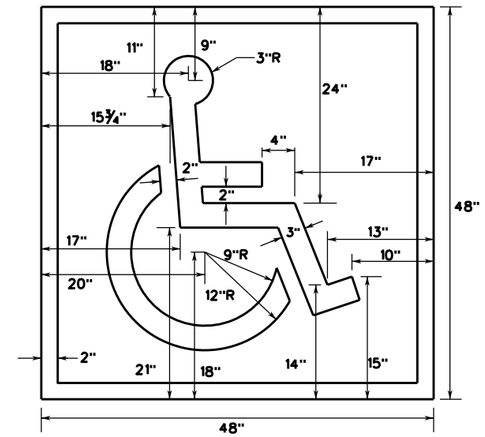


RAMP DETAILS ARE AS SHOWN ELSEWHERE IN THE PLANS



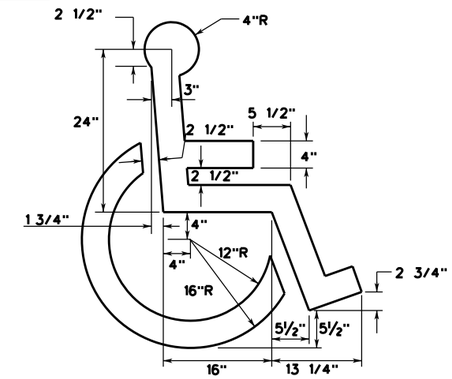


PAVEMENT MARKINGS



WITH BACKGROUND

SYMBOL & BORDER: WHITE
BACKGROUND: BLUE



SYMBOL ONLY

SYMBOL: BLUE OR WHITE

NOTES:

1. ALL PARKING SPACE LIMIT LINES SHALL BE 4" SOLID WHITE LINES.
2. AISLE MARKINGS SHOWN ARE EXAMPLES ONLY. OTHER METHODS TO INDICATE A NO PARKING AREA ARE ACCEPTABLE. AISLE MARKINGS SHALL BE WHITE.
3. DIMENSIONS OF LIMIT LINES, AISLE MARKINGS, AND SYMBOL (WITH OR WITHOUT BACKGROUND) MAY VARY ± 10%.
4. PAVEMENT MARKING SYMBOLS (WITH BACKGROUND):
   A) ARE REQUIRED UNLESS STATED ELSEWHERE IN THE PLANS,
   B) SHOULD BE PLACED TOWARD THE FAR END OF THE PARKING SPACES SO AS TO BE VISIBLE TO MOTORISTS IN THE TRAVEL LANE,
   C) MAY BE PAINTED OR PREFABRICATED MATERIAL, AND
   D) SHALL BE 30"x30" MINIMUM.
5. WITH APPROVAL OF THE CITY TRAFFIC ENGINEER, PREFABRICATED PAVEMENT MARKING SYMBOLS WITH BACKGROUND OF OTHER DIMENSIONS EXCEEDING THE 30"x30" MINIMUM MAY BE USED. ALTERNATIVE DESIGNS SHALL INCLUDE A PROPORTION SIZED SYMBOL OF ACCESSIBILITY, AND SHALL CONFORM TO THE ILLUSTRATED COLORS FOR BACKGROUND, SYMBOL AND BORDER.
6. ALL SLOPE IN AND AROUND EXPECTED WHEEL CHAIR PATH SHALL NOT EXCEED 2% X-SLOPES.

SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

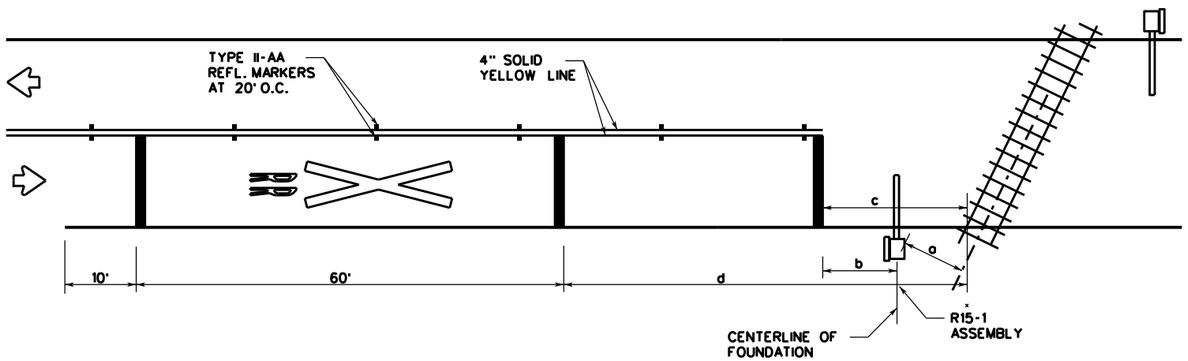
TRAFFIC ENGINEERING STANDARDS

PAVEMENT MARKINGS FOR ACCESSIBLE PARKING

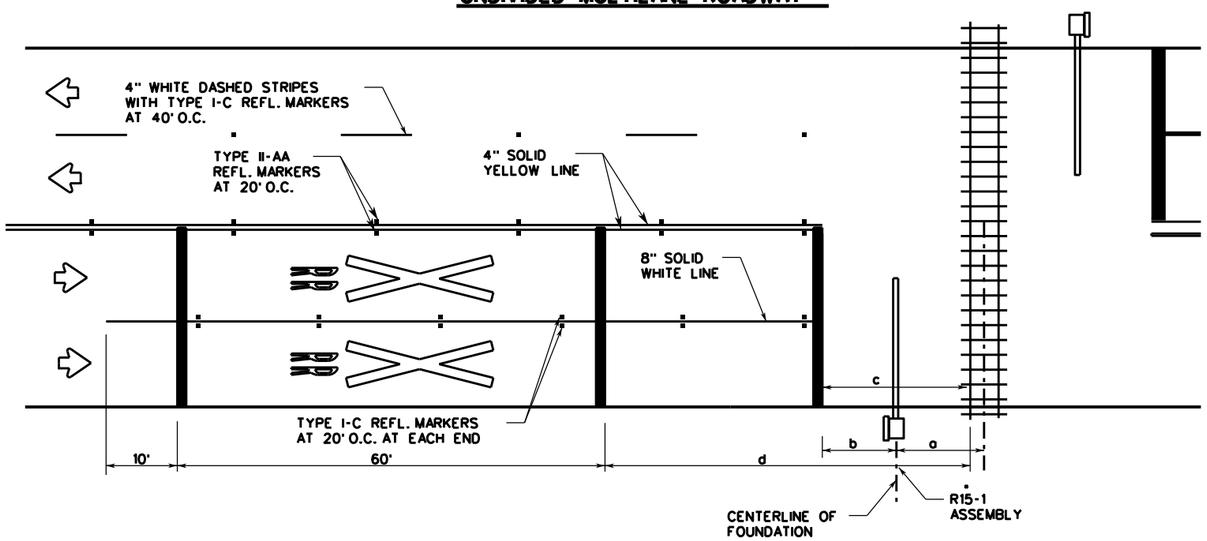
SHEET 6 OF 16

% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.	SHEET NO.: 26 OF 60

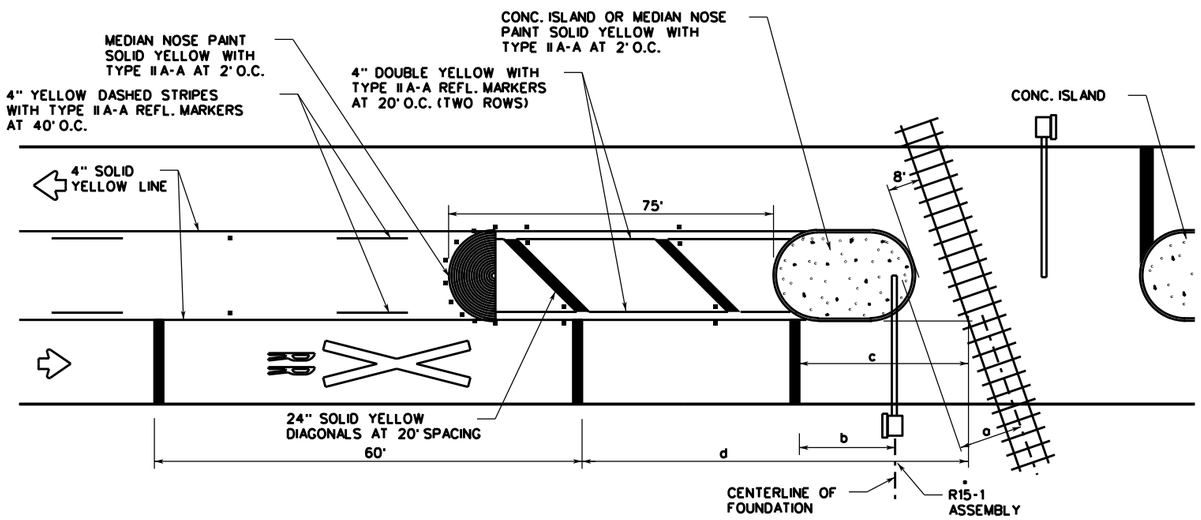
TWO LANE, TWO-WAY



UNDIVIDED MULTILANE ROADWAY



TWO-WAY LEFT-TURN LANE (TWLTL)



a = 12 FEET MINIMUM, 15 FEET USUAL, IF ACTIVE WARNING DEVICES ARE PRESENT. DISTANCE "a" SHOULD BE MEASURED FROM THE CENTERLINE OF = R15-1 ASSEMBLY TO THE CENTER-LINE OF NEAREST TRACK.

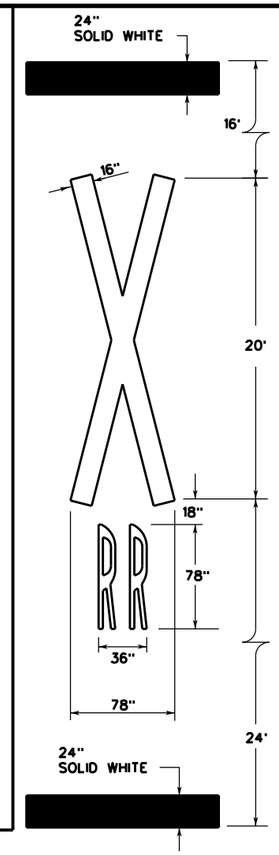
b= STOP LINES SHOULD BE APPROX-IMATELY 8 FEET IN ADVANCE OF ACTIVE WARNING DEVICES (TYPE A, E OR F). STOP LINE SHOULD BE APPROXIMATELY 15 FEET FROM NEAR RAIL IF ONLY PASSIVE DEVICES (R15-1, PLUS R15-2 WHEN APPLICABLE) ARE PRESENT.

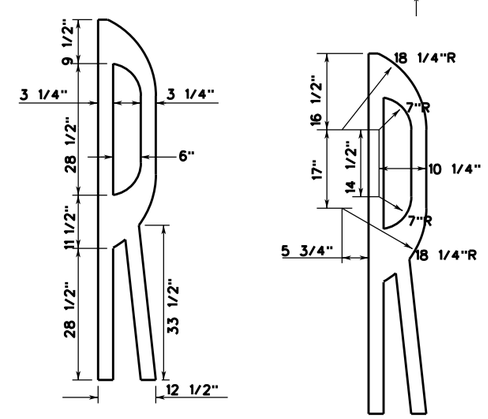
c= 15 FEET DESIRABLE MINIMUM IF NO GATE OR SIGNAL IS PRESENT. R15-1 SHOULD BE PLACED BETWEEN STOP LINE AND RAILS WITH ADEQUATE DISTANCE PROVIDED FOR "a".

d*=

APPROACH SPEED (MPH)	DESIRABLE PLACEMENT (FEET)
20	145
25	220
30	295
35	370
40	445
45	520
50	595
55	670
60	745
65	820
70	900

* LOCAL CONDITIONS MAY REQUIRE ALTERNATE PLACEMENT LOCATIONS.





NOTES:

1. THE PAVEMENT MARKINGS ON AN APPROACH TO A RAILROAD GRADE CROSSING SHALL CONSISTS OF:
   A) THE RR X-ING SYMBOL,
   B) THREE TRANSVERSE 24" LINES, AND
   C) LANE LINES: A SOLID NO PASSING LINE FOR TWO-WAY TRAFFIC APPROACHES, OR SOLID LAND LINES FOR MULTILANE APPROACHES.
2. FOR BIDDING PURPOSES, THE RR X-ING SYMBOL WILL BE MEASURED AND PAID FOR AS FOR EACH LANE IN PLACE. THE TRANSVERSE MARKINGS AND LANE LINES WILL BE MEASURED AND PAID FOR BY THE LINEAL FOOT.
3. CENTERLINES SHALL BE YELLOW, OTHER MARKINGS SHALL BE WHITE.
4. APPROACH LANES LESS THAN 8 FOOT WIDTH SHALL NOT HAVE MARKINGS.
5. MARKINGS SHOULD NOT BE PLACED WHERE LESS THAN 110 FEET OF APPROACH ROADWAY IS AVAILABLE FOR PLACEMENT UNLESS DIRECTED BY CITY TRAFFIC ENGINEER.
6. RR X-ING SYMBOLS SHOULD BE PLACED APPROXIMATELY IN THE CENTER OF THE APPROACH LANE.
7. ALL TRANSVERSE MARKINGS, INCLUDING STOP LINES, SHALL BE PLACED AT RIGHT ANGLES TO THE CENTERLINE AND ACROSS ALL APPROACH LANES.
8. EXISTING NON-STANDARD MARKINGS SHALL BE REMOVED TO THE FULLEST EXTENT POSSIBLE SO AS NOT TO LEAVE A DISCERNABLE MARKING, BY ANY METHOD APPROVED BY THE CITY TRAFFIC ENGINEER. OVERPAINTING WILL NOT BE ALLOWED.
9. ADDITIONAL MARKINGS AND PLACEMENT DETAILS MAY BE FOUND IN THE TMUTCD, APPENDIX H.
10. THE CITY TRAFFIC ENGINEER MAY REQUIRE ADDITIONAL LONGITUDINAL MARKINGS IF THE DISTANCE BETWEEN THE STOP LINES IS GREATER THAN 80 FEET. MARKINGS ARE NOT REQUIRED ACROSS OR BETWEEN THE RAILS UNLESS SPECIFIED ELSEWHERE IN THE PLANS.

R15-1
ASSEMBLY

MAY CONSIST OF ONE OR MORE OF THE FOLLOWING:

R15-1 CROSSBUCK SIGN
R15-2 MULTIPLE TRACK SIGN
TYPE A MAST FLASHERS
TYPE E CANTILEVERS
TYPE F GATES

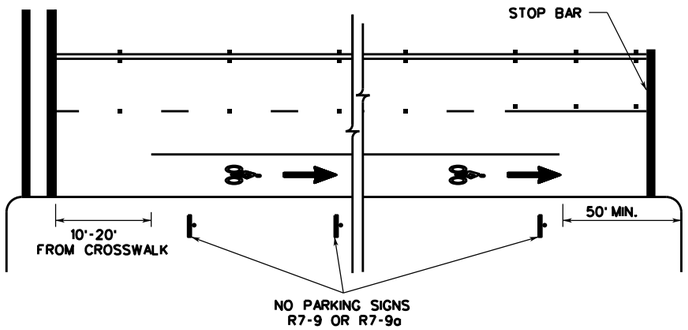
SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

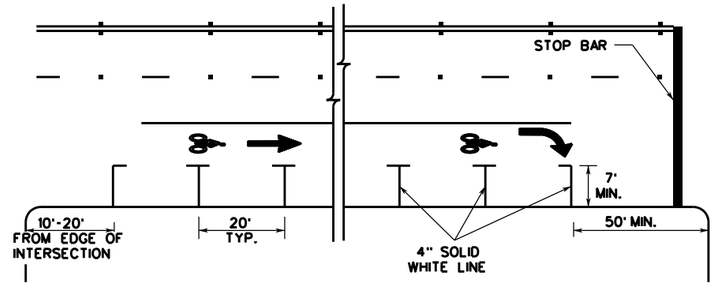
TRAFFIC ENGINEERING STANDARDS
RAILROAD CROSSING PAVEMENT MARKING (RCPM) DETAILS
SHEET 7 OF 16

% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: LAN	DSGN. BY: C.R.V.	CHKD. BY: M.E.	SHEET NO.: 27 OF 60

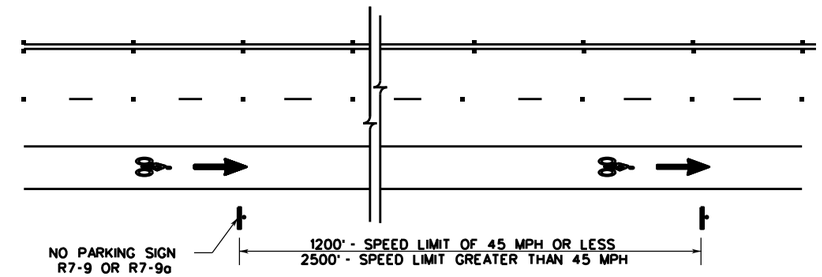
NO PARKING ALONG BICYCLE LANE

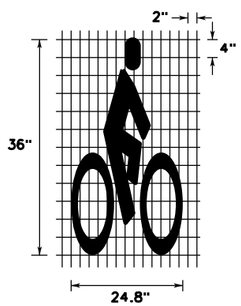


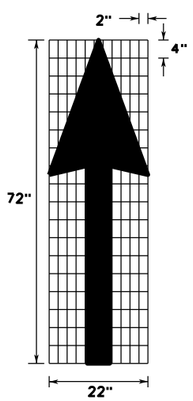
PARKING ALONG BICYCLE LANE

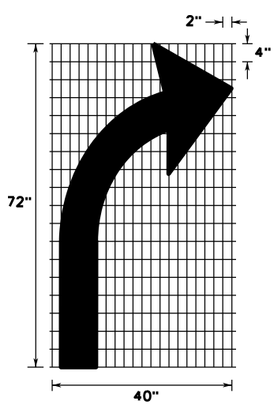


ROADWAYS WITH FEW INTERSECTIONS

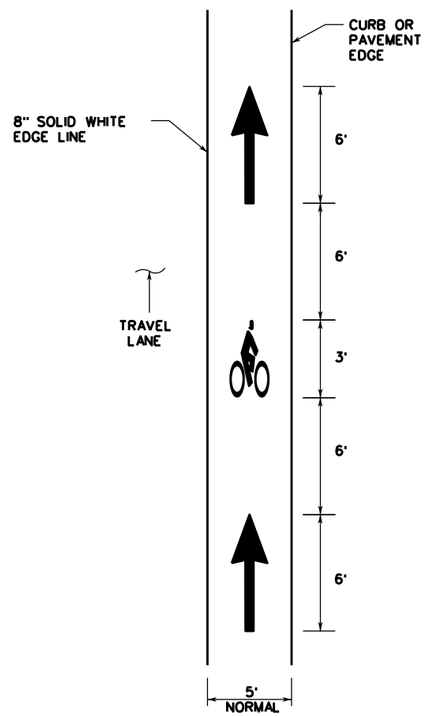






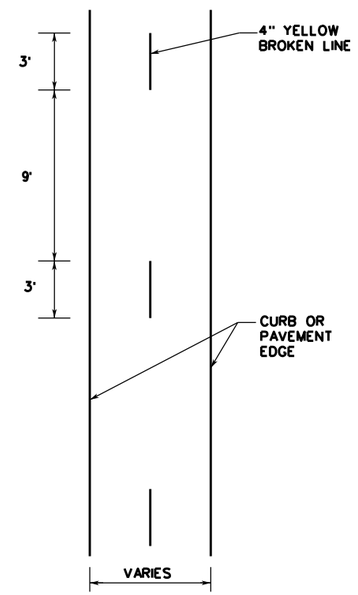


ADJACENT TO TRAVEL LANE

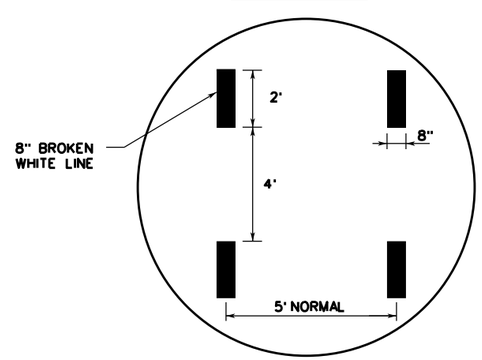


SHARED USE PATH

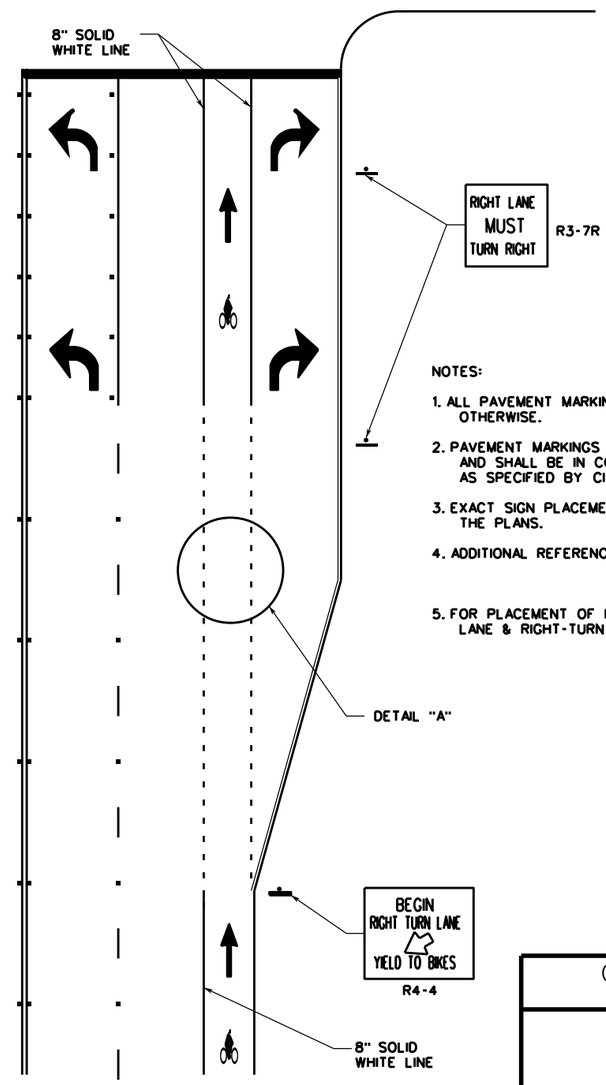
(SEPERATE FROM ROADWAY WITH NO MOTORIZED TRAFFIC)



DETAIL "A"



RIGHT-TURN LANE AT INTERSECTION



NOTES:

1. ALL PAVEMENT MARKINGS SHALL BE WHITE EXCEPT WHEN NOTED OTHERWISE.
2. PAVEMENT MARKINGS SHALL BE OF THE MATERIALS SPECIFIED AND SHALL BE IN CONFORMANCE WITH MATERIAL SPECIFICATIONS AS SPECIFIED BY CITY OF SAN ANTONIO STANDARD SPECIFICATIONS.
3. EXACT SIGN PLACEMENT AND DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.
4. ADDITIONAL REFERENCES: TMUTCD
   GUIDE FOR THE DEVELOPMENT OF BICYCLES FACILITIES, AASHTO, 1991.
5. FOR PLACEMENT OF PAVEMENT ARROWS AND WORDS SEE LEFT-TURN LANE & RIGHT-TURN LANE DESIGN WORKSHEET.

SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

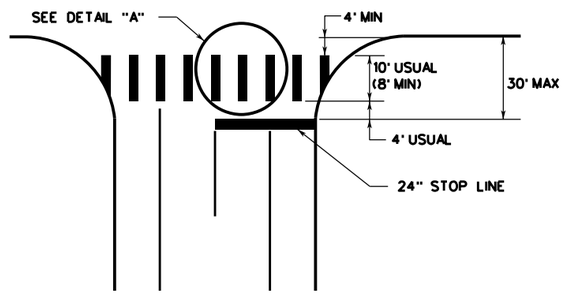
TRAFFIC ENGINEERING STANDARDS

BICYCLE LANE
PAVEMENT MARKINGS

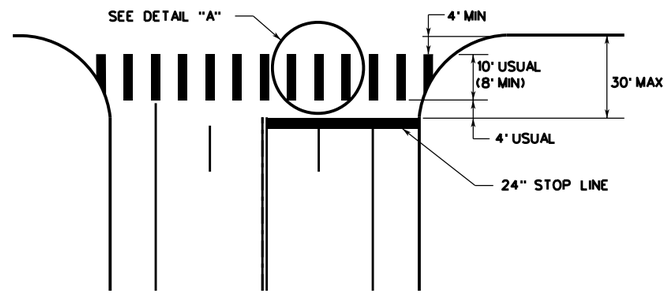
SHEET 8 OF 16

___% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.	SHEET NO.: 28 OF 60

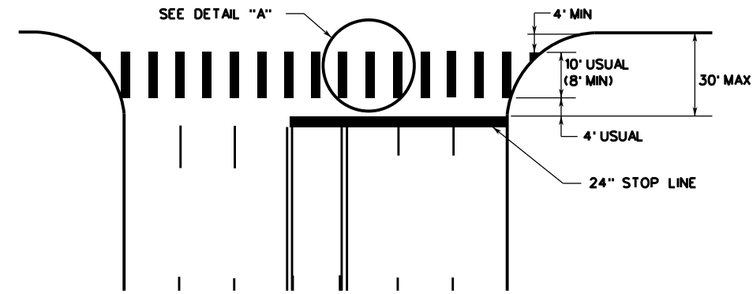
TWO LANES WITH SHOULDERS



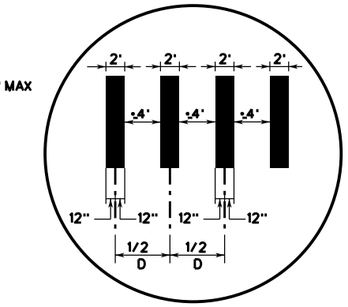
FOUR LANES WITH SHOULDERS



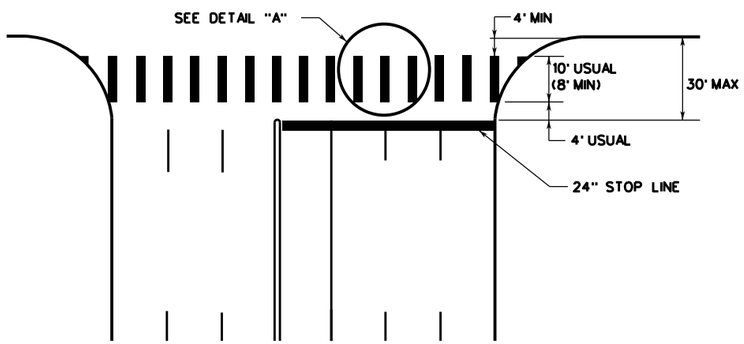
MULTI - LANES



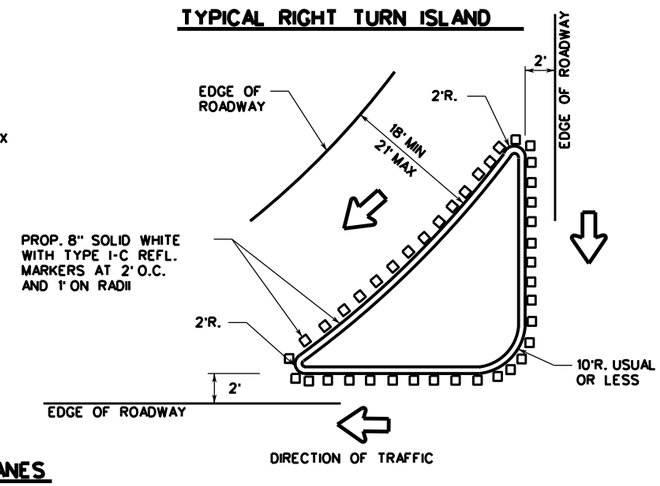
DETAIL "A"



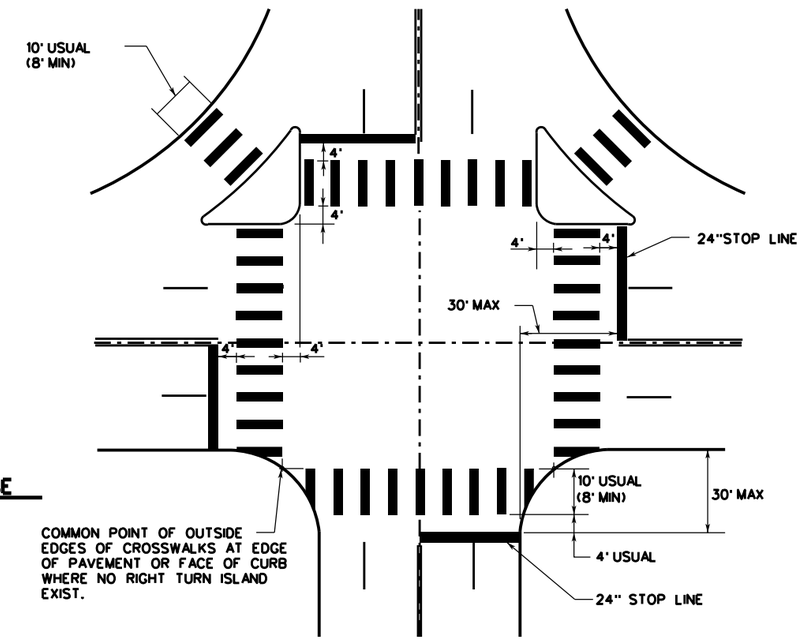
MULTI - LANE WITH MEDIAN



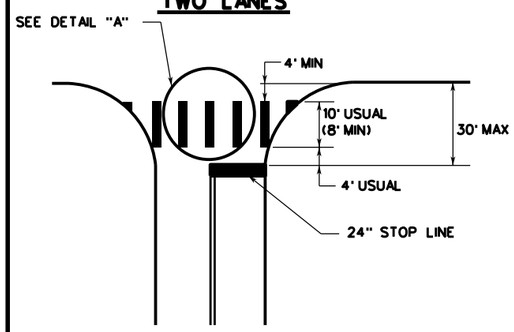
TYPICAL RIGHT TURN ISLAND



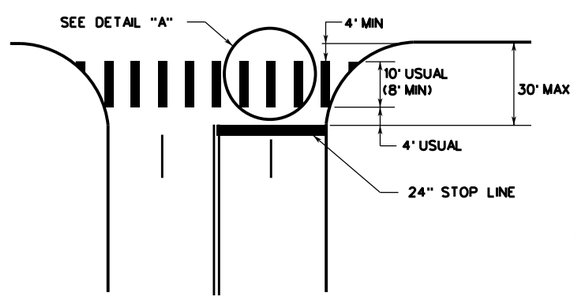
INTERSECTION WITH RIGHT - TURN ISLANDS



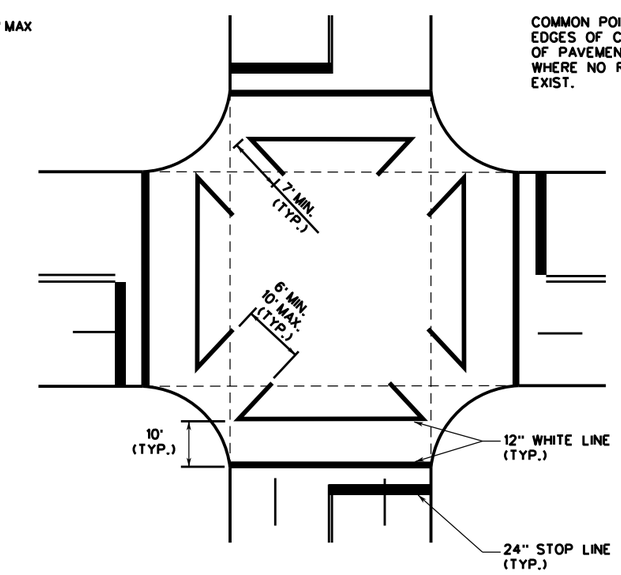
TWO LANES



FOUR LANES



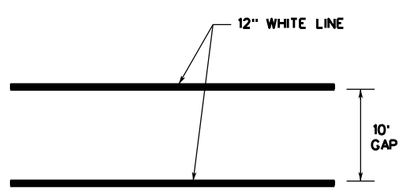
EXCLUSIVE PEDESTRIAN PHASE



NOTES:

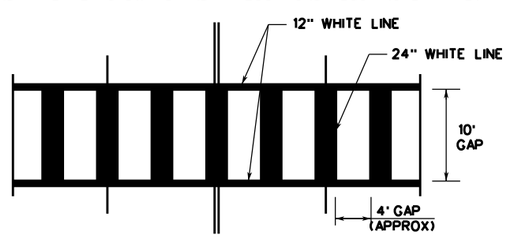
1. CROSSWALKS AND STOP LINES SHALL BE WHITE.
2. "D" IS EQUAL TO ONE HALF THE WIDTH OF TRAVEL LANE.

CENTRAL BUSINESS DISTRICT CROSSWALK DETAIL



HIGH VISIBILITY CROSSWALK DETAIL

TYPICALLY USED AT SIGNALIZED AND NON-SIGNALIZED MID-BLOCK CROSSINGS FOR COLLECTOR AND ARTERIAL ROADWAYS AND AT LOCATIONS REQUIRING EXTRA EMPHASIS.



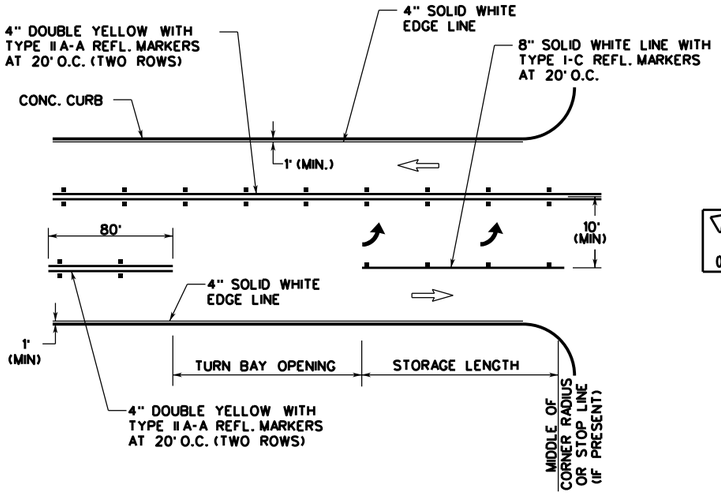
SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC ENGINEERING STANDARDS
TYPICAL CROSSWALK DETAILS
SHEET 9 OF 16

% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.	SHEET NO.: 29 OF 60

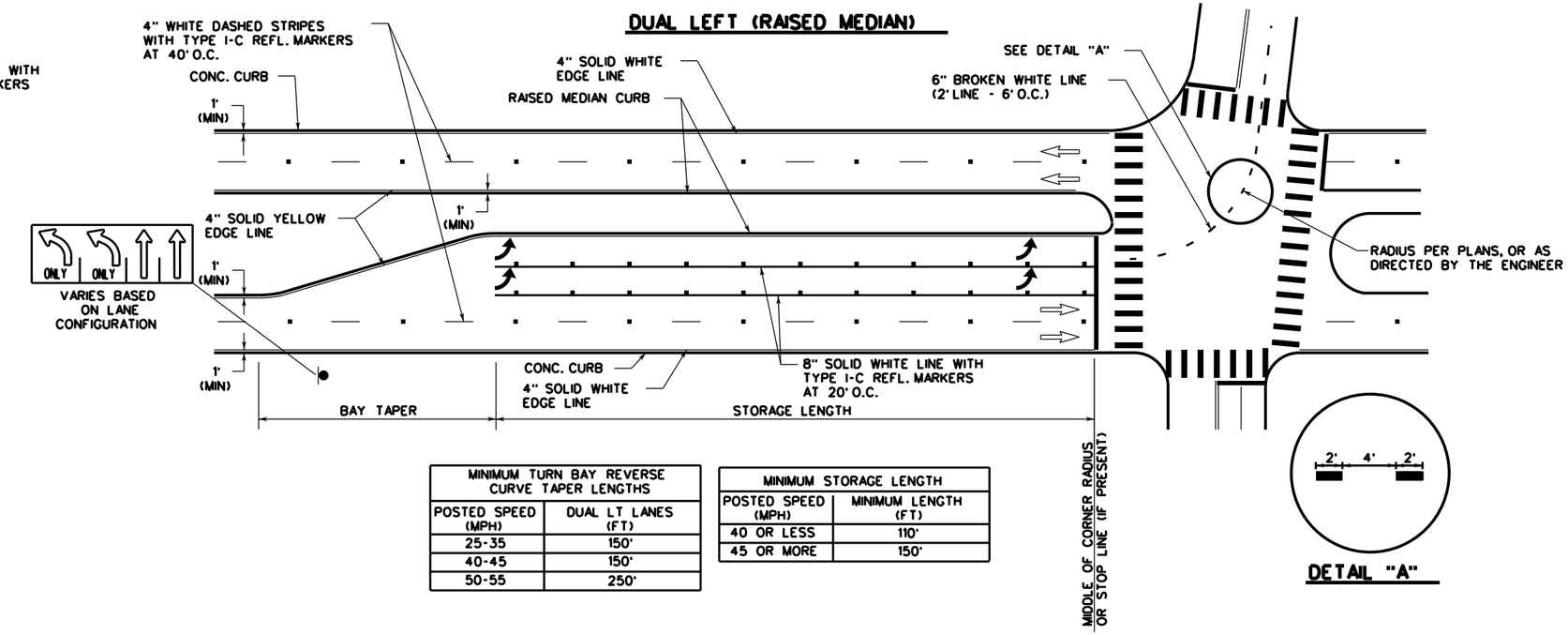
LEFT-TURN LANE



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

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

DUAL LEFT (RAISED MEDIAN)



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

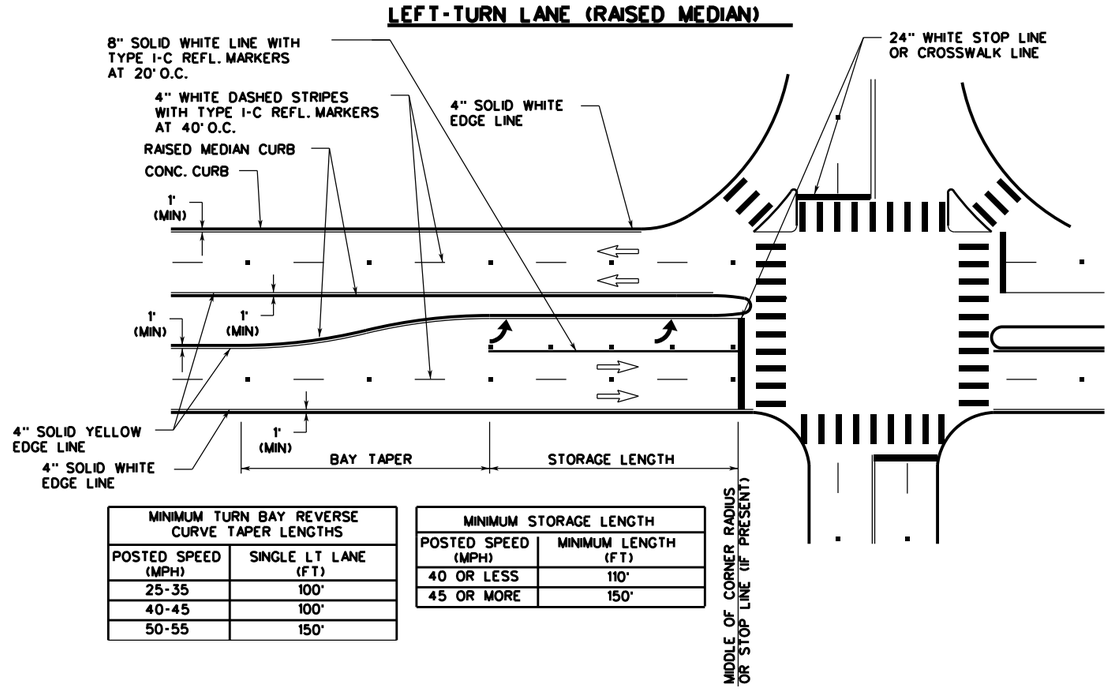
MINIMUM STORAGE LENGTH	
POSTED SPEED (MPH)	MINIMUM LENGTH (FT)
40 OR LESS	110'
45 OR MORE	150'

DETAIL "A"

NOTES:

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

LEFT-TURN LANE (RAISED MEDIAN)



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

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

SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC ENGINEERING STANDARDS

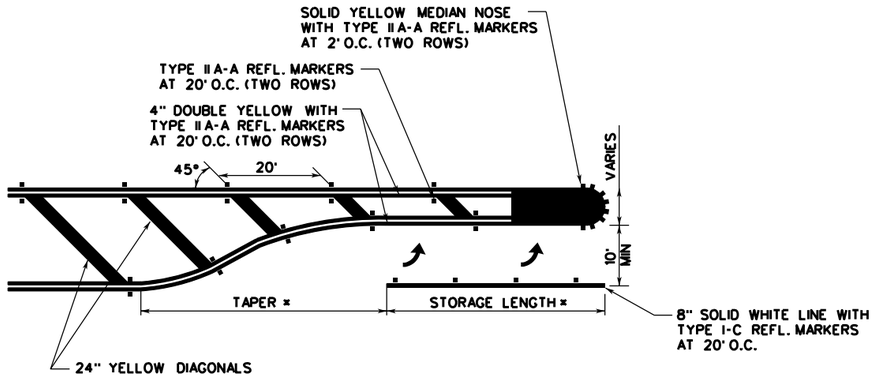
LEFT–TURN LANE & RIGHT–TURN LANE DESIGN WORKSHEET 1

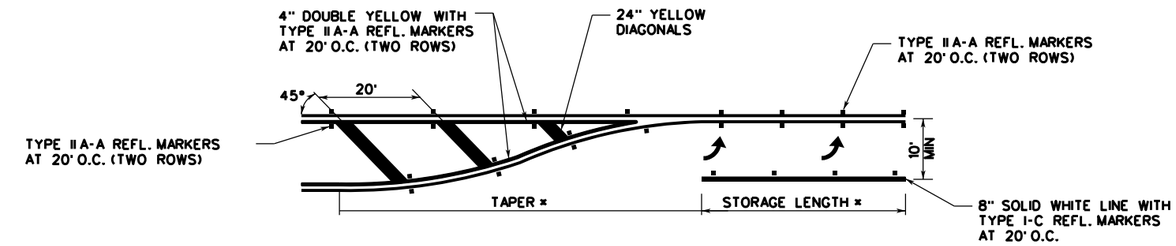
SHEET 10 OF 16

% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: LAN	DSGN. BY: C.R.V.	CHKD. BY: M.E.	SHEET NO.: 30 OF 60

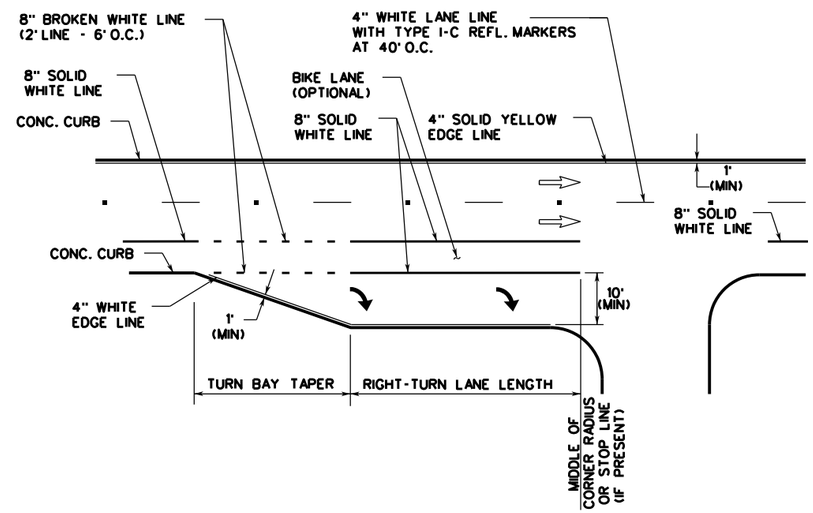
PAINTED MEDIAN LEFT TURN BAY DETAILS

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





UNSIGNALIZED RIGHT-TURN LANE



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

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

NOTES:

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

SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

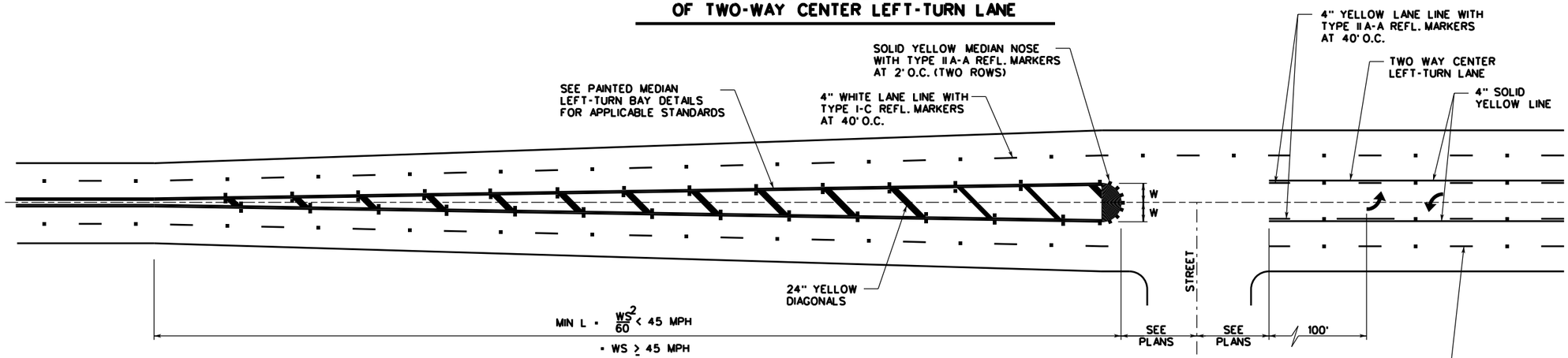
TRAFFIC ENGINEERING STANDARDS

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

SHEET 11 OF 16

% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.	SHEET NO.: 31 OF 60

TYPICAL TRANSITION AT BEGINNING AND END OF TWO-WAY CENTER LEFT-TURN LANE



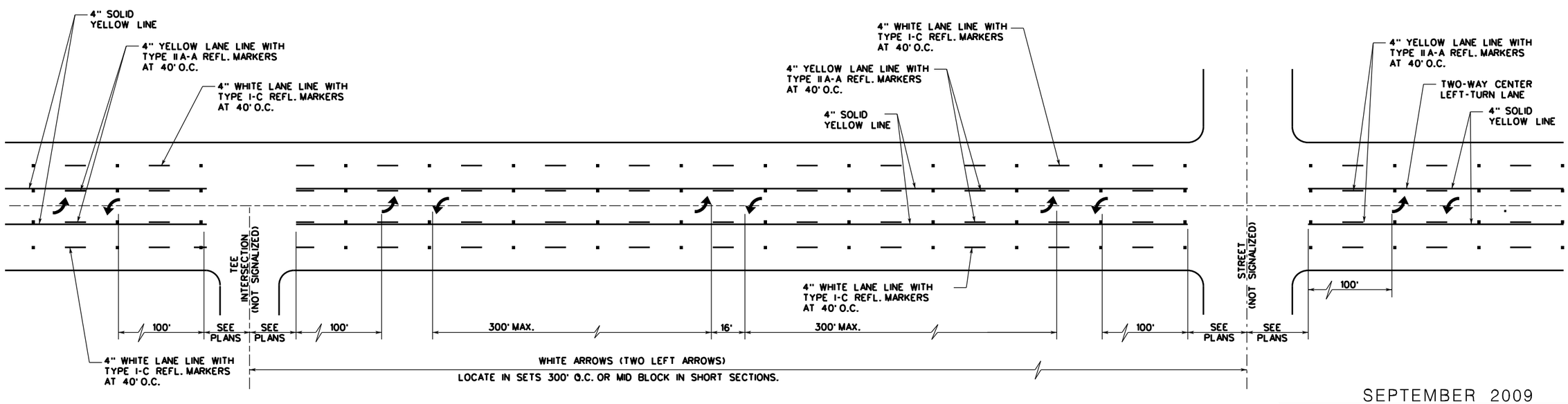
W = WIDTH OF OFFSET (FT)
S = POSTED SPEED (MPH)
L = LENGTH OF CROSSHATCHING (FT)

LEGEND
TYPICAL DETAIL
(PLACE LEGENDS IN ACCORDANCE TO LEFT TURN "ONLY" AND ARROW SPACING WORKSHEET)

NOTE:

1. REFLECTIVE RAISED PAVEMENT MARKERS SHOULD BE IN ACCORDANCE WITH STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE AND LEFT-TURN & RIGHT-TURN LANE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS.
2. SEE LEFT-TURN & RIGHT-TURN LANE DESIGN WORKSHEET FOR APPLICABLE INFORMATION.
3. SEE LEFT-TURN "ONLY" AND ARROW SPACING WORKSHEET.

TWO-WAY LEFT-TURN LANE DETAILS NON-SIGNALIZED INTERSECTIONS



SEPTEMBER 2009

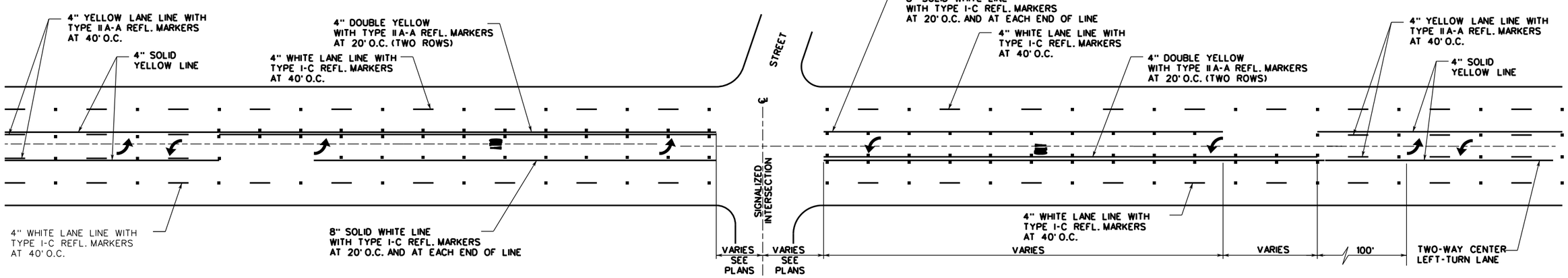
CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC ENGINEERING STANDARDS
TWO-WAY LEFT-TURN LANE DETAILS 1
SHEET 12 OF 16

% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.	SHEET NO.: 32 OF 60

TYPICAL TWO-WAY LEFT-TURN LANE DETAILS

SIGNALIZED INTERSECTION



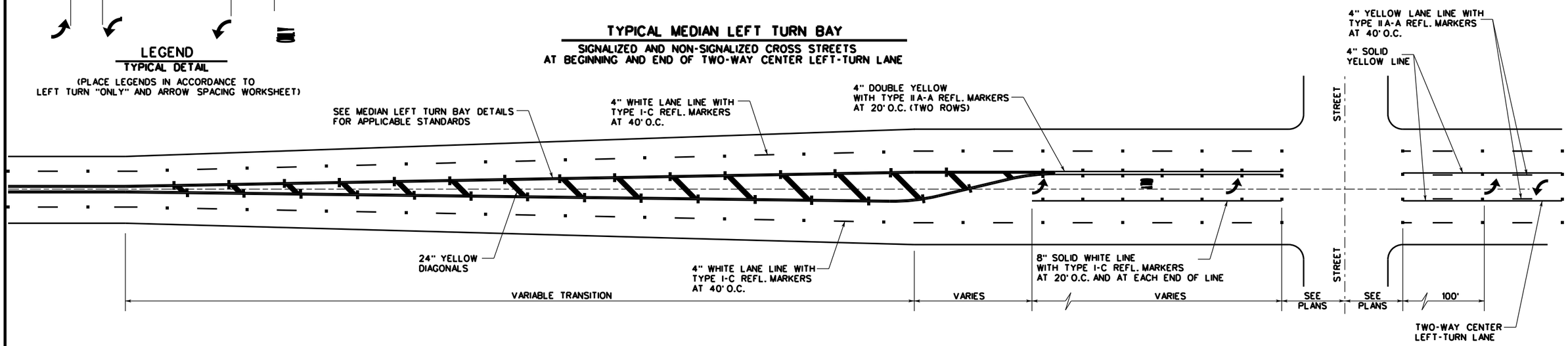
LEGEND

TYPICAL DETAIL

(PLACE LEGENDS IN ACCORDANCE TO LEFT TURN "ONLY" AND ARROW SPACING WORKSHEET)

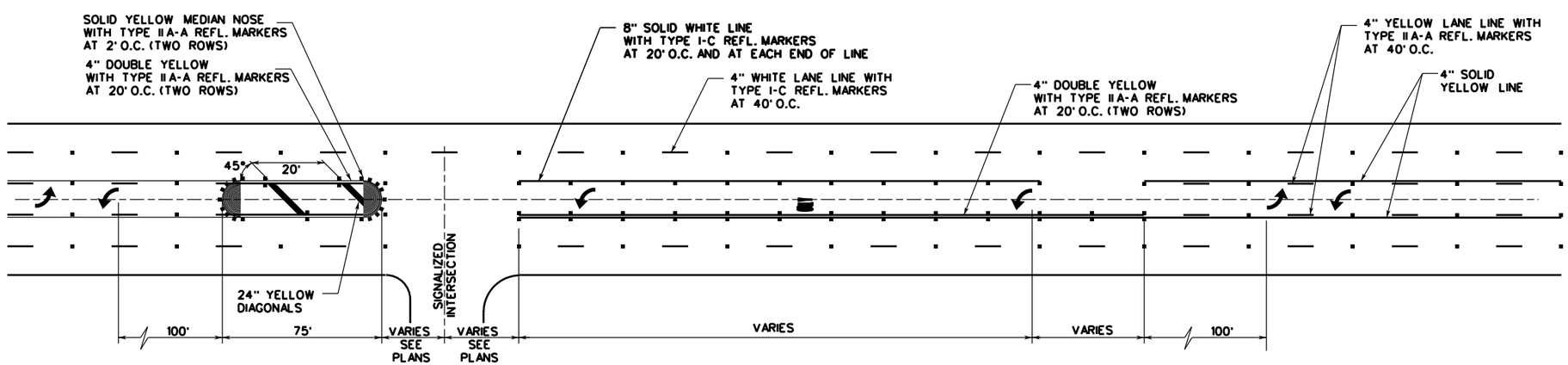
TYPICAL MEDIAN LEFT TURN BAY

SIGNALIZED AND NON-SIGNALIZED CROSS STREETS AT BEGINNING AND END OF TWO-WAY CENTER LEFT-TURN LANE



TYPICAL TWO-WAY LEFT-TURN LANE DETAILS

SIGNALIZED TEE INTERSECTION



NOTE:

1. REFLECTIVE RAISED PAVEMENT MARKERS SHOULD BE IN ACCORDANCE WITH STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS FOR POSITION GUIDANCE AND LEFT-TURN & RIGHT-TURN LANE STANDARD PAVEMENT MARKINGS WITH REFLECTIVE RAISED PAVEMENT MARKERS.
2. SEE LEFT-TURN & RIGHT-TURN LANE DESIGN WORKSHEET FOR APPLICABLE INFORMATION.
3. SEE LEFT-TURN "ONLY" AND ARROW SPACING WORKSHEET.

SEPTEMBER 2009

CITY OF SAN ANTONIO

DEPARTMENT OF PUBLIC WORKS

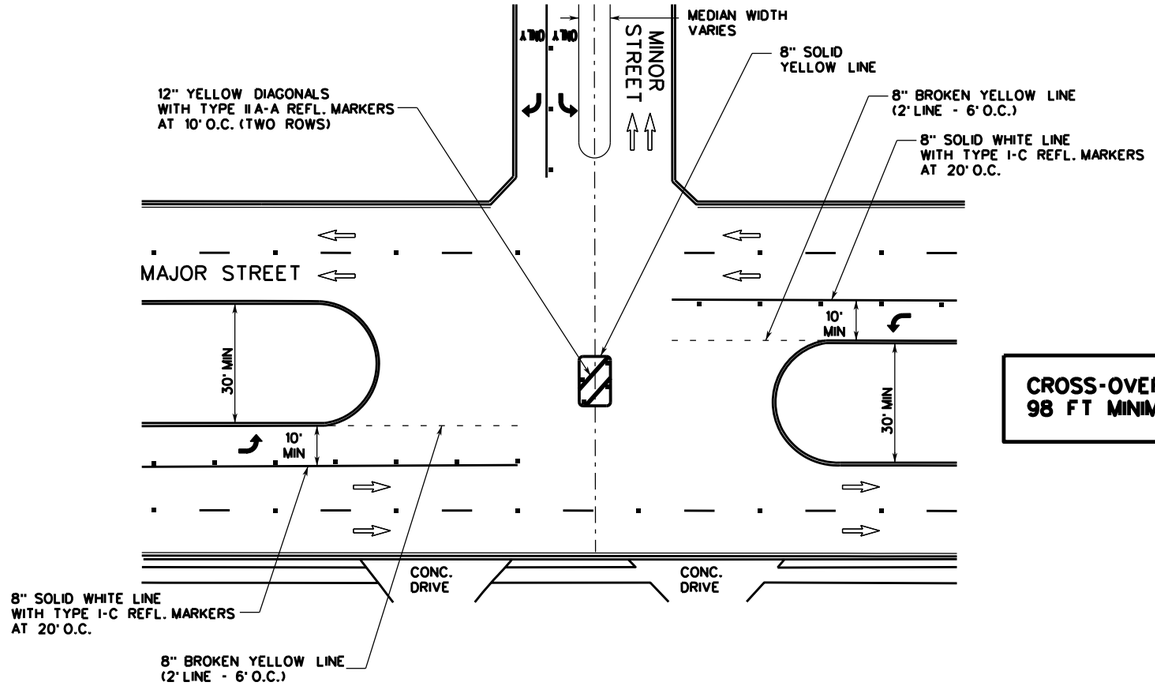
TRAFFIC ENGINEERING STANDARDS

TWO-WAY LEFT-TURN LANE DETAILS 2

SHEET 13 OF 16

% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.	SHEET NO.: 33 OF 60

CROSS-OVER MEDIAN OPENING WITHOUT TURN AROUND STRIPING "TEE" INTERSECTION

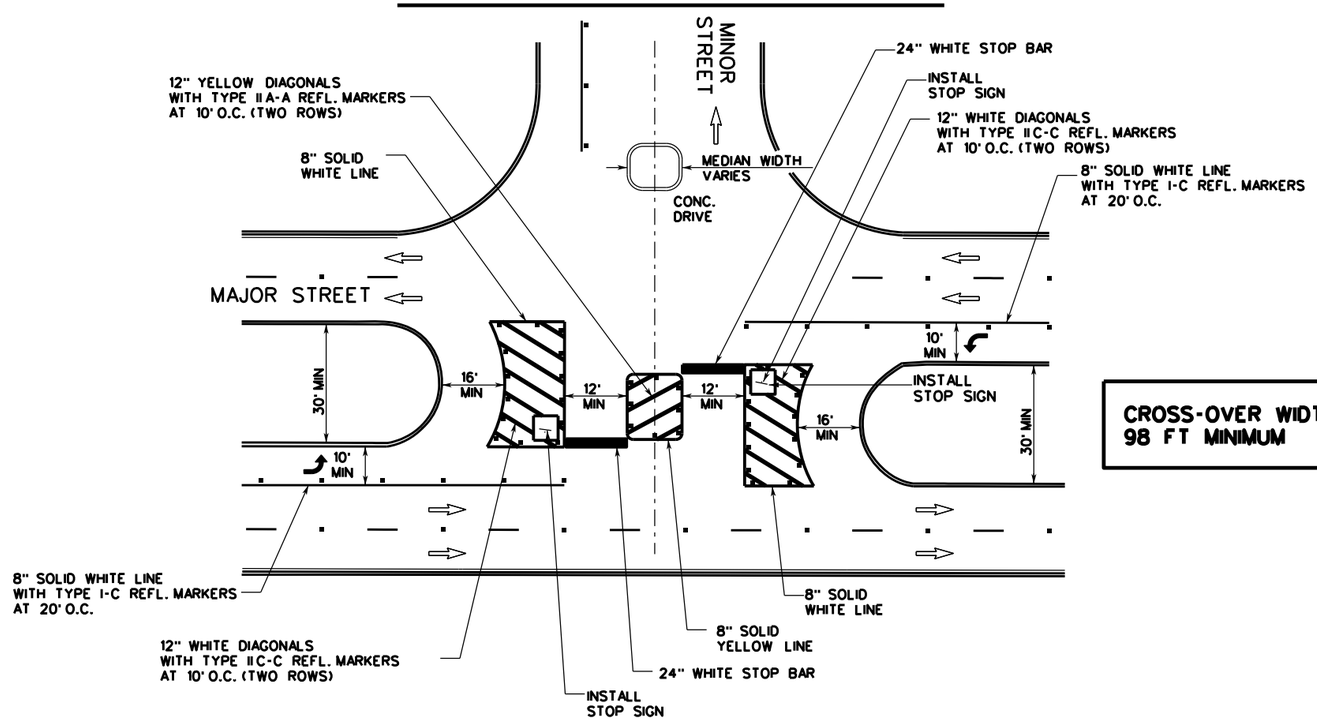


CROSS-OVER WIDTH 98 FT MINIMUM

NOTE:

1. REFER TO LEFT TURN "ONLY" AND ARROW SPACING WORKSHEET.
2. SEE MISC. CROSS-OVER DETAIL FOR APPLICABLE INFORMATION.
3. ALL MEDIANS SHALL BE FIELD MEASURED TO DETERMINE THE LOCATION OF NECESSARY STRIPING. STOP BARS AND CENTERLINES SHALL BE PLACED WHEN THE MEDIAN WIDTH IS GREATER THAN 30 FT.
4. THE MEDIAN WIDTH IS DEFINED AS THE AREA BETWEEN TWO ROADWAYS OF A DIVIDED HIGHWAY MEASURED FROM EDGE OF TRAVELED WAY TO EDGE OF TRAVELED WAY. THE MEDIAN EXCLUDES TURN LANES.
5. THE MEDIAN WIDTH MIGHT BE DIFFERENT BETWEEN INTERSECTIONS, INTERCHANGES AND OF OPPOSITE APPROACHES OF THE SAME INTERSECTION.
6. THE NARROW MEDIAN WIDTH WILL BE THE CONTROLLING WIDTH TO DETERMINE IF MARKINGS ARE REQUIRED.

CROSS-OVER MEDIAN OPENING WITH TURN AROUND STRIPING "TEE" INTERSECTION



CROSS-OVER WIDTH 98 FT MINIMUM

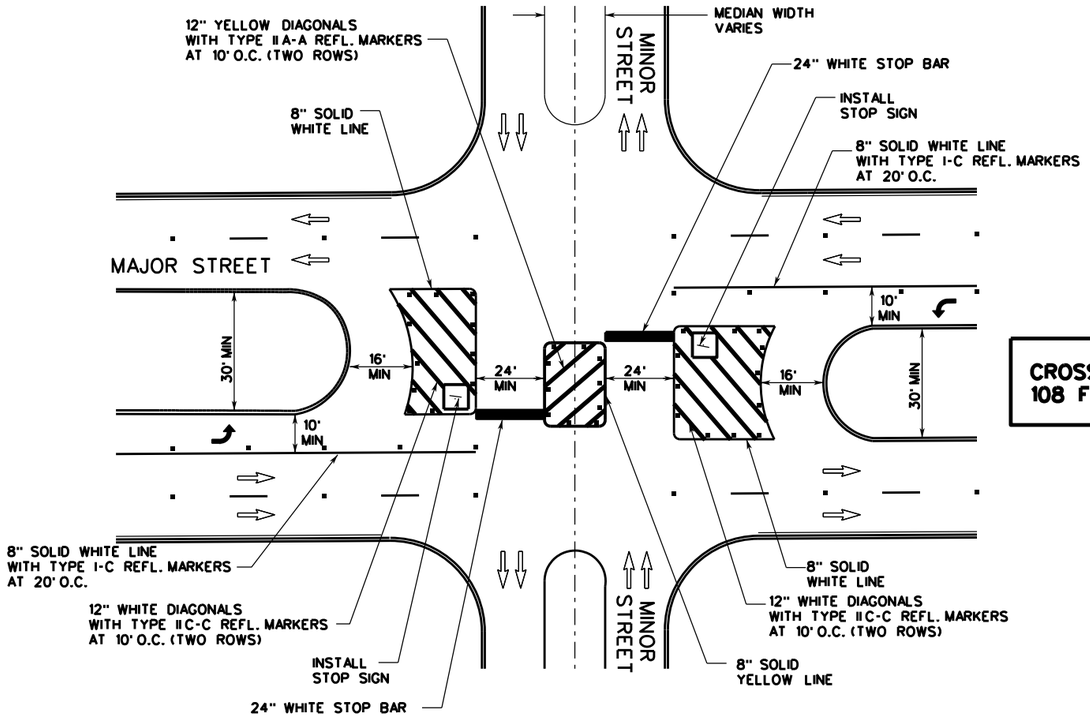
SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC ENGINEERING STANDARDS
STANDARD CROSS-OVER MEDIAN OPENING 1
SHEET 14 OF 16

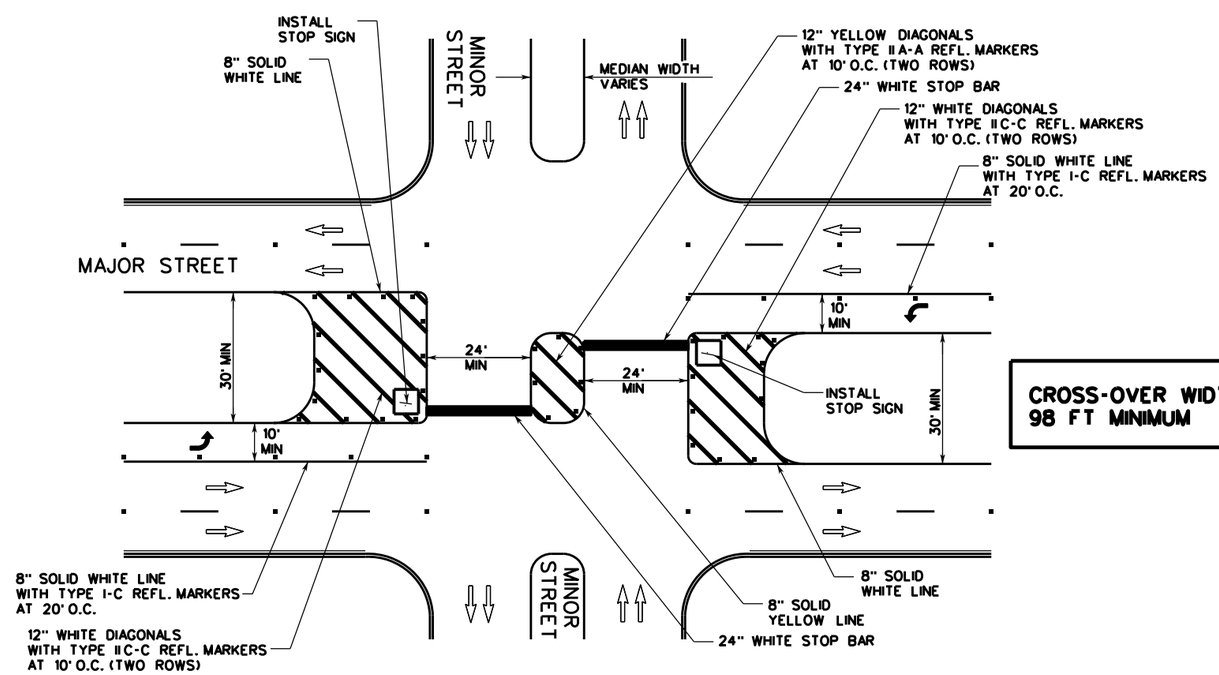
% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: LAN	DSGN. BY: C.R.V.	CHKD. BY: M.E.	SHEET NO.: 34 OF 60

CROSS-OVER MEDIAN OPENING WITH TURN AROUND STRIPING FOUR-WAY INTERSECTION



CROSS-OVER WIDTH 108 FT MINIMUM

CROSS-OVER MEDIAN OPENING WITHOUT TURN AROUND STRIPING FOUR-WAY INTERSECTION



CROSS-OVER WIDTH 98 FT MINIMUM

NOTE:

1. REFER TO LEFT TURN "ONLY" AND ARROW SPACING WORKSHEET.
2. SEE MISC. CROSS-OVER DETAIL FOR APPLICABLE INFORMATION.
3. ALL MEDIANS SHALL BE FIELD MEASURED TO DETERMINE THE LOCATION OF NECESSARY STRIPING. STOP BARS AND CENTERLINES SHALL BE PLACED WHEN THE MEDIAN WIDTH IS GREATER THAN 30 FT.
4. THE MEDIAN WIDTH IS DEFINED AS THE AREA BETWEEN TWO ROADWAYS OF A DIVIDED HIGHWAY MEASURED FROM EDGE OF TRAVELED WAY TO EDGE OF TRAVELED WAY. THE MEDIAN EXCLUDES TURN LANES.
5. THE MEDIAN WIDTH MIGHT BE DIFFERENT BETWEEN INTERSECTIONS, INTERCHANGES AND OF OPPOSITE APPROACHES OF THE SAME INTERSECTION.
6. THE NARROW MEDIAN WIDTH WILL BE THE CONTROLLING WIDTH TO DETERMINE IF MARKINGS ARE REQUIRED.

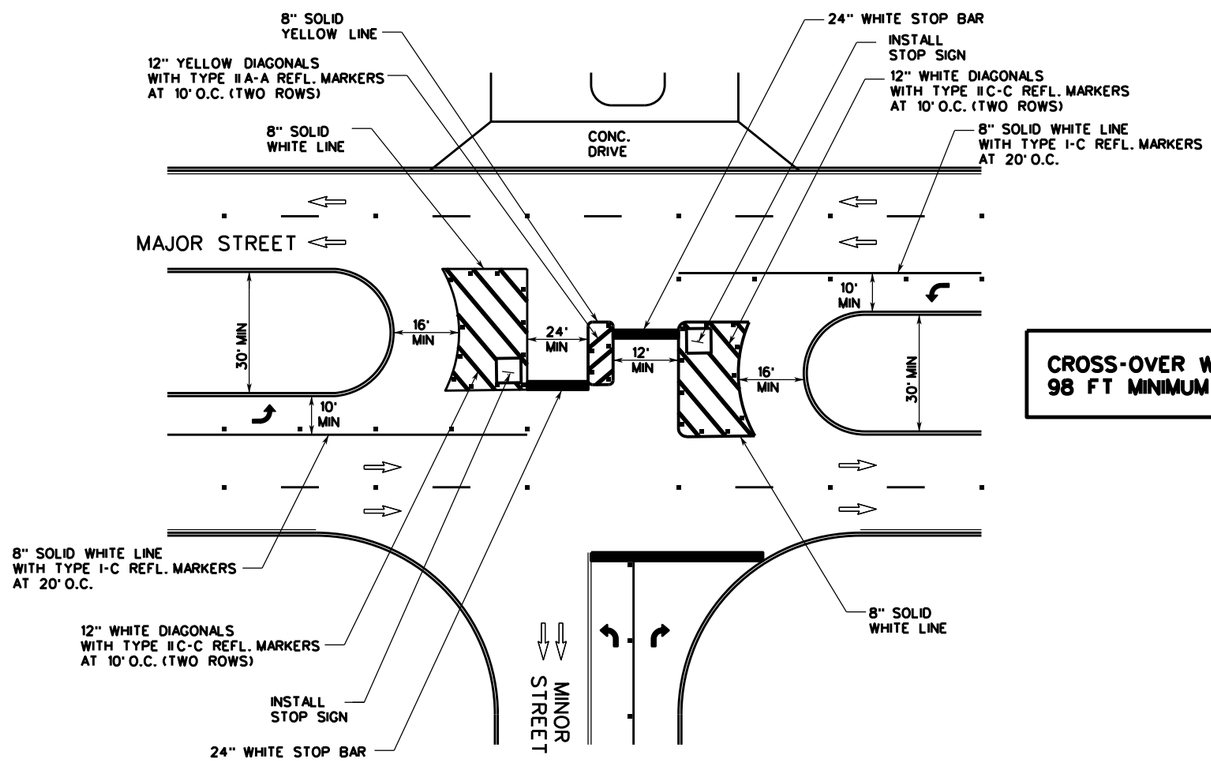
SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC ENGINEERING STANDARDS
STANDARD CROSS-OVER MEDIAN OPENING 2
SHEET 15 OF 16

% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V. CHKD. BY: M.E.	SHEET NO.: 35 OF 60

CROSS-OVER MEDIAN OPENING WITH TURN AROUND STRIPING "TEE" INTERSECTION



CROSS-OVER WIDTH 98 FT MINIMUM

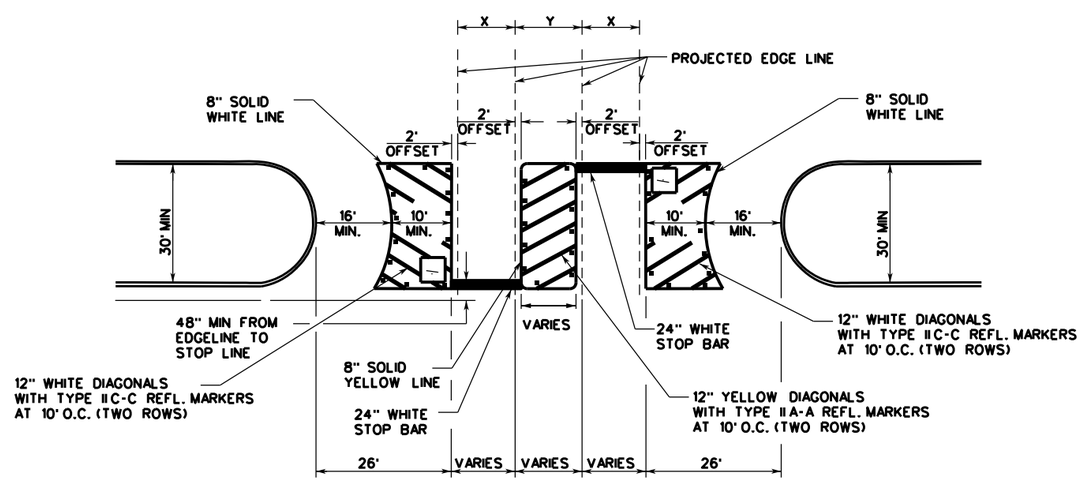
NOTE:

1. REFER TO LEFT TURN "ONLY" AND ARROW SPACING WORKSHEET.
2. SEE MISC. CROSS-OVER DETAIL FOR APPLICABLE INFORMATION.
3. ALL MEDIANS SHALL BE FIELD MEASURED TO DETERMINE THE LOCATION OF NECESSARY STRIPING. STOP BARS AND CENTERLINES SHALL BE PLACED WHEN THE MEDIAN WIDTH IS GREATER THAN 30 FT.
4. THE MEDIAN WIDTH IS DEFINED AS THE AREA BETWEEN TWO ROADWAYS OF A DIVIDED HIGHWAY MEASURED FROM EDGE OF TRAVELED WAY TO EDGE OF TRAVELED WAY. THE MEDIAN EXCLUDES TURN LANES.
5. THE MEDIAN WIDTH MIGHT BE DIFFERENT BETWEEN INTERSECTIONS, INTERCHANGES AND OF OPPOSITE APPROACHES OF THE SAME INTERSECTION.
6. THE NARROW MEDIAN WIDTH WILL BE THE CONTROLLING WIDTH TO DETERMINE IF MARKINGS ARE REQUIRED.

MISCELLANEOUS CROSS-OVER DETAIL WITH TURN AROUND STRIPING

NOTE:

1. X - ROADWAY WIDTH AND NUMBER OF LANES VARIES
2. Y - MEDIAN WIDTH VARIES



SEPTEMBER 2009

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC ENGINEERING STANDARDS
STANDARD CROSS-OVER MEDIAN OPENING 3
SHEET 16 OF 16

% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: LAN	DSGN. BY: C.B.V.	CHKD. BY: M.E.	SHEET NO.: 36 OF 60

TRAFFIC NOTES

TRENCHING / EXCAVATING

The following notes shall apply to excavations of trenches or pits that are located in the pavement or are within six (6) feet of the edge of roadway:

1.) Trench walls shall not be closer than three (3) feet from the edge of the traveled way at any stage of construction.

2.) Traffic control devices shall be in place before starting any excavation.

3.) Trenches or pits will not be permitted to be bridged by steel plates and open to traffic unless they are temporarily backfilled to finished street grade.

4.) For pits or trenches along or in a roadway that are going to be left open over night that are zero to fifty (0 – 50) feet in length, the following applies. GUARD RAIL OR CONCRETE BARRIER SHALL BE USED.

5.) For pits or trenches along or in roadway that are going to be left open over night and are longer than 50 feet in length. CONCRETE BARRIERS MUST BE USED.

6.) Plastic construction fencing shall be required for any trench or pit left open over night.

7.) When using any guardrail or concrete barrier, protected end must be used as per the TEXAS–M.U.T.C.D.

8.) For vertical drop–offs greater than two (2) feet along roadway, low profile concrete with appropriate end protection must be installed.

9.) All concrete barriers placed on City R.O.W shall be low profile. No high profile barriers will be allowed.

REFLECTIVE SHEETING

The reflectorized white and reflectorized orange stripes for channelizing devices such as barricade drums and vertical panels shall be constructed of reflective sheeting meeting the color and retro–reflectivity requirements of high intensity, unless otherwise specified in the plans.

MAINTENANCE

1.) All traffic signs shall be kept in proper position, clean and legible at all times. Damaged barricades, signs, and other traffic control devices shall be replaced without undue delay.

2.) To ensure adequate maintenance, a suitable schedule for inspection, cleaning, and replacement of barricades, lights, and signs shall be established.

3.) Special attention and necessary action shall be taken to see that weeds, trees, shrubbery and construction materials do not obscure the face of any sign or barricades.

TRAINING

Each person whose actions affect maintenance and construction zone safety, from the upper–level management personnel through construction and maintenance field personnel, should receive training appropriate to the job decision each individual is required to make. Only those individuals who are qualified by means of adequate training in safe traffic control practices and have a basic understanding of the principles established by applicable standards and regulations, including those of the TEXAS M.U.T.C.D. should supervise the selection, placement, and maintenance of traffic control devices in maintenance and construction areas.

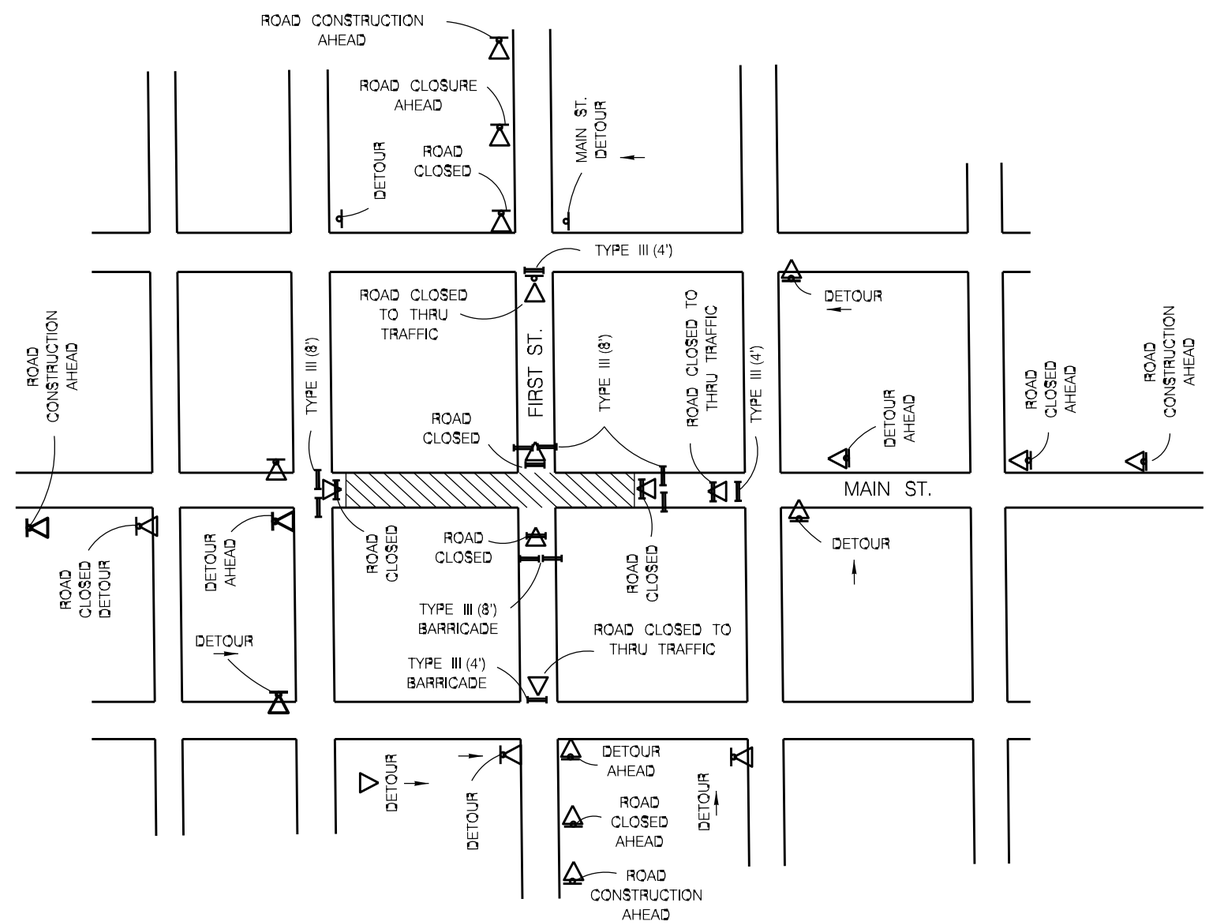
SPECIAL EVENTS BARRICADING

All Type I, (8') barricades used for special events (Dome, Runs, Walks, Parades etc.) shall be a minimum of 42" high and 96" wide. Any necessary signs will require proper sign stands.

USE OF CITY R.O.W.

The City of San Antonio reserves the right to allow contracting and barricading sub–contractors to use the City's R.O.W. The City also reserves the right to advise contractors and barricading sub–contractors to remove stored or unused traffic control devices from the City of San Antonio R.O.W. It is the barricading sub–contractor's responsibility to remove any traffic control device from City's R.O.W. when instructed to do so by a City representative.

CLOSURE DIAGRAMS



TYPICAL INTERSECTING STREET CLOSURE FOR TWO LANE STREETS

NOTE:
ALL SIGNS WILL BE MOUNTED ON SIGN SUPPORTS ONLY

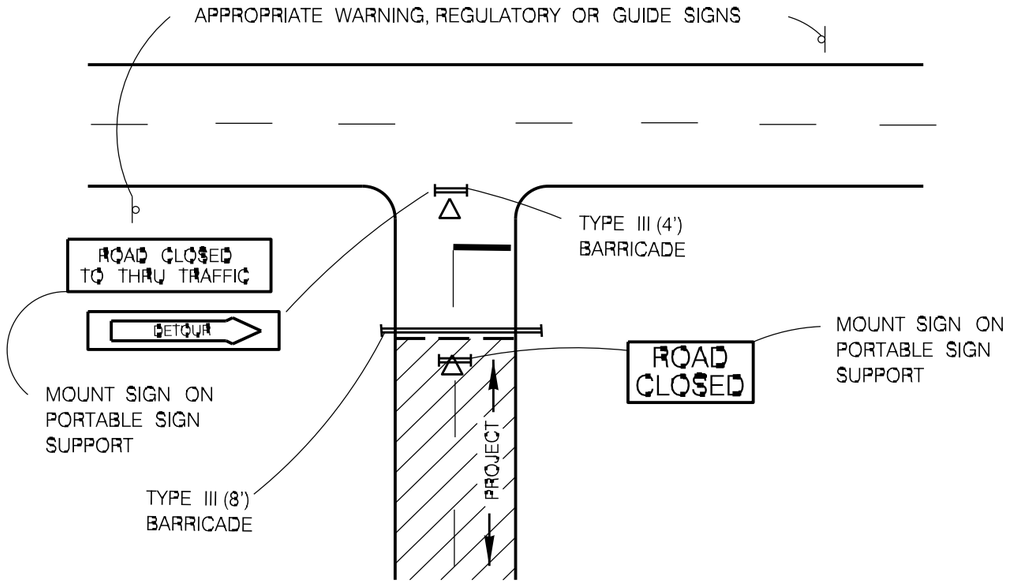
THE ORIGINAL OF THIS DRAWING WAS SIGNED AND SEALED BY JOHN D. FRIEBELE, #46394 ON 06–20–05 AND IS ON FILE WITH THE TRAFFIC ENGINEERING DIVISION OF THE PUBLIC WORKS DEPARTMENT, CITY OF SAN ANTONIO.

JUNE 2005

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

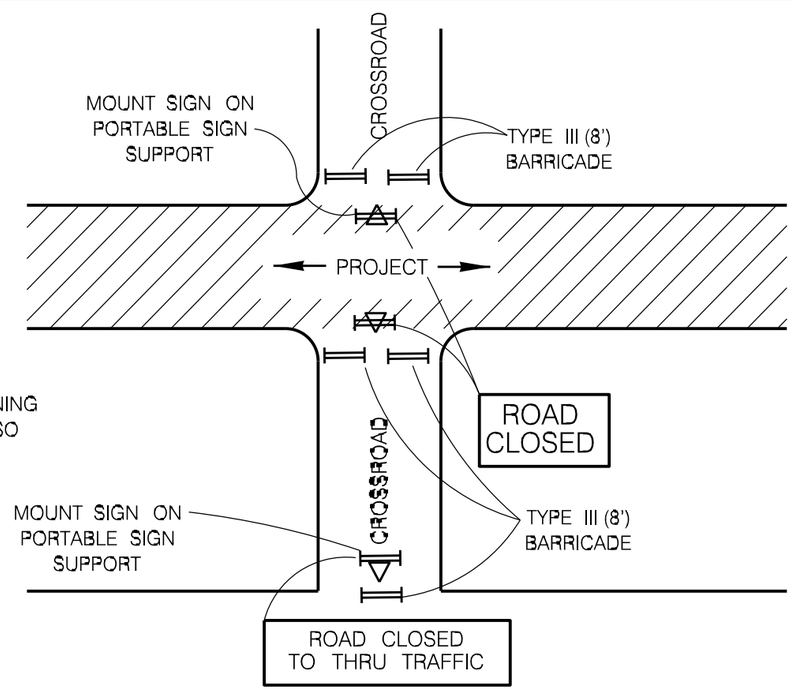
TRAFFIC STANDARDS
BARRICADE AND CONSTRUCTION STANDARDS
SHEET 1 OF 4

% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: A.F.G.	DSGN. BY: E.N.M.	CHKD. BY: J.D.F./E.N.M.	SHEET NO.: 37 OF 60



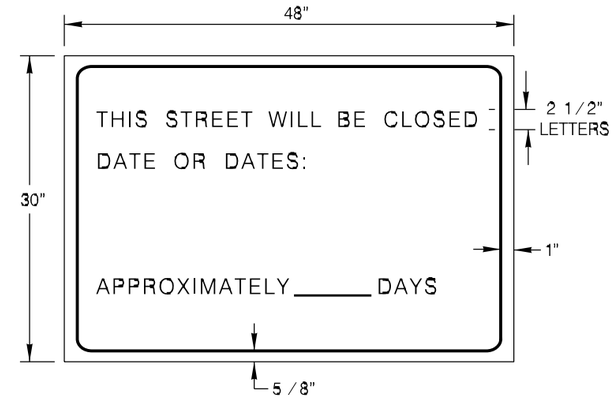
PROJECT LIMITS FOR CLOSED ROADWAY

BARRICADES SHALL BE ERECTED COMPLETELY ACROSS ROADWAY. CHANNELIZING DEVICES MAY BE DRUMS, VERTICAL PANELS OR CONES AS SPECIFIED IN THE PLANS

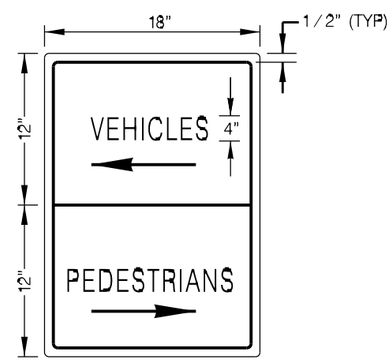


NOTE:
ADVANCE WARNING SIGNS WILL ALSO BE NECESSARY

CROSS STREET SIGNING AND BARRICADING TOTALLY CLOSED

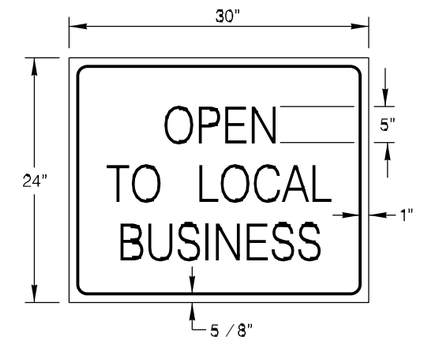


LETTERS– BLACK
BORDER– BLACK
BACKGROUND– ORANGE



LETTERS– BLACK
BORDER– BLACK
BACKGROUND– ORANGE
SPACING–3 SIGNS PER BLOCK

DIRECTION OF ARROWS ARE REVERSIBLE



LETTERS– WHITE
BORDER– WHITE
BACKGROUND– BLUE REFLECTIVE

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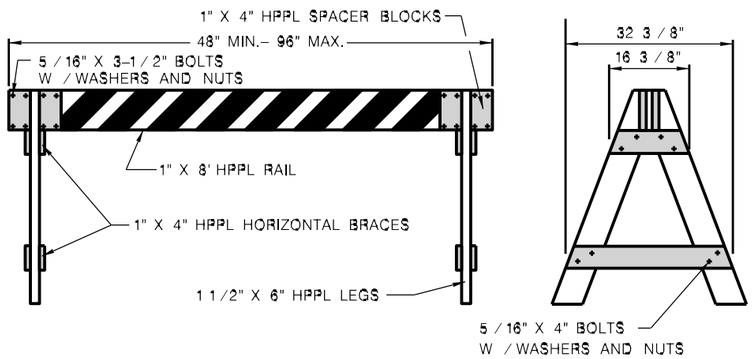
JUNE 2005

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC STANDARDS
BARRICADE AND CONSTRUCTION STANDARDS
SHEET 2 OF 4

% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: A.F.G.	DSGN. BY: E.N.M.	CHKD. BY: J.D.F./E.N.M.	SHEET NO.: 38 OF 40

TYPE I BARRICADE



1.) Only the following Type I barricade shall be used in the City of San Antonio Right–Of–Way:

A. 1" x 8" plastic rail with 2" x 6" wooden legs.

B. 1" x 8" wooden rail with plastic legs.

C. 1" x 8" wooden rail with 2" x 6" wood legs.

D. No screws allowed for assembly of A–legs or rail.

E. Warning lights will be used as directed by the Traffic Engineer.

F. All Type I (4') barricades will be a minimum of 36" high and 60" wide. (For Construction Use Only)

G. All Type I (8') barricades with wooden legs shall be 2" X 6" wood only.

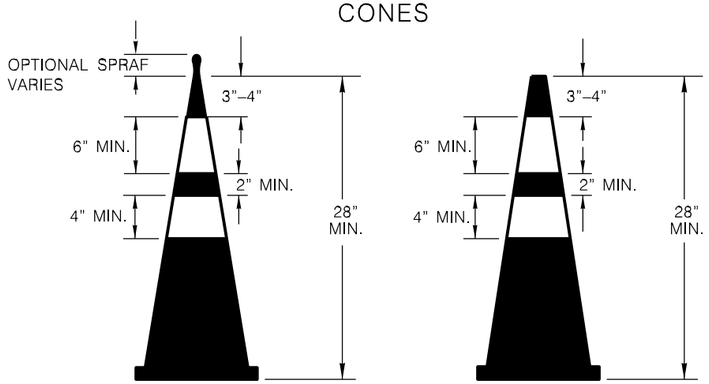
H. All Type I (4') barricades with wooden legs shall be 1" X 8" wood only.

2.) Type I Barricades shall not be used for partial and total street closures in construction work zones. Only Type III barricades shall be used for this purpose.

3.) Warning lights shall not be mounted on Type I barricades.

(See TxDOT BC–03 Sheets for specific construction information)

CONES

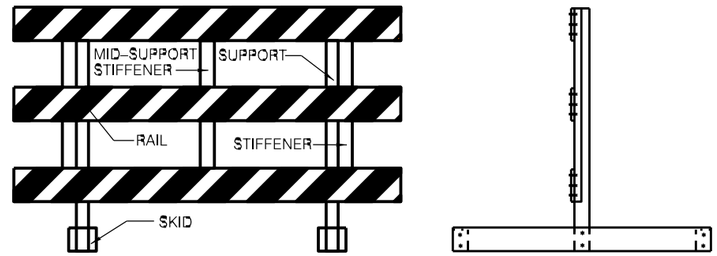


1.) Base for 28" high cones must weigh at least 9.5 lbs.

2.) Night time cones must have reflective collars.

(See TxDOT BC–03 Sheets for specific construction information)

Type III BARRICADE



1.) Only the following Type III barricade shall be used in the City of San Antonio Right–Of–Way.

A. Hollow polyvinyl or fiberglass tubing post with 1" X 8" wooden rails.

B. Hollow polyvinyl or fiberglass tubing post with plastic rails.

C. Skids must be wood or solid plastic only.

D. Warning lights shall not be mounted on Type III barricades.

(See TxDOT BC–03 Sheets for specific construction information)

TEMPORARY MARKINGS

1.) Solid double yellow painted lines shall be installed for temporary division of traffic or construction duration longer than five (5) days, with repainting to occur once monthly or at the discretion of the Traffic Engineer. (All cost of upkeep will be at the contractor's expense.)

2.) Solid double yellow tabs, or V/P panels shall be installed for temporary division of traffic for construction duration less than five (5) days, with re–tabbing to occur at the discretion of the Traffic Engineer.
NAILS SHALL NOT BE USED TO FIX TABS TO CEMENT OR BASE
(All cost of upkeep will be at the contractor's expense.)

(See TxDOT BC–03 Sheets for specific construction information.)

TEMPORARY CONCRETE BARRIER

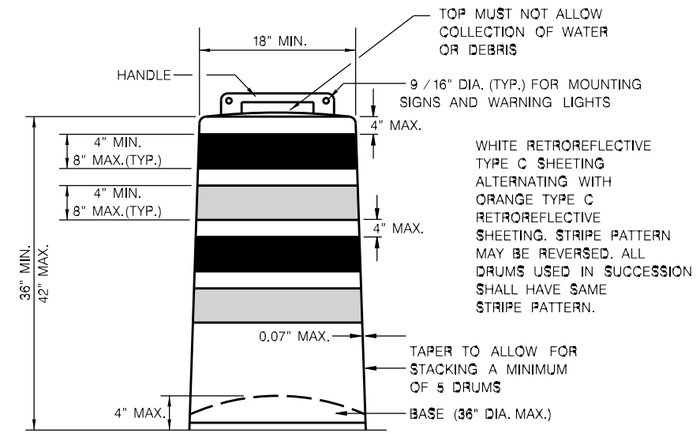
1.) All concrete barriers placed on City R.O.W. shall be low profile.

2.) No high profile barriers will be allowed.

3.) Reflectors will be required on each concrete barrier.

(See TxDOT BC–03 Sheets for specific construction information)

PLASTIC DRUMS



1.) 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).

2.) 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.

3.) The Engineer/Inspector shall provide written notice to the Contractor regarding the replacement of drums or other traffic control devices. The Contractor shall have a maximum of 24 hours to replace any plastic drums or other traffic control devices identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

4.) Each drum must have a 40 lb. rubber or plastic snap on.

5.) No signs larger than 18" X 24" will be allowed to be mounted on plastic drums.

6.) No warning lights will be allowed to be mounted on plastic barrels.

7.) In lieu of a warning light, a yellow reflector will be acceptable.

(See TxDOT BC–03 Sheets for specific construction information)

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JUNE 2005

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC STANDARDS
BARRICADE AND CONSTRUCTION STANDARDS
SHEET 3 OF 4

% SUBMITTAL	PROJECT NO.:	DATE:
DRWN. BY: A.F.G.	DSGN. BY: E.N.M. CHKD. BY: J.D.F./E.N.M.	SHEET NO.: 39 OF 60

SIGNS

1.) A maximum of two signs can be mounted on any one Long / Intermediate Term Stationary Portable Sign Support.

2.) 48" X 48" signs shall be mounted separately on the Long / Intermediate Term Stationary Portable Sign Support.

3.) For Short Term Stationary Portable Sign Support the distance from the bottom of the vinyl sign to the exiting ground must be one (1) foot.

4.) Long / Intermediate Term Stationary Portable Signs must be made of wood or plastic only.

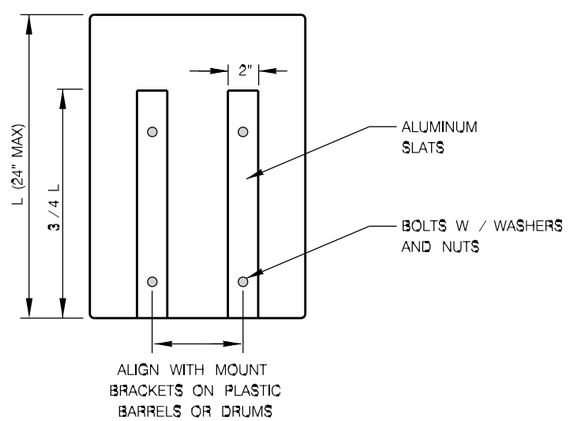
5.) No signs shall be mounted to any Type I, Type III, or folding barricades.

6.) Signs shall be mounted only on TxDOT approved sign supports.

7.) Detour signs will be mounted on single "D" legs w / 7' clearance from the bottom of the sign.

8.) WORK DURATION TERMINOLOGY
Long Term Stationary = occupies a location 3 or more days.
Intermediate–Term Stationary = occupies a location for overnight to 3 days.
Short Term Stationary = daylight work that occupies a location from 1 to 12 hours.
Short Duration = occupies a location up to 1 hour.

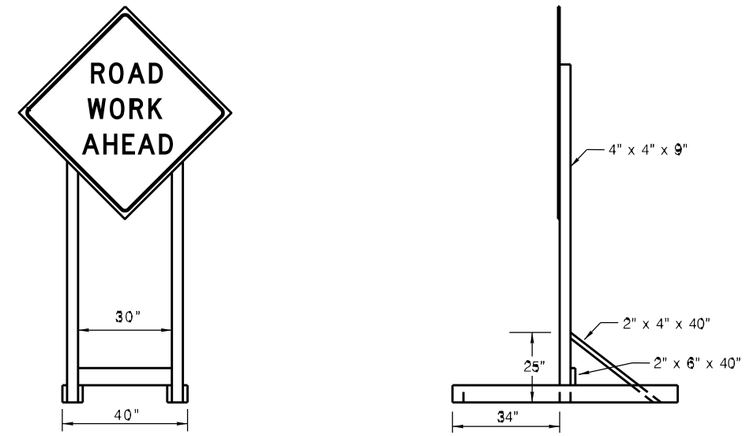
9.) Signs shall adhere to the following requirements:
- Signs placed on plastic barrels or drums shall be made of ABS plastic or plywood.
- Signs placed on skids shall be made of plywood or aluminum.
- Aluminum signs shall have a minimum thickness of 0.08".
- Plywood signs shall have a minimum thickness of 1 / 2".
- ABS Plastic signs shall have a minimum thickness of 0.13". Plastic signs cannot exceed 18" by 24" in size and shall be reinforced with 2" wide, 0.08" thick aluminum slats, as depicted below:



- No other material shall be accepted without the express written approval of the Traffic Engineer.

(See TxDOT BC–03 Sheets for specific construction information.)

LONG TERM / INTERMEDIATE TERM SIGN SUPPORT



1.) 48" X48" signs must be mounted independently.

2.) A maximum of two signs can be mounted on any one long term / intermediate sign support.

3.) Sand bag all sign supports.

4.) Distance from the bottom of the sign to the existing ground shall be 7'.

5.) Distance from the header barricade rail to the face of the sign panel shall be 2' min. and 10' max.

6.) Steel tripods shall not be allowed.

(See TxDOT BC–03 Sheets for specific construction information)

THE ORIGINAL OF THIS DRAWING WAS SIGNED AND SEALED BY JOHN D. FRIEBELE, #46394 ON 06–20–05 AND IS ON FILE WITH THE TRAFFIC ENGINEERING DIVISION OF THE PUBLIC WORKS DEPARTMENT, CITY OF SAN ANTONIO.

JUNE 2005

CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

TRAFFIC STANDARDS
BARRICADE AND CONSTRUCTION STANDARDS
SHEET 4 OF 4

% SUBMITTAL	PROJECT NO.:		DATE:
DRWN. BY: A.F.G.	DSGN. BY: E.N.M.	CHKD. BY: J.D.F. / E.N.M.	SHEET NO.: 40 OF 40

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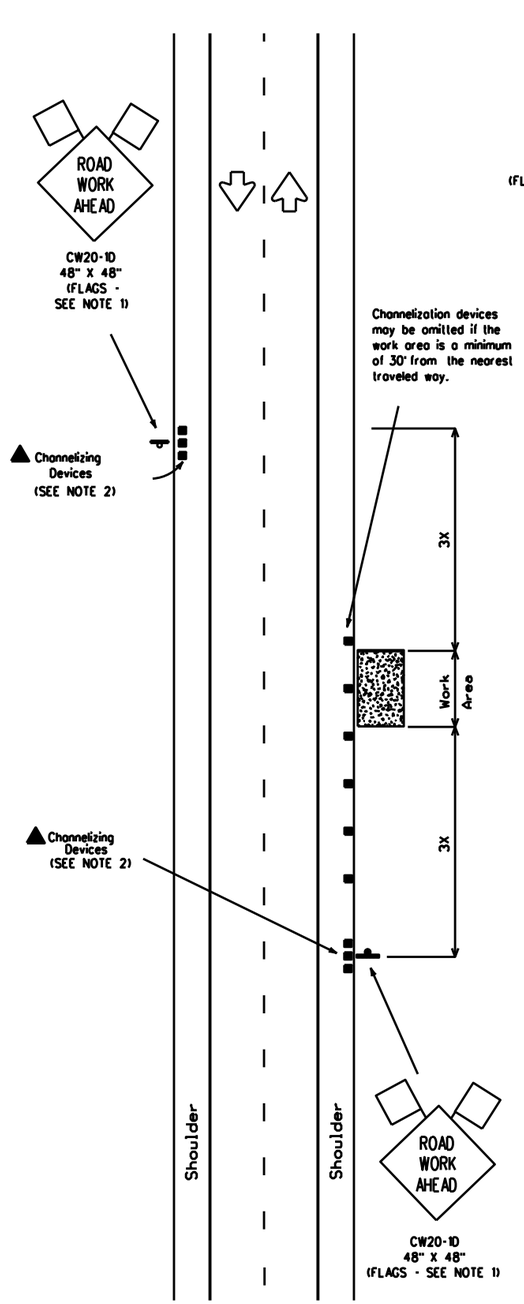
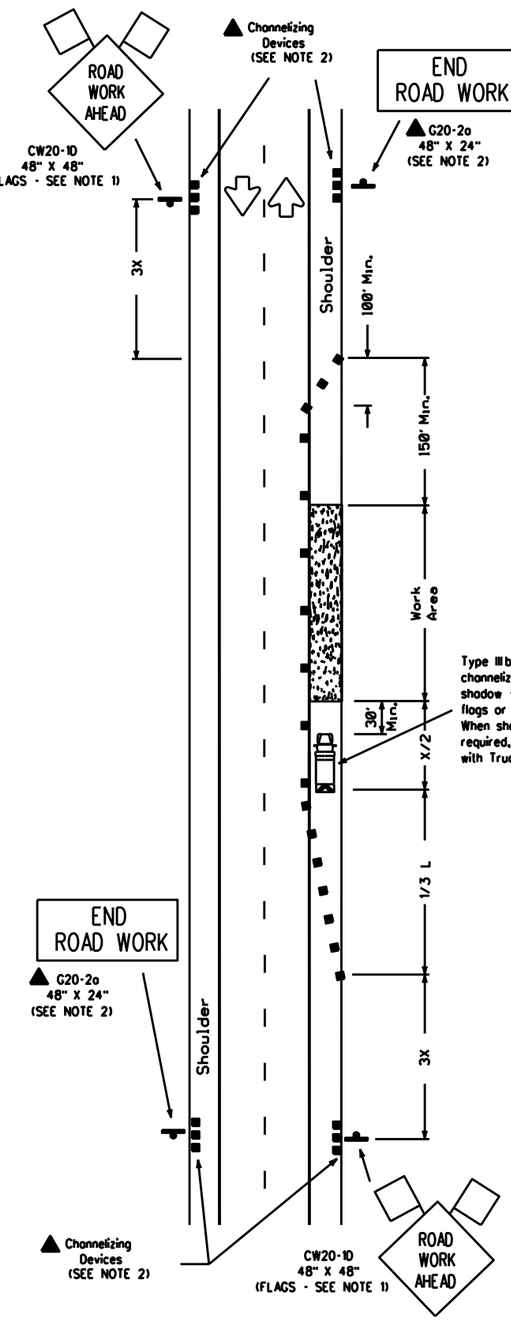


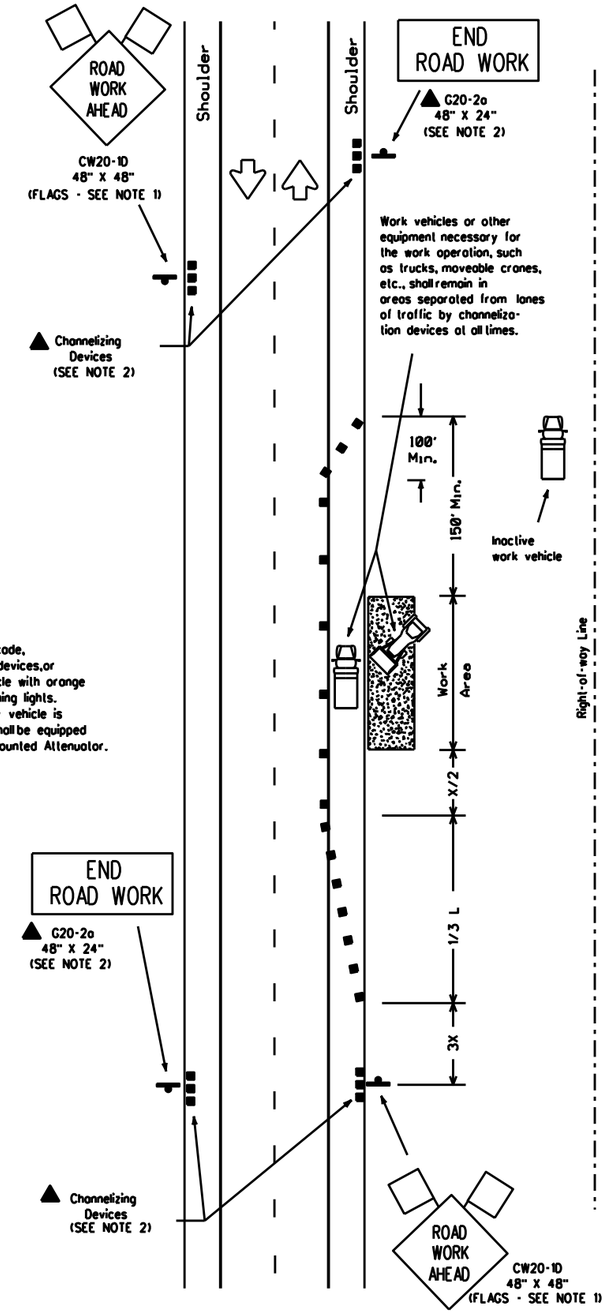
TCP (1-1a)

Work Area Near Shoulder



TCP (1-1b)

Work Area on Shoulder



TCP (1-1c)

Work Vehicles on Shoulder

LEGEND

- Type III Barricade
- Channelizing Devices
- Flag
- Heavy Work Vehicle
- Truck Mounted Attenuator
- Trailer Mounted Flashing Arrow Panel
- Portable Changeable Message Sign
- Flagger
- Sign Post

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent	Minimum Sign Spacing * Distance
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'	120'
35		205'	225'	245'	35'	70'-90'	160'
40		265'	295'	320'	40'	80'-100'	240'
45	L=WS	450'	495'	540'	45'	90'-110'	320'
50		500'	550'	600'	50'	100'-125'	400'
55		550'	605'	660'	55'	110'-140'	500'
60		600'	660'	720'	60'	120'-150'	* 600'
65		650'	715'	780'	65'	130'-165'	* 700'
70		700'	770'	840'	70'	140'-175'	* 800'

* 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. Unless otherwise stated in the plans, flags attached to signs 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.
3. On high speed facilities advance warning signs should be installed approximately 3X from the work area or from the beginning of a lane or shoulder taper. On low speed facilities the advance warning signs should be placed based on the "X" minimum distance.
4. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.

Only pre-qualified products shall be used. A list of compliant products and their sources may be obtained by writing or fasing:

Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3335
Fax (512) 416-3161
E-mail TRF-STANDARD@mailgw.dot.state.tx.us

The requirement for shadow vehicles will be listed in the project GENERAL NOTES, Item 502, Barricades, Signs and Traffic Handling.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN

TCP(1-1)-98

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DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
			41

REVISIONS
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1-97
4-98

DATE:
FILE:

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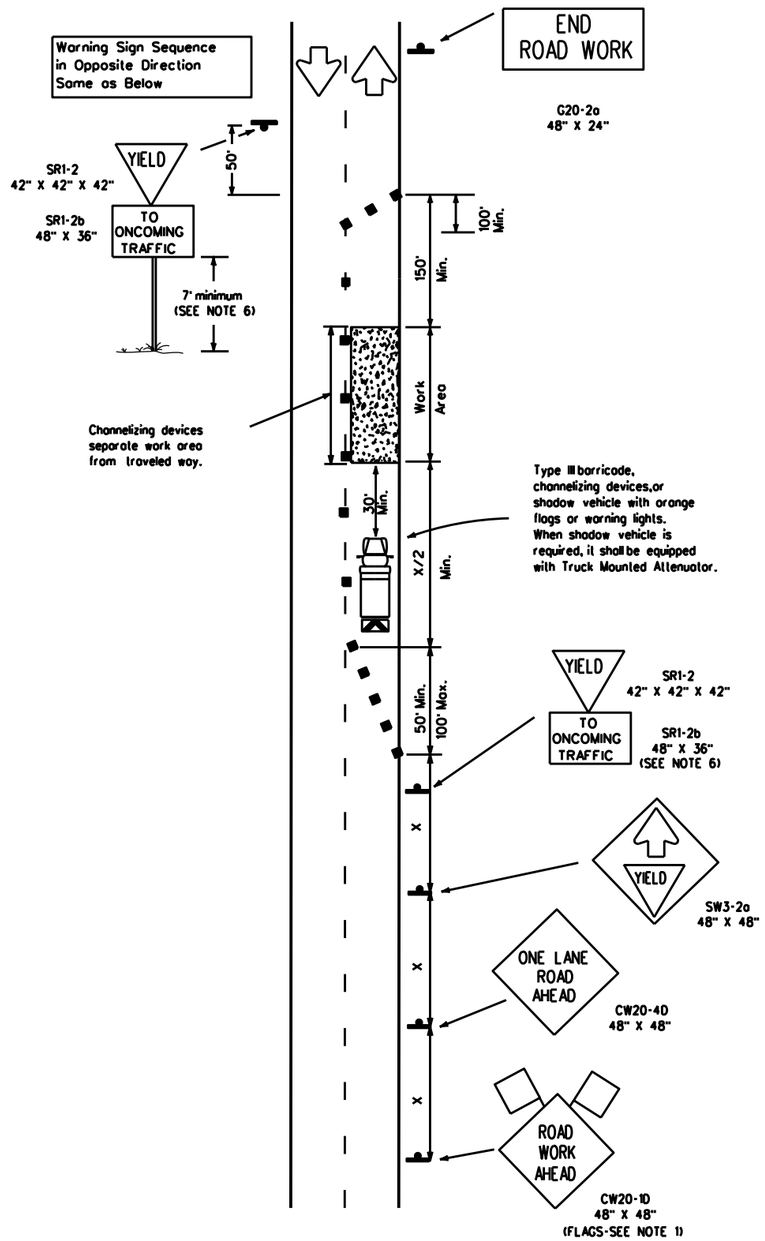
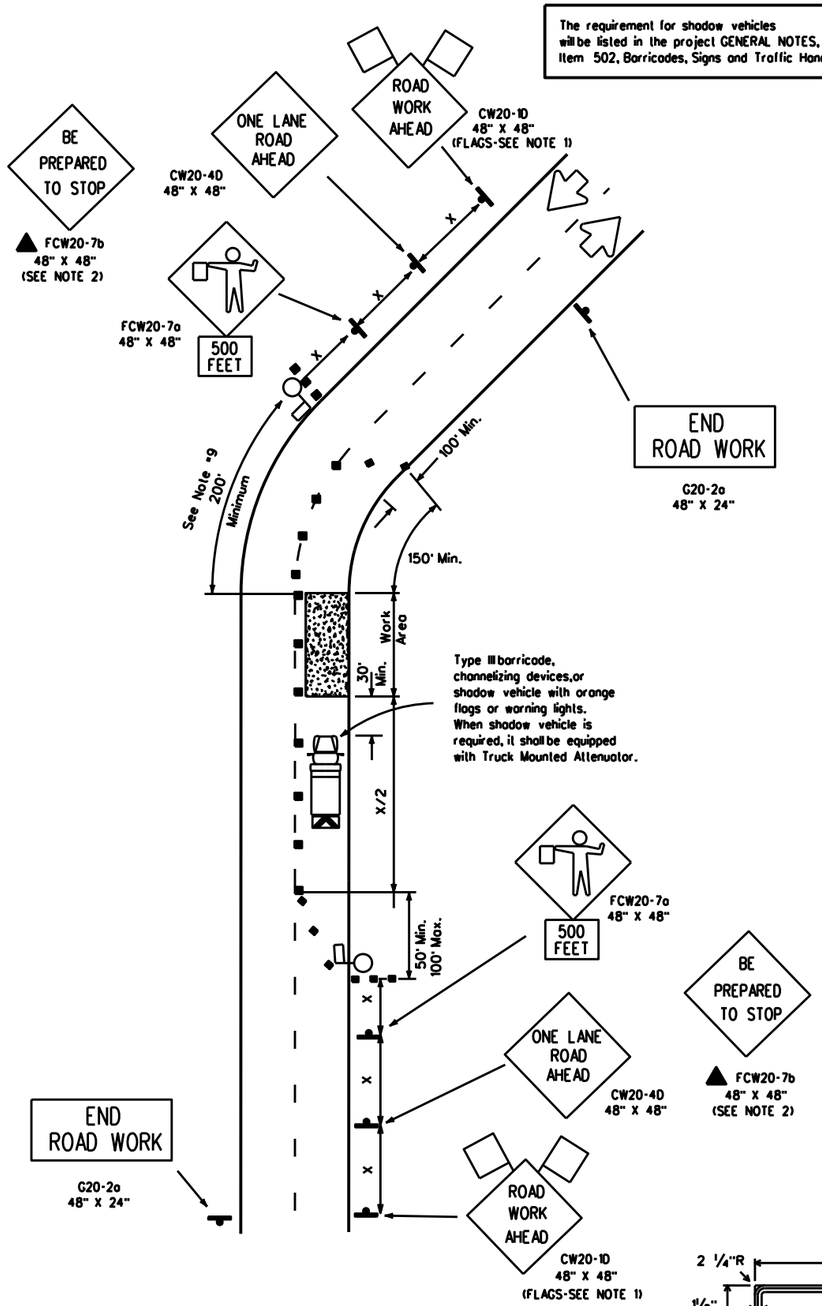


TCP (1-2a)

One Lane Closed
Adequate Field of View

The requirement for shadow vehicles will be listed in the project GENERAL NOTES, Item 502, Barricades, Signs and Traffic Handling.



TCP (1-2b)

One Lane Closed
Inadequate Field of View

LEGEND

Type III Barricade
Channelizing Devices
Flag
Heavy Work Vehicle
Truck Mounted Attenuator
Trailer Mounted Flashing Arrow Panel
Portable Changeable Message Sign
Flagger
Sign Post

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent	Minimum Sign Spacing * Distance
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'	120'
35		205'	225'	245'	35'	70'-90'	160'
40		265'	295'	320'	40'	80'-100'	240'
45	L=WS	450'	495'	540'	45'	90'-110'	320'
50		500'	550'	600'	50'	100'-125'	400'
55		550'	605'	660'	55'	110'-140'	500'
60		600'	660'	720'	60'	120'-150'	* 600'
65		650'	715'	780'	65'	130'-165'	* 700'
70		700'	770'	840'	70'	140'-175'	* 800'

* 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 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.
3. The BE PREPARED TO STOP sign may be installed after the ONE LANE ROAD AHEAD sign, but proper sign spacing shall be maintained.
4. ROAD WORK AHEAD sign may be repeated if the visibility of the work zone is less than 1500'.

TCP(1-2a)

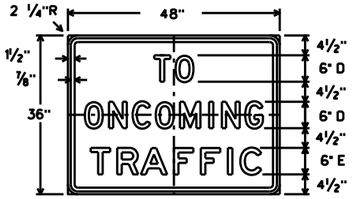
5. YIELD sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work zones should be no longer than one half city block. In rural areas on roadways with less than 4000 ADT, work areas should be no longer than 400'.
6. YIELD TO ONCOMING TRAFFIC sign shall be placed on a support at a 7' minimum mounting height.

TCP(1-2b)

7. Flaggers should use two-way radios or other methods of communication to control traffic.
8. Length of work area should be based on the ability of flaggers to communicate.
9. Distance along curve of work area should be adequate length for motorists to identify and react to flagger signals.

Only pre-qualified products shall be used. A list of compliant products and their sources may be obtained by writing or faxing:

Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3335
Fax (512) 416-3161
E-mail TRF-STANDARDS@mail.dot.state.tx.us



SR1-2b
48" x 36"

Letters - Black
Background - White
Reflective

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN

TCP(1-2)-98

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DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

REVISIONS
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CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
			42

DATE:
FILE:

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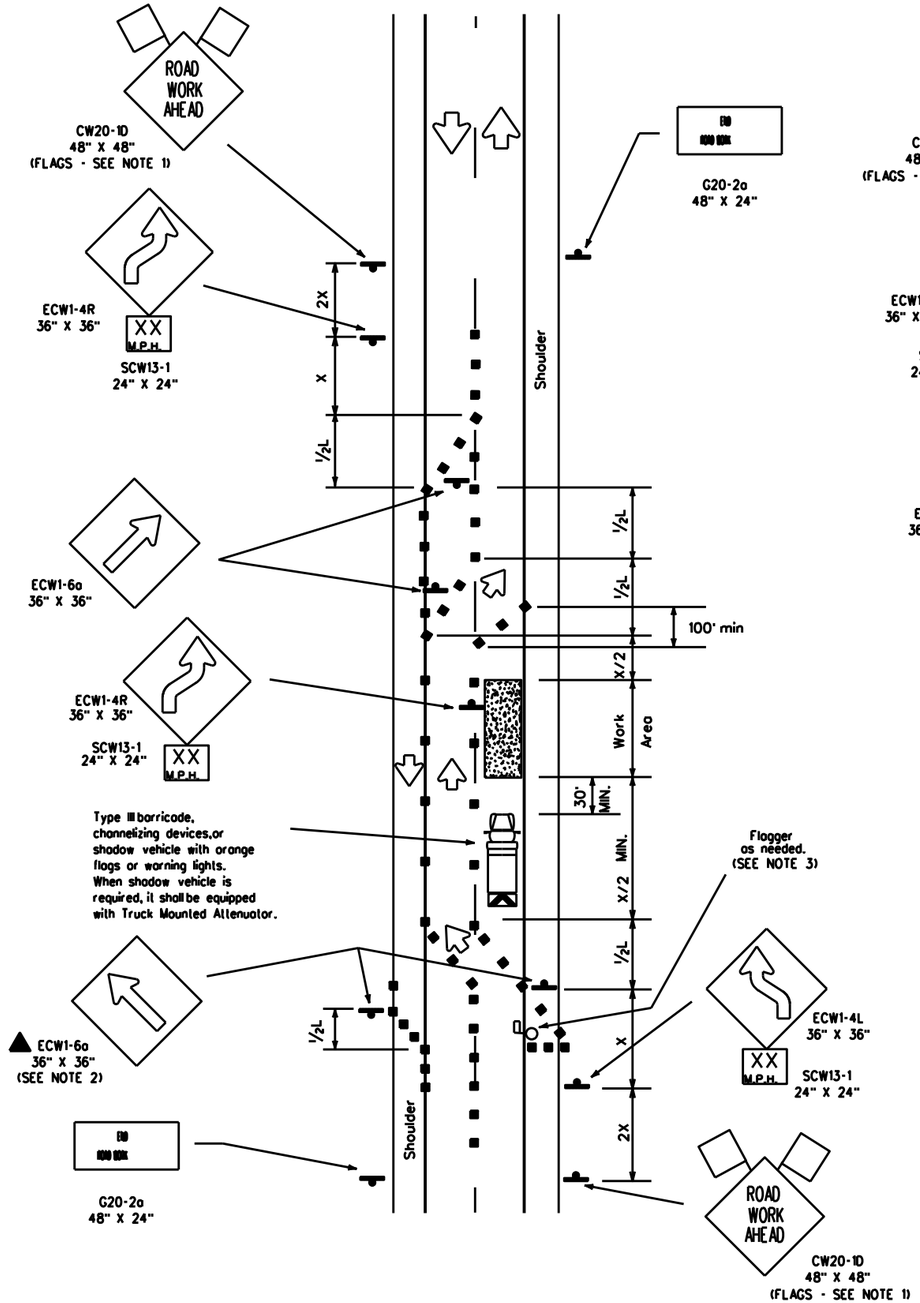
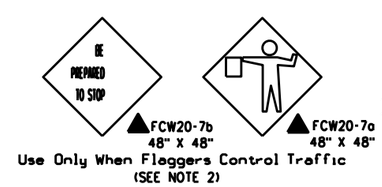
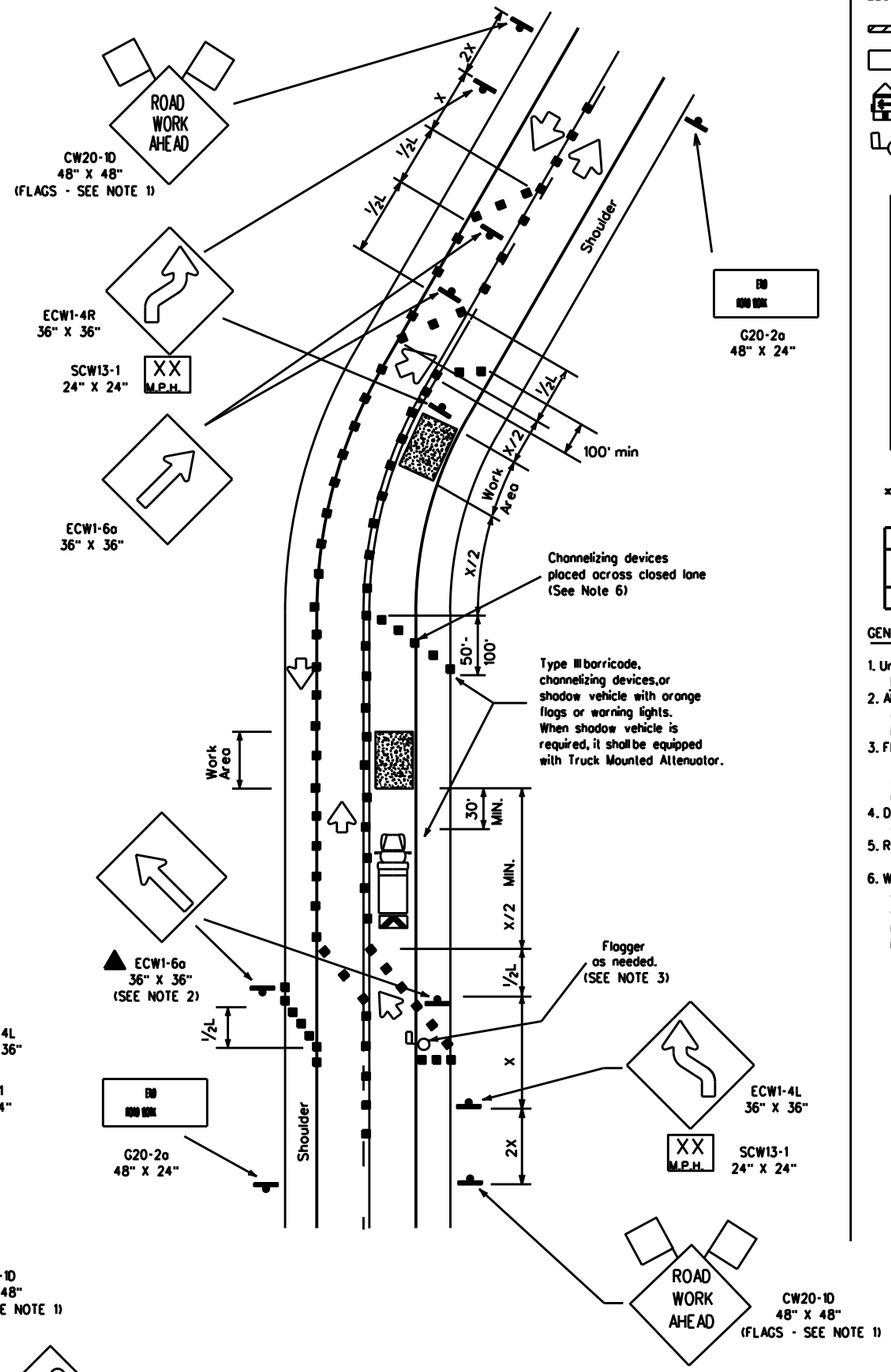


TCP (1-3a)
2-Lane Roadway With Paved Shoulders
One Lane Closed
Adequate Field of View





TCP (1-3b)
2-Lane Roadway With Paved Shoulders
One Lane Closed
Inadequate Field of View

LEGEND

Type III Barricade — Channelizing Devices — Flag
Heavy Work Vehicle — Truck Mounted Attenuator
Trailer Mounted Flashing Arrow Panel — Portable Changeable Message Sign
Flagger — Sign Post

Posted Speed *	Formula	Minimum Desirable Taper Lengths * * 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent	Minimum Sign Spacing * Distance
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'	120'
35		205'	225'	245'	35'	70'-90'	160'
40		265'	295'	320'	40'	80'-100'	240'
45	L=WS	450'	495'	540'	45'	90'-110'	320'
50		500'	550'	600'	50'	100'-125'	400'
55		550'	605'	660'	55'	110'-140'	500'
60		600'	660'	720'	60'	120'-150'	* 600'
65		650'	715'	780'	65'	130'-165'	* 700'
70		700'	770'	840'	70'	140'-175'	* 800'

* 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. Unless otherwise stated in the plans, flags attached to signs 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.
3. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Additional flaggers should be positioned at end of traffic queues unless 24" x 24" STOP/SLOW paddle is used.
4. DO NOT PASS, PASS WITH CARE, and construction regulatory speed zone signs may be installed downstream of the ROAD WORK AHEAD signs.
5. ROAD WORK AHEAD sign may be repeated if the visibility of the work zone is less than 1500'.
6. When the work zone is made up of several work areas, 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' in urban areas and every 1/4 to 1/2 mile in rural areas.

Only pre-qualified products shall be used. A list of compliant products and their sources may be obtained by writing or faxing:

Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3335
Fax (512) 416-3161
E-mail TRF-STANDARD@mailgw.dot.state.tx.us

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Traffic Operations Division

TRAFFIC CONTROL PLAN

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CONT	SECT	JOB	HIGHWAY
DIST		COUNTY	SHEET NO.
			43

REVISIONS
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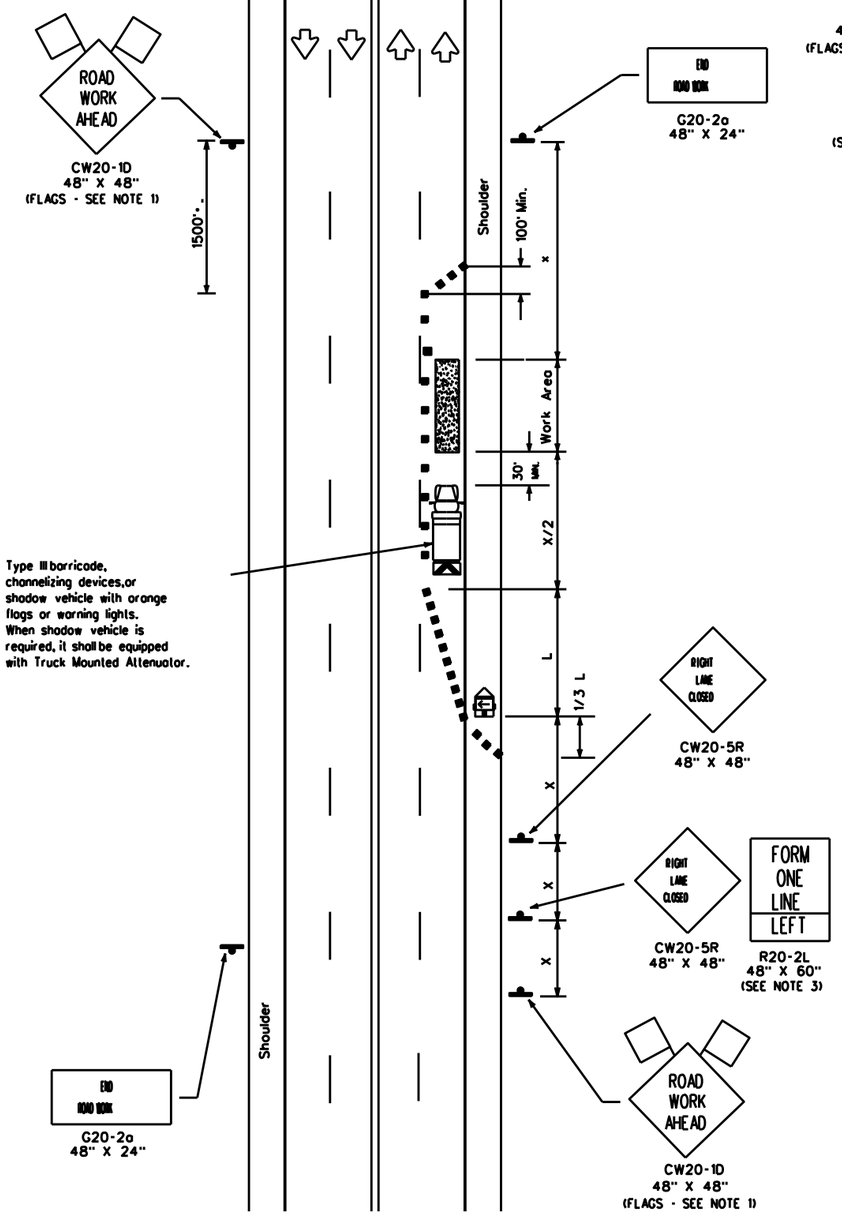
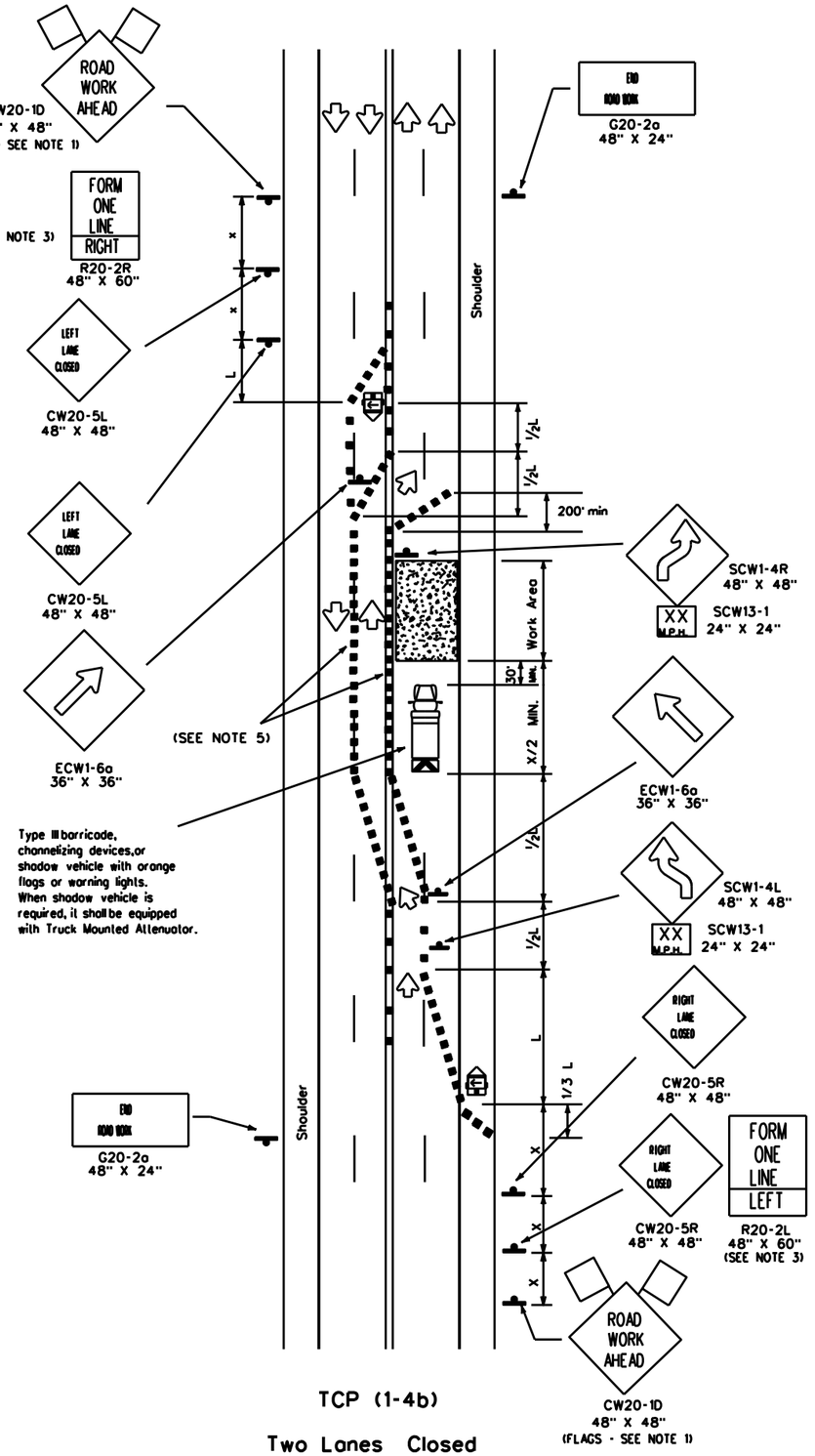


TCP (1-4a)

One Lane Closed



TCP (1-4b)

Two Lanes Closed

LEGEND

- Type III Barricade
- Channelizing Devices
- Flag
- Heavy Work Vehicle
- Truck Mounted Attenuator
- Trailer Mounted Flashing Arrow Panel
- Portable Changeable Message Sign
- Flagger
- Stop Post

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Device On a Taper	On a Tangent	Minimum Sign Spacing X Distance
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'-75'	120'
35		205'	225'	245'	35'	70'-90'	160'
40		265'	295'	320'	40'	80'-100'	240'
45	L=WS	450'	495'	540'	45'	90'-110'	320'
50		500'	550'	600'	50'	100'-125'	400'
55		550'	605'	660'	55'	110'-140'	500'
60		600'	660'	720'	60'	120'-150'	* 600'
65		650'	715'	780'	65'	130'-165'	* 700'
70		700'	770'	840'	70'	140'-175'	* 800'

* 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. Unless otherwise stated in the plans, flags attached to the signs 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.
3. The FORM ONE LANE LEFT sign may be used following the RIGHT LANE CLOSED sign. Spacing distance between signs should be the minimum distance indicated.
4. ROAD WORK AHEAD sign may be repeated if the visibility of the work zone is less than 1500'.
5. If pavement markings are not removed and traffic is directed over a double yellow centerline, the maximum spacing of channelizing devices in a tangent section should be no greater than 10 feet.

Only pre-qualified products shall be used. A list of compliant products and their sources may be obtained by writing or faxing:

Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3335
Fax (512) 416-3161
E-mail TRF-STANDARD@mailgw.dot.state.tx.us

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Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN

TCP(1-4)-98

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CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
			44

REVISIONS
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FILE:

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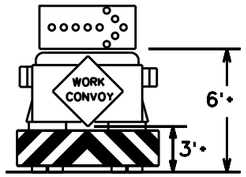
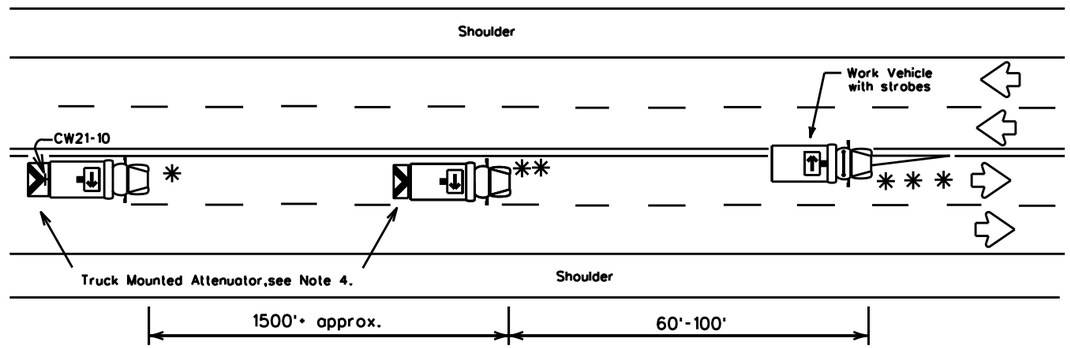
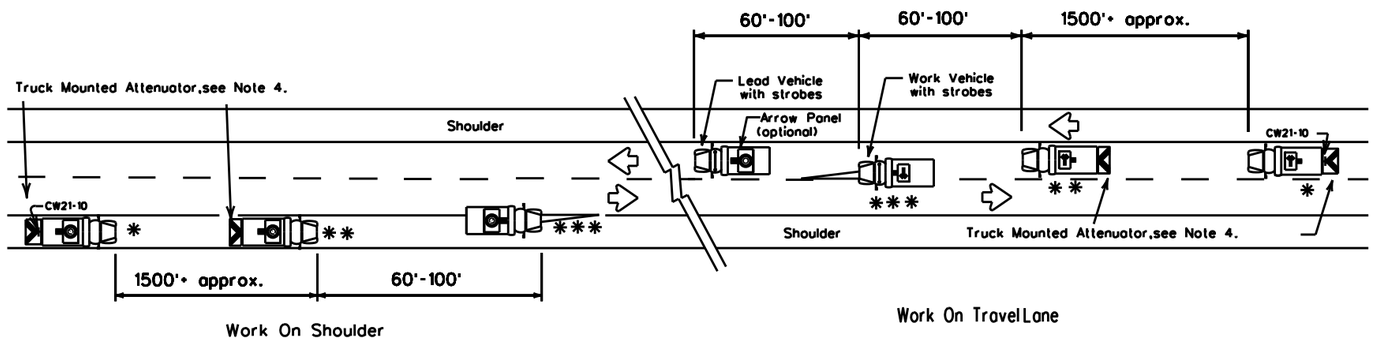


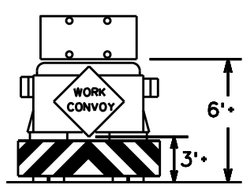
Typical Trail Vehicle
with RIGHT Directional display
Flashing Arrow Panel



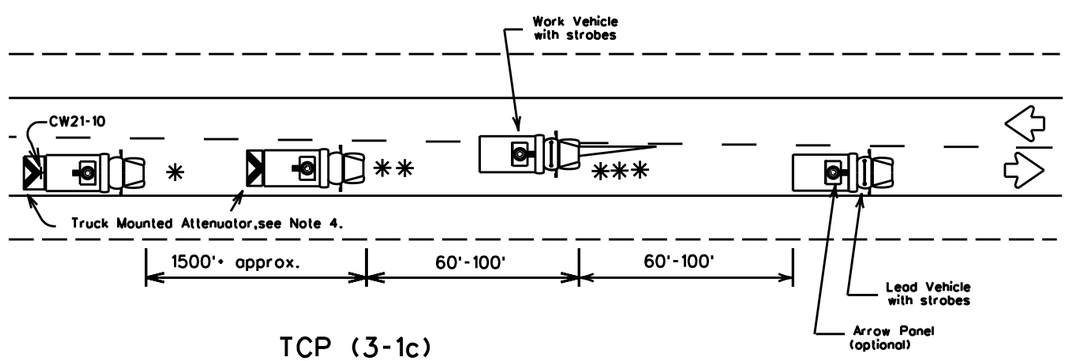
TCP (3-1a)
Undivided Multilane Roadway



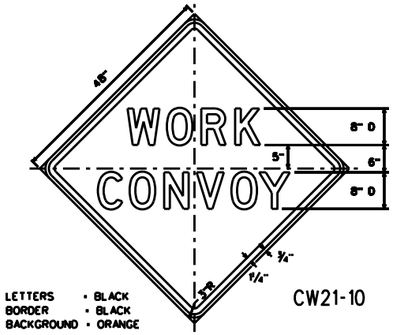
TCP (3-1b)
Two-Way Roadway With Paved Shoulders



Typical Trail Vehicle
with (four corner flash)
CAUTION display
Flashing Arrow Panel



TCP (3-1c)
Two-Way Roadway Without Paved Shoulders



LETTERS • BLACK
BORDER • BLACK
BACKGROUND • ORANGE

CW21-10

Legend:

- * TRAIL VEHICLE
- * * SHADOW VEHICLE
- * * * WORK VEHICLE
- Truck mounted attenuator
- HEAVY WORK VEHICLE

Arrow Panel Displays

- RIGHT Directional
- LEFT Directional
- RIGHT or LEFT Directional
- CAUTION mode

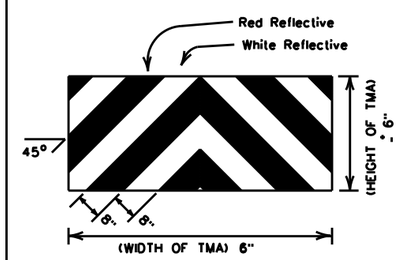
GENERAL NOTES:

1. TRAIL, SHADOW, LEAD, and work vehicles shall be equipped with arrow panels as illustrated. The Engineer will determine if the LEAD VEHICLE and/or TRAIL VEHICLE are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. All traffic control devices shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD), latest edition.
3. The use of yellow rotating beacons or strobe lights on vehicles are required unless otherwise stated elsewhere in the plans.
4. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE and the TRAIL VEHICLE are required.
5. Optional striping on the back panel of all truck mounted attenuators shall be 8" red and white reflective sheeting placed in an inverted "V" design. Reflective sheeting shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION D-9-8300, TYPE C.
6. Flashing Arrow Panels shall be Type B or Type C as per BC Standards. The panel operation shall be controlled from inside the vehicle.
7. Each vehicle shall have two-way radio communication capability.
8. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
9. Vehicle spacing between TRAIL VEHICLE and SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE.

Only pre-qualified products shall be used. A list of compliant products and their sources may be obtained by writing or faxing:

Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3335
Fax (512) 416-3161
E-mail TRF-STANDARD@mailgw.dot.state.tx.us

Shadow and trail vehicle shall be equipped with Truck Mounted Attenuator.



OPTIONAL STRIPING FOR TMA

STRIPING FOR TMA WILL BE REQUIRED ON ALL PROJECTS AWARDED AFTER JANUARY 1, 2000

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN
MOBILE OPERATIONS
UNDIVIDED HIGHWAYS

TCP(3-1)-98

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DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
DIST		COUNTY	SHEET NO.
			45

REVISIONS
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4-98

DATE:
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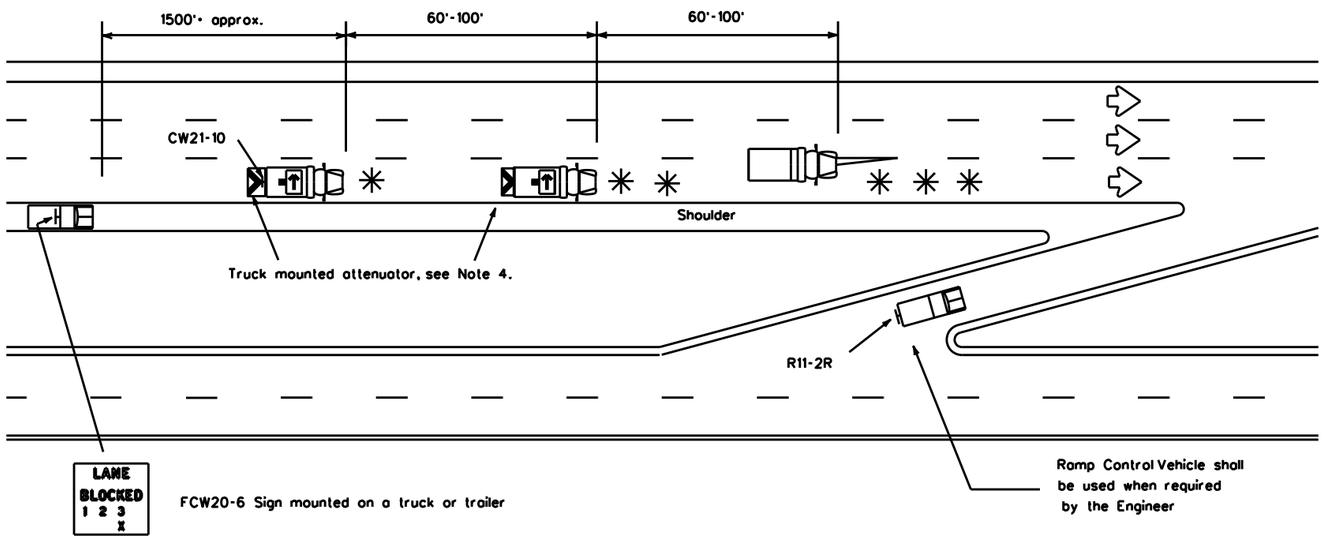
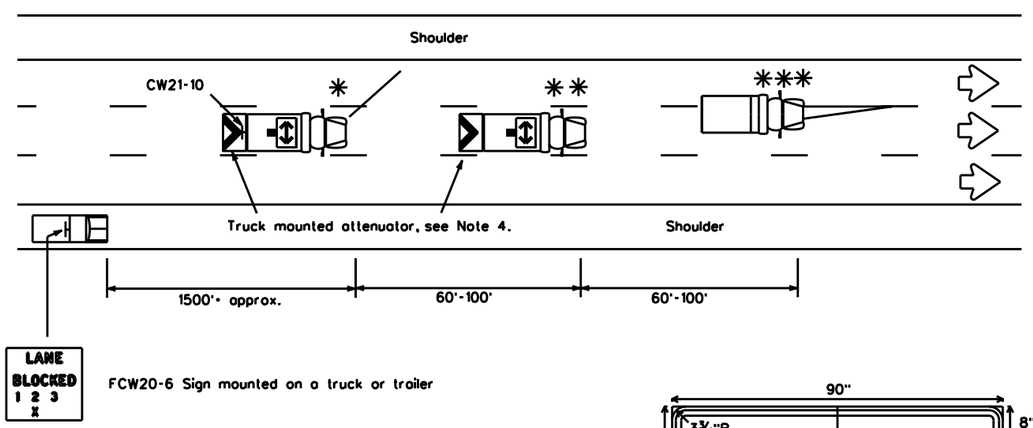
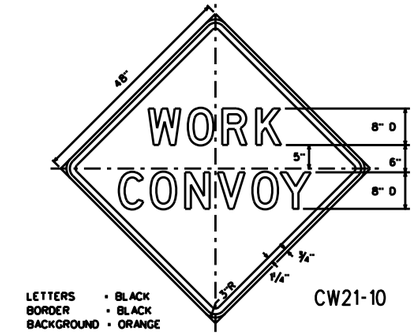




Shadow and trail vehicle shall be equipped with Truck Mounted Attenuator.



Legend:

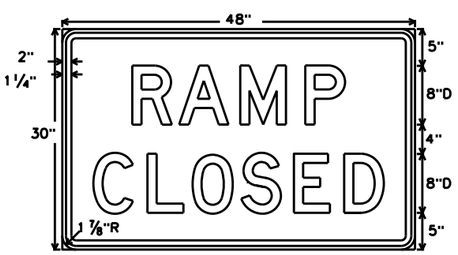
- ✱ TRAIL VEHICLE
- ✱ ✱ SHADOW VEHICLE
- ✱ ✱ ✱ WORK VEHICLE
- Truck mounted attenuator
- HEAVY WORK VEHICLE

Arrow Panel Displays

- RIGHT Directional
- LEFT Directional
- RIGHT or LEFT Directional
- CAUTION mode

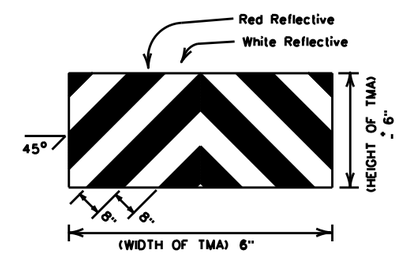
GENERAL NOTES:

1. TRAIL, SHADOW, LEAD, and work vehicles shall be equipped with arrow panels as illustrated. The Engineer will determine if the LEAD VEHICLE and/or TRAIL VEHICLE are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. All traffic control devices shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD), latest edition.
3. The use of yellow rotating beacons or strobe lights on vehicles are required unless otherwise stated elsewhere in the plans.
4. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE and the TRAIL VEHICLE are required.
5. Optional striping on the back panel of all truck mounted attenuators shall be 8" red and white reflective sheeting placed in an inverted "V" design. Reflective sheeting shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION D-9-8300, TYPE C.
6. Flashing Arrow Panels shall be Type B or Type C as per BC Standards. The panel operation shall be controlled from inside the vehicle.
7. Each vehicle shall have two-way radio communication capability.
8. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
9. Vehicle spacing between TRAIL VEHICLE and SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE.
10. The LANE BLOCKED sign (FCW20-6) shall be used on divided highways and may be mounted on a truck or trailer. For divided highways with two lanes in each direction, the RIGHT or LEFT LANE CLOSED sign (CW20-5, 48" x 48") may be substituted for the LANE BLOCKED sign (FCW20-6).



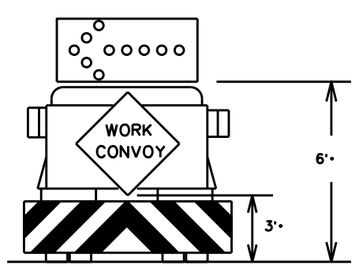
R11-2R

LETTERS • BLACK
BORDER • BLACK
BACKGROUND • WHITE

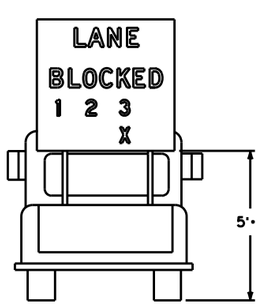


OPTIONAL STRIPING FOR TMA

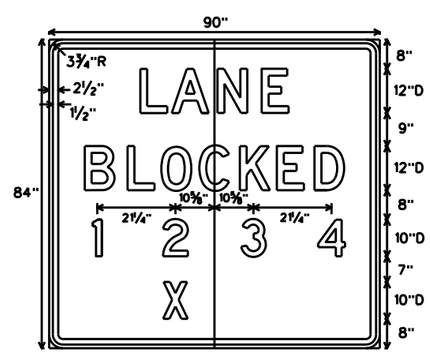
STRIPING FOR TMA WILL BE REQUIRED ON ALL PROJECTS AWARDED AFTER JANUARY 1, 2000



Typical Trail Vehicle with LEFT Directional display Flashing Arrow Panel



Typical Advance Warning Vehicle



FCW20-6

LETTERS • BLACK
BORDER • BLACK
BACKGROUND • ORANGE

Only pre-qualified products shall be used. A list of compliant products and their sources may be obtained by writing or faxing:

Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3335
Fax (512) 416-3161
E-mail TRF-STANDARD@mailgw.dot.state.tx.us

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN MOBILE OPERATIONS DIVIDED HIGHWAYS

TCP(3-2)-98

© TxDOT December 1985

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
			46

REVISIONS
2-94
8-95
1-97
4-98

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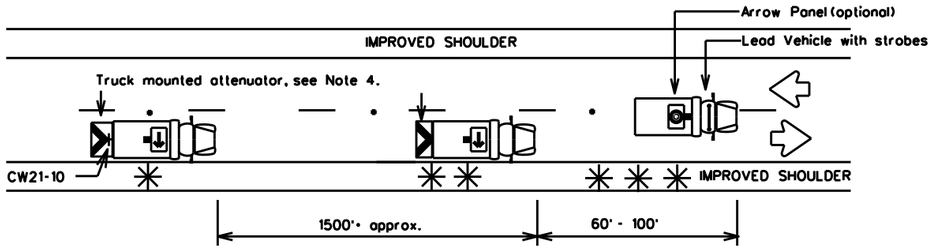
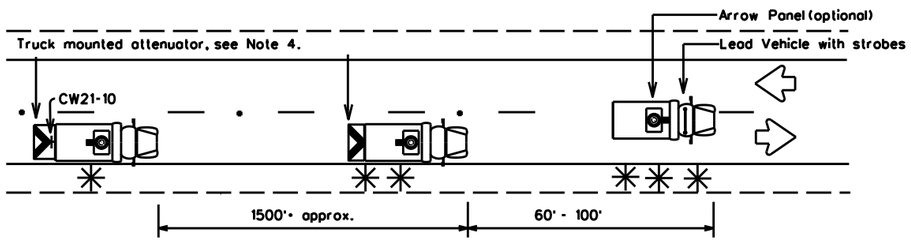
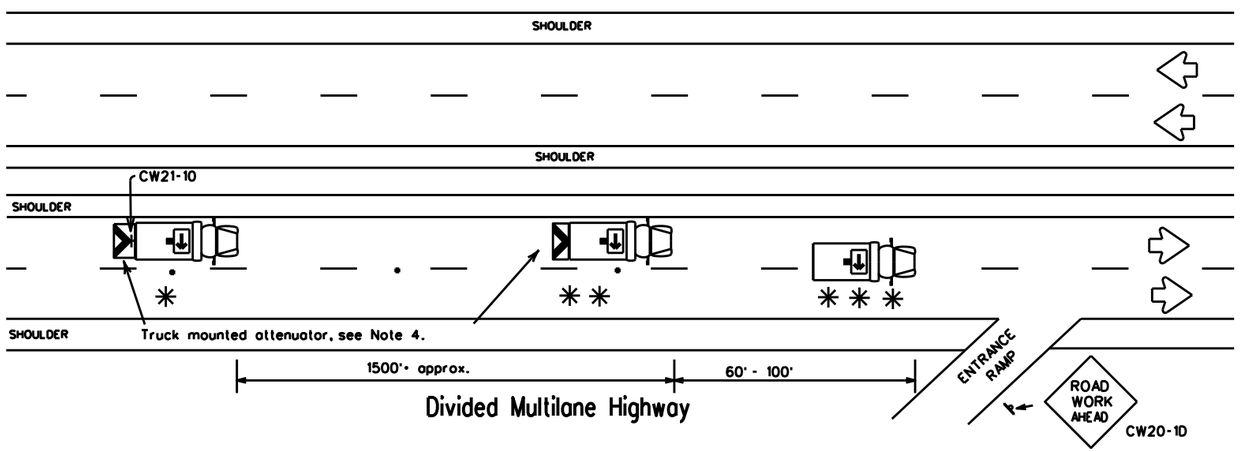


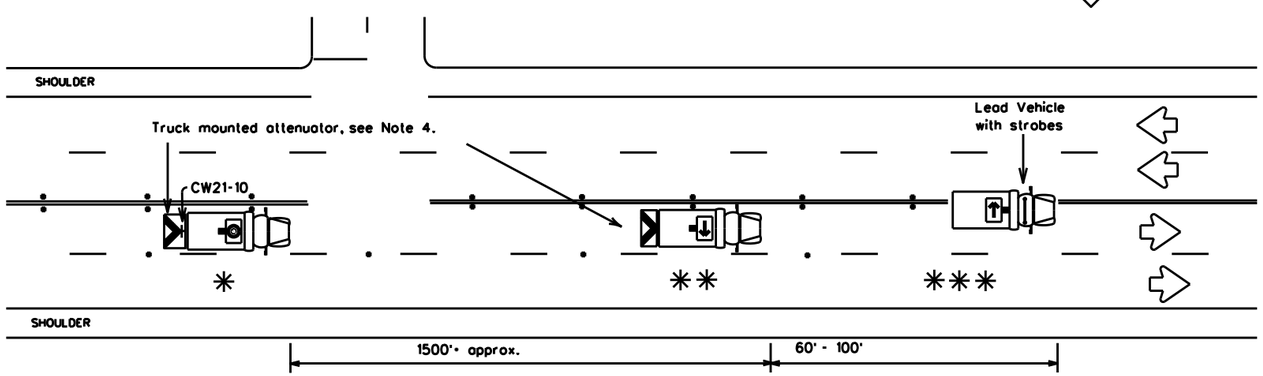
Two Lane Highway With Paved Shoulders (work on travel lane)



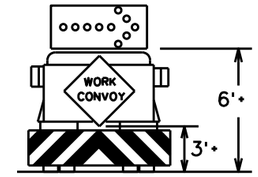
Two Lane Highway Without Paved Shoulders (work on travel lane)



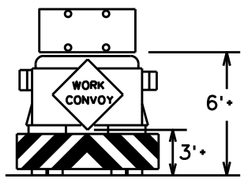
Divided Multilane Highway



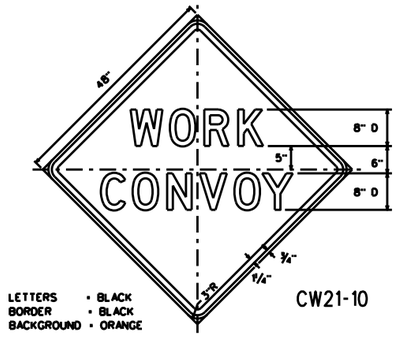
Undivided Multilane Highway



TYPICAL TRAIL VEHICLE
RIGHT Directional display
Flashing Arrow Panel



TYPICAL TRAIL VEHICLE
with (four corner flash)
CAUTION display
Flashing Arrow Panel



CW21-10

Legend:

- ✱ TRAIL VEHICLE
- ✱ ✱ SHADOW VEHICLE
- ✱ ✱ ✱ WORK VEHICLE
- Truck mounted attenuator
- HEAVY WORK VEHICLE

Arrow Panel Displays

- RIGHT Directional
- LEFT Directional
- RIGHT or LEFT Directional
- CAUTION mode

GENERAL NOTES:

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5. Optional striping on the back panel of all truck mounted attenuators shall be 8" red and white reflective sheeting placed in an inverted "V" design. Reflective sheeting shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION D-9-8300, TYPE C.
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Phone (512) 416-3335
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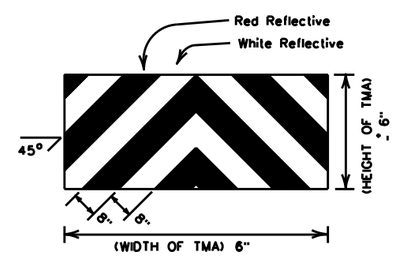
E-mail TRF-STANDARD@mailgw.dot.state.tx.us

Shadow and trail vehicle shall be equipped with Truck Mounted Attenuator.



OPTIONAL STRIPING FOR TMA

STRIPING FOR TMA WILL BE REQUIRED ON ALL PROJECTS AWARDED AFTER JANUARY 1, 2000

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN MOBILE OPERATIONS RAISED PAVEMENT MARKER INSTALLATION

TCP(3-3)-98

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DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
DIST		COUNTY	SHEET NO.
			47

REVISIONS
2-94
8-95
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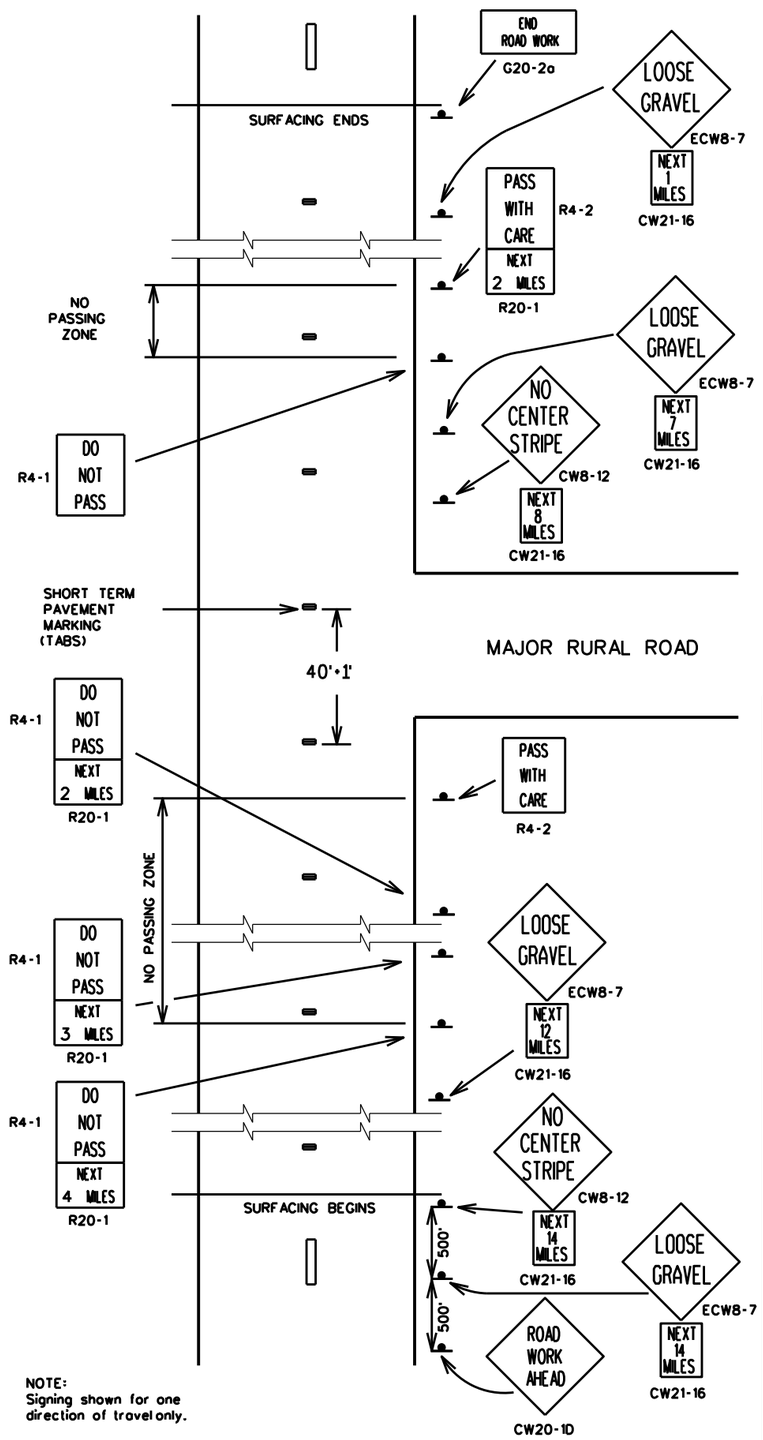
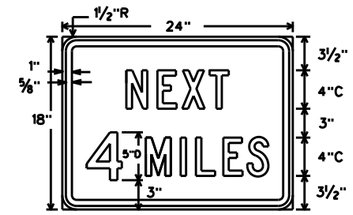


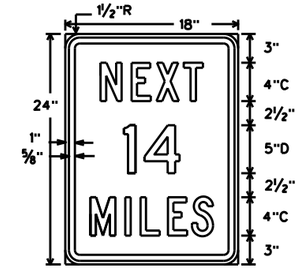
NOTE:
Signing shown for one direction of travel only.



R20-1
24"x18"

Legend - Black
Border - Black
Background - White Refl.

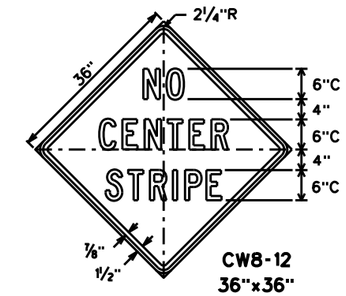
FOR USE WITH REGULATORY SIGNS ONLY



CW21-16
18"x24"

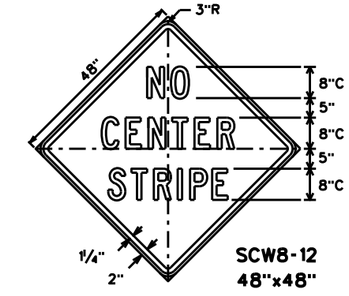
Legend - Black
Border - Black
Background - Orange Refl.

FOR USE WITH CONSTRUCTION WARNING SIGNS ONLY



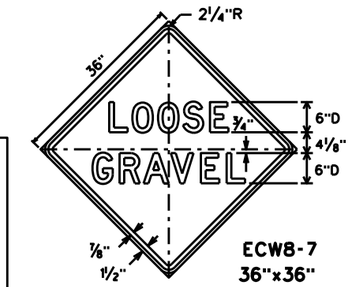
CW8-12
36"x36"

Legend - Black
Border - Black
Background - Orange Refl.



SCW8-12
48"x48"

Legend - Black
Border - Black
Background - Orange Refl.

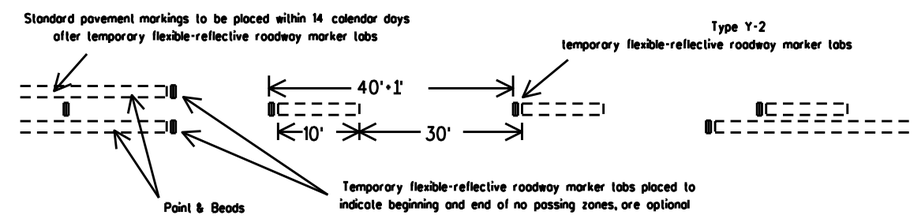


ECW8-7
36"x36"

Legend - Black
Border - Black
Background - Orange Refl.

TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS

for surfacing projects only



GENERAL NOTES

The traffic control devices detailed on this sheet will be furnished and erected as directed by the Engineer on sections of roadway where the surfacing operation has covered or obliterated existing pavement markings. These traffic control devices are to be used to supplement those required by BC Standards.

"DO NOT PASS" SIGN (R4-1) and NO-PASSING ZONES

Prior to the beginning of construction, all currently striped no-passing zones should be signed with the DO NOT PASS sign (R4-1) and PASS WITH CARE sign (R4-2) placed at the beginning and end of each zone for each direction of travel except as otherwise provided herein. Signs marking these individual no-passing zones need not be covered prior to construction if the signs supplement the existing pavement markings.

At the discretion of the Engineer, in areas of numerous no-passing zones, several zones may be combined and signed as a single zone. If passing is to be prohibited over one or more lengthy sections, a DO NOT PASS sign and a NEXT XX MILES sign (R20-1) may be used at the beginning of such zones. The DO NOT PASS and NEXT XX MILES signs should be repeated every mile to the end of the no-passing zone. In areas where there is considerable distance between no-passing zones, the end of a no-passing zone may be signed with a PASS WITH CARE and NEXT XX MILES sign.

Depending on traffic volumes and length of sections, it may be desirable to prohibit passing throughout the project to prevent damage to windshields and lights. The DO NOT PASS and NEXT XX MILES sign should be used and repeated as often as necessary for this purpose. Where several existing zones are to be combined into one individual no-passing zone, the sign at the beginning of the zone should be covered until the surfacing operation has passed this location so as not to have the DO NOT PASS sign conflict with existing pavement markings. Also, unless one days operation completes the entire length of such combined zones, care must be taken to place DO NOT PASS and PASS WITH CARE signs in order to sign the beginning and end of the no-passing zones in the area where the surfacing operation has stopped for the day.

R4-1 and R4-2 signs should be mounted on fixed supports as detailed on BC Standards. These signs are to remain in place until standard pavement markings are placed.

"NO CENTER STRIPE" SIGN (CW21-15)

At the time construction activity obliterates the existing centerline (low volume roads may not have an existing centerline), a NO CENTER STRIPE sign (CW8-12) should be erected at each end of the work area and just beyond major rural intersections and other location deemed necessary by the Engineer. Where possible, the signs erected at each end of the work area should be located in such a manner that drivers can read the sign and immediately see the change to no centerline. The NO CENTER STRIPE sign should be supplemented with the NEXT XX MILES sign (CW21-16) mounted below it.

The NO CENTER STRIPE sign should be erected as detailed on BC Standards. These signs are to remain in place until standard pavement markings are placed.

"LOOSE GRAVEL" SIGN (ECW8-7)

When construction begins, a LOOSE GRAVEL sign (ECW8-7) should be erected at each end of the work area and repeated at intervals of approximately two (2) miles in rural areas and closer in urban areas. The LOOSE GRAVEL sign should be supplemented with the NEXT XX MILES sign (CW21-16) mounted below it.

The LOOSE GRAVEL sign should be erected as detailed on BC Standards. They should remain in place until the loose gravel condition no longer exists.

PAVEMENT MARKINGS

Short term pavement markings for surfacing projects shall use Temporary Flexible-reflective Roadway Marker Tabs. Tabs are to be installed to provide true alignment for striping crews or as directed by the Engineer. Tabs will be placed at the spacing indicated. Tabs should be applied to the pavement no more than two (2) days before the surfacing is applied. After the surfacing is rolled and swept the cover over the reflective strip shall be removed. Tabs shall NOT be used to simulate edge lines.

Only pre-qualified products shall be used. A list of compliant products and their sources may be obtained by writing or fax:

Standards Engineer
Traffic Operations Division - TE
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483
Phone (512) 416-3335
Fax (512) 416-3161
E-mail TRF-STANDARD@maige.dot.state.tx.us

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

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL DETAILS for SURFACING OPERATIONS

TCP(7-1)-98

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REVISIONS
4-92
1-97
4-98

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
			48

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. As shown on BC(2), the OBEY WARNING SIGNS STATE LAW sign 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.
11. Except for devices required by Note 10, 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 Apparel 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" 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.

Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes prequalified products and their sources and may be found on-line at the web address given below or by contacting:

Texas Department of Transportation
Traffic Operations Division - TE
Phone (512) 416-3134

WEB ADDRESSES FOR REFERENCED DOCUMENTS

Compliant Work Zone Traffic Control Devices List (CWZTCD)
http://www.txdot.gov/publications/traffic.htm

Texas Manual on Uniform Traffic Control Devices (TMUTCD)
http://www.txdot.gov/publications/traffic.htm

Standard Highway Sign Designs for Texas (SHSD)
http://www.txdot.gov/publications/traffic.htm

Traffic Engineering Standard Sheets
http://www.txdot.gov/business/disclaim.htm

Material Producer List
http://www.txdot.gov/business/producer-list.htm

Departmental Material Specifications (DMS)
http://www.txdot.gov/services/construction/material-specifications/

Roadway Design Manual
http://www.txdot.gov/services/general-services/manuals.htm

Texas Department of Transportation
Traffic Operations Division

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

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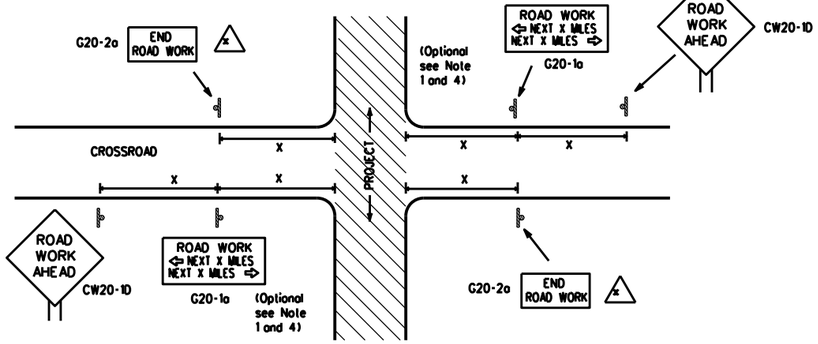
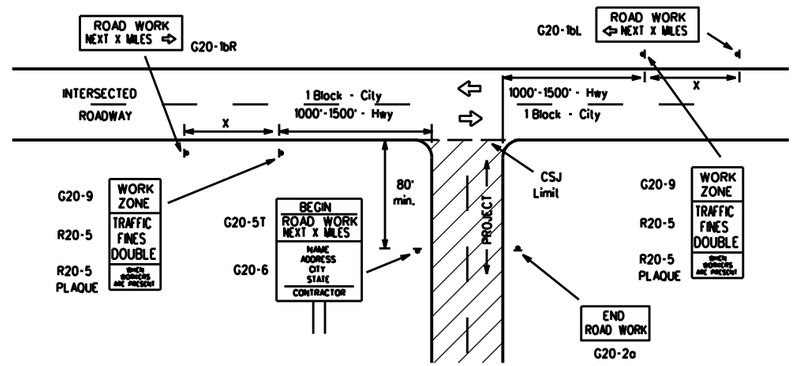
TYPICAL LOCATION OF CROSSROAD SIGNS



⁂ May be mounted on back of CW20-1D sign with approval of engineer. (See note 2 below)

1. The typical minimum signing on a crossroad approach should be a CW20-1D ROAD WORK AHEAD sign and a G20-2a 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 (G20-2a) 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. 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 G20-1a 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 G20-6 "Contractor Name" sign behind the Type III Barricades for the road closure (see BC(10) also). The G20-1bL and G20-1bR 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" Δ
MPH	Feet (Approx.)
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]

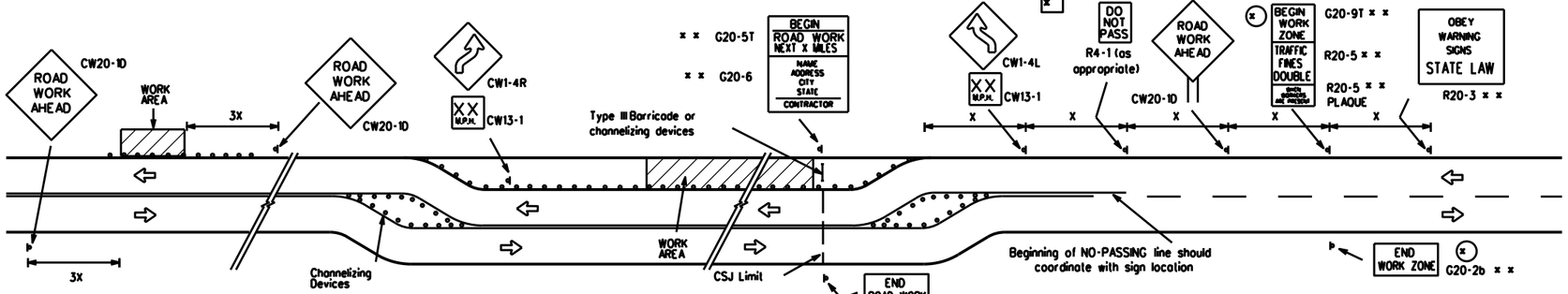
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

Δ 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 ½ 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. 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

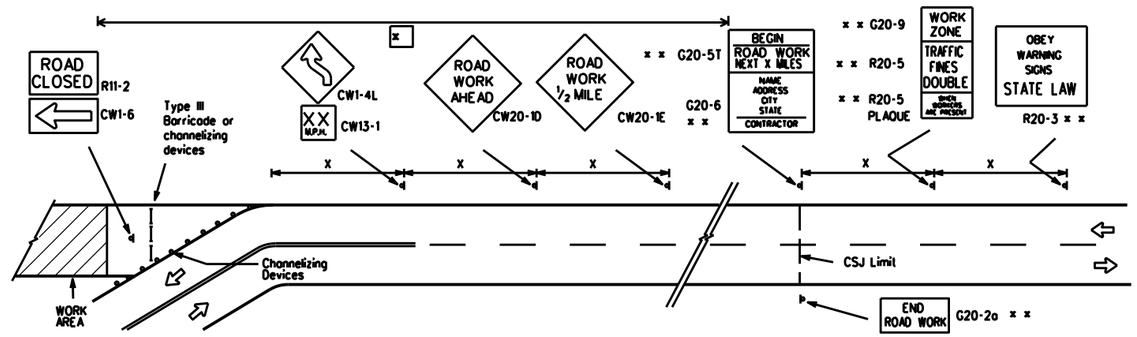


When extended distances occur between minimal work areas, the Engineer/Inspector should ensure additional Road Work Ahead (CW20-1D) signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

R20-3
Legend/Border - Black
Background - White

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



NOTES

The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and 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.

(x) The G20-9T and G20-2b shall be used when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a work zone where traffic fines may double if workers are present.

× × Required CSJ Limit signing. See Note 10 on BC(1).

[x] Area for placement of "ROAD WORK AHEAD" sign and other signs or devices as called for on the Traffic Control Plan.

LEGEND

Sign

Channelizing Devices

Type III Barricade

X See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.

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BARRICADE AND CONSTRUCTION PROJECT LIMIT STANDARD

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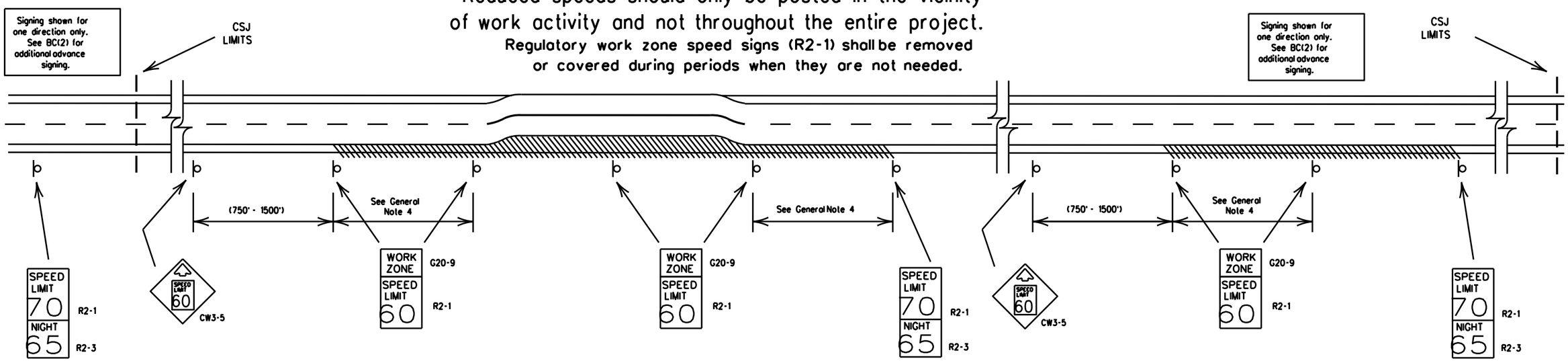
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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 should be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 15 feet of pavement edge or actually on the pavement.

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, errection and maintenance of the CW3-5 sign, G20-9 plaque and the R2-1 and R2-3 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 otherwise noted.
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.

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BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT STANDARD

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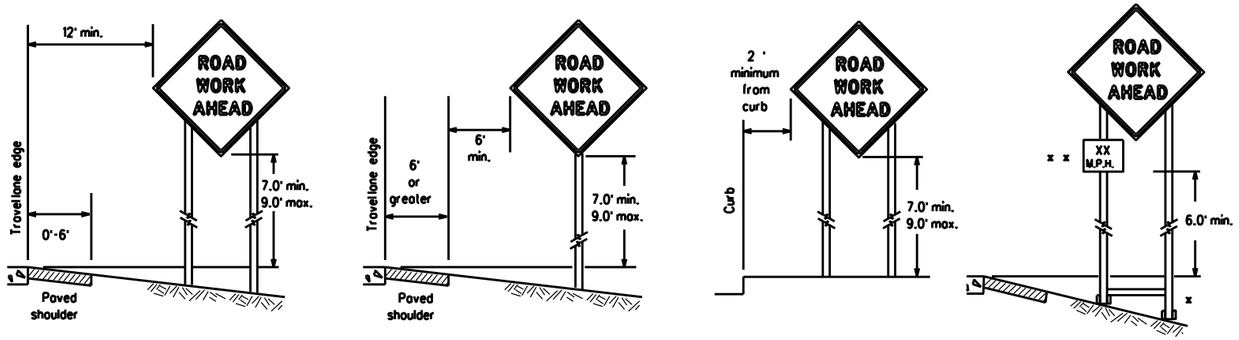
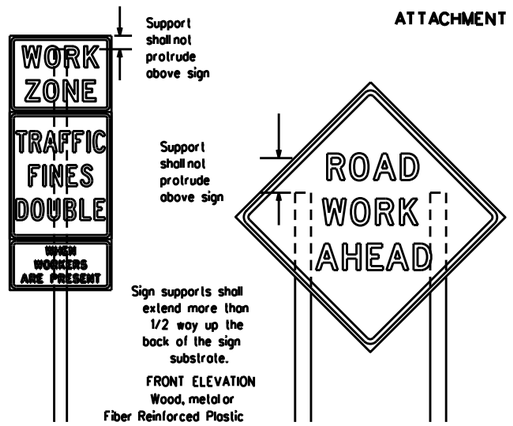
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



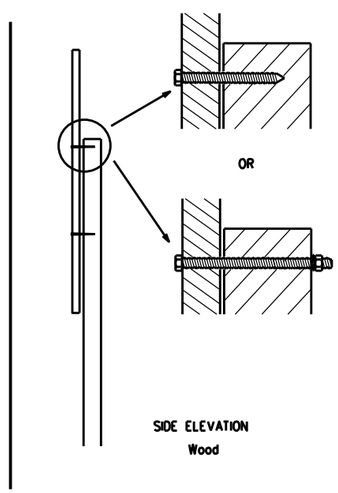
x When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

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

ATTACHMENT FOR SIGN SUPPORTS



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 guage material.



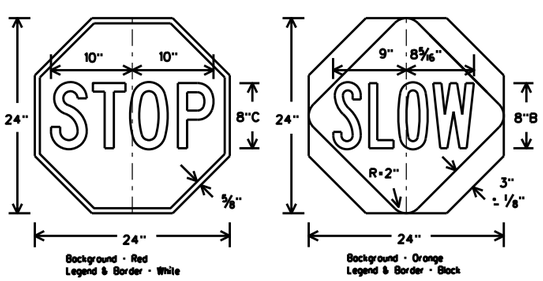
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

Nails will 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.

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" as detailed below.
2. When used at night, the STOP/SLOW paddle shall be retroreflectorized.
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.



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, 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.
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 sheets or the CWZTCD. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards 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. Nails shall NOT be used to attach signs to any support.
5. 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.
6. 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.
7. The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD). 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.
8. 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.
9. 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.
10. 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 Engineer may allow the use of smaller size construction warning signs on secondary roads or city streets where speeds are low if the sign size is listed as an option on the "Typical Construction Warning Sign Size and Spacing" chart shown on BC(2).
2. The Contractor shall furnish the sign sizes shown in plans, the BC Sheets, the TCP sheets 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 lightness 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 C (High Specific Intensity), shall be used for signs with a white background.
3. Orange sheeting, meeting the requirements of DMS-8300 Type E (Fluorescent Prismatic), 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 type of sign support meets the crashworthiness standards regardless of the direction of impact. 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. These materials can damage the retroreflectivity of sheeting.
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 is recommended.
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.
6. Rubber (such as tire inner tubes) shall NOT be used for sandbags.
7. 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.
8. 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.
9. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

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Traffic Operations Division

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES STANDARD

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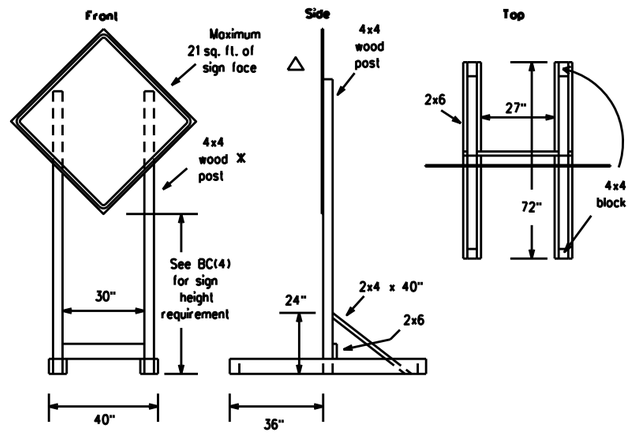
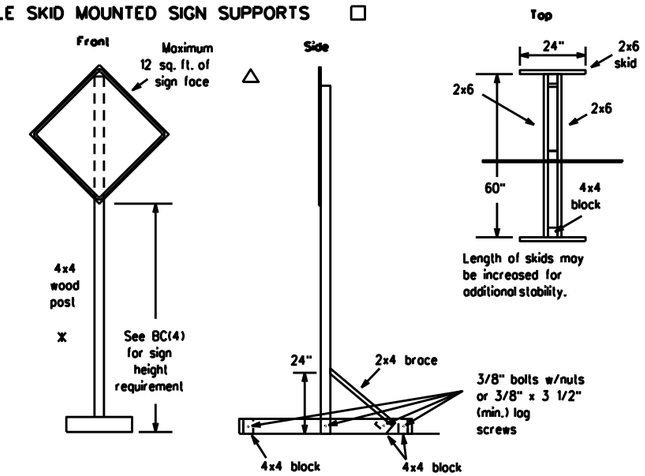
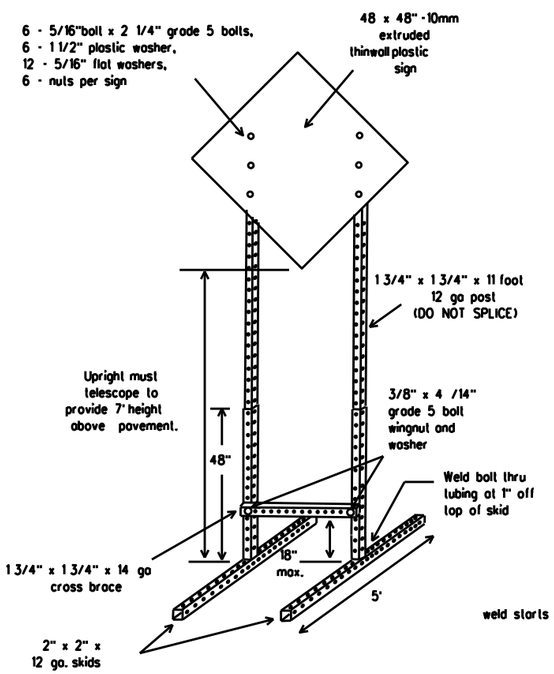
SKID MOUNTED WOOD SIGN SUPPORTS

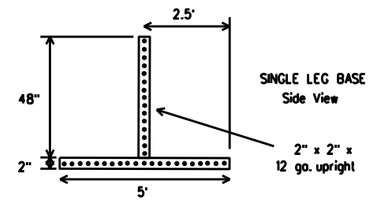
LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS □

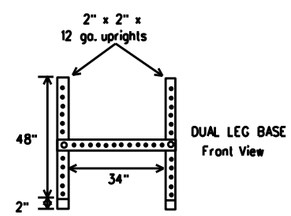


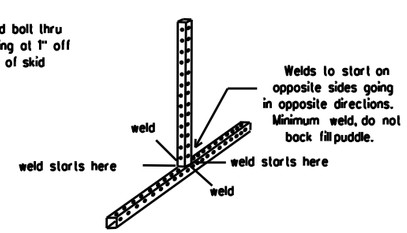


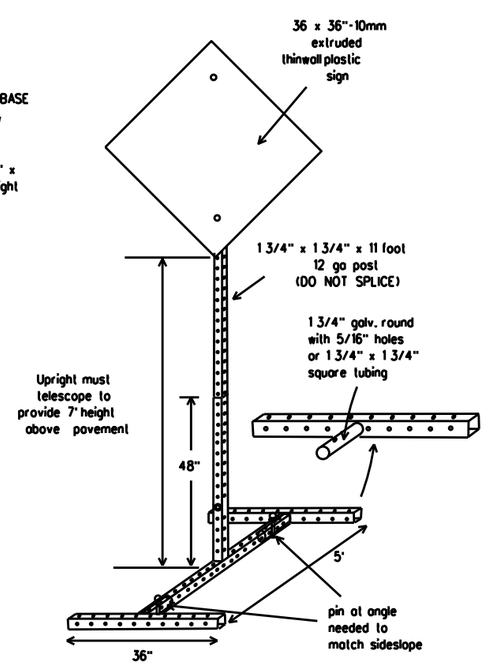
SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS







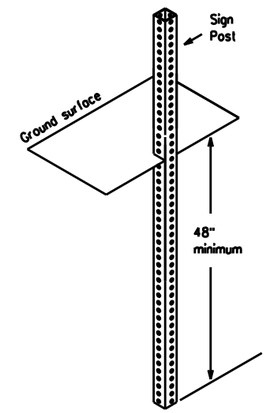




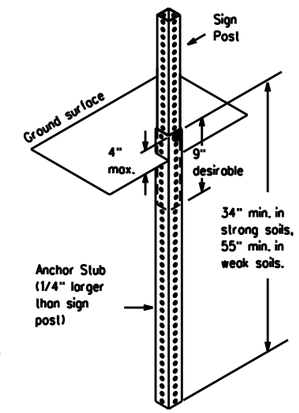
GROUND MOUNTED SIGN SUPPORTS

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.

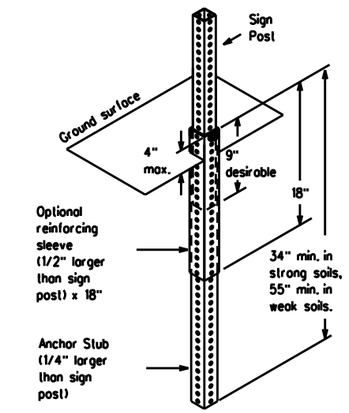
PERFORATED SQUARE METAL TUBING



OPTION 1
(Direct Embedment)



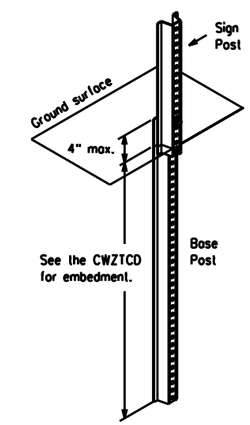
OPTION 2
(Anchor Stub)



OPTION 3
(Anchor Stub and Reinforcing Sleeve))

WING CHANNEL

Lap-splice/base bolted anchor



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. More details of approved Long/Intermediate and Short Term supports can be found on the CWZTCD list. See BC(1) for website location.
3. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
4. When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

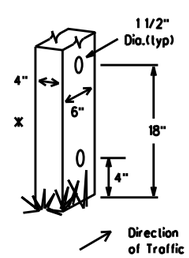
□ See BC(4) for definition of "Work Duration."

x 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.

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)).



WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS

Nominal Post Size	Maximum No. of Posts	Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required	
4 x 4	1	12	36"	NO	
4 x 4	2	21	36"	NO	
4 x 6	1	21	36"	YES	
4 x 6	2	36	36"		YES

Texas Department of Transportation
Traffic Operations Division

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT STANDARD

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DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
DIST		COUNTY	SHEET NO.
			53

9-07 REVISIONS

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PORTABLE CHANGEABLE MESSAGE SIGNS

1. The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
2. Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
3. Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
4. Use the word "EXIT" to refer to an exit ramp on a freeway: i.e., "EXIT CLOSED." Do not use the term "RAMP."
5. Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
6. When in use the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
7. The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
8. The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
9. Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
10. Do not present redundant information on a two-phase message: i.e., keeping two lines of the message the same and changing the third line.
11. Do not use the word "Danger" in message.
12. Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
13. Do not display messages that scroll horizontally or vertically across the face of the sign.
14. The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated.
15. PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 720 feet. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
16. Each line of text should be centered on the message board rather than left or right justified.
17. If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

Word or Phrase	Abb.	Word or Phrase	Abb.
Access Road	ACCS RD	Major	MAJ
Air Quality	AIR QLTY	Miles	MI
Alternate	ALT	Miles Per Hour	MPH
Avenue	AVE	Minor	MNR
Best Route	BEST RTE	Monday	MON
Boulevard	BLVD	Normal	NORM
Bridge	BRDG	North	N
Cannot	CANT	Northbound	(route) N
Center	CNTR	Parking	PKING
Construction Ahead	CONST AHEAD	Parking Lot	PRK LOT
Detour Route	DETOUR RTE	Road	RD
Do Not	DONT	Right Lane	RGT LN
East	E	Saturday	SAT
Eastbound	(route) E	Service Road	SERV RD
Emergency	EMER	Shoulder	SHLDR
Emergency Vehicle	EMER VEH	Slippery	SLIP
Entrance, Enter	ENT	South	S
Express Lanes	EXP LANE	Southbound	(route) S
Expressway	EXPWY	Speed	SPD
XXXX Feet	XXXX FT	Street	ST
Fog Ahead	FOG AHD	Sunday	SUN
Freeway	FRWY, FWY	Telephone	PHONE
Freeway Blocked	FWY BLKD	Temporary	TEMP
Friday	FRI	Thursday	THURS
Hazardous Driving	HAZ DRIVING	To Downtown	TO DWNTN
Hazardous Material	HAZMAT	Traffic	TRAF
High-Occupancy Vehicle	HOV	Travelers	TRVLRS
Highway	HWY	Tuesday	TUES
Hours	HR	Time Minutes	TIME MIN
Information	INFO	Upper Level	UPPR LVL
It Is	ITS	Vehicle	VEH
Junction	JCT	Warning	WARN
Left	LFT	Wednesday	WED
Left Lane	LFT LN	Weight Limit	WT LIMIT
Lane Closed	LN CLSD	West	W
Lower Level	LOWR LVL	Westbound	(route) W
Maintenance	MAINT	Wet Pavement	WET PVMT
		Will Not	WONT

Roadway designation = IH-number, US-number, SH-number, FM-number

WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

(The Engineer may approve other messages not specifically covered here.)

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT
RIGHT X LANES CLOSED	RIGHT X LANES OPEN
CENTER LANE CLOSED	DAYTIME LANE CLOSURES
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE
EXIT CLOSED	RIGHT LN TO BE CLOSED
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI
XXXXXXXX BLVD CLOSED	

Other Condition List

ROADWORK XXX FT	ROAD REPAIRS XXXX FT
FLAGGER XXXX FT	LANE NARROWS XXXX FT
RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
DETOUR X MILE	ROUGH ROAD XXXX FT
ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
BUMP XXXX FT	US XXX EXIT X MILES
TRAFFIC SIGNAL XXXX FT	LANES SHIFT *

* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

MERGE RIGHT	FORM X LINES RIGHT
DETOUR NEXT X EXITS	USE XXXXX RD EXIT
USE EXIT XXX	USE EXIT I-XX NORTH
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N
TRUCKS USE US XXX N	WATCH FOR TRUCKS
WATCH FOR TRUCKS	EXPECT DELAYS
EXPECT DELAYS	PREPARE TO STOP
REDUCE SPEED XXX FT	END SHOULDER USE
USE OTHER ROUTES	WATCH FOR WORKERS
STAY IN LANE *	

Location List

AT FM XXXX
BEFORE RAILROAD CROSSING
NEXT X MILES
PAST US XXX EXIT
XXXXXXX TO XXXXXXX
US XXX TO FM XXXX

Warning List

SPEED LIMIT XX MPH
MAXIMUM SPEED XX MPH
MINIMUM SPEED XX MPH
ADVISORY SPEED XX MPH
RIGHT LANE EXIT
USE CAUTION
DRIVE SAFELY
DRIVE WITH CARE

** Advance Notice List

TUE-FRI XX AM-X PM
APR XX-XX X PM-X AM
BEGINS MONDAY
BEGINS MAY XX
MAY X-X XX PM - XX AM
NEXT FRI-SUN
XX AM TO XX PM
NEXT TUE AUG XX
TONIGHT XX PM-XX AM

** See Application Guidelines Note 6.

Application Guidelines

1. Only 1 or 2 phases are to be used on a PCMS.
2. The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
3. A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
4. A Location Phase is necessary only if a distance or location is not included in the first phase selected.
5. If two PCMS are used in sequence, they must be separated by a minimum of 1000 ft. Each PCMS shall be limited to two phases, and should be understandable by themselves.
6. For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for no more than one week prior to the work

Wording Alternatives

1. The words RIGHT, LEFT and ALL can be interchanged as appropriate.
2. Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
3. EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
4. Highway names and numbers replaced as appropriate.
5. ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
6. AHEAD may be used instead of distances if necessary.
7. FT and MI, MILE and MILES interchanged as appropriate.
8. AT, BEFORE and PAST interchanged as needed.
9. Distances or AHEAD can be eliminated from the message if a location phase is used.

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS.

FULL MATRIX PCMS SIGNS

1. When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
2. When symbol signs, such as the CW20-7a Flagger Symbol, are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
3. When symbol signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
4. A full matrix PCMS may be used to simulate a flashing arrow panel provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.

Texas Department of Transportation
Traffic Operations Division

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS) STANDARD

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9-07 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.
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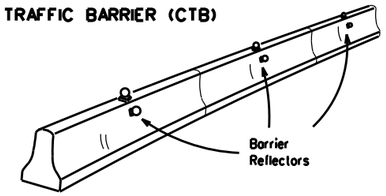
DATE:
FILE:

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

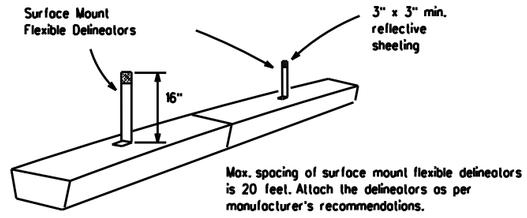
1. Barrier Reflectors shall be prequalified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors (Type C Delineators) can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 502.

CONCRETE TRAFFIC BARRIER (CTB)

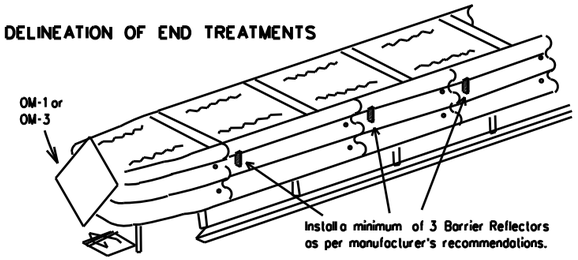


3. Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. 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. Yellow Barrier Reflectors shall be made with Type E Fluorescent Prismatic Yellow Retroreflective Sheeting. White reflectors shall be made with Type D White Prismatic sheeting.
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.

LOW PROFILE CONCRETE BARRIER (LPCB)



DELINEATION OF END TREATMENTS



	APPROACHING TRAFFIC	
	BOTH SIDES	ONE SIDE
DELINEATION	OM-1	OM-3 or Vertical Panel

END TREATMENTS FOR CTB'S USED IN WORK ZONES

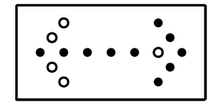
End treatments used on CTB's in work zones shall meet crashworthy standards as defined in the National Cooperative Highway Research Report 350. Refer to the CWZTCD List for approved end treatments and manufacturers.

TYPICAL FLASHING ARROW PANEL

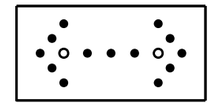
Arrow Panels may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

1. The Flashing Arrow Panel 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 Panels 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 Panel.
4. The Flashing Arrow Panel should be able to display the following symbols:

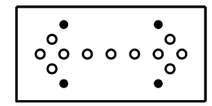
Flashing RIGHT (LEFT) ARROW



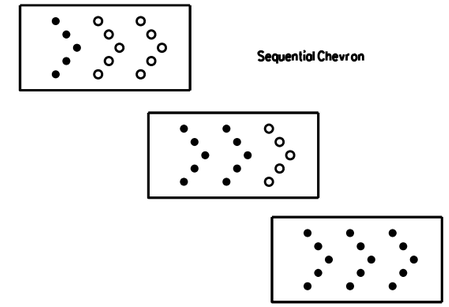
Flashing DOUBLE ARROW



Flashing CAUTION



5. The "CAUTION" display consists of four corner lamps flashing simultaneously.
6. The straight line caution display is NOT ALLOWED.
7. The Flashing Arrow Panel 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.



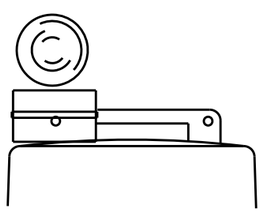
REQUIREMENTS

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

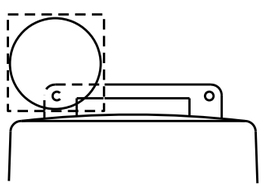
ATTENTION: Flashing Arrow Panels shall be equipped with automatic dimming devices.

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

11. The Flashing Arrow Panel shall be mounted on a vehicle, trailer or other suitable support.
12. A Flashing Arrow Panel SHALL NOT BE USED to laterally shift traffic.
13. A full matrix PCMS may be used to simulate a Flashing Arrow Panel 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 panels should be 7 feet from roadway to bottom of panel.



Type C Warning Light or approved substitute mounted adjacent to the travelway.



Warning reflector may be round or square. Must have a 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 E Sheeting (Fluorescent Prismatic) 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.

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 D (Non-fluorescent Prismatic).
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.

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the National Cooperative Highway Research Report No. 350 (NCHRP 350).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the dates shown in the CWZTCD to ensure that the TMA meets the age requirements and the crashworthiness criteria established by the Federal Highway Administration (FHWA) for TMAs.
4. Refer to the CWZTCD for a list of approved TMAs.
5. TMAs are required on freeways unless otherwise noted in the plans.
6. A TMA should be used anytime that it can be positioned approximately 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
7. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is on extended distance from the TMA.

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

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9-07 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST		COUNTY	SHEET NO. 55

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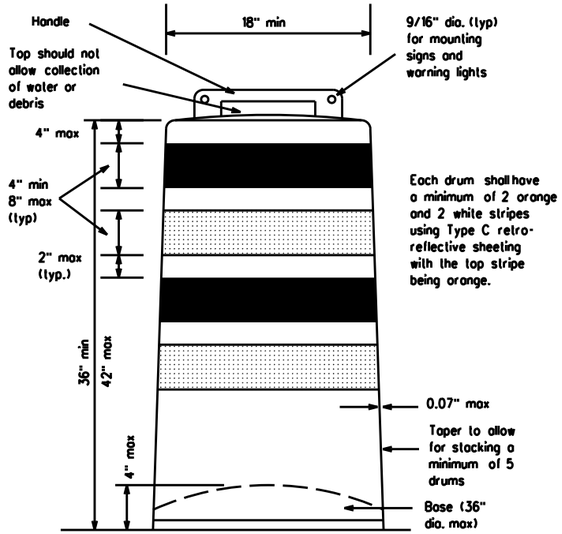


GENERAL NOTES

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

Prequalified plastic drums shall meet the following requirements:

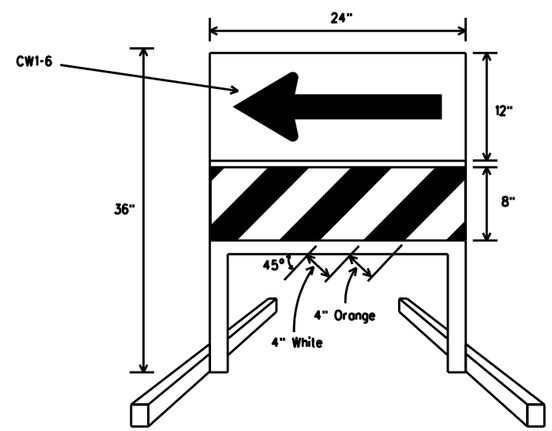
1. Plastic drums shall be a two-piece design: the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents 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 minimum unballasted weight of 7.7 lbs. and maximum unballasted weight of 11 lbs. The wall of the drum body shall be a minimum of 0.07 inch in thickness. Weight of any drum supplied shall not vary more than 0.5 lb. from that of the prequalified sample.
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, "Flat Surface Reflective Sheeting." High Specific Intensity (Type C) retroreflective 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.

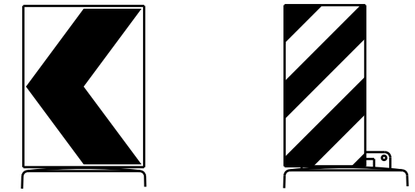
BALLAST

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. 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.
4. 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.
5. Ballast shall not be placed on top of drums.
6. Adhesives may be used to secure base of drums to pavement.



DIRECTION INDICATOR BARRICADE

1. The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
2. If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
3. The Direction Indicator Barricade shall consist of One-Direction Large Arrow (CW1-6) sign in the size shown with a black arrow on a background of Type E Fluorescent Prismatic Orange above a rail with Type C High Specific Intensity retroreflective sheeting in alternation 4" white and orange stripes sloping downward at an angle of 45 degrees in the direction road users are to pass.
4. Double arrows on the Direction Indicator Barricade will not be allowed.
5. Approved manufacturers are shown on the CWZTCD List. Ballast shall be as approved by the manufacturers instructions.



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 E (Fluorescent Prismatic) 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 C (High Specific Intensity). 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.
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.

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BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES STANDARD

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4-03 REVISIONS 9-07	CONT	SECT	JOB	HIGHWAY
	DIST		COUNTY	SHEET NO. 56

DATE:
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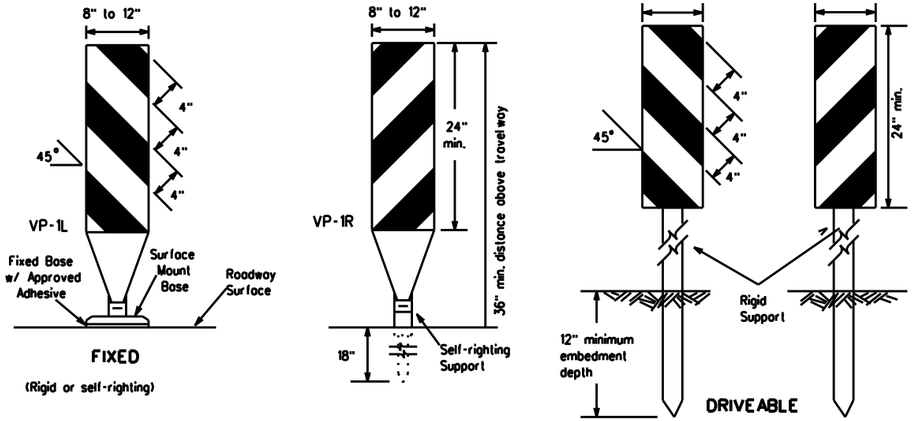
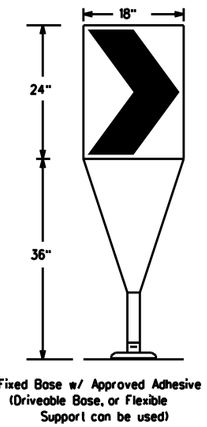
CHANNELIZING DEVICES

VERTICAL PANELS (VPs)



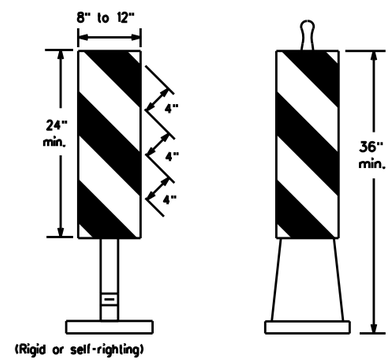
CHEVRONS



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 E (Fluorescent Prismatic) conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall be black vinyl non-reflective decal sheeting meeting 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.

GENERAL NOTES:

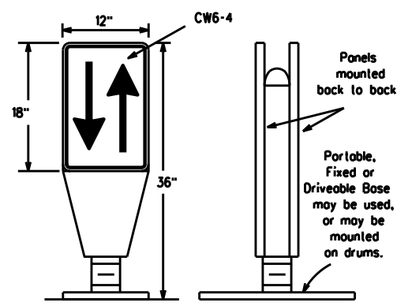
1. Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control 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 approximately 35 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.
8. Examples on this sheet are commonly used channelizing devices in work zones. For other devices, refer to the CWZTCD.



PORTABLE

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 Appendix B "Treatment of Pavement Drop-offs in Work Zones" for additional guidelines on the use of 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, shall have a minimum of 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 C (High Specific Intensity) conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
7. Where the height of reflective material on the vertical panel is greater than 36 inches, a panel stripe of 6 inches shall be used.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

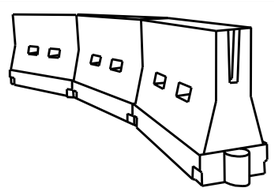


1. Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The 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 simple tubular markers or VPs.
3. Spacing between the OTLD shall not exceed 500 feet. Tubular markers or VPs placed between the OTLD's should not exceed 100 foot spacing.
4. The OTLD shall be orange with a black nonreflective legend. Sheeting for the OTLD shall be retroreflective Type E (Fluorescent Prismatic) conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall be black vinyl non-reflective decal sheeting meeting the requirements of DMS-8300.

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'-75'
35		205'	225'	245'	35'	70'-90'
40		265'	295'	320'	40'	80'-100'
45	L=WS	450'	495'	540'	45'	90'-110'
50		500'	550'	600'	50'	100'-125'
55		550'	605'	660'	55'	110'-140'
60		600'	660'	720'	60'	120'-150'
65		650'	715'	780'	65'	130'-165'
70		700'	770'	840'	70'	140'-175'
75		750'	825'	900'	75'	150'-185'
80		800'	880'	960'	80'	160'-195'

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

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



LONGITUDINAL CHANNELIZING DEVICES

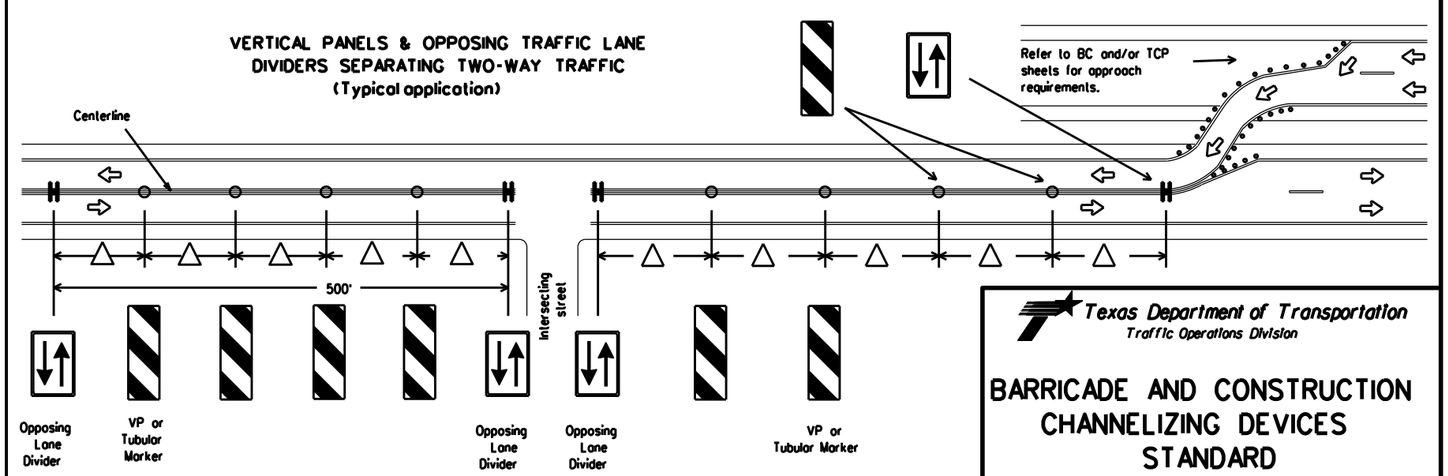
1. Longitudinal channelizing devices are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are [illegible] impact.
2. Longitudinal channelizing devices may be used instead of a line of cones or drums.
3. Longitudinal channelizing devices shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Longitudinal channelizing devices should not be used to provide positive protection for obstacles, pedestrians or workers.
5. Longitudinal channelizing devices shall be retroreflective, or supplemented with retroreflective delineation as required for temporary barriers on BC(7)-07.

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 NCHRP 350 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 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 be not less than 32 inches in height.

VERTICAL PANELS & OPPOSING TRAFFIC LANE DIVIDERS SEPARATING TWO-WAY TRAFFIC (Typical application)



△ Spacing between the VP's or tubular markers shall not exceed 100 feet. On roadways with speeds less than 45 MPH, spacing between the tubular markers or VP's shall be as shown on the channelizing spacing table shown on this page. If the table shows spacing greater than 100 feet based on the roadway speed, then use a maximum of 100 feet spacing between the tubular markers or VP's. Every fifth channelizing device shall be an OTLD, except when the OLTD must be spaced closer to accomodate an intersection. Spacing between the OTLD shall not exceed 500 feet.

Texas Department of Transportation
Traffic Operations Division

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES STANDARD

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9-07 REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST		COUNTY	SHEET NO. 57

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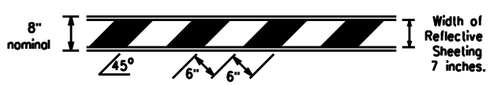
TYPE III BARRICADES

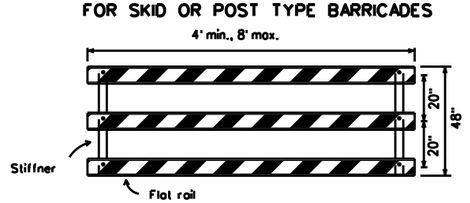
1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type III Barricades and a list of all materials used in the construction of Type III Baricades.
2. Type III Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades extending 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 C (High Specific Intensity) 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



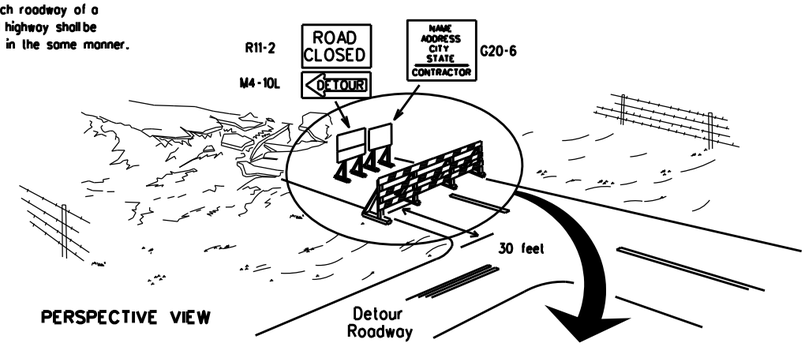
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES



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

TYPE III BARRICADE (POST AND SKID) TYPICAL APPLICATION

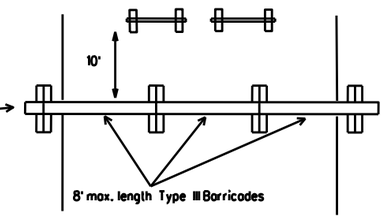
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

The three rails on Type III barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.

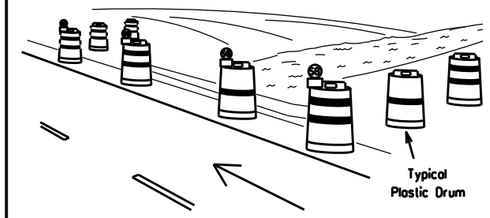
Barricade striping should slant downward in the direction of detour.



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 III Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

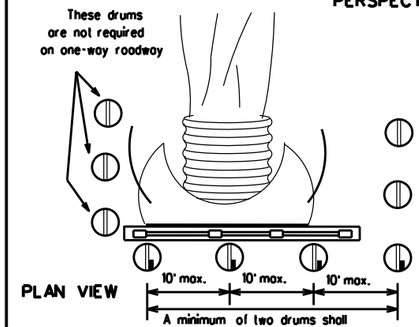


PERSPECTIVE VIEW

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.

These drums are not required on one-way roadway

Increase number of plastic drums on the side of approaching traffic if the crown width makes it necessary. (minimum of 2 and maximum of 4 drums)

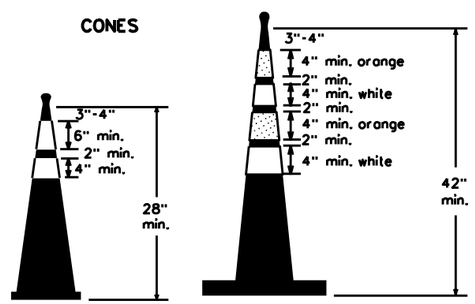


PLAN VIEW

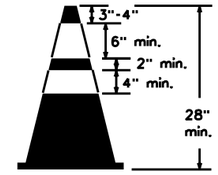
Legend

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

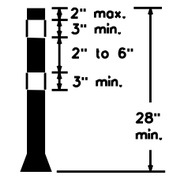
CONES



Two-Piece cones



One-Piece cones

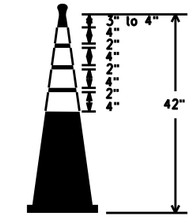


Tubular Marker

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.

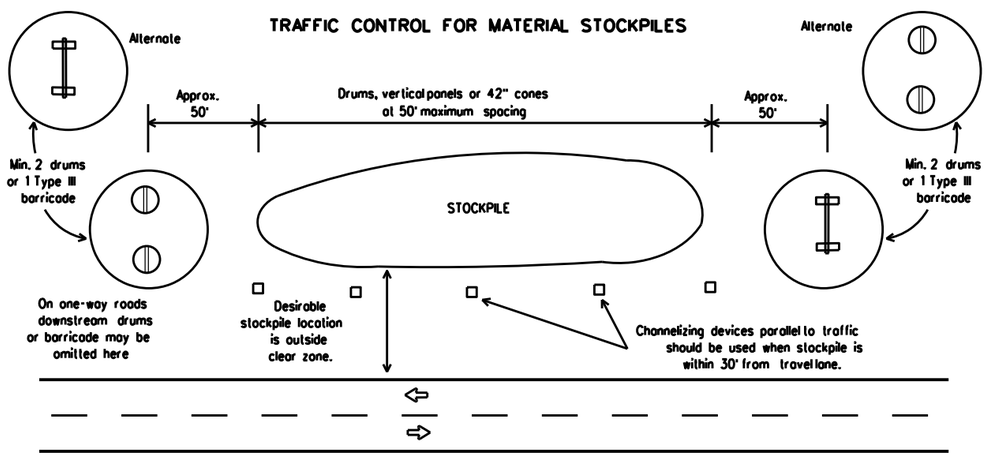
1. Traffic cones and tubular markers shall be a minimum of 28 inches in height when used either on freeways or at nighttime.
2. Cones or tubular markers shall be predominantly orange, fluorescent red-orange, or fluorescent yellow-orange. They should be kept clean and bright for maximum visibility.
3. Cones used only for daytime operations do not require the reflectorized bands.
4. Cones and tubular markers used for nighttime operations shall be reflectorized. Reflectorized material shall have a smooth, sealed outer surface that displays the same approximate color during the day and night. The reflectorized bands shall be retroreflective Type C (High Specific Intensity) conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
5. When used at night, appropriate personnel shall ensure that cones and tubular markers remain in their proper location and in an upright position.
6. Reflectorization of 28" cones shall consist of a minimum 6 inch band placed at least 3 inches but not more than 4 inches from the top, supplemented by a minimum 4 inch band spaced a minimum of 2 inches below the 6 inch band.
7. Reflectorization of 42" cones shall be provided by alternating 4 to 6" orange and white stripes with orange on top.
8. Reflectorization of tubular markers shall be a minimum of two 3 inch bands placed a maximum of 2 inches from the top with a maximum of 6 inches between bands.
9. One-piece cones or tubular markers are generally suitable for temporary usage (up to 8 hours) with other channelization devices such as vertical panels, drums or two-piece cones for long term usage. Care should be taken to ensure they remain in their proper location and in an upright position.
10. Cones or tubular markers used on each project shall be of the same size and shape.
11. The handle may be designed as a hook or other shape, fabricated from non-rigid materials similar to the cone material, and may extend up to a maximum of 8 inches above the top of cone. Length of the handle shall not be considered with regard to the overall height of the cone.



EDGELINE CHANNELIZER

1. This device is intended only for use in place of a vertical panel to channelize traffic by indicating the edge of the travel lane. It is not intended to be used in transitions or tapers.
2. This device shall not be used to separate lanes of traffic (opposing or otherwise) or warn of objects.
3. This device is based on a 42 inch, two-piece cone with an alternate striping pattern: four 4 inch retroreflective bands, with an approximate 2 inch gap between bands. The color of the band should correspond to the color of the edgeline (yellow for left edgeline, white for right edgeline) for which the device is substituted or for which it supplements. The reflectorized bands shall be retroreflective Type C encapsulated bead (High Specific Intensity) conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
4. The base must weigh a minimum of 30 lbs.

TRAFFIC CONTROL FOR MATERIAL STOCKPILES



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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.

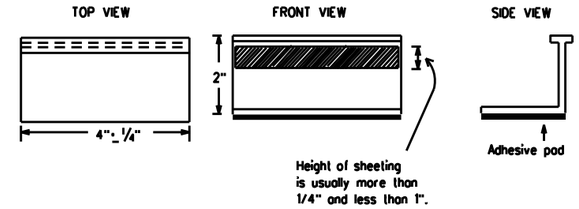
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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 two weeks, 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.
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
PREFABRICATED PAVEMENT MARKINGS-PERMANENT	DMS-8240
PREFABRICATED PAVEMENT MARKINGS-REMOVABLE	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).

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BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS STANDARD

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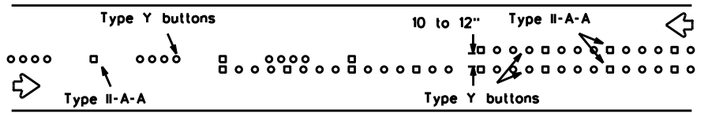
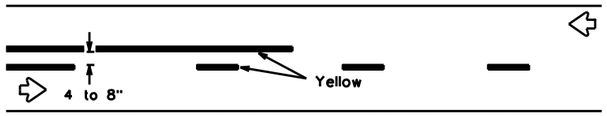
PAVEMENT MARKING PATTERNS

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

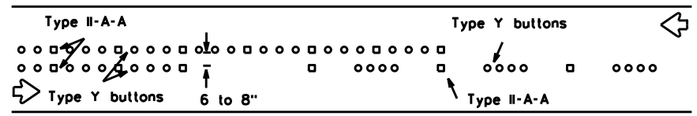
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



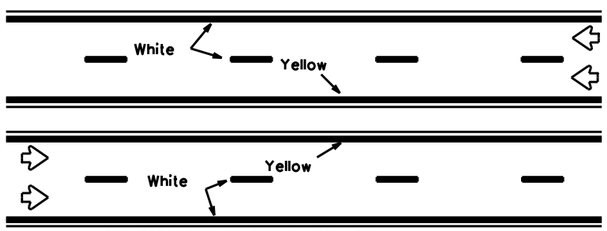
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



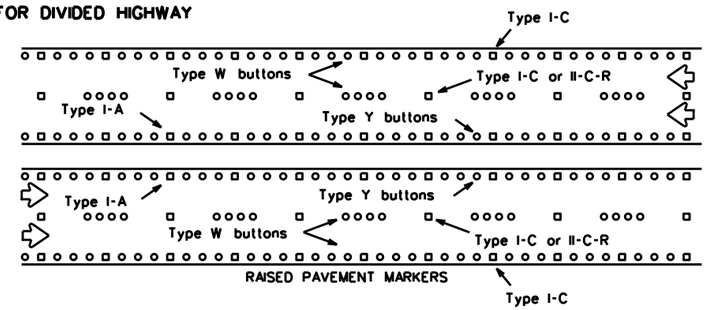
RAISED PAVEMENT MARKERS - PATTERN B

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.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



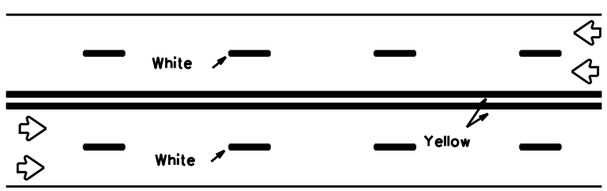
REFLECTORIZED PAVEMENT MARKINGS



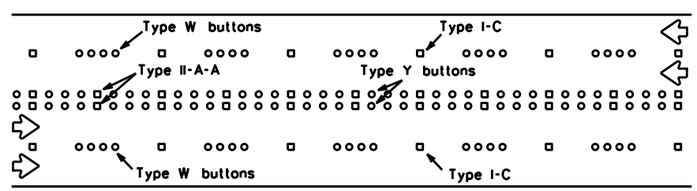
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



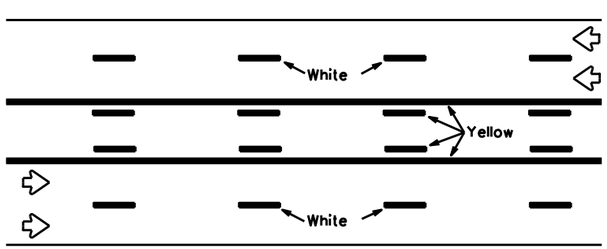
REFLECTORIZED PAVEMENT MARKINGS



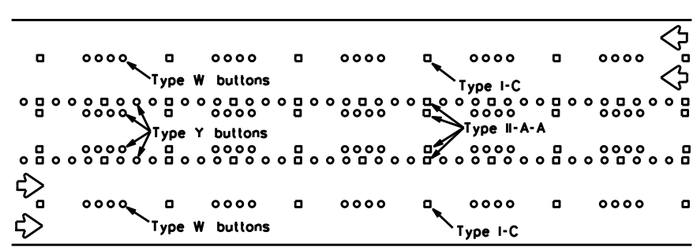
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE



REFLECTORIZED PAVEMENT MARKINGS



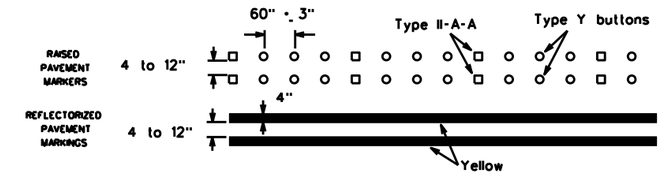
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

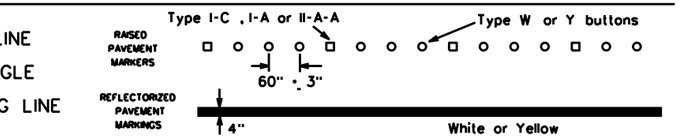
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

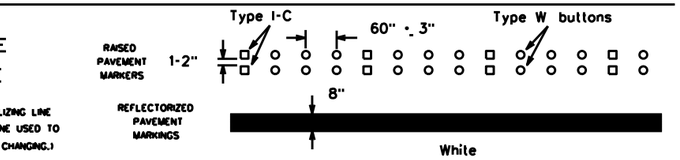


EDGE LINE OR SINGLE NO-PASSING LINE



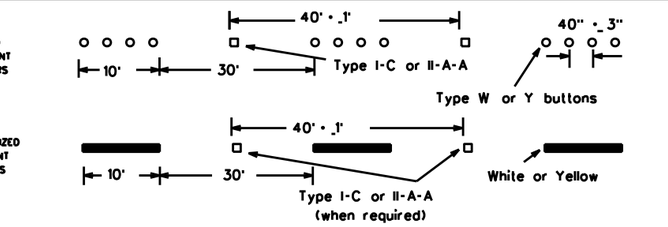
WIDE LINE

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



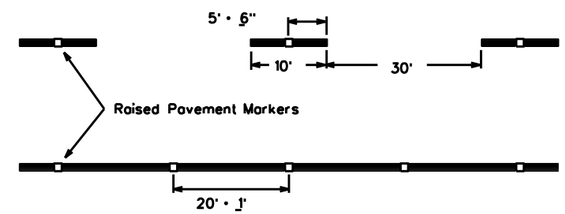
BROKEN LINE

(FOR CENTER LINE OR LANE 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."

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