PROJECT TITLE: THE HILLS DRIVE WALKING TRAIL EXTENSION - CITY VILLAGE OF THE HILLS, TEXAS

VILLAGE OF THE HILLS

CONTINUATION OF WALKING TRAIL PHASE 4
FEBRUARY 2024
CONSTRUCTION PLANS

OWNER:
VILLAGE OF THE HILLS

CIVIL ENGINEER:
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CONTACT: GRAYSON COX

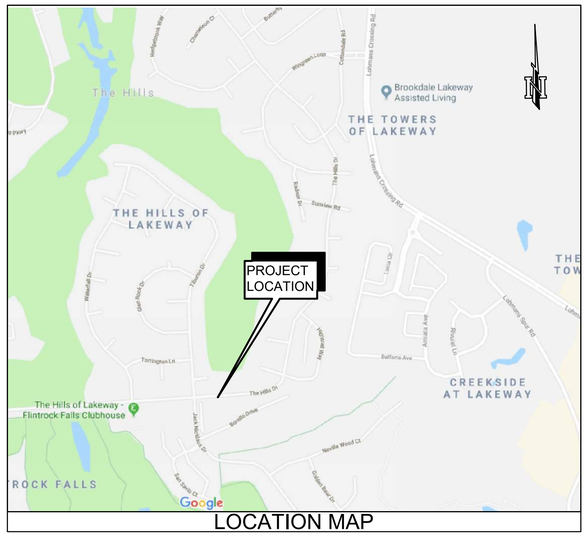
MAYOR:
GREG WHARTON

MAYOR PRO TEM:
HILDA POTSAVICH

COUNCIL:
SARAH CARROLL
KEVIN PROUD
RICK VAN DALEN
JIM VICK

CITY MANAGER:
DEAN HUARD

VICINITY MAP



LOCATION MAP

RECOMMENDED BY:
KSA
TBPE FIRM REGISTRATION No. F-1356

STATE OF TEXAS
2-29-2024
GRAYSON M. COX
111345
LICENSED PROFESSIONAL ENGINEER

GRAYSON COX, P.E. DATE
PROJECT MANAGER

ACCEPTED BY:
VILLAGE OF THE HILLS

DEAN HUARD DATE
CITY MANAGER

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GENERAL NOTES AND SPECIFICATION DATA:

1. THE CONTRACTOR SHALL NOTIFY VILLAGE OF THE HILLS (CITY) 48 HOURS PRIOR TO ANY CONSTRUCTION AT 512-261-6281 . ALL REFERENCES IN THE PLANS AND SPECIFICATIONS TO THE CITY OR OWNER SHALL BE DIRECTED TO THE CITY.

2. PRIOR TO START OF CONSTRUCTION, THE CONTRACTOR SHALL COORDINATE WITH VILLAGE OF THE HILLS (CITY), AND ALL 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. 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. NO SEPARATE MEASUREMENT OR PAYMENT SHALL BE MADE FOR THIS ITEM.

9. 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 WORK AREA THAT THE CONTRACTOR MAY OPEN AT ANY TIME.

10. 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.

11. WATER SUPPLY FOR USE DURING CONSTRUCTION SHALL BE APPROVED BY THE ENGINEER AND SECURED BY THE CONTRACTOR FROM THE LOCAL WATER UTILITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING A METER TO BE INSTALLED AT LOCATIONS DESIGNATED BY THE UTILITY OWNER.

12. 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.

13. 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.

14. 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 WALKING TRAIL ITEM REQUIRING SUCH ACTIVITIES. ALL TIE-IN SLOPES FOR WALKING TRAIL AND DRIVEWAYS ARE 6:1 DESIRABLE, 3:1 MAX. NATURAL GROUND SLOPES EXCEEDING 3:1 WILL BE REJECTED AND REQUIRE REGRADING.

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

16. WALKING TRAIL RAMP ITEM SHALL INCLUDE ANY REQUIRED PAVEMENT REPAIR TO ACHIEVE A SMOOTH TIE-IN.

17. 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.

18. ALL DISTURBED SOIL SHALL BE SODDED WITH GRASS TYPE OF EXISTING ADJACENT PROPERTY. THE QUANTITIES SHOWN FOR BLOCK SOD ON THE PROPOSAL AREA THEORETICAL CALCULATIONS BASED ON THE EXPECTED SOIL DISTURBANCE. 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. THIS ITEM OF WORK TO BE DONE BY OTHERS. ESTABLISHMENT SHALL BE SUBSIDIARY TO THE BLOCK SOD PAY ITEM. NO SEPARATE PAY. SEE APPLICABLE SPECIFICATIONS.

19. DRIVEWAYS SHALL BE RECONSTRUCTED IN A MANNER TO MINIMIZE GRADES WHILE ACCOMMODATING THE REQUIRED ACCESSIBLE ROUTE. THE ADJACENT WALKING TRAIL ELEVATION, WIDTH OF ACCESSIBLE ROUTE ACROSS DRIVEWAY, AND DRIVEWAY LIMITS OF RECONSTRUCTION MAY BE ADJUSTED AS ALLOWED BY ENGINEER TO ACHIEVE MINIMAL GRADE CHANGES ALONG DRIVEWAY. ALL DRIVEWAY RECONSTRUCTION GRADES SHALL BE REVIEWED AND APPROVED BY THE ENGINEER PRIOR TO DRIVEWAY REMOVAL.

20. 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.

21. 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.

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

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

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

25. ALL DIMENSIONS PROVIDED ON WALKING TRAIL 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.

26. ALL ELEMENTS SHALL BE CONSTRUCTED TO COMPLY WITH THE TEXAS ACCESSIBILITY STANDARDS, LATEST VERSION. 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.

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

SEQUENCE OF CONSTRUCTION

1. CONTRACTOR MUST MAINTAIN ACCESS TO RESIDENCES AND BUSINESSES THROUGHOUT THE CONSTRUCTION OF IMPROVEMENTS.

2. CONTACT VILLAGE OF THE HILLS 512-261-6281 AT LEAST 4 DAYS PRIOR TO COMMENCING CONSTRUCTION IN ORDER TO SCHEDULE AN ON-SITE PRE-CONSTRUCTION COORDINATION MEETING.

3. HOLD PRE-CONSTRUCTION COORDINATION MEETING AT LEAST 48 HOURS PRIOR TO CONSTRUCTION.

4. INSTALL AND MAINTAIN EROSION CONTROLS AS NEEDED.

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 STRUCTURES. INSTALLATION OF TEMPORARY WALKWAYS AND/OR DRIVEWAYS TO EXISTING RESIDENCES AND BUSINESSES.

10. SAW-CUT EXISTING PAVEMENT, INSTALLATION OF WALKING TRAIL AND RAMPS.

11. CONCRETE POUR FOR WALKING TRAIL AND RAMPS.

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.

BID ITEM NOTES:

1. WALKING TRAIL PAY ITEMS MAY INCLUDE VERTICAL FEATURES AS SHOWN IN THE TYPICAL SECTION DETAILS. SUCH PAY ITEMS INDICATED IN THE BID SCHEDULE INCLUDE ALL IMPROVEMENTS SHOWN IN THE TYPICAL SECTION DETAILS. ALL WALL HEIGHTS VARY TO MEET TYPICAL SECTION DETAIL TIE-IN SLOPES. TOE WALLS, RETAINING WALLS, AND ELEVATED STRUCTURE, AS APPLICABLE, ARE SUBSIDIARY TO THE UNIT PRICE OF WALKING TRAIL AS MEASURED IN SQUARE YARDS OF SURFACE AREA.

2. ALL ROW PREP, 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 WALKING TRAIL ITEM REQUIRING SUCH ACTIVITIES.

3. REMOVE AND REPLACE EXISTING RIP RAP AS REQUIRED, SUBSIDIARY TO SIDEWALK WALKING TRAIL BID ITEM.

SHEET INDEX

Sheet Number	Sheet Title
C01	COVER SHEET
C02	GENERAL NOTES AND SHEET INDEX
C03	PROJECT LAYOUT
C04	DEMOLITION AND EROSION CONTROL PLAN
C05	PROPOSED WALKING TRAIL P&P
C06	PROPOSED DRAINAGE CHANNEL P&P
C07	MISCELLANEOUS DETAILS I
C08	MISCELLANEOUS DETAILS II
C09	PROPOSED MARKING AND SIGNAGE PLAN
C10	TxDOT DETAILS I
C11	TxDOT DETAILS II
C12	TxDOT DETAILS III
C13	TxDOT DETAILS IV
C14	TxDOT DETAILS V
C15	TxDOT DETAILS VI
C16	TxDOT DETAILS VII

MARK	REVISION	DATE

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DRAWING PATH\NAME | LAYOUT | PLOT DATE - TIME

PROJECT TITLE: THE HILLS DRIVE WALKING TRAIL EXTENSION - CITY VILLAGE OF THE HILLS, TEXAS

SHEET NAME:

GENERAL NOTES AND SHEET INDEX

PROJECT NAME:

VILLAGE OF THE HILLS, TEXAS CONTINUATION OF WALKING TRAIL PHASE 4

DRAWN BY:	DESIGNED BY:	LATEST REVISION	KSA JOB NO.:
BG	JD, GC	9/20/2021	VTH004

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SHEET NO.

C02

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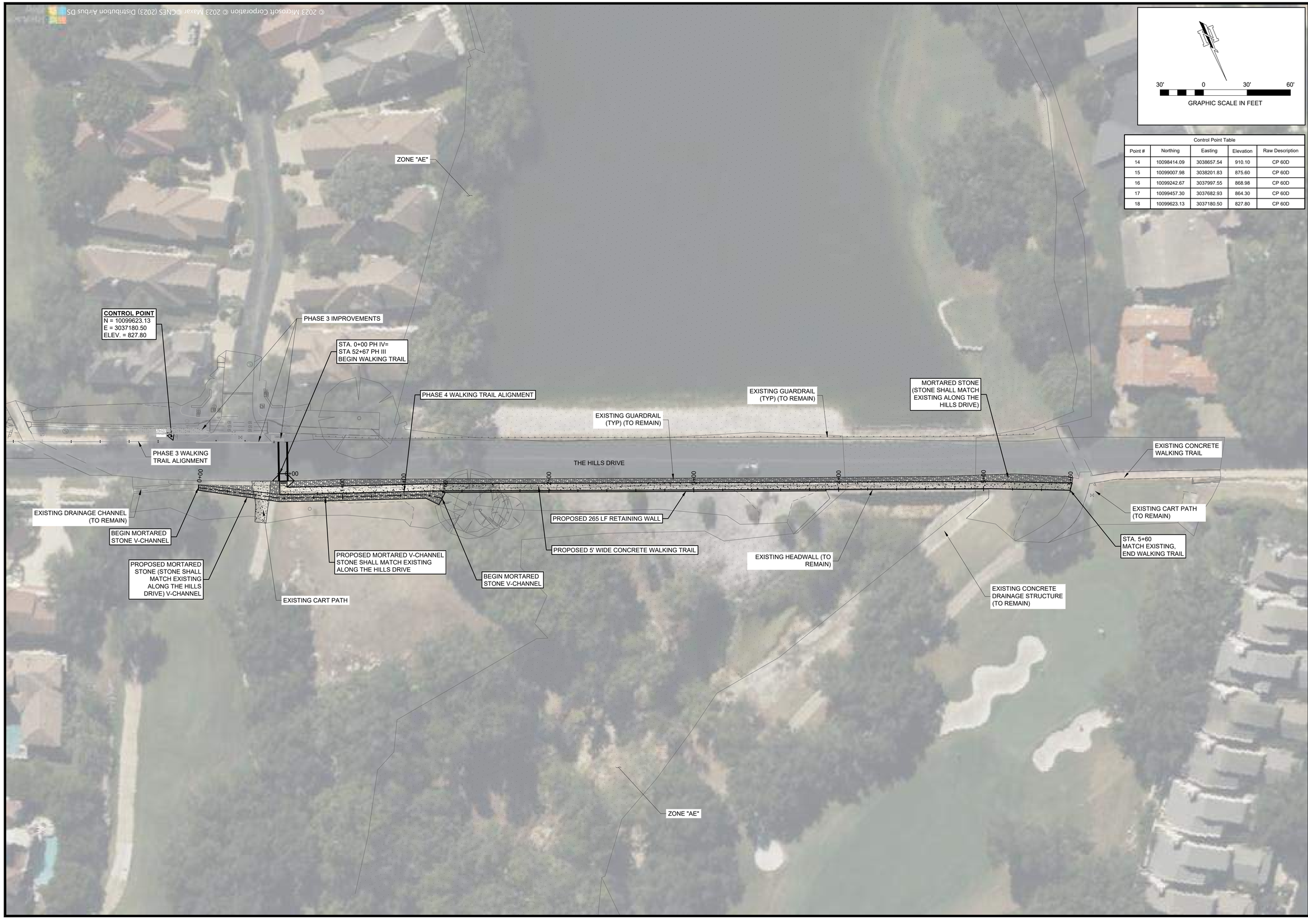

30' 0 30' 60'

GRAPHIC SCALE IN FEET

Control Point Table				
Point #	Northing	Easting	Elevation	Raw Description
14	10098414.09	3038657.54	910.10	CP 60D
15	10099007.98	3038201.83	875.60	CP 60D
16	10099242.67	3037997.55	868.98	CP 60D
17	10099457.30	3037682.93	864.30	CP 60D
18	10099623.13	3037180.50	827.80	CP 60D

MARK	REVISION	DATE

\\KSA.NET\GATEWAY\PROJECTS\VTH\004\008 CAD\30 SHEETS\02 CIVIL\ VTH004-C-LO-0001.DWG | PROJECT LAYOUT | 1:1 | 2024-4-29 | KSM

DRAWING PATHNAME | LAYOUT | PLOT DATE - TIME

PROJECT TITLE: THE HILLS DRIVE WALKING TRAIL EXTENSION - CITY VILLAGE OF THE HILLS, TEXAS

SHEET NAME:

OVERALL PROJECT LAYOUT

PROJECT NAME:

VILLAGE OF THE HILLS, TEXAS
CONTINUATION OF WALKING TRAIL PHASE 4

DRAWN BY:	DESIGNED BY:	LATEST REVISION:	KSA JOB NO.:
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SHEET NO.

C03

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DRAWING PATH\NAME | LAYOUT | PLOT DATE - TIME

PROJECT TITLE: THE HILLS DRIVE WALKING TRAIL EXTENSION - CITY VILLAGE OF THE HILLS, TEXAS

SHEET NAME:

DEMOLITION AND EROSION CONTROL PLAN

PROJECT NAME:

VILLAGE OF THE HILLS, TEXAS CONTINUATION OF WALKING TRAIL PHASE 4

DRAWN BY: BG
DESIGNED BY: JD, GC
LATEST REVISION: 9/20/2021
KSA JOB NO.: VTH004

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SHEET NO.
C04

Point Table				
Point #	Elevation	Northing	Easting	Description
1	823.52	10099678.97	3037122.00	TOS
2	823.42	10099680.70	3037117.31	TOS
3	823.50	10099684.66	3037118.77	TOS
4	823.49	10099687.62	3037125.19	TOS
5	823.75	10099674.21	3037120.24	SAW-CUT
6	823.49	10099675.94	3037115.55	SAW-CUT
7	816.37	10099881.54	3036615.35	MATCH EXISTING

Point Table				
Point #	Elevation	Northing	Easting	Description
8	814.30	10099860.25	3036667.44	TOW=TOS
9	814.27	10099820.20	3036772.38	TOW=TOS
10	816.20	10099725.99	3037019.19	TOW=TOS
11	817.00	10099718.17	3037025.75	TOS
12	814.37	10099820.41	3036757.93	TOS
13	814.41	10099855.64	3036665.64	TOS
14	816.57	10099877.34	3036612.43	MATCH EXISTING

20' 0 20' 40'
HORIZONTAL SCALE IN FEET

2' 0 2' 4'
VERTICAL SCALE IN FEET

ZONE "AE"

PH 3 WALKING TRAIL IMPROVEMENTS

BEGIN TYPE A SIDEWALK STA 1+27
SEE CONCRETE WALKING TRAIL SECTION A DETAIL
N = 10099726.00
E = 3037019.17

STA. 0+00 PH IV=
STA 52+67 PH III
BEGIN WALKING TRAIL

INSTALL 220 SY OF 4" MORTARED STONE (STONE SHALL MATCH EXISTING ALONG THE HILLS DRIVE)

SAWCUT EXISTING GUARDRAIL BOLTSFLUSH WITH EXISTING NUTS

PH IV WALKING TRAIL ALIGNMENT

EXISTING GUARDRAIL (TO REMAIN) (TYP)

EXISTING GUARDRAIL (TO REMAIN) (TYP)

EXISTING EXISTING CONCRETE WALKING TRAIL

SAW-CUT CLEAN EDGE AND MATCH EXISTING ROADWAY

RECONSTRUCT APPROX 23 SY OF ASPHALT PAVEMENT

B C07

A C07

PROPOSED 5' WIDE CONCRETE WALKING TRAIL

THE HILLS DRIVE

PROPOSED 5' WIDE CONCRETE WALKING TRAIL

D C07

E C07

INSTALL 5'X5' LANDING

INSTALL TY 1 CURB RAMP

PROPOSED MORTARED STONE (STONE SHALL MATCH EXISTING ALONG THE HILLS DRIVE) V-CHANNEL

RE-SOD ALL DISTURBED GROUND TO MATCH EXISTING GRASS TYPE

BEGIN TYPE D SIDEWALK STA 3+91
SEE CONCRETE WALKING TRAIL SECTION D DETAIL
N = 10099820.17
E = 3036772.46

EXISTING HEADWALL (TO REMAIN)

EXISTING CONCRETE DRAINAGE STRUCTURE (TO REMAIN)

BEGIN TYPE E SIDEWALK STA 5+04
SEE CONCRETE WALKING TRAIL SECTION E DETAIL
N = 10099860.25
E = 3036667.46

LIMIT DISTURBANCE TO EXISTING LANDSCAPING TO LESS THAN 12" BEHIND PROPOSED WALKING TRAIL.

EXISTING CART PATH (TO REMAIN)

STA. 5+60
SAW CUT CLEAN EDGE AND MATCH EXISTING CART PATH. END WALKING TRAIL.

BEGIN TYPE B SIDEWALK STA 0+14
SEE CONCRETE WALKING TRAIL SECTION B DETAIL
N = 10099687.51
E = 3037125.32

RECONSTRUCT APPROX 31 SY OF 4" THICK CONCRETE PAVEMENT (REPLACE GOLF CART PATH WITH TYP CONCRETE DRIVEWAY SECTION AT WALKING TRAIL DETAIL)

ZONE "AE"

EXISTING ASPHALT PAVEMENT
STA. 0+00 PH IV= BEGIN WALKING TRAIL
-4.55%
-0.32%
-6.72%
DO NOT EXCEED ADJACENT ROADWAY CENTERLINE SLOPE PER TEXAS ACCESSIBILITY REQUIREMENTS (TYP)
-6.23%
FINISHED GRADE (TOP OF WALKING TRAIL)
BEGIN PROPOSED RETAINING WALL
-7.93%
-1.97%
FINISHED GRADE (TOP OF WALKING TRAIL)
0.35%
EXISTING GRADE @ NORTH EDGE OF WALKING TRAIL
BEGIN PROPOSED RETAINING WALL
-3.37%
0.03%
EXISTING CONCRETE WALL
FINISHED GRADE (TOP OF WALKING TRAIL)
3.80%
1.97%

	GRADE BREAK STA = 0+00	ELEV = 823.75	GRADE BREAK STA = 0+05	ELEV = 823.52	GRADE BREAK STA = 0+14	ELEV = 823.49	GRADE BREAK STA = 0+38	ELEV = 821.87	GRADE BREAK STA = 1+18	ELEV = 816.90	GRADE BREAK STA = 1+27	ELEV = 816.20	GRADE BREAK STA = 2+28	ELEV = 814.20	GRADE BREAK STA = 3+78	ELEV = 814.72	GRADE BREAK STA = 3+91	ELEV = 814.27	GRADE BREAK STA = 5+04	ELEV = 814.31	GRADE BREAK STA = 5+55	ELEV = 816.25	GRADE BREAK STA = 5+67	ELEV = 816.30
FG ELEV	823.75		823.20		822.21		820.73		816.11		814.74		814.14		813.58		813.21		812.85		812.90		813.04	
EG ELEV	823.75		823.20		822.21		820.73		816.11		814.74		814.14		813.58		813.21		812.85		812.90		813.04	

	812.84	812.92	812.92	813.23	813.90	814.07	813.88	814.33	814.36	814.38	814.37	814.35	814.31	814.92	815.48
FG ELEV	812.84	812.92	812.92	813.23	813.90	814.07	813.88	814.33	814.36	814.38	814.37	814.35	814.31	814.92	815.48
EG ELEV	812.84	812.92	812.92	813.23	813.90	814.07	813.88	814.33	814.36	814.38	814.37	814.35	814.31	814.92	815.48

-0+50 0+00 0+20 0+40 0+60 0+80 1+00 1+20 1+40 1+60 1+80 2+00 2+20 2+40 2+60 2+80 3+00 3+20 3+40 3+60 3+80 4+00 4+20 4+40 4+60 4+80 5+00 5+20 5+40 5+60 5+

MARK	REVISION	DATE

I:\KSA\NETGATEWAY\PROJECTS\VTH\004\008 CAD\30 SHEETS\02 CIVIL\ VTH004-C-PP-2001 DWG [PRPOSED WALKING TRAIL SHEET 2001-4] 9/20/2021 - 8:34 AM
DRAWING PATHNAME - [LAYOUT], PLOT DATE - TIME

PROJECT TITLE: THE HILLS DRIVE WALKING TRAIL EXTENSION - CITY VILLAGE OF THE HILLS, TEXAS

PROPOSED WALKING TRAIL PLAN & PROFILE 0+00 TO 5+60

SHEET NAME:

VILLAGE OF THE HILLS, TEXAS CONTINUATION OF WALKING TRAIL PHASE 4

PROJECT NAME:

DRAWN BY:	DESIGNED BY:	LATEST REVISION	KSA JOB NO.:
BG	JD, GC	9/20/2021	VTH004

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C05

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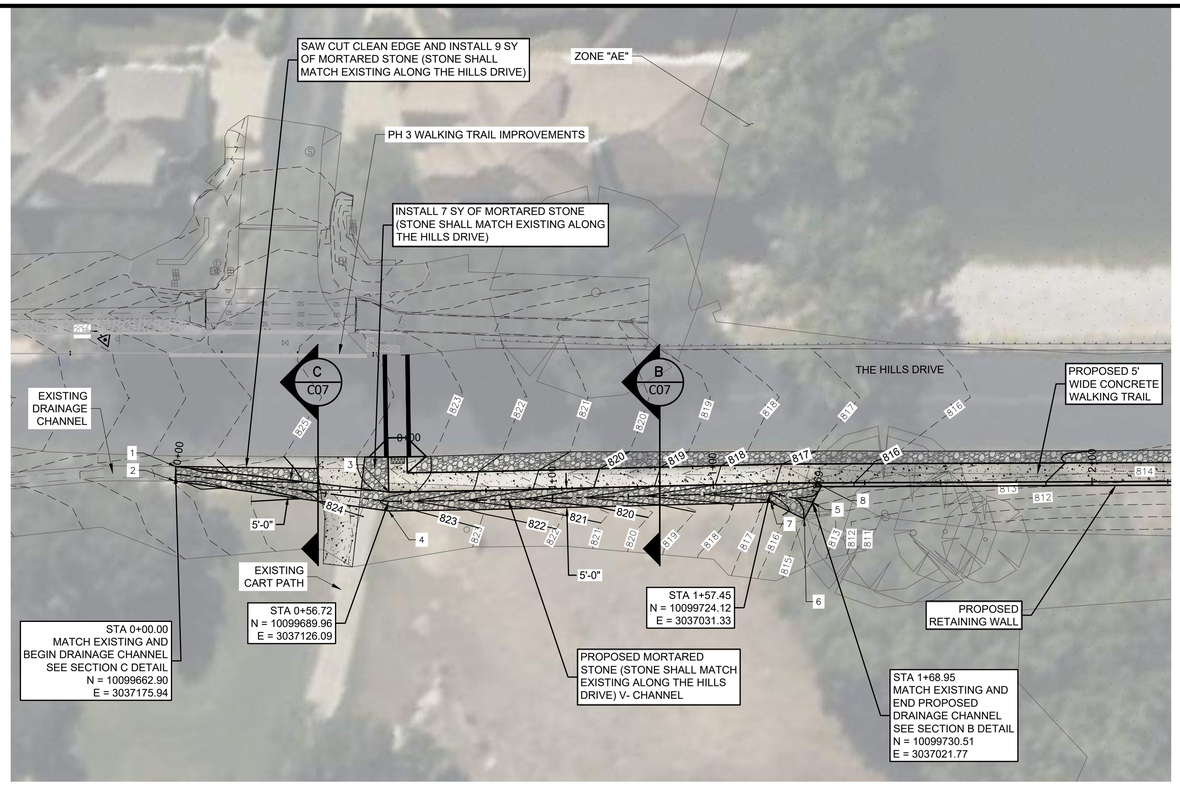
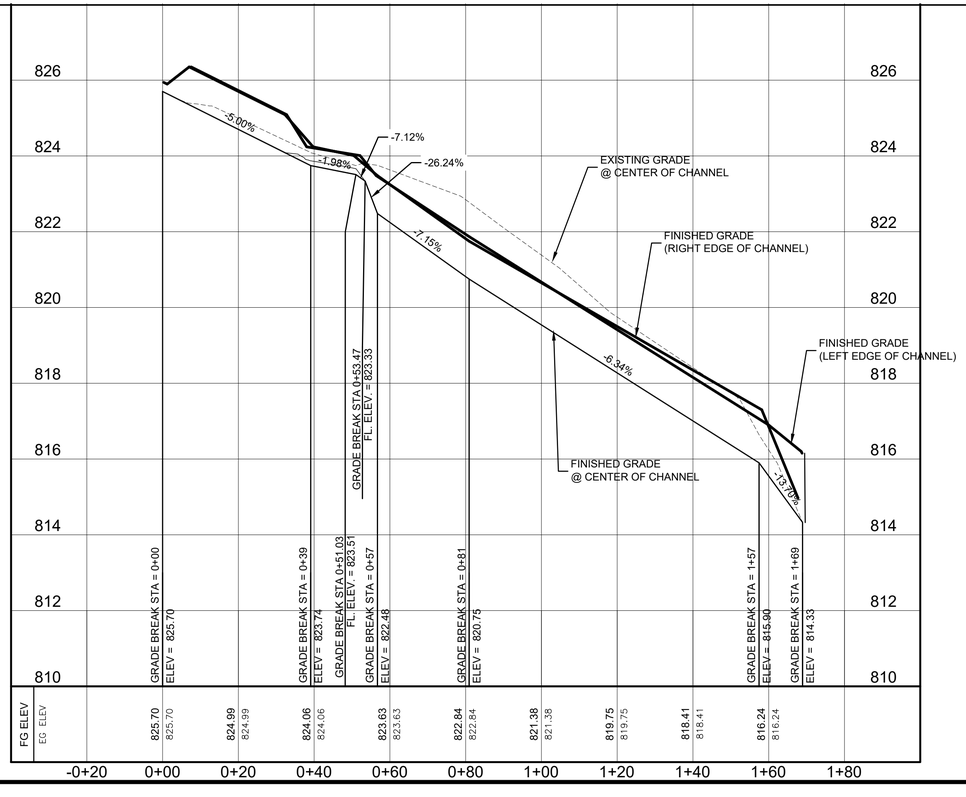


Point Table				
Point #	Elevation	Northing	Easting	Description
1	825.64	10099661.05	3037175.19	MATCH EXISTING
2	825.95	10099664.67	3037176.63	MATCH EXISTING
3	823.49	10099687.62	3037125.19	EDGE OF CHANNEL
4	823.49	10099692.30	3037126.98	EDGE OF CHANNEL
5	814.32	10099730.51	3037021.77	MATCH EXISTING
6	814.97	10099733.82	3037025.40	MATCH EXISTING
7	816.76	10099726.51	3037032.06	EDGE OF CHANNEL
8	816.20	10099725.94	3037019.19	BEGIN RETAINING WALL

20' 0 20' 40'
HORIZONTAL SCALE IN FEET

2' 0 2' 4'
VERTICAL SCALE IN FEET



MARK	REVISION	DATE

I:\KSA.NET\GATEWAY\PROJECTS\VTH\004\008 CAD\30 SHEETS\02 CIVIL\ VTH004-C-PP-0002.DWG | PRPOSED WALKING TRAIL PH 4 | 9/22/2021 9:54 AM
DRAWING PATHNAME - LAYOUT - PLOT DATE - TIME

PROJECT TITLE: THE HILLS DRIVE WALKING TRAIL EXTENSION - CITY VILLAGE OF THE HILLS, TEXAS

PROPOSED DRAINAGE CHANNEL PLAN & PROFILE STA 0+00 TO 1+70

SHEET NAME:

VILLAGE OF THE HILLS, TEXAS CONTINUATION OF WALKING TRAIL PHASE 4

PROJECT NAME:

DRAWN BY:	BG
DESIGNED BY:	JD, GC
LATEST REVISION	9/20/2021
KSA JOB NO.:	VTH004

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SHEET NO.

C06

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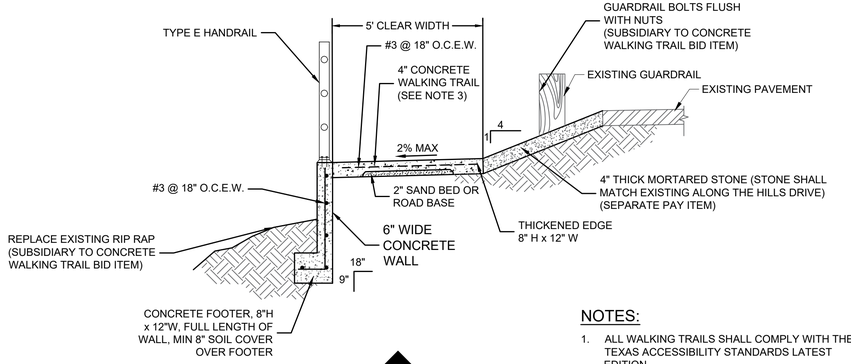
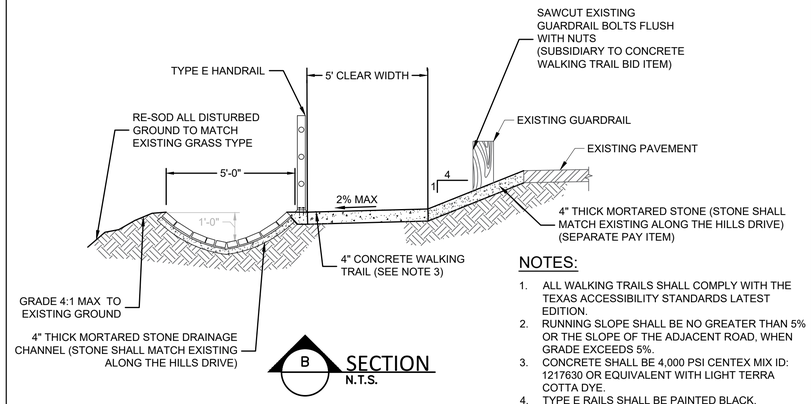


A SECTION N.T.S.

TYPE A
CONCRETE WALKING
TRAIL ALIGNMENT
STA 1+27 TO 3+91

NOTES:

1. ALL WALKING TRAILS SHALL COMPLY WITH THE TEXAS ACCESSIBILITY STANDARDS LATEST EDITION.
2. RUNNING SLOPE SHALL BE NO GREATER THAN 5% OR THE SLOPE OF THE ADJACENT ROAD, WHEN GRADE EXCEEDS 5%.
3. CONCRETE SHALL BE 4,000 PSI CENTEX MIX ID: 1217630 OR EQUIVALENT WITH LIGHT TERRA COTTA DYE.
4. TYPE E RAILS SHALL BE POWDER COATED BLACK, SUBSIDIARY TO RAIL PAY ITEM.

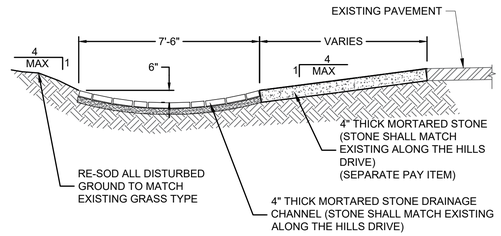


B SECTION N.T.S.

TYPE B
CONCRETE WALKING
TRAIL ALIGNMENT
STA 0+14 TO 1+27

NOTES:

1. ALL WALKING TRAILS SHALL COMPLY WITH THE TEXAS ACCESSIBILITY STANDARDS LATEST EDITION.
2. RUNNING SLOPE SHALL BE NO GREATER THAN 5% OR THE SLOPE OF THE ADJACENT ROAD, WHEN GRADE EXCEEDS 5%.
3. CONCRETE SHALL BE 4,000 PSI CENTEX MIX ID: 1217630 OR EQUIVALENT WITH LIGHT TERRA COTTA DYE.
4. TYPE E RAILS SHALL BE PAINTED BLACK, SUBSIDIARY TO RAIL PAY ITEM.
5. MORTARED FLAGSTONE DRAINAGE CHANNEL TO BE PAID FOR BY SEPARATE PAY ITEM FROM CONCRETE WALKING TRAIL.

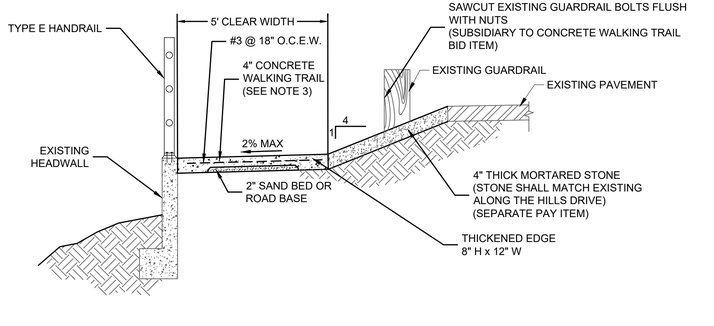


C SECTION N.T.S.

MORTARED FLAGSTONE DRAINAGE
CHANNEL ALIGNMENT
STA 0+00 TO 0+56.72

NOTES:

1. V-CHANNEL WIDTH VARIES. SEE PLAN SHEET C04 FOR SPECIFIC DIMENSIONS.
2. MORTARED FLAGSTONE DRAINAGE CHANNEL TO BE PAID FOR BY SEPARATE PAY ITEM FROM CONCRETE WALKING TRAIL
3. 4" THICK CONCRETE PAVEMENT SHALL BE USED IN PLACE OF MORTARED STONE ALONG DRAINAGE CHANNEL ALIGNMENT STA 0+39 TO STA 0+52

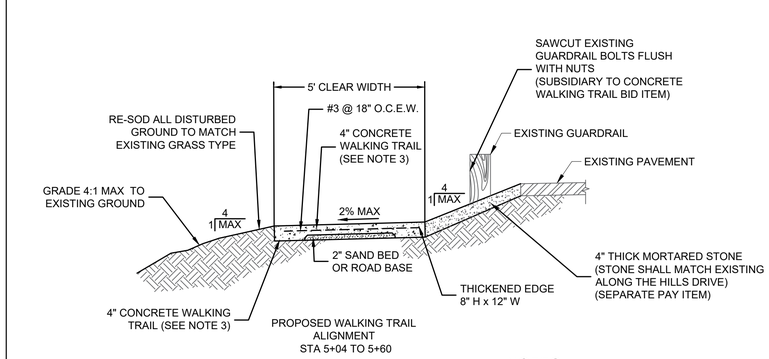


D SECTION N.T.S.

TYPE D
CONCRETE WALKING
TRAIL ALIGNMENT
STA 3+91 TO 5+04

NOTES:

1. ALL WALKING TRAILS SHALL COMPLY WITH THE TEXAS ACCESSIBILITY STANDARDS LATEST EDITION.
2. RUNNING SLOPE SHALL BE NO GREATER THAN 5% OR THE SLOPE OF THE ADJACENT ROAD, WHEN GRADE EXCEEDS 5%.
3. CONCRETE SHALL BE 4,000 PSI CENTEX MIX ID: 1217630 OR EQUIVALENT WITH LIGHT TERRA COTTA DYE.
4. TYPE E RAILS SHALL BE PAINTED BLACK, SUBSIDIARY TO RAIL PAY ITEM.

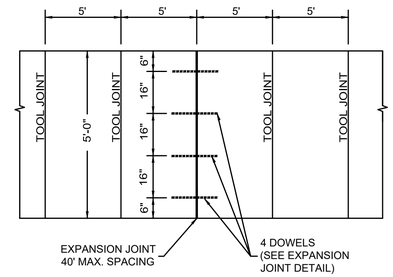


E SECTION N.T.S.

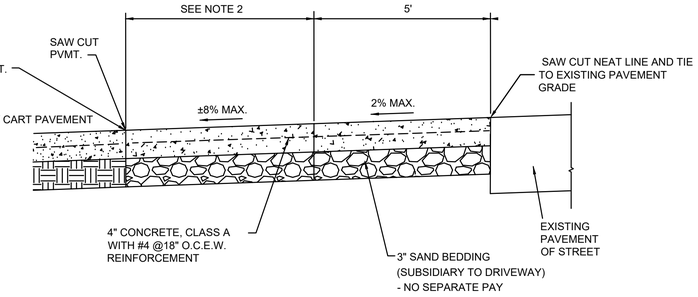
TYPE E
CONCRETE WALKING
TRAIL ALIGNMENT
STA 5+04 TO 5+60

NOTES:

1. ALL WALKING TRAILS SHALL COMPLY WITH THE TEXAS ACCESSIBILITY STANDARDS LATEST EDITION.
2. RUNNING SLOPE SHALL BE NO GREATER THAN 5% OR THE SLOPE OF THE ADJACENT ROAD, WHEN GRADE EXCEEDS 5%.
3. CONCRETE SHALL BE 4,000 PSI CENTEX MIX ID: 1217630 OR EQUIVALENT WITH LIGHT TERRA COTTA DYE.



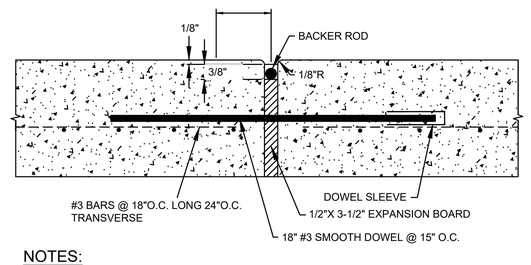
PLAN VIEW OF TYPLICAL WALKING TRAIL
N.T.S.



GENERAL NOTES:

1. SEE PED 18 FOR WALKING TRAIL TREATMENT AT DRIVEWAYS.
2. DRIVEWAY PAVEMENT SHALL BE SAW CUT AND REMOVED TO THE MINIMUM EXTENTS NECESSARY TO TIE DRIVEWAY TO PROPOSED WALKING TRAIL OR TRAIL GRADE WITHIN THE MAXIMUM SLOPES ALLOWED.
3. ALL CONCRETE SHALL BE CL. "A". 4,000 psi. STRUCTURAL STEEL SHALL BE GRADE A36. ALL REINFORCING STEEL SHALL BE GRADE 60. ALL REINFORCING STEEL SHALL HAVE A MINIMUM COVER OF 2".
4. FLEX BASE USED CAN BE OF ANY TYPE AND GRADE APPROVED BY THE ENGINEER.

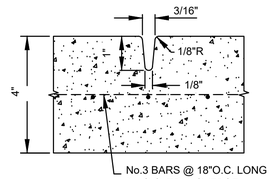
TYP. CONCRETE DRIVEWAY SECTION AT WALKING TRAIL
N.T.S.



NOTES:

1. JOINT SEALANT SHALL BE SELF-LEVELING SILICONE.
2. INSTALL EXPANSION JOINT AT ALL TIE-INS TO EXISTING WALKING TRAIL.

EXPANSION JOINT
N.T.S.



TOOLED JOINT
N.T.S.

MARK	REVISION	DATE

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DRAWING PATHNAME - LAYOUT | PLOT DATE - TIME

PROJECT TITLE: THE HILLS DRIVE WALKING TRAIL EXTENSION - CITY VILLAGE OF THE HILLS, TEXAS

MISCELLANEOUS DETAILS I

SHEET NAME:

VILLAGE OF THE HILLS, TEXAS
CONTINUATION OF WALKING TRAIL PHASE 4

PROJECT NAME:

DRAWN BY:	DESIGNED BY:	LATEST REVISION	KSA JOB NO.:
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SHEET NO.

C07

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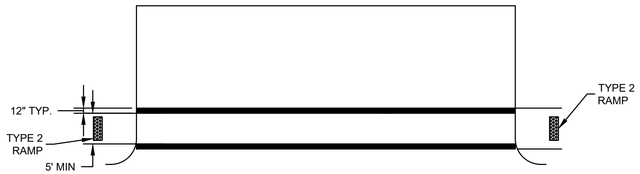
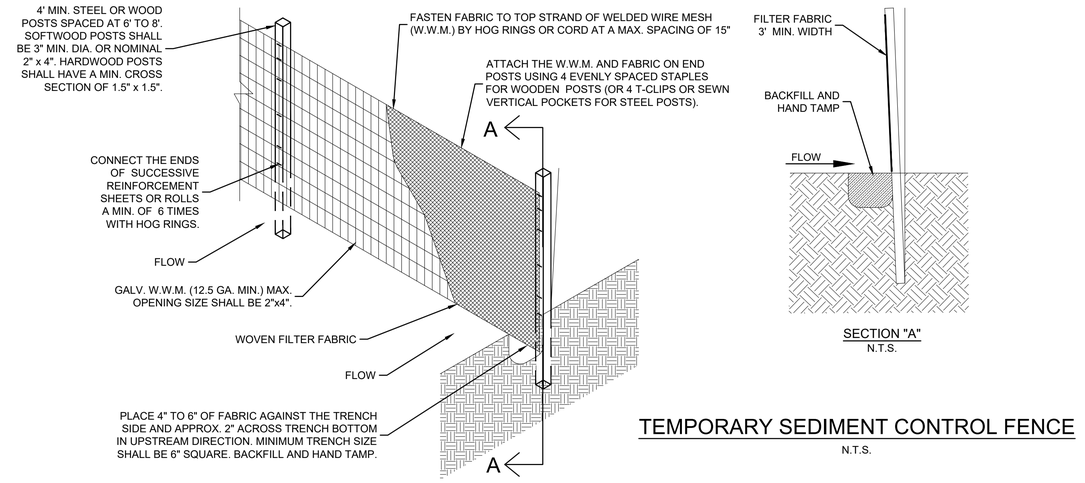


NOTES:

1. FINAL PLACEMENT OF STOP BAR AND CONTINENTAL CROSSWALK SHALL BE APPROVED BY THE ENGINEER IN THE FIELD.
2. SPACE CONTINENTAL MARKINGS WIDE ENOUGH TO AVOID VEHICLE WHEEL PATHS.
3. WIDTHS OF SPACING BETWEEN MARKINGS SHALL BE CONSISTENT THROUGHOUT THE LENGTH OF THE CROSSWALK, EXCEPT WHERE MARKING IS ADJACENT TO CURB.

CROSS WALK DETAIL

N.T.S.



SECTION "A"
N.T.S.

TEMPORARY SEDIMENT CONTROL FENCE

N.T.S.

MARK	REVISION	DATE

\\KSA.NET\GATEWAY\PROJECTS\VTH\004\008 CAD\30 SHEETS\02 CIVIL\ VTH004-C-DT-MISC.DWG | MISCELLANEOUS DETAILS II | 9/20/2021 4:45:44 PM | LAYOUT | PLOT DATE - TIME DRAWING PATHNAME | LAYOUT | PLOT DATE - TIME

PROJECT TITLE: THE HILLS DRIVE WALKING TRAIL EXTENSION - CITY VILLAGE OF THE HILLS, TEXAS

SHEET NAME:
MISCELLANEOUS DETAILS II

VILLAGE OF THE HILLS, TEXAS
CONTINUATION OF WALKING TRAIL PHASE 4

PROJECT NAME:

DRAWN BY:	BG
DESIGNED BY:	JD, GC
LATEST REVISION	9/20/2021
KSA JOB NO.:	VTH004

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SHEET NO.
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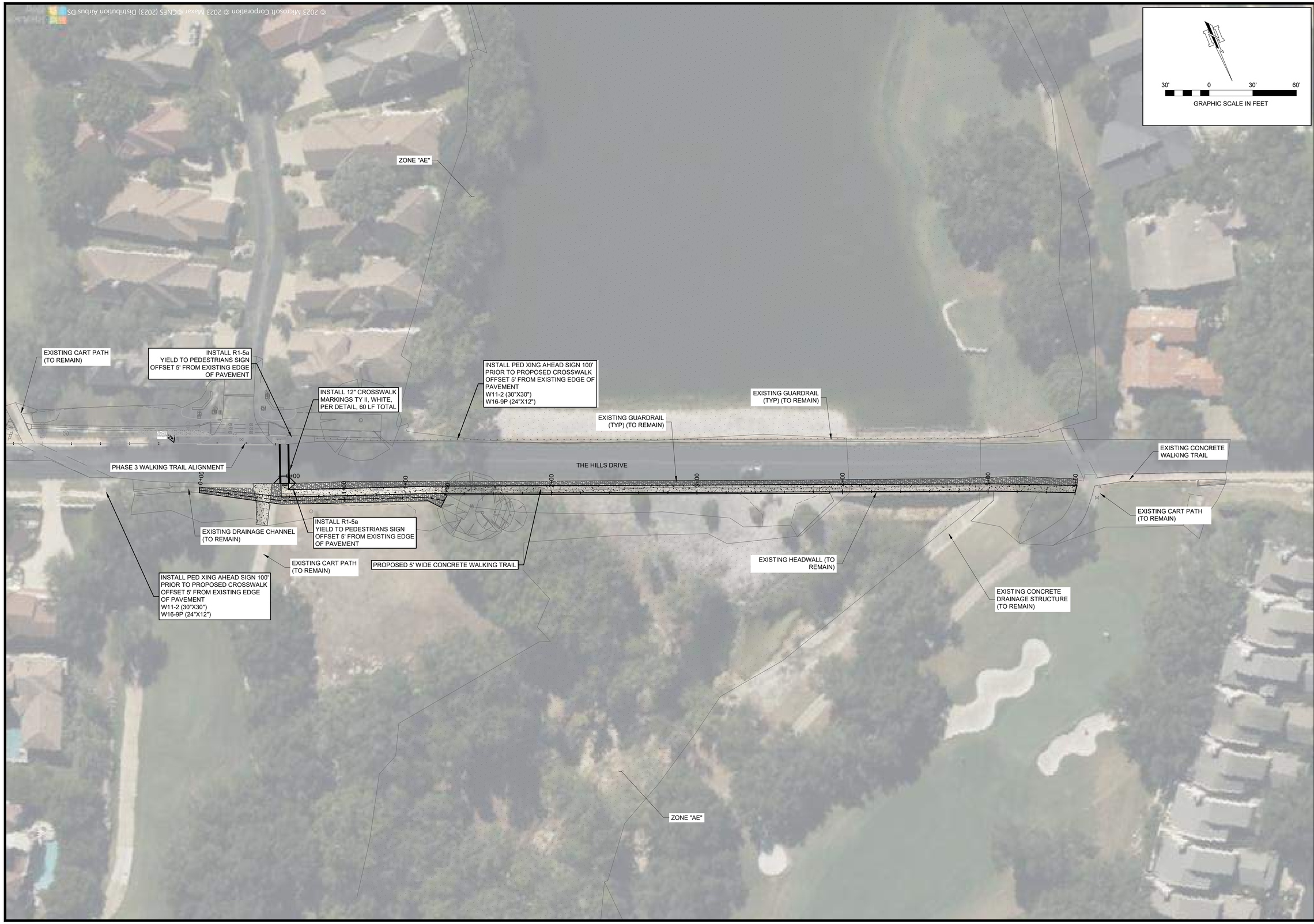

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DRAWING PATHNAME | LAYOUT | PLOT DATE - TIME

PROJECT TITLE: THE HILLS DRIVE WALKING TRAIL EXTENSION - CITY VILLAGE OF THE HILLS, TEXAS

PROPOSED MARKING AND SIGNAGE PLAN

SHEET NAME:

VILLAGE OF THE HILLS, TEXAS
CONTINUATION OF WALKING TRAIL PHASE 4

PROJECT NAME:

DRAWN BY:	DESIGNED BY:	LATEST REVISION:	KSA JOB NO.:
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SHEET NO.

C09

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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. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.
11. Traffic control devices should be in place only while work is actually in progress or a definite need exists.
12. The Engineer has the final decision on the location of all traffic control devices.
13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY NOTES:

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

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

1. Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.
2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

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

SHEET 1 OF 12

Texas Department of Transportation — Traffic Safety Division Standard

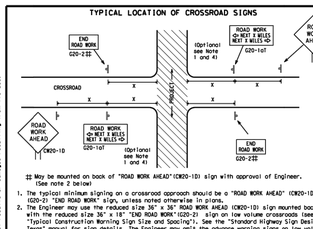
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

FILE:	bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS					
4-03	7-13	DIST	COUNTY		SHEET NO.
9-07	8-14				
5-10	5-21				

DATE:
FILE:

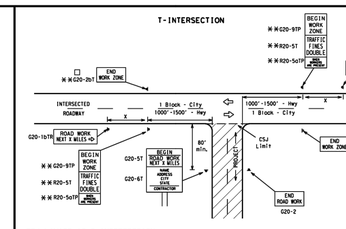
TYPICAL LOCATION OF CROSSROAD SIGNS



‡‡ 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 crossroads approach should be a "ROAD WORK AHEAD" (CW20-1D)sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
2. The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK"(G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume as per TMUTCD Part 5. This information shall be shown in the plans.
3. Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, traffic control Plan sheets or the Work Zone Standard Sheets.
4. The "ROAD WORK NEXT X MILES"(G20-1oT)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 used 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(12) 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[4,5,6]

SIZE

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

SPACING

Posted Speed	Sign △ Spacing "X"
MPH	Feet (Approx.)
30	120
35	160
40	240
45	320
50	400
55	500[7]
60	600[7]
65	700[7]
70	800[7]
75	900[7]
80	1000[7]
*	* [3]

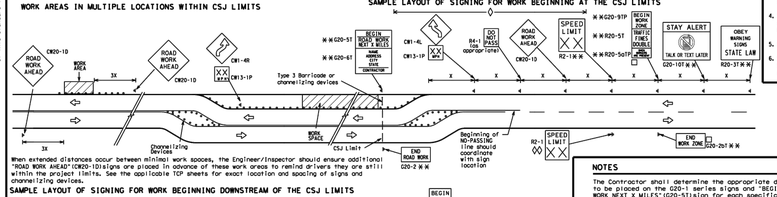
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

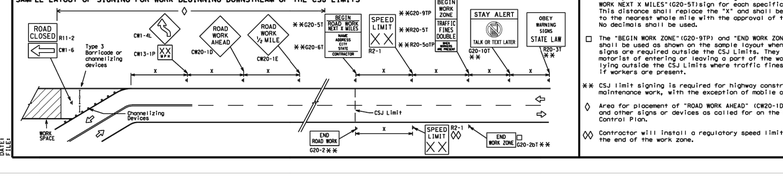
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

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

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

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

LEGEND

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

SHEET 2 OF 12

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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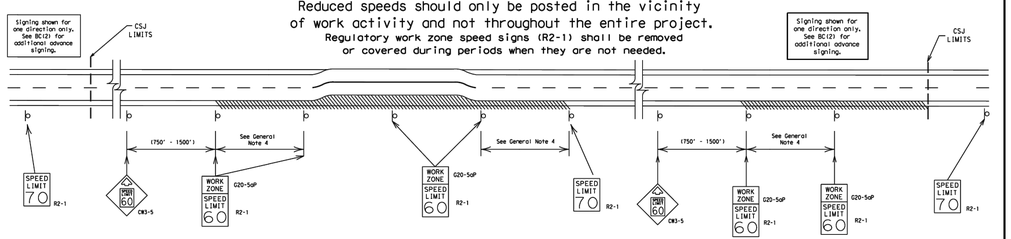
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present. Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:
a) rough road or damaged pavement surface
b) substantial alteration of roadway geometrics (diversions)
c) construction detours
d) grade
e) widths
f) other conditions readily apparent to the driver
As long as any of these conditions exist, the work zone speed limit signs should remain in place.

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

SHEET 3 OF 12

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-21

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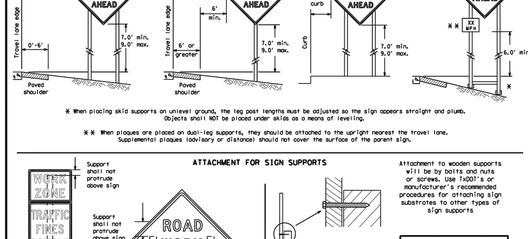
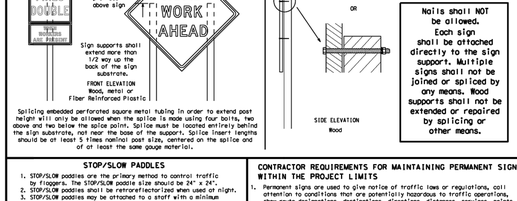
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects should 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 splice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

STOP/SLOW PADDLES

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

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

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

1. Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, specific service (LOGO), or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
2. When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition. For details for covering large guide signs see the TMUTCD standards.
3. When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times. 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.
4. If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC standard sheets, TLRS standard sheets or the CWZTCD list. The signs shall meet the required mounting heights shown on the BC, or the SMD standard sheets during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
5. 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. Roof tanks 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 signs and supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD) for small roadside signs. Supports for temporary large roadside signs shall meet the requirements detailed on the Temporary Large Roadside Signs (TLRS) standard sheets.The Contractor shall install the sign supports 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 non-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 SIGNS (as defined in "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 that 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 fineness 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 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_A, shall be used for signs with a white background.
3. Orange sheeting, meeting the requirements of DMS-8300 Type B_A, or Type C_A, 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 shown in the "Standard Highway Sign Designs 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 is not in use. Signs installed on wooden posts may not be turned.
3. Short-term signs on the right side of the road may be turned perpendicular to traffic.
4. Signs installed on wooden posts shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
5. When signs are covered, the material used shall be opaque, such as heavy all 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.
6. Burlap shall NOT be used to cover signs.
7. Duct tape or other adhesive material shall NOT be affixed to a sign face.
8. Signs and anchor studs 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. Sandbags filled with 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 resists ultraviolet 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 sign. Sandbags shall not be placed on sign supports where they could interfere with sign caps, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
8. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

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

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Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-21

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PROJECT TITLE: THE HILLS DRIVE WALKING TRAIL EXTENSION - CITY VILLAGE OF THE HILLS, TEXAS

SHEET NAME:

VILLAGE OF THE HILLS, TEXAS
CONTINUATION OF WALKING TRAIL PHASE 4

PROJECT NAME:

DRAWN BY:	BG
DESIGNED BY:	JD, GC
LATEST REVISION	9/20/2021
KSA JOB NO.:	VTH004

MARK	REVISION	DATE

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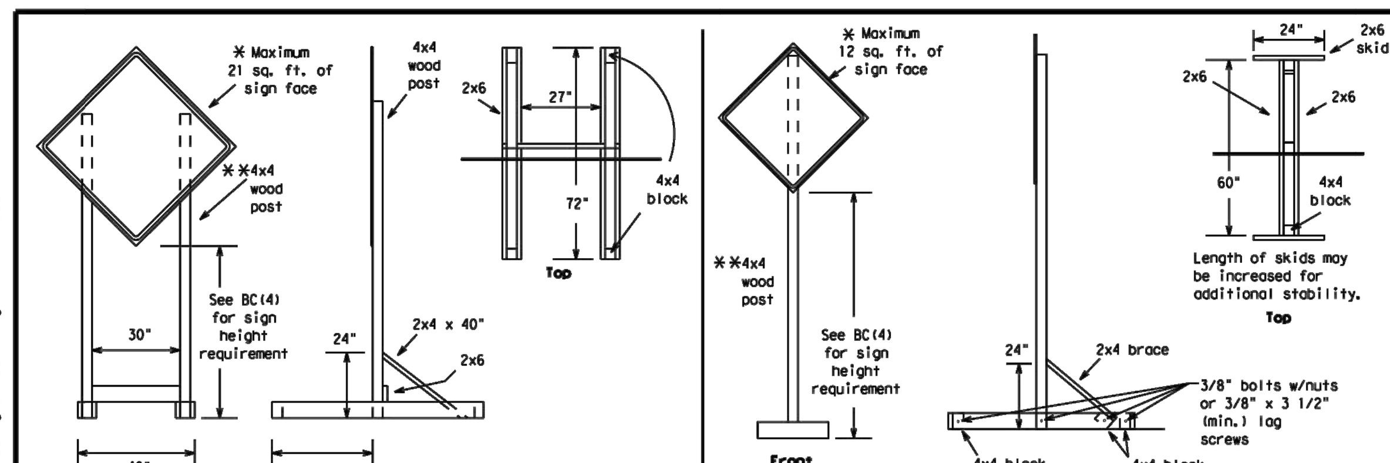
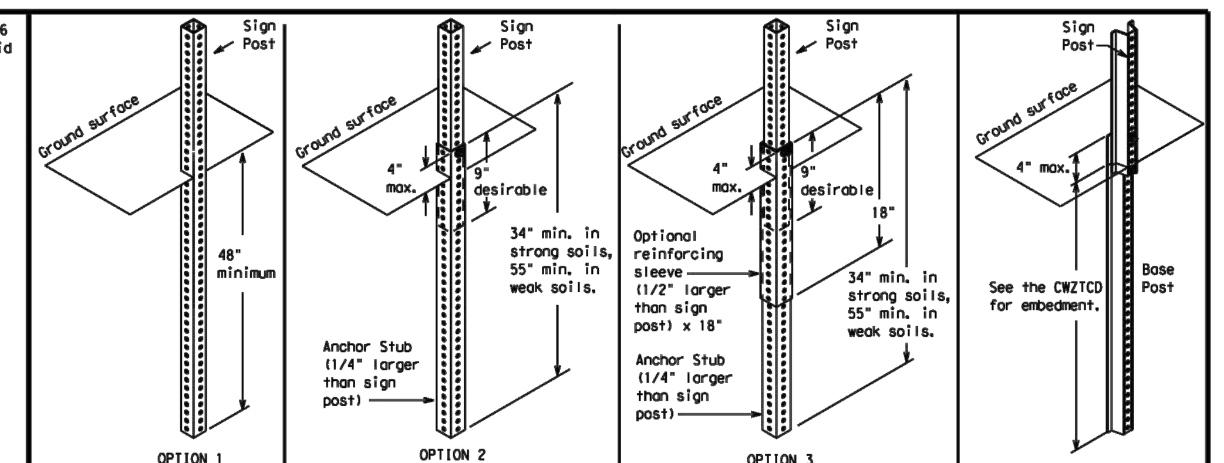
C10

SKID MOUNTED WOOD SIGN SUPPORTS



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



GROUND MOUNTED SIGN SUPPORTS

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

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.

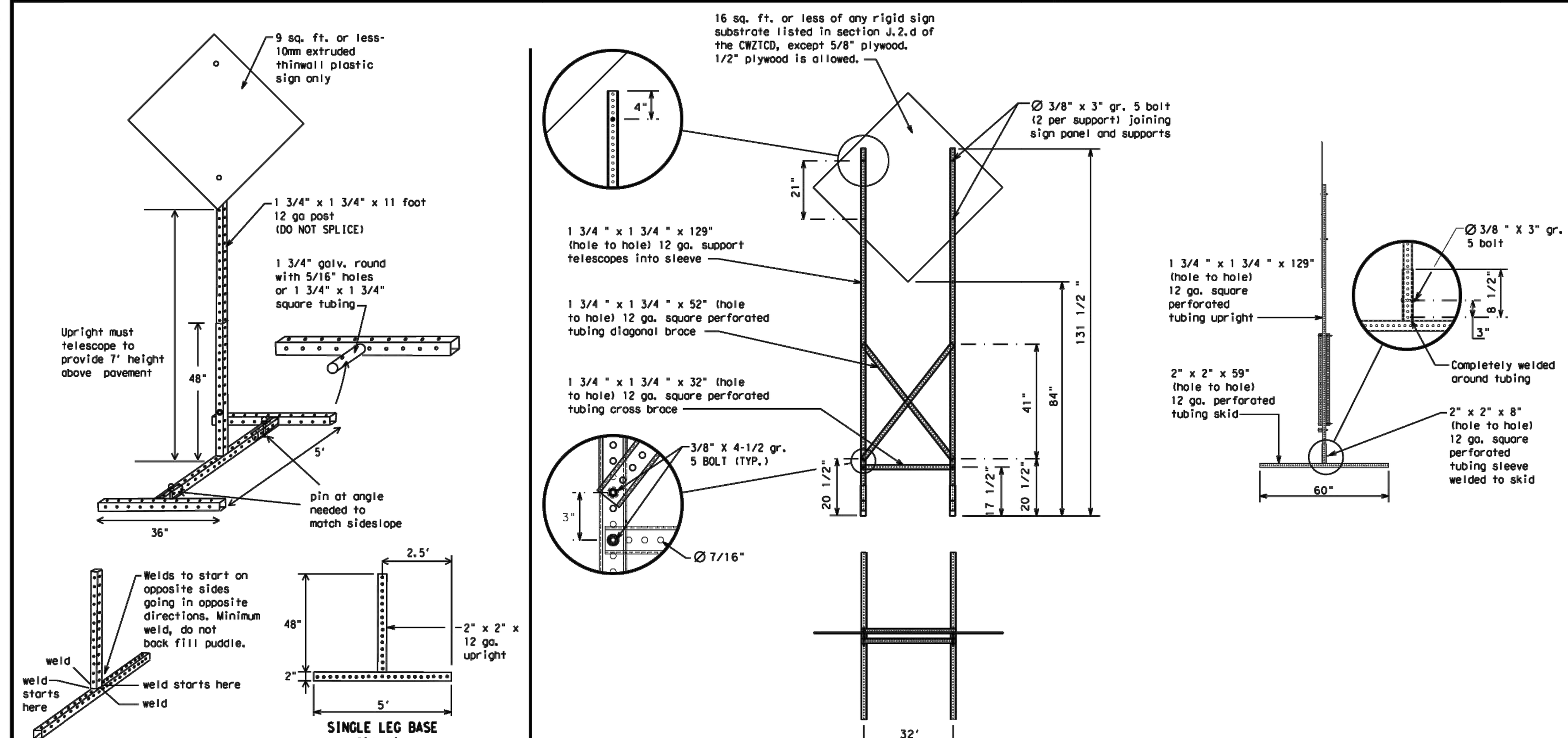
GENERAL NOTES

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.



SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

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

SHEET 5 OF 12

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-21

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

PORTABLE CHANGEABLE MESSAGE SIGNS

1. The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
2. Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
3. Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
4. Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
5. Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
6. When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
7. The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
8. The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
9. Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
10. Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
11. Do not use the word "Danger" in message.
12. Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
13. Do not display messages that scroll horizontally or vertically across the face of the sign.
14. The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated, unless shown in the TMUTCD.
15. PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 600 feet at night and 800 feet in daylight. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
16. Each line of text should be centered on the message board rather than left or right justified.
17. If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

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

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

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

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

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

Phase 1: Condition Lists

Road/Lane/Ramp Closure List		Other Condition List	
FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED	ROADWORK XXX FT	ROAD REPAIRS XXXX FT
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT	FLAGGER XXXX FT	LANE NARROWS XXXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT	RIGHT LN NARROWS XXXX FT	TWO-WAY TRAFFIC XX MILE
RIGHT X LANES CLOSED	RIGHT X LANES OPEN	MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
CENTER LANE CLOSED	DAYTIME LANE CLOSURES	LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED	DETOUR X MILE	ROUGH ROAD XXXX FT
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE	ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
EXIT CLOSED	RIGHT LN TO BE CLOSED	BUMP XXXX FT	US XXX EXIT X MILES
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI	TRAFFIC SIGNAL XXXX FT	LANES SHIFT *
XXXXXXXX BLVD CLOSED			

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List		Location List	Warning List	** Advance Notice List
MERGE RIGHT	FORM X LINES RIGHT	AT FM XXXX	SPEED LIMIT XX MPH	TUE-FRI XX AM- X PM
DETOUR NEXT X EXITS	USE XXXXX RD EXIT	BEFORE RAILROAD CROSSING	MAXIMUM SPEED XX MPH	APR XX- XX X PM-X AM
USE EXIT XXX	USE EXIT I-XX NORTH	NEXT X MILES	MINIMUM SPEED XX MPH	BEGINS MONDAY
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N	PAST US XXX EXIT	ADVISORY SPEED XX MPH	BEGINS MAY XX
TRUCKS USE US XXX N	WATCH FOR TRUCKS	XXXXXXX TO XXXXXXX	RIGHT LANE EXIT	MAY X-X XX PM - XX AM
WATCH FOR TRUCKS	EXPECT DELAYS	US XXX TO FM XXXX	USE CAUTION	NEXT FRI-SUN
EXPECT DELAYS	PREPARE TO STOP		DRIVE SAFELY	XX AM TO XX PM
REDUCE SPEED XXX FT	END SHOULDER USE		DRIVE WITH CARE	NEXT TUE AUG XX
USE OTHER ROUTES	WATCH FOR WORKERS			TONIGHT XX PM- XX AM
STAY IN LANE *				

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE DRUM AT EACH OF THE FOUR CORNERS OF THE UNIT.

FULL MATRIX PCMS SIGNS

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

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Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-21

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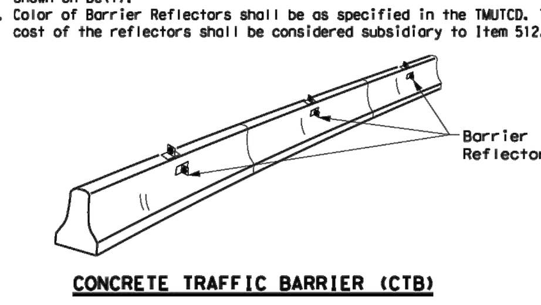
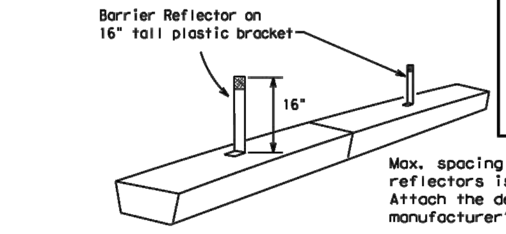
1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost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



CONCRETE TRAFFIC BARRIER (CTB)

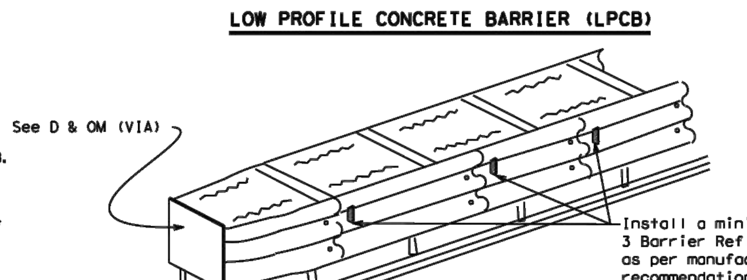


LOW PROFILE CONCRETE BARRIER (LPCB)

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

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

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

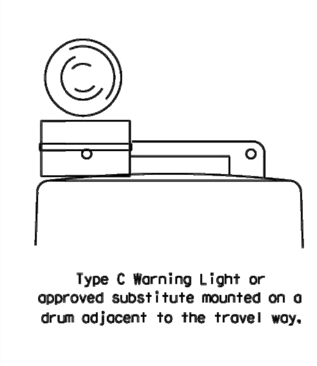


DELINEATION OF END TREATMENTS

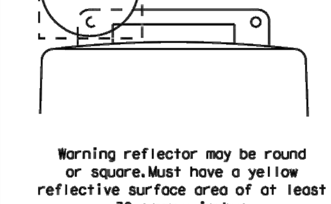
END TREATMENTS FOR CTB'S USED IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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



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

WARNING LIGHTS

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

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

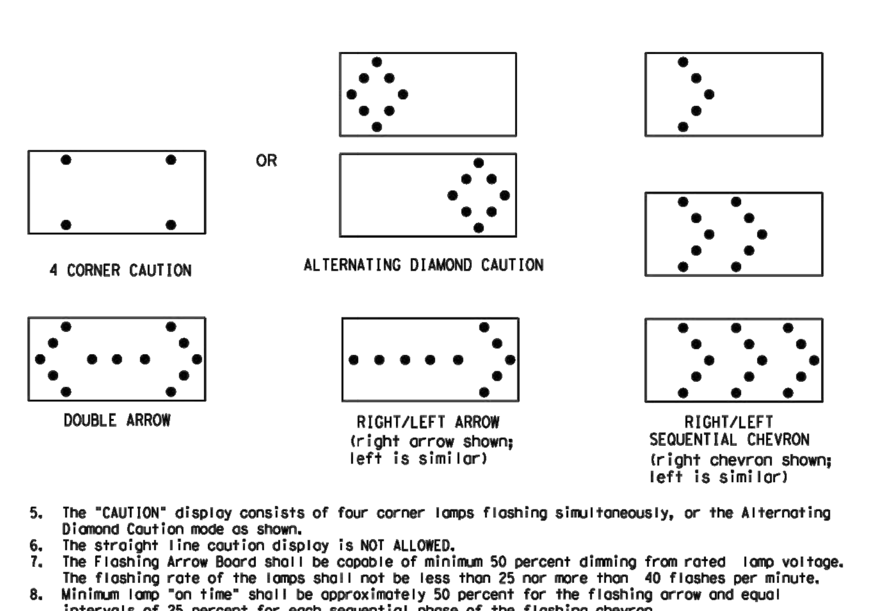
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing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

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

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

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

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



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

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

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

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

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

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

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Texas Department of Transportation — Traffic Safety Division Standard

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

BC(7)-21

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GENERAL NOTES

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

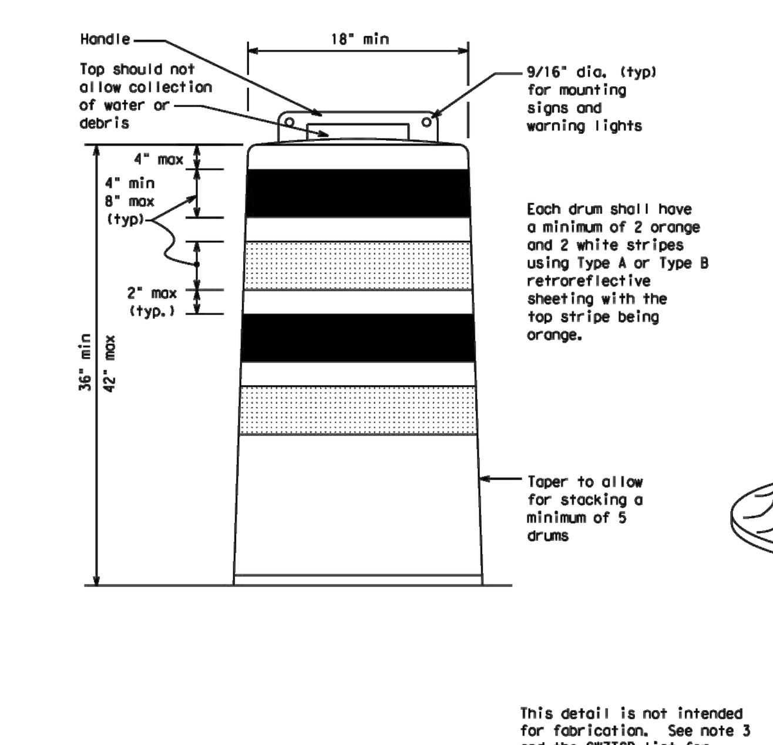
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

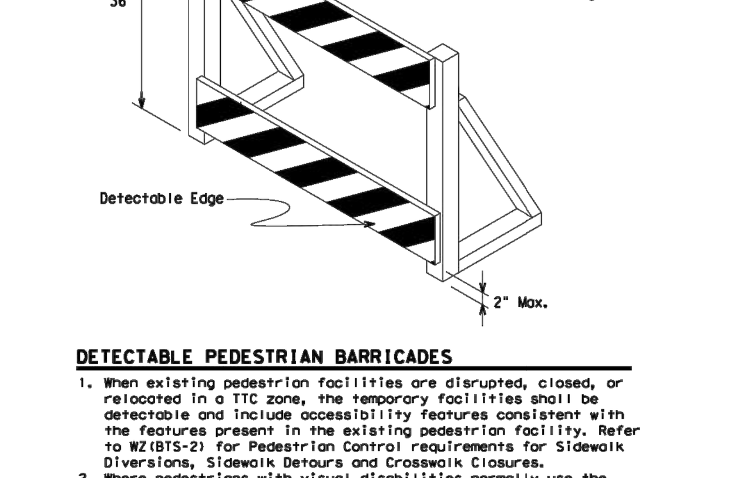
RETROREFLECTIVE SHEETING

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

BALLAST

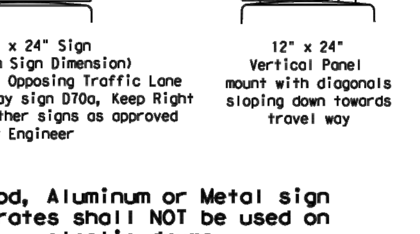
1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other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





DETECTABLE PEDESTRIAN BARRICADES

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



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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

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Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-21

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MARK	REVISION	DATE

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DRAWING PATHNAME | LAYOUT | PLOT DATE - TIME

PROJECT TITLE: THE HILLS DRIVE WALKING TRAIL EXTENSION - CITY VILLAGE OF THE HILLS, TEXAS

SHEET NAME: TXDOT DETAILS II

PROJECT NAME: VILLAGE OF THE HILLS, TEXAS CONTINUATION OF WALKING TRAIL PHASE 4

DRAWN BY: BG
DESIGNED BY: JD, GC
LATEST REVISION: 9/20/2021
KSA JOB NO.: VTH004

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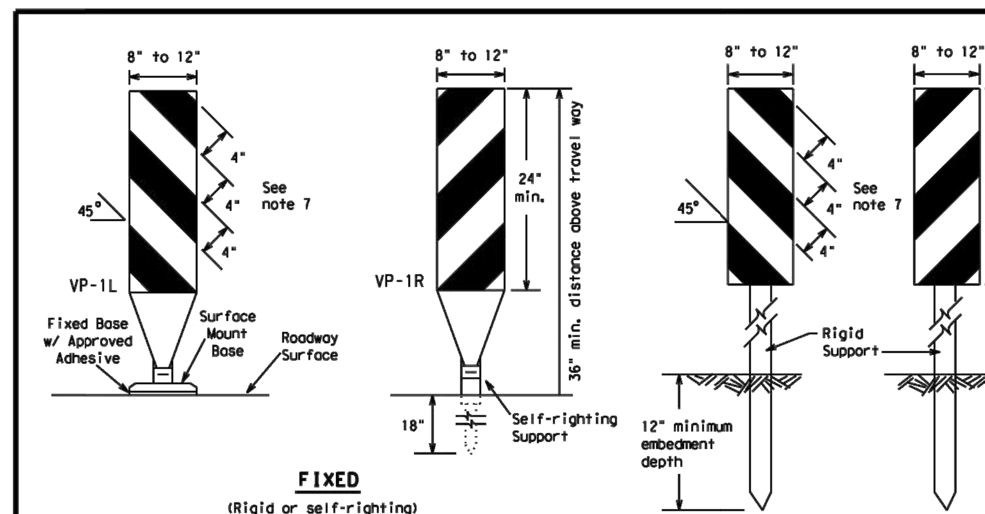
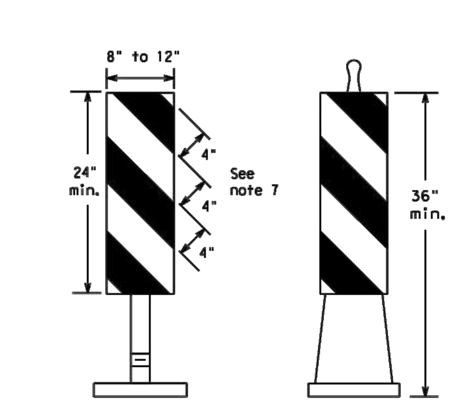


FIXED
(Rigid or self-righting)

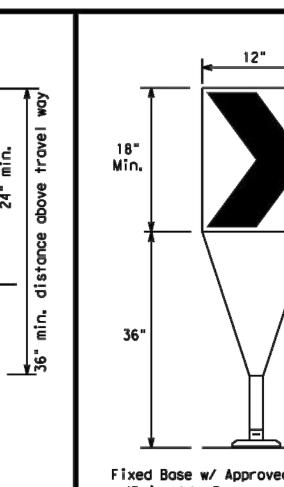
DRIVEABLE



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 for additional requirements on the use VP's for drop-offs.
3. VP's should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
4. VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
5. Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
6. Sheeting for the VP's shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
7. Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.

VERTICAL PANELS (VPs)

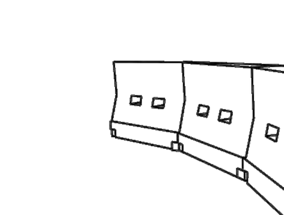


1. The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
2. Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
3. Chevrons, when used, shall be erected on the out-side 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 nonreflec-tive 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 else-where in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
4. The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
5. Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
6. Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
7. The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.



LONGITUDINAL CHANNELIZING DEVICES (LCD)

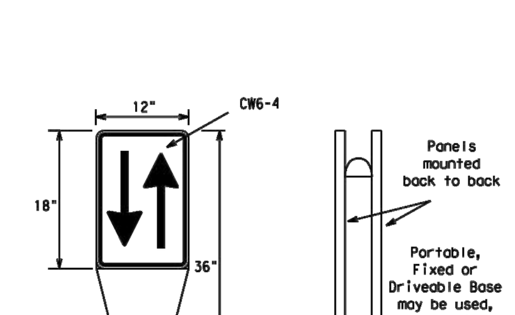
1. LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application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

WATER BALLASTED SYSTEMS USED AS BARRIERS

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

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

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



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)

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(9)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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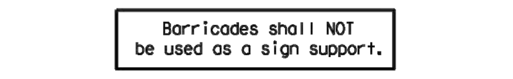
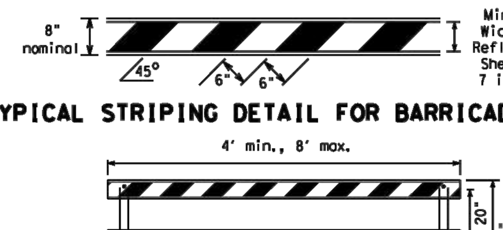
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.

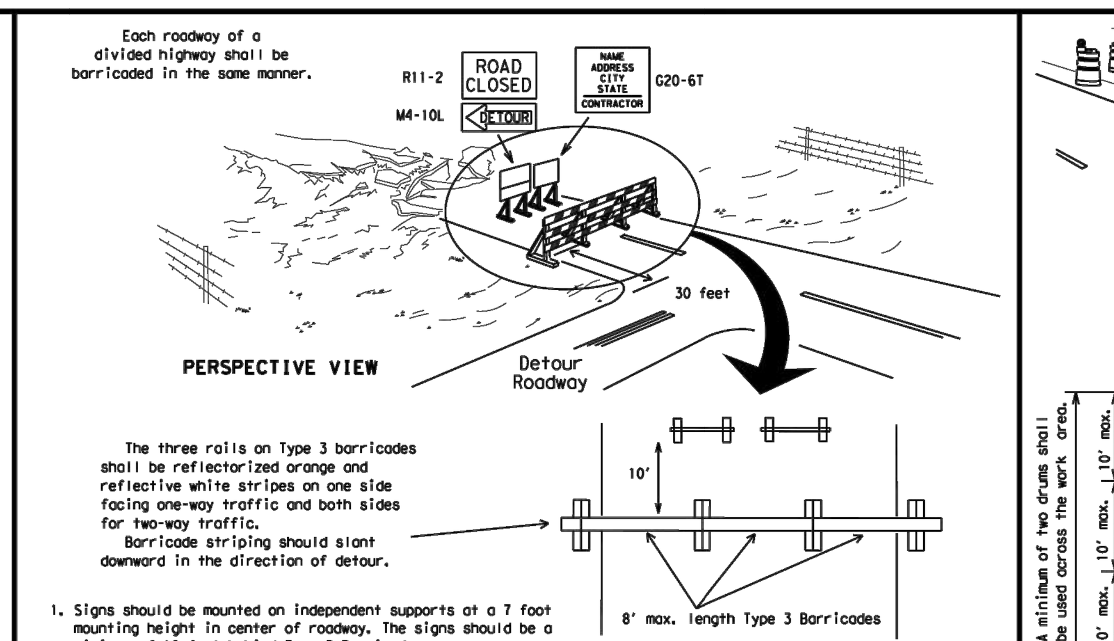


TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



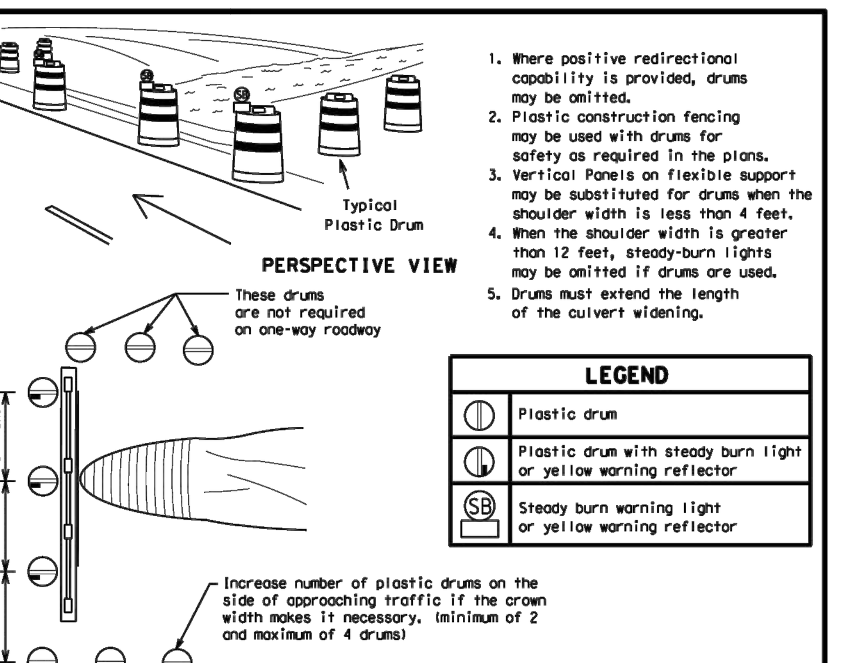
Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES



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.

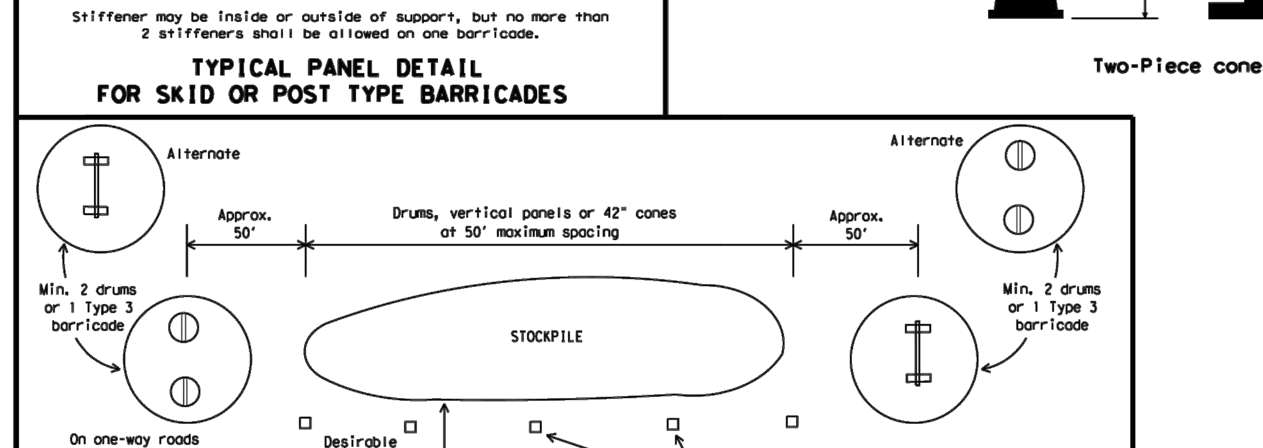
TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



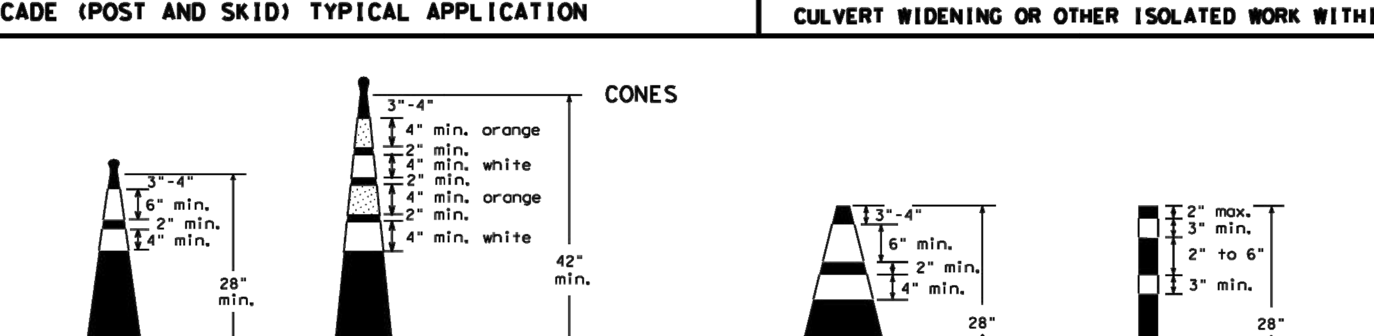
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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

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

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



TRAFFIC CONTROL FOR MATERIAL STOCKPILES



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

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

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

SHEET 10 OF 12

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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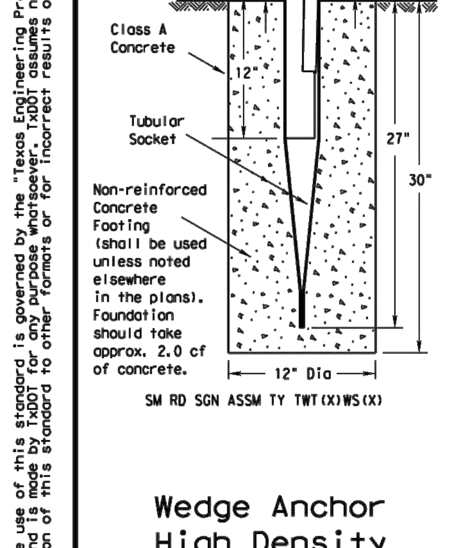
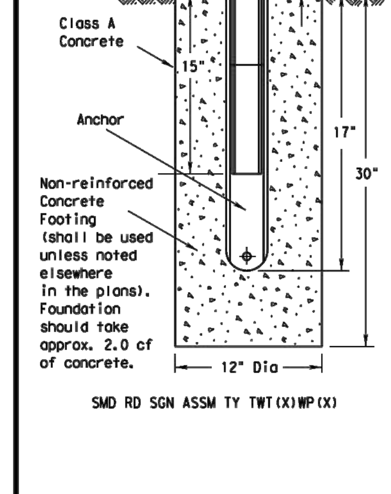
Wedge Anchor Steel System



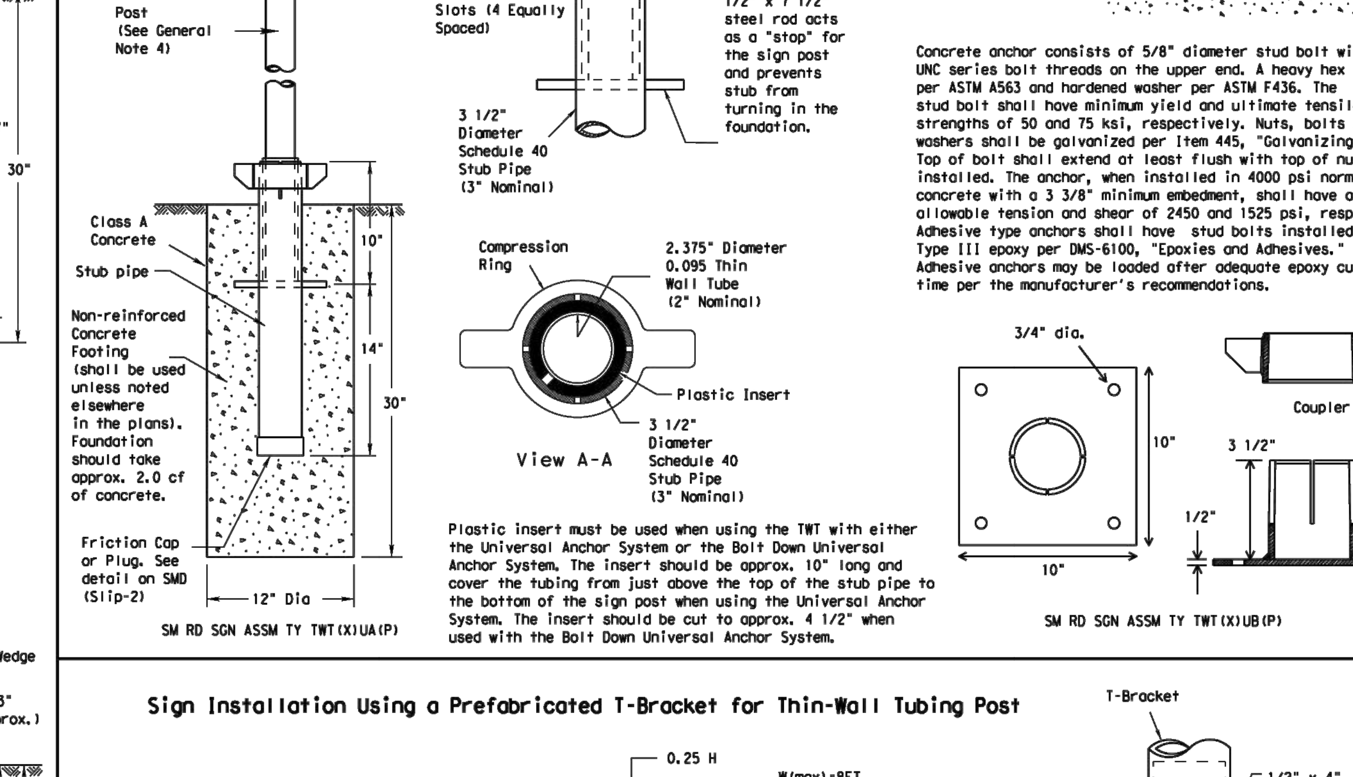
SM RD SGN ASSM TY TWT(X)WS(X)

Wedge Anchor High Density Polyethylene (HDPE) System



SMD RD SGN ASSM TY TWT(X)WP(X)

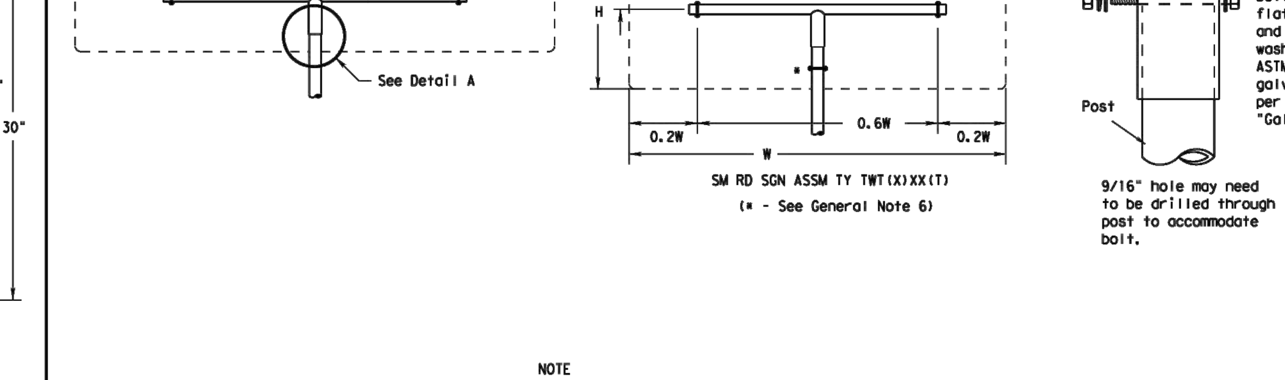
Universal Anchor System with Thin-Walled Tubing Post



Plastic insert must be used when using the TWT with either the Universal Anchor System or the Bolt Down Universal Anchor System. The insert should be approx. 10" long and cover the tubing from just above the top of the stub pipe to the bottom of the sign post when using the Universal Anchor System. The insert should be cut to approx. 4 1/2" when used with the Bolt Down Universal Anchor System.

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. A heavy hex nut per ASTM A563 and hardened washer per ASTM F436. The stud bolt shall have minimum yield and ultimate tensile strengths of 50 and 75 ksi, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Top of bolt shall extend at least flush with top of nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 3 3/8" minimum embedment, shall have a minimum allowable tension and shear of 2450 and 1525 psi, respectively. Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations.

Sign Installation Using a Prefabricated T-Bracket for Thin-Wall Tubing Post



NOTE

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

GENERAL NOTES:

1. The Wedge Anchor System and the Universal Anchor System with thin wall tubing post may be used to support up to 10 square feet of sign area.
2. The tubular socket, wedge and prefabricated T-bracket shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to the approval of the TxDOT Traffic Standards Engineer.
3. Except for posts (13 BWG Tubing), clamps, nuts and bolts, all components shall be prequalified. A list of prequalified vendors may be obtained from the Material Producer List web page. The website address is: http://www.txdot.gov/business/producer_list.htm
4. Material used as post with this system shall conform to the following specifications: 13 BWG Tubing (2.375" outside diameter) (TWT)
   - 0.095" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following: 55,000 PSI minimum yield strength; 70,000 PSI minimum tensile strength; 18% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of .083" to .099"
   - Outside diameter (uncoated) shall be within the range of 2.369" to 2.381"
   - Galvanization per ASTM 123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.
5. Sign blanks shall be the sizes and shapes shown on the plans.
6. Additional sign clamp required on the "T-bracket" post for 24" high signs. Place clamp at least 3" above bottom of sign when possible.
7. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
8. See the Traffic Operations Division website for detailed drawings of sign clamps and Wedge Anchor System components. The website address is: http://www.txdot.gov/publications/traffic.htm

WEDGE ANCHOR SYSTEM INSTALLATION PROCEDURE

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

UNIVERSAL ANCHOR SYSTEM INSTALLATION PROCEDURE

1. Dig foundation hole. Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18". When solid rock is encountered below ground level, the foundation shall extend in the solid rock a minimum depth of 18" or provide a minimum foundation depth of 30". If solid rock is encountered, the socket/stub may be reduced in length as required to a minimum length of 18". Any material removed from the socket/stub shall be from the bottom and the clearance requirements given on SMD(GEN) must be followed. The inner surfaces of the socket/stub must remain free of concrete or other debris.
2. Insert base post in hole to depths shown and backfill hole with concrete.
3. Level and plumb the base post using a torpedo level and allow concrete adequate time to set. The bottom of the slots provided in the stub pipe shall remain above the top of the concrete foundation.
4. Attach the sign to the sign post.
5. Install plastic insert around bottom of post.
6. Insert sign post into base post. Lower until the post comes to rest on steel rod.
7. Seat compression ring using a hammer. Typically, the top of compression ring will be approximately level with top of stub post when optimally installed.
8. Check sign post by hand to ensure it is unable to turn. If loose, increase the tightening of the compression ring.

Texas Department of Transportation — Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS WEDGE & UNIVERSAL ANCHOR WITH THIN WALL TUBING POST

SMD(TWT)-08

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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

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

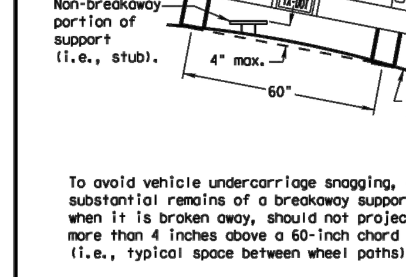
Post Type
- FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
- TWT = Thin-Walled Tubing (see SMD(TWT))
- 10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
- S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

Anchor Type
- UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
- UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
- WS = Wedge Anchor Steel - (see SMD(TWT))
- WP = Wedge Anchor Plastic (see SMD(TWT))
- SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
- SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

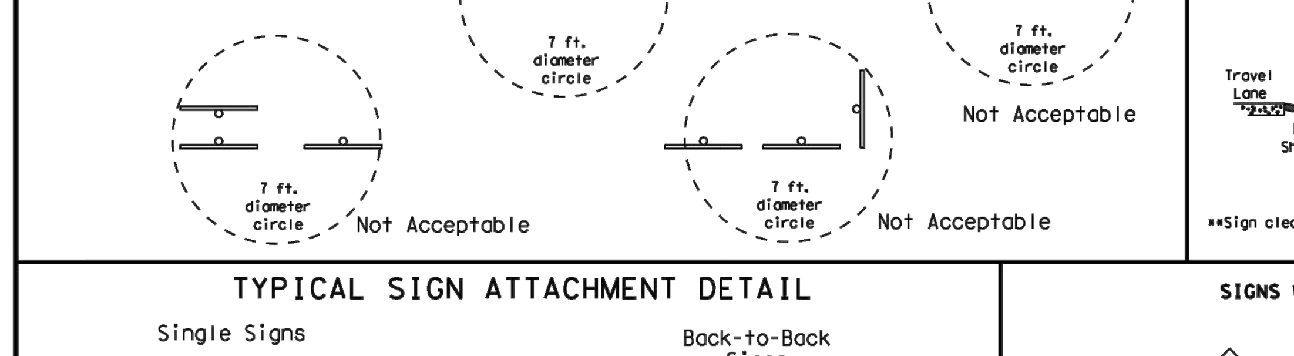
Sign Mounting Designation
- P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
- T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
- U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
- IF REQUIRED
- 1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
- BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
- WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
- EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-3))

REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT

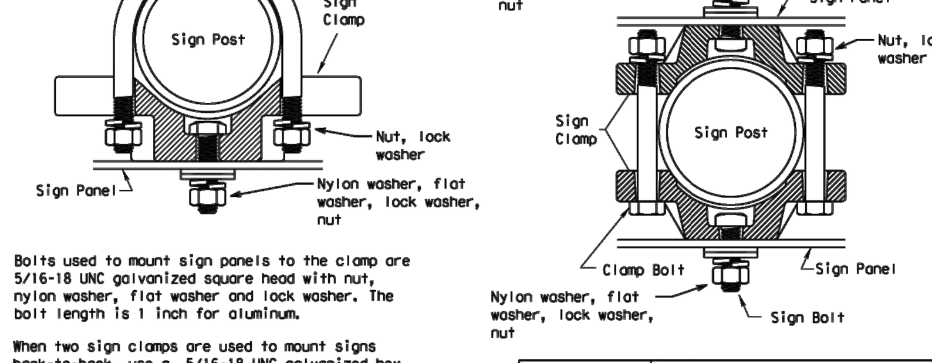


To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

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



TYPICAL SIGN ATTACHMENT DETAIL



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

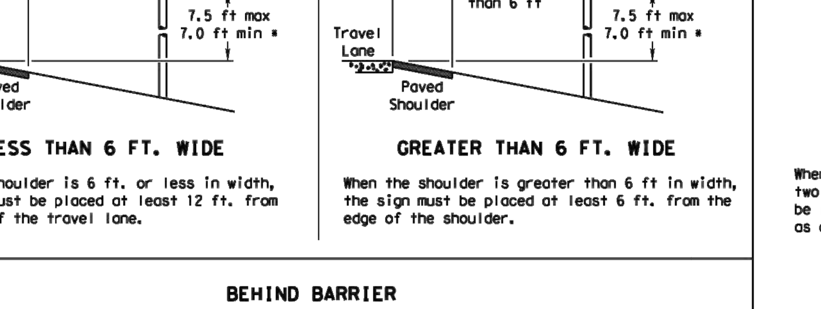
When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

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

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

SIGN LOCATION

PAVED SHOULDERS



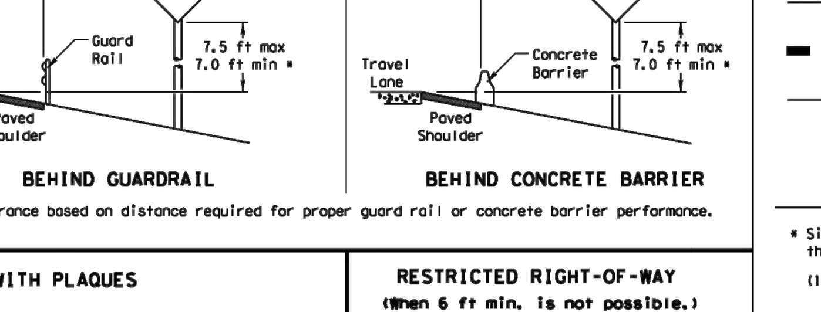
LESS THAN 6 FT. WIDE

When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.

GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

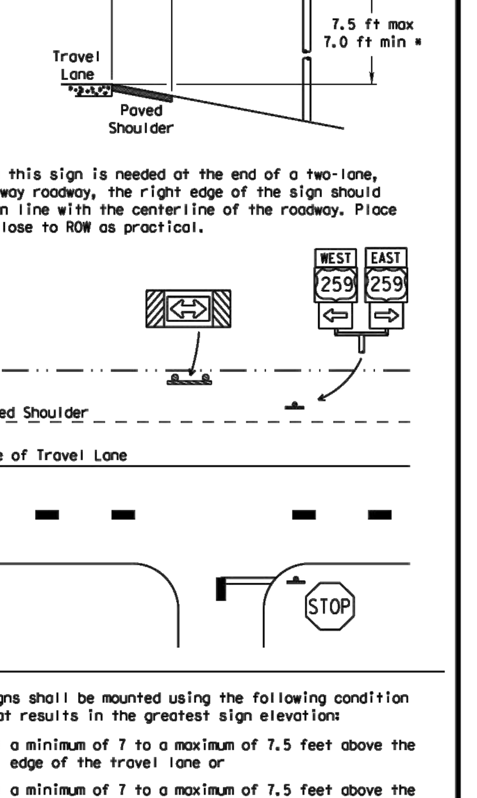
BEHIND BARRIER



BEHIND GUARDRAIL — **BEHIND CONCRETE BARRIER**

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

T-INTERSECTION



When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.

* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

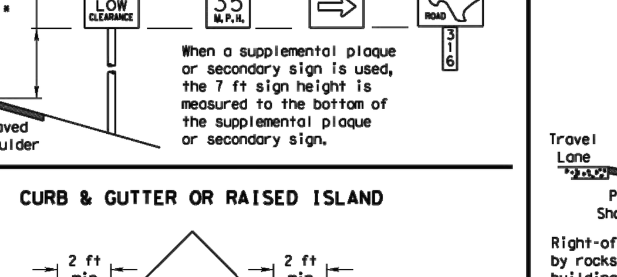
(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

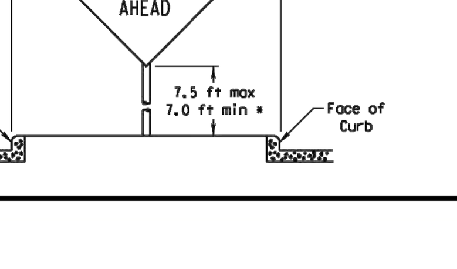
The website address is: http://www.txdot.gov/publications/traffic.htm

SIGNS WITH PLAQUES

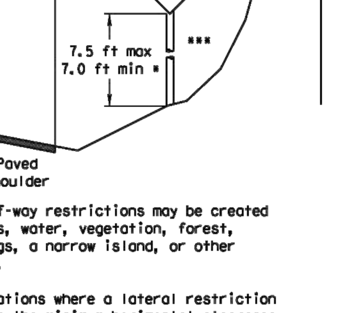


When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



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



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

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

Texas Department of Transportation — Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

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26A

DATE:
FILE:

MARK	REVISION	DATE

\\KSA.NET\GATEWAY\PROJECTS\VTH004\008 CAD\30 SHEETS\02 CIVIL\ VTH004-C-DT-MISC-1.DWG | TXDOT DETAILS III | 2/22/2024 - 9:55 AM
DRAWING PATHNAME | LAYOUT | PLOT DATE - TIME

PROJECT TITLE: THE HILLS DRIVE WALKING TRAIL EXTENSION - CITY VILLAGE OF THE HILLS, TEXAS

SHEET NAME:
TXDOT DETAILS III

PROJECT NAME:
VILLAGE OF THE HILLS, TEXAS CONTINUATION OF WALKING TRAIL PHASE 4

DRAWN BY:	BG
DESIGNED BY:	JD, GC
LATEST REVISION:	9/20/2021
KSA JOB NO.:	VTH004

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STATE OF TEXAS
2-29-2024
GRAYSON M. COX
111345
LICENSED PROFESSIONAL ENGINEER

TBPE Firm Registration No. F-1356

SHEET NO.
C12

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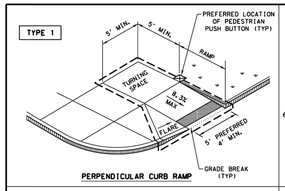
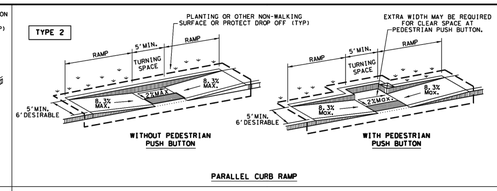
TYPE 1



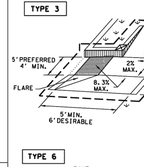
PERPENDICULAR CURB RAMP

TYPE 2

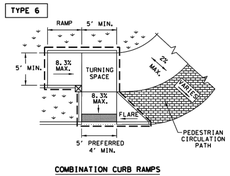


PARALLEL CURB RAMP

TYPE 3

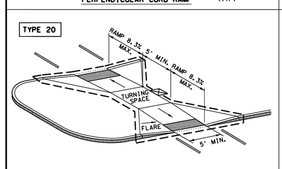


TYPE 6



COMBINATION CURB RAMPS

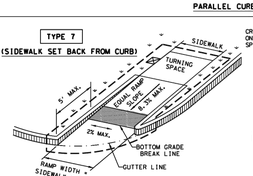
TYPE 20



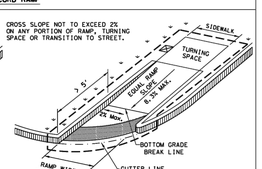
CURB RAMPS AT MEDIAN ISLANDS

TYPE 7

(SIDEWALK SET BACK FROM CURB)

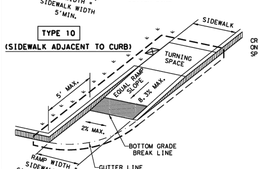


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.

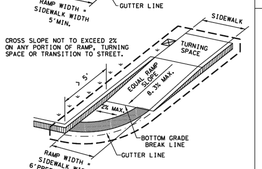


TYPE 10

(SIDEWALK ADJACENT TO CURB)

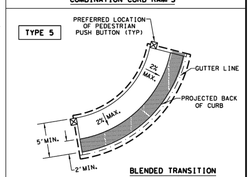


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



DIRECTIONAL RAMPS WITHIN RADIUS

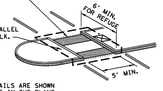
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

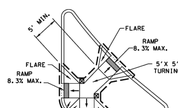
TYPE 21

INSTALL DETECTABLE WARNING SURFACE AT EACH END OF THE CUT-THROUGH RAMP WITH A MINIMUM 2' USUAL SIDEWALK SURFACE BETWEEN. IF MEDIAN IS LESS THAN 6' WIDE, ELIMINATE DETECTABLE WARNING SURFACES.



NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS

TYPICAL SECTION OF PERPENDICULAR CURB RAMP AT CONNECTION TO ROADWAY

NOTES / LEGEND:

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

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

DETECTABLE WARNING SURFACE

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

GUTTER LINE

GRADE BREAK

RAMP LIMITS OF PAYMENT

SHEET 1 OF 4

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18		DN: TxDOT	CK: VP	DW: VP	CK: KM	CK: PK & JG
	TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS						
REVISED 08.2005		DIST	COUNTY			SHEET NO.
REVISED 08.2010						
REVISED 07.2014						

DATE:
FILE:

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

DETECTABLE WARNING MATERIAL

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

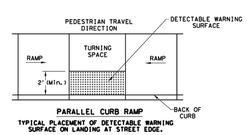
DETECTABLE WARNING PAVERS (IF USED)

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

SIDEWALKS

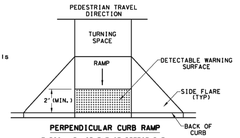
27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.
28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items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

DETECTABLE WARNING SURFACE DETAILS



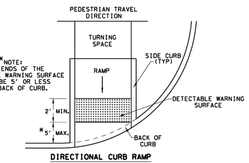
PARALLEL CURB RAMP

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



PERPENDICULAR CURB RAMP

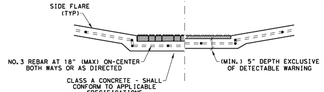
TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.



DIRECTIONAL CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.

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



SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

SHEET 2 OF 4

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18		DN: TxDOT	CK: VP	DW: VP	CK: KM	CK: PK & JG
	TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS						
REVISED 08.2005		DIST	COUNTY			SHEET NO.
REVISED 08.2010						
REVISED 07.2014						

DATE:
FILE:

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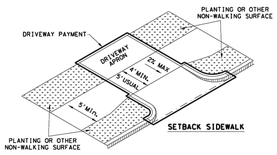
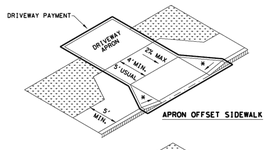
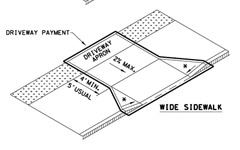
SIDEWALK TREATMENT AT DRIVEWAYS



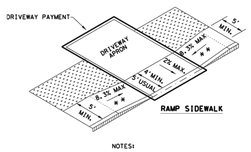
SETBACK SIDEWALK



APRON OFFSET SIDEWALK

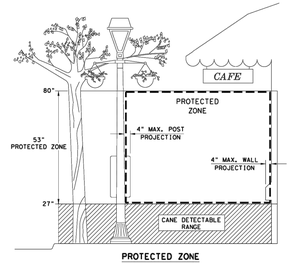


WIDE SIDEWALK



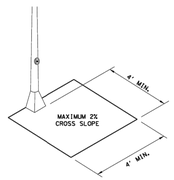
RAMP SIDEWALK

NOTES:
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.
* * IF CURB HEIGHT IS GREATER THAN 6 INCHES, USE GRADE LESS THAN OR EQUAL TO 5%. HANDRAIL AND DETECTABLE WARNING ARE NOT REQUIRED.

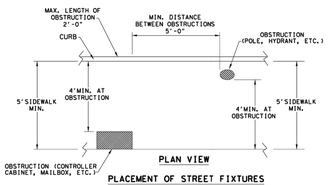


PROTECTED ZONE

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



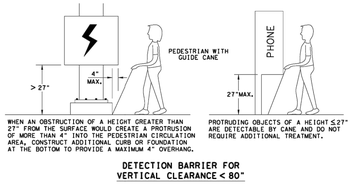
CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



PLAN VIEW

PLACEMENT OF STREET FIXTURES

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



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

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

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

SHEET 3 OF 4

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18		DN: TxDOT	CK: VP	DW: VP	CK: KM	CK: PK & JG
	TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS						
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REVISED 08.2010						
REVISED 07.2014						

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FILE:

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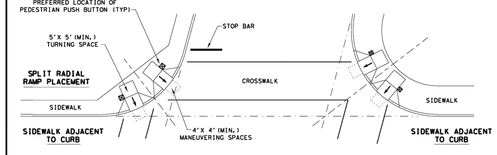
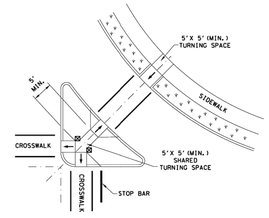
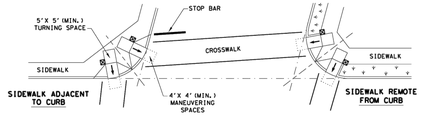
TYPICAL CROSSING LAYOUTS
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



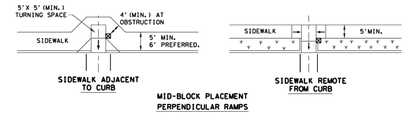
SKEWED INTERSECTION WITH "LARGE" RADIUS



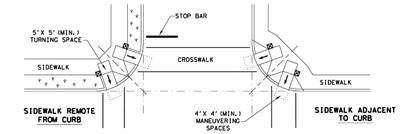
AT INTERSECTION W/FREE RIGHT TURN & ISLAND



SKEWED INTERSECTION WITH "SMALL" RADIUS



MID-BLOCK PLACEMENT PERPENDICULAR RAMPS



NORMAL INTERSECTION WITH "SMALL" RADIUS

LEGEND:

SHOWS DOWNWARD SLOPE.

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

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

SHEET 4 OF 4

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18		DN: TxDOT	CK: VP	DW: VP	CK: KM	CK: PK & JG
	TxDOT: MARCH, 2002	CONT	SECT	JOB		HIGHWAY
REVISIONS						
REVISED 08.2005		DIST	COUNTY			SHEET NO.
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REVISED 07.2014						

MARK	REVISION	DATE

\\KSA.NET\GATEWAY\PROJECTS\VTH004\008 CAD\3D SHEETS\02 CIVIL\VTH004-C-DT-MISC-1.DWG | TXDOT DETAILS IV | 2/20/2021 | 2:47:08 PM | DRAWING PATHNAME | LAYOUT | PLOT DATE - TIME

PROJECT TITLE: THE HILLS DRIVE WALKING TRAIL EXTENSION - CITY VILLAGE OF THE HILLS, TEXAS

TXDOT DETAILS IV

SHEET NAME:

VILLAGE OF THE HILLS, TEXAS CONTINUATION OF WALKING TRAIL PHASE 4

PROJECT NAME:

DRAWN BY:	DESIGNED BY:	LATEST REVISION:	KSA JOB NO.:
BG	JD, GC	9/20/2021	VTH004

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STATE OF TEXAS
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TBPE Firm Registration No. F-1356

SHEET NO.

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DATE:
FILE:

Warning Sign Sequence In Opposite Direction Same as Below

R1-2 40" X 40" X 40"

TO ONCOMING TRAFFIC

R1-2aP 48" X 36" (See note 8)

END ROAD WORK G20-2 48" X 24"

100' Approx. Taper Length

150' Min.

Channelizing devices separate work space from traveled way

Work Space

Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. (See notes 5 & 6)

30' Min.

50' Max. 100' Max. 20' spacing

R1-2 40" X 42" X 42"

TO ONCOMING TRAFFIC

R1-2aP 48" X 36" (See note 8)

W3-2 48" X 48"

ONE LANE ROAD AHEAD

W20-4D 48" X 48"

ROAD WORK AHEAD

W20-1D 48" X 48" (Flags- See note 1)

TCP (1-2a)

ONE LANE TWO-WAY CONTROL WITH YIELD SIGNS

(Less than 2000 ADT - See note 7)

W3-4 48" X 48" (See note 2)

BE PREPARED TO STOP

W20-7 48" X 48"

W16-2P 24" X 18" (See note 2)

XXX FEET

Except in emergencies, flagger stations shall be illuminated at night

1000' Approx. Taper Length 70' Work Zone

150' Min.

100' Min. Work Space

W20-7 48" X 48"

W16-2P 24" X 18" (See note 2)

BE PREPARED TO STOP

W3-4 48" X 48" (See note 2)

ONE LANE ROAD AHEAD

W20-4D 48" X 48"

ROAD WORK AHEAD

W20-1D 48" X 48" (Flags- See note 1)

END ROAD WORK G20-2 48" X 24"

TCP (1-2b)

ONE LANE TWO-WAY CONTROL WITH FLAGGERS

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

Posted Speed M	Formula	Minimum Desirable Taper Lengths K K 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Tangent	On a Tangent	Minimum Sign Spacing Distance	Suggested Longitudinal Buffer Space	Shopping Sign Distance
30		150'	165'	180'	30'	60'	120'	90'	200'
35	L = WS² / 60	205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45		450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55	L = WS	550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

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

TYPICAL USAGE

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

GENERAL NOTES

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

TCP (1-2a)

7. R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work spaces should be no longer than one half city block. In rural areas on roadways with less than 2000 ADT, work spaces should be no longer than 1 mile.
8. R1-2 "YIELD" sign with R1-2aP "TO ONCOMING TRAFFIC" plaque shall be placed on a support at a 7 foot minimum mounting height.

TCP (1-2b)

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

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(1-2)-18

FILE:	tcp1-2-18.dgn	DN:	CK:	DW:	CK:
©TxDOT	December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS					
4-98	4-03				
2-98	2-10	DIST	COUNTY		SHEET NO.
1-97	2-18				

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DATE:
FILE:

BE PREPARED TO STOP

W3-4 48" X 48"

W20-7 48" X 48"

For either TCP(1-3a) or TCP(1-3b)

USE ONLY WHEN FLAGGERS CONTROL TRAFFIC
(See Notes 2 & 3)

W20-1D 48" X 48" (Flags- See note 1)

ROAD WORK AHEAD

W20-1D 48" X 48" (Flags- See note 1)

W1-4R 48" X 48"

W13-1P 24" X 24" (See note 2)

XX MPH

END ROAD WORK G20-2 48" X 24"

W1-6aT 36" X 36"

W1-4L 48" X 48"

W13-1P 24" X 24" (See note 2)

W1-6aT 36" X 36" (See note 2)

Shoulder

1/2 L

L

W

100' Approx.

30' Min.

Work Space

Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. (See notes 6 & 7)

Flagger as needed (See note 3)

W1-4L 48" X 48"

W13-1P 24" X 24" (See note 2)

W1-6aT 36" X 36" (See note 2)

W1-4L 48" X 48"

W13-1P 24" X 24" (See note 2)

W1-6aT 36" X 36" (See note 2)

ROAD WORK AHEAD

W20-1D 48" X 48" (Flags- See note 1)

G20-2 48" X 24"

TCP (1-3a)

2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED ADEQUATE FIELD OF VIEW

W20-1D 48" X 48" (Flags- See note 1)

W20-7 48" X 48"

W1-4R 48" X 48"

W13-1P 24" X 24" (See note 2)

XX MPH

END ROAD WORK G20-2 48" X 24"

W1-6aT 36" X 36"

Shoulder

L

W

100' Approx.

30' Min.

Work Space

Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. (See notes 5 & 6)

Channelizing devices placed across closed lane (See note 5)

W1-4L 48" X 48"

W13-1P 24" X 24" (See note 2)

W1-6aT 36" X 36" (See note 2)

W1-4L 48" X 48"

W13-1P 24" X 24" (See note 2)

W1-6aT 36" X 36" (See note 2)

ROAD WORK AHEAD

W20-1D 48" X 48" (Flags- See note 1)

G20-2 48" X 24"

TCP (1-3b)

2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED INADEQUATE FIELD OF VIEW

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

Posted Speed M	Formula	Minimum Desirable Taper Lengths K K 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Tangent	On a Tangent	Minimum Sign Spacing Distance	Suggested Longitudinal Buffer Space
30		150'	165'	180'	30'	60'	120'	90'
35	L = WS² / 60	205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45		450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55	L = WS	550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

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

TYPICAL USAGE

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

GENERAL NOTES

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

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO LANE ROADS

TCP(1-3)-18

FILE:	tcp1-3-18.dgn	DN:	CK:	DW:	CK:
©TxDOT	December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS					
2-94	4-98				
8-95	2-10	DIST	COUNTY		SHEET NO.
1-97	2-18				

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DATE:
FILE:

Shoulder

5' max. (See General Note 1)

24" White crosswalk lines

24" White stop line

Center of crosswalk line to lane line

Center of crosswalk line to center of travel lane

4' min.

6' min.

Center of crosswalk line to shoulder line (if shoulder is present)

Shoulder

HIGH-VISIBILITY LONGITUDINAL CROSSWALK AT CONTROLLED APPROACH

GENERAL NOTES

1. Longitudinal crosswalk lines should not be placed in the wheel path of vehicles. Center the crosswalk lines on travel lanes, lane lines, and shoulder lines (if present).
2. A minimum 6' clear distance shall be provided to the curb face. If the last crosswalk line falls into this distance it must be omitted.
3. For divided roadways, adjustments in spacing of the crosswalk lines should be made in the median so that the crosswalk lines are maintained in their proper location across the travel portion of the roadway.
4. At skewed crosswalks, the crosswalk lines are to remain parallel to the lane lines.
5. Each crosswalk shall be a minimum of 6' wide.
6. The High-Visibility Longitudinal Crosswalk is the preferred crosswalk pattern on State Highways. Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used. All crosswalk designs and dimension shall comply with the "Texas Manual on Uniform Traffic Control Devices."
7. Final placement of Stop Bar and Crosswalk shall be approved by the Engineer in the field.

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

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

See Notes 1 & 2

R1-5b

Shoulder

24" White crosswalk lines

20' - 50'

Center of crosswalk line to lane line

24" White stop line

24" White stop line

Center of crosswalk line to center of travel lane

6' min.

20' - 50'

Center of crosswalk line to shoulder line (if shoulder is present)

Shoulder

R1-5b

See Notes 1 & 2

UNSIGNALIZED MIDBLOCK HIGH-VISIBILITY LONGITUDINAL CROSSWALK

NOTES:

1. Use stop bars with Stop Here For Pedestrians (R1-5b) signs at unsignalized midblock cross walks.
2. Use stop bars with STOP HERE ON RED (R10-6 or R10-6a) signs at mid block crosswalks controlled by traffic signals or pedestrian hybrid beacons.

Texas Department of Transportation — Traffic Safety Division Standard

CROSSWALK PAVEMENT MARKINGS

PM(4)-22A

FILE:	pm-22a.dgn	DN:	CK:	DW:	CK:
©TxDOT	December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS					
6-20					
6-22		DIST	COUNTY		SHEET NO.
12-22					

200

LAST SAVED BY: BGAREMANI

PROJECT TITLE: THE HILLS DRIVE WALKING TRAIL EXTENSION - CITY VILLAGE OF THE HILLS, TEXAS
DRAWING PATHNAME - LAYOUT PLOT DATE - TIME
SHEET NAME:

MARK	REVISION	DATE

\\KSA-NETGATEWAY\PROJECTS\VTH004\008 CAD\3D SHEETS\02 CIVIL\ VTH004-C-DT-MISC-1.DWG | TXDOT DETAILS V

TXDOT DETAILS V

VILLAGE OF THE HILLS, TEXAS
CONTINUATION OF WALKING TRAIL PHASE 4

PROJECT NAME:

DRAWN BY:	DESIGNED BY:	LATEST REVISION	KSA JOB NO.:
BG	JD, GC	9/20/2021	VTH004

KSA
4833 Spicewood Springs Rd., Suite 204
Austin, Texas 78759
T. 512.454.6668 F. 888.224.9418
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STATE OF TEXAS
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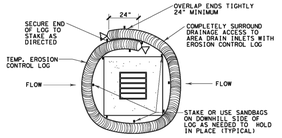
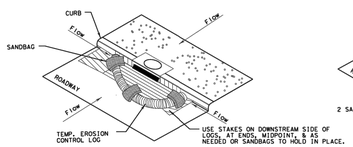
FILE:



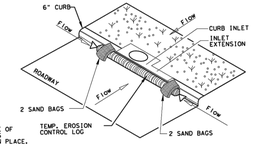
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

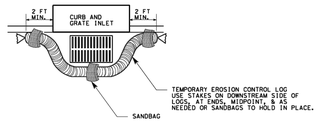
CL-CI



EROSION CONTROL LOG AT CURB INLET

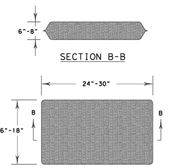
CL-CI

NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.



EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI



SHEET 3 OF 3

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DW: TxDOT	CK: KM	DW: LS/PT	CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO.

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DATE:
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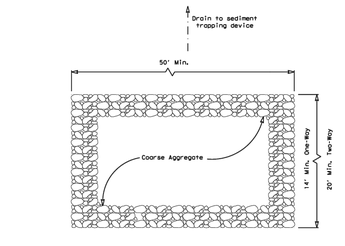
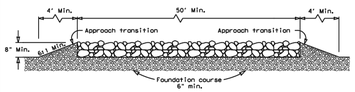


PLAN VIEW



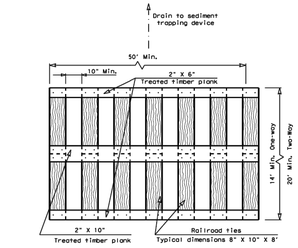
ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

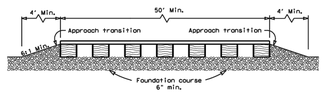
ROCK CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materials approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
7. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.



PLAN VIEW



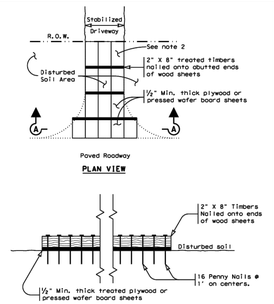
ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.



PLAN VIEW

SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

SHORT TERM

GENERAL NOTES (TYPE 3)

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

CONSTRUCTION EXITS

EC(3)-16

FILE: ec316	DW: TxDOT	CK: KM	DW: VP	CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	6CR	1KS	9JR	81HWY
	DIST	COUNTY		SHEET NO.
	6DST	6CTY	6EC(3)A-1	

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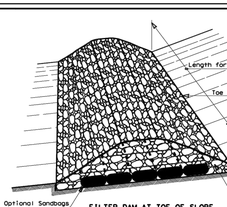
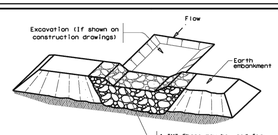
FILE:



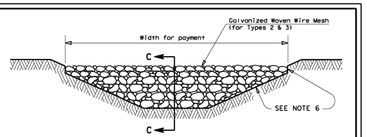
FILTER DAM AT TOE OF SLOPE

RFD1



FILTER DAM AT SEDIMENT TRAP

RFD1 OR RFD2

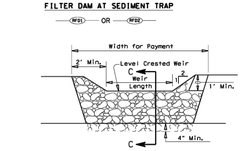


FILTER DAM AT CHANNEL SECTIONS

RFD1 OR RFD2 OR RFD3

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream of drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼".
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.



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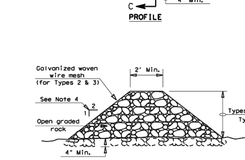
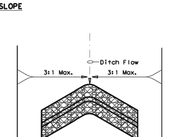
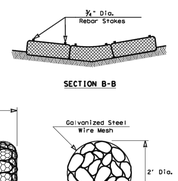


SECTION C-C



PLAN VIEW

SECTION B-B



TYPE 4 (SACK GABIONS)

RFD4

SECTION A-A

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT² of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximately 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.

PLAN SHEET LEGEND

Type 1 Rock Filter Dam — RFD1
Type 2 Rock Filter Dam — RFD2
Type 3 Rock Filter Dam — RFD3
Type 4 Rock Filter Dam — RFD4

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

ROCK FILTER DAMS

EC(2)-16

FILE: ec216	DW: TxDOT	CK: KM	DW: VP	CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO.

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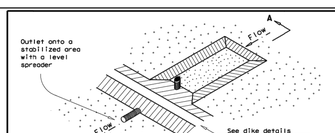
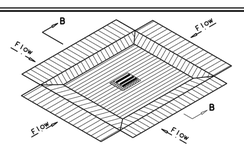


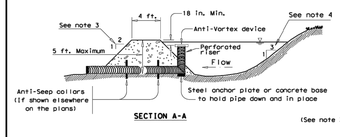
SEDIMENT BASIN AND/OR TRAP WITH PIPE OUTLET



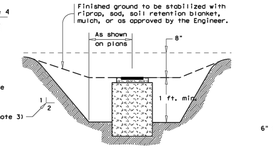
DROP INLET SEDIMENT TRAP

ST-DI

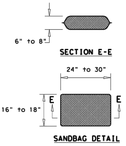
ST/PO



SECTION A-A

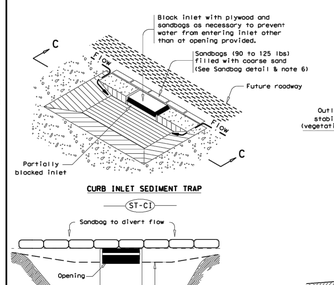


SECTION B-B



SECTION E-E

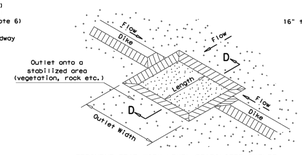
SANDBAG DETAIL



CURB INLET SEDIMENT TRAP

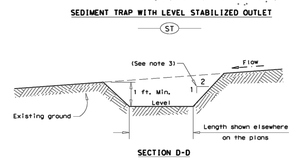
ST-CI

SECTION C-C



SEDIMENT TRAP WITH LEVEL STABILIZED OUTLET

ST



SECTION D-D

GENERAL NOTES

1. Pipe outlet material shall conform to the item "Pipe Underdrains" or as accepted by the Engineer.
2. All pipe connections shall be watertight.
3. Side slopes within the safety clear zone of a roadway shall be 6:1 or flatter. Protect the traveling public from inlet stacks within the clear zone.
4. Sediment basins shall have side slopes of 3:1 or flatter.
5. The dimensions and limits of excavation for sediment basins and traps will be as shown elsewhere on the plans.
6. The sandbag material shall be made of polypropylene, polyethylene or polyamide woven fabric, min. unit weight 4 ounces /SY, Mullen burst strength exceeding 300 psi and ultraviolet stability exceeding 70%.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

SEDIMENT BASIN & TRAP USAGE GUIDELINES

A sediment basin and/or trap may be used to precipitate sediment out of runoff draining from an unstabilized area.

Basins: The drainage area for a sediment basin should not exceed 100 acres. The basin capacity shall be at least 1800 CF/Acre of drainage area (0.5" over the drainage area). If the disturbed area draining to the basin is larger than 10 acres, the basin capacity should be 3600 CF/Acre (1.0" over the drainage area).

The basin should have a 40 hour draw-down time with an emergency spillway. The spillway may be designed to pass the peak rate of runoff from a 25 year frequency storm. The 100 year storm should be investigated to consider possible flooding impacts.

The entrance into the basin should be protected from erosion. The basin should be cleaned when the capacity has been reduced by 1/3.

Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Sediment traps should be placed in the following locations:
1. Within drainage ditches spaced ≠ 500'± on center
2. Immediately preceding ditch inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way

The trap outlet may either be through a perforated riser and pipe assembly designed to achieve a 40 hour draw-down time or over a level stabilized area (vegetation, rock, etc.).

The trap should be cleaned when the capacity has been reduced by ½ or the sediment has accumulated to a depth of 1', whichever is less.

PLANS SHEET LEGEND

ST/PO — Sediment Basin and / or Trap with Pipe Outlet
ST-DI — Drop Inlet Sediment Trap
ST-CI — Curb Inlet Sediment Trap
ST — Sediment Trap with Level Stabilized Outlet

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

SEDIMENT BASINS AND TRAPS (EARTHWORK FOR EROSION CONTROL)

EC(6)-16

FILE: ec616	DW: TxDOT	CK: KM	DW: VP	CK: LS
©TxDOT: JULY 2016	CONT	SECT	JOB	HIGHWAY
REVISIONS	DIST	COUNTY		SHEET NO.

LAST SAVED BY: BGAREMANI

	REVISION	DATE
MARK		

1)KSA:NETGATEWAY\PROJECTS\VTH004008 CAD\30 SHEETS\02 CIVIL\VTH004-C-DT-MISC-1.DWG | TXDOT DETAILS VI | 2/20/2024 | 9:54:11 AM | CDT
DRAWING PATHNAME | LAYOUT | PLOT DATE - TIME

PROJECT TITLE: THE HILLS DRIVE/WALKING TRAIL EXTENSION - CITY VILLAGE OF THE HILLS, TEXAS

TXDOT DETAILS VI

SHEET NAME:

VILLAGE OF THE HILLS, TEXAS CONTINUATION OF WALKING TRAIL PHASE 4

PROJECT NAME:

DRAWN BY:	BG
DESIGNED BY:	JD, GC
LATEST REVISION	9/20/2021
KSA JOB NO.:	VTH004

KSA
4833 Spicewood Springs Rd., Suite 204
Austin, Texas 78759
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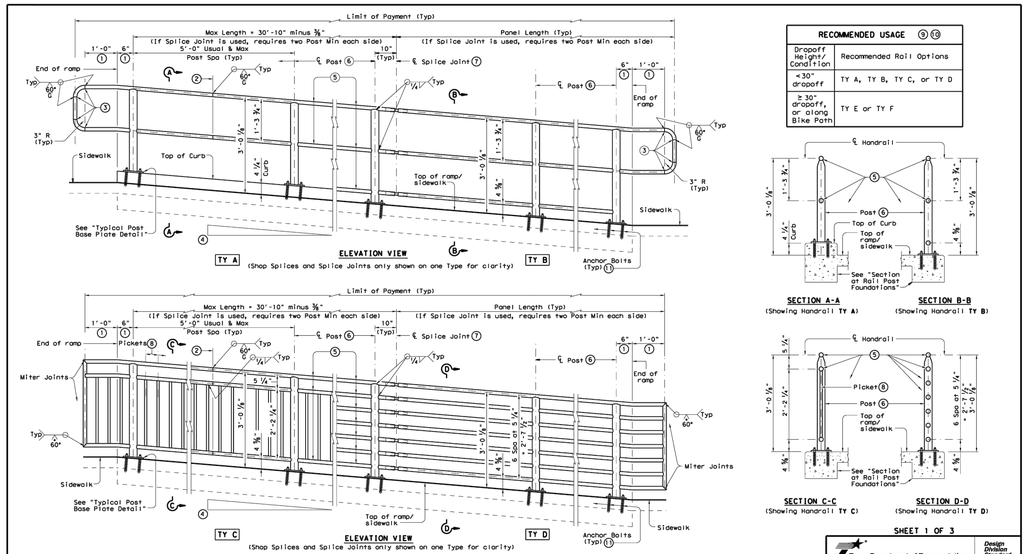
www.ksaeng.com

STATE OF TEXAS
2-29-2024
GRAYSON M. COX
111345
LICENSED
PROFESSIONAL ENGINEER

TBPE Firm Registration No. F-1356

SHEET NO.

C15



RECOMMENDED USAGE ⑨ ⑫	
Dropoff Height/ Condition	Recommended Rail Options
<30" dropoff	TY A, TY B, TY C, or TY D
≥ 30" dropoff, or along Bike Path	TY E or TY F

① Parallel to ground.

② One shop splice per panel is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.

③ Shop splice is permitted with minimum 85 percent penetration. The weld may be square groove or single vee groove. Grind smooth.

④ See Ramp Details located elsewhere in plans for ramp slope and dimensions. Maximum ramp slope will not exceed 8.3 percent. Level landing required for each 30" rise if grade exceeds 5 percent.

⑤ 1 ½" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp / sidewalk. Provide holes as needed in 1 ½" Dia. pipe for galvanizing drainage and venting.

⑥ 2 ½" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). See "Post Mount Detail" for crimping and trimming post to fit Dia. of top rail. Provide holes as needed in post for galvanizing drainage and venting. Plumb all posts.

⑦ See "Handrail Fabrication Details" for Splice Joints.

⑧ ℄ ⅜" Dia. Round Bar equal spacing at 4 ½" Max. Plumb all pickets.

⑨ When needed for accessibility (grade > 5 percent) or as needed for pedestrian safety.

⑫ Not to be used on bridges.

⑪ See "General Notes" for anchor bolt information.

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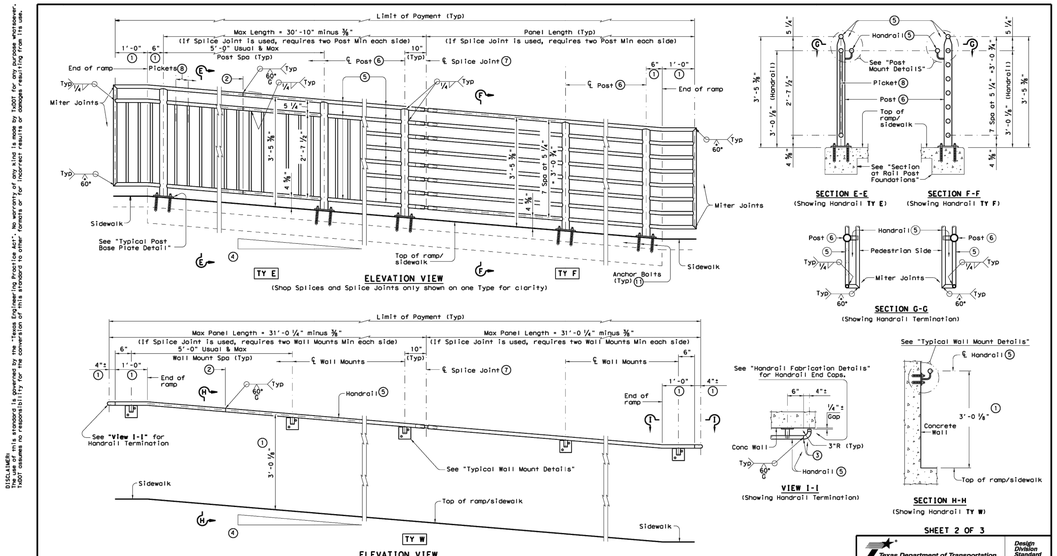

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⑦ See "Handrail Fabrication Details" for Splice Joints.

⑧ ℄ ⅜" Dia. Round Bar equal spacing at 4 ½" Max. Plumb all pickets.

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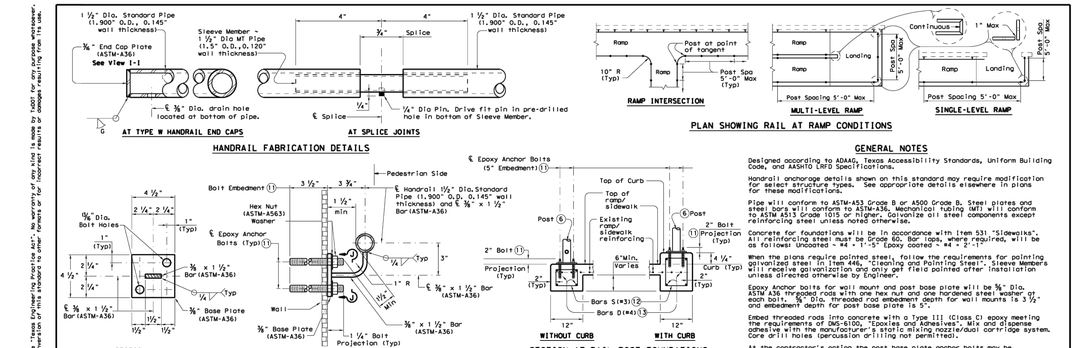

⑤ 1 ½" Dia. Standard Pipe (1.900" O.D., 0.145" wall thickness). Parallel to ramp/sidewalk. Provide holes as needed in 1 ½" Dia. pipe for galvanizing drainage and venting.

⑥ 2 ½" Dia. Standard Pipe (2.875" O.D., 0.203" wall thickness). Plumb all posts. See "Post Mount Detail" for crimping and trimming post to fit the diameter of top rail. Provide holes as needed in post for galvanizing drainage and venting.

⑪ See "General Notes" for anchor bolt information.

⑫ Bars S(#3) spaced at 12" Max (Spaced 3" from outside edge of overall length of Ramp/Sidewalk).

⑬ Provide 1 ½" end cover to Bars D(#4) from outside edge of overall length of Ramp/Sidewalk.

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GENERAL NOTES

Designed according to ADAAG, Texas Accessibility Standards, Uniform Building Code, and AASHTO LRFD Specifications.

Handrail anchorage details shown on this standard may require modification for select structure types. See appropriate details elsewhere in plans for these modifications.

Pipe will conform to ASTM-A53 Grade B or A500 Grade B. Steel plates and steel bar will conform to ASTM-A36. Mechanical tubing (MT) will conform to ASTM-A513 Grade 1010 or higher. Galvanize all steel components except reinforcing steel unless noted otherwise.

Concrete for foundations will be in accordance with Item 531 "Sidewalks". All reinforcing steel must be Grade 60. Bar laps, where required, will be as follows: Uncoated - #4 - 1'-5" Epoxy coated - #4 - 2'-1"

When the plans require painted steel, follow the requirements for painting galvanized steel in Item 446, "Cleaning and Painting Steel". Sleeve Members will receive galvanization and only get field painted after installation unless directed otherwise by Engineer.

Epoxy Anchor bolts for wall mount and post base plate will be ⅝" Dia. ASTM A36 threaded rods with one hex nut and one hardened steel washer at each bolt. ⅝" Dia. holes for rods, forward and embedment depth for wall mounts is 3 ½", and embedment depth for post base plate is 9".

Embed threaded rods into concrete with a Type III (Class C) epoxy meeting the requirements of DMS-6100, "Epoxies and Adhesives". Mix and dispense adhesive with the manufacturer's static mixing nozzle/dual cartridge system. Core drill holes (percussion drilling not permitted).

At the contractor's option the post base plate anchor bolts may be cast with the Ramp/Sidewalk (See Cast-in-Place Anchor Bolt Options).

Optional cast-in-place anchor bolts will be ⅝" Dia ASTM A307 Grade A bolts (or A36 threaded rods with one hex welded hex nut each) with one hex nut and one hardened steel washer at each bolt. Embedment depth of cast-in-place bolt will be 8" for post base plate.

Handrails and any wall or other surface adjacent to them will be free of any sharp or abrasive elements.

Submit shop drawings to the Engineer unless otherwise noted, for curved handrail applications, fabricate the handrail to the curve if radius is less than 600 ft. Shop drawings are required when rail is fabricated to the curve.

For all handrails, erection drawings will be submitted to the Engineer for approval to ensure proper installation.

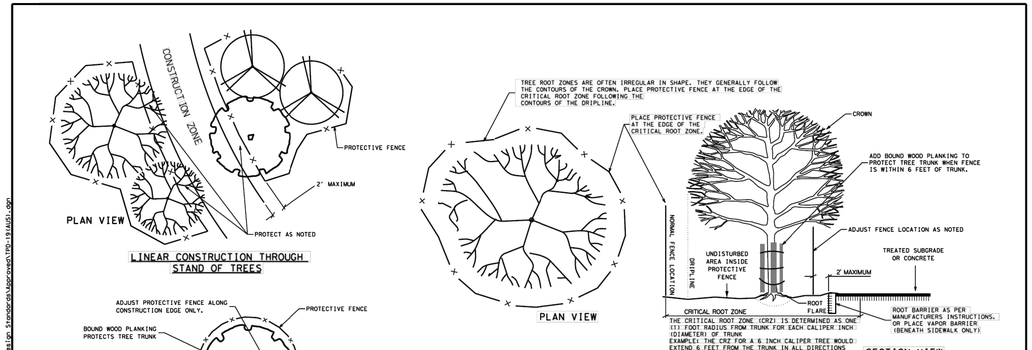
Drawings will show handrail mount locations with bolts setting, spacing, ramp slope, and/or splice joint locations, and handrail lengths with identification showing where each handrail goes on the layout.

Payment for concrete sidewalks or curb ramps will be paid for in accordance with Item 531 "Sidewalks".

Payment for all items shown is to be included in unit price bid in accordance with Item 450 "Railing" of the type specified.

All exposed edges will be rounded or chamfered to approximately ¼" by grinding.

SHEET 3 OF 3
PEDESTRIAN HANDRAIL DETAILS
PRD-13
Texas Department of Transportation
Design Division Standard



NOTES:

CRITICAL ROOT ZONE IS 1 FT. AWAY FROM TREE TRUNK FOR EVERY 1 IN. OF TREE DIAMETER MEASURED AT 4 FT. HEIGHT.

WATER TREES EVERY 2 WEEKS WITH A MINIMUM OF 100 GALLONS PER TREE.

SPRAY TREE WITH WATER TO REMOVE CONSTRUCTION DUST WHEN DIRECTED.

CONSTRUCTION FENCE SHALL BE 4 FT. TALL.

DO NOT PERFORM WORK OR STORE EQUIPMENT WITHIN PROTECTED AREA.

COVER THE CRITICAL ROOT ZONE BETWEEN THE PROTECTED AREA AND THE CONSTRUCTION ZONE WITH 4 IN. OF MULCH

PERFORM TREE TRIMMING AND WOUND REPAIR PER STANDARD SPECIFICATIONS.

DAMAGED AND EXPOSED ROOTS SHALL BE TRIMMED AND TREATED PER STANDARD SPECIFICATIONS. BACKFILL EXPOSED ROOTS WITH TOPSOIL WITHIN 24 HOURS OF EXPOSURE.

PLACE PLASTIC UNDER CONCRETE PLACED IN THE CRITICAL ROOT ZONE.

PLACE A ROOT BARRIER IN THE CRITICAL ROOT ZONE AT THE EDGE OF TREATED SUBGRADE TO THE DEPTH OF THE SUBGRADE.

ALL WORK IS SUBSIDIARY TO BID ITEM.

Texas Department of Transportation
Austin District Standard
TREE PROTECTION DETAILS
TPD-19(AUS)

FILE: tpd19aus.dgn	DW: TxDOT	CK: AM	DW: JTR	CK: CSL
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			DATE
MARK	REVISION		DATE

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PROJECT TITLE: THE HILLS DRIVE WALKING TRAIL EXTENSION - CITY VILLAGE OF THE HILLS, TEXAS

TXDOT DETAILS VII

SHEET NAME:

VILLAGE OF THE HILLS, TEXAS
CONTINUATION OF WALKING TRAIL PHASE 4

PROJECT NAME:

DRAWN BY:	BG
DESIGNED BY:	JD, GC
LATEST REVISION	9/20/2021
KSA JOB NO.:	VTH004

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STATE OF TEXAS
9-29-2024
GRAYSON M. COX
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TBPE Firm Registration No. F-1356

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