CITY OF LEANDER, TEXAS

BAGDAD ROAD
SIDEWALK IMPROVEMENTS
CRYSTAL FALLS TO EAGLES WAY

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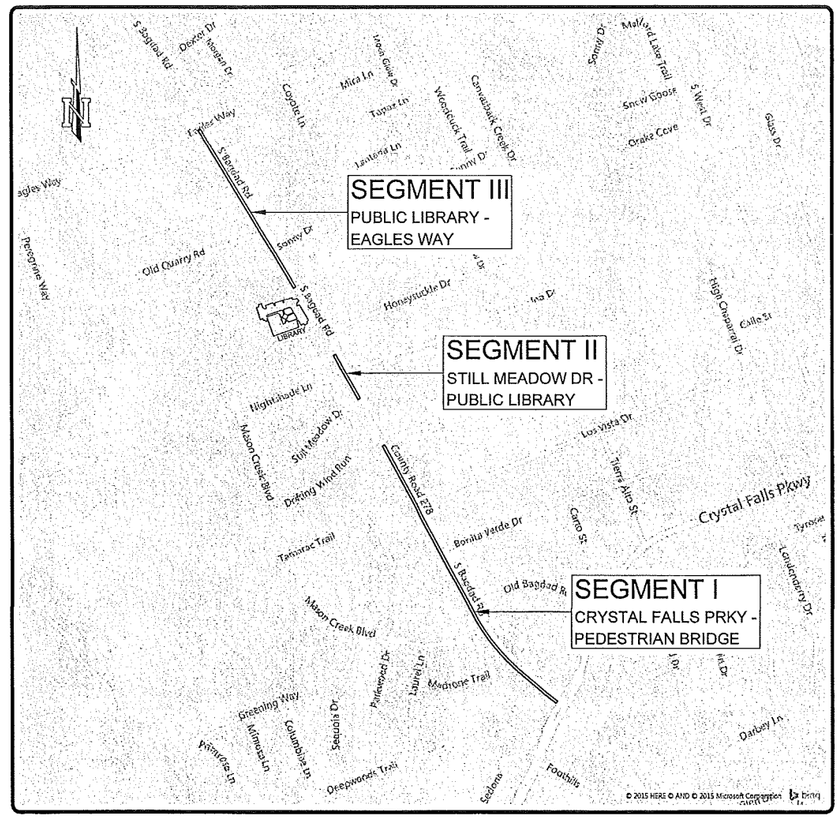
35	SIDEWALK SEGMENT III CROSS SECTIONS STA. 11+40 - END

R E V I S I O N S				
NUMBER	DATE	REMARKS	SHEETS	APPROVED BY



PROJECT LOCATION
N.T.S.

RECOMMENED BY:
KSA ENGINEERS, INC.

GRAYSON M. COX, P.E. — DATE 7-22-15

APPROVED BY:
CITY OF LEANDER, TEXAS

STEVE BOSAK — DATE
PARKS AND RECREATION DIRECTOR

MARK	REVISION	DATE

\\KSA-AUS-SERVER3\MAIN\PROJECTS\LEAN\004\DRAW\SHEETS\LEAN004-C-GH0001.DWG | LAYOUT:1 | 7/22/2015 - 11:22 AM

DRAWING PATH/NAME | LAYOUT | PLOT DATE - TIME

PROJECT TITLE: PROJECT DESCRIPTION LOCATION - CITY XX, TEXAS

SHEET NAME: COVER

PROJECT NAME: CITY OF LEANDER, TEXAS — BAGDAD ROAD SIDEWALK IMPROVEMENTS — CRYSTAL FALLS TO EAGLES WAY

DRAWN BY: BC
DESIGNED BY: GC
LATEST REVISION: 7/22/2015
KSA JOB NO.: LEAN.004

KSA
4833 Spicewood Springs Rd., Suite 204
Austin, Texas 78759
T. 512-342-6868 F. 512-342-6877
www.ksaeng.com

STATE OF TEXAS — 7-22-15 — GRAYSON M. COX — 111345 — LICENSED PROFESSIONAL ENGINEER

SEAL:
TBPE Firm Registration No. F-1386

SHEET NO.
01

GENERAL NOTES AND SPECIFICATION DATA

1. THE CONTRACTOR SHALL NOTIFY THE ENGINEERING DEPARTMENT OF THE CITY OF LEANDER 48 HOURS PRIOR . ALL REFERENCES IN THE PLANS AND SPECIFICATIONS TO THE 512-528-2993 TO ANY CONSTRUCTION AT CITY OR OWNER SHALL BE DIRECTED TO THE CITY.

2. PRIOR TO START OF CONSTRUCTION, THE CONTRACTOR SHALL COORDINATE WITH THE CITY OF LEANDER, ENTEX, TXU (POWER AND COMMUNICATIONS), AND ANY OTHER UTILITIES OR PIPELINE COMPANIES INVOLVED UNDER THE SCOPE OF THIS PROJECT.

3. THE ITEMS UNDER WHICH PAYMENT IS TO BE MADE TO THE CONTRACTOR ARE LISTED IN THE PROPOSAL. REFERENCE TO OTHER ITEMS IN THE STANDARD SPECIFICATIONS AS PAY ITEMS IS HEREBY DELETED. THE PROVISIONS FOR CONSTRUCTION AND MATERIAL REQUIREMENTS FOR SUCH ITEMS ARE TO BE COMPLIED WITH AND ONLY THE PROVISION FOR DIRECT PAYMENT IS DELETED.

4. PRIOR TO THE START OF WORK, THE CONTRACTOR SHALL DEVELOP IN DETAIL A CONSTRUCTION SCHEDULE AND METHOD THAT SHALL CAUSE MINIMUM INTERFERENCE WITH TRAFFIC ALONG, ACROSS, OR ADJACENT TO THE PROJECT DURING CONSTRUCTION. IF THE SCHEDULE OR METHOD BECOMES UNWORKABLE OR UNSATISFACTORY AS WORK PROCEEDS, ADJUSTMENTS SHALL BE MADE. IF AT ANY TIME DURING CONSTRUCTION, THE CONTRACTOR'S PROPOSED PLAN OF OPERATION RESULTS IN UNSATISFACTORY TRAFFIC MOVEMENT IN THE OPINION OF THE ENGINEER, THE CONTRACTOR SHALL IMMEDIATELY CORRECT THE UNSATISFACTORY CONDITION.

5. THE STANDARD SPECIFICATIONS, MODIFICATIONS, SPECIAL SPECIFICATIONS, SPECIAL CONDITIONS, CONTRACT, PLANS AND ADDENDA ARE ESSENTIAL PARTS OF THE CONTRACT AND ANY PROVISION OCCURRING IN ONE IS AS BINDING AS THOUGH OCCURRING IN ALL. THEY ARE INTENDED TO BE COOPERATIVE AND TO DESCRIBE AND PROVIDE FOR A COMPLETE WORK. NOTIFY THE ENGINEER PROMPTLY OF ANY OMISSIONS, ERRORS, OR DISCREPANCIES DISCOVERED IN THE PLANS OR SPECIFICATIONS SO THAT NECESSARY CORRECTIONS AND INTERPRETATIONS CAN BE MADE. FAILURE TO PROMPTLY NOTIFY THE ENGINEER WILL CONSTITUTE A WAIVER OF ALL CLAIMS FOR MISUNDERSTANDINGS OR AMBIGUITIES THAT RESULT FROM THE ERRORS, OMISSIONS, OR DISCREPANCIES DISCOVERED. IN GENERAL, PLANS SHALL GOVERN OVER SPECIFICATIONS AND PROJECT SPECIFIC SPECIFICATIONS OR MODIFICATIONS TO STANDARD SPECIFICATIONS SHALL GOVERN OVER STANDARD SPECIFICATIONS IN CASE OF DISCREPANCY.

6. THE LOCATION OF EXISTING UTILITIES INDICATED ON THE PLANS HAVE BEEN DETERMINED FROM FIELD SURVEYS AND AVAILABLE PUBLIC RECORDS. PROBES FOR DETERMINATION OF LOCATION AND ELEVATION HAVE BEEN MADE ONLY AS SHOWN ON THE PLANS. EXACT LOCATION AND ELEVATION OF ALL UTILITIES ARE NOT GUARANTEED AND SHALL BE DETERMINED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION. IT SHALL BE THE DUTY OF THE CONTRACTOR TO ASCERTAIN WHETHER ANY ADDITIONAL UTILITIES OTHER THAN THOSE SHOWN ON THE PLANS MAY EXIST AND TO LOCATE THE SAME IN THE FIELD PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL ALSO BECOME FAMILIAR WITH ANY PROPOSED ADJUSTMENTS TO BE MADE BY THE UTILITY OWNERS AND EXTEND FULL COOPERATION. ANY COST RESULTING FROM CONTRACTOR DAMAGES TO UTILITIES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

7. THE CONTRACTOR IS RESPONSIBLE FOR TRAFFIC HANDLING AND SAFETY IN THE CONSTRUCTION AREA DURING THE CONSTRUCTION PERIOD. SIGNS, BARRICADES AND OTHER NECESSARY DEVICES SHALL BE FURNISHED AND MAINTAINED IN COMPLIANCE WITH PART VI OF THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, CURRENT TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, CURRENT EDITION. PAYMENT FOR THIS WORK SHALL BE AS SHOWN IN THE BID PROPOSAL.

8. THE CONTRACTOR SHALL PROVIDE ACCESS TO EXISTING DRIVEWAYS AT ALL TIMES. ALL WEATHER GRAVEL SURFACE SHALL BE USED FOR MAINTAINING TEMPORARY ACCESS TO SAID DRIVEWAYS. NO SEPARATE MEASUREMENT OR PAYMENT SHALL BE MADE FOR THIS ITEM.

9. THROUGHOUT THE CONSTRUCTION OPERATIONS, ONE LANE OF TRAFFIC IN EACH DIRECTION SHALL BE MAINTAINED AT ALL TIMES. HOWEVER, DETOURS MAY BE UTILIZED BY CONTRACTOR IF REQUESTED IN WRITING AND APPROVED BY THE OWNER AND ENGINEER.

10. A VERY IMPORTANT FEATURE OF THIS CONTRACT IS PROVIDING FOR THE CONVENIENCE OF THE TRAVELING PUBLIC AND ABUTTING PROPERTY OWNER AND TENANT. THE SCHEDULE TO BE PROVIDED UNDER ITEM 4 OF THESE GENERAL NOTES SHALL ENSURE THIS PROVISION. WHERE, IN THE OPINION OF THE ENGINEER, LOCAL TRAFFIC AND ABUTTING PROPERTY OWNER WOULD BE UNDULY INCONVENIENCED FOR AN EXTENDED PERIOD OF TIME, THE ENGINEER SHALL LIMIT THE LENGTH OF EXCAVATION AREA THAT THE CONTRACTOR MAY OPEN AT ONE TIME.

11. THE CONTRACTOR SHALL PROVIDE FOR CONTINUOUS SUPERVISION OF CONSTRUCTION AND A SUPERINTENDENT SHALL BE ON THE PROJECT SITE AT ALL TIMES DURING WORKING HOURS. THE SUPERINTENDENT SHALL, AT ALL TIMES, HAVE IN HIS IMMEDIATE POSSESSION A COMPLETE SET OF CURRENT CONTRACT DOCUMENTS INCLUDING THE PLANS AND SPECIFICATIONS.

12. WATER SUPPLY FOR USE DURING CONSTRUCTION SHALL BE APPROVED BY THE ENGINEER AND SECURED BY THE CONTRACTOR FROM THE CITY OF LEANDER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING A METER TO BE INSTALLED AT LOCATIONS DESIGNATED BY THE CITY.

13. MAIL BOXES AND MAIL SERVICES SHALL BE MAINTAINED THROUGHOUT THE PROJECT. PAYMENT FOR REMOVAL, TEMPORARY RELOCATION AND PERMANENT LOCATION OF ALL MAIL BOXES, REGARDLESS OF TYPE OR CONSTRUCTION, SHALL BE INCLUDED IN OTHER ITEMS OF WORK.

14. ALL EXISTING STREET AND TRAFFIC SIGNS SHALL BE PROTECTED AS NECESSARY DURING CONSTRUCTION. THE PAYMENT FOR THIS WORK SHALL BE SUBSIDIARY TO OTHER ITEMS. ALL OTHER ROAD HARDWARE ITEMS REMOVED FROM THIS PROJECT SUCH AS PIPE, GUARDRAIL, ETC., SHALL BE SALVAGED FOR THE OWNER WHERE DIRECTED.

15. ALL EXCAVATION AND EMBANKMENT REQUIRED TO COMPLETE THE WORK AT THE PROPOSED GRADES SHOWN WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE SUBSIDIARY TO THE APPROPRIATE SIDEWALK ITEM REQUIRING SUCH ACTIVITIES. ALL TIE-IN SLOPES FOR SIDEWALKS AND DRIVEWAYS ARE 4:1 DESIRABLE, 3:1 MAX. NATURAL GROUND SLOPES EXCEEDING 3:1 WILL BE REJECTED AND REQUIRE REGRADING.

16. EXISTING CONCRETE PAVEMENT, CURB, ASPHALT PAVEMENT, OR CURB AND GUTTER TO BE REMOVED, WHETHER IN STREETS OR DRIVES, SHALL BE SAWED ALONG NEAT LINES WHERE PORTIONS ARE TO BE LEFT IN PLACE.

17. THE END OF THE STREET AND DRIVEWAY PAVEMENT SHALL MATCH THE EXISTING PAVING UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

18. BARRIER FREE RAMPS SHALL BE PROVIDED AT ALL STREETS AND DRIVES ACCORDING TO THE STANDARD DETAILS FOR PAVING INCLUDED IN THE PLANS. PAYMENT FOR THIS WORK SHALL BE AS SHOWN IN THE BID PROPOSAL.

19. CONTRACTOR SHALL INSTALL EROSION CONTROL DEVICES AT LOCATIONS AS REQUIRED TO PREVENT SOIL AND SEDIMENT RUNOFF. LOCATIONS SHALL ALSO BE AS DIRECTED BY THE OWNER AND ENGINEER. SILT FENCE SHALL BE PAID FOR IN A PER LINEAR FOOT BASIS OF ACTUAL FILTER FABRIC FENCE INSTALLED OR AS SHOWN IN THE PROPOSAL.

20. THE CONTRACTOR SHALL FURNISH THE ENGINEER A COPY OF THE SIGNED AGREEMENT WITH THE PROPERTY OWNER FOR EACH DISPOSAL SITE WHICH THE CONTRACTOR INTENDS TO USE FOR "WASTE" MATERIALS. CONDITIONS AND RESTRICTIONS, IF ANY, WILL BE CLEARLY STATED. COMPLIANCE WILL BE REQUIRED AND A RELEASE FROM THE PROPERTY OWNER MUST BE OBTAINED UPON COMPLETION OF THE PROJECT.

21. ALL DISTURBED SOIL SHALL BE BLOCK SODDED WITH BERMUDA UNLESS OTHERWISE SPECIFIED. THE QUANTITIES SHOWN FOR BLOCK SOD ON THE PROPOSAL ARE THEORETICAL CALCULATIONS BASED ON THE EXPECTED SOIL DISTURBANCE FROM THE CONSTRUCTION OF THE PROPOSED GRADE TO THE EXISTING TOPOGRAPHY USING TYPICAL TIE-IN SLOPES PER NOTE 16. THE ITEM FOR THIS WORK SHALL BE A PLAN QUANTITY PAYMENT ONLY. NO ADJUSTMENTS TO THESE QUANTITIES WILL BE MADE; THEREFORE, THE CONTRACTOR IS ADVISED TO MINIMIZE THE CONSTRUCTION AREA AND SOIL DISTURBANCE TO THE EXTENT PRACTICAL TO COMPLETE THE PROPOSED WORK. ALL VEGETATIVE WATERING REQUIRED FOR GRASS ESTABLISHMENT SHALL BE SUBSIDIARY TO THE BLOCK SOD PAYMENT ITEM. NO SEPARATE PAY. SEE APPLICABLE SPECIFICATIONS.

22. AT ALL AREAS WHERE TRENCHES, CULVERT EXCAVATION AND OTHER EXCAVATIONS ARE GREATER THAN 5'; SHORING, SHEET PILING OR OTHER METHODS OF SUPPORT SHALL BE PROVIDED AS NEEDED AND REQUIRED TO ENSURE SAFE TRAVEL TO THE PUBLIC. IT MAY BE NECESSARY TO ERECT A TEMPORARY GUARD FENCE TO FURTHER PROVIDE SAFETY TO MOTORISTS. PAYMENT FOR TRENCH SAFETY, IF REQUIRED, SHALL BE SUBSIDIARY TO OTHER INVOLVED ITEMS.

23. ENGINEER SHALL SET BENCHMARKS IN THE PROJECT AREA FOR HORIZONTAL AND VERTICAL CONTROL. CONTRACTOR SHALL TAKE SPECIAL CARE TO PROTECT THESE BENCHMARKS. CONTRACTOR SHALL PROVIDE ANY ADDITIONAL SURVEYING OR LAYOUTS AS REQUIRED TO COMPLETE THE PROJECT AS SHOWN ON THE PLANS.

24. THE WORK AREA SHALL BE KEPT AS CLEAN AS POSSIBLE DURING WORK. UPON PROJECT COMPLETION, ALL WORK AREA MUST BE LEFT AS CLEAN AS PRE-EXISTING CONDITION.

25. CONTACT TxDOT AND THE CITY WHEN CONSTRUCTION OPERATIONS ARE WITHIN 400 FEET OF A SIGNALIZED INTERSECTION TO DETERMINE/VERIFY THE LOCATION OF LOOP DETECTORS, CONDUIT, GROUND-BOXES, ETC. ANY SIGNAL EQUIPMENT DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED OR REPLACED AT THEIR EXPENSE. THE METHOD OF REPAIR OR REPLACEMENT SHALL BE PRE-APPROVED AND INSPECTED BY THE ENGINEER. DEPENDING ON TYPE AND EXTENT OF DAMAGE, TxDOT RESERVES THE RIGHT TO PERFORM THE REPAIR OR REPLACEMENT WORK AND THE CONTRACTOR SHALL BE BILLED FOR THE COST OF THIS WORK.

26. IN THE INSTANCE WHERE FIXED FEATURES REQUIRE, THE CROSS SECTION SLOPES MAY BE VARIED TO THE EXTENT DETERMINED/APPROVED BY THE ENGINEER.

27. IF WASTE AREAS OR MATERIAL SOURCE AREAS RESULT FROM THIS PROJECT THE CONTRACTOR IS REMINDED TO FOLLOW THE REQUIREMENTS OF THE TEXAS AGGREGATE QUARRY AND PIT SAFETY ACT.

28. MAINTAIN THE RIGHT-OF-WAY FREE OF TRASH, CONSTRUCTION DEBRIS, AND SURPLUS MATERIALS AS SHOWN IN THE PLANS AND/OR DIRECTED/ APPROVED BY THE ENGINEER.

29. ANY MATERIALS REMOVED AND NOT REUSED AND DETERMINED TO BE SALVAGEABLE BY THE ENGINEER, SHALL BE RETAINED BY THE OWNER AND SHALL BE STORED WITHIN THE PROJECT LIMITS AT AN APPROVED SECURE LOCATION OR DELIVERED UNDAMAGED TO THE SALVAGE/STORAGE YARD AS DIRECTED BY THE ENGINEER. MATERIALS THAT ARE NOT DETERMINED TO BE SALVAGEABLE BY THE ENGINEER SHALL BECOME THE PROPERTY OF THE CONTRACTOR FOR PROPER DISPOSAL AT THEIR EXPENSE. SIGNS MUST BE DEFACED IN SUCH A MANNER THAT THEY WILL NOT REAPPEAR IN PUBLIC AS SIGNS.

30. IN PREPARING HOLES FOR POSTS AND/OR FOUNDATIONS, CARE SHALL BE TAKEN SO AS NOT TO RUPTURE EXISTING DRAINAGE STRUCTURES, ELECTRICAL CONDUITS, PUBLIC UTILITIES, ETC.

31. ANY SIGNS THAT ARE TO BE ADJUSTED AND/OR REMOVED AND REPLACED, SHALL BE DONE IN THE SAME WORKDAY UNLESS OTHERWISE APPROVED BY THE ENGINEER.

32. SIGN TYPES FOR WHICH DETAILS ARE NOT SHOWN IN THE PLANS SHALL CONFORM WITH THE TEXAS MUTCD.

33. THE PRACTICES SHOWN IN THE PLANS ARE PROPOSED TO CONTROL POLLUTANTS IN STORM WATER DISCHARGES. THESE PRACTICES ARE BASED ON INFORMATION CONTAINED IN TxDOT STORM WATER MANAGEMENT GUIDELINES. THE SCHEDULE OF IMPLEMENTATION OF THESE PRACTICES WILL BE BASED ON INTENDED SEQUENCE OF MAJOR SOIL DISTURBING ACTIVITIES. DISTURBED AREA ON WHICH ACTIVITY HAS CEASED (TEMPORARILY OR PERMANENTLY) SHALL BE STABILIZED WITHIN 14 DAYS UNLESS ACTIVITIES ARE SCHEDULED TO RESUME WITHIN 21 DAYS.

34. ENDANGERED SPECIES AND HISTORIC PRESERVATION INFORMATION (IF APPLICABLE) IS REFERENCED IN THE PROJECT'S ENVIRONMENTAL DOCUMENT.

35. A 2'x2' SQUARE SHALL BE PLACED WITH AN EXPANSION JOINT AT ALL FIRE HYDRANTS, POWER POLES, METER BOXES, ETC. TO ALLOW FUTURE ACCESS. MASTIC JOINT FILLER SHALL BE PLACED AT THE BASE OF RIGID OBJECTS CAST INTO CONCRETE.

36. ALL BRICK PAVERS SHALL BE LAID IN HERRINGBONE PATTERN.

37. EXPANSION JOINTS SHALL BE PLACED AT THE END OF THE DAYS WORK.

38. CURRENT AREAS HAVING GRASS COVER SHALL BE ADJUSTED TO MATCH PROPOSED CURB OR SIDEWALK ELEVATIONS IN AREA. GRADE SHALL NOT EXCEED 3:1. CONTRACTOR SHALL RE-GRADE AND SEED OR SOD DISTURBED AREA.

39. ANY NON-COMPLIANT WORK SHALL BE REMOVED AND REPLACED AT CONTRACTORS EXPENSE.

40. ALL DIMENSIONS PROVIDED ON SIDEWALK PLAN DRAWINGS SHALL BE VERIFIED BY CONTRACTOR ONCE FORMS ARE IN PLACE. LENGTHS GIVEN FOR RAMPS AND LANDINGS SHALL BE ADJUSTED AS REQUIRED TO MAINTAIN SLOPE INDICATED.

41. ALL ELEMENTS SHALL BE CONSTRUCTED TO COMPLY WITH THE TDLR AND THE USDOJ ADA REGULATIONS. ANY WORK FOUND TO BE NONCOMPLIANT WITH APPLICABLE ACCESSIBILITY REQUIREMENTS SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR'S EXPENSE PRIOR TO PROCEEDING WITH OTHER ITEMS OF WORK UNLESS OTHERWISE DIRECTED BY ENGINEER.

42. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY CORRECTIONS AND/OR RECONSTRUCTION NECESSARY AS A RESULT OF ADA INSPECTION AT THE END OF THE PROJECT.

43. REFERENCE IS HEREBY MADE TO THE TECHNICAL SPECIFICATIONS FOR APPLICABLE TxDOT STANDARD SPECIFICATIONS AND MODIFICATIONS AS REQUIRED FOR THIS PROJECT.

44. QUALITY CONTROL TESTING SHALL BE THE RESPONSABILITY OF THE CONTRACTOR TO ENSURE MATERIALS AND CONSTRUCTION MEET SPECIFICATION REQUIREMENTS. QUALITY ASSURANCE MAY BE CONDUCTED BY THE OWNER OR ENGINEER.

SEQUENCE OF CONSTRUCTION

1. CONTRACTOR MUST MAINTAIN ACCESS TO RESIDENCES AND BUSINESSES THROUGHOUT THE CONSTRUCTION OF IMPROVEMENTS.
2. INSTALL AND MAINTAIN EROSION CONTROLS AS NEEDED.
3. CONTACT CITY OF LEANDER PUBLIC WORKS DEPARTMENT 512-259-2640 AT LEAST 4 DAYS PRIOR TO COMMENCING CONSTRUCTION IN ORDER TO SCHEDULE AN ON-SITE PRE-CONSTRUCTION COORDINATION MEETING.
4. HOLD PRE-CONSTRUCTION COORDINATION MEETING AT LEAST 48 HOURS PRIOR TO CONSTRUCTION.
5. POST NOTICES 48 HOURS PRIOR TO CONSTRUCTION ALONG PARKING AREAS TO LIMIT ANY REQUIRED TOWING OF PARKED VEHICLES. TO LIMIT TOWING, CONSTRUCTION BARRICADES/TRAFFIC CONTROL DEVICES CAN BE INSTALLED 48 HOURS PRIOR TO CONSTRUCTION INSTALLATION OF TRAFFIC CONTROLS WILL NOT BE CONSIDERED A CONSTRUCTION PHASE. ADDITIONALLY, EFFORT SHALL BE MADE TO FIND THE VEHICLE'S OWNER PRIOR TO TOWING. VEHICLES WILL BE TOWED TO A LOCATION DESIGNATED BY THE CITY.
6. INSTALLATION OF TRAFFIC CONTROLS 24 HOURS PRIOR TO CONSTRUCTION. NOTICES PLACED ON VEHICLES, STATING VEHICLE WILL BE TOWED THE NEXT DAY IF NOT MOVED.
7. DETERMINE LOCATION OF ANY EXISTING UTILITIES. TEMPORARY SIGNAGE INSTALLED AND THEN EXISTING SIGNAGE REMOVED.
8. FIRST DAY OF CONSTRUCTION: ATTEMPT TO LOCATE VEHICLE'S OWNER. INFORM CITY INSPECTOR OF VEHICLES TO BE TOWED. TOW VEHICLES OUT OF CONSTRUCTION PHASE TO AREA DESIGNATED BY CITY.
9. DEMOLITION OF EXISTING SIDEWALK. INSTALLATION OF TEMPORARY WALKWAYS AND/OR DRIVEWAYS TO EXISTING RESIDENCES AND BUSINESSES.
10. SAW-CUT EXISTING PAVEMENT, INSTALLATION OF SIDEWALKS, RAMPS, AND DRIVEWAYS.
11. CONCRETE POUR FOR SIDEWALKS, RAMPS, CURB AND GUTTER AND DRIVEWAYS.
12. INSTALLATION OF RAMP DETECTABLE WARNING SURFACES
13. REMOVAL OF FORMS, SITE CLEANUP.
14. REINSTALLATION OF EXISTING SIGNAGE AND REMOVAL OF TEMPORARY SIGNAGE.
15. RE-VEGETATION OF DISTURBED AREAS
16. REMOVAL OF EROSION CONTROLS AFTER RE-VEGETATION.
17. REMOVAL OF TRAFFIC CONTROLS.

SPECIAL NOTES

1. RAMP SURFACE SHALL BE FIRM, STABLE, AND SLIP-RESISTANT. FOR PURPOSES OF WARNING, REFER TO PED-12A.
2. THE ACCEPTABLE TEXTURE ONLY INCLUDES: TRUNCATED DOMES MEETING THE REQUIREMENTS IN TAS 705
3. EXPANSION JOINTS ARE REQUIRED AT THE TOP OF ALL RAMPS.
4. ANY CONSTRUCTED SIDEWALK WITH A CROSS-SLOPE GREATER THAN 2% WILL BE REMOVED AND RECONSTRUCTED AT CONTRACTOR'S EXPENSE.

MARK	REVISION	DATE

\\KSA-AUS-SERVER3\MAIN\PROJECTS\LEAN004\DRAW\SHEETS
LEAN004-C-GI-0002.DWG | GEN NOTES | 7/22/2015 - 10:33 AM
DRAWING PATHNAME | LAYOUT | PLOT DATE - TIME
PROJECT TITLE: PROJECT DESCRIPTION LOCATION - CITY XX, TEXAS

SHEET NAME: GENERAL NOTES

CITY OF LEANDER, TEXAS
BAGDAD ROAD SIDEWALK IMPROVEMENTS
PROJECT NAME: CRYSTAL FALLS TO EAGLES WAY

DRAWN BY: BC
DESIGNED BY: GC
LATEST REVISION: 7/22/2015
KSA JOB NO.: LEAN.004

KSA
4833 Spicewood Springs Rd., Suite 204
Austin, Texas 78759
T. 512-342-6868 F. 512-342-6877
www.ksaeng.com

STATE OF TEXAS
7-22-15
GRAYSON M. COX
111345
LICENSED
PROFESSIONAL ENGINEER

SEAL:
TBPE Firm Registration No. F-1356

SHEET NO. 02

MARK	REVISION	DATE

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DRAWING PATHNAME | LAYOUT | PLOT DATE - TIME

PROJECT TITLE: PROJECT DESCRIPTION LOCATION - CITY XX, TEXAS

SHEET NAME: PROJECT LAYOUT

CITY OF LEANDER, TEXAS
BAGDAD ROAD SIDEWALK IMPROVEMENTS

PROJECT NAME: CRYSTAL FALLS TO EAGLES WAY

DRAWN BY:	BC
DESIGNED BY:	GC
LATEST REVISION:	7/22/2015
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KSA

4633 Spicewood Springs Rd., Suite 204
Austin, Texas 78759
T. 512-342-6868 F. 512-342-6877
www.ksaeng.com

STATE OF TEXAS
GRAYSON M. COX
111345
LICENSED PROFESSIONAL ENGINEER

SEAL:
TBPE Firm Registration No. F-1356

SHEET NO.
03

HYDROLOGY SUMMARY[1]

		SHEET FLOW		SHALLOW FLOW		CHANNEL FLOW			Σ T_C	RAINFALL INTENSITY			RUNOFF COEFFICIENT			PEAK RUNOFF			
DA NO.	AREA (AC)	L (FT)	T_C (MIN)	L (FT)	T_C (MIN)	L (FT)	V_{100} (FT/S)	T_C (MIN)	T_C (MIN)	I_5	I_{25}	I_{100}	C_5	C_{25}	C_{100}	Q_5 (CFS)	Q_{25} (CFS)	Q_{100} (CFS)	Q_{DESIGN} (CFS)
1a	2.24	100	12.47	250	1.83	450	4.93	1.52	15.82	4.89	6.78	8.74	0.32	0.39	0.46	3.51	5.93	9.02	20
1	3.11	100	12.47	250	1.83	1,150	3.99	4.80	19.10	4.46	6.21	8.05	0.32	0.39	0.46	4.43	7.52	11.50	45
2	1.13	100	11.90	0	0.00	690	5.18	2.22	14.12	5.15	7.14	9.16	0.55	0.63	0.71	3.18	5.06	7.32	8.5
3	4.31	100	9.45	510	3.59	400	7.56	0.88	13.92	5.18	7.18	9.21	0.23	0.29	0.36	5.14	8.98	14.31	30
4	10.54	100	9.45	1,300	9.50	860	5.75	2.49	21.44	4.20	5.86	7.62	0.43	0.51	0.58	19.15	31.35	46.82	65
5	8.36	100	9.45	1,250	8.79	430	4.59	1.56	19.80	4.38	6.10	7.91	0.46	0.53	0.61	16.64	27.06	40.15	50

[1]PER CITY OF AUSTIN DRAINAGE CRITERIA MANUAL, SECTION 2.4.0

MARK	REVISION	DATE

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DRAWING PATH/NAME | LAYOUT | PLOT DATE - TIME

PROJECT TITLE: PROJECT DESCRIPTION LOCATION - CITY XX, TEXAS

SHEET NAME:

PROJECT DRAINAGE AREA LAYOUT

CITY OF LEANDER, TEXAS
BAGDAD ROAD SIDEWALK IMPROVEMENTS
CRYSTAL FALLS TO EAGLES WAY

PROJECT NAME:

DRAWN BY:	BC
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KSA
4633 Spicewood Springs Rd., Suite 204
Austin, Texas 78759
T. 512-342-4848 F. 512-342-4877
www.ksaeng.com

STATE OF TEXAS
7-22-15
GRAYSON M. COX
111345
LICENSED PROFESSIONAL ENGINEER

SEAL:
TBPE Firm Registration No. F-1356

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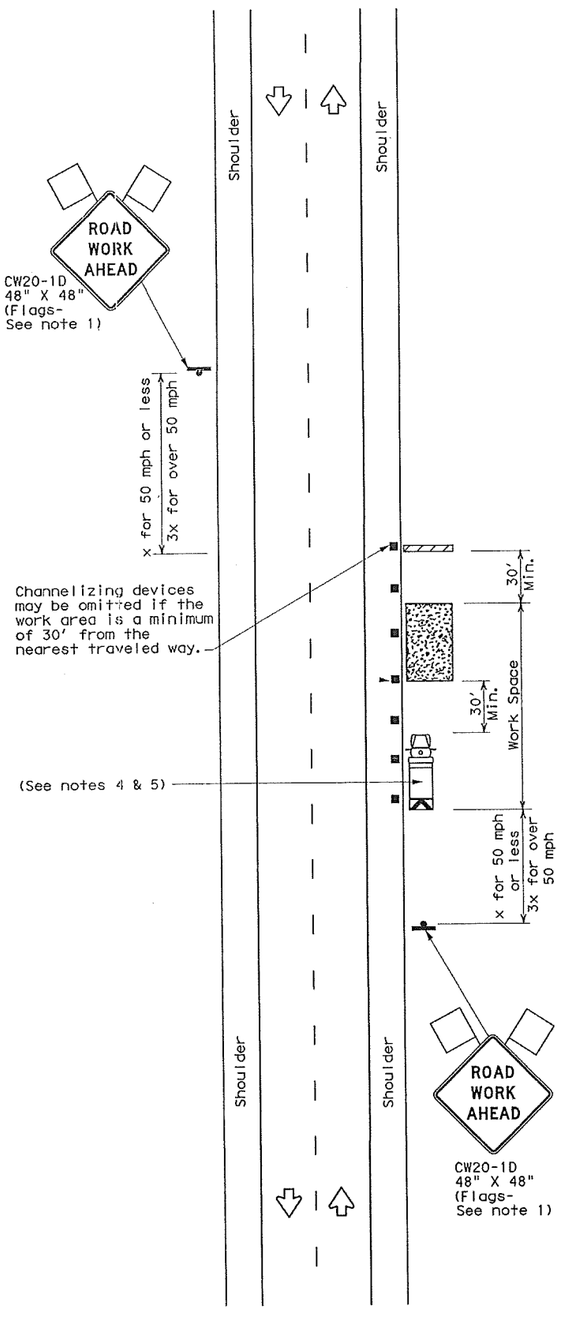
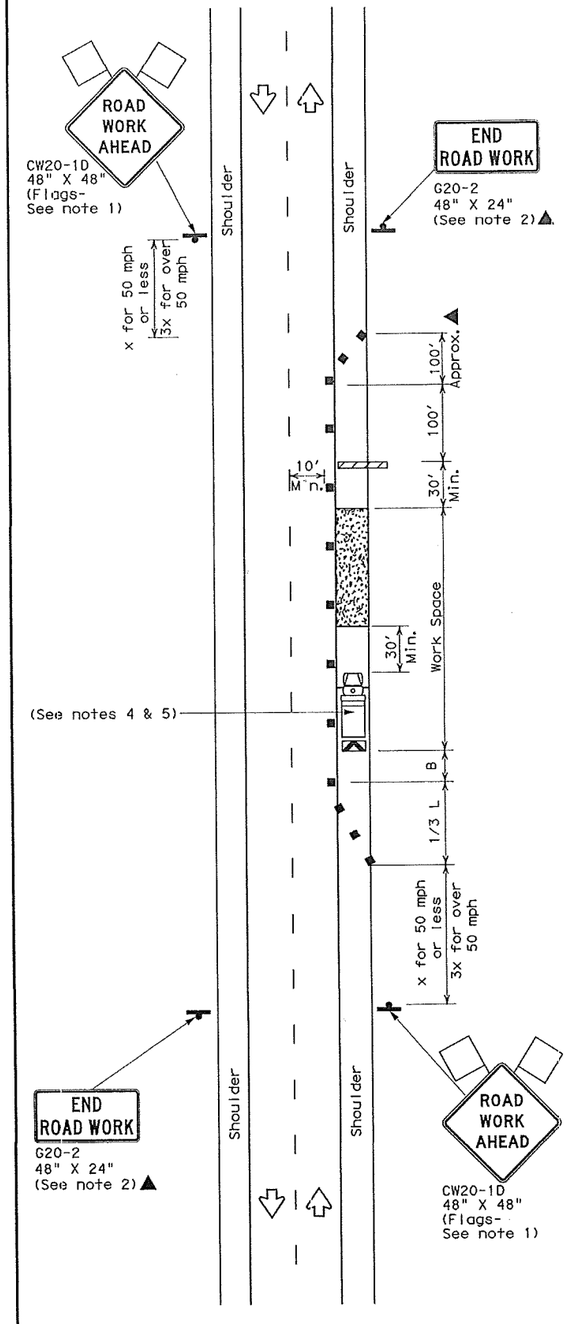


TCP (2-1a)

WORK SPACE NEAR SHOULDER

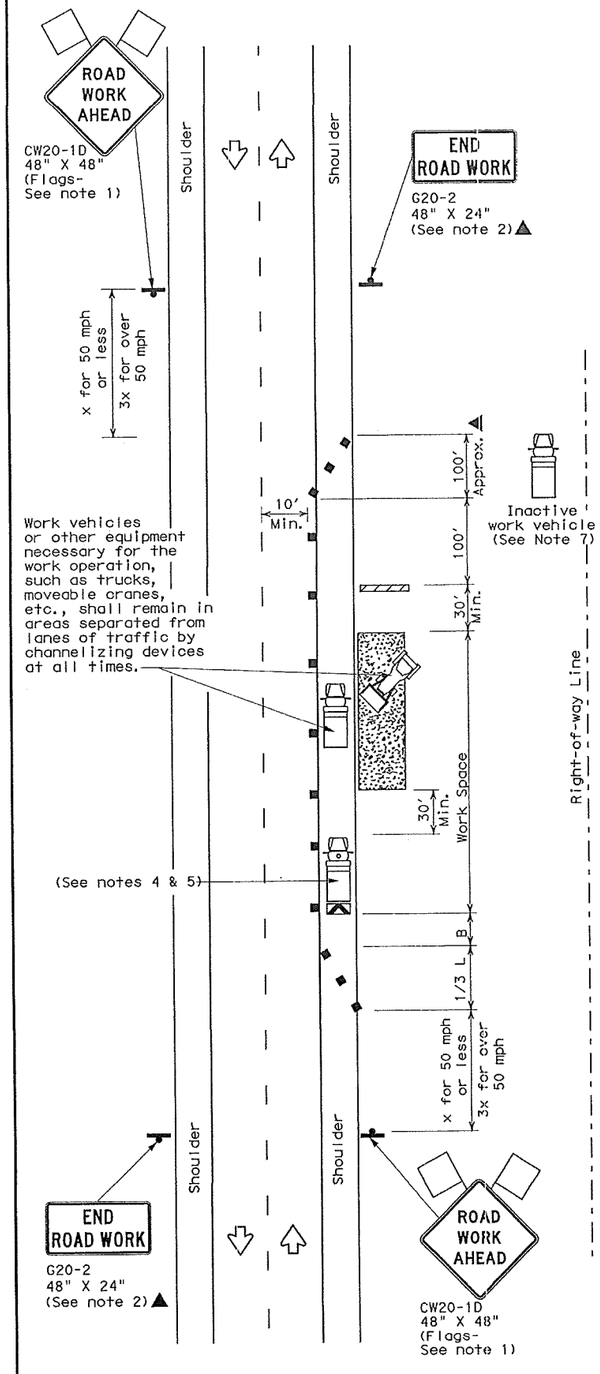
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER

Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER

Conventional Roads

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

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

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 CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-12

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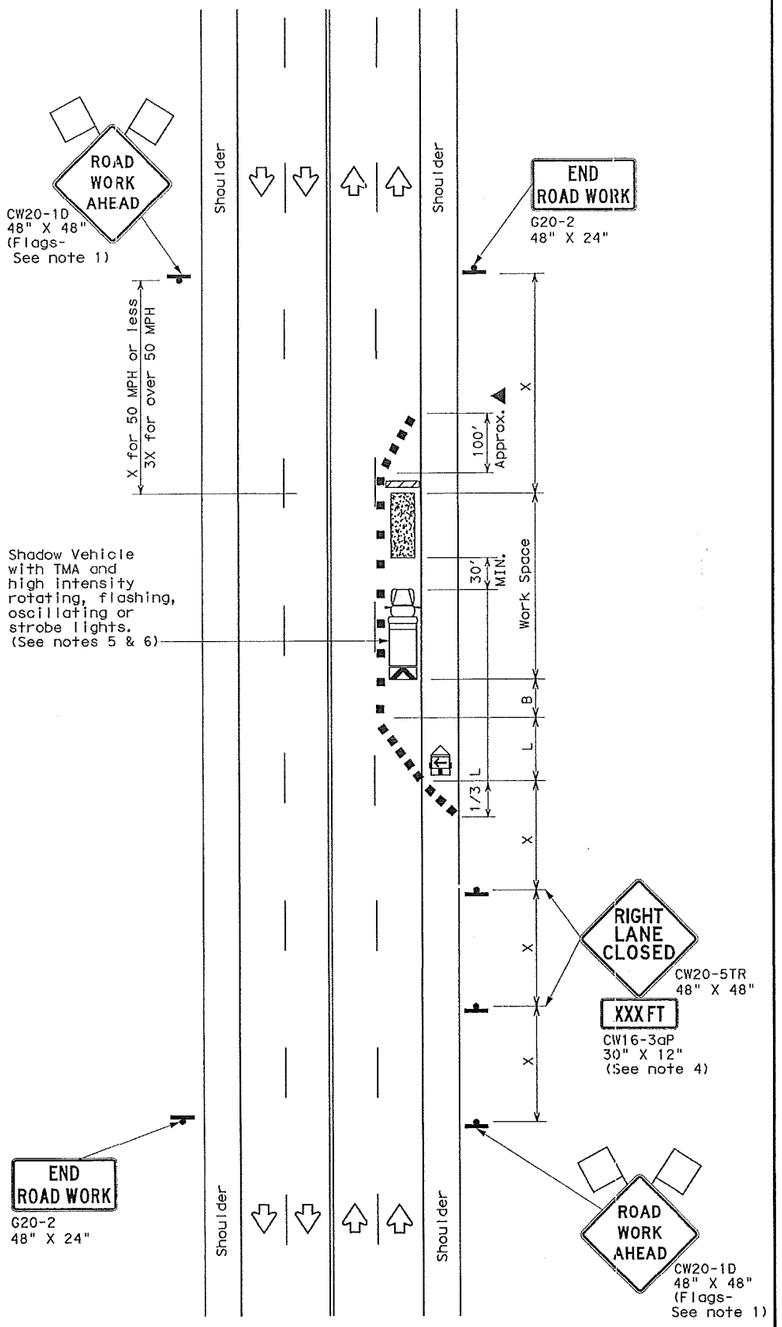
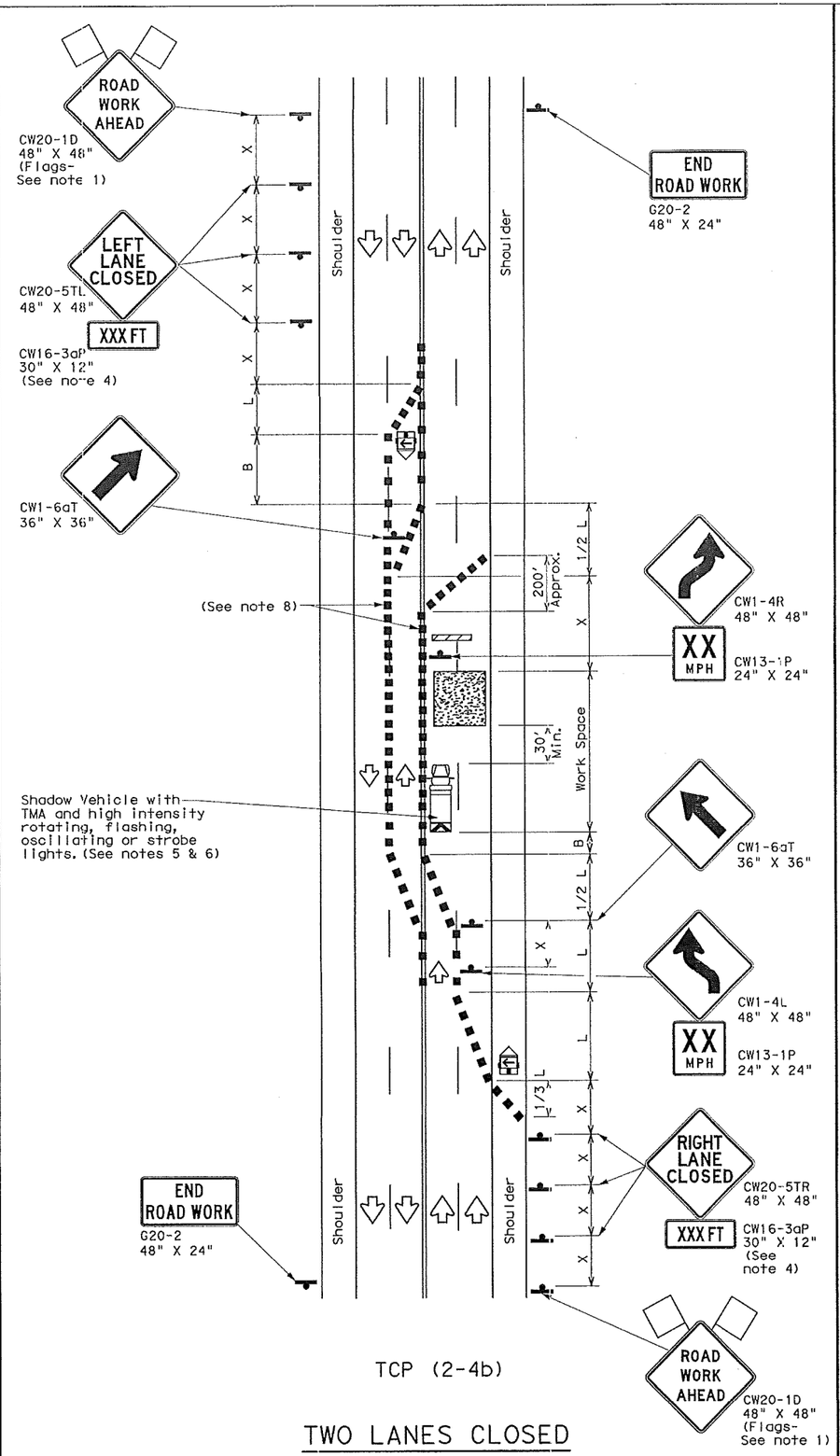


TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

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

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

✳ Conventional Roads Only

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

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

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The 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

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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.

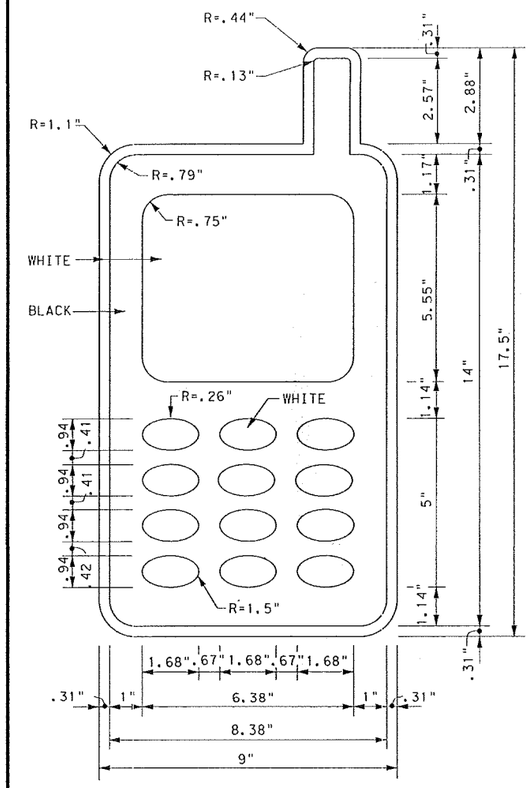
11. Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.

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.



3.0" Radius, 1.25" Border, 0.75" Indent, Black on Yellow;
[STAY ALERT] Font: D
3.0" Radius, 1.25" Border, 0.75" Indent, Black on Orange;
[TALK OR TEXT LATER] Font: C specified length;

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

Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-14

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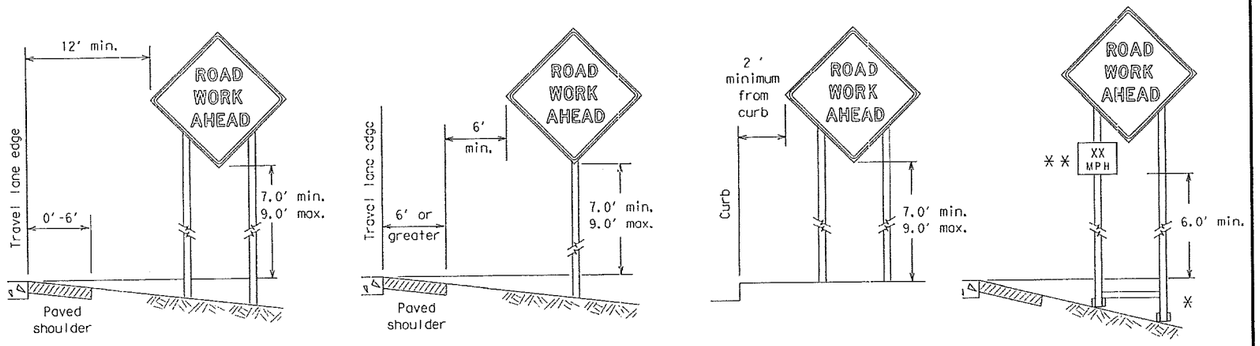
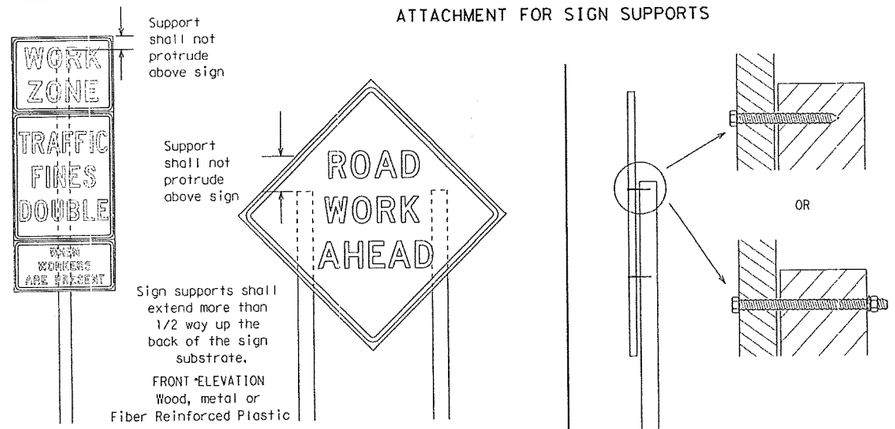
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



✱ 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



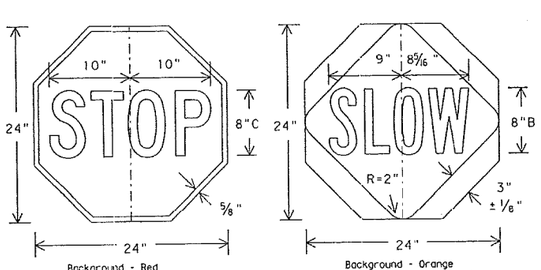
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

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

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

STOP/SLOW PADDLES

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



CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. 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.

Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-14

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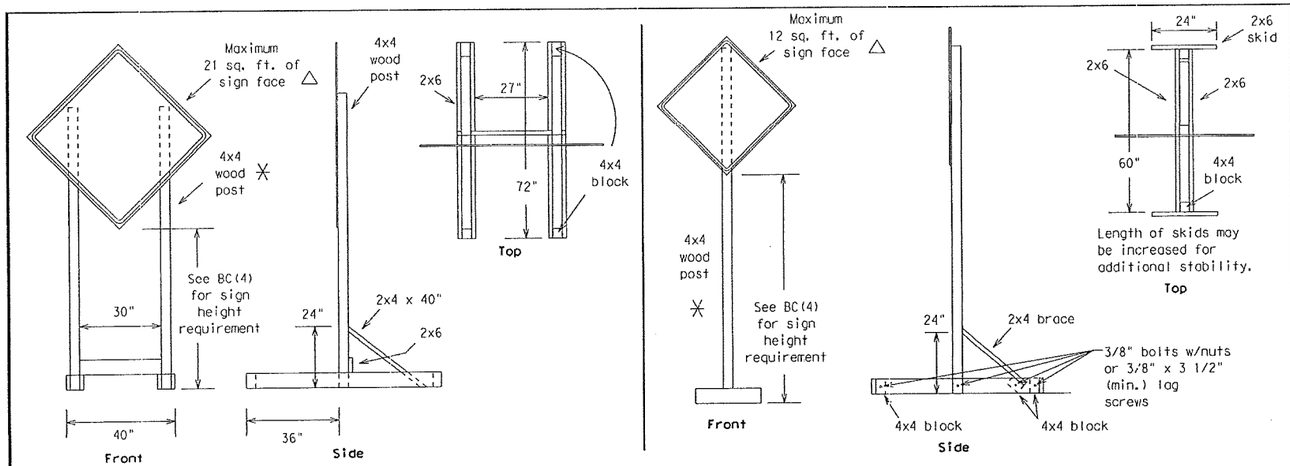
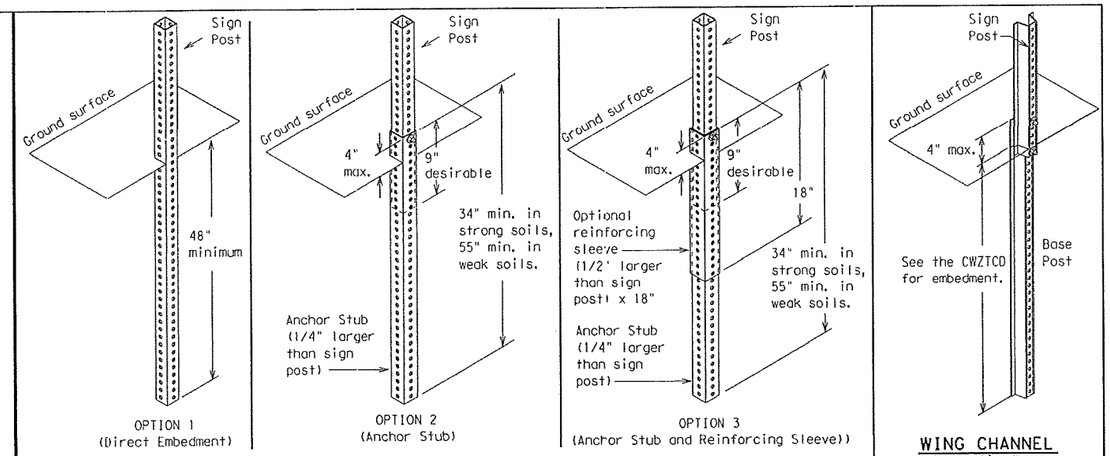


SKID MOUNTED WOOD SIGN SUPPORTS

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

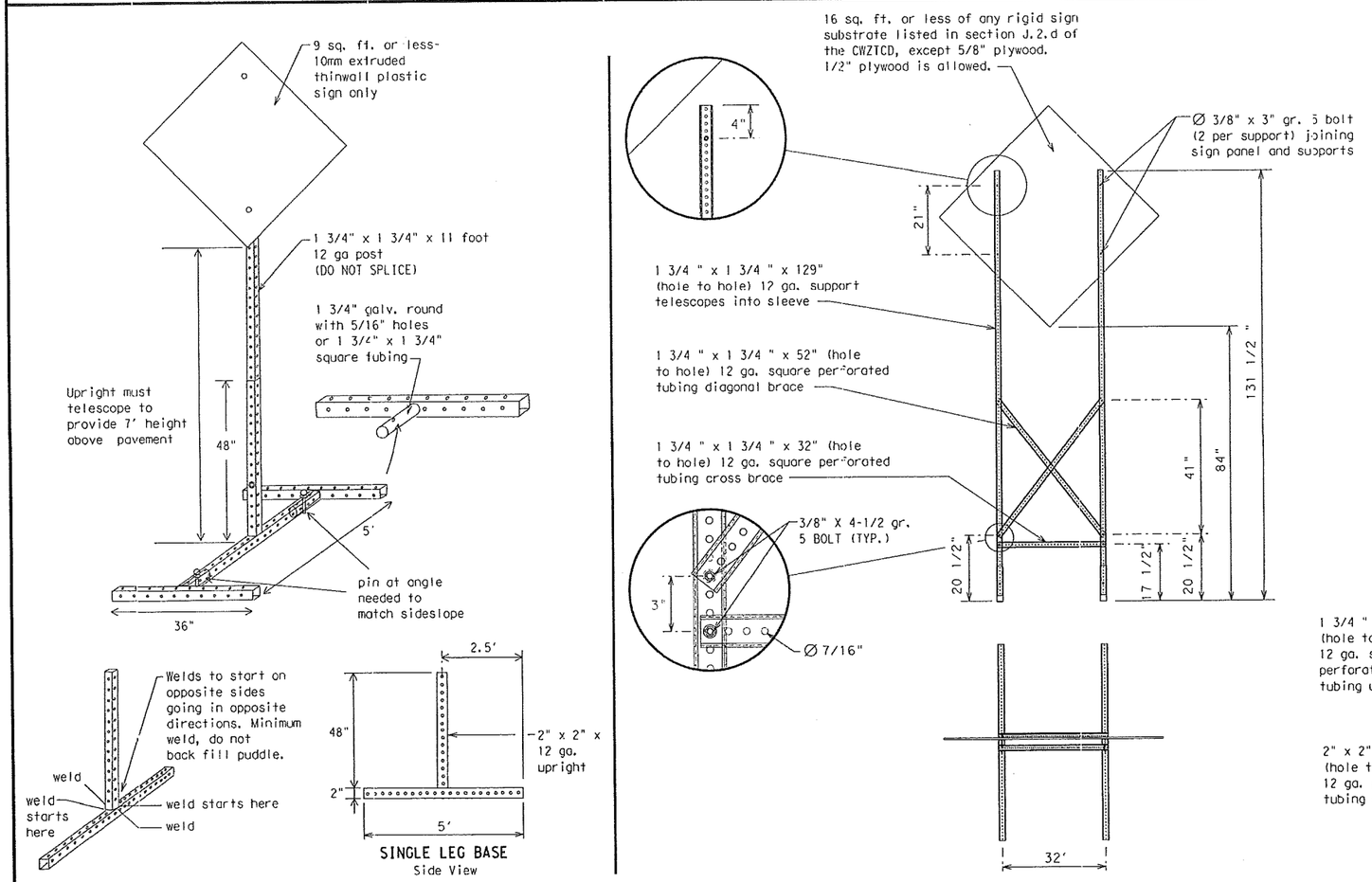


PERFORATED SQUARE METAL TUBING

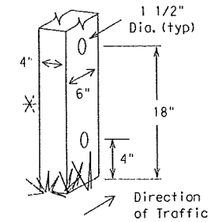
WING CHANNEL
Lap-splice/base bolted anchor

GROUND MOUNTED SIGN SUPPORTS

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

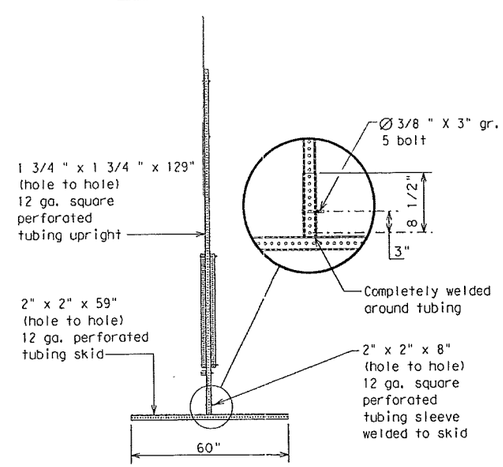


SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS



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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-14

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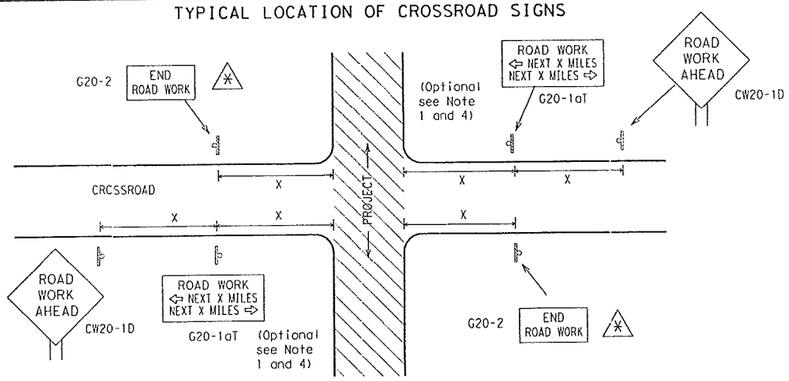
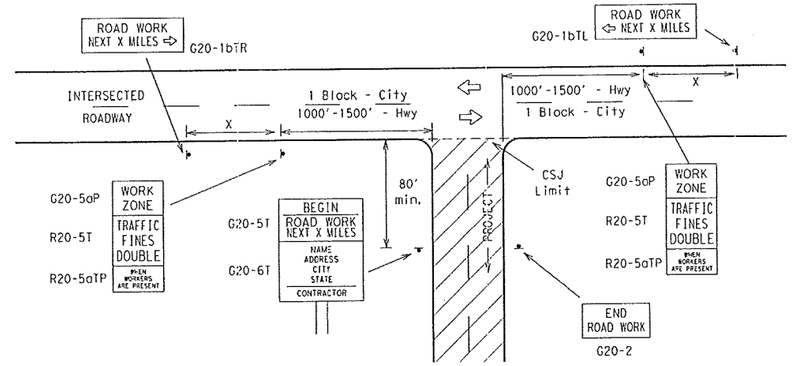
TYPICAL LOCATION OF CROSSROAD SIGNS



(*) 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/ Freewcy
CW20[4] CW21 CW22 CW23 CW25	48" x 48"	48" x 48"
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"

SPACING

Posted Speed	Sign Spacing "X" Δ
MPH	Feet (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]

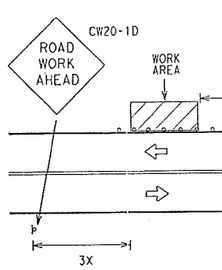
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

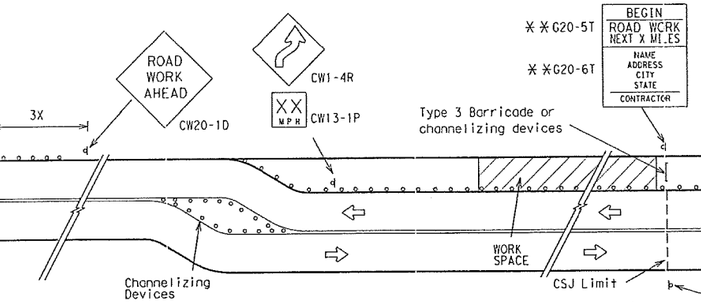
Δ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 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.

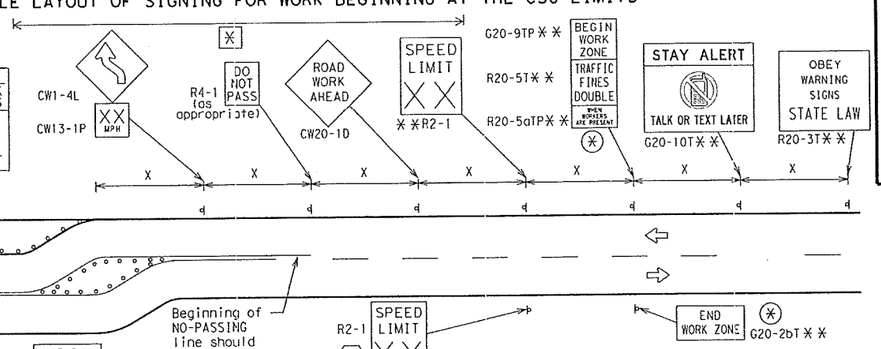
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



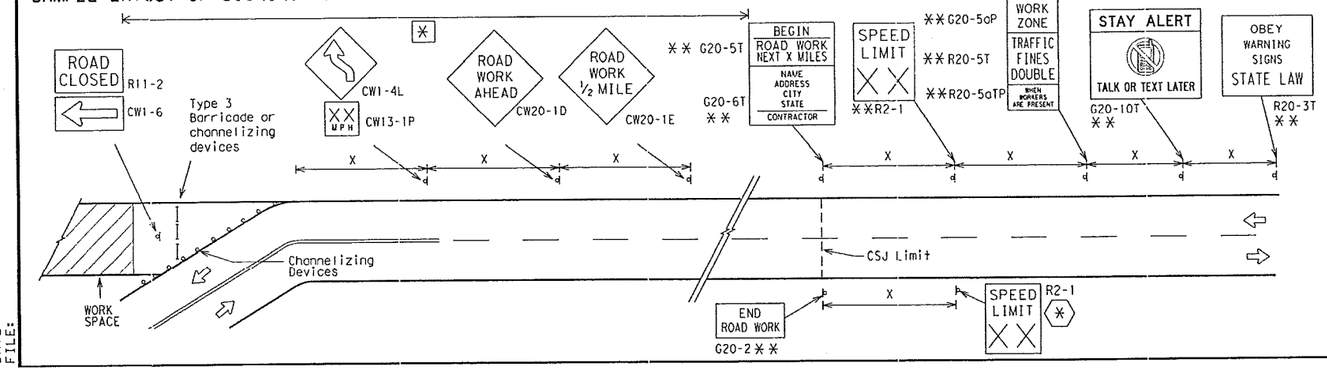


When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additiona "ROAD WORK AHEAD"(CW20-1D) signs are placed in advance of these work areas to remind drivers they are stil within the project limits. See the applicable TCP sheets for exact location and spacing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

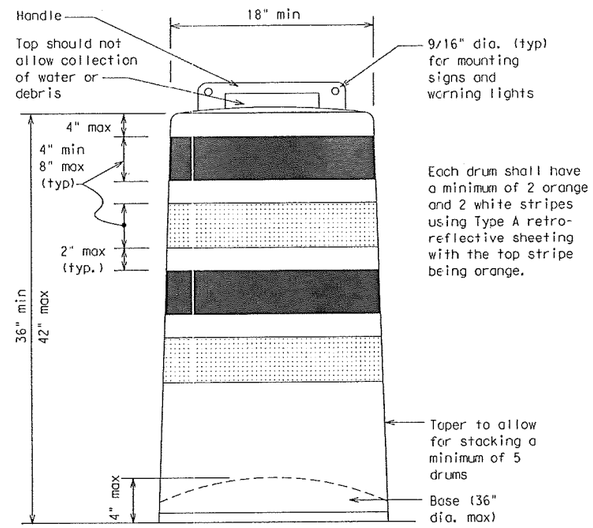
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents 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.

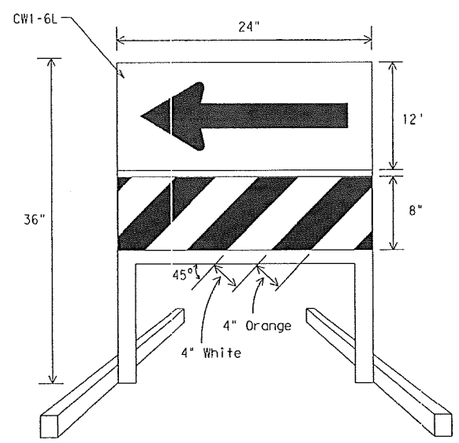
RETROREFLECTIVE SHEETING

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.

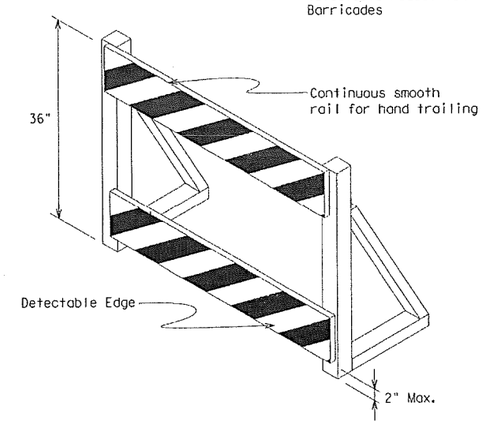




DIRECTION INDICATOR BARRICADE

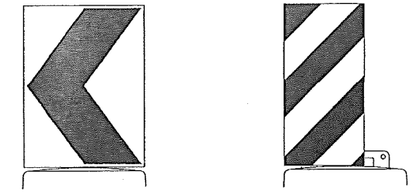
1. The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
2. If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
3. 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.



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

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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-14

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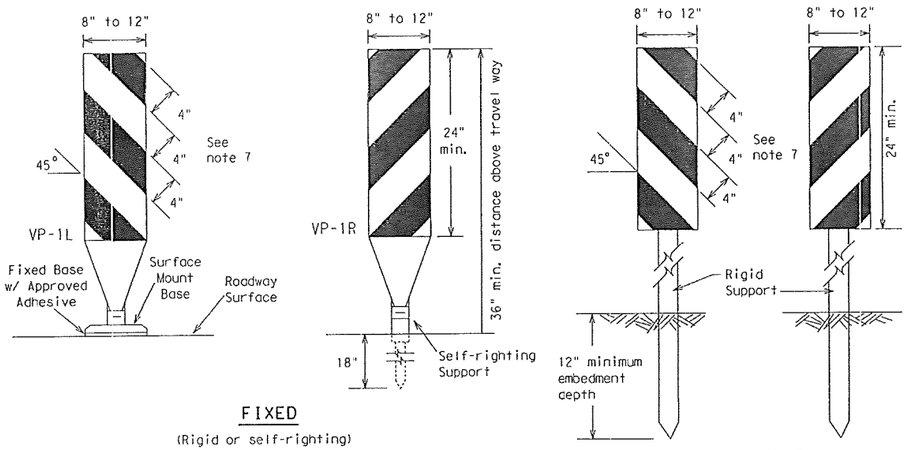
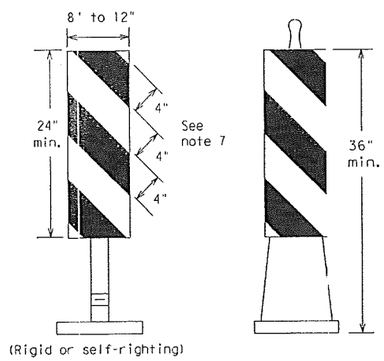


FIXED

(Rigid or self-righting)

DRIVEABLE

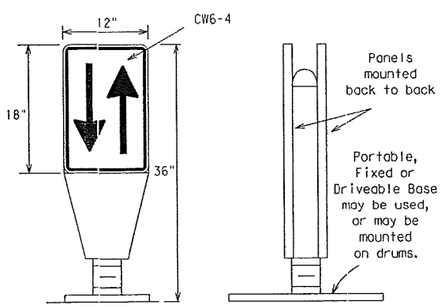


(Rigid or self-righting)

PORTABLE

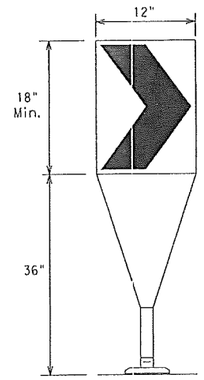
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is 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_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



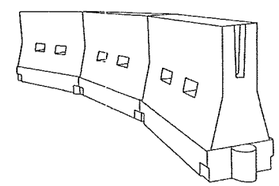
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

Posted Speed ✱	Formula	Minimum Desirable Taper Lengths ✱✱			Suggested Maximum Spacing of Channelizing Devices	
		10' Offset	11' Offset	12' Offset	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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-14

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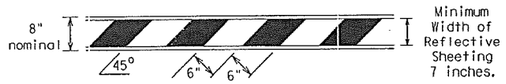
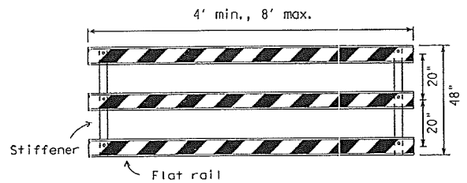
TYPE 3 BARRICADES

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.



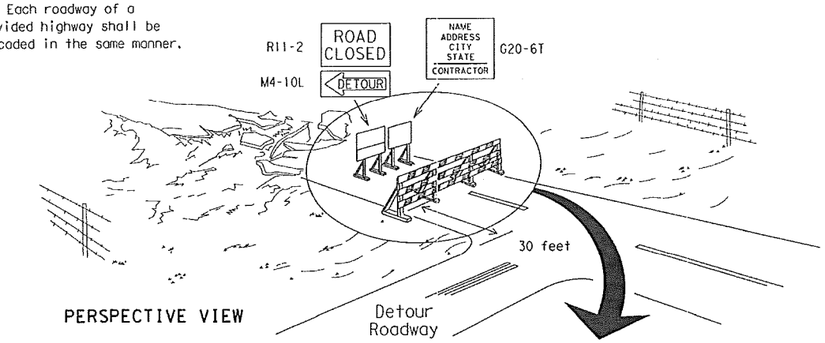
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

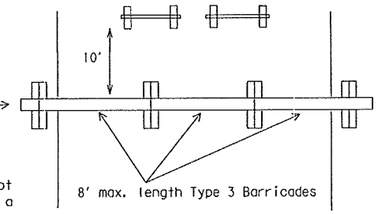
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

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



PERSPECTIVE VIEW

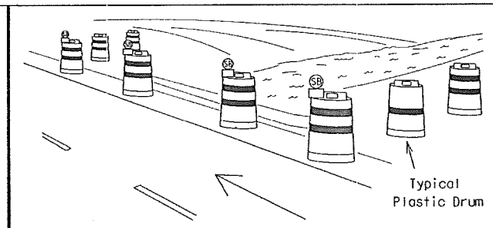
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

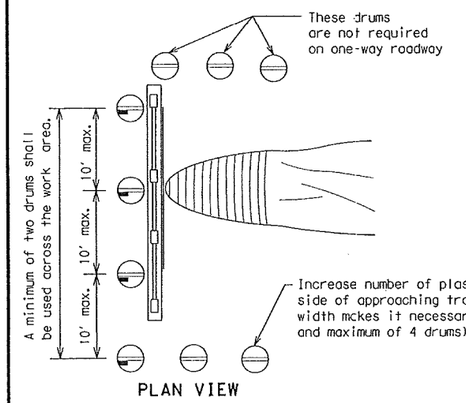
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

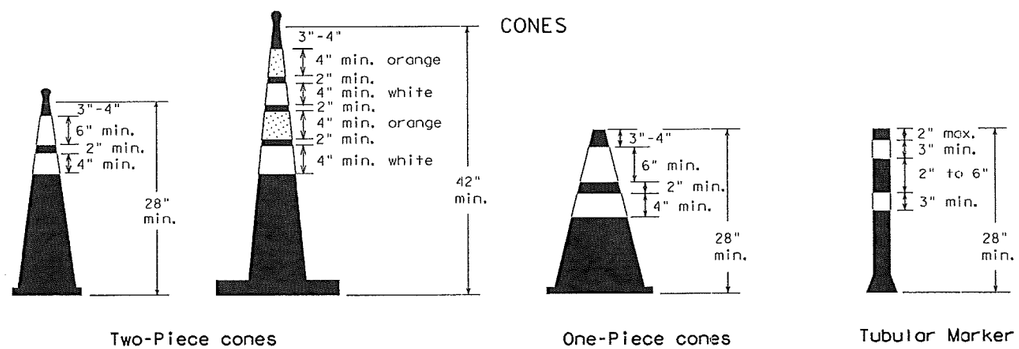
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder 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



Two-Piece cones

One-Piece cones

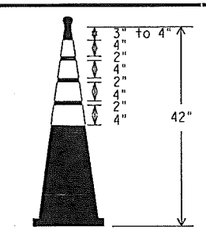
Tubular Marker

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.

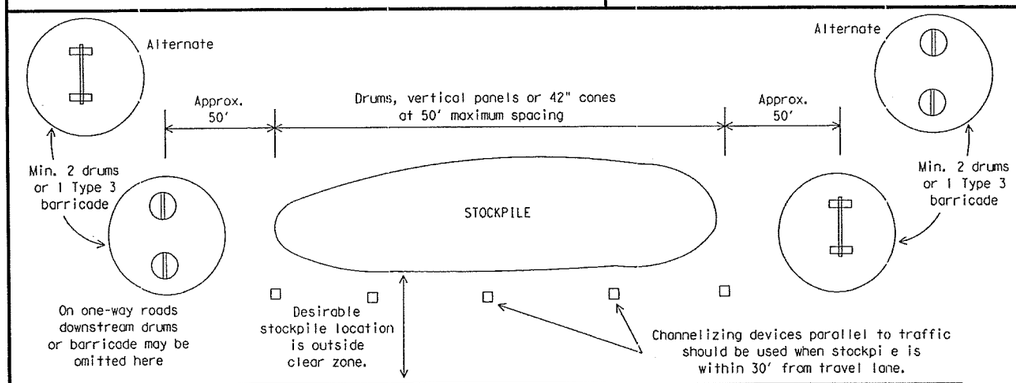
1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added 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.

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.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

SHEET 10 OF 12

Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-14

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DATE:
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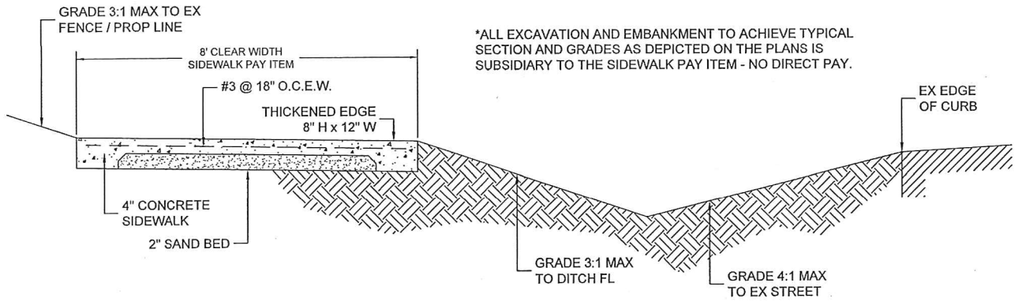
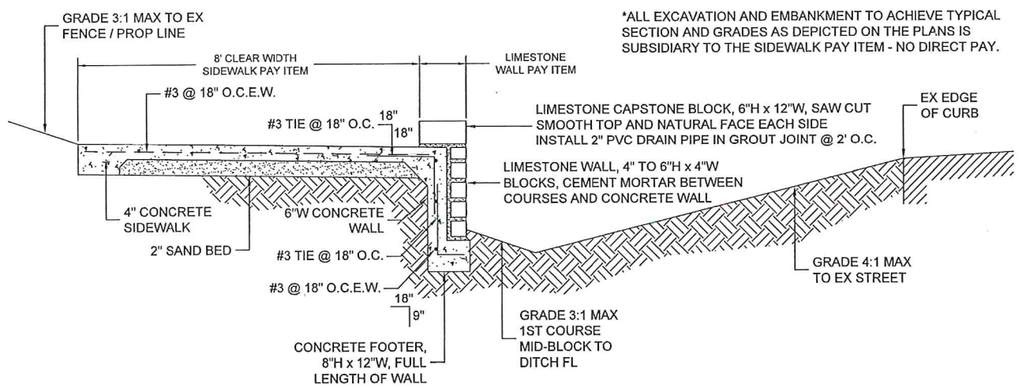


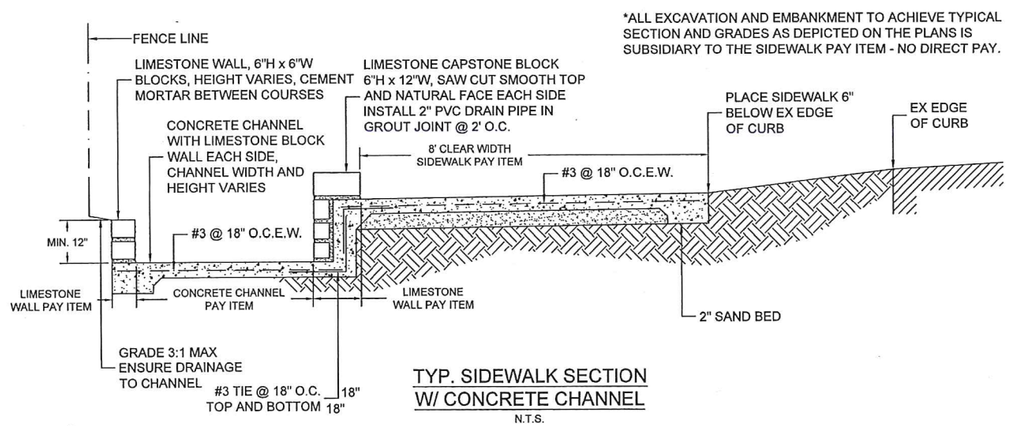
*ALL EXCAVATION AND EMBANKMENT TO ACHIEVE TYPICAL SECTION AND GRADES AS DEPICTED ON THE PLANS IS SUBSIDIARY TO THE SIDEWALK PAY ITEM - NO DIRECT PAY.

TYP. SIDEWALK SECTION
N.T.S.



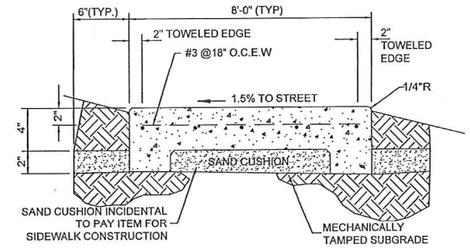
*ALL EXCAVATION AND EMBANKMENT TO ACHIEVE TYPICAL SECTION AND GRADES AS DEPICTED ON THE PLANS IS SUBSIDIARY TO THE SIDEWALK PAY ITEM - NO DIRECT PAY.

TYP. SIDEWALK SECTION W/ WALL
N.T.S.

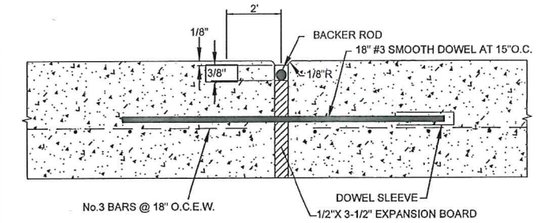


*ALL EXCAVATION AND EMBANKMENT TO ACHIEVE TYPICAL SECTION AND GRADES AS DEPICTED ON THE PLANS IS SUBSIDIARY TO THE SIDEWALK PAY ITEM - NO DIRECT PAY.

TYP. SIDEWALK SECTION W/ CONCRETE CHANNEL
N.T.S.



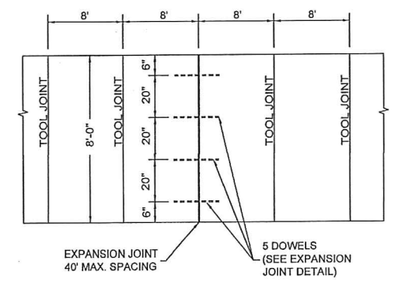
SECTION THRU SIDEWALK
N.T.S.



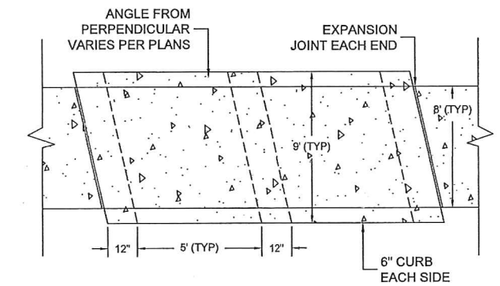
SIDEWALK NOTE:

SEE PED-12A SHEETS FOR RAMP REQUIREMENTS, DRIVEWAY OPTIONS, AND ADDITIONAL SIDEWALK REQUIREMENTS.

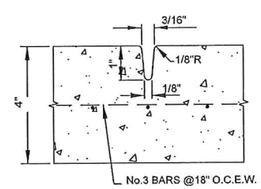
EXPANSION JOINT
N.T.S.



PLAN VIEW OF TYPICAL SIDEWALK
N.T.S.

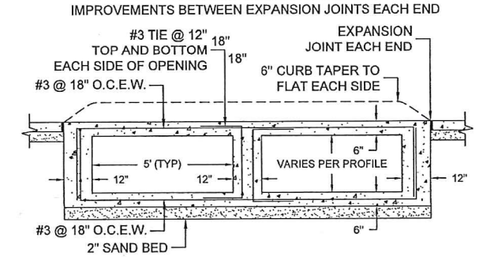


ELEVATED SIDEWALK PLAN
N.T.S.



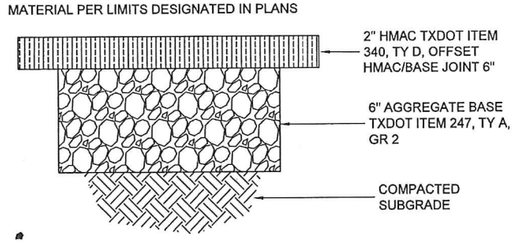
TOOLED JOINT
N.T.S.

*PAY ITEM FOR ELEVATED SIDEWALK INCLUDES ALL IMPROVEMENTS BETWEEN EXPANSION JOINTS EACH END



ELEVATED SIDEWALK SECTION
N.T.S.

*PAY ITEM FOR ASPHALT DRIVEWAY REPAIR IS INCLUSIVE OF HMAC, BASE, AND SUBGRADE COMPACTION AND REMOVAL OF EXISTING DRIVEWAY MATERIAL PER LIMITS DESIGNATED IN PLANS



ASPHALT DRIVEWAY REPAIR
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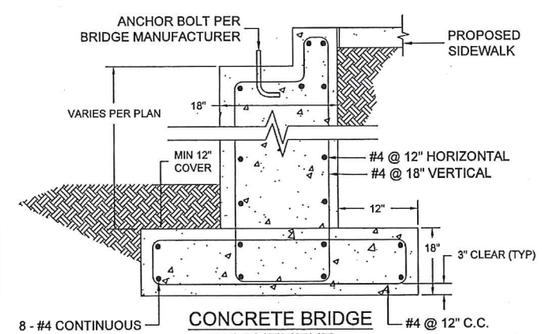

CONCRETE BRIDGE ABUTMENT
N.T.S.

MARK	REVISION	DATE

\\KSA-AUS-SERVER3\MAIN\PROJECTS\LEAN004\DRAWSHEETS\LEAN004-C-DT-SIDEWALK-D001.DWG | SW DETS | 7/22/2015 - 10:08 AM
DRAWING PATHNAME | LAYOUT | PLOT DATE - TIME
PROJECT TITLE: PROJECT DESCRIPTION LOCATION - CITY XX, TEXAS

SHEET NAME: SIDEWALK DETAILS

PROJECT NAME: CITY OF LEANDER, TEXAS
BAGDAD ROAD SIDEWALK IMPROVEMENTS
CRYSTAL FALLS TO EAGLES WAY

DRAWN BY: BC
DESIGNED BY: GC
LATEST REVISION: 7/22/2015
KSA JOB NO.: LEAN.004

KSA
4833 Spicewood Springs Rd., Suite 204
Austin, Texas 78759
T. 512-342-6868 F. 512-342-6877
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SHEET NO.
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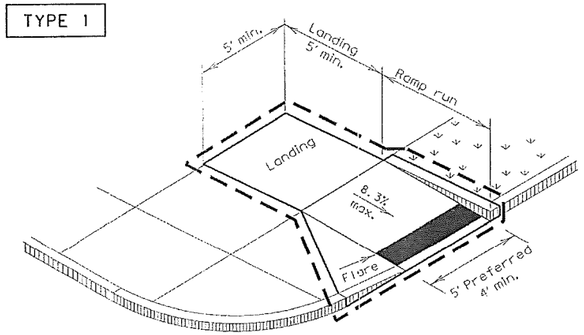
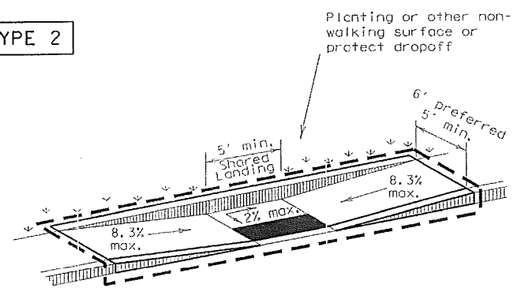


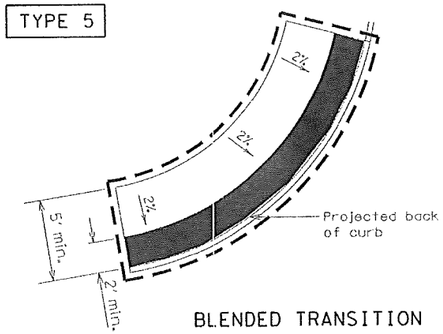
PERPENDICULAR CURB RAMP

TYPE 2



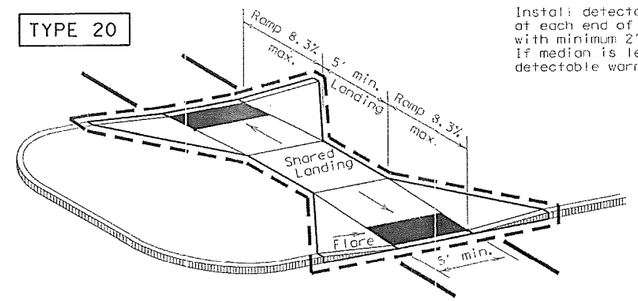
PARALLEL CURB RAMP
(Use only where water will not pond in the landing.)

TYPE 5



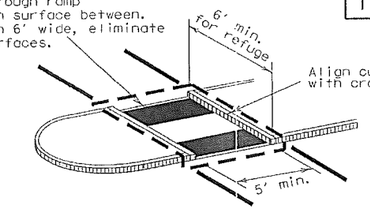
BLENDED TRANSITION

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.

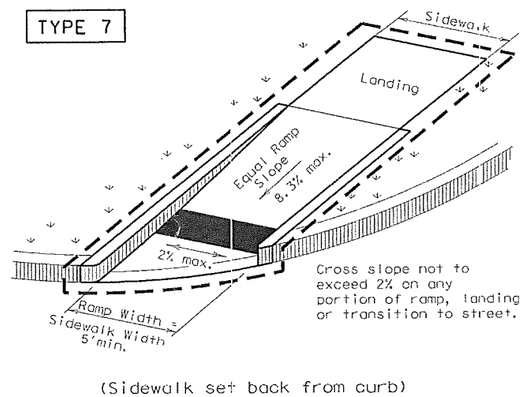
TYPE 21



Curb details are shown elsewhere in the plans.

CURB RAMPS AT MEDIAN ISLANDS

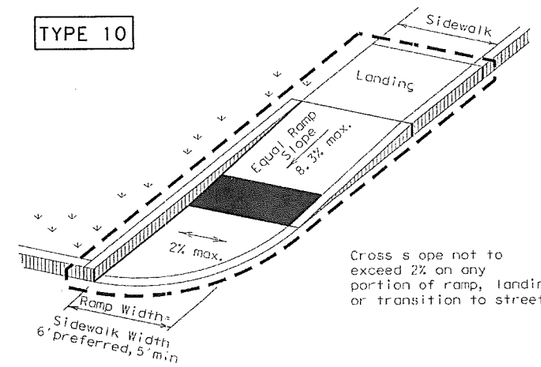
TYPE 7



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

(Sidewalk set back from curb)

TYPE 10

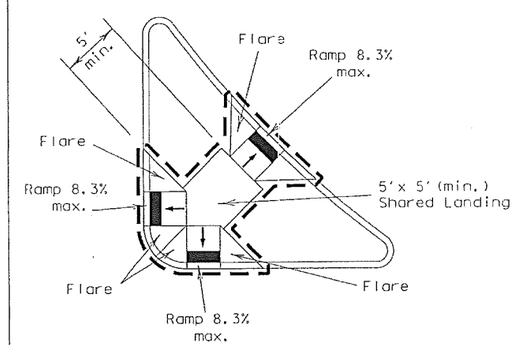


Cross s ope not to exceed 2% on any portion of ramp, landing or transition to street.

(Sidewalk adjacent to curb)

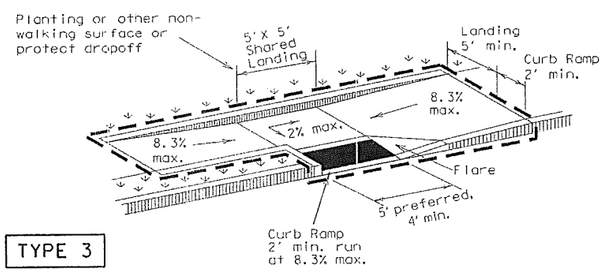
DIRECTIONAL RAMPS WITHIN RADIUS

TYPE 22

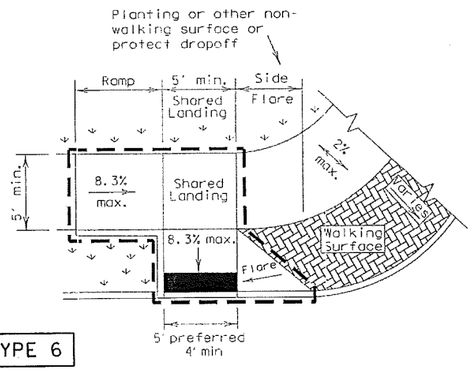


COMBINATION ISLAND RAMPS

TYPE 3

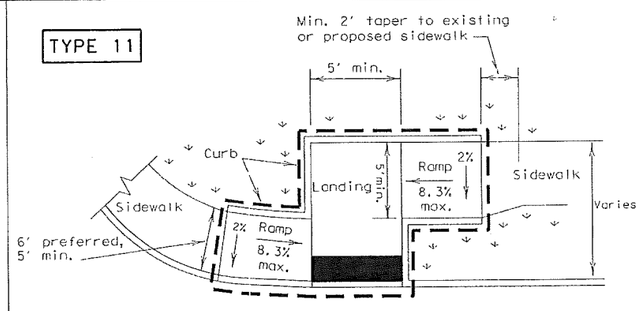


TYPE 6



COMBINATION CURB RAMPS

TYPE 11



OFFSET PARALLEL CURB RAMP

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
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REVISIONS VP June 13, 2012	15		

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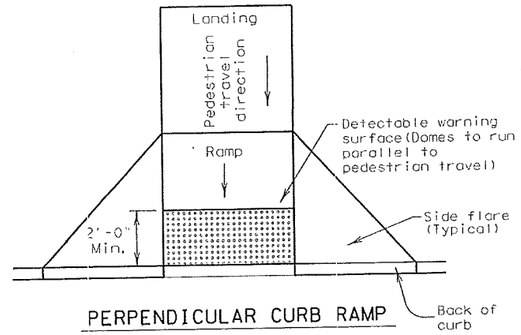
General Notes

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 an 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.

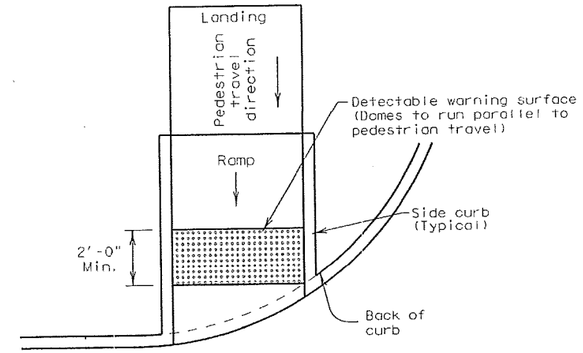
Detectable Warning Material

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.



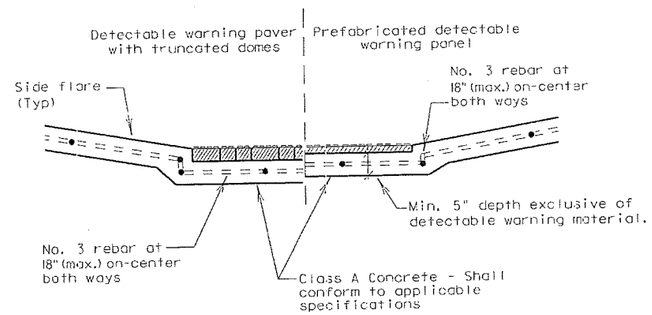
PERPENDICULAR CURB RAMP

Typical placement of detectable warning surface on sloping ramp run.

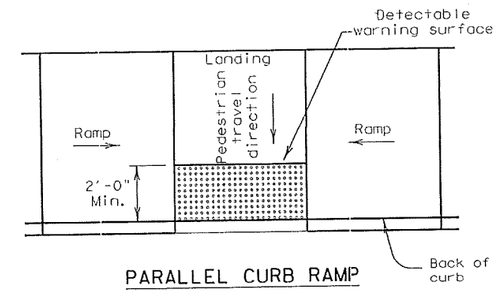


DIRECTIONAL CURB RAMP

Typical placement of detectable warning surface on sloping ramp run.



SECTION: CURB RAMP AT DETECTABLE WARNING



PARALLEL CURB RAMP

Typical placement of detectable warning surface on landing at street edge.

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

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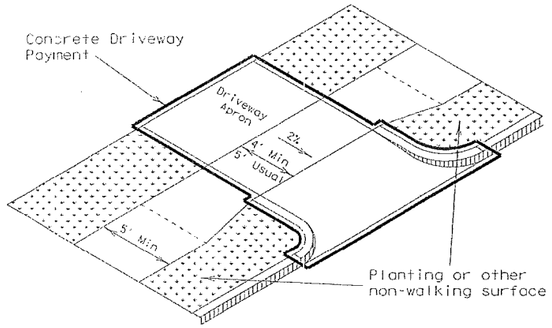
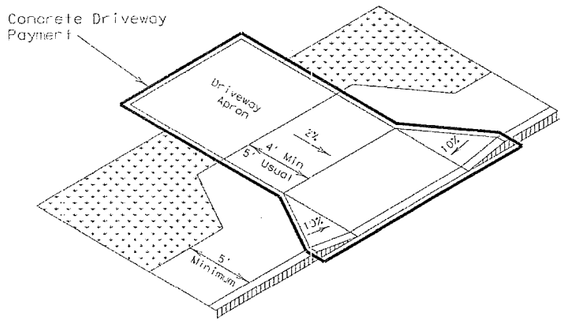
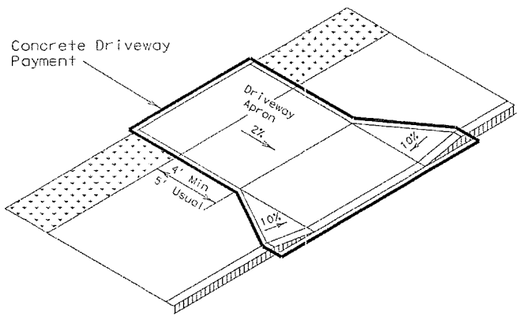


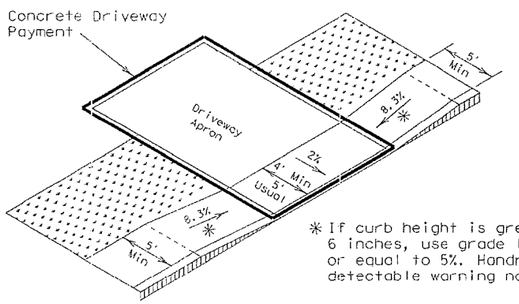
Setback sidewalk



Apron offset sidewalk



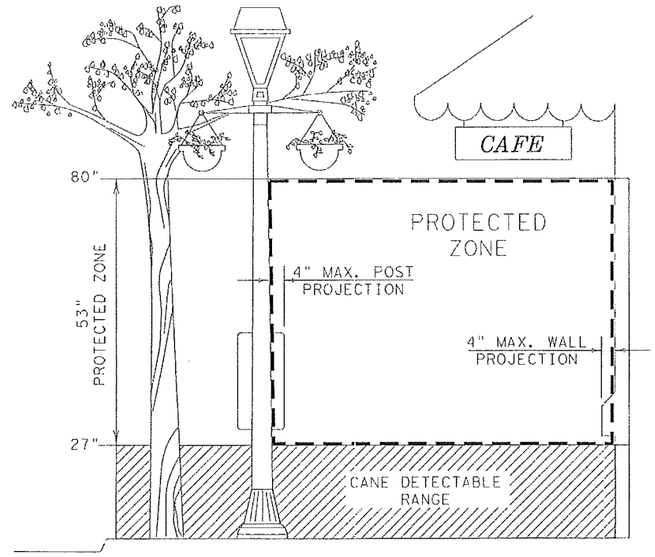
Wide sidewalk



* If curb height is greater than 6 inches, use grade less than or equal to 5%. Handrail and detectable warning not required.

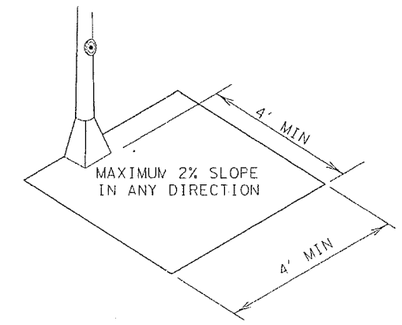
Ramp sidewalk

SIDEWALK TREATMENT AT DRIVEWAYS

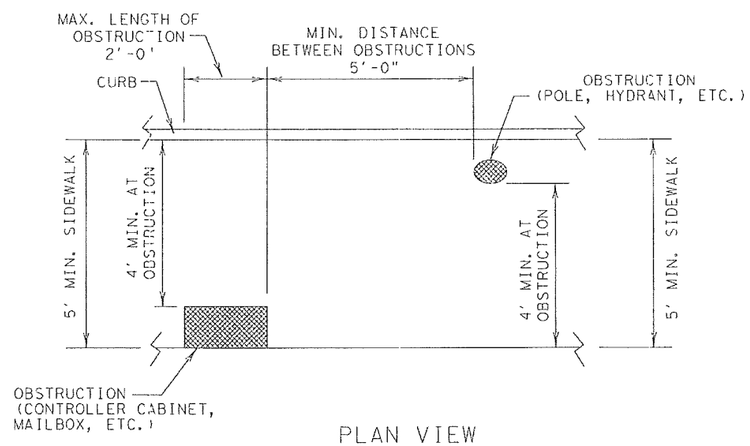


PROTECTED ZONE

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



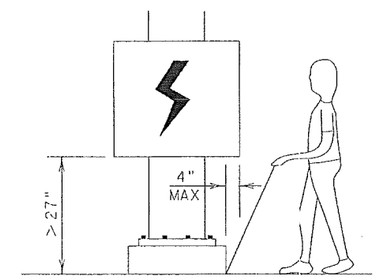
CLEAR GROUND SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



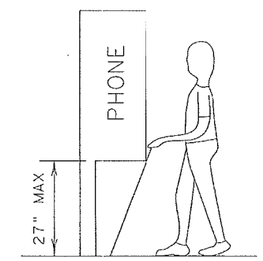
PLAN VIEW

PLACEMENT OF STREET FIXTURES

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



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



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

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

SHEET 3 OF 4

Texas Department of Transportation — Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

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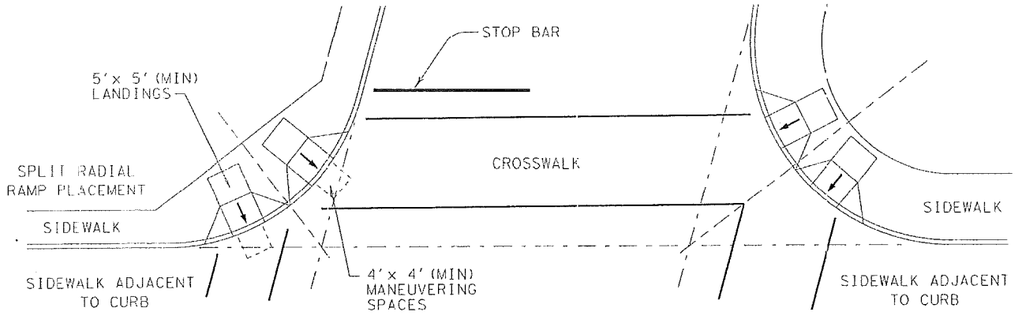
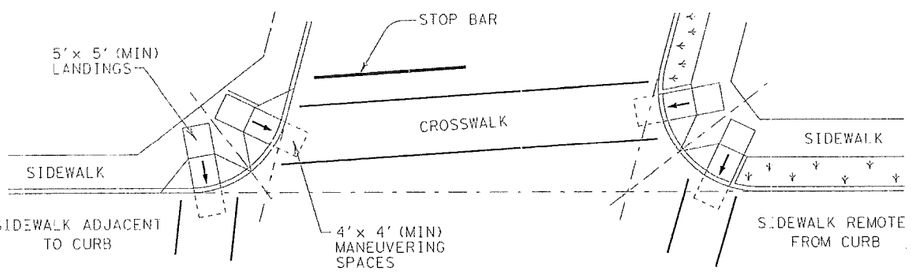
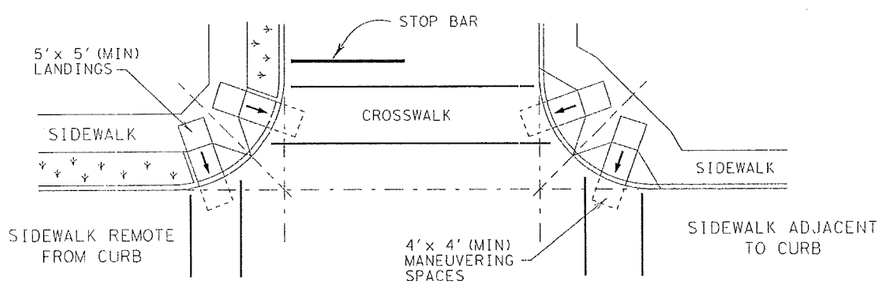


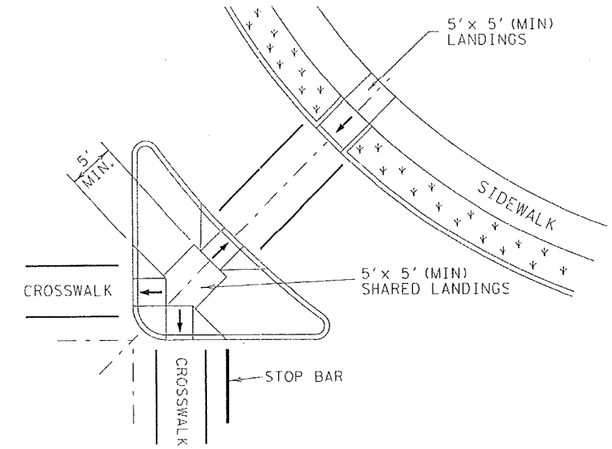
SKEWED INTERSECTION WITH "LARGE" RADIUS



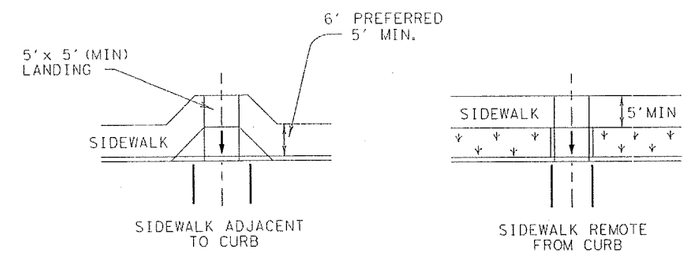
SKEWED INTERSECTION WITH "SMALL" RADIUS



NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND



MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

TYPICAL CROSSING LAYOUTS

SHEET 4 OF 4

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-12A

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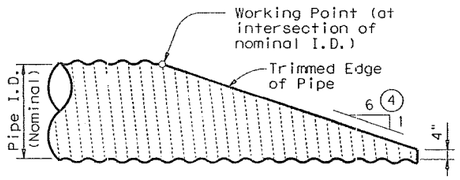
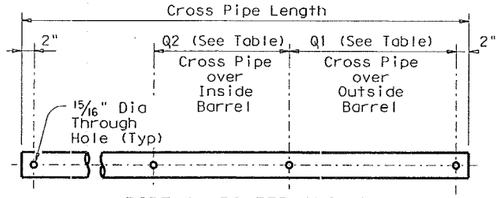


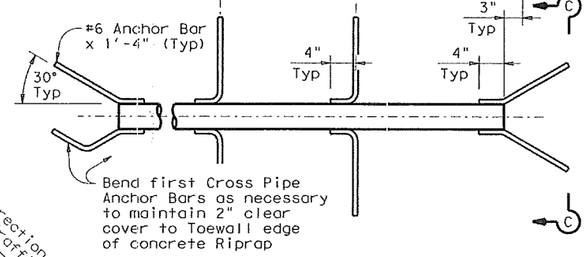
NOTE: All Cross Pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

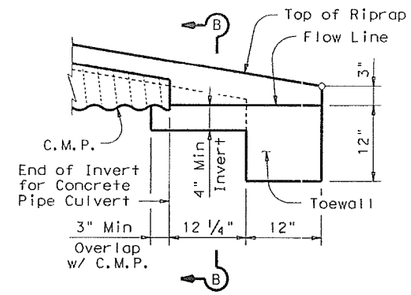
(Showing Corrugated Metal Pipe Culvert.)
(Details at Concrete Pipe Culvert are similar.)



PIPE W/ BOLTED ANCHOR

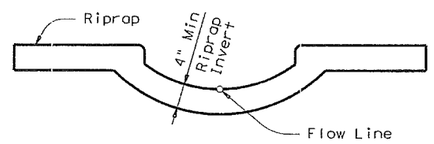


PIPE W/ ANCHOR BARS



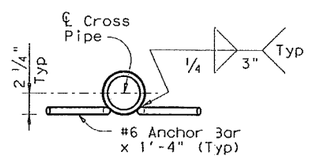
DETAIL "A"

(Showing Invert with Corrugated Metal Pipe Culvert. Concrete Pipe Culvert details are similar. Cross Pipes not shown for clarity.)



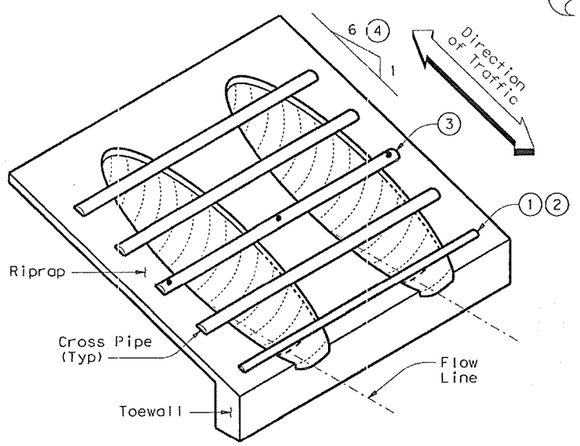
SECTION B-B

(Cross Pipes not shown for clarity.)

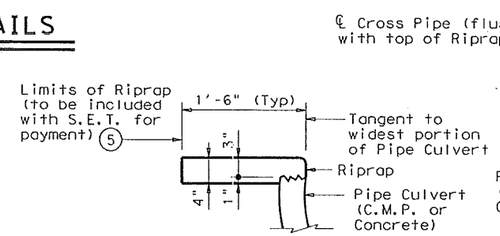


SECTION C-C

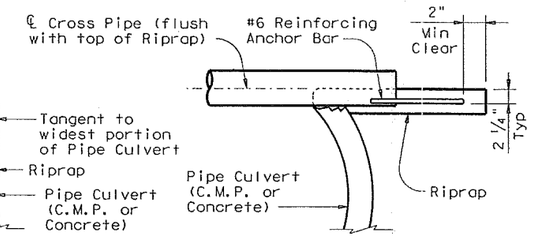
CROSS PIPE DETAILS



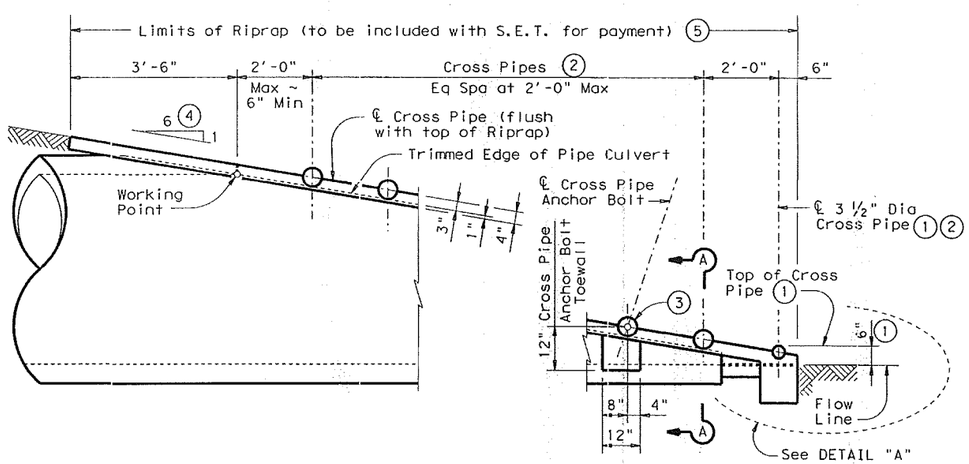
ISOMETRIC VIEW OF TYPICAL INSTALLATION



SHOWING TYPICAL PIPE CULVERT & RIPRAP

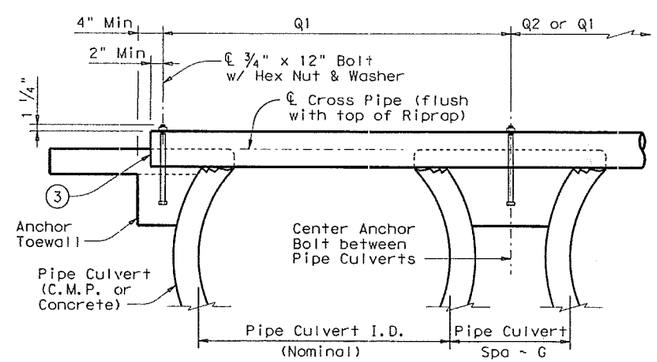


SHOWING CROSS PIPE WITH ANCHOR BAR



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing Concrete Pipe Culvert.)
(Details at Corrugated Metal Pipe Culvert are similar.)



SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, & RIPRAP QUANTITIES 2

Nominal Culvert I.D.	Conc Riprap (CY) 6	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for use of Cross Pipes	Cross Pipe Size
12"	0.6	9"	N/A	2'- 1"	1'- 9"	3 or more Pipe Culverts	3" Std (3.500" O.D.)
15"	0.7	11"	N/A	2'- 5"	2'- 2"		
18"	0.8	1'- 2"	N/A	2'-10"	2'- 8"		
21"	0.9	1'- 4"	N/A	3'- 2"	3'- 1"		
24"	0.9	1'- 7"	N/A	3'- 6"	3'- 7"		
27"	1.0	1'- 8"	N/A	3'-10"	3'-11"	3 or more Pipe Culverts	3 1/2" Std (4.000" O.D.)
30"	1.1	1'-10"	N/A	4'- 2"	4'- 4"	2 or more Pipe Culverts	
33"	1.2	1'-11"	4'- 2"	4'- 5"	4'- 8"	All Pipe Culverts	
36"	1.3	2'- 1"	4'- 5"	4'- 9"	5'- 1"	All Pipe Culverts	4" Std (4.500" O.D.)
42"	1.5	2'- 4"	4'-11"	5'- 5"	5'-10"		
48"	1.7	2'- 7"	5'- 5"	6'- 0"	6'- 7"	All Pipe Culverts	5" Std (5.563" O.D.)
54"	2.0	3'- 0"	5'-11"	6'- 9"	7'- 6"		
60"	2.2	3'- 3"	6'- 5"	7'- 4"	8'- 3"		
66"	2.4	3'- 3"	6'-11"	7'-10"	8'- 9"		
72"	2.7	3'- 4"	7'- 5"	8'- 5"	9'- 4"		

1. The proper installation of the first Cross Pipe is critical for vehicle safety. The top of the first Cross Pipe must be placed at no more than 6" above the flow line.
2. Size of Cross Pipes, except the first bottom pipe, shall be as shown in the PIPE SIZE table. The first bottom pipe shall be 3 1/2" Standard Pipe (4" O.D.).
3. The third Cross Pipe from the bottom of the Culvert shall always be installed using a bolted connection. Care shall be taken to ensure that Riprap concrete does not flow into the Cross Pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, all other Cross Pipes may a so be installed using the bolted connection details.
4. Match Cross Slope as shown elsewhere in the plans. Cross Slope of 6:1 or flatter is required for vehicle safety.
5. Riprap placed beyond the limits shown will be paid as Concrete Riprap in accordance with Item 432, "Riprap".
6. Quantities shown are for one end of one reinforced Concrete Pipe Culvert. For multiple pipe cu verts or for Corrugated Metal Pipe Culverts, quantities wil need to be adjusted. Riprap quantities are for Contractor's information only.

GENERAL NOTES:

Cross Pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Safety End Treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the Cross Pipes.

Riprap and all necessary inverts shall be Concrete Riprap conforming to the requirements of Item 432, "Riprap".

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.

Cross Pipes shall conform to the requirements of ASTM A53 (Type E or S, Grade B), ASTM A500 (Grade B), or API 5LX52.

Bolts and nuts shall conform to ASTM A307.

All steel components, except concrete reinforcing, shall be galvanized after fabrication. Galvanizing damaged during transport or construction shall be repaired in accordance with the specifications.

Texas Department of Transportation — Bridge Division Standard

SAFETY END TREATMENT

FOR 12" DIA TO 72" DIA
PIPE CULVERTS
TYPE II ~ PARALLEL DRAINAGE

SETP-PD

FILE: setppdse.dgn	DN: GAF	CK: CAT	DW: JRP	CK: GAF
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REVISIONS
11-10: Add note for synthetic fibers.

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DATE:
FILE:

SEG. I LINE AND CURVE TABLE

NUMBER	RADIUS	LENGTH	LINE/CHORD DIRECTION	BEGIN STA.	END STA.	BEGIN NORTHING	BEGIN EASTING
L1		7.40	N31° 20' 48.56"E	0+00.00	0+07.40	N:10173039.3616	E:3076374.8276
C1	10.00	16.37	N15° 32' 46.81"W	0+07.40	0+23.77	N:10173045.6837	E:3076378.6786
L2		78.31	N62° 26' 22.17"W	0+23.77	1+02.09	N:10173059.7511	E:3076374.7651
C2	200.00	40.01	N56° 42' 28.01"W	1+02.09	1+42.10	N:10173095.9860	E:3076305.3375
L3		242.85	N50° 58' 33.85"W	1+42.10	3+84.95	N:10173117.9139	E:3076271.9456
C3	1479.24	212.51	N46° 53' 03.66"W	3+84.95	5+97.46	N:10173270.8220	E:3076083.2810
C4	50.00	20.66	N30° 55' 57.43"W	5+97.48	6+18.11	N:10173415.9408	E:3075928.2886
L4		6.02	N19° 05' 50.30"W	6+18.11	6+24.13	N:10173433.5336	E:3075917.7459
C5	20.00	9.90	N33° 17' 04.82"W	6+24.13	6+34.04	N:10173439.2236	E:3075915.7759
C6	400.00	133.19	N37° 55' 58.21"W	6+34.04	7+67.23	N:10173447.4190	E:3075910.3956
C7	100.00	8.07	N30° 42' 17.32"W	7+67.23	7+75.30	N:10173551.9875	E:3075828.8950
L5		109.66	N33° 00' 57.55"W	7+75.30	8+84.96	N:10173558.9221	E:3075824.7767
C8	12.88	9.47	N8° 33' 44.32"W	8+84.96	8+94.44	N:10173650.8767	E:3075765.0242
L6		17.84	N29° 38' 29.34"W	8+94.44	9+12.28	N:10173660.0352	E:3075763.6453
C9	50.00	15.64	N38° 35' 59.86"W	9+12.28	9+27.91	N:10173675.5413	E:3075754.8218
L7		10.26	N47° 33' 30.37"W	9+27.91	9+38.17	N:10173687.7110	E:3075745.1068
C10	50.00	17.39	N37° 35' 48.24"W	9+38.17	9+55.56	N:10173694.6357	E:3075737.5343
L8		1311.78	N27° 38' 06.12"W	9+55.56	22+67.34	N:10173708.3421	E:3075726.9802
L9		216.86	N28° 38' 21.34"W	22+67.34	24+84.20	N:10174870.4780	E:3075118.5252
C11	30.00	26.07	N53° 32' 12.38"W	24+84.20	25+10.27	N:10175060.8022	E:3075014.5878
L10		1.92	N78° 26' 03.42"W	25+10.27	25+12.20	N:10175075.8143	E:3074994.2729
C12	20.00	15.71	N55° 56' 03.42"W	25+12.20	25+27.90	N:10175076.1997	E:3074992.3895

SEG. II LINE AND CURVE TABLE

NUMBER	RADIUS	LENGTH	LINE/CHORD DIRECTION	BEGIN STA.	END STA.	BEGIN NORTHING	BEGIN EASTING
L1		4.78	N28° 06' 30.08"W	0+00.00	0+04.78	N:10175438.9999	E:3074810.0855
C1	15.00	7.52	N13° 44' 57.53"W	0+04.78	0+12.30	N:10175443.2136	E:3074807.8348
L2		10.03	N0° 36' 35.02"E	0+12.30	0+22.33	N:10175450.4403	E:3074806.0665
C2	50.00	25.18	N13° 49' 03.27"W	0+22.33	0+47.51	N:10175460.4734	E:3074806.1733
L3		179.87	N28° 14' 41.56"W	0+47.51	2+27.38	N:10175484.6675	E:3074800.2228
L4		95.77	N28° 54' 14.53"W	2+27.38	3+23.15	N:10175643.1187	E:3074715.1021
L5		64.91	N30° 04' 59.14"W	3+23.15	3+88.06	N:10175726.9626	E:3074668.8102
C3	26.13	23.44	N51° 47' 18.09"W	3+88.06	4+11.49	N:10175783.1255	E:3074636.2758
L6		5.20	N76° 36' 34.73"W	4+11.49	4+16.69	N:10175797.1412	E:3074618.4724
C4	12.00	9.42	N54° 06' 34.73"W	4+16.69	4+26.12	N:10175798.3448	E:3074613.4168

SEG. III LINE AND CURVE TABLE

NUMBER	RADIUS	LENGTH	LINE/CHORD DIRECTION	BEGIN STA.	END STA.	BEGIN NORTHING	BEGIN EASTING
L1		3.26	N26° 42' 02.32"W	0+00.00	0+03.26	N:10176260.9880	E:3074316.8710
C1	20.00	3.47	N21° 44' 02.18"W	0+03.26	0+06.73	N:10176263.9021	E:3074315.4053
L2		27.61	N16° 46' 02.04"W	0+06.73	0+34.34	N:10176267.1190	E:3074314.1229
C2	20.00	5.26	N24° 17' 45.72"W	0+34.34	0+39.60	N:10176293.5583	E:3074306.1569
L3		286.61	N31° 49' 29.41"W	0+39.60	3+26.21	N:10176298.3351	E:3074304.0005
C3	24.96	4.11	N27° 06' 53.22"W	3+26.21	3+30.32	N:10176541.8563	E:3074152.8648
L4		14.70	N22° 24' 17.03"W	3+30.32	3+45.02	N:10176545.5107	E:3074150.9935
C4	25.00	3.62	N26° 32' 55.00"W	3+45.02	3+48.64	N:10176559.1024	E:3074145.3901
L5		99.45	N30° 41' 32.96"W	3+48.64	4+48.08	N:10176562.3345	E:3074143.7752
C5	10.00	3.37	N40° 21' 03.52"W	4+48.08	4+51.45	N:10176647.8515	E:3074093.0141
L6		12.96	N50° 00' 34.08"W	4+51.45	4+64.41	N:10176650.4087	E:3074090.8415
C6	10.00	3.18	N40° 53' 22.20"W	4+64.41	4+67.59	N:10176658.7353	E:3074080.9149
L7		90.75	N31° 46' 10.32"W	4+67.59	5+58.34	N:10176661.1318	E:3074078.8398
L8		34.01	N31° 31' 48.68"W	5+58.34	5+92.35	N:10176738.2819	E:3074031.0615
L9		45.20	N29° 52' 04.75"W	5+92.35	6+37.55	N:10176767.2692	E:3074013.2770
L10		95.61	N31° 07' 30.09"W	6+37.55	7+33.15	N:10176806.4627	E:3073990.7689
L11		18.79	N31° 58' 12.18"W	7+33.15	7+51.94	N:10176888.3076	E:3073941.3481
L12		201.37	N30° 52' 06.66"W	7+51.94	9+53.31	N:10176904.2456	E:3073931.4006
L13		6.76	N30° 07' 36.66"W	9+53.31	9+60.07	N:10177077.0916	E:3073828.0833
L14		95.70	N29° 46' 29.58"W	9+60.07	10+55.77	N:10177082.9388	E:3073824.6902
L15		96.19	N30° 16' 42.05"W	10+55.77	11+51.97	N:10177168.0052	E:3073777.1659
L16		55.38	N31° 32' 33.97"W	11+51.97	12+07.33	N:10177249.0749	E:3073728.6660
L17		42.00	N33° 56' 39.44"W	12+07.33	12+49.32	N:10177296.2562	E:3073699.7048
L18		255.53	N30° 52' 06.66"W	12+49.32	15+04.85	N:10177331.0959	E:3073676.2543
L19		3.53	S59° 07' 53.34"W	15+04.85	15+08.38	N:10177550.4268	E:3073545.1512
C7	8.00	12.71	N75° 21' 23.60"W	15+08.38	15+21.09	N:10177548.6145	E:3073542.1193
L20		10.71	N29° 50' 40.55"W	15+21.09	15+31.80	N:10177551.5001	E:3073531.0757

MARK	REVISION	DATE

V:\KSA-AUS-SERVER\MAIN\PROJECTS\LEAN\004\DRAWSHEETS\LEAN-004-GR0003-LAG TABLES.DWG | LAYOUT1 | 7/22/2015 - 4:03 PM
DRAWING PATHNAME | LAYOUT | PLOT DATE - TIME

SHEET NAME: LINE AND CURVE TABLES

PROJECT NAME: CITY OF LEANDER, TEXAS
BAGDAD ROAD SIDEWALK IMPROVEMENTS
CRYSTAL FALLS TO EAGLES WAY

DRAWN BY:	BC
DESIGNED BY:	GC
LATEST REVISION:	7/22/2015
KSA JOB NO.:	LEAN.004

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T. 512-342-5588 F. 512-342-5877
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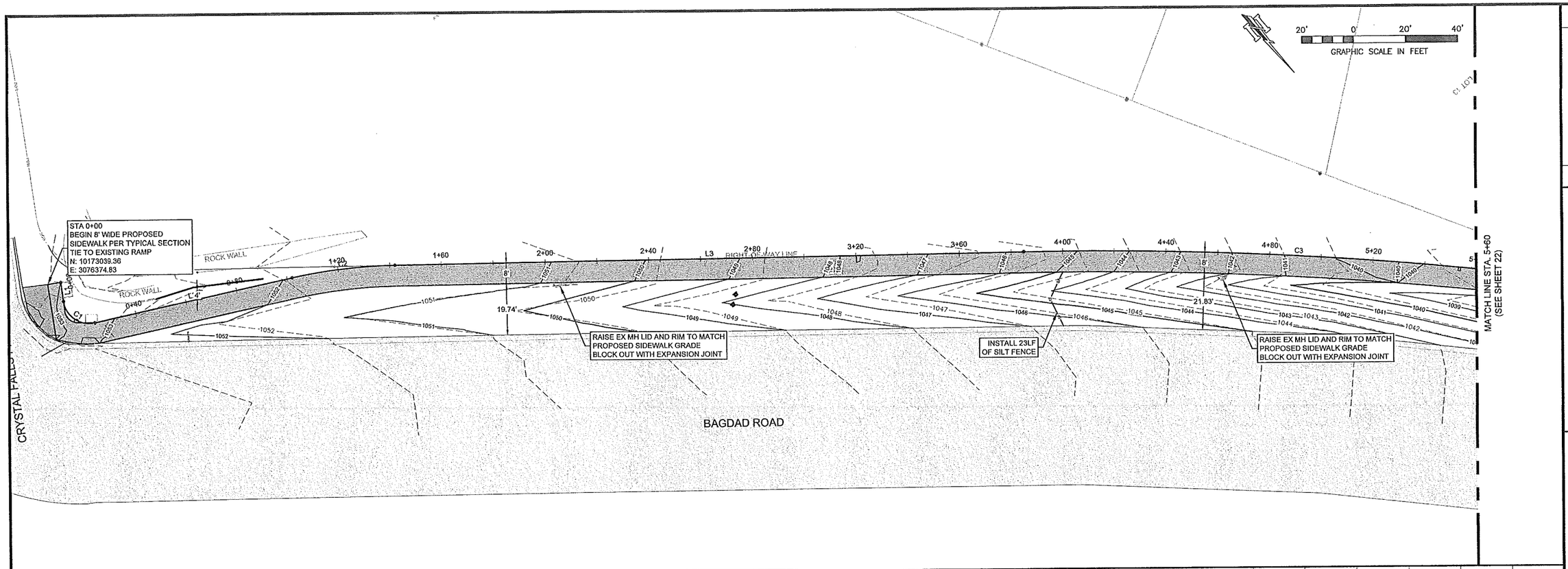
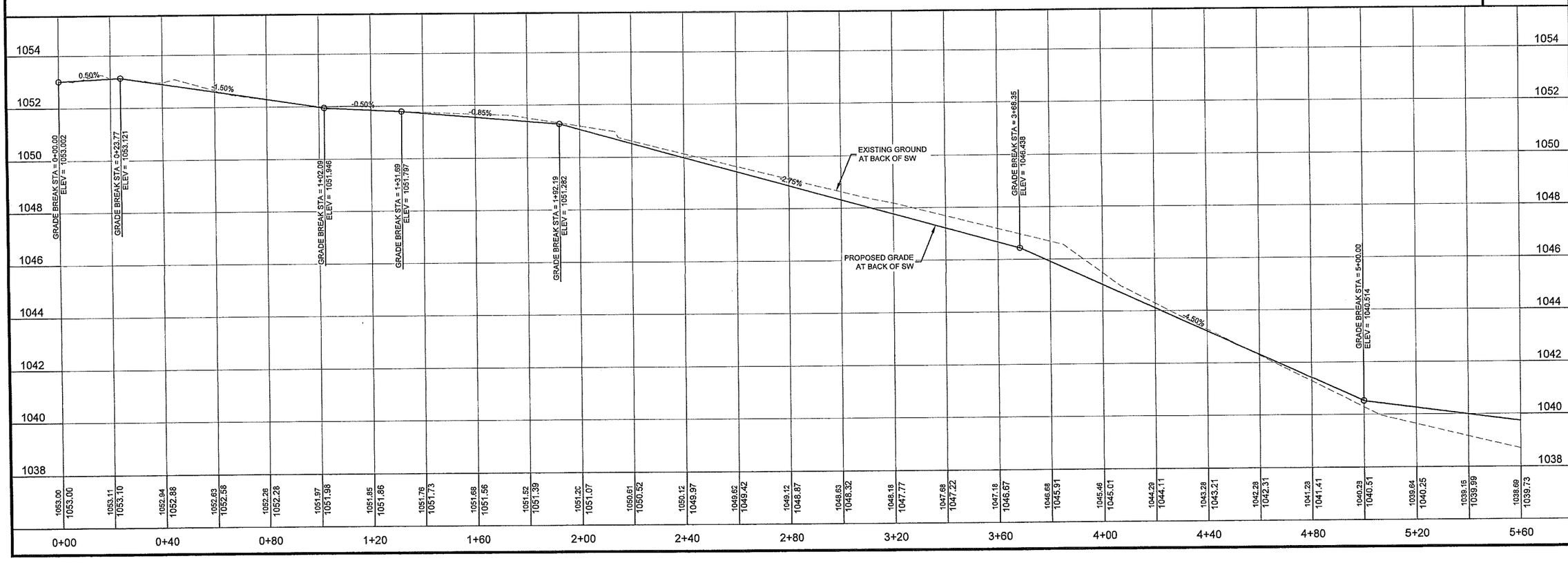
SHEET NO.
20





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DRAWING PATH/NAME | LAYOUT | PLOT DATE - TIME

SIDEWALK SEGMENT I PLAN AND PROFILE STA. 0+00 - 5+60

SHEET NAME:

CITY OF LEANDER, TEXAS

BAGDAD ROAD SIDEWALK IMPROVEMENTS

CRYSTAL FALLS TO EAGLES WAY

PROJECT NAME:

DRAWN BY:	BC
DESIGNED BY:	GC
LATEST REVISION:	7/22/2015
KSA JOB NO.:	LEAN.004

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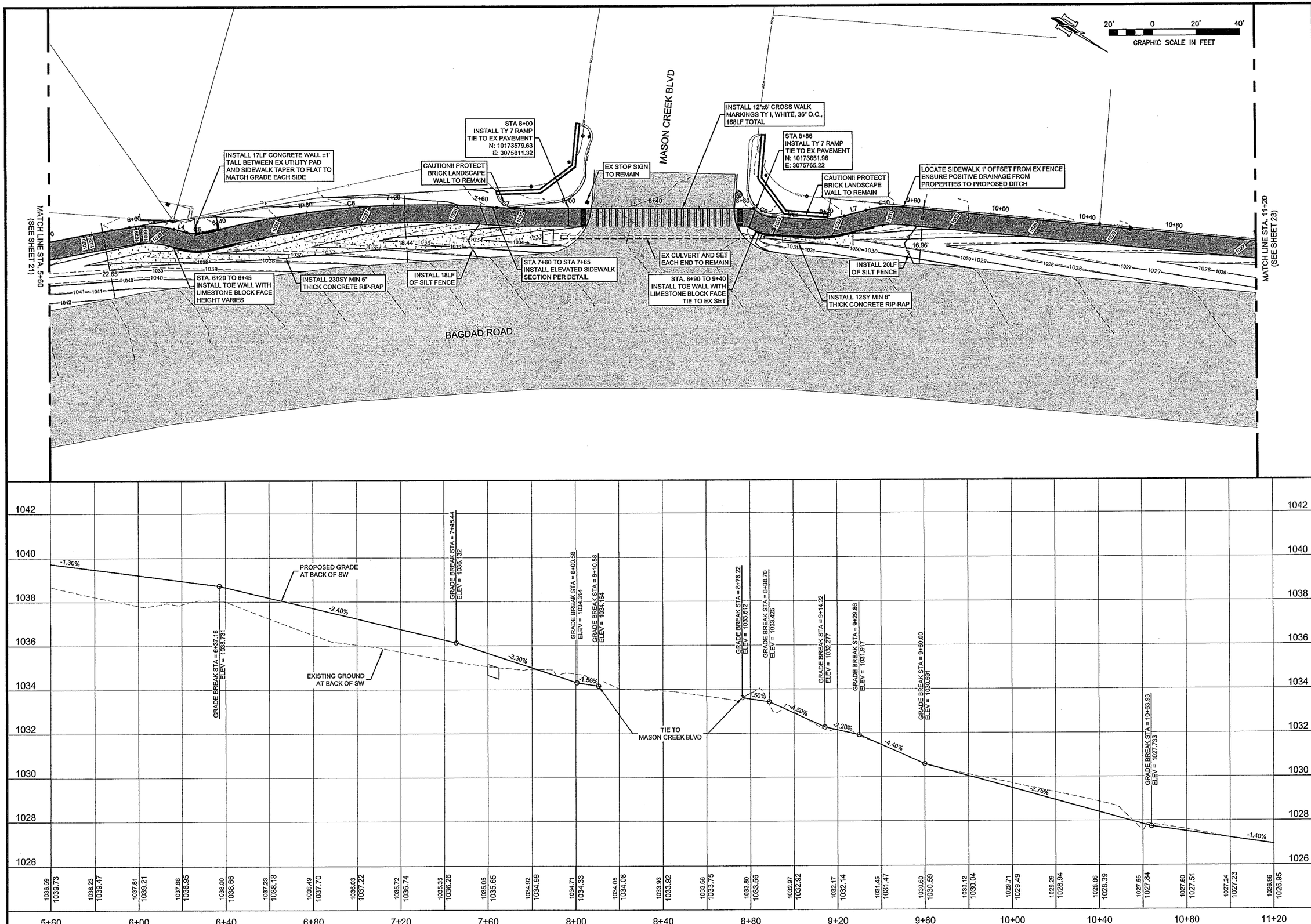
SHEET NO.
21



MARK	REVISION	DATE

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DRAWING PATH/NAME | LAYOUT | PLOT DATE - TIME

SIDEWALK SEGMENT I PLAN AND PROFILE STA. 5+60 - 11+20

SHEET NAME:

CITY OF LEANDER, TEXAS
BAGDAD ROAD SIDEWALK IMPROVEMENTS
CRYSTAL FALLS TO EAGLES WAY

PROJECT NAME:

DRAWN BY:	BC
DESIGNED BY:	GC
LATEST REVISION:	7/22/2015
KSA JOB NO.:	LEAN.004

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T. 512-342-6464 F. 512-342-6477
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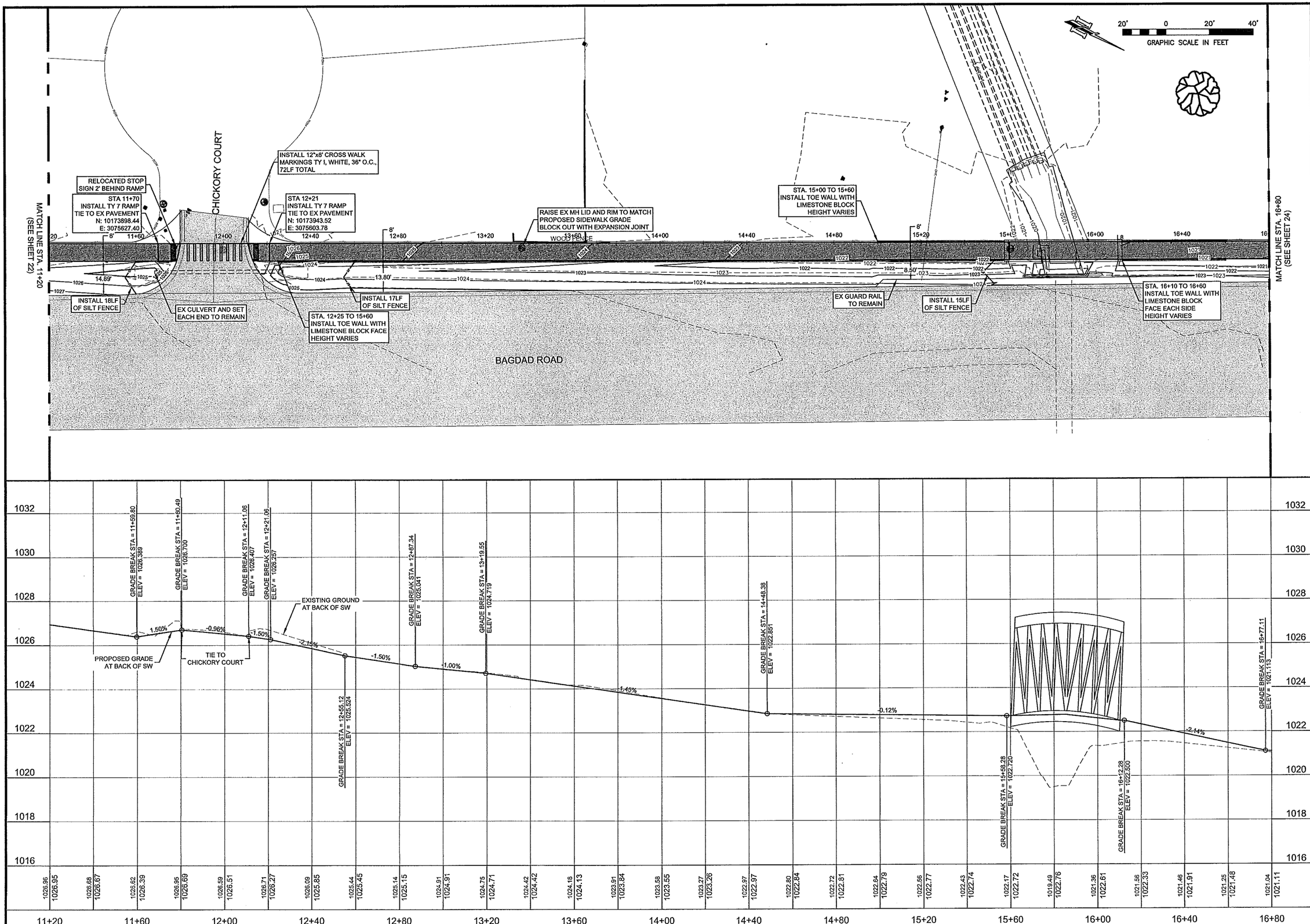
SHEET NO.
22



MARK	REVISION	DATE

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DRAWING PATHNAME | LAYOUT | PLOT DATE - TIME

SIDEWALK SEGMENT I PLAN AND PROFILE STA. 11+20 - 16+80

SHEET NAME:

CITY OF LEANDER, TEXAS
BAGDAD ROAD SIDEWALK IMPROVEMENTS
CRYSTAL FALLS TO EAGLES WAY

PROJECT NAME:

DRAWN BY:	BC
DESIGNED BY:	GC
LATEST REVISION:	7/22/2015
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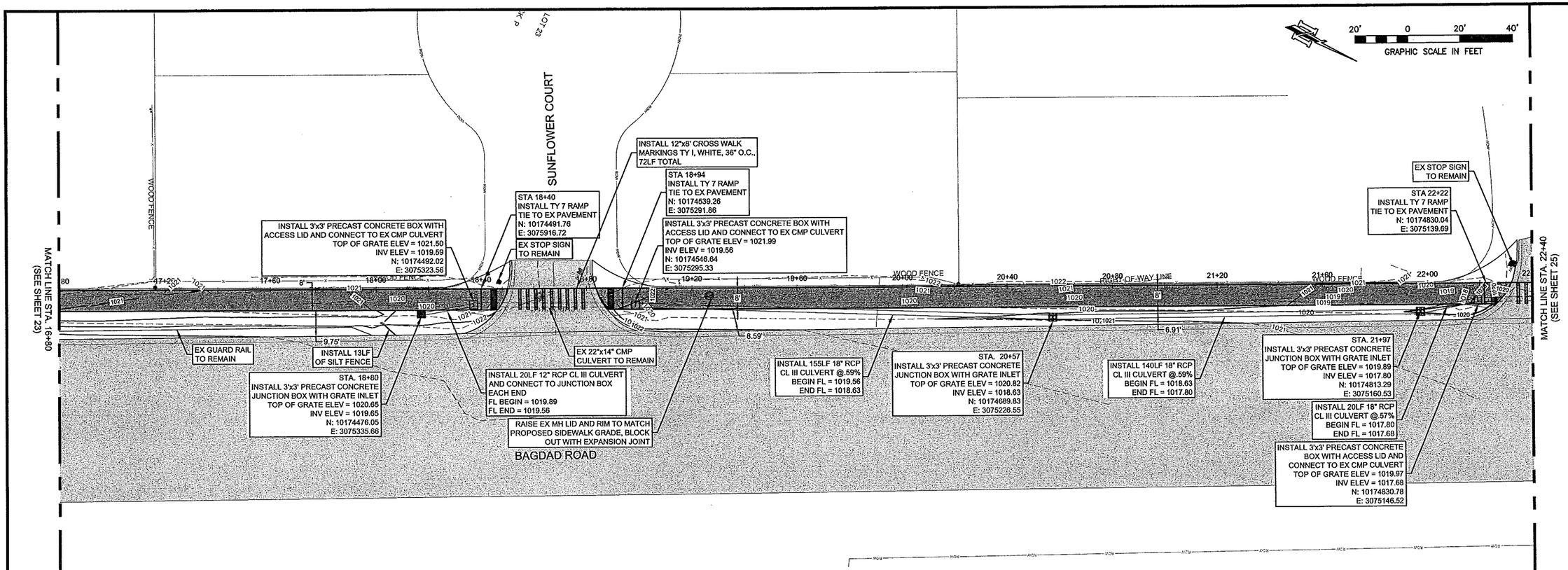
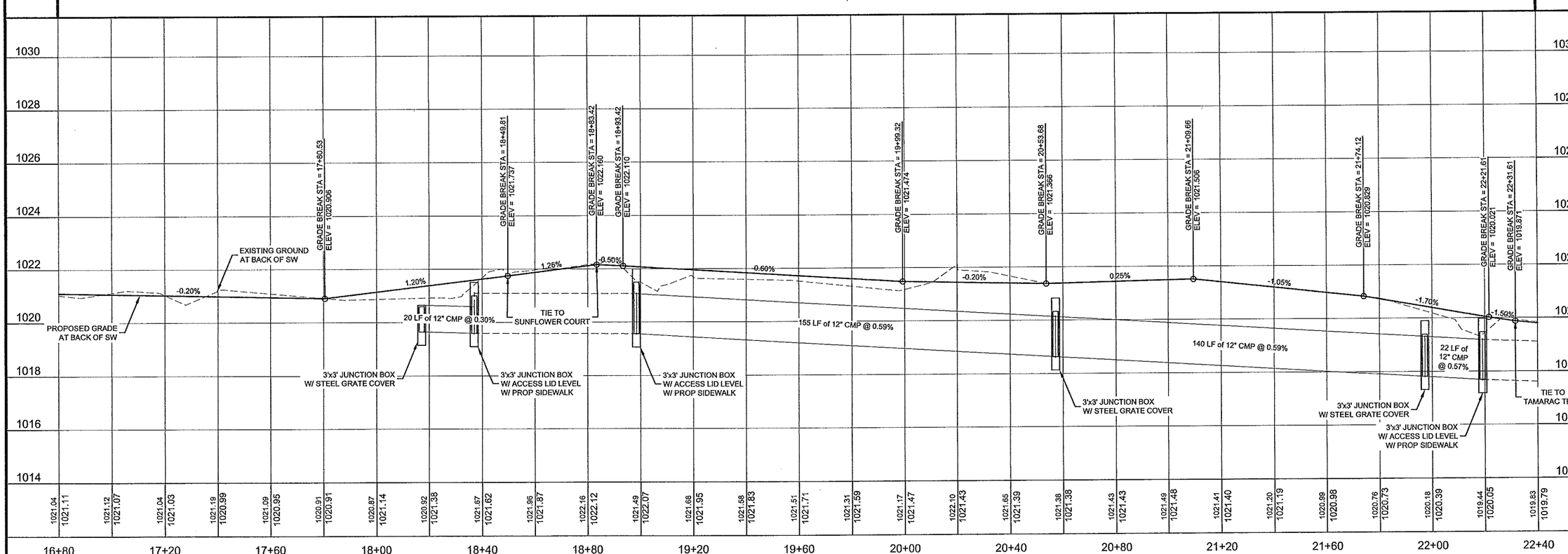
SHEET NO.
23





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DRAWING PATHNAME | LAYOUT | PLOT DATE - TIME

SIDEWALK SEGMENT I PLAN AND PROFILE STA. 16+80 - 22+40

SHEET NAME:

CITY OF LEANDER, TEXAS
BAGDAD ROAD SIDEWALK IMPROVEMENTS

CRYSTAL FALLS TO EAGLES WAY

PROJECT NAME:

DRAWN BY:	BC
DESIGNED BY:	GC
LATEST REVISION:	7/22/2015
KSA JOB NO.:	LEAN.004

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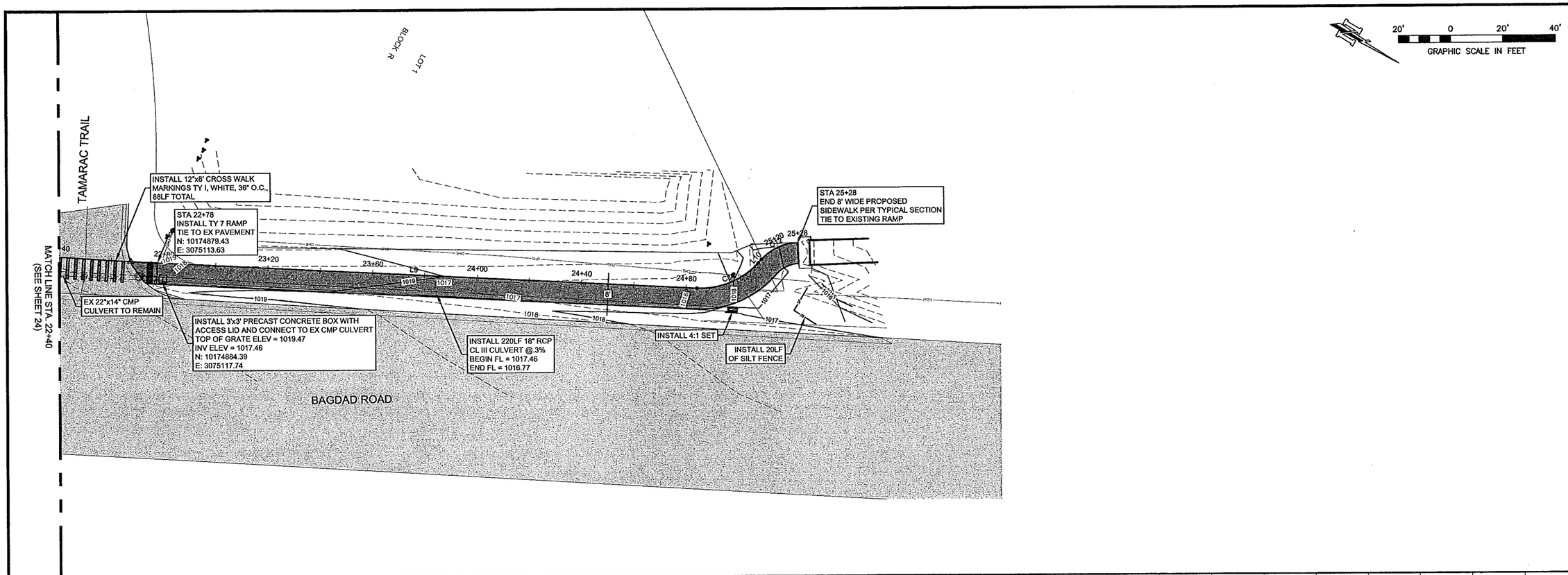
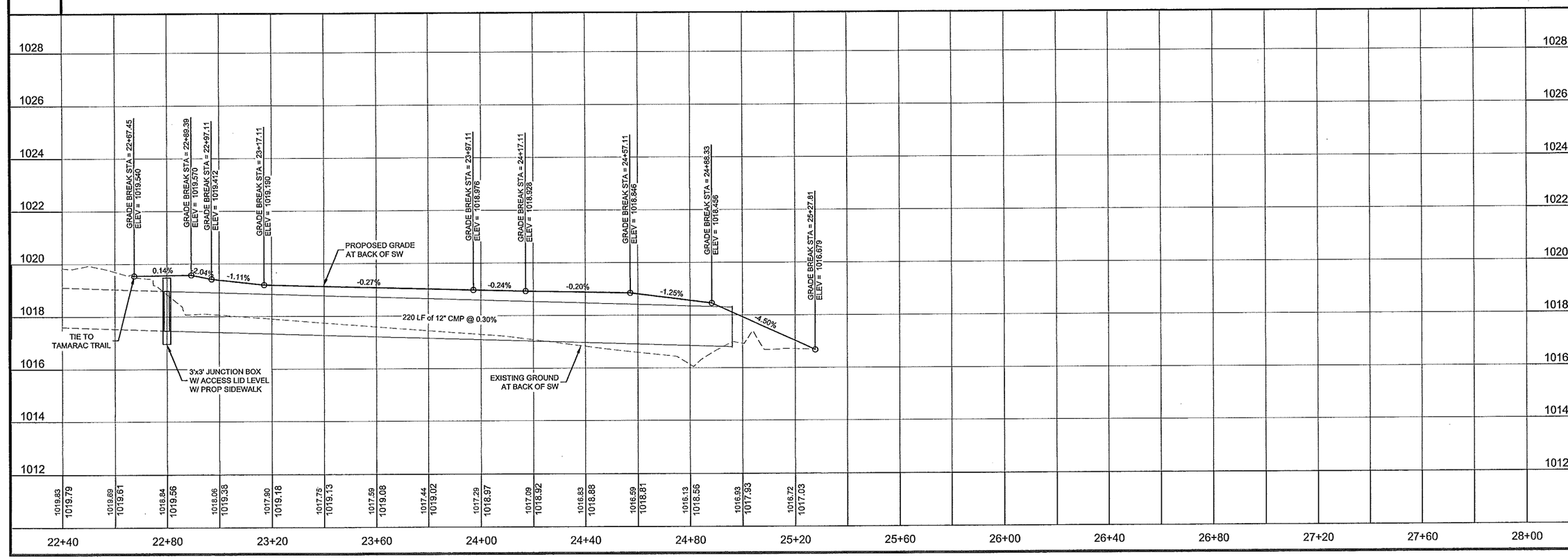
SHEET NO.
24





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\\KSA-AUS-SERVER3\MAN\PROJECTS\LEAN\04\DRAWSHEETS
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DRAWING PATHNAME | LAYOUT | PLOT DATE - TIME

SIDEWALK SEGMENT I PLAN AND PROFILE STA. 22+40 - END

SHEET NAME:

CITY OF LEANDER, TEXAS
BAGDAD ROAD SIDEWALK IMPROVEMENTS
CRYSTAL FALLS TO EAGLES WAY

PROJECT NAME:

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BC	GC	7/22/2015	LEAN.004

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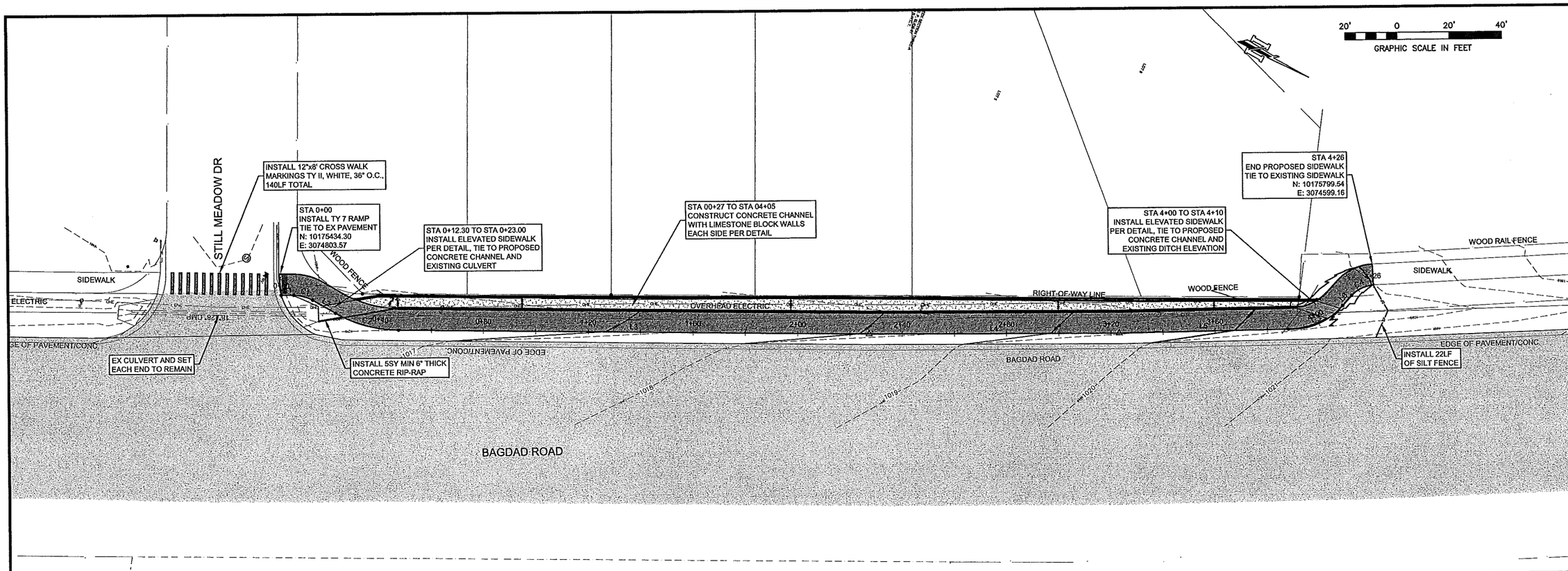
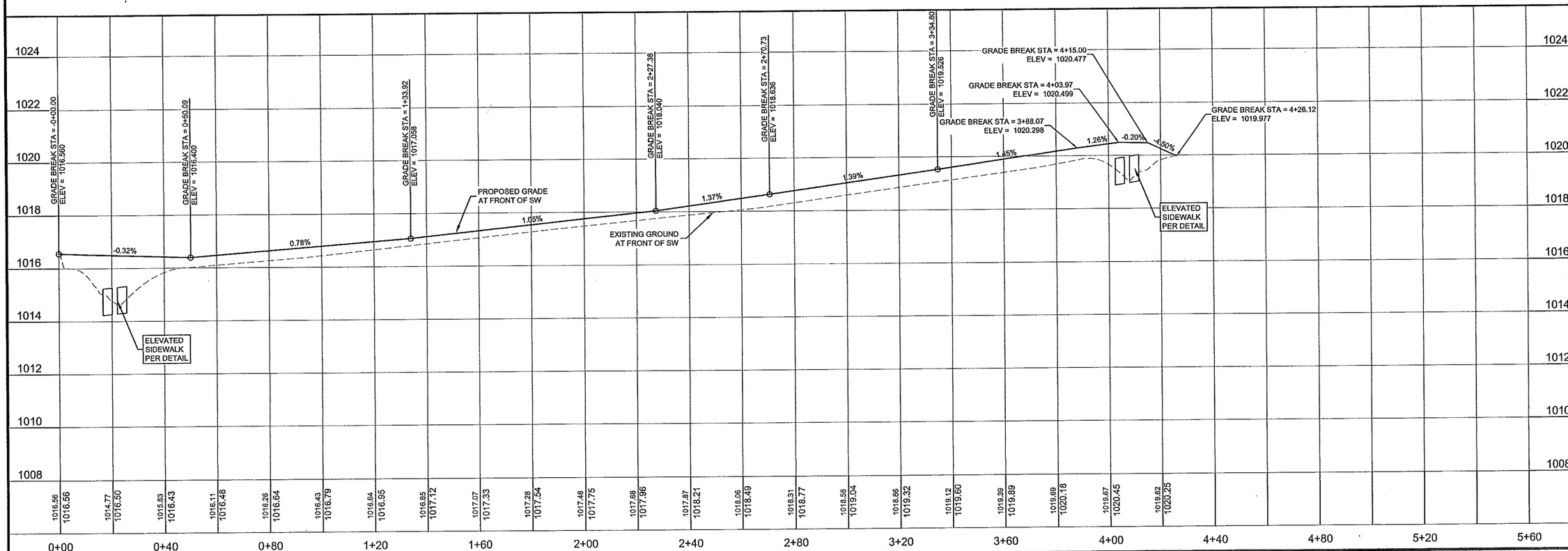
SHEET NO.
25





MARK	REVISION	DATE

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DRAWING PATHNAME [LAYOUT] PLOT DATE - TIME

SIDEWALK SEGMENT II PLAN AND PROFILE STA. 0+00 - END

SHEET NAME:

CITY OF LEANDER, TEXAS
BAGDAD ROAD SIDEWALK IMPROVEMENTS

CRYSTAL FALLS TO EAGLES WAY

PROJECT NAME:

DRAWN BY:	BC
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LATEST REVISION:	7/22/2015
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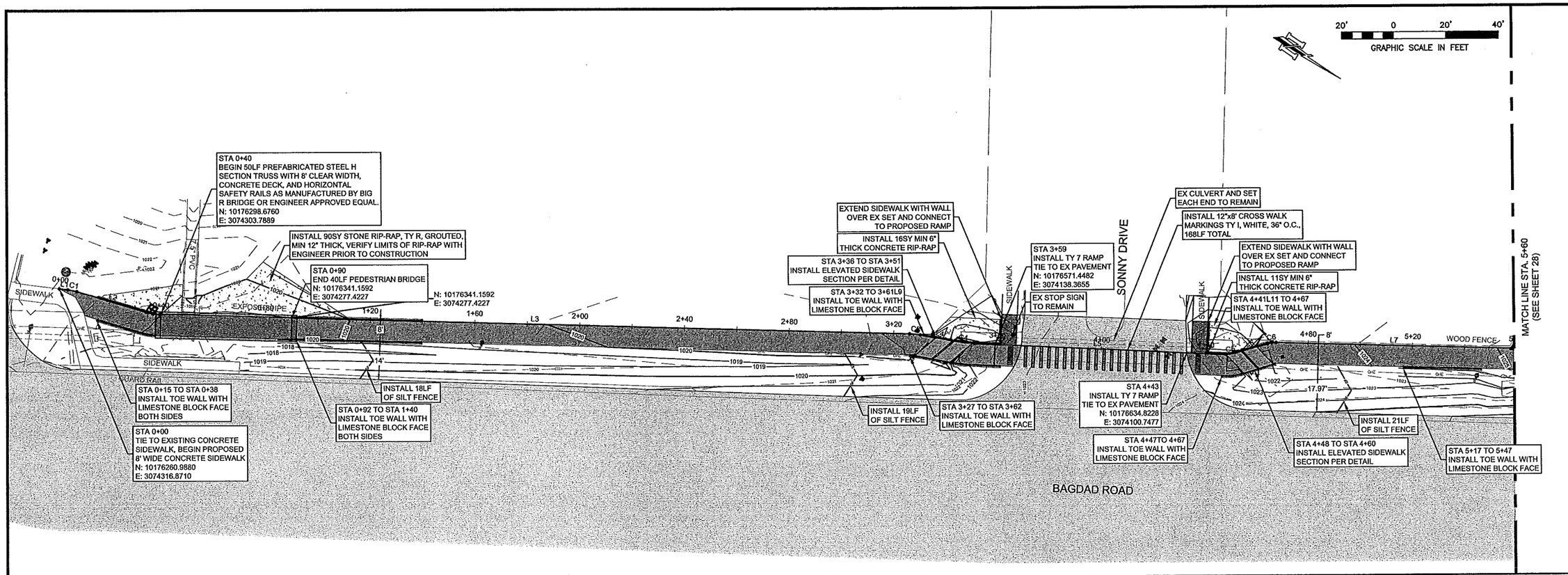
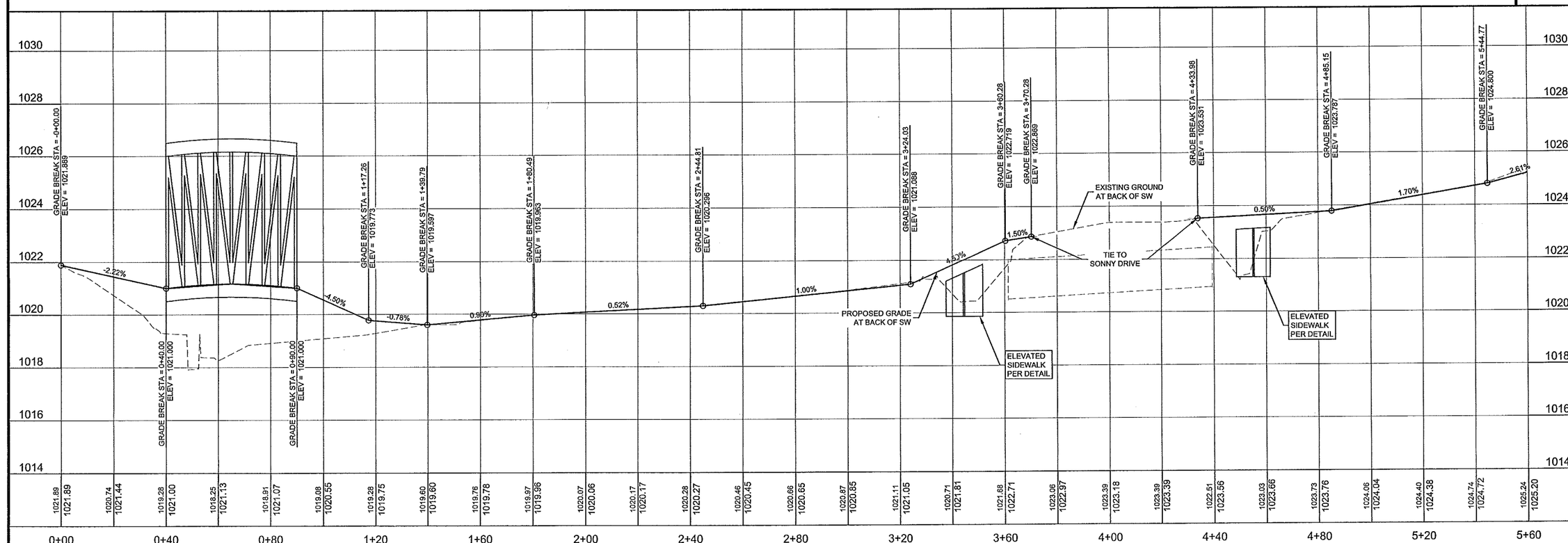
SHEET NO.
26





MARK	REVISION	DATE

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DRAWING PATHNAME | LAYOUT | PLOT DATE - TIME

SIDEWALK SEGMENT III PLAN AND PROFILE STA. 0+00 - 5+60

SHEET NAME:

CITY OF LEANDER, TEXAS
BAGDAD ROAD SIDEWALK IMPROVEMENTS
CRYSTAL FALLS TO EAGLES WAY

PROJECT NAME:

DRAWN BY:	BC
DESIGNED BY:	GC
LATEST REVISION:	7/22/2015
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T. 512-346-8487 F. 512-342-6877
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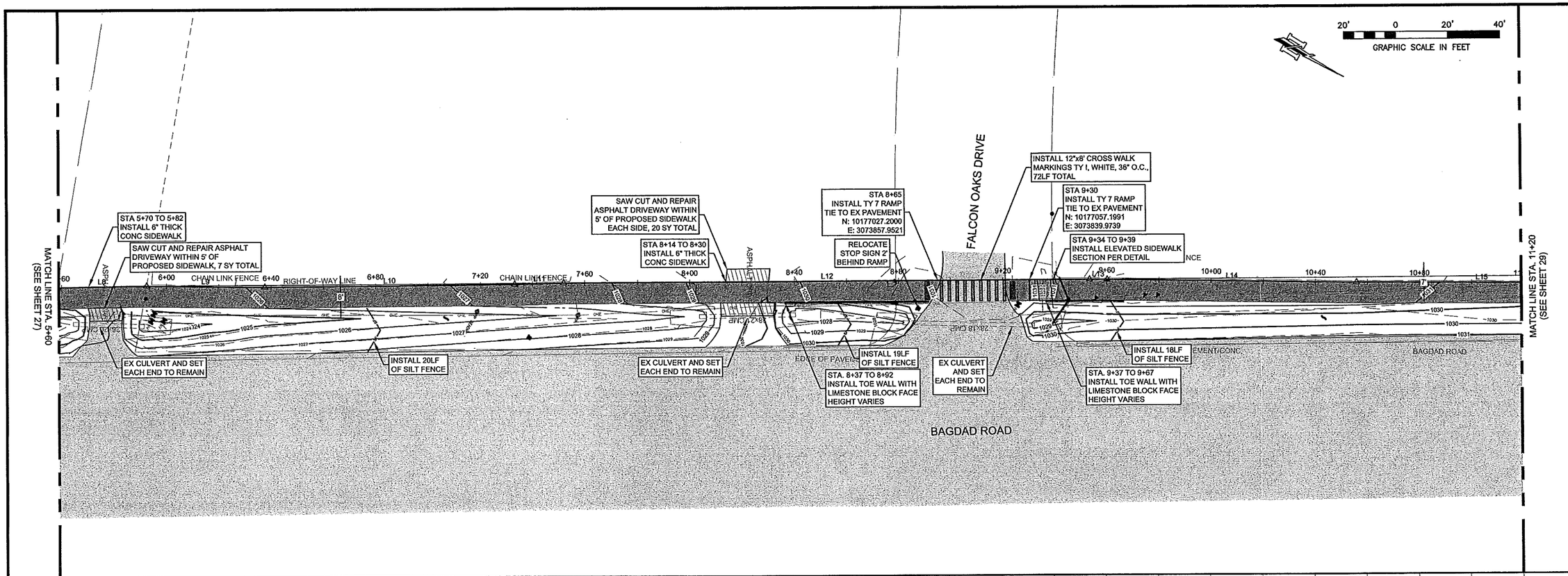
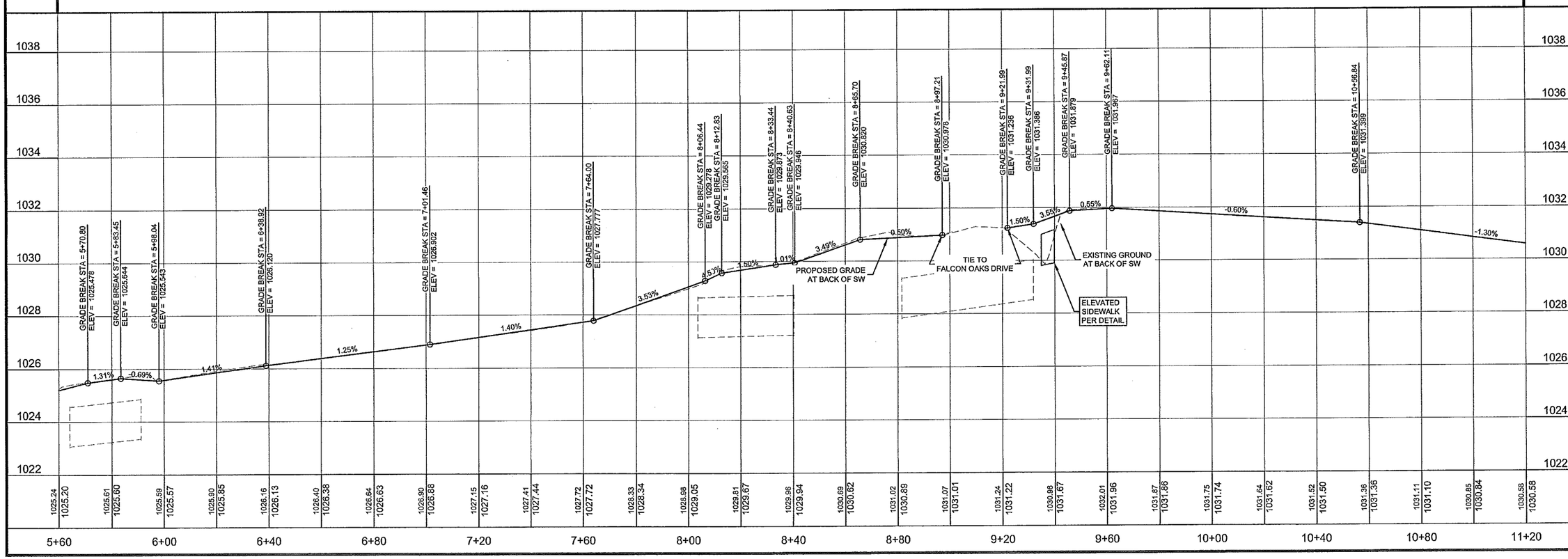
SHEET NO.
27





MARK	REVISION	DATE

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DRAWING PATHNAME | LAYOUT | PLOT DATE - TIME

SIDEWALK SEGMENT III PLAN AND PROFILE STA. 5+60 - 11+20

SHEET NAME:

CITY OF LEANDER, TEXAS
BAGDAD ROAD SIDEWALK IMPROVEMENTS
CRYSTAL FALLS TO EAGLES WAY

PROJECT NAME:

DRAWN BY:	BC
DESIGNED BY:	GC
LATEST REVISION:	7/22/2015
KSA JOB NO.:	LEAN.004

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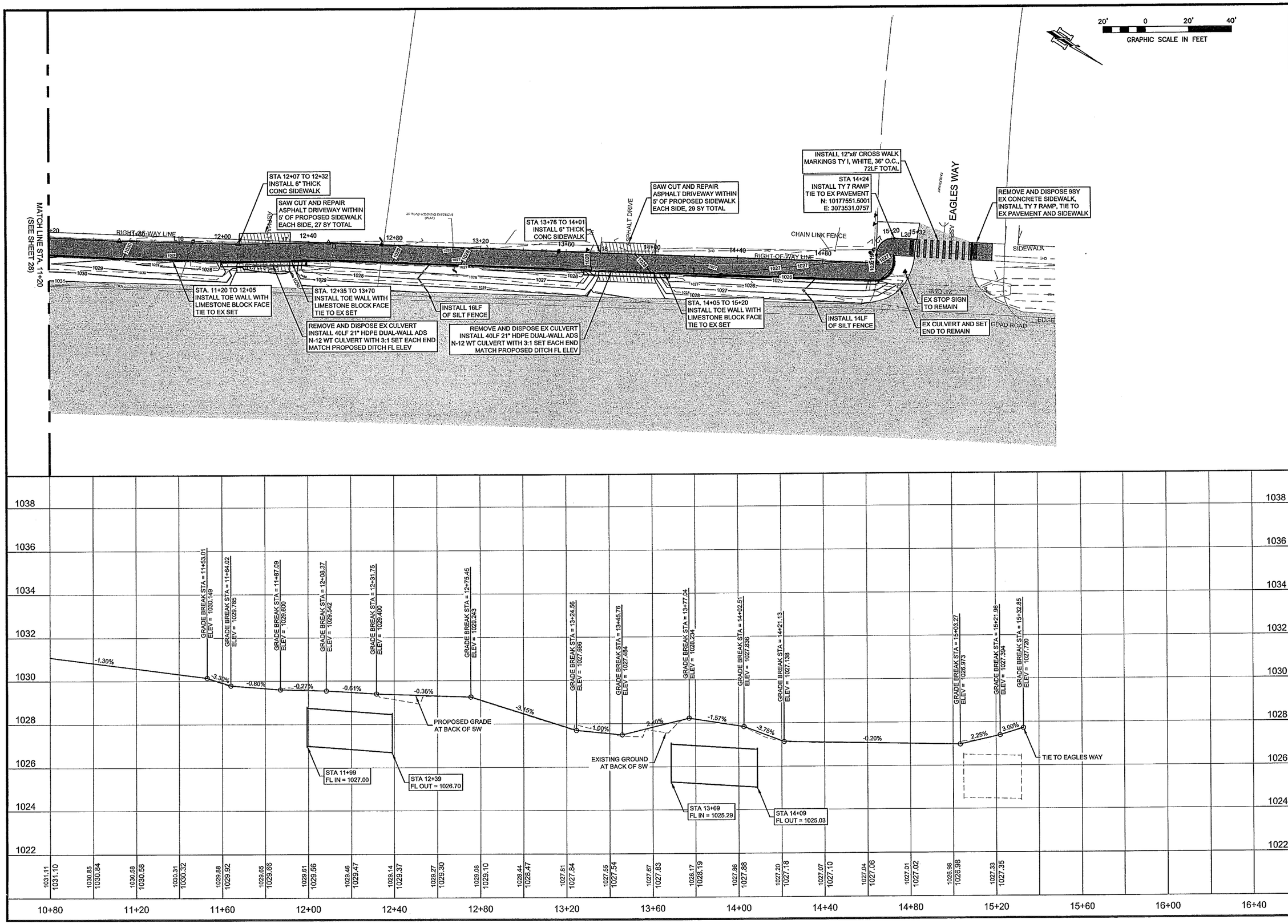
SHEET NO.
28



MARK	REVISION	DATE

USA-AUS-SERVER\MANPROJECTS\LEANDER\DRAWINGS\SEG III\LEAN04-CP-PD05-SEG III.DWG | SEG III PP01 | 7/22/2015 - 4:59 PM
DRAWING PATHNAME | LAYOUT | PLOT DATE - TIME

SIDEWALK SEGMENT III PLAN AND PROFILE STA. 11+20 - END

SHEET NAME:

CITY OF LEANDER, TEXAS
BAGDAD ROAD SIDEWALK IMPROVEMENTS
CRYSTAL FALLS TO EAGLES WAY

PROJECT NAME:

DRAWN BY:	BC
DESIGNED BY:	GC
LATEST REVISION:	7/22/2015
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Austin, Texas 78759
T. 512-342-8878 F. 512-342-8877
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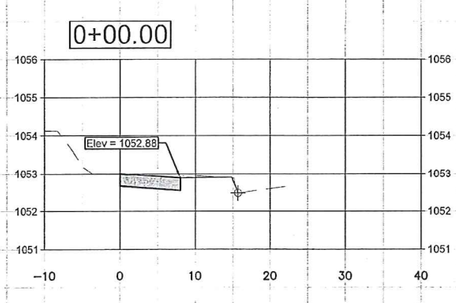
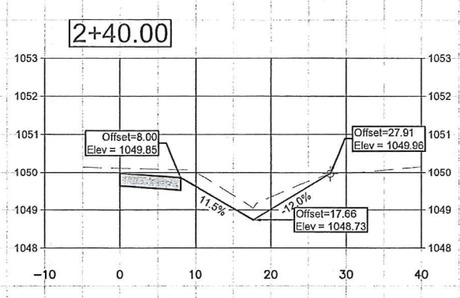
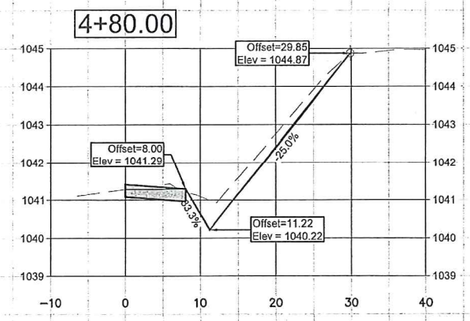
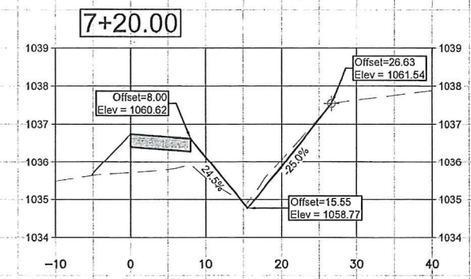
TBPE Firm Registration No. F-1356

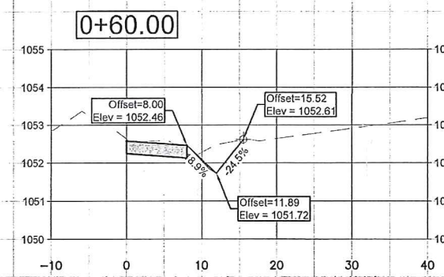
SHEET NO.
29

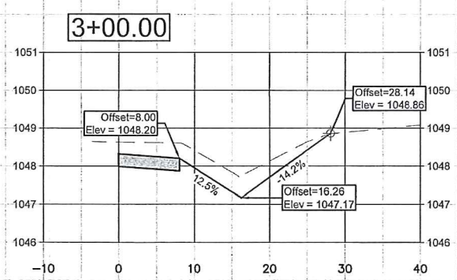


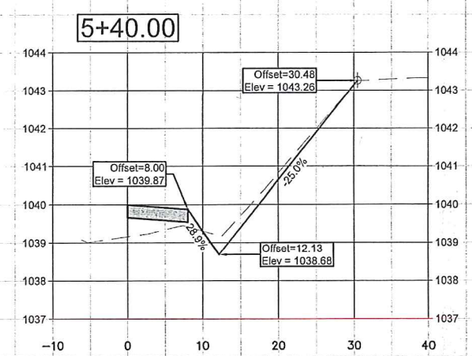


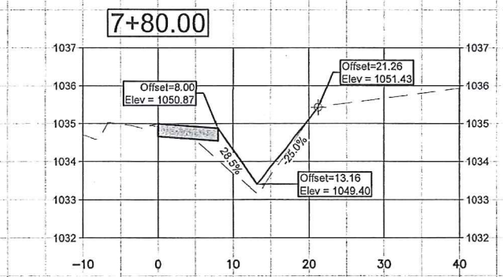


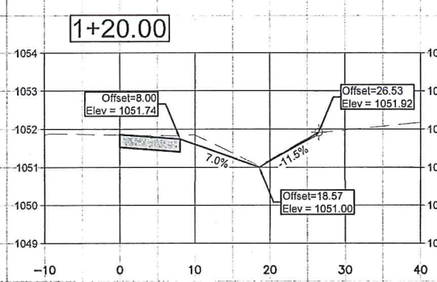


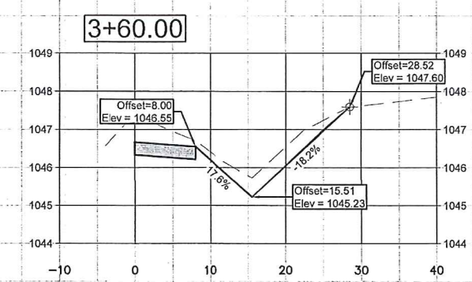


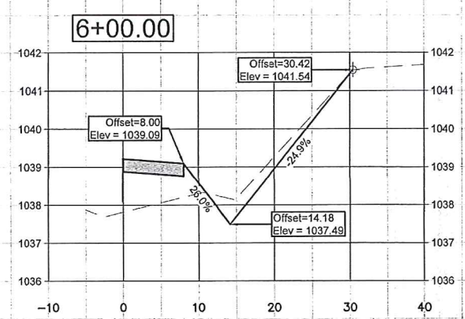


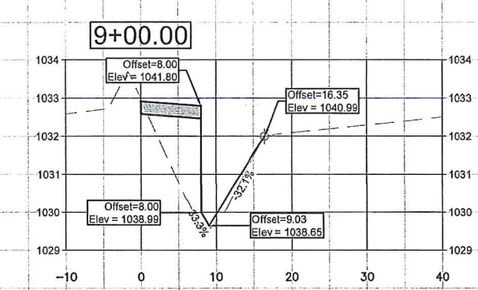


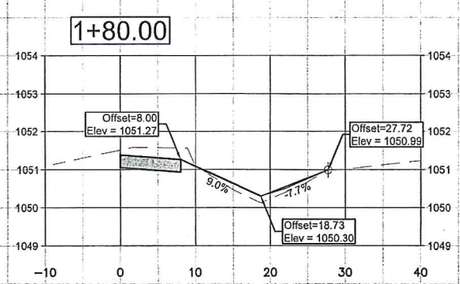


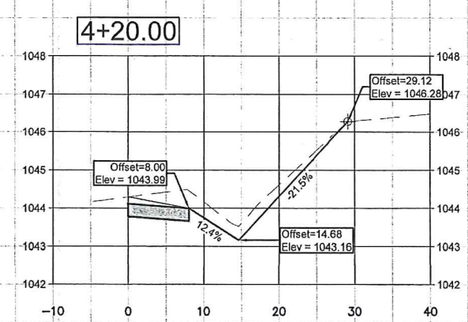


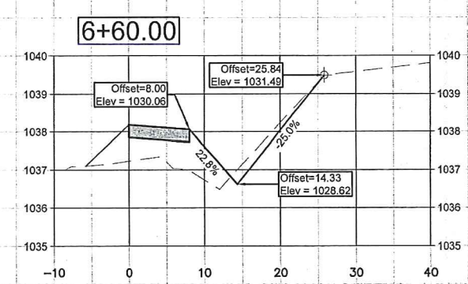


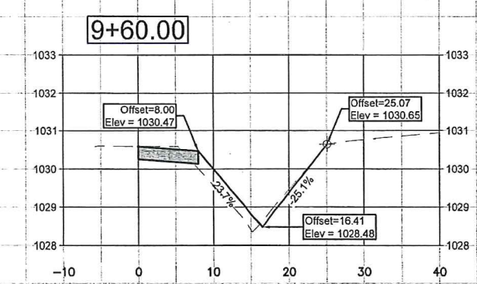












MARK	REVISION	DATE

V:\KSA-AUS-SERVER3\MAINPROJECTS\LEAN004\DRAW\SHEETS\LEAN004-C-XC-0001.DWG | SEG. 1 (1) | 7/22/2015 - 11:12 AM

DRAWING PATHNAME | LAYOUT | PLOT DATE - TIME

PROJECT TITLE - PROJECT DESCRIPTION | LOCATION - CITY XX TEXAS

SIDEWALK SEGMENT I CROSS SECTIONS STA. 0+00 - 9+60

SHEET NAME:

CITY OF LEANDER, TEXAS

BAGDAD ROAD SIDEWALK IMPROVEMENTS

CRYSTAL FALLS TO EAGLES WAY

PROJECT NAME

DRAWN BY:	BC
DESIGNED BY:	GC
LATEST REVISION:	7/22/2015
KSA JOB NO.:	LEAN.004

KSA
4633 Spicewood Springs Rd., Suite 204
Austin, Texas 78759
T. 512-342-6868 F. 512-342-6877
www.ksaeng.com

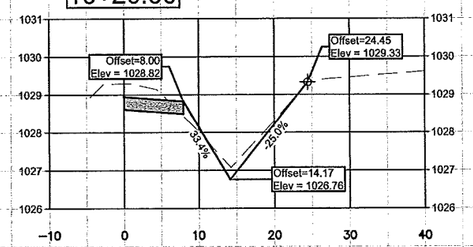
STATE OF TEXAS
GRAYSON M. COX
111345
LICENSED
PROFESSIONAL ENGINEER

SEAL:
TBPE Firm Registration No. F-1356

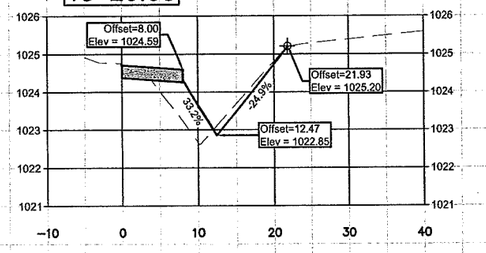
SHEET NO.

30

10+20.00



13+20.00



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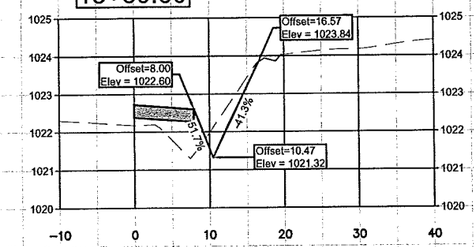

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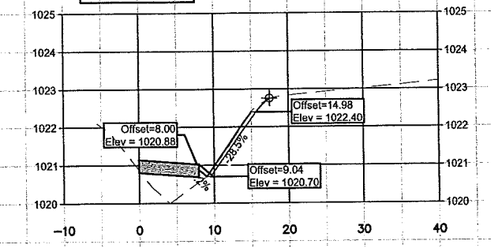

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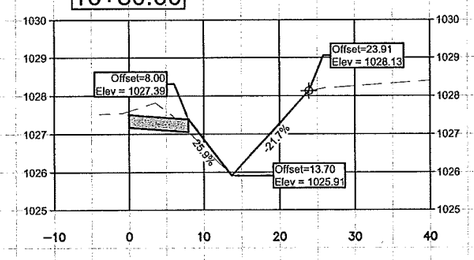

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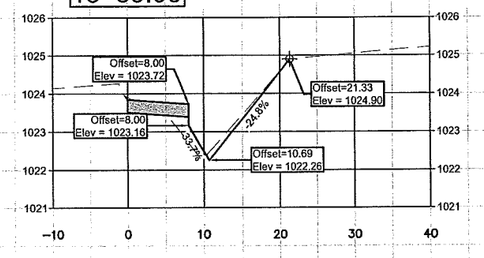

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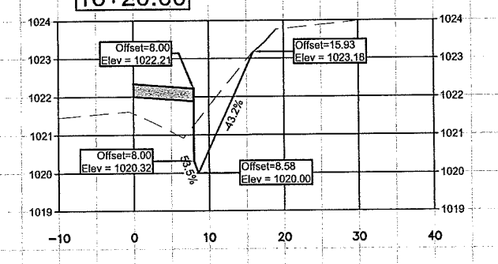

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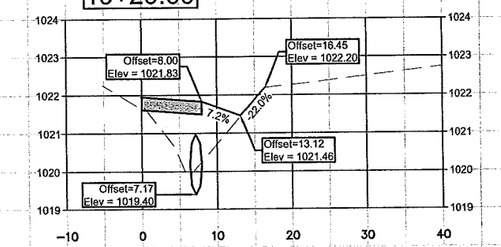

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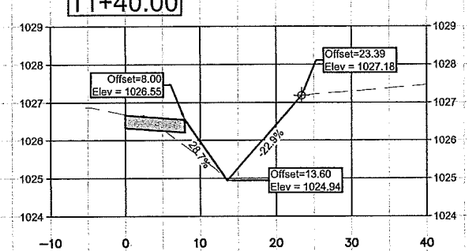

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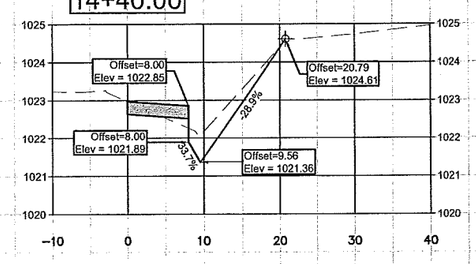

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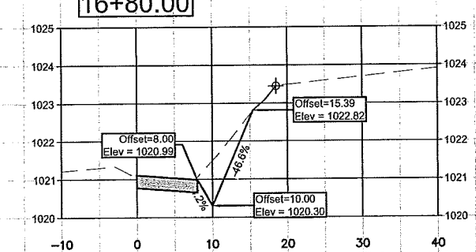

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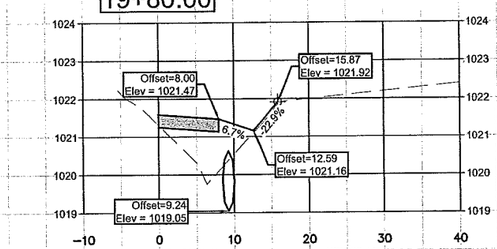

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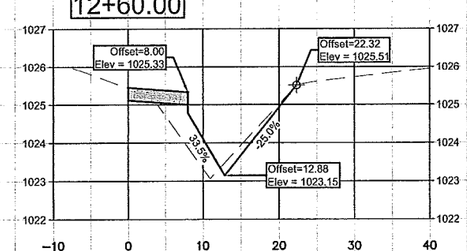

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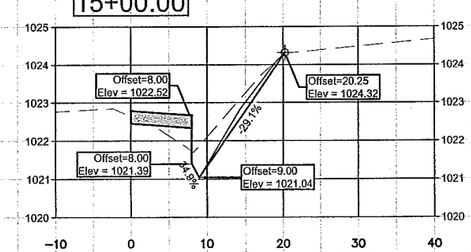

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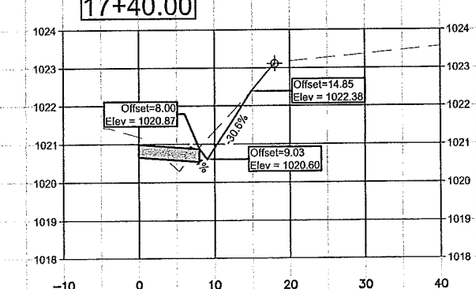

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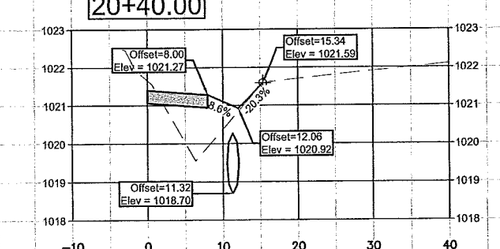


MARK	REVISION	DATE

WSA-AUS-SERVER1MAIN(PROJECTS)LEAN)0A(DRAWINGS)LEAN0A-SC-001.DWG | SEC. I (R) | 7/22/2015 - 4:12 PM

DRAWING PATHNAME | LAYOUT | PLOT DATE - TIME

PROJECT TO: PROJECT COORDINATE SYSTEM: NAD 83 TEXAS CENTRAL FIPS 4203 (FEET)

SIDEWALK SEGMENT I CROSS SECTIONS STA. 10+20 - 20+40

SHEET NAME:

CITY OF LEANDER, TEXAS
BAGDAD ROAD SIDEWALK IMPROVEMENTS
CRYSTAL FALLS TO EAGLES WAY

PROJECT NAME:

DRAWN BY:	BC
DESIGNED BY:	GC
LATEST REVISION:	7/22/2015
KSA JOB NO.:	LEAN.004

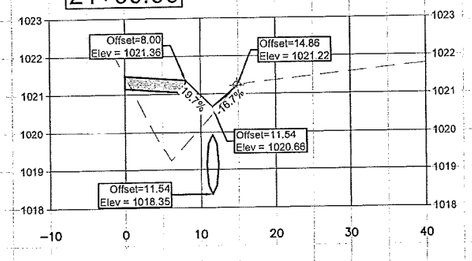
KSA
4833 Spicewood Springs Rd., Suite 204
Austin, Texas 78759
T: 512-342-6884 F: 512-342-6877
www.ksaeng.com

STATE OF TEXAS
7-22-15
GRAYSON M. COX
111345
LICENSED PROFESSIONAL ENGINEER

SEAL:
TBPE Firm Registration No. F-1356

SHEET NO.
31

21+00.00



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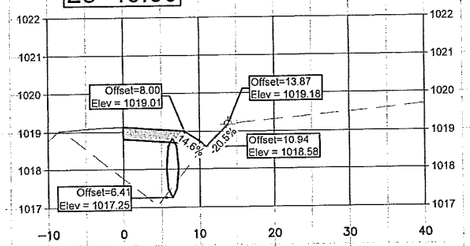

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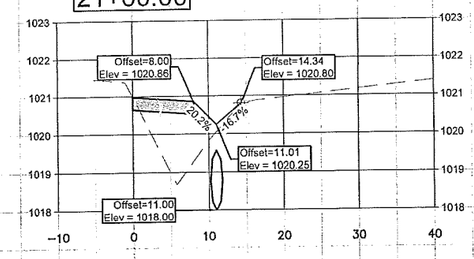
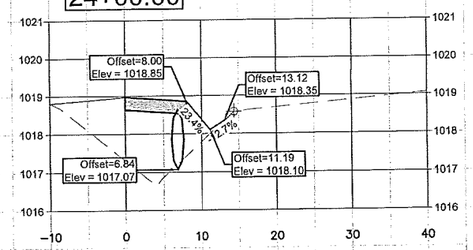


24+00.00



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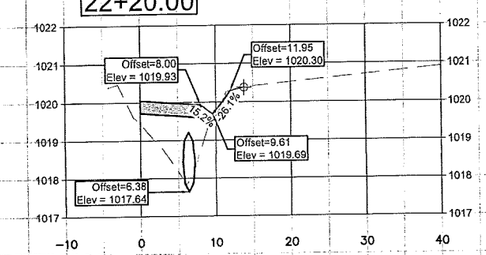

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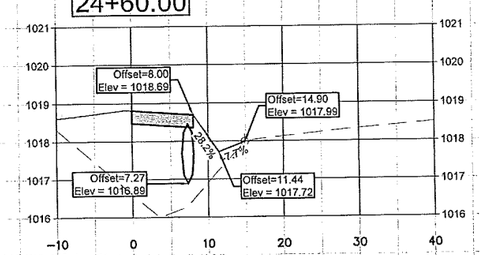

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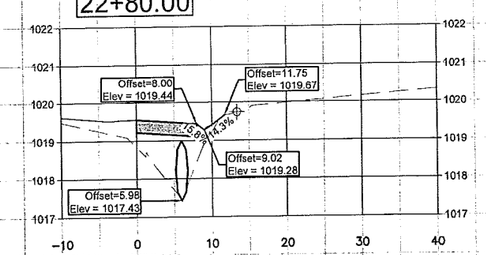


MARK	REVISION	DATE

\\KSA-AUS-SERVER3\MAIN\PROJECTS\LEAN004\DRAWSHEETS\LEAN004-C-XC-0001.DWG | SEQ. 1 (3) | 7/22/2015 - 11:12 AM

DRAWING PATH/NAME | LAYOUT | PLOT DATE - TIME

PROJECT TITLE: PROJECT DESCRIPTION LOCATION - CITY XX, TEXA

SIDEWALK SEGMENT I
CROSS SECTIONS
STA. 21+00 - END

SHEET NAME:

CITY OF LEANDER, TEXAS
BAGDAD ROAD SIDEWALK
IMPROVEMENTS
CRYSTAL FALLS TO EAGLES WAY

PROJECT NAME:

DRAWN BY:	BC
DESIGNED BY:	GC
LATEST REVISION:	7/22/2015
KSA JOB NO.:	LEAN.004

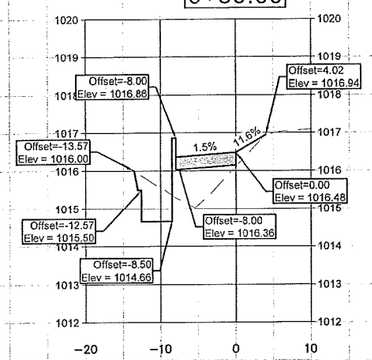
KSA
4833 Spicewood Springs Rd., Suite 204
Austin, Texas 78759
T. 512-342-4888 F. 512-342-5877
www.ksaeng.com

STATE OF TEXAS
GRAYSON M. COX
111345
LICENSED
PROFESSIONAL ENGINEER

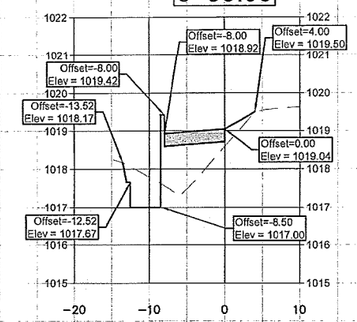
SEAL:
TBPE Firm Registration No. F-1356

SHEET NO.
32

0+60.00



3+00.00



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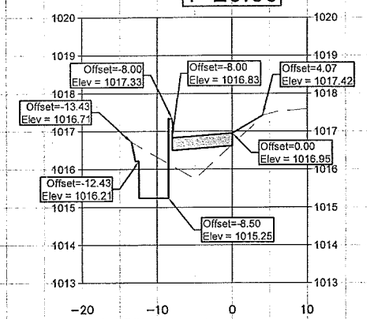

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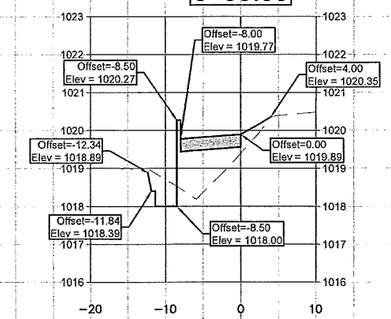

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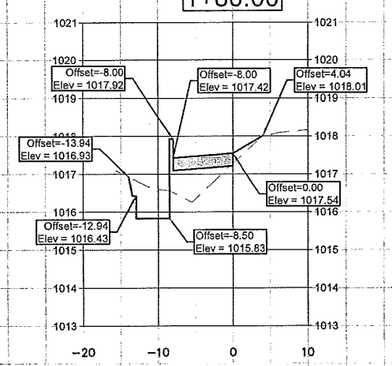
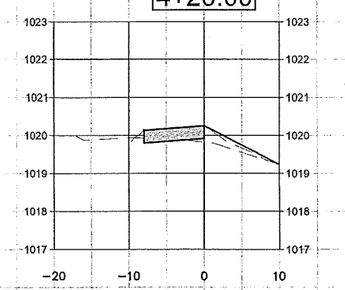


4+20.00



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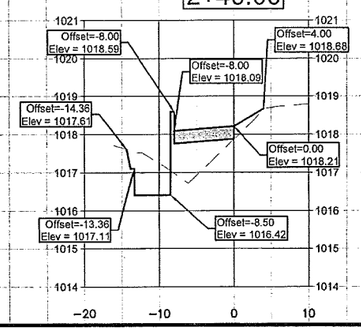

MARK	REVISION	DATE

\\KSA-AUS-SERVER3\MAINPROJECTS\LEAN004\DRAW\SHEETS\LEAN004-CX-C001-MI SECTION II.DWG | SEG. II (1) | 7/22/2015 1:19 AM

DRAWING PATHNAME | LAYOUT | PLOT DATE - TIME

PROJECT TITLE: PROJECT DESCRIPTION LOCATION - CITY XX, TEXAS

SIDEWALK SEGMENT II
CROSS SECTIONS
STA. 0+00 - END

SHEET NAME:

CITY OF LEANDER, TEXAS
BAGDAD ROAD SIDEWALK
IMPROVEMENTS
CRYSTAL FALLS TO EAGLES WAY

PROJECT NAME:

DRAWN BY:	BC
DESIGNED BY:	GC
LATEST REVISION:	7/22/2015
KSA JOB NO.:	LEAN.004

KSA
4833 Spicewood Springs Rd., Suite 204
Austin, Texas 78759
T. 512-342-6868 F. 512-342-6877
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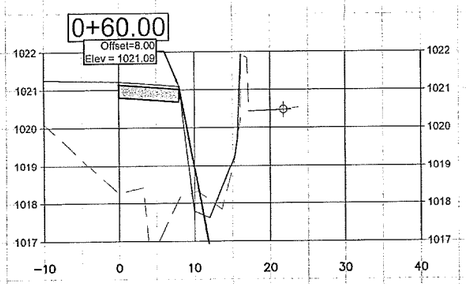
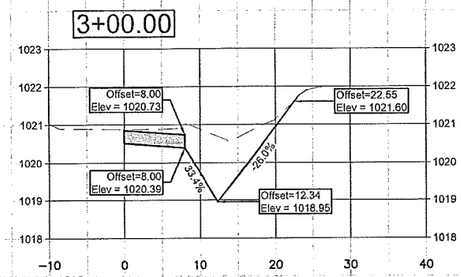
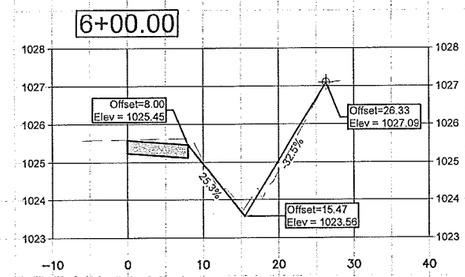
STATE OF TEXAS
7-22-15
GRAYSON M. COX
111345
LICENSED
PROFESSIONAL ENGINEER

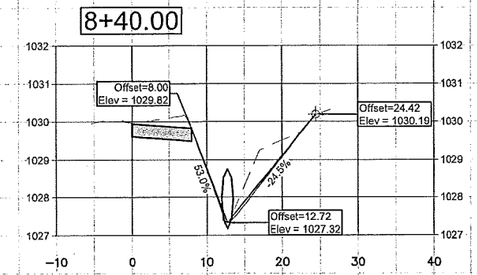
SEAL:
TBPE Firm Registration No. F-1356

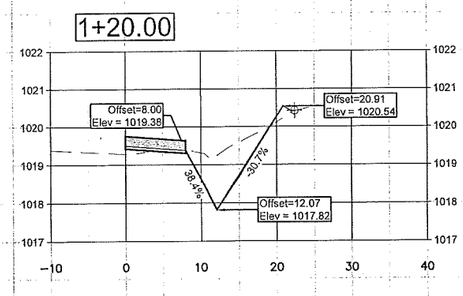
SHEET NO.
33

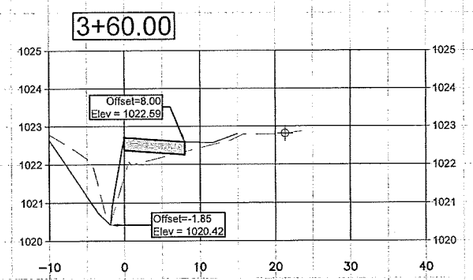


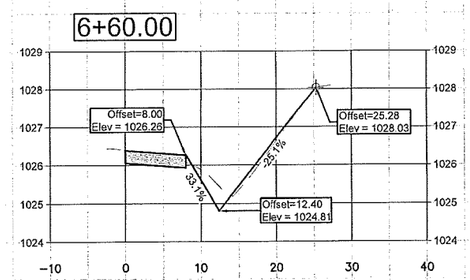


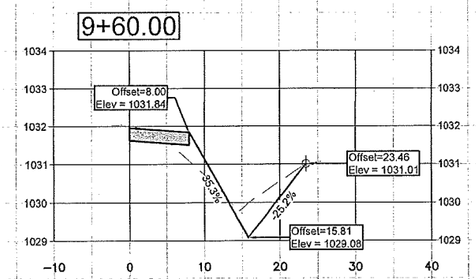


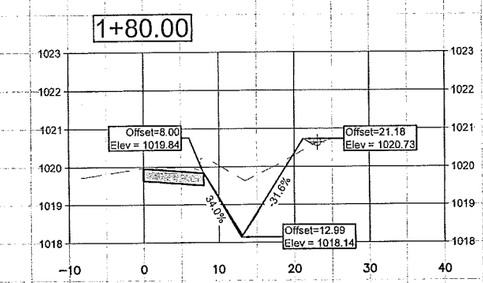


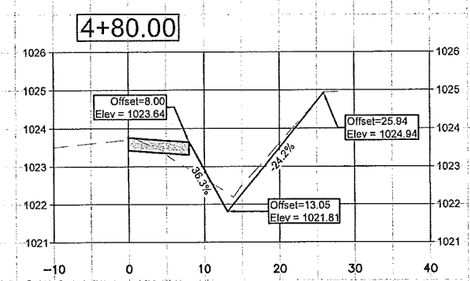


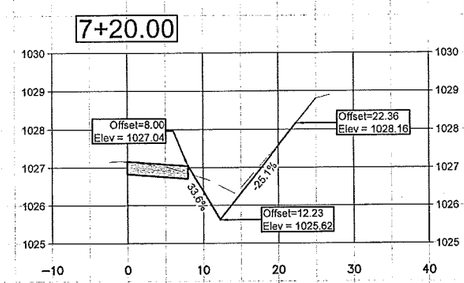


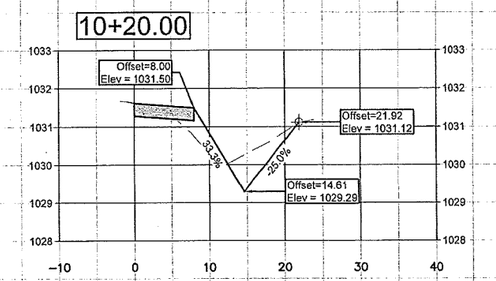


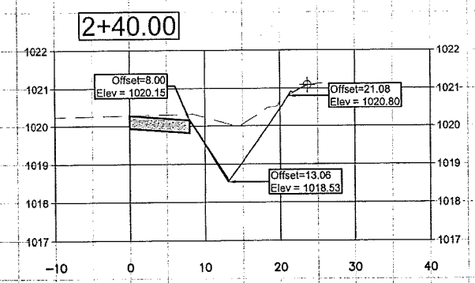


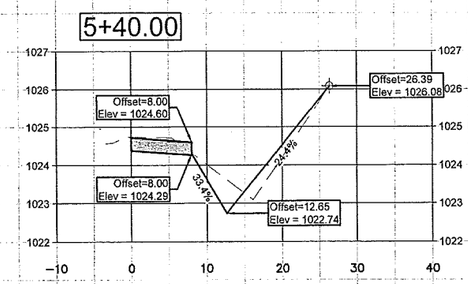


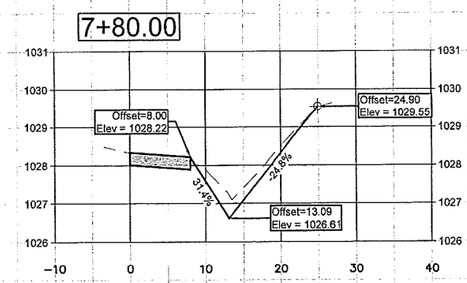


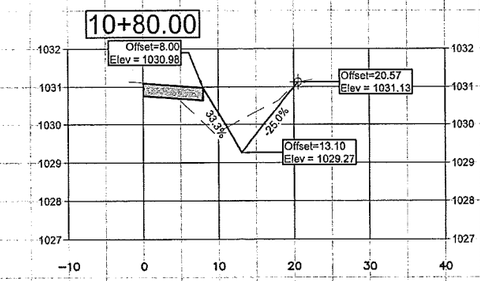












MARK	REVISION	DATE

\\KSA-AUS-SERVER3\MAIN\PROJECTS\LEAN004\DRAW\SHEETS\LEAN004-2-XC-0001.DWG | SEED: III (1) | 7/22/2015 - 11:20 AM

DRAWING PATHNAME | LAYOUT | PLOT DATE - TIME

PROJECT TITLE: PROJECT DESCRIPTION LOCATION - CITY XX, TEXAS

SIDEWALK SEGMENT III
CROSS SECTIONS
STA. 0+60 - 10+80

SHEET NAME:

CITY OF LEANDER, TEXAS
BAGDAD ROAD SIDEWALK
IMPROVEMENTS
CRYSTAL FALLS TO EAGLES WAY

PROJECT NAME:

DRAWN BY:	BC
DESIGNED BY:	GC
LATEST REVISION:	7/22/2015
KSA JOB NO.:	LEAN.004

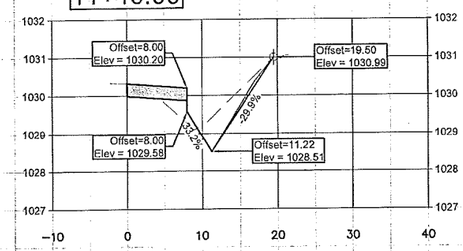
KSA
4833 Spicewood Springs Rd., Suite 204
Austin, Texas 78759
T. 512-342-5588 F. 512-342-5877
www.ksaeng.com

STATE OF TEXAS
7-22-15
GRAYSON M. COX
111345
LICENSED
PROFESSIONAL ENGINEER

SEAL:
TBPE Firm Registration No. F-1356

SHEET NO.
34

11+40.00



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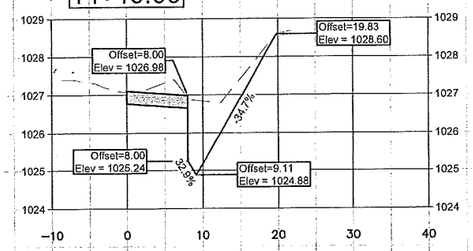

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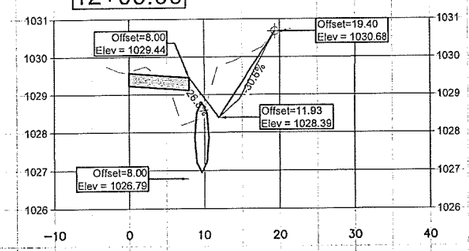

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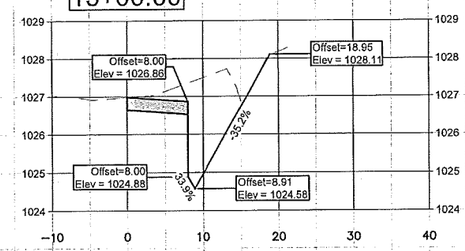

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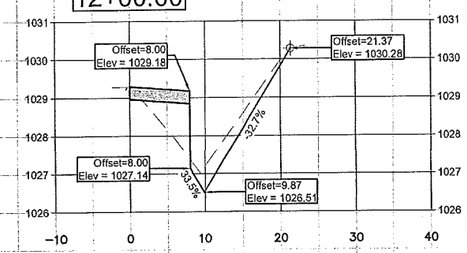

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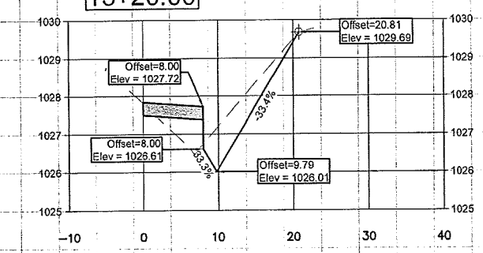

MARK	REVISION	DATE

V:\KSA-AUS-SERVER2\MAIN\PROJECTS\LEAND04\DRAW\SHEETS
LEAND04-C-XC-0001.DWG | SEQ. III (2) | 7/22/2015 - 11:21 AM

DRAWING PATH/NAME | LAYOUT | PLOT DATE - TIME

PROJECT TITLE: PROJECT DESCRIPTION LOCATION - CITY XX, TEXAS

SIDEWALK SEGMENT III
CROSS SECTIONS
STA. 11+40 - END

SHEET NAME:

CITY OF LEANDER, TEXAS
BAGDAD ROAD SIDEWALK
IMPROVEMENTS
CRYSTAL FALLS TO EAGLES WAY

PROJECT NAME:

DRAWN BY:	BC
DESIGNED BY:	GC
LATEST REVISION:	7/22/2015
KSA JOB NO.:	LEAN.004

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SEAL:
TBPE Firm Registration No. F-1356

SHEET NO.
35