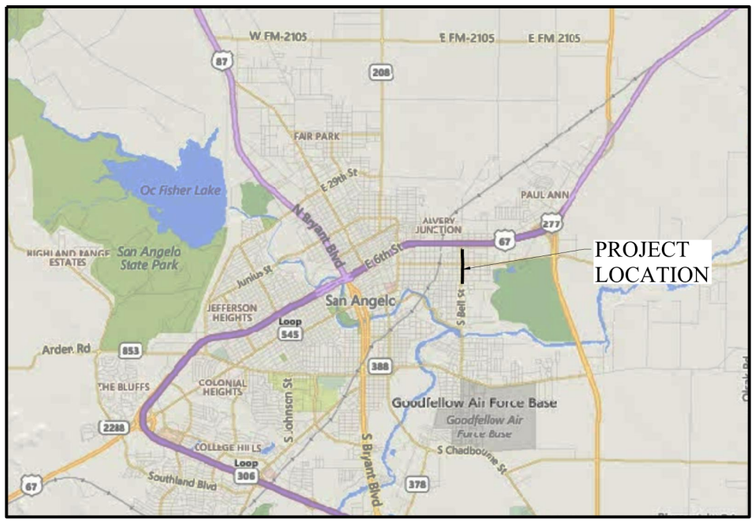
CITY OF SAN ANGELO, TEXAS

BELL STREET PAVING, DRAINAGE, WATER AND WASTEWATER IMPROVEMENTS PHASE III



NORTH

VICINITY MAP
NOT TO SCALE

OCTOBER 2017

PREPARED BY:

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SAN16188

100% SUBMITTAL

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LEGEND:

EXISTING — PROPOSED

- PROPERTY LINE
- EASEMENT LINE
- BUILDING LINE
- FENCE
- EDGE OF PAVE
- TREE OR SHRUB
- SIGN — SIGN
- CONTROL POINT — CP#00
- ELECTRIC
  - OVERHEAD
  - OVERHEAD STREET LIGHT CONDUCTION
  - UNDERGROUND
  - STREET LIGHT — LP
  - POWER POLE — PP
  - GUY WIRE — GUY
  - POTHOLE POINT — PH#
- GAS
  - LINE
  - METER — GM
- STORM DRAIN
  - LINE
  - INLET
  - MANHOLE
- SANITARY SEWER
  - LINE
  - MANHOLE
  - CLEAN OUT
- TELEPHONE
  - OVERHEAD
  - UNDERGROUND
  - PEDESTAL — TEL
  - MANHOLE — TMH
- WATER
  - LINE
  - FIRE HYDRANT — FH
  - METER — WM
  - VALVE — WV
  - REDUCER
  - SPRINKLER CONTROL BOX — SV

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

STATE OF TEXAS — WAYNE P. HARTT — 118231 — LICENSED PROFESSIONAL ENGINEER

10/23/2017

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CITY OF SAN ANGELO, TEXAS
BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS
PHASE III
GENERAL

INDEX OF SHEETS

NO.	ISSUES	BY	DATE

F&N JOB NO. SAN16188
DATE 10/2017
DESIGNED JWP
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SHEET INDEX
SEQ. 2

GENERAL CONSTRUCTION NOTES - CITY OF SAN ANGELO

1. UTILITY LOCATION: THE UTILITIES SHOWN ON THE PLANS WERE COMPILED FROM VARIOUS SOURCES AND ARE INTENDED TO SHOW IN GENERAL THE EXISTENCE AND LOCATION OF UTILITIES IN THE AREA OF CONSTRUCTION. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OF THE UTILITY INFORMATION SHOWN ON THE PLANS. THE CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL CONTACT ALL UTILITY COMPANIES 48 HOURS IN ADVANCE OF ANY CONSTRUCTION ACTIVITIES IN ORDER TO DETERMINE IF THERE IS ANY CONFLICT WITH THE PROPOSED FACILITIES. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY IF CONFLICTS WITH EXISTING UTILITIES ARE DISCOVERED. THE CONTRACTOR SHALL VERIFY, OR HAVE VERIFIED BY THE APPROPRIATE UTILITY COMPANY, ALL ACTUAL LINE LOCATIONS, ELEVATIONS AND CONFIGURATIONS PRIOR TO CONSTRUCTION IN ORDER TO MAKE ANY NECESSARY TIE-INS OR BY-PASSES. SUCH VERIFICATIONS SHALL BE CONSIDERED SUBSIDIARY TO THE COST OF THE PROJECT AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED.

2. UTILITY PROTECTION: THE PROPOSED UTILITY LINES AT TIMES WILL BE LAID CLOSE TO OTHER EXISTING UTILITIES AND STRUCTURES BOTH ABOVE AND BELOW GROUND. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS FOR THE PROTECTION AND SUPPORT OF ALL UTILITY FACILITIES AND EXISTING STRUCTURES (INCLUDING BUT NOT LIMITED TO UTILITY POLES, GAS MAINS, TELEPHONE CABLES, ELECTRIC CABLES, TV CABLES, DRAINAGE PIPES AND STRUCTURES, UTILITY SERVICES, OTHER UTILITIES, FENCES, TREES AND SHRUBS) BOTH ABOVE AND BELOW THE GROUND DURING CONSTRUCTION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY ALL UTILITY OWNERS PRIOR TO ANY CONSTRUCTION IN THE AREA AND VERIFY THE ACTUAL LOCATION OF ALL BURIED UTILITIES THAT MAY OR MAY NOT BE SHOWN ON THE PLANS. THE CONTRACTOR SHALL PRESERVE AND PROTECT ALL UNDERGROUND AND OVERHEAD FACILITIES AND BE RESPONSIBLE FOR ANY DAMAGE CAUSED BY CONTRACTOR'S OPERATIONS.

3. THE CONTRACTOR SHALL CONTACT THE FOLLOWING AT LEAST 48 HOURS PRIOR TO EXCAVATING AT EACH LOCATION:

   CITY OF SAN ANGELO (325) 657-4299
   ATMOS ENERGY (GAS), EARLA AHRENS (325) 650-1167
   AEP-TEXAS
   AT&T, NICK ROSE (325) 315-8993
   FRONTIER COMMUNICATIONS, WILLIAM GATLIN (325) 949-7667
   DIG TESS (UTILITIES) (800) 344-3877
   AEP-TEXAS, KEVIN POOL, 361-290-7046
   SUDDENLINK, CRAIG THORNELL, 325-486-4113

4. WHEN NOTIFYING UTILITY COMPANIES BY CALLING 1-800-DIG-TESS (1-800-344-8377) THE CONTRACTOR SHALL CALL AT LEAST 48 HOURS PRIOR TO CONSTRUCTION AND SHALL PROVIDE MAPSCO GRID NUMBERS FOR THE WORK AREA AND SHALL RECORD THE CONFIRMATION NUMBERS ISSUED BY DIG TESS. THESE NUMBERS AND/OR TICKETS SHALL BE PROVIDED TO THE CITY ON REQUEST.

5. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING GENERAL SAFETY AT AND ADJACENT TO THE PROJECT AREA, INCLUDING THE PERSONAL SAFETY OF THE CONSTRUCTION CREW AND GENERAL PUBLIC, AND THE SAFETY OF PUBLIC AND PRIVATE PROPERTY.

6. THE TYPES AND LOCATIONS OF THE TEMPORARY BARRICADES AND SIGNS USED DURING CONSTRUCTION SHALL CONFORM TO THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES. PLACEMENT AND MAINTENANCE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR WITH APPROVED TRAFFIC CONTROL PLAN.

7. THE CONTRACTOR SHALL NOTIFY ALL EMERGENCY UNITS AND SCHOOL DISTRICTS OPERATING WITHIN THE AREA OF THE PROPOSED WORK OF STREET OR LANE CLOSURES AND CONSTRUCTION SCHEDULES.

8. THE CONTRACTOR SHALL MAINTAIN FIRE EMERGENCY VEHICLE ACCESS TO FIRE HYDRANTS THROUGHOUT THE DURATION OF THE PROJECT. INACTIVE FIRE HYDRANTS SHALL BE SALVAGED.

9. PRIOR TO PRE-CONSTRUCTION MEETINGS, THE CONTRACTOR SHALL SUBMIT THE NAME OF THE INDEPENDENT TESTING LABORATORY TO BE USED FOR THE CITY'S REVIEW AND APPROVAL. COST OF TESTING SHALL BE SUBSIDARY TO APPROPRIATE BID ITEMS. ALL MATERIAL TESTING SHALL BE COORDINATED WITH THE PROJECT INSPECTOR. THE PROJECT INSPECTOR SHALL BE PRESENT DURING ALL TESTS AND SHALL BE GIVEN A MINIMUM OF 24 HOURS ADVANCED NOTICE PRIOR TO ANY TESTING. ANT TEST RESULTS NOT MEETING THE SPECIFICATIONS SHALL REQUIRE ADDITIONAL INSPECTIONS AND TESTS AT NO ADDITIONAL COST TO THE CITY.

10. CONSTRUCTION ACTIVITIES SHALL BE LIMITED TO THE HOURS OF 7:00 AM TO 6:00 PM MON.-FRI. UNLESS OTHERWISE APPROVED OR DIRECTED IN WRITING BY THE PROJECT INSPECTOR.

11. THE CONTRACTOR WILL VIDEO OR PHOTOGRAPH ALL BUILDING FACADES WITHIN THE CONSTRUCTION LIMITS PRIOR TO WORK. VIDEOS SHALL INCLUDE DATE NOTATION AND AUDIO IDENTIFICATION OF PROPERTY. THIS SHALL BE CONSIDERED SUBSIDIARY WORK. CONTRACTOR SHALL SPRAY PAINT ADDRESS #'S ON DRIVE APPROACHES.

12. THE CONTRACTOR SHALL TAKE ADEQUATE MEASURES TO PREVENT EROSION. IN THE EVENT THAT SIGNIFICANT EROSION OCCURS AS A RESULT OF THE CONSTRUCTION, THE CONTRACTOR SHALL RESTORE THE ERODED AREA TO ITS ORIGINAL OR BETTER CONDITION AT HIS OWN EXPENSE.

13. ALL AREAS DISTURBED OR EXPOSED DURING CONSTRUCTION SHALL BE REVEGETATED IN ACCORDANCE WITH THE CONSTRUCTION PLANS AND/OR PROJECT SPECIFICATIONS. REVEGETATION OF ALL DISTURBED OR EXPOSED AREAS SHALL CONSIST OF DRILL SEEDING AS INDICATED IN THE PLANS & SPECS. HOWEVER, THE TYPE OF REVEGETATION MUST EQUAL OR EXCEED THE TYPE OF VEGETATION PRESENT BEFORE CONSTRUCTION BEGAN.

14. ALL TREES SHOWN ON PLANS AND WITHIN ROW SHALL REMAIN IN PLACE UNLESS OTHERWISE SPECIFIED. ALL TREES TO REMAIN IN PLACE SHALL BE PRESERVED & PROTECTED BY THE CONTRACTOR. TREES WITHIN FIVE (5) FEET OF THE PROPOSED CURB LINE OR ANY OTHER TREES WHICH REQUIRE REMOVAL IN ORDER TO FACILITATE THE PROPOSED CONSTRUCTION SHALL BE REMOVED BY THE CONTRACTOR AS PART OF THE WORK PERFORMED UNDER THE PAY ITEM FOR "PREPARE RIGHT-OF-WAY" BUT ONLY WITH THE SPECIFIC AUTHORIZATION AND APPROVAL OF THE CITY. STUMPS SHALL BE GROUND AND ROOT SYSTEMS REMOVED TO A CLEAR DEPTH OF 36" BELOW EXISTING GROUND.

15. ALL MAILBOXES, FENCES, DRIVEWAYS, LANDSCAPING, IRRIGATION SYSTEMS, CULVERT PIPES, DRAINAGE DITCHES, AND ANY IMPROVEMENTS ON PRIVATE PROPERTY NOT SCHEDULED FOR REPLACEMENT DURING CONSTRUCTION WHICH ARE DAMAGED OR MOVED BY THE CONTRACTOR SHALL BE RESTORED TO ORIGINAL OR BETTER CONDITION BY THE CONTRACTOR WITH LIKE MATERIAL AT NO ADDITIONAL COST TO THE CITY OR TO THE AFFECTED PROPERTY OWNER.

16. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING GENERAL SAFETY AT AND ADJACENT TO THE PROJECT AREA, INCLUDING THE PERSONAL SAFETY OF THE CONSTRUCTION CREW AND GENERAL PUBLIC AND THE SAFETY OF PUBLIC AND PRIVATE PROPERTY. CONTRACTOR SHALL MAKE THE WORK SITE AND ANY OPEN TRENCHES SECURE AND SAFE AT THE END OF EVERY DAY. CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF ANY FENCING OR ANY OTHER SAFETY EQUIPMENT.

17. THE CONTRACTOR SHALL REMOVE ALL FENCES, LOCATED WITHIN EASEMENTS, INTERFERING WITH CONSTRUCTION OPERATION AND PROVIDE TEMPORARY FENCING DURING CONSTRUCTION. REMOVED FENCES, WOODEN OR CHAIN LINK, SHALL BE REPLACED WITH A NEW FENCE OR UNDAMAGED ORIGINAL FENCING. ALL AFFECTED PROPERTY OWNERS SHALL BE NOTIFIED PRIOR TO CONSTRUCTION. REMOVAL AND REPLACEMENT OF EXISTING FENCES SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST AND REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED IN THE PROPOSAL.

18. WHEN IT IS REQUIRED THAT A CONTRACTOR WORK IN PRIVATE PROPERTY, THE CONTRACTOR SHALL DISTRIBUTE LETTERS TO ALL AFFECTED PROPERTY OWNERS 48 HOURS PRIOR TO BEGINNING WORK ON EACH PROPERTY. THE LETTER SHALL INCLUDE NAMES AND TELEPHONE NUMBERS OF CONTRACTOR CONTACTS, A DESCRIPTION OF THE WORK TO BE DONE, AND THE TIME FRAME FOR DOING THE WORK. COPIES OF THE LETTER SHALL BE FORWARDED TO THE CITY INSPECTOR. DISTRIBUTION OF LETTERS SHALL BE CONSIDERED AS SUBSIDIARY TO THE COST OF PROJECT AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED.

19. THE CONTRACTOR SHALL REMOVE FROM THE PROJECT AREA ALL SURPLUS MATERIAL. THIS SHALL BE INCIDENTAL AND NOT A SEPARATE PAY ITEM. SURPLUS MATERIALS FROM EXCAVATION INCLUDING DIRT, TRASH, ETC. SHALL BE PROPERLY DISPOSED OF AT A SITE ACCEPTABLE TO THE CITY'S FLOOD PLAIN ADMINISTRATOR IF WITHIN THE CITY LIMITS. IF THE LOCATION IS NOT WITHIN THE CITY LIMITS, THE CONTRACTOR SHALL PROVIDE A LETTER STATING SO. NO EXCESS EXCAVATED MATERIAL SHALL BE DEPOSITED IN LOW AREAS OR ALONG NATURAL DRAINAGE WAY WITHOUT WRITTEN PERMISSION FROM THE AFFECTED PROPERTY OWNER AND THE CITY'S FLOOD PLAIN ADMINISTRATOR. IF THE CONTRACTOR PLACES EXCESS MATERIAL IN THE AREAS WITHOUT WRITTEN PERMISSION, HE WILL BE RESPONSIBLE FOR ALL DAMAGE RESULTING FROM SUCH FILL AND HE SHALL REMOVE THE MATERIAL AT HIS OWN COST.

20. ALL EXISTING CONCRETE AND ASPHALT DRIVEWAYS ARE TO BE SAWCUT WHEN CONSTRUCTING A NEW CONCRETE DRIVEWAY APPROACH.

21. CURB RETURN RADII FOR DRIVEWAYS SHALL BE 5 FEET UNLESS OTHERWISE NOTED.

22. ALL ROADWAY DIMENSIONS ARE TO THE BACK-OF-CURB UNLESS OTHERWISE NOTED.

23. THE CONTRACTOR SHALL USE EXTREME CAUTION IN LOCATING AND PROTECTING EXISTING WATER, GAS, ELECTRIC, AND SEWER SERVICES.

24. ALL EXCAVATIONS, TRENCHING AND SHORING OPERATIONS SHALL COMPLY WITH THE REQUIREMENTS OF THE U.S. DEPARTMENT OF LABOR, OSHA, "CONST. SAFETY AND HEALTH REGULATIONS", VOL. 29, SUBPART P., PG 128-137, AND ANY AMENDMENTS THERETO.

25. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING ALL EXCESS TRENCH EXCAVATIONS AND HAULING MATERIALS TO AN APPROVED DISPOSAL SITE. NO SEPARATE PAY WILL BE ALLOWED.

26. DISTANCE BETWEEN ALL WATERLINES AND SANITARY SEWERS SHALL CONFORM TO THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) REGULATIONS (CHP. 290.44 (E) (4) (A&B)).

27. CONTRACTOR'S PERSONNEL SHALL HAVE IDENTIFYING CLOTHING, HATS OR BADGES AT ALL TIMES WHICH IDENTIFY THE CONTRACTOR'S NAME, LOGO OR COMPANY.

28. COSTS ASSOCIATED WITH PROPOSED CONNECTIONS TO EXISTING FACILITIES SHALL BE INCLUDED IN EACH RESPECTIVE BID ITEM. NO SEPARATE PAY, EXCEPT AS SPECIFICALLY INDICATED WITHIN THESE PLANS OR THE CONTRACT DOCUMENTS.

29. CONTRACTOR SHALL CONTACT LOCAL SCHOOLS PRIOR TO BEGINNING CONSTRUCTION TO INFORM PRINCIPALS AND ADMINISTRATORS OF CONSTRUCTION IN THE AREA. A NOTE ON THE SCHOOL MARQUEE IS SUGGESTED TO INFORM PARENTS AND STUDENTS OF CONSTRUCTION AND CONSTRUCTION DURATION AND POSSIBLE ALTERNATE ROUTES AROUND CONSTRUCTION SITES.

30. ALL VALVE BOXES AND MANHOLE LIDS SHALL BE SET TO MATCH FINISHED GRADE, UNLESS OTHERWISE NOTED.

31. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS BEFORE CONSTRUCTION BEGINS.

32. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO ENSURE THAT ELECTRIC POWER AND TELEPHONE POLES ARE NOT DISTURBED DURING CONSTRUCTION. ALL COSTS INCURRED FOR SUPPORTING ELECTRIC POWER AND TELEPHONE POLES SHALL BE INCLUDED IN THE PRICE BID FOR THE CONSTRUCTION OF THE WATER LINE OR SEWER LINE. NO ADDITIONAL COMPENSATION WILL BE ALLOWED.

33. ALL STREETS WITHIN THE SCOPE OF THE CONTRACT SHALL BE KEPT ACCESSIBLE TO FIRE TRUCKS, AMBULANCES AND OTHER EMERGENCY VEHICLES.

34. CONTRACTOR SHALL MAINTAIN SUITABLE CONSTRUCTION ACCESS TO PRIVATE PROPERTY OWNERS, THE ENGINEER AND CITY OF SAN ANGELO, AT ALL TIMES DURING CONSTRUCTION.

35. IT IS THE CONTRACTORS RESPONSIBILITY TO MAINTAIN NEAT AND ACCURATE PLANS ON RECORD.

36. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ADEQUATE SITE DRAINAGE THROUGHOUT THE DURATION OF THIS PROJECT.

37. THE CONTRACTOR SHALL NOT PLACE FILL OR WASTE MATERIAL ON ANY PRIVATE PROPERTY WITHOUT PRIOR WRITTEN PERMISSION FROM THE PROPERTY OWNER AND PROVIDE CITY WITH A COPY.

38. THE CONTRACTOR SHALL AVOID DAMAGING ANY EXISTING WATER SPRINKLER SYSTEM THAT MAY BE IN THE CONSTRUCTION AREA AND WILL BE RESPONSIBLE FOR REPAIRS TO ANY HEADS OR LINES OF DAMAGED. REPLACEMENT, AS NECESSARY, SHALL BE AT LIKE OR BETTER MATERIAL AND INSTALLED BY A LICENSED IRRIGATOR, AT THE CONTRACTORS EXPENSE. DAMAGED SPRINKLERS SHALL BE REPLACED THE SAME DAY THEY ARE DAMAGED, TO THE SATISFACTION OF THE CITY, DEVELOPER AND OWNER.

39. ALL DRIVEWAYS, WHICH SHALL BE SAW CUT, SHALL HAVE ACCESS PROVIDED AT ALL TIMES. CLOSURES, PART OR FULL OF ANY DRIVEWAYS, SHALL BE COORDINATED WITH PROPERTY OWNER. FOR DRIVEWAY TIE-INS THAT EXTEND BEYOND THE RIGHT-OF-WAY, THE CONTRACTOR SHALL COORDINATE WITH THE CITY OF SAN ANGELO AND THE PROPERTY OWNER TO OBTAIN PERMISSION TO ACCESS THE PROPERTY AS NECESSARY TO HARMONIZE THE DRIVEWAY CONNECTION.

40. PI'S AND VPI'S ARE SHOWN IN THE PLANS FOR ALIGNMENT PURPOSES.

41. CONTRACTOR SHALL USE STANDARD FITTINGS SHOW ON THE PLAN AND DEFLECTED PIPE JOINTS, NO GREATER THAN 75% OF THE MANUFACTURERS RECOMMENDATIONS, TO ACHIEVE THE ALIGNMENT SHOWN IN THE PLANS. PIPELINE O.D. SHALL BE MAINTAINED WITHIN R.O.W. OR PERMANENT EASEMENT.

42. THE CONTRACTOR SHALL DISINFECT THE NEW WATER MAINS IN ACCORDANCE WITH AWWA STANDARD C651 AND THEN FLUSH AND SAMPLE, AND PROVIDE A HARD COPY OF TEST RESULTS PRIOR TO TESTING THE LINES BEFORE BEING PLACED INTO SERVICE. SAMPLES SHALL BE COLLECTED FOR MICROBIOLOGICAL ANALYSIS TO CHECK THE EFFECTIVENESS OF THE DISINFECTION PROCEDURE WHICH SHALL BE REPEATED IF CONTAMINATION PERSISTS. A MINIMUM OF ONE SAMPLE FOR EACH 1,000 FEET OF COMPLETED WATER LINE WILL BE REQUIRED OR AT THE NEXT AVAILABLE SAMPLING POINT BEYOND 1,000 FEET AS DESIGNATED BY THE DESIGN ENGINEER. TEST MUST BE APPROVED BY THE CITY OF SAN ANGELO BEFORE THE WATER LINE CAN BE PUT IN SERVICE.

43. ALL NEWLY INSTALLED WATER PIPES AND RELATED PRODUCTS MUST CONFORM TO AMERICAN NATIONAL STANDARDS INSTITUTE/NATIONAL SCIENCE FOUNDATION (ANSI/NSF) STANDARD 61 AND MUST BE CERTIFIED BY AN ORGANIZATION ACCREDITED BY ANSI.

44. UNLESS SPECIFICALLY STATED ON DRAWING, THE CONTRACTOR SHALL NOT REMOVE, CUT OR DAMAGE TREES OR LIMBS WITHOUT WRITTEN APPROVAL OF THE CITY

45. CONTRACTOR SHALL INSTALL TEMPORARY BACKFILL AS REQUIRED FOR OPEN TRENCH IN ESTABLISHED ROADWAYS. NO OPEN TRENCH WILL BE ALLOWED IN EXISTING PAVEMENT EXCEPT DURING DAYLIGHT HOURS DURING CONSTRUCTION OPERATIONS. TEMPORARY BACK FILL SHALL BE INSTALLED TO THE FINISHED GRADE OF THE EXISTING PAVEMENT AND SHALL BE MAINTAINED BY THE CONTRACTOR TO ENSURE A SMOOTH DRIVING SURFACE FREE OF RUTTING AND POTHOLES. REPAIR DAMAGED PAVEMENT IN ACCORDANCE WITH SPECIFICATIONS.

46. DRILL SEEDING SHALL BE ACCOMPLISHED FOR ALL UNIMPROVED SURFACES WITHIN THE RIGHT-OF-WAY AND EASEMENTS AND AS DIRECTED BY THE CITY. CONTRACTOR IS RESPONSIBLE FOR SUCCESSFULLY ESTABLISHING TURF (VIA DRILL SEEDING) IN THE ENTIRE PROJECT LIMITS.

100% SUBMITTAL

FREESE AND NICHOLS, INC. TEXAS REGISTERED ENGINEERING FIRM F-2144

10/23/2017

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CITY OF SAN ANGELO, TEXAS
BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS PHASE III
GENERAL

GENERAL NOTES

F&N JOB NO. SAN16188
DATE 08/2017
DESIGNED JWP
DRAWN EB
CHECKED WH
FILE NAME ph2-trt-gn-notes01.sht

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

SHEET NOTES-1
SEQ. 3

EROSION & SEDIMENTATION CONTROL NOTES

1. CONTRACTOR WILL BE RESPONSIBLE FOR COMPLYING WITH TCEQ'S TPDES AND EPA'S NPDES PROGRAMS FOR CONTROL OF SILT AND EROSION. CONTRACTOR SHALL PREPARE A STORMWATER POLLUTION PREVENTION PLAN (SWPPP). THE CONTRACTOR SHALL UPDATE THE SWPPP AS NECESSARY BASED ON FIELD CONDITIONS.

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

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

4. SEDIMENT CONTROL DEVICES SHALL BE INSTALLED AS INDICATED ON THE PLANS. PRIOR TO ANY EMBANKMENT OR EXCAVATION WORK BEING DONE. WHEN THE PROJECT IS COMPLETE AND THE ENTIRE PROJECT 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.

5. THE SITE SHALL BE REVIEWED WEEKLY AND AFTER ANY MAJOR STORM ADJUSTMENTS/REPAIRS TO THE EROSION CONTROL DEVICES SHALL BE MADE AS DIRECTED BY THE CITY.

6. THE EROSION CONTROL PLANS PROVIDED IN THE PLAN SET DOES NOT RELIEVE THE CONTRACTOR FROM PROVIDING ADDITIONAL EROSION CONTROL MEASURES AS REQUIRED BY THE SWPPP OR AS REQUIRED BY FIELD CONDITIONS AND DIRECTED BY THE CITY. THE EROSION CONTROL PLANS ARE PROVIDED AS A COURTESY TO THE CONTRACTOR. HOWEVER, IT IS THE CONTRACTORS RESPONSIBILITY TO MEET ALL REGULATORY REQUIREMENTS FOR EROSION CONTROL.

7. EROSION CONTROL MEASURES MAY ONLY BE PLACED IN FRONT OF INLETS, OR IN CHANNELS, DRAINAGEWAYS OR BORROW DITCHES AT RISK OF CONTRACTOR. CONTRACTOR SHALL REMAIN LIABLE FOR ANY DAMAGE CAUSED BY THE MEASURES, INCLUDING FLOODING DAMAGE, WHICH MAY OCCUR DUE TO BLOCKED DRAINAGE. AT THE CONCLUSION OF ANY PROJECT, ALL CHANNELS, DRAINAGEWAYS AND BORROW DITCHES IN THE WORK ZONE SHALL BE DREDGED OF ANY SEDIMENT GENERATED BY THE PROJECT OR DEPOSITED AS A RESULT OF EROSION CONTROL MEASURES.

8. THE CONTRACTOR WILL BE RESPONSIBLE FOR PREPARING, IMPLEMENTATION AND MAINTENANCE OF THE SWPPP. THE INSPECTION AND MAINTENANCE OF THE EROSION PREVENTION MEASURES SHALL BE THE CONTRACTOR'S RESPONSIBILITY THROUGHOUT ALL PHASES OF CONSTRUCTION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO COMPLY WITH TCEQ'S TPDES AND THE EPA'S NPDES (NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM) REGULATIONS 40-CFR-122, 123, 124 CONCERNING EROSION AND SEDIMENT CONTROL. THE CONTRACTOR WILL BE RESPONSIBLE FOR SUBMITTING A NOTICE OF INTENT "NOI" TO EPA 72 HOURS PRIOR TO BEGINNING CONSTRUCTION AND NOTICE OF TERMINATION "NOT" TO EPA UPON COMPLETION OF THE PROJECT.

8. EXCAVATE ACCUMULATED SEDIMENT WITH BACKHOE, TRACK HOE, OR BUCKET-TYPE EXCAVATING APPARATUS ONLY. DO NOT USE A BULLDOZER OR OTHER MOVING EQUIPMENT TO PUSH MATERIAL OUT OF STREAMBED OR OTHERWISE RE-DISTRIBUTE SEDIMENT WITHIN THE STREAMBED; EXCAVATE WITH NO MORE THAN INCIDENTAL FALLBACK (I.E. SMALL SPILLS FROM THE EXCAVATION APPARATUS). EXCAVATE BETWEEN ORDINARY HIGH WATER MARKS (OHWMs), AS MAPPED, FROM THE TOP OF THE STREAM BANK ONLY. PLACE SEDIMENT DIRECTLY INTO A TRUCK OR CONTAINER AND REMOVE FOR DISPOSAL AT AN UPLAND SITE. DO NOT ALLOW EXCAVATED MATERIAL TO DEWATER INTO THE STREAM OR ANY OTHER WATER BODY.

TRAFFIC SIGNS AND PAVEMENT MARKINGS:

1. ALL TRAFFIC SIGNS SHOWN ON THE PLANS WILL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.

PAVING NOTES

1. ALL DRIVEWAYS, WHICH ARE OPEN CUT, SHALL HAVE AT LEAST A TEMPORARY DRIVING SURFACE AT THE END OF EACH DAY. THE TEMPORARY SURFACE SHALL BE CONSIDERED AS A SUBSIDIARY ITEM OF WORK. THE COST OF WHICH SHALL BE INCLUDED IN THE PRICE BID IN THE PROPOSAL FOR VARIOUS BID ITEMS.

2. EXISTING ASPHALT CONCRETE PAVEMENT SHALL BE REMOVED AND DELIVERED TO THE CITY'S MAINTENCE YARD ON ANN STREET. REMOVAL BY MILLING SHALL NOT BE ALLOWED. ASPHALT PAVEMENT REMOVAL IS NOT REFLECTED IN THE ROADWAY EXCAVATION QUANTITIES.

SIDEWALKS AND CURB RAMP NOTES:

1. THE CURB RAMP STANDARD DETAILS ARE INTENDED TO SHOW TYPICAL LAYOUTS FOR THE CONSTRUCTION OF THE CURB RAMPS. THE INFORMATION SHOWN ON THE STANDARD DETAILS MEET THE REQUIREMENTS SHOWN IN THE 2012 TEXAS ACCESSIBILITY STANDARDS(TAS) AND THE 2010 ADA STANDARDS FOR ACCESSIBLE DESIGN BY THE DEPARTMENT OF JUSTICE.

2. THE CONTRACTOR MAY NOT MAKE CHANGES TO THE SIDEWALK AND CURB RAMP LAYOUT WITHOUT APPROVAL OF THE CITY. THE CONTRACTOR MAY PROPOSE CHANGES TO THE SIDEWALK AND CURB RAMP LAYOUT DUE TO FIELD CONDITIONS, BUT ANY PROPOSED CHANGES MUST BE APPROVED BY THE CITY.

3. CURB RAMP RUNNING SLOPES SHALL NOT BE STEEPER THAN 8.3% (12:1). ADJUST CURB RAMP LENGTH OR GRADE OF APPROACH SIDEWALKS AS DIRECTED BY THE CITY.

4. CURB RAMP FLARE SLOPES SHALL NOT BE STEEPER THAN 10% (10:1) AS MEASURED ALONG BACK OF CURB.

5. MAXIMUM ALLOWABLE CROSS SLOPE ON SIDEWALK AND CURB RAMP SURFACES IS 2%.

6. THE MINIMUM WIDTH OF SIDEWALKS AND CURB RAMPS SHALL BE 3 FEET. SIDEWALK WIDTHS UNDER 4 FEET CONNOT EXCEED 150 FT IN LENGTH.

7. LANDINGS SHALL BE PROVIDED AT THE TOP OF CURB RAMPS. THE LANDING CLEAR LENGTH SHALL BE 5 FEET MINIMUM FROM THE END OF RAMP. THE LANDING CLEAR WIDTH SHALL BE AT LEAST AS WIDE AS THE CURB RAMP, EXCLUDING FLARES. THE LANDING SHALL HAVE A MAXIMUM SLOPE OF 2% IN ANY DIRECTION.

8. IN ALTERATIONS WHERE THERE IS NO LANDING AT THE TOP OF THE CURB RAMP, CURB RAMP FLARES SHALL BE PROVIDED AND SHALL NOT BE STEEPER THAN 8.3% (12:1).

9. WHERE TURNING IS REQUIRED, MANEUVERING SPACE AT THE TOP AND BOTTOM OF CURB RAMPS SHALL BE 5 FEET BY 5 FEET MINIMUM. THE SPACE AT THE BOTTOM SHALL BE WHOLLY CONTAINED WITHIN THE CROSSWALK MARKINGS AND SHALL NOT PROJECT INTO VEHICULAR TRAFFIC LANES.

10. CURB RAMPS WITH RETURNED CURBS MAY BE USED ONLY WHERE PEDESTRIANS WOULD NORMALLY NOT WALK ACROSS THE RAMP, EITHER BECAUSE THE ADJACENT SURFACE IS PLANTING OR OTHER NON-WALKING SURFACE OR BECAUSE THE SIDE APPROACH IS SUBSTANTIALLY OBSTRUCTED.

11. WHERE CURB RAMPS ARE PROVIDED, CROSSWALK MARKINGS SHALL BE REQUIRED AND RAMPS SHALL BE ALIGNED WITH THE CROSSWALK.

12. COUNTER SLOPES OF ADJOINING GUTTERS AND ROAD SURFACES IMMEDIATELY ADJACENT TO THE CURB RAMP SHALL NOT BE STEEPER THAN 5% (20:1) IN ANY DIRECTION.

TRAFFIC CONTROL:

1. THE CONTRACTOR SHALL SUBMIT A WORK SCHEDULE & TRAFFIC CONTROL PLAN.

2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF PEDESTRIANS AND MOTORISTS IN THE AREA OF THE TRAFFIC SIGNAL CONSTRUCTION SITE.

3. ROADS AND STREETS SHALL BE KEPT OPEN TO TRAFFIC AT ALL TIMES. CONTRACTOR SHALL ARRANGE CONSTRUCTION SO AS TO CLOSE ONLY ONE LANE IN EACH DIRECTION OF A ROADWAY AT A TIME.

4. ALL CONSTRUCTION OPERATIONS SHALL BE CONDUCTED TO PROVIDE MINIMAL INTERFERENCE TO TRAFFIC. ALL TRAFFIC SIGNAL EQUIPMENT INSTALLATIONS SHALL BE ARRANGED SO AS TO PERMIT CONTINUOUS MOVEMENT OF TRAFFIC IN ALL DIRECTIONS AT ALL TIMES.

5. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY SIGNAGE NECESSARY DURING CONSTRUCTION.

6. ALL SIGNS, BARRICADES, PAVEMENT MARKINGS AND TRAFFIC CONTROL DEVICES, INCLUDING PLACEMENT, SHALL CONFORM TO THE LATEST EDITION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

7. ALL TRAFFIC CONTROL DEVICES USED AT NIGHT SHALL BE REFLECTORIZED AND/OR ILLUMINATED. CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT BATTERIES IN ILLUMINATED DEVICES ARE CHARGED SUCH THAT NO DEVICE FAILS TO OPERATE DURING THE NIGHT.

8. THE CONTRACTOR SHALL FURNISH, INSTALL AND MAINTAIN BARRICADES, WARNING SIGNS, FLASHERS, AND OTHER DEVICES OF THE TYPE AND SIZE INDICATED IN THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, CURRENT REVISION.

9. IN LIEU OF TYPE D (2" THICK) SURFACE COURSE FOR TEMPORARY PAVEMENT, THE CONTRACTOR MAY SUBSTITUTE ALTERNATIVE 2-COURSE PENETRATION SURFACE TYPE(S) WITH THE UNDERSTANDING THAT AN ACCEPTABLE DRIVING SURFACE IS MAINTAINED TO THE SATISFACTION OF THE CITY.

10. CONTRACTOR SHALL MAINTAIN ACCESS TO ALL BUSINESSES AND PROPERTIES DURING CONSTRUCTION.

11. TWO-WAY TRAFFIC MUST BE MAINTAINED AT ALL TIMES. ONE LANE OF TRAFFIC IN EACH DIRECTION AROUND CONSTRUCTION OPERATIONS IN PROGRESS WITH ADEQUATE SAFEGUARDS WILL BE ACCEPTABLE, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

12. A TRAFFIC CONTROL PLAN WAS PREPARED FOR THIS PROJECT. THE CONTRACTOR IS RESPONSIBLE FOR THE IMPLEMENTATION AND MAINTENANCE OF THE TRAFFIC CONTROL PLAN. CHANGES MADE TO THE TRAFFIC CONTROL PLAN SHALL BE PREPARED BY A PROFESSIONAL ENGINEER AND SUBMITTED FOR APPROVAL BY THE OWNER AT NO ADDITIONAL COST TO THE OWNER. TWO-WAY TRAFFIC MUST BE MAINTAINED AT ALL TIMES. ALL BARRICADES, WARNING SIGNS, AND LIGHTS DEVICES FOR THE GUIDANCE AND PROTECTION OF TRAFFIC AND PEDESTRIANS MUST CONFORM TO THE INSTALLATION SHOWN IN THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (LATEST EDITION), TXDOT. ALL TRAFFIC CONTROL DEVICES SHALL BE INSPECTED DAILY.

WATER & WASTEWATER NOTES:

1. FOR UTILITY WORK WITHIN UTILITY EASEMENTS, ONCE PIPE OR APPURTENANCES HAVE BEEN INSTALLED OR REHABILITATED, IMMEDIATELY COMMENCE TEMPORARY SURFACE RESTORATION. COMPLETE SURFACE RESTORATION TO THE OWNER'S SATISFACTION WITHIN SEVEN (7) DAYS OF WORK FINISHING ON-SITE. FAILURE TO MAINTAIN SURFACE RESTORATION, AS NOTED ABOVE, MAY RESULT IN SUSPENSION OF WORK UNTIL RESTORATION IS COMPLETE.

2. EXISTING VERTICAL DEFLECTIONS AND PIPE SLOPES SHOWN ON THE DRAWINGS ARE APPROXIMATE AND HAVE NOT BEEN FIELD VERIFIED, UNLESS OTHERWISE NOTED. RIM ELEVATIONS, FLOW LINES, AND HORIZONTAL LOCATIONS OF EXISTING MANHOLES WERE DETERMINED FROM FIELD SURVEY. IF FIELD CONDITIONS VARY FROM THOSE SHOWN ON DRAWINGS CONTRACTOR SHALL NOTIFY CITY.

3. MAINTAIN ALL EXISTING WATER AND WASTEWATER CONNECTIONS TO CUSTOMERS IN WORKING ORDER AT ALL TIMES, EXCEPT FOR BRIEF INTERRUPTIONS IN SERVICE FOR WATER AND SEWER SERVICES TO BE REINSTATED. IN NO CASE SHALL SERVICES BE ALLOWED TO REMAIN OUT OF SERVICE OVERNIGHT.

4. PROVIDE AND FOLLOW APPROVED CONFINED SPACE ENTRY PROGRAM IN ACCORDANCE WITH OSHA REQUIREMENTS. CONFINED SPACES SHALL INCLUDE MANHOLES AND ALL OTHER CONFINED SPACES IN ACCORDANCE WITH OSHA'S PERMIT REQUIRED FOR CONFINED SPACES.

WATER:

1. PROVIDE THRUST RESTRAINT BY MEANS OF RESTRAINING JOINTS AT FITTINGS AND CONCRETE BLOCKING. WHEN SPECIFICALLY INDICATED ON THE DRAWINGS, PROVIDE THRUST RESTRAINT AT DESIGNATED JOINTS BEYOND THE FITTINGS. EACH METHOD SHALL BE CAPABLE OF THRUST RESTRAINT INDEPENDENT OF THE OTHER SYSTEM.

2. PROPOSED WATER MAINS SHALL HAVE A MINIMUM COVER OF 36-INCHES COVER ABOVE THE TOP OF PIPE, UNLESS SHOWN OTHERWISE ON THE DRAWINGS OR DETAILS.

3. ELEVATION ADJUSTMENT AT CONNECTIONS MAY BE MADE WITH BENDS, OFFSETS, OR JOINT DEFLECTIONS. JOINT DEFLECTIONS SHALL NOT EXCEED SEVENTY-FIVE PERCENT (75%) OF MANUFACTURER'S RECOMMENDATIONS.

4. TEMPORARY PRESSURE PLUGS REQUIRED FOR SEQUENCING OF CONSTRUCTION AND TESTING OF PROPOSED WATER LINES SHALL BE CONSIDERED SUBSIDIARY TO THE WORK AND SHALL BE INCLUDED IN THE PRICE BID IN THE PROPOSAL FOR VARIOUS BID ITEMS.

5. THE CONTRACTOR SHALL NOT PLACE THE PIPE IN WATER OR WHERE IT CAN BE FLOODED WITH WATER OR SEWAGE DURING ITS STORAGE OR INSTALLATION.

6. CONTRACTOR SHALL DECHLORINATE WATER USED FOR FLUSHING NEW PIPELINE PRIOR TO DISCHARGE TO STORM DRAIN PER TCEQ AND EPA REQUIREMENTS. WATER DISCHARGE WHILE DRAINING, TESTING, OR DISINFECTING PIPELINES SHALL BE DONE IN ACCORDANCE WITH TCEQ GENERAL PERMIT NO. TX670000.

7. ALL BURIED VALVES, FIRE HYDRANTS, METALLIC PIPING, AND METALLIC EQUIPMENT SHALL BE WRAPPED IN POLYETHYLENE IN ACCORDANCE WITH THE SPECIFICATIONS.

8. THE CONTRACTOR SHALL NOT OPERATE WATER MAIN VALVES WITHOUT DIRECT SUPERVISION BY CITY.

9. CONTRACTOR SHALL FURNISH AND INSTALL TEMPORARY BY-PASS WATER SYSTEMS AS REQUIRED TO MAINTAIN FRESH, CLEAN, POTABLE WATER SUPPLY TO WATER SERVICE CUSTOMERS. ONLY MINIMAL SERVICE SHUTDOWNS WILL BE ALLOWED. CONTRACTOR SHALL NOTIFY THE OWNER AND ALL WATER SERVICE CUSTOMERS OF ANY TEMPORARY WATER SERVICE SHUTDOWNS. REFERENCE SPECIFICATION FOR MORE DETAILS.

10. CONTRACTOR SHALL COORDINATE WITH THE CITY FOR ALL REMOVED AND SALVAGED EQUIPMENT TO BE TRANSPORTED TO THE CITY YARD ON ST. ANN SREET. CONTRACTOR SHALL NOT REUSE ANY SALVAGED EQIPMENT FOR NEW CONSTRUCTION.

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

STATE OF TEXAS
WAYNE P. HART
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LICENSED
PROFESSIONAL ENGINEER
10/23/2017

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CITY OF SAN ANGELO, TEXAS
BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS
PHASE III
GENERAL
GENERAL NOTES

F&N JOB NO.	SAN16188
DATE	08/2017
DESIGNED	JWP
DRAWN	EB
REVISED	
CHECKED	WH
FILE NAME	ph2-trf-gn-notes01.sht

NO. | ISSUES | BY | DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

SHEET NOTES-2
SEQ. 4

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UNIT 1: PAVING IMPROVEMENTS

ITEM	DESCRIPTION	RP-01	RP-02	RP-03	PP-01	PP-02	PP-03	PP-04	PP-05	PP-06	PP-07	PP-08	PM-01	PM-02	PM-03	EP-01	EP-02	EP-03	QUANTITY	UNIT
I-1	REMOVING CONCRETE PAVEMENT (6"-8" THICK)		556	1918															2474	SY
I-2	REMOVING CONCRETE (DRIVEWAYS AND SIDEWALK)	193	418	671															1282	SY
I-3	REMOVING CONCRETE (CURB & GUTTER)	1714	1135	1238															4087	LF
I-4	REMOVE ASPHALT PAVEMENT (4" AVG DEPTH)	6840	7045	5135															19020	SY
I-5	EMBANKMENT (FINAL)(ORD COMP)(TY B)(CL 3)																		300	CY
I-6	DRILL SEEDING				307	509	497	493	153	494	498	442							3393	SY
I-7	FL BS (CMP IN PLC)(TY A)(GR1-2)(6")(TCP TEMP PAVT)																		820	SY
I-8	CEMENT TREATED SUBGRADE (8")				2043	2853	2973	3164	1134	3075	2863	2001							20106	SY
I-9	CEMENT				28.2	39.4	41	43.7	15.6	42.4	39.5	27.6							277.4	TN
I-10	D-GR HMA(SQ) TY D PG 64-72 (2" THICK)(TCP TEMP PAVT)																		820	SY
I-11	BARRICADES, SIGNS AND TRAFFIC HANDLING																		12	MO
I-12	ROCK FILTER DAMS															48			48	LF
I-13	REMOVE ROCK FILTER DAMS															48			48	LF
I-14	TEMP SEDIMENT CONTROL FENCE (INSTALL)															660	603	35	1298	LF
I-15	TEMP SEDIMENT CONTROL FENCE (REMOVE)															660	603	35	1298	LF
I-16	TEMP EROSION CONTROL LOGS (INSTALL)															0	80	40	120	LF
I-17	TEMP EROSION CONTROL LOGS (REMOVE)															0	80	40	120	LF
I-18	CONCRETE CURB & GUTTER (STANDARD)				444	801	833	743	224	854	715	613							5227	LF
I-19	CONCRETE CURB & GUTTER (SAWTOOTH)						40												40	LF
I-20	DRIVEWAYS (CONCRETE)				189	158	35	183	69	69	281	227							1211	SY
I-21	CONCRETE SIDEWALKS (4")				113	248	273	231	78	262	247	181							1633	SY
I-22	CURB RAMPS (TY 7)				1	1	2	2	0	2	2	0							10	EA
I-23	MAILBOX INSTALL-S (TWG POST) TY 1												1	0	3				4	EA
I-24	MAILBOX (GANG TYPE)(RELOCATE)(INST 4" CONC PAD)													1					1	EA
I-25	RELOCATE SM RD SIGN SUP & AMS												0	3	5				8	EA
I-26	REMOVE SM RD SIGN SUP & AMS												6	5	3				14	EA
I-27	INST SM RD SIGN SUP & AM												6	5	3				14	EA
I-28	REFLECTOR PAVEMENT MARKING TY 1 (W) 4" (BRK)												474	400	378				1252	LF
I-29	REFLECTOR PAVEMENT MARKING TY 1 (W) 8" (SLD)													79					79	LF
I-30	REFLECTOR PAVEMENT MARKING TY 1 (W) 24" (SLD)												74	68	32				174	LF
I-31	REFLECTOR PAVEMENT MARKING TY 1 (W) (ARROW)													2					2	EA
I-32	REFLECTOR PAVEMENT MARKING TY 1 (Y) 4" (SLD)												1898	2792	1376				6066	LF
I-33	REFLECTOR PAVEMENT MARKING TY 1 (Y) 12" (SLD)													191					191	LF
I-34	REFLECTOR PAVEMENT MARKING TY 2 - A - A												24	76	17				117	EA
I-35	REFLECTOR PAVEMENT MARKING TY 1 - C													4					4	EA

UNIT 2: ALT. A - HMAC PAVING

ITEM	DESCRIPTION	RP-01	RP-02	RP-03	PP-01	PP-02	PP-03	PP-04	PP-05	PP-06	PP-07	PP-08	PM-01	PM-02	PM-03	EP-01	EP-02	EP-03	QUANTITY	UNIT
IA-1	FLEX BASE (CMP IN PLACE)(TY A GR 2)(CL 4) (BID ALT A)				2043	2853	2973	3164	1134	3075	2863	2001							20106	SY
IA-2	D-GR HMA TY-B PG64-22 (BID ALT A)				1840	2570	2679	2851	1021	2770	2579	1803							18113	SY
IA-3	D-GR HMA TY-D PG64-22 (BID ALT A)				1840	2570	2679	2851	1021	2770	2579	1803							18113	SY
IA-4	EXCAVATION (ROADWAY)(BID ALT. A)																		8048	CY

UNIT 3: ALT. B - ROLLER COMPACTED CONCRETE

ITEM	DESCRIPTION	RP-01	RP-02	RP-03	PP-01	PP-02	PP-03	PP-04	PP-05	PP-06	PP-07	PP-08	PM-01	PM-02	PM-03	EP-01	EP-02	EP-03	QUANTITY	UNIT
IB-1	ROLLER COMPACTED CONCRETE (8.5" THICK) (BID ALT B)				1840	2570	2679	2851	1021	2770	2579	1803							18113	SY
IB-2	EXCAVATION (ROADWAY)(BID ALT. B)																		3881	CY

UNIT 7: DRAINAGE IMPROVEMENTS

ITEM	DESCRIPTION	C-26 to C-30	C-28	C-31	QUANTITY	UNIT
II-1	EXCAVATION (CHANNEL)	800			800	CY
II-2	SLOPED HEADWALL		15		15	CY
II-3	RIPRAP CONCRETE 5"			6	6	CY
II-4	RIPRAP STONE, COMMON, 18"			20	20	CY
II-5	TXDOT TYPE C223 RAIL			148	148	LF
II-6	CONCRETE BOX CULVERT 10' X 5'			144	144	LF
II-7	REINFORCED CONCRETE PIPE, 18", CLASS IV		388		388	LF
II-8	WINGWALL PW-1 (HW=7')			4	4	EA

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

STATE OF TEXAS
WAYNE P. HARTT
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23 Oct 2017

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CITY OF SAN ANGELO, TEXAS
BELL ST. ROADWAY & UTILITY IMPROVEMENTS
PHASE III
CIVIL
QUANTITY TAKE OFF

FAN JOB NO. SAN16188
DATE OCT 2017
DESIGNED ABC
DRAWN SB
REVISED -
CHECKED DCS
FILE NAME GN-ALL-NOTES04.dwg

NO.	ISSUE	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

SHEET NOTES-03
SEQ. 5

100% SUBMITTAL

ACAD Rel: 21.0s (LMS Tech)
Filename: N:\WTU\Drawings\GN-ALL-NOTES04.dwg
Last Saved: 10/23/2017 5:26 PM Saved By: sb

Plot Date: 10/23/2017 7:10 PM Plot By: 02435 Filename: N:\WTU\Drawings\GN-ALL-NOTES04.dwg

UNIT 5: WATER IMPROVEMENTS

ITEM	DESCRIPTION	W-1	W-2	W-3	W-4	W-5	W-6	W-7	QUANTITY	UNIT
5-1	16" WATER LINE	400	500	500	451	471	500	284	3106	LF
5-2	16" WATER LINE INSIDE OF CASING				90				90	LF
5-3	16" WATER LINE BY OTHER THAN OPEN CUT				49	29			78	LF
5-4	30" STEEL CASING OTHER THAN BY OPEN CUT				90				90	LF
5-5	TRENCH SAFETY	400	500	500	451	471	500	284	3106	LF
5-6	2" COMBINATION AIR VALVE	1			1			1	3	EA
5-7	16" GATE VALVE	1	1	1	1	1		1	6	EA
5-8	12" GATE VALVE					1			1	EA
5-9	10" GATE VALVE	1	1						2	EA
5-10	8" GATE VALVE		1			1		1	3	EA
5-11	6" GATE VALVE	1	1	3		4		2	11	EA
5-12	4" BLOW-OFF VALVE				1				1	EA
5-13	FIRE HYDRANTS		1	1		1		2	5	EA
5-14	1" WATER SERVICE	1	1	1		1	1		5	EA
5-15	2" WATER SERVICE WITH DOUBLE 1" SERVICES				1				1	EA
5-16	1" WATER METER	1	2			1	1		5	EA
5-17	16" LINE STOP							1	1	EA
5-18	CONNECTION TO EXISTING 16" WATER LINE	1						1	2	EA
5-19	CONNECTION TO EXISTING 12" WATER LINE					1			1	EA
5-20	CONNECTION TO EXISTING 10" WATER LINE	1	1						2	EA
5-21	CONNECTION TO EXISTING 8" WATER LINE		1						1	EA
5-22	CONNECTION TO EXISTING 6" WATER LINE	1		2	1	1			5	EA
5-23	CONNECTION TO EXISTING 2" WATER LINE					1			1	EA
5-24	WATER LINE ABANDONMENT GROUT								181	CY
	16" WATER LINE ABANDONMENT GROUT	20.69	25.86	25.86	25.86	25.86	25.86	13.96	163.93	CY
	10" WATER LINE ABANDONMENT GROUT		9.23						9.23	CY
	12" WATER LINE ABANDONMENT GROUT					1.63			1.63	CY
	6" WATER LINE ABANDONMENT GROUT			1.82	1.24	1.09		1.53	5.67	CY
	2" WATER LINE ABANDONMENT GROUT					0.02			0.02	CY
5-25	REMOVE EXISTING VALVE	3	5	4	3	3		2	20	EA
5-26	REMOVE EXISTING FIRE HYDRANT		1			1		1	3	EA
5-27	REMOVE EXISTING WATER METER					1	1		2	EA
5-28	PERMANENT CURB AND GUTTER REPAIR	15	9	21					45	LF
5-29	CEMENT STABILIZED SAND		12						12	CY
5-30	PERMANENT ASPHALT PAVEMENT REPAIR	44	15	63		27			149	SY

UNIT 6: SANITARY SEWER IMPROVEMENTS

ITEM	DESCRIPTION	SS-1	SS-2	SS-3	SS-4	QUANTITY	UNIT
6-1	21" SANITARY SEWER LINE	500	297		36.45	834	LF
6-2	10" PRESSURE RATED SANITARY SEWER				71.22	72	LF
6-3	8" SANITARY SEWER LINE		129	240		369	LF
6-4	8" SANITARY SEWER LINE INSIDE OF STEEL CASING		74	236		310	LF
6-5	8" PRESSURE RATED SANITARY SEWER				72.44	73	LF
6-6	16" STEEL CASING BY OTHER THAN OPEN CUT		74	236		310	LF
6-7	TRENCH SAFETY	500	426	240	36.45	1203	LF
6-8	4' DIAMETER MANHOLE		2	2	2	6	EA
6-9	5' DIAMETER MANHOLE	2	2		1	5	EA
6-10	5' DIAMETER DROP MANHOLE	1	1	1		3	EA
6-11	CONNECTION TO EXISTING 24" SANITARY SEWER LINE	1				1	EA
6-10	SANITARY SEWER LINE ABANDONMENT GROUT					63	CY
	18" SANITARY SEWER LINE ABANDONMENT GROUT	10.75				11	CY
	15" SANITARY SEWER LINE ABANDONMENT GROUT	8.27	14.82			24	CY
	12" SANITARY SEWER LINE ABANDONMENT GROUT		9.69	14.02		24	CY
	8" SANITARY SEWER LINE ABANDONMENT GROUT	3.01				4	CY
6-11	REMOVE/ABANDON EXISTING MANHOLE	2	2	1	1	6	EA
6-12	BY-PASS PUMPING					1	LS
6-13	PERMANENT ASPHALT PAVEMENT REPAIR		16			16	SY

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

STATE OF TEXAS
AARON B. CONINE
109794
LICENSED PROFESSIONAL ENGINEER
23 Oct 2017

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CITY OF SAN ANGELO, TEXAS
PHASE III
BELL ST. ROADWAY & UTILITY IMPROVEMENTS
CIVIL
QUANTITY TAKE OFF

NO.	ISSUE	BY	DATE

F&N JOB NO. SAN16188
DATE OCT 2017
DESIGNED ABC
DRAWN SB
REVISED -
CHECKED DGS
FILE NAME GN-ALL-NOTES04.dwg

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

SHEET NOTES-04
SEQ. 6

100% SUBMITTAL

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Last Saved: 8/18/2017 12:07 PM Saved By: sb

Plot Date: 9/20/2017 12:28 PM Plot By: mdc Filename: N:\WTU\Drawings\GN-ALL-NOTES04.dwg

Test Hole #	Utility Size, O.D. (inches)	Utility Material	Depth to Top of Utility (feet)	Surface Type and Thickness	Date Test Hole Excavated	Utility Observed (Yes or No)	Survey Point #	Northing (Y)	Easting (X)	Ground Elevation (Z)	Top of Utility Elevation	Notes
1	16	AC	5.0	Dirt BOC	1-Sep	Y	1	10492767.444	2271581.773	1804.982	1799.982	
2	8	VCT	4.5	Dirt Alley	1-Sep	Y	2	10494410.221	2271599.374	1839.345	1834.845	
3	8 (?)	VCT	9.1	Pvmt	8-Sep	Y	14	10494665.311	2271668.509	1839.947	1830.847	
4	8	VCT	5.0	Dirt Alley	1-Sep	Y	3	10494910.182	2271601.110	1840.085	1835.085	
5A	8	VCT	5.0	Dirt Alley	1-Sep	Y	4	10495408.237	2271602.888	1838.037	1833.037	
5B	8	VCT	4.5	Dirt Alley	1-Sep	Y	5	10495909.415	2271608.052	1835.086	1830.586	
6	6 (?)	VCT	6.0	Pvmt	9.8	N	16	10495632.584	2271687.796	1832.506	1826.506	
7	6 (?)	VCT	8.1	Pvmt	8-Sep	Y	13	10496080.489	2271679.139	1835.642	1827.542	
8	8	VCT	3.5	Dirt Alley	1-Sep	Y	6	10496411.905	2271613.846	1836.763	1833.263	
9	18"	PVC (White)	3.8	Dirt BOC	2-Sep	Y	7	10497859.399	2271688.291	1824.897	1821.147	
10	MH	Conc		Conc	8-Sep	Y	Top Conc MH Strct	10497896.782	2271629.364	1827.595		Z elevation is top of concrete structure adjacent to MH ring & cover - See sketch.
11	?	Conc Cap	2.0	Dirt BOC	2-Sep	N	9	10497876.833	2271626.025	1824.310	1822.310	
12	10	DI	2.5	Pvmt	8-Sep	Y	15	10497655.734	2271698.611	1825.660	1823.160	
13											0.000	
14A	MH	Fiberglass	6.4 FL	Dirt BOC	8-Sep	Y	11	10497148.847	2272878.381	1821.810		
14B	MH	Fiberglass	6.3 FL	Dirt BOC	8-Sep	Y	12	10497141.047	2272878.223	1821.760		8" from West @ -4.8'
15	16"	CI	3.5	Pvmt	14-Sep	Y	-	10499980.182	2271659.795	1860.598	1857.098	
16	16"	CI	4.0	Pvmt	14-Sep	Y	-	10500981.419	2271668.001	1865.071	1861.071	

BENCH MARK LOCATION			
Letter	Northing	Easting	Elevation
A	10497129.47	2271627.70	1834.39
B	10497642.18	2271621.23	1826.46
C	10498134.10	2271640.62	1828.89
D	10498607.38	2271700.26	1834.16
E	10499180.37	2271701.32	1839.14
F	10499633.75	2271624.11	1851.72
G	10500055.93	2271676.98	1860.39

CONTROL POINT LOCATION				
Number	Northing	Easting	Elevation	Location
1	10497721.76	2271620.85	1826.15	TPT 109
2	10498607.40	2271700.23	1834.16	CP OPUS
3	10498719.81	2271709.07	1834.25	TPT 110
4	10499909.29	2271610.51	1860.20	TPT 111

Chain BELL contains:
BELL04 BELL05 CUR BELL-1 BELL06 BELL07 CUR BELL-2 CUR BELL-3 CUR BELL-4 BELL08-BELL09

Beginning chain BELL description

Point BELL04 N 10,492,017.4750 E 2,271,657.7385 Sta 10+00.00

Course from BELL04 to BELL05 N 2° 42' 50.80" W Dist 620.8980

Point BELL05 N 10,492,637.6765 E 2,271,628.3375 Sta 16+20.90

Course from BELL05 to PC BELL-1 N 2° 28' 03.11" W Dist 214.1908

Curve Data

Curve BELL-1
P.I. Station 18+59.83 N 10,492,876.3910 E 2,271,618.0505
Delta = 2° 34' 38.60" (RT)
Degree = 5° 12' 31.35"
Tangent = 24.7453
Length = 49.4823
Radius = 1,100.0000
External = 0.2783
Long Chord = 49.4781
Mid. Ord. = 0.2782
P.C. Station 18+35.09 N 10,492,851.6686 E 2,271,619.1159
P.T. Station 18+84.57 N 10,492,901.1363 E 2,271,618.0979
C.C. N 10,492,899.0271 E 2,272,718.0959
Back = N 2° 28' 03.11" W
Ahead = N 0° 06' 35.49" E
Chord Bear = N 1° 10' 43.81" W

Course from PT BELL-1 to BELL06 N 0° 06' 35.49" E Dist 339.7760

Point BELL06 N 10,493,240.9117 E 2,271,618.7494 Sta 22+24.35

Course from BELL06 to BELL07 N 0° 30' 55.03" E Dist 3,096.4495

Point BELL07 N 10,496,337.2360 E 2,271,646.5968 Sta 53+20.80

Course from BELL07 to PC BELL-2 N 0° 34' 13.24" E Dist 1,894.7345

Curve Data

Curve BELL-2
P.I. Station 72+62.73 N 10,498,279.0738 E 2,271,665.9273
Delta = 0° 32' 27.11" (LT)
Degree = 0° 34' 22.65"
Tangent = 47.1996
Length = 94.3985
Radius = 10,000.0000
External = 0.1114
Long Chord = 94.3981
Mid. Ord. = 0.1114
P.C. Station 72+15.53 N 10,498,231.8765 E 2,271,665.4574
P.T. Station 73+09.93 N 10,498,326.2734 E 2,271,665.9515
C.C. N 10,498,331.4186 E 2,261,665.9529
Back = N 0° 34' 13.24" E
Ahead = N 0° 01' 46.13" E
Chord Bear = N 0° 17' 59.68" E

Course from PT BELL-2 to PC BELL-3 N 0° 01' 46.13" E Dist 816.1901

Curve Data

Curve BELL-3
P.I. Station 81+49.08 N 10,499,165.4200 E 2,271,666.3833
Delta = 2° 23' 28.09" (LT)
Degree = 5° 12' 31.35"
Tangent = 22.9566
Length = 45.9065
Radius = 1,100.0000
External = 0.2395
Long Chord = 45.9032
Mid. Ord. = 0.2395
P.C. Station 81+26.12 N 10,499,142.4634 E 2,271,666.3715
P.T. Station 81+72.03 N 10,499,188.3571 E 2,271,665.4373
C.C. N 10,499,143.0294 E 2,270,566.3716
Back = N 0° 01' 46.13" E
Ahead = N 2° 21' 41.96" W
Chord Bear = N 1° 09' 57.92" W

Course from PT BELL-3 to PC BELL-4 N 2° 21' 41.96" W Dist 249.6268

Curve Data

Curve BELL-4
P.I. Station 86+61.26 N 10,499,677.1777 E 2,271,645.2774
Delta = 2° 44' 42.70" (RT)
Degree = 0° 34' 22.65"
Tangent = 239.6093
Length = 479.1269
Radius = 10,000.0000
External = 2.8702
Long Chord = 479.0811
Mid. Ord. = 2.8694
P.C. Station 84+21.65 N 10,499,437.7719 E 2,271,655.1510
P.T. Station 89+00.78 N 10,499,916.7816 E 2,271,646.8813
C.C. N 10,499,849.8421 E 2,281,646.6573
Back = N 2° 21' 41.96" W
Ahead = N 0° 23' 00.74" E
Chord Bear = N 0° 59' 20.61" W

Course from PT BELL-4 to BELL08 N 0° 23' 00.74" E Dist 715.5594

Point BELL08 N 10,500,632.3250 E 2,271,651.6712 Sta 96+16.34

Course from BELL08 to BELL09 N 0° 32' 54.87" E Dist 2,738.0315

Point BELL09 N 10,503,370.2311 E 2,271,677.8859 Sta 123+54.37

Ending chain BELL description

100% SUBMITTAL

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

STATE OF TEXAS
WAYNE F. HUBELE
118231
LICENSED
PROFESSIONAL ENGINEER

10/23/2017

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CITY OF SAN ANGELO, TEXAS

PHASE III
BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS

GENERAL
SURVEY CONTROL
AND PROJECT LAYOUT

NO.	ISSUES	BY	DATE

F&N JOB NO. SAN16188
DATE 8/2017
DESIGNED JWP
DRAWN EB
REVISED
CHECKED WH
FILE NAME ph2-trt-pl-Control02.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

SHEET CTRL-1
SEQ. 7

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Active Model: Phase II Control02.dgn
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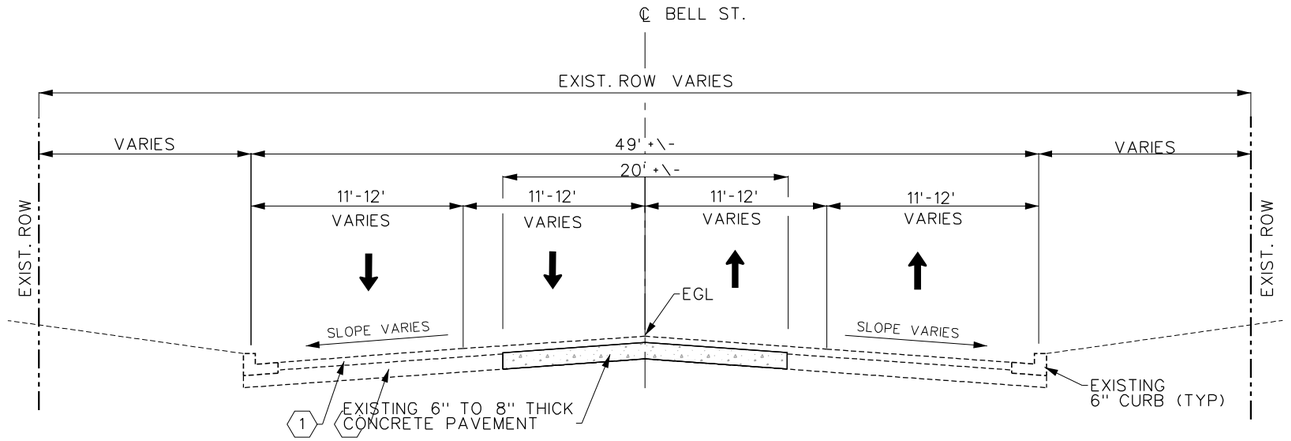
Date: Feb. 21, 2017 11:28:37 AM
Project: Phase II

Office: Fort Worth SAN16188 User: 02235 File: N:\lf\Drawings\Phase II\ph2-trt-pl-Control02.dgn



1
BELL STREET
EXISTING TYPICAL SECTION
NOT TO SCALE

NOTES BY SYMBOL

(1) - EXISTING HMAC VARIES (3.25" - 9.5")

(2) - EXISTING FLEXBASE VARIES (6" - 16")

100% SUBMITTAL

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

STATE OF TEXAS
WAYNE P. HARTT
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CITY OF SAN ANGELO, TEXAS
BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS
PHASE III
GENERAL
BELL STREET
EXISTING TYPICAL SECTIONS

F&N JOB NO. SAN16188
DATE 08/2017
DESIGNED JWP
DRAWN EB
REVISED
CHECKED
FILE NAME ph2-trt-gn-typicals01.sht

NO.	ISSUES	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

SHEET TS-01
SEQ. 8

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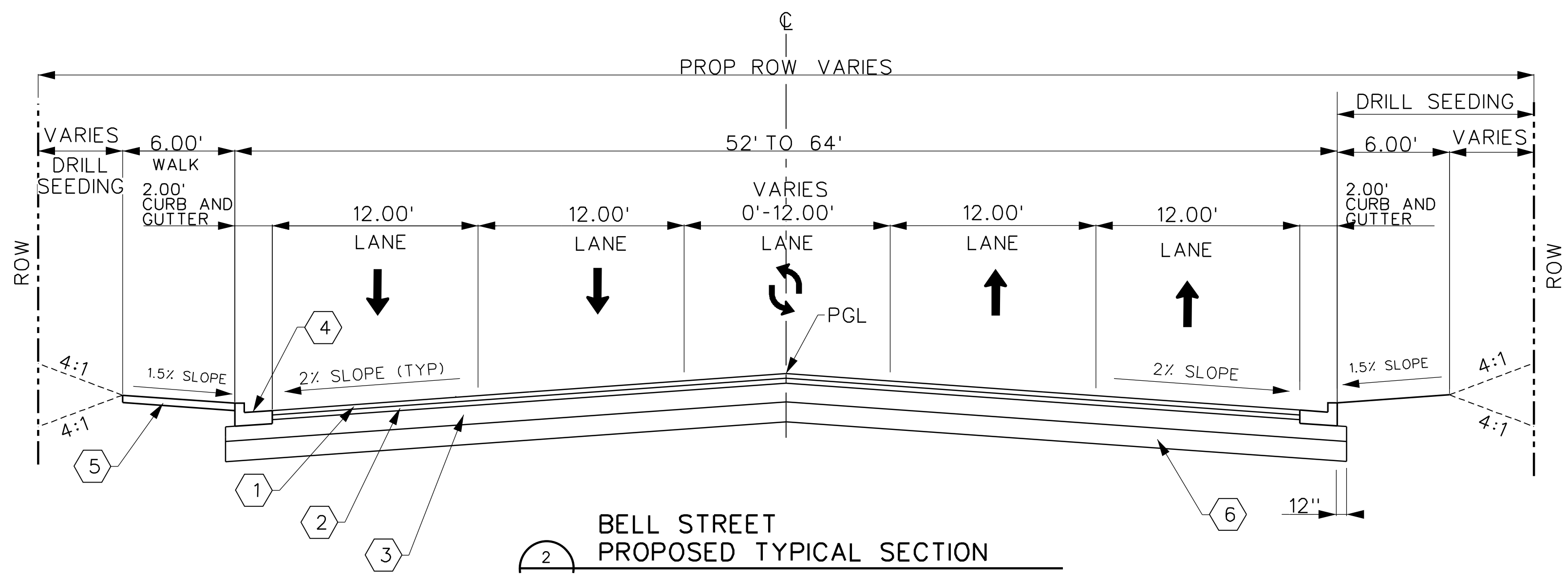
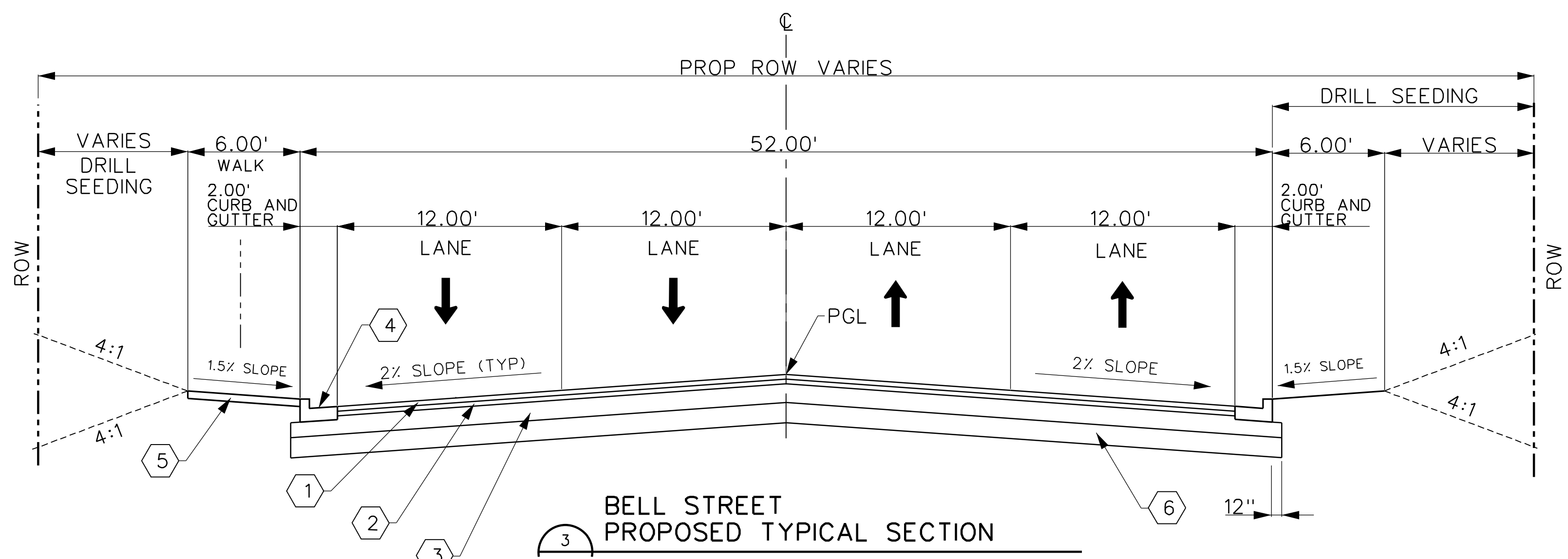


BELL STREET PROPOSED TYPICAL SECTION (2)

NOT TO SCALE
STA 71+91 TO STA 74+92
STA 77+93 TO 80+99
(LOOKING NORTH)



BELL STREET PROPOSED TYPICAL SECTION (3)

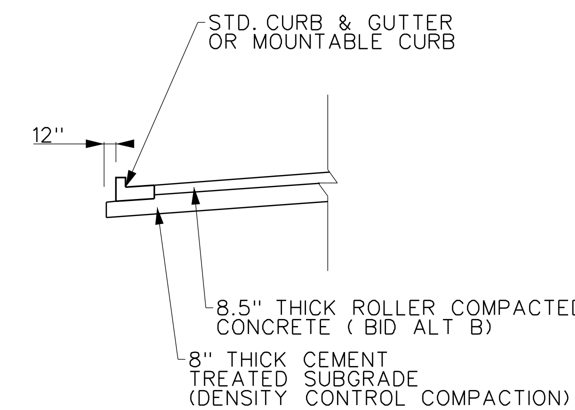
NOT TO SCALE
STA 58+50 TO STA 71+91
STA 80+99 TO STA 91+63
(LOOKING NORTH)

NOTES BY SYMBOL

1. - PROPOSED 1.5" HMAC TYPE D SURFACE COURSE (BID ALT. A)
2. - PROPOSED 2.5" HMAC TYPE B BASE COURSE (BID ALT. A)
3. - PROPOSED 12" FLEXBASE TYPE A GR 2
   6" MIN UNDER ALL CURBS AND GUTTERS (BID ALT. A)
4. - STD CURB & GUTTER (SEE PLAN & PROFILE SHEETS FOR LIMITS OF MOUNTABLE CURB)
5. - 4" MIN CONCRETE SIDEWALK CLASS 'A' CONCRETE REINFORCED WITH NOVOMESH. GROOVED CONTRACTION JOINT EVERY 5' AND EXPANSION JOINTS EVERY 40'
6. - 8" THICKNESS OF CEMENT TREATED SUBGRADE (DENSITY CONTROL COMPACTION)

GENERAL NOTE

1. COMPLY WITH ALL SITE PREPARATION AND EARTHWORK RECOMMENDATIONS PROVIDED IN THE GEOTECHNICAL ENGINEERING STUDY.
2. PLANT SEED MIXTURE UNIFORMLY AT DEPTH OF 1/4 TO 1/3 INCH USING DRILLING EQUIPMENT INTENDED FOR THAT PURPOSE AND APPROVED BY THE CITY. DRILL SEEDING TO BE IN ACCORDANCE WITH SPECIFICATIONS (ITEM 107). TYPE OF SEED MIXTURE SHALL BE APPROVED BY THE CITY. PAYMENT IS FULL COMPENSATION FOR ALL MATERIALS AND WORK REQUIRED FOR ACCEPTANCE. NO SEPARTE PAYMENT SHALL BE MADE FOR WATER, FERTILIZER, OR MULCH.



BID ALTERNATE (ALT. B) ROLLER COMPACTED CONCRETE (RCC) (4)

NOT TO SCALE

NOTE:
MEASURE RIDE QUALITY OF THE FINISHED RCC SURFACE IN ACCORDANCE WITH SPEC ITEM 585.

CEMENT TREATED SUBGRADE NOTES:

1. CEMENT TREAT EXISTING SUBGRADE TO 200 PSI COMPRESSIVE STRENGTH (MIN) (3%-5% OF PORTLAND CEMENT BY DRY SOIL WEIGHT, 20 LBS/SY TO 35 LBS/SY)
2. PERFORM COMPACTION IN ACCORDANCE WITH "DENSITY CONTROL" (ITEM 275).

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CITY OF SAN ANGELO, TEXAS
BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS
PHASE III
GENERAL
BELL STREET
PROPOSED TYPICAL SECTIONS

F&N JOB NO.	SAN16188
DATE	08/2017
DESIGNED	JWP
DRAWN	EB
REVISED	
CHECKED	WH
FILE NAME	ph2-trt-gn-typicals02.sht

NO. | ISSUES | BY | DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

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SHEET TS-02
SEQ. 9

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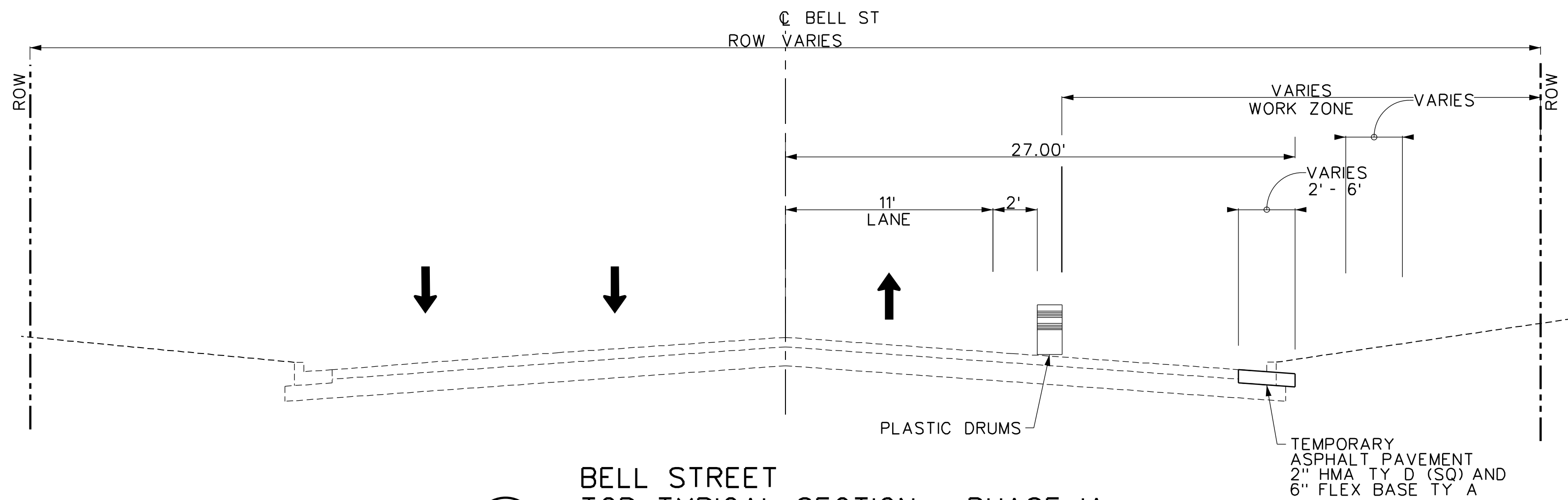
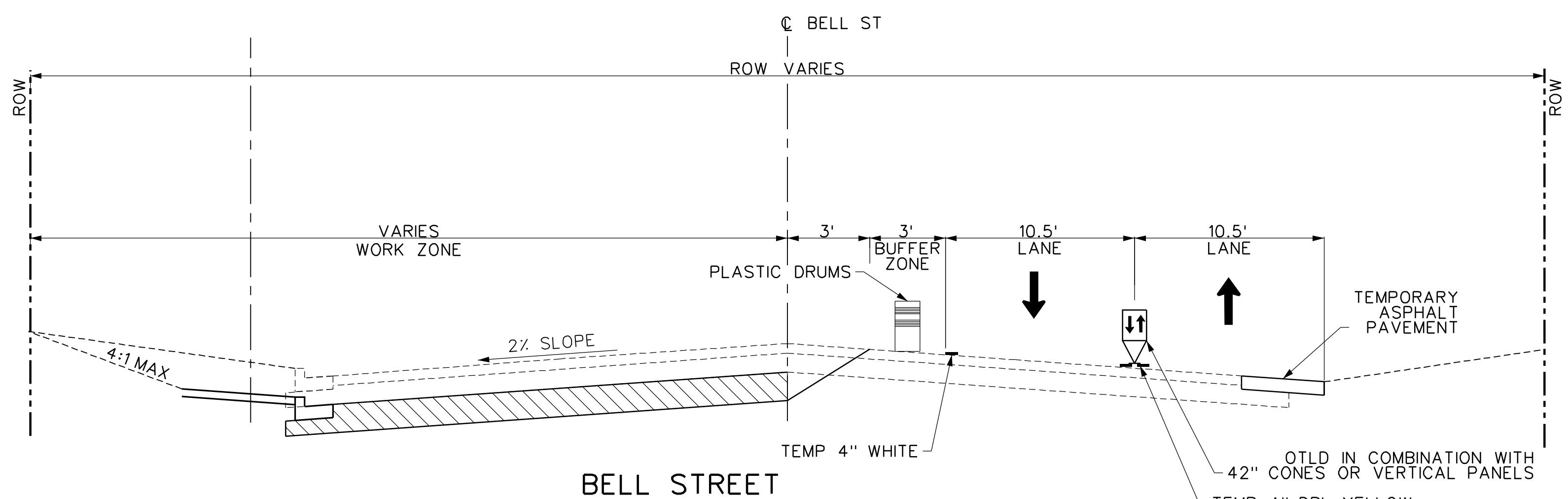
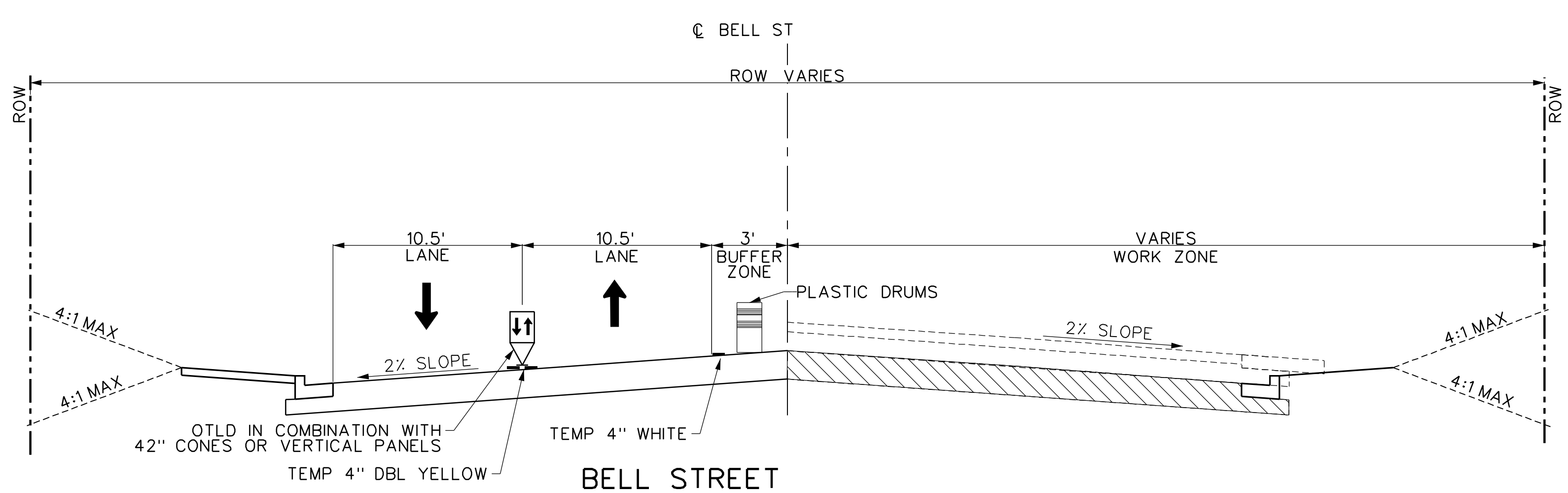


1 BELL STREET
TCP TYPICAL SECTION - PHASE IA
NOT TO SCALE



2 BELL STREET
TCP TYPICAL SECTION - PHASE I
NOT TO SCALE

DEVICE	SPACING	
	TANGENT	TAPER
OPPOSING LANE TRAFFIC DIVIDER (OTLD)	240'	NA
42" CONE OR VP	60'	30'
PLASTIC DRUMS	60'	30'



3 BELL STREET
TCP TYPICAL SECTION - PHASE II
NOT TO SCALE

GENERAL NOTES FOR TRAFFIC CONTROL:

1. ROAD CLOSURE SHALL BELIMITED TO WORK AREA ONLY.
2. ALL WORK IS TO BE PREFORMED BETWEEN 7AM AND 6PM.
3. CONTRACTOR SHALL PROVIDE CONTINUOUS ACCESS TO ALL BUSINESS AND RESIDENTIAL DRIVEWAYS DURING THE CONSTRUCTION PERIOD.
4. THE STREET INTERSECTION DESIGNATED FOR PARTIAL CLOSURE MAY BE PARTIAL CLOSED TO TRAFFIC 24 HOURS A DAY UNTIL THE OWRK IS COMPLETE. CONTRACTOR SHALL NOTIFY CITY ENGINEER 14 CALENDAR DAYS PRIOR TO COMMENCING ANY INTERSECTION CLOSURE ACTIVITY, IF REQURED.
5. ALL WORK ACTIVITIES SHALL BE IN ACCORDANCE WITH THE PROJECTS TRAFFIC CONTROL PLAN. NO WORK SHALL BE PERFORMED OUT OF SEQUENCE UNLESS AUTHORIZED BY CITY REPRESENTATIVE.
6. TRAFFIC SIGNS, SIGN SPACING, SIGN LOCATIONS AND ALL TRAFFIC CONTROL DEVICES SHALL BE IN STRICT ACCORDANCE WITH THE PROJECTS TRAFFIC CONTROL PLAN AND ALSO COMPLY WITH THE 2011 "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" AND CURRENT REVISIONS.
7. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING AND MAINTAINING ALL TRAFFIC CONTROL DEVICES FOR THE COMPLETE DURATION OF PROJECT. ANY TRAFFIC CONTROL DEVICES DEEMED UNSATISFACTORY BY THE ENGINEER SHALL BE REPLACED WITHIN 24 HOURS AT EXPENSE TO THE CITY.
8. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING AND MAINTAIN A 4' HIGH BARRIER FENCE AROUND ALL OPEN TRENCHES OR EXCAVATED AREAS. SAFETY BARRICADE FENCING SHALL BE HIGH DENSITY POLYETHYLENE (TENSAR-UX4050 9SB-ORANGE-4' HIGH)
9. BARRICADES, SIGNS, CHANNELIZING DEVICES AND OTHER TRAFFIC CONTROL DEVICES MAY BE ADJUSTED TO FIT FIELD CONDITIONS AS DIRECTED BY THE ENGINEER.
10. EQUIPMENT AND MATERIALS SHALL NOT BE STORED IN PUBLIC RIGHT-OF-WAY AT ANY TIME DURING THE COURSE OF CONSTRUCTION. ANY MATERIAL OR EQUIPMENT APROVED BY THE ENGINEER FOR TEMPORARY PLACEMENT IN PUBLIC RIGHT-OF-WAY SHALL BE ADEQUATELY BARRICADE WITH TYPE III BARRICADES ON EACH DIRECTION OF TRAVEL.
11. THE CONTRACTOR SHALL MAINTAIN ALL REGULATORY SIGNS DURING THE CONSTRUCTION PERIOD.
12. ALL CONSTRUCTION WARNING SIGNS MAY BE SKID MOUNTED OR ENGINEER APPROVED PORTABLE MOUNTING DEVICES. DO NOT DAMAGE ASPHALT PAVEMENT.
13. CONTRACTOR SHALL NOTIFY THE CITY TRAFFIC ENGINEER DEPARTMENT AT LEAST 48 HOURS PRIOR TO MAKING ANY LANE CHANGES OR LANE CLOSURES.

SEQUENCE OF CONSTRUCTION:

PHASE 1A:

1. INSTALL CHANNELIZING DEVICES, TEMPORARY PAVEMENT MARKINGS, SIGNS AND BARRICADES PER DETAIL TCP (2-5)-12.
2. SHIFT TRAFFIC TO ONE LANE ON THE NORTHBOUND SIDE OF BELL STREET BEFORE APPROACHING WORK ZONE, PER PHASE 1A TYPICAL AND DETAIL TCP (2-5)-12.
3. CONSTRUCT TEMPORARY ASPHALT PAVEMENT WIDENING ALONG EAST SIDE OF BELL STREET.

PHASE 1:

1. INSTALL CHANNELIZING DEVICES, TEMPORARY PAVEMENT MARKINGS, SIGNS AND BARRICADES FOR CONSTRUCTION ON EAST SIDE OF BELL STREET.
2. SHIFT ALL TRAFFIC TO THE NORTHBOUND LANES AS SHOWN ON PLANS.
3. CONSTRUCT SEWER LINE ON WEST SIDE OF BELL STREET AS SHOWN ON PLANS.
4. CONSTRUCT PROPOSED IMPROVEMENTS ON WEST SIDE OF BELL STREET.
5. PHASE DRIVEWAY AND SIDE STREET CONSTRUCTION TO MAINTAIN ACCESS AT ALL TIMES.

PHASE 2:

1. ADJUST CHANNELIZING DEVICES, TEMPORARY PAVEMENT MARKINGS, SIGNS AND BARRICADES FOR CONSTRUCTION ON EAST SIDE OF BELL STREET.
2. SHIFT ALL TRAFFIC TO THE NEWLY CONSTRUCTED SOUTH BOUND LANES AS SHOWN ON PLANS.
3. REMOVE TEMPORARY ASPHALT PAVEMENT AND CONSTRUCT PROPOSED IMPROVEMENTS ALONG EAST SIDE OF BELL STREET.
4. PHASE DRIVEWAY AND SIDE STREET CONSTRUCTION TO MAINTAIN ACCESS AT ALL TIMES.

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144
WAYNE P. HARTT 118231 LICENSED PROFESSIONAL ENGINEER
10/23/2017

FREESE NICHOLS
4055 International Plaza, Suite 200
Fort Worth, Texas 76109-4895
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Web - www.freese.com

CITY OF SAN ANGELO, TEXAS
PHASE III
BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS
GENERAL
PROPOSED TYPICAL SECTIONS
TRAFFIC CONTROL PHASE I & II

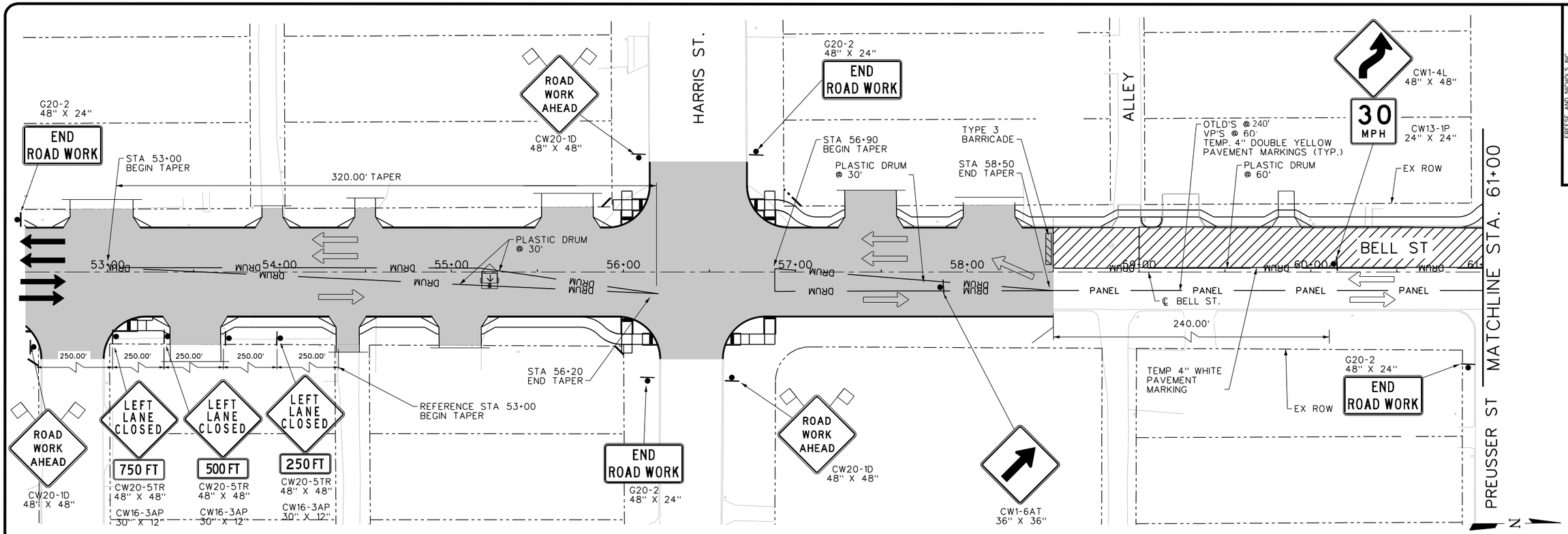
F&N JOB NO.	SAN16188
DATE	08/2017
DESIGNED	JWP
DRAWN	JFA
REVISED	
CHECKED	WH
FILE NAME	ph2-trt-gn-typicals03_tcp.sht

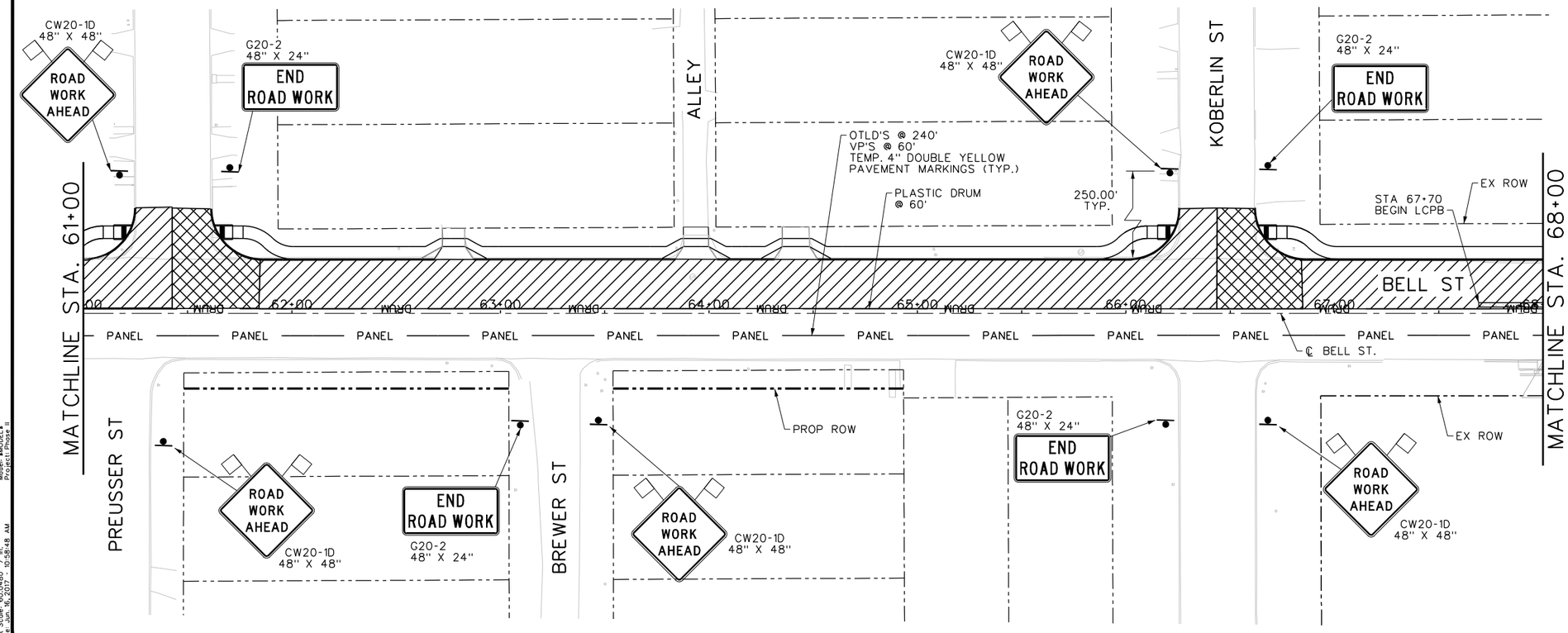
NO.	ISSUES	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

SHEET TS-03
SEQ. 10

100% SUBMITTAL





GENERAL NOTES

1) ALL DRIVEWAYS ARE TO REMAIN OPEN UNLESS 72 HOURS NOTICE HAS BEEN GIVEN TO THE PROPERTY OWNER AND THE CITY.
2) SIGN LOCATIONS ARE SCHEMATICALLY SHOWN, ACTUAL LOCATIONS SHALL CONFORM TO THE TEXAS MUTCD.
3) MAINTAIN ACCESS TO SIDE STREETS AT ALL TIMES.

LEGEND

- PANEL — OTLD WITH 42" CONES OR VERTICAL PANELS
- DRUM — PLASTIC DRUMS
- TCP SIGNAGE
- EXISTING TRAFFIC FLOW
- TCP TRAFFIC FLOW
- TEMPORARY ARROW
- TRAILER MOUNTED FLASHING ARROW BOARD
- PHASE I CONSTRUCTION
- PHASED SIDE STREET CONSTRUCTION
- PREVIOUS PHASE CONSTRUCTION

100% SUBMITTAL

FREESE AND NICHOLS, INC.
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STATE OF TEXAS
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CITY OF SAN ANGELO, TEXAS

PHASE III
BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS

TRAFFIC CONTROL

TRAFFIC CONTROL PLAN PHASE I
BEGIN TO STA. 68+00

NO.	ISSUES	BY	DATE

F&N JOB NO. SAN16188
DATE 8/2017
DESIGNED JWP
DRAWN SI
REVISED
CHECKED WH
FILE NAME ph2-trt-pl-tcp1-1.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

SHEET TC-01
SEQ. 11

MicroStation V8 User: 04008Office: Dallas
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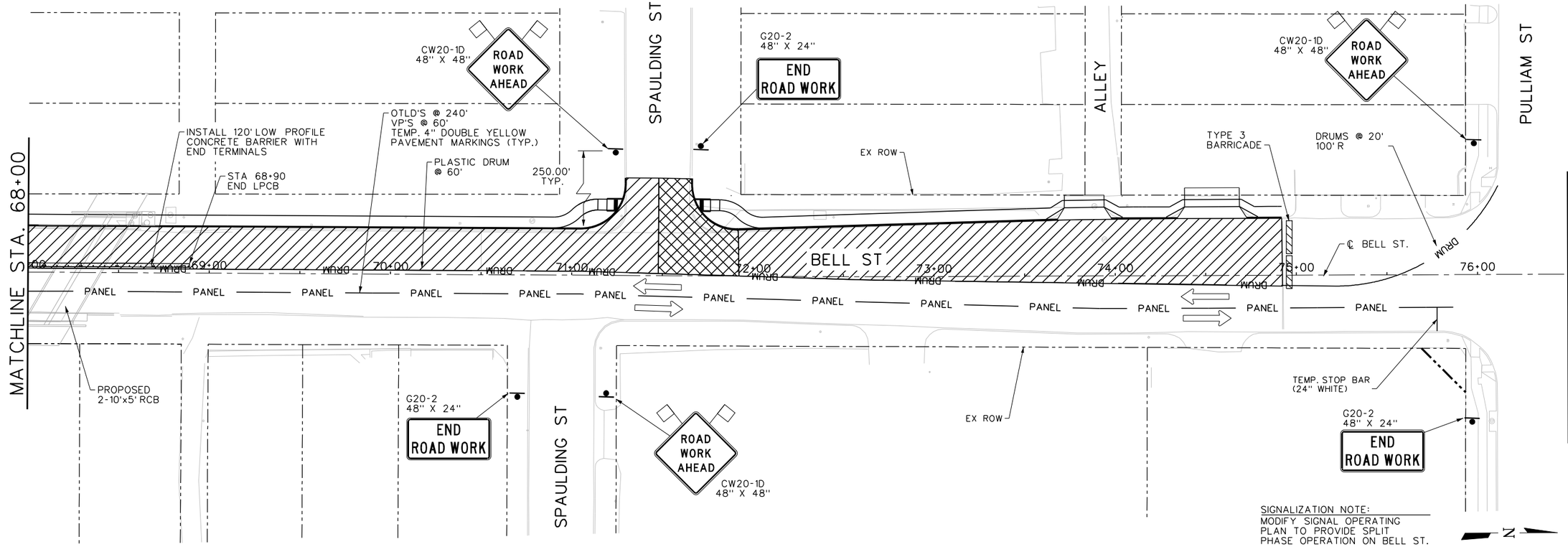
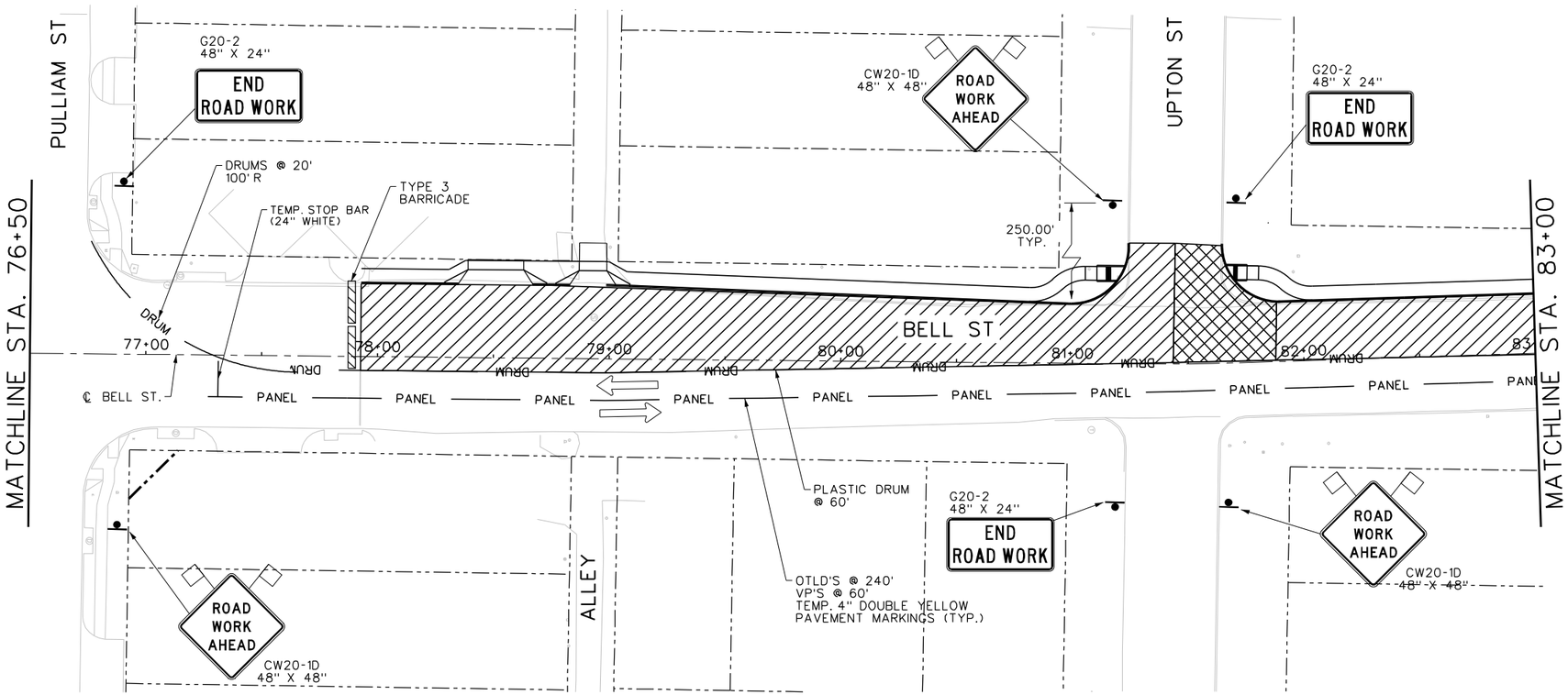
Date: Jun. 16, 2017 - 10:58:48 AM
Officer: Dallas $ACCOUNT$ Date: Jun. 16, 2017 - 10:58:48 AM User: 04008File: N:\IF\Drawings\Phase II\ph2-trt-pl-tcp1-1.dgn





GENERAL NOTES

1) ALL DRIVEWAYS ARE TO REMAIN OPEN UNLESS 72 HOURS NOTICE HAS BEEN GIVEN TO THE PROPERTY OWNER AND THE CITY.
2) SIGN LOCATIONS ARE SCHEMATICALLY SHOWN, ACTUAL LOCATIONS SHALL CONFORM TO THE TEXAS MUTCD.
3) MAINTAIN ACCESS TO SIDE STREETS AT ALL TIMES.

LEGEND

- PANEL — OTLD WITH 42" CONES OR VERTICAL PANELS
- DRUM — PLASTIC DRUMS
- TCP SIGNAGE
- EXISTING TRAFFIC FLOW
- TCP TRAFFIC FLOW
- TEMPORARY ARROW
- TRAILER MOUNTED FLASHING ARROW BOARD
- PHASE I CONSTRUCTION
- PHASED SIDE STREET CONSTRUCTION

N

0 10' 20' 30' 60'
SCALE IN FEET

100% SUBMITTAL

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144
STATE OF TEXAS
WAYNE P. HARTT
118231
LICENSED PROFESSIONAL ENGINEER
10/23/2017

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CITY OF SAN ANGELO, TEXAS
PHASE III
BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS
TRAFFIC CONTROL

TRAFFIC CONTROL PLAN PHASE I STA. 68+00 TO STA. 83+00

F&N JOB NO. SAN16188
DATE 8/2017
DESIGNED JWP
DRAWN SI
REVISED
CHECKED WH
FILE NAME ph2-trt-pl-tcp1-2.dgn

NO.	ISSUES	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

SHEET TC-02
SEQ. 12

MicroStation V8 User: 04008Office: Dallas
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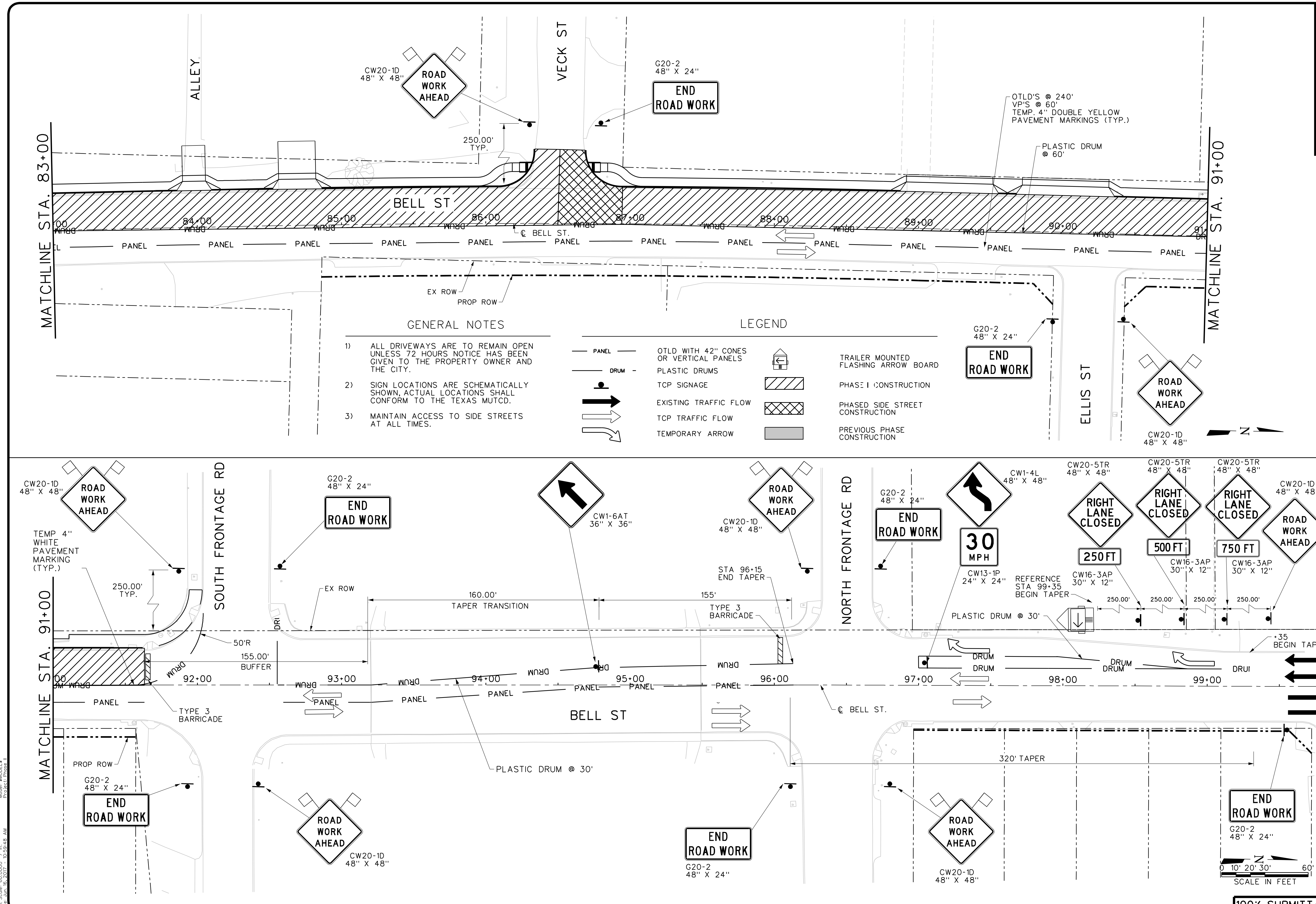
Date: Jun. 16, 2017 - 10:59:18 AM



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STATE OF TEXAS
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10/23/2017

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CITY OF SAN ANGELO, TEXAS
PHASE III
BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS
TRAFFIC CONTROL

TRAFFIC CONTROL PLAN PHASE I
STA. 83+00 TO END

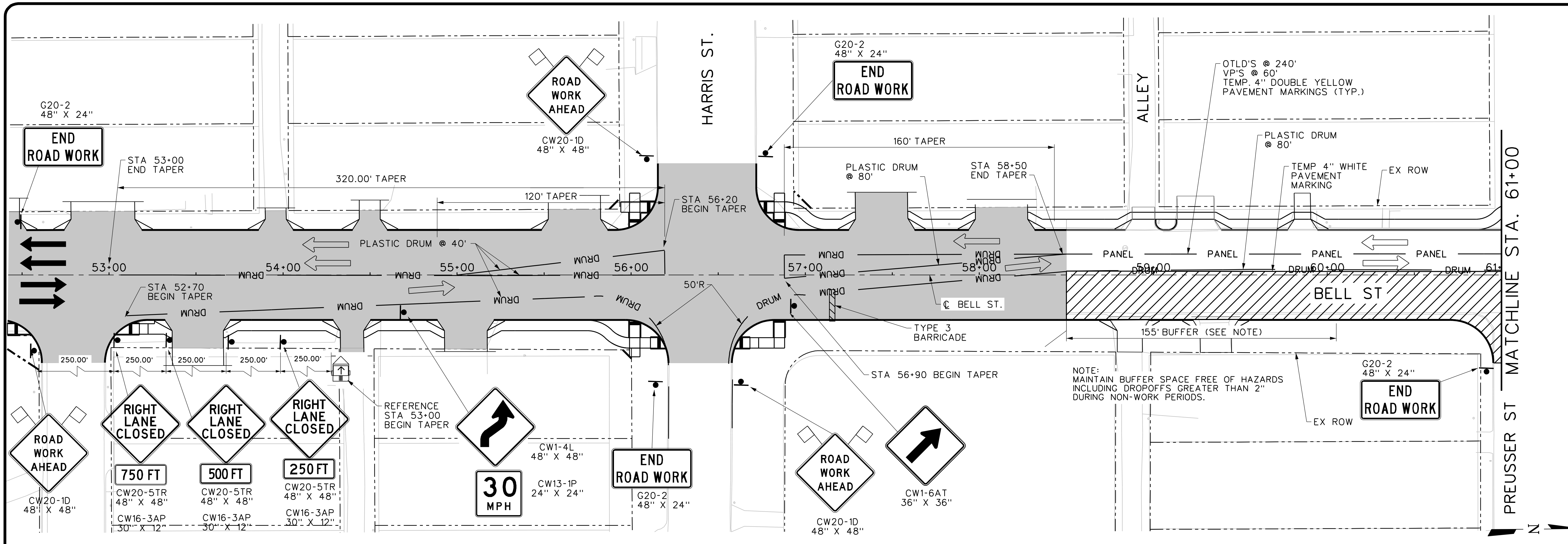
F&N JOB NO.	SAN16188
DATE	8/2017
DESIGNED	JWP
DRAWN	SI
CHECKED	WH
FILE NAME	ph2-trt-pl-tcp1-3.dgn

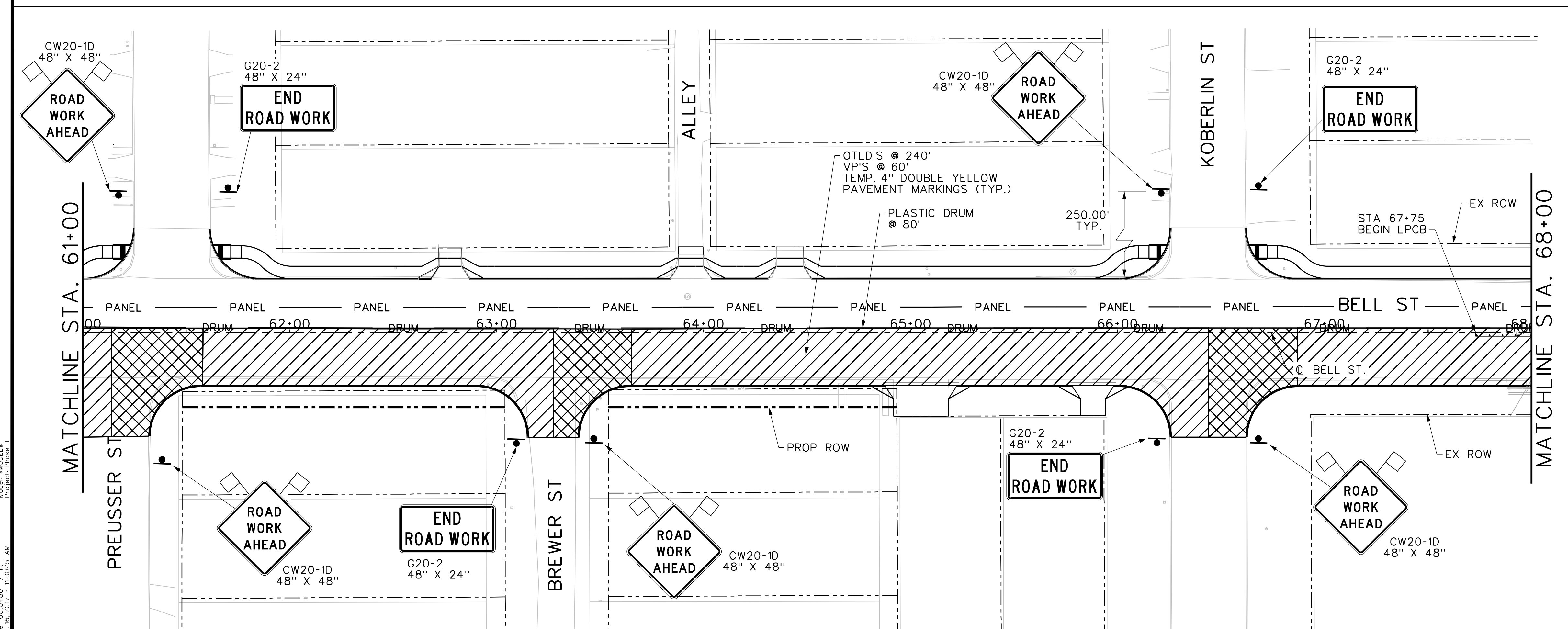
NO.	ISSUES	DATE	BY

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

SHEET TC-03
SEQ. 13

Office: Dallas $ACCOUNT$ Date: Jun. 16, 2017 - 10:59:48 AM User: 04008 File: N:\IF\Drawings\Phase II\ph2-trt-pl-tcp1-3.dgn





GENERAL NOTES

1) ALL DRIVEWAYS ARE TO REMAIN OPEN UNLESS 72 HOURS NOTICE HAS BEEN GIVEN TO THE PROPERTY OWNER AND THE CITY.

2) SIGN LOCATIONS ARE SCHEMATICALLY SHOWN, ACTUAL LOCATIONS SHALL CONFORM TO THE TEXAS MUTCD.

3) MAINTAIN ACCESS TO SIDE STREETS AT ALL TIMES.

LEGEND

Symbol	Description
PANEL	OTLD WITH 42" CONES OR VERTICAL PANELS
DRUM	PLASTIC DRUMS
	TCP SIGNAGE
	EXISTING TRAFFIC FLOW
	TCP TRAFFIC FLOW
	TEMPORARY ARROW
	TRAILER MOUNTED FLASHING ARROW BOARD
	PHASE II CONSTRUCTION
	PHASED SIDE STREET CONSTRUCTION
	PREVIOUS PHASE CONSTRUCTION

0 10' 20' 30' 60'
SCALE IN FEET

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

STATE OF TEXAS
WAYNE P. HART
118231
LICENSED PROFESSIONAL ENGINEER
10/23/2017

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CITY OF SAN ANGELO, TEXAS
PHASE III
BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS
TRAFFIC CONTROL

TRAFFIC CONTROL PLAN PHASE II BEGIN TO STA. 68+00

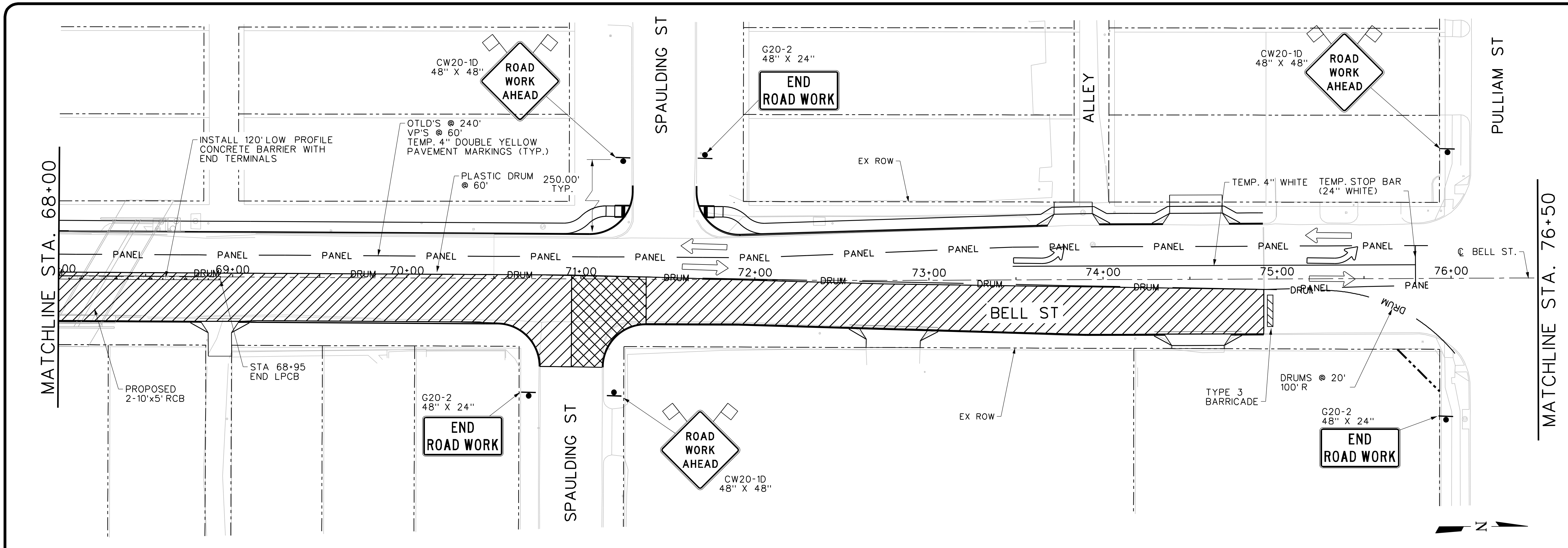
F&N JOB NO. SAN16188
DATE 8/2017
DESIGNED JWP
DRAWN SI
CHECKED WH
FILE NAME ph2-trt-pl-tcp2-1.dgn

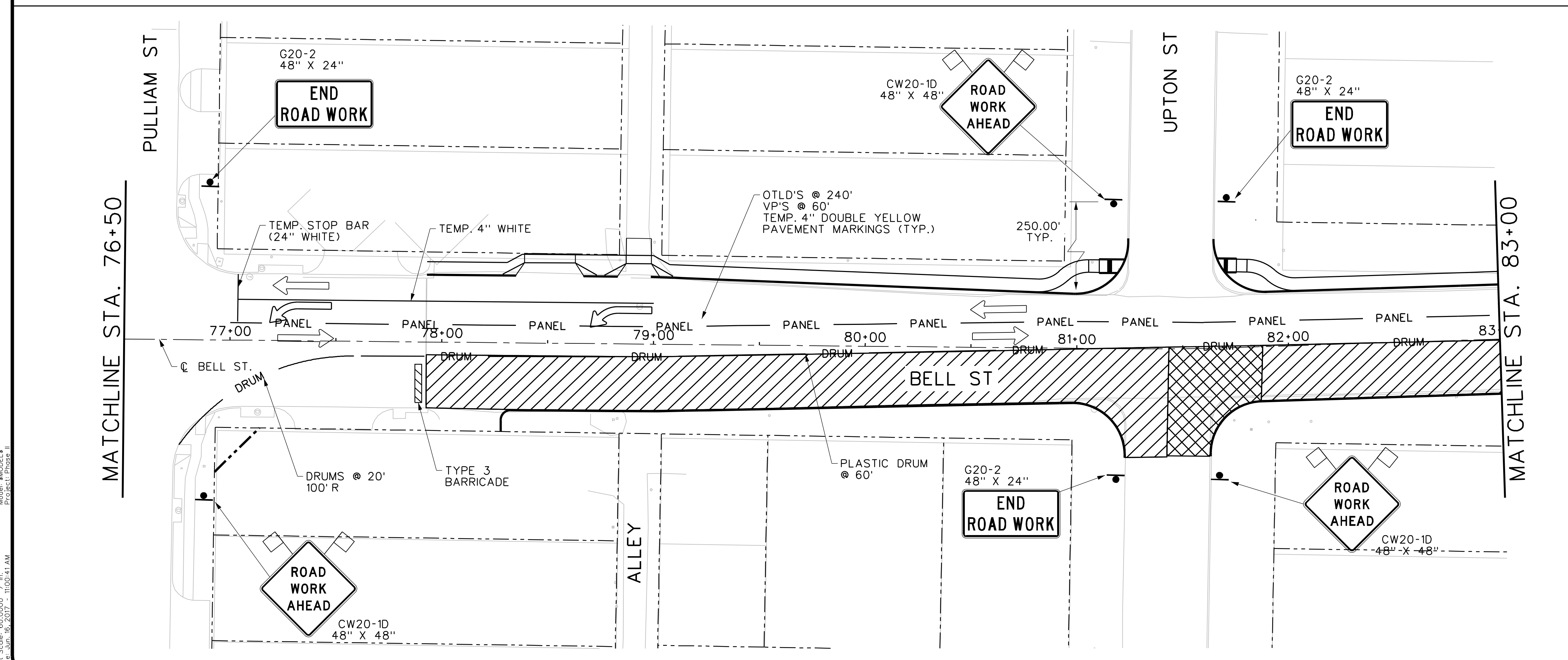
NO.	ISSUES	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

100% SUBMITTAL

SHEET TC-04
SEQ. 14





GENERAL NOTES

1) ALL DRIVEWAYS ARE TO REMAIN OPEN UNLESS 72 HOURS NOTICE HAS BEEN GIVEN TO THE PROPERTY OWNER AND THE CITY.

2) SIGN LOCATIONS ARE SCHEMATICALLY SHOWN, ACTUAL LOCATIONS SHALL CONFORM TO THE TEXAS MUTCD.

3) MAINTAIN ACCESS TO SIDE STREETS AT ALL TIMES.

LEGEND

PANEL	OTLD WITH 42" CONES OR VERTICAL PANELS
DRUM	PLASTIC DRUMS
	TCP SIGNAGE
	EXISTING TRAFFIC FLOW
	TCP TRAFFIC FLOW
	TEMPORARY ARROW
	TRAILER MOUNTED FLASHING ARROW BOARD
	PHASE II CONSTRUCTION
	PHASED SIDE STREET CONSTRUCTION

N

0 10' 20' 30' 60'
SCALE IN FEET

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

STATE OF TEXAS
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CITY OF SAN ANGELO, TEXAS
PHASE II
BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS

TRAFFIC CONTROL
TRAFFIC CONTROL PLAN PHASE II STA. 68+00 TO STA. 83+00

F&N JOB NO.	SAN16188
DATE	8/2017
DESIGNED	JWP
DRAWN	SI
REVISED	
CHECKED	WH
FILE NAME	ph2-trt-pl-tcp2-2.dgn

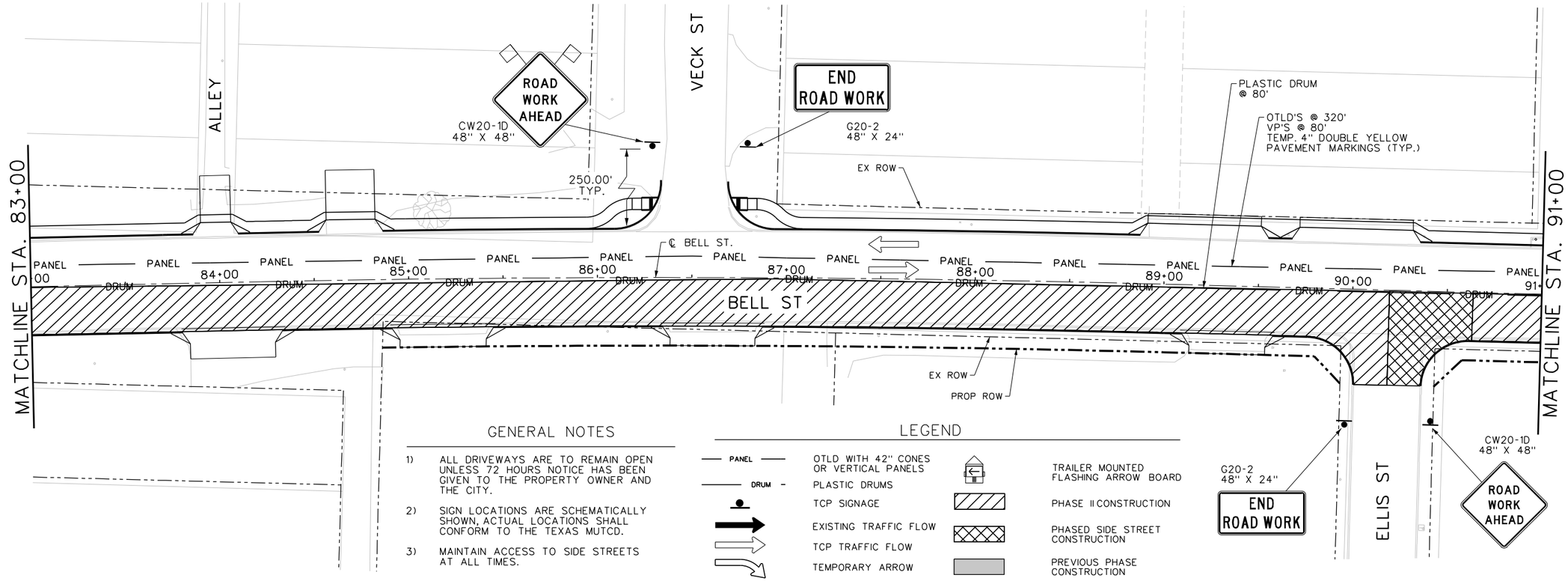
NO.	ISSUES	DATE	BY

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

SHEET TC-05
SEQ. 15

100% SUBMITTAL

MicroStation V8 User: 04008 Office: Dallas
Office: Dallas $ACCOUNT$ Date: Jun. 16, 2017 - 11:00:41 AM User: 04008 File: N:\IF\Drawings\Phase II\ph2-trt-pl-tcp2-2.dgn

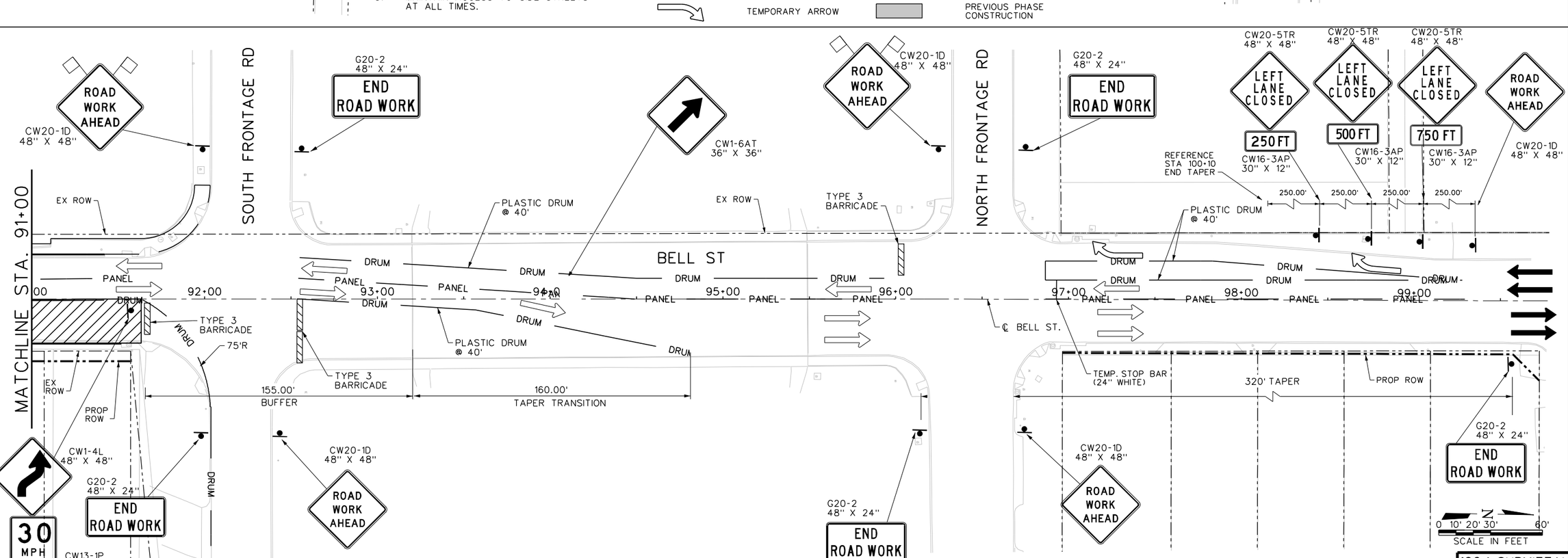


GENERAL NOTES

1) ALL DRIVEWAYS ARE TO REMAIN OPEN UNLESS 72 HOURS NOTICE HAS BEEN GIVEN TO THE PROPERTY OWNER AND THE CITY.
2) SIGN LOCATIONS ARE SCHEMATICALLY SHOWN, ACTUAL LOCATIONS SHALL CONFORM TO THE TEXAS MUTCD.
3) MAINTAIN ACCESS TO SIDE STREETS AT ALL TIMES.

LEGEND

- PANEL
- DRUM
- OTLD WITH 42" CONES OR VERTICAL PANELS
- PLASTIC DRUMS
- TCP SIGNAGE
- EXISTING TRAFFIC FLOW
- TCP TRAFFIC FLOW
- TEMPORARY ARROW
- TRAILER MOUNTED FLASHING ARROW BOARD
- PHASE II CONSTRUCTION
- PHASED SIDE STREET CONSTRUCTION
- PREVIOUS PHASE CONSTRUCTION



FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

STATE OF TEXAS
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CITY OF SAN ANGELO, TEXAS
PHASE III
BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS
TRAFFIC CONTROL
TRAFFIC CONTROL PLAN PHASE II
STA. 83+00 TO END

NO.	ISSUES	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

F&N JOB NO. SAN16188
DATE 8/2017
DESIGNED JMP
DRAWN SI
REVISED
CHECKED WH
FILE NAME ph2-trf-pl-tcp2-3.dgn

SHEET TC-06
SEQ. 16

100% SUBMITTAL

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Plot Scale: 60.0000 '/ in.
Date: Jun. 16, 2017 - 11:01:07 AM
Model: $MODEL$
Project: Phase II
Office: Dallas $ACCOUNT$ Date: Jun. 16, 2017 - 11:01:07 AM User: 04008File: N:\IF\Drawings\Phase II\ph2-trf-pl-tcp2-3.dgn

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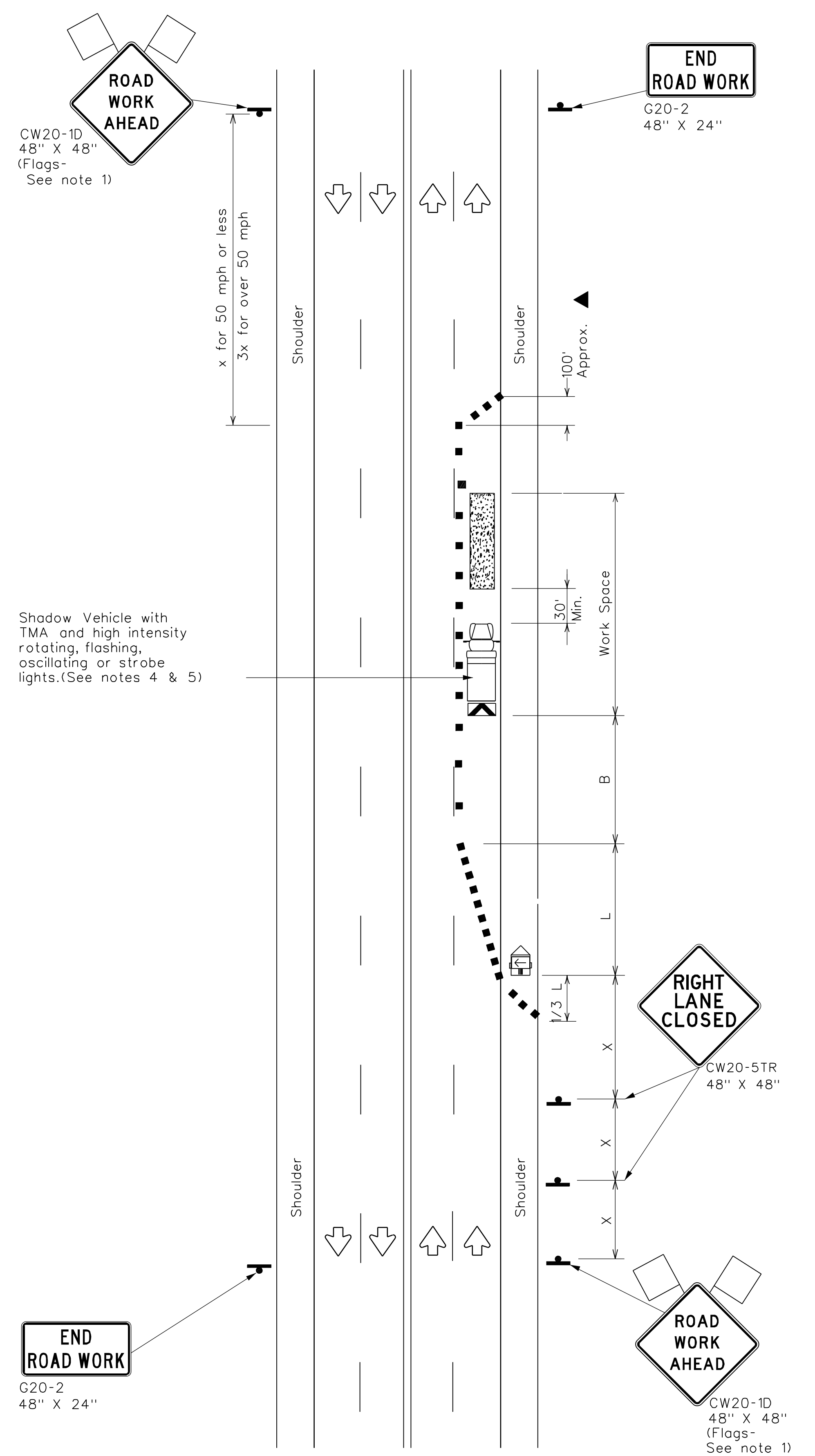
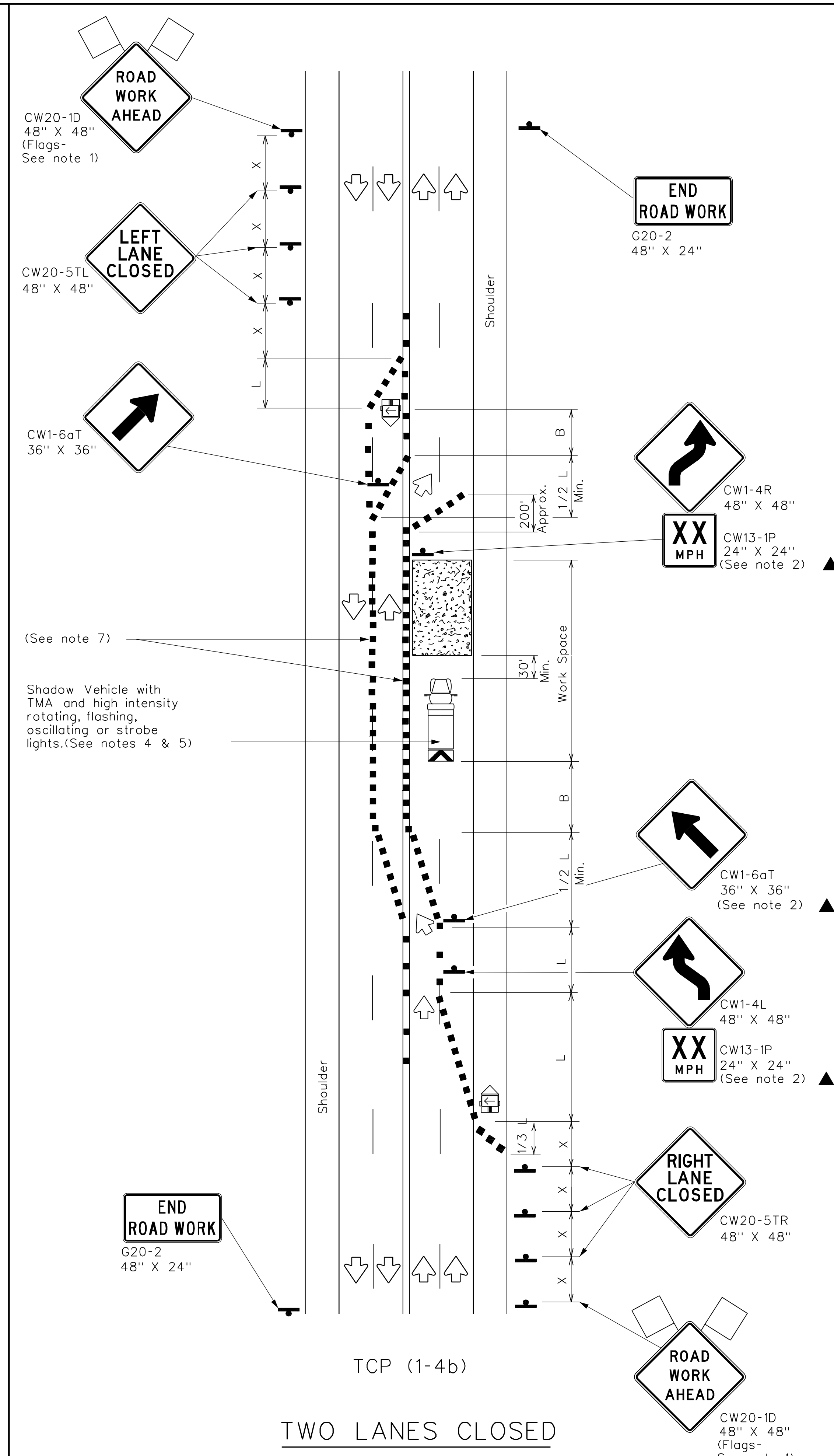


TCP (1-4a)

ONE LANE CLOSED



TCP (1-4b)

TWO LANES CLOSED

LEGEND

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

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

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

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

GENERAL NOTES

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

TCP (1-4a)

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

TCP (1-4b)

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

For construction or maintenance contract work, specific project requirements for shadow vehicles can be found in the project GENERAL NOTES for Item 502, Barricades, Signs and Traffic Handling.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(1-4)-12

©TxDOT December 1985 | DN: TXDOT | CK: TXDOT | DW: TXDOT | CK: TXDOT
REVISIONS 2-94 2-12 8-95 1-97 4-98 | CONT | SECT | JOB | HIGHWAY | DIST | COUNTY | SHEET NO.
154

MicroStation V8 User: 02235 Office: Fort Worth $ACCOUNTS N:\IF\Drawings\TXDOT Details\Phase I Txdot Details\Traffic Control Details\tcp1-4.dgn
DATE:
FILE:
Office: Fort Worth $ACCOUNT$ Date: Jan. 12, 2017 - 03:53:11 PM User: 02235 File: N:\IF\Drawings\TXDOT Details\Phase I Txdot Details\Traffic Control Details\tcp1-4.dgn

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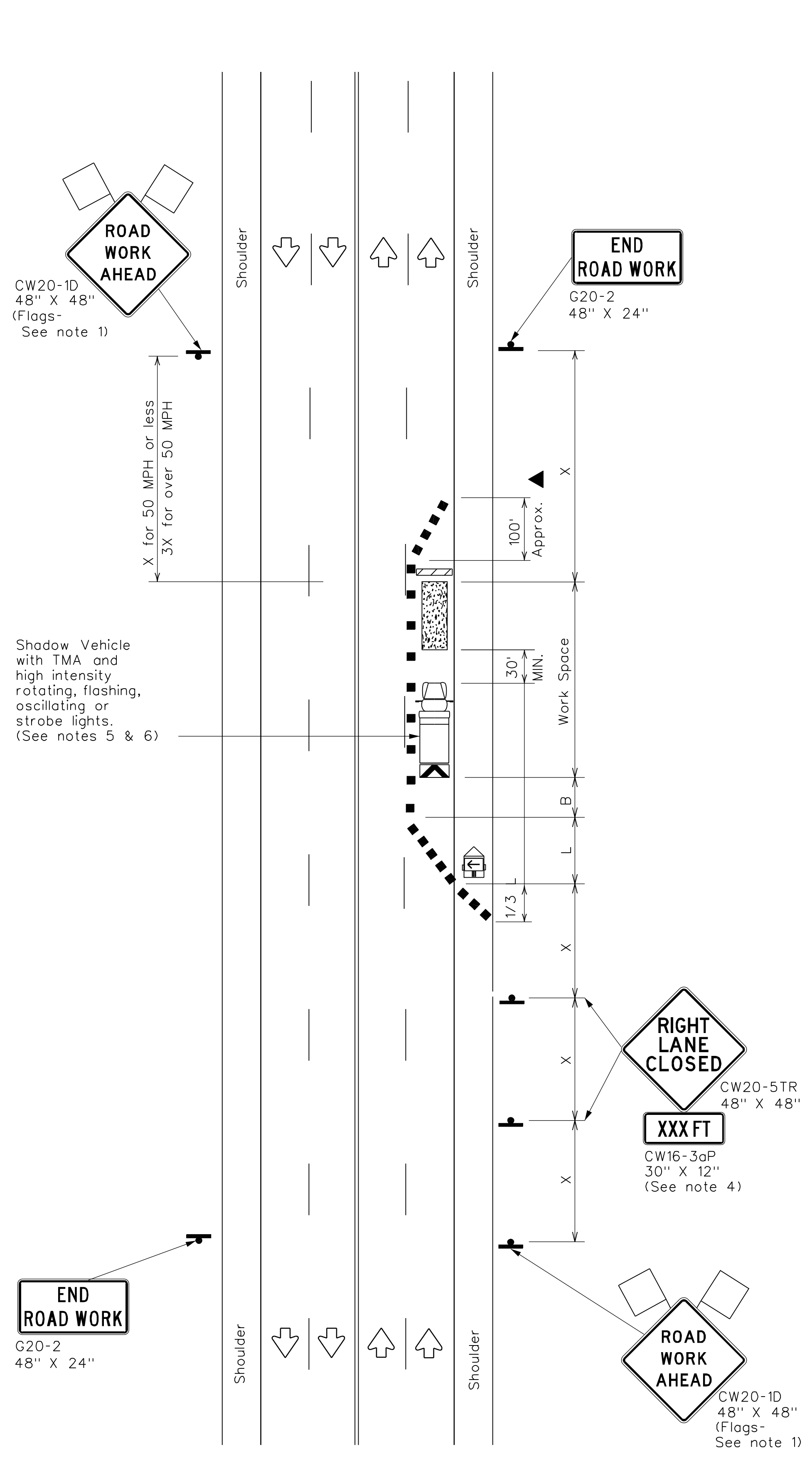
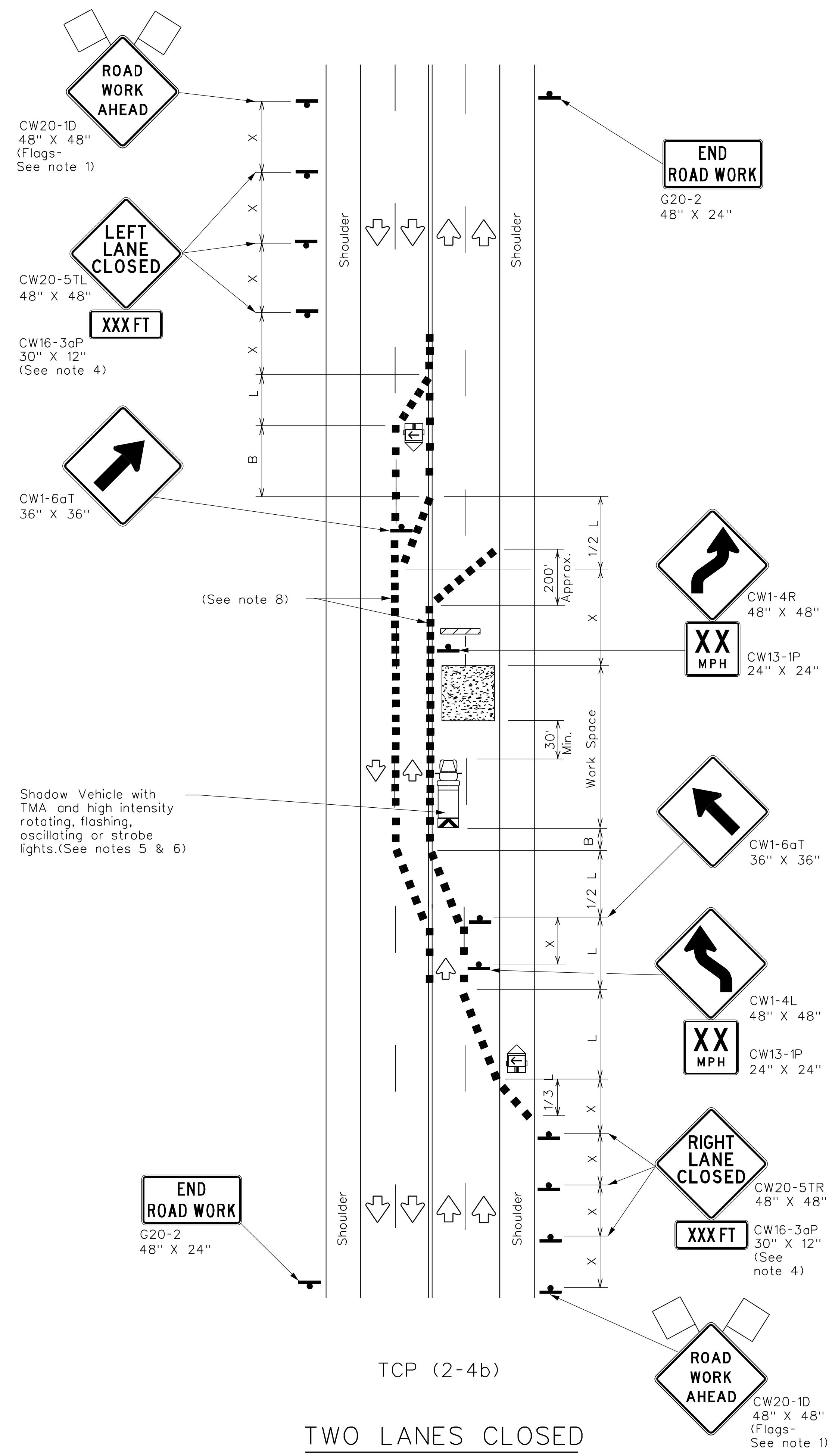


TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

LEGEND

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

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

✳ Conventional Roads Only

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

TYPICAL USAGE

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The downstream taper is optional. When used, it should be 100 feet minimum length per lane.
4. For short term applications, when post mounted signs are not used, the distance legend may be shown on the sign face rather than on a CW16-3aP supplemental plaque.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-4a)

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

TCP (2-4b)

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

For construction or maintenance contract work, specific project requirements for shadow vehicles can be found in the project GENERAL NOTES for Item 502, Barricades, Signs and Traffic Handling.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-12

DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
REVISIONS 8-95 2-12 1-97 4-98 3-03	CONT / SECT / JOB / HIGHWAY	DIST / COUNTY / SHEET NO.	

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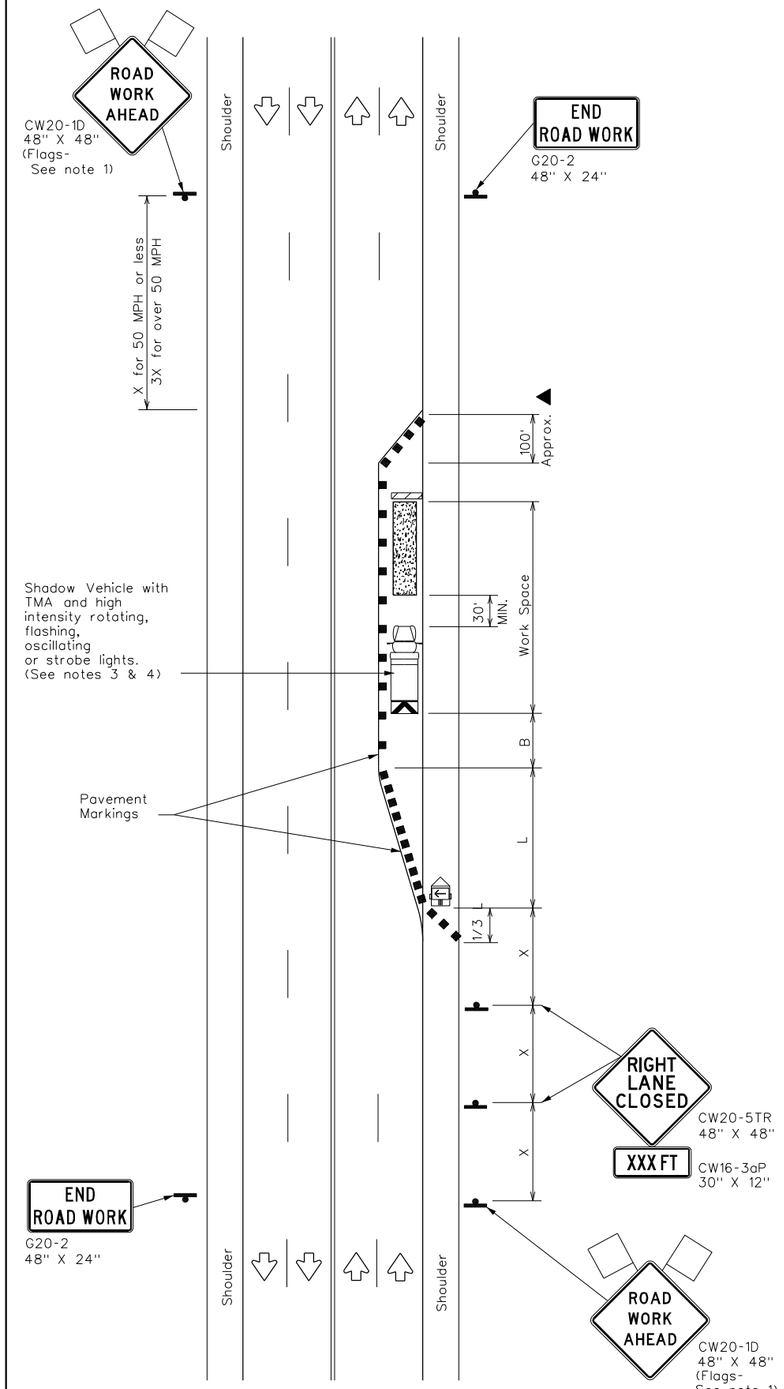
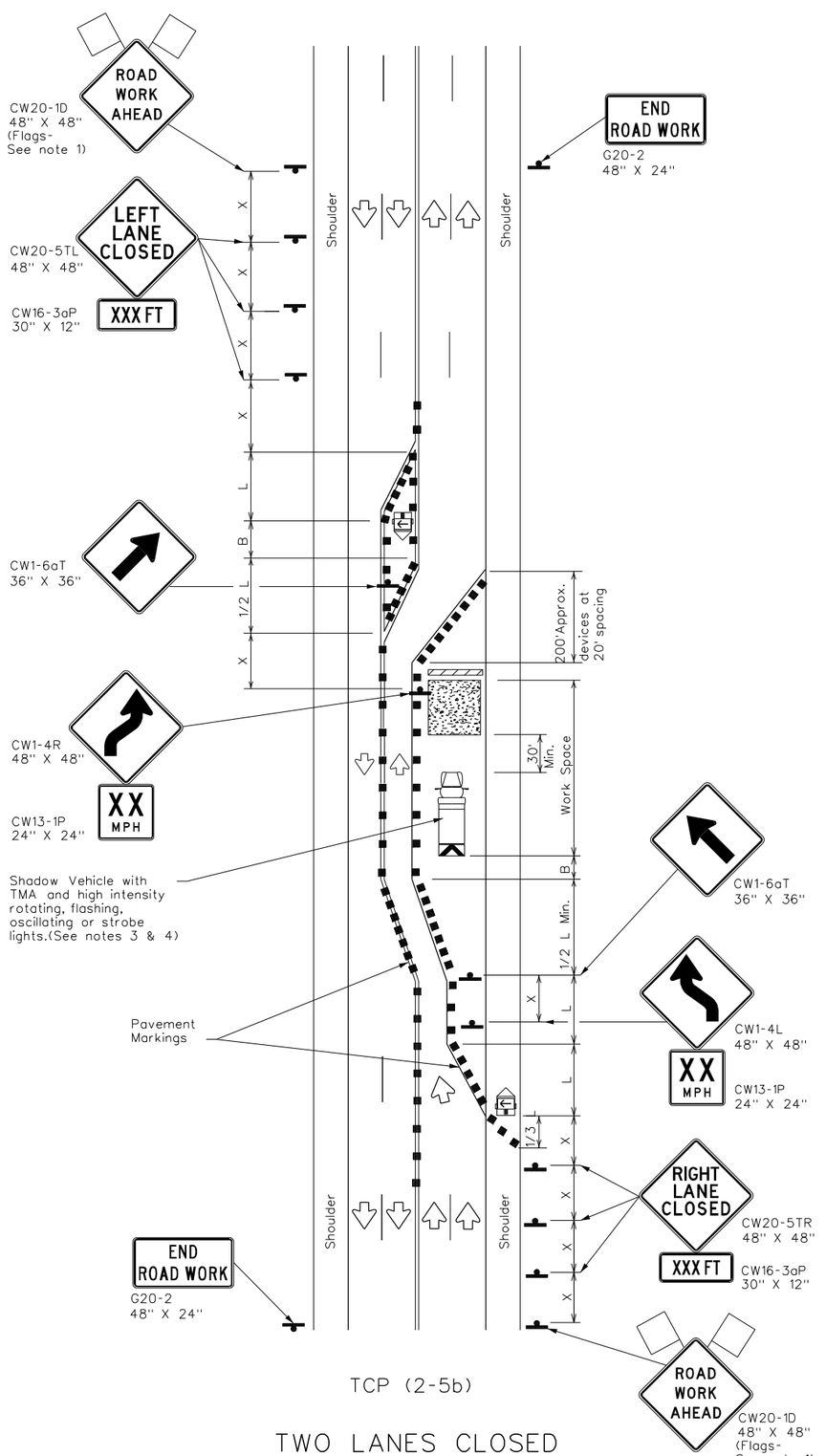
Office: Fort Worth $ACCOUNT$ Date: Jan. 12, 2017 - 03:53:12 PM User: 02235 File: N:\F\Drawings\TXDOT Details\Phase 1 Txdot Details\Traffic Control Details\tcp2-4.dgn



TCP (2-5a)

ONE LANE CLOSED



TCP (2-5b)

TWO LANES CLOSED

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

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

✳ Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew eposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substitutued for the Shadow Vehicle and TMA.
4. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.
5. The downstream taper is optional. When used, it should be 100 feet approximately per lane, with channelizing devices spaced at 20 feet.

TCP (2-5a)

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

TCP (2-5b)

7. Conflicting pavement markings shall be removed for long-term projects.

For construction or maintenance contract work, specific project requirements for shadow vehicles can be found in the project GENERAL NOTES for Item 502, Barricades, Signs and Traffic Handling.

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN LONG TERM LANE CLOSURES MULTILANE CONVENTIONAL RDS.

TCP(2-5)-12

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CONT	SECT	JOB	HIGHWAY
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1-97
4-98
3-03

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MicroStation V8 User: 02235Office: Fort Worth
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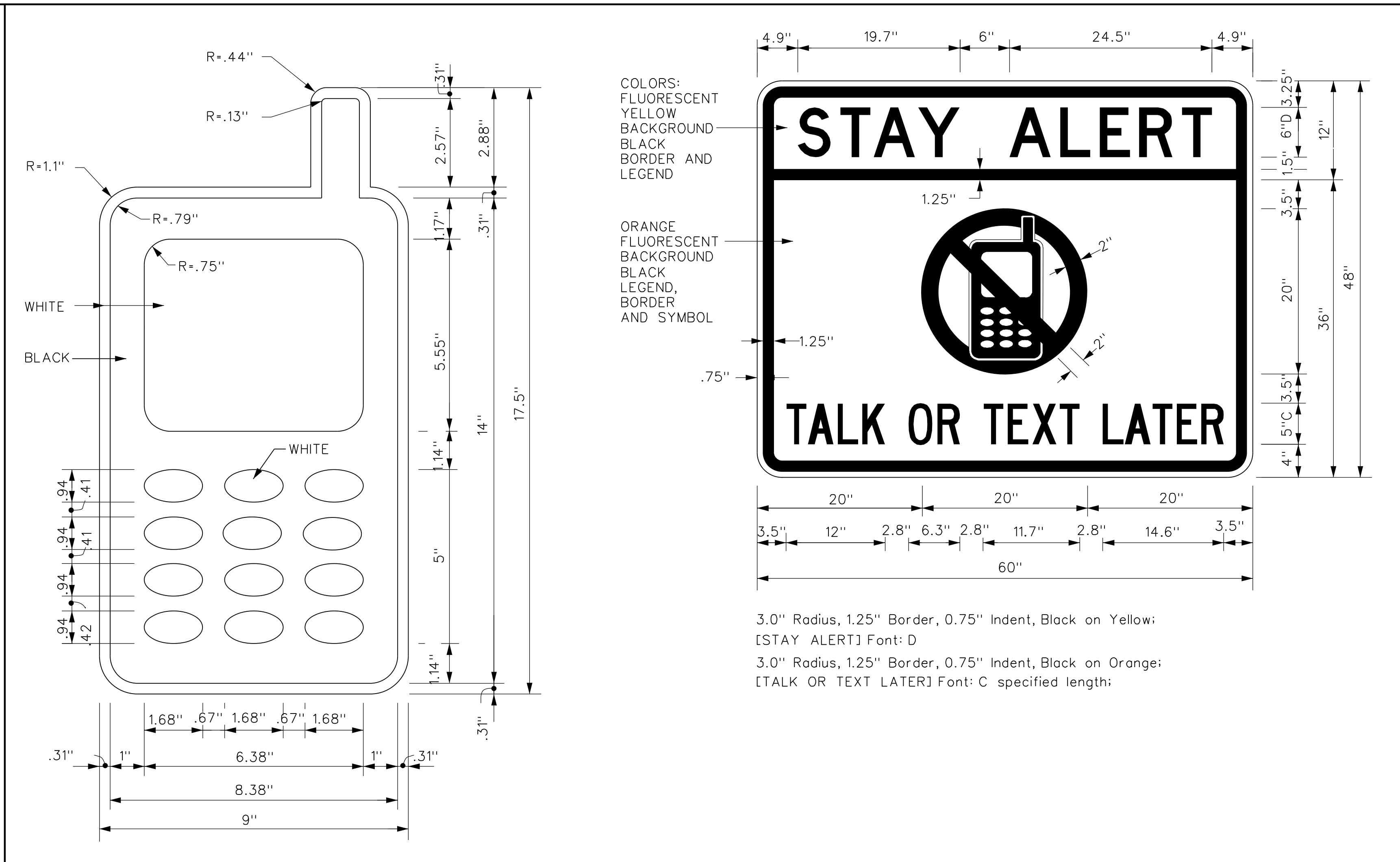
BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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, STAY ALERT TALK OR TEXT LATER (see Sign Detail G20-10T) and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. However, the TRAFFIC FINES DOUBLE sign will not be required on projects consisting solely of mobile operation work, such as striping or milling edgeline rumble strips. 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," or equivalent revisions, and labeled as ANSI 107-2004 standard performance for Class 2 or 3 risk exposure. Class 3 garments should be considered for high traffic volume work areas or night time work.



SIGN DETAIL (G20-10T)

Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified 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) 416-3118

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

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SHEET 1 OF 12

Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-14

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REVISIONS 4-03 5-10 8-14 9-07 7-13	DIST	COUNTY		SHEET NO.

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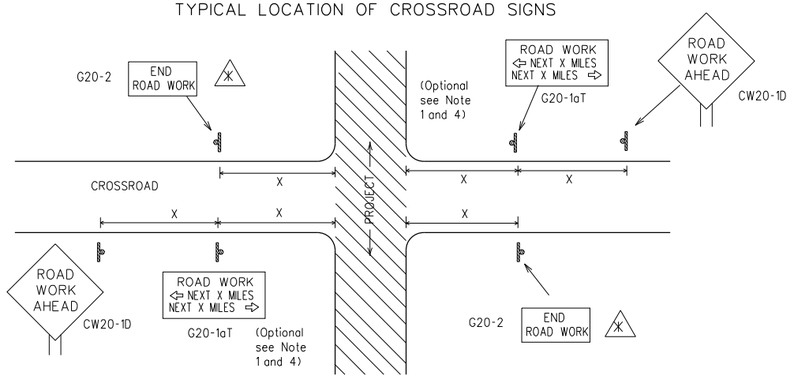
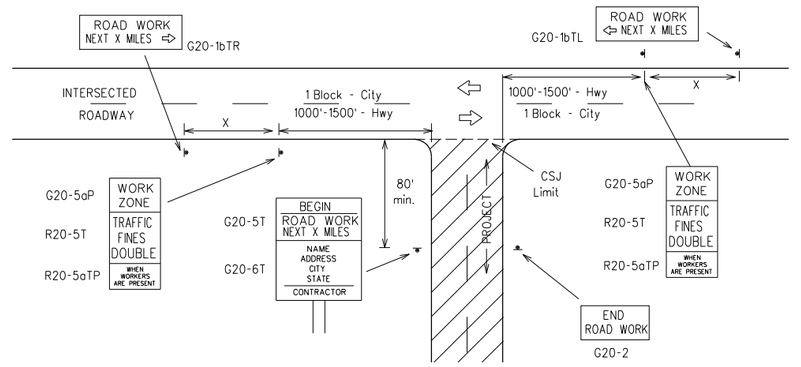
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

SIZE

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

SPACING

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

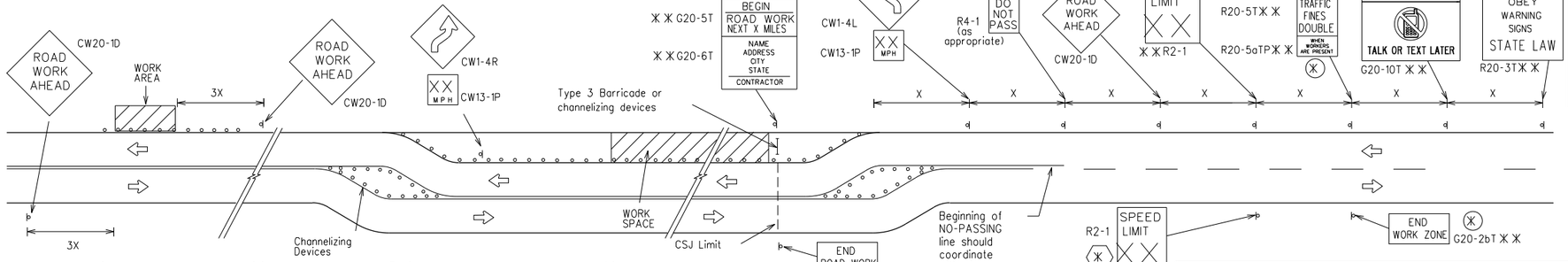
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

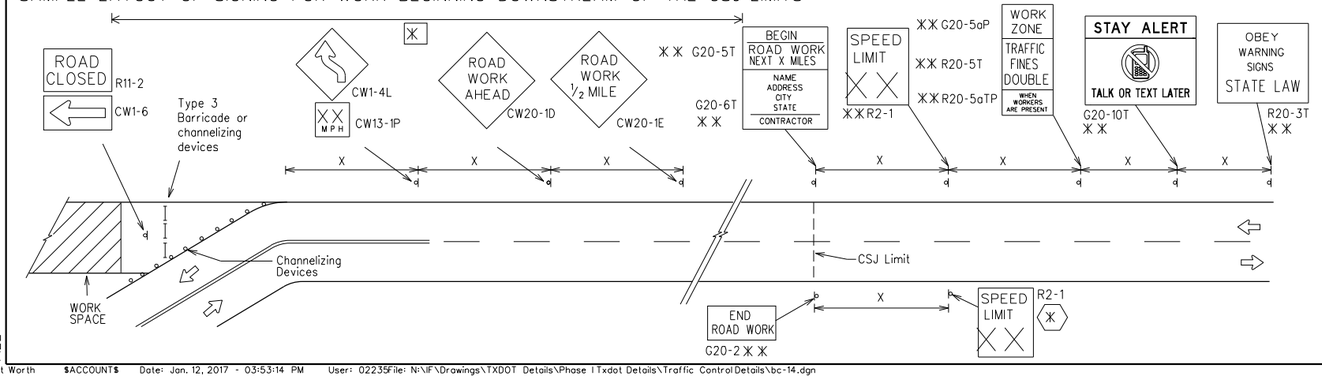
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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

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

** Required CSJ Limit signing. See Note 10 on BC(1). TRAFFIC FINES DOUBLE signs will not be required on projects consisting solely of mobile operations work.

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

(*) Contractor will install a regulatory speed limit sign at the end of the work zone.

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

SHEET 2 OF 12

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-14

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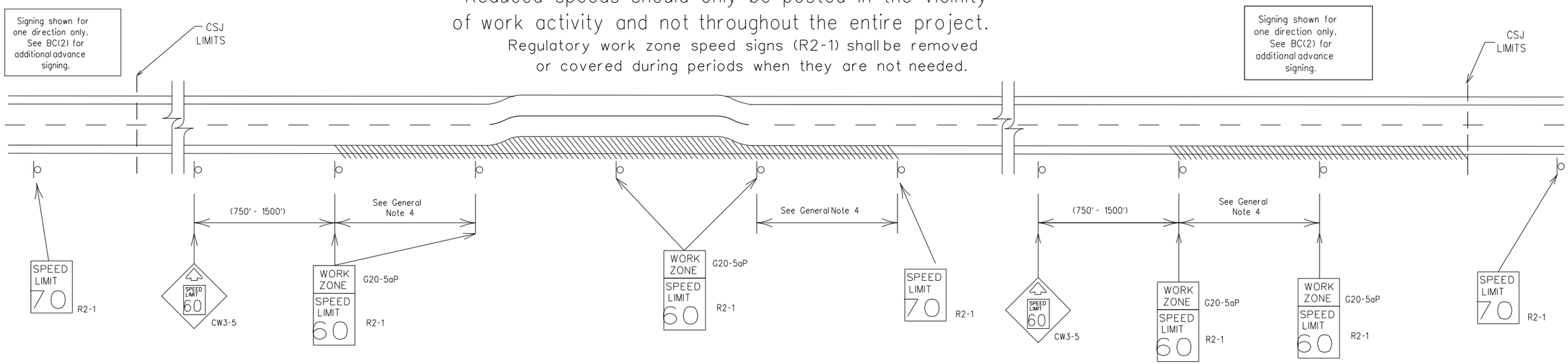
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project.
Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-14

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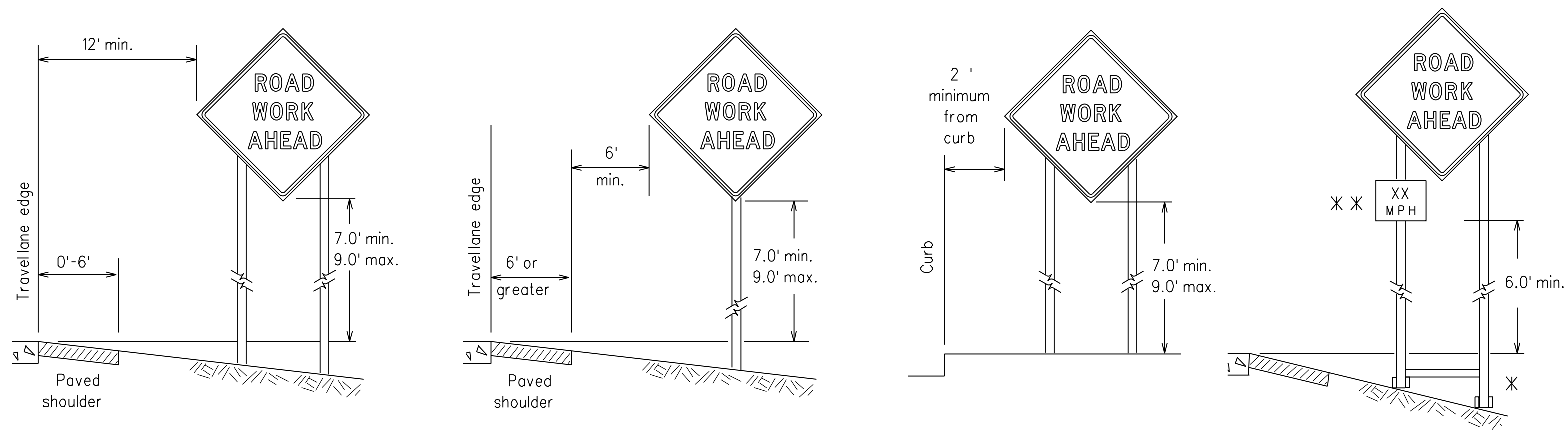
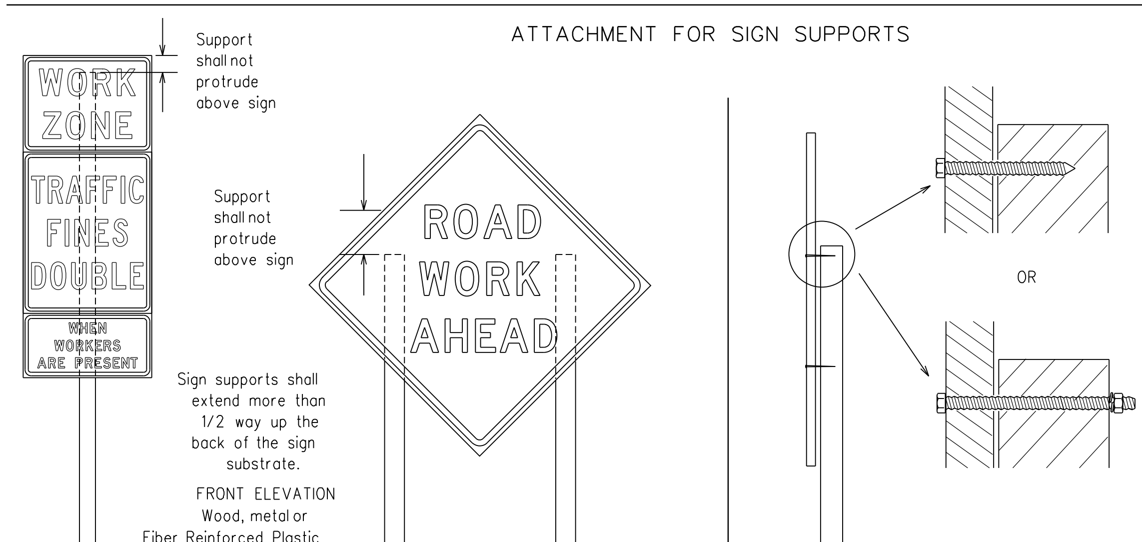
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



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

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

ATTACHMENT FOR SIGN SUPPORTS



SIDE ELEVATION
Wood

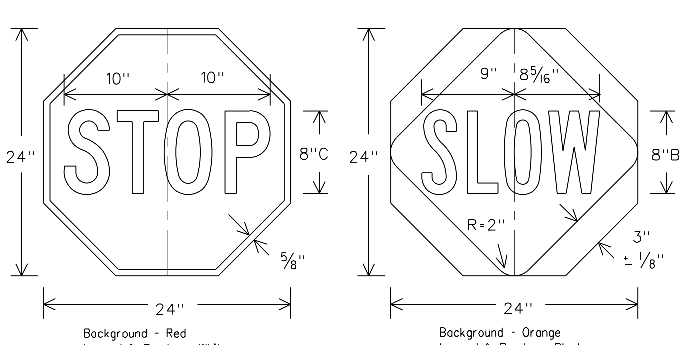
Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the spice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should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

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

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

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.



Background - Red
Legend & Border - White

Background - Orange
Legend & Border - Black

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

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BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-14

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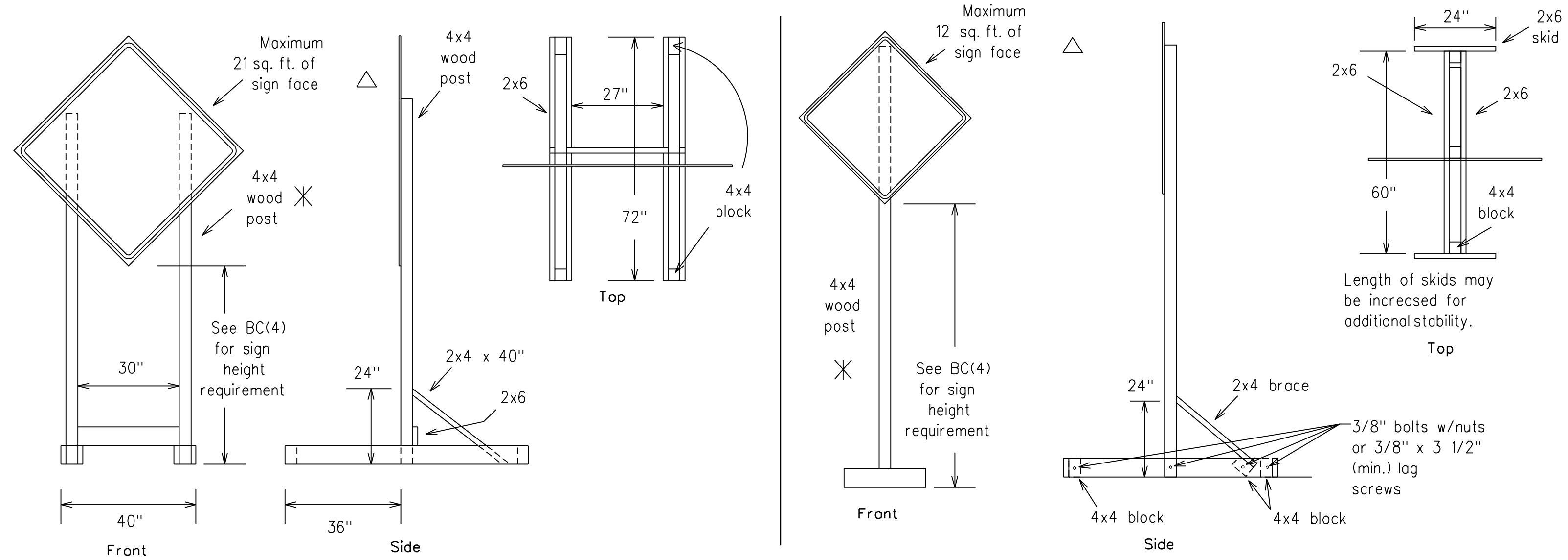
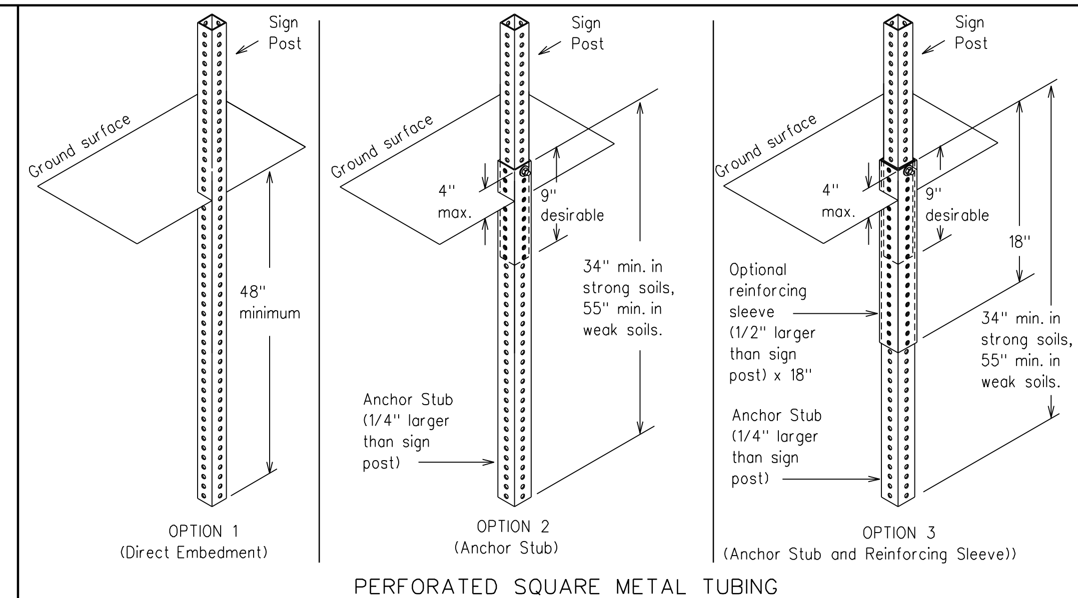
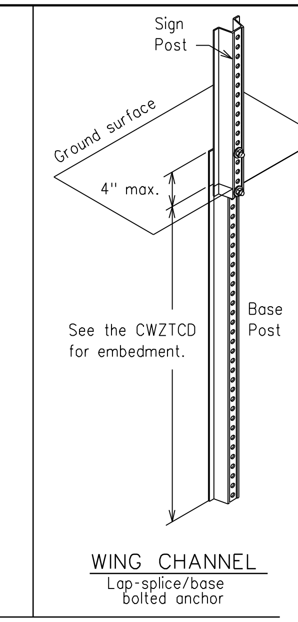


SKID MOUNTED WOOD SIGN SUPPORTS

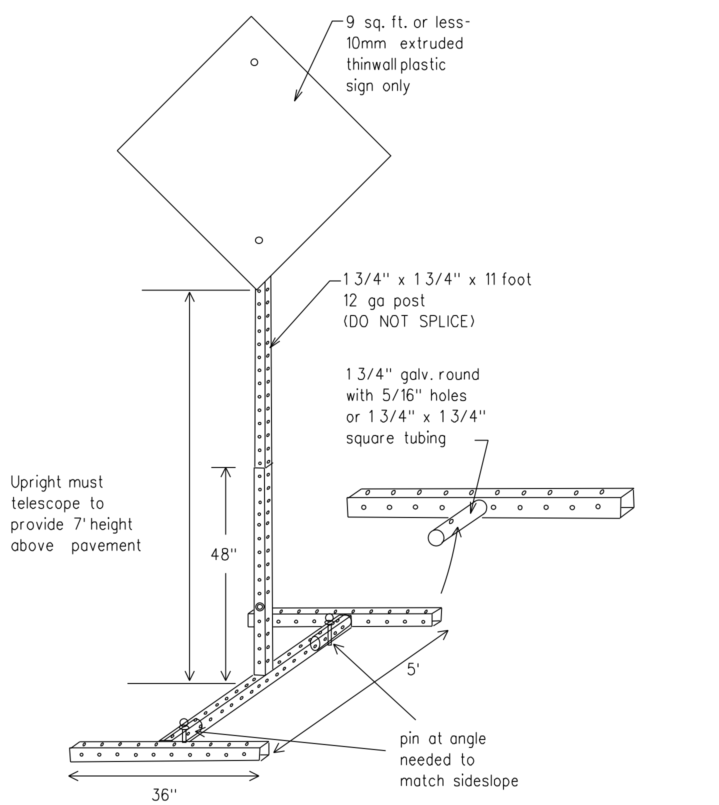
LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS ☐

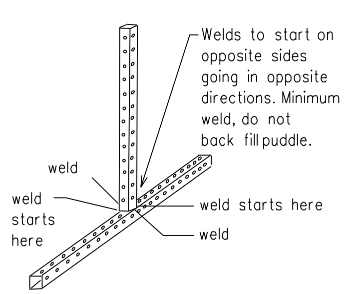


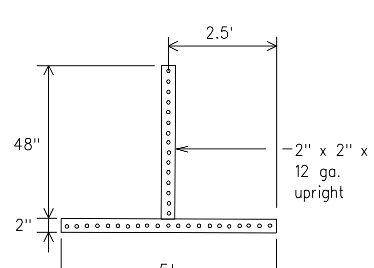


GROUND MOUNTED SIGN SUPPORTS

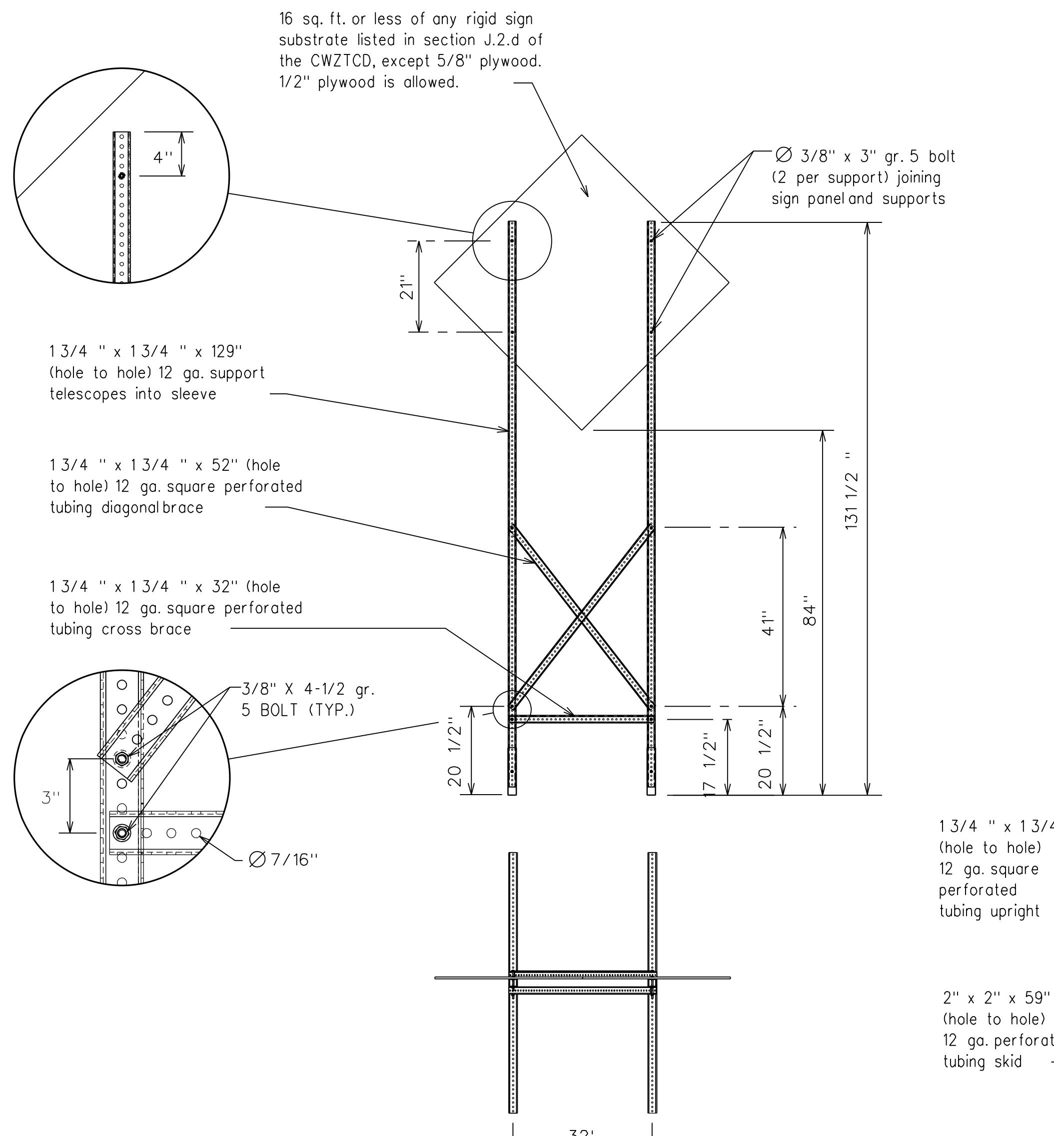
Refer to the CWZTCD and the manufacturer's installation procedure for each type sign support.
The maximum sign square footage shall adhere to the manufacturer's recommendation.
Two post installations can be used for larger signs.

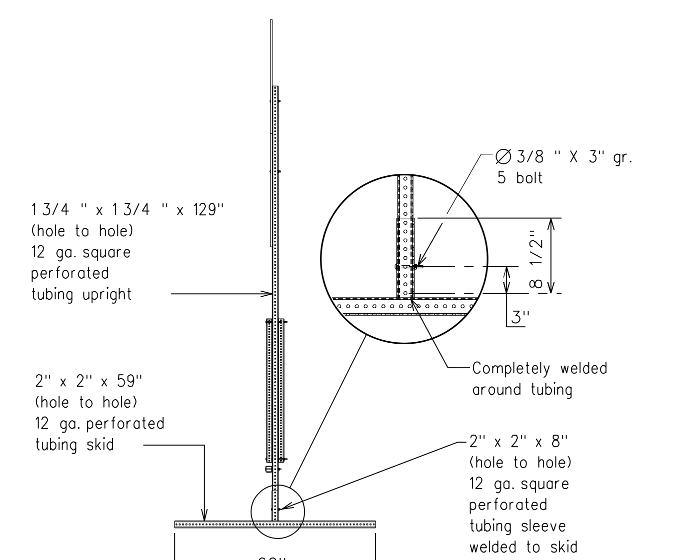




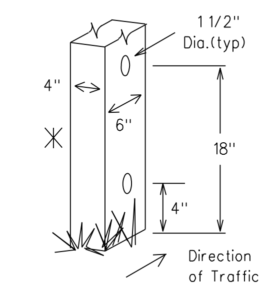


SINGLE LEG BASE
Side View





SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS



Nominal Post Size	Number of Posts	Maximum 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

WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

1. Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.

2. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.

3. When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

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

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

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

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Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-14

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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

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, unless shown in the TMUTCD.
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 600 feet at night and 800 feet in daylight. 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	ABBREVIATION
Access Road	ACCS RD
Alternate	ALT
Avenue	AVE
Best Route	BEST RTE
Boulevard	BLVD
Bridge	BRDG
Cannot	CANT
Center	CTR
Construction Ahead	CONST AHD
CROSSING	XING
Detour Route	DETOUR RTE
Do Not	DONT
East	E
Eastbound	(route) E
Emergency	EMER
Emergency Vehicle	EMER VEH
Entrance, Enter	ENT
Express Lane	EXP LN
Expressway	EXPWY
XXXX Feet	XXXX FT
Fog Ahead	FOG AHD
Freeway	FRWY, FWY
Freeway Blocked	FWY BLKD
Friday	FRI
Hazardous Driving	HAZ DRIVING
Hazardous Material	HAZMAT
High-Occupancy Vehicle	HOV
Highway	HWY
Hour (s)	HR, HRS
Information	INFO
It Is	ITS
Junction	JCT
Left	LFT
Left Lane	LFT LN
Lane Closed	LN CLOSED
Lower Level	LWR LEVEL
Maintenance	MAINT

WORD OR PHRASE	ABBREVIATION
Major	MAJ
Miles	MI
Miles Per Hour	MPH
Minor	MNR
Monday	MON
Normal	NORM
North	N
Northbound	(route) N
Parking	PKING
Road	RD
Right Lane	RT LN
Saturday	SAT
Service Road	SERV RD
Shoulder	SHLDR
Slippery	SLIP
South	S
Southbound	(route) S
Speed	SPD
Street	ST
Sunday	SUN
Telephone	PHONE
Temporary	TEMP
Thursday	THURS
To Downtown	TO DWNTN
Traffic	TRAF
Travelers	TRVLRS
Tuesday	TUES
Time Minutes	TIME MIN
Upper Level	UPR LEVEL
Vehicles (s)	VEH, VEHS
Warning	WARN
Wednesday	WED
Weight Limit	WT LIMIT
West	W
Westbound	(route) W
Wet Pavement	WET PVMT
Will Not	WONT

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

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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, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE DRUM AT EACH OF THE FOUR CORNERS OF THE UNIT.

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 "Flagger Symbol"(CW20-7) 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 board 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 Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-14

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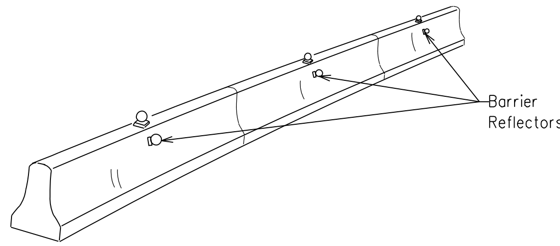
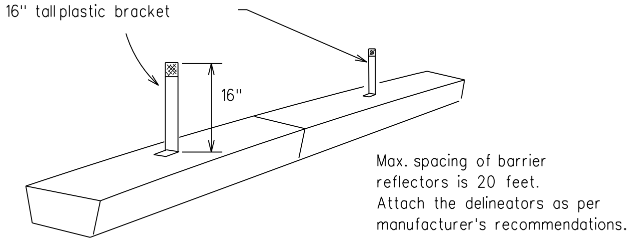
Office: Fort Worth $ACCOUNT$ Date: Jan. 12, 2017 - 03:53:17 PM User: 02235 File: N:\IF\Drawings\TXDOT Details\Phase I Txdot Details\Traffic Control Details\bc-14.dgn

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

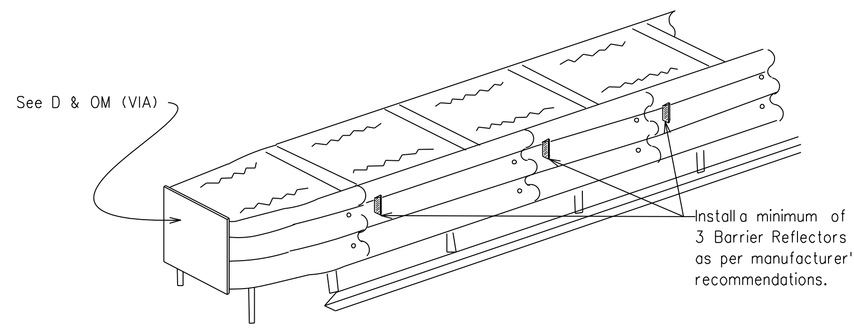


CONCRETE TRAFFIC BARRIER (CTB)



LOW PROFILE CONCRETE BARRIER (LPCB)

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



DELINEATION OF END TREATMENTS

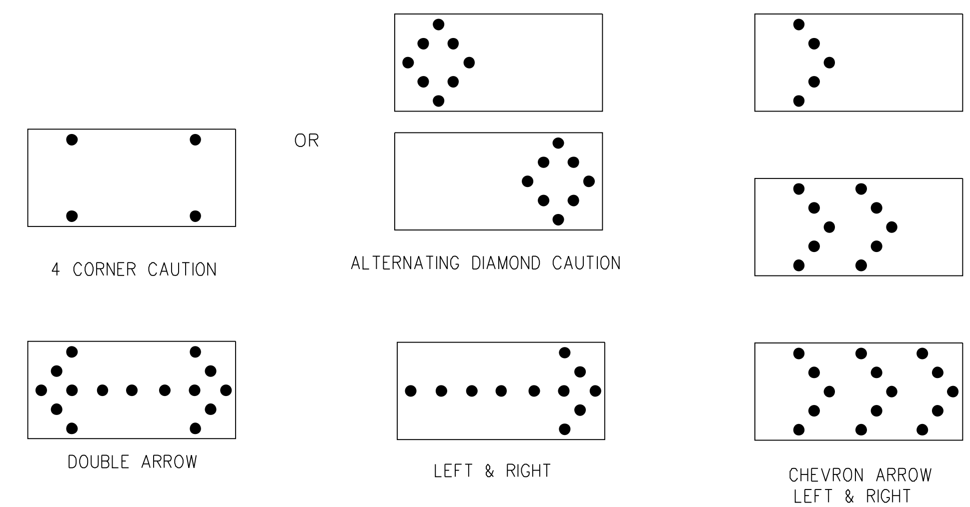
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS

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

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



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

REQUIREMENTS

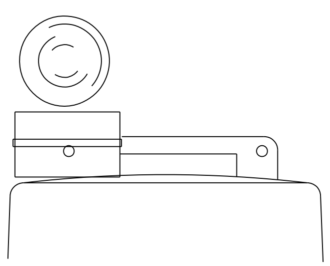
TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE
B	30 x 60	13	3/4 mile
C	48 x 96	15	1 mile

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS



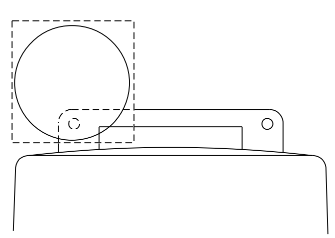
Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

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



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

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

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

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

SHEET 7 OF 12

Texas Department of Transportation

Traffic Operations Division Standard

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

BC(7)-14

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

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

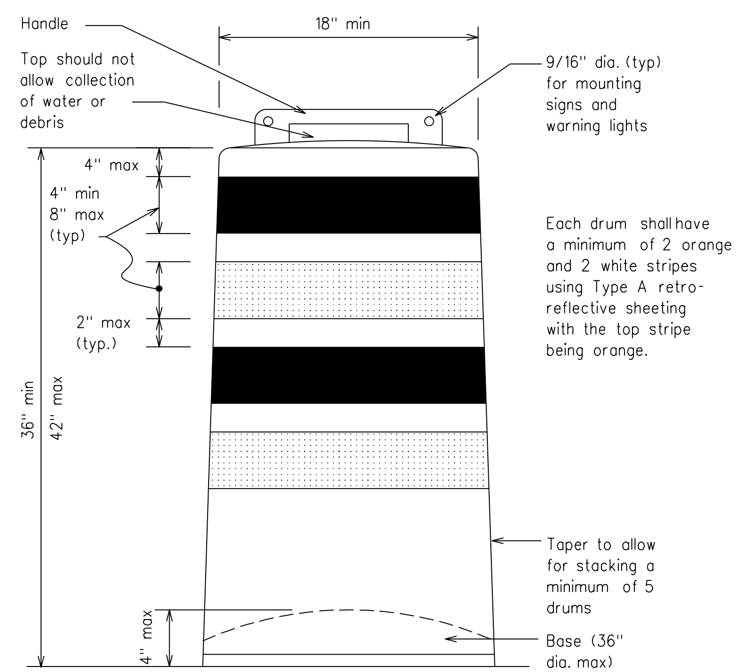
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

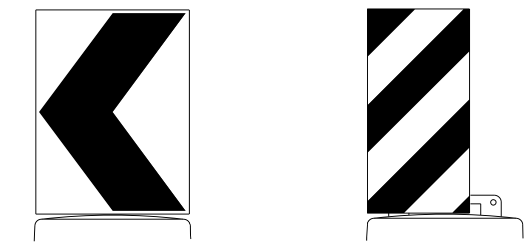
RETROREFLECTIVE SHEETING

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

BALLAST

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

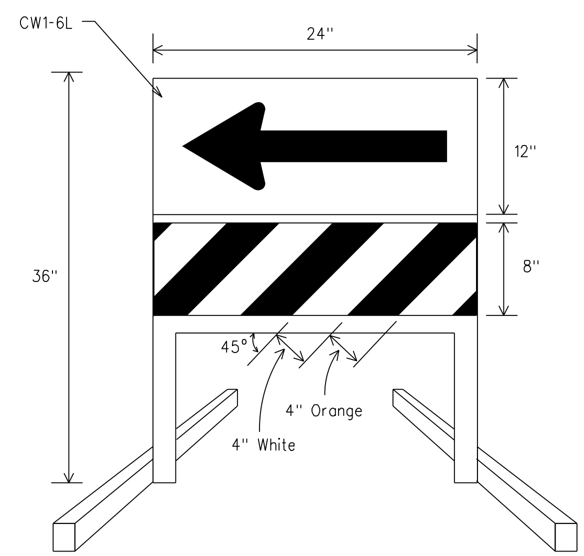




Plywood, Aluminum or Metal sign substrates shall NOT be used on plastic drums

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

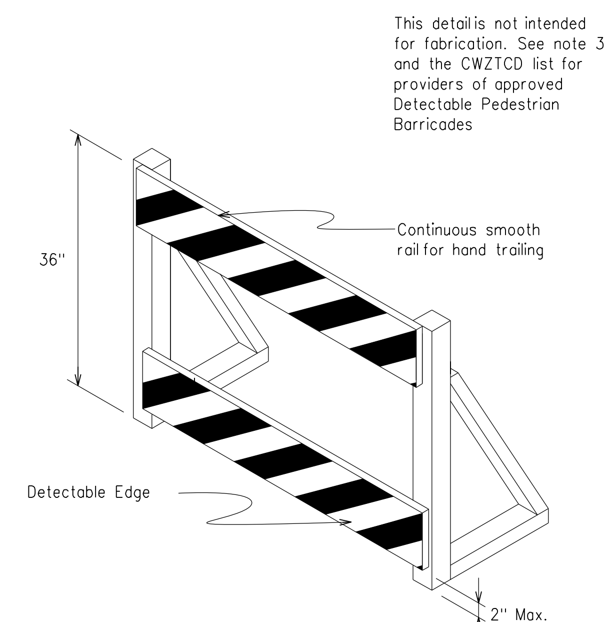
1. Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
2. Chevrons and other work zone signs with an orange background shall be manufactured with Type B$_{FL}$ or Type C$_{FL}$ Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign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



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 B$_{FL}$ or Type C$_{FL}$ Orange retroreflective sheeting above a rail with Type A retroreflective sheeting in alternating 4" white and orange stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. Sheeting types shall be as per DMS 8300.
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.

This detail is not intended for fabrication. See note 3 and the CWZTCD list for providers of approved Detectable Pedestrian Barricades



DETECTABLE PEDESTRIAN BARRICADES

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

SHEET 8 OF 12

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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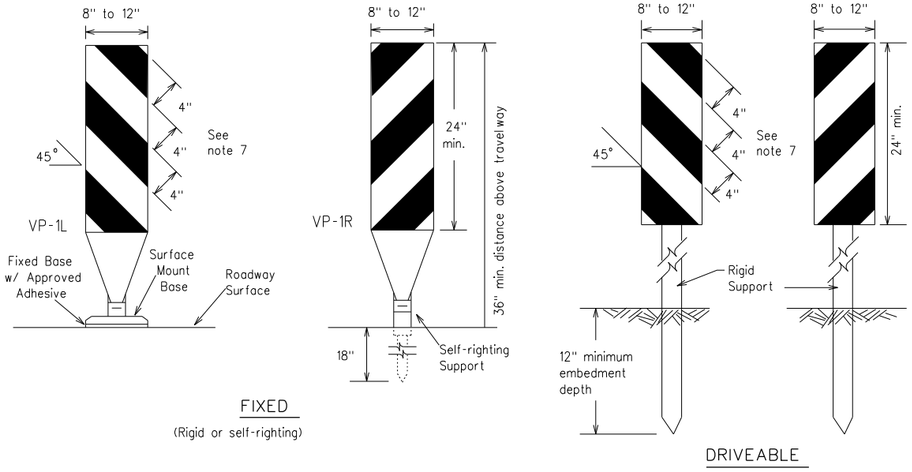
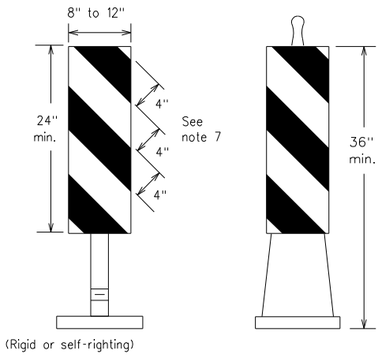


FIXED

(Rigid or self-righting)

DRIVEABLE

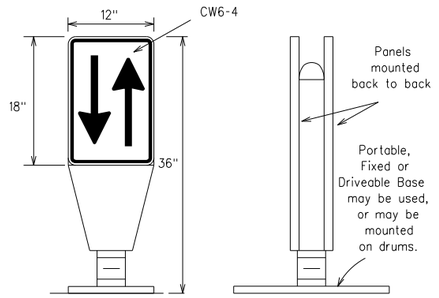


(Rigid or self-righting)

PORTABLE

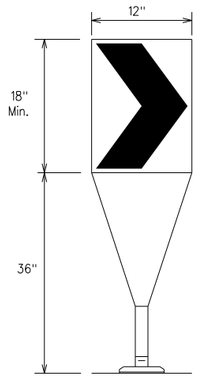
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is 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, may have more than 270 square inches of retroreflective area facing traffic.
5. Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
6. Sheeting for the VP's shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
7. Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.

VERTICAL PANELS (VPs)



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

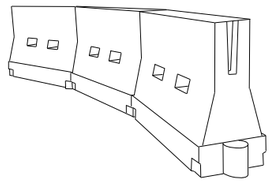
OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



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

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

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate 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 a point outside the clear zone.

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

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

GENERAL NOTES

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-14

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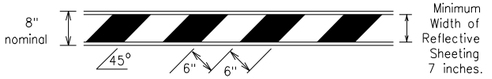
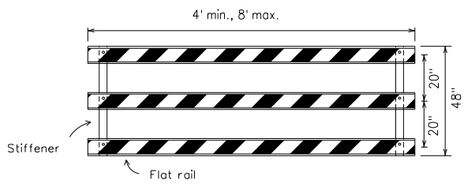
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



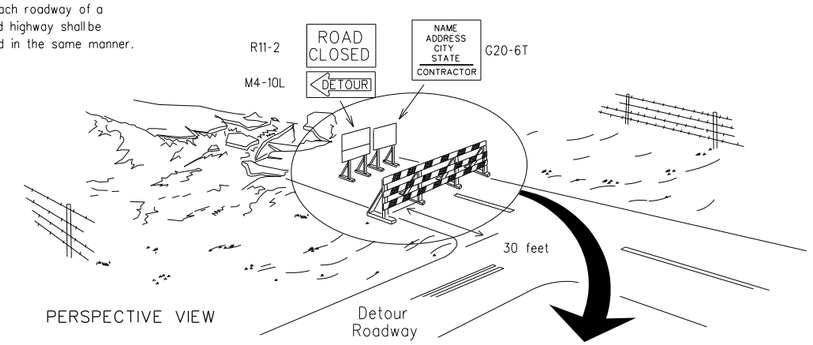
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

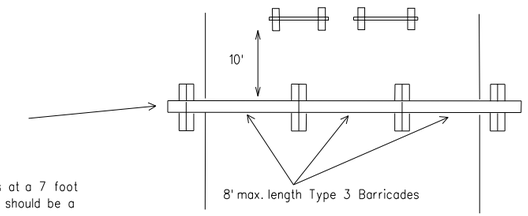
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.

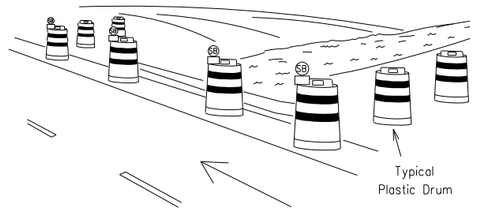
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

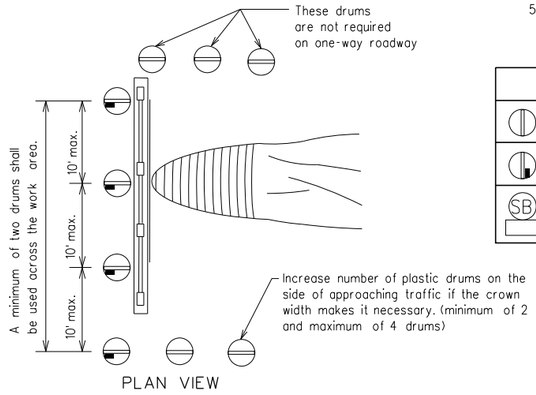
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

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

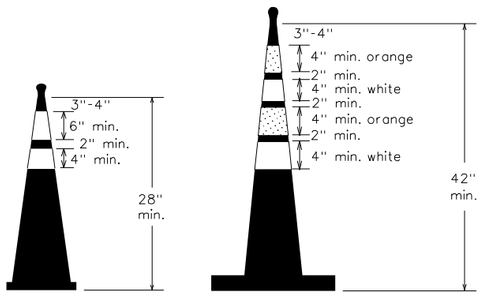


PLAN VIEW

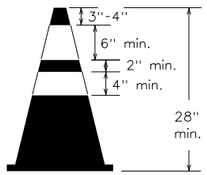
LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

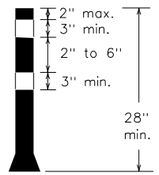
CONES



Two-Piece cones



One-Piece cones

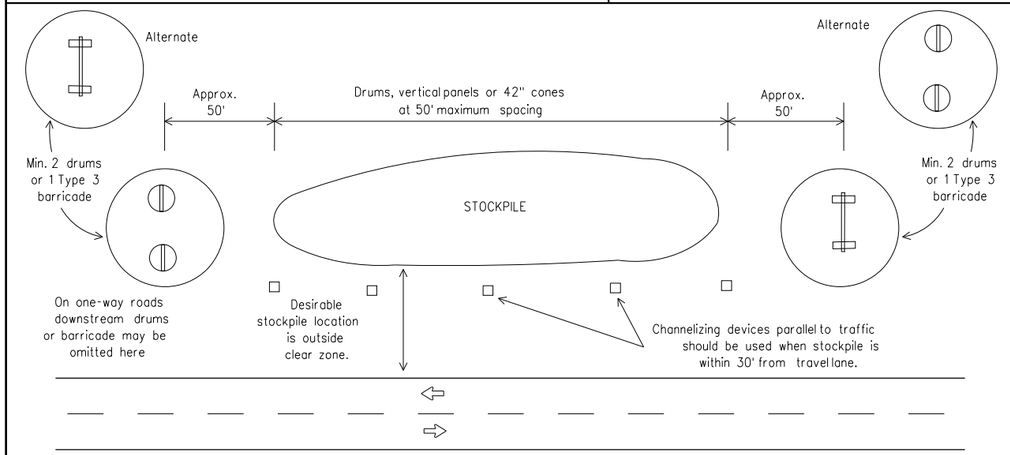


Tubular Marker

28" Cones shall have a minimum weight of 9 1/2 lbs.

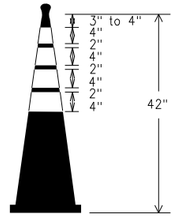
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

THIS DEVICE SHALL NOT BE USED ON PROJECTS LET AFTER MARCH 2014.



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 A conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
4. The base must weigh a minimum of 30 lbs.

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-14

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

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Project: Phase 1
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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

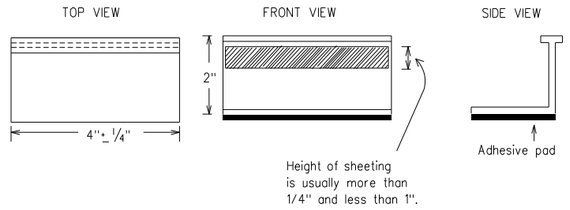
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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1-02 7-13				
11-02 8-14				

105

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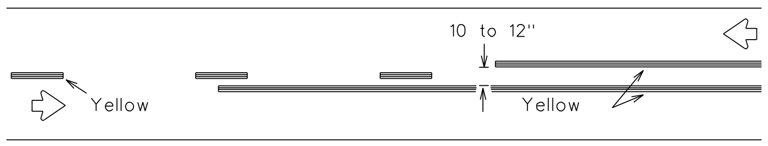
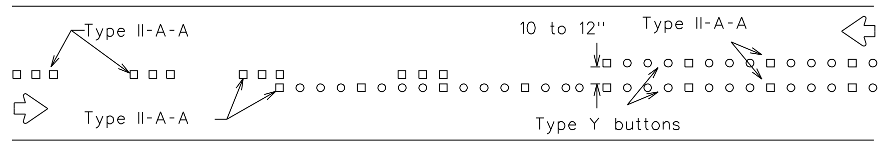
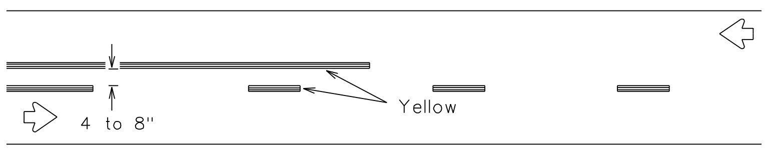
PAVEMENT MARKING PATTERNS



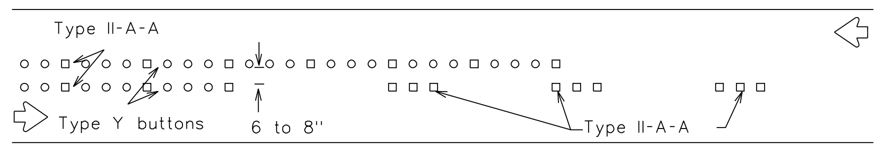
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



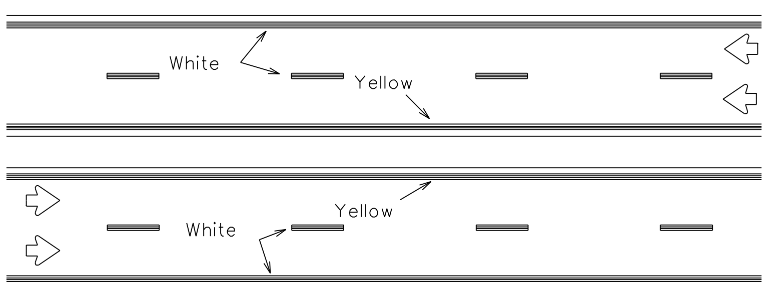
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



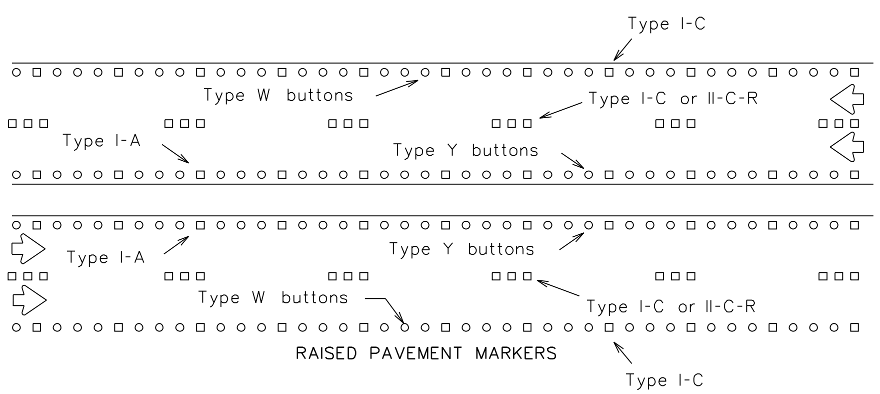
RAISED PAVEMENT MARKERS - PATTERN B

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

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



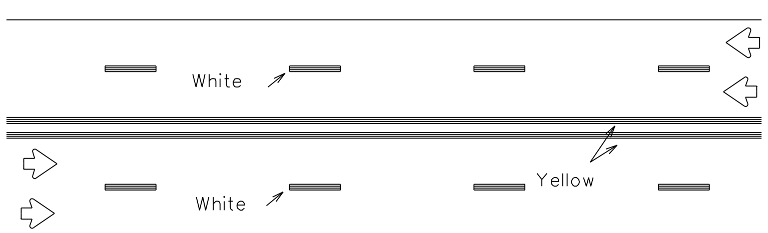
REFLECTORIZED PAVEMENT MARKINGS



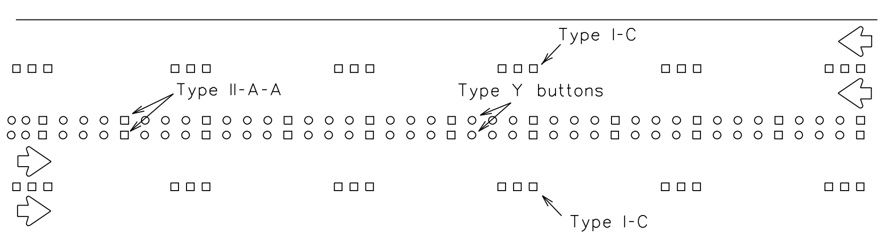
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



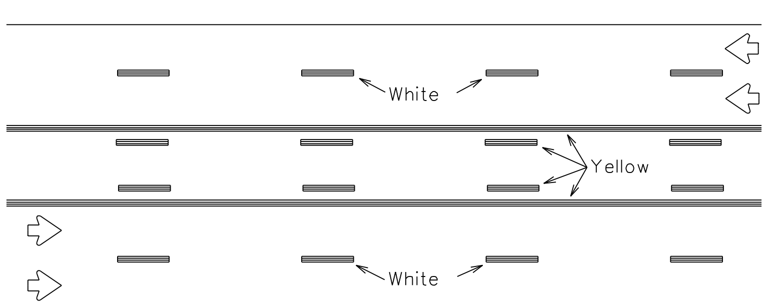
REFLECTORIZED PAVEMENT MARKINGS



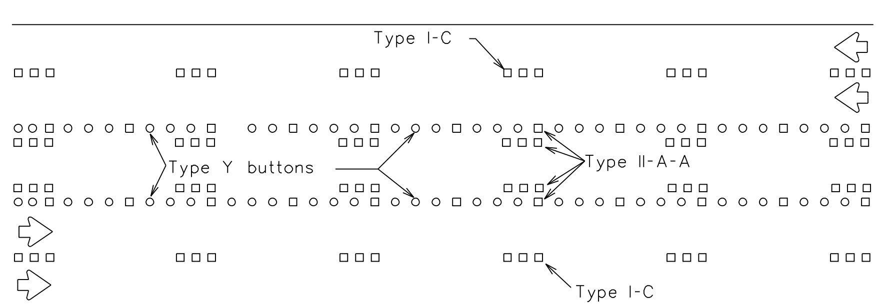
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

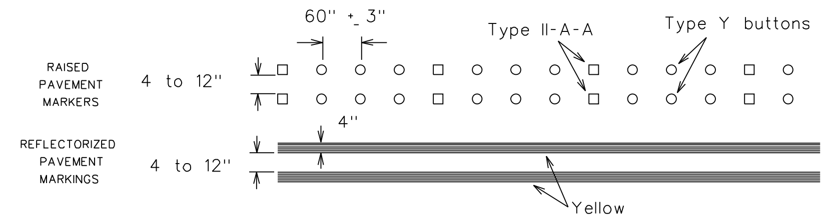
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

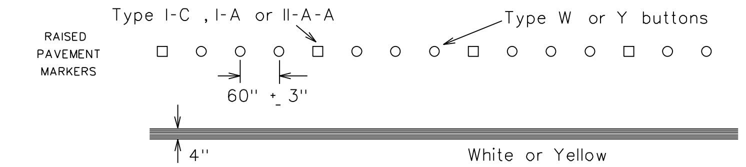
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

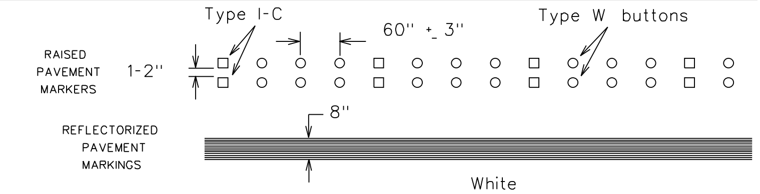


EDGE LINE OR SINGLE NO-PASSING LINE



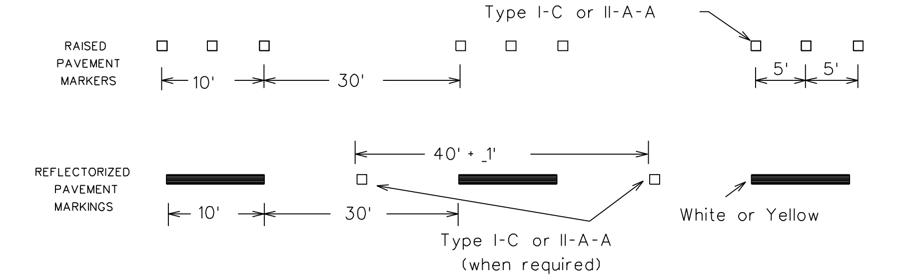
WIDE LINE

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

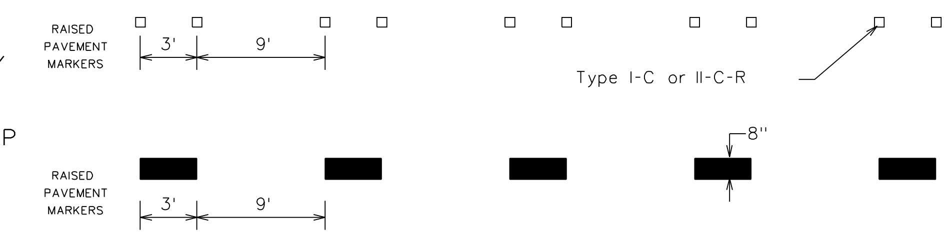


BROKEN LINES

CENTER LINE OR LANE LINE

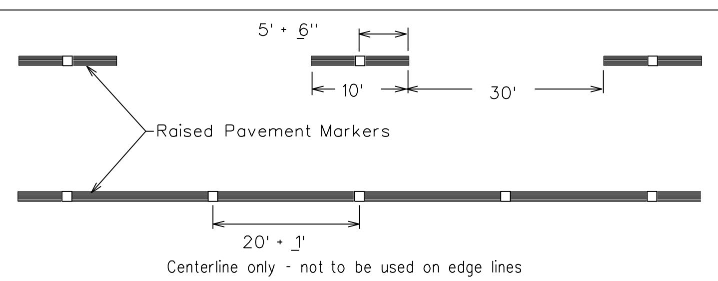


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



SHEET 12 OF 12

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-14

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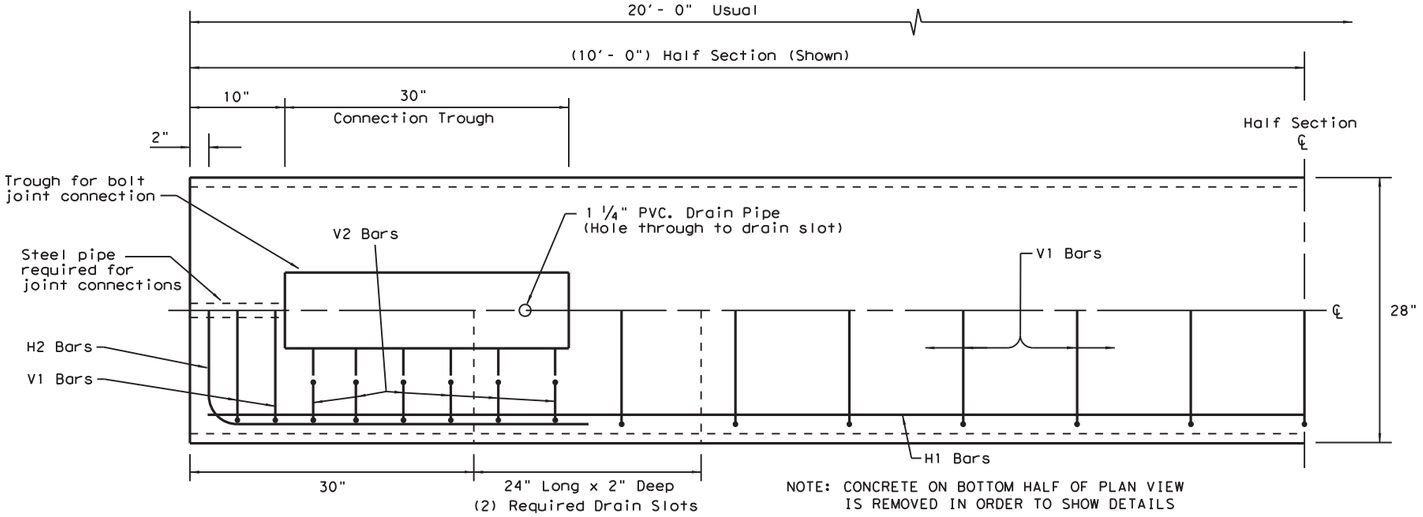
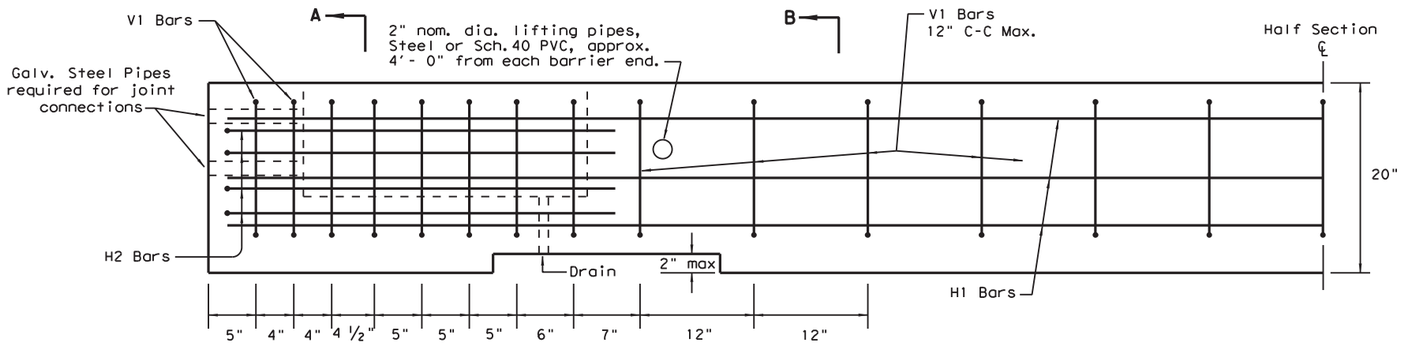
				106

DATE:
FILE:

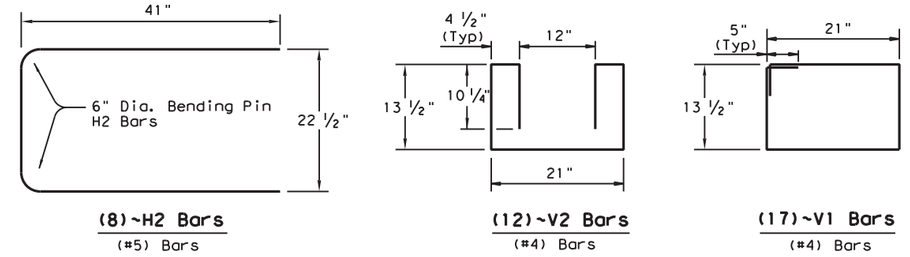


NOTE: CONCRETE ON BOTTOM HALF OF PLAN VIEW IS REMOVED IN ORDER TO SHOW DETAILS

PLAN
(TYPE 1) BARRIER SEGMENT
(SYMMETRICAL ABOUT CENTER LINES)



ELEVATION
(TYPE 1) BARRIER SEGMENT
(SYMMETRICAL ABOUT CENTER LINES)



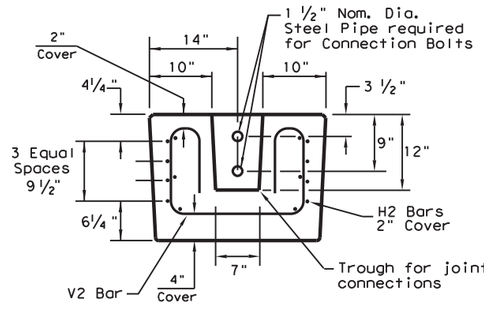
(8)~H2 Bars (#5) Bars

(12)~V2 Bars (#4) Bars

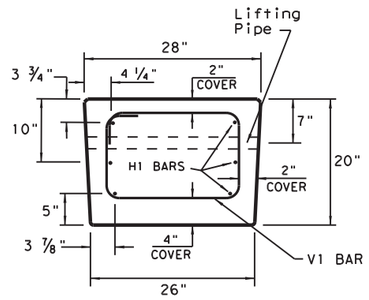
(17)~V1 Bars (#4) Bars

REINFORCING STEEL DETAILS
TYPE 1 - BARRIER SEGMENT

Note: Use 2" Dia. Bending Pin, unless otherwise shown



SECTION A-A



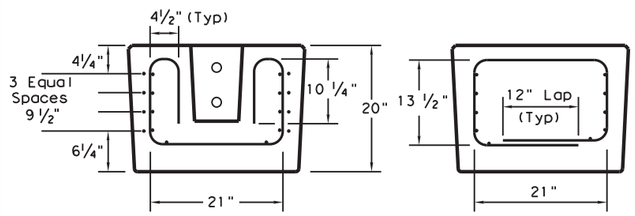
SECTION B-B

GENERAL NOTES

1. Low Profile Concrete Barrier (LPCB), is approved for use in temporary work zone locations, where the posted speed is 45 mph, or less.
2. Concrete shall be Class H for precast barrier with a minimum compressive strength of 3,600 psi.
3. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
4. Precast LPCB barrier length shall be 20 ft.
5. All barrier edges shall have ¾" chamfer or a tooled radius.
6. Joint connection hardware shall be in accordance with Item 449, "Anchor Bolts." and is considered subsidiary.
7. Steel pipe required for joint connection bolts shall be galvanized in accordance with Item 445,"Galvanizing."
8. Welded wire reinforcement (WWR) may be used in lieu of conventional reinforcement for Type 1 barrier, and shall meet the requirements shown.

FOR CONTRACTORS INFORMATION ONLY

(TYPE 1) APPROX. QUANTITIES 20 FT. SECTION		
CONCRETE	CY	2.6
REINFORCING STEEL	LBS	330
TOTAL BARRIER WT.	LBS	11000



SECTION A-A SECTION B-B

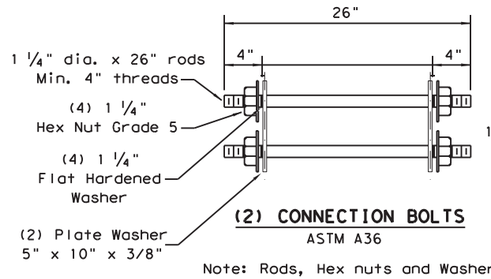
(WWR) GENERAL NOTES

1. Deformed Welded Wire Reinforcement shall conform to ASTM A497.
2. Welded wire cage may be cut or bent, if necessary, but must be approved by the Engineer.
3. Combinations of reinforcing steel and WWR are permitted, as directed by the Engineer. The dimensions from the end of the barrier section to the first wire shall not exceed 3".

REQUIRED (WWR) WIRE DESIGN

8 ~ (D31) Horizontal Wires (Equally spaced)
10 ~ (D20) Horizontal Wires (Equally spaced)
29 ~ (D20) Vertical Wires (Spaced as shown in Elevation View)

WELDED WIRE REINFORCEMENT (WWR)- OPTIONAL REINFORCING



(2) CONNECTION BOLTS
ASTM A36

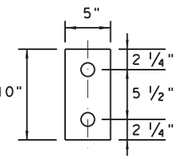


PLATE WASHER
5" x 10" x ⅜"

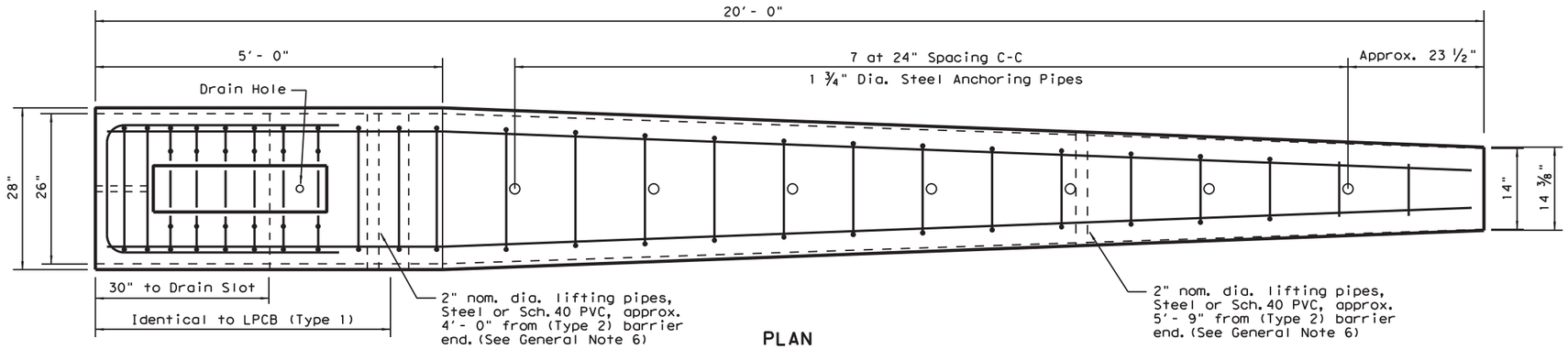
Note: Rods, Hex nuts and Washers shall be Galvanized.

SHEET 1 OF 2

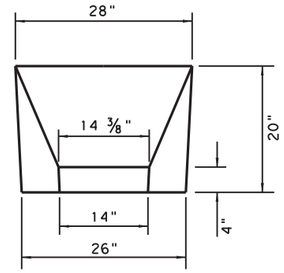
Texas Department of Transportation — Design Division Standard

LOW PROFILE CONCRETE BARRIER
PRECAST BARRIER (TYPE 1)
LPCB-13

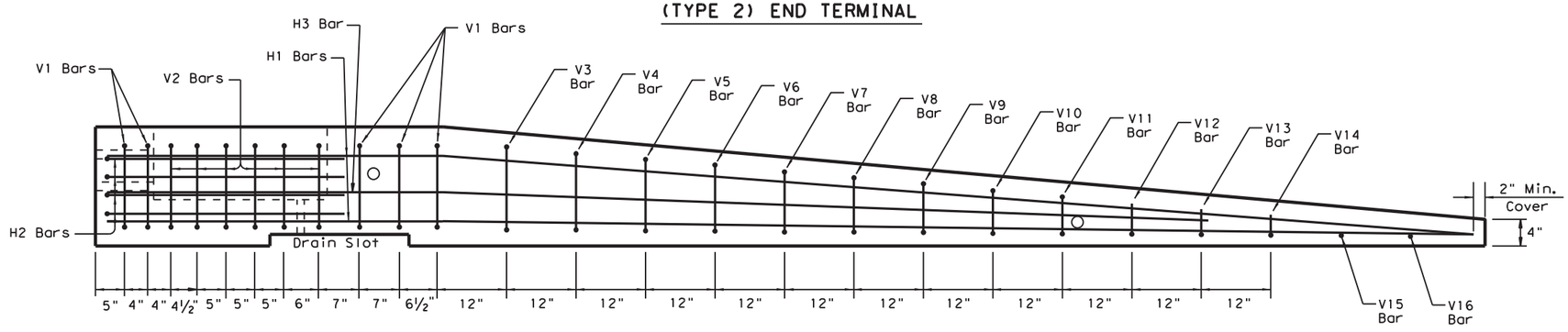
FILE: lpcb13.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.



PLAN
(TYPE 2) END TERMINAL



APPROACH VIEW

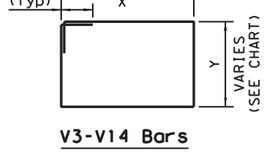


ELEVATION
(TYPE 2) END TERMINAL

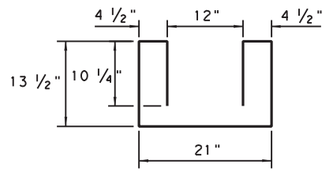
Note:
Anchoring pipes not shown in Elevation View

TYPE 2 - NOTES

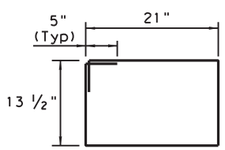
1. Welded wire reinforcment (WWR) is "not" an option for Type 2 Barrier.
2. Type 2 Barrier shall be used as an end treatment for the Type 1 barrier segments, when applicable.
3. The end treatment can be used without the anchor pins in locations that can accommodate approximately 4 ft. of lateral displacement of the end treatment. The use of non-pinned end treatment does not affect the performance or the deflection of the Low-Profile barrier system.
4. The anchor pins are all the same length and are to be driven flush with the top of the (Type 2) barrier surface.
5. The bends in the H3 and H1 bars are slight, no formal bend is necessary.
6. The Type 2 barrier segment must be lifted from the rear first, to prevent cracking of sloped section.
7. See LPCB sheet 1 for additional information.



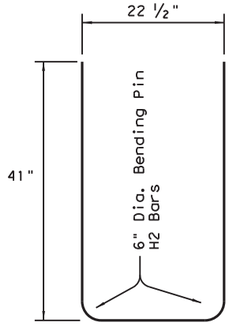
V3-V14 Bars



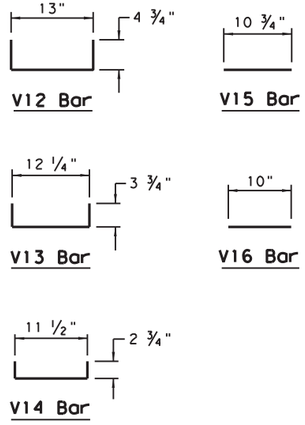
(6)~V2 Bars



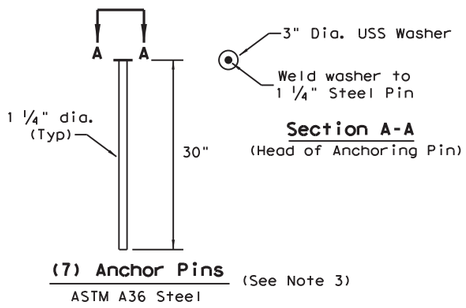
(5)~V1 Bars



(4)~H2 Bars
(#5) Bars

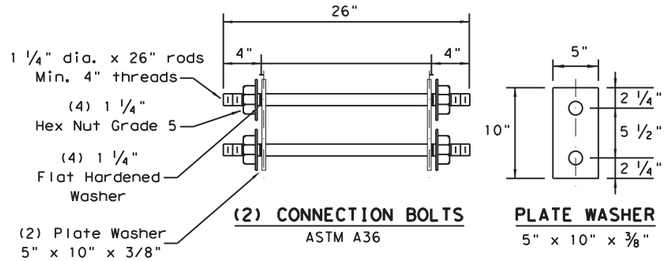


Note: All V Bars are (#4)



Section A-A
(Head of Anchoring Pin)

(7) Anchor Pins
ASTM A36 Steel
(See Note 3)



(2) CONNECTION BOLTS
ASTM A36

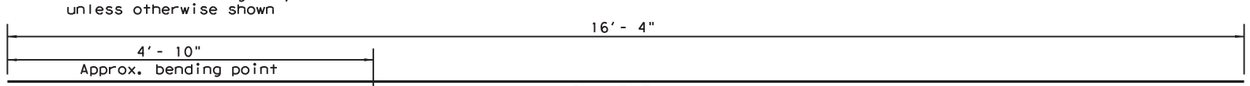
PLATE WASHER
5" x 10" x ⅜"

Note: Rods, Hex nuts and Washers shall be Galvanized.

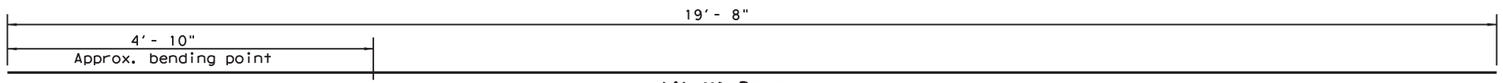
BAR(#4)	X (IN.)	Y (IN.)
V3 BAR	20 ¼	14 ½
V4 BAR	19 ½	13 ½
V5 BAR	18 ½	12 ¼
V6 BAR	17 ½	11 ¼
V7 BAR	17	10 ¼
V8 BAR	16 ¼	9
V9 BAR	15 ½	8
V10 BAR	14 ½	7
V11 BAR	13 ¾	6

REINFORCING STEEL DETAILS
TYPE 2 - END TERMINAL

Note: Use 2" Dia. Bending Pin, unless otherwise shown



(2)~H3 Bars
(#5) Bar



Note: Bends on H1 and H3 bars are slight and do not require formal bends.

(4)~H1 Bars
(#5) Bar

FOR CONTRACTORS INFORMATION ONLY

(TYPE 2) APPROX. QUANTITIES 20 FT. SECTION		
CONCRETE	CY	1.65
REINFORCING STEEL	LBS	240
TOTAL BARRIER WT.	LBS	7000

SHEET 2 OF 2

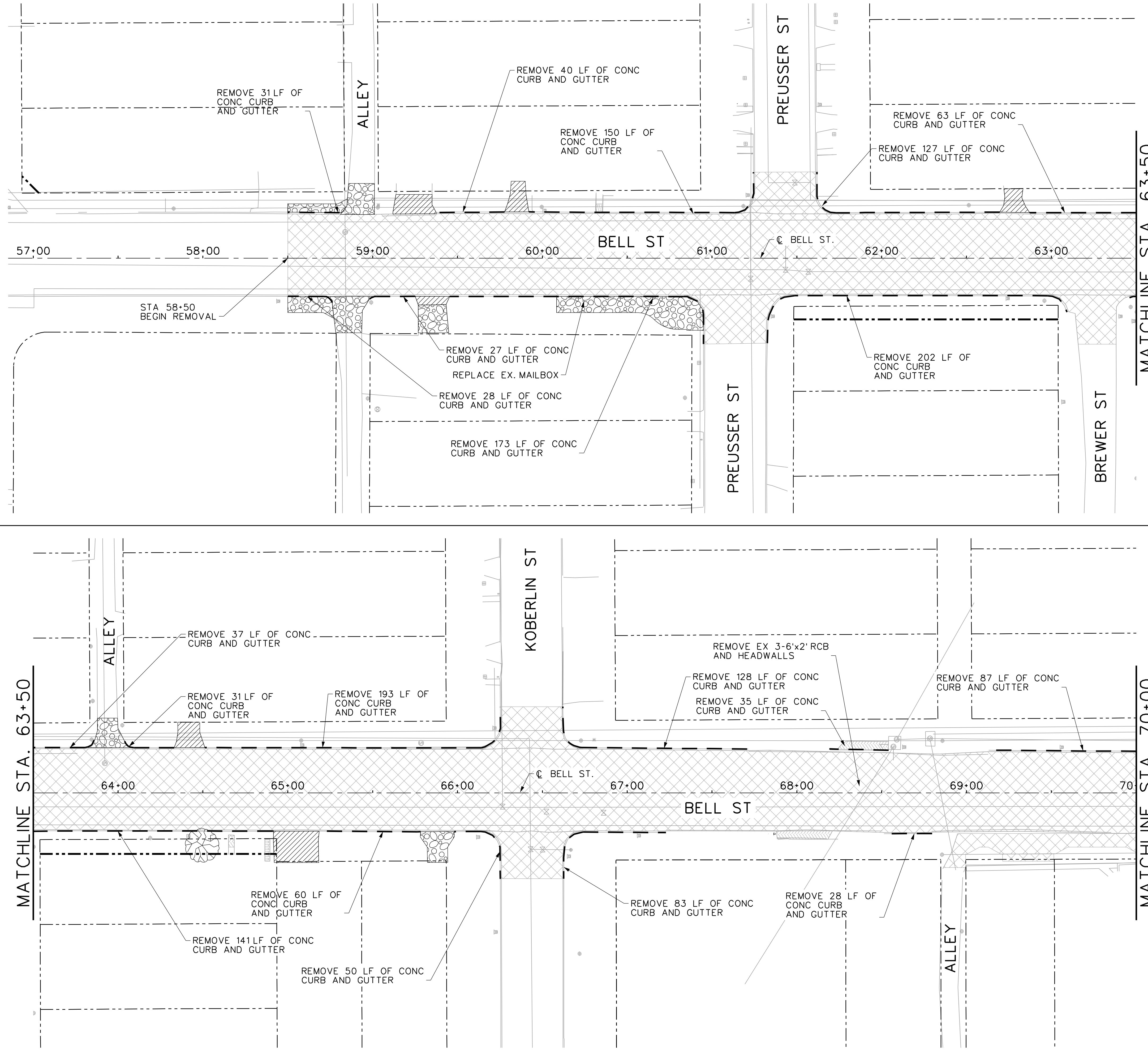
Texas Department of Transportation

Design Division Standard

LOW PROFILE CONCRETE BARRIER
PRECAST BARRIER (TYPE 2)
LPCB-13

FILE: lpcb13.dgn	DN: TxDOT	CK: AM	DW: VP	CK:
©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.

DATE:
FILE:



NOTES BY SYMBOL

- REMOVE ASPHALT (PAV)
- REMOVE CONC (DRIVEWAY)
- REMOVE CONC (SIDEWALK)
- REMOVE GRAVEL
- REMOVE CONC (CURB AND GUTTER)

N

0 10' 20' 30' 60'
SCALE IN FEET

100% SUBMITTAL

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

STATE OF TEXAS
WAYNE P. HARTT
118231
LICENSED PROFESSIONAL ENGINEER
10/23/2017

FREESE NICHOLS
4055 International Plaza, Suite 200
Fort Worth, Texas 76109-4895
Phone - (817) 735-7300
Fax - (817) 735-7491
Web - www.freese.com

CITY OF SAN ANGELO, TEXAS
PHASE III
BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS
ROADWAY IMPROVEMENTS

BELL STREET REMOVAL PLAN STA. 63+50 TO STA. 70+00

NO.	ISSUES	BY	DATE

F&N JOB NO. SAN16188
DATE 08/2017
DESIGNED JWP
DRAWN EB
REVISED
CHECKED WH
FILE NAME ph2-trt-pl-demo01.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
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SHEET RP-01
SEQ. 34

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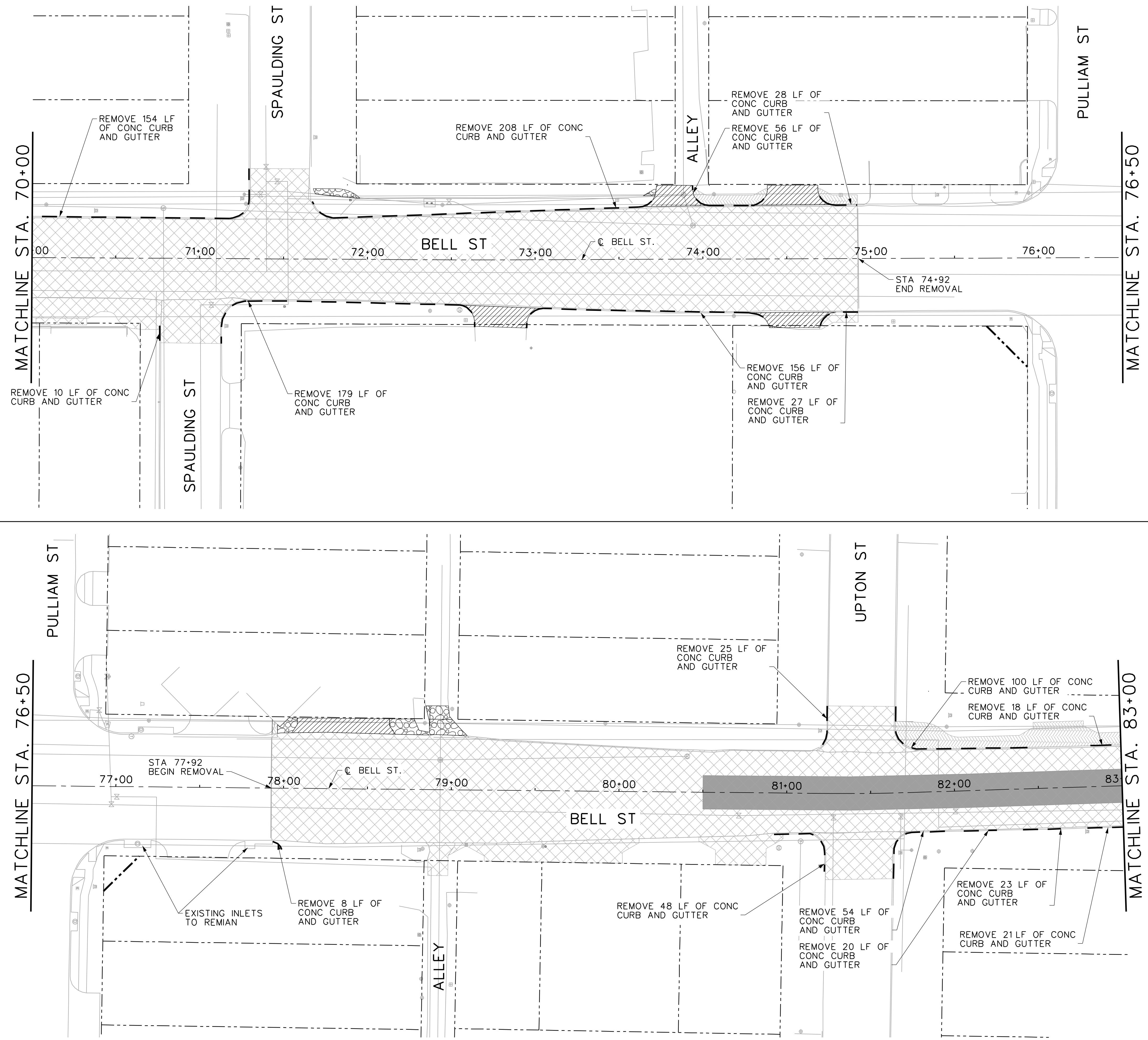

NOTES BY SYMBOL

- REMOVE ASPHALT (PAV)
- REMOVE CONC (DRIVEWAY)
- REMOVE CONC (SIDEWALK)
- REMOVE GRAVEL
- REMOVE CONC (CURB AND GUTTER)
- REMOVE EXISTING CONCRETE PAVEMENT (6"-8") UNDER EXISTING ASHALT PAVEMENT

N

0 10' 20' 30' 60'
SCALE IN FEET

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WAYNE P. HARTT
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LICENSED PROFESSIONAL ENGINEER
10/23/2017

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CITY OF SAN ANGELO, TEXAS
PHASE III
BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS

ROADWAY IMPROVEMENTS
BELL STREET REMOVAL PLAN
STA. 70+00 TO STA. 83+00

F&N JOB NO.	SAN16188
DATE	08/2017
DESIGNED	JWP
DRAWN	EB
REVISED	
CHECKED	WH
FILE NAME	ph2-trt-pl-demo02.dgn

NO.	ISSUES	BY	DATE

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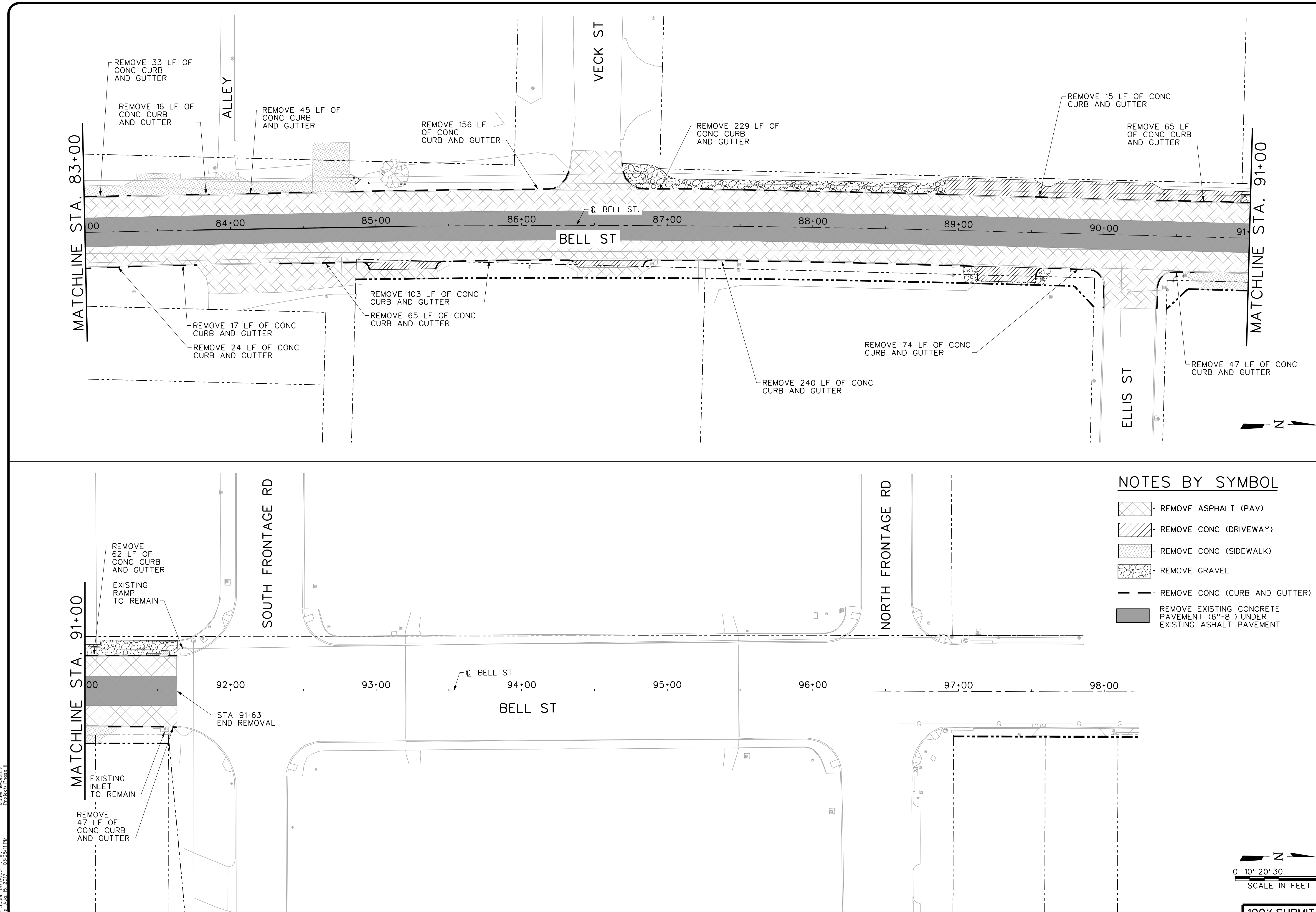
SEQ. 35

100% SUBMITTAL



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CITY OF SAN ANGELO, TEXAS
PHASE III
BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS

ROADWAY IMPROVEMENTS
BELL STREET REMOVAL PLAN
STA. 83+00 TO END

F&N JOB NO.	SAN16188
DATE	08/2017
DESIGNED	JWP
DRAWN	EB
REVISED	
CHECKED	WH
FILE NAME	ph2-trt-pl-demo03.dgn

NO.	ISSUES	BY	DATE

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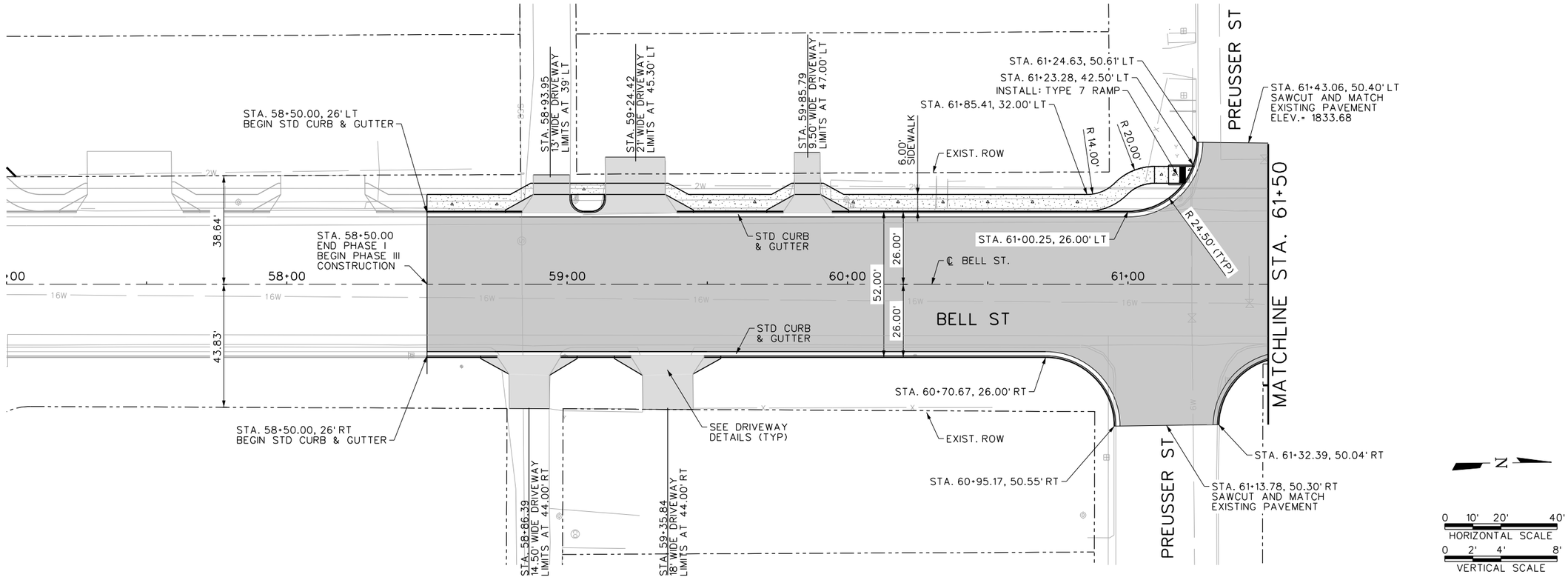
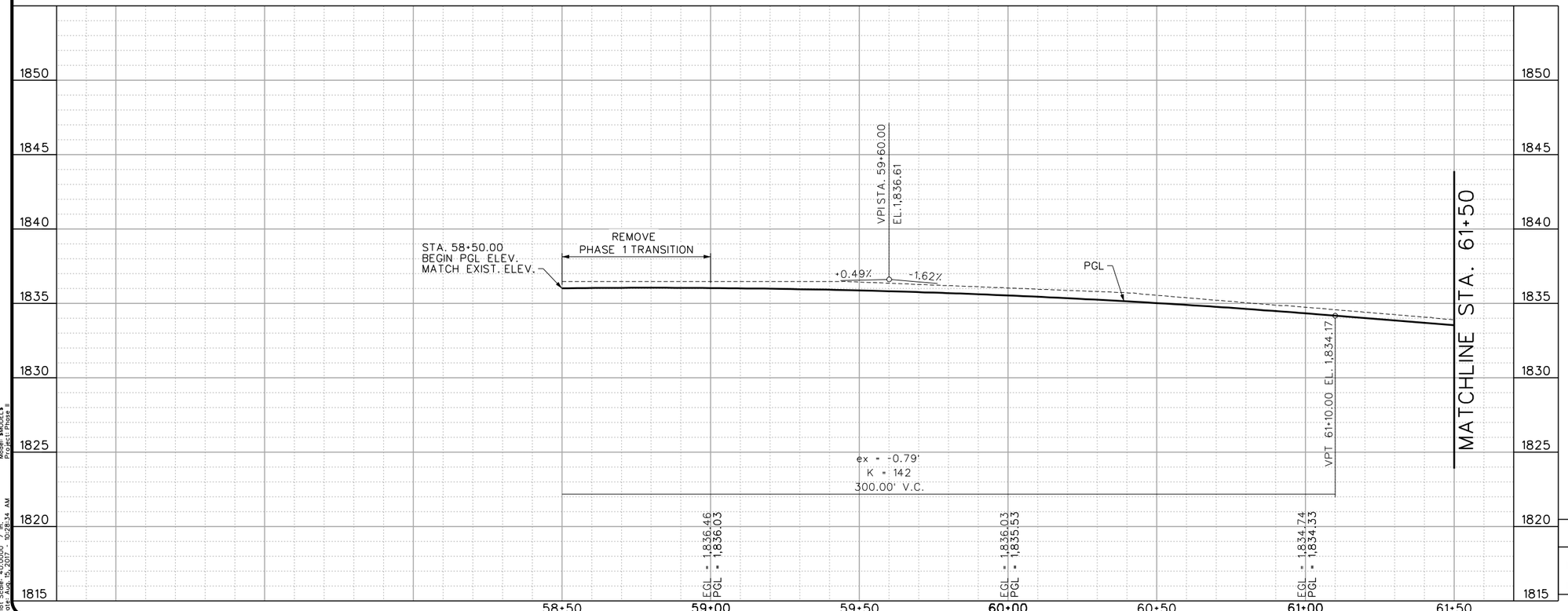
SEQ. 36





NOTE:

1. ALL DRIVEWAYS ARE 5' RADIUS UNLESS OTHERWISE NOTED.
2. ALL SIDEWALKS ARE 6' WIDE UNLESS OTHERWISE NOTED.
3. WIDTH DIMENSION AT DRIVEWAY IS TAKEN AT END OF DRIVEWAY CURB RETURN AT BACK OF CURB.
4. ALL STREET INTERSECTION CURB RETURNS ARE 24.50' RADIUS UNLESS OTHERWISE NOTED.
5. ALL DIMENSIONS ARE GIVEN TO BACK OF CURB UNLESS NOTED OTHERWISE.

LEGEND

- PROPOSED ROADWAY PAVEMENT
- 6" PROPOSED CONCRETE DRIVEWAY
- 4" PROPOSED CONCRETE SIDEWALK

PROFILE LEGEND

EXISTING GRADE @ ℄ ----------

PGL ——————

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CITY OF SAN ANGELO, TEXAS

PHASE III

BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS

ROADWAY IMPROVEMENTS

PLAN AND PROFILE
BEGIN TO STA. 61+50

F&N JOB NO. SAN16188	BY	DATE	NO. ISSUES
DATE 08/2017			
DESIGNED JWP			
DRAWN EB			
REVISED			
CHECKED WH			
FILE NAME ph2-trt-pp-road01.dgn			

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

0 1"

SHEET PP-01

SEQ. 37

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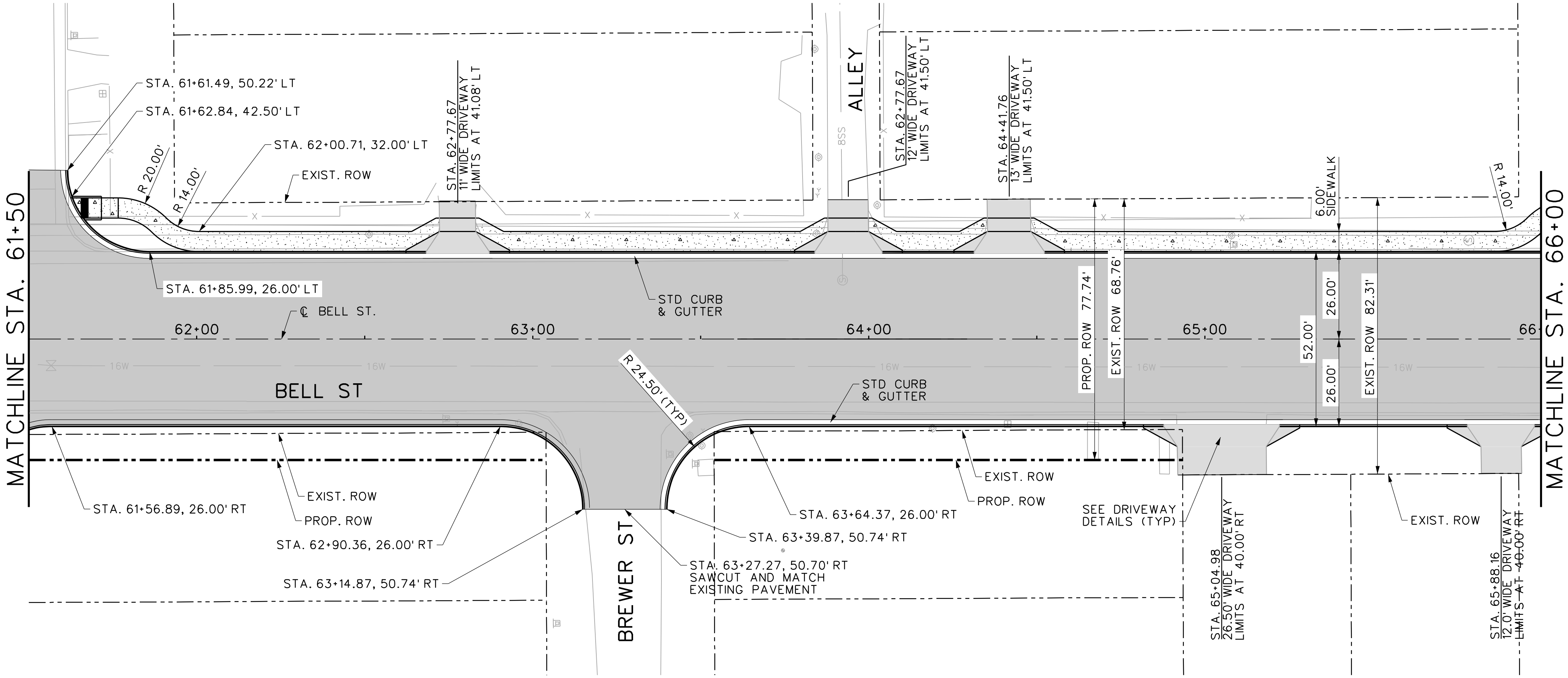

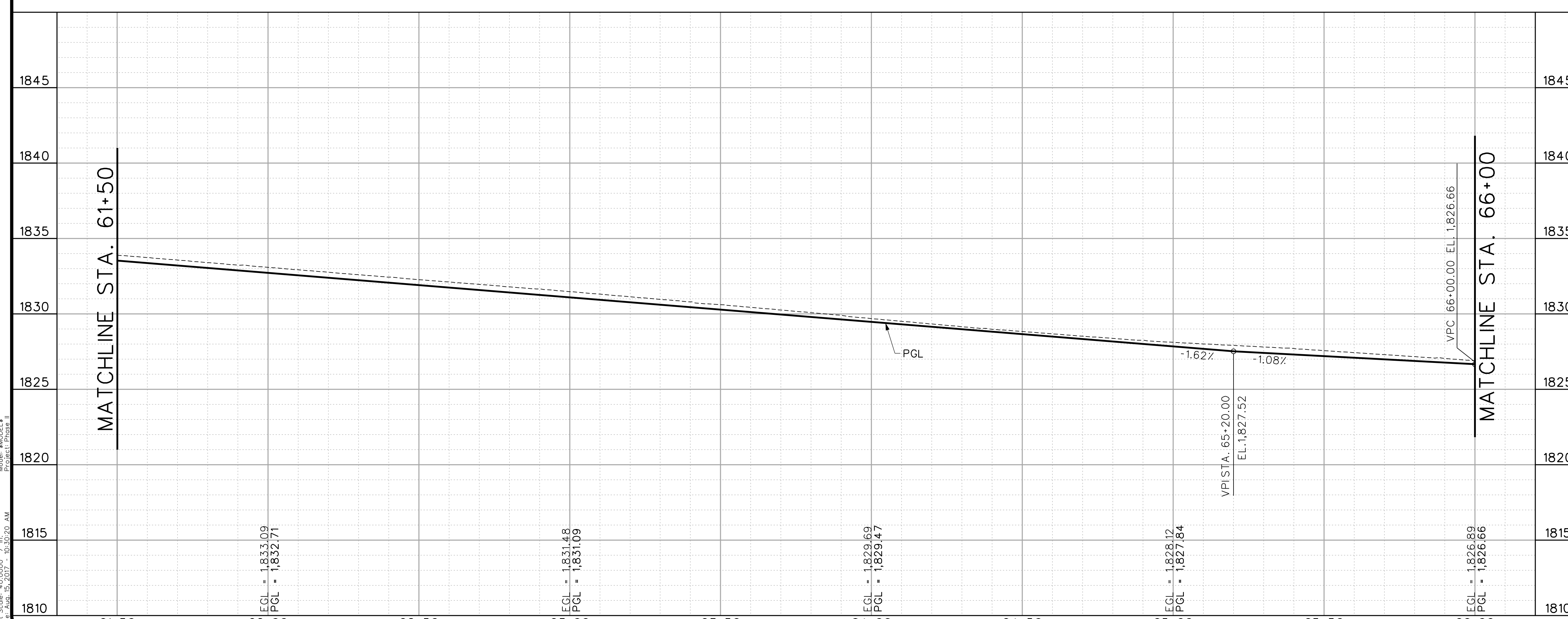

NOTE:

1. ALL DRIVEWAYS ARE 5' RADIUS UNLESS OTHERWISE NOTED.
2. ALL SIDEWALKS ARE 6' WIDE UNLESS OTHERWISE NOTED.
3. WIDTH DIMENSION AT DRIVEWAY IS TAKEN AT END OF DRIVEWAY CURB RETURN AT BACK OF CURB.
4. ALL STREET INTERSECTION CURB RETURNS ARE 24.50' RADIUS UNLESS OTHERWISE NOTED.
5. ALL DIMENSIONS ARE GIVEN TO BACK OF CURB UNLESS NOTED OTHERWISE.

LEGEND

- PROPOSED ROADWAY PAVEMENT
- 6" PROPOSED CONCRETE DRIVEWAY
- 4" PROPOSED CONCRETE SIDEWALK

PROFILE LEGEND

- EXISTING GRADE @ ℄
- PGL

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CITY OF SAN ANGELO, TEXAS
PHASE III
BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS
ROADWAY IMPROVEMENTS
PLAN AND PROFILE
STA. 61+50 TO STA. 66+00

F&N JOB NO.	SAN16188
DATE	08/2017
DESIGNED	JWP
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NO.	ISSUES	BY	DATE

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SHEET PP-02
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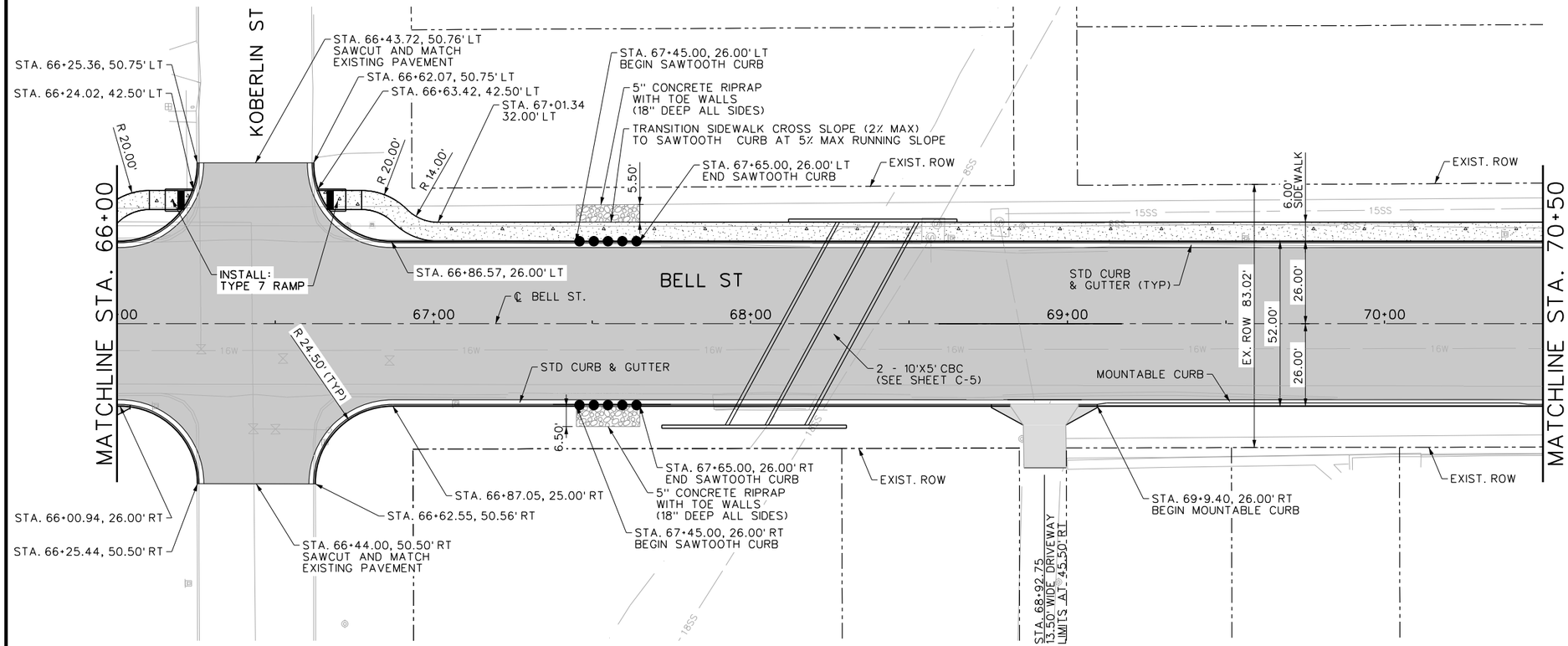

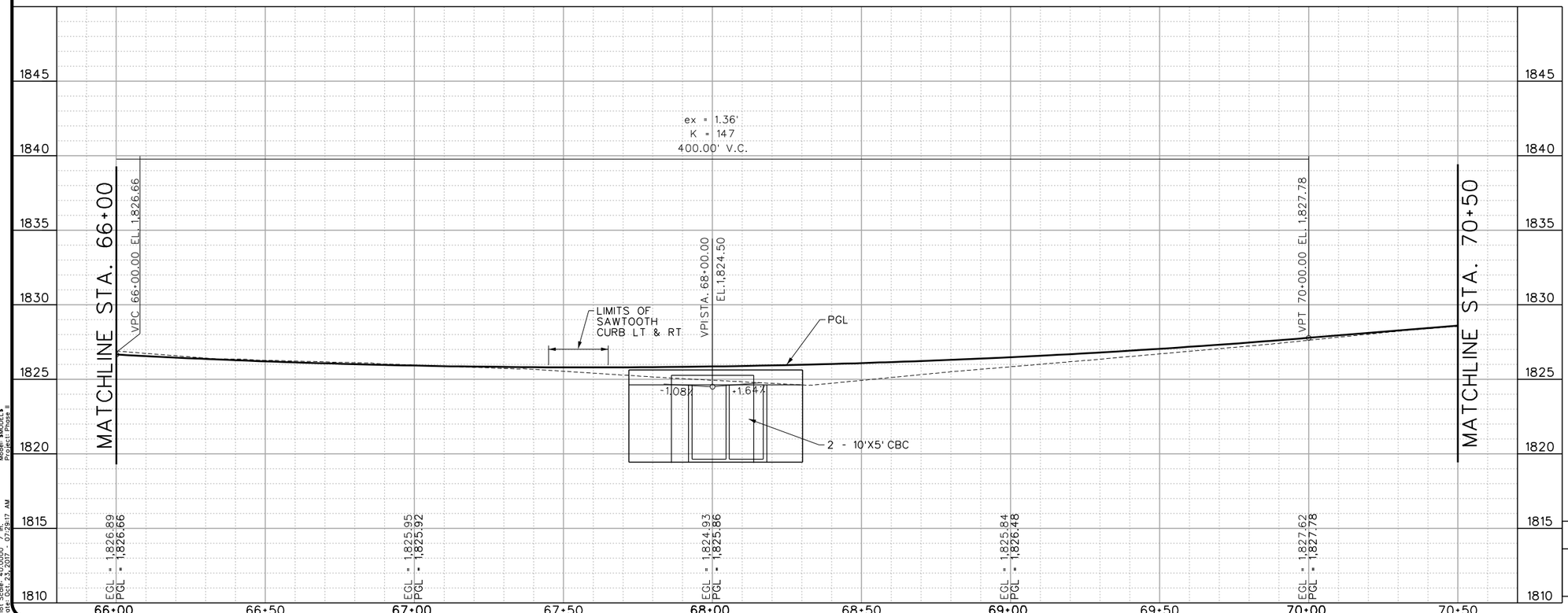

NOTE:

1. ALL DRIVEWAYS ARE 5' RADIUS UNLESS OTHERWISE NOTED.
2. ALL SIDEWALKS ARE 6' WIDE UNLESS OTHERWISE NOTED.
3. WIDTH DIMENSION AT DRIVEWAY IS TAKEN AT END OF DRIVEWAY CURB RETURN AT BACK OF CURB.
4. ALL STREET INTERSECTION CURB RETURNS ARE 24.50' RADIUS UNLESS OTHERWISE NOTED.
5. ALL DIMENSIONS ARE GIVEN TO BACK OF CURB UNLESS NOTED OTHERWISE.

LEGEND

- PROPOSED ROADWAY PAVEMENT
- 6" PROPOSED CONCRETE DRIVEWAY
- 4" PROPOSED CONCRETE SIDEWALK

PROFILE LEGEND

EXISTING GRADE @ ℄ ----------

PGL ——————

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TEXAS REGISTERED ENGINEERING FIRM F-2144

STATE OF TEXAS — REGISTERED — 118231 — LICENSED — PROFESSIONAL ENGINEER — Jeffrey W. Hibbard

10/23/2017

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CITY OF SAN ANGELO, TEXAS

PHASE III

BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS

ROADWAY IMPROVEMENTS

PLAN AND PROFILE

STA. 66+00 TO STA. 70+50

NO.	ISSUES	BY	DATE

F&N JOB NO. SAN16188
DATE 10/2017
DESIGNED JWP
DRAWN EB
REVISED
CHECKED WH
FILE NAME ph2-trt-pp-road03.dgn

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SHEET PP-03

SEQ. 39

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Project: Phase II

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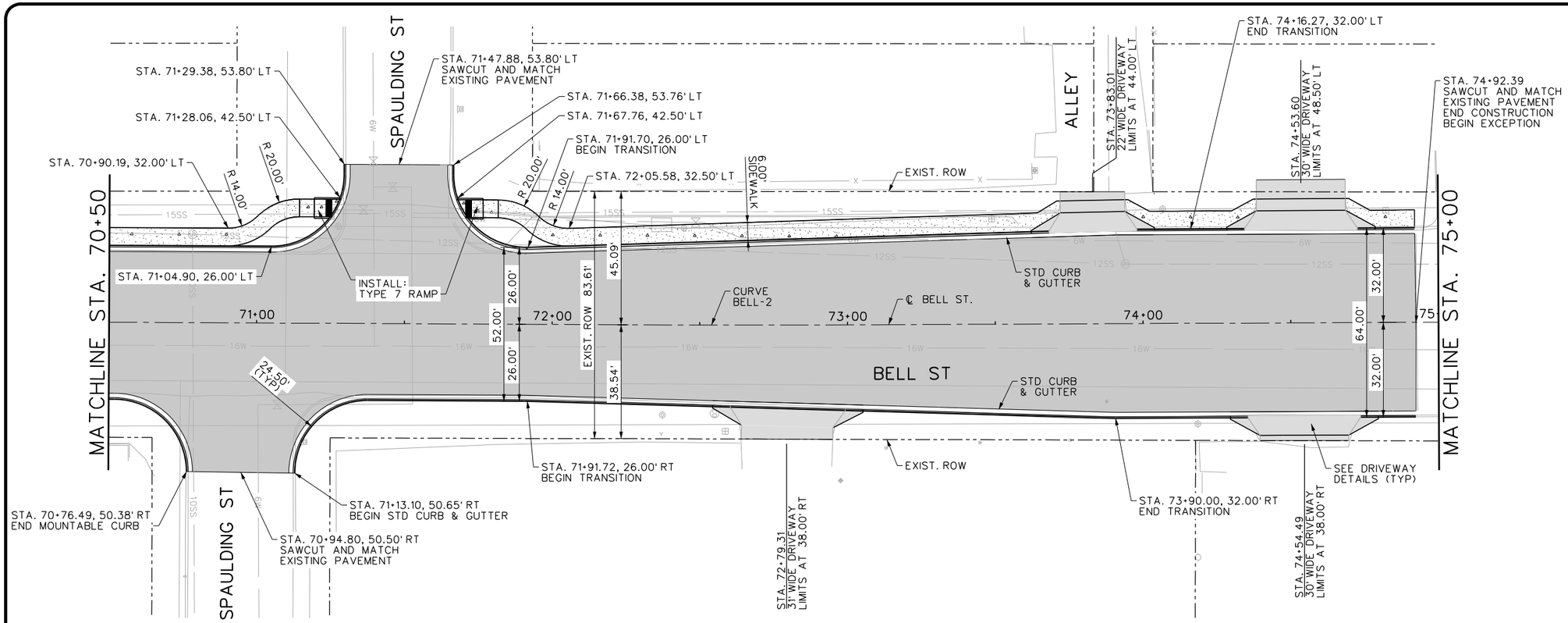


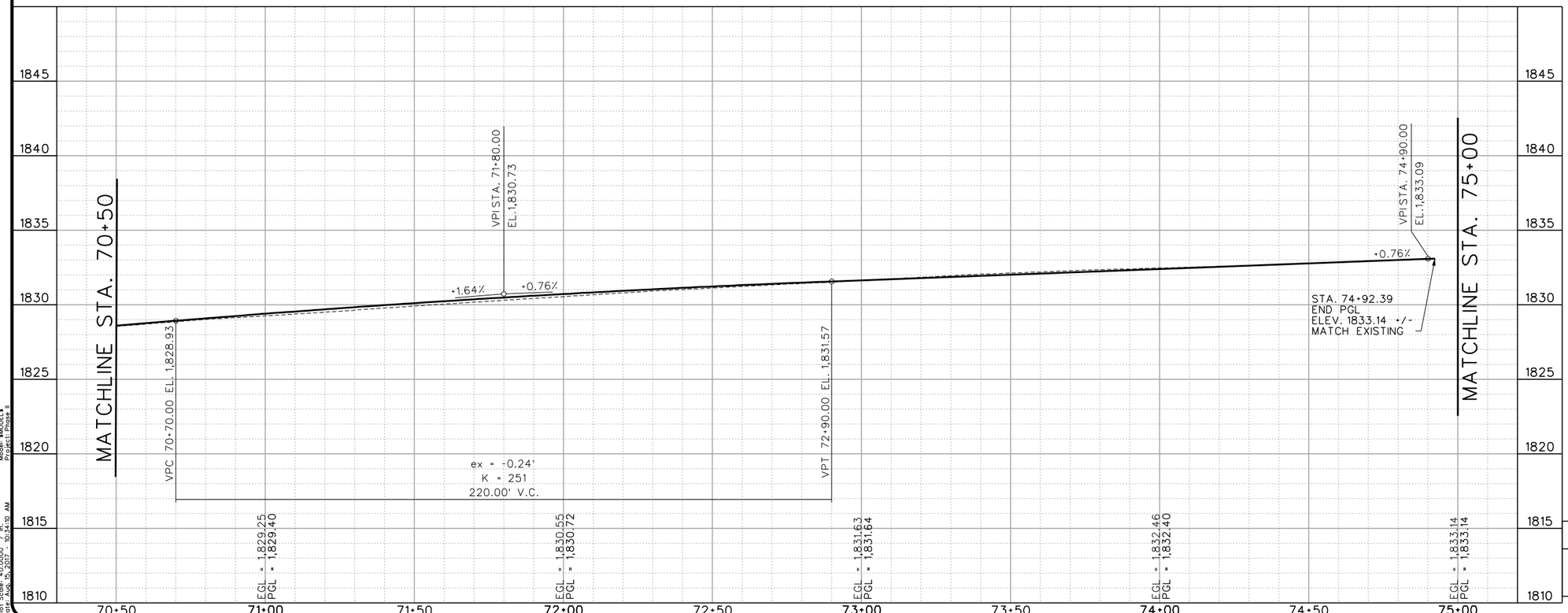
CURVE BELL-2

△ = 0° 32' 27.11" (LT)
T = 47.20
L = 94.40
R = 10,000.00

N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE



NOTE:

1. ALL DRIVEWAYS ARE 5' RADIUS UNLESS OTHERWISE NOTED.
2. ALL SIDEWALKS ARE 6' WIDE UNLESS OTHERWISE NOTED.
3. WIDTH DIMENSION AT DRIVEWAY IS TAKEN AT END OF DRIVEWAY CURB RETURN AT BACK OF CURB.
4. ALL STREET INTERSECTION CURB RETURNS ARE 24.50' RADIUS UNLESS OTHERWISE NOTED.
5. ALL DIMENSIONS ARE GIVEN TO BACK OF CURB UNLESS NOTED OTHERWISE.

LEGEND

- PROPOSED ROADWAY PAVEMENT
- 6" PROPOSED CONCRETE DRIVEWAY
- 4" PROPOSED CONCRETE SIDEWALK

PROFILE LEGEND

EXISTING GRADE @ ℄ ----------
PGL ——————

100% SUBMITTAL

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144
STATE OF TEXAS
WAYNE P. HARTT
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10/23/2017

FREESE NICHOLS
4055 International Plaza, Suite 200
Fort Worth, Texas 76109-4895
Phone: (817) 735-7300
Fax: (817) 735-7491
Web: www.freese.com

CITY OF SAN ANGELO, TEXAS

PHASE III

BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS

ROADWAY IMPROVEMENTS

PLAN AND PROFILE
STA. 70+50 TO STA. 75+00

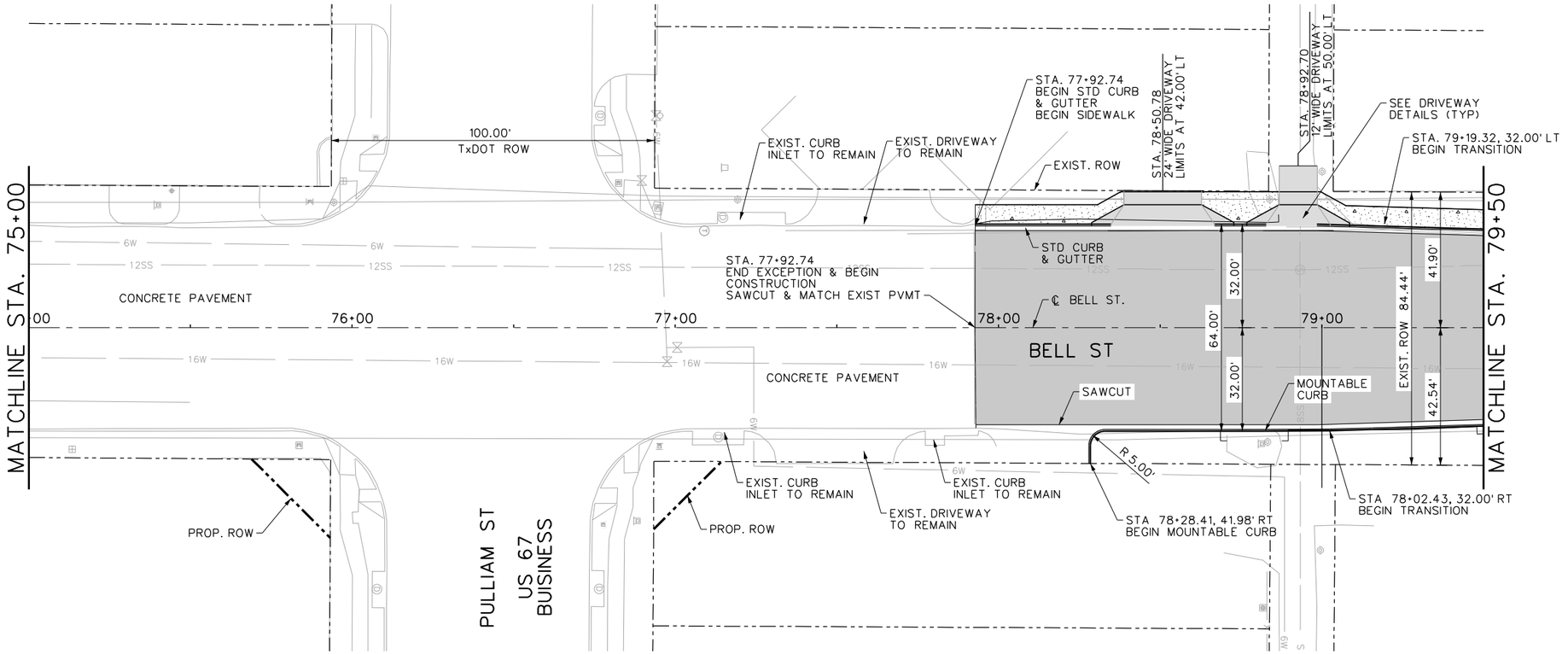
F&N JOB NO. SAN16188
DATE 08/2017
DESIGNED JWP
DRAWN EB
REVISED
CHECKED WH
FILE NAME ph2-trt-pp-road04.dgn

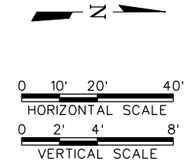
NO.	ISSUES	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

SHEET PP-04
SEQ. 40

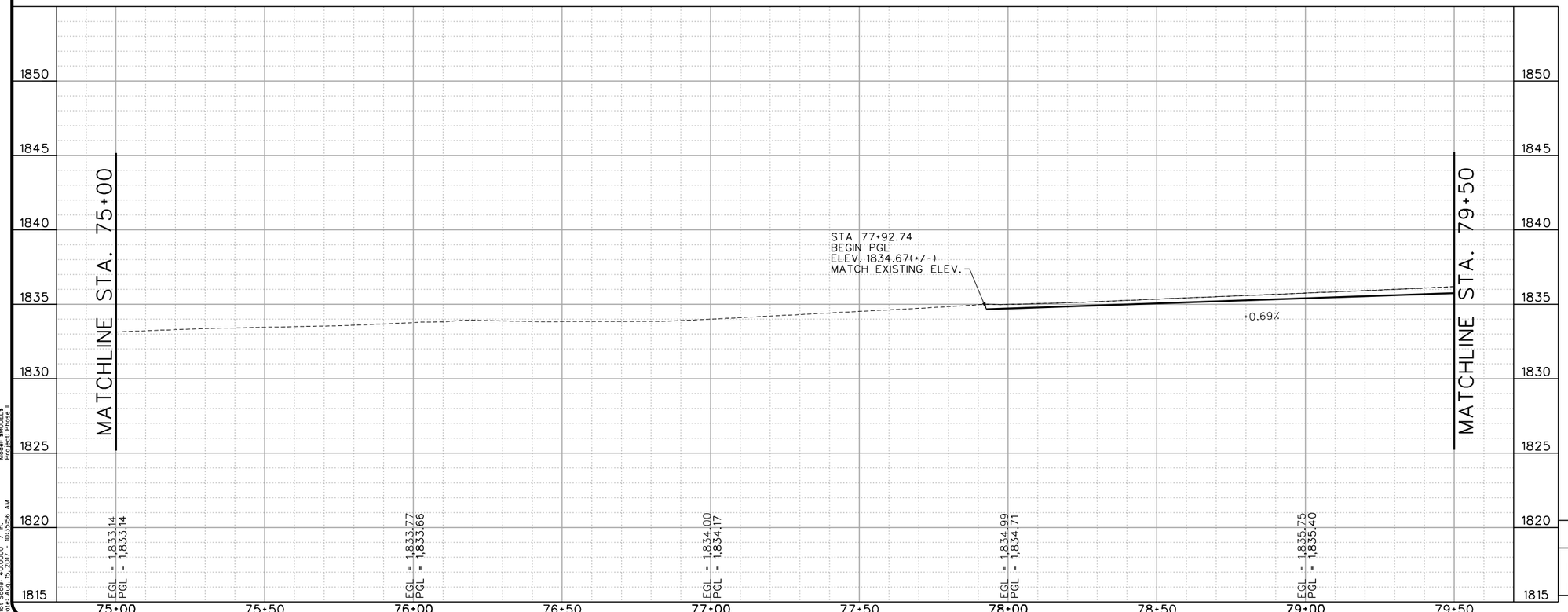
MicroStation V8 User: sli Office: Frisco
$ACCOUNT$ N:\IF\Drawings\Phase II\ph2-trt-pp-road04.dgn
File: N:\IF\Drawings\Phase II\ph2-trt-pp-road04.dgn Model: $MODEL$
Plot Scale: 40.0000 '/ in. Project Phase: $
Date: Aug. 15, 2017 - 10:34:10 AM





0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE



NOTE:

1. ALL DRIVEWAYS ARE 5' RADIUS UNLESS OTHERWISE NOTED.
2. ALL SIDEWALKS ARE 6' WIDE UNLESS OTHERWISE NOTED.
3. WIDTH DIMENSION AT DRIVEWAY IS TAKEN AT END OF DRIVEWAY CURB RETURN AT BACK OF CURB.
4. ALL STREET INTERSECTION CURB RETURNS ARE 24.50' RADIUS UNLESS OTHERWISE NOTED.
5. ALL DIMENSIONS ARE GIVEN TO BACK OF CURB UNLESS NOTED OTHERWISE.

LEGEND

- PROPOSED ROADWAY PAVEMENT
- 6" PROPOSED CONCRETE DRIVEWAY
- 4" PROPOSED CONCRETE SIDEWALK

PROFILE LEGEND

EXISTING GRADE @ ℄ ----------

PGL ——————

100% SUBMITTAL

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

STATE OF TEXAS
WAYNE P. HARTT
118231
LICENSED
PROFESSIONAL ENGINEER
10/23/2017

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4055 International Plaza, Suite 200
Fort Worth, Texas 76109-4895
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Web: www.freese.com

CITY OF SAN ANGELO, TEXAS

PHASE III

BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS

ROADWAY IMPROVEMENTS

PLAN AND PROFILE
STA. 75+00 TO STA. 79+50

F&N JOB NO.	SAN16188
DATE	08/2017
DESIGNED	JWP
DRAWN	EB
REVISED	
CHECKED	WH

NO.	ISSUES	BY	DATE

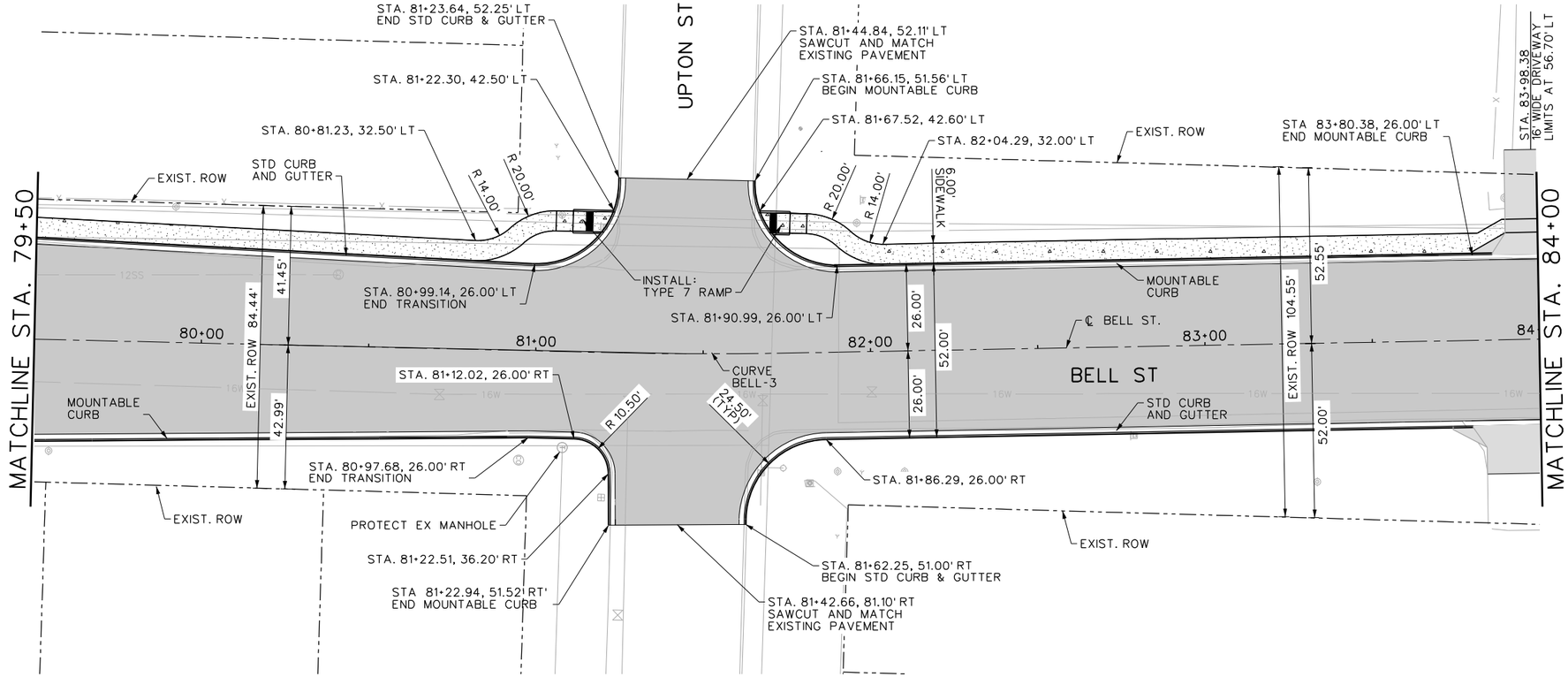
FILE NAME ph2-trt-pp-road05.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

SHEET PP-05

SEQ. 41

MicroStation V8 User: sli Office: Frisco
$ACCOUNT$ N:\IF\Drawings\Phase II\ph2-trt-pp-road05.dgn
Plot Date/Time: 08/15/2017 10:35:56 AM Model: $MODEL$
Plot Scale: 40.0000 ' / in. Project: Phase II
Date: Aug. 15, 2017 - 10:35:56 AM



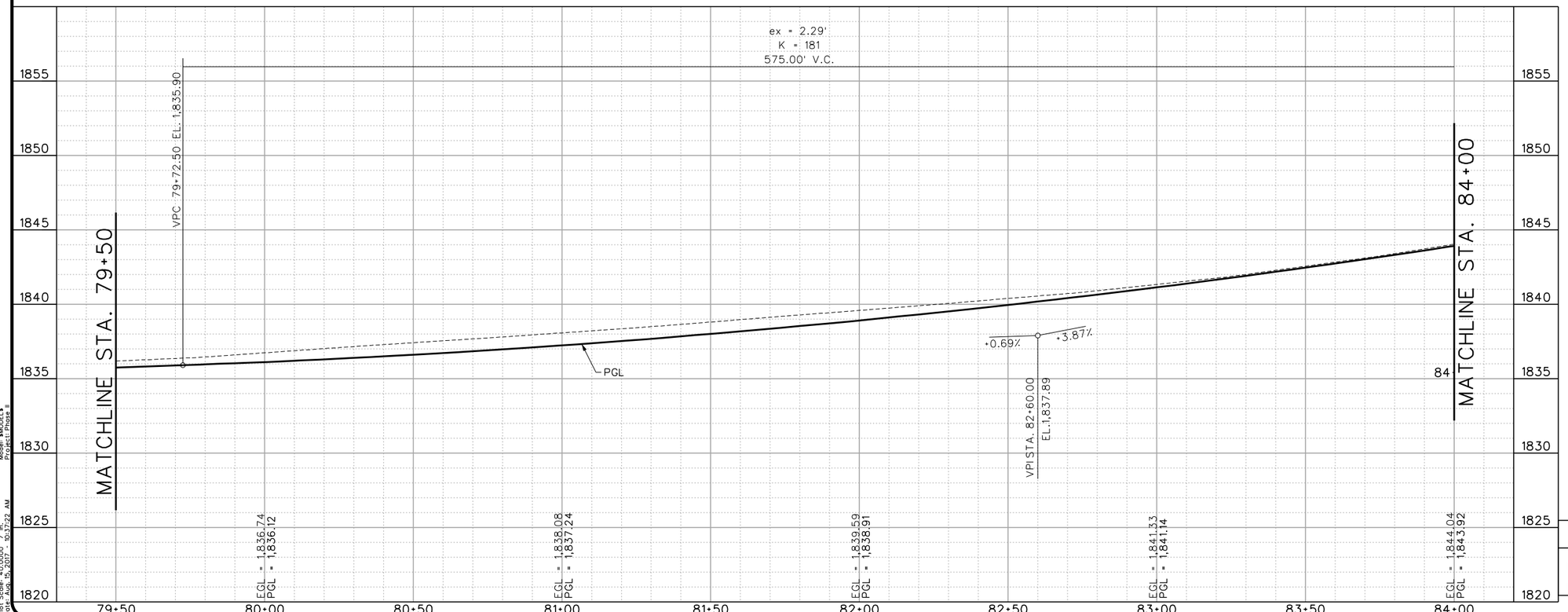
CURVE BELL-3

△ = 2° 23' 28.09" (LT)
T = 22.96
L = 45.90
R = 1,100.00

N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE



NOTE:

1. ALL DRIVEWAYS ARE 5' RADIUS UNLESS OTHERWISE NOTED.
2. ALL SIDEWALKS ARE 6' WIDE UNLESS OTHERWISE NOTED.
3. WIDTH DIMENSION AT DRIVEWAY IS TAKEN AT END OF DRIVEWAY CURB RETURN AT BACK OF CURB.
4. ALL STREET INTERSECTION CURB RETURNS ARE 24.50' RADIUS UNLESS OTHERWISE NOTED.
5. ALL DIMENSIONS ARE GIVEN TO BACK OF CURB UNLESS NOTED OTHERWISE.

LEGEND

- PROPOSED ROADWAY PAVEMENT
- 6" PROPOSED CONCRETE DRIVEWAY
- 4" PROPOSED CONCRETE SIDEWALK

PROFILE LEGEND

EXISTING GRADE @ ℄ ----------
PGL ——————

100% SUBMITTAL

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

STATE OF TEXAS
WAYNE P. HARTT
118231
LICENSED
PROFESSIONAL ENGINEER
10/23/2017

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CITY OF SAN ANGELO, TEXAS

PHASE III

BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS

ROADWAY IMPROVEMENTS

PLAN AND PROFILE
STA. 79+50 TO STA. 84+00

F&N JOB NO. SAN16188
DATE 08/2017
DESIGNED JWP
DRAWN EB
REVISED
CHECKED WH
FILE NAME ph2-trt-pp-road06.dgn

NO.	ISSUES	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

SHEET PP-06
SEQ. 42

MicroStation V8 User: sli Office: Frisco
$ACCOUNT$ N:\IF\Drawings\Phase II\ph2-trt-pp-road06.dgn
Plot Date: Aug. 15, 2017 - 10:37:22 AM Model: $MODEL$
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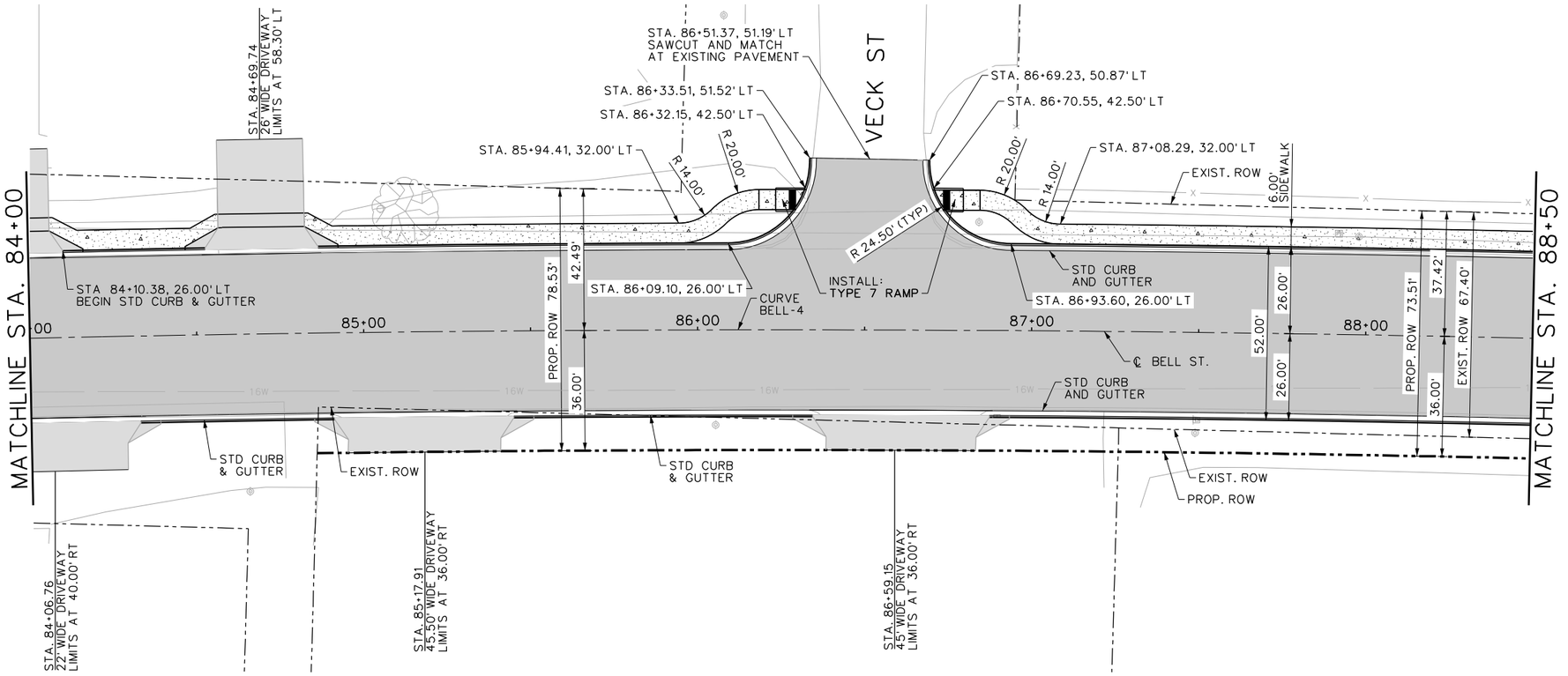


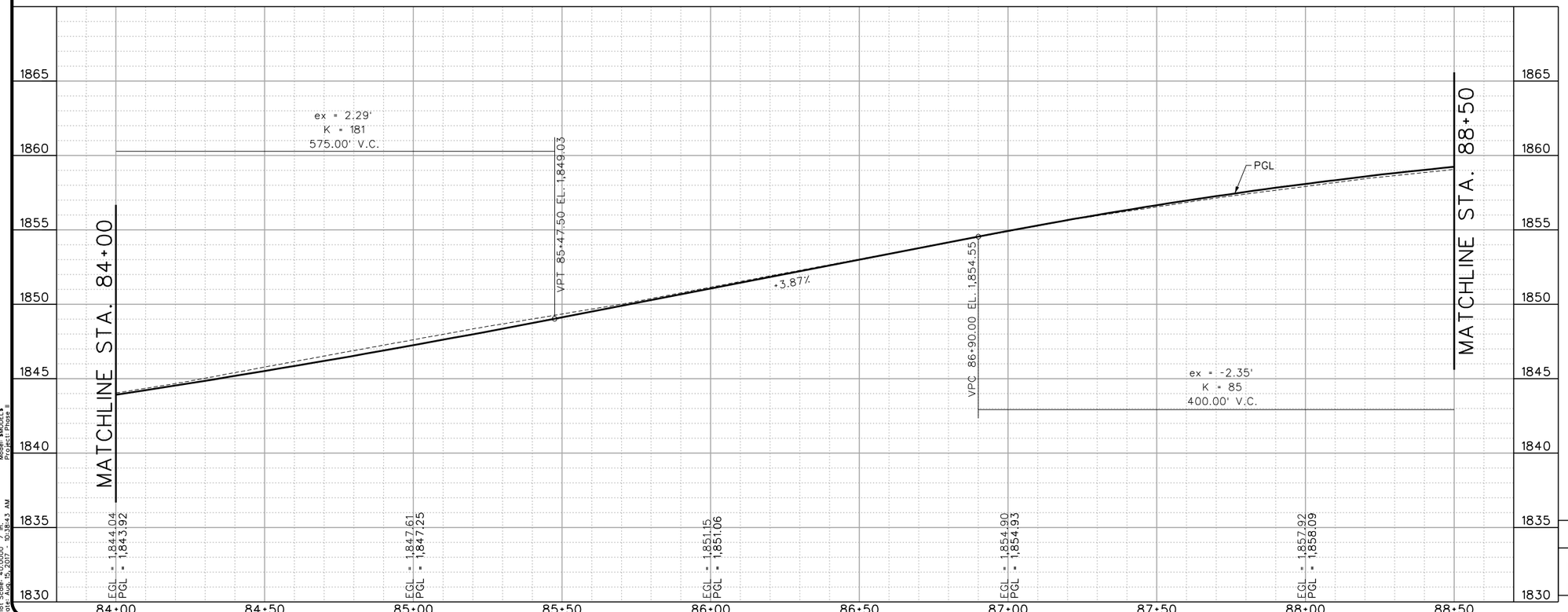
CURVE BELL-4

△ = 2° 44' 42.70" (RT)
T = 239.61
L = 479.13
R = 10,000.00

N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE



NOTE:

1. ALL DRIVEWAYS ARE 5' RADIUS UNLESS OTHERWISE NOTED.
2. ALL SIDEWALKS ARE 6' WIDE UNLESS OTHERWISE NOTED.
3. WIDTH DIMENSION AT DRIVEWAY IS TAKEN AT END OF DRIVEWAY CURB RETURN AT BACK OF CURB.
4. ALL STREET INTERSECTION CURB RETURNS ARE 24.50' RADIUS UNLESS OTHERWISE NOTED.
5. ALL DIMENSIONS ARE GIVEN TO BACK OF CURB UNLESS NOTED OTHERWISE.

LEGEND

- PROPOSED ROADWAY PAVEMENT
- 6" PROPOSED CONCRETE DRIVEWAY
- 4" PROPOSED CONCRETE SIDEWALK

PROFILE LEGEND

EXISTING GRADE @ ℄ ----------
PGL ——————

100% SUBMITTAL

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

STATE OF TEXAS
WAYNE P. HARTT
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PROFESSIONAL ENGINEER
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CITY OF SAN ANGELO, TEXAS

PHASE III
BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS

ROADWAY IMPROVEMENTS

PLAN AND PROFILE
STA. 84+00 TO STA. 88+50

NO.	ISSUES	BY	DATE

F&N JOB NO. SAN16188
DATE 08/2017
DESIGNED JWP
DRAWN EB
REVISED
CHECKED WH
FILE NAME ph2-trt-pp-road07.dgn

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

SHEET PP-07
SEQ. 43

MicroStation V8 User: sli Office: Frisco
$ACCOUNT$ N:\IF\Drawings\Phase II\ph2-trt-pp-road07.dgn
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Plot Date: Aug. 15, 2017 - 10:38:43 AM Project: Phase II
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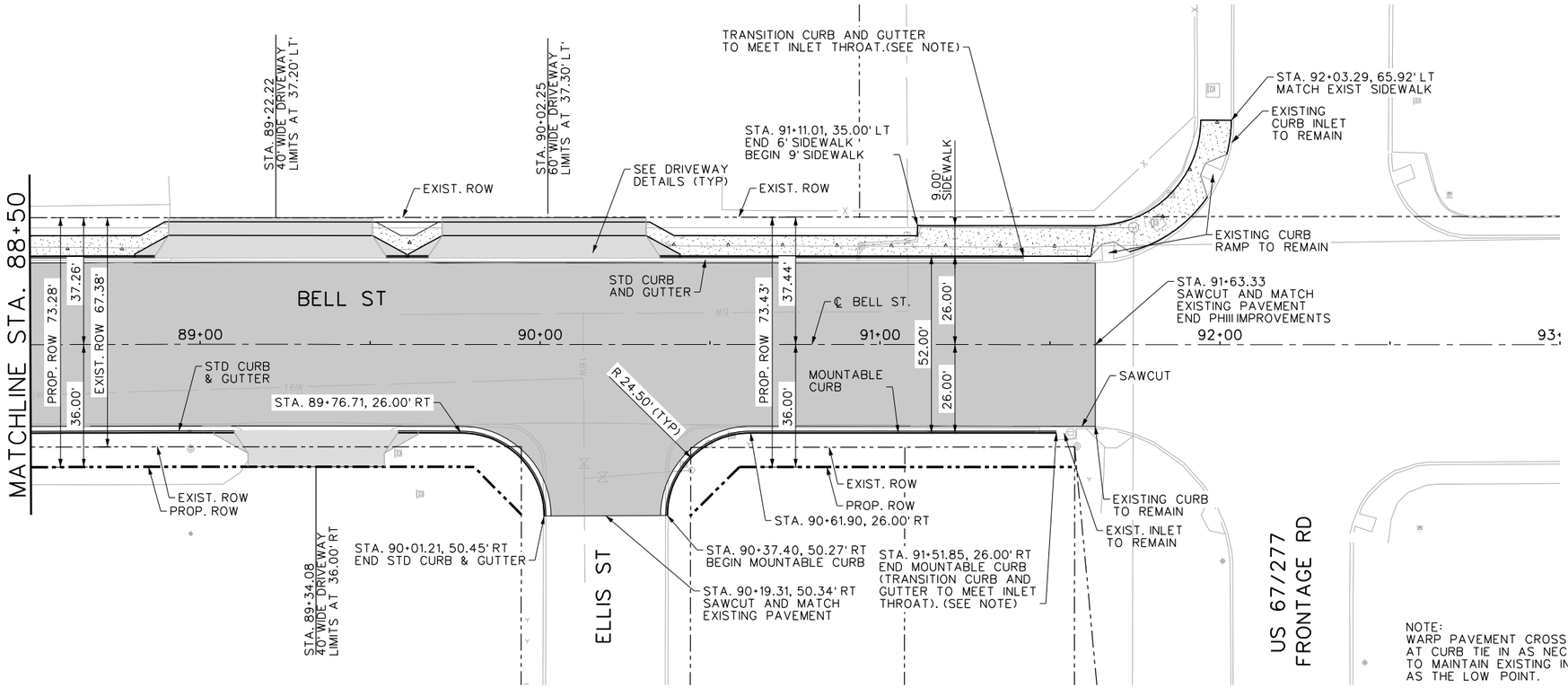


NOTE:
WARP PAVEMENT CROSS-SLOPE AT CURB TIE IN AS NECESSARY TO MAINTAIN EXISTING INLET AS THE LOW POINT.

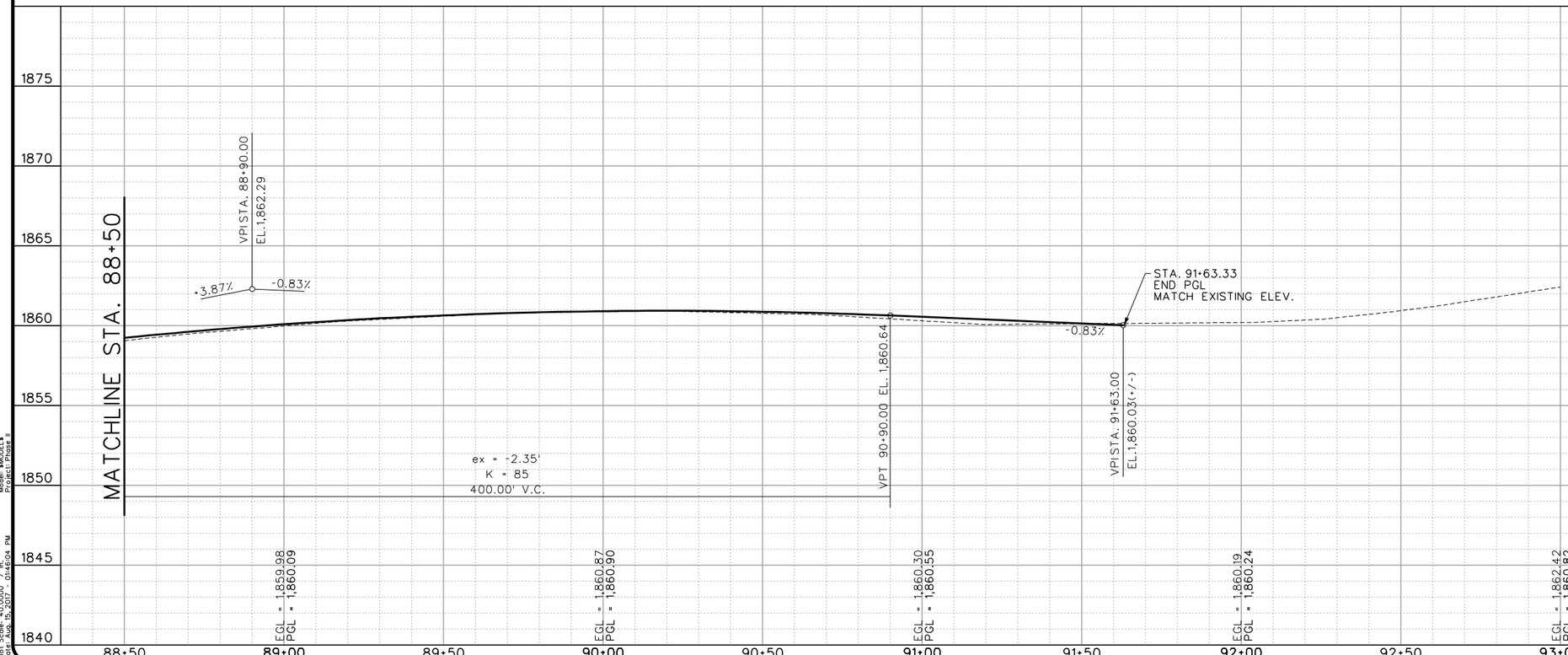
CURVE BELL-4

△ = 2° 44' 42.70" (RT)
T = 239.61
L = 479.13
R = 10,000.00

N

0 10' 20' 40'
HORIZONTAL SCALE

0 2' 4' 8'
VERTICAL SCALE



NOTE:
1. ALL DRIVEWAYS ARE 5' RADIUS UNLESS OTHERWISE NOTED.
2. ALL SIDEWALKS ARE 6' WIDE UNLESS OTHERWISE NOTED.
3. WIDTH DIMENSION AT DRIVEWAY IS TAKEN AT END OF DRIVEWAY CURB RETURN AT BACK OF CURB.
4. ALL STREET INTERSECTION CURB RETURNS ARE 24.50' RADIUS UNLESS OTHERWISE NOTED.
5. ALL DIMENSIONS ARE GIVEN TO BACK OF CURB UNLESS NOTED OTHERWISE.

LEGEND

PROPOSED ROADWAY PAVEMENT

6" PROPOSED CONCRETE DRIVEWAY

4" PROPOSED CONCRETE SIDEWALK

PROFILE LEGEND

EXISTING GRADE @ ℄ ----------

PGL ——————

100% SUBMITTAL

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

STATE OF TEXAS
WAYNE P. HARTT
118231
LICENSED
PROFESSIONAL ENGINEER
10/23/2017

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CITY OF SAN ANGELO, TEXAS
PHASE III
BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS
ROADWAY IMPROVEMENTS
PLAN AND PROFILE
STA. 88+50 TO END

F&N JOB NO. SAN16188	DATE	BY	NO.	ISSUES
DATE 08/2017				
DESIGNED JWP				
DRAWN EB				
REVISED				
CHECKED WH				
FILE NAME ph2-trt-pp-road08.dgn				

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

SHEET PP-08
SEQ. 44

MicroStation V8 User: slk Office: Frisco
ACCOUNT$ (XLUP:\Drawings\Phase II\ph2-trt-pp-road08.dgn
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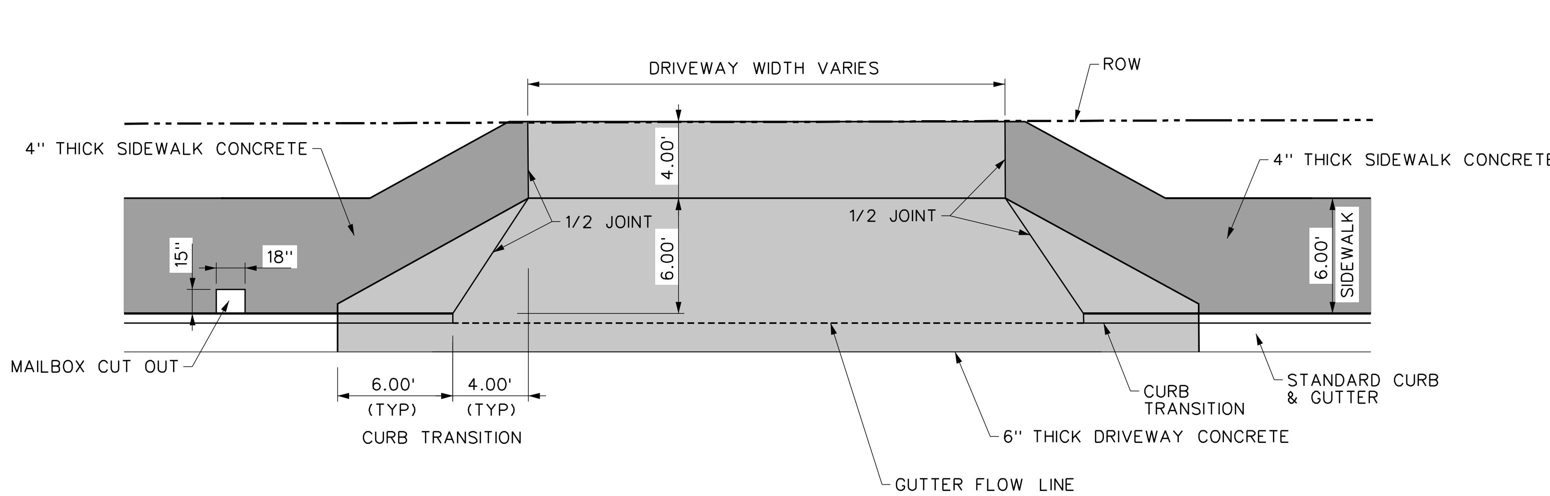
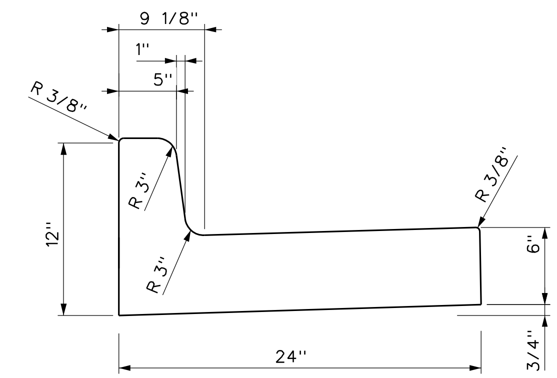
Plot Scale: 40.0000 '/ in. Plot Date: Aug. 15, 2017 - 04:46:04 PM Project Phase: $

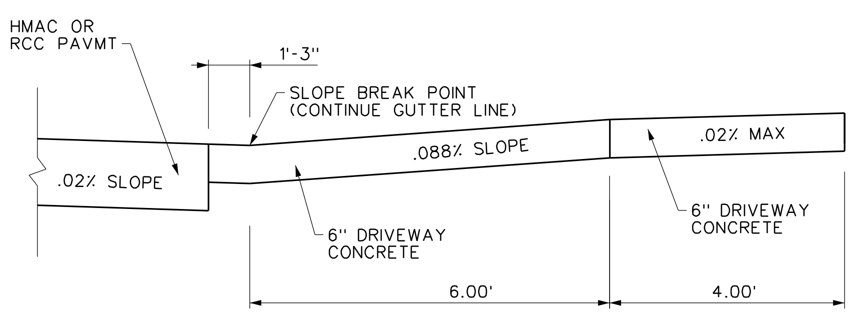
Office: Frisco $ACCOUNT$ Date: Aug. 15, 2017 - 01:46:04 PM User: slk File: N:\IF\Drawings\Phase II\ph2-trt-pp-road08.dgn



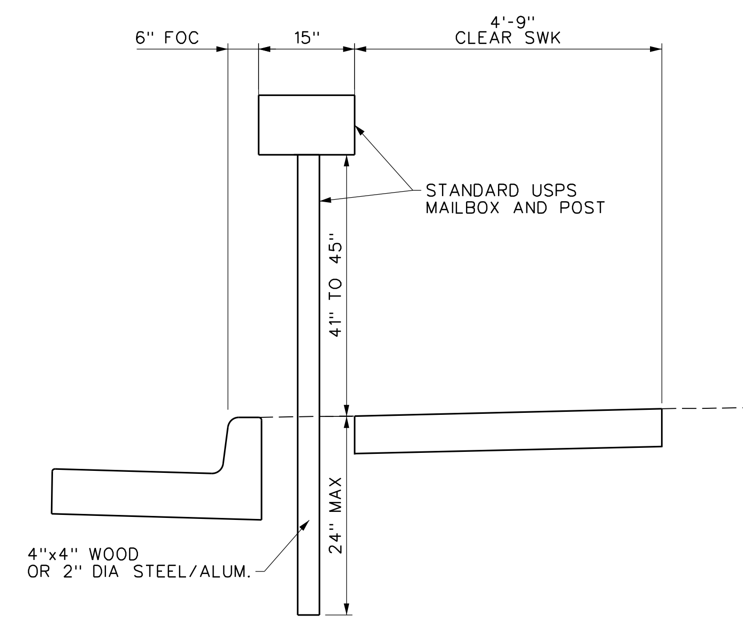
1 - DRIVEWAY DETAIL PLAN VIEW
NOT TO SCALE



3 - STANDARC CURB & GUTTER SECTION VIEW
NOT TO SCALE



2 - DRIVEWAY DETAIL SECTION VIEW
NOT TO SCALE



4 - MAILBOX INSTALLATION DETAIL
NOT TO SCALE

DRIVEWAY AND SIDEWALK NOTES:

1. GROOVED CONTRACTION JOINTS EVERY 5' AND EXPANSION JOINTS EVERY 40'.
2. ALL SIDEWALKS SHALL BE A CLASS "A" CONCRETE AND REINFORCED WITH NOVOMESH (36#/CY).
3. A ROUGH BROOM FINISH IS PREFERRED.
4. 6" SUBGRADE SHALL BE COMPACTED TO AN EQUIVALENT OF 95% STANDARD PROCTOR DENSITY.
5. WET SUBGRADE SHALL BE CORRECTED PRIOR TO PLACEMENT OF CONCRETE.
6. ALL DRIVEWAYS AND SIDEWALKS ACROSS DRIVEWAYS SHALL BE 6" REINFORCED CONCRETE (CLASS 'P')(#4 BARS @ 18" O.C.E.W. OR NOVAMESH 23#/CY)(MIN).
7. IN NARROW ROW SITUATIONS, MIN. CLEAR WIDTH OF SIDEWALK SHALL BE 36".

CONCRETE CURB & GUTTER NOTE:

1. CONCRETE FOR CURB AND GUTTER SHALL BE CLASS "A" CONCRETE EXCEPT FOR STANDARD MONOLITHIC CURB WHICH IS CLASS "P". THE USE OF MORTAR TOPPING IS OPTIONAL. IF NOT MACHINE LAID, A "MULE" FINISHING TOOL SHALL BE USED.
2. ALL TOOLED CONTRACTION JOINTS WILL BE ON 10" SPACING AT 1-1/2" MINIMUM DEPTHS 1/2". EXPANSION JOINTS ON 50' SPACINGS OR AT BEGINNING OF RADII, OR AT INTERSECTIONS. LIGHT BROOM FINISH.
3. EXTRUDED CONCRETE MAY USE A MODIFIED GRADATION FOR MACHINE LAID CURB AND GUTTER AS APPROVED BY THE CITY ENGINEER.
4. IF MACHINE LAID, A MAXIMUM 1" FLARE AT THE BOTTOM IS PERMITTED.

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144
STATE OF TEXAS
WAYNE P. HARTT
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10/23/2017

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Web - www.freese.com

CITY OF SAN ANGELO, TEXAS
PHASE III
BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS
ROADWAY STANDARD DETAILS
BELL STREET DETAILS

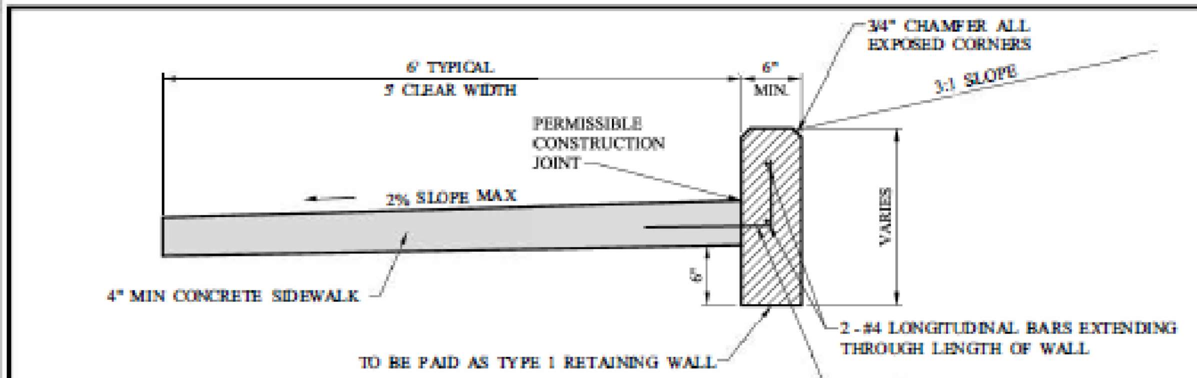
F&N JOB NO.	SAN16188
DATE	08/2017
DESIGNED	JWP
DRAWN	EB
REVISED	
CHECKED	WH
FILE NAME	ph2-trt-dt-details01.sht

NO.	ISSUES	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

SHEET DT-01
SEQ. 45

100% SUBMITTAL



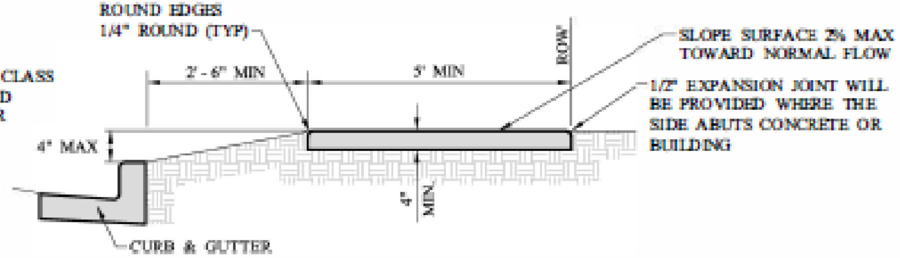
TYPICAL TYPE 1 RETAINING WALL
NOT TO SCALE

5' WIDE SIDEWALK:

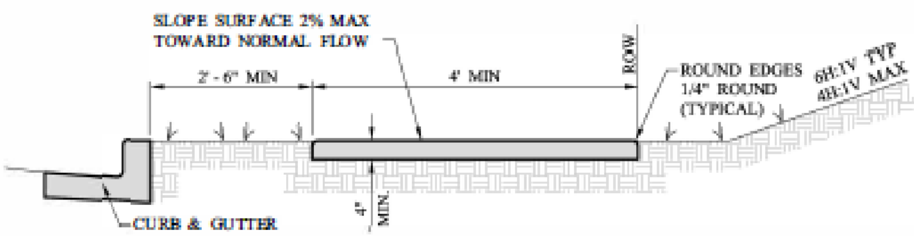
GROOVED CONTRACTION JOINTS EVERY 5' AND EXPANSION JOINTS EVERY 40'.

NOTE:

ALL SIDEWALKS SHALL BE A CLASS "A" CONCRETE AND REINFORCED WITH #3 BARS AT 18" O.C.E.W. OR NOVAMESH 3#/CY.



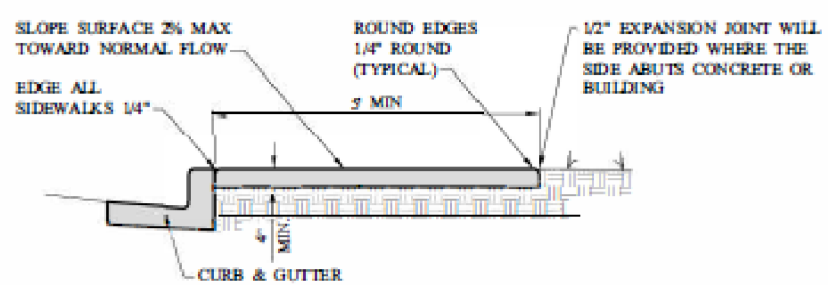
ARTERIAL AND COLLECTOR STREETS
NOT TO SCALE



RESIDENTIAL STREET
NOT TO SCALE

4' WIDE SIDEWALK:

GROOVED CONTRACTION JOINTS EVERY 4' AND EXPANSION JOINTS EVERY 32'.



RESIDENTIAL STREET "ALTERNATE"
NOT TO SCALE

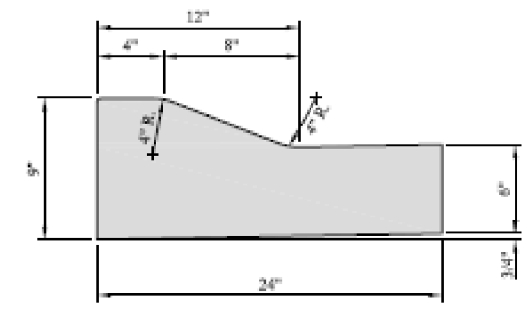
NOTES:

1. 6" SUBGRADE SHALL BE COMPACTED TO AN EQUIVALENT OF 95% STANDARD PROCTOR DENSITY.
2. A ROUGH BROOM FINISH IS PREFERRED.
3. LONGITUDINAL SLOPE OF SIDEWALK SHALL NOT EXCEED 5%, AND CROSS SLOPE OF SIDEWALK SHALL NOT EXCEED 2%.
4. WET SUBGRADE SHALL BE CORRECTED PRIOR TO PLACEMENT OF CONCRETE.
5. ALL SIDEWALKS ACROSS DRIVEWAYS SHALL BE 6" REINFORCED CONCRETE. SEE CONCRETE APPROACH SHEET S-X-2.
6. IN NARROW RIGHT OF WAY SITUATIONS, THE MINIMUM CLEAR WIDTH OF SIDEWALK SHALL BE 36 INCHES.

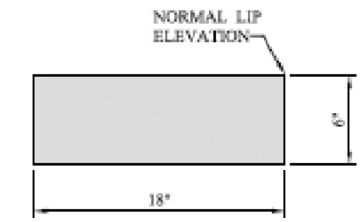
CITY OF SAN ANGELO

CONCRETE SIDEWALKS

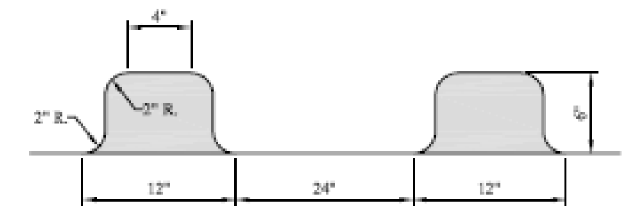
S-FF-1



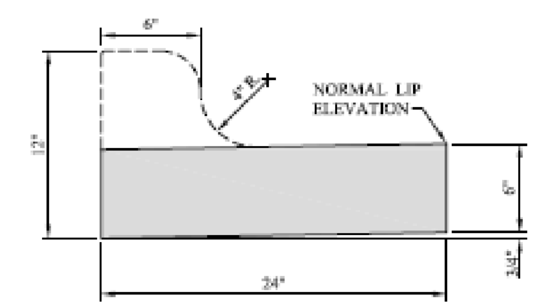
MOUNTABLE CURB
NOT TO SCALE



HEADER CURB
NOT TO SCALE



FRONT VIEW
NOT TO SCALE



SIDE VIEW
SAWTOOTH CURB
NOT TO SCALE

NOTES:

1. DIMENSIONS HEREIN SHOWN ARE MINIMUM REQUIRED. THE DESIGNER MAY ADJUST WIDTH ACCORDING TO THE NEED. CONCRETE FOR CURB AND GUTTER SHALL BE CLASS "A" CONCRETE EXCEPT FOR STANDARD MONOLITHIC CURB WHICH IS CLASS "P". THE USE OF MORTAR TOPPING IS OPTIONAL. IF NOT MACHINE LAID, A "MULE" FINISING TOOL SHALL BE USED.
2. ALL TOOLED CONTRACTION JOINTS WILL BE ON 10' SPACING AT 1-1/2" MINIMUM DEPTHS. 1/2". EXPANSION JOINTS ON 50' SPACING OR AT BEGINNING OF RADII, OR AT INTERSECTIONS. LIGHT BROOM FINISH.
3. EXTRUDED CONCRETE MAY USE A MODIFIED GRADATION FOR MACHINE LAID CURB AND GUTTER AS APPROVED BY THE CITY ENGINEER.
4. IF MACHINE LAID, A MAXIMUM 1" FLARE AT THE BOTTOM IS PERMITTED.

CITY OF SAN ANGELO

CONCRETE CURB & GUTTERS

S-T-2

FREESE AND NICHOLS, INC. TEXAS REGISTERED ENGINEERING FIRM F-2144

STATE OF TEXAS — WAYNE P. HART — 118231 — LICENSED PROFESSIONAL ENGINEER

10/23/2017

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4055 International Plaza, Suite 200
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Fax - (817) 735-7491
Web - www.freese.com

CITY OF SAN ANGELO, TEXAS
BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS PHASE III
ROADWAY DEATAILS

PAVING DETAILS

F&N JOB NO. SAN16188
DATE 8/2017
DESIGNED JWP
DRAWN SL
REVISED
CHECKED WH
FILE NAME cv-trt-dt-DT-02.sht

NO.	ISSUES	BY	DATE

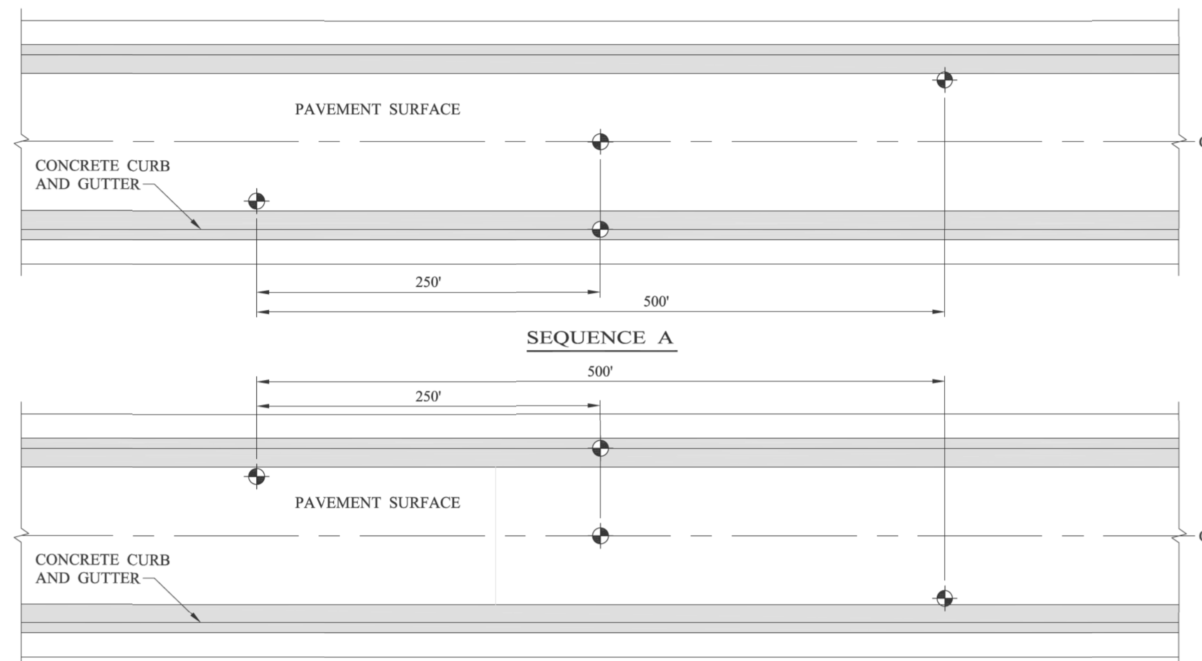
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1

SHEET DT-02

SEQ. 46

100% SUBMITTAL

BASE COURSE AND SUBGRADE SOILS TESTING



PLAN VIEW

NOT TO SCALE

NOTES:

1. LOCATIONS OF TESTS ON DRAWING ARE TYPICAL SEQUENCE, EXACT LOCATIONS OF TESTING SHALL BE AT THE INSPECTORS DISCRETION. THE TOTAL NUMBER OF TESTS SHOWN SHALL NOT EXCEED THAT SHOWN PER LENGTH OF STREET.
2. BEFORE CONSTRUCTION INITIATION, THE CONTRACTOR SHALL SUBMIT THE NAME OF THE INDEPENDENT TESTING LABORATORY TO BE USED FOR THE CITY'S REVIEW AND APPROVAL.
3. DURING CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING A COPY OF ALL OFFICIAL TEST RESULTS TO THE CITY.
4. IF THE DENSITY REQUIREMENTS SPECIFIED ARE NOT MET, THE CONTRACTOR WILL RECONSTRUCT THE PROBLEM AREA AND RE-TEST, AT HIS/HER EXPENSE, AS NECESSARY UNTIL SPECIFIED DENSITY REQUIREMENTS ARE MET.
5. IF THE CONTRACTOR CHANGES MATERIAL TYPE AND OR SOURCE DURING CONSTRUCTION, THE INSPECTOR MAY, AT HIS DISCRETION, REQUIRE ADDITIONAL TESTING OF SOURCE MATERIAL AS REQUIRED TO ASSURE CONFORMANCE WITH SPECIFICATIONS.
6. FOR STREETS LESS THAN 500 FEET IN LENGTH, A MINIMUM OF 3 TEST LOCATIONS.
7. FOR CUL-DE-SACS, A MINIMUM OF 1 TEST IN THE CUL-DE-SAC.

LEGEND

⊕ TEST LOCATION

CITY OF SAN ANGELO

STREET TESTING
CITY SUBDIVISIONS

S-EE-1

FREESE AND NICHOLS, INC.
TEXAS REGISTERED ENGINEERING FIRM F-2144

STATE OF TEXAS — WAYNE P. HARTT — 118231 — LICENSED PROFESSIONAL ENGINEER

10/23/2017

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Fort Worth, Texas 76109-4895
Phone - (817) 735-7300
Fax - (817) 735-7491
Web - www.freese.com

CITY OF SAN ANGELO, TEXAS

PHASE III

BELL STREET ROADWAY AND UTILITIES IMPROVEMENTS

CIVIL

PAVING DETAILS

F&N JOB NO.	SAN16188
DATE	8/2017
DESIGNED	JWP
DRAWN	EB
REVISED	
CHECKED	WH
FILE NAME	cv-trt-dt-DT-03.sht

NO.	ISSUES	BY	DATE

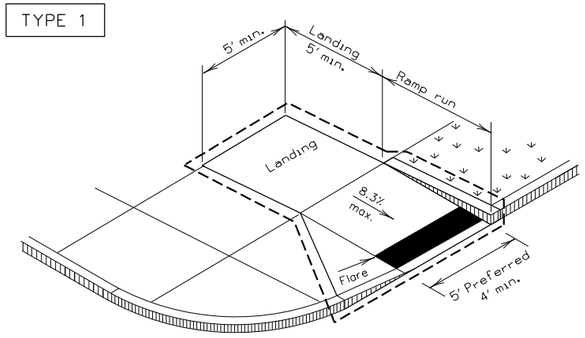
VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.

SHEET DT-03

SEQ. 47

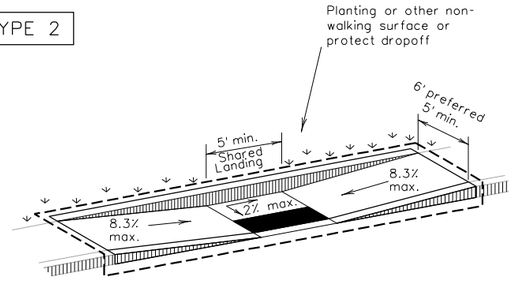
100% SUBMITTAL

TYPE 1



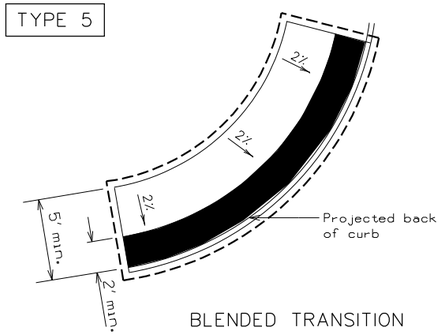
PERPENDICULAR CURB RAMP

TYPE 2



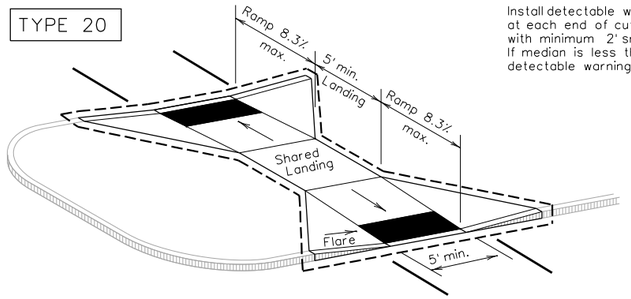
PARALLEL CURB RAMP
(Use only where water will not pond in the landing.)

TYPE 5



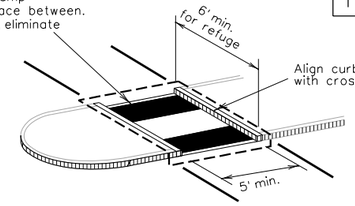
BLENDED TRANSITION

TYPE 20



Install detectable warning surface at each end of cut-through ramp with minimum 2' smooth surface between. If median is less than 6' wide, eliminate detectable warning surfaces.

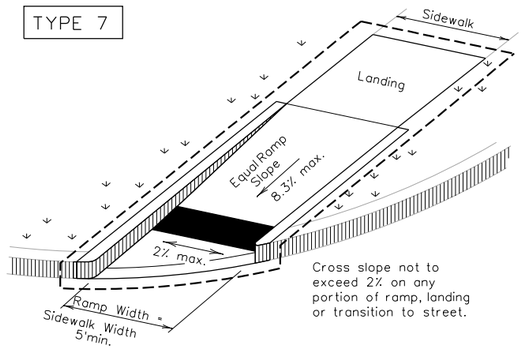
TYPE 21



Curb details are shown elsewhere in the plans.

CURB RAMPS AT MEDIAN ISLANDS

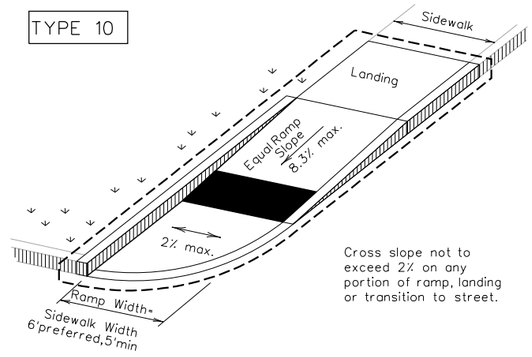
TYPE 7



Cross slope not to exceed 2% on any portion of ramp, landing or transition to street.

(Sidewalk set back from curb)

TYPE 10

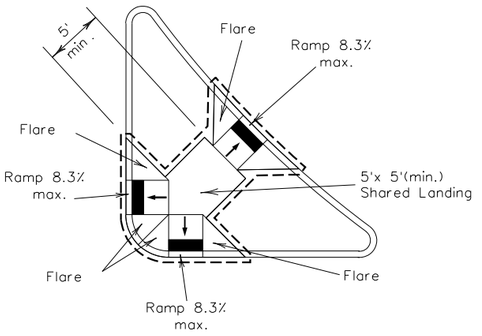


Cross slope not to exceed 2% on any portion of ramp, landing or transition to street.

(Sidewalk adjacent to curb)

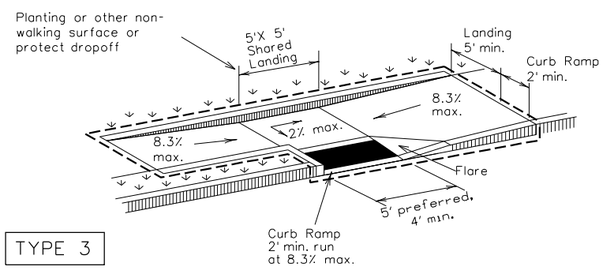
DIRECTIONAL RAMPS WITHIN RADIUS

TYPE 22

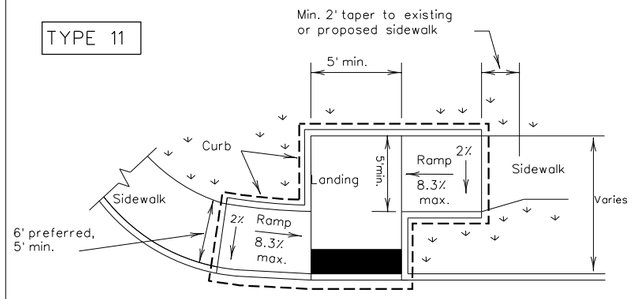


COMBINATION ISLAND RAMPS

TYPE 3

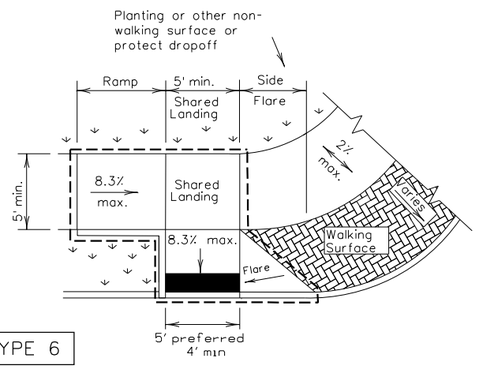


TYPE 11



OFFSET PARALLEL CURB RAMP

TYPE 6



COMBINATION CURB RAMPS

NOTES / LEGEND:

See General Notes on sheet 2 of 4 for more information.

Denotes planting or non-walking surface not part of pedestrian circulation path.

Ramp Limits of Payment

Detectable Warning Surface

SHEET 1 OF 4

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-12A

FILE: ped12a.dgn	DN: TxDOT	CK: RM	DW: TxDOT	CK: VP
© TxDOT March 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
VP June 13, 2012	DIST	COUNTY		SHEET NO.

MicroStation V8 User: sli Office: Frisco
$ACCOUNT$ N:\IF\Drawings\TXDOT Details\Phase I Txdot Details\Roadway Details\ped12a.dgn
Plot Date: 06 APR 2017 Plot Time: 15:34:45 Model: $MODEL$
Plot Scale: 2.0000 ' / in. Project: Phase I
Date: Apr. 06, 2017 - 03:34:45 PM

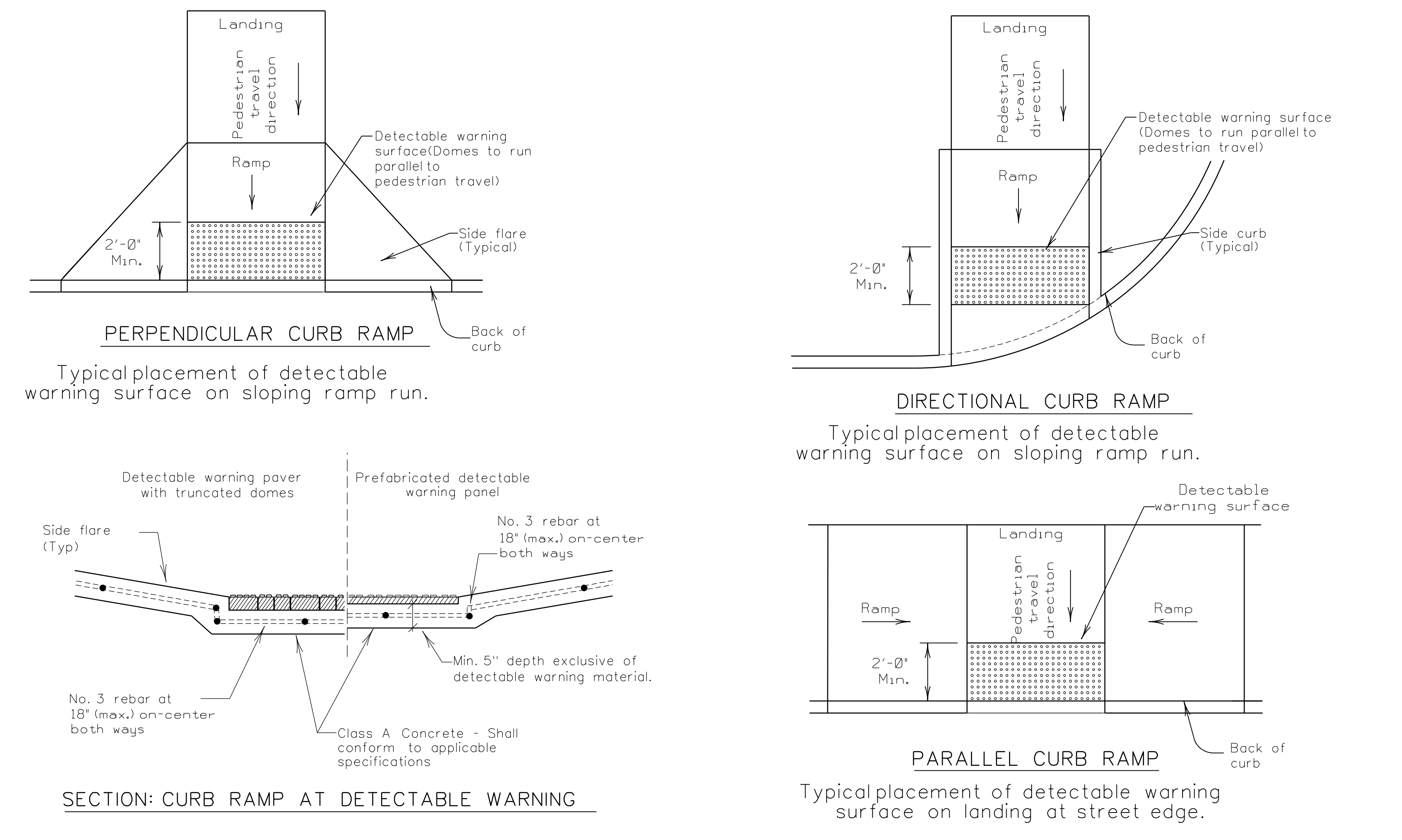
General Notes

Curb Ramps

1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Lesser slopes that will still drain properly should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. The minimum sidewalk width is 5'. Where the sidewalk is adjacent to the back of curb, a 6' sidewalk width is desirable. Where a 5' sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4' for short distances. 5'x 5' passing areas at intervals not to exceed 200' are required.
4. Landings shall be 5'x 5' minimum with a maximum 2% slope in any direction.
5. Maneuvering space at the bottom of curb ramps shall be a minimum of 4'x 4' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
6. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
8. Additional information on curb ramp location, design, light reflective value and texture may be found in the current edition of the Texas Accessibility Standards (TAS) and 16 TAC 68.102.
9. To serve as a pedestrian refuge area, the median should be a minimum of 6' wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.
10. Small channelization islands, which do not provide a minimum 5'x 5' landing at the top of curb ramps, shall be cut through level with the surface of the street.
11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.
12. Handrails are not required on curb ramps. Provide curb ramps wherever on accessible route crosses (penetrates) a curb.
13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
15. Provide a smooth transition where the curb ramps connect to the street.
16. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.
17. Existing features that comply with TAS may remain in place unless otherwise shown on the plans.

Detectable Warning Material

18. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with Section 705 of the TAS. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
19. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
20. Detectable warning surfaces must be slip resistant and not allow water to accumulate.
21. Detectable warning surfaces shall be a minimum of 24" in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
22. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb. Align the rows of domes to be perpendicular to the grade break between the ramp run and the street. Detectable warning surfaces may be curved along the corner radius.
23. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.



DETECTABLE WARNINGS

Detectable Warning Pavers

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

Sidewalks

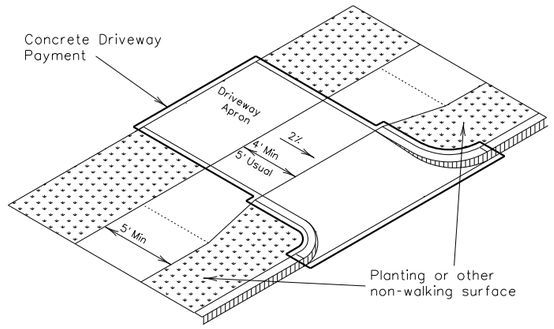
26. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within one or more reach ranges specified in TAS 308.
27. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
28. Street grades and cross slopes shall be as shown elsewhere in the plans.
29. Changes in level greater than 1/4 inch are not permitted.
30. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than 5% must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with TAS 505.
31. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
32. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".
33. Sidewalk details are shown elsewhere in the plans.

Texas Department of Transportation — Design Division Standard

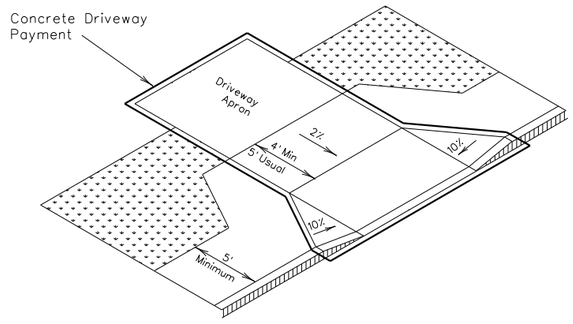
PEDESTRIAN FACILITIES
CURB RAMPS

PED-12A

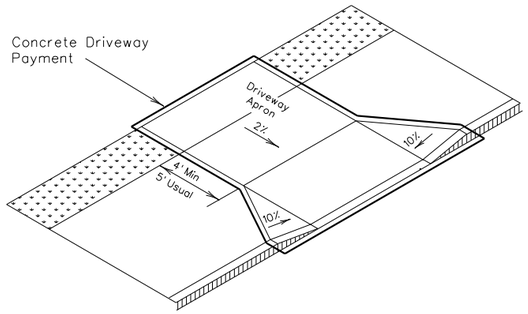
FILE: ped12a.dgn	DN: TxDOT	CK: RM	DW: TxDOT	CK: VP
©TxDOT March 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
VP June 13, 2012	DIST		COUNTY	SHEET NO.



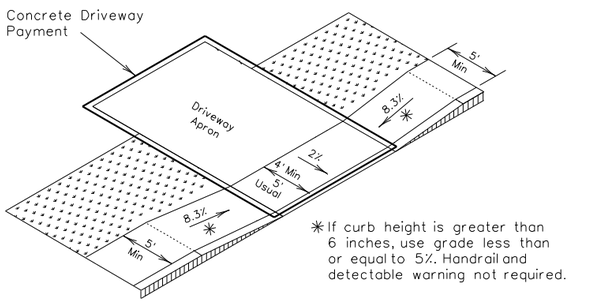
Setback sidewalk



Apron offset sidewalk

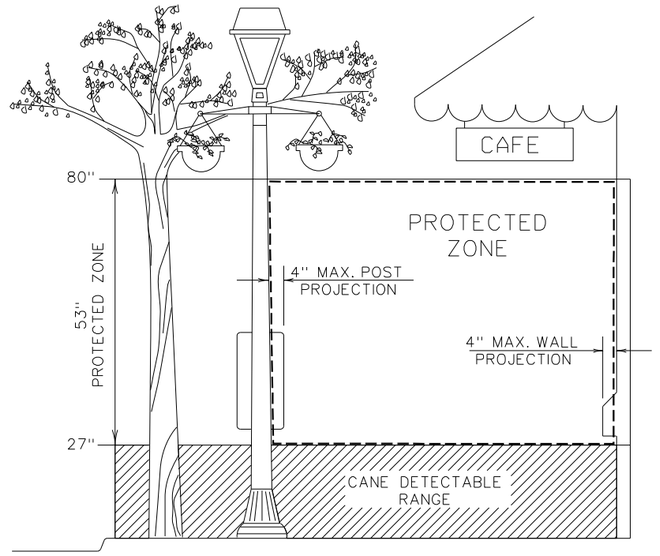


Wide sidewalk



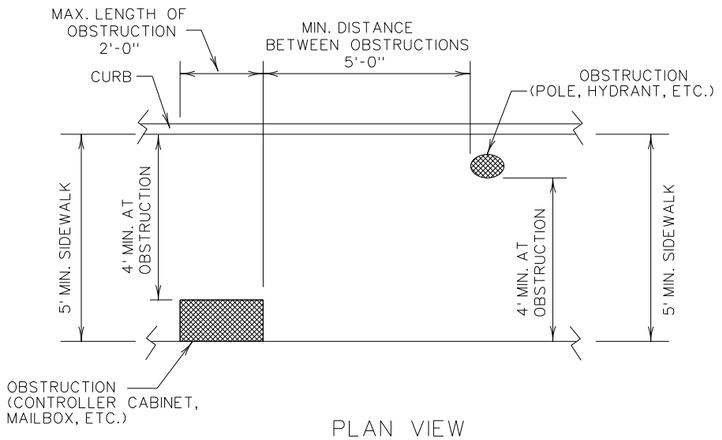
Ramp sidewalk

SIDEWALK TREATMENT AT DRIVEWAYS



PROTECTED ZONE

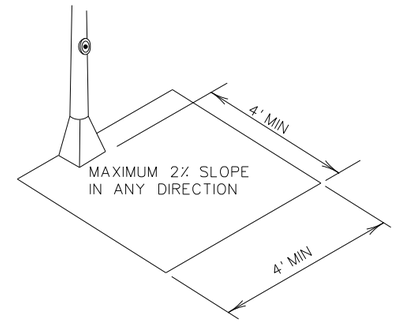
In pedestrian circulation area, maximum 4" projection for post or wall mounted objects between 27"and 80" above the surface.



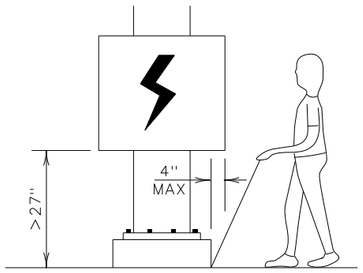
PLAN VIEW

PLACEMENT OF STREET FIXTURES

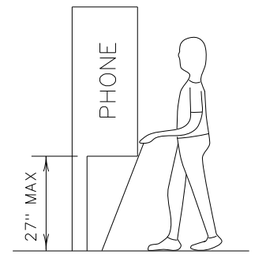
(ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' x 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.)



CLEAR GROUND SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



When an obstruction of a height greater than 27" from the surface would create a protrusion of more than 4" into the pedestrian circulation area, construct additional curb or foundation at the bottom to provide a maximum 4" overhang.



Protruding objects of a height ≥27" are detectable by cane and do not require additional treatment.

DETECTION BARRIER FOR VERTICAL CLEARANCE <80"

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-12A

FILE: ped12a.dgn	DN: TxDOT	CK: RM	DW: TxDOT	CK: VP		
©TxDOT March 2002	CONT	SECT	JOB		HIGHWAY	
REVISIONS VP June 13, 2012	DIST	COUNTY			SHEET NO.	

MicroStation V8 User: sli Office: Frisco
$ACCOUNT$ N:\IF\Drawings\TXDOT Details\Phase I Txdot Details\Roadway Details\ped12a.dgn
Plot: Scale: 2.0000 FT / IN. Model: $MODEL$
Date: Apr. 06, 2017 - 03:35:21 PM Project: Phase I

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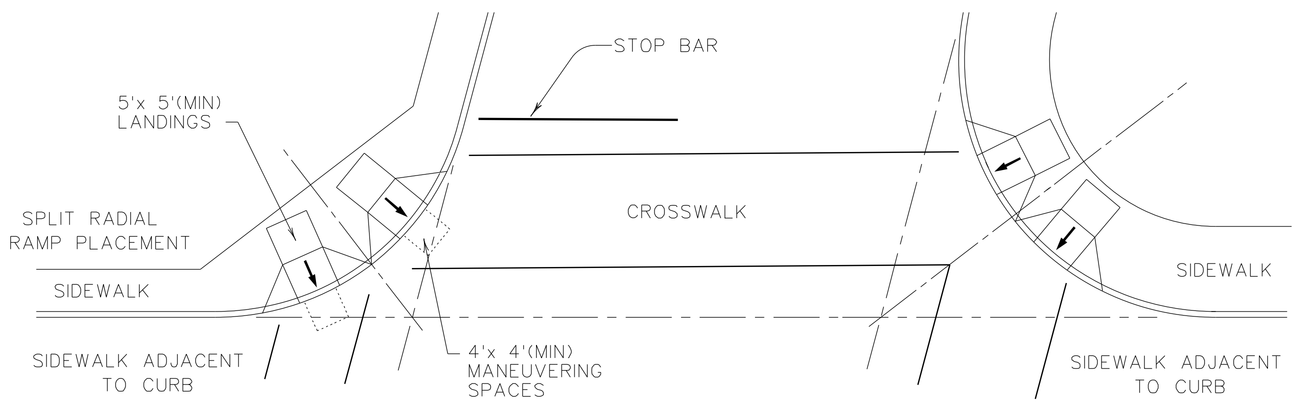
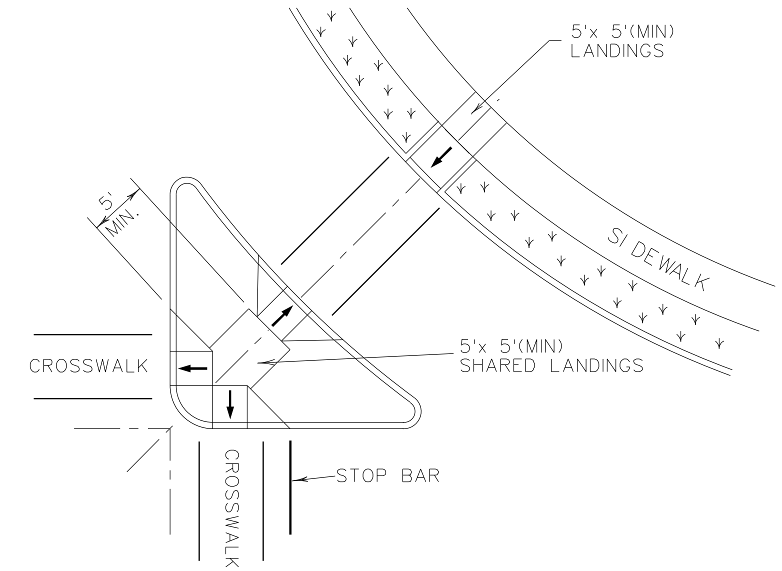
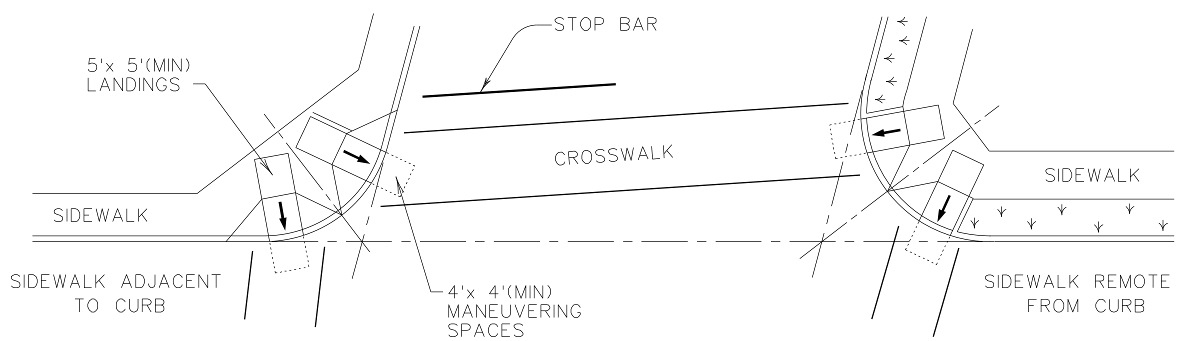


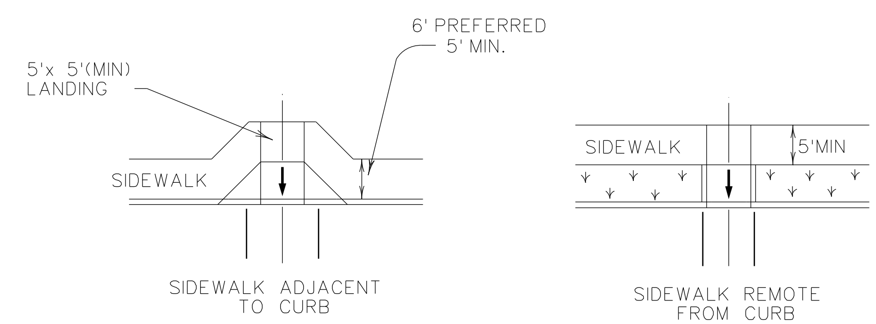
SKEWED INTERSECTION WITH "LARGE" RADIUS



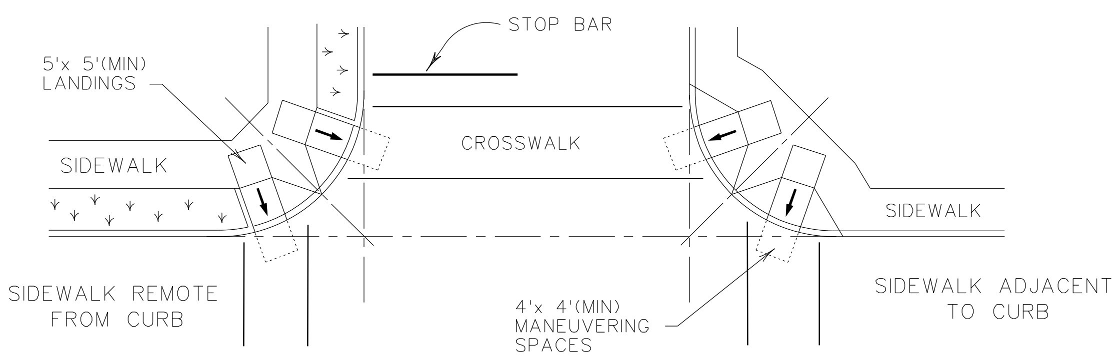
AT INTERSECTION
W/FREE RIGHT TURN & ISLAND



SKEWED INTERSECTION WITH "SMALL" RADIUS



MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS



NORMAL INTERSECTION WITH "SMALL" RADIUS

TYPICAL CROSSING LAYOUTS

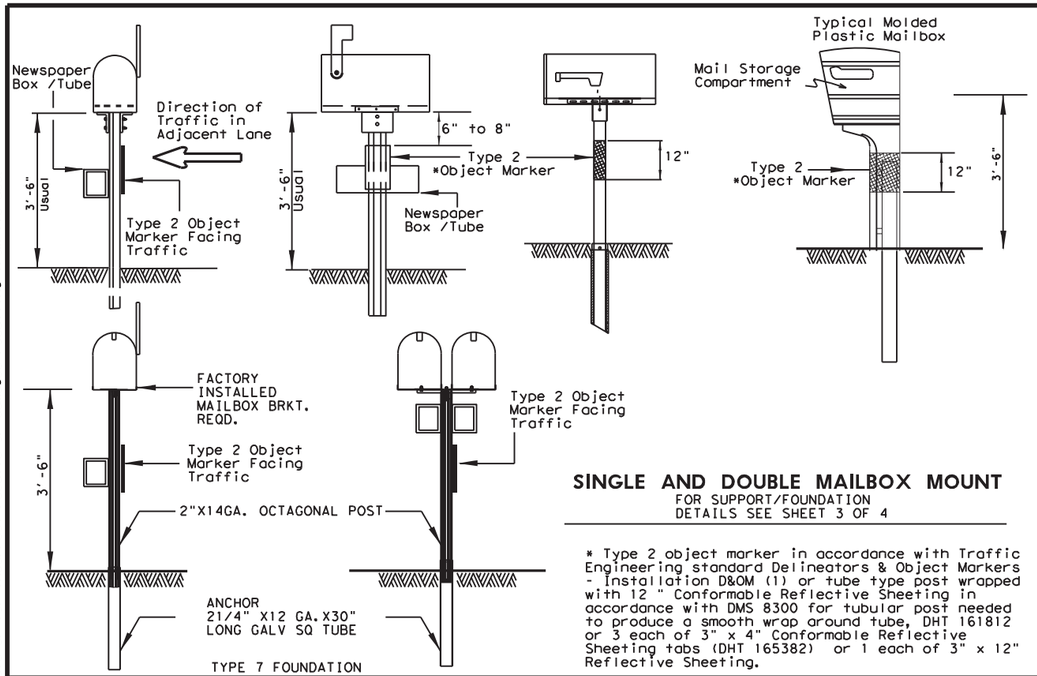
SHEET 4 OF 4

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES
CURB RAMPS

PED-12A

FILE: ped12a.dgn	DN: TxDOT	CK: RM	DW: TxDOT	CK: VP
©TxDOT March 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
VP June 13, 2012	DIST		COUNTY	SHEET NO.



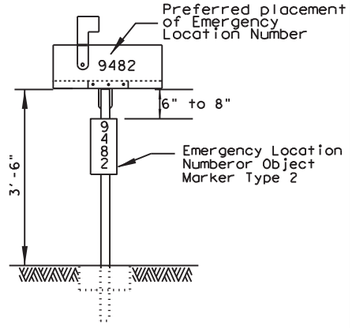
SINGLE AND DOUBLE MAILBOX MOUNT

FOR SUPPORT/FOUNDATION DETAILS SEE SHEET 3 OF 4

* Type 2 object marker in accordance with Traffic Engineering standard Delineators & Object Markers - Installation D&OM (1) or tube type post wrapped with 12 " Conformable Reflective Sheeting in accordance with DMS 8300 for tubular post needed to produce a smooth wrap around tube, DHT 161812 or 3 each of 3" x 4" Conformable Reflective Sheeting tabs (DHT 165382) or 1 each of 3" x 12" Reflective Sheeting.

Note: Mailbox installations in sidewalk areas shall be in accordance with the latest TxDOT Pedestrian Facilities Curb ramps standard *PED-XX for pedestrian facilities.

*PED-XX: XX is the standard year for example PED- 12 , PED-13,etc.



PLACEMENT OF EMERGENCY LOCATION NUMBER

Location Number shall be placed on: 1. A yellow, type A plate with class 1 flat surface reflective sheeting in accordance with DMS 8600. The color of numbers shall be black. or 2: A green or blue plate with white numbers attached to post beside the object marker. Other contrasting color configuration, as approved , may be used. (Use Same type plate as used for the type 2 Object Marker. Recommended sign size is 6" by 15")

TYPICAL MAILBOX SIZE				LIGHT WEIGHT MATERIAL	
				SHEET METAL	**PLASTIC
SIZE	LENGTH (INCHES)	WIDTH (INCHES)	HEIGHT (INCHES)	MAXIMUM WEIGHT (POUNDS)	
SMALL	19 ½	6	7	5	5
MEDIUM	22 ½	8	11 ½	7	7
LARGE	23 ½*	11 ½*	13 ½*	10	10

* Maximum allowed dimensions for mailbox
** Excluding Molded Plastic on 4 X 4 Post

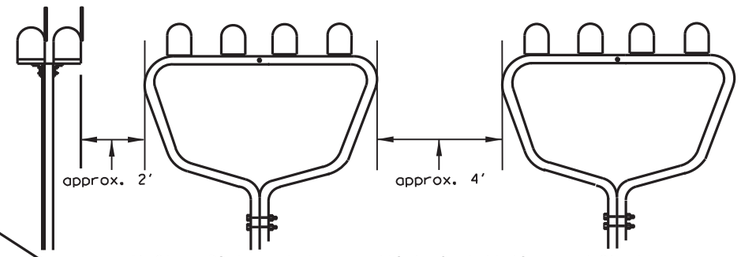
LOCKABLE ARCHITECTURAL MAILBOX SIZE (INCHES)					
VIEW	TOP	BOTTOM	FRONT SIDE	BACK SIDE	WEIGHT (POUNDS)
SIDE	18	15	18.3	15	22.4
BACK	11 ½	11 ½		15	

SEE TOP RIGHT CORNER OF SHEET 2 OF 4

MAILBOX SIZES

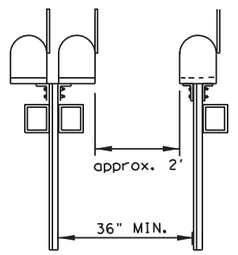
Mailboxes shall be made of light weight sheet metal or light weight plastic. Lockable architectural mailboxes shall meet the requirements of the above table.

Heavy steel, cast iron or decorative mailboxes shall not be used on the state highway system.



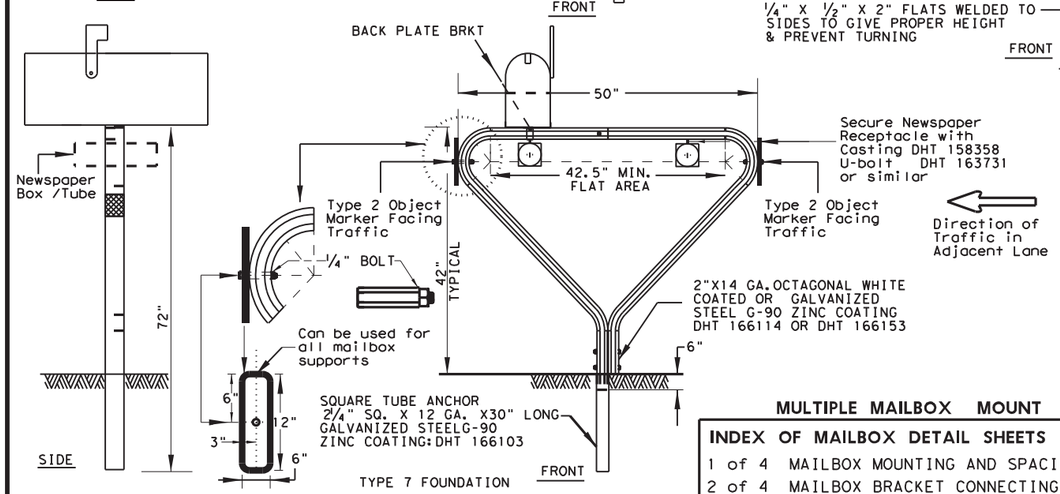
4' Clear Distance between multiple installations and 2' clearance between double or single installations and the multiple installation. DHT #'s 164116 or 149339.

MULTIPLE MAILBOX PLACEMENT



Clear Distance between single or double mounted posts. (Normally when 3 or more mailboxes are in one location, a multiple support is used).

SINGLE & DOUBLE MAILBOX PLACEMENT



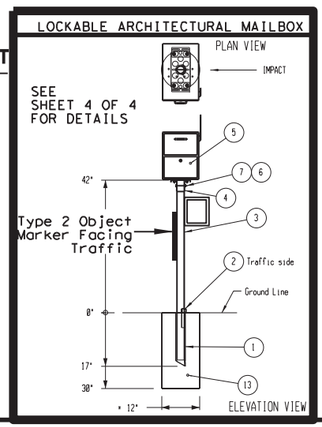
DOUBLE AND MULTIPLE MAILBOX MOUNT

FOR SUPPORT/FOUNDATION DETAILS SEE SHEET 3 OF 4 FOR DHT NUMBERS SEE SHEET 4 OF 4

NEWSPAPER RECEPTACLE

A light weight receptacle for newspaper delivery can be attached to mailbox posts as shown on this page if the receptacle:

- Does not touch the mailbox.
- Does not present a hazard to traffic or delivery of the mail.
- Does not extend beyond the front of the mailbox.
- Does not display advertising, except the publication title.
- Newspaper receptacles on separate supports are prohibited.



MULTIPLE MAILBOX MOUNT

INDEX OF MAILBOX DETAIL SHEETS

Texas Department of Transportation — Maintenance Division Standard

MAILBOX MOUNTING AND SPACING

MB-15(1)

FILE: MB14(1).DGN	DN: JEO	CK: JEO	DW:	CK:
©TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS: Added additional newspaper receptacle for double mailbox support	DIST	COUNTY		SHEET NO.

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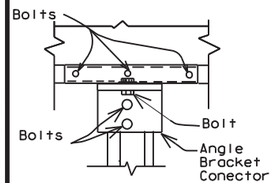
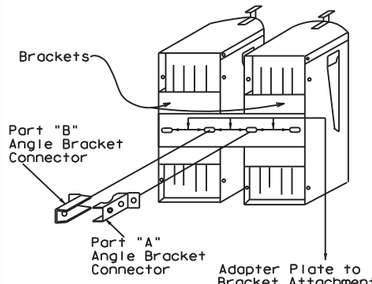


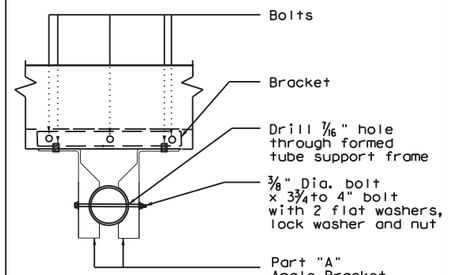
For bolt sizes see details below for "SMALL MAILBOX" and "MEDIUM AND LARGE MAILBOXES"

SINGLE MAILBOX

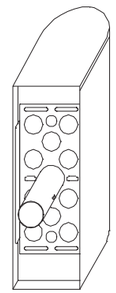


(Not permitted for Large Mailboxes)

DOUBLE MAILBOX

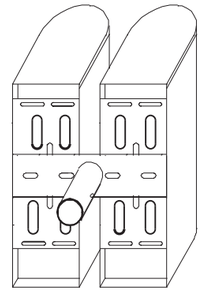


MULTIPLE MAILBOX



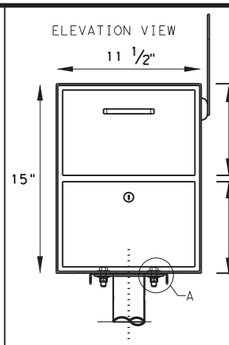
To be used with 2⅜" OD RR or thinwall Steel posts.

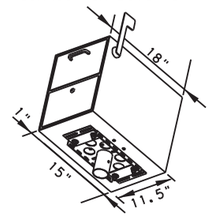
WELDED SINGLE MAILBOXBRACKET

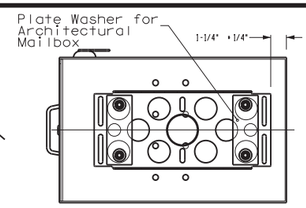


To be used with thinwall Steel posts. Not to be used with RR posts.

WELDED DOUBLE MAILBOX BRACKET WITHADAPTER PLATE

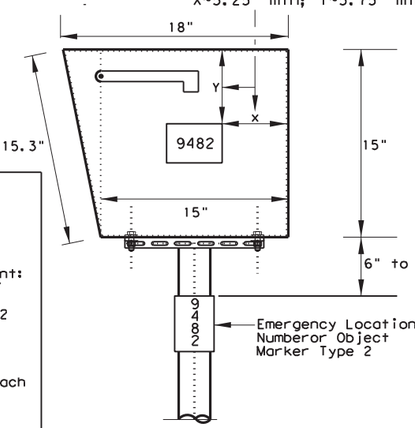






Preferred placement of Emergency Location Number

X~5.25" min; Y~5.75" min



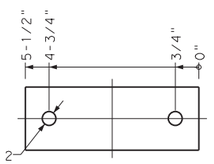
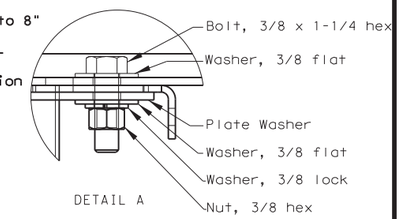
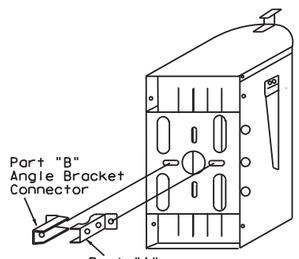
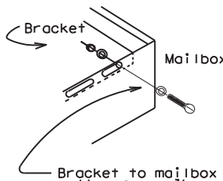


Plate Washer for Architectural Mailbox Plate, 2" x 1/8" ASTM A36 Steel



LOCKABLE ARCHITECTURAL MAILBOX CONNECTION DETAILS



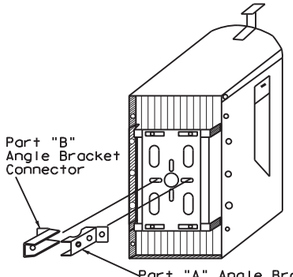


Bracket to mailbox attachment: 6 - ¼" Dia. x ¾" bolt w/ 2 flat washers and nut per each bolt.

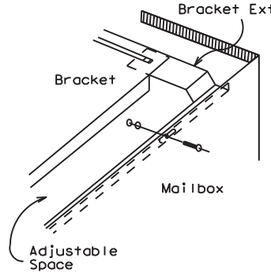
Angle to bracket attachment: 2 - ⅜" Dia. x ¾" bolt with 2 flat washers, lock washer and nut per each bolt.

Angle to 2 - ⅜" Dia. x 2½" bolt with 2 flat washers, lock washer and nut per each bolt.

SMALL MAILBOX



Use both Parts "A" and "B" Angle Bracket Connectors for Winged Channel Posts



Bracket to mailbox attachment: 6 - ¼" Dia. x ¾" bolt w/2 flat washers and nut per each bolt.

Bracket to bracket extension attachment: 2 - ¼" Dia. x ¾" carriage bolt w/ flat washer, lock washer and nut per bolt (4 bolts required if 2 bracket extensions are used).

Angle to bracket attachment: 2 - ⅜" Dia. x ¾" bolt w/2 flat washers, lock washer and nut per each bolt.

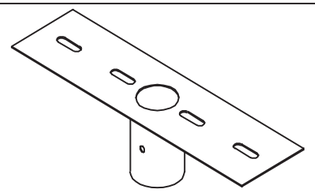
Angle to mailbox support attachment: 2 - ⅜" Dia. x 2½" bolt w/2 flat washers, lock washer, and nut per each bolt.

Medium size mailboxes - one extension bracket
Large size mailboxes - two extension brackets

MEDIUM AND LARGE MAILBOXES

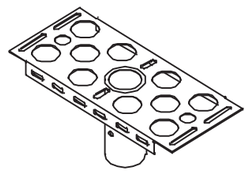
GENERAL NOTES

1. Connecting hardware detailed on this sheet is for the hardware that the Department stocks at the Regional Warehouses. This hardware is available to the contractor only when so stated elsewhere in the plans or specification.
2. Hardware for mounting mailboxes to the support/foundation furnished by industry should be used when shown on the Maintenance Divisions "Approved Products List." Only mailbox hardware that have been crash tested in accordance with NCHRP Report 350, will be on the approved list.
3. Hardware furnished by industry shall be erected in accordance with the manufacturer's recommendation.
4. Bracket and bracket extension shall be constructed of 14 gauge galvanized steel sheet metal.
5. The angles, brackets and adapter plates shall be constructed of 12 gauge galvanized steel sheet metal.
6. Items with evidence of damage to the galvanized coating or wet storage stains (white rust) will not be accepted.



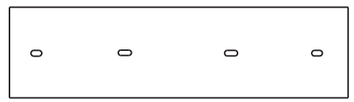
DHT 162323

For use with galvanized thinwall steel posts DHT # 143426 or powder-coated thinwall steel post DHT # 162911.



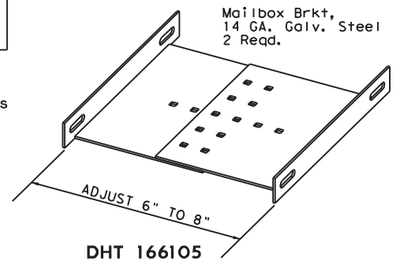
DHT 161443

For use with RCR post DHT # 161442 or galvanized thinwall steel post DHT # 143426 or powder-coated thinwall steel post. DHT # 162911.

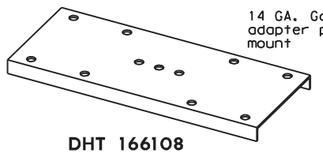


DHT #3789

Used for mounting two Mailboxes on the same post.

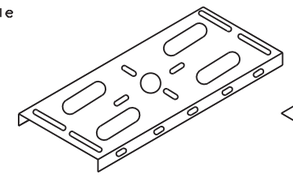


DHT 166105



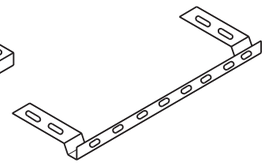
14 GA. Galv. Steel adapter plate for double mount

DHT 166108



DHT 148939

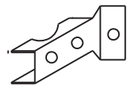
Mailbox Bracket



DHT 148938

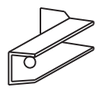
Used for extending 6" wide bracket to attach larger mailboxes.

Bracket Extension



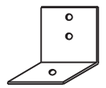
DHT 159489

Part "A" Angle Bracket Connector



DHT 159490

Part "B" Angle Bracket Connector



DHT 2917

Angle Bracket For Temporary Mailbox

HARDWARE AT TXDOT REGIONAL WAREHOUSES

Brackets and adapter plate shown in this section should be available to the Contractor when stated elsewhere in plans or specifications.

See Table of Applicable DHT Numbers on sheet 4 of 4 for DHT description and unit of measure.

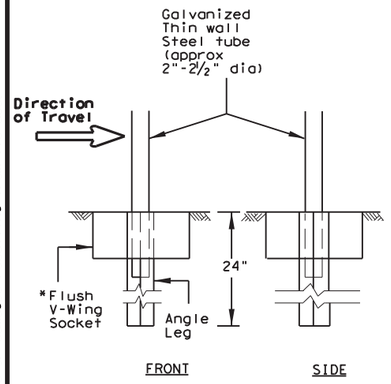
Texas Department of Transportation

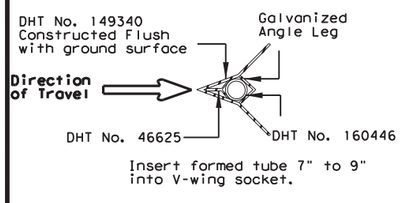
Maintenance Division Standard

MAILBOX BRACKET CONNECTING DETAILS

MB-15(1)

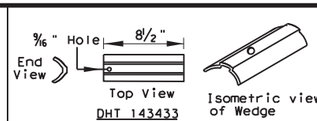
FILE:MB14(1).DGN	DN: JEO	CK:	DW: JEO	CK:
©TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS ADDED DHT 163730	DIST	COUNTY		SHEET NO.





TYPE 1 SUPPORT/FOUNDATION

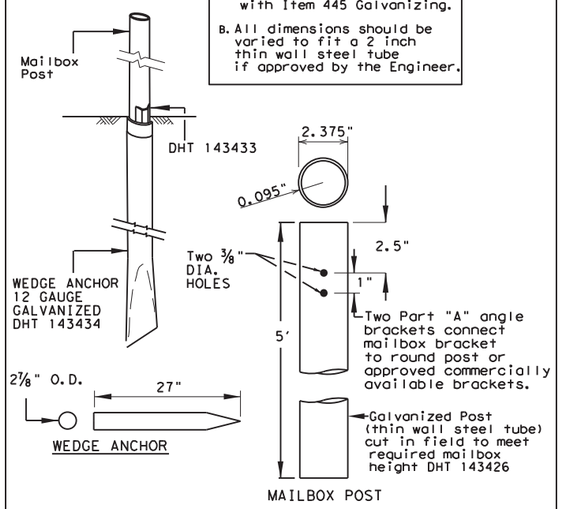
THIN WALL STEEL TUBE w/ V-LOC ANCHORAGE



NOTES FOR TYPE 2 SUPPORT/FOUNDATION

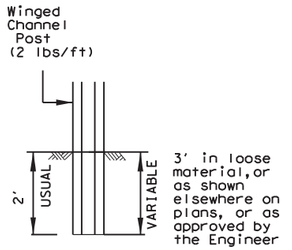
A. Galvanize steel support foundation in accordance with Item 445 Galvanizing.

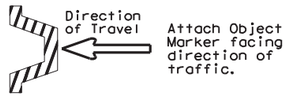
B. All dimensions should be varied to fit a 2 inch thin wall steel tube if approved by the Engineer.



TYPE 2 SUPPORT/FOUNDATION

THIN WALL STEEL TUBE w/ WEDGE ANCHOR SYSTEM



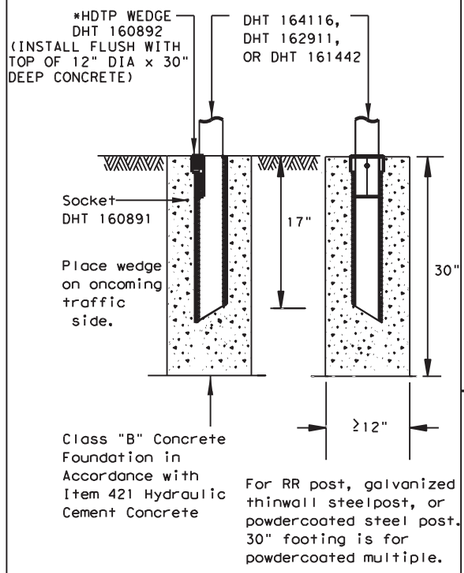


DHT No. 4289 to
ASTM A 1011
SS GRADE 50, STEEL.

TYPE 3 SUPPORT/FOUNDATION

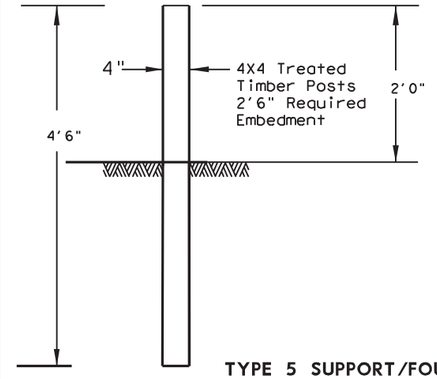
WINGED CHANNEL POST

Note on DHT Number
See Table of Applicable DHT
Numbers on this sheet 4 for
DHT description.



TYPE 4 SUPPORT/FOUNDATION

FOR WHITECOATED STEEL POST, MULTIPLE POST, AND RECYCLED RUBBER.

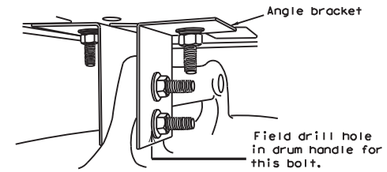


TYPE 5 SUPPORT/FOUNDATION

FOR ONE PIECE MOLDED PLASTIC MAILBOX

ONE PIECE MOLDED PLASTIC MAILBOXES

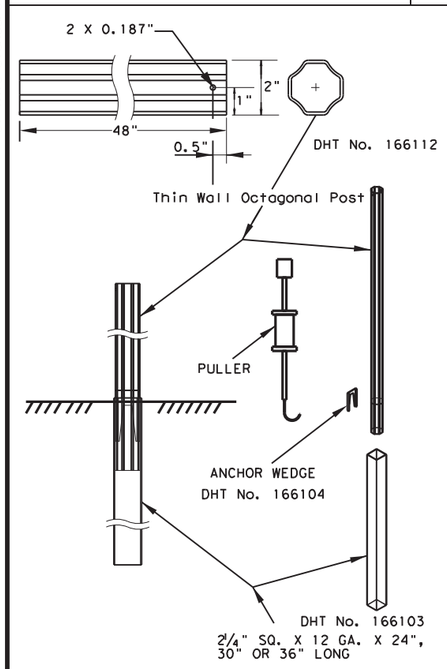
Molded Plastic Mailboxes shall be installed on 4"x4" treated timber posts only. The use of steel pipe or structural tubing in place of timber post is prohibited.



Placed on approved plastic drum as shown in the Compliant Work Zone Traffic Control Devices (CWZTCD).
Existing attachment hardware shall be used unless damaged. Damaged hardware shall be replaced.

TYPE 6 TEMPORARY MAILBOX SUPPORT

CONNECTION DETAIL



TYPE 7 MAILBOX SUPPORT/FOUNDATION

CONNECTION DETAIL

MB-(X) ASSM TY (XXX) (X) (XX) (OPTIONAL)

Type of Mailbox
- S = Single
- D = Double
- M = Multiple
- SP = Single Plastic

Type of Post
- WC = Winged Channel Post
- RR = Recycled Rubber
- TWW = Thin Walled White Tubing
- TWG = Thin Walled Galvanized Tubing
- TIM = Timber

Type of Foundation
- Ty 1 = V-Loc
- Ty 2 = Wedge Anchor Steel System
- Ty 3 = Winged Channel post
- Ty 4 = Wedge Anchor Plastic System
- Ty 5 = 4 X 4 Post
- Ty 7 = Wedge Anchor

Type of Bracket
- AB = Angle Bracket.
- TB = 2.375" Tube Bracket

GENERAL NOTES

1. Erect post plumb or vertical.
2. When galvanized part is required galvanize in accordance with Item 445.
3. type 1, 2, 3, 4 or 7 supports or foundation can be used for single or double mailbox installations. The RCR post should be used only for a single installation with a small mailbox. The Type 5 support/foundation is used for the single molded plastic mailbox. The Type 4 support/foundation is used for the 2.375" O.D. RR post, thin wall steel post, and white multiple mailbox post.
4. The Type 1 or type 7 support/foundation can be used for a multiple mailbox mount.
5. The Type 4 support should be used with thin wall steel pipe for the medium, large and double mailbox installations.
6. Use a concrete footing as shown or when directed. Concrete footing will be required when soils do not hold the support/foundations in a stable condition.

DOUBLE AND LARGE MAILBOXES MUST BE ON STEEL POST.

*HDTP: High density thermoplastic polyesters

Texas Department of Transportation

Maintenance Division Standard

MAILBOX SUPPORT AND FOUNDATION

MB-15(1)

FILE: MB14(1).DGN	DN: JEO	CK:	DW: JEO	CK:
©TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.

LOCKABLE ARCHITECTURAL MAILBOX

SINGLE-MOUNT INSTALLATION PARTS			
#	PART NAME	PART/DHT #	QTY
1	SOCKET, TYPE 4 FOUNDATION	160891	1
2	WEDGE FOR TYPE 4 FOUNDATION	160892	1
3	THIN-WALL WHITE STEEL TUBE 2.375 OD	162911	1
4	BRACKET FOR ATTACHING MAILBOX	161443	1
5	ARCHITECTURAL MAILBOX	SEE NOTE	1
6	NUT, 5/16" HEX	NUT, 5/16" HEX	1
7	BOLT, 5/16 X 3 HEX	GRADE 5	1
8	PLATE WASHER FOR ARCHITECTURAL MAILBOX	SEE SEE SHEET 2	2
9	WASHER, 3/8 FLAT		8
10	WASHER, 3/8 LOCK		4
11	NUT, 3/8 HEX		4
12	BOLT, 3/8 X 1-1/4 HEX	GRADE 5	4
13	CONCRETE, CLASS B (2000 PSI)		1

LOCKABLE ARCHITECTURAL MAILBOX DETAILS

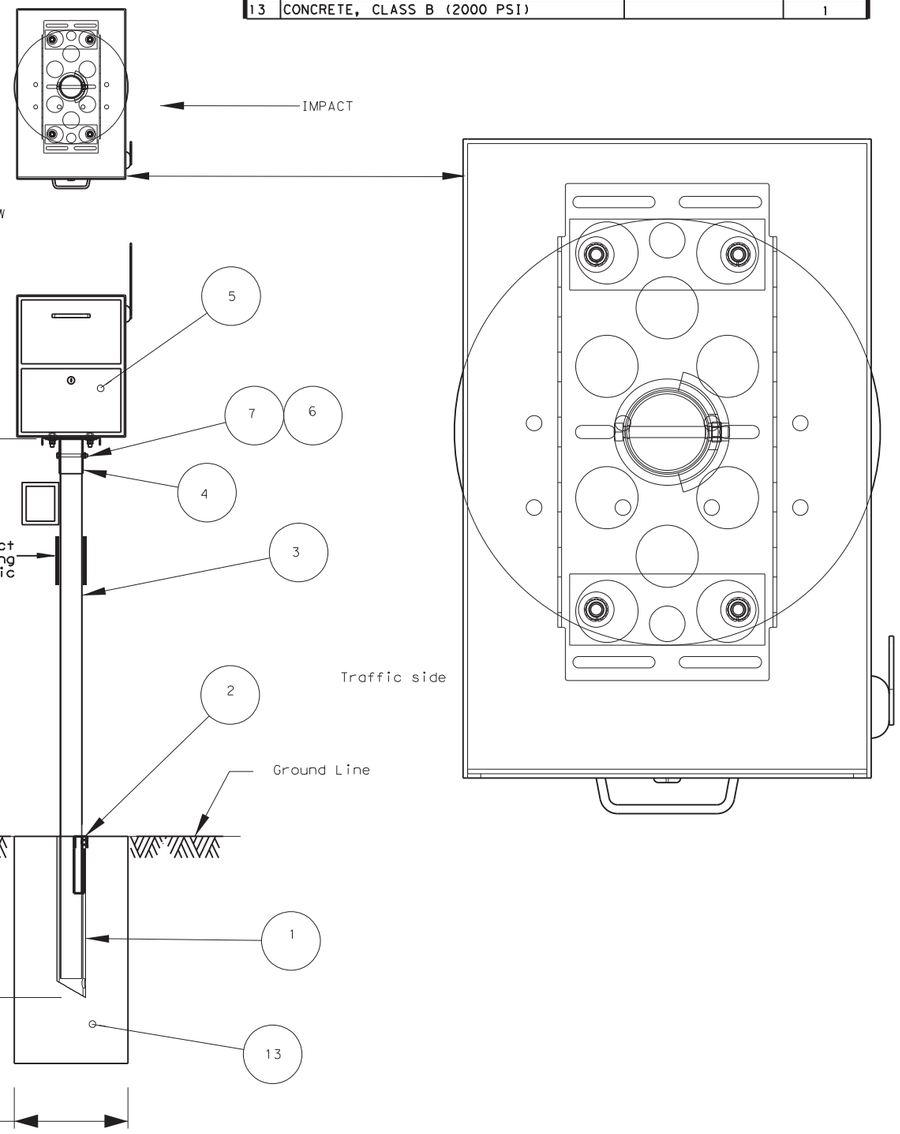


TABLE OF APPLICABLE DHT NUMBERS	
DHT NUMBER	DESCRIPTION
	FOUNDATIONS
46625	WEDGE FOR V-WING SOCKET FOR TYPE 1 FOUNDATION
149340	V-WING SOCKET FOR TYPE 1 FOUNDATION
143433	WEDGE FOR TYPE 2 FOUNDATION
143434	ANCHOR FOR TYPE 2 FOUNDATION
166103	ANCHOR FOR TYPE 7 FOUNDATION
160891	SOCKET FOR TYPE 4 FOUNDATION
160892	WEDGE FOR TYPE 4 FOUNDATION
166104	WEDGE FOR TYPE 7 FOUNDATION
	POSTS
4289	WINGED CHANNEL MAILBOX POST
149339	MULTIPLE MAILBOX POST (GALVANIZED TUBING)
164116	MULTIPLE MAILBOX POST (WHITE COATED)
166114	MULTIPLE MAILBOX POST (WHITE COATED OCTAGONAL)
166153	MULTIPLE MAILBOX POST (GALVANIZED OCTAGONAL)
161442	RECYCLED RUBBER POST. FOR SMALL MAILBOX ONLY
143426	THIN-WALL GALVANIZED STEEL TUBE 2.375" OUTER DIAMETER
162911	THINWALL WHITE STEEL TUBE 2.375" OUTER DIAMETER
166152	SINGLE OR DOUBLE THIN-WALL MAILBOX POST GALVANIZED 2" OCTAGONAL
166112	SINGLE OR DOUBLE THIN-WALL MAILBOX POST WHITECOATED 2" OCTAGONAL
	REFLECTIVE SHEETING
161812	REFLECTIVE SHEETING FOR EMERGENCY LOCATION NUMBER PANEL
	CONNECTING HARDWARE
2917	ANGLE BRACKET USED FOR TEMPORARY MAILBOX SUPPORT
166105	BRACKET FOR SINGLE MOUNTING OF MAILBOXES (MOUNTING KIT)
3789	PLATE FOR DOUBLE MOUNTING OF MAILBOXES
166108	BRACKET FOR DOUBLE MOUNTING OF MAILBOXES (MOUNTING KIT)
166111	BRACKET FOR MULTIPLE MOUNTING OF MAILBOXES (MOUNTING KIT)
148939	BRACKET FOR ATTACHING SMALL OR MEDIUM SIZE MAIL BOX
148938	EXTENDER TO BRACKET FOR ATTACHING LARGE MAILBOX
159489	ANGLE BRACKET PART A
159490	ANGLE BRACKET PART B
162323	BRACKET FOR DOUBLE MOUNTING OF MAILBOXES ON THINWALL STEEL POST, GALVANIZED OR POWDERCOATED.
161443	BRACKET FOR ATTACHING MAILBOX TO RECYCLED RUBBER POST AND TO MULTIPLE WHITE MAILBOX POST
158358	CASTING (NEWSPAPER RECEPTACLE BRACKET)
163731	U-BOLT (NEWSPAPER RECEPTACLE BRACKET)
160698	BOLT;HEX HEAD, GALV;3/8"DIA X 3/4"L HD, W/2-FLAT WASHERS
163750	BOLT;HEX HEAD, GALV;3/8" X 1-1/2, 16 NC, W/WASHERS
160701	BOLT;HEX HEAD, GALV;3/8"DIA X 2-1/2"L, HD, W/2-FLAT WASHERS
163730	BOLT;HEX HEAD, GALV;3/8" X 3-1/2", NC, W/NUT, 2 FLAT WASHERS
160699	BOLT;HEX HEAD, GALV;3/8"DIA X 3-3/4"L HD, W/2-FLAT WASHERS
160700	BOLT;HEX HEAD, GALV;3/8"DIA X 4"L HD, W/2-FLAT WASHERS

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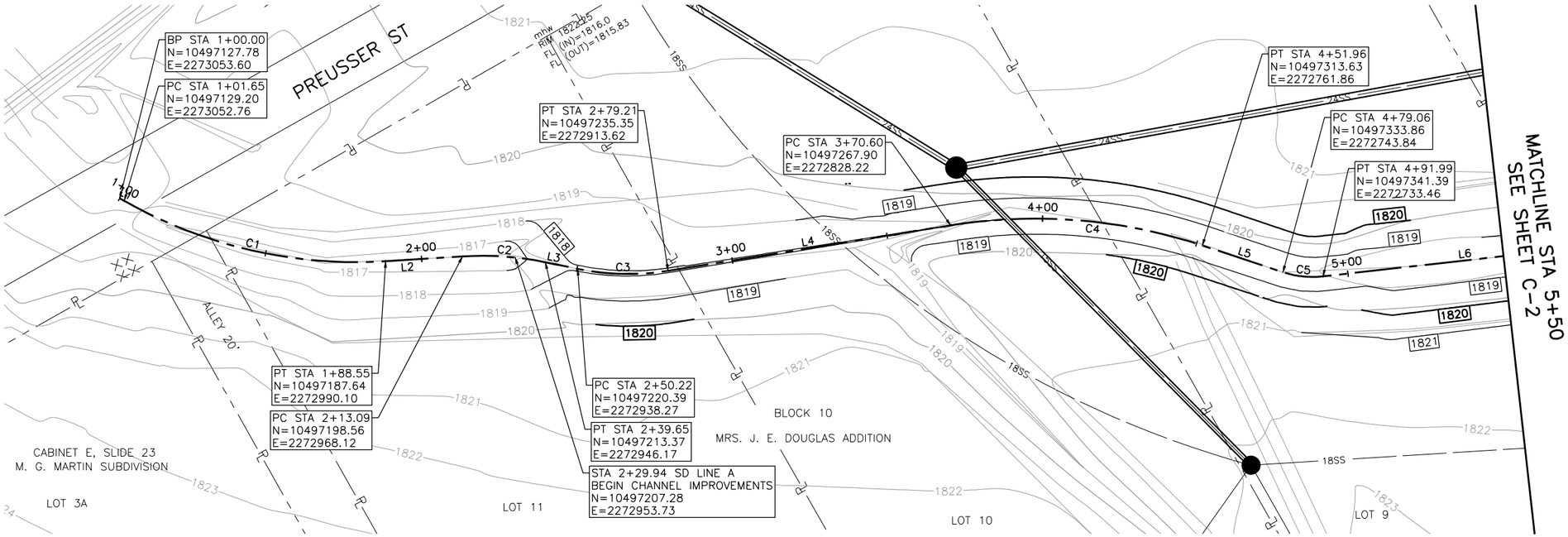
DHT NUMBERS TABLE

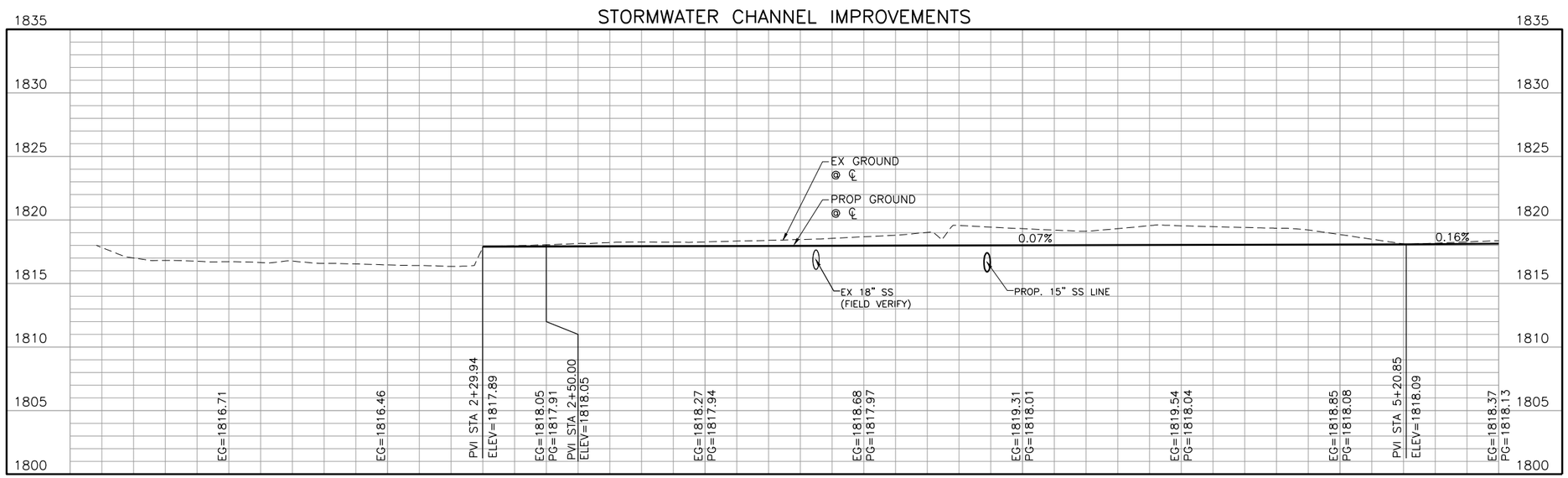
MB-15(1)

FILE:MB14(1).DGN	DN:	CK:	DW:	CK:
©TxDOT APRIL 2015	CONT	SECT	JOB	HIGHWAY
REVISIONS				
	DIST	COUNTY		SHEET NO.

SD LINE A						
NUMBER	START	END	DELTA	RADIUS	LENGTH	LINE/CHORD DIRECTION
L1	STA 1+00.00 N=10497127.78 E=2273053.60	STA 1+01.65 N=10497129.20 E=2273052.76			1.653	N30° 24' 10.03"W
C1	STA 1+01.65 N=10497129.20 E=2273052.76	STA 1+88.55 N=10497187.64 E=2272990.10	033.19'	150.000	86.895	N46° 59' 54.85"W
L2	STA 1+88.55 N=10497187.64 E=2272990.10	STA 2+13.09 N=10497198.56 E=2272968.12			24.538	N63° 35' 39.68"W
C2	STA 2+13.09 N=10497198.56 E=2272968.12	STA 2+39.65 N=10497213.37 E=2272946.17	015.22'	100.000	26.562	N55° 59' 05.46"W
L3	STA 2+39.65 N=10497213.37 E=2272946.17	STA 2+50.22 N=10497220.39 E=2272938.27			10.571	N48° 22' 31.25"W
C3	STA 2+50.22 N=10497220.39 E=2272938.27	STA 2+79.21 N=10497235.35 E=2272913.62	020.76'	80.000	28.987	N58° 45' 19.83"W

SD LINE A						
NUMBER	START	END	DELTA	RADIUS	LENGTH	LINE/CHORD DIRECTION
L4	STA 2+79.21 N=10497235.35 E=2272913.62	STA 3+70.60 N=10497267.90 E=2272828.22			91.394	N69° 08' 08.36"W
C4	STA 3+70.60 N=10497267.90 E=2272828.22	STA 4+51.96 N=10497313.63 E=2272761.86	027.42'	170.000	81.364	N55° 25' 27.79"W
L5	STA 4+51.96 N=10497313.63 E=2272761.86	STA 4+79.06 N=10497333.86 E=2272743.84			27.092	N41° 41' 44.73"W
C5	STA 4+79.06 N=10497333.86 E=2272743.84	STA 4+91.99 N=10497341.39 E=2272733.46	024.70'	30.000	12.931	N54° 02' 37.10"W
L6	STA 4+91.99 N=10497341.39 E=2272733.46	STA 5+75.31 N=10497374.76 E=2272657.10			83.326	N66° 23' 30.25"W





LEGEND

- TREE PROTECTION
- TREE DEMOLITION
- PROPOSED CONTOUR (1817)
- EXISTING CONTOUR (1817)

NOTES:

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0 20' 40'
SCALE IN FEET
HORIZONTAL

0 5' 10'
SCALE IN FEET
VERTICAL

100% SUBMITTAL

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144
TEXAS KEVIN MORRIS 105091 LICENSED PROFESSIONAL ENGINEER
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CITY OF SAN ANGELO, TEXAS

BELL ST. ROADWAY & UTILITY IMPROVEMENTS

CIVIL

STORMWATER CHANNEL IMPROVEMENTS PLAN AND PROFILE

FILE BEGIN TO STA 5+50

F&N JOB NO. SAN16188
DATE 8/18/17
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FILE NAME CV-DRA-PP-SD01.dwg

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SHEET C-1
SEQ. 56

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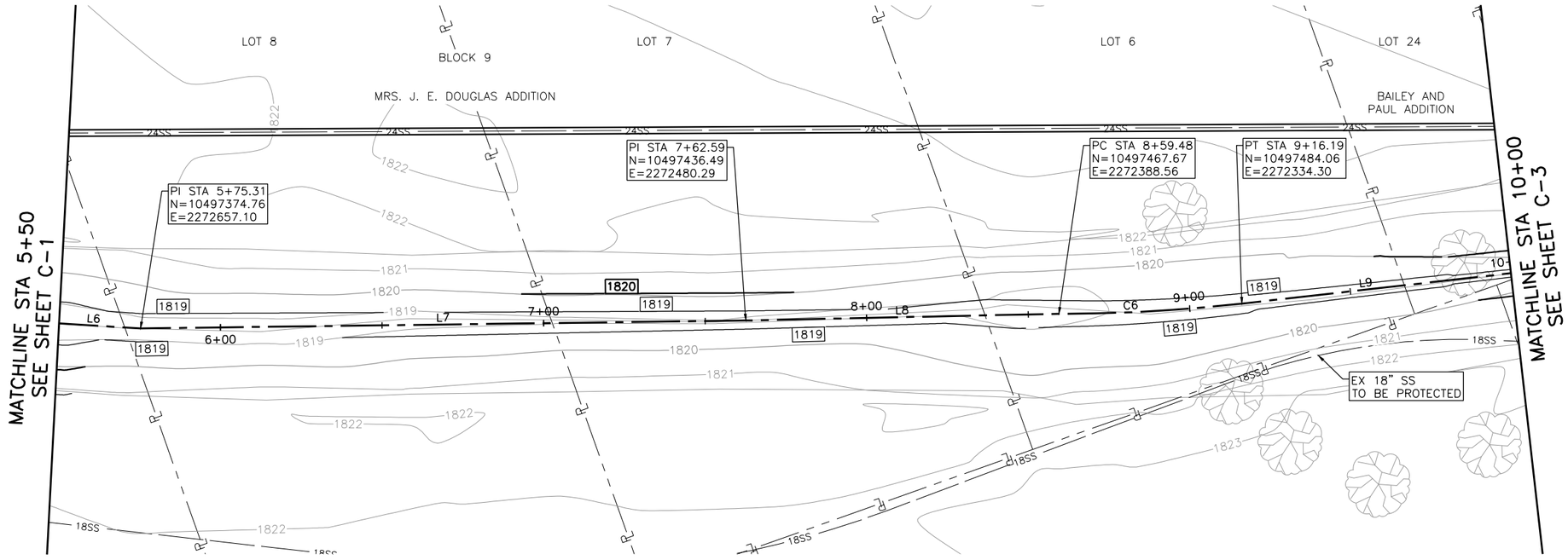
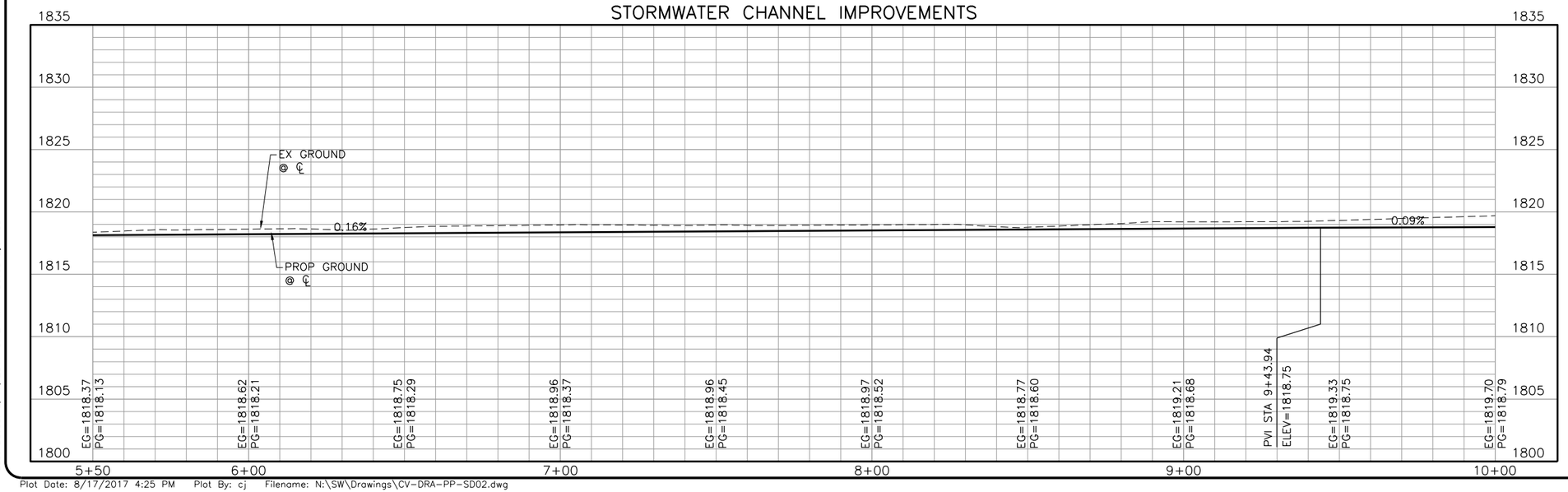
SD LINE A						
NUMBER	START	END	DELTA	RADIUS	LENGTH	LINE/CHORD DIRECTION
L6	STA 4+91.99 N=10497341.39 E=2272733.46	STA 5+75.31 N=10497374.76 E=2272657.10			83.326	N66° 23' 30.25"W
L7	STA 5+75.31 N=10497374.76 E=2272657.10	STA 7+62.59 N=10497436.49 E=2272480.29			187.274	N70° 45' 21.97"W
L8	STA 7+62.59 N=10497436.49 E=2272480.29	STA 8+59.48 N=10497467.67 E=2272388.56			96.892	N71° 13' 42.02"W
C6	STA 8+59.48 N=10497467.67 E=2272388.56	STA 9+16.19 N=10497484.06 E=2272334.30	006.50'	500.000	56.709	N73° 11' 17.14"W
L9	STA 9+16.19 N=10497484.06 E=2272334.30	STA 10+61.37 N=10497518.11 E=2272193.17			145.184	N76° 26' 14.26"W





LEGEND

- TREE PROTECTION
- TREE DEMOLITION
- PROPOSED CONTOUR (1817)
- EXISTING CONTOUR (1817)

NOTES:

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SCALE IN FEET
HORIZONTAL

0 5' 10'
SCALE IN FEET
VERTICAL

100% SUBMITTAL

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CIVIL

STORMWATER CHANNEL IMPROVEMENTS
PLAN AND PROFILE STA 5+50 TO STA 10+00

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SHEET C-2
SEQ. 57

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SD LINE A						
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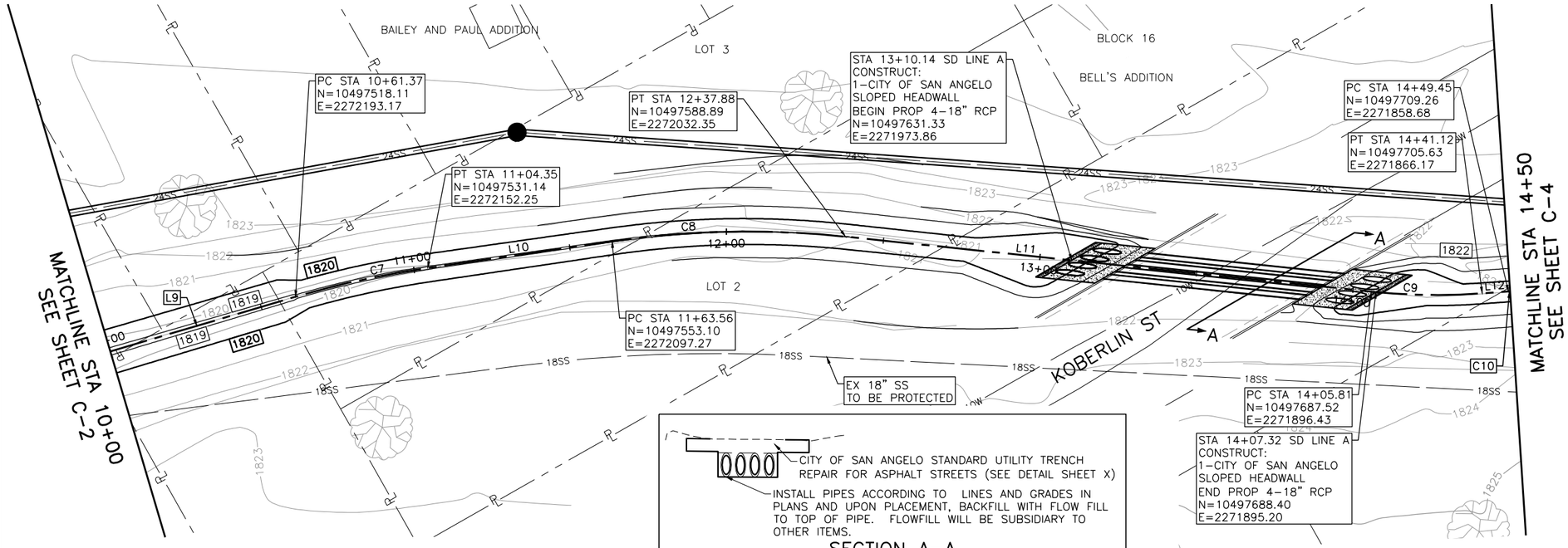
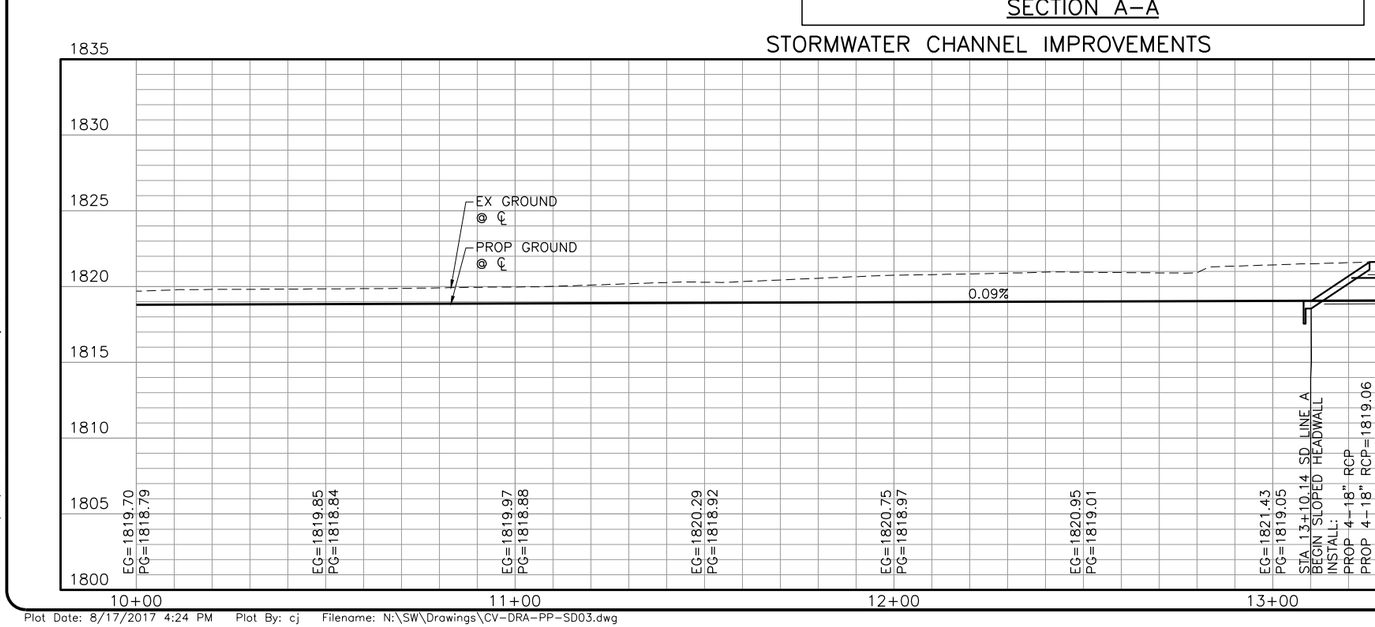
L9	STA 9+16.19 N=10497484.06 E=2272334.30	STA 10+61.37 N=10497518.11 E=2272193.17			145.184	N76° 26' 14.26"W
C7	STA 10+61.37 N=10497518.11 E=2272193.17	STA 11+04.35 N=10497531.14 E=2272152.25	008.21'	300.000	42.979	N72° 19' 59.11"W
L10	STA 11+04.35 N=10497531.14 E=2272152.25	STA 11+63.56 N=10497553.10 E=2272097.27			59.205	N68° 13' 43.97"W
C8	STA 11+63.56 N=10497553.10 E=2272097.27	STA 12+37.88 N=10497588.89 E=2272032.35	014.19'	300.000	74.323	N61° 07' 53.54"W
L11	STA 12+37.88 N=10497588.89 E=2272032.35	STA 14+05.81 N=10497687.52 E=2271896.43			167.929	N54° 02' 03.10"W

SD LINE A						
NUMBER	START	END	DELTA	RADIUS	LENGTH	LINE/CHORD DIRECTION
C9	STA 14+05.81 N=10497687.52 E=2271896.43	STA 14+41.12 N=10497705.63 E=2271866.17	010.12'	200.000	35.308	N59° 05' 30.13"W
L12	STA 14+41.12 N=10497705.63 E=2271866.17	STA 14+49.45 N=10497709.26 E=2271858.68			8.330	N64° 08' 57.16"W
C10	STA 14+49.45 N=10497709.26 E=2271858.68	STA 14+75.34 N=10497722.03 E=2271836.17	007.42'	200.000	25.896	N60° 26' 23.71"W





LEGEND

- TREE PROTECTION
- TREE DEMOLITION
- PROPOSED CONTOUR
- EXISTING CONTOUR

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N

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SCALE IN FEET
HORIZONTAL

0 5' 10'
SCALE IN FEET
VERTICAL

100% SUBMITTAL

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CITY OF SAN ANGELO, TEXAS

BELL ST. ROADWAY & UTILITY IMPROVEMENTS

CIVIL

STORMWATER CHANNEL IMPROVEMENTS
PLAN AND PROFILE STA 10+00 TO STA 14+50

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0 1"

SHEET C-3
SEQ. 58

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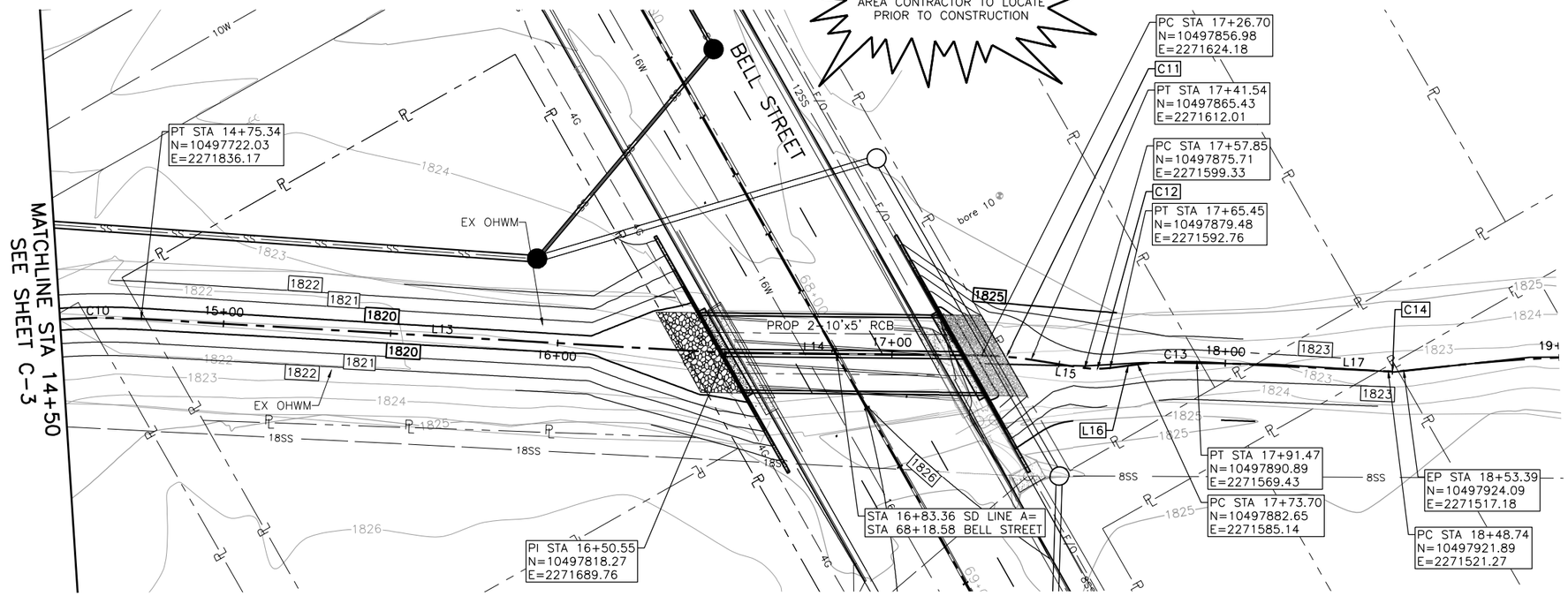
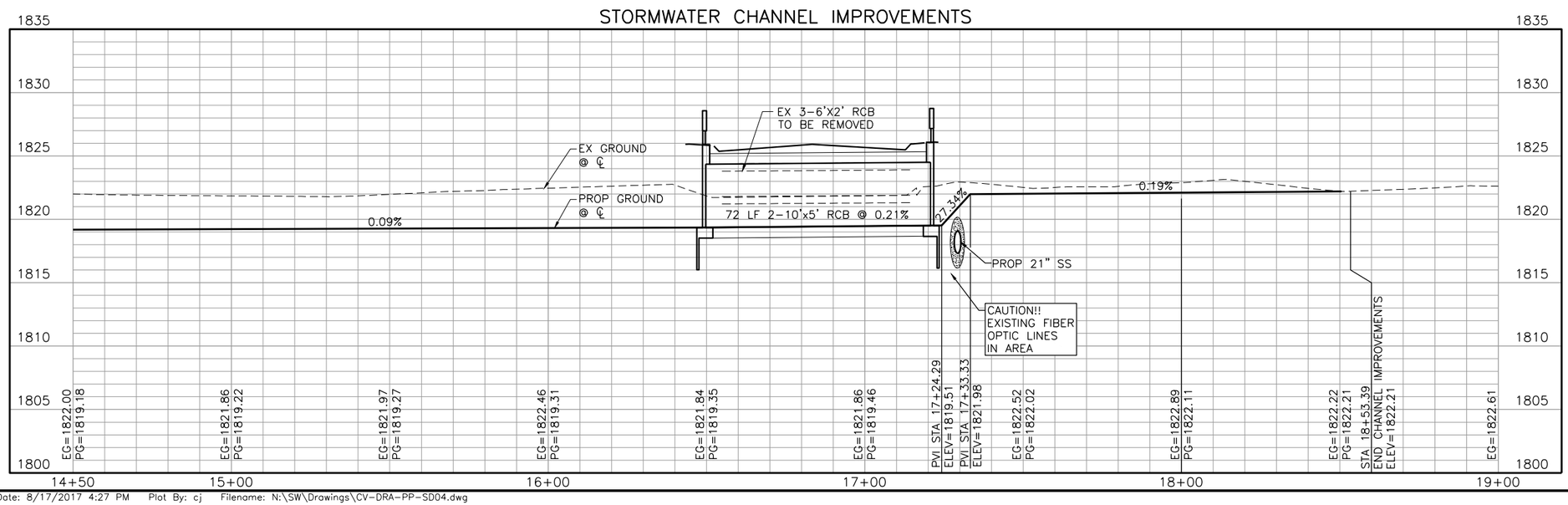
SD LINE A						
NUMBER	START	END	DELTA	RADIUS	LENGTH	LINE/CHORD DIRECTION
C10	STA 14+49.45 N=10497709.26 E=2271858.68	STA 14+75.34 N=10497722.03 E=2271836.17	007.42'	200.000	25.896	N60° 26' 23.71"W
L13	STA 14+75.34 N=10497722.03 E=2271836.17	STA 16+50.55 N=10497818.27 E=2271689.76			175.207	N56° 40' 52.49"W
L14	STA 16+50.55 N=10497818.27 E=2271689.76	STA 17+26.70 N=10497856.98 E=2271624.18			76.157	N59° 27' 05.47"W
C11	STA 17+26.70 N=10497856.98 E=2271624.18	STA 17+41.54 N=10497865.43 E=2271612.01	008.50'	100.000	14.831	N55° 12' 09.89"W
L15	STA 17+41.54 N=10497865.43 E=2271612.01	STA 17+57.85 N=10497875.71 E=2271599.33			16.317	N50° 57' 14.32"W
C12	STA 17+57.85 N=10497875.71 E=2271599.33	STA 17+65.45 N=10497879.48 E=2271592.76	014.52'	30.000	7.601	N60° 09' 16.78"W

SD LINE A						
NUMBER	START	END	DELTA	RADIUS	LENGTH	LINE/CHORD DIRECTION
L16	STA 17+65.45 N=10497879.48 E=2271592.76	STA 17+73.70 N=10497882.65 E=2271585.14			8.248	N67° 24' 48.54"W
C13	STA 17+73.70 N=10497882.65 E=2271585.14	STA 17+91.47 N=10497890.89 E=2271569.43	010.18'	100.000	17.766	N62° 19' 26.19"W
L17	STA 17+91.47 N=10497890.89 E=2271569.43	STA 18+48.74 N=10497921.89 E=2271521.27			57.275	N57° 14' 03.84"W
C14	STA 18+48.74 N=10497921.89 E=2271521.27	STA 18+53.39 N=10497924.09 E=2271517.18	008.87'	30.000	4.647	N61° 40' 18.42"W

CAUTION!!!

EXISTING FIBER OPTIC LINES IN AREA CONTRACTOR TO LOCATE PRIOR TO CONSTRUCTION





LEGEND

- TREE PROTECTION
- TREE DEMOLITION
- PROPOSED CONTOUR
- EXISTING CONTOUR

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N

0 20' 40'
SCALE IN FEET
HORIZONTAL

0 5' 10'
SCALE IN FEET
VERTICAL

100% SUBMITTAL

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

STATE OF TEXAS
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105091
LICENSED
PROFESSIONAL ENGINEER
10/23/2017

STATE OF TEXAS
HEATHER RAE KEISTER
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CITY OF SAN ANGELO, TEXAS

BELL ST. ROADWAY & UTILITY IMPROVEMENTS

CIVIL

STORMWATER CHANNEL IMPROVEMENTS
PLAN AND PROFILE STA 14+50 TO END

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SHEET C-4
SEQ. 59

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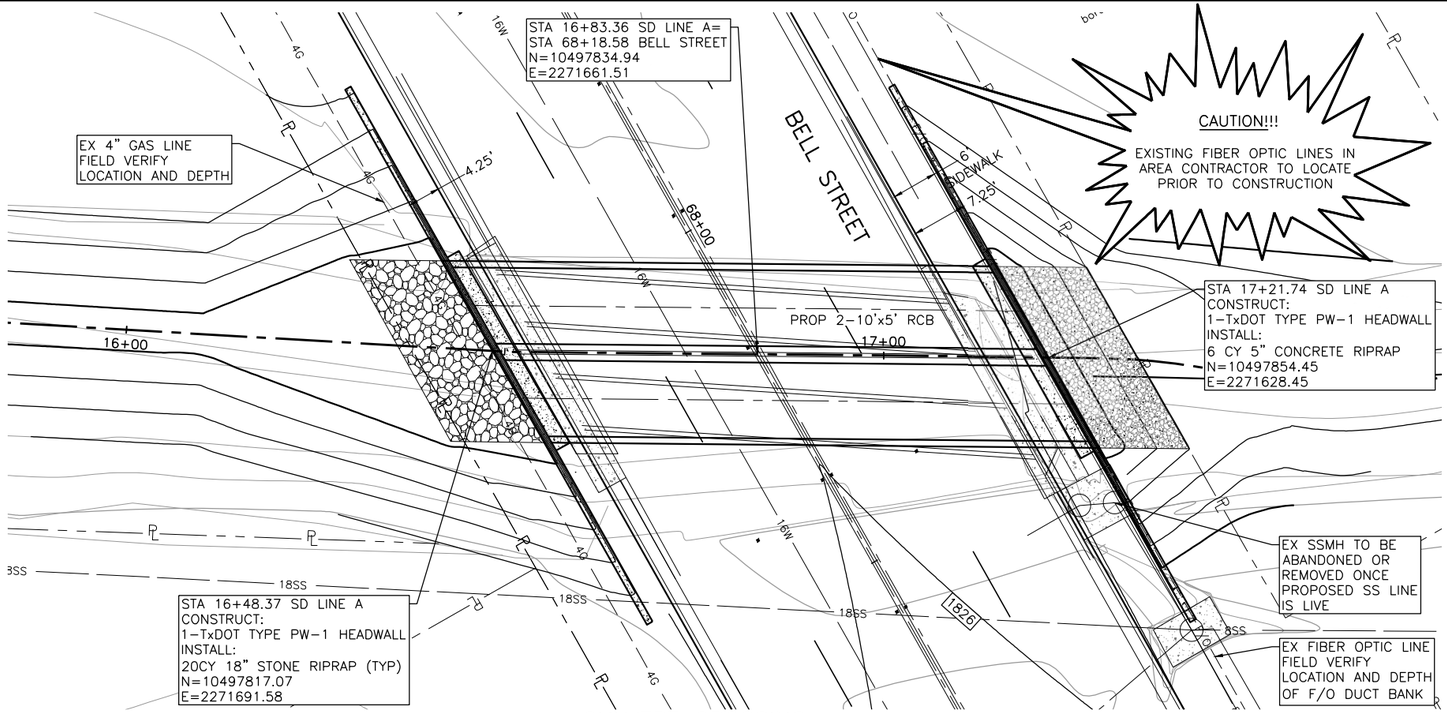

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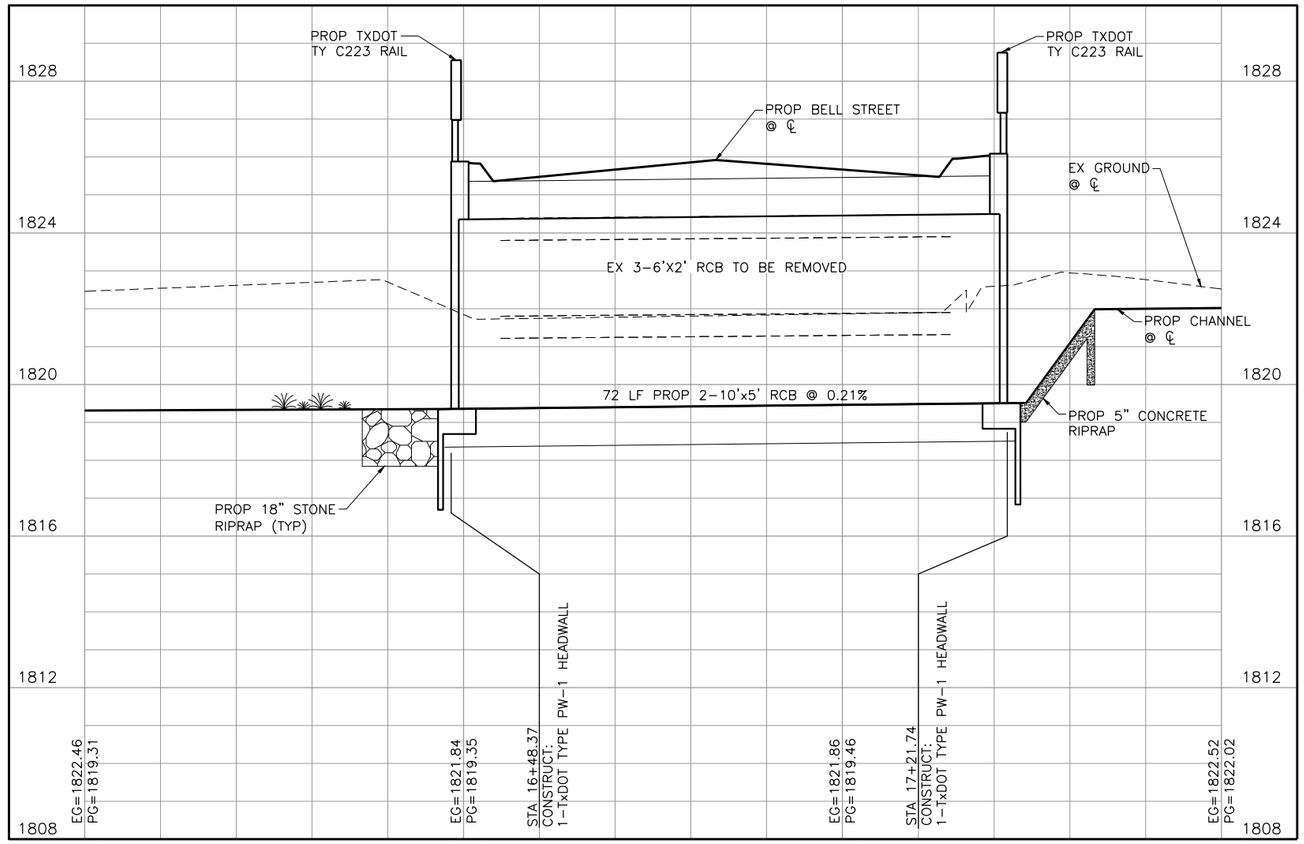

LEGEND

1817 PROPOSED CONTOUR

1817 EXISTING CONTOUR

0 10' 20'
SCALE IN FEET
HORIZONTAL

0 2 4
SCALE IN FEET
VERTICAL

100% SUBMITTAL

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Texas Registered Engineering Firm F-2144

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CULVERT CROSSING AT BELL STREET

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FILE NAME CV-DRA-PP-SD06.dwg

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SHEET C-5
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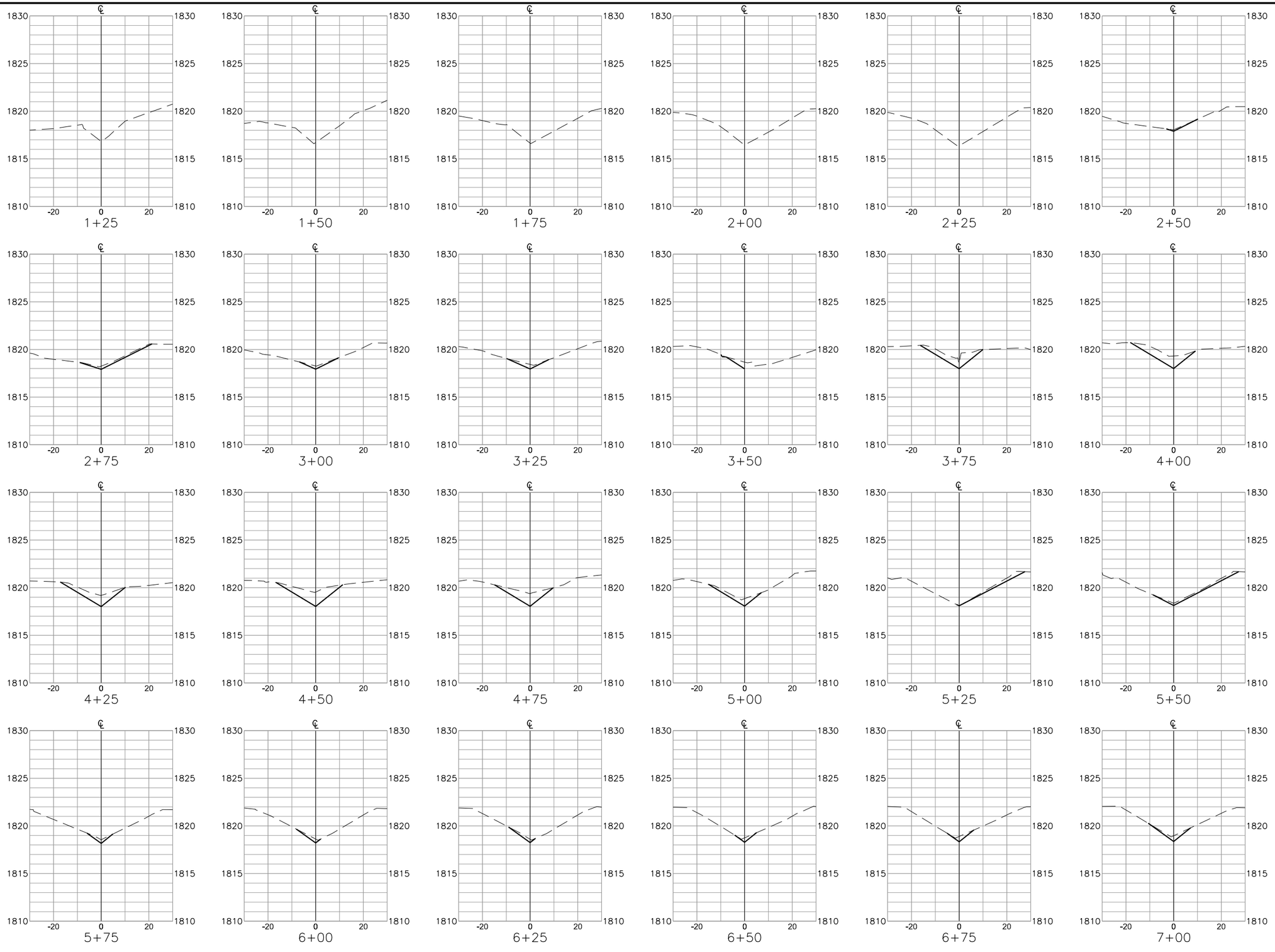

0 20' 40'
SCALE IN FEET
HORIZONTAL

0 5' 10'
SCALE IN FEET
VERTICAL

100% SUBMITTAL

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STORMWATER CHANNEL IMPROVEMENTS
CROSS SECTIONS STA 1+25 TO STA 7+00

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REVISED
CHECKED
FILE NAME CV-DRA-PR-XS01.dwg

SHEET C-6
SEQ. 61

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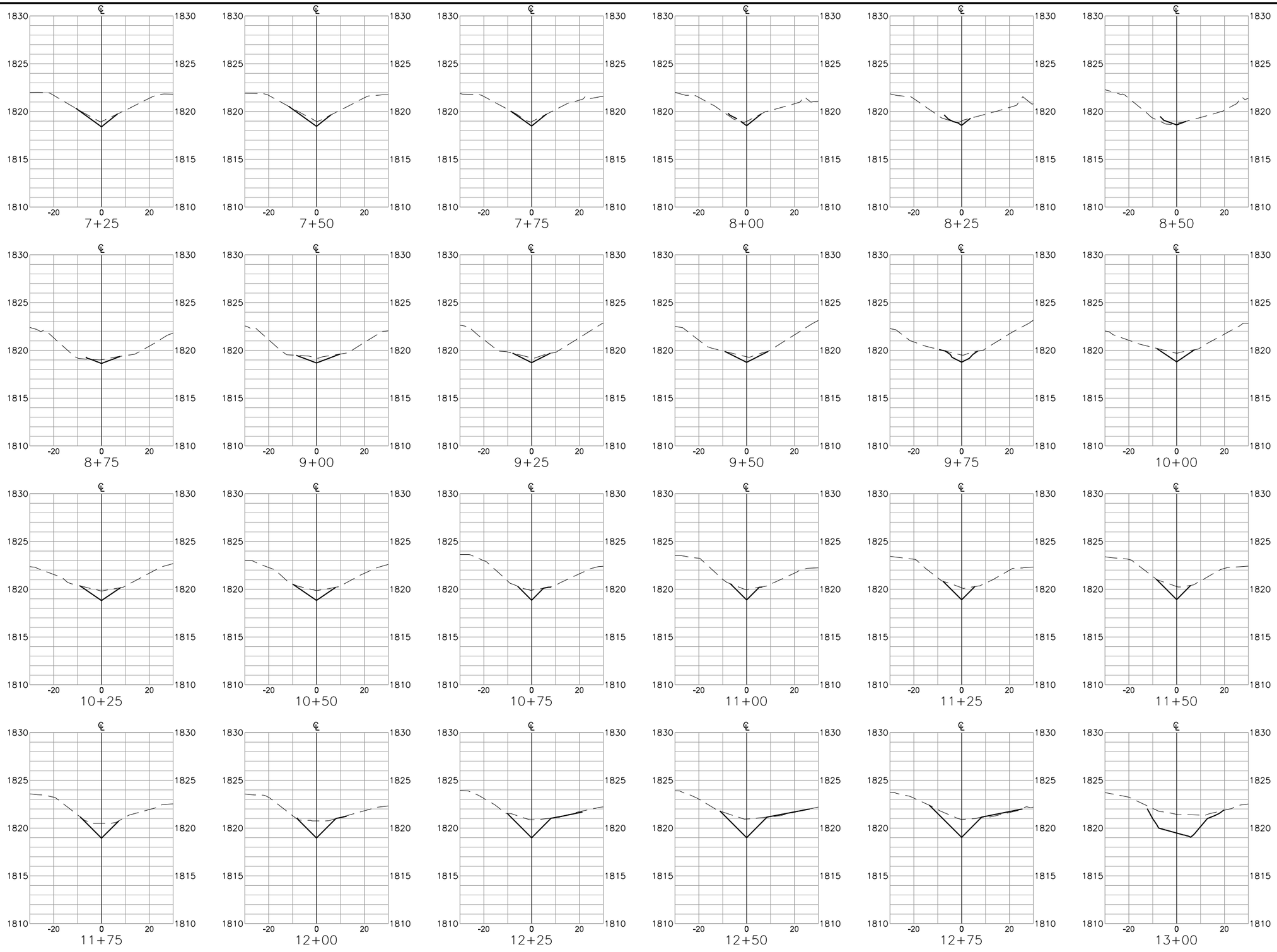

0 20' 40'
SCALE IN FEET
HORIZONTAL

0 5' 10'
SCALE IN FEET
VERTICAL

100% SUBMITTAL

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STORMWATER CHANNEL IMPROVEMENTS
CROSS SECTIONS STA 7+25 TO STA 13+00

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FILE NAME	CV-DRA-PR-XS01.dwg

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SHEET C-7

SEQ. 62

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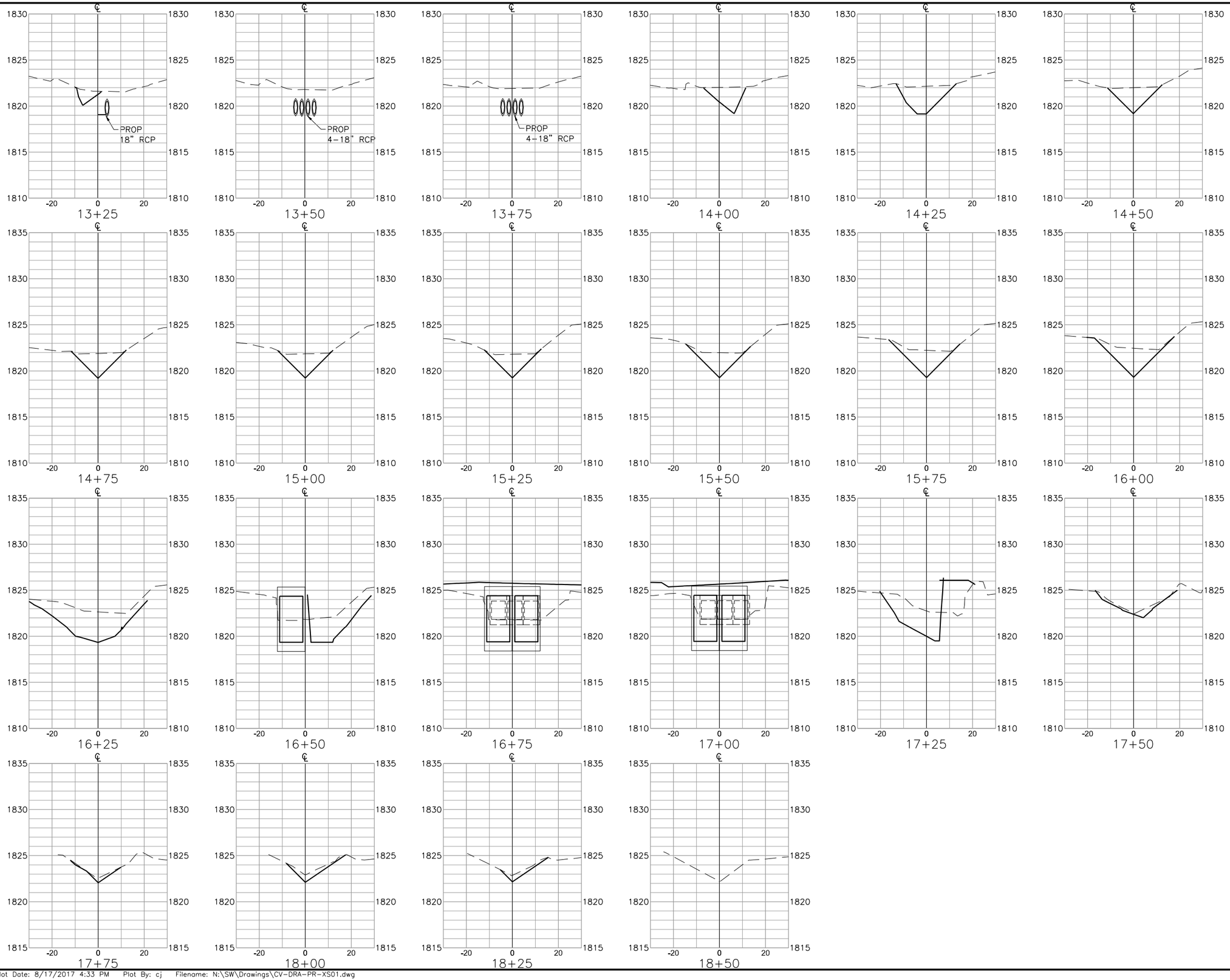

0 20' 40'
SCALE IN FEET
HORIZONTAL

0 5' 10'
SCALE IN FEET
VERTICAL

100% SUBMITTAL

Freese and Nichols, Inc.
Texas Registered Engineering Firm F-2144

STATE OF TEXAS
KEVIN MORRIS
105091
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PROFESSIONAL ENGINEER
10/23/2017

STATE OF TEXAS
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CITY OF SAN ANGELO, TEXAS

BELL ST. ROADWAY & UTILITY IMPROVEMENTS

CIVIL

STORMWATER CHANNEL IMPROVEMENTS
CROSS SECTIONS STA 13+25 TO END

FNI JOB NO.	SAN16188
DATE	8/18/17
DESIGNED	HRK
DRAWN	CAU
REVISED	
CHECKED	
FILE NAME	CV-DRA-PR-XS01.dwg

NO.	ISSUE	BY	DATE

VERIFY SCALE Bar is one inch on original drawing. If not one inch on this sheet, adjust scale.
0 1"

SHEET C-8

SEQ. 63

ACAD Rel: 21.0s (LMS Tech)
Filename: N:\SW\Drawings\CV-DRA-PR-XS01.dwg
Last Saved: 8/17/2017 9:21 AM Saved By: nbb

Plot Date: 8/17/2017 4:33 PM Plot By: cj Filename: N:\SW\Drawings\CV-DRA-PR-XS01.dwg