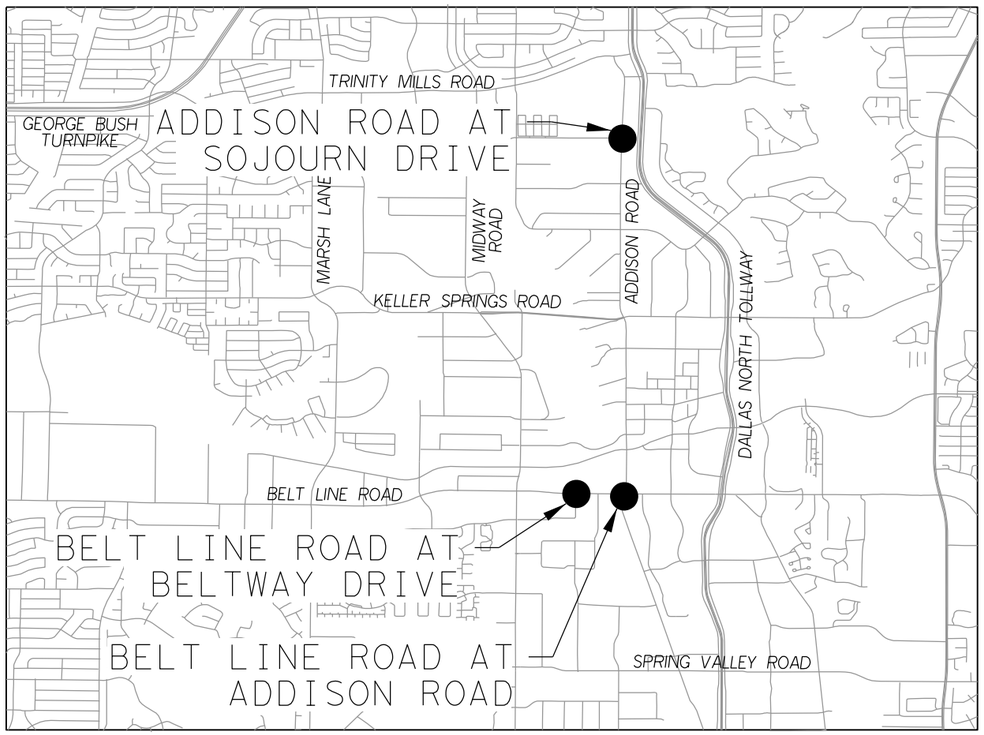
TOWN OF ADDISON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

TRAFFIC SIGNAL AND ADA IMPROVEMENTS

ROAD: VARIOUS
DALLAS COUNTY
PROJECT NO. = 2021-10-C
BID NO. = 22-133

INDEX OF DRAWINGS



LOCATION MAP

SPECIFICATIONS ADOPTED BY THE TEXAS DEPARTMENT OF TRANSPORTATION, NOVEMBER 1, 2014, AND THE CONTRACT PROVISIONS LISTED AND DATED AS FOLLOWS SHALL GOVERN ON THIS PROJECT: REQUIRED CONTRACT PROVISIONS FOR ALL FEDERAL-AID CONSTRUCTION CONTRACTS (FORM FHWA 1273, MAY 1, 2012)

JUNE 2022

LEGEND

● PROJECT INTERSECTION

PLANS PREPARED BY:

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CONTACT: THOMAS HARTMANN, P.E.

6/6/2022

STATE OF TEXAS
THOMAS W HARTMANN
109948
LICENSED
PROFESSIONAL ENGINEER

Owner:

Town of Addison, Texas
Addison Service Center
16801 Westgrove Drive
Addison, TX 75001
972.450.2871

Mayor Joe Chow

Councilmember Kathryn Wheeler
Councilmember Lori Ward
Councilmember Tom Braun
Councilmember Darren Gardner
Councilmember Guillermo Quintanilla
Councilmember Eileen Resnik

City Manager Wesley S. Pierson

Director of Public Works & Engineering
Shannon Hicks, P.E.

RECOMMENDED FOR LETTING: DATE:

DIRECTOR OF PUBLIC WORKS & ENGINEERING

TIME: 11:03:46 AM
DATE: 6/6/2022
FILENAME: K:\DAL*TPTO\project\063543039 - Addison Signal Construction Support\CADD\Addison (Cover) - Belt Line.dgn

ITEM NO.	TxDOT Item	TxDOT Code	DESCRIPTION	UNIT	BID QUANTITY			
					BEGIN TO END	BELT LINE ROAD & ADDISON ROAD	BELT LINE ROAD & BELTWAY DRIVE	ADDISON ROAD & SOJOURN DRIVE
BASE BID - ITEMS								
1	160	6004	FURNISHING AND PLACING TOPSOIL (6")	SY	36	25		11
2	162	6002	BLOCK SODDING	SY	36	25		11
3	416	6031	DRILL SHAFT (TRF SIG POLE)	LF	33		11	22
4	416	6032	DRILL SHAFT (TRF SIG POLE)	LF	39		26	13
5	416	6034	DRILL SHAFT (TRF SIG POLE)	LF	66	66		
6	500	6001	MOBILIZATION (MAX 5% PER TOWN OF ADDISON)	LS	1	0.33	0.33	0.33
7	479	6001	ADJUSTING MANHOLES	LS	1	1		
8	502	6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	6	2	2	2
9	529	6002	CONC CURB (TY II)	LF	32			32
10	531	6003	CONC SIDEWALKS (6")	SY	82	39	10	33
11	531	6010	CURB RAMPS (TY 7)	EA	17	8	1	8
12	618	6023	CONDT (PVC) (SCH 40) (2")	LF	290	195	60	35
13	618	6024	CONDT (PVC) (SCH 40) (2")	LF	225	225		
14	618	6029	CONDT (PVC) (SCH 40) (3")	LF	465	210	185	70
15	618	6033	CONDT (PVC) (SCH 40) (4")	LF	125	60	40	25
16	618	6034	CONDT (PVC) (SCH 40) (4")	LF	940	475	320	145
17	618	6046	CONDT (PVC) (SCH 80) (2")	LF	40	10	10	20
18	620	6009	ELEC CONDR (NO.6) BARE	LF	1795	880	535	380
19	620	6010	ELEC CONDR (NO.6) INSULATED	LF	90	30	30	30
20	624	6008	GROUND BOX TY C	EA	16	5	6	5
21	624	6028	REMOVE GROUND BOX	EA	6	1		5
22	628	6144	ELC SRV TY D 120/240 060(NS)SS(E)PS(U)	EA	3	1	1	1
23	666	6035	REFL PAV MRK TY I	LF	45			45
24	666	6041	REFL PAV MRK TY I	LF	925	430		495
25	666	6047	REFL PAV MRK TY I (W)24"(SLD)(090MIL)	LF	195	55		140
26	666	6224	PAVEMENT SEALER 4"	LF	8	8		
27	666	6226	PAVEMENT SEALER 8"	LF	45			45
28	666	6228	PAVEMENT SEALER 12"	LF	925	430		495
29	666	6230	PAVEMENT SEALER 24"	LF	195	55		140
30	666	6231	PAVEMENT SEALER (ARROW)	EA	2			2
31	666	6232	PAVEMENT SEALER (WORD)	EA	1			1
32	666	6299	RE PM W/RET REQ TY I (W)4"(BRK)(090MIL)	LF	8	8		
33	668	6077	PREFAB PAV MRK TY C (W)	EA	2			2
34	668	6085	PREFAB PAV MRK TY C (W)	EA	1			1
35	677	6001	ELIM EXT PAV MRK & MRKS (4")	LF	5	5		
36	677	6005	ELIM EXT PAV MRK & MRKS (12")	LF	935	420		515
37	677	6007	ELIM EXT PAV MRK & MRKS (24")	LF	190	55		135
38	677	6008	ELIM EXT PAV MRK & MRKS	EA	2			2
39	678	6001	PAV SURF PREP FOR MRK (4")	LF	8	8		
40	678	6004	PAV SURF PREP FOR MRK (8")	LF	45			45
41	678	6006	PAV SURF PREP FOR MRK (12")	LF	925	430		495
42	678	6008	PAV SURF PREP FOR MRK (24")	LF	195	55		140
43	678	6009	PAV SURF PREP FOR MRK (ARROW)	EA	2			2
44	678	6016	PAV SURF PREP FOR MRK (WORD)	EA	1			1
45	680	6002	INSTALL HWY TRF SIG	EA	3	1	1	1
46	680	6004	REMOVING TRAFFIC SIGNALS	EA	3	1	1	1
47	682	6001	VEH SIG SEC (12")LED(GRN)	EA	19	12	2	5
48	682	6002	VEH SIG SEC (12")LED(GRN ARW)	EA	13	7	2	4
49	682	6003	VEH SIG SEC (12")LED(YEL)	EA	25	12	8	5
50	682	6004	VEH SIG SEC (12")LED(YEL ARW)	EA	19	7	4	8
51	682	6005	VEH SIG SEC (12")LED(RED)	EA	25	12	8	5
52	682	6006	VEH SIG SEC (12")LED(RED ARW)	EA	13	7	2	4
53	682	6007	VEH SIG SEC (12")LED(GRN U-TURN ARW)	EA	1		1	
54	682	6008	VEH SIG SEC (12")LED(YEL U-TURN ARW)	EA	2		2	
55	682	6009	VEH SIG SEC (12")LED(RED U-TURN ARW)	EA	1		1	
56	682	6018	PED SIG SEC (LED)(COUNTDOWN)	EA	16	8	4	4
57	682	6023	BACK PLATE (12")(3 SEC)	EA	23	10	8	5

ITEM NO.	TxDOT Item	TxDOT Code	DESCRIPTION	UNIT	BID QUANTITY			
					BEGIN TO END	BELT LINE ROAD & ADDISON ROAD	BELT LINE ROAD & BELTWAY DRIVE	ADDISON ROAD & SOJOURN DRIVE
BASE BID - ITEMS (CONTINUED)								
58	682	6024	BACK PLATE (12")(4 SEC)	EA	13	7	2	4
59	682	6025	BACK PLATE (12")(5 SEC)	EA	2	2		
60	684	6029	TRF SIG CBL (TY A)(14 AWG)(3 CONDR)	LF	1665	750	340	575
61	684	6031	TRF SIG CBL (TY A)(14 AWG)(5 CONDR)	LF	1280	575	340	365
62	684	6033	TRF SIG CBL (TY A)(14 AWG)(7 CONDR)	LF	2785	1485	615	685
63	684	6046	TRF SIG CBL (TY A)(14 AWG)(20 CONDR)	LF	1455	685	315	455
64	684	6079	TRF SIG CBL (TY C)(12 AWG)(2 CONDR)	LF	3010	1315	770	925
65	686	6029	INS TRF SIG PL AM (S)1 ARM(28')	EA	1			1
66	686	6033	INS TRF SIG PL AM(S)1 ARM(32')	EA	1		1	
67	686	6041	INS TRF SIG PL AM(S)1 ARM(40')	EA	1			1
68	686	6049	INS TRF SIG PL AM(S)1 ARM(48')	EA	3	1	2	
69	686	6057	INS TRF SIG PL AM(S)1 ARM(55')	EA	1	1		
70	686	6061	INS TRF SIG PL AM(S)1 ARM(60')	EA	1	1		
71	687	6001	PED POLE ASSEMBLY	EA	10	5	3	2
72	687	6002	PEDESTRIAN PUSH BUTTON POLE	EA	2	1		1
73	688	6001	PED DETECT PUSH BUTTON (APS)	EA	20	8	4	8
74	688	6003	PED DETECTOR CONTROLLER UNIT	EA	3	1	1	1
75	6002	6001	VIVDS PROCESSOR SYSTEM	EA	3	1	1	1
76	6002	6002	VIVDS CAMERA ASSEMBLY	EA	12	4	3	5
77	6002	6005	VIVDS COMMUNICATION CABLE (COAXIAL)	LF	2065	935	460	670
78	6010	6002	CCTV FIELD EQUIPMENT (DIGITAL)	EA	2	1		1
79	6010	6004	CCTV MOUNT (POLE)	EA	2	1		1
80	6089	6002	CAT 5 ETHERNET CABLE	LF	395	185		210
81			VEH SIG SEC (12")LED(BI-MODAL GRN/YEL ARW)	EA	2	2		
82			OPTICOM CABLE	LF	1780	875	450	455
83			TYPE 721 OPTICOM DETECTOR	EA	11	4	3	4
84			TYPE 764 PHASE SELECTOR	EA	3	1	1	1
85			PROJECT SIGN	EA	3	1	1	1
86			RELOCATE FIRE HYDRANT	EA	1	1		
87	432	6003	RIPRAP (CONC)(6 IN)	CY	1			1

BASE BID - ALLOWANCES								
X1			CONTINGENCY CONSTRUCTION APPROVAL ALLOWANCE	LS	1			
X2			PROJECT ALLOWANCE FOR LANDSCAPE IMPROVEMENTS	LS	1			
X3			PROJECT ALLOWANCE FOR IRRIGATION IMPROVEMENTS	LS	1			
X4			PROJECT ALLOWANCE FOR EROSION CONTROL	LS	1			

ALTERNATE BID - PAVERS & MEDIAN NOSE ALTERNATE								
A1	528	6004	LANDSCAPE PAVERS	SY	112	103	9	
A2	104	6001	REMOVING CONC (PAV)	SY	11			11
A3	104	6011	REMOVING CONC (MEDIANS)	SY	67	14		53
A4	104	6021	REMOVING CONC (CURB)	LF	30			30
A5	251	6034	REWORK BS MTL (TY C) (8") (ORD COMP)	SY	53			53
A6	360	6044	CONC PVMT (CONT REINF)(FAST TRK)(12")	SY	53			53
A7	529	6008	CONC CURB & GUTTER (TY II)	LF	56			56
A8	536	6005	CONCRETE MEDIAN (NOSE)	SY	3	3		

6/6/2022

STATE OF TEXAS
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ADDISON

SUMMARY OF QUANTITIES

KHA PROJECT NUMBER: 063543039
SCALE: AS SHOWN
DATE: 6/6/2022

DESIGN	GRAPHICS	CHECK
TWH	LMR	TWH

2

PLOTTED: 6/6/2022
FILENAME: K:\DAL_TPTO\project\063543039 - Addison Signal Construction Support\CADD\Belt Line_SHT_001_Quantities.dgn
$$$SCALE$$$
BY: Lucy.Cunningham

GENERAL NOTES FOR ALL CONSTRUCTION ACTIVITIES

1. ALL CONSTRUCTION, TESTING, AND MATERIALS SHALL BE IN ACCORDANCE WITH THE TOWN'S CURRENT STANDARDS, DETAILS, AND SPECIFICATIONS. IF NOT EXPLICITLY SPECIFIED IN TOWN DOCUMENTS, NCTCOG OR THE APPROPRIATE GOVERNING BODY'S, STANDARDS AND DETAILS SHALL REGULATE CONSTRUCTION, TESTING, AND MATERIALS.

2. CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS PRIOR TO BEGINNING ANY CONSTRUCTION. CONTACT PUBLIC WORKS & ENGINEERING SERVICES DEPARTMENT FOR A PERMIT TO WORK WITHIN TOWN ROW.

3. ALL SHOP DRAWINGS, WORKING DRAWINGS OR OTHER DOCUMENTS WHICH REQUIRE REVIEW BY THE TOWN, SHALL BE SUBMITTED BY THE CONTRACTOR SUFFICIENTLY IN ADVANCE OF SCHEDULED CONSTRUCTION TO ALLOW NO LESS THAN 21 CALENDAR DAYS FOR REVIEW AND RESPONSE BY THE TOWN.

4. CONTRACTOR SHALL NOTIFY THE TOWN AT LEAST 48 HOURS PRIOR TO BEGINNING CONSTRUCTION.

5. CONTRACTORS ARE ALLOWED TO MAKE CONNECTIONS TO THE TOWN WATER SYSTEM BY OPENING AN ACCOUNT THROUGH THE ADDISON FINANCE DEPARTMENT AND RENTING A FIRE HYDRANT METER. THE COMPANY OR INDIVIDUAL IS SOLELY RESPONSIBLE FOR THE COST, MAINTENANCE, PROPER USE, AND SECURITY OF THE RENTAL EQUIPMENT. THE COMPANY OR INDIVIDUAL IS ALSO RESPONSIBLE FOR THE COST OF THE WATER USED.

6. CONTRACTOR MUST KEEP AVAILABLE ONSITE, AT ALL TIMES, APPROVED CONSTRUCTION PLANS AND COPIES OF ANY/ALL REQUIRED PERMITS ALONG WITH THE APPROPRIATE VERSIONS OF THE FOLLOWING APPLICABLE REFERENCES:
   - 6.1. TOWN OF ADDISON ENGINEERING STANDARDS & DETAILS
   - 6.2. NCTCOG STANDARDS & SPECIFICATIONS
   - 6.3. TCEQ STANDARDS & SPECIFICATIONS
   - 6.4. TXDOT SPECIFICATIONS & STANDARD DRAWINGS, AS APPLICABLE.

7. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL REQUIRED CONSTRUCTION SURVEYING AND STAKING AND SHALL NOTIFY THE DESIGN ENGINEER OF ANY DISCREPANCIES PRIOR TO PROCEEDING WITH ANY WORK.

8. CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL SURVEY MARKERS INCLUDING IRON RODS, PROPERTY CORNERS, OR SURVEY MONUMENTS WITHIN THE LIMITS OF CONSTRUCTION AND OUTSIDE ROW DURING CONSTRUCTION. ANY SURVEY MARKERS DISTURBED DURING CONSTRUCTION SHALL BE REPLACED BY THE CONTRACTOR AT NO COST TO THE TOWN.

9. TESTING AND INSPECTION OF MATERIALS SHALL BE PERFORMED BY A COMMERCIAL TESTING LABORATORY SPECIFIED BY OR APPROVED BY THE TOWN. CONTRACTOR SHALL FURNISH MATERIALS OR SPECIMENS FOR TESTING AND SHALL FURNISH SUITABLE EVIDENCE THAT THE MATERIALS PROPOSED TO BE INCORPORATED INTO THE WORK ARE IN ACCORDANCE WITH THE SPECIFICATIONS. COPIES OF TESTING REPORTS SHALL BE FURNISHED TO THE TOWN IMMEDIATELY UPON RECEIPT BY THE CONTRACTOR.

10. FOR PUBLIC PROJECTS, CONTRACTOR SHALL PROVIDE A CONSTRUCTION SCHEDULE AND WEEKLY PROGRESS REPORTS.

11. CONTRACTOR IS RESPONSIBLE FOR KEEPING STREETS AND DRIVEWAYS ADJACENT TO THE PROJECT FREE OF DIRT, MUD, AND DEBRIS AT ALL TIMES. CONTRACTOR SHALL CLEAN UP AND REMOVE ALL LOOSE MATERIAL RESULTING FROM CONSTRUCTION OPERATIONS. THE CONTRACTOR SHALL TAKE ALL AVAILABLE PRECAUTIONS TO CONTROL DUST.

12. THE EXISTENCE AND LOCATIONS OF THE PUBLIC AND FRANCHISE UTILITIES SHOWN ON THE DRAWINGS WERE OBTAINED FROM AVAILABLE RECORDS AND ARE APPROXIMATE. THE CONTRACTOR SHALL DETERMINE THE DEPTH AND LOCATION OF EXISTING UNDERGROUND UTILITIES PRIOR TO EXCAVATING, TRENCHING, OR DRILLING AND SHALL BE REQUIRED TO TAKE ANY PRECAUTIONARY MEASURES TO PROTECT ALL LINES SHOWN AND / OR ANY OTHER UNDERGROUND UTILITIES NOT OF RECORD OR NOT SHOWN ON THE PLANS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL PUBLIC AGENCIES AND FRANCHISE UTILITIES 48 HOURS PRIOR TO CONSTRUCTION. THE CONTRACTOR MAY BE REQUIRED EXPOSE THESE FACILITIES AT NO COST TO THE TOWN. THE CONTRACTOR WILL BE RESPONSIBLE FOR DAMAGES TO UTILITIES IF THE DAMAGE IS CAUSED BY NEGLIGENCE OR FAILURE TO HAVE LOCATES PERFORMED.

13. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING FACILITIES OR ADJACENT PROPERTIES DURING CONSTRUCTION. ANY REMOVAL OR DAMAGE TO EXISTING FACILITIES SHALL BE REPLACED OR REPAIRED TO EQUAL OR BETTER CONDITION BY THE CONTRACTOR.

14. CONTRACTOR SHALL NOT STORE MATERIALS, EQUIPMENT OR OTHER CONSTRUCTION ITEMS ON ADJACENT PROPERTIES OR RIGHT-OF-WAY WITHOUT THE PRIOR WRITTEN CONSENT OF THE PROPERTY OWNER AND/OR THE TOWN, AS APPLICABLE.

15. TEMPORARY FENCING SHALL BE INSTALLED PRIOR TO THE REMOVAL OF EXISTING FENCING. TEMPORARY FENCING SHALL BE REMOVED AFTER PROPOSED FENCING IS APPROVED BY THE TOWN. ALL TEMPORARY AND PROPOSED FENCING LOCATIONS SHALL BE SUBJECT TO FIELD REVISIONS AS DIRECTED BY THE TOWN.

16. UNUSABLE EXCAVATED MATERIAL, OR CONSTRUCTION DEBRIS SHALL BE IMMEDIATELY REMOVED AND DISPOSED OF OFFSITE AT AN APPROVED DISPOSAL FACILITY BY THE CONTRACTOR AT HIS EXPENSE.

17. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN A NEAT AND ACCURATE RECORD OF CONSTRUCTION FOR THE TOWN'S RECORDS.

GENERAL NOTES FOR EROSION CONTROL

1. ALL OPERATORS AND/OR CONTRACTORS SHALL CONFORM TO THE TERMS & CONDITIONS OF THE TCEQ TPDES GENERAL PERMIT NO. 150000.
   - 1.1. THE NOTICE OF INTENT (NOI), AS REQUIRED BY THE GENERAL PERMIT, MUST BE PROPERLY DISPLAYED ON THE SITE AT ALL TIMES BY EACH OPERATOR. A COPY OF THE NOI MUST BE PROVIDED TO THE PUBLIC WORKS & ENGINEERING SERVICES PRIOR TO START OF CONSTRUCTION.
   - 1.2. ALL RELEASES OF REPORTABLE QUANTITIES OF HAZARDOUS SUBSTANCES SHALL BE REPORTED IMMEDIATELY TO THE FACILITY OPERATOR, EPA, AND TCEQ.
   - 1.3. IF ANY CONTRACTOR SEES A VIOLATION BY AN OPERATOR OR ANOTHER CONTRACTOR, THAT OPERATOR OR CONTRACTOR IN VIOLATION SHALL BE NOTIFIED AS WELL AS THE FACILITY OPERATOR.

2. EROSION CONTROL DEVICES SHALL BE INSTALLED ON ALL PROJECTS PRIOR TO ANY SOIL DISTURBANCE AND SHALL BE MAINTAINED THROUGHOUT THE PROJECT IN A CONDITION ACCEPTABLE TO THE TOWN.
   - 2.1. IT SHALL BE THE CONTRACTOR5#32S RESPONSIBILITY TO CONTROL AND LIMIT SILT AND SEIDMENT LEAVING THE SITE. SPECIFICALLY , THE CONTRACTOR SHALL PROTECT ALL PUBLIC STREETS, ALLEYS, STREAMS, AND STORM DRANAGE SYSTEMS FROM EROSION DEPOSITS.
     - 2.1.1. QUALIFIED OPERATOR PERSONNEL MUST INSPECT THE SITE WEEKLY, AND WITHIN 24 HRS (BEFORE AND AFTER) A STORM EVEN OF 0.5 INCHES OR GREATER.
     - 2.1.2. ACCUMULATED SILT DEPOSITS SHALL BE REMOVED FROM SILT FENCES AND HAY BALE DIKES WHEN SILT DEPTH REACHES THREE INCHES (39#32) OF 25% OF THE HEIGHT OF THE DEVICE (WHICHEVER IS LESS). THE SILT SHALL BE DISPOSED OF AT AN APPROVED SITE AND IN SUCH A MANNER SO AS NOT TO CONTRIBUTE TO ADDITIONAL SILTATION.
   - 2.2. THE CONTRACTOR SHALL ADD OR DELETE EROSION PROTECTION AT THE REQUEST AND DIRECTION OF THE OPERATOR OR TOWN.
   - 2.3. MODIFICATIONS TO THE SWPPP SHALL BE IMPLEMENTED AND IN-PLACE WITHIN A SEVEN CALENDAR DAY PERIOD. ANY MAJOR MODIFICATIONS SHALL BE REVIEWED AND APPROVED BY THE DESIGN ENGINEER AND PUBLIC WORKS & ENGINEERING SERVICES PRIOR TO IMPLEMENTATION.

3. CONSTRUCTION ENTRANCES AND WASHOUTS
   - 3.1. ASPHALT BAGS SHALL BE PLACED AT CONSTRUCTION ENTRANCES TO PREVENT CURB DAMAGE.
   - 3.2. GEOTEXTILE FABRIC SHALL BE PLACED ON SUBGRADE PRIOR TO STONE PLACEMENT FOR CONSTRUCTION ENTRANCES.
   - 3.3. NO EQUIPMENT SHALL BE CLEANED ON-SITE, OR OTHER LIQUIDS DEPOSITED AND ALLOWED TO FLOW OVERLAND OR SUBTERRANEAN WITHIN THE LIMITS OF THE CRITICAL ROOT ZONE OF TREES THAT REMAIN ON SITE. THIS INCLUDES PAINT, OIL, SOLVENTS, ASPHALT, CONCRETE, CONCRETE EQUIPMENT WASH WATER, MORTAR OF SIMILAR MATERIALS.

4. WASTE DISPOSAL
   - 4.1. CONTRACTOR SHALL PROVIDE WASTE DISPOSAL CONTAINERS ON THE SITE FOR DISPOSAL OF ALL NON-HAZARDOUS CONSTRUCTION WASTE MATERIALS. THE CONTAINERS SHALL BE HAULED TO THE APPROPRIATE DISPOSAL LOCATION BY THE CONTRACTOR.
   - 4.2. ALL HAZARDOUS MATERIALS SHALL BE HANDLED AND DISPOSED OF BY THE CONTRACTOR IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS.

5. AFTER INSTALLATION OF PAVEMENT, FINAL LOT BENCHING, AND GENERAL CLEANUP, THE CONTRACTOR SHALL ESTABLISH GRASS GROUNDCOVER IN ALL STREET PARKWAYS, LOTS, AND ALL OTHER DISTURBED AREAS. SODDING SHALL BE DONE AS SPECIFIED BY THE MORE RESTRICTIVE OF CURRENT NCTCOG OR TOWN STANDARDS.

6. SILT FENCE NOTES.
   - 6.1. POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. THE POST MUST BE EMBEDDED A MINIMUM OF 189#32. STEEL POSTS SHALL NOT BE USED TO INSTALL EROSION CONTROL MEASURES WITHIN TOWN ROW.
   - 6.2. THE TOE OF THE SILT FENCE SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW.
     - 6.2.1. THE TRENCH MUST BE A MINIMUM OF SIX INCHES (69#32) DEEP AND SIX INCHES (69#32) WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.
     - 6.2.2. WHERE THE FENCE CANNOT BE TRENCHED IN (E.G. PAVEMENT), WEIGHT FABRIC FLAP WITH WASHED GRAVEL ON THE UPHILL SIDE TO PREVENT FLOW UNDER FENCE.
   - 6.3. WIRE REINFORCEMENT SHALL BE USED ON ALL SILT FENCE USED FOR EROSION CONTROL. SILT FENCE SHALL BE SECURELY FASTENED TO EACH SUPPORT POST. THERE SHALL BE A SIX INCH (69#32) DOUBLE OVERLAP, SECURELY FASTENED, WHERE ENDS OF FABRIC MEET.
   - 6.4. SILT FENCE SHALL BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

GENERAL NOTES FOR LANDSCAPING

1. ALL LANDSCAPING CONSTRUCTION, INSTALLATION, TESTING, AND MATERIALS SHALL BE IN ACCORDANCE WITH THE TOWN'S CURRENT STANDARDS, DETAILS, AND SPECIFICATIONS UNLESS OTHERWISE NOTED.

2. CONTRACTOR SHALL AVOID DAMAGE TO EXISTING TREES. WHEN NECESSARY, TREES AND SHRUB TRIMMING FOR CONSTRUCTION SHALL BE PERFORMED BY CERTIFIED TREE WORKER OR UNDER THE DIRECTION OF A REGISTERED LANDSCAPE ARCHITECT OR CERTIFIED ARBORIST.

3. CONTRACTOR SHALL LOCATE AND PROTECT ALL EXISTING LANDSCAPE IRRIGATION SYSTEMS. DAMAGE TO EXISTING IRRIGATION SYSTEMS AND LANDSCAPE MATERIALS SHALL BE RESTORED TO EQUAL OR BETTER CONDITION AT NO COST TO TOWN.

4. EXCAVATION OR GRADE CHANGES BELOW THE DRIPLINE OF EXISTING TREES IS NOT ALLOWED UNLESS A TREE PROTECTION PLAN WHICH CONTAINS SPECIFIC INFORMATION ON THE ROOTS OF EACH TREE IS PROVIDED, AND APPROVED BY THE PARKS & RECREATION DEPARTMENT.

5. PRIOR TO OBTAINING A GRADING PERMIT OR SCHEDULING A PRE-CONSTRUCTION MEETING:
   - 5.1. WHERE TRANSPLANTING OR TREE REMOVAL IS REQUIRED, CONTRACTOR MUST APPLY FOR A TREE PERMIT. CONTACT PARKS & RECREATION DEPARTMENT FOR TREE REMOVAL PERMIT.
   - 5.2. ALL TREE MARKINGS AND PROTECTIVE FENCING MUST BE INSTALLED BY THE CONTRACTOR AND BE INSPECTED BY THE TOWN'S LANDSCAPE ARCHITECT.
   - 5.3. COORDINATE WITH PARKS DEPARTMENT ON ANY TREES THAT REQUIRE BEING TRANSPLANTED OR REMOVED FROM MEDIANS.

6. ALL TREES WHICH ARE TO REMAIN ON SITE SHALL BE PROTECTED WITH A 45#32 TALL BRIGHTLY COLORED PLASTIC FENCE PLACED AT THE DRIP LINE OF THE TREES.

7. TREES TO BE REMOVED MAY BE CHIPPED AND USED FOR MULCH ON SITE OR HAULED OFF-SITE. BURNING OF REMOVED TREES, STUMPS, OR FOLIAGE REQUIRES WRITTEN APPROVAL BY THE FIRE DEPARTMENT.

8. PLANT MATERIALS SHALL NOT IMPEDE OR OBSTRUCT VISION OR ROUTE OF TRAVEL FOR VEHICULAR, PEDESTRIAN, OR BICYCLE TRAFFIC ALONG TOWN RIGHT-OF-WAY, VISIBILITY EASEMENTS, SIDEWALKS OR OTHER EASEMENTS.

9. NO SIGNS, WIRES, OR OTHER ATTACHMENTS OTHER THAN THOSE OF A PROTECTIVE NATURE SHALL BE ATTACHED TO ANY TREE TO REMAIN ON SITE.

10. IF TOPSOIL IS TO BE ADDED TO A ROUGH GRADE, TILL 3 TO 4 INCHES DEEP, THEN ADD TOPSOIL FOR BETTER BINDING AND ELIMINATE LAYING.

11. SOD INSTALLATION
   - 11.1. SPRAY EXISTING WEEDS WITH NON-SELECTIVE HERBICIDE PRIOR TO SOD INSTALLATION.
   - 11.2. ON PUBLIC PROJECTS, THE TOWN'S REPRESENTATIVE RESERVES THE RIGHT TO INSPECT SOD FARM TO SELECT SOD TO BE HARVESTED. INSPECTION OF TURFGRASS SOD BY THE TOWN5#32S REPRESENTATIVE MAY BE MADE AT THE GROWING SITE, BUT SUCH INSPECTION WILL NOT PRECLUDE REJECTIONS AFTER DELIVERY TO THE JOB SITE.
   - 11.3. NO MORE TURFGRASS SOD SHALL BE DELIVERED TO THE JOB SITE ON ANY DAY THAN CAN BE PLACED AND WATERED ON THAT DAY.
   - 11.4. THE IRRIGATION SYSTEM SHOULD BE FULLY OPERATIONAL AT THE SITE PRIOR TO INSTALLATION OF THE TURFGRASS SOD.
   - 11.5. ANY TURFGRASS SOD SO REJECTED SHALL BE REMOVED FROM THE SITE IMMEDIATELY AND REPLACED WITH ACCEPTED TURFGRASS SOD.
   - 11.6. CONTRACTOR SHALL PROVIDE OPTIMUM INSTALLATION TIME PERIOD FOR SOD. NO INSTALLATION ON FROZEN SOIL. NO HARVEST OF FROZEN SOD.

12. PLANTING TIME FOR MEDIANS IS MARCH TO SEPTEMBER. OUTSIDE OF THIS TIME FRAME THE MEDIAN SHALL BE STABILIZED.

13. ESCROW FOR THE REMOVAL OF TEMPORARY STABILIZATION AND INSTALLATION OF SOD PER SPEC.

6/6/2022

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ADDISON

GENERAL NOTES

SHEET 1 OF 3

KHA PROJECT NUMBER: 063543039

SCALE: AS SHOWN

DATE: 6/6/2022

DESIGN	GRAPHICS	CHECK	
TWH	LMR	TWH	3

PLOTTED: 6/6/2022
FILENAME: K:\DAL_TPTO\Project\063543039 - Addison Signal Construction Support\CADD\Belt Line_SHT_002_General Notes.dgn
$$$SCALE$$$
BY: Lucy.Cunningham

GENERAL NOTES FOR TRAFFIC CONTROL:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING AND INSTALLING ALL TEMPORARY AND PERMANENT TRAFFIC CONTROL IN ACCORDANCE WITH THE MINIMUM REQUIREMENTS OF THE LATEST REVISION OF THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT BARRICADE AND CONSTRUCTION STANDARDS.

2. CONTRACTOR SHALL NOT IMPEDE TRAFFIC ON EXISTING STREETS, DRIVEWAYS, ALLEYS, OR FIRE LANES OPEN TO THE PUBLIC. IN THE EVENT THE CONSTRUCTION WORK REQUIRES THE CLOSURE OF AN EXISTING STREET, ALLEY, OR FIRE LANE, THE CONTRACTOR SHALL REQUEST THE ROAD CLOSURE THROUGH THE PUBLIC WORKS & ENGINEERING SERVICES A MINIMUM OF 72 HOURS IN ADVANCE OF THE REQUESTED CLOSURE. CLOSURES WILL NOT BE ALLOWED PRIOR TO 9:00 A.M. OR AFTER 3:30 P.M., MONDAY THROUGH FRIDAY UNLESS OTHERWISE APPROVED BY THE TOWN.

GENERAL NOTES FOR TRAFFIC SIGNALS AND STREET LIGHTING:

1. ALL TRAFFIC SIGNAL AND STREET LIGHTING CONSTRUCTION, TESTING, AND MATERIALS SHALL BE IN ACCORDANCE WITH THE TOWN5#32S CURRENT STANDARDS, DETAILS, AND SPECIFICATIONS UNLESS OTHERWISE NOTED. ALL ELECTRICAL WORK SHALL BE IN ACCORDANCE WITH THE MOST CURRENT NATIONAL ELECTRICAL CODE, TOWN AND TXDOT SPECIFICATIONS AND STANDARDS.

2. CONTRACTOR SHALL NOTIFY THE TRAFFIC DEPARTMENT AT LEAST 7 BUSINESS DAYS PRIOR TO ANY WORK, PROVIDE A CONSTRUCTION SCHEDULE AND WEEKLY PROGRESS REPORTS TO THE TRAFFIC DEPARTMENT, AND NOTIFY THE TRAFFIC DEPARTMENT AT LEAST 48 HOURS PRIOR TO SIGNAL TURN-ON.

3. CONTRACTOR SHALL COORDINATE ELECTRICAL SERVICES WITH THE TOWN AND EITHER ONCOR OR COSERV REPRESENTATIVES (ACCORDING TO THEIR RESPECTIVE AREA).

4. CONTRACTOR SHALL COORDINATE WITH THE ELECTRIC COMPANY TO DE-ENERGIZE ANY OVERHEAD OR UNDERGROUND POWER LINES. ANY COST ASSOCIATED WITH DE- ENERGIZING THE POWER LINE AND/OR ANY OTHER PROTECTIVE MEASURES REQUIRED SHALL BE AT NO COST TO TOWN.

5. THE CONTRACTOR SHALL COORDINATE WITH THE APPROPRIATE UTILITY COMPANY AND TXDOT/NTTA (IF WITHIN TXDOT/NTTA ROW) PRIOR TO BEGINNING ERECTION OF POLES, LUMINARIES AND STRUCTURES LOCATED NEAR ANY OVERHEAD OR UNDERGROUND UTILITIES.

6. PROPOSED CONCRETE FOUNDATION AND CONDUIT ALIGNMENT SHALL BE STAKED BY THE CONTRACTOR AND APPROVED BY THE TOWN PRIOR TO INSTALLATION.

7. CONTRACTOR SHALL CONTACT THE TOWN TRAFFIC DEPARTMENT (BETWEEN 8 AM AND 5PM) FOR INSPECTION PRIOR TO POURING ANY CONCRETE FOUNDATION AND DIGGING FOR CONDUIT RUNS AT LEAST 48 HOURS IN ADVANCE.

8. CONTRACTOR SHALL HAVE A QUALIFIED IMSA LEVEL II OR A TRF453 CERTIFIED TECHNICIAN ON THE PROJECT SITE TO PLACE THE TRAFFIC SIGNALS IN OPERATION.

9. ELECTRICAL WORK SHALL BE PERFORMED BY CERTIFIED PERSONS IN ACCORDANCE WITH THE REQUIREMENTS OF THE CONTRACT AND MAY BE REJECTED AS UNSUITABLE FOR USE DUE TO POOR WORKMANSHIP. THE REQUIRED ELECTRICAL CERTIFICATION COURSE IS AVAILABLE AND IS SCHEDULED PERIODICALLY BY TEEX. ALTERNATIVELY, THE CONTRACTOR MAY PURCHASE AN ENTIRE COURSE FOR THEIR PERSONNEL TO BE HELD AT A TIME AND LOCATION OF THEIR CHOICE AS NEGOTIATED THROUGH TEEX. FOR MORE INFORMATION, CONTACT: TEXAS ENGINEERING EXTENSION SERVICE (TEEX), TXDOT ELECTRICAL SYSTEM COURSE.

10. THE CONTRACTOR SHALL NOT PLACE PEDESTRIAN CROSSWALK AND STOP BAR PAVEMENT MARKINGS UNTIL SIGNAL IS OPERATIONAL.

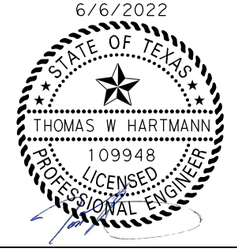
11. ALL LIGHTING POLES, FIXTURES, AND ARMS WHICH ARE REMOVED SHALL BE DELIVERED TO THE TOWN PUBLIC WORKS & ENGINEERING SERVICES FACILITY BY THE CONTRACTOR AND WILL REMAIN THE PROPERTY OF THE TOWN. CONTACT THE TRAFFIC DEPARTMENT AT LEAST 24 HOURS IN ADVANCE OF DELIVERY.

12. DURING THE 30-DAY TRAFFIC SIGNAL TEST PERIOD, CONTRACTOR SHALL RESPOND TO AND DIAGNOSE ALL TROUBLE CALLS WITH QUALIFIED PERSONNEL WITHIN A REASONABLE TRAVEL TIME FROM A DALLAS ADDRESS, BUT NOT MORE THAN TWO (2) HOURS MAXIMUM. CONTRACTOR SHALL REPAIR ANY MALFUNCTIONS OF SIGNAL EQUIPMENT SUPPLIED BY CONTRACTOR ON THE PROJECT. A LOCAL TELEPHONE NUMBER (NOT SUBJECT TO FREQUENT CHANGES) WHERE TROUBLE CALLS ARE TO BE RECEIVED ON A 24-HOUR BASIS SHALL BE PROVIDED TO THE TOWN BY THE CONTRACTOR. APPROPRIATE REPAIRS SHALL BE MADE WITHIN 24 HOURS. THE CONTRACTOR SHALL KEEP A RECORD OF EACH TROUBLE CALL REPORTED IN THE LOGBOOK PROVIDED BY THE TOWN AND SHALL NOTIFY THE TOWN OF EACH TROUBLE CALL. THE ERROR LOG IN THE MALFUNCTION MANAGEMENT UNIT (MMU) SHALL NOT BE CLEARED DURING THE 30-DAY TEST PERIOD WITHOUT THE APPROVAL OF THE TOWN.

13. TEXAS STATE LAW, ARTICLE 1436C, MAKES IT UNLAWFUL TO OPERATE EQUIPMENT OR MACHINES WITHIN 10-FEET OF ANY OVERHEAD ELECTRICAL LINES UNLESS DANGER AGAINST CONTACT WITH HIGH VOLTAGE OVERHEAD LINES HAS BEEN EFFECTIVELY GUARDED AGAINST PURSUANT TO THE PROVISIONS OF THIS ARTICLE. WHEN CONSTRUCTION OPERATIONS REQUIRE WORKING NEAR AN OVERHEAD ELECTRICAL LINE, THE CONTRACTOR SHALL CONTACT THE OWNER/OPERATOR OF THE OVERHEAD ELECTRICAL LINE TO MAKE ADEQUATE ARRANGEMENTS AND TO TAKE NECESSARY SAFETY PRECAUTIONS TO ENSURE THAT ALL LAWS, ELECTRICAL LINE OWNER/OPERATOR REQUIREMENTS AND STANDARD SAFETY PRACTICES ARE MET.

PLOTTED: 6/6/2022
FILENAME: K:\DAL_TPTO\project\063543039 - Addison Signal Construction Support\CADD\Belt Line_SHT_003_General Notes.dgn
$$$SCALE$$$
BY: Lucy.Cunningham

6/6/2022



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ADDISON

GENERAL NOTES

SHEET 2 OF 3

KHA PROJECT NUMBER: 063543039

SCALE: AS SHOWN

DATE: 6/6/2022

DESIGN	GRAPHICS	CHECK	
TWH	LMR	TWH	4

ITEM 416, DRILL SHAFTS:

PROVIDE A FORMED SMOOTH FINISH FOR ALL PORTIONS OF DRILL SHAFTS EXTENDING ABOVE PROPOSED GROUND. INCLUDE COST FOR THIS WORK IN THE UNIT BID PRICE FOR THIS ITEM.

TRAFFIC SIGNAL POLE FOUNDATIONS WILL BE PAID FOR ONCE REGARDLESS OF EXTRA WORK CAUSED BY OBSTRUCTIONS.

INSTALL A 5/8"X10' COPPER CLAD GROUND ROD IN EACH TRAFFIC SIGNAL POLE FOUNDATION. THE GROUND ROD FOR EACH FOUNDATION WILL PROTRUDE ABOVE THE FINISH GRADE OF THE FOUNDATION A MINIMUM OF 1" AND A MAXIMUM OF 2".

CONCRETE REMOVAL REQUIRED FOR INSTALLATION OF DRILLED SHAFTS WILL BE SUBSIDIARY TO ITEM 416.

FORM A 3/4-INCH CHAMFER ON THE TOP EDGE OF EACH SIGNAL POLE FOUNDATION.

PROBE FOR UTILITIES AND UNDERGROUND STRUCTURES PRIOR TO DRILLING FOUNDATIONS. FOUNDATIONS SHALL BE PAID FOR ONCE REGARDLESS OF EXTRA WORK CAUSED BY OBSTRUCTIONS.

ITEM 528, LANDSCAPE PAVERS:

PER TOWN OF ADDISON, LANDSCAPE PAVERS SHALL BE PAVESTONE VERONA 6"X18" PAVERS WITH QUARTEX FINISH. CONFIRM PAVER COLOR WITH TOWN OF ADDISON.

ITEM 531, CURB RAMPS:

PER TOWN OF ADDISON, DETECTABLE WARNING PLATES SHALL BE USED.

ITEM 618, CONDUITS:

THE LOCATION OF CONDUITS AND GROUND BOXES ARE DIAGRAMMATIC ONLY AND MAY BE SHIFTED TO ACCOMMODATE FIELD CONDITIONS AS DIRECTED.

SECURE PERMISSION AND APPROVAL FROM THE PROPER AUTHORITY PRIOR TO CUTTING INTO OR REMOVING ANY SIDEWALKS OR CURBS FOR INSTALLATION OF THIS ITEM.

WHEN HOLES ARE DRILLED THROUGH CONCRETE STRUCTURES, USE A CORING DEVICE. DO NOT USE MASONRY OR CONCRETE DRILLS.

PLACE CONDUIT UNDER EXISTING PAVEMENT BY AN APPROVED BORING METHOD. DO NOT PLACE BORING PITS CLOSER THAN 2 FEET FROM THE EDGE OF THE PAVEMENT UNLESS OTHERWISE DIRECTED. DO NOT USE WATER JETTING. WHEN CONDUITS ARE BORED, DO NOT EXCEED 18 INCHES IN THE VERTICAL AND HORIZONTAL TOLERANCES AS MEASURED FROM THE INTENDED TARGET POINT.

DO NOT USE A PNEUMATICALLY DRIVEN DEVICE FOR PUNCHING HOLES BENEATH THE PAVEMENT (COMMONLY KNOWN AS A "MISSILE").

FURNISH AND INSTALL A NON-METALLIC PULL ROPE IN CONDUIT RUNS IN EXCESS OF 50 FEET.

USE A COLORED CLEANER-PRIMER ON ALL PVC TO PVC JOINTS BEFORE APPLICATION OF PVC CEMENT.

SEAL ALL CONDUIT ENDS WITH A PERMANENTLY SOFT, NON-TOXIC DUCT SEAL. USE A DUCT SEAL THAT DOES NOT ADVERSELY AFFECT OTHER PLASTIC MATERIALS OR CORRODE METALS.

FURNISH AND INSTALL NON-METALLIC PULL ROPES IN CONDUIT INSTALLED FOR FUTURE USE AND CAP USING STANDARD WEATHER-TIGHT CONDUIT CAPS, AS APPROVED. THIS WORK WILL NOT BE PAID FOR DIRECTLY, BUT IS SUBSIDIARY TO THIS ITEM.

WHEN USING EXISTING CONDUIT, ENSURE THAT ALL CONDUITS HAVE BUSHINGS AND ARE CLEANED OF MUD AND DEBRIS. RE-STRAP CONDUIT THAT IS BEING RELOCATED TO NEW TIMBER POLES AS IF IT WERE A NEW INSTALLATION. THIS WORK WILL NOT BE PAID FOR DIRECTLY, BUT IS SUBSIDIARY TO THIS ITEM.

ITEM 620, CONDUCTORS:

THE EQUIPMENT GROUNDING CONDUCTOR SHALL BE IDENTIFIED BY A CONTINUOUS GREEN COLORED JACKET INSULATION OR BARE WIRE. GROUNDED CONDUCTORS (NEUTRAL) SHALL BE IDENTIFIED BY A CONTINUOUS WHITE COLORED JACKET. UNGROUNDED CONDUCTORS (HOT) IN A 120/240V OR 240/480V SYSTEM SHALL BE IDENTIFIED BY EACH POLE OR LEG. FOR 240-VOLT BRANCH CIRCUIT FED FROM 120/240 SOURCE AND 480-VOLT BRANCH CIRCUIT FED FROM 240/480 SOURCE, ENSURE ONE LEG IS IDENTIFIED BY A CONTINUOUS BLACK COLORED JACKET AND THE OTHER LEG BY A CONTINUOUS RED COLORED JACKET.

FOR PED POLES (ITEM 687) WITHIN THE PROJECT, PROVIDE SINGLE-POLE BREAKAWAY DISCONNECTS. USE BUSSMAN HEBW, LITTLEFUSE LEB, FERRAZ-SHAWMUT FEB, OR EQUAL ON UNGROUNDED CONDUCTORS. FOR ALL GROUNDED CONDUCTORS USE BUSSMAN HET, LITTLEFUSE LET, FERRAZ-SHAWMUT FEBN, OR EQUAL. THESE BREAKAWAY CONNECTORS HAVE A WHITE COLORED MARKING AND A PERMANENTLY INSTALLED SOLID NEUTRAL.

ITEM 624, GROUND BOXES:

SLACK CONDUCTORS REQUIRED BY STANDARD SHEET ED(2)-03 WILL BE SUBSIDIARY TO ITEM 624.

CONCRETE REMOVAL REQUIRED FOR INSTALLATION OF GROUND BOXES WILL BE SUBSIDIARY TO ITEM 624.

ITEM 680, INSTALLATION OF TRAFFIC SIGNALS:

REQUIREMENTS FOR THIS ITEM INCLUDE THE FOLLOWING WORK, ALL OF WHICH ARE SUBSIDIARY TO THIS ITEM:

1. NOTIFY THE TOWN OF ADDISON ONE WEEK BEFORE BEGINNING ANY WORK INVOLVING TRAFFIC SIGNALS.
2. PROVIDE SUBMITTAL LITERATURE FOR ALL TRAFFIC SIGNAL EQUIPMENT FOR TOWN APPROVAL BEFORE INSTALLATION.
3. PROVIDE DETECTOR CARDS. PROVIDE A USER'S MANUAL WITH FULL OPERATING INSTRUCTIONS AND THE CONTACT NAME, ADDRESS, AND TELEPHONE NUMBER FOR THE REPRESENTATIVE, MANUFACTURER, OR DISTRIBUTOR FOR WARRANTY REPAIR.
4. THE FOLLOWING ITEMS WILL BE FURNISHED AND INSTALLED BY THE CONTRACTOR: SIGNAL CABINET, ALL INTERNAL HARDWARE, AND VIVDS EQUIPMENT. SIGNAL CABINET SHALL BE NEMA TS-2. SIGNAL CONTROLLER SHALL BE ECONOLITE COBALT, AND MMU SHALL BE EDI MMU2-16LEIP.
5. RELOCATE BATTERY BACKUP UNIT FROM EXISTING CABINETS.
6. CONNECT ALL FIELD WIRING TO THE CONTROLLER ASSEMBLY
7. FURNISH AND INSTALL ALL SIGN PANELS FOR MOUNTING ON SIGNAL POLES AND MAST ARMS. FABRICATE THE SIGN PANELS IN ACCORDANCE WITH ITEM 636, AND MOUNT WITH ASTRO-SIGN BRAC, SIGNFIX ALUMINUM CHANNEL, OR EQUAL AS APPROVED BY THE ENGINEER.
8. FURNISH AND INSTALL ALL OTHER SIGNS IN ACCORDANCE TO ITEM 636. FURNISH ALL MOUNTING HARDWARE FOR ALL SIGNS. MOUNT SIGNS WITH ASTRO-SIGN BRAC, SIGNFIX ALUMINUM CHANNEL, OR EQUAL AS APPROVED BY THE ENGINEER.
9. RELOCATE ILSNS FROM EXISTING MAST ARMS.
10. INSTALL THE EMERGENCY VEHICLE PREEMPTION EQUIPMENT.
11. HAVE A QUALIFIED TECHNICIAN ON THE PROJECT SITE TO PLACE THE TRAFFIC SIGNAL IN OPERATION.
12. USE QUALIFIED PERSONNEL TO RESPOND TO AND DIAGNOSE ALL TROUBLE CALLS DURING THE THIRTY-DAY TEST PERIOD. REPAIR ANY MALFUNCTION TO CONTRACTOR-SUPPLIED SIGNAL EQUIPMENT. PROVIDE TO THE ENGINEER A LOCAL TELEPHONE NUMBER, NOT SUBJECT TO FREQUENT CHANGES AND AVAILABLE ON A 24-HOUR BASIS, FOR REPORTING TROUBLE CALLS. RESPONSE TIME TO REPORTED CALLS MUST BE LESS THAN 2 HOURS. MAKE APPROPRIATE REPAIRS WITHIN 24 HOURS. PLACE A LOGBOOK IN THE CONTROLLER CABINET AND KEEP A RECORD OF EACH TROUBLE CALL REPORTED. NOTIFY THE ENGINEER OF EACH TROUBLE CALL. DO NOT CLEAR THE ERROR LOG IN THE CONFLICT MONITOR OR MMU DURING THE THIRTY-DAY TEST PERIOD WITHOUT APPROVAL.
13. PREVENT ANY DAMAGE TO PROPERTY OWNER$^{S}/_{12}$ S POLES, FENCES, SHRUBS, ETC. PROTECT ALL UNDERGROUND AND OVERHEAD UTILITIES AND REPAIR ANY DAMAGE. PROVIDE ACCESS TO ALL DRIVEWAYS DURING CONSTRUCTION.

ITEM 682, SIGNAL HEADS:

INSTALL SIGNAL HEAD ATTACHMENTS SO THAT THE WIRING TO EACH SIGNAL HEAD PASSES FROM THE MAST ARM THROUGH THE ATTACHMENT HARDWARE TO THE SIGNAL HEAD. DO NOT LEAVE CABLE OR WIRING EXPOSED.

PROVIDE SIGNAL HEAD ATTACHMENTS THAT ALLOW FOR ADJUSTMENT ABOUT THE HORIZONTAL AND VERTICAL AXIS.

TURN DOWN SIGNAL HEADS OR COVER WITH BURLAP OR OTHER MATERIAL, AS APPROVED, UNTIL TRAFFIC SIGNAL IS PLACED IN OPERATION.

MOUNT SIGNAL HEADS LEVEL AND PLUMB AND AIMED AS DIRECTED. MATCH EXISTING SIGNAL HEAD SECTION COLOR (BLACK).

ITEM 684, SIGNAL CABLE:

PROVIDE STRANDED 14 AWG TYPE A SIGNAL CABLES.

PROVIDE A SEPARATE MULTI-CONDUCTOR SIGNAL CABLE (14 AWG) INSIDE PEDESTAL POLES AND SIGNAL POLES FROM THE TERMINAL STRIP TO EACH SIGNAL HEAD AS SHOWN ON THE PLANS.

IDENTIFY EACH CABLE AS SHOWN ON THE PLANS (CABLE 1, ETC.) WITH PERMANENT MARKING LABELS (PANDUIT TYPE PLM STANDARD SINGLE MARKER TIE, THOMAS&BETTS TYPE 548M, OR EQUAL) AT EACH GROUND BOX, POLE BASE, AND CONTROLLER.

ITEM 686, SIGNAL POLES:

ALL MAST ARM POLE ASSEMBLIES, AS SUPPLIED AND INSTALLED, MUST CONFORM TO THE DETAILED DRAWINGS AND/OR REQUIREMENTS IN THE PLANS AS TO HEIGHT, GENERAL DESIGN, AND FINISH. THE CONTRACTOR SHALL SUBMIT FOR APPROVAL BY THE ENGINEER, FIVE (5) PRINTS OF DRAWINGS WHICH SHOW ALL PERTINENT INFORMATION AND DATA REQUIRED FOR VERIFYING STRUCTURAL ADEQUACY, AND ALL FABRICATION AND ERECTION DETAILS.

PROVIDE 12 CIRCUIT BUCHANAN TYPE 112SN, KULKA TYPE 985-GP-12 CU, OR EQUAL TERMINAL STRIPS IN THE SIGNAL POLE ACCESS COMPARTMENT. PROVIDE ADDITIONAL TERMINAL STRIPS OF 8 CIRCUITS EACH WHEN MORE THAN 12 CIRCUITS ARE REQUIRED. THE CONDUCTORS FOR THE LINE AND LOAD SIDE OF THE TERMINAL STRIP SHALL BE IDENTIFIED WITH A PLASTIC LABEL WITH TWO STRAPS PER TAG. THE LINE SIDE SHALL HAVE EACH SIGNAL HEAD, PED HEAD, AND PUSH BUTTON IDENTIFIED ON THE TAG.

MARK POLE SHAFTS AND MAST ARMS WITH THE IDENTIFICATION NUMBERS FROM THE PLANS TO FACILITATE FIELD-ASSEMBLY. IDENTIFY POLE SHAFTS AND MAST ARMS BY INTERSECTION FOR PROJECTS WITH MULTIPLE INTERSECTIONS.

PROVIDE NUTS ON TOP AND BOTTOM (DOUBLE NUTS) OF THE BASE PLATE AS SHOWN ON THE PLANS.

SET ANCHOR BOLTS FOR MAST ARM SIGNAL POLES AND STRAIN POLES SO THAT TWO ARE IN TENSION AND TWO ARE IN COMPRESSION. OBTAIN APPROVAL OF ANCHOR BOLT PLACEMENT BEFORE PLACING CONCRETE.

USE THE TRAFFIC SIGNAL POLE HEIGHTS AND MAST ARM LENGTHS SHOWN ON THE PLANS AND IN THE MATERIAL SUMMARY FOR BIDDING PURPOSES ONLY. MAKE FIELD MEASUREMENTS TO DETERMINE THE ACTUAL POLE HEIGHT AND MAST ARM LENGTH REQUIRED. PROVIDE VERTICAL CLEARANCE OF 17 TO 19 FEET FROM THE ROADWAY TO THE LOWEST POINT OF THE SIGNAL HEAD OR MAST ARM. PLACE SIGNAL HEADS 40 FEET MINIMUM AND 180 FEET MAXIMUM FROM THE STOP LINE. IF THE NEAREST SIGNAL IS MORE THAN 180 FEET FROM THE STOP LINE, PLACE A SUPPLEMENTAL NEAR-SIDE SIGNAL HEAD. DETERMINE THE FIELD MEASUREMENTS AND ELEVATIONS FROM THE ACTUAL FIELD LOCATION OF THE POLES, CONSIDERING ALL ABOVE AND BELOW GROUND UTILITIES AND EXISTING ROADWAY ELEVATIONS.

ITEM 686, SIGNAL POLES (CONTINUED):

PROVIDE VIBRATION DAMPERS FOR MAST ARMS 28 FEET TO 48 FEET IN LENGTH. INSTALL AS SHOWN ON MA-DPD-12.

FOR EXISTING SIGNAL POLES, REPLACEMENT OF EXISTING CONDUCTORS IS NOT REQUIRED INSIDE THE POLES. PLUG ANY UNUSED OPENINGS IN EXISTING MAST ARMS AND POLES WITH AN APPROVED MATERIAL.

PROVIDE 3 PIPE PLUGS FOR WIRING ACCESS ON STRAIN POLES.

PROVIDE A THREE PIECE BRACKET ASSEMBLY ON STRAIN POLES OR DRILL THE POLE AND USE THIMBLE EYE BOLTS TO ATTACH THE STRAIN VISE FOR THE SPAN WIRE.

PER TOWN OF ADDISON, SIGNAL POLE AND MAST ARMS AT BELT LINE ROAD & BELTWAY DRIVE AND BELT LINE ROAD & ADDISON ROAD TO BE POWDER COATED FROM IFS COATINGS, INC. PRODUCT # SRSL 90259, BATCH # C11341, DESCRIPTION: KIM PLATINUM SILVER.

ITEM 688, PUSH BUTTONS:

PROVIDE PEDESTRIAN PUSH BUTTON ASSEMBLIES THAT HAVE PERMANENT-TYPE SIGNS WITHIN THE DETECTOR UNIT WHICH INDICATES WHICH CROSSWALK SIGNAL IS ACTUATED. PROVIDE PUSH BUTTONS WITH A MINIMUM 2 INCH CONVEX PLUNGER. PROVIDE A PROTECTIVE SHROUD ENCIRCLING THE PLUNGER TO DETER VANDALISM THAT IS CAST AS PART OF THE HOUSING COVER. USE A PLUNGER THAT PROTRUDES BEYOND THE SHROUD A DISTANCE ADEQUATE TO ACCOMMODATE THE SWITCH TRAVEL.

VERIFY THE LOCATION OF THE PUSH BUTTON ASSEMBLIES AND THE DIRECTION OF THE ARROWS ON THE SIGNS PRIOR TO INSTALLATION.

ALL NEW PEDESTRIAN SIGNAL HEADS TO BE COUNTDOWN.

PER TOWN OF ADDISON, PROVIDE POLARA IN2 APS PUSH BUTTONS AND CONTROLLER UNIT.

ITEM 6002, VEHICLE DETECTION:

PER TOWN OF ADDISON, PROVIDE AUTOSCOPE VISION VIVDS CAMERA AND PROCESSING SYSTEM.

6/6/2022

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ADDISON

TRAFFIC SIGNAL
GENERAL NOTES

SHEET 3 OF 3

KHA PROJECT NUMBER: 063543039

SCALE: AS SHOWN

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DESIGN	GRAPHICS	CHECK
TWH	LMR	TWH

5

PLOTTED: 6/6/2022
FILENAME: K:\DAL_TPTO\project\063543039 - Addison Signal Construction Support\CADD\Belt Line_SHT_004_General Notes.dgn
$$$SCALE$$$
BY: Lucy.Cunningham

EXISTING SIGNALS

V5LT * — SH 1, 6, 7, 18

V3 — SH 2, 5, 8, 9, 10, 14, 15, 19, 20, 21

V3LT — SH 13

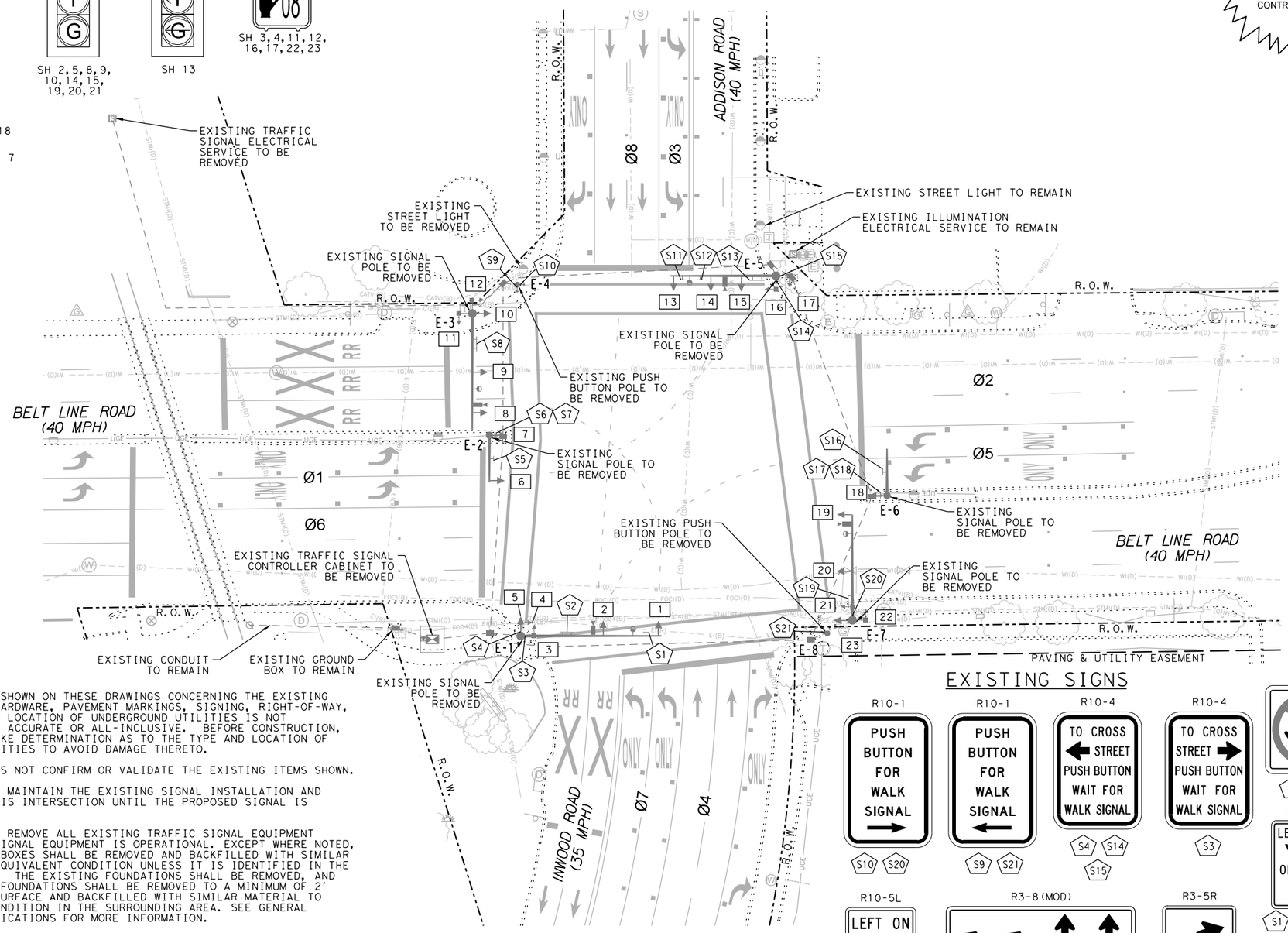
LED COUNTDOWN PEDESTRIAN SIGNAL — SH 3, 4, 11, 12, 16, 17, 22, 23

* SEE NOTE 7

STOP!
CALL BEFORE YOU DIG
DIG TESS
1-800-DIG-TESS
(@ least 72 hours prior to digging)

CAUTION!!
EXISTING UNDERGROUND UTILITIES IN THE AREA CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REPAIRS TO EXISTING UTILITIES DUE TO DAMAGE INCURRED DURING CONSTRUCTION. CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES ON THE PLANS.

0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'



LEGEND

- EXISTING TYPICAL MAST ARM COMBINATION SIGNAL\ WITH PEDESTRIAN SIGNAL, PUSH BUTTON, LUMINAIRE, AND SIGNAGE
- EXISTING TYPICAL PED POLE WITH PEDESTRIAN SIGNAL, PUSH BUTTONS, AND SIGNAGE
- EXISTING TRAFFIC SIGNAL CONTROLLER CABINET
- EXISTING GROUND BOX
- EXISTING CONDUIT
- EXISTING ELECTRICAL SERVICE
- EXISTING VIVDS
- SIGNAL HEAD NUMBER
- SIGN LABEL
- E-# EXISTING TRAFFIC SIGNAL POLE NUMBER

NOTES:

1. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING THE EXISTING TRAFFIC SIGNAL HARDWARE, PAVEMENT MARKINGS, SIGNING, RIGHT-OF-WAY, AND THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL-INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.
2. THE ENGINEER DOES NOT CONFIRM OR VALIDATE THE EXISTING ITEMS SHOWN.
3. CONTRACTOR SHALL MAINTAIN THE EXISTING SIGNAL INSTALLATION AND OPERATIONS AT THIS INTERSECTION UNTIL THE PROPOSED SIGNAL IS OPERATIONAL.
4. CONTRACTOR SHALL REMOVE ALL EXISTING TRAFFIC SIGNAL EQUIPMENT AFTER PROPOSED SIGNAL EQUIPMENT IS OPERATIONAL. EXCEPT WHERE NOTED, EXISTING GROUND BOXES SHALL BE REMOVED AND BACKFILLED WITH SIMILAR MATERIAL TO AN EQUIVALENT CONDITION UNLESS IT IS IDENTIFIED IN THE PLANS TO REMAIN. THE EXISTING FOUNDATIONS SHALL BE REMOVED, AND THE SIGNAL POLE FOUNDATIONS SHALL BE REMOVED TO A MINIMUM OF 2' BELOW EXISTING SURFACE AND BACKFILLED WITH SIMILAR MATERIAL TO AN EQUIVALENT CONDITION IN THE SURROUNDING AREA. SEE GENERAL NOTES AND SPECIFICATIONS FOR MORE INFORMATION.
5. ELIMINATE EXISTING PAVEMENT MARKINGS WHICH CONFLICT WITH PROPOSED MARKINGS. ELIMINATE EXISTING PAVEMENT MARKINGS WITHIN THE INTERSECTION. REFER TO PAVEMENT MARKING SHEET FOR ADDITIONAL INFORMATION.
6. CURB RAMP AND SIDEWALK REMOVALS SHALL BE SUBSIDIARY TO THE INSTALLATION OF NEW CURB RAMP OR CONCRETE SIDEWALK (SEE TxDOT ITEM 531 QTYS AND PROPOSED PEDESTRIAN RAMP AND SIDEWALK LAYOUT).
7. LEFT TURN SIGNALS CURRENTLY RUN PROTECTED-ONLY AT ALL TIMES.

S19: 15100 Addison Rd / Inwood Rd 15000
S8: 15000 Inwood Rd / Addison Rd 15100
S13: Belt Line Rd 4600 4800
S2: Belt Line Rd 4800 4600

EXISTING SIGNS

R10-1 PUSH BUTTON FOR WALK SIGNAL → — S10, S20
R10-1 PUSH BUTTON FOR WALK SIGNAL ← — S9, S21
R10-4 TO CROSS ← STREET PUSH BUTTON WAIT FOR WALK SIGNAL — S4, S14; S15
R10-4 TO CROSS STREET → PUSH BUTTON WAIT FOR WALK SIGNAL — S3
R3-4 — S7, S18
R10-12 LEFT TURN YIELD ON GREEN — S1, S6, S17
R10-5L LEFT ON GREEN ARROW ONLY — S11
R3-8 (MOD) ONLY ONLY ONLY ONLY — S12
R3-5R ONLY — S14
R3-8 (MOD) ONLY ONLY — S5, S16

6/6/2022
STATE OF TEXAS
THOMAS W HARTMANN
109948
LICENSED
PROFESSIONAL ENGINEER

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ADDISON

TRAFFIC SIGNAL PLANS
EXISTING CONDITIONS AND REMOVALS
BELT LINE ROAD AT ADDISON ROAD

KHA PROJECT NUMBER: 063543039
SCALE: AS SHOWN
DATE: 6/6/2022

DESIGN	GRAPHICS	CHECK	
TWH	LMR	TWH	6

PLOTTED: 6/6/2022
FILENAME: K:\DAL_TPTO\1project\063543039 - Addison Signal Construction Support\CADD\Belt Line_SHT_011_Addison Rd_Existing Conditions.dgn
$$$SCALE$$$
BY: Lucy.Cunningham

NOTES:

1. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL-INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.

2. ALL WORK DETAILED ON THESE PLANS TO BE PERFORMED UNDER THIS CONTRACT SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE TOWN OF ADDISON SPECIFICATIONS. CONTRACTOR TO CONTACT THE TOWN OF ADDISON PUBLIC WORKS AND ENGINEERING SERVICES AT (972-450-2871) 48 HOURS IN ADVANCE TO COORDINATE WORK.

3. THE LOCATION OF THE PROPOSED SIGNAL POLES, SIGNAL HEADS, VIVDS DETECTORS, CONDUIT, GROUND BOXES, AND CONDUCTORS ARE DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE ENGINEER TO ACCOMMODATE FIELD CONDITIONS.

4. THE FOLLOWING ITEMS WILL BE FURNISHED AND INSTALLED BY THE CONTRACTOR: SIGNAL CABINET, ALL INTERNAL HARDWARE, VIVDS EQUIPMENT, AND OPTICOM EQUIPMENT. EXISTING BATTERY BACKUP UNITS WILL BE RELOCATED FROM EXISTING CABINETS.

5. INSTALL BASE MOUNTED CONTROLLER CABINET (TS-2 CABINET) AND FOUNDATION.

6. SIGNAL POLES SHALL BE POWDERCOATED TO MATCH THE TOWN'S COLOR SCHEME FOR THE BELT LINE CORRIDOR, FROM IFS COATINGS, INC. PRODUCT # SRSL 90259, BATCH # C11341, DESCRIPTION: KIM PLATINUM SILVER.

7. SIGNAL HEADS SHALL BE BLACK POLYCARBONATE WITH BLACK POLYCARBONATE VISORS AND BACK PLATES.

8. CONTRACTOR SHALL REMOVE AND SALVAGE ALL EXISTING TRAFFIC SIGNAL EQUIPMENT AFTER PROPOSED SIGNAL EQUIPMENT IS OPERATIONAL. EXISTING FOUNDATIONS AND GROUND BOXES SHALL BE REMOVED, AND SIGNAL POLE FOUNDATIONS SHALL BE REMOVED TO A MINIMUM OF 2' BELOW EXISTING GROUND AND BACK FILLED WITH SIMILAR MATERIALS IN THE SURROUNDING AREA.

STOP!
CALL BEFORE YOU DIG
DIG TESS
1-800-DIG-TESS
(@ least 72 hours prior to digging)

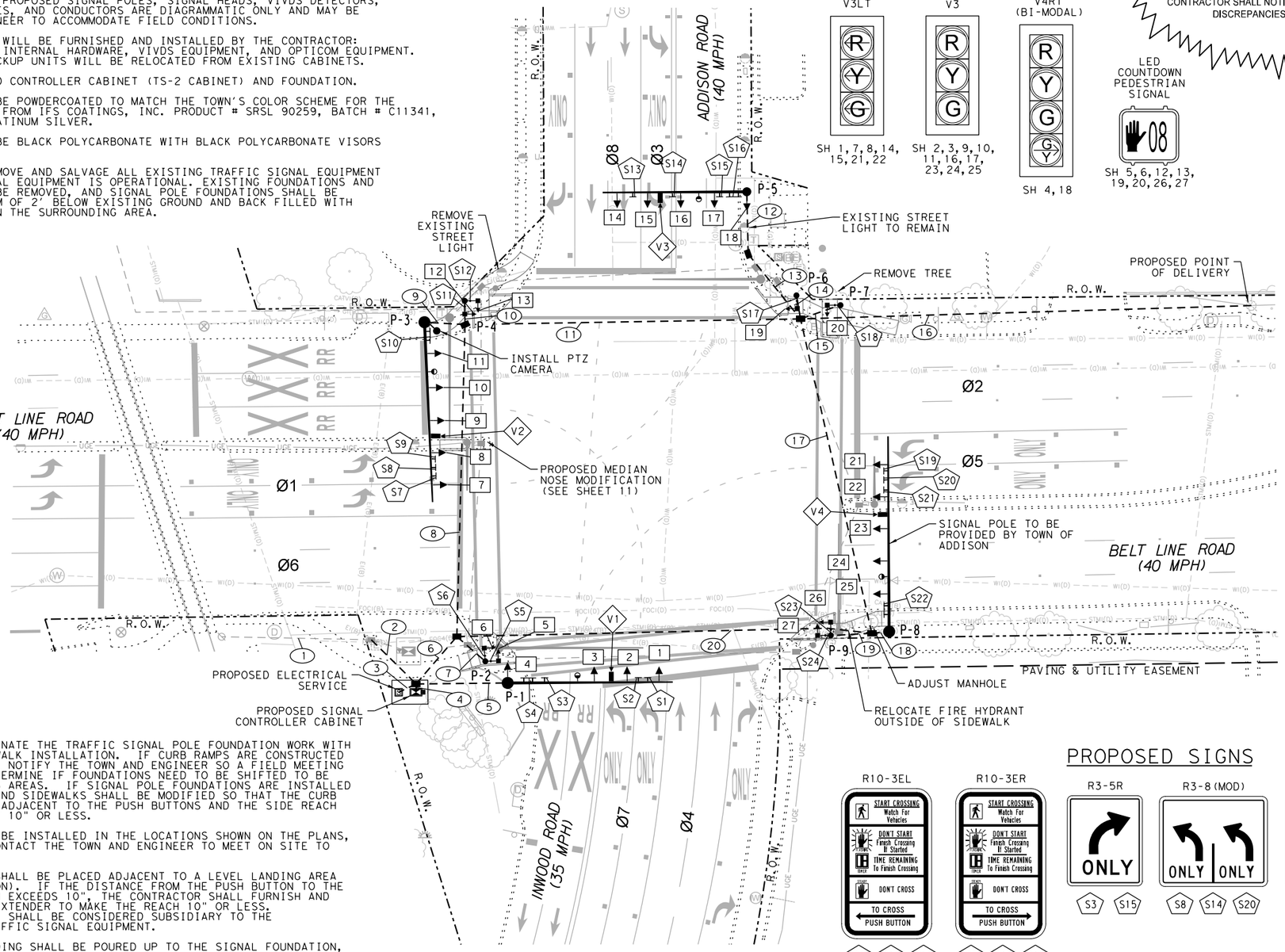
CAUTION!!
EXISTING UNDERGROUND UTILITIES IN THE AREA CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REPAIRS TO EXISTING UTILITIES DUE TO DAMAGE INCURRED DURING CONSTRUCTION. CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES ON THE PLANS.

0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

PROPOSED SIGNALS

V3LT — SH 1, 7, 8, 14, 15, 21, 22
V3 — SH 2, 3, 9, 10, 11, 16, 17, 23, 24, 25
V4RT (BI-MODAL) — SH 4, 18

LED COUNTDOWN PEDESTRIAN SIGNAL — SH 5, 6, 12, 13, 19, 20, 26, 27



LEGEND

- TYPICAL PROPOSED MAST ARM COMBINATION SIGNAL\ WITH PEDESTRIAN SIGNAL, PUSH BUTTON, LED LUMINAIRE AND SIGNAGE
- TYPICAL PROPOSED PED POLE WITH PEDESTRIAN SIGNAL, PUSH BUTTONS, AND SIGNAGE
- TRAFFIC SIGNAL CONTROLLER CABINET AND CONCRETE PAD WITH BBU SYSTEM (EXTERNAL BATTERY CABINET)
- PROPOSED TYPE C GROUND BOX W/ APRON
- PROPOSED CONDUIT
- (1) CONDUIT RUN NUMBER
- [1] SIGNAL HEAD NUMBER
- (S1) SIGN LABEL
- (V1) ITERIS CAMERA AND LABEL
- PROPOSED OPTICOM DETECTOR
- PROPOSED PTZ CAMERA
- [S] PROPOSED ELECTRICAL SERVICE
- P-# PROPOSED TRAFFIC SIGNAL POLE NUMBER
- Ø2 TRAFFIC SIGNAL PHASE NUMBER

9. CONTRACTOR SHALL COORDINATE THE TRAFFIC SIGNAL POLE FOUNDATION WORK WITH THE CURB RAMP AND SIDEWALK INSTALLATION. IF CURB RAMPS ARE CONSTRUCTED FIRST, CONTRACTOR SHALL NOTIFY THE TOWN AND ENGINEER SO A FIELD MEETING CAN BE SCHEDULED TO DETERMINE IF FOUNDATIONS NEED TO BE SHIFTED TO BE ADJACENT TO THE LANDING AREAS. IF SIGNAL POLE FOUNDATIONS ARE INSTALLED FIRST, THE CURB RAMPS AND SIDEWALKS SHALL BE MODIFIED SO THAT THE CURB RAMP LANDING AREAS ARE ADJACENT TO THE PUSH BUTTONS AND THE SIDE REACH TO THE PUSH BUTTONS ARE 10" OR LESS.

10. IF SIGNAL POLES CANNOT BE INSTALLED IN THE LOCATIONS SHOWN ON THE PLANS, THE CONTRACTOR SHALL CONTACT THE TOWN AND ENGINEER TO MEET ON SITE TO DISCUSS NEW LOCATIONS.

11. PROPOSED PUSH BUTTONS SHALL BE PLACED ADJACENT TO A LEVEL LANDING AREA (2% MAX IN ANY DIRECTION). IF THE DISTANCE FROM THE PUSH BUTTON TO THE EDGE OF ACCESSIBLE PATH EXCEEDS 10", THE CONTRACTOR SHALL FURNISH AND INSTALL A PUSH BUTTON EXTENDER TO MAKE THE REACH 10" OR LESS. MEASUREMENT AND PAYMENT SHALL BE CONSIDERED SUBSIDIARY TO THE INSTALLATION OF THE TRAFFIC SIGNAL EQUIPMENT.

12. PROPOSED CURB RAMP LANDING SHALL BE POURED UP TO THE SIGNAL FOUNDATION, LEAVING NO GAPS.

13. PEDESTRIAN ACCESS SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION.

14. MAINTAIN RAILROAD PREEMPTION THROUGHOUT CONSTRUCTION. CONNECT EXISTING PREEMPTION WIRING TO NEW CABINET USING CONDUIT RUNS 1, 2, AND 4.

PROPOSED SIGNS

R10-3EL — START CROSSING Watch For Vehicles; DON'T START Finish Crossing If Started; TIME REMAINING To Finish Crossing; DON'T CROSS; TO CROSS PUSH BUTTON — S6, S12, S17, S24
R10-3ER — START CROSSING Watch For Vehicles; DON'T START Finish Crossing If Started; TIME REMAINING To Finish Crossing; DON'T CROSS; TO CROSS PUSH BUTTON — S5, S11, S18, S23
R3-5R — ONLY — S3, S15
R3-8 (MOD) — ONLY | ONLY — S8, S14, S20
R10-5L — LEFT ON GREEN ARROW ONLY — S1, S7, S13, S19
R3-4 — S9, S21
R3-5L — ONLY — S2

RELOCATED SIGNS

15000 Inwood Rd / Addison Rd 15100 — S10
15100 Addison Rd / Inwood Rd 15000 — S22
Belt Line Rd 4600 4800 — S16
Belt Line Rd 4800 4600 — S4

6/6/2022

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ADDISON

TRAFFIC SIGNAL PLANS

PROPOSED TRAFFIC SIGNAL LAYOUT

BELT LINE ROAD AT ADDISON ROAD

KHA PROJECT NUMBER: 063543039
SCALE: AS SHOWN
DATE: 6/6/2022

DESIGN	GRAPHICS	CHECK	
TWH	LMR	TWH	7

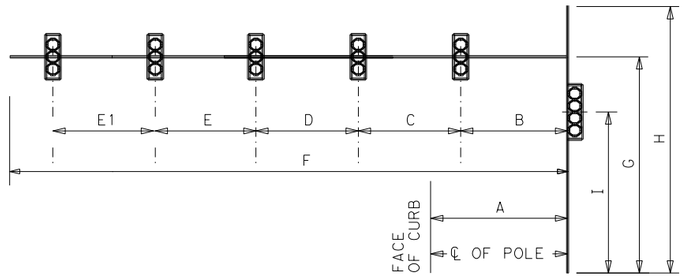
PLOTTED: 6/6/2022
FILENAME: K:\DAL_TPTO\Project\063543039 - Addison Signal Construction Support\CADD\Belt Line_SHT_012_Addison Rd_Proposed Signal.dgn
$$$SCALE$$$
BY: Lucy.Cunningham

CONDUIT AND CABLE CHART
WIRE SIZE AND TYPE

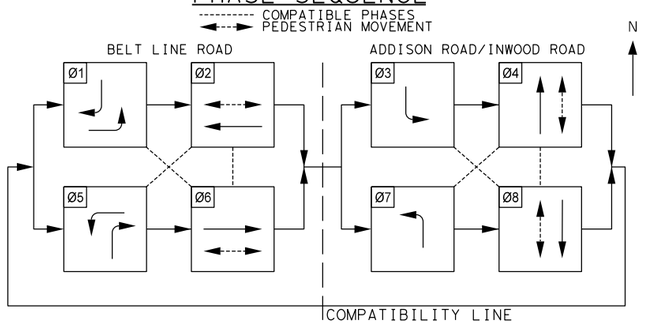
RUN NO	CONDUIT STATUS	ITEM 618 CONDUIT												CABLE STATUS	ITEM 620 ELECTRICAL CONDUCTORS				ITEM 684 TRAFFIC SIGNAL CABLES										ITEM 6002		OPTICOM CABLE		CAT 5 ETHERNET CABLE		TOTAL LENGTH OF RUN	RUN NO
		2" PVC SCH 80 (RISER)		2" PVC (TRENCHED)		2" PVC (BORED)		3" PVC (TRENCHED)		4" PVC (TRENCHED)		4" PVC (BORED)			NO. 6 XHHW WIRE		NO. 6 BARE WIRE		TY C 2 CNDR NO. 12		TY A 3 CNDR NO. 14		TY A 5 CNDR NO. 14		TY A 7 CNDR NO. 14		TY A 20 CNDR NO. 14		VIVDS CABLE							
		Qty	Len	Qty	Len	Qty	Len	Qty	Len	Qty	Len	Qty	Len		Qty	Len	Qty	Len	Qty	Len	Qty	Len	Qty	Len	Qty	Len	Qty	Len	Qty	Len	Qty	Len	Qty	Len		
1	E													E																					55	1
2	I							1	25					I			1	25																	25	2
3	I			1	10									I	2	20	1	10			4	40													10	3
4	I			1	5					2	10			I	2	10	1	5	8	40					5	25	4	20	4	20	4	20	1	5	5	4
5	I							1	35					I			1	35			1	35					1	35	1	35	1	35			35	5
6	I			1	25					2	50			I			1	25	8	200					5	125	3	75	3	75	3	75	1	25	25	6
7	I							1	15					I			1	15	1	15					1	15									15	7
8	I					1	110					1	110	I			1	110	4	440	2	220			3	330	2	220	2	220	2	220	1	110	110	8
9	I							1	15					I			1	15			1	15					1	15	1	15	1	15	1	15	15	9
10	I							1	10					I			1	10	1	10					1	10									10	10
11	I					1	115					1	115	I			1	115	2	230	1	115			2	230	1	115	1	115	1	115			115	11
12	I							1	25					I			1	25			1	25					1	25	1	25	1	25			25	12
13	I							1	30					I			1	30			1	30					1	30	1	30	1	30			30	13
14	I							1	10					I			1	10	1	10					1	10									10	14
15	I							1	20					I			1	20	1	20					1	20									20	15
16	I	1	10	1	155									I			1	155																	155	16
17	I											1	110	I			1	110																	110	17
18	I							1	10					I			1	10			1	10					1	10	1	10	1	10			10	18
19	I							1	15					I			1	15	2	30					1	15									15	19
20	I											1	140	I			1	140	2	280	1	140			1	140	1	140	1	140	1	140			140	20
SUBTOTAL			10		195		225		210		60		475			30		880		1275		630		0		920		685		685		685		155		
P-1	P													I								30		115		90				55		55			VARIES	P-1
P-2	P													I						10				20											VARIES	P-2
P-3	P													I								30		135		150				65		40		30	VARIES	P-3
P-4	P													I						10				20											VARIES	P-4
P-5	P													I								30		110		175				70		55			VARIES	P-5
P-6	P													I						5				10											VARIES	P-6
P-7	P													I						5				10											VARIES	P-7
P-8	P													I								30		135		150				60		40			VARIES	P-8
P-9	P													I						10				20											VARIES	P-9
SUBTOTAL			0		0		0		0		0		0			0		0		40		120		575		565		0		250		190		30		
TOTAL			10		195		225		210		60		475			30		880		1315		750		575		1485		685		935		875		185		

CONDUIT STATUS: E=EXISTING; I=INSTALL; A=ABANDON; AC=AERIAL CABLE; R=REMOVE AND SALVAGE; P=INSTALL WIRE INSIDE STEEL POLE
P-# - REFERS TO WIRING WITHIN THE SIGNAL POLE AND MAST ARM

GROUND BOX SUMMARY			
ITEM NO.	DESCRIPTION	UNIT	QTY.
0624	GROUND BOX TY C (162911) W/APRON	EA	5



PHASE SEQUENCE



SIGNAL HEAD AND POLE PLACEMENT (FT)

POLE NUMBER	STATUS	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)	E1 (FT)	F (FT)	G (FT)	H (FT)	I (FT)	NO. OF HEADS (EA)*	ITEM 6002	DRILLED SHAFT LENGTH (FT)			FDN. TYPE WIND ZONE 80 MPH
													VIDEO DET. (EA)	24" DIA SUB TO ITEM 687	36" DIA TYPE A ITEM 416	48" DIA TYPE A ITEM 416	
P-1	I	7	18	11	11	-	-	55	19	-	13	3	1	-	-	22	48-A
P-2	I	11	PEDESTRIAN SIGNAL POLE						10	-	-	-	-	6	-	-	24-A
P-3	I	8	12	11	11	11	11	60	19	30	-	5	1	-	-	22	48-A
P-4	I	5	PEDESTRIAN SIGNAL POLE						10	-	-	-	-	5	-	-	24-A
P-5	I	3	11	11	11	10	-	48	19	-	13	4	1	-	13	-	36-A
P-6	I	9	PEDESTRIAN SIGNAL POLE						10	-	-	-	-	6	-	-	24-A
P-7	I	11	PEDESTRIAN SIGNAL POLE						10	-	-	-	-	6	-	-	24-A
P-8**	I	8	13	11	11	10	11	65	19	-	-	5	1	-	-	22	48-A
P-9	I	3	PEDESTRIAN SIGNAL POLE						10	-	-	-	-	6	-	-	24-A
											TOTAL:		4	29	13	66	

SIGNAL POLE STATUS: I=INSTALL; E=EXISTING; REM=REMOVE; F=INSTALL IN FUTURE PHASE
*- DOES NOT INCLUDE VERTICAL SIDEMOUNT SIGNAL HEADS OR PEDESTRIAN SIGNAL HEADS
**- TOWN OF ADDISON TO PROVIDE SIGNAL POLE

6/6/2022
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ADDISON

TRAFFIC SIGNAL PLANS
PROPOSED QUANTITIES

BELT LINE ROAD AT
ADDISON ROAD

SHEET 1 OF 3

KHA PROJECT NUMBER: 063543039
SCALE: AS SHOWN
DATE: 6/6/2022

DESIGN	GRAPHICS	CHECK
TWH	LMR	TWH

8

PLOTTED: 6/6/2022
FILENAME: K:\DAL_TPTO\project\063543039 - Addison Signal Construction Support\CADD\Belt Line_SHT_013_Addison Rd_Signal Quantities.dgn
$$$SCALE$$$
BY: Lucy.Cunningham

CABLE TERMINATION CHART

CNDR. NO.	CONDUCTOR COLOR	CABLE 1 20 CNDR. FROM P-1 TO CNTRL.	CABLE 2 7 CNDR. FROM P-2 TO CNTRL.	CABLE 3 20 CNDR. FROM P-3 TO CNTRL.	CABLE 4 7 CNDR. FROM P-4 TO CNTRL.	CABLE 5 20 CNDR. FROM P-5 TO CNTRL.	CABLE 6 7 CNDR. FROM P-6 TO CNTRL.	CABLE 7 7 CNDR. FROM P-7 TO CNTRL.	CABLE 8 20 CNDR. FROM P-8 TO CNTRL.	CABLE 9 7 CNDR. FROM P-9 TO CNTRL.
1	BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
2	WHITE	SH COM	SH COM	SH COM	SH COM	SH COM	SH COM	SH COM	SH COM	SH COM
3	RED	SH 2,3,4 - Ø8 R	SH 5 - Ø6 DW	SH 9,10,11 - Ø2 R	SH 13 - Ø2 DW	SH 16,17,18 - Ø4 R	SH 19 - Ø2 DW	SH 20 - Ø4 DW	SH 23,24,25 - Ø6 R	SH 26 - Ø6 DW
4	GREEN	SH 2,3,4 - Ø8 G	SH 5 - Ø6 W	SH 9,10,11 - Ø2 G	SH 13 - Ø2 W	SH 16,17,18 - Ø4 G	SH 19 - Ø2 W	SH 20 - Ø4 W	SH 23,24,25 - Ø6 G	SH 26 - Ø6 W
5	ORANGE	SH 2,3,4 - Ø8 Y	SPARE	SH 9,10,11 - Ø2 Y	SPARE	SH 16,17,18 - Ø4 Y	SPARE	SPARE	SH 23,24,25 - Ø6 Y	SPARE
6	BLUE	SPARE	SH 6 - Ø8 DW	SPARE	SH 12 - Ø8 DW	SPARE	SPARE	SPARE	SPARE	SH 27 - Ø4 DW
7	WHITE/BLACK	SPARE	SH 6 - Ø8 W	SPARE	SH 12 - Ø8 W	SPARE	SPARE	SPARE	SPARE	SH 27 - Ø4 W
8	RED/BLACK	SPARE		SPARE		SPARE			SPARE	
9	GREEN/BLACK	SPARE		SPARE		SPARE			SPARE	
10	ORANGE/BLACK	SPARE		SPARE		SPARE			SPARE	
11	BLUE/BLACK	SH 4 - Ø1 G (RT ARW)		SPARE		SH 18 - Ø5 G (RT ARW)			SPARE	
12	BLACK/WHITE	SH 4 - Ø1 Y (RT ARW)		SPARE		SH 18 - Ø5 Y (RT ARW)			SPARE	
13	RED/WHITE	SH 1 - Ø3 R (LT ARW)		SH 7,8 - Ø5 R (LT ARW)		SH 14,15 - Ø7 R (LT ARW)			SH 21,22 - Ø1 R (LT ARW)	
14	GREEN/WHITE	SH 1 - Ø3 G (LT ARW)		SH 7,8 - Ø5 G (LT ARW)		SH 14,15 - Ø7 G (LT ARW)			SH 21,22 - Ø1 G (LT ARW)	
15	BLUE/WHITE	SH 1 - Ø3 Y (LT ARW)		SH 7,8 - Ø5 Y (LT ARW)		SH 14,15 - Ø7 Y (LT ARW)			SH 21,22 - Ø1 Y (LT ARW)	
16	BLACK/RED	SPARE		SPARE		SPARE			SPARE	
17	WHITE/RED	SPARE		SPARE		SPARE			SPARE	
18	ORANGE/RED	SPARE		SPARE		SPARE			SPARE	
19	BLUE/RED	SPARE		SPARE		SPARE			SPARE	
20	RED/GREEN	SPARE		SPARE		SPARE			SPARE	

*NOTE: HOME RUN 2 CONDR. TO ALL POLES WITH PED HEADS FOR PED CALL

SIGNAL HEADS (ITEM 682)

SIGNAL HEAD NUMBER	SIGNAL HEAD TYPE	STATUS	12" LED SIGNAL INDICATION										PED SIG SEC (LED) (COUNTDOWN)
			BACK PLATE			LED SIGNAL LAMPS							
			3 SEC	4 SEC	5 SEC	<-G/Y->	<-G->	G	<-Y->	Y	<-R->	R	
			EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
1	V3LT	I		1			1		1		1		
2	V3	I	1					1		1		1	
3	V3	I	1					1		1		1	
4	V4RT(B)	I			1	1		1		1		1	
5	PED	I											1
6	PED	I											1
7	V3LT	I		1			1		1		1		
8	V3LT	I		1			1		1		1		
9	V3	I	1					1		1		1	
10	V3	I	1					1		1		1	
11	V3	I	1					1		1		1	
12	PED	I											1
13	PED	I											1
14	V3LT	I		1			1		1		1		
15	V3LT	I		1			1		1		1		
16	V3	I	1					1		1		1	
17	V3	I	1					1		1		1	
18	V4RT(B)	I			1	1		1		1		1	
19	PED	I											1
20	PED	I											1
21	V3LT	I		1			1		1		1		
22	V3LT	I		1			1		1		1		
23	V3	I	1					1		1		1	
24	V3	I	1					1		1		1	
25	V3	I	1					1		1		1	
26	PED	I											1
27	PED	I											1
	TOTAL (NEW)		10	7	2	2	7	12	7	12	7	12	8

STATUS: I=INSTALL; E=EXISTING; REM=EXISTING TO BE REMOVED; REL=RELOCATE

(B) = BI-MODAL: THIS SIGNAL HEAD HAS A TOTAL OF 4 SECTIONS, AND THE GREEN/YELLOW ARROW ARE BI-MODAL, SHARING THE SAME BOTTOM SIGNAL SECTION.

ELECTRICAL SERVICE DATA

ELEC. SERVICE ID	PLAN SHEET NUMBER	ELECTRICAL SERVICE DESCRIPTION (SEE ED(5)-14)	SERVICE CONDUIT **SIZE	SERVICE CONDUCTORS NO. / SIZE	SAFETY SWITCH AMPS	MAIN CKT. BRK. POLE / AMPS	TWO-POLE CONTACTOR AMPS	PANELBD / LOADCENTER AMP RATING (MIN)	BRANCH CIRCUIT ID	BRANCH CKT. BRK. POLE / AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
ES-01	____	TY D (120/240) 060 (NS) SS (E) PS (U)	2"	3 / #4	N/A	2P / 60	30	100	T.S.	1P / 50	23	<7.1
									ILSN	1P / 20	2	

** - VERIFY SERVICE CONDUIT SIZE WITH UTILITY. SIZE MAY CHANGE DUE TO THE UTILITY METER REQUIREMENTS. ENSURE CONDUIT SIZE MEETS THE NATIONAL ELECTRICAL CODE.

6/6/2022

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ADDISON

TRAFFIC SIGNAL PLANS
PROPOSED QUANTITIES

BELT LINE ROAD AT ADDISON ROAD

SHEET 2 OF 3

KHA PROJECT NUMBER: 063543039

SCALE: AS SHOWN

DATE: 6/6/2022

DESIGN	GRAPHICS	CHECK
TWH	LMR	TWH

PLOTTED: 6/6/2022
FILENAME: K:\DAL_TPTO\1project\063543039 - Addison Signal Construction Support\CADD\Belt Line_SHT_014_Addison Rd_Signal Quantities.dgn
$$$SCALE$$$
BY: Lucy.Cunningham

APS MESSAGE CHART			
POLE LOCATION	PEDESTRIAN MOVEMENT	FUNCTIONS	SPEECH MESSAGE/SOUND DETAILS
P-2	Phase 6	BUTTON PUSH ON DW	WAIT TO CROSS ADDISON ROAD AT BELT LINE ROAD
		EXTENDED BUTTON PUSH	WAIT TO CROSS ADDISON ROAD AT BELT LINE ROAD
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	ADDISON ROAD, WALK LIGHT IS ON TO CROSS ADDISON ROAD
P-2	Phase 8	BUTTON PUSH ON DW	WAIT TO CROSS BELT LINE ROAD AT ADDISON ROAD
		EXTENDED BUTTON PUSH	WAIT TO CROSS BELT LINE ROAD AT ADDISON ROAD
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	BELT LINE ROAD, WALK LIGHT IS ON TO CROSS BELT LINE ROAD
P-4	Phase 2	BUTTON PUSH ON DW	WAIT TO CROSS ADDISON ROAD AT BELT LINE ROAD
		EXTENDED BUTTON PUSH	WAIT TO CROSS ADDISON ROAD AT BELT LINE ROAD
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	ADDISON ROAD, WALK LIGHT IS ON TO CROSS ADDISON ROAD
P-4	Phase 8	BUTTON PUSH ON DW	WAIT TO CROSS BELT LINE ROAD AT ADDISON ROAD
		EXTENDED BUTTON PUSH	WAIT TO CROSS BELT LINE ROAD AT ADDISON ROAD
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	BELT LINE ROAD, WALK LIGHT IS ON TO CROSS BELT LINE ROAD
P-6	Phase 2	BUTTON PUSH ON DW	WAIT TO CROSS ADDISON ROAD AT BELT LINE ROAD
		EXTENDED BUTTON PUSH	WAIT TO CROSS ADDISON ROAD AT BELT LINE ROAD
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	ADDISON ROAD, WALK LIGHT IS ON TO CROSS ADDISON ROAD
P-7	Phase 4	BUTTON PUSH ON DW	WAIT TO CROSS BELT LINE ROAD AT ADDISON ROAD
		EXTENDED BUTTON PUSH	WAIT TO CROSS BELT LINE ROAD AT ADDISON ROAD
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	BELT LINE ROAD, WALK LIGHT IS ON TO CROSS BELT LINE ROAD
P-9	Phase 4	BUTTON PUSH ON DW	WAIT TO CROSS BELT LINE ROAD AT ADDISON ROAD
		EXTENDED BUTTON PUSH	WAIT TO CROSS BELT LINE ROAD AT ADDISON ROAD
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	BELT LINE ROAD, WALK LIGHT IS ON TO CROSS BELT LINE ROAD
P-9	Phase 6	BUTTON PUSH ON DW	WAIT TO CROSS ADDISON ROAD AT BELT LINE ROAD
		EXTENDED BUTTON PUSH	WAIT TO CROSS ADDISON ROAD AT BELT LINE ROAD
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	ADDISON ROAD, WALK LIGHT IS ON TO CROSS ADDISON ROAD

* COUNTDOWN SPEECH MESSAGE = "OFF" FOR ALL UNITS

SIGNS SUMMARY					
SIGN *	SIGN TYPE	SIGN LEGEND	STATUS	SUPPORT	SIGN DIMENSION (in x in)
S1	R10-5L	LEFT ON GREEN ARROW ONLY	I	P-1	24"x30"
S2	R3-5L	LANE ASSIGNMENT	I	P-1	30"x36"
S3	R3-5R	LANE ASSIGNMENT	I	P-1	30"x36"
S4	ILSN	BELT LINE RD	REL	P-1	24"xVA
S5	R10-3ER	PED PUSH BUTTON	I	P-2	9"x15"
S6	R10-3EL	PED PUSH BUTTON	I	P-2	9"x15"
S7	R10-5L	LEFT ON GREEN ARROW ONLY	I	P-3	24"x30"
S8	R3-8(MOD)	LANE ASSIGNMENT	I	P-3	36"x30"
S9	R3-4	NO U-TURN	I	P-3	36"x36"
S10	ILSN	ADDISON RD/INWOOD RD	REL	P-3	24"xVA
S11	R10-3ER	PED PUSH BUTTON	I	P-4	9"x15"
S12	R10-3EL	PED PUSH BUTTON	I	P-4	9"x15"
S13	R10-5L	LEFT ON GREEN ARROW ONLY	I	P-5	24"x30"
S14	R3-8(MOD)	LANE ASSIGNMENT	I	P-5	36"x30"
S15	R3-5R	LANE ASSIGNMENT	I	P-5	30"x36"
S16	ILSN	BELT LINE RD	REL	P-5	24"xVA
S17	R10-3EL	PED PUSH BUTTON	I	P-6	9"x15"
S18	R10-3ER	PED PUSH BUTTON	I	P-7	9"x15"
S19	R10-5L	LEFT ON GREEN ARROW ONLY	I	P-8	24"x30"
S20	R3-8(MOD)	LANE ASSIGNMENT	I	P-8	36"x30"
S21	R3-4	NO U-TURN	I	P-8	36"x36"
S22	ILSN	INWOOD RD/ADDISON RD	REL	P-8	24"xVA
S23	R10-3ER	PED PUSH BUTTON	I	P-9	9"x15"
S24	R10-3EL	PED PUSH BUTTON	I	P-9	9"x15"

STATUS: I=INSTALL; E=EXISTING; REM=EXISTING TO BE REMOVED; REL=EXISTING TO BE RELOCATED

VIDEO DETECTION DETAILS						
VIDEO DETECTOR NUMBER	MOUNTING LOCATION	MOUNTING HEIGHT	ZONE LOCATIONS	ZONE(S)	DIMENSIONS	DETECT UNIT
V1	MAST ARM P-1	24'	STOP BAR	V3-1	6'X40'	Ø3-1
				V8-1	6'X40'	Ø8-1
				V8-2	6'X40'	Ø8-2
				V8-3	6'X40'	Ø8-3
V2	MAST ARM P-3	24'	STOP BAR	V5-1	6'X40'	Ø5-1
				V5-2	6'X40'	Ø5-2
				V2-1	6'X40'	Ø2-1
				V2-2	6'X40'	Ø2-2
				V2-3	6'X40'	Ø2-3
V3	MAST ARM P-5	24'	STOP BAR	V7-1	6'X40'	Ø7-1
				V7-2	6'X40'	Ø7-2
				V4-1	6'X40'	Ø4-1
				V4-2	6'X40'	Ø4-2
				V4-3	6'X40'	Ø4-3
V4	MAST ARM P-8	24'	STOP BAR	V1-1	6'X40'	Ø1-1
				V1-2	6'X40'	Ø1-2
				V6-1	6'X40'	Ø6-1
				V6-2	6'X40'	Ø6-2
				V6-3	6'X40'	Ø6-3

6/6/2022

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ADDISON

TRAFFIC SIGNAL PLANS
PROPOSED QUANTITIES

BELT LINE ROAD AT
ADDISON ROAD

SHEET 3 OF 3

KHA PROJECT NUMBER: 063543039

SCALE: AS SHOWN

DATE: 6/6/2022

DESIGN	GRAPHICS	CHECK
TWH	LMR	TWH

PLOTTED: 6/6/2022
FILENAME: K:\DAL_TPTO\project\063543039 - Addison Signal Construction Support\CADD\Belt Line_SHT_015_Addison Rd_Signal Quantities.dgn
$$$SCALE$$$
BY: Lucy.Cunningham

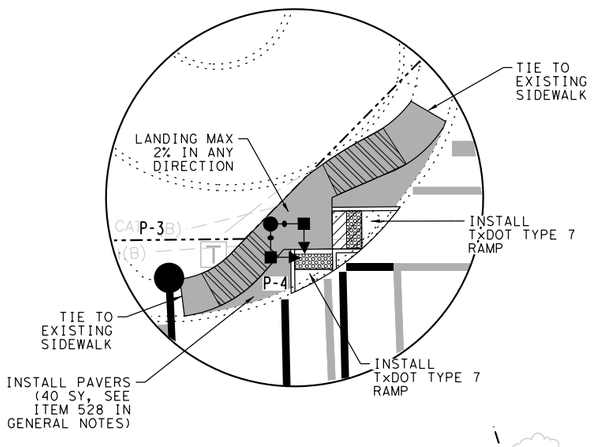
0 5 10 20 — PEDESTRIAN RAMP DETAILS : SCALE: 1" = 20'

0 10 20 40 — ORIGINALLY PLOTTED SCALE: SCALE: 1" = 40'

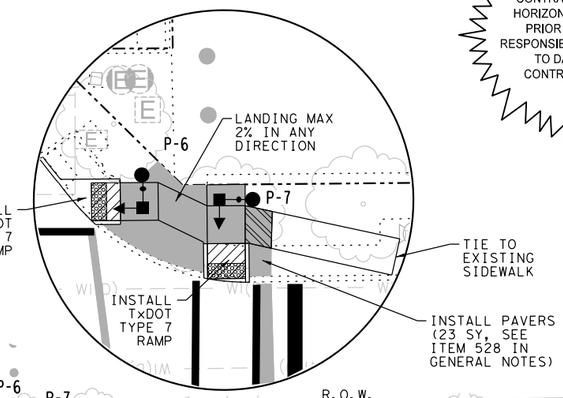
STOP!
CALL BEFORE YOU DIG
DIG TESS
1-800-DIG-TESS
(@ least 72 hours prior to digging)

CAUTION!!
EXISTING UNDERGROUND UTILITIES IN THE AREA CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REPAIRS TO EXISTING UTILITIES DUE TO DAMAGE INCURRED DURING CONSTRUCTION. CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES ON THE PLANS.

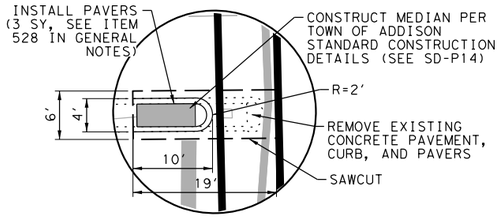
DETAIL AT NW CORNER



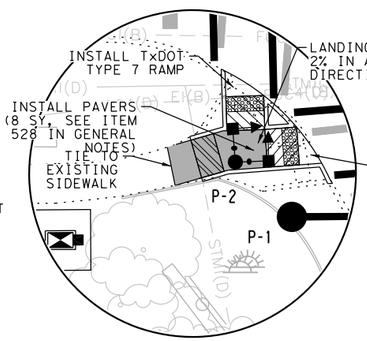
DETAIL AT NE CORNER



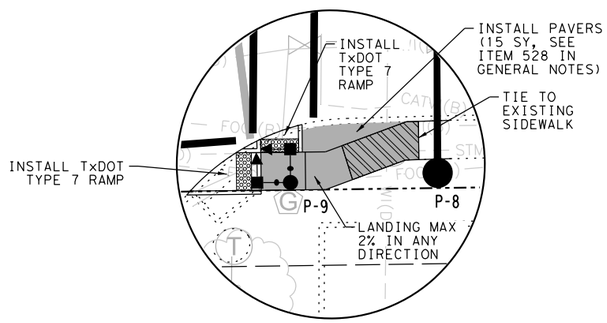
MEDIAN NOSE DETAIL



DETAIL AT SW CORNER



DETAIL AT SE CORNER



NOTES:

1. INSTALLATION AND PAYMENT FOR PROPOSED RAMPS AND SIDEWALKS SHALL INCLUDE ALL INCIDENTAL WORK, INCLUDING EXCAVATION, REMOVAL AND DISPOSAL OF EXISTING CONCRETE CURB AND SIDEWALK, PROPOSED CURB ALONG SIDEWALKS, AND OTHER MISCELLANEOUS MATERIAL NECESSARY TO CONSTRUCT THE PROPOSED RAMPS AND SIDEWALKS. SIDEWALK QUANTITIES PROVIDED ARE ESTIMATES ONLY. PAYMENT FOR SIDEWALK SHALL BE FOR THE QUANTITY APPROVED BY THE ENGINEER AND CONSTRUCTED ON SITE.
2. PROPOSED CURB RAMP LANDING SHALL BE POURED UP TO THE SIGNAL FOUNDATION, LEAVING NO GAPS.
3. CONTRACTOR SHALL ENSURE THAT ALL PED RAMPS DRAIN TOWARDS THE STREET WITHOUT PONDING IN THE RAMP OR GUTTER AREA.
4. RAMP LANDINGS SHALL NOT EXCEED 2% MAX CROSS SLOPE AND 2% RUNNING SLOPE. PROPOSED SIDEWALKS SHALL NOT EXCEED 2% MAX CROSS SLOPE AND 5% RUNNING SLOPE.
5. EXISTING STRIPING AND BUTTONS SHALL REMAIN UNLESS OTHERWISE NOTED.
6. PEDESTRIAN ACCESS SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION.
7. CONTRACTOR TO MAINTAIN EXISTING ILLUMINATION CIRCUIT ALONG BELT LINE.

LEGEND
PAVEMENT MARKING

- (A) RE PM W/RET REQ TY I (W)4"(BRK)(090MIL) (PUPPY TRACKS)
- (B) REFL PAV MRK TY I (W)12"(SLD)(090MIL)
- (C) REFL PAV MRK TY I (W)24"(SLD)(090MIL)
- (D) REMOVAL OF PAVEMENT MARKING LINE

LEGEND
PEDESTRIAN RAMPS

- 8.3% MAX RUNNING SLOPE 2% MAX CROSS SLOPE
- 5% MAX RUNNING SLOPE 2% MAX CROSS SLOPE
- TRUNCATED DOME DETECTABLE WARNING
- BRICK PAVERS

6/6/2022

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ADDISON

TRAFFIC SIGNAL PLANS

PROPOSED PEDESTRIAN RAMPS AND PAVEMENT MARKINGS

BELT LINE ROAD AT ADDISON ROAD

KHA PROJECT NUMBER: 063543039
SCALE: AS SHOWN
DATE: 6/6/2022

DESIGN	GRAPHICS	CHECK
TWH	LMR	TWH

11

PLOTTED: 6/6/2022
FILENAME: K:\DAL_TPTO\1project\063543039 - Addison Signal Construction Support\CADD\Belt Line_SHT_016_Addison Rd_Proposed Ramps.dgn
$$$SCALE$$$
BY: Lucy.Cunningham

NOTES:

1. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING THE EXISTING TRAFFIC SIGNAL HARDWARE, PAVEMENT MARKINGS, SIGNING, RIGHT-OF-WAY, AND THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL-INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.
2. THE ENGINEER DOES NOT CONFIRM OR VALIDATE THE EXISTING ITEMS SHOWN.
3. CONTRACTOR SHALL MAINTAIN THE EXISTING SIGNAL INSTALLATION AND OPERATIONS AT THIS INTERSECTION UNTIL THE PROPOSED SIGNAL IS OPERATIONAL.
4. CONTRACTOR SHALL REMOVE ALL EXISTING TRAFFIC SIGNAL EQUIPMENT AFTER PROPOSED SIGNAL EQUIPMENT IS OPERATIONAL. THE EXISTING GROUND BOXES SHALL BE REMOVED AND BACKFILLED WITH SIMILAR MATERIAL TO AN EQUIVALENT CONDITION UNLESS IT IS IDENTIFIED IN THE PLANS TO REMAIN. THE EXISTING FOUNDATIONS SHALL BE REMOVED, AND THE SIGNAL POLE FOUNDATIONS SHALL BE REMOVED TO A MINIMUM OF 2' BELOW EXISTING SURFACE AND BACKFILLED WITH SIMILAR MATERIAL TO AN EQUIVALENT CONDITION IN THE SURROUNDING AREA. SEE GENERAL NOTES AND SPECIFICATIONS FOR MORE INFORMATION.
5. ELIMINATE EXISTING PAVEMENT MARKINGS WHICH CONFLICT WITH PROPOSED MARKINGS. ELIMINATE EXISTING PAVEMENT MARKINGS WITHIN THE INTERSECTION. REFER TO PAVEMENT MARKING SHEET FOR ADDITIONAL INFORMATION.
6. CURB RAMP AND SIDEWALK REMOVALS SHALL BE SUBSIDIARY TO THE INSTALLATION OF NEW CURB RAMP OR CONCRETE SIDEWALK (SEE TxDOT ITEM 531 QTYS AND PROPOSED PEDESTRIAN RAMP AND SIDEWALK LAYOUT).

STOP!
CALL BEFORE YOU DIG
DIG TESS
1-800-DIG-TESS
(@ least 72 hours prior to digging)

CAUTION!!
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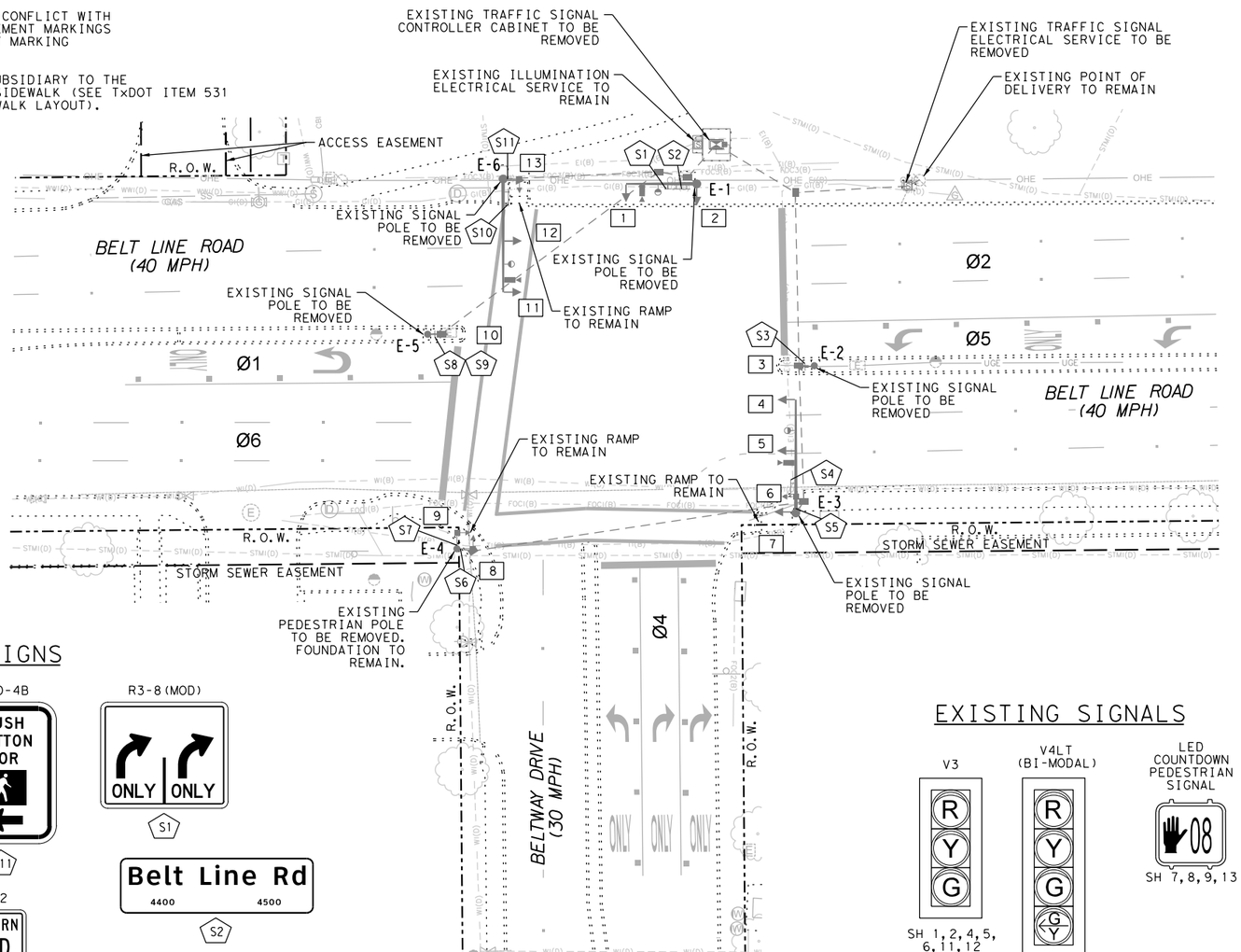
0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'



LEGEND

- EXISTING TYPICAL MAST ARM COMBINATION SIGNAL\ WITH PEDESTRIAN SIGNAL, PUSH BUTTON, LUMINAIRE, AND SIGNAGE
- EXISTING TYPICAL PED POLE WITH PEDESTRIAN SIGNAL, PUSH BUTTONS, AND SIGNAGE
- EXISTING TRAFFIC SIGNAL CONTROLLER CABINET
- EXISTING GROUND BOX
- EXISTING CONDUIT
- EXISTING ELECTRICAL SERVICE
- EXISTING VIVDS
- 1 — SIGNAL HEAD NUMBER
- S1 — SIGN LABEL
- E-# — EXISTING TRAFFIC SIGNAL POLE NUMBER

EXISTING SIGNS

R10-4 — TO CROSS STREET → PUSH BUTTON WAIT FOR WALK SIGNAL — S5, S6

R10-4 — ← TO CROSS STREET PUSH BUTTON WAIT FOR WALK SIGNAL — S7

R10-4B — PUSH BUTTON FOR — S11

R3-8 (MOD) — ONLY | ONLY — S1

R3-5uT — ONLY — S3

R3-4 — S9

R10-12 — LEFT TURN YIELD ON GREEN — S8

Belt Line Rd 4400 4500 — S2

Beltway Dr 15000 — S10

Beltway Dr 15000 — S4

EXISTING SIGNALS

V3 — R Y G — SH 1, 2, 4, 5, 6, 11, 12

V4LT (BI-MODAL) — R Y G G Y — SH 3, 10

LED COUNTDOWN PEDESTRIAN SIGNAL — 08 — SH 7, 8, 9, 13

6/6/2022

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Fax No. (972) 239-3820

ADDISON

TRAFFIC SIGNAL PLANS

EXISTING CONDITIONS AND REMOVALS

BELT LINE ROAD AT BELTWAY DRIVE

KHA PROJECT NUMBER: 063543039
SCALE: AS SHOWN
DATE: 6/6/2022

DESIGN	GRAPHICS	CHECK
TWH	LMR	TWH

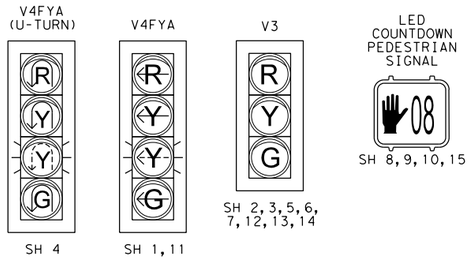
12

PLOTTED: 6/6/2022
FILENAME: K:\DAL_TPTO\project\063543039 - Addison Signal Construction Support\CADD\Belt Line_SHT_111_Beltway_Existing Conditions.dgn
$$$SCALE$$$
BY: Lucy.Cunningham

NOTES:

1. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL-INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.
2. ALL WORK DETAILED ON THESE PLANS TO BE PERFORMED UNDER THIS CONTRACT SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE TOWN OF ADDISON SPECIFICATIONS. CONTRACTOR TO CONTACT THE TOWN OF ADDISON PUBLIC WORKS AND ENGINEERING SERVICES AT (972-450-2871) 48 HOURS IN ADVANCE TO COORDINATE WORK.
3. THE LOCATION OF THE PROPOSED SIGNAL POLES, SIGNAL HEADS, VIVDS DETECTORS, CONDUIT, GROUND BOXES, AND CONDUCTORS ARE DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE ENGINEER TO ACCOMMODATE FIELD CONDITIONS.
4. THE FOLLOWING ITEMS WILL BE FURNISHED AND INSTALLED BY THE CONTRACTOR: SIGNAL CABINET, ALL INTERNAL HARDWARE, VIVDS EQUIPMENT, AND OPTICOM EQUIPMENT. EXISTING BATTERY BACKUP UNITS WILL BE RELOCATED FROM EXISTING CABINETS.
5. INSTALL BASE MOUNTED CONTROLLER CABINET (TS-2 CABINET) AND FOUNDATION.
6. SIGNAL POLES SHALL BE POWDERCOATED TO MATCH THE TOWN'S COLOR SCHEME FOR THE BELT LINE CORRIDOR, FROM IFS COATINGS, INC. PRODUCT # SRSL 90259, BATCH # C11341, DESCRIPTION: KIM PLATINUM SILVER.
7. SIGNAL HEADS SHALL BE BLACK POLYCARBONATE WITH BLACK POLYCARBONATE VISORS AND BACK PLATES.

PROPOSED SIGNALS



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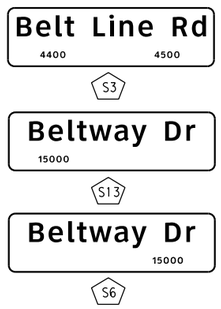
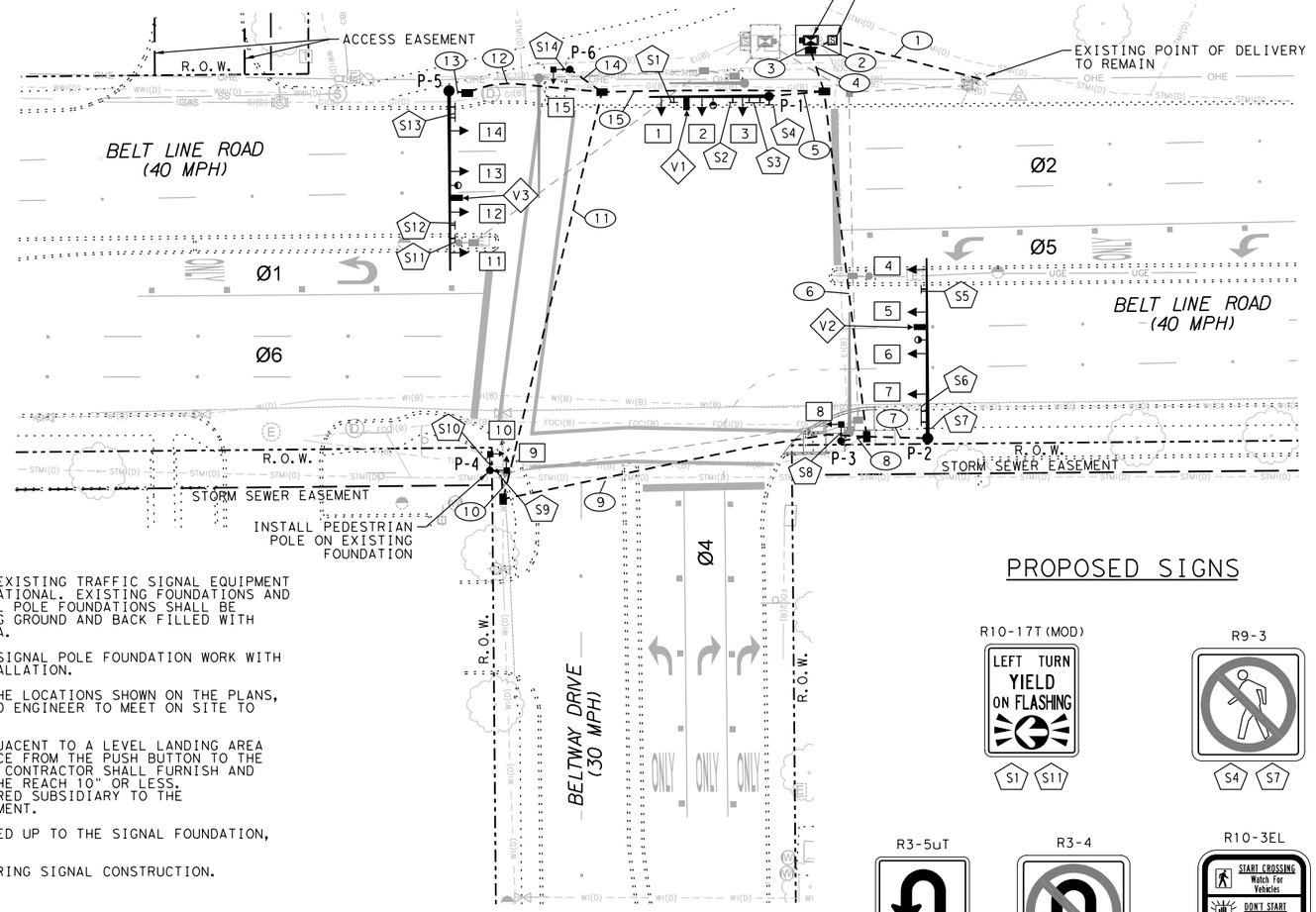
0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

LEGEND

- TYPICAL PROPOSED MAST ARM COMBINATION SIGNAL\ WITH PEDESTRIAN SIGNAL, PUSH BUTTON, LED LUMINAIRE AND SIGNAGE
- TYPICAL PROPOSED PED POLE WITH PEDESTRIAN SIGNAL, PUSH BUTTONS, AND SIGNAGE
- TRAFFIC SIGNAL CONTROLLER CABINET AND CONCRETE PAD WITH BBU SYSTEM (EXTERNAL BATTERY CABINET)
- PROPOSED TYPE C GROUND BOX W/ APRON
- PROPOSED CONDUIT
- (1) CONDUIT RUN NUMBER
- [1] SIGNAL HEAD NUMBER
- (S1) SIGN LABEL
- (V1) ITERIS CAMERA AND LABEL
- PROPOSED OPTICOM DETECTOR
- PROPOSED PTZ CAMERA
- [S] PROPOSED ELECTRICAL SERVICE
- P-# PROPOSED TRAFFIC SIGNAL POLE NUMBER
- Ø2 TRAFFIC SIGNAL PHASE NUMBER

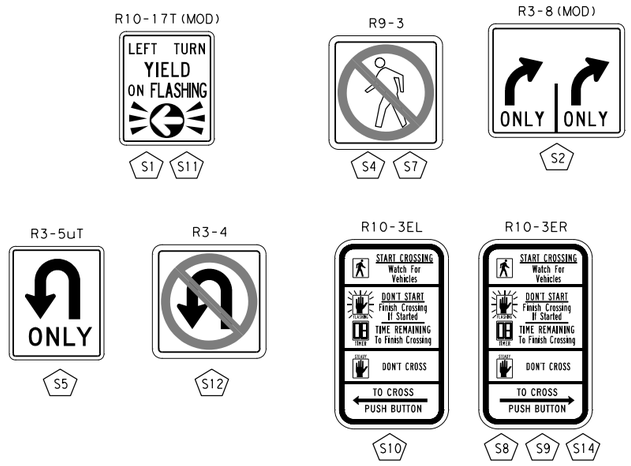
RELOCATED SIGNS





8. CONTRACTOR SHALL REMOVE AND SALVAGE ALL EXISTING TRAFFIC SIGNAL EQUIPMENT AFTER TEMPORARY SIGNAL EQUIPMENT IS OPERATIONAL. EXISTING FOUNDATIONS AND GROUND BOXES SHALL BE REMOVED, AND SIGNAL POLE FOUNDATIONS SHALL BE REMOVED TO A MINIMUM OF 2' BELOW EXISTING GROUND AND BACK FILLED WITH SIMILAR MATERIALS IN THE SURROUNDING AREA.
9. CONTRACTOR SHALL COORDINATE THE TRAFFIC SIGNAL POLE FOUNDATION WORK WITH THE EXISTING CURB RAMP AND SIDEWALK INSTALLATION.
10. IF SIGNAL POLES CANNOT BE INSTALLED IN THE LOCATIONS SHOWN ON THE PLANS, THE CONTRACTOR SHALL CONTACT THE TOWN AND ENGINEER TO MEET ON SITE TO DISCUSS NEW LOCATIONS.
11. PROPOSED PUSH BUTTONS SHALL BE PLACED ADJACENT TO A LEVEL LANDING AREA (2% MAX IN ANY DIRECTION). IF THE DISTANCE FROM THE PUSH BUTTON TO THE EDGE OF ACCESSIBLE PATH EXCEEDS 10", THE CONTRACTOR SHALL FURNISH AND INSTALL A PUSH BUTTON EXTENDER TO MAKE THE REACH 10" OR LESS. MEASUREMENT AND PAYMENT SHALL BE CONSIDERED SUBSIDIARY TO THE INSTALLATION OF THE TRAFFIC SIGNAL EQUIPMENT.
12. PROPOSED CURB RAMP LANDING SHALL BE POURED UP TO THE SIGNAL FOUNDATION, LEAVING NO GAPS.
13. PEDESTRIAN ACCESS SHALL BE MAINTAINED DURING SIGNAL CONSTRUCTION.

PROPOSED SIGNS



6/6/2022

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ADDISON

TRAFFIC SIGNAL PLANS

PROPOSED TRAFFIC SIGNAL LAYOUT

BELT LINE ROAD AT BELTWAY DRIVE

KHA PROJECT NUMBER: 063543039
SCALE: AS SHOWN
DATE: 6/6/2022

DESIGN	GRAPHICS	CHECK
TWH	LMR	TWH

13

PLOTTED: 6/6/2022
FILENAME: K:\DAL_TPTO\project\063543039 - Addison Signal Construction Support\CADD\Belt Line_SHT_112_Beltway_Proposed Signal.dgn
$$$SCALE$$$
BY: Lucy.Cunningham

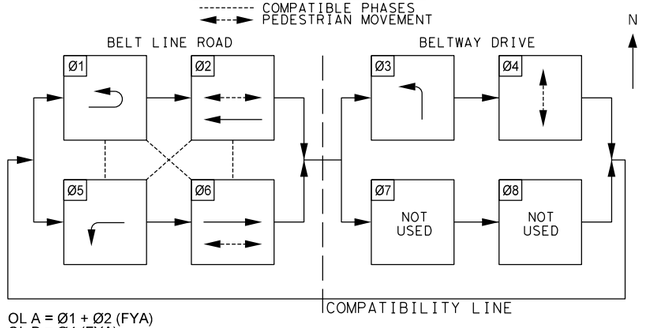
CONDUIT AND CABLE CHART
WIRE SIZE AND TYPE

RUN NO	CONDUIT STATUS	ITEM 618 CONDUIT										CABLE STATUS	ITEM 620 ELECTRICAL CONDUCTORS				ITEM 684 TRAFFIC SIGNAL CABLES										ITEM 6002		OPTICOM CABLE		TOTAL LENGTH OF RUN	RUN NO
		2" PVC SCH 80 (RISER)		2" PVC (TRENCHED)		3" PVC (TRENCHED)		4" PVC (TRENCHED)		4" PVC (BORED)			NO. 6 XHHW WIRE		NO. 6 BARE WIRE		TY C 2 CNDR NO. 12		TY A 3 CNDR NO. 14		TY A 5 CNDR NO. 14		TY A 7 CNDR NO. 14		TY A 20 CNDR NO. 14		VIVDS CABLE					
		Qty	Len	Qty	Len	Qty	Len	Qty	Len	Qty	Len		Qty	Len	Qty	Len	Qty	Len	Qty	Len	Qty	Len	Qty	Len	Qty	Len	Qty	Len	Qty	Len		
1	I	1	10	1	45							I	WIRING TO BE INSTALLED BY OTHERS																		45	1
2	I			1	10							I	2	20	1	10			3	30											10	2
3	I			1	5			2	10			I	2	10	1	5	4	20					3	15	3	15	3	15	3	15	5	3
4	I							2	30			I			1	15	4	60	3	45			3	45	3	45	3	45	3	45	15	4
5	I					1	20					I			1	20			1	20					1	20	1	20	1	20	20	5
6	I									1	100	I			1	100	2	200	1	100			1	100	1	100	1	100	1	100	100	6
7	I					1	20					I			1	20			1	20					1	20	1	20	1	20	20	7
8	I					1	5					I			1	5	2	10					1	5							5	8
9	I									1	105	I			1	105															105	9
10	I					1	10					I			1	10	2	20					1	10							10	10
11	I									1	115	I			1	115	2	230					1	115							115	11
12	I					1	40					I			1	40			1	40					1	40	1	40	1	40	40	12
13	I					1	10					I			1	10			1	10					1	10	1	10	1	10	10	13
14	I					1	15					I			1	15	1	15					1	15							15	14
15	I					1	65					I			1	65	3	195	1	65			2	130	1	65	1	65	1	65	65	15
SUBTOTAL			10		60		185		40		320			30		535		750		330		0		435		315		315		315		
P-1	P											I								30		70		50				45		35	VARIES	P-1
P-2	P											I								30		135		65				50		50	VARIES	P-2
P-3	P											I						5				10									VARIES	P-3
P-4	P											I						10				20									VARIES	P-4
P-5	P											I								30		95		65				50		50	VARIES	P-5
P-6	P											I						5				10									VARIES	P-6
SUBTOTAL			0		0		0		0		0			0		0		20		90		340		180		0		145		135		
TOTAL			10		60		185		40		320			30		535		770		420		340		615		315		460		450		

CONDUIT STATUS: E=EXISTING; I=INSTALL; A=ABANDON; AC=AERIAL CABLE; R=REMOVE AND SALVAGE; P=INSTALL WIRE INSIDE STEEL POLE
P-# - REFERS TO WIRING WITHIN THE SIGNAL POLE AND MAST ARM

GROUND BOX SUMMARY			
ITEM NO.	DESCRIPTION	UNIT	QTY.
0624	GROUND BOX TY C (162911) W/APRON	EA	6

PHASE SEQUENCE



OL A = Ø1 + Ø2 (FYA)
OL B = Ø4 (FYA)
OL C = Ø5 + Ø6 (FYA)

SIGNAL HEAD AND POLE PLACEMENT (FT)														
POLE NUMBER	STATUS	A (FT)	B (FT)	C (FT)	D (FT)	E (FT)	F (FT)	G (FT)	NO. OF HEADS (EA)*	ITEM 6002	DRILLED SHAFT LENGTH (FT)			FDN. TYPE WIND ZONE 80 MPH
										VIDEO DET. (EA)	24" DIA SUB TO ITEM 687	30" DIA TYPE A ITEM 416	36" DIA TYPE A ITEM 416	
P-1	I	3	7	10	11	-	32	19	3	1	-	11	-	30-A
P-2	I	9	12	11	11	11	48	19	4	1	-	-	13	36-A
P-3	I	8	PEDESTRIAN SIGNAL POLE					10	-	-	6	-	-	24-A
P-4	I	8	PEDESTRIAN SIGNAL POLE					10	-	-	-	-	-	E
P-5	I	4	9	11	11	11	48	19	4	1	-	-	13	36-A
P-6	I	10	PEDESTRIAN SIGNAL POLE					10	-	-	6	-	-	24-A
											12	11	26	

SIGNAL POLE STATUS: I=INSTALL; E=EXISTING; REM=REMOVE; F=INSTALL IN FUTURE PHASE
*- DOES NOT INCLUDE VERTICAL SIDEMOUNT SIGNAL HEADS OR PEDESTRIAN SIGNAL HEADS

6/6/2022

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ADDISON

TRAFFIC SIGNAL PLANS
PROPOSED QUANTITIES

BELT LINE ROAD AT
BELTWAY DRIVE

SHEET 1 OF 3

KHA PROJECT NUMBER: 063543039
SCALE: AS SHOWN
DATE: 6/6/2022

DESIGN	GRAPHICS	CHECK
TWH	LMR	TWH

PLOTTED: 6/6/2022
FILENAME: K:\DAL_TPTO\project\063543039 - Addison Signal Construction Support\CADD\Belt Line_SHT_113_Beltway_Signal Quantities.dgn
$$$SCALE$$$
BY: Lucy.Cunningham

CABLE TERMINATION CHART

CNDR. NO.	CONDUCTOR COLOR	CABLE 1 20 CNDR. FROM P-1 TO CNTRL.	CABLE 2 20 CNDR. FROM P-2 TO CNTRL.	CABLE 3 7 CNDR. FROM P-3 TO CNTRL.	CABLE 4 7 CNDR. FROM P-4 TO CNTRL.	CABLE 5 20 CNDR. FROM P-5 TO CNTRL.	CABLE 6 7 CNDR. FROM P-6 TO CNTRL.
1	BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
2	WHITE	SH COM	SH COM	SH COM	SH COM	SH COM	SH COM
3	RED	SH 2,3 - OLB R	SH 5,6,7 - Ø6 R	SH 8 - Ø6 DW	SH 9 - Ø6 DW	SH 12,13,14 - Ø2 R	SH 15 - Ø4 DW
4	GREEN	SH 2,3 - OLB G	SH 5,6,7 - Ø6 G	SH 8 - Ø6 W	SH 9 - Ø6 W	SH 12,13,14 - Ø2 G	SH 15 - Ø4 W
5	ORANGE	SH 2,3 - OLB Y	SH 5,6,7 - Ø6 Y	SPARE	SPARE	SH 12,13,14 - Ø2 Y	SPARE
6	BLUE	SPARE	SPARE	SPARE	SH 10 - Ø4 DW	SPARE	SPARE
7	WHITE/BLACK	SPARE	SPARE	SPARE	SH 10 - Ø4 W	SPARE	SPARE
8	RED/BLACK	SPARE	SPARE			SPARE	
9	GREEN/BLACK	SPARE	SPARE			SPARE	
10	ORANGE/BLACK	SPARE	SPARE			SPARE	
11	BLUE/BLACK	SPARE	SPARE			SPARE	
12	BLACK/WHITE	SPARE	SPARE			SPARE	
13	RED/WHITE	SH 1 - OLB R (LT ARW)	SH 4 - OLA R (UT ARW)			SH 11 - OLC R (LT ARW)	
14	GREEN/WHITE	SH 1 - Ø3 G (LT ARW)	SH 4 - Ø1 G (UT ARW)			SH 11 - Ø5 G (LT ARW)	
15	BLUE/WHITE	SH 1 - OLB Y (LT ARW)	SH 4 - OLA Y (UT ARW)			SH 11 - OLC Y (LT ARW)	
16	BLACK/RED	SPARE	SPARE			SPARE	
17	WHITE/RED	SPARE	SPARE			SPARE	
18	ORANGE/RED	SPARE	SPARE			SPARE	
19	BLUE/RED	SH 1 - OLB FY (LT ARW)	SH 4 - OLA FY (UT ARW)			SH 11 - OLC FY (LT ARW)	
20	RED/GREEN	SPARE	SPARE			SPARE	

*NOTE: HOME RUN 2 CONDR. TO ALL POLES WITH PED HEADS FOR PED CALL

SIGNAL HEADS (ITEM 682)

SIGNAL HEAD NUMBER	SIGNAL HEAD TYPE	STATUS	12" LED SIGNAL INDICATION											PED SIG SEC (LED) (COUNTDOWN)
			BACK PLATE		LED SIGNAL LAMPS									
			3 SEC	4 SEC	<-G-	G(U)	G	<-Y-	Y(U)	Y	<-R-	R(U)	R	
			EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA	EA
1	V4FYA	I		1	1			2			1			
2	V3	I	1				1			1			1	
3	V3	I	1				1			1			1	
4	V4FYA(U)	I		1		1			2			1		
5	V3	I	1				1			1			1	
6	V3	I	1				1			1			1	
7	V3	I	1				1			1			1	
8	PED	I												1
9	PED	I												1
10	PED	I												1
11	V4FYA	I			1			2			1			
12	V3	I	1				1			1			1	
13	V3	I	1				1			1			1	
14	V3	I	1				1			1			1	
15	PED	I												1
TOTAL (NEW)			8	2	2	1	8	4	2	8	2	1	8	4

STATUS: I=INSTALL; E=EXISTING; REM=EXISTING TO BE REMOVED; REL=RELOCATE

ELECTRICAL SERVICE DATA

ELEC. SERVICE ID	PLAN SHEET NUMBER	ELECTRICAL SERVICE DESCRIPTION (SEE ED(5)-14)	SERVICE CONDUIT **SIZE	SERVICE CONDUCTORS NO. / SIZE	SAFETY SWITCH AMPS	MAIN CKT. BRK. POLE / AMPS	TWO-POLE CONTACTOR AMPS	PANELBD / LOADCENTER AMP RATING (MIN)	BRANCH CIRCUIT ID	BRANCH CKT. BRK. POLE / AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
ES-01	____	TY D (120/240) 060 (NS) SS (E) PS (U)	2"	3 / #4	N/A	2P / 60	30	100	T.S.	1P / 50	23	<7.1
									ILSN	1P / 20	2	

** - VERIFY SERVICE CONDUIT SIZE WITH UTILITY. SIZE MAY CHANGE DUE TO THE UTILITY METER REQUIREMENTS. ENSURE CONDUIT SIZE MEETS THE NATIONAL ELECTRICAL CODE.

6/6/2022

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ADDISON

TRAFFIC SIGNAL PLANS
PROPOSED QUANTITIES

BELT LINE ROAD AT
BELTWAY DRIVE

SHEET 2 OF 3

KHA PROJECT NUMBER: 063543039

SCALE: AS SHOWN

DATE: 6/6/2022

DESIGN	GRAPHICS	CHECK
TWH	LMR	TWH

15

APS MESSAGE CHART			
POLE LOCATION	PEDESTRIAN MOVEMENT	FUNCTIONS	SPEECH MESSAGE/SOUND DETAILS
P-3	Phase 6	BUTTON PUSH ON DW	WAIT TO CROSS BELTWAY DRIVE AT BELT LINE ROAD
		EXTENDED BUTTON PUSH	WAIT TO CROSS BELTWAY DRIVE AT BELT LINE ROAD
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	BELTWAY, WALK LIGHT IS ON TO CROSS BELTWAY
P-4	Phase 4	BUTTON PUSH ON DW	WAIT TO CROSS BELT LINE ROAD AT BELTWAY DRIVE
		EXTENDED BUTTON PUSH	WAIT TO CROSS BELT LINE ROAD AT BELTWAY DRIVE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	BELT LINE, WALK LIGHT IS ON TO CROSS BELT LINE
P-4	Phase 6	BUTTON PUSH ON DW	WAIT TO CROSS BELTWAY DRIVE AT BELT LINE ROAD
		EXTENDED BUTTON PUSH	WAIT TO CROSS BELTWAY DRIVE AT BELT LINE ROAD
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	BELTWAY, WALK LIGHT IS ON TO CROSS BELTWAY
P-6	Phase 4	BUTTON PUSH ON DW	WAIT TO CROSS BELT LINE ROAD AT BELTWAY DRIVE
		EXTENDED BUTTON PUSH	WAIT TO CROSS BELT LINE ROAD AT BELTWAY DRIVE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	BELT LINE, WALK LIGHT IS ON TO CROSS BELT LINE

* COUNTDOWN SPEECH MESSAGE = "OFF" FOR ALL UNITS

SIGNS SUMMARY					
SIGN *	SIGN TYPE	SIGN LEGEND	STATUS	SUPPORT	SIGN DIMENSION (in x in)
S1	R10-17T(MOD)	LEFT TURN YIELD ON FLASHING	I	P-1	30"x30"
S2	R3-8(MOD)	LANE ASSIGNMENT	I	P-1	36"x30"
S3	ILSN	BELT LINE RD	REL	P-1	24"xVA
S4	R9-3	NO PEDESTRIANS	I	P-1	24"x24"
S5	R3-5uT	LANE ASSIGNMENT	I	P-2	30"x36"
S6	ILSN	BELTWAY DR	REL	P-2	24"xVA
S7	R9-3	NO PEDESTRIANS	I	P-2	24"x24"
S8	R10-3ER	PED PUSH BUTTON	I	P-3	9"x15"
S9	R10-3ER	PED PUSH BUTTON	I	P-4	9"x15"
S10	R10-3EL	PED PUSH BUTTON	I	P-4	9"x15"
S11	R10-17T(MOD)	LEFT TURN YIELD ON FLASHING	I	P-5	30"x30"
S12	R3-4	NO U-TURN	I	P-5	36"x36"
S13	ILSN	BELTWAY DR	REL	P-5	24"xVA
S14	R10-3ER	PED PUSH BUTTON	I	P-6	9"x15"

STATUS: I=INSTALL; E=EXISTING; REM=EXISTING TO BE REMOVED; REL=EXISTING TO BE RELOCATED

VIDEO DETECTION DETAILS						
VIDEO DETECTOR NUMBER	MOUNTING LOCATION	MOUNTING HEIGHT	ZONE LOCATIONS	ZONE(S)	DIMENSIONS	DETECT UNIT
V1	MAST ARM P-1	24'	STOP BAR	V4-1	6'X40'	Ø4-1
				V4-2	6'X40'	Ø4-2
				V4-3	6'X40'	Ø4-3
V2	MAST ARM P-2	24'	STOP BAR	V1-1	6'X40'	Ø1-1
				V6-1	6'X40'	Ø6-1
				V6-2	6'X40'	Ø6-2
				V6-3	6'X40'	Ø6-3
V3	MAST ARM P-5	24'	STOP BAR	V5-1	6'X40'	Ø5-1
				V2-1	6'X40'	Ø2-1
				V2-2	6'X40'	Ø2-2
				V2-3	6'X40'	Ø2-3

6/6/2022

STATE OF TEXAS
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ADDISON

TRAFFIC SIGNAL PLANS
PROPOSED QUANTITIES

BELT LINE ROAD AT
BELTWAY DRIVE

SHEET 3 OF 3

KHA PROJECT NUMBER: 063543039

SCALE: AS SHOWN

DATE: 6/6/2022

DESIGN	GRAPHICS	CHECK
TWH	LMR	TWH

NOTES:

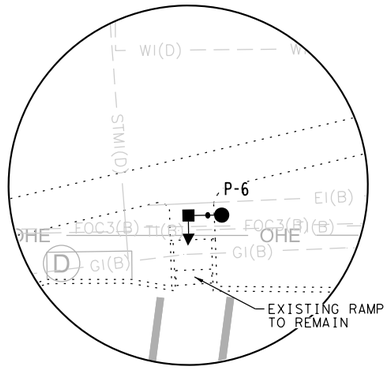
1. INSTALLATION AND PAYMENT FOR PROPOSED SIDEWALKS SHALL INCLUDE ALL INCIDENTAL WORK, INCLUDING EXCAVATION, REMOVAL AND DISPOSAL OF EXISTING CONCRETE CURB AND SIDEWALK, PROPOSED CURB ALONG SIDEWALKS, AND OTHER MISCELLANEOUS MATERIAL NECESSARY TO CONSTRUCT THE PROPOSED SIDEWALKS. QUANTITIES PROVIDED ARE ESTIMATES ONLY. PAVEMENT FOR SIDEWALK SHALL BE FOR THE QUANTITY APPROVED BY THE ENGINEER AND CONSTRUCTED ON SITE.
2. PROPOSED SIDEWALKS SHALL NOT EXCEED 2% MAX CROSS SLOPE AND 5% RUNNING SLOPE.
3. EXISTING STRIPING AND BUTTONS SHALL REMAIN UNLESS OTHERWISE NOTED.
4. PEDESTRIAN ACCESS SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION.

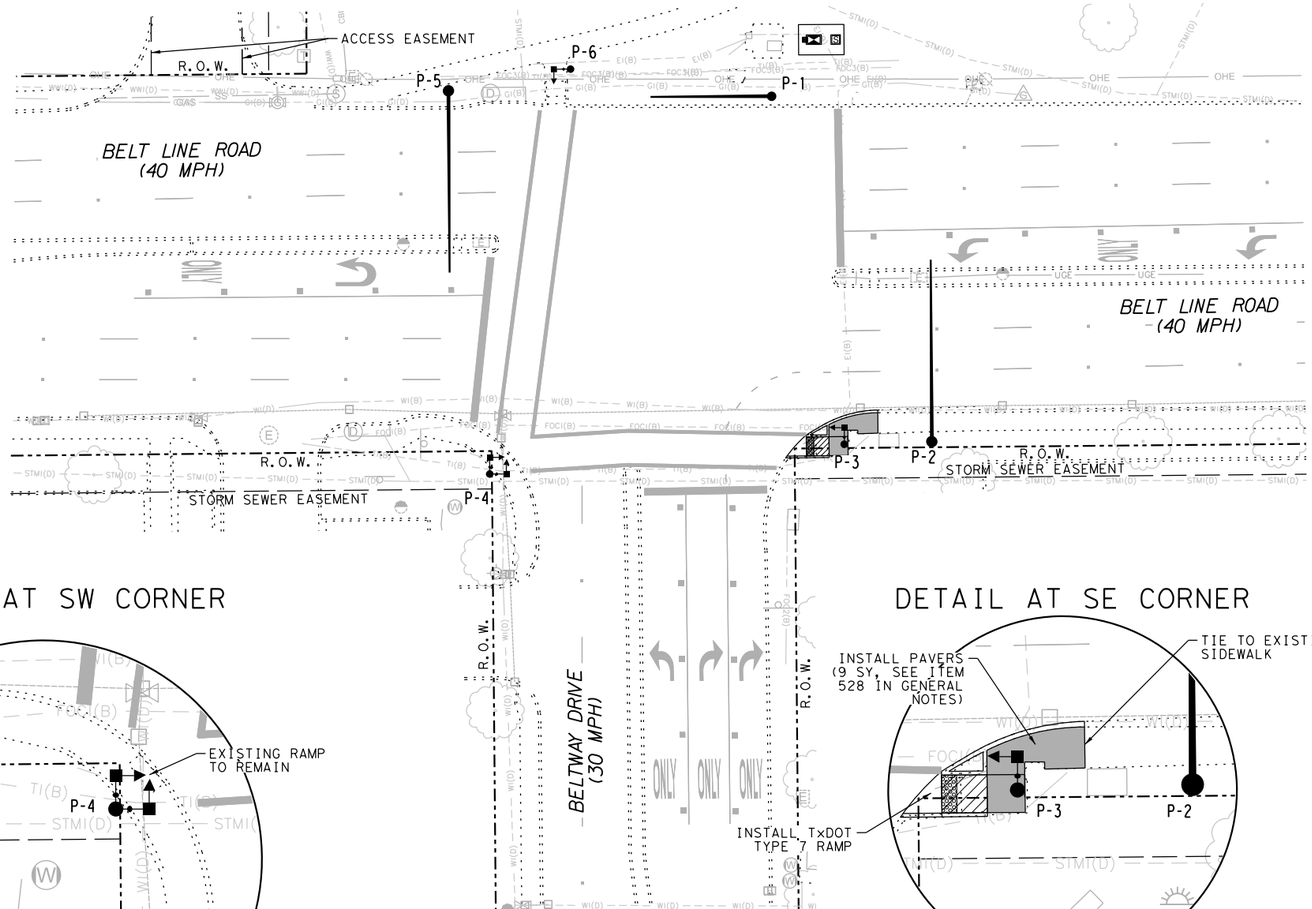
STOP!
CALL BEFORE YOU DIG
DIG TESS
1-800-DIG-TESS
(@ least 72 hours prior to digging)

CAUTION!!
EXISTING UNDERGROUND UTILITIES IN THE AREA CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REPAIRS TO EXISTING UTILITIES DUE TO DAMAGE INCURRED DURING CONSTRUCTION. CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES ON THE PLANS.

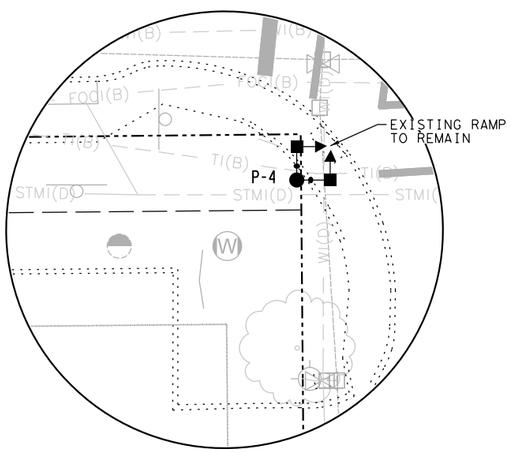
0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

DETAIL AT NW CORNER





DETAIL AT SW CORNER



DETAIL AT SE CORNER

LEGEND

PEDESTRIAN RAMPS

- 8.3% MAX RUNNING SLOPE 2% MAX CROSS SLOPE
- 5% MAX RUNNING SLOPE 2% MAX CROSS SLOPE
- TRUNCATED DOME DETECTABLE WARNING
- BRICK PAVERS

6/6/2022

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ADDISON

TRAFFIC SIGNAL PLANS

PROPOSED PEDESTRIAN RAMPS AND PAVEMENT MARKINGS

BELT LINE ROAD AT BELTWAY DRIVE

KHA PROJECT NUMBER: 063543039
SCALE: AS SHOWN
DATE: 6/6/2022

DESIGN	GRAPHICS	CHECK	
TWH	LMR	TWH	17

PLOTTED: 6/6/2022
FILENAME: K:\DAL_TPTO\project\063543039 - Addison Signal Construction Support\CADD\Belt Line_SHT_116_Beltway_Proposed Ramps.dgn
$$$SCALE$$$
BY: Lucy.Cunningham

NOTES:

1. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING THE EXISTING TRAFFIC SIGNAL HARDWARE, PAVEMENT MARKINGS, SIGNING, RIGHT-OF-WAY, AND THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL-INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.
2. THE ENGINEER DOES NOT CONFIRM OR VALIDATE THE EXISTING ITEMS SHOWN.
3. CONTRACTOR SHALL MAINTAIN THE EXISTING SIGNAL INSTALLATION AND OPERATIONS AT THIS INTERSECTION UNTIL THE PROPOSED SIGNAL IS OPERATIONAL.
4. CONTRACTOR SHALL REMOVE ALL EXISTING TRAFFIC SIGNAL EQUIPMENT AFTER PROPOSED SIGNAL EQUIPMENT IS OPERATIONAL. EXCEPT WHERE NOTED, EXISTING GROUND BOXES SHALL BE REMOVED AND BACKFILLED WITH SIMILAR MATERIAL TO AN EQUIVALENT CONDITION UNLESS IT IS IDENTIFIED IN THE PLANS TO REMAIN. THE EXISTING FOUNDATIONS SHALL BE REMOVED, AND THE SIGNAL POLE FOUNDATIONS SHALL BE REMOVED TO A MINIMUM OF 2' BELOW EXISTING SURFACE AND BACKFILLED WITH SIMILAR MATERIAL TO AN EQUIVALENT CONDITION IN THE SURROUNDING AREA. SEE GENERAL NOTES AND SPECIFICATIONS FOR MORE INFORMATION.
5. ELIMINATE EXISTING PAVEMENT MARKINGS WHICH CONFLICT WITH PROPOSED MARKINGS. REFER TO PAVEMENT MARKING SHEET FOR ADDITIONAL INFORMATION.
6. CURB RAMP AND SIDEWALK REMOVALS SHALL BE SUBSIDIARY TO THE INSTALLATION OF NEW CURB RAMP OR CONCRETE SIDEWALK (SEE TxDOT ITEM 531 QTYS AND PROPOSED PEDESTRIAN RAMP AND SIDEWALK LAYOUT).

STOP!
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DIG TESS
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CAUTION!!
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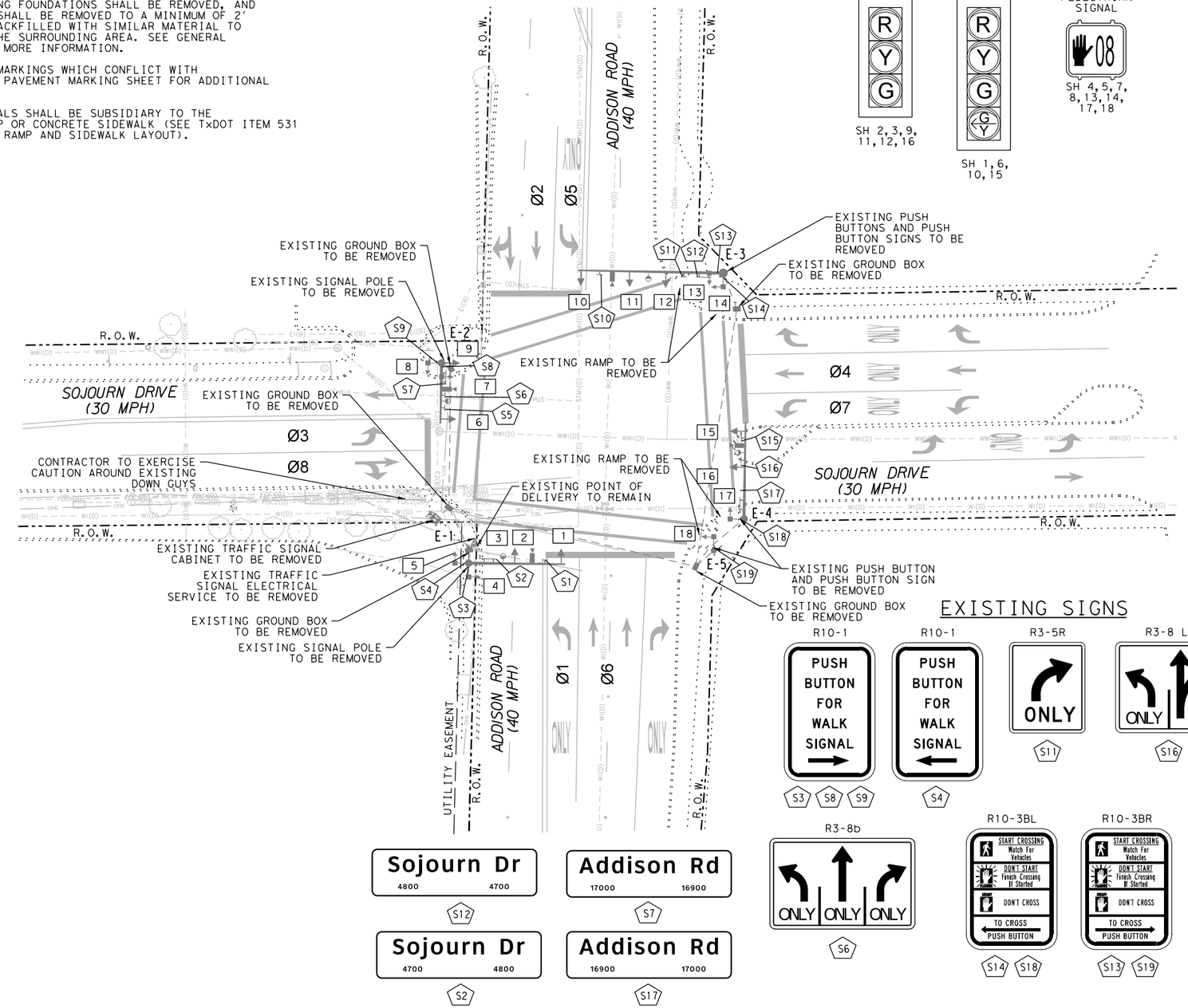
0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

EXISTING SIGNALS

V3 — SH 2, 3, 9, 11, 12, 16
V4LT (BI-MODAL) — SH 1, 6, 10, 15
LED COUNTDOWN PEDESTRIAN SIGNAL — SH 4, 5, 7, 8, 13, 14, 17, 18



LEGEND

- EXISTING TYPICAL MAST ARM COMBINATION SIGNAL\ WITH PEDESTRIAN SIGNAL, PUSH BUTTON, LUMINAIRE, AND SIGNAGE
- EXISTING TYPICAL PED POLE WITH PEDESTRIAN SIGNAL, PUSH BUTTONS, AND SIGNAGE
- EXISTING TRAFFIC SIGNAL CONTROLLER CABINET
- EXISTING GROUND BOX
- EXISTING CONDUIT
- EXISTING ELECTRICAL SERVICE
- EXISTING VIVDS
- SIGNAL HEAD NUMBER
- SIGN LABEL
- E-# EXISTING TRAFFIC SIGNAL POLE NUMBER

EXISTING SIGNS

R10-1 PUSH BUTTON FOR WALK SIGNAL — S3, S8, S9
R10-1 PUSH BUTTON FOR WALK SIGNAL — S4
R3-5R ONLY — S11
R3-8 LK ONLY — S16
R3-8b ONLY ONLY ONLY — S6
R10-3BL START CROSSING Watch For Vehicles / DON'T START Finish Crossing If Started / DON'T CROSS / TO CROSS PUSH BUTTON — S14, S18
R10-3BR START CROSSING Watch For Vehicles / DON'T START Finish Crossing If Started / DON'T CROSS / TO CROSS PUSH BUTTON — S13, S19
R10-12 LEFT TURN YIELD ON GREEN — S1, S5, S10, S15

Sojourn Dr 4800 4700 — S12
Addison Rd 17000 16900 — S7
Sojourn Dr 4700 4800 — S2
Addison Rd 16900 17000 — S17

6/6/2022

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ADDISON

TRAFFIC SIGNAL PLANS
EXISTING CONDITIONS AND REMOVALS
ADDISON ROAD AT SOJOURN DRIVE

KHA PROJECT NUMBER: 063543039
SCALE: AS SHOWN
DATE: 6/6/2022

DESIGN	GRAPHICS	CHECK
TWH	LMR	TWH

PLOTTED: 6/6/2022
FILENAME: K:\DAL_TPTO\project\063543039 - Addison Signal Construction Support\CADD\Sojourn_SHT_011_Existing Conditions.dgn
$$$SCALE$$$
BY: Lucy.Cunningham

NOTES:

1. THE INFORMATION SHOWN ON THESE DRAWINGS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL-INCLUSIVE. BEFORE CONSTRUCTION, CONTRACTOR TO MAKE DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES TO AVOID DAMAGE THERETO.
2. ALL WORK DETAILED ON THESE PLANS TO BE PERFORMED UNDER THIS CONTRACT SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE TOWN OF ADDISON SPECIFICATIONS. CONTRACTOR TO CONTACT THE TOWN OF ADDISON PUBLIC WORKS AND ENGINEERING SERVICES AT (972-450-2852) 48 HOURS IN ADVANCE TO COORDINATE WORK.
3. THE LOCATION OF THE PROPOSED SIGNAL POLES, SIGNAL HEADS, AUTOSCOPE VISION, DETECTORS, CONDUIT, GROUND BOXES, AND CONDUCTORS ARE DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE ENGINEER TO ACCOMMODATE FIELD CONDITIONS.
4. THE FOLLOWING ITEMS WILL BE FURNISHED AND INSTALLED BY THE CONTRACTOR: SIGNAL CABINET, ALL INTERNAL HARDWARE, AND VIVDS EQUIPMENT. EXISTING BATTERY BACKUP UNIT, CELLULAR MODEM, AND 900 MHZ RADIO WILL BE RELOCATED FROM EXISTING CABINET.
5. INSTALL BASE MOUNTED CONTROLLER CABINET (HENKE ENTERPRISES TS2 ADDISON CABINET ASSEMBLY 2 DOOR P44) AND FOUNDATION.
6. SIGNAL POLES SHALL BE POWDERCOATED BLACK TO MATCH EXISTING POLES AT THE INTERSECTION.
7. SIGNAL HEADS SHALL BE BLACK POLYCARBONATE WITH BLACK POLYCARBONATE VISORS AND BACK PLATES.
8. CONTRACTOR SHALL REMOVE AND SALVAGE ALL EXISTING TRAFFIC SIGNAL EQUIPMENT AFTER PROPOSED SIGNAL EQUIPMENT IS OPERATIONAL. EXISTING FOUNDATIONS AND GROUND BOXES SHALL BE REMOVED, AND SIGNAL POLE FOUNDATIONS SHALL BE REMOVED TO A MINIMUM OF 2' BELOW EXISTING GROUND AND BACK FILLED WITH SIMILAR MATERIALS IN THE SURROUNDING AREA.
9. CONTRACTOR SHALL COORDINATE THE TRAFFIC SIGNAL POLE FOUNDATION WORK WITH THE CURB RAMP AND SIDEWALK INSTALLATION. IF CURB RAMPS ARE CONSTRUCTED FIRST, CONTRACTOR SHALL NOTIFY THE TOWN AND ENGINEER SO A FIELD MEETING CAN BE SCHEDULED TO DETERMINE IF FOUNDATIONS NEED TO BE SHIFTED TO BE ADJACENT TO THE LANDING AREAS. IF SIGNAL POLE FOUNDATIONS ARE INSTALLED FIRST, THE CURB RAMPS AND SIDEWALKS SHALL BE MODIFIED SO THAT THE CURB RAMP LANDING AREAS ARE ADJACENT TO THE PUSH BUTTONS AND THE SIDE REACH TO THE PUSH BUTTONS ARE 10" OR LESS.

STOP!
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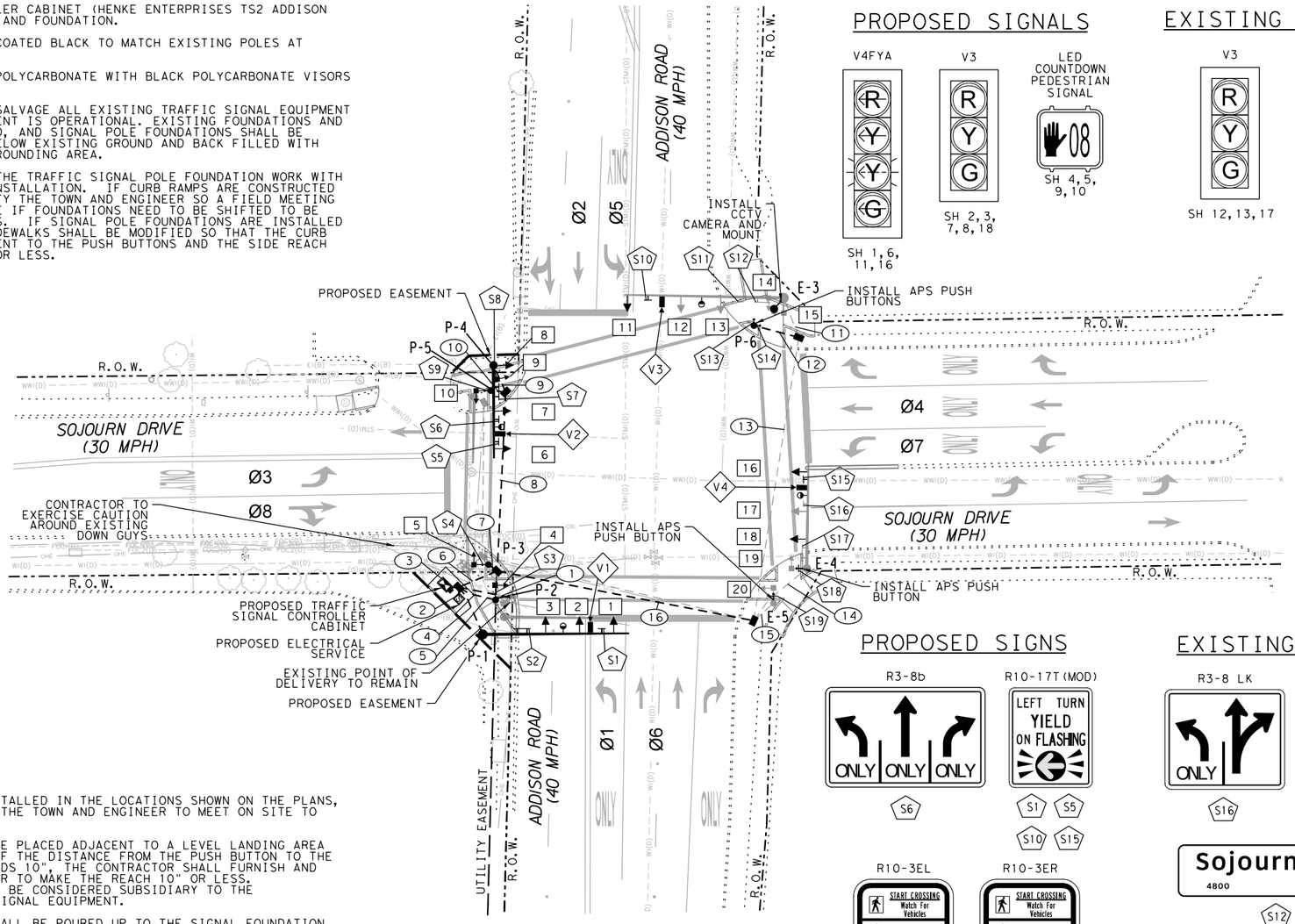
1-800-DIG-TESS
(@ least 72 hours prior to digging)

CAUTION!!
EXISTING UNDERGROUND UTILITIES IN THE AREA CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REPAIRS TO EXISTING UTILITIES DUE TO DAMAGE INCURRED DURING CONSTRUCTION. CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES ON THE PLANS.



PROPOSED SIGNALS

EXISTING SIGNALS

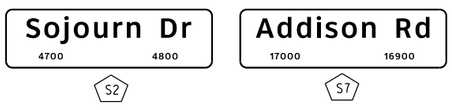
0 10 20 40
ORIGINALLY PLOTTED SCALE:
SCALE: 1" = 40'

LEGEND

- TYPICAL PROPOSED MAST ARM COMBINATION SIGNAL\ WITH PEDESTRIAN SIGNAL, PUSH BUTTON, LED LUMINAIRE AND SIGNAGE
- TYPICAL PROPOSED PED POLE WITH PEDESTRIAN SIGNAL, PUSH BUTTONS, AND SIGNAGE
- TRAFFIC SIGNAL CONTROLLER CABINET AND CONCRETE PAD WITH BBU SYSTEM (EXTERNAL BATTERY CABINET)
- PROPOSED TYPE C GROUND BOX W/ APRON
- PROPOSED CONDUIT
- (1) CONDUIT RUN NUMBER
- [1] SIGNAL HEAD NUMBER
- (S1) SIGN LABEL
- (V1) ITERIS CAMERA AND LABEL
- PROPOSED OPTICOM DETECTOR
- PROPOSED PTZ CAMERA
- [S] PROPOSED ELECTRICAL SERVICE
- P-# PROPOSED TRAFFIC SIGNAL POLE NUMBER
- Ø2 TRAFFIC SIGNAL PHASE NUMBER

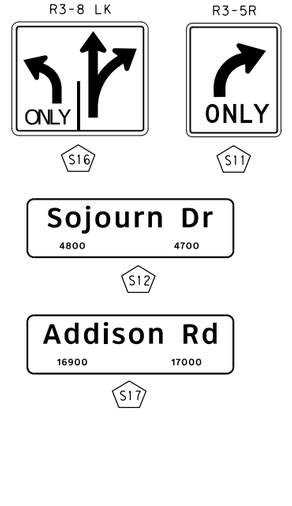
10. IF SIGNAL POLES CANNOT BE INSTALLED IN THE LOCATIONS SHOWN ON THE PLANS, THE CONTRACTOR SHALL CONTACT THE TOWN AND ENGINEER TO MEET ON SITE TO DISCUSS NEW LOCATIONS.
11. PROPOSED PUSH BUTTONS SHALL BE PLACED ADJACENT TO A LEVEL LANDING AREA (2% MAX IN ANY DIRECTION). IF THE DISTANCE FROM THE PUSH BUTTON TO THE EDGE OF ACCESSIBLE PATH EXCEEDS 10" THE CONTRACTOR SHALL FURNISH AND INSTALL A PUSH BUTTON EXTENDER TO MAKE THE REACH 10" OR LESS. MEASUREMENT AND PAYMENT SHALL BE CONSIDERED SUBSIDIARY TO THE INSTALLATION OF THE TRAFFIC SIGNAL EQUIPMENT.
12. PROPOSED CURB RAMP LANDING SHALL BE POURED UP TO THE SIGNAL FOUNDATION, LEAVING NO GAPS.
13. PEDESTRIAN ACCESS SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION.
14. CONTRACTOR TO VERIFY THAT EASEMENT ACQUISITION HAS BEEN FINALIZED PRIOR TO COMMENCEMENT OF CONSTRUCTION.

RELOCATED SIGNS



PROPOSED SIGNS

EXISTING SIGNS



6/6/2022

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ADDISON

TRAFFIC SIGNAL PLANS

PROPOSED TRAFFIC SIGNAL LAYOUT

ADDISON ROAD AT SOJOURN DRIVE

KHA PROJECT NUMBER: 063543039
SCALE: AS SHOWN
DATE: 6/6/2022

DESIGN	GRAPHICS	CHECK
TWH	LMR	TWH

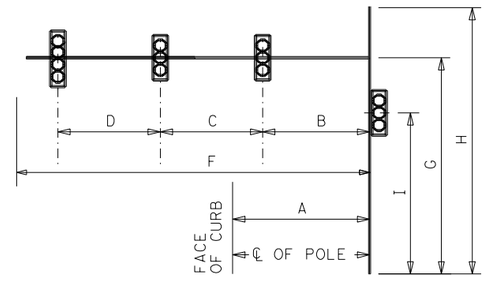
PLOTTED: 6/6/2022
FILENAME: K:\DAL_TPTO\project\063543039 - Addison Signal Construction Support\CADD\Sojourn_SHT_012_Proposed Signal.dgn
$$$SCALE$$$
BY: Lucy.Cunningham

CONDUIT AND CABLE CHART
WIRE SIZE AND TYPE

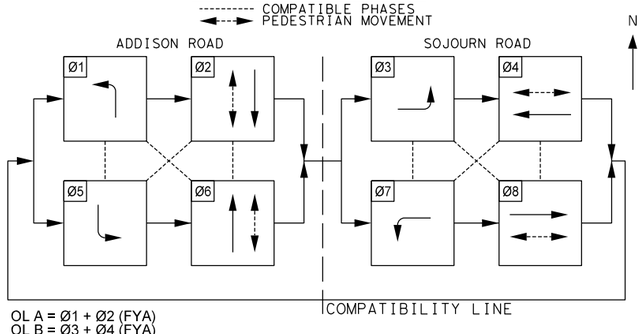
RUN NO	CONDUIT STATUS	ITEM 618 CONDUIT										CABLE STATUS	ITEM 620 ELECTRICAL CONDUCTORS				ITEM 684 TRAFFIC SIGNAL CABLES										ITEM 6002		OPTICOM CABLE		CAT 5 ETHERNET CABLE		TOTAL LENGTH OF RUN	RUN NO
		2" PVC SCH 80 (RISER)		2" PVC (TRENCHED)		3" PVC (TRENCHED)		4" PVC (TRENCHED)		4" PVC (BORED)			NO. 6 XHHW WIRE		NO. 6 BARE WIRE		TY C 2 CNDR NO. 12		TY A 3 CNDR NO. 14		TY A 5 CNDR NO. 14		TY A 7 CNDR NO. 14		TY A 20 CNDR NO. 14		VIVDS CABLE							
		Qty	Len	Qty	Len	Qty	Len	Qty	Len	Qty	Len		Qty	Len	Qty	Len	Qty	Len	Qty	Len	Qty	Len	Qty	Len	Qty	Len	Qty	Len	Qty	Len	Qty	Len		
1	I	1	20	1	20							I	WIRING TO BE INSTALLED BY OTHERS																				20	1
2	I			2	10							I	4	20	1	5			4	20													5	2
3	I			1	5			2	10			I	2	10	1	5	8	40					5	25	4	20	4	20	4	20	1	5	5	3
4	I					1	20					I			1	20			1	20					1	20	1	20	1	20			20	4
5	I					1	15					I			1	15	1	15					1	15									15	5
6	I							1	15			I			1	15	7	105	3	45			4	60	3	45	3	45	3	45	1	15	15	6
7	I					1	5					I			1	5	1	5					1	5									5	7
8	I									1	60	I			1	60	2	120	1	60			1	60	1	60	1	60	1	60			60	8
9	I					1	10					I			1	10	1	10	1	10					1	10	1	10	1	10			10	9
10	I					1	5					I			1	5	1	5					1	5									5	10
11	E											I			1	15			1	15					1	15	1	15	1	15	1	15	15	11
12	I					1	15					I			1	15	2	30					1	15									15	12
13	E											I			1	90	2	180	1	90			1	90	1	90	1	90	1	90	1	90	90	13
14	E											I			1	25	1	25	1	25					1	25	1	25	1	25			25	14
15	E											I			1	10	1	10					1	10									10	15
16	I									1	85	I			1	85	4	340	2	170			2	170	2	170	2	170	2	170	1	85	85	16
SUBTOTAL			20		35		70		25		145			30		380		885		455		0		455		455		455		455		210		
P-1	P											I								30		90		60				55		45			VARIES	P-1
P-2	P											I						5				10											VARIES	P-2
P-3	P											I						5				10											VARIES	P-3
P-4	P											I						5		30		65		50				45		40			VARIES	P-4
P-5	P											I						5				10											VARIES	P-5
P-6	P											I						10															VARIES	P-6
E-3	P											I								30		100		70				65		45		30	VARIES	E-3
E-4	P											I						5		30		70		50				50		45			VARIES	E-4
E-5	P											I						5				10											VARIES	E-5
SUBTOTAL			0		0		0		0		0			0		0		40		120		365		230		0		215		0		0		
TOTAL			20		35		70		25		145			30		380		925		575		365		685		455		670		455		210		

CONDUIT STATUS: E=EXISTING; I=INSTALL; A=ABANDON; AC=AERIAL CABLE; R=REMOVE AND SALVAGE; P=INSTALL WIRE INSIDE STEEL POLE
P-# - REFERS TO WIRING WITHIN THE SIGNAL POLE AND MAST ARM

GROUND BOX SUMMARY			
ITEM NO.	DESCRIPTION	UNIT	QTY.
0624	GROUND BOX TY C (162911) W/APRON	EA	5



PHASE SEQUENCE



OL A = Ø1 + Ø2 (FYA)
OL B = Ø3 + Ø4 (FYA)
OL C = Ø5 + Ø6 (FYA)
OL D = Ø7 + Ø8 (FYA)

SIGNAL HEAD AND POLE PLACEMENT (FT)														
POLE NUMBER	STATUS	A (FT)	B (FT)	C (FT)	D (FT)	F (FT)	G (FT)	H (FT)	I (FT)	NO. OF HEADS (EA)*	ITEM 6002	DRILLED SHAFT LENGTH (FT)			FDN. TYPE WIND ZONE 80 MPH
											VIDEO DET. (EA)	24" DIA SUB TO ITEM 687	30" DIA TYPE A ITEM 416	36" DIA TYPE A ITEM 416	
P-1	I	8	16	11	11	44	19	-	-	3	1	-	-	13	36-A
P-2	I	7	PEDESTRIAN SIGNAL POLE			10	-	-	-	-	6	-	-	24-A	
P-3	I	6	PEDESTRIAN SIGNAL POLE			19	-	13	2	1	-	11	-	30-A	
P-4	I	10	14	12	-	28	19	-	13	2	1	-	11	-	30-A
P-5	I	6	PEDESTRIAN SIGNAL POLE			10	-	-	-	-	6	-	-	24-A	
P-6	I	3	PEDESTRIAN PUSH BUTTON POLE			10	-	-	-	-	5	-	-	24-A	
E-3	I	15	20	12	17	48	19	-	-	3	1	-	-	-	E
E-4	I	5	9	9	12	32	19	-	-	3	1	-	-	-	E
E-5	I	8	PEDESTRIAN SIGNAL POLE			10	-	-	-	1	-	-	-	-	E
									TOTAL:		5	17	22	13	

SIGNAL POLE STATUS: I=INSTALL; E=EXISTING; REM=REMOVE; F=INSTALL IN FUTURE PHASE
*- DOES NOT INCLUDE VERTICAL SIDEMOUNT SIGNAL HEADS OR PEDESTRIAN SIGNAL HEADS

6/6/2022

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ADDISON

TRAFFIC SIGNAL PLANS
PROPOSED QUANTITIES

ADDISON ROAD AT
SOJOURN DRIVE

SHEET 1 OF 3

KHA PROJECT NUMBER: 063543039
SCALE: AS SHOWN
DATE: 6/6/2022

DESIGN	GRAPHICS	CHECK
TWH	LMR	TWH

PLOTTED: 6/6/2022
FILENAME: K:\DAL_TPTO\project\063543039 - Addison Signal Construction Support\CADD\Sojourn_SHT_013_Signal Quantities.dgn
$$$SCALE$$$
BY: Lucy.Cunningham

CABLE TERMINATION CHART

CNDR. NO.	CONDUCTOR COLOR	CABLE 1 20 CNDR.	CABLE 2 7 CNDR.	CABLE 3 7 CNDR.	CABLE 4 20 CNDR.	CABLE 5 7 CNDR.	CABLE 6 20 CNDR.	CABLE 7 20 CNDR.	CABLE 8 7 CNDR.
		FROM P-1 TO CNTRL.	FROM P-2 TO CNTRL.	FROM P-3 TO CNTRL.	FROM P-4 TO CNTRL.	FROM P-5 TO CNTRL.	FROM E-3 TO CNTRL.	FROM E-4 TO CNTRL.	FROM E-5 TO CNTRL.
1	BLACK	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE
2	WHITE	SH COM	SH COM	SH COM	SH COM	SH COM	SH COM	SH COM	SH COM
3	RED	SH 2,3 - Ø2 R	SH 4 - Ø8 DW	SH 5 - Ø2 DW	SH 7,8 - Ø4 R	SH 10 - Ø2 DW	SH 12,13 - Ø6 R	SH 17,18 - Ø8 R	SH 20 - Ø8 DW
4	GREEN	SH 2,3 - Ø2 G	SH 4 - Ø8 W	SH 5 - Ø2 W	SH 7,8 - Ø4 G	SH 10 - Ø2 W	SH 12,13 - Ø6 G	SH 17,18 - Ø8 G	SH 20 - Ø8 W
5	ORANGE	SH 2,3 - Ø2 Y	SPARE	SPARE	SH 7,8 - Ø4 Y	SPARE	SH 12,13 - Ø6 Y	SH 17,18 - Ø8 Y	SPARE
6	BLUE	SPARE	SPARE	SPARE	SH 9 - Ø4 DW	SPARE	SH 14 - Ø6 DW	SH 19 - Ø6 DW	SPARE
7	WHITE/BLACK	SPARE	SPARE	SPARE	SH 9 - Ø4 W	SPARE	SH 14 - Ø6 W	SH 19 - Ø6 W	SPARE
8	RED/BLACK	SPARE			SPARE		SPARE	SPARE	
9	GREEN/BLACK	SPARE			SPARE		SH 15 - Ø4 DW	SPARE	
10	ORANGE/BLACK	SPARE			SPARE		SH 15 - Ø4 W	SPARE	
11	BLUE/BLACK	SPARE			SPARE		SPARE	SPARE	
12	BLACK/WHITE	SPARE			SPARE		SPARE	SPARE	
13	RED/WHITE	SH 1 - OLC R (LT ARW)			SH 6 - OLD R (LT ARW)		SH 11 - OLA R (LT ARW)	SH 16 - OLB R (LT ARW)	
14	GREEN/WHITE	SH 1 - Ø5 G (LT ARW)			SH 6 - Ø7 G (LT ARW)		SH 11 - Ø1 G (LT ARW)	SH 16 - Ø3 G (LT ARW)	
15	BLUE/WHITE	SH 1 - OLC Y (LT ARW)			SH 6 - OLD Y (LT ARW)		SH 11 - OLA Y (LT ARW)	SH 16 - OLB Y (LT ARW)	
16	BLACK/RED	SPARE			SPARE		SPARE	SPARE	
17	WHITE/RED	SPARE			SPARE		SPARE	SPARE	
18	ORANGE/RED	SPARE			SPARE		SPARE	SPARE	
19	BLUE/RED	SH 1 - OLC FY (LT ARW)			SH 6 - OLD FY (LT ARW)		SH 11 - OLA FY (LT ARW)	SH 16 - OLB FY (LT ARW)	
20	RED/GREEN	SPARE			SPARE		SPARE	SPARE	

*NOTE: HOME RUN 2 CONDR. TO ALL POLES WITH PED HEADS FOR PED CALL

SIGNAL HEADS (ITEM 682)

SIGNAL HEAD NUMBER	12" LED SIGNAL INDICATION										PED SIG SEC (LED) (COUNTDOWN)
	SIGNAL HEAD TYPE	STATUS	BACK PLATE		LED SIGNAL LAMPS						
			3 SEC	4 SEC	<-G-	G	<-Y-	Y	<-R-	R	
			EA	EA	EA	EA	EA	EA	EA	EA	EA
1	V4FYA	I		1	1		2		1		
2	V3	I	1			1		1		1	
3	V3	I	1			1		1		1	
4	PED	I									1
5	PED	I									1
6	V4FYA	I		1	1		2		1		
7	V3	I	1			1		1		1	
8	V3	I	1			1		1		1	
9	PED	I									1
10	PED	I									1
11	V4FYA	I		1	1		2		1		
12	V3	E									
13	V3	E									
14	PED	E									
15	PED	E									
16	V4FYA	I		1	1		2		1		
17	V3	E									
18	V3	I	1			1		1		1	
19	PED	E									
20	PED	E									
	TOTAL (NEW)		5	4	4	5	8	5	4	5	4

STATUS: I=INSTALL; E=EXISTING; REM=EXISTING TO BE REMOVED; REL=RELOCATE

ELECTRICAL SERVICE DATA

ELEC. SERVICE ID	PLAN SHEET NUMBER	ELECTRICAL SERVICE DESCRIPTION (SEE ED(5)-14)	SERVICE CONDUIT **SIZE	SERVICE CONDUCTORS NO. / SIZE	SAFETY SWITCH AMPS	MAIN CKT. BRK. POLE / AMPS	TWO-POLE CONTACTOR AMPS	PANELBD / LOADCENTER AMP RATING (MIN)	BRANCH CIRCUIT ID	BRANCH CKT. BRK. POLE / AMPS	BRANCH CIRCUIT AMPS	KVA LOAD
ES-01	____	TY D (120/240) 060 (NS) SS (E) PS (U)	2"	3 / #4	N/A	2P / 60	30	100	T.S. ILSN	1P / 50 1P / 20	23 2	<7.1

** - VERIFY SERVICE CONDUIT SIZE WITH UTILITY. SIZE MAY CHANGE DUE TO THE UTILITY METER REQUIREMENTS. ENSURE CONDUIT SIZE MEETS THE NATIONAL ELECTRICAL CODE.

6/6/2022

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ADDISON

TRAFFIC SIGNAL PLANS
PROPOSED QUANTITIES

ADDISON ROAD AT SOJOURN DRIVE

SHEET 2 OF 3

KHA PROJECT NUMBER: 063543039

SCALE: AS SHOWN

DATE: 6/6/2022

DESIGN	GRAPHICS	CHECK
TWH	LMR	TWH

21

PLOTTED: 6/6/2022
FILENAME: K:\DAL_TPTO\project\063543039 - Addison Signal Construction Support\CADD\Sojourn_SHT_014_Signal Quantities.dgn
$$$SCALE$$$
BY: Lucy.Cunningham

APS MESSAGE CHART			
POLE LOCATION	PEDESTRIAN MOVEMENT	FUNCTIONS	SPEECH MESSAGE/SOUND DETAILS
P-2	Phase 8	BUTTON PUSH ON DW	WAIT TO CROSS ADDISON ROAD AT SOJOURN DRIVE
		EXTENDED BUTTON PUSH	WAIT TO CROSS ADDISON ROAD AT SOJOURN DRIVE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	ADDISON ROAD, WALK LIGHT IS ON TO CROSS ADDISON ROAD
P-3	Phase 2	BUTTON PUSH ON DW	WAIT TO CROSS SOJOURN DRIVE AT ADDISON ROAD
		EXTENDED BUTTON PUSH	WAIT TO CROSS SOJOURN DRIVE AT ADDISON ROAD
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	SOJOURN, WALK LIGHT IS ON TO CROSS SOJOURN
P-4	Phase 4	BUTTON PUSH ON DW	WAIT TO CROSS ADDISON ROAD AT SOJOURN DRIVE
		EXTENDED BUTTON PUSH	WAIT TO CROSS ADDISON ROAD AT SOJOURN DRIVE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	ADDISON ROAD, WALK LIGHT IS ON TO CROSS ADDISON ROAD
P-5	Phase 2	BUTTON PUSH ON DW	WAIT TO CROSS SOJOURN DRIVE AT ADDISON ROAD
		EXTENDED BUTTON PUSH	WAIT TO CROSS SOJOURN DRIVE AT ADDISON ROAD
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	SOJOURN, WALK LIGHT IS ON TO CROSS SOJOURN
P-6	Phase 4	BUTTON PUSH ON DW	WAIT TO CROSS ADDISON ROAD AT SOJOURN DRIVE
		EXTENDED BUTTON PUSH	WAIT TO CROSS ADDISON ROAD AT SOJOURN DRIVE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	ADDISON ROAD, WALK LIGHT IS ON TO CROSS ADDISON ROAD
P-6	Phase 6	BUTTON PUSH ON DW	WAIT TO CROSS SOJOURN DRIVE AT ADDISON ROAD
		EXTENDED BUTTON PUSH	WAIT TO CROSS SOJOURN DRIVE AT ADDISON ROAD
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	SOJOURN, WALK LIGHT IS ON TO CROSS SOJOURN
E-4	Phase 6	BUTTON PUSH ON DW	WAIT TO CROSS SOJOURN DRIVE AT ADDISON ROAD
		EXTENDED BUTTON PUSH	WAIT TO CROSS SOJOURN DRIVE AT ADDISON ROAD
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	SOJOURN, WALK LIGHT IS ON TO CROSS SOJOURN
E-5	Phase 8	BUTTON PUSH ON DW	WAIT TO CROSS ADDISON ROAD AT SOJOURN DRIVE
		EXTENDED BUTTON PUSH	WAIT TO CROSS ADDISON ROAD AT SOJOURN DRIVE
		LOCATOR TONE	SLOW TICK
		WALK INDICATION*	ADDISON ROAD, WALK LIGHT IS ON TO CROSS ADDISON ROAD

* COUNTDOWN SPEECH MESSAGE = "OFF" FOR ALL UNITS

SIGNS SUMMARY					
SIGN *	SIGN TYPE	SIGN LEGEND	STATUS	SUPPORT	SIGN DIMENSION (in x in)
S1	R10-17T(MOD)	LEFT TURN YIELD ON FLASHING	I	P-1	30"x30"
S2	ILSN	SOJOURN DR	REL	P-1	24"xVA
S3	R10-3EL	PED PUSH BUTTON	I	P-2	9"x15"
S4	R10-3EL	PED PUSH BUTTON	I	P-3	9"x15"
S5	R10-17T(MOD)	LEFT TURN YIELD ON FLASHING	I	P-4	30"x30"
S6	R3-8b	LANE ASSIGNMENT	I	P-4	48"x30"
S7	ILSN	ADDISON RD	REL	P-4	24"xVA
S8	R10-3ER	PED PUSH BUTTON	I	P-4	9"x15"
S9	R10-3ER	PED PUSH BUTTON	I	P-5	9"x15"
S10	R10-17T(MOD)	LEFT TURN YIELD ON FLASHING	I	E-3	30"x30"
S11	R3-5R	LANE ASSIGNMENT	E	E-3	30"x36"
S12	ILSN	SOJOURN DR	E	E-3	24"xVA
S13	R10-3ER	PED PUSH BUTTON	I	P-6	9"x15"
S14	R10-3EL	PED PUSH BUTTON	I	P-6	9"x15"
S15	R10-17T(MOD)	LEFT TURN YIELD ON FLASHING	I	E-4	30"x30"
S16	R3-8 LK	LANE ASSIGNMENT	E	E-4	36"x30"
S17	ILSN	ADDISON RD	E	E-4	24"xVA
S18	R10-3EL	PED PUSH BUTTON	I	E-4	9"x15"
S19	R10-3ER	PED PUSH BUTTON	I	E-5	9"x15"

STATUS: I=INSTALL; E=EXISTING; REM=EXISTING TO BE REMOVED; REL=EXISTING TO BE RELOCATED

VIDEO DETECTION DETAILS						
VIDEO DETECTOR NUMBER	MOUNTING LOCATION	MOUNTING HEIGHT	ZONE LOCATIONS	ZONE(S)	DIMENSIONS	DETECT UNIT
V1	MAST ARM P-1	24'	STOP BAR	V5-1	6'X40'	Ø5-1
				V2-1	6'X40'	Ø2-1
				V2-2	6'X40'	Ø2-2
V2	MAST ARM P-4	24'	STOP BAR	V7-1	6'X40'	Ø7-1
				V4-1	6'X40'	Ø4-1
				V4-2	6'X40'	Ø4-2
V3	MAST ARM E-3	24'	STOP BAR	V1-1	6'X40'	Ø1-1
				V6-1	6'X40'	Ø6-1
				V6-2	6'X40'	Ø6-2
				V6-3	6'X40'	Ø6-3
V4	MAST ARM E-4	24'	STOP BAR	V3-1	6'X40'	Ø3-1
				V8-1	6'X40'	Ø8-1

6/6/2022

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ADDISON

TRAFFIC SIGNAL PLANS
PROPOSED QUANTITIES

ADDISON ROAD AT
SOJOURN DRIVE

SHEET 3 OF 3

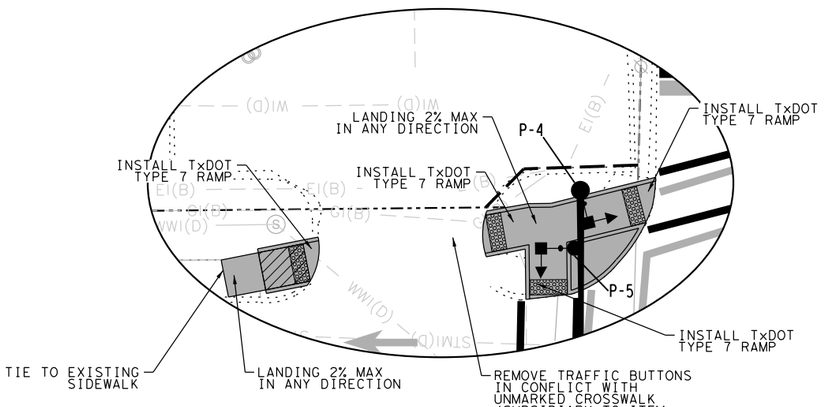
KHA PROJECT NUMBER: 063543039

SCALE: AS SHOWN

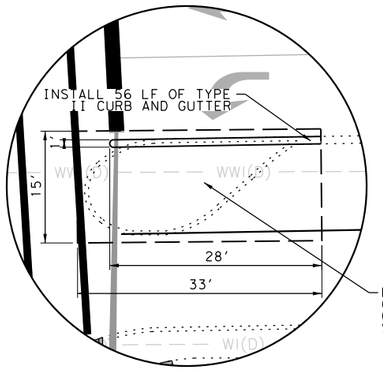
DATE: 6/6/2022

DESIGN	GRAPHICS	CHECK
TWH	LMR	TWH

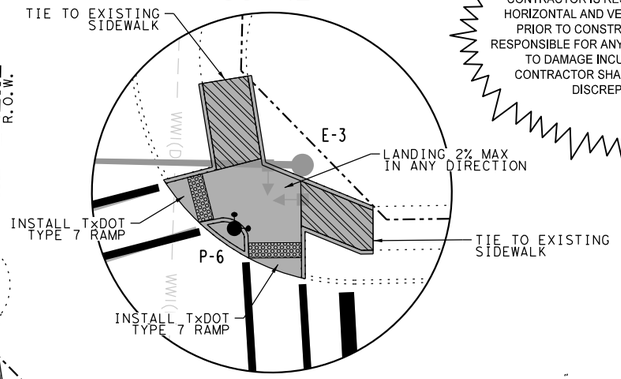
DETAIL AT NW CORNER



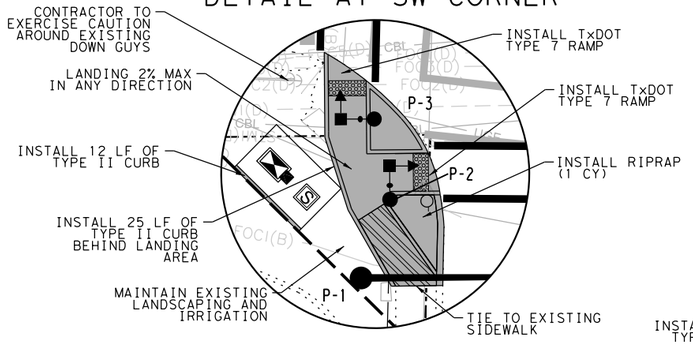
MEDIAN NOSE DETAIL



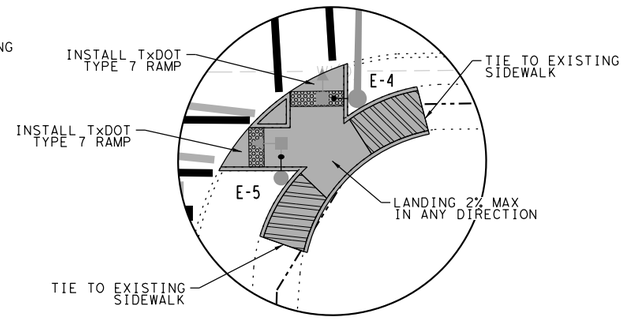
DETAIL AT NE CORNER



DETAIL AT SW CORNER



DETAIL AT SE CORNER



0 5 10 20 — PEDESTRIAN RAMP DETAILS : SCALE: 1" = 20'

0 10 20 40 — ORIGINALLY PLOTTED SCALE: SCALE: 1" = 40'

CAUTION!!

EXISTING UNDERGROUND UTILITIES IN THE AREA CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE HORIZONTAL AND VERTICAL LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REPAIRS TO EXISTING UTILITIES DUE TO DAMAGE INCURRED DURING CONSTRUCTION. CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES ON THE PLANS.

STOP!

CALL BEFORE YOU DIG

DIG TESS
1-800-DIG-TESS
(@ least 72 hours prior to digging)

LEGEND

PAVEMENT MARKING

- (A) PREFAB PAV MRK TY C (W) (ARROW)
- (B) PREFAB PAV MRK TY C (W) (WORD)
- (C) REFL PAV MRK TY I (W)12" (SLD) (090MIL)
- (D) REFL PAV MRK TY I (W)24" (SLD) (090MIL)
- (E) REFL PAV MRK TY I (W)8" (SLD) (090MIL)
- (F) REMOVAL OF PAVEMENT MARKING LINE
- (G) REMOVAL OF PAVEMENT MARKING ARROW

LEGEND

- 8.3% MAX RUNNING SLOPE 2% MAX CROSS SLOPE
- 5% MAX RUNNING SLOPE 2% MAX CROSS SLOPE
- TRUNCATED DOME DETECTABLE WARNING

NOTES:

1. INSTALLATION AND PAYMENT FOR PROPOSED RAMPS AND SIDEWALKS SHALL INCLUDE ALL INCIDENTAL WORK, INCLUDING EXCAVATION, REMOVAL AND DISPOSAL OF EXISTING CONCRETE CURB AND SIDEWALK, PROPOSED CURB ALONG SIDEWALKS, AND OTHER MISCELLANEOUS MATERIAL NECESSARY TO CONSTRUCT THE PROPOSED RAMPS AND SIDEWALKS. SIDEWALK QUANTITIES PROVIDED ARE ESTIMATES ONLY. PAYMENT FOR SIDEWALK SHALL BE FOR THE QUANTITY APPROVED BY THE ENGINEER AND CONSTRUCTED ON SITE.
2. PROPOSED CURB RAMP LANDING SHALL BE POURED UP TO THE SIGNAL FOUNDATION, LEAVING NO GAPS.
3. CONTRACTOR SHALL ENSURE THAT ALL PED RAMPS DRAIN TOWARDS THE STREET WITHOUT PONDING IN THE RAMP OR GUTTER AREA.
4. RAMP LANDINGS SHALL NOT EXCEED 2% MAX CROSS SLOPE AND 2% RUNNING SLOPE. PROPOSED SIDEWALKS SHALL NOT EXCEED 2% MAX CROSS SLOPE AND 5% RUNNING SLOPE.
5. EXISTING STRIPING AND BUTTONS SHALL REMAIN UNLESS OTHERWISE NOTED.
6. PEDESTRIAN ACCESS SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION.
7. CONTRACTOR SHALL COORDINATE WITH METHODIST HOSPITAL REGARDING REMOVAL OF MEDIAN NOSE, LANDSCAPING, AND ANY ASSOCIATED IRRIGATION EQUIPMENT.
8. CONTRACTOR TO VERIFY THAT EASEMENT ACQUISITION HAS BEEN FINALIZED PRIOR TO COMMENCEMENT OF CONSTRUCTION.

6/6/2022

STATE OF TEXAS
THOMAS W HARTMANN
109948
LICENSED
PROFESSIONAL ENGINEER

Kimley»Horn F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

ADDISON

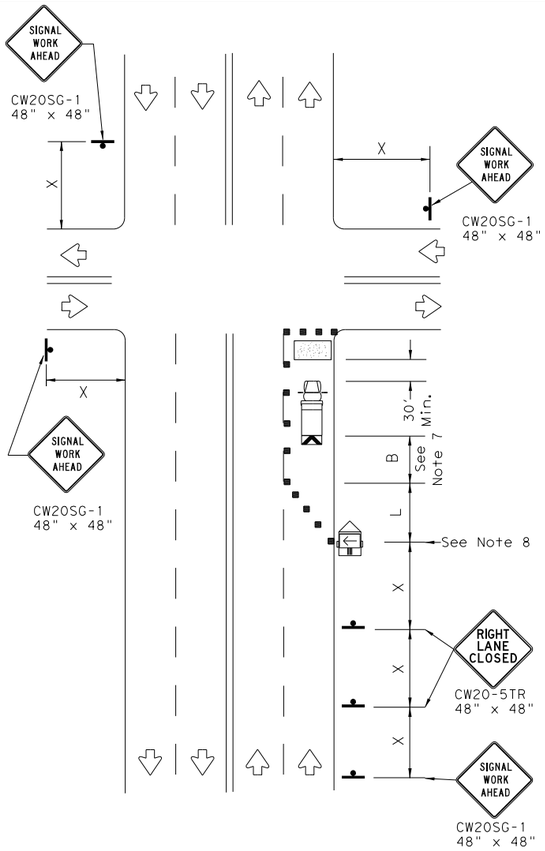
TRAFFIC SIGNAL PLANS

PROPOSED PEDESTRIAN RAMPS AND PAVEMENT MARKINGS

ADDISON ROAD AT SOJOURN DRIVE

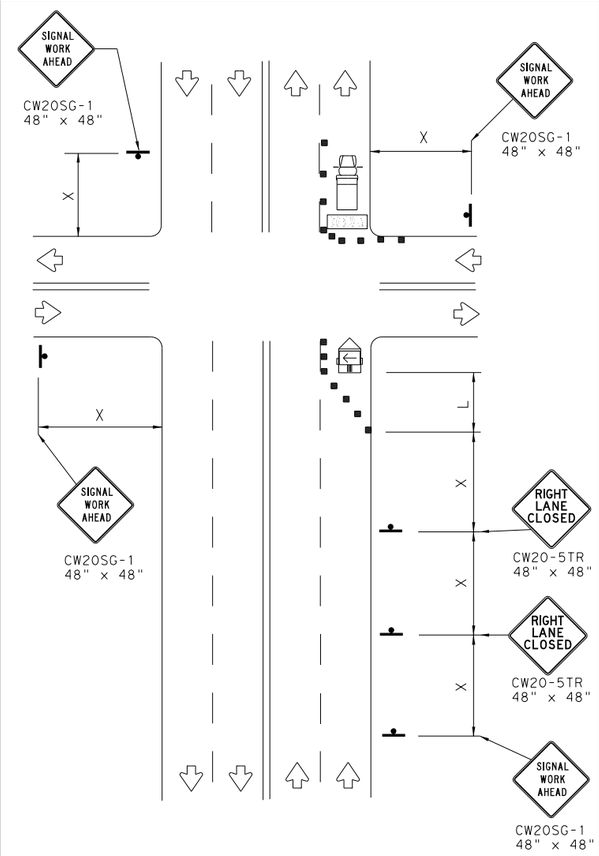
KHA PROJECT NUMBER: 063543039			
SCALE: AS SHOWN			
DATE: 6/6/2022			23
DESIGN TWH	GRAPHICS LMR	CHECK TWH	

DATE:
FILE:



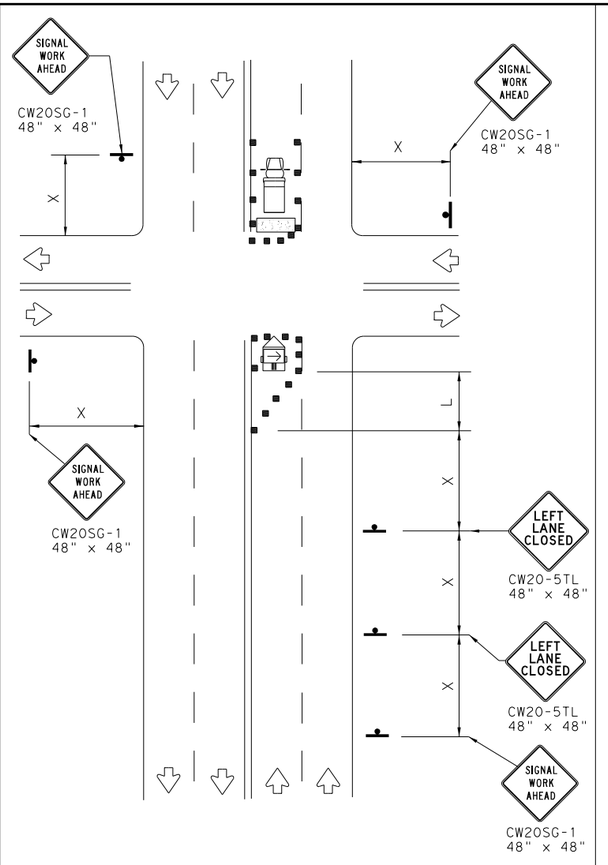
NEAR SIDE LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY



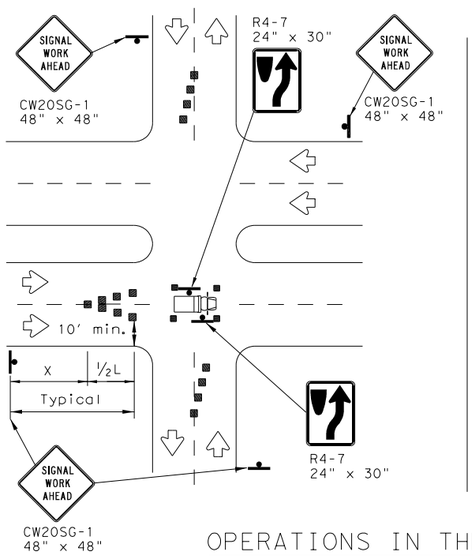
FAR SIDE RIGHT LANE CLOSURE

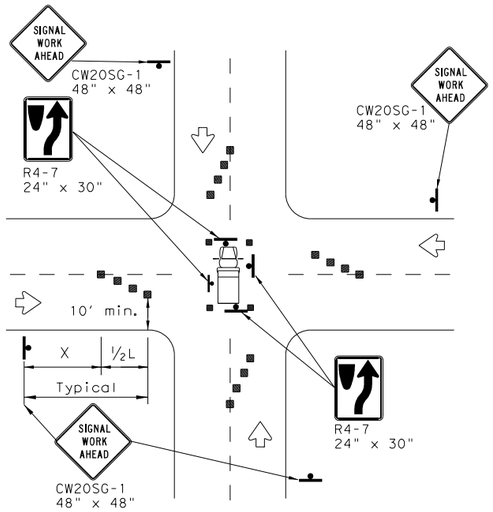
SHORT DURATION OR SHORT TERM STATIONARY



FAR SIDE LEFT LANE CLOSURE

SHORT DURATION OR SHORT TERM STATIONARY





OPERATIONS IN THE INTERSECTION

SHORT DURATION

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

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

* Conventional Roads Only

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

WORKERS IN BUCKET TRUCKS SHALL NOT WORK ABOVE OPEN LANES OF TRAFFIC.

GENERAL NOTES

1. The minimum size channelizing device is the 28" cone. 42" Two-piece cones, drums, vertical panels or barricades will be required when the device must be left unattended at night.
2. Obstructions or hazards at the work area shall be clearly marked and delineated at all times.
3. Flaggers and Flagger Symbol (CW20-7) signs may be required according to field conditions.
4. Vehicles parked in roadway shall be equipped with at least two high intensity rotating, flashing, oscillating or strobe type lights.
5. High level warning devices (flag trees) may be used at corners of the vehicle.
6. When work operations are performed on existing signals, the signals may be placed in flashing red mode when approved by the engineer. If existing signals do not have power, All-Way Stop (R1-1 and R1-3P) signs may be implemented when approved by the engineer.
7. For Short-Term Stationary work the buffer space "B" from the above table should be used if field conditions permit. For Short Duration (less than 1 hour) any buffer space provided will enhance the safety of the setup.
8. The arrow board at this location may be omitted for Short Duration work if the work vehicle has an arrow board in operation. As an option, the arrow board may be placed at the end of the taper in the closed lane if space is not available at the beginning of the taper.
9. Signs and devices for the NEAR SIDE LANE CLOSURE may be altered for a left lane closure by using a LEFT LANE CLOSED (CW20-5TL) and adding channelizing devices on the centerline to protect the work space from opposing traffic.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC SIGNAL WORK TYPICAL DETAILS

WZ(BTS-1)-13

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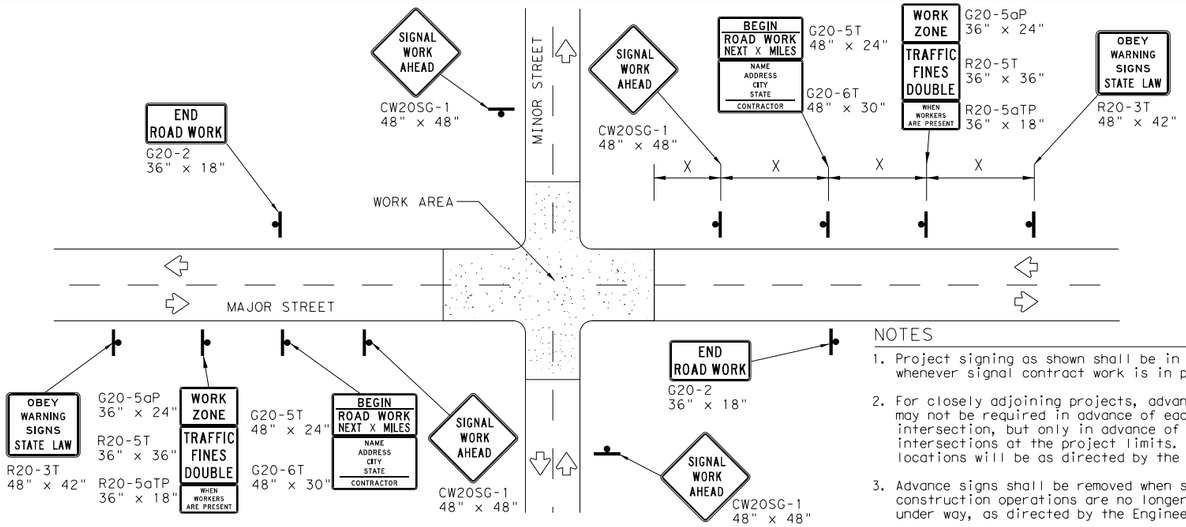


TYPICAL ADVANCE SIGNAL PROJECT SIGNING

FOR LONG TERM and INTERMEDIATE-TERM STATIONARY WORK OPERATIONS

NOTES

1. Project signing as shown shall be in place whenever signal contract work is in progress.
2. For closely adjoining projects, advance signing may not be required in advance of each intersection, but only in advance of the intersections at the project limits. Actual locations will be as directed by the Engineer.
3. Advance signs shall be removed when signal construction operations are no longer under way, as directed by the Engineer.
4. Warning sign spacing shown is typical for both directions.
5. See the Table on sheet 1 of 2 for Typical warning sign spacing.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Signs shall be installed and maintained in a straight and plumb condition.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. Nails shall NOT be used to attach signs to any support.
5. All signs shall be installed in accordance with the plans or as directed by the Engineer.
6. The Contractor shall furnish the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD).
7. The Contractor shall furnish sign supports and substrates listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD), installed as per the manufacturer's recommendations.
8. Temporary signs that have damaged or cracked substrates and/or damaged or marred reflective sheeting shall be replaced as directed by the Engineer.
9. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1".
10. Damaged wood posts shall be replaced. Splicing wood posts will not be allowed.

DURATION OF WORK

1. Work zone durations are defined in Part 6, Section 6G.02 of the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

SIGN MOUNTING HEIGHT

1. Sign height of Long-term/Intermediate-term warning signs shall be as shown on Figure 6F-1 of the TMUTCD.
2. Sign height of Short-term/Short Duration warning signs shall be as shown on Figure 6F-2 of the TMUTCD.
3. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered, unless otherwise approved by the Engineer.
2. When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night without damaging the sign sheeting. Burlap, or heavy materials such as plywood or alluminum shall not be used to cover signs.
3. Duct tape or other adhesive material shall NOT be affixed to a sign face.
4. Signs and anchor stubs shall be removed and holes backfilled upon completion of the work.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the requirements of the DMS and color usage table shown on this sheet.

SIGN SUPPORT WEIGHTS

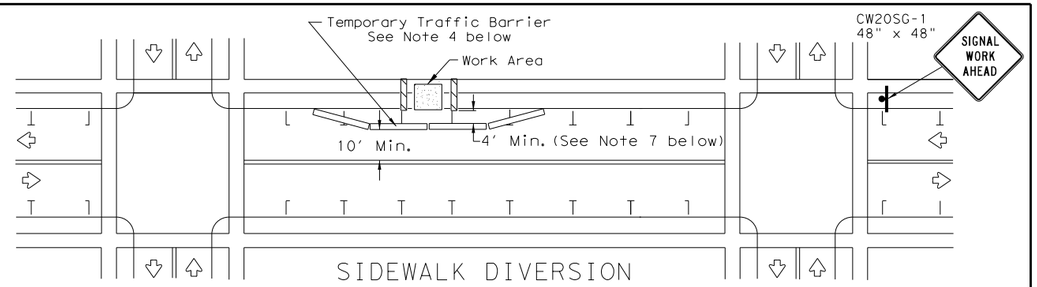
1. Weights used to keep signs from turning over should be sandbags filled with dry, cohesionless material.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects will not be permitted for use as sign support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

LEGEND	
	Sign
	Channelizing Devices
	Type 3 Barricade

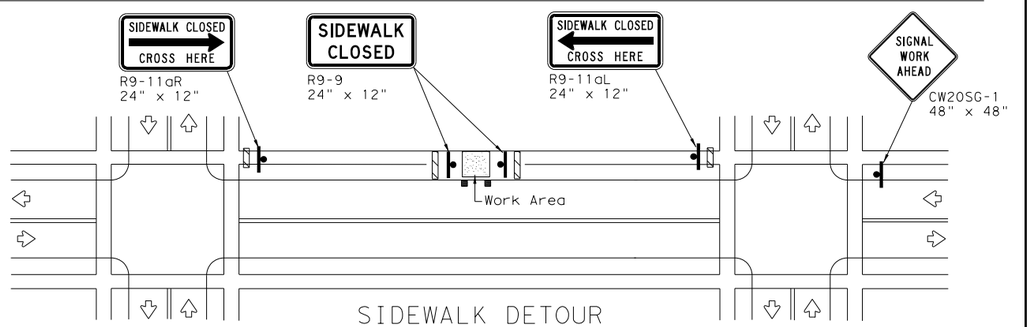
DEPARTMENTAL MATERIAL SPECIFICATIONS	
SIGN FACE MATERIALS	DMS-8300
FLEXIBLE ROLL-UP REFLECTIVE SIGNS	DMS-8310

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL} SHEETING
WHITE	BACKGROUND	TYPE A SHEETING
BLACK	LEGEND & BORDERS	ACRYLIC NON-REFLECTIVE SHEETING

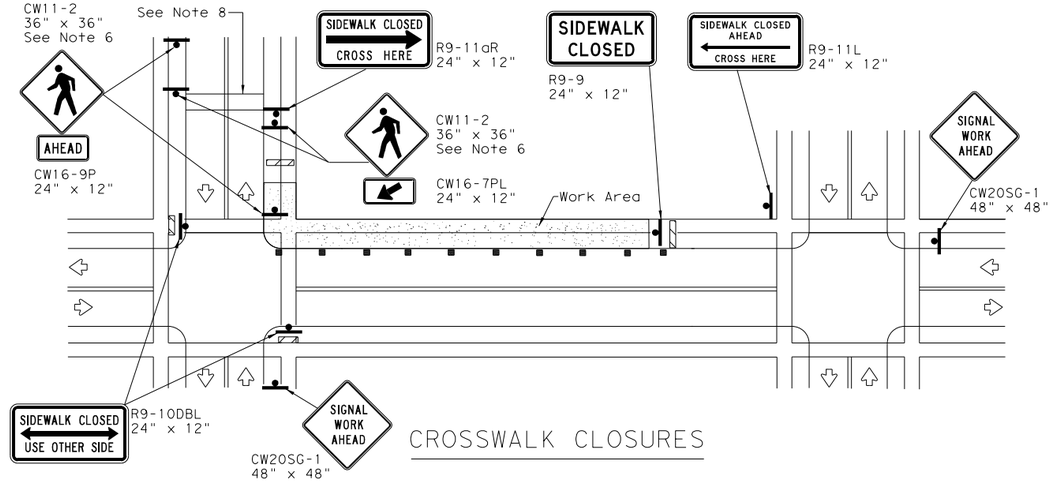
Only pre-qualified products shall be used. A copy of the "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found at the following web address:
http://www.txdot.gov/txdot_library/publications/construction.htm



SIDEWALK DIVERSION



SIDEWALK DETOUR



CROSSWALK CLOSURES

PEDESTRIAN CONTROL

1. Holes, trenches or other hazards shall be adequately protected by covering, delineating or surrounding the hazard with orange plastic pedestrian fencing or longitudinal channelizing devices, or as directed by the Engineer.
2. "CROSSWALK CLOSURES" as detailed above will require the Engineer's approval prior to installation.
3. R9 series signs shown may be placed on supports detailed on the BC standards or CWZTCD list, or when fabricated from approved lightweight plastic substrates, they may be mounted on top of a plastic drum at or near the location shown.
4. For speeds less than 45 mph longitudinal channelizing devices may be used instead of traffic barriers when approved by the Engineer. Attenuation of blunt ends and installation of water filled devices shall be as per BC(9) and manufacturer's recommendations.
5. Location of devices are for general guidance. Actual device spacing and location must be field adjusted to meet actual conditions.
6. Where pedestrians with visual disabilities normally use the closed sidewalk Detectable Pedestrian Barricades should be used instead of the Type 3 Barricades shown.
7. The width of existing sidewalk should be maintained if practical.
8. Pavement markings for mid-block crosswalks shall be paid for under the appropriate bid items.
9. When crosswalks or other pedestrian facilities are closed or relocated, temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC SIGNAL WORK BARRICADES AND SIGNS

WZ(BTS-2)-13

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2-98 10-99 7-13	DIST	COUNTY		SHEET NO.
4-98 3-03	.	.		25

DATE:
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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

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

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

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

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

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

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

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

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

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

10. As shown on BC(2), the OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER (see Sign Detail G20-10T) and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. However, the TRAFFIC FINES DOUBLE sign will not be required on projects consisting solely of mobile operation work, such as striping or milling edgeline rumble strips. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits.

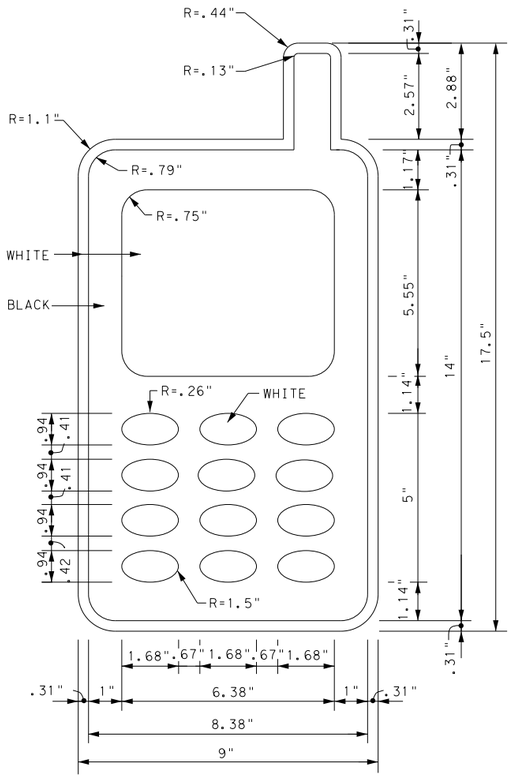
11. Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.

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

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

WORKER SAFETY APPAREL NOTES:

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



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

SIGN DETAIL (G20-10T)

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

Texas Department of Transportation
Traffic Operations Division - TE
Phone (512) 416-3118

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

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-14

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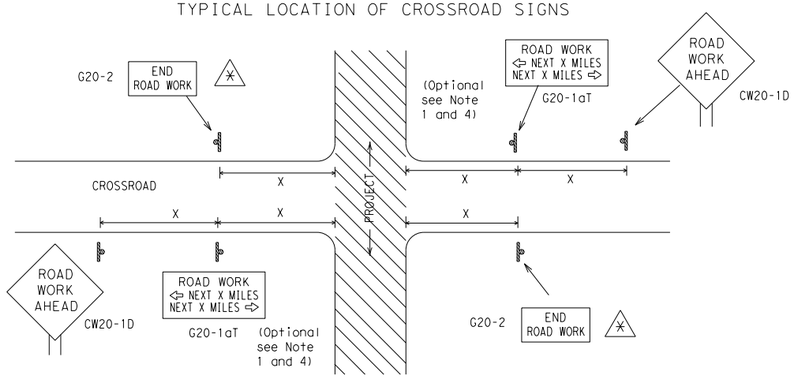
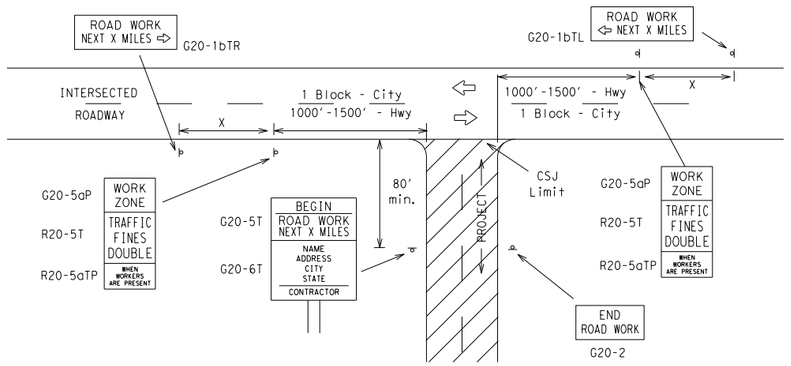
TYPICAL LOCATION OF CROSSROAD SIGNS



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

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

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

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

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

Sign Number or Series	SIZE: Conventional Road	SIZE: Expressway/ Freeway	SPACING: Posted Speed	SPACING: Sign Spacing "X" △
			MPH	Feet (Apprx.)
CW20[4], CW21, CW22, CW23, CW25	48" x 48"	48" x 48"	30	120
			35	160
			40	240
			45	320
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"	50	400
			55	500[2]
			60	600[2]
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"	65	700[2]
			70	800[2]
			75	900[2]
			80	1000[2]
			✳	✳[3]

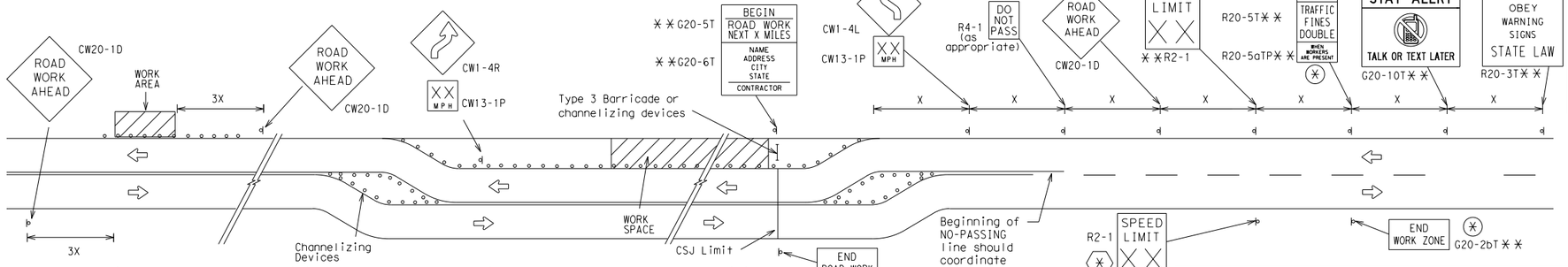
✳ For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

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

GENERAL NOTES

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

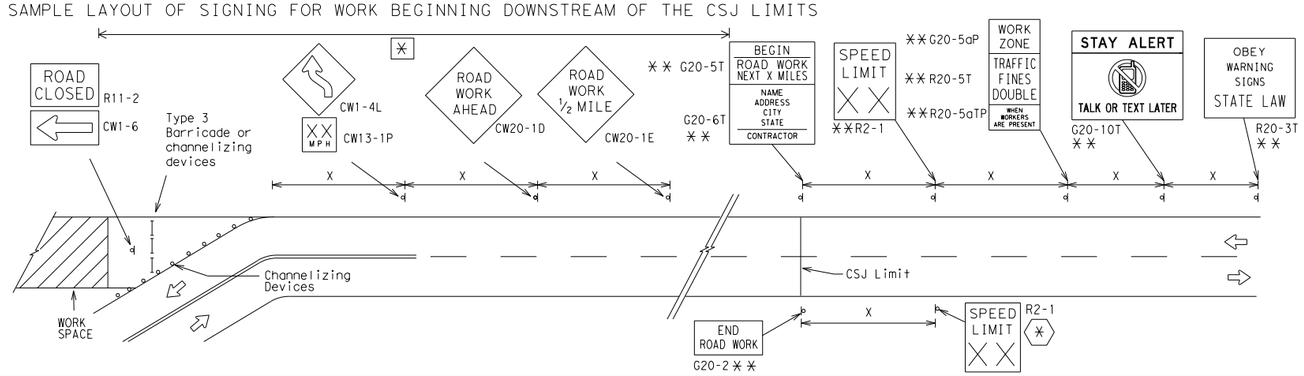
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



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

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

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



NOTES

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

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

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

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-14

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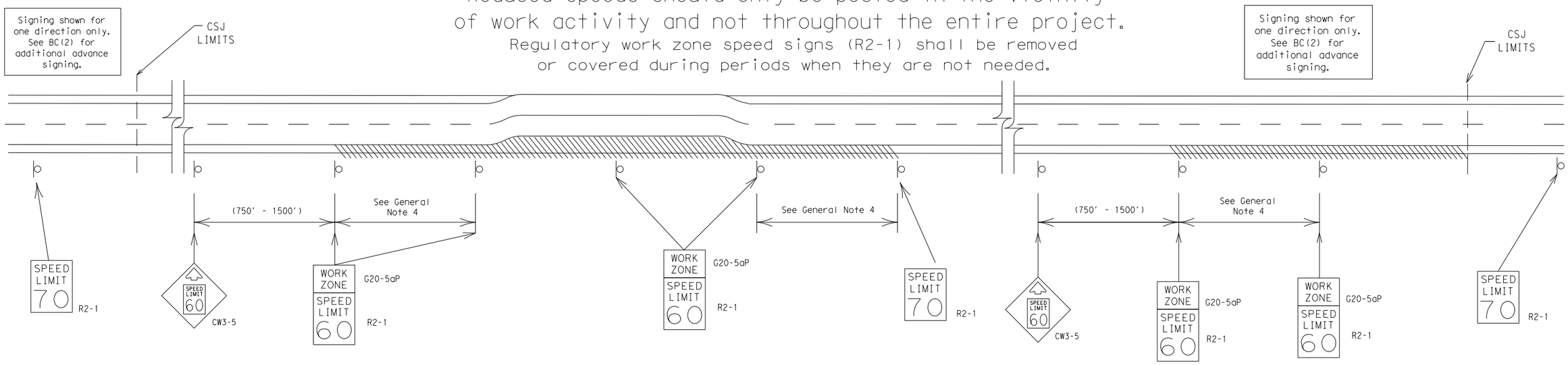
TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

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

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

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



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

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

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

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

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

SHORT TERM WORK ZONE SPEED LIMITS

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

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

GENERAL NOTES

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

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Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-14

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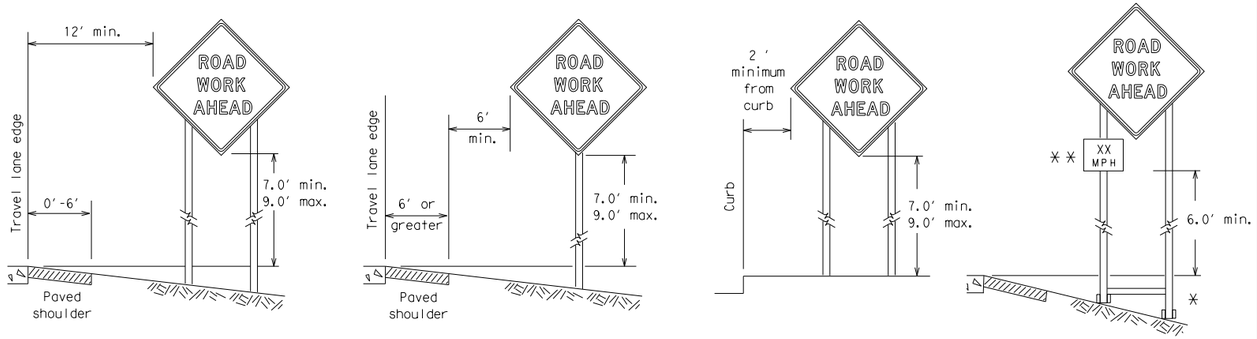
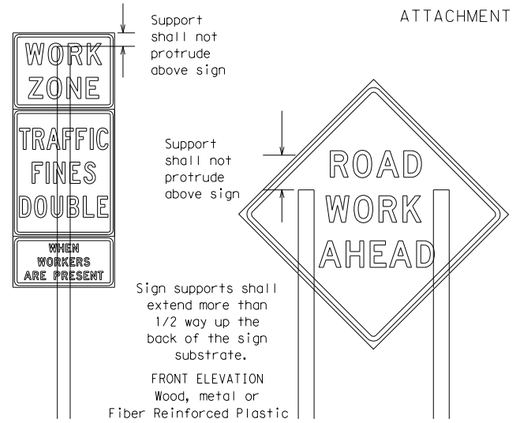
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



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

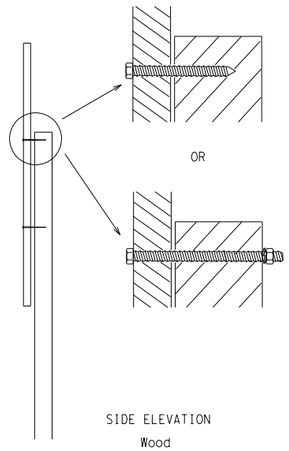
⁎⁎ When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS



FRONT ELEVATION
Wood, metal or Fiber Reinforced Plastic

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



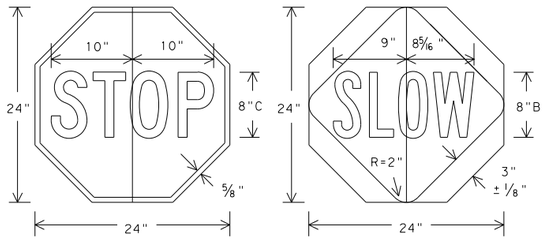
SIDE ELEVATION
Wood

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

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

STOP/SLOW PADDLES

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



Background - Red
Legend & Border - White

Background - Orange
Legend & Border - Black

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

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

GENERAL NOTES FOR WORK ZONE SIGNS

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

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

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

SIGN MOUNTING HEIGHT

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

SIZE OF SIGNS

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

SIGN SUBSTRATES

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

REFLECTIVE SHEETING

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

SIGN LETTERS

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

REMOVING OR COVERING

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

SIGN SUPPORT WEIGHTS

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

FLAGS ON SIGNS

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-14

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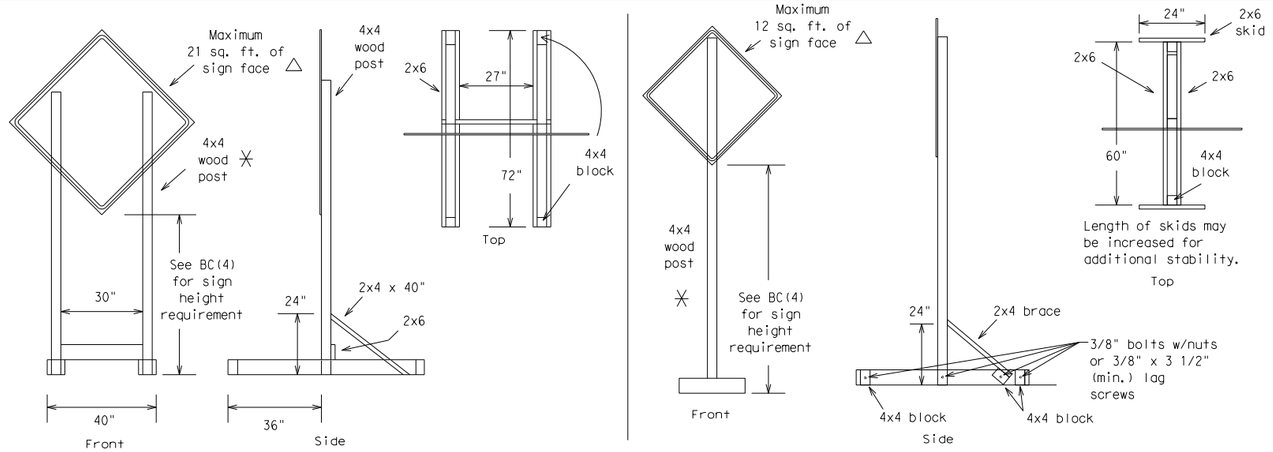
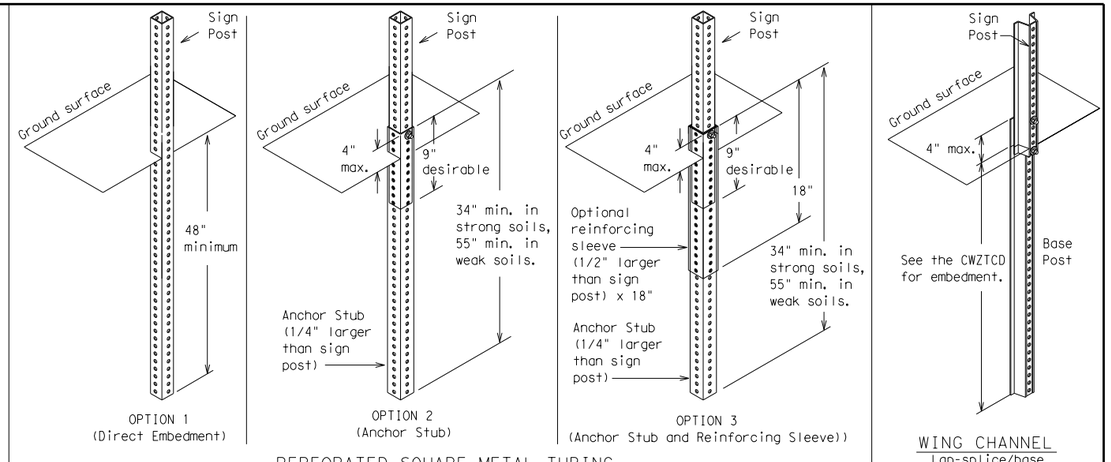


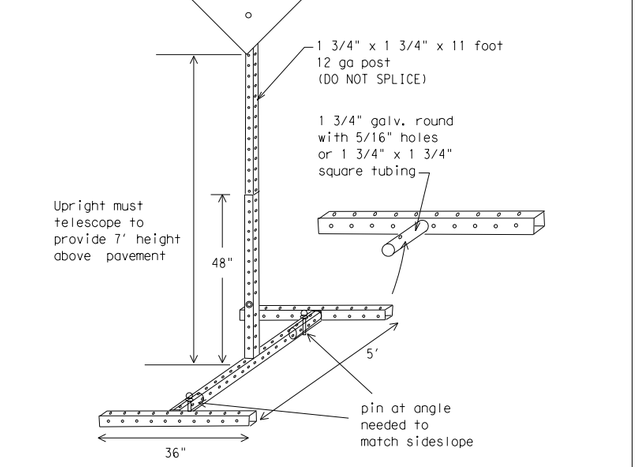
SKID MOUNTED WOOD SIGN SUPPORTS

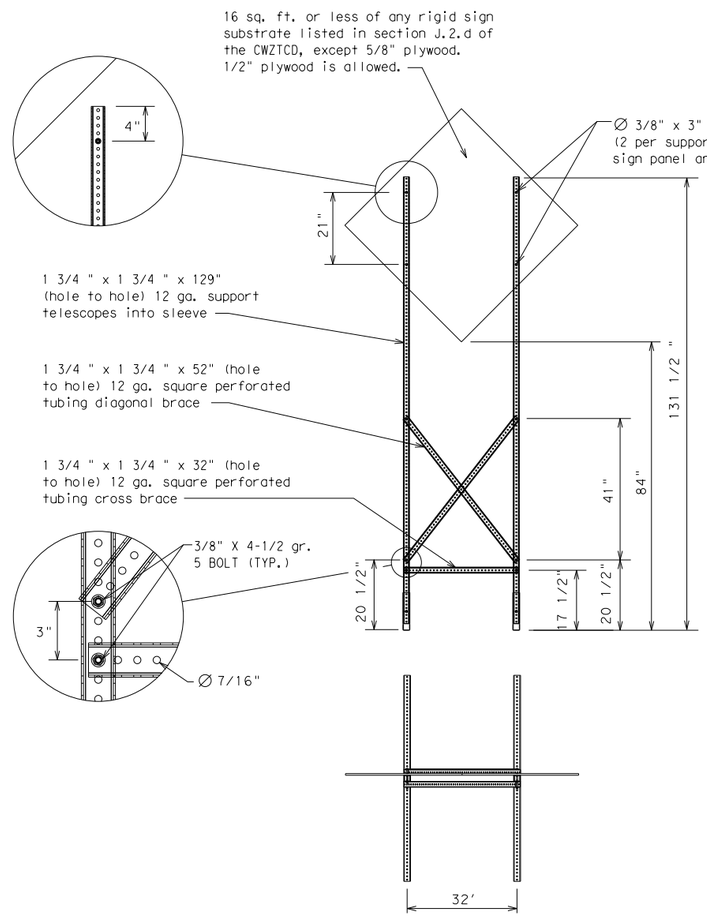
LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS □

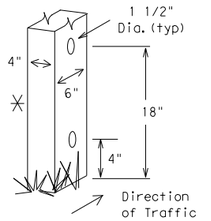


GROUND MOUNTED SIGN SUPPORTS

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.

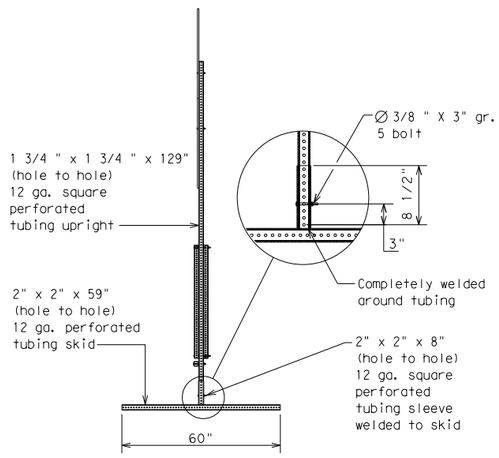






Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS



SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

WEDGE ANCHORS

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

OTHER DESIGNS

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

GENERAL NOTES

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

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

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

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-14

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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	HOV
Vehicle 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

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

Other Condition List

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

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

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

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

Location List

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

Warning List

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

** Advance Notice List

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

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

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

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

WORDING ALTERNATIVES

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

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

FULL MATRIX PCMS SIGNS

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

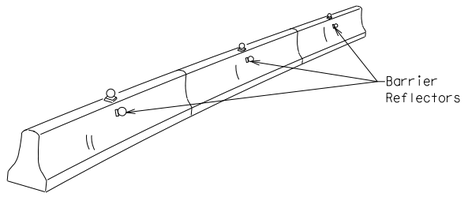
BC(6)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS	.	.	.	.
9-07 8-14	DIST	COUNTY		SHEET NO.
7-13	.	.		31

100

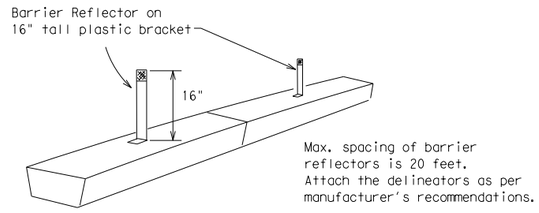
DATE:
FILE:

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

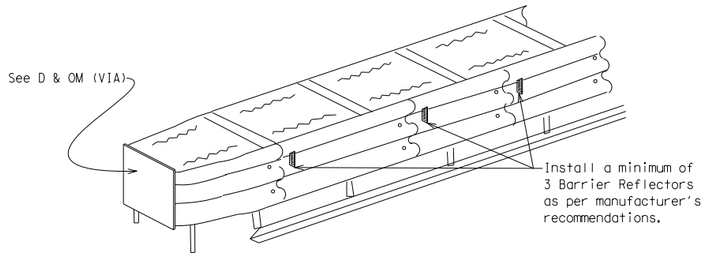


CONCRETE TRAFFIC BARRIER (CTB)

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



LOW PROFILE CONCRETE BARRIER (LPCB)

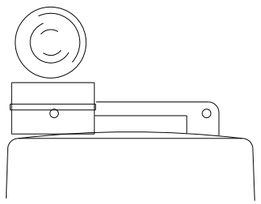


DELINEATION OF END TREATMENTS

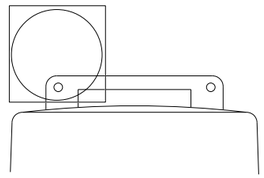
END TREATMENTS FOR
CTB'S USED
IN WORK ZONES

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

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



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

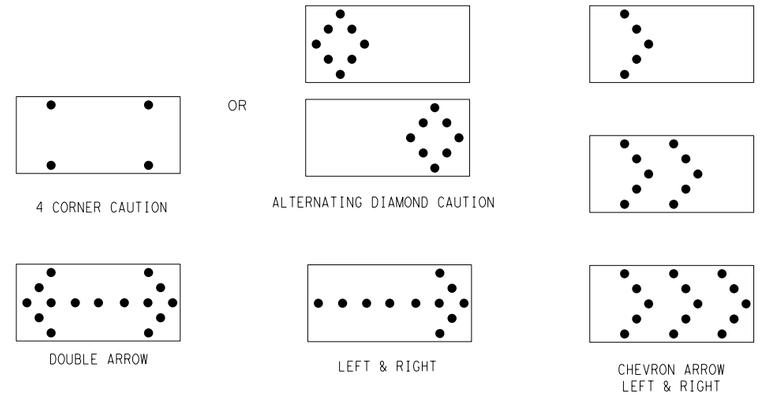
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing 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 National Cooperative Highway Research Report No. 350 (NCHRP 350) or the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.

Texas Department of Transportation

Traffic Operations Division Standard

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

BC(7)-14

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

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

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

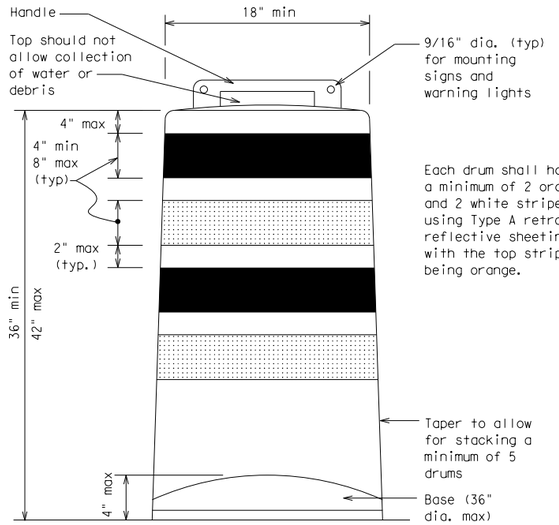
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents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

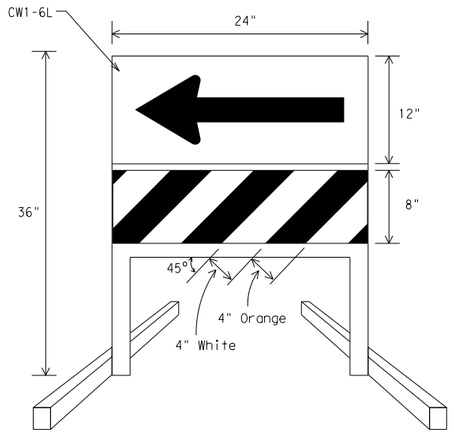
RETROREFLECTIVE SHEETING

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

BALLAST

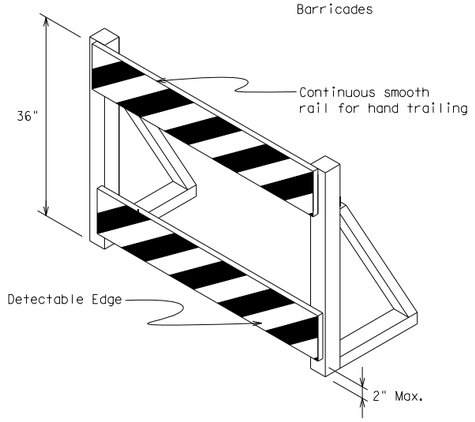
1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other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





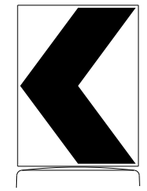
DIRECTION INDICATOR BARRICADE

1. The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
2. If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
3. The Direction Indicator Barricade shall consist of One-Direction Large Arrow (CW1-6) sign in the size shown with a black arrow on a background of Type B_{FL} or Type C_{FL} Orange retroreflective sheeting above a rail with Type A retroreflective sheeting in alternating 4" white and orange stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. Sheeting types shall be as per DMS 8300.
4. Double arrows on the Direction Indicator Barricade will not be allowed.
5. Approved manufacturers are shown on the CWZTCD List. Ballast shall be as approved by the manufacturers instructions.

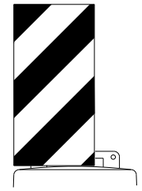


DETECTABLE PEDESTRIAN BARRICADES

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



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



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

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

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

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

Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(8)-14

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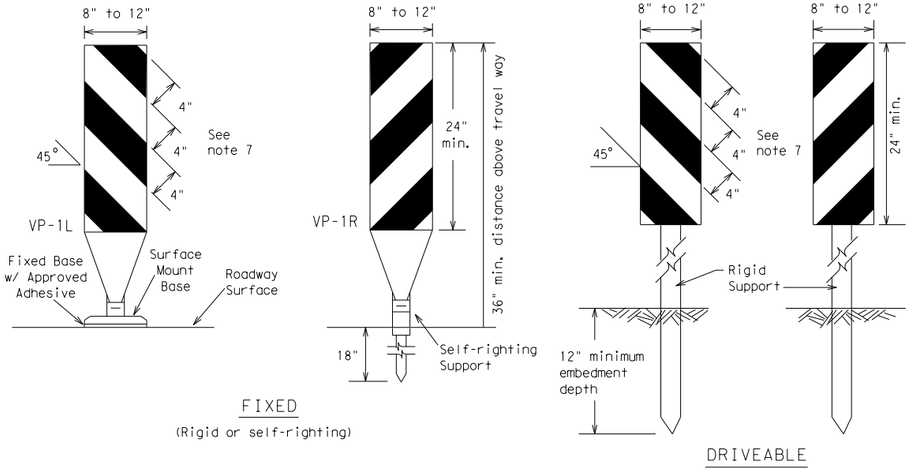
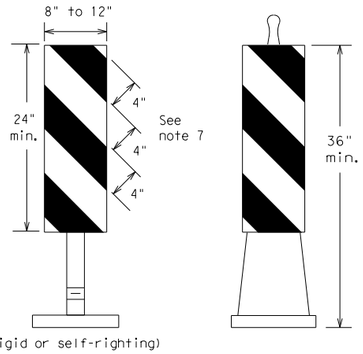


FIXED
(Rigid or self-righting)

DRIVEABLE

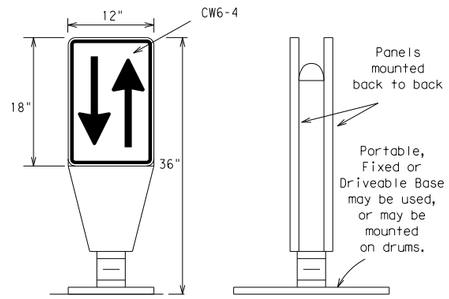


(Rigid or self-righting)

PORTABLE

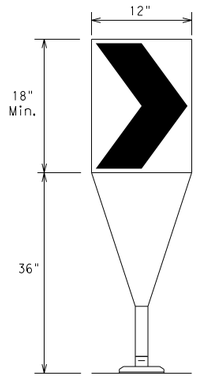
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is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

VERTICAL PANELS (VPs)



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

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



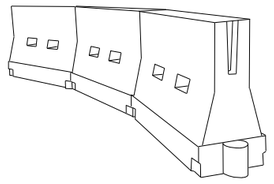
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

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

CHEVRONS

GENERAL NOTES

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



LONGITUDINAL CHANNELIZING DEVICES (LCD)

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

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate NCHRP 350 crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

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

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

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

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

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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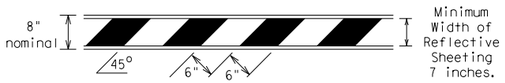
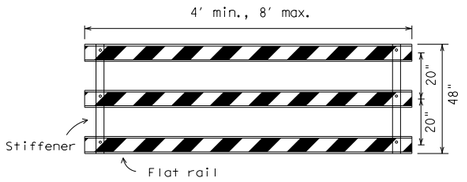
TYPE 3 BARRICADES

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

Barricades shall NOT be used as a sign support.



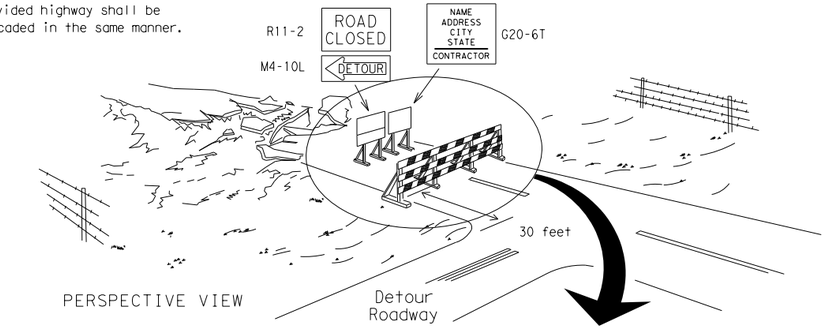
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



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

TYPICAL PANEL DETAIL
FOR SKID OR POST TYPE BARRICADES

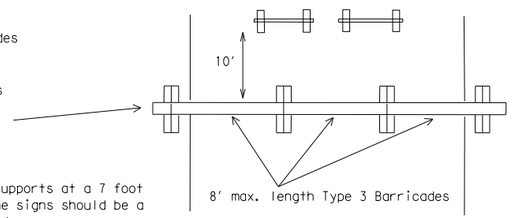
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

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

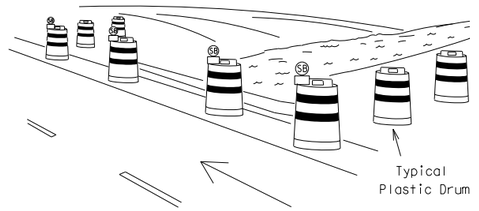
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

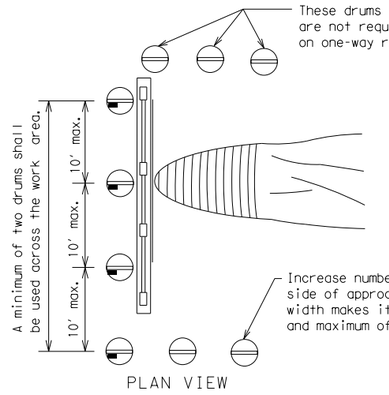
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

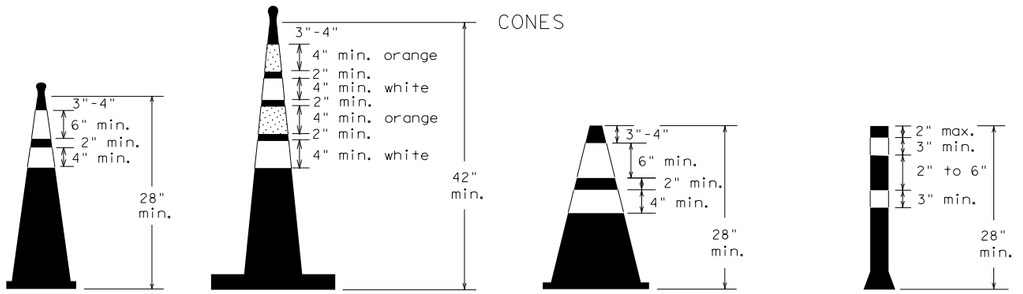
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder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



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

PLAN VIEW

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones

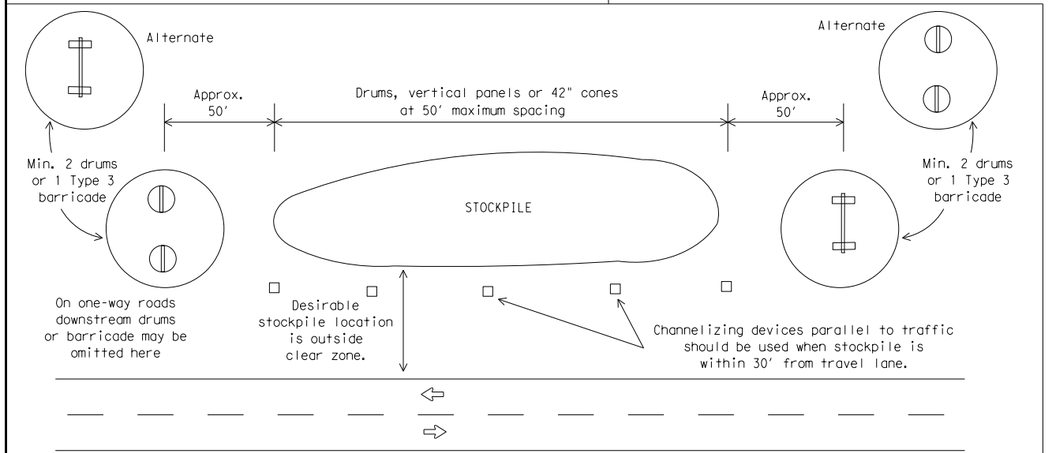
One-Piece cones

Tubular Marker

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

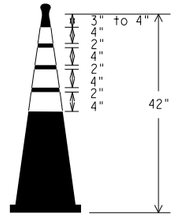
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

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



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

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



EDGELINE CHANNELIZER

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

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WORK ZONE PAVEMENT MARKINGS

GENERAL

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

RAISED PAVEMENT MARKERS

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

PREFABRICATED PAVEMENT MARKINGS

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

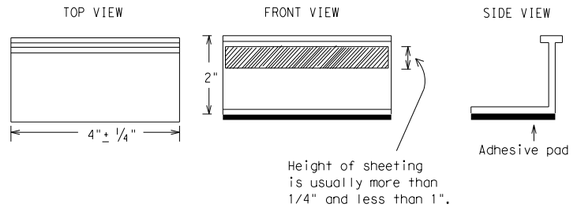
MAINTAINING WORK ZONE PAVEMENT MARKINGS

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

REMOVAL OF PAVEMENT MARKINGS

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

Temporary Flexible-Reflective Roadway Marker Tabs



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

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

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

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

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

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

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

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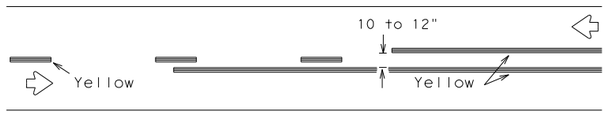
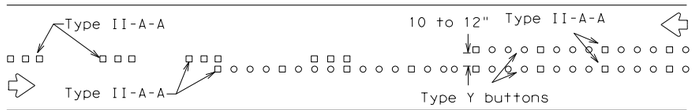
FILE:

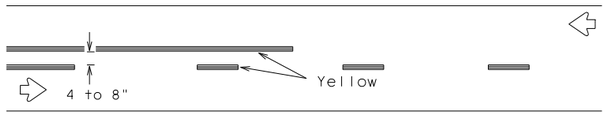
PAVEMENT MARKING PATTERNS



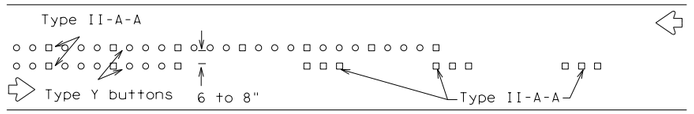
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



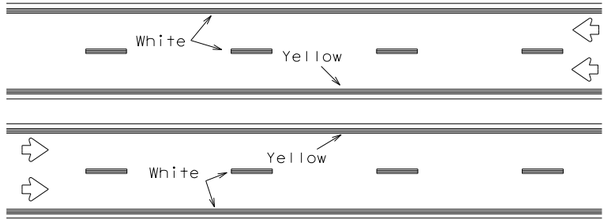
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



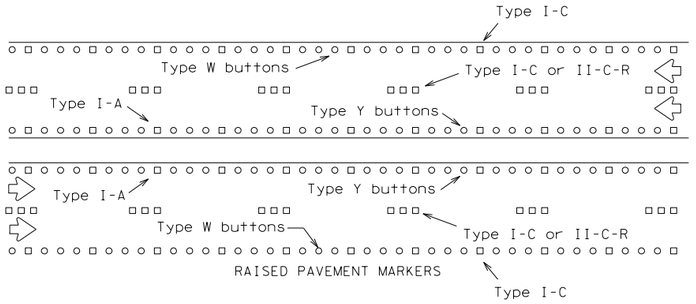
RAISED PAVEMENT MARKERS - PATTERN B

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

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



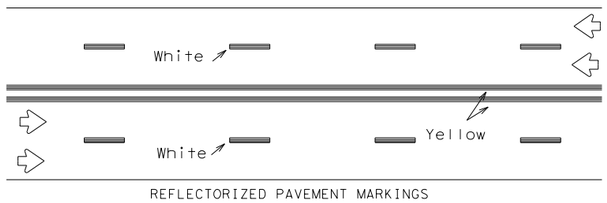
REFLECTORIZED PAVEMENT MARKINGS



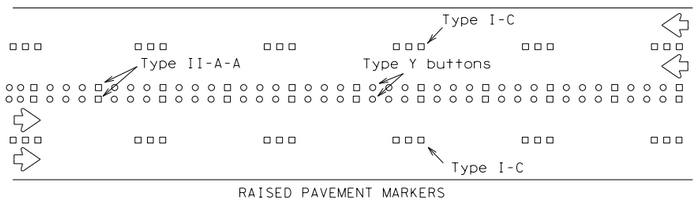
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



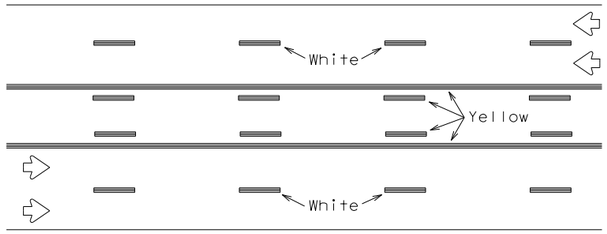
REFLECTORIZED PAVEMENT MARKINGS



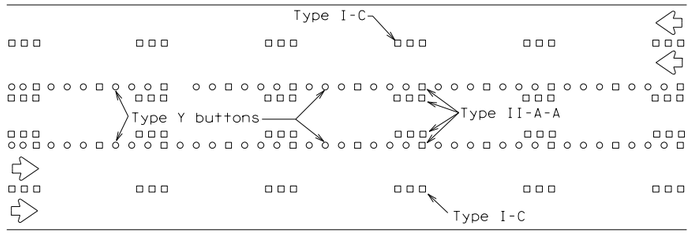
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

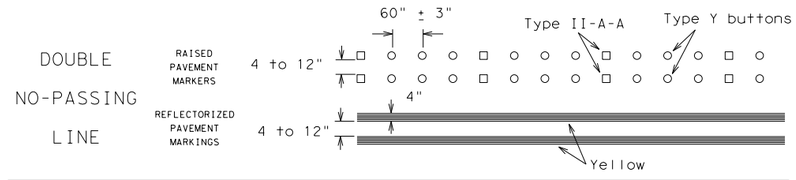
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

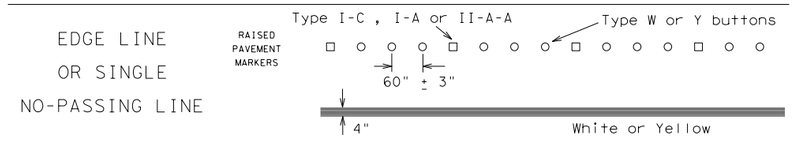
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

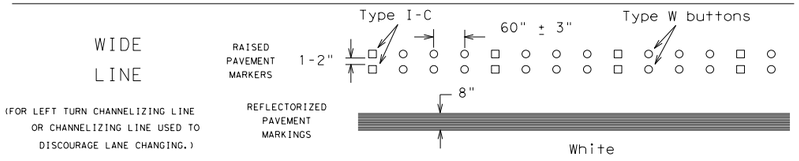


EDGE LINE OR SINGLE NO-PASSING LINE



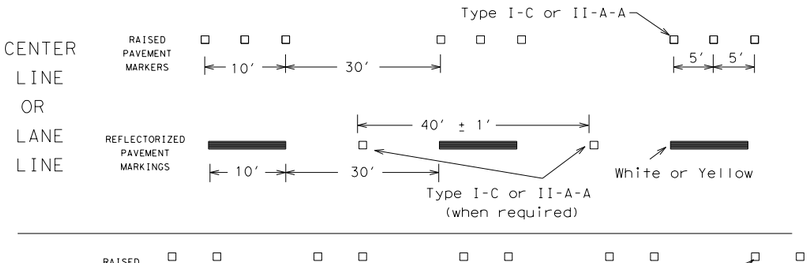
WIDE LINE

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

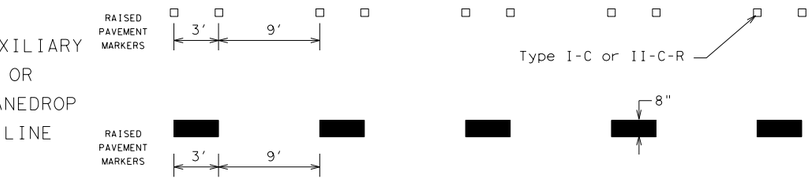


BROKEN LINES

CENTER LINE OR LANE LINE

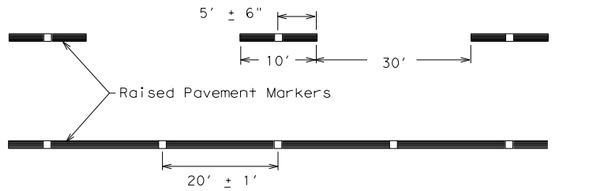


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

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



Centerline only - not to be used on edge lines

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

Texas Department of Transportation

Traffic Operations Division Standard

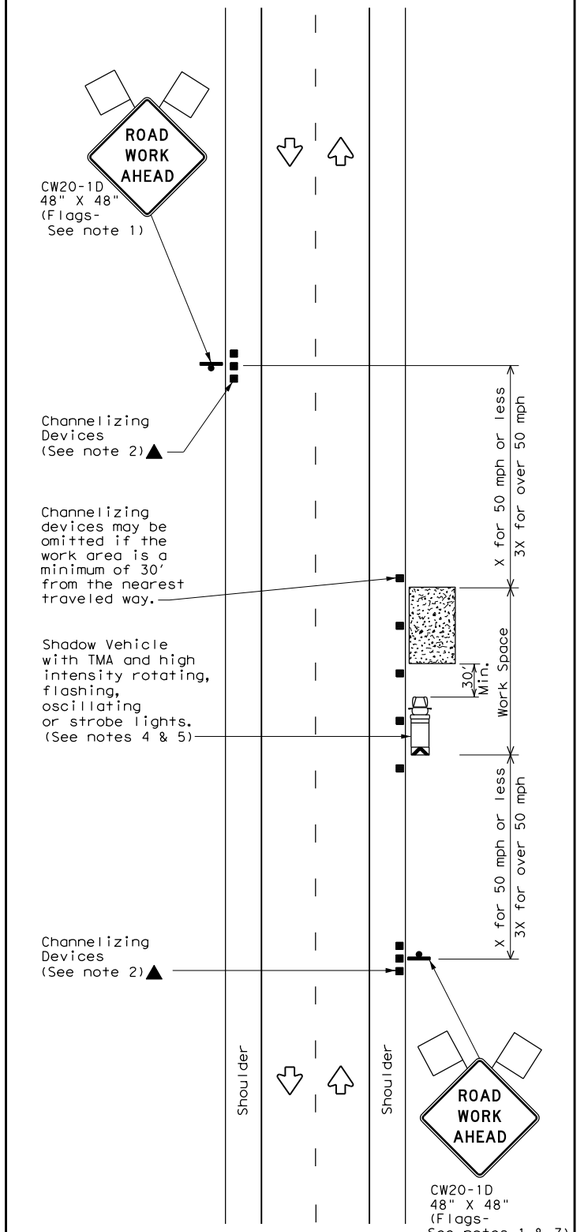
BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
REVISIONS	.	.	.	.
1-97 9-07	DIST	COUNTY		SHEET NO.
2-98 7-13	.	.		37
11-02 8-14				

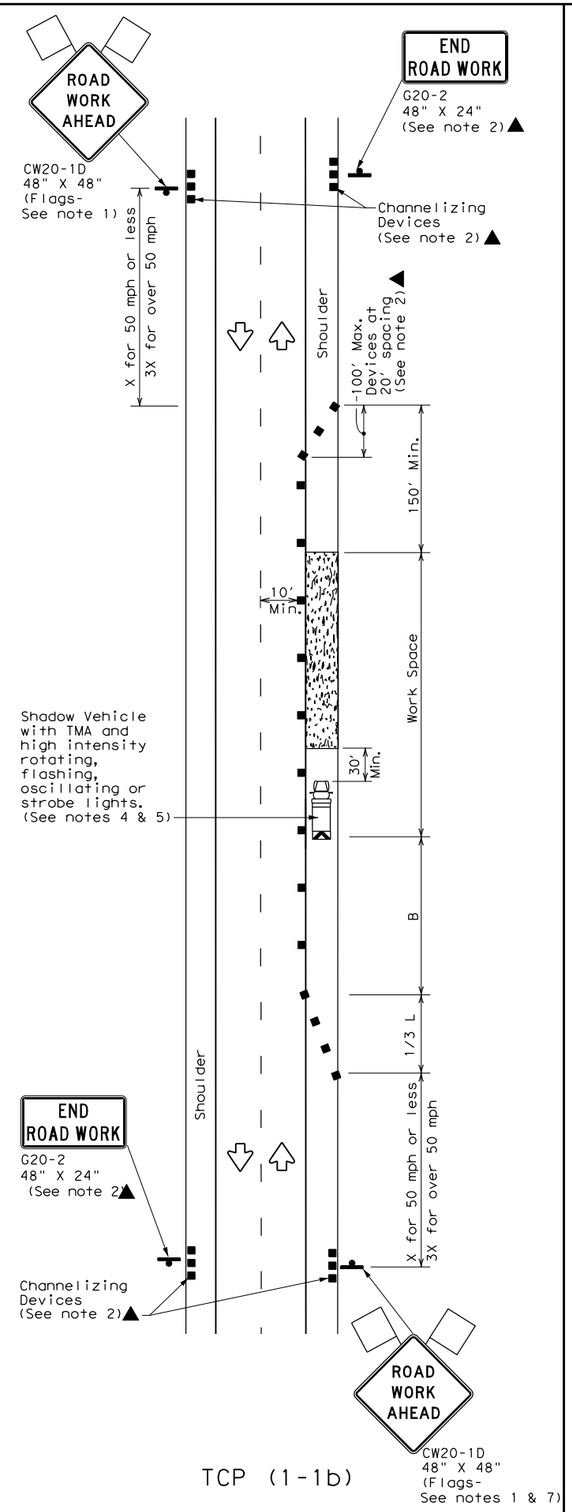
106

DATE:
FILE:



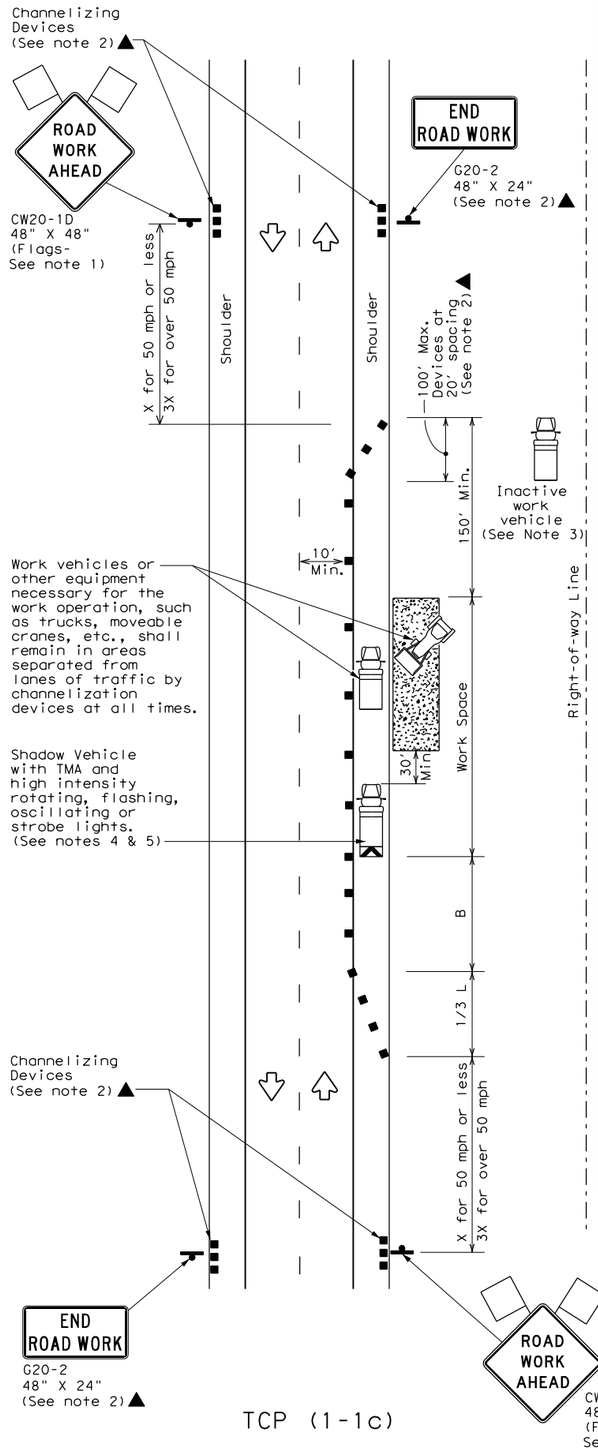
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

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

Texas Department of Transportation
Traffic Operations Division

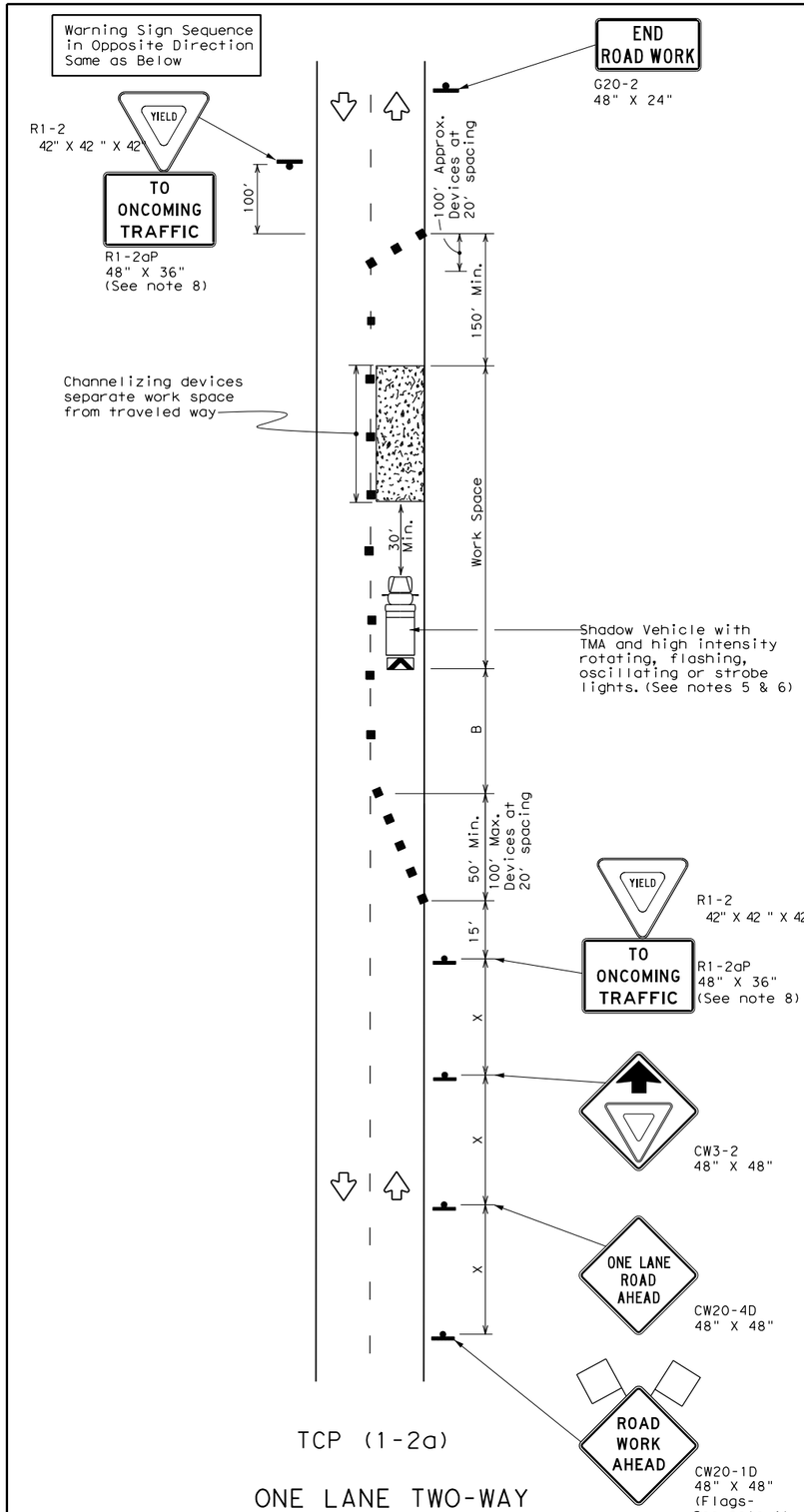
TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-12

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

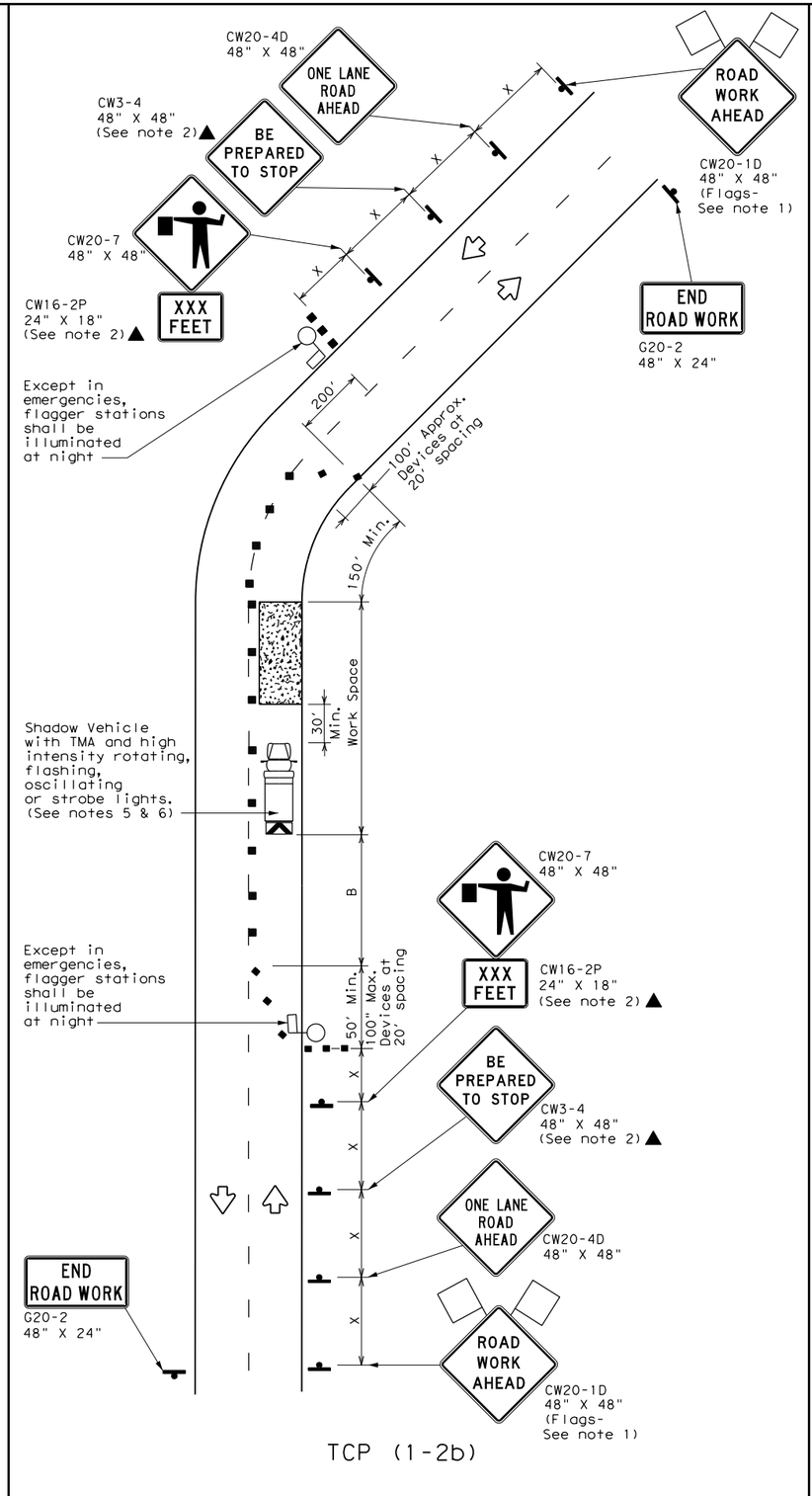
REVISIONS	CONT	SECT	JOB	HIGHWAY
2-94 2-12	.	.	.	.
8-95	DIST	COUNTY		SHEET NO.
1-97	.	.		38
4-98				

DATE:
FILE:



TCP (1-2a)

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



TCP (1-2b)

ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

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

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

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

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

GENERAL NOTES

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

TCP (1-2a)

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

TCP (1-2b)

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

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

Texas Department of Transportation
Traffic Operations Division

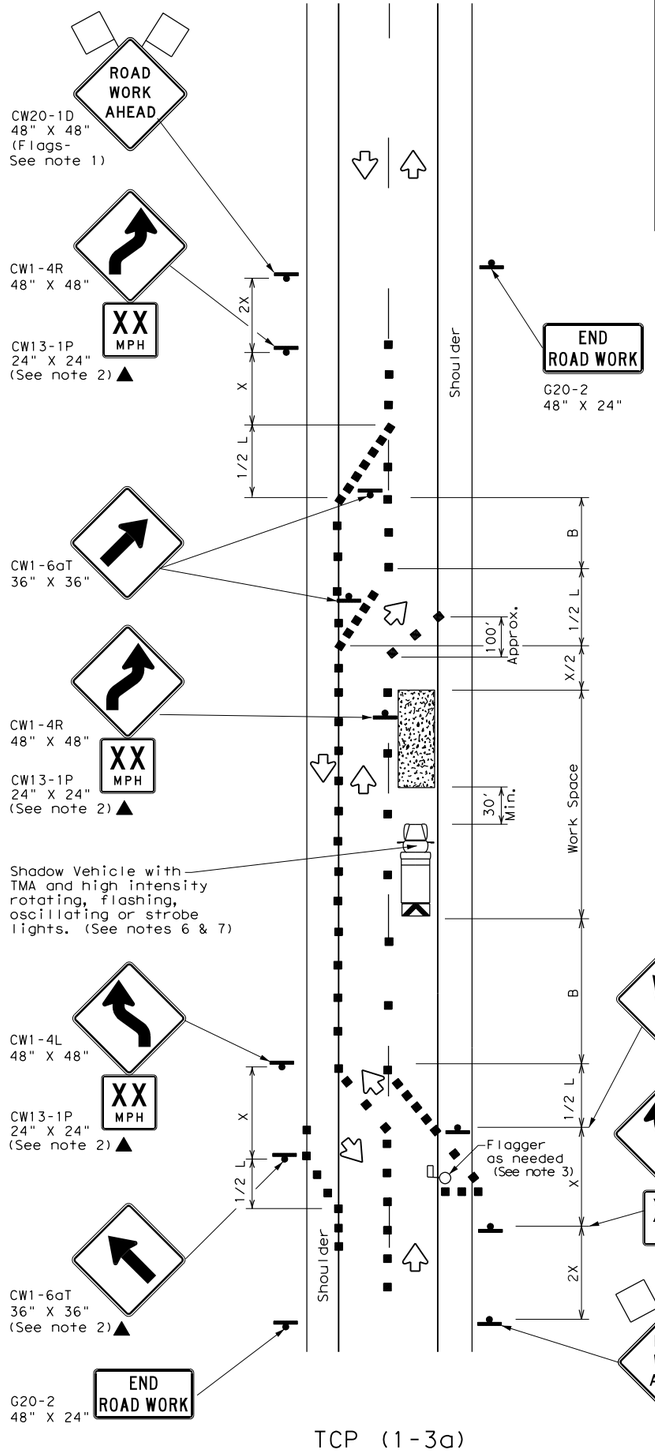
TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY TRAFFIC CONTROL

TCP(1-2)-12

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

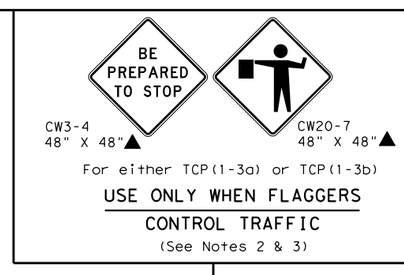
REVISIONS	CONT	SECT	JOB	HIGHWAY
4-90 2-12	.	.	.	.
2-94	DIST	COUNTY		SHEET NO.
1-97	.	.		39
4-98				

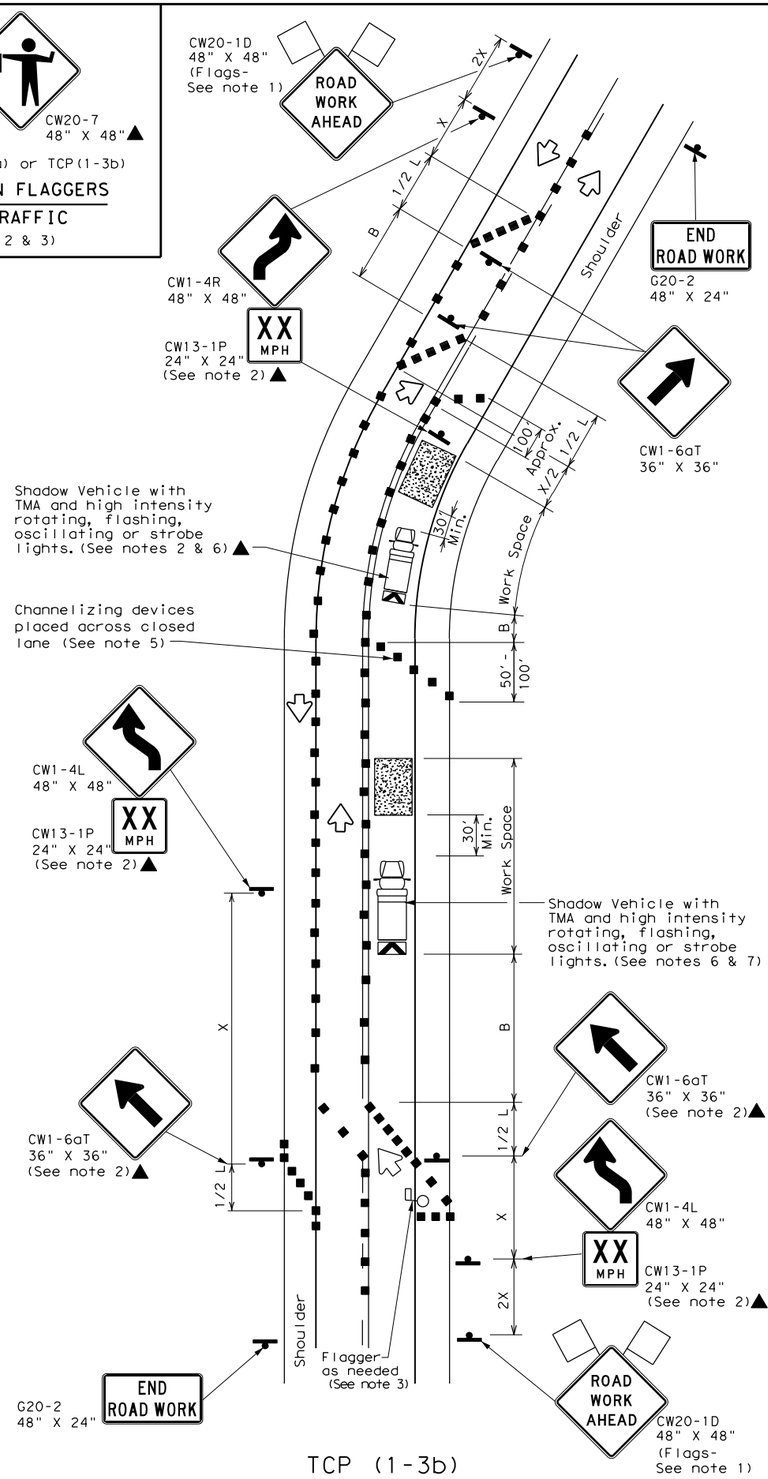
DATE:
FILE:



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

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW





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

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

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

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

* Conventional Roads Only

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

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

GENERAL NOTES

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

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

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN
TRAFFIC SHIFTS ON TWO LANE ROADS

TCP(1-3)-12

REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
2-94 2-12	CONT	SECT	JOB	HIGHWAY
8-95	.	.	.	.
1-97	DIST	COUNTY		SHEET NO.
4-98	.	.		40

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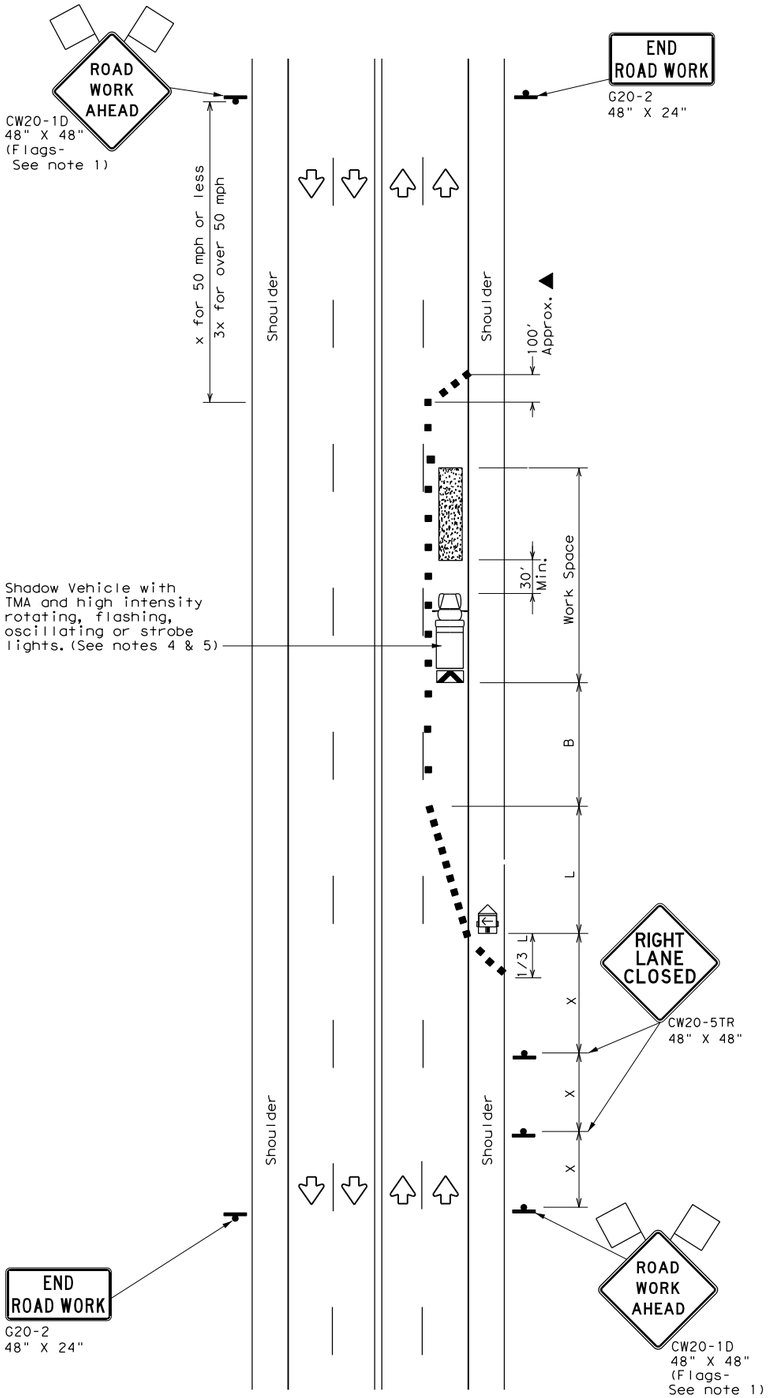
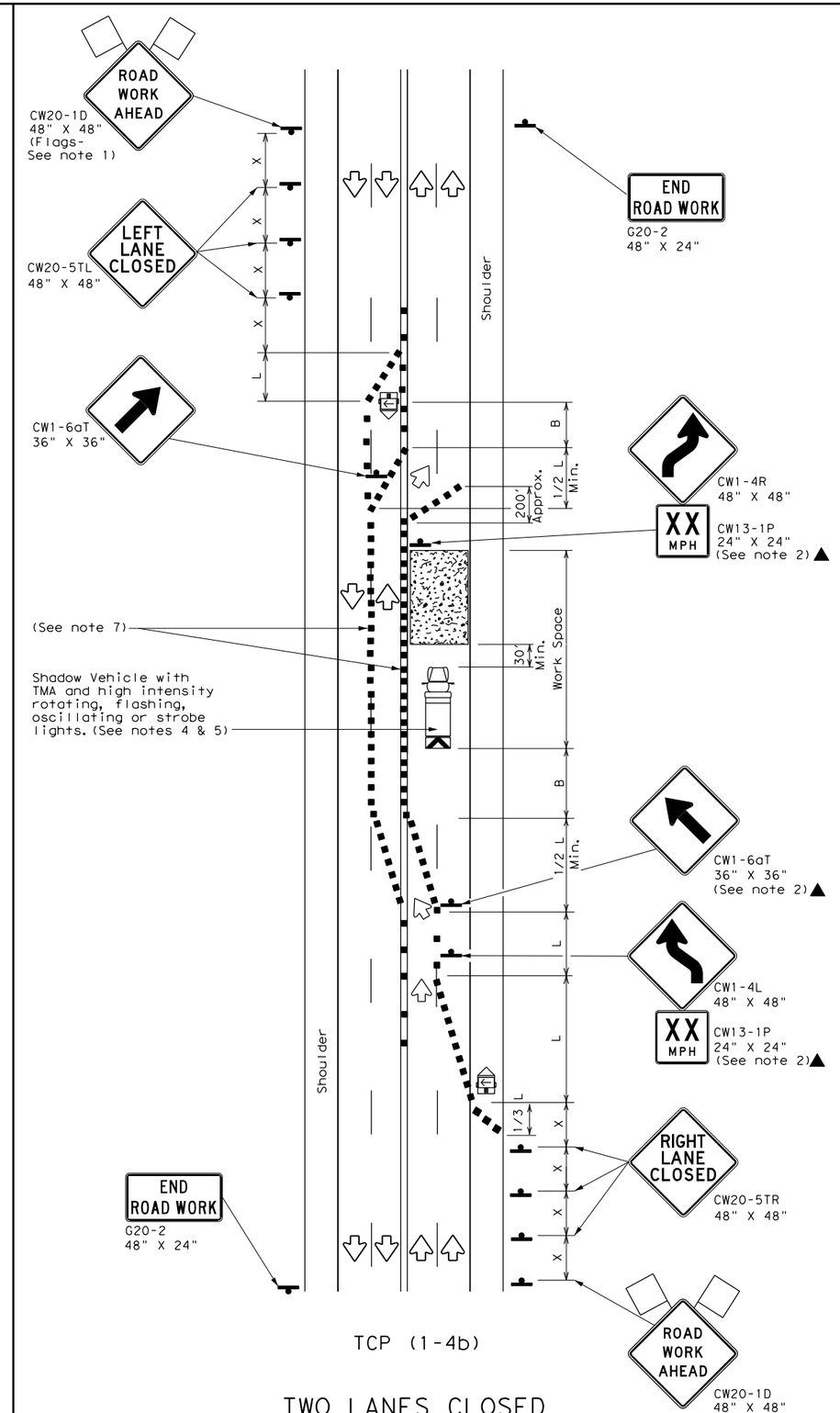
DATE:
FILE:



TCP (1-4a)

ONE LANE CLOSED



TCP (1-4b)

TWO LANES CLOSED

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

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

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

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

GENERAL NOTES

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

TCP (1-4a)

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

TCP (1-4b)

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

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

Texas Department of Transportation
Traffic Operations Division

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(1-4)-12

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

REVISIONS
2-94 2-12
8-95
1-97
4-98

PAVING – GENERAL NOTES

1. GENERAL:
   PAVEMENT THICKNESS IS AS SHOWN IN ITEM 7. SUBGRADE DESIGN SHALL CONFORM TO TOWN OF ADDISON PUBLIC WORKS REQUIREMENTS IN ITEM 3, AND SHALL EXTEND 12" MIN. BEHIND THE BACK OF CURB.

2. REINFORCED CONCRETE PAVEMENT:
   A. CONCRETE STRENGTH SHALL BE AS SHOWN IN ITEM 7 (NCTCOG LATEST EDITION).
   B. ALL CURBS SHALL BE INTEGRAL WITH PAVEMENT AND SHALL BE OF THE SAME STRENGTH AS CONCRETE PAVEMENT.
   C. DETAIL AND ARRANGEMENT OF PAVEMENT JOINTS, ALL TYPES, SHALL BE AS SHOWN ON THE TOWN STANDARD CONSTRUCTION DETAILS.
   D. BAR LAPS SHALL BE THIRTY DIAMETERS.
   E. REINFORCING STEEL SHALL BE #3 REBAR (3/8") ON 18" CENTERS FOR 8" OR LESS. #4 FOR 10" OR ABOVE

3. SUBGRADE:
   SUBGRADE UNDER ALL PAVEMENT SHALL BE 6" THICK AND SHALL BE STABILIZED WITH AT LEAST 30 LBS. PER SQ. YD. HYDRATED LIME, COMPACTED TO A DENSITY NOT LESS THAN 95 PERCENT. LABORATORY TESTS MUST BE SUBMITTED TO THE PUBLIC WORKS DEPARTMENT FOR APPROVAL TO DETERMINE AMOUNT OF LIME REQUIRED. LABORATORY TEST MAY BE WAIVED PROVIDED AT LEAST 36 LBS. OF LIME PER SQ. YD. IS USED. SEE NCTCOG ITEM 301.2 "LIME TREATMENT". FLEXIBLE BASE (CRUSHED STONE/CONCRETE) PER NCTCOG ITEM 301.5 MAY BE SUBSTITUTED FOR LIME TREATMENT WITH THE APPROVAL OF THE TOWN ENGINEER.

4. REBAR SHALL BE SUPPORTED BY BAR CHAIRS OR OTHER DEVICES APPROVED BY TOWN ENGINEER.

5. NO TRAFFIC ON FINISHED SUBGRADE SHALL BE PERMITTED AFTER REINFORCING STEEL IS INSTALLED ABOVE SUBGRAGE. NO TRAFFIC SHALL BE PERMITTED BEFORE OR DURING THE PLACING OF CONCRETE.

6. CROSS SLOPE OF STRAIGHT CROWN STREETS SHALL BE 1/4" PER FOOT UNLESS APPROVED BY THE TOWN ENGINEER.

7. PAVEMENT THICKNESS AND STRENGTHS SHALL BE AS FOLLOWS:
   MAJOR ARTERIAL – 10" CLASS "P1" OR "P2."
   MINOR ARTERIAL – 8" CLASS "P1" OR "P2."
   COMMERCIAL/INDUSTRIAL COLLECTOR – 8" CLASS "P1" OR "P2."
   RESIDENTIAL COLLECTOR – 8" CLASS "P1" OR "P2."
   RESIDENTIAL LOCAL – 8" CLASS "P1" OR "P2."
   SIDEWALK AND BFR's–4"–CLASS "A"
   DRIVE APPROACH–8"–CLASS "P2"
   ALLEY–6" CLASS "P1" OR "P2."

8. CONCRETE MIX DESIGN SHALL BE AS DEFINED BY NCTCOG 303.3.

9. ALL MEDIANS AND PARKWAYS SHALL BE PROVIDED WITH BERMUDA GROUND COVER.

10. ONCE A CURB ABUTTING A THOROUGHFARE HAS BEEN SAWCUT AND REMOVED, THE CONTRACTOR MUST REPLACE THE CONCRETE WITH A NEW POUR (i.e. DRIVEWAY) WITHIN 14 CALENDAR DAYS. LIQUIDATED DAMAGES WILL BE ASSESSED AT $500 PER DAY FOR EACH CALENDAR DAY IN EXCESS OF 14 CALENDAR DAYS. PAYMENT SHALL BE MADE PRIOR TO ACCEPTANCE OR ISSUANCE OF A CERTIFICATE OF OCCUPANCY.

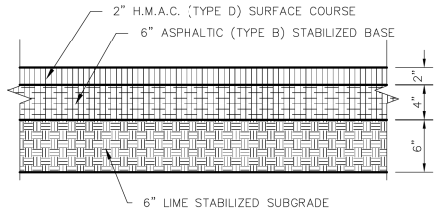
11. ALL SIDEWALKS AND ACCESSIBLE ROUTES SHALL HAVE A MAXIMUM LONGITUDINAL SLOPE OF 5% AND A MAXIMUM CROSS SLOPE OF 2%.

12. ALLEYS AND DRIVEWAYS

    A. CONCRETE FOR ALLEY RETURNS AND DRIVEWAYS SHALL HAVE A MINIMUM COPRESSIVE STRENGTH AT 28 DAYS IDENTICAL TO THAT SPECIFIED FOR THE STREET PAVEMENT OR BASE WHEN BUILT AS COMPONENTS OF A CONCRETE PAVING PROJECT. WHEN BUILT SEPARATELY, THE STRENGTH SHALL BE AS SPECIFIED ON THE CONSTRUCTION PLAN.

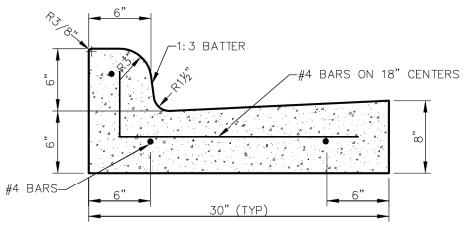
    B. SPACING AND CONSTRUCTION OF JOINTS SHALL CONFORM TO PARABOLIC STREET PAVEMENT.

Addison! PUBLIC WORKS DEPARTMENT	PAVING GENERAL NOTES	STANDARD CONSTRUCTION DETAILS PAVING		
		DATE: AUGUST, 2010	REV DATE: –	SHEET : SD–P01



ASPHALT PAVING CROSS SECTION

NOTE:
CUT OF 6" INTO EXISTING PAVEMENT IS REQUIRED FOR CONSTRUCTION JOINT WITH NEW POURS TO GET A SMOOTH FINISH.



Addison! PUBLIC WORKS DEPARTMENT	CURB AND GUTTER & ASPHALT PAVING CROSS SECTION	STANDARD CONSTRUCTION DETAILS PAVING		
		DATE: AUGUST, 2010	REV DATE: –	SHEET : SD–P06

6/6/2022

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ADDISON

TOWN OF ADDISON STANDARDS

SHEET 1 OF 6

KHA PROJECT NUMBER: 063543039

SCALE: AS SHOWN

DATE:

DESIGN	GRAPHICS	CHECK

42

PLOTTED: 6/6/2022
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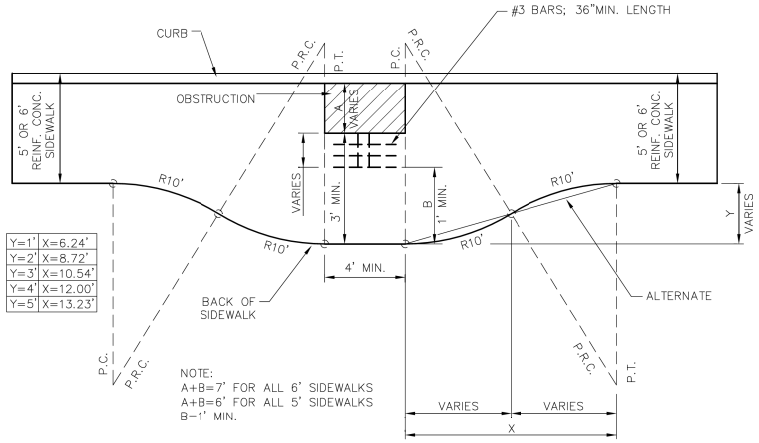
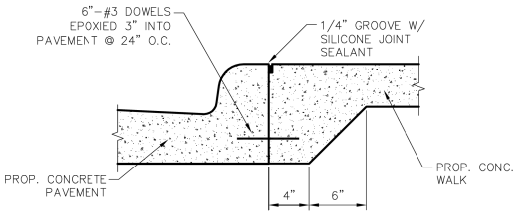


SIDEWALK WIDENING REQUIRED AROUND OBSTACLE IN SIDEWALK

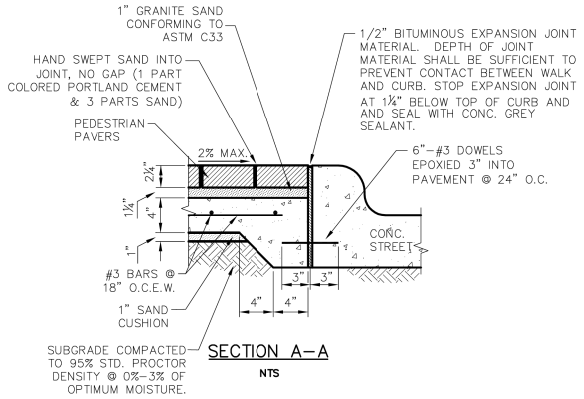
NTS



JOINT DETAIL FOR SIDEWALKS ADJACENT TO CURB

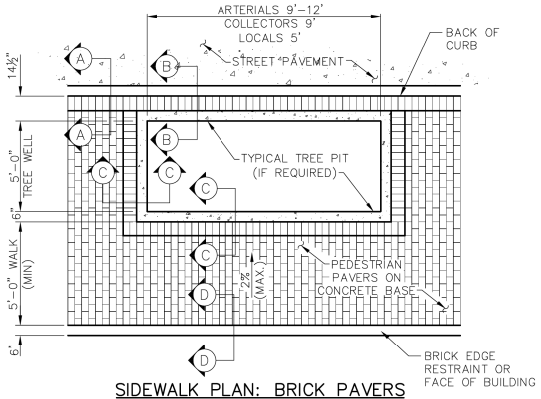
NTS

Addison! PUBLIC WORKS DEPARTMENT	SIDEWALK WIDENING REQUIRED AROUND OBSTACLE IN SIDEWALK & JOINT DETAIL FOR SIDEWALKS ADJACENT TO CURB	STANDARD CONSTRUCTION DETAILS PAVING		
		DATE: AUGUST, 2010	REV DATE: –	SHEET : SD-P25



SECTION A-A

NTS



SIDEWALK PLAN: BRICK PAVERS

NTS

NOTE:
SEE SD-P29 FOR ADDITIONAL SECTIONS AND GENERAL NOTES

Addison! PUBLIC WORKS DEPARTMENT	SIDEWALK BRICK PAVERS	STANDARD CONSTRUCTION DETAILS PAVING		
		DATE: AUGUST, 2010	REV DATE: –	SHEET : SD-P28

6/6/2022

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ADDISON

TOWN OF ADDISON STANDARDS

SHEET 2 OF 6

KHA PROJECT NUMBER: 063543039

SCALE: AS SHOWN

DATE:

DESIGN	GRAPHICS	CHECK

43

PLOTTED: 6/6/2022
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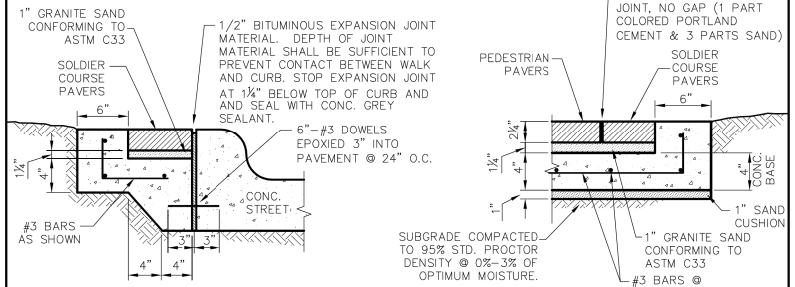
BY: Lucy.Cunningham

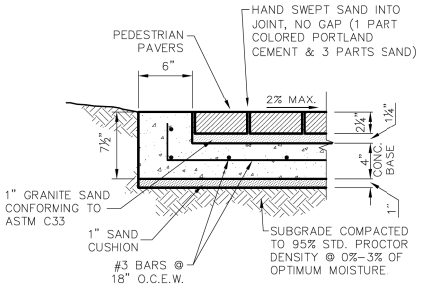


SECTION B–B

NTS

SECTION C–C

NTS



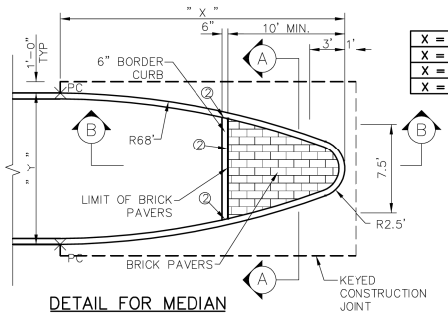
SECTION D–D

NTS

NOTES:

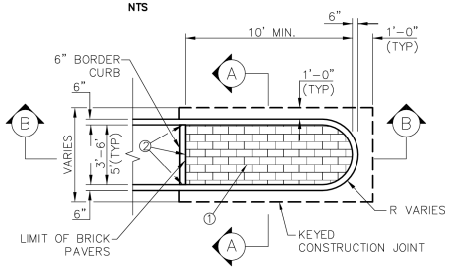
1. PEDESTRIAN PAVERS AND SOLDIER COURSE PAVERS SHALL BE LIGHT TRAFFIC PAVING BRICK MEETING ASTM C902, CLASS SX, TYPE II, APPLICATION PX, W/ DIMENSIONS (W)4"X(L)8"X(T)2¼".
2. PEDESTRIAN PAVERS SHALL BE APPROVED BY PUBLIC WORKS.
3. PROVIDE BRICK WITHOUT FROGS OR CORES, IN SURFACES EXPOSED TO VIEW IN COMLETED WORK.

Addison! PUBLIC WORKS DEPARTMENT	SIDEWALK BRICK PAVERS CONTINUED	STANDARD CONSTRUCTION DETAILS PAVING		
		DATE: AUGUST, 2010	REV DATE: –	SHEET : SD–P29



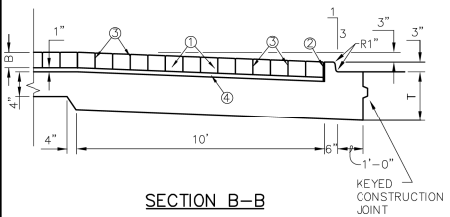
DETAIL FOR MEDIAN WIDER THAN 6' (Y>6')

NTS



DETAIL FOR MEDIAN 3'–0" TO 6'–0"

NTS



SECTION B–B

NTS

DIMENSIONS OF MEDIAN NOSE

X = 13.90'	Y = 7.0'	X = 26.36'	Y = 14.0'
X = 16.44'	Y = 8.0'	X = 29.89'	Y = 17.0'
X = 18.08'	Y = 9.0'	X = 32.93'	Y = 20.0'
X = 20.42'	Y = 10.0'	X = 36.47'	Y = 24.0'

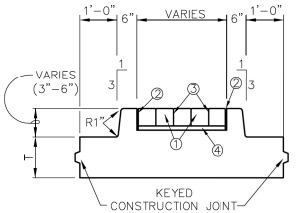
① VEHICULAR BRICK PAVER

② ½" BITUMINOUS EXPANSION JOINT MATERIAL SHALL BE SUFFICIENT TO PREVENT CONTACT BETWEEN WALK & CURB. STOP EXPANSION JOINT AT ½" BELOW TOP OF CURB AND FILL WITH CONC. GRAY SEALANT.

③ JOINT SAND COMPRISED OF CRUSHED GRANITE SAND CONFORMING TO ASTM C144 AND A DRY MIX POLYMER BASED JOINT SAND STABILIZER. JOINT SAND STABILIZER SHALL BE APPROVED BY THE PUBLIC WORKS DEPARTMENT PRIOR TO INSTALLATION.

④ BEDDING SAND COMPRISED OF 90% NATURAL OR CRUSHED GRANITE SAND CONFORMING TO ASTM C33 AND 10% PORTLAND CEMENT.

T=PAVEMENT THICKNESS
B=BRICK PAVER THICKNESS



SECTION A–A

NTS

NOTES:

1. BRICK PAVERS SHALL BE VEHICULAR PAVERS CONFORMING TO ASTM C1272, TYPE R APPLICATION AND SHALL BE APPROVED BY PUBLIC WORKS DEPT.
2. BRICK PAVERS SHALL BE WITHOUT FROGS OR CORES IN SURFACE EXPOSED TO VIEW IN THE COMPLETED WORK.
3. MEDIAN PAVERS SHALL EXTEND TO A POINT WHERE MEDIAN IS AT LEAST 6' WIDE. IF MEDIAN IS 6' WIDE, PAVERS SHALL EXTEND 10' FROM THE NOSE.
4. ALL DISTANCES ARE MINIMUM.

Addison! PUBLIC WORKS DEPARTMENT	MEDIAN DETAILS	STANDARD CONSTRUCTION DETAILS PAVING		
		DATE: AUGUST, 2010	REV DATE: –	SHEET : SD–P14

6/6/2022

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ADDISON

TOWN OF ADDISON STANDARDS

SHEET 3 OF 6

KHA PROJECT NUMBER: 063543039

SCALE: AS SHOWN

DATE:

DESIGN	GRAPHICS	CHECK

44

PLOTTED: 6/6/2022
FILENAME: K:\DAL_TPTO\Project\063543039 - Addison Signal Construction Support\CADD\Standards_Town of Addison\Addison-Standards03.dgn
$$$SCALE$$$
BY: Lucy.Cunningham

GENERAL NOTES FOR PEDESTRIAN FACILITIES

1. ALL SLOPES ARE MAXIMUM ALLOWABLE. THE LEAST POSSIBLE SLOPE THAT WILL STILL DRAIN PROPERLY SHOULD BE USED. ADJUST CURB RAMP LENGTH OR GRADE OF APPROACH SIDEWALKS AS DIRECTED.
2. LANDINGS SHALL BE 5'X5' MINIMUM WITH A MAXIMUM 2% SLOPE IN ANY DIRECTION.
3. MANEUVERING SPACE AT THE BOTTOM OF CURB RAMPS SHALL BE A MINIMUM OF 4'X4' WHOLLY CONTAINED WITHIN THE CROSSWALK AND WHOLLY OUTSIDE THE PARALLEL VEHICULAR TRAVEL PATH.
4. MAXIMUM ALLOWABLE CROSS SLOPE ON SIDEWALK AND CURB RAMP SURFACES IS 2%
5. CURB RAMPS WITH RETURNED CURBS MAY BE USED ONLY WHERE PEDESTRIANS WOULD NOT NORMALLY WALK ACROSS THE RAMP, EITHER BECAUSE THE ADJACENT SURFACE IS PLANTING OR OTHER NON-WALKING SURFACE OR BECAUSE THE SIDE APPROACH IS SUBSTANTIALLY OBSTRUCTED. OTHERWISE, PROVIDE FLARED SIDES.
6. ADDITIONAL INFORMATION ON CURB RAMP LOCATION, DESIGN, LIGHT REFLECTIVE VALUE AND TEXTURE MAY BE FOUND IN THE CURRENT EDITION OF THE TEXAS ACCESSIBILITY STANDARDS (TAS) AND 16 TAC §68.102.
7. CURB RAMPS SHALL BE ALIGNED WITH THEORETICAL CROSSWALKS, OR AS DIRECTED BY THE TOWN ENGINEER.
8. HANDRAILS ARE NOT REQUIRED ON CURB RAMPS. PROVIDE CURB RAMPS WHEREVER ON ACCESSIBLE ROUTE CROSSES (PENETRATES) A CURB.
9. FLARE SLOPE SHALL NOT EXCEED 10% MEASURED ALONG CURB LINE.
10. BARRIER FREE RAMPS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CURRENT EDITION OF THE TEXAS ACCESSIBILITY STANDARDS (TAS).
11. ALL BARRIER FREE RAMPS MUST PASS AN INDEPENDENT INSPECTION. A LETTER OF COMPLIANCE ACCEPTANCE IS REQUIRED PRIOR TO FINAL ACCEPTANCE BY THE TOWN OF ADDISON.
12. STREETS ON STEEP GRADE WILL REQUIRE LONGER TRANSITION ON UPGRADE SIDE.
13. MAXIMUM SLOPE ON RAMP PORTION SHALL NOT EXCEED 1" PER FOOT AT ANY LOCATION. VERTICAL DISTANCE BETWEEN STREET AND RAMP SHALL NOT EXCEED ¼".

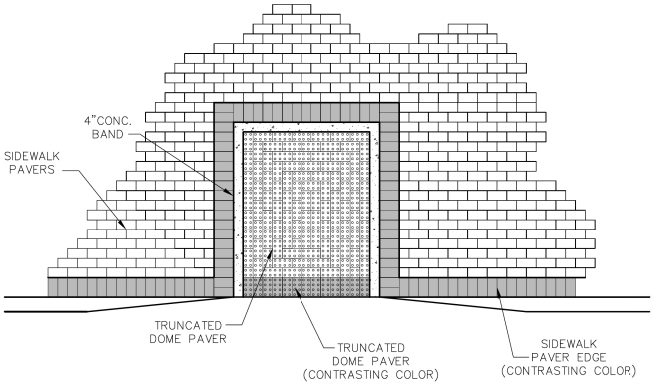
GENERAL NOTES FOR DETECTABLE WARNINGS

1. CURB RAMPS MUST CONTAIN A DETECTABLE WARNING SURFACE THAT CONSIST OF RAISED TRUNCATED DOMES COMPLYING WITH SECTION 4.29 OF THE TEXAS ACCESSIBILITY STANDARDS (TAS). THE SURFACE MUST CONTRAST VISUALLY WITH THE ADJOINING SURFACES, INCLUDING SIDE FLARES. FURNISH DARK RED COLORED DETECTABLE WARNING SURFACE ADJACENT TO UNCOLORED CONCRETE AND CREAM COLORED DETECTABLE WARNING SURFACE ADJACENT TO DARK RED COLORED BRICK PAVERS.
2. DETECTABLE WARNING SURFACES MUST BE SLIP RESISTANT AND NOT ALLOW WATER TO ACCUMULATE.
3. ALIGN TRUNCATED DOMES IN THE DIRECTION OF PEDESTRIAN TRAVEL WHEN ENTERING THE STREET.
4. DETECTABLE WARNING SURFACES SHALL BE A MINIMUM OF 24" IN DEPTH IN THE DIRECTION OF PEDESTRIAN TRAVEL, AND EXTEND THE FULL WIDTH OF THE CURB RAMP OR LANDING WHERE THE PEDESTRIAN ACCESS ROUTE ENTERS THE STREET.
5. DETECTABLE WARNING SURFACES SHALL BE LOCATED SO THAT THE EDGE NEAREST THE CURB LINE IS A MINIMUM OF 6" AND A MAXIMUM OF 8" FROM THE EXTENSION OF THE FACE OF CURB AND SHALL BE AN INTEGRAL PART OF THE WALKING SURFACE. DETECTABLE WARNING SURFACES MAY BE CURVED ALONG THE CORNER RADIUS.

GENERAL NOTES FOR DETECTABLE WARNING PAVER UNITS

1. DETECTABLE WARNING PAVER UNITS SHALL MEET OR EXCEED ALL REQUIREMENTS OF ASTM C-936, C-33, AND BE LAID IN A TWO BY TWO UNIT BASKET WEAVE PATTERN OR AS DIRECTED.
2. LAY FULL-SIZE UNITS FIRST FOLLOWED BY CLOSURE UNITS CONSISTING OF AT LEAST 25 PERCENT OF A FULL UNIT. CUT DETECTABLE WARNING PAVER UNITS USING A POWER SAW.

Addison! PUBLIC WORKS DEPARTMENT	PEDESTRIAN FACILITIES GENERAL NOTES	STANDARD CONSTRUCTION DETAILS PAVING		
		DATE: AUGUST, 2010	REV DATE: –	SHEET : SD-P37



NOTE:
ALL PAVER COLORS TO BE APPROVED BY TOWN OF ADDISON.

Addison! PUBLIC WORKS DEPARTMENT	TYPICAL PATTERN FOR PAVER SIDEWALK AND CURB RAMP	STANDARD CONSTRUCTION DETAILS PAVING		
		DATE: AUGUST, 2010	REV DATE: –	SHEET : SD-P40

6/6/2022

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ADDISON

TOWN OF ADDISON STANDARDS

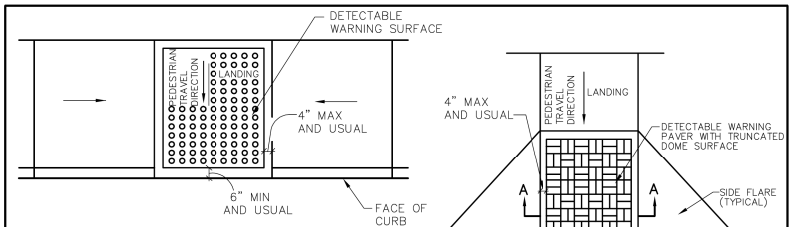
SHEET 4 OF 6

KHA PROJECT NUMBER: 063543039

SCALE: AS SHOWN

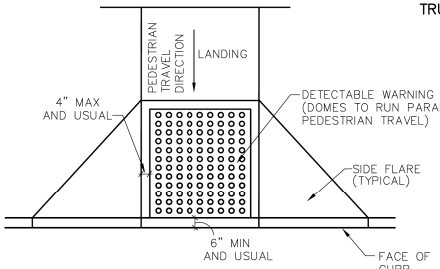
DATE:

DESIGN	GRAPHICS	CHECK

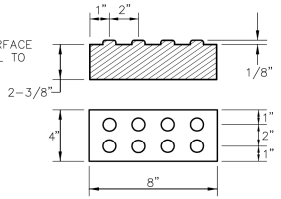


TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON LANDING AT STREET EDGE.

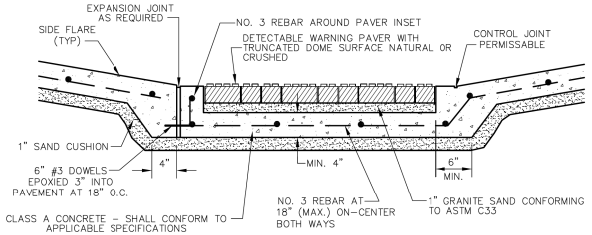
TRUNCATED DOME PATTERN CURB RAMP



TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.



DETECTABLE WARNING PAVER



SECTION A-A

DETECTABLE WARNING PAVER (OPTION)

Addison! PUBLIC WORKS DEPARTMENT	DETECTABLE WARNING PAVER	STANDARD CONSTRUCTION DETAILS PAVING		
		DATE: AUGUST, 2010	REV DATE: -	SHEET : SD-P41

PLOTTED: 6/6/2022
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$$$SCALE$$$ BY: Lucy.Cunningham

DOCUMENT IS FOR INTERIM REVIEW AND NOT INTENDED FOR CONSTRUCTION BIDDING, OR PERMIT PURPOSES.

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DATE

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ADDISON

TOWN OF ADDISON STANDARDS

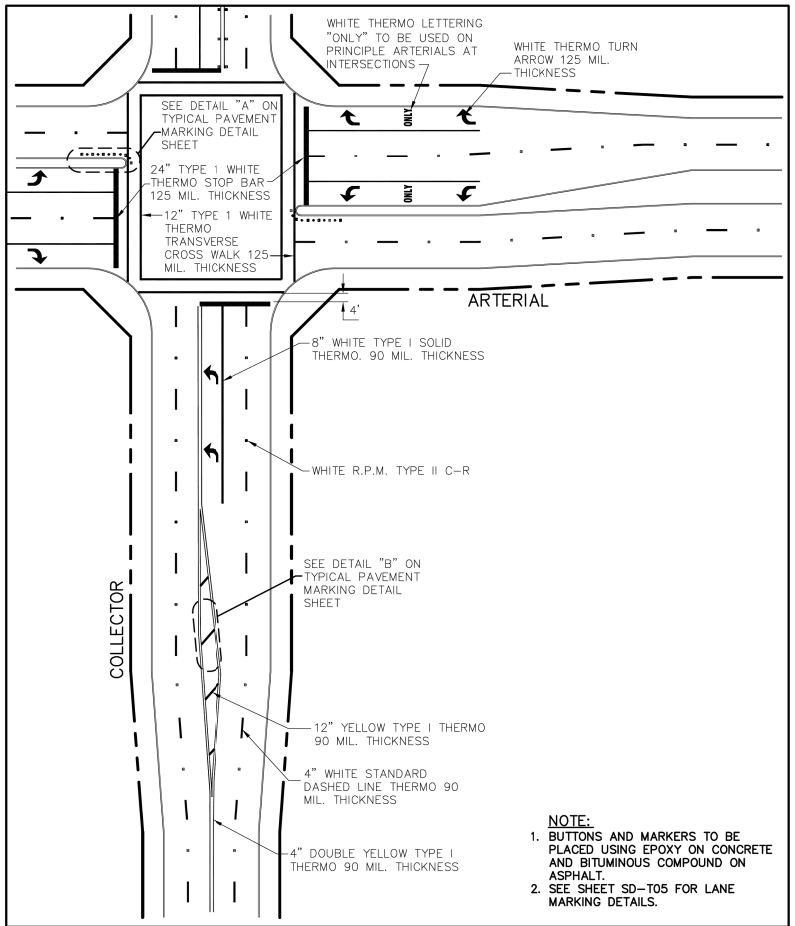
SHEET 5 OF 6

KHA PROJECT NUMBER: 063543029

SCALE: AS SHOWN

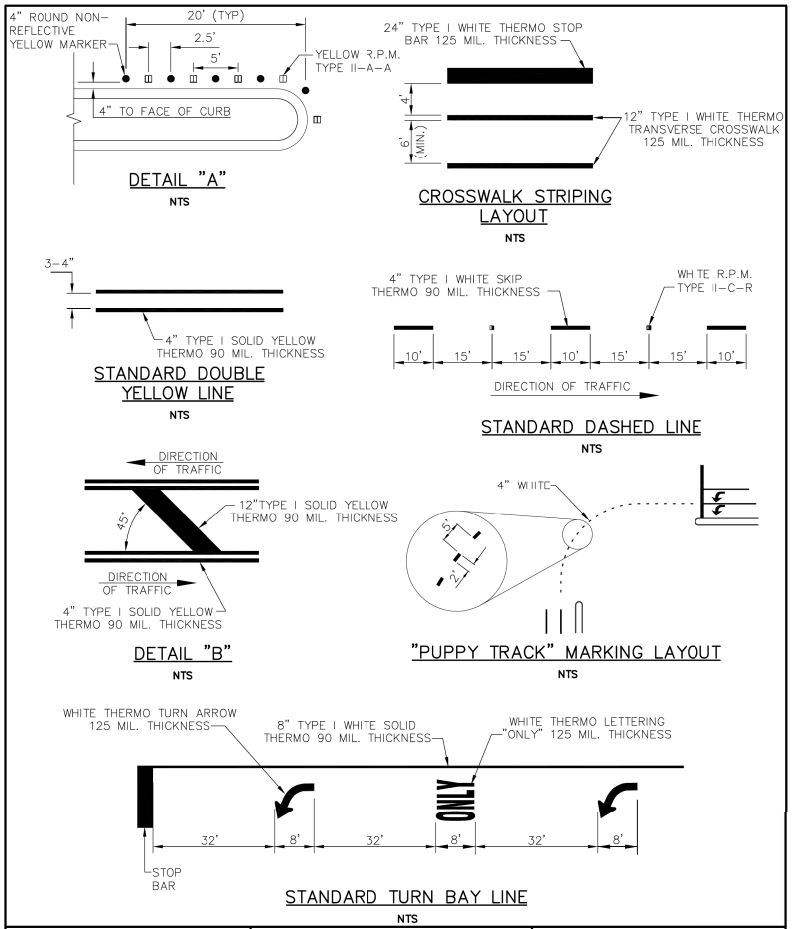
DATE:

DESIGN	GRAPHICS	CHECK



NOTE:
1. BUTTONS AND MARKERS TO BE PLACED USING EPOXY ON CONCRETE AND BITUMINOUS COMPOUND ON ASPHALT.
2. SEE SHEET SD-T05 FOR LANE MARKING DETAILS.

Addison! PUBLIC WORKS DEPARTMENT	TYPICAL PAVMENT MARKING LAYOUT	STANDARD CONSTRUCTION DETAILS TRAFFIC		
		DATE: AUGUST, 2010	REV DATE: –	SHEET : SD-T04



Addison! PUBLIC WORKS DEPARTMENT	TYPICAL PAVMENT MARKING DETAILS	STANDARD CONSTRUCTION DETAILS TRAFFIC		
		DATE: AUGUST, 2010	REV DATE: –	SHEET : SD-T05

DOCUMENT IS FOR INTERIM REVIEW AND NOT INTENDED FOR CONSTRUCTION BIDDING, OR PERMIT PURPOSES.

THOMAS W. HARTMANN, P.E.
109948
TEXAS SERIAL NO.
6/6/2022
DATE

Kimley»Horn F-928
13455 Noel Road
Two Galleria Office Tower, Suite 700
Dallas, Texas 75240
Tel. No. (972) 770-1300
Fax No. (972) 239-3820

ADDISON

TOWN OF ADDISON STANDARDS

SHEET 6 OF 6

KHA PROJECT NUMBER: 063543029

SCALE: AS SHOWN

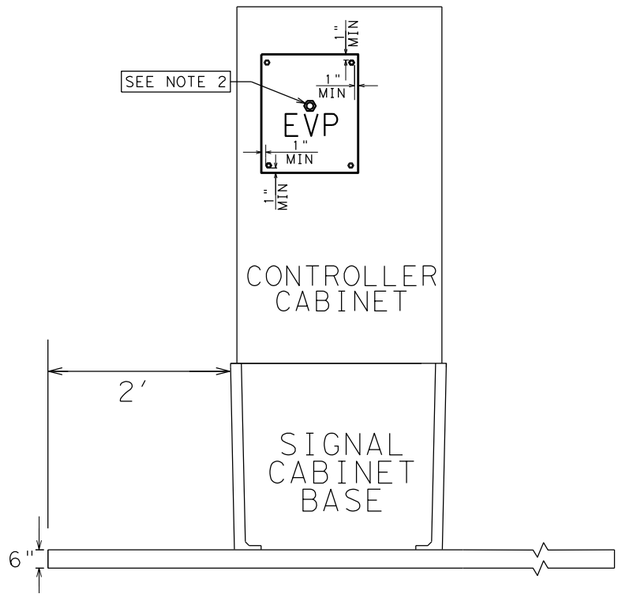
DATE:

DESIGN	GRAPHICS	CHECK

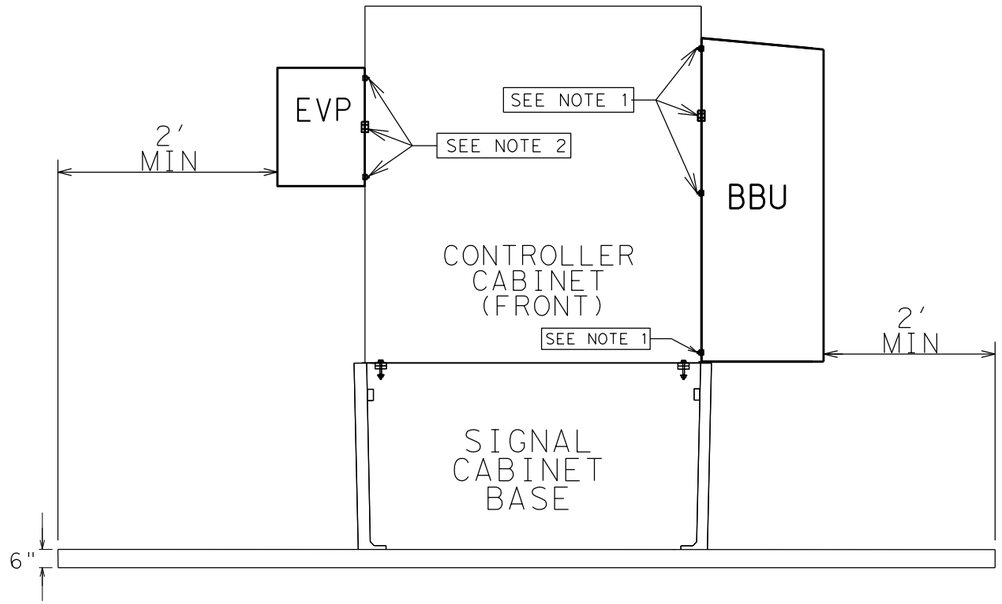
PLOTTED: 6/6/2022
FILENAME: K:\DAL_TPTO\Project\063543039 - Addison Signal Construction Support\CADD\Standards_Town of Addison\Addison-Standards07_PM.dgn
$$$SCALE$$$ BY: Lucy.Cunningham

NOTES:

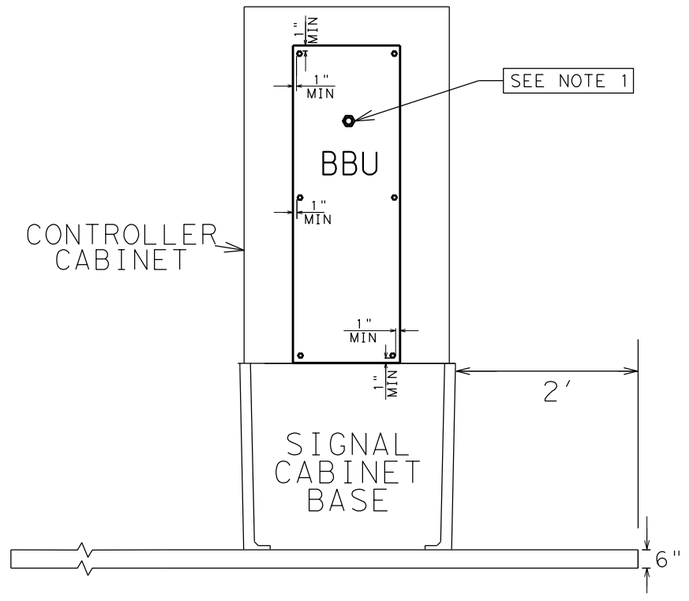
1. INSTALL 1½" ALL THREAD NIPPLE WITH BONDING BUSHINGS ON BOTH ENDS AND 6 EA OF ½" X 1½" 13 UNC MOUNTING BOLTS BETWEEN THE TWO CABINETS (SIGNAL AND BBU).
2. INSTALL 2 " FITTING FOR EVP CABLES/WIRES AND 4 EA OF ½" X 1½" 13 UNC MOUNTING BOLTS BETWEEN THE TWO CABINETS (SIGNAL AND EVP).
3. USE SILICON SEALANT TO SEAL BETWEEN THE CABINETS OF THE CONTROLLER, EVP AND BBU UNIT.
4. THE ABOVE WORK PERFORMED AND MATERIALS FURNISHED WILL NOT BE PAID FOR DIRECTLY, BUT WILL BE SUBSIDIARY TO PERTINENT ITEMS.



SIDE VIEW
(EVP)



ELEVATION VIEW

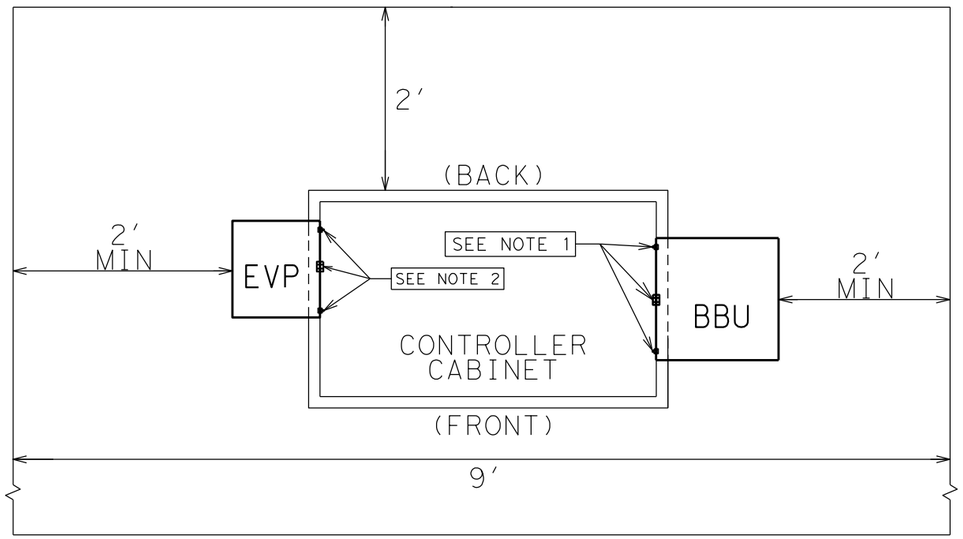


SIDE VIEW
(BBU)

REQUIRED CABLE/CONDUCTORS FOR EVP			
QUANTITY EACH	WIRE SIZE	COLOR	FUNCTION
1	#14	BLACK	120 VAC FOR EVP
1	#14	RED	120 VAC FOR FAN & CABINET LIGHT
1	#14	WHITE	AC NEUTRAL
1	#14	GREEN	CHASIS GROUND
1	#18	GRAY	LOGIC GROUND
4	#18	BLUE	PREEMPT COMMANDS
4	-	-	CABLE FROM DETECTOR UNIT

REQUIRED CONDUCTORS FOR BBU			
QUANTITY EACH	WIRE SIZE	COLOR	FUNCTION
1	-	BLACK	120 VAC FROM SERVICE
1	-	WHITE	AC NEUTRAL FROM SERVICE
1	#6	BLACK	120 VAC TO CONTROLLER
1	#6	WHITE	AC NEUTRAL TO CONTROLLER
1	#6	GREEN	GROUND

LEGEND:
EVP-EMERGENCY VEHICLE PREEMPTION CABINET.
BBU-BATTERY BACKUP UNIT.



PLAN VIEW

INSTALLATION OF BBU/EVP

EXTERNAL SIDE MOUNT CABINET INSTALLATION DETAILS

DALLAS DISTRICT STANDARD

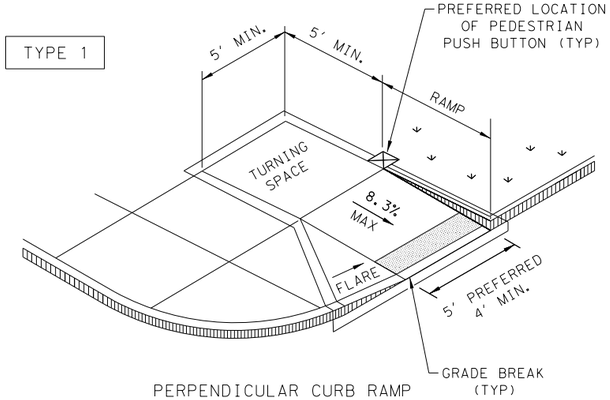
N.T.S.

SHEET 1 OF 1

FED.RD. DIV.NO.	FEDERAL AID PROJECT NO.		HIGHWAY NO.
6			
STATE	DISTRICT	COUNTY	SHEET NO.
TEXAS			48
CONTROL	SECTION	JOB	

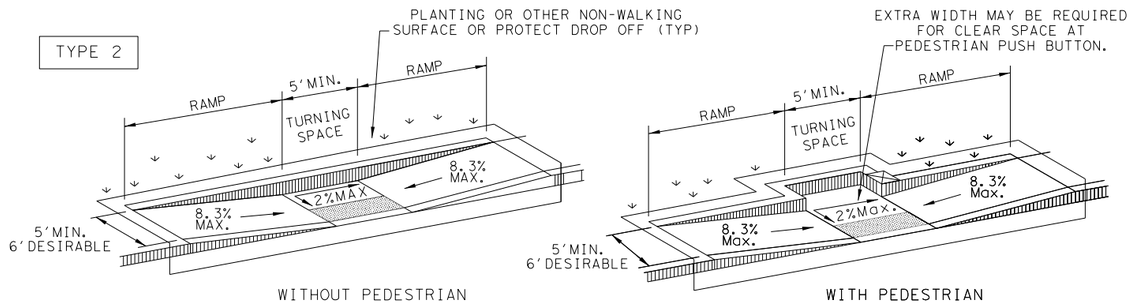
DATE:
FILE:

TYPE 1



PERPENDICULAR CURB RAMP

TYPE 2

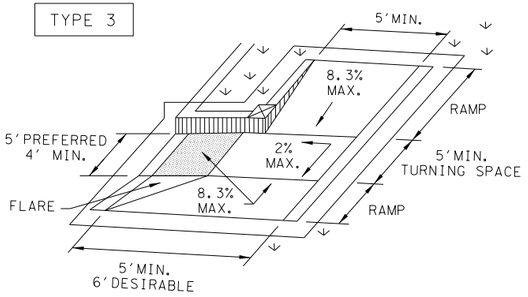


WITHOUT PEDESTRIAN PUSH BUTTON

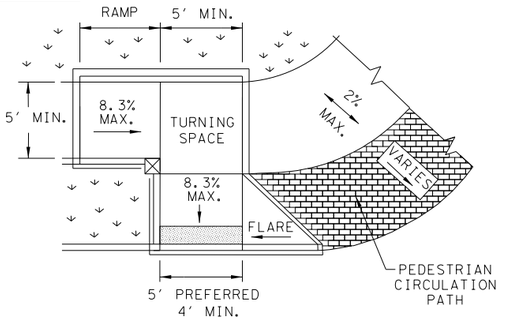
WITH PEDESTRIAN PUSH BUTTON

PARALLEL CURB RAMP

TYPE 3

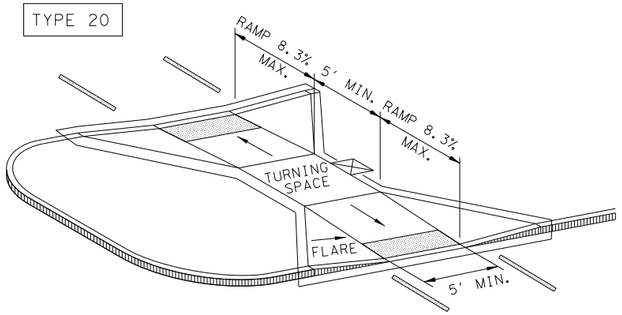


TYPE 6



COMBINATION CURB RAMPS

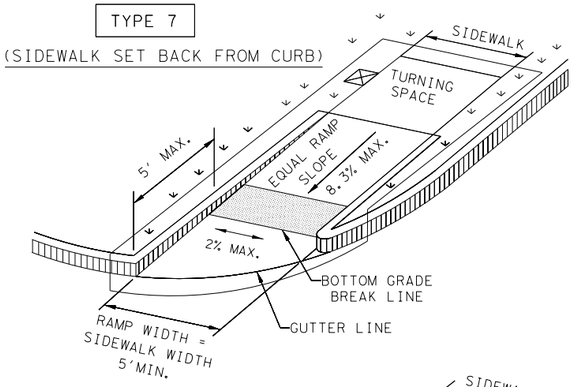
TYPE 20



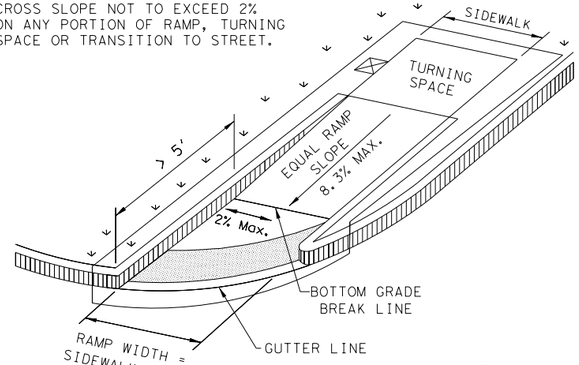
CURB RAMPS AT MEDIAN ISLANDS

TYPE 7

(SIDEWALK SET BACK FROM CURB)

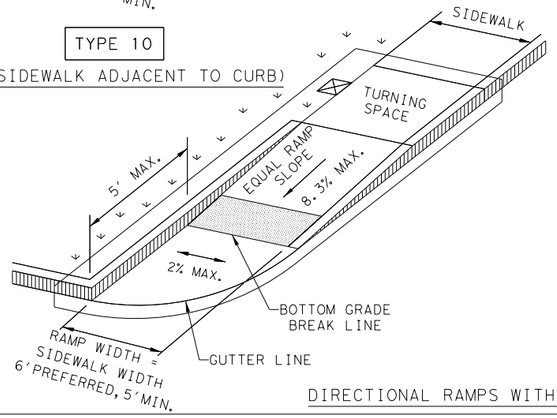


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.

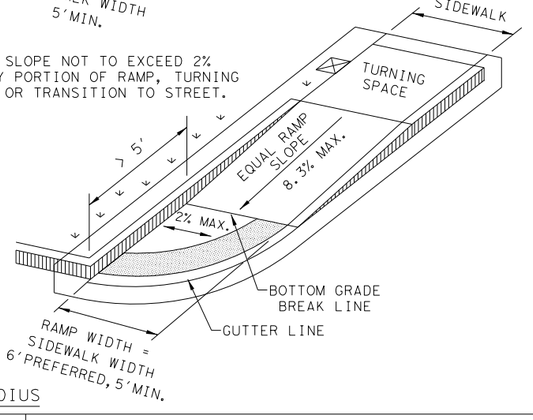


TYPE 10

(SIDEWALK ADJACENT TO CURB)

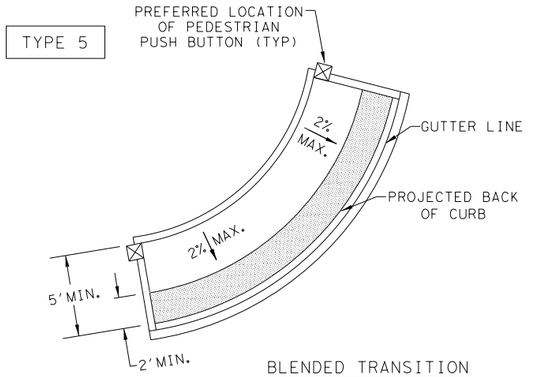


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



DIRECTIONAL RAMPS WITHIN RADIUS

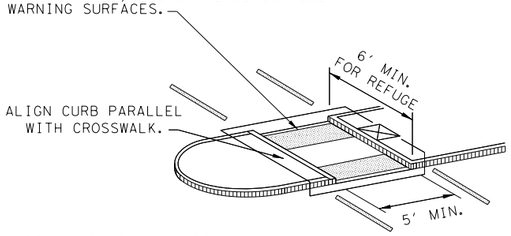
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

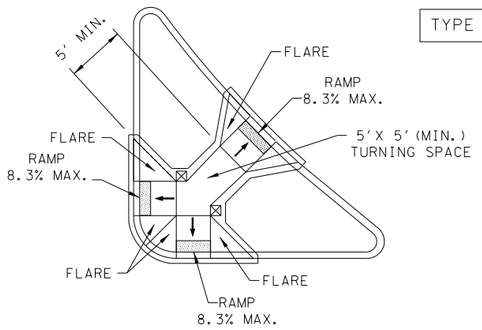
TYPE 21

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.



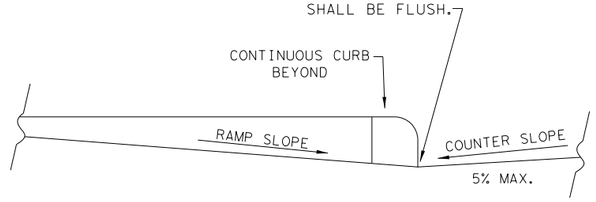
NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS

BOTTOM GRADE BREAK OF CURB RAMP WILL NORMALLY BE AT GUTTER LINE. SURFACE SLOPES AT GRADE BREAKS SHALL BE FLUSH.



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	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
				49

DATE:
FILE:

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 applicalble standards may remain in place unless otherwise shown on the plans.

DETECTABLE WARNING MATERIAL

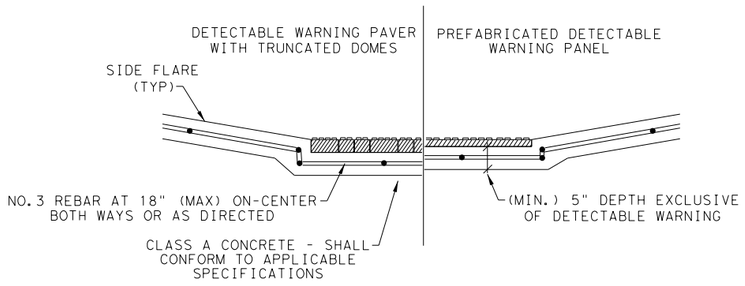
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored 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

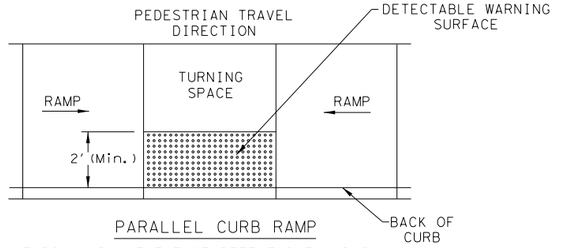
27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.
28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items 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 parallel 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.



SECTION VIEW DETAIL

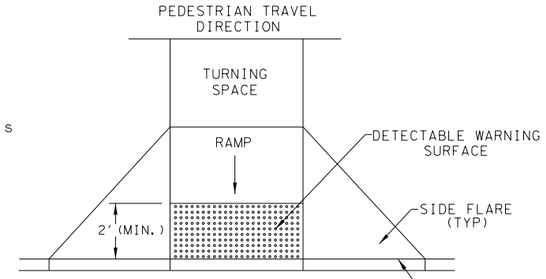
CURB RAMP AT DETECTIBLE WARNINGS

DETECTABLE WARNING SURFACE DETAILS



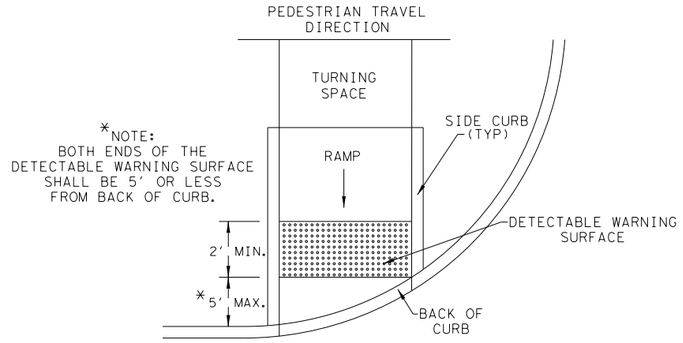
PARALLEL CURB RAMP

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.

SHEET 2 OF 4

Texas Department of Transportation

Design Division Standard

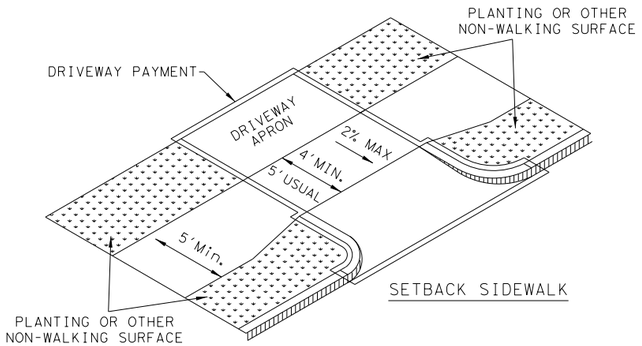
PEDESTRIAN FACILITIES CURB RAMPS

PED-18

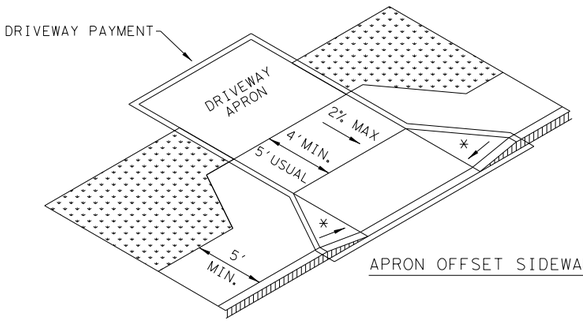
FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
				50

DATE:
FILE:

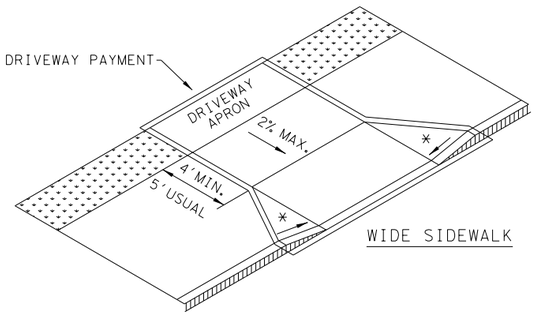
SIDEWALK TREATMENT AT DRIVEWAYS



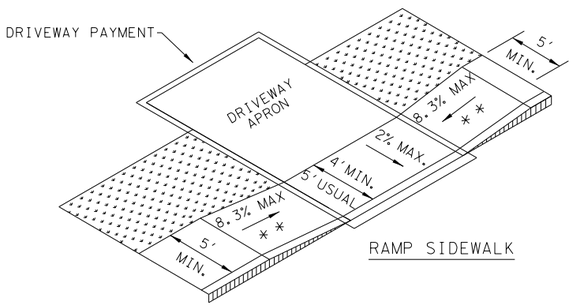
SETBACK SIDEWALK



APRON OFFSET SIDEWALK



WIDE SIDEWALK

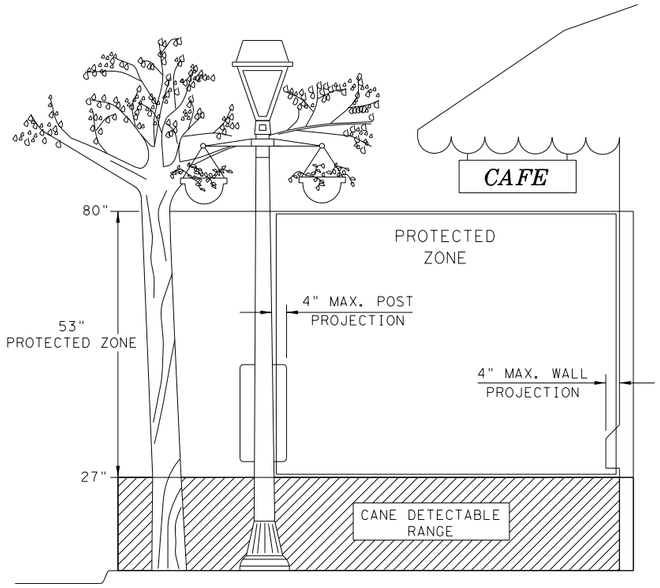


RAMP SIDEWALK

NOTES:

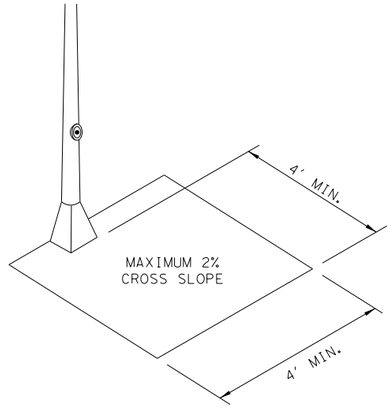
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

* * IF CURB HEIGHT IS GREATER THAN 6 INCHES, USE GRADE LESS THAN OR EQUAL TO 5%. HANDRAIL AND DETECTABLE WARNING ARE NOT REQUIRED.

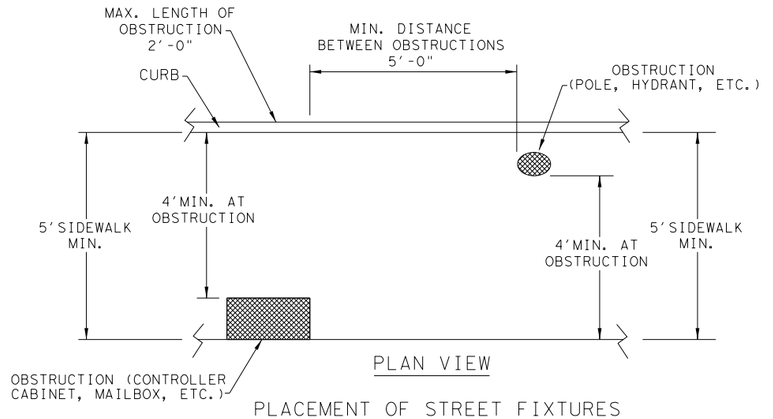


PROTECTED ZONE

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



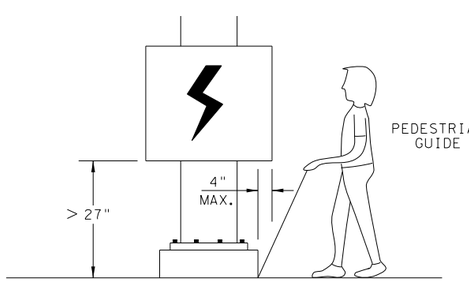
CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



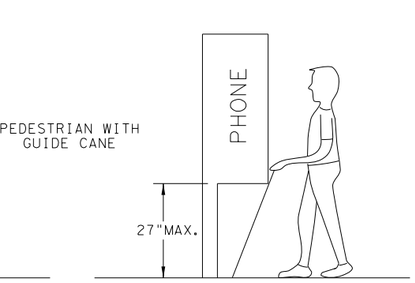
PLAN VIEW

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"

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

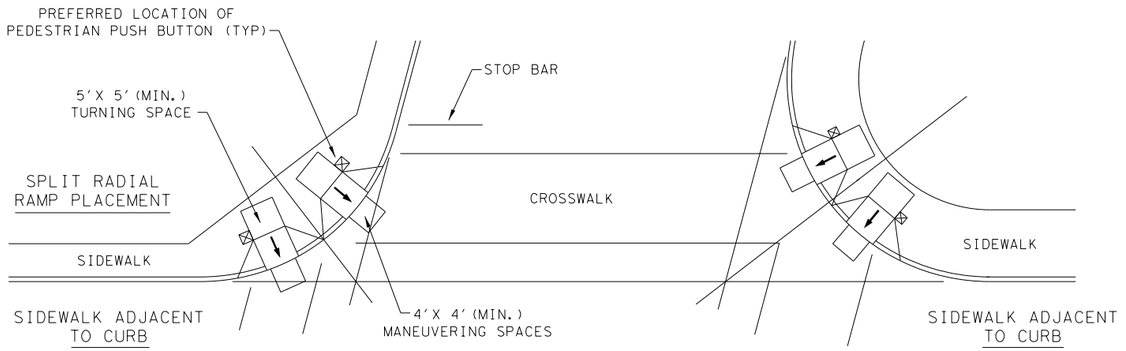
PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS REVISED 08,2005 REVISED 06,2012 REVISED 01,2018				
	DIST	COUNTY		SHEET NO.
				51

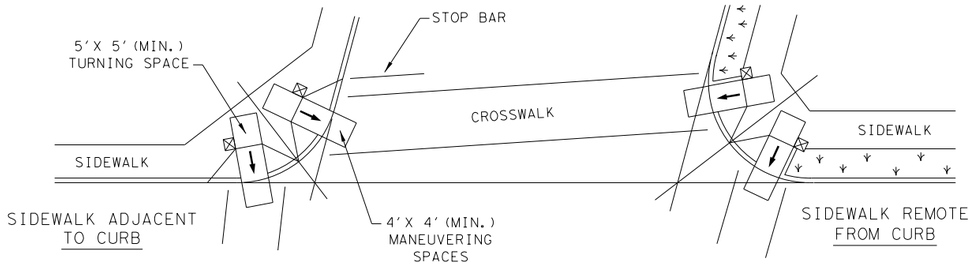
DATE:
FILE:

TYPICAL CROSSING LAYOUTS

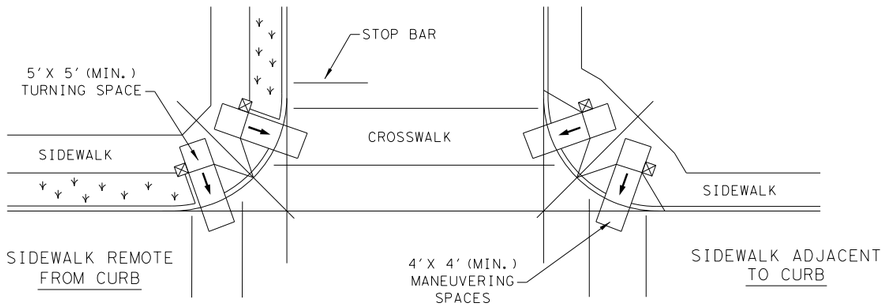
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



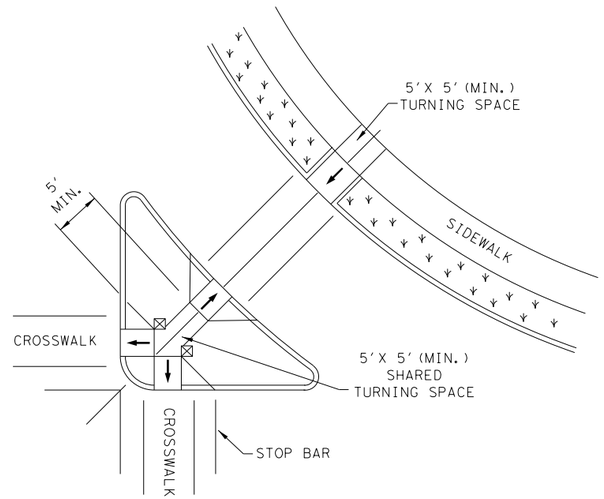
SKEWED INTERSECTION WITH "LARGE" RADIUS



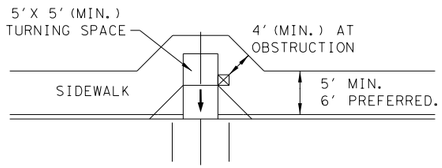
SKEWED INTERSECTION WITH "SMALL" RADIUS

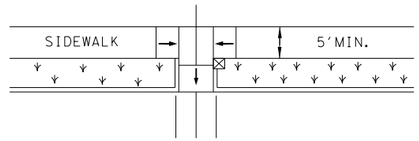


NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND





MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

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.

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES
CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.
				52

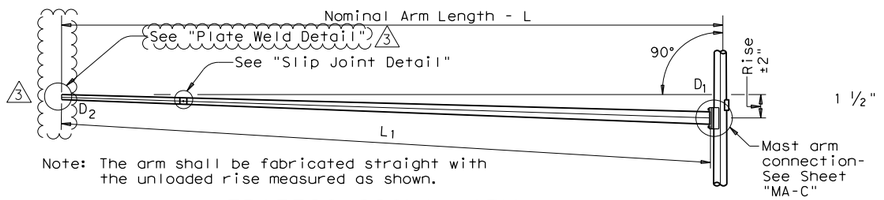
Arm Length	ROUND POLES					POLYGONAL POLES					Foundation Type
	D_B	D_{19}	D_{24}	D_{30}	① thk	D_B	D_{19}	D_{24}	D_{30}	① thk	
ft.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	
20	10.5	7.8	7.1	6.3	.179	11.5	8.5	7.7	6.8	.179	30-A
24	11.0	8.3	7.6	6.8	.179	12.0	9.0	8.2	7.3	.179	30-A
28	11.5	8.8	8.1	7.3	.179	12.5	9.5	8.7	7.8	.179	30-A
32	12.5	9.8	9.1	8.3	.179	12.0	9.0	8.2	7.3	.239	30-A
36	12.0	9.3	8.6	7.8	.239	12.5	9.5	8.7	7.8	.239	36-A
40	12.0	9.3	8.6	7.8	.239	13.5	10.5	9.7	8.8	.239	36-A
44	12.5	9.8	9.1	8.3	.239	14.0	11.0	10.2	9.3	.239	36-A
48	13.0	10.3	9.6	8.8	.239	15.0	12.0	11.2	10.3	.239	36-A

Arm Length	ROUND ARMS					POLYGONAL ARMS				
	L_1	D_1	D_2	① thk	Rise	L_1	D_1	② D_2	① thk	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	6.5	3.8	.179	1′-9"	19.1	7.0	3.5	.179	1′-8"
24	23.1	7.5	4.3	.179	1′-10"	23.1	7.5	3.5	.179	1′-9"
28	27.1	8.0	4.2	.179	1′-11"	27.1	8.0	3.5	.179	1′-10"
32	31.0	9.0	4.7	.179	2′-1"	31.0	9.0	3.5	.179	2′-0"
36	35.0	9.5	4.6	.179	2′-4"	35.0	10.0	3.5	.179	2′-1"
40	39.0	9.5	4.1	.239	2′-8"	39.0	9.5	3.5	.239	2′-3"
44	43.0	10.0	4.1	.239	2′-11"	43.0	10.0	3.5	.239	2′-6"
48	47.0	10.5	4.1	.239	3′-4"	47.0	11.0	3.5	.239	2′-9"

D_B = Pole Base O.D.
D_{19} = Pole Top O.D. with no Luminaire and no ILSN
D_{24} = Pole Top O.D. with ILSN w/out Luminaire
D_{30} = Pole Top O.D. with Luminaire
D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L = Nominal Arm Length

① Thickness shown are minimums, thicker materials may be used.

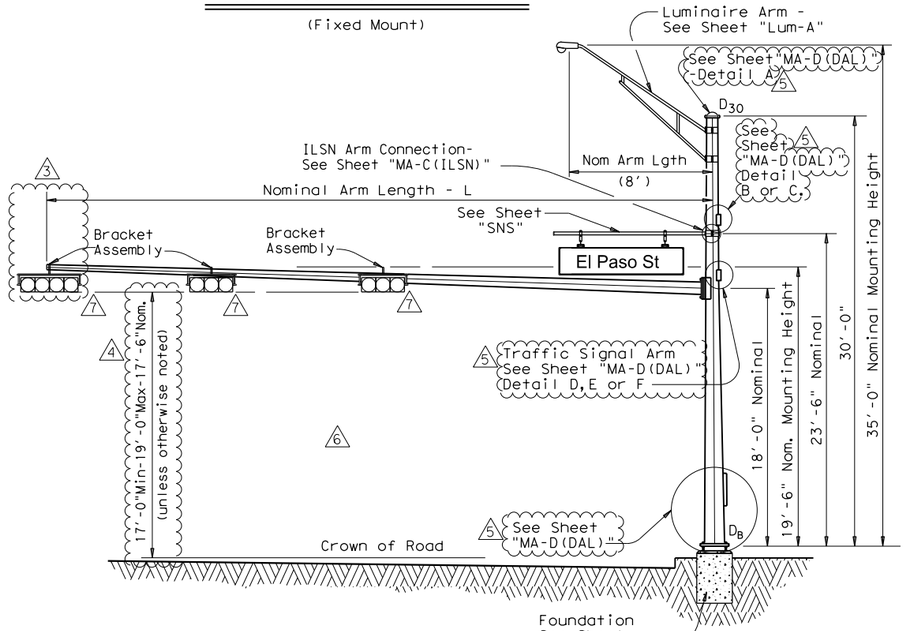
② D_2 may be increased by up to 1" for polygonal arms.



Note: The arm shall be fabricated straight with the unloaded rise measured as shown.

TRAFFIC SIGNAL ARM

(Fixed Mount)



STRUCTURE ASSEMBLY

6/6/2022

STATE OF TEXAS
THOMAS W HARTMANN
109948
LICENSED PROFESSIONAL ENGINEER

SHIPPING PARTS LIST

Ship each pole with the following attached: enlarged hand hole, pole cap, fixed-arm connection bolts and washers and any additional hardware listed in the table.

Nominal Arm Length	30′ Poles With Luminaire		24′ Poles With ILSN		19′ Poles With No Luminaire and No ILSN	
	Above hardware plus: One (or two if ILSN attached) small hand hole, clamp-on simplex		Above hardware plus one small hand hole		See note above	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20L-80		20S-80		20-80	
24	24L-80		24S-80		24-80	
28	28L-80		28S-80		28-80	1
32	32L-80		32S-80		32-80	1
36	36L-80		36S-80		36-80	
40	40L-80		40S-80		40-80	
44	44L-80		44S-80		44-80	1
48	48L-80		48S-80		48-80	3

Traffic Signal Arms (1 per Pole) Ship each arm with the listed equipment attached

Nominal Arm Length	Type I Arm (1 Signal)		Type II Arm (2 Signals)		Type III Arm (3 Signals)	
	① 1 Bracket Assembly		2 Bracket Assemblies		3 Bracket Assemblies	
ft	Designation	Quantity	Designation	Quantity	Designation	Quantity
20	20I-80					
24	24I-80		24II-80			
28	28I-80		28II-80	1		
32			32II-80		32III-80	1
36			36II-80		36III-80	
40			② 40II-80		40III-80	
44			44II-80		44III-80	1
48			48II-80		48III-80	3 *

Luminaire Arms (1 per 30′ pole)

Nominal Arm Length	Quantity
8′ Arm	

* PROVIDE ONE ADDITIONAL BRACKET FOR EACH ARM.

ILSN Arm (Max. 2 per pole) Ship with clamps, bolts and washers

Nominal Arm Length	Quantity
7′ Arm	
9′ Arm	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
¾"	1′-6"	
1 ½"	3′-4"	2
1 ¾"	3′-10"	4

Each anchor bolt assembly consists of the following: Top and Bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers, and 4 nut anchor devices (Type 2) per Standard Drawing "TS-FD".

Templates may be removed for shipment.

MODIFICATIONS:

① REPLACED CGB CONNECTOR WITH BRACKET ASSEMBLY. (2/12)
② ADDITIONAL OPTION. (3/12)
③ REPLACED TENON DETAIL WITH PLATE WELD DETAIL. (2/12)
④ REVISED MINIMUM SIGNAL HEIGHT. (3/12)
⑤ REPLACED "MA-D" WITH "MA-D(DAL)". (2/12)
⑥ REMOVED TABLE OF DIMENSIONS "A". (2/12)
⑦ REMOVED CGB CONNECTORS. (2/12)

Texas Department of Transportation

TRAFFIC SIGNAL SUPPORT STRUCTURES

SINGLE MAST ARM ASSEMBLY

(80 MPH WIND ZONE)

SMA-80(1)-12(DAL)

REVISIONS
5-96
11-99
1-12

DN: MS *REFR	CK: JSW *REFR	DW: MW *REFR	CK: JSW *REFR

CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
			53

122A

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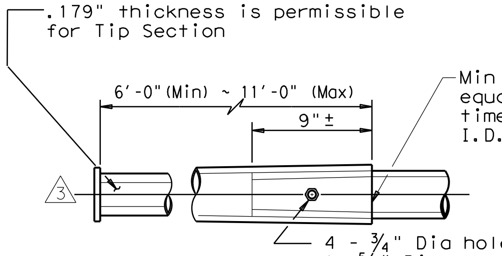


Note: A slip joint is permissible for arms 40' and greater in length. The slip joint shall be made in the shop, but may be match marked and shipped disassembled.

SLIP JOINT DETAIL

NOTE:

Pole manufacturer shall drill ½" hole in bottom of mast arm at end plate. (for hot-dip galvanizing)

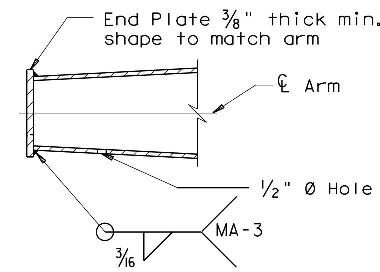


PLATE WELD DETAIL

3

VIBRATION WARNING

Mast Arms of SMA and DMA structures and clamp-on Arms of LMA structures of approximately 40 ft or longer are subject to harmonic vertical vibrations in light wind conditions due to the aeroelastic characteristics of a few of the myriads of possible combinations of the following: signal numbers, weights and positions; existence/solidity of backplates; presence of additional attachments to the arm, such as signs and cameras; arm-wind orientation; and arm-pole stiffness.

Such vibrations may cause fatigue damage to the structure and may lead to galloping in moderate wind conditions which may further damage the structure and alarm the public. Tests have indicated that when wind is blowing toward the back side of signal heads having un-vented backplates attached the probability of unacceptable harmonic vibration and/or galloping is rather high.

If backplates are not required for improved visibility they should not be applied to the signal heads or, if they must be applied, they should be vented as a first and inexpensive measure to mitigate vibrations.

The traffic signal mast arms shall be visually inspected in 5 to 20 mph wind conditions after installation of signal heads and any attachments, including any required backpates. If vertical movements with a total excursion (maximum upward excursion to maximum downward excursion) of more than approximately 8" are observed at the arm tip, a damping plate shall be fitted to the arm. See "Damping Plate Mounting Details" on standard sheet, MA-DPD-10.

This visual inspection shall be repeated after each modification of the structure that could affect its aeroelastic response. Excessive vibrations shall not be allowed to continue for more than two days.

Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 ½" Dia Threaded Coupling.

BRACKET ASSEMBLY

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed equals 80 mph plus a 1.3 gust factor.

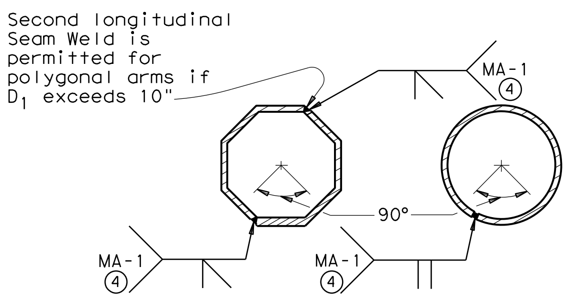
Poles are designed to support one 8'-0" luminaire arm, one 9'-0" internally lighted street name sign and one traffic signal arm with a length as tabulated. The specified luminaire load applied at the end of the luminaire arm equals 60 lbs vertical dead load plus the horizontal wind load on an effective projected area of 1.6 sq ft. The specified internally lighted street name sign load applied 4.5 ft from the centerline of the pole equals 85 lbs vertical dead load plus horizontal wind load on an effective projected area of 11.5 sq ft. The specified signal load applied at the end of the traffic signal arm equals 180 lbs vertical dead load plus the horizontal wind load on an effective projected area of 32.4 sq ft (actual area times drag coefficient).

5 See Standard Sheet "MA-D(DAL)" for pole details, "MA-C" for traffic signal arm connection details, "MA-C (ILSN)" for internally lighted street name sign arm connection details, "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-FD" for anchor bolt and foundation details. See "MA-C" for material specifications.

Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Materials, fabrication tolerances, and shipping practices shall meet the requirements of this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing", after fabrication.

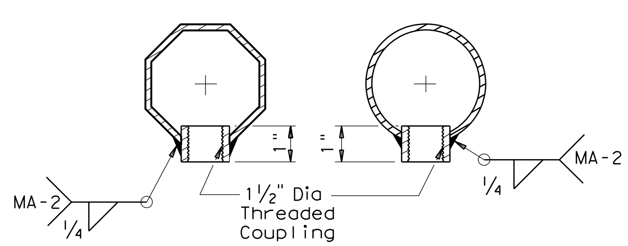
Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.



Longitudinal Seam Weld must be oriented within the lower 90° of the signal arm.

ARM WELD DETAIL

(4) 60% Min. penetration 100% pemetration within 6" of circumferential base welds.



ARM COUPLING DETAILS

3 REPLACED TENON DETAIL WITH PLATE WELD DETAIL(2/12).

5 REPLACED "MA-D" WITH "MA-D(DAL)"(2/12).

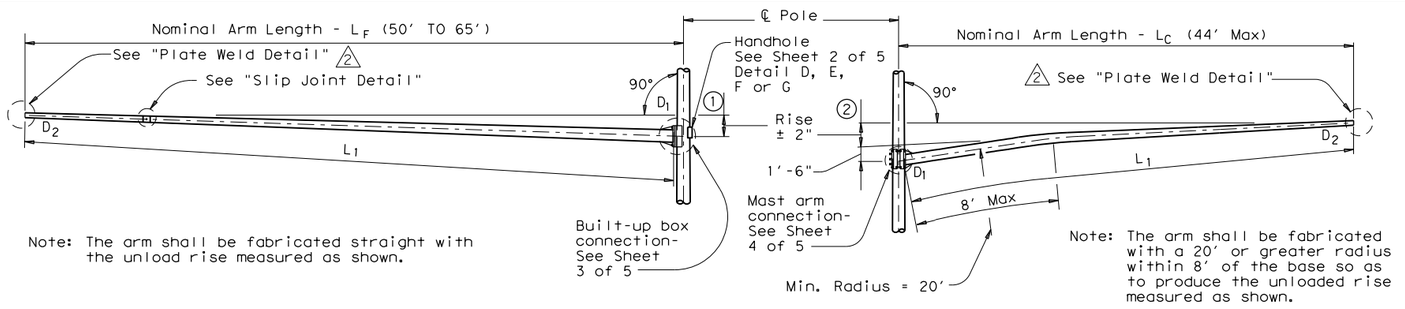
SHEET 2 OF 2

Texas Department of Transportation

TRAFFIC SIGNAL SUPPORT STRUCTURES
SINGLE MAST ARM ASSEMBLY (80 MPH WIND ZONE)
SMA-80(2)-12(DAL)

DN: MS	CK: JSY	DW: MMF	CK: JSY
REVISIONS	CONT	SECT	JOB	HIGHWAY
5-96 1-12	DIST	COUNTY	SHEET NO. 54

122B



Note: The arm shall be fabricated straight with the unload rise measured as shown.

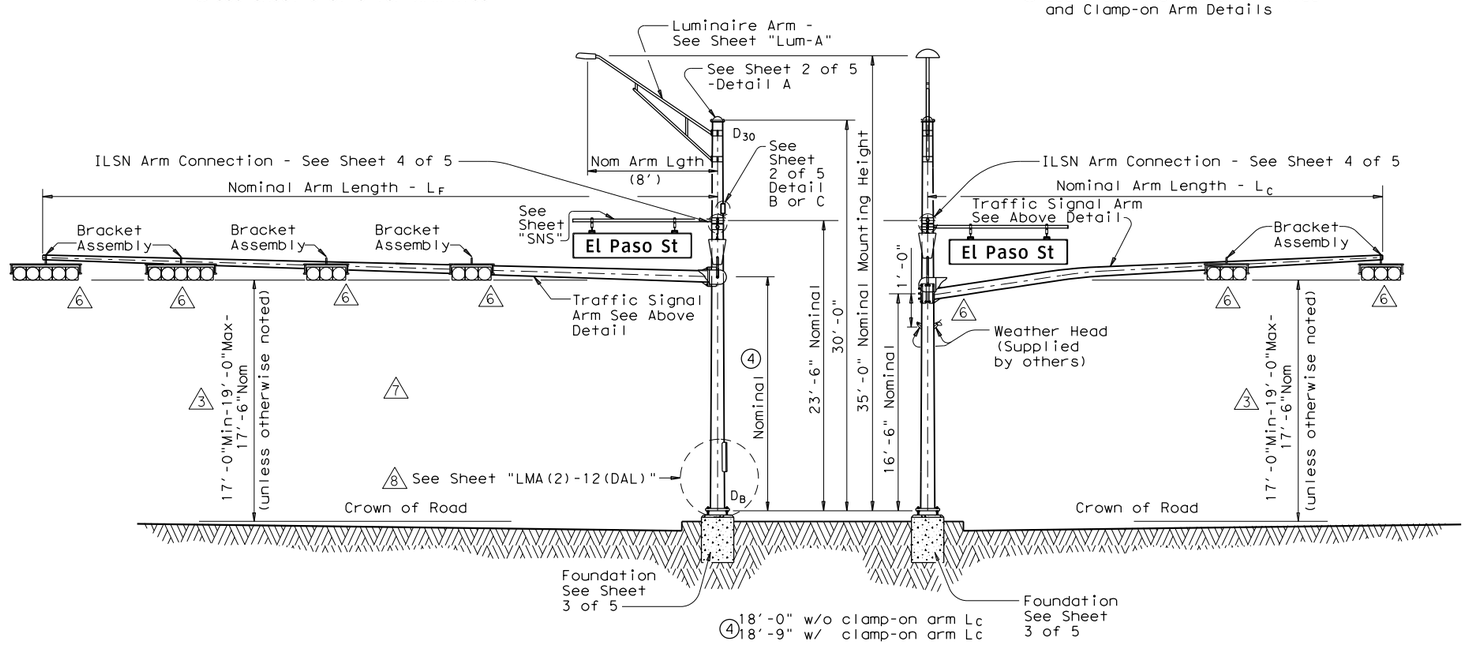
Note: The arm shall be fabricated with a 20' or greater radius within 8' of the base so as to produce the unloaded rise measured as shown.

FIXED MOUNT TRAFFIC SIGNAL ARM

1 See Sheet 3 of 5 for Arm Rise

CLAMP-ON TRAFFIC SIGNAL ARM (IF REQUIRED)

2 See Sheet 4 of 5 for Arm Rise and Clamp-on Arm Details



ELEVATION
(Showing fixed mount arm)

STRUCTURE ASSEMBLY

ELEVATION
(Showing clamp-on arm)

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Specifications thereto. Design Wind Speed can be either 100 mph or 80 mph plus a 1.3 gust factor. If clamp-on traffic signal is required, designs are based on an arm included angle of 90 degrees or more. Angles of less than approximately 75 degrees will require a special design.

Poles are designed to support one 8'-0" luminaire arm, two 9'-0" internally lighted street name (ILSN) signs and two traffic signal arms with limited length combinations.

Each arm with its related attachment is shown below

Arm	Equivalent DL 5	WL EPA 5 6
8' Luminaire Arm	Luminaire 60 lbs	1.6 sq ft
9' ILSN Arm	Sign 85 lbs	11.5 sq ft
50' to 65' Fixed Mount Arm	Signal Loads 310 lbs	52 sq ft
Up to 44' Clamp-on Arm	Signal Loads 180 lbs	32.4 sq ft

5 Equivalent dead load plus horizontal wind load applied at the end of arm except ILSN arm, which applied 4.5' from the centerline of the pole.

6 Effective projected area (actual area times drag coefficient) for the application of horizontal wind load.

4 Except as noted in Sheet 1 thru 5 of 5, other details not covered shall refer to Standard Sheet "LUM-A" for luminaire arm and connection details, "SNS" for internally lighted street name sign details, and "TS-FD" for anchor bolt and foundation details.

Fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. Material, fabrication tolerances, and shipping practices shall also meet the requirements of this sheet and Item 686, "Traffic Signal Pole Assemblies (Steel)".

Unless otherwise noted, all parts shall be galvanized in accordance with Item 445, "Galvanizing" after fabrication.

Deviations from the details and dimensions shown herein require submission of shop drawings in accordance with the Item 441, "Steel Structures". Alternate designs are not acceptable.

Installation of damping plate for the long mast arm is not recommended.

Provision of the bracket assembly used to support the traffic signal heads shall be under the direction of the Engineer for approval.

Design also conforms to NCHRP Report 412 for fatigue resistance except that there are no stiffeners at the base plate. TxDOT is conducting tests to determine if stiffeners at the base plate will or will not result in optimal performance; depending upon the results of the tests, poles may need a retrofit to ensure optimal fatigue performance.

MODIFICATIONS:

5

1 REPLACED CGB CONNECTOR WITH BRACKET ASSEMBLY. (2/12)

2 REPLACED TENON DETAIL WITH PLATE WELD DETAIL. (2/12)

3 REVISED MINIMUM SIGNAL HEIGHT. (3/12)

4 REMOVED "MA-D" REFERENCE. (2/12)

5 REMOVED TABLE OF DIMENSIONS "A". (2/12)

6 REMOVED CGB CONNECTORS. (2/12)

7 REMOVED THREADED COUPLING FOR CGB CONNECTOR. (2/12)

8 REVISED THE ELEVATION OF ACCESS COMPARTMENT. (3/12)

NOTE:

Pole manufacturer shall drill ½" hole in bottom of mast arm at end plate. (for hot-dip galvanizing)

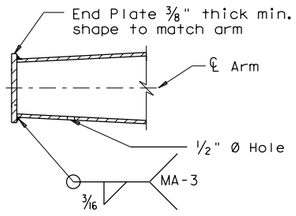
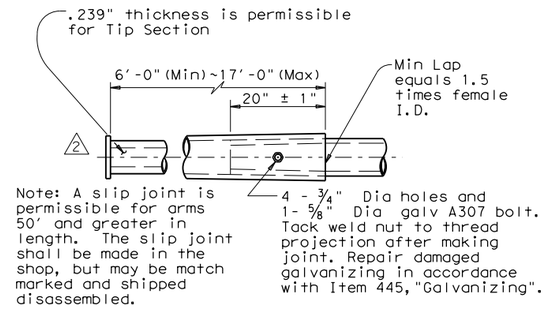


PLATE WELD DETAIL



Note: A slip joint is permissible for arms 50' and greater in length. The slip joint shall be made in the shop, but may be match marked and shipped disassembled.

SLIP JOINT DETAIL (FIXED MOUNT ARM)

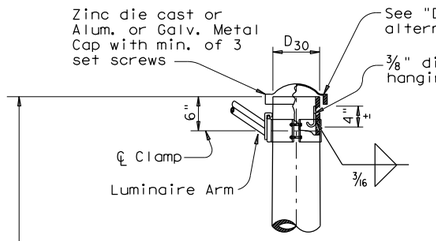
Texas Department of Transportation

TRAFFIC SIGNAL SUPPORT STRUCTURES
LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)
LMA(1)-12(DAL)

Sheet 1 of 5

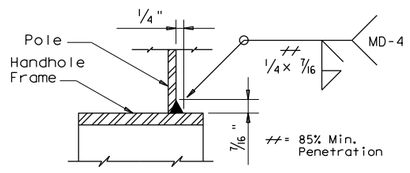
© TxDOT July 2000	DN: JSY	CK: ARC	DW: TGG	CK: JSY
REVISIONS	CONT	SECT	JOB	HIGHWAY
4-20-01 1-12				
	DIST	COUNTY		SHEET NO.
				55

131A

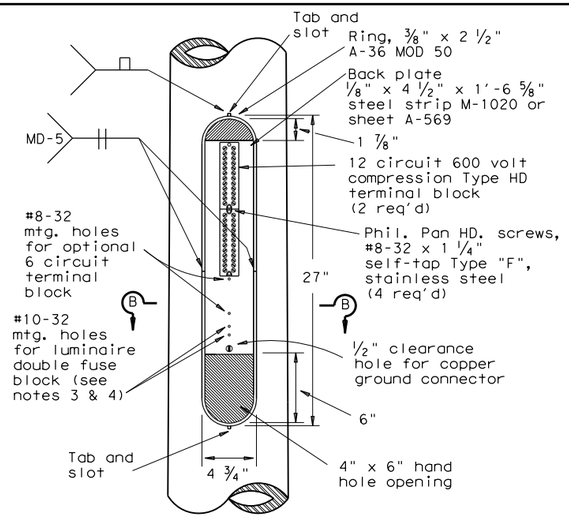


DETAIL A

(for pole with luminaire)



DETAIL H

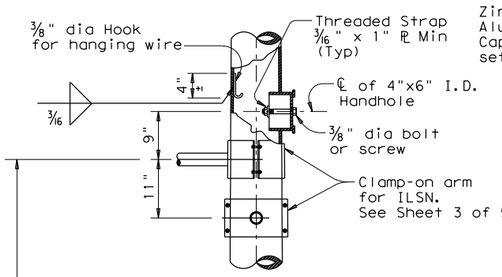


ACCESS COMPARTMENT

MATERIALS	
Round Shafts or Polygonal Shafts (7)	ASTM A595 Gr.A, A588, A1008 HSLAS Gr.50 Class 2, A1011 HSLAS Gr.50 Class 2, A572 Gr.50 or A1011 SS Gr.50 (8)
Plates (7)	ASTM A36, A588, or A572 Gr.50
Connection Bolts	ASTM A325, or A449 except where noted
Pin Bolts	ASTM A325
Pipe (7)	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50, A1011 HSLAS-F Gr.50
Misc. Hardware	Galvanized steel or stainless steel or as noted

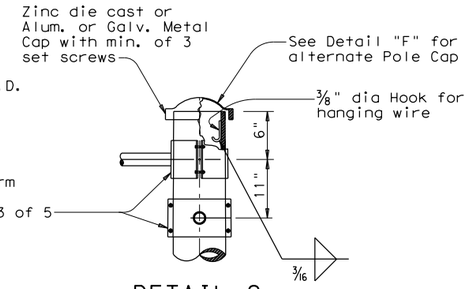
(7) ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F, or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.

(8) ASTM A1011 SS Gr.50 shall also have a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches. Material thickness in excess of those stipulated under A1011 SS will be acceptable providing the material meets all other A1011 SS requirements and the requirements of this item.

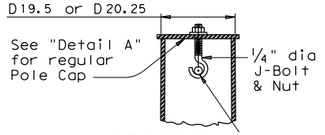


DETAIL B

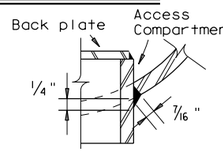
(If ILSN applied)



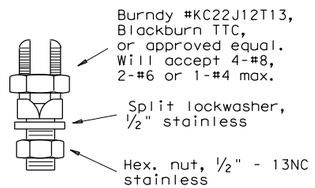
DETAIL C



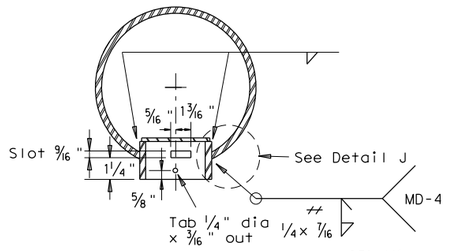
SECTION Y-Y



DETAIL J



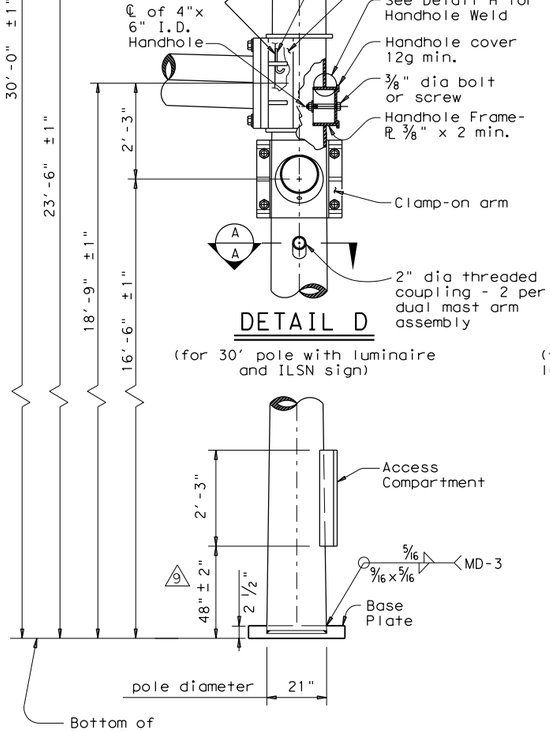
COPPER GROUND CONNECTOR



SECTION B-B

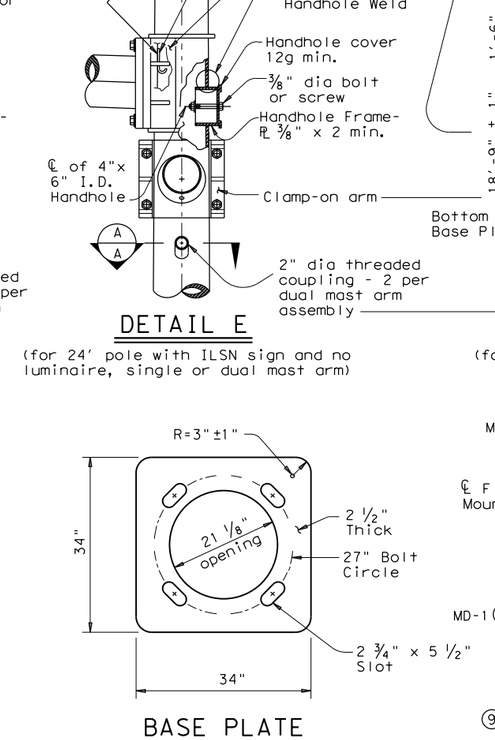
// = 85% Min. Penetration

Opening for access compartment shall be no more than 1/16 inch wider than the access compartment itself.



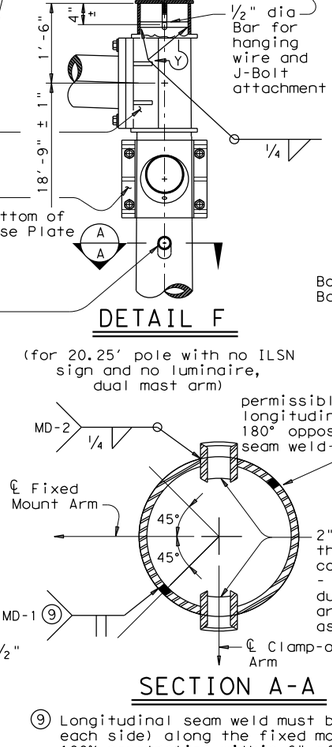
DETAIL D

(for 30' pole with luminaire and ILSN sign)



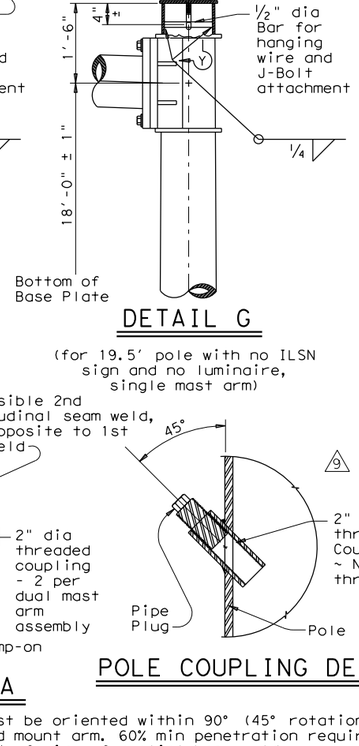
DETAIL E

(for 24' pole with ILSN sign and no luminaire, single or dual mast arm)



DETAIL F

(for 20.25' pole with no ILSN sign and no luminaire, dual mast arm)



DETAIL G

(for 19.5' pole with no ILSN sign and no luminaire, single mast arm)

ACCESS COMPARTMENT NOTES:

1. The cover shall be one piece formed from ABS plastic, shall be a pearl gray color, and shall be suitable for exposure to harsh sunlight and extreme weather. Cover shall latch with two screw latches and shall fit tightly to the enclosure ring to create a rainproof seal. Latch screws shall be 1/4-20 stainless flat socket head screws with tamper proof feature.
2. The pole manufacturer shall provide with each pole a separate kit consisting of: one cover with two latching assemblies, two terminal strips (Marathon #985GP12CU or approved equal), four #8-32 x 1 1/4" self tapping type "F" stainless steel pan head screws, and one ground connector (Blackburn TTC, Burndy KC22J12T13, or Ilsco SSS-5). The traffic signal contractor shall install the kit items in the field.
3. The screw hole spacing on the enclosure back plate shall be for two Marathon #985GP12 terminal strips, one Marathon #985GP06CU terminal strip, and one Bussmann #BM6032B fuse block.
4. Install one Bussmann #BM6032B, Littelfuse #L60030M-2C, or Ferraz-Shawmut #30352 fuse block for poles where luminaires are to be installed.

POLE ELEVATION

BASE PLATE

SECTION A-A

POLE COUPLING DETAIL

(9) Longitudinal seam weld must be oriented within 90° (45° rotation each side) along the fixed mount arm. 60% min penetration required, 100% penetration within 6" of circumferential base weld.

(9) REVISED THE ELEVATION OF ACCESS COMPARTMENT (2/12).

Texas Department of Transportation

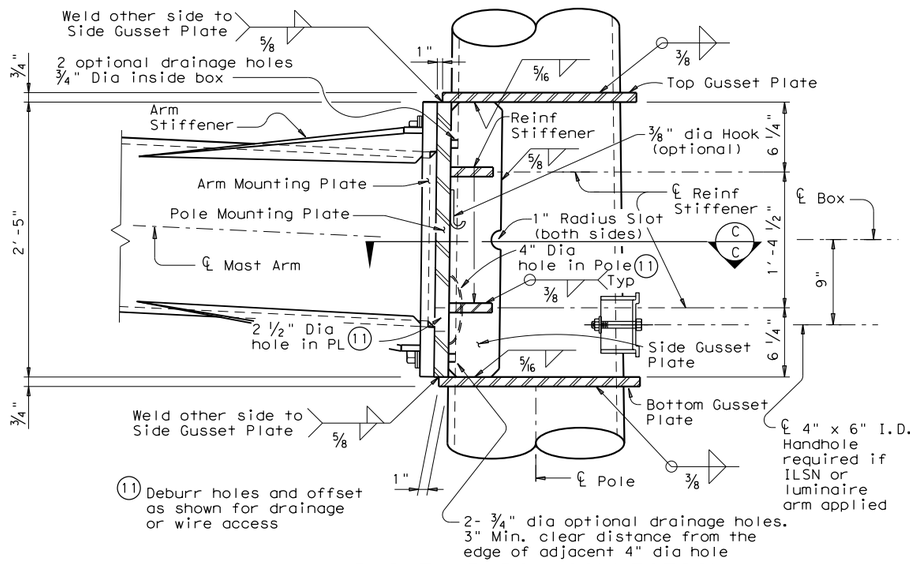
TRAFFIC SIGNAL SUPPORT STRUCTURES

LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)

Sheet 2 of 5 LMA(2)-12(DAL)

©TxDOT July 2000	DN: JSY	CK: ARC	DW: TGG	CK: JSY
REVISIONS	CONT	SECT	JOB	HIGHWAY
4-20-01 1-12				
	DIST	COUNTY		SHEET NO.
				56

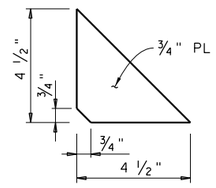
131B



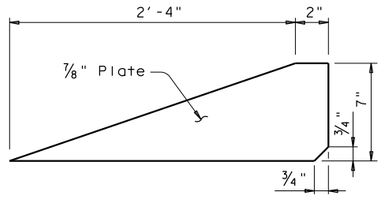
(11) Deburr holes and offset as shown for drainage or wire access

2- 3/4" dia optional drainage holes. 3" Min. clear distance from the edge of adjacent 4" dia hole

BUILT-UP BOX CONNECTION



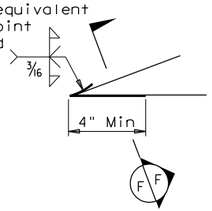
REINFORCING STIFFENER



ARM STIFFENER

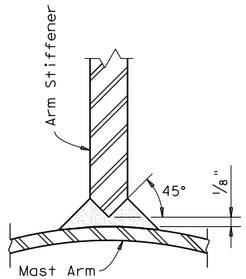
(Cut to match arm inclination and taper)

Provide Detail shown in SECTION F-F or equivalent 100% complete joint penetration weld from both sides.



Only 4" length at tip of Arm Stiffener requires a complete joint penetration weld. Smooth weld radius to connect Stiffener. Only a fillet weld is required for the remaining weld length.

DETAIL "K"



SECTION F-F

Fixed Mount Arm L_F	ROUND POLES (13)					Foundation Type
	D_B	$D_{19.5}$ or $D_{20.25}$	D_{24}	D_{30}	(12) thk	
ft.	in.	in.	in.	in.	in.	
50', 55' 60', 65'	21.0	18.2	17.6	16.8	.3125	48-A

Fixed Mount Arm L_F	ROUND ARMS (13)				
	L_1	D_1	D_2	(12) thk	Rise
ft.	ft.	in.	in.	in.	
50	49	18.5	11.7	.3125	3'- 3"
55	54	18.5	11.0	.3125	3'- 7"
60	59	18.5	10.3	.3125	3'-11"
65	64	18.5	9.6	.3125	4'- 4"

D_B = Pole Base O.D.
$D_{19.5}$ = Pole Top O.D. with no Luminaire and no ILSN (single mast arm)
$D_{20.25}$ = Pole Top O.D. with no Luminaire and no ILSN (dual mast arm)
D_{24} = Pole Top O.D. with ILSN w/out Luminaire
D_{30} = Pole Top O.D. with Luminaire
D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L_F = Fixed Arm Length

(12) Thickness shown is minimum, thicker materials may be used.

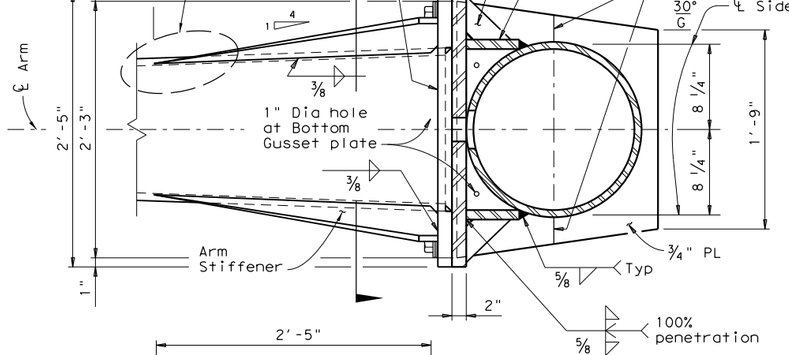
(13) Shaft profile 16-sided or 18-sided is considered to be equivalent to round section.

GENERAL NOTES:

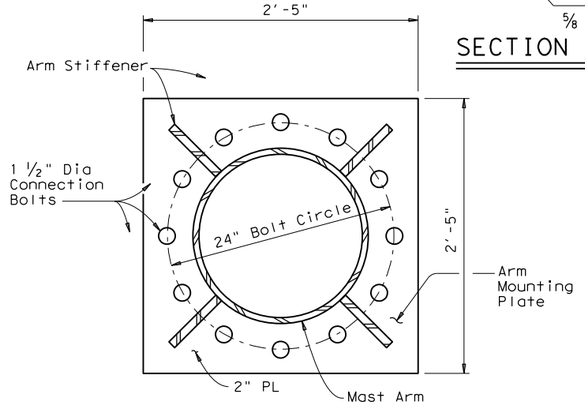
Built-up Box Connection: For the welded arm-to-pole connection as a build-up box configuration illustrated here is an example only, fabricators are required to submit a shop drawing of box connection for approval. The drawing shall specify the details of each box element, welds of arm-to-pole connection, arm-to-plate socket connection, and arm rise creation. Specify the proper location of drain holes along the pole. 2 1/2" dia hole in the pole mounting plate and 4" dia hole in the pole need to be aligned for wiring access or drainage. Arm stiffeners cut to match arm inclination and taper shall also be included.

The deviation from flat for either arm or pole mounting plate shall not exceed 1/32 in., which is measured along the center of mounting plate to a radial distance of 13.5 in. The deformed-from-flat connection between arm and pole mounting plates shall not be allowed if the center of both mounting plates cannot contact directly.

Fixed mount details are used for single mast arm assemblies and for the first arm on dual mast arm assemblies.

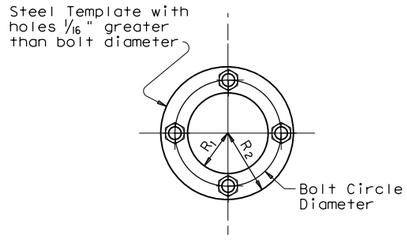


SECTION C-C



SECTION D-D

NUT ANCHOR
(TYPE 2)



TEMPLATE DETAIL

ANCHOR BOLT ASSEMBLY

ANCHOR BOLT & TEMPLATE SIZE						
Bolt Dia in.	Length ‡	Top Thread	Bottom Thread	Bolt Circle	R_2	R_1
2 1/2"	5'-2"	10"	6 1/2"	27"	16"	11"

‡ Min dimension given, longer bolts are acceptable.

FOUNDATION DESIGN TABLE													
FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		DRILLED SHAFT LENGTH-ft (16), (17), (18)			ANCHOR BOLT DESIGN (14)				FOUNDATION DESIGN LOAD (15)		TYPICAL APPLICATION
		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N blows/ft			ANCHOR BOLT DIA	Fy (ksi)	BOLT CIR DIA	ANCHOR TYPE	MOMENT K-ft	SHEAR Kips	
				10	15	40							
48-A	48"	20 #9	#4 at 6"	21.9	19.5	14.7	2 1/2"	55	27"	2	490	10	50' to 65' Mast arm assembly.

SEE SHEET "TS-FD" FOR ADDITIONAL DETAILS.

(14) Anchor bolt design develops the foundation capacity given under Foundation Design Laods.

(15) Foundation Design Loads are the allowable moments and shears at the base of the structure.

(16) Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.

(17) If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.

(18) Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

Texas Department of Transportation

TRAFFIC SIGNAL SUPPORT STRUCTURES
LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)

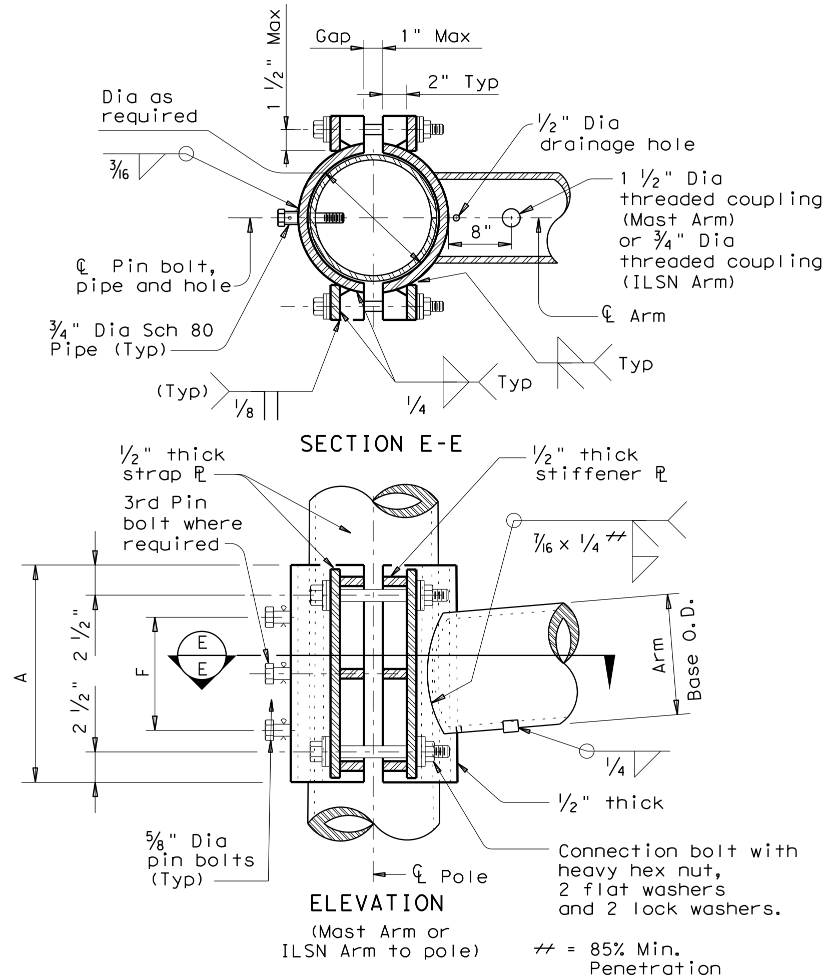
Sheet 3 of 5 LMA(3)-12

DN: JSY	CK: ARC	DW: TGG	CK: JSY

REVISIONS
4-20-01
1-12

CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
			57

131C



CLAMP-ON CONNECTION

80 MPH WIND

Clamp-on Arm LC	ROUND ARMS					POLYGONAL ARMS				
	L1	D1	D2	thk (12)	Rise	L1	D1	D2	thk (12)	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	6.5	3.8	.179	1'-9"	19.1	7.0	3.5	.179	1'-8"
24	23.1	7.5	4.3	.179	1'-10"	23.1	7.5	3.5	.179	1'-9"
28	27.1	8.0	4.2	.179	1'-11"	27.1	8.0	3.5	.179	1'-10"
32	31.0	9.0	4.7	.179	2'-1"	31.0	9.0	3.5	.179	2'-0"
36	35.0	9.5	4.6	.179	2'-4"	35.0	10.0	3.5	.179	2'-1"
40	39.0	9.5	4.1	.239	2'-8"	39.0	9.5	3.5	.239	2'-3"
44	43.0	10.0	4.1	.239	2'-11"	43.0	10.0	3.5	.239	2'-6"

100 MPH WIND

Clamp-on Arm LC	ROUND ARMS					POLYGONAL ARMS				
	L1	D1	D2	thk (12)	Rise	L1	D1	D2	thk (12)	Rise
ft.	ft.	in.	in.	in.		ft.	in.	in.	in.	
20	19.1	8.0	5.3	.179	1'-8"	19.1	8.0	3.5	.179	1'-7"
24	23.1	9.0	5.8	.179	1'-9"	23.1	9.0	3.5	.179	1'-8"
28	27.1	9.5	5.7	.179	1'-10"	27.1	10.0	3.5	.179	1'-9"
32	31.0	9.5	5.2	.239	1'-11"	31.0	9.5	3.5	.239	1'-10"
36	35.0	10.0	5.1	.239	2'-0"	35.0	10.0	3.5	.239	1'-11"
40	39.0	10.5	5.1	.239	2'-3"	39.0	11.0	3.5	.239	2'-1"
44	43.0	11.0	5.1	.239	2'-8"	43.0	11.5	4.0	.239	2'-3"

D_1 = Arm Base O.D.
D_2 = Arm End O.D.
L_1 = Shaft Length
L_C = Clamp-on Arm Length

(12) Thickness shown is minimum, thicker materials may be used.

CLAMP-ON ARM CONNECTION

ILSN Arm Size		A	F	4 Conn. Bolts	⅝" Dia. Pin Bolts
Sch 40 pipe Dia	Thick			Dia	No.
in.	in.	in.	in.	in.	ea
3	.216	10	4	¾	2

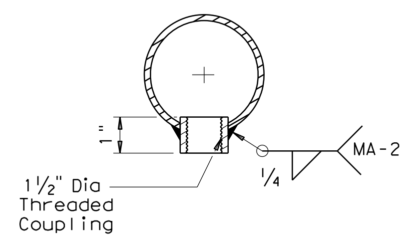
Mast Arm Size		A	F	4 Conn. Bolts	⅝" Dia. Pin Bolts
Base Dia	Thick			Dia	No.
in.	in.	in.	in.	in.	ea
6.5	.179	12	6	1	2
7.5	.179	14	8	1	2
8.0	.179	14	8	1	2
9.0	.179	16	10	1	2
9.5	.179	18	12	1 ¼	3
9.5	.239	18	12	1 ¼	3
10.0	.239	18	12	1 ¼	3
10.5	.239	18	12	1 ¼	3
11.0	.239	18	12	1 ¼	3
11.5	.239	18	12	1 ¼	3

GENERAL NOTES:

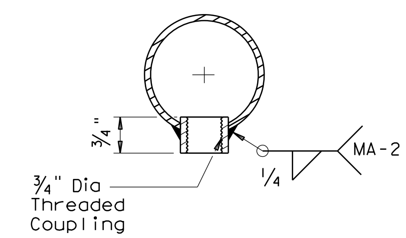
Clamp-on details are used for the second arm on dual mast arm assemblies or ILSN arm support. For a clamp-on mast arm, a maximum 1 ½" wide vertical slotted hole may be cut in the front clamp plate to facilitate drainage during galvanizing. The slot shall be centered behind the arm and shall be no longer than the arm diameter minus 1". For an ILSN arm, a 1 ½" diameter hole shall be cut in the front clamp plate for wire access. A matched hole shall be field drilled through the pole to provide wire access after arm is oriented. Deburr both holes.

Where duplicate parts occur on a detail, welds shown for part shall apply to all similar parts on the detail.

Pin bolts are required to prevent rotation of clamp-on arms under design wind forces. Pin bolts shall be ASTM A325 with threads excluded from the shear plane. Pin bolt and ¾" diameter pipe shall have ³⁄₁₆" diameter holes for a ⅛" diameter galvanized cotter pin. Back clamp plate shall be furnished with a ¾" diameter hole for each pin bolt. An ¹¹⁄₁₆" diameter hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.

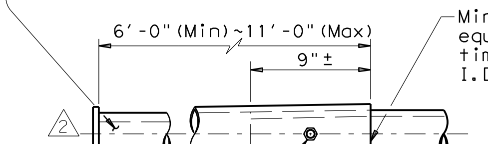


ARM COUPLING DETAIL



ILSN ARM COUPLING DETAIL

.179" thickness is permissible for Tip Section



Min Lap equals 1.5 times female I.D.

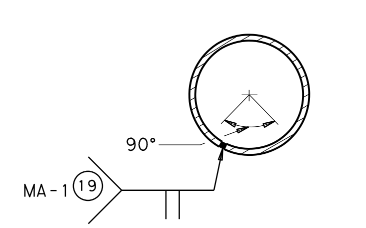
Note: A slip joint is permissible for arms 40' and greater in length. The slip joint shall be made in the shop, but may be match marked and shipped disassembled.

4 - ¾" Dia holes and 1- ⅝" Dia galv A307 bolt. Tack weld nut to thread projection after making joint. Repair damaged galvanizing in accordance with Item 445, "Galvanizing".

SLIP JOINT DETAIL (CLAMP-ON ARM)

Stainless steel bands (or Cables) and cast bracket as in "Astro-Brac", "Sky Bracket" or "Easy Bracket" with 1 ½" Dia Threaded Coupling.

BRACKET ASSEMBLY



ARM WELD DETAIL

(19) Longitudinal Seam Weld must be oriented within the lower 90° of the signal arm. 60% Min penetration 100% penetration within 6" of circumferential base welds.

(2) REPLACED TENON DETAIL WITH PLATE WELD DETAIL (2/12).

Texas Department of Transportation

TRAFFIC SIGNAL SUPPORT STRUCTURES LONG MAST ARM ASSEMBLY (50 TO 65 FT) (80 AND 100 MPH WIND ZONE)

Sheet 4 of 5 LMA(4)-12(DAL)

DN: JK	CK: GRB	DW: FDN	CK: CAL
REVISIONS 4-20-01 1-12	CONT / SECT / JOB		HIGHWAY
DIST	COUNTY		SHEET NO. 58

131D

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Shipping Parts List

Ship each pole with the following attached: enlarged hand hole, pole cap, fixed arm connection bolts and washers, and any additional hardware listed in the table.

Nominal Arm Length	30' Poles with Luminaire: See note above plus: one (or two if ILSN attached) small hand hole, clamp-on simplex	24' Poles with ILSN: See note above plus one small hand hole	19.50' (Single Mast Arm) 20.25' (Dual Mast Arm) Poles with no Luminaire and no ILSN: See note above

Single Mast Arm

Lf ft.	30' Poles with Luminaire: Designation	Quantity	24' Poles with ILSN: Designation	Quantity	19.50'/20.25' Poles with no Luminaire and no ILSN: Designation	Quantity
50	50L		50S		50	
55	55L		55S		55	1
60	60L	1	60S		60	
65	65L		65S		65	

Dual Mast Arm

Lf ft.	Lc ft.	30' Poles with Luminaire: Designation	Quantity	24' Poles with ILSN: Designation	Quantity	19.50'/20.25' Poles with no Luminaire and no ILSN: Designation	Quantity
50	20	5020L		5020S		5020	
	24	5024L		5024S		5024	
	28	5028L		5028S		5028	
	32	5032L		5032S		5032	
	36	5036L		5036S		5036	
	40	5040L		5040S		5040	
	44	5044L		5044S		5044	
55	20	5520L		5520S		5520	
	24	5524L		5524S		5524	
	28	5528L		5528S		5528	
	32	5532L		5532S		5532	
	36	5536L		5536S		5536	
	40	5540L		5540S		5540	
	44	5544L		5544S		5544	
60	20	6020L		6020S		6020	
	24	6024L		6024S		6024	
	28	6028L		6028S		6028	
	32	6032L		6032S		6032	
	36	6036L		6036S		6036	
	40	6040L		6040S		6040	
	44	6044L		6044S		6044	
65	20	6520L		6520S		6520	
	24	6524L		6524S		6524	
	28	6528L		6528S		6528	
	32	6532L		6532S		6532	
	36	6536L		6536S		6536	
	40	6540L		6540S		6540	
	44	6544L		6544S		6544	

Foundation Summary Table **

Location Ident.	Avg. N Blow/ft.	No. Each	Drill Shaft *** Length (feet) 48-A
BELT LINE AT ADDISON RD	10	2	44
Total Drill Shaft Length			44

Notes

** Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.

*** Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

* INCLUDE 2 ADDITIONAL BRACKET ASSEMBLIES

Shipping Parts List

Traffic Signal Arms (Fixed Mount) (1 per pole)
Ship each arm with listed equipment attached

Nominal Arm Length ft.	Type IV Arm (4 Signals) △1 4 Bracket Assemblies: Designation	Quantity
50	50IV	
55	55IV	1
60	60IV	1 *
65	65IV	

Luminaire Arms (1 per 30' pole)

Nominal Arm Length	Quantity
8' Arm	

ILSN Arm (Max. 2 per pole) Ship with clamps, bolts and washers

Nominal Arm Length	Quantity
7' Arm	
9' Arm	

Traffic Signal Arms (80 MPH Clamp-On Mount) (1 per pole) Ship each arm with listed equipment attached

Nominal Arm Length △1 ft.	Type I Arm (1 Signal): 1 Bracket Assembly and 1clamp w/bolts and washers: Designation	Quantity	Type II Arm (2 Signals): 2 Bracket Assemblies and 1clamp w/bolts and washers: Designation	Quantity	Type III Arm (3 Signals): 3 Bracket Assemblies and 1clamp w/bolts and washers: Designation	Quantity
20	20I-80					
24	24I-80		24II-80			
28	28I-80		28II-80			
32			32II-80		32III-80	
36			36II-80		36III-80	
40					40III-80	
44					44III-80	

Traffic Signal Arms (100 MPH Clamp-On Mount) (1 per pole) Ship each arm with listed equipment attached

Nominal Arm △1 ft.	Type I Arm (1 Signal): 1 Bracket Assembly and 1clamp w/bolts and washers: Designation	Quantity	Type II Arm (2 Signals): 2 Bracket Assemblies and 1clamp w/bolts and washers: Designation	Quantity	Type III Arm (3 Signals): 3 Bracket Assemblies and 1clamp w/bolts and washers: Designation	Quantity
20	20I-100					
24	24I-100		24II-100			
28	28I-100		28II-100			
32			32II-100		32III-100	
36			36II-100		36III-100	
40					40III-100	
44					44III-100	

Anchor Bolt Assemblies (1 per pole)

Anchor Bolt Diameter	Anchor Bolt Length	Quantity
2 1/2 "	5' - 3"	2

Each anchor bolt assembly consists of the following: Top and bottom templates, 4 anchor bolts, 8 nuts, 8 flat washers and 4 nut anchor devices (type 2) per Standard Drawing "TS-FD". Templates may be removed for shipment.

Abbreviations
Lf= Fixed Arm Length
Lc= Clamp-on Arm Length (44' Max.)

6/6/2022
STATE OF TEXAS
THOMAS W HARTMANN
109948
LICENSED
PROFESSIONAL ENGINEER

△1 REPLACED CGB CONNECTOR WITH BRACKET ASSEMBLY(2/12).

Texas Department of Transportation

LONG MAST ARM ASSEMBLY PARTS LIST

LMA(5)-12(DAL)

Sheet 5 of 5

DN: JK	CK: GRB	DW: FDN	CK: CAL

REVISIONS	CONT	SECT	JOB	HIGHWAY
4-20-01				
1-12	DIST	COUNTY		SHEET NO.
				59

131E

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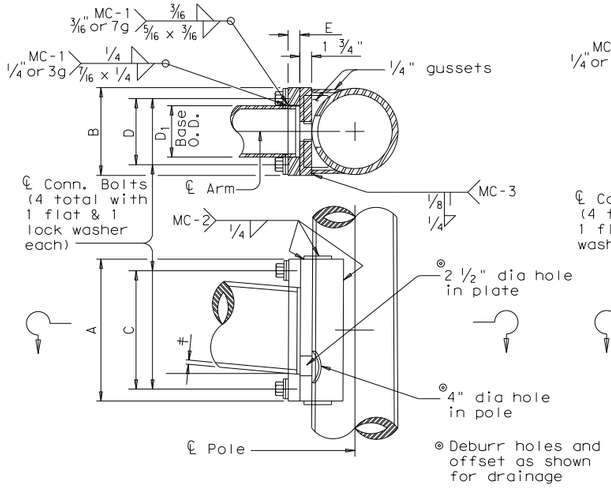
DATE:
FILE:

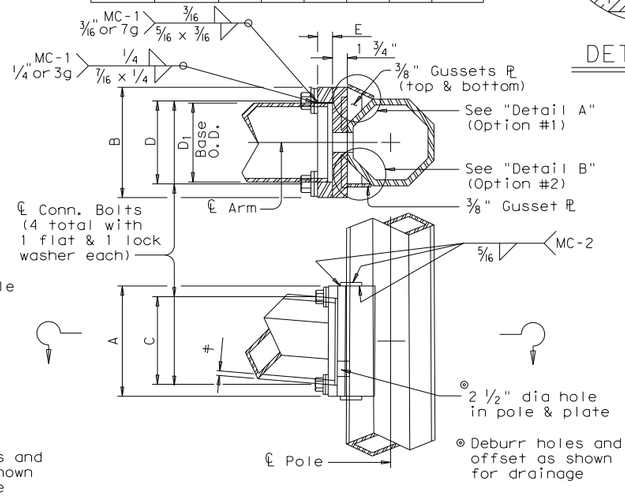
ARM SIZE D_1	ARM SIZE ǂ	A	B	C	D	E	CONN BOLT DIA
in.	in.	in.	in.	in.	in.	in.	in.
6.5	.179	12	9	9	6	1 ¾	1
7.5	.179	13	9	10	6	1 ¾	1
8.0	.179	14	10	11	7	2	1 ¼
9.0	.179	16	11	13	8	2	1 ¼
9.5	.179	17	12	14	9	2	1 ¼
9.5	.239	18	12	15	9	2	1 ¼
10.0	.239	18	12	15	9	2	1 ¼
10.5	.239	18	13	15	10	3	1 ½
11.0	.239	18	13	15	10	3	1 ½



FIXED MOUNT DETAIL 1

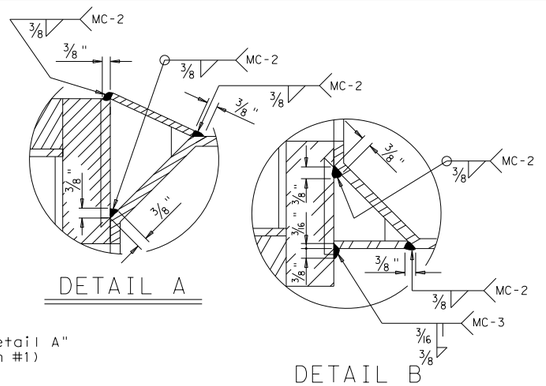
ARM SIZE D_1	ARM SIZE ǂ	A	F	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	ea.	in.	ea.	in.
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	4	1 1/4	3	5/8
9.5	.239	18	12	4	1 1/4	3	5/8
10.0	.239	18	12	4	1 1/4	3	5/8

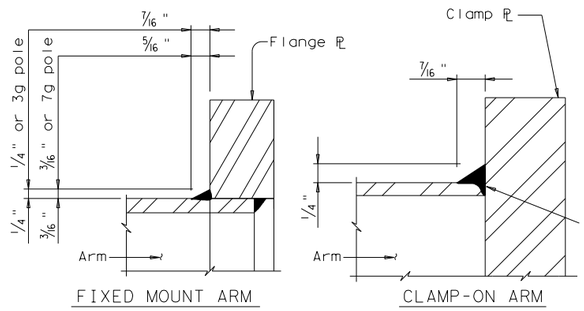
ARM SIZE D_1	ARM SIZE ǂ	A	B	C	D	E	CONN BOLT DIA
in.	in.	in.	in.	in.	in.	in.	in.
7.0	.179	11	11	8	8	1 ¾	1 ¼
7.5	.179	11	11	8	8	1 ¾	1 ¼
8.0	.179	11	11	8	8	2	1 ¼
9.0	.179	13	13	10	10	2	1 ¼
10.0	.179	13	13	10	10	2	1 ¼
9.5	.239	13	13	10	10	2	1 ¼
10.0	.239	14	14	11	11	2	1 ½
11.0	.239	14	14	11	11	3	1 ½
11.5	.239	14	14	11	11	3	1 ½



FIXED MOUNT DETAIL 2

ARM SIZE D_1	ARM SIZE ǂ	A	F	T	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	in.	ea.	in.	ea.	in.
7.0	.179	12	6	¾	4	¾	2	5/8
7.5	.179	14	8	¾	4	¾	2	5/8
8.0	.179	14	8	¾	4	¾	2	5/8
9.0	.179	16	10	⅞	4	1	2	5/8
10.0	.179	18	10	⅞	4	1	2	5/8
9.5	.239	18	10	1	6	1	3	5/8
10.0	.239	18	10	1	6	1	3	5/8





ARM BASE WELD DETAILS

ARM SIZE D_1	ARM SIZE ǂ	A	F	CONN. BOLTS No.	CONN. BOLTS Dia	PIN BOLTS No.	PIN BOLTS Dia
in.	in.	in.	in.	ea.	in.	ea.	in.
6.5	.179	12	6	4	1	2	5/8
7.5	.179	14	8	4	1	2	5/8
8.0	.179	14	8	4	1	2	5/8
9.0	.179	16	10	4	1	2	5/8
9.5	.179	18	12	6	1	3	5/8
9.5	.239	18	12	6	1	3	5/8
10.0	.239	18	12	6	1	3	5/8

MATERIALS	
Round Shafts or Polygonal Shafts ①	ASTM A595 Gr.A, A588, A1008 HSLAS Gr.50 Class 2, A1011 HSLAS Gr.50 Class 2, A572 Gr.50 or A1011 SS Gr.50 ②
Plates ①	ASTM A36, A588, or A572 Gr.50
Connection Bolts	ASTM A325 or A449, except where noted
Pin Bolts	ASTM A325
Pipe ①	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50, A1011 HSLAS-F Gr.50
Misc. Hardware	Galvanized steel or stainless steel or as noted

① ASTM A572, A1008 HSLAS, A1011 HSLAS, A1008 HSLAS-F, A1011 HSLAS-F or A1011 SS may have higher yield strengths but shall not have less elongation than the grade indicated.

② ASTM A1011 SS Gr.50 material shall also have a minimum elongation of 18 percent in 8 inches or 23 percent in 2 inches. Material thickness in excess of those stipulated under A1011 SS will be acceptable providing the material meets all other A1011 SS requirements and the requirements of this item.

GENERAL NOTES:

Clamp-on details are used for the second arm on dual mast arm assemblies. A Maximum 1 ½" wide vertical slotted hole shall be cut in the front clamp plate to facilitate drainage during galvanizing. The slot shall be centered behind the arm and shall be no longer than the arm diameter minus 1"

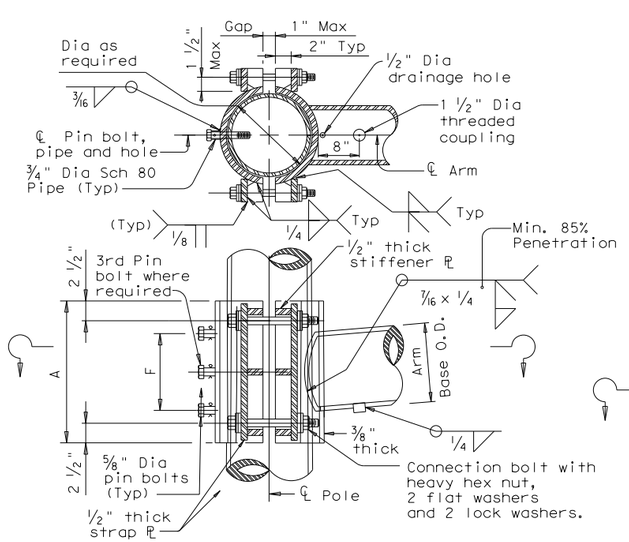
Fixed mount details are used for single mast arm assemblies and for the first arm on dual mast arm assemblies.

Where duplicate parts occur on a detail, welds shown for one part shall apply to all similar parts on the detail.

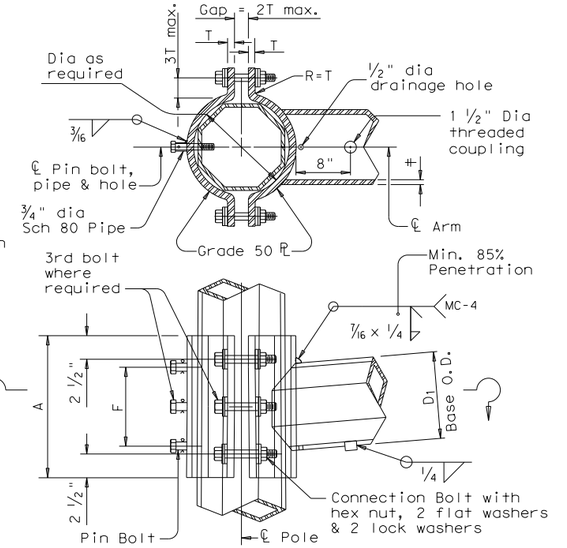
Pin bolts are required to prevent rotation of clamp-on arms under design wind forces.

NOTE:

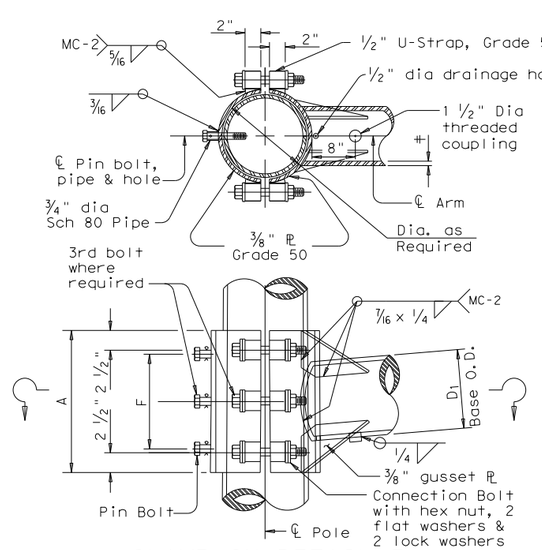
Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and ¾" dia pipe shall have 5/16" dia holes for a 1/8" dia galvanized cotter pin. Back clamp plate shall be furnished with a ¾" dia hole for each pin bolt. An 11/16" dia hole for each pin bolt shall be field drilled through the pole after arm orientations have been approved by the Engineer.



CLAMP-ON DETAIL 1



CLAMP-ON DETAIL 2



CLAMP-ON DETAIL 3

Texas Department of Transportation
Traffic Operations Division

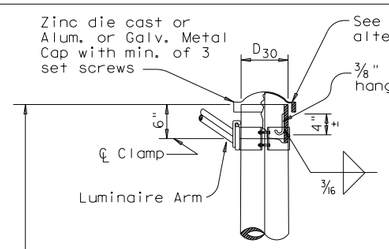
STANDARD ASSEMBLY FOR TRAFFIC SIGNAL SUPPORT STRUCTURES

MAST ARM CONNECTIONS

MA-C-12

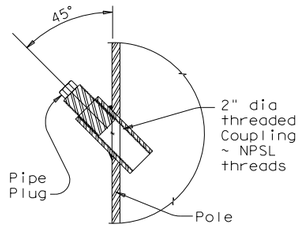
©TxDOT August 1995	DN: MS	CK: JSY	DW: MMF	CK: JSY
REVISIONS 5-96 5-09 1-12	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.
				60

126A

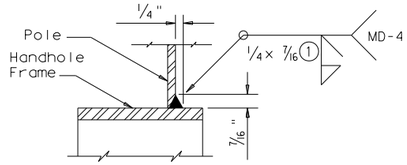


DETAIL A

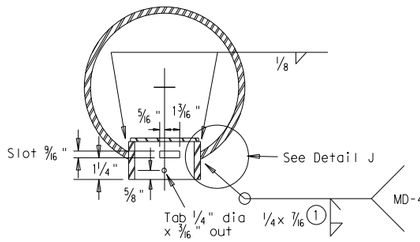
(for pole with luminaire)



POLE COUPLING DETAIL

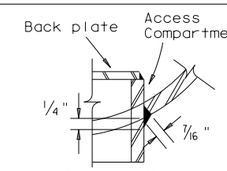


DETAIL G

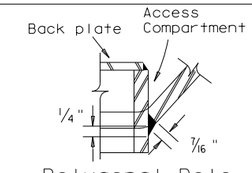


SECTION X-X

Opening for access compartment shall be no more than 1/16 inch wider than the access compartment itself.

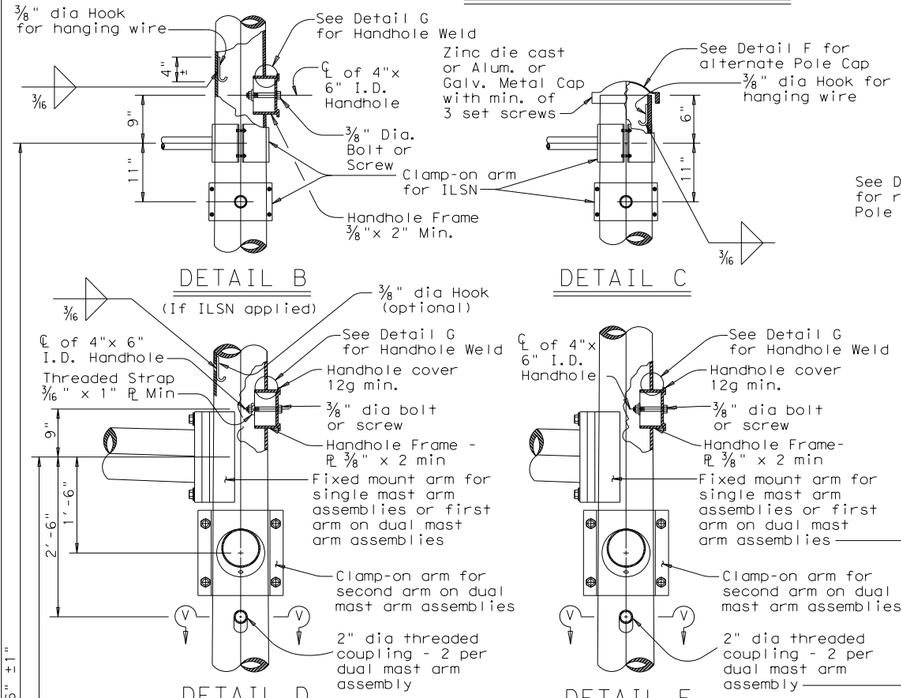


Round Pole



Polygonal Pole

DETAIL J



DETAIL B

(If ILSN applied)

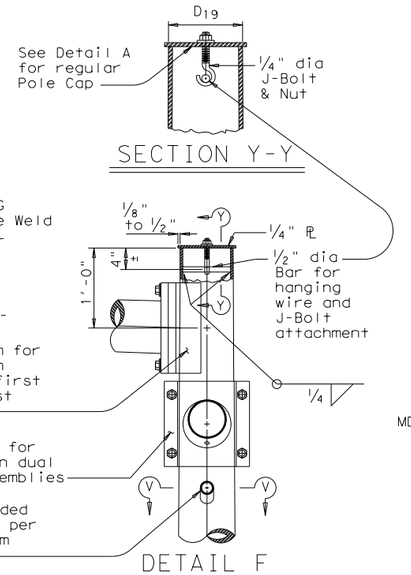
DETAIL C

DETAIL D

(for 30' pole with luminaire and ILSN sign)

DETAIL E

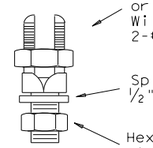
(for 24' pole with ILSN sign and no luminaire)



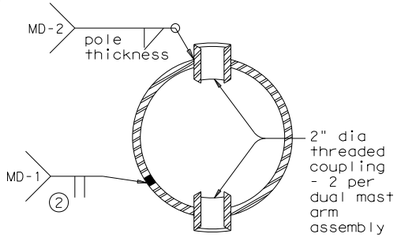
DETAIL F

(for 19' pole with no ILSN sign and no luminaire)

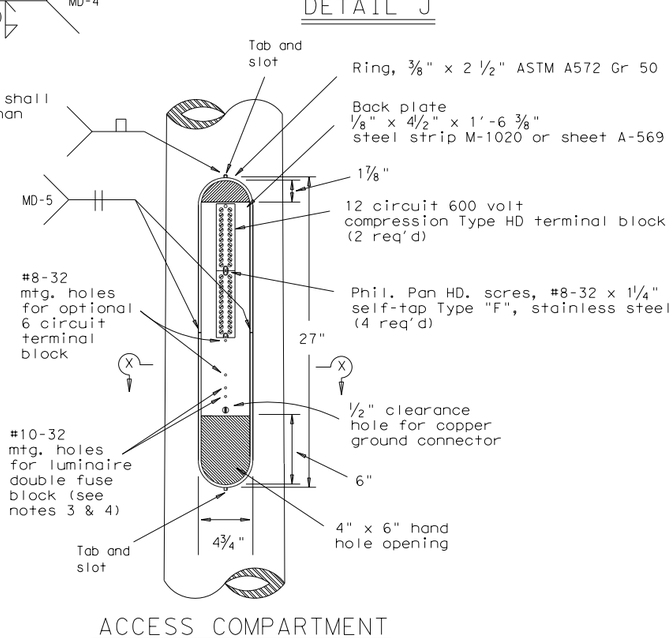
SECTION Y-Y



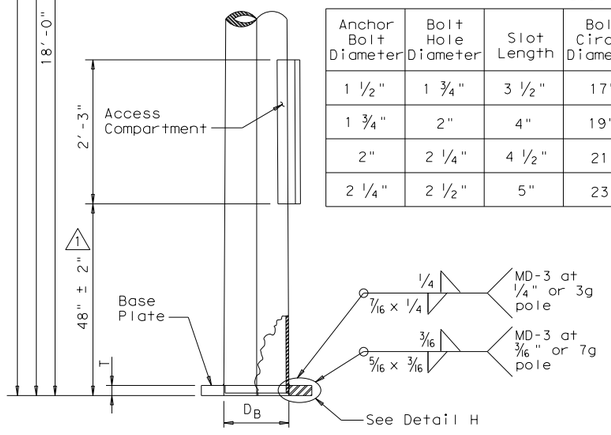
COPPER GROUND CONNECTOR



SECTION V-V

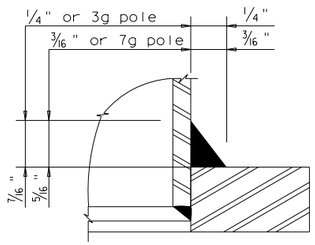


ACCESS COMPARTMENT

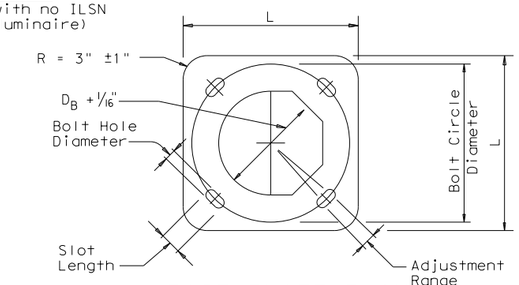


POLE ELEVATION

Anchor Bolt Diameter	Bolt Hole Diameter	Slot Length	Bolt Circle Diameter	Base ℞ Dim. L x T	Adjust. Range
1 1/2"	1 3/4"	3 1/2"	17"	18" x 1 1/2"	13.4°
1 3/4"	2"	4"	19"	20" x 1 3/4"	13.5°
2"	2 1/4"	4 1/2"	21"	22" x 2"	13.6°
2 1/4"	2 1/2"	5"	23"	24" x 2 1/4"	13.7°



DETAIL H



BASE PLATE PLAN

(1) 85% Min. penetration

(2) 60% Min. penetration 100% pemetration within 6" of circumferential base welds.

NOTES:

1. The cover shall be one piece formed from ABS plastic, shall be a pearl gray color, and shall be suitable for exposure to harsh sunlight and extreme weather. Cover shall latch with two screw latches and shall fit tightly to the enclosure ring to create a rainproof seal. Latch screws shall be 1/4-20 stainless flat socket head screws with tamper proof feature.
2. The pole manufacturer shall provide with each pole a separate kit consisting of: one cover with two latching assemblies, two terminal strips (Marathon #985GP12CU or approved equal), four #8-32 x 1 1/4" self tapping type "F" stainless steel pan head screws, and one ground connector (Blackburn TTC, Burndy KC22J12T13, or Ilsco SSS-5). The traffic signal contractor shall install the kit items in the field.
3. The screw hole spacing on the enclosure back plate shall be for two Marathon #985GP12 terminal strips, one Marathon #985GP06CU terminal strip, and one Bussmann #BM6032B fuse block.
4. Install one Bussmann #BM6032B, Littelfuse #L60030M-2C, or Ferraz-Shawmut #30352 fuse block for poles where luminaires are to be installed.

1 REVISED THE ELEVATION OF ACCESS COMPARTMENT (2/12).

Texas Department of Transportation

TRAFFIC SIGNAL SUPPORT STRUCTURES MAST ARM POLE DETAILS

MA-D-12(DAL)

DN: MS	CK: JSY	DW: FDN	CK: CAL

REVISIONS

8-99
1-12

CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
		61

DATE:
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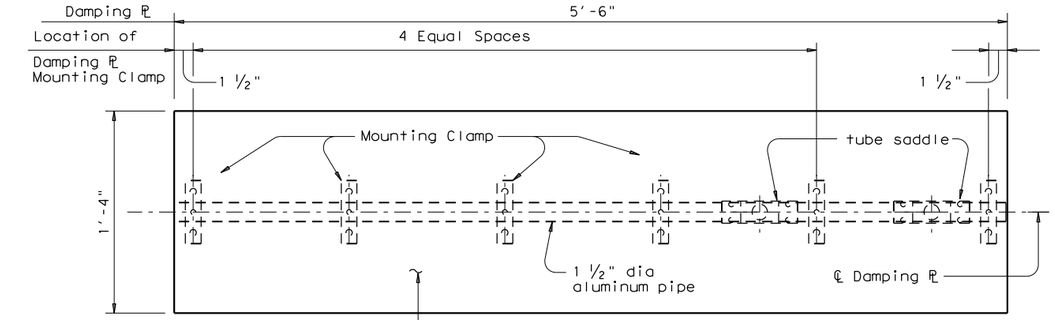
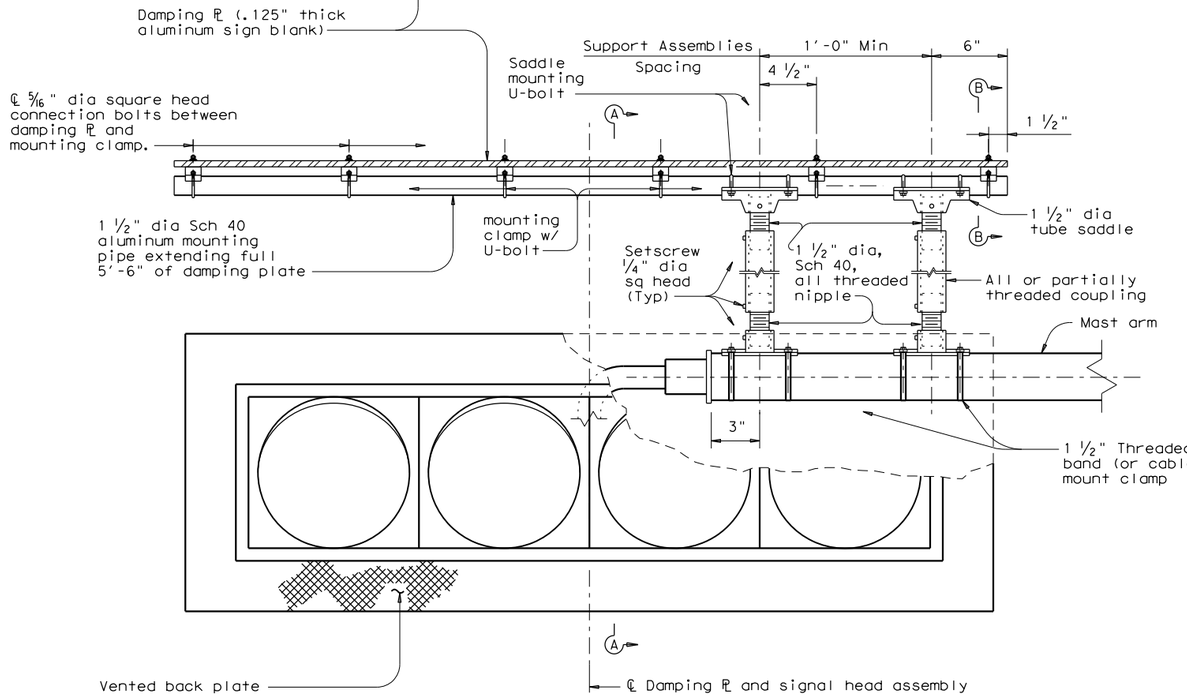


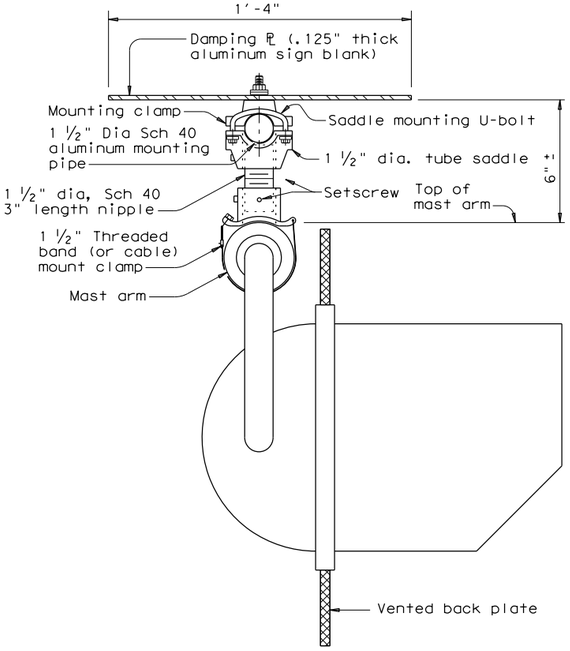
PLAN



ELEVATION

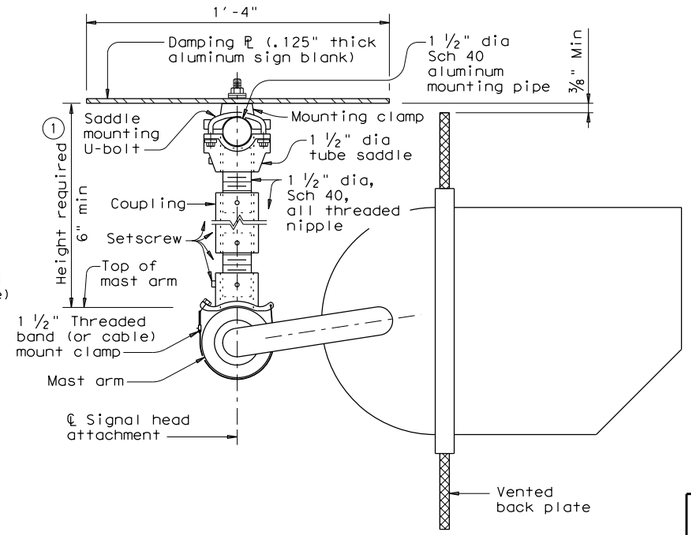
DAMPING PLATE MOUNTING DETAILS

(Showing alternate placement of signal head)



SECTION A-A

(Showing standard placement of signal head)
(Mounting clamp U-bolt is not shown for clarity)



SECTION A-A

(Showing alternate placement of signal head)
(Mounting clamp U-bolt is not shown for clarity)

① Recommended supporting assemblies to achieve required height			
Height required	One nipple each length	Two nipples each length plus	One coupling each length
6"-6 ¾"	3"	-	-
7"-8 ½"	4"	-	-
9"-10 ½"	6"	-	-
11"-15 ½"	-	4"	5"
16"-24"	-	6"	10"

GENERAL NOTES:

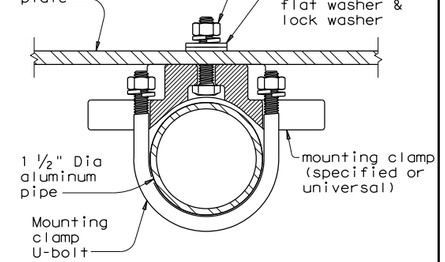
In accordance with the findings of TxDOT sponsored research, the installation of a damping plate in accordance with the details shown here at the end of signal mast arms of SMA and DMA standard structures reduces excessive harmonic vertical vibration, and thus fatigue damage. Any deviation from these details may reduce the effectiveness of this damping device.

Aluminum sign blank for damping plate shall conform to Departmental Material Specifications DMS-7110. Materials for mast arm mounting clamp and tube saddle shall be aluminum castings or aluminum alloys as in accordance with manufacturers' stipulations. Mounting pipe, pipe nipple and coupling shall be aluminum alloy 6061-T6 or 6063-T6. Damping plate mounting clamp and u-bolt assemblies shall conform to Standard sheet SMD(GEN)-08. U-bolts for saddle mounting shall have a minimum yield strength of 36 ksi.

Damping plate shall be mounted horizontally. Position centerline of damping plate to align with centerline of signal head assembly. Vertical clearance between signal head (with or without backing plate) and bottom of damping plate shall be maintained as shown. The attachments shown here are examples only, other supporting details which meet both alignment and vertical clearance requirements are also acceptable.

Unless stipulated by the manufacturers, all steel parts shall be galvanized finish in accordance with Standard Specification Item 445, "Galvanizing".

Contractor shall verify applicable field dimensions before the installation.



SECTION B-B

(Showing damping plate attachment)

Texas Department of Transportation
Traffic Operations Division

MAST ARM DAMPING PLATE DETAILS

MA-DPD-12

©TxDOT January 2012	DN: JSY	CK: ARC	DW: TGG	CK: JSY
REVISIONS	CONT	SECT	JOB	HIGHWAY
	DIST	COUNTY		SHEET NO.
				62

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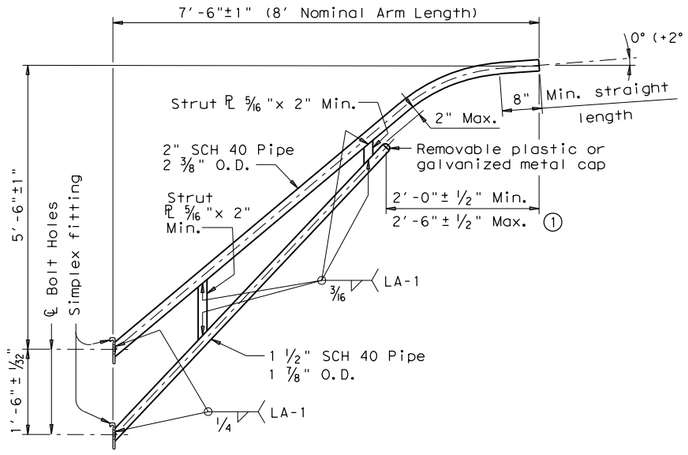
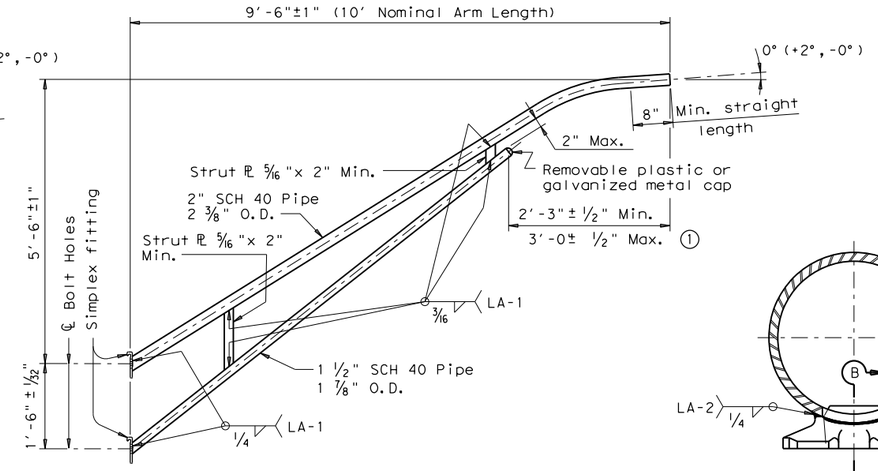
DATE:
FILE:



8-FOOT LUMINAIRE ARM



10-FOOT LUMINAIRE ARM

DIRECT ATTACHMENT DETAIL

MATERIALS	
Pole or Arm Simplex	ASTM A27 Gr.65-35 or A148 Gr.80-50, A576 Gr.1021 (3), or A36 (Arm only)
Arm Pipes	ASTM A53 Gr.B, A501, A1008 HSLAS-F Gr.50 (4), or A1011 HSLAS-F Gr.50 (4)
Arm Strut Plates (2)	ASTM A36, A572 Gr.50 (4), or A588
Misc.	ASTM designations as noted

(1) Dimensional limits are given to show acceptable variation in design. All of a Fabricator's production of a particular arm length shall have the same dimensions within specified tolerances.

(2) Any of the materials listed for plates may be used where the drawings do not specify a particular ASTM designation.

(3) A576 must be suitable for forging and also meet minimum tensile strength of 65 ksi, minimum yield of 35 ksi, and elongation in 2 inches of 22 percent.

(4) ASTM A572, A1008 HSLAS-F, and A1011 HSLAS-F may have higher yield strengths but shall not have less elongation than the grade indicated.

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals and Interim Revisions thereto. Design Wind Speed equals 90 mph plus a 1.3 gust factor. Arms are designed to support a 60 lb. luminaire having an effective projected area (actual area times drag coefficient) of 1.6 sq. ft.

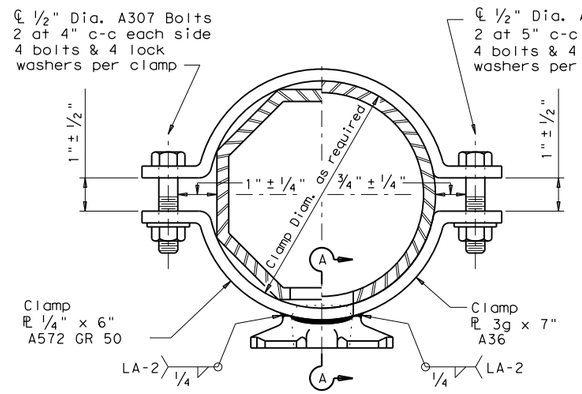
Materials and fabrication shall be in accordance with Item 686, "Traffic Signal Pole Assemblies (Steel)" and with the details, dimensions, and weld procedures shown herein. Weld references call for preapproved weld procedures which the Fabricator must obtain prior to fabrication. In the absense of specified Fabricaton tolerances, dimensions shall be within the tolerances generally obtainable in normal fabrication practice.

Unless otherwise noted, all parts shall be galvanized after fabrication in accordance with Item 445, "Galvanizing".

Deviation from the details and dimensions shown herein require submission of shop drawings in accordance with Item 441, "Steel Structures". Alternate designs are not acceptable.

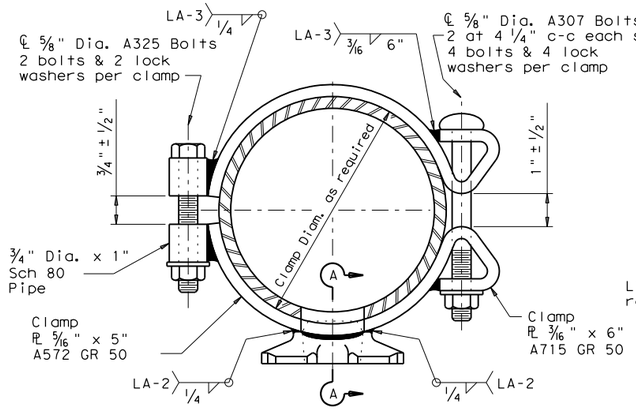
Each pole simplex fitting shall be supplied with 2 ASTM A325 bolts and 2 lock washers of the size specified. The bolts and lock washers shall be secured to the pole with the other hardware items called for in the plans. When clamp attachment is specified, the Fabricator shall ship the clamp assembly securely attached to the pole at the location shown on the plans.

If clamp assemblies are ordered without poles, the Fabricator shall ship one upper and one lower clamp assembly together in a single package, including all nuts and washers required for the clamps and simplex fittings.



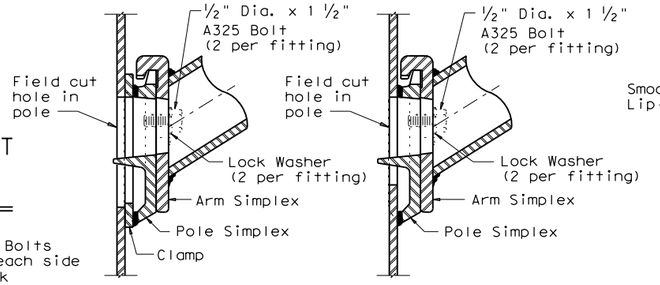
CLAMP ATTACHMENT DETAIL NO. 1 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO. 2 (HALF SECTION)



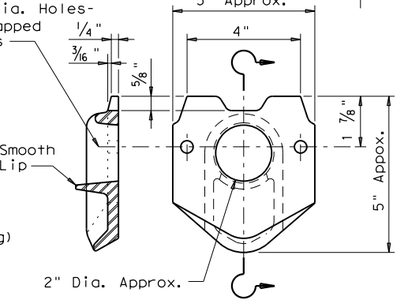
CLAMP ATTACHMENT DETAIL NO. 3 (HALF SECTION)

CLAMP ATTACHMENT DETAIL NO. 4 (HALF SECTION)

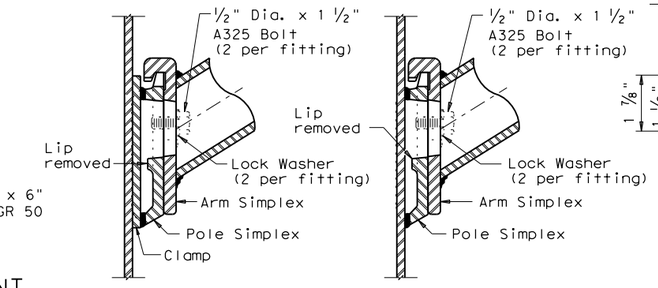


UPPER SIMPLEX FITTING

UPPER SIMPLEX FITTING



POLE SIMPLEX DETAIL

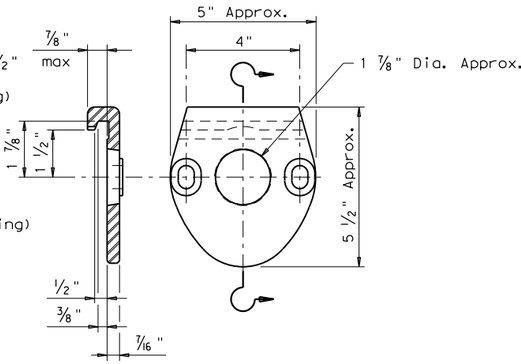


LOWER SIMPLEX FITTING

SECTON A-A

LOWER SIMPLEX FITTING

SECTON B-B



ARM SIMPLEX DETAIL

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY DRAWINGS FOR LUMINAIRE SUPPORT STRUCTURES

ARM DETAILS

LUM-A-12

DN: LEH	CK: JSY	DW: LTT	CK: TEB

REVISIONS	CONT	SECT	JOB	HIGHWAY
5-96				
1-99				
1-12				
	DIST	COUNTY		SHEET NO.
				63

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

DATE:
FILE:

FOUNDATION DESIGN TABLE

FDN TYPE	DRILLED SHAFT DIA	REINFORCING STEEL		EMBEDDED DRILLED SHAFT LENGTH-ft (4), (5), (6)			ANCHOR BOLT DESIGN (1)				FOUNDATION DESIGN LOAD (2)		TYPICAL APPLICATION
		VERT BARS	SPIRAL & PITCH	TEXAS CONE PENETROMETER N blows/ft			ANCHOR BOLT DIA	Fy (ksi)	BOLT CIR DIA	ANCHOR TYPE	MOMENT K-ft	SHEAR Kips	
				10	15	40							
24-A	24"	4- #5	#2 at 12"	5.7	5.3	4.5	¾"	36	12 ¾"	1	10	1	Pedestal pole, pedestal mounted controller.
30-A	30"	8- #9	#3 at 6"	11.3	10.3	8.0	1 ½"	55	17"	2	87	3	Mast arm assembly. (see Selection Table)
36-A	36"	10- #9	#3 at 6"	13.2	12.0	9.4	1 ¾"	55	19"	2	131	5	Mast arm assembly. (see Selection Table) 30' strain pole with or without luminaire.
36-B	36"	12- #9	#3 at 6"	15.2	13.6	10.4	2"	55	21"	2	190	7	Mast arm assembly. (see Selection Table) Strain pole taller than 30' & strain pole with mast arm
42-A	42"	14- #9	#3 at 6"	17.4	15.6	11.9	2 ¼"	55	23"	2	271	9	Mast arm assembly. (see Selection Table)

NOTES:

(1) Anchor bolt design develops the foundation capacity given under Foundation Design Loads.

(2) Foundation Design Loads are the allowable moments and shears at the base of the structure.

(3) Foundations may be listed separately or grouped according to similarity of location and type. Quantities are for the Contractor's information only.

(4) Field Penetrometer readings at a depth of approximately 3 to 5 feet may be used to adjust shaft lengths.

(5) If rock is encountered, the Drilled Shaft shall extend a minimum of two diameters into solid rock.

(6) Decimal lengths in Design Table are to allow interpolation for other penetrometer values. Round to nearest foot for entry into Summary Table.

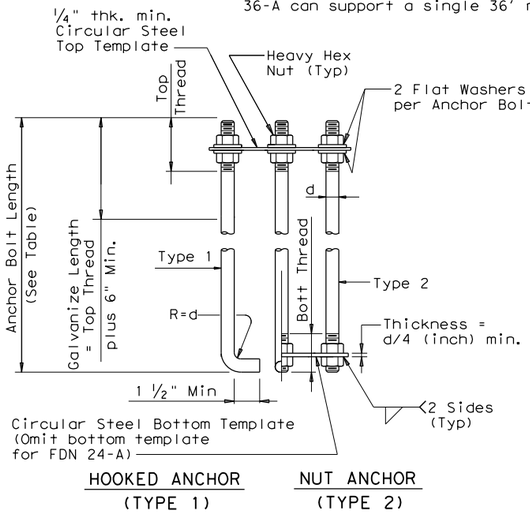
FOUNDATION SUMMARY TABLE (3)

LOCATION IDENTIFICATION	AVG. N BLOW /ft.	FDN TYPE	NO. EA	DRILLED SHAFT LENGTH (6) (FEET)				
				24-A	30-A	36-A	36-B	42-A
BELT LINE AT ADDISON RD	10	24-A	5	30				
	10	36-A	1			13		
BELT LINE AT ADDISON RD	10	24-A	2	12				
	10	30-A	1		11			
	10	36-A	2			26		
ADDISON RD AT SOJOURN DR	10	24-A	4	24				
	10	30-A	1		11			
	10	36-A	1			13		
TOTAL DRILLED SHAFT LENGTHS				66	22	52		

FOUNDATION SELECTION TABLE FOR STANDARD MAST ARM PLUS ILSN SUPPORT ASSEMBLIES (ft)

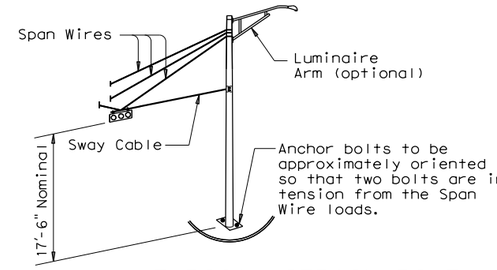
		FDN 30-A	FDN 36-A	FDN 36-B	FDN 42-A
80 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH	32'	48'		
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' X 24'			
		28' X 28'			
		32' X 28'	32' X 32'		
			36' X 36'		
			40' X 36'		
			44' X 28'	44' X 36'	
100 MPH DESIGN WIND SPEED	MAX SINGLE ARM LENGTH		36'	44'	
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS		24' X 24'		
			28' X 28'		
			32' X 24'	32' X 32'	
				36' X 36'	
				40' x24'	40' X 36'
					44' x 36'

EXAMPLE:
1. For 80mph design wind speed, foundation 30-A can support up to a 32' arm with another arm up to 28'
2. For 100mph design wind speed, foundation 36-A can support a single 36' mast arm.

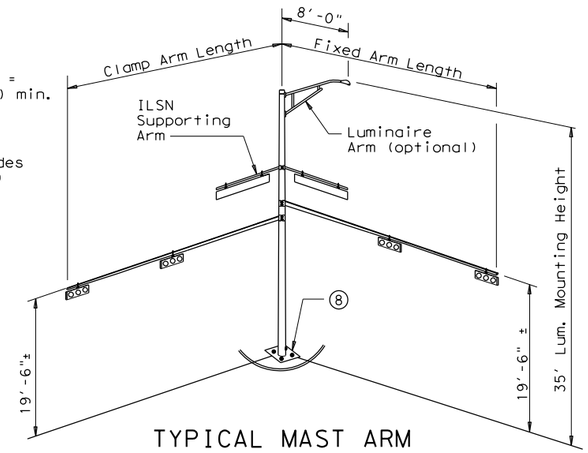


HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)

ANCHOR BOLT ASSEMBLY

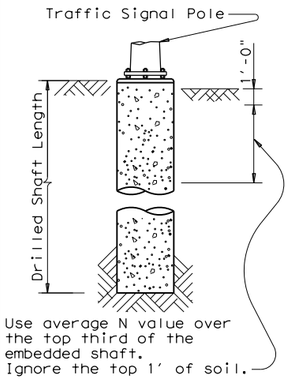


TYPICAL STRAIN POLE ASSEMBLY



TYPICAL MAST ARM ASSEMBLY

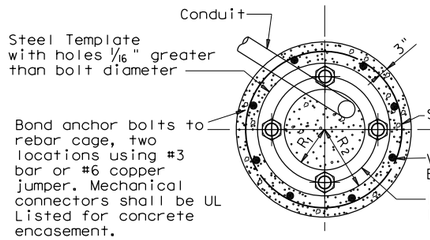
⑧ Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.



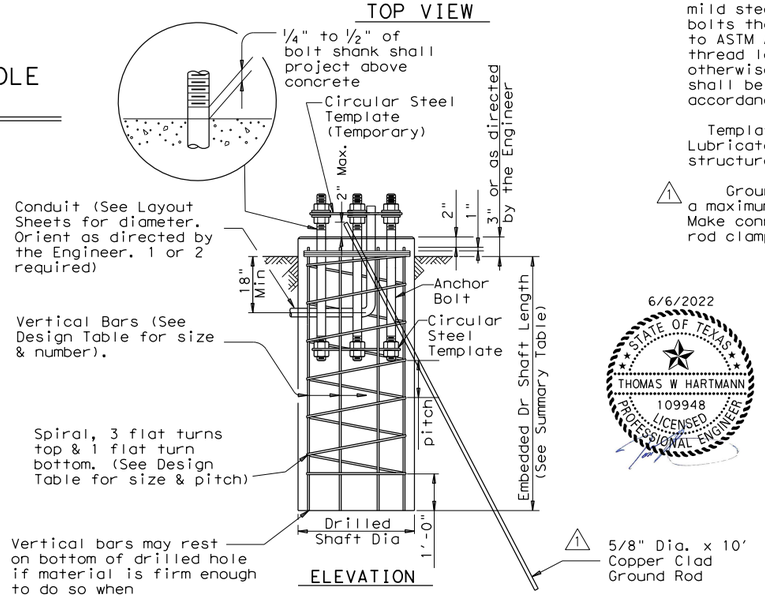
ANCHOR BOLT & TEMPLATE SIZES

BOLT DIA IN.	(7) BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	R1
¾"	1'-6"	3"	—	12 ¾"	7 ⅛"	5 ⅝"
1 ½"	3'-4"	6"	4"	17"	10"	7"
1 ¾"	3'-10"	7"	4 ½"	19"	11 ¼"	7 ¾"
2"	4'-3"	8"	5"	21"	12 ½"	8 ½"
2 ¼"	4'-9"	9"	5 ½"	23"	13 ¾"	9 ¼"

(7) Min dimensions given, longer bolts are acceptable.



TOP VIEW



ELEVATION

FOUNDATION DETAILS

GENERAL NOTES:

Design conforms to 1994 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and interim revisions thereto.

Reinforcing steel shall conform to Item 440, "Reinforcing Steel".

Concrete shall be Class "C".

Threads for anchor bolts and nuts shall be rolled or cut threads of 8UN series up to 2" in diameter or UNC series for all sizes. Bolts and nuts shall have Class 2A and 2B fit tolerances. Galvanized nuts shall be tapped after galvanizing.

Anchor bolts that are larger than 1" in diameter shall conform to "alloy steel" or "medium-strength mild steel" per Item 449, "Anchor Bolts". Anchor bolts that are 1" in diameter or less shall conform to ASTM A36. Galvanize a minimum of the top end thread length plus 6" for all anchor bolts unless otherwise noted. Exposed washers and exposed nuts shall be galvanized. All galvanizing shall be in accordance with Item 445, "Galvanizing".

Templates and embedded nuts need not be galvanized. Lubricate and tighten anchor bolts when erecting the structure in accordance with Item 449, "Anchor Bolts".

1 Ground rod shall protrude a minimum of 1"and a maximum of 2" above the finish grade of the foundation. Make connections to ground rods according to NEC. Ground rod clamps shall be listed for their intended purpose.

MODIFICATIONS:

1 ADDED GROUND ROD TO FOUNDATION DETAILS (9/15)

6/6/2022

STATE OF TEXAS
THOMAS W HARTMANN
109948
LICENSED
PROFESSIONAL ENGINEER

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL POLE FOUNDATION

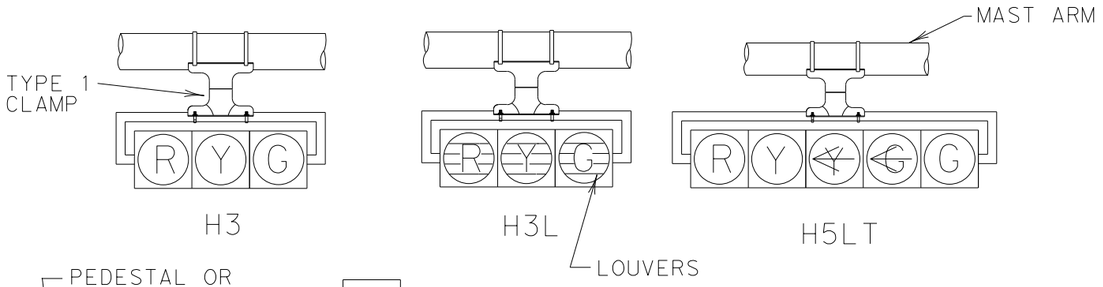
TS-FD-12 (DAL)

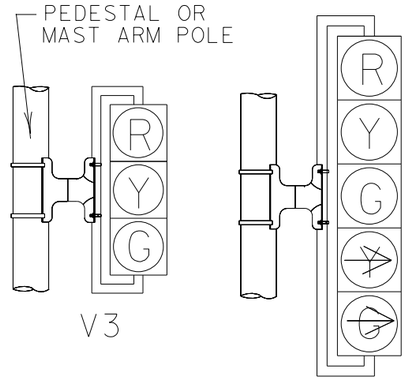
DN: MS	CK: JSY	DW: MAO/MMF	CK: JSY/TEB

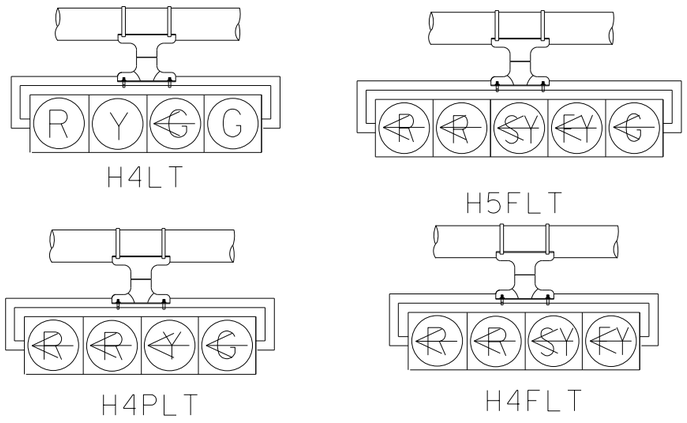
REVISIONS: 5-96, 11-99, 1-12

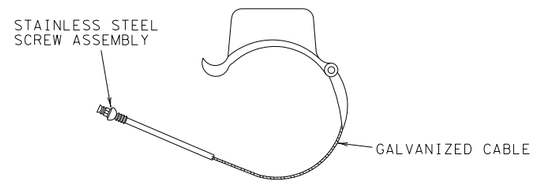
CONT	SECT	JOB	HIGHWAY

DIST	COUNTY	SHEET NO.
		64

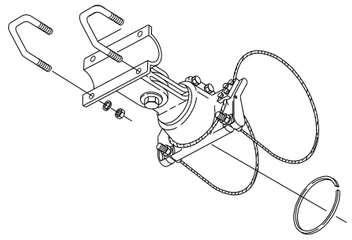








TYPE 1 AND 2 CLAMPS

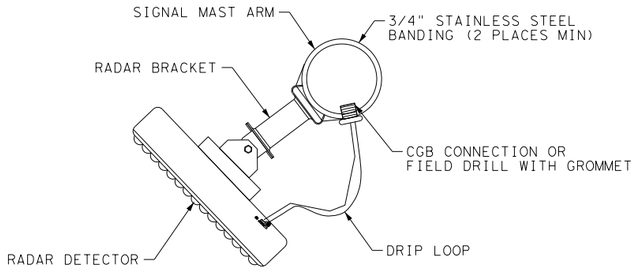


TYPE 2 CLAMP KIT

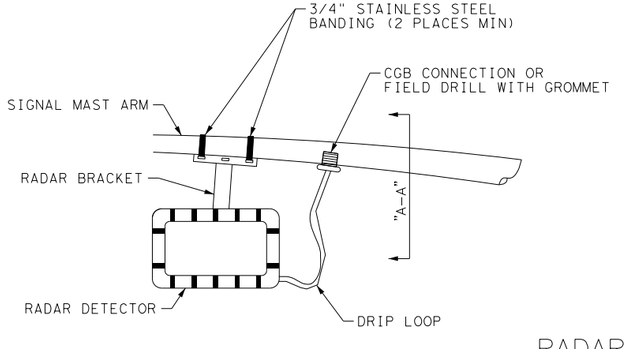
SHALL BE INSTALLED WHEN ROTATION ABOUT THE HORIZONTAL AND VERTICAL AXES ARE NEEDED.

NOTES:

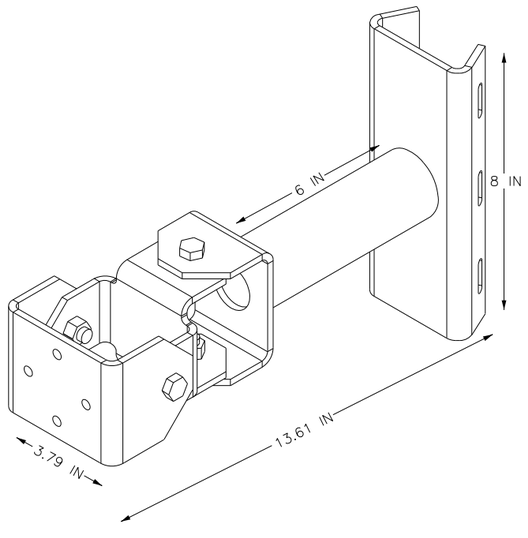
1. VEHICLE SIGNAL HEADS SHALL BE MOUNTED WITH TYPE 1 CLAMP AND APPROPRIATE TUBING.
2. ALL POLE MOUNTED VEHICLE HEADS SHALL BE INSTALLED ON THE AWAY-FROM-TRAFFIC SIDE OF THE PEDESTAL OR MAST ARM POLE.
3. THE SIGNAL HEADS SHOWN ARE NOT MEANT TO REFLECT ALL POSSIBLE SIGNAL HEADS, BUT ARE REPRESENTATIVE OF SIGNAL HEADS COMMONLY IN USE. SEE THE TRAFFIC SIGNAL LAYOUT FOR REQUIRED SIGNAL HEADS, AND THE NUMBER AND ORIENTATION OF LOUVERS.



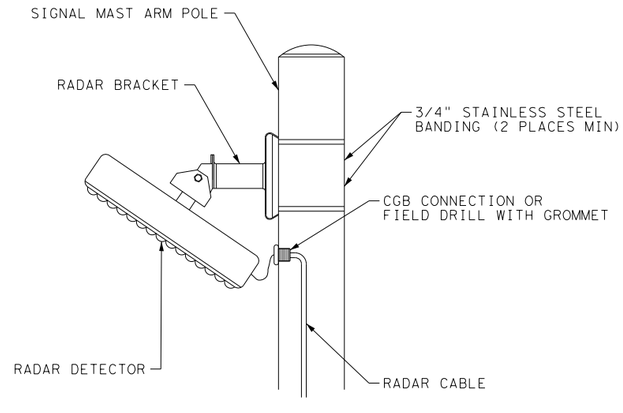
SECTION "A–A"



MAST ARM MOUNT



RADAR DETECTOR BRACKET MOUNT



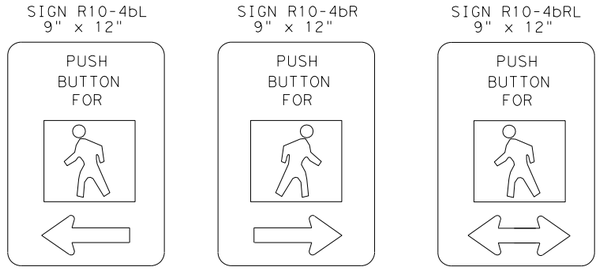
POLE MOUNT

RADAR DETECTION INSTALLATION

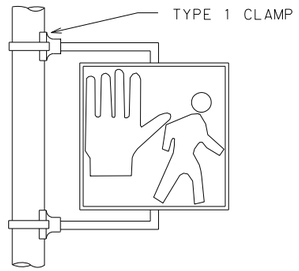
DALLAS DISTRICT STANDARD

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			65
STATE	STATE DIST.	COUNTY	
TEXAS			
CONT.	SECT.	JOB	HIGHWAY NO.

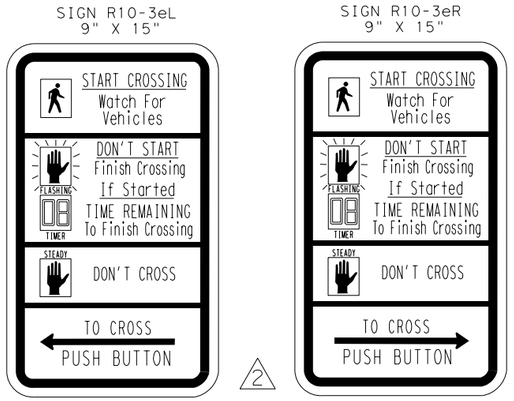
TRAFFIC SIGNAL HEAD AND RADAR INSTALLATION DETAILS



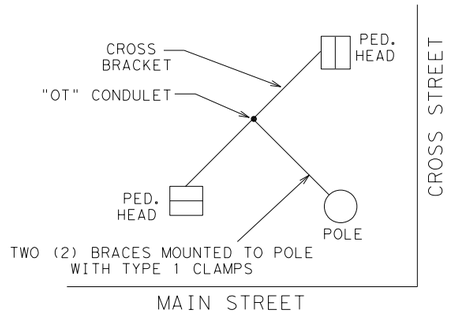
PEDESTRIAN PUSHBUTTON
SIGN DETAILS



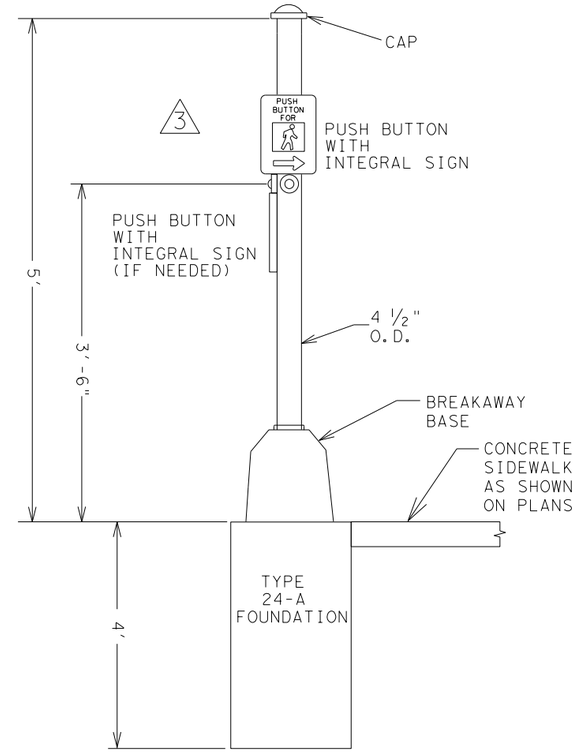
PEDESTRIAN SIGNAL HEAD MOUNTING
FOR ONE PEDESTRIAN SIGNAL HEAD
152A



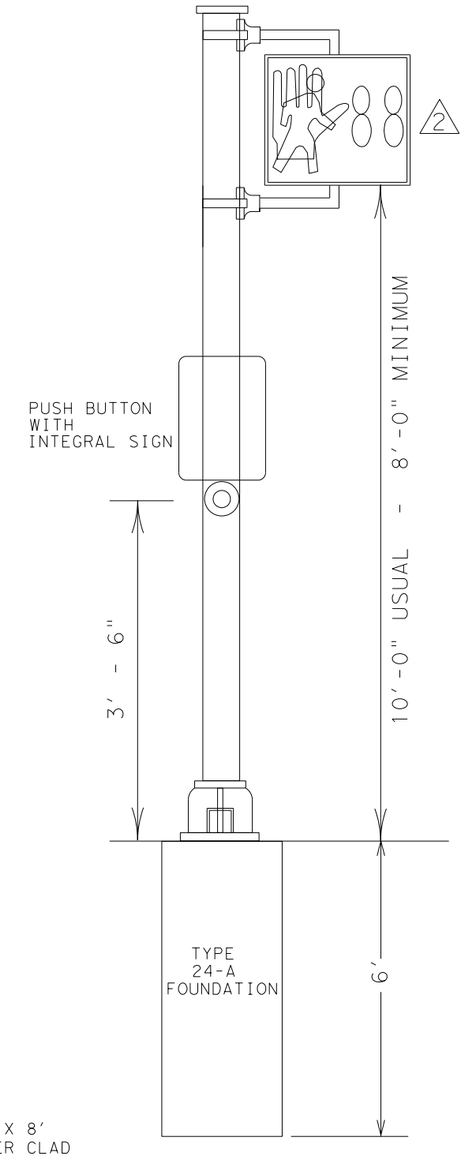
COUNTDOWN PEDESTRIAN PUSHBUTTON
SIGN DETAILS



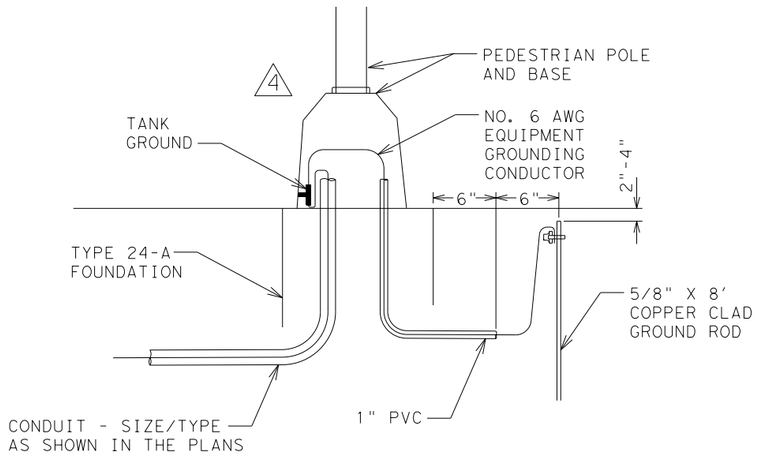
PEDESTRIAN SIGNAL HEAD MOUNTING
FOR TWO PEDESTRIAN SIGNAL HEADS
143C



PEDESTRIAN PUSH BUTTON POLE



PEDESTAL POLE

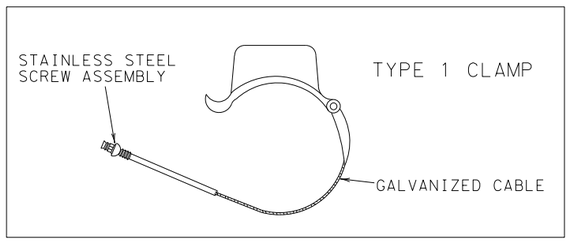


PEDESTRIAN PUSH BUTTON POLE
GROUNDING DETAILS

NOTE: 3

THE POLES ON THIS DRAWING ARE SHOWN AS AN EXAMPLE ONLY. POLES OF SIMILAR DESIGN FOR ANY CROSS SECTION WHICH MEET THE SPECIFICATIONS AND REQUIREMENTS SHOWN ON THESE DRAWINGS AND ARE APPROVED BY THE ENGINEER WILL BE DEEMED ACCEPTABLE.

1 NOTE: CLAM SHELL MOUNTING HARDWARE MAY BE USED INSTEAD OF MOUNTING HARDWARE SHOWN ABOVE, AS APPROVED BY THE ENGINEER. ICC P/N 4805 OR McCAIN QUICKMOUNT OR APPROVED EQUAL.



1 ALTERNATIVE MOUNTING METHOD
revised 12-92

2 ALTERNATIVE PEDESTRIAN SIGNAL HEAD AND SIGNING
revised 10-08

3 PEDESTRIAN PUSH BUTTON POLE
revised 01-11

4 PEDESTRIAN PUSH BUTTON POLE GROUNDING DETAILS
revised 09-15

NOTES:

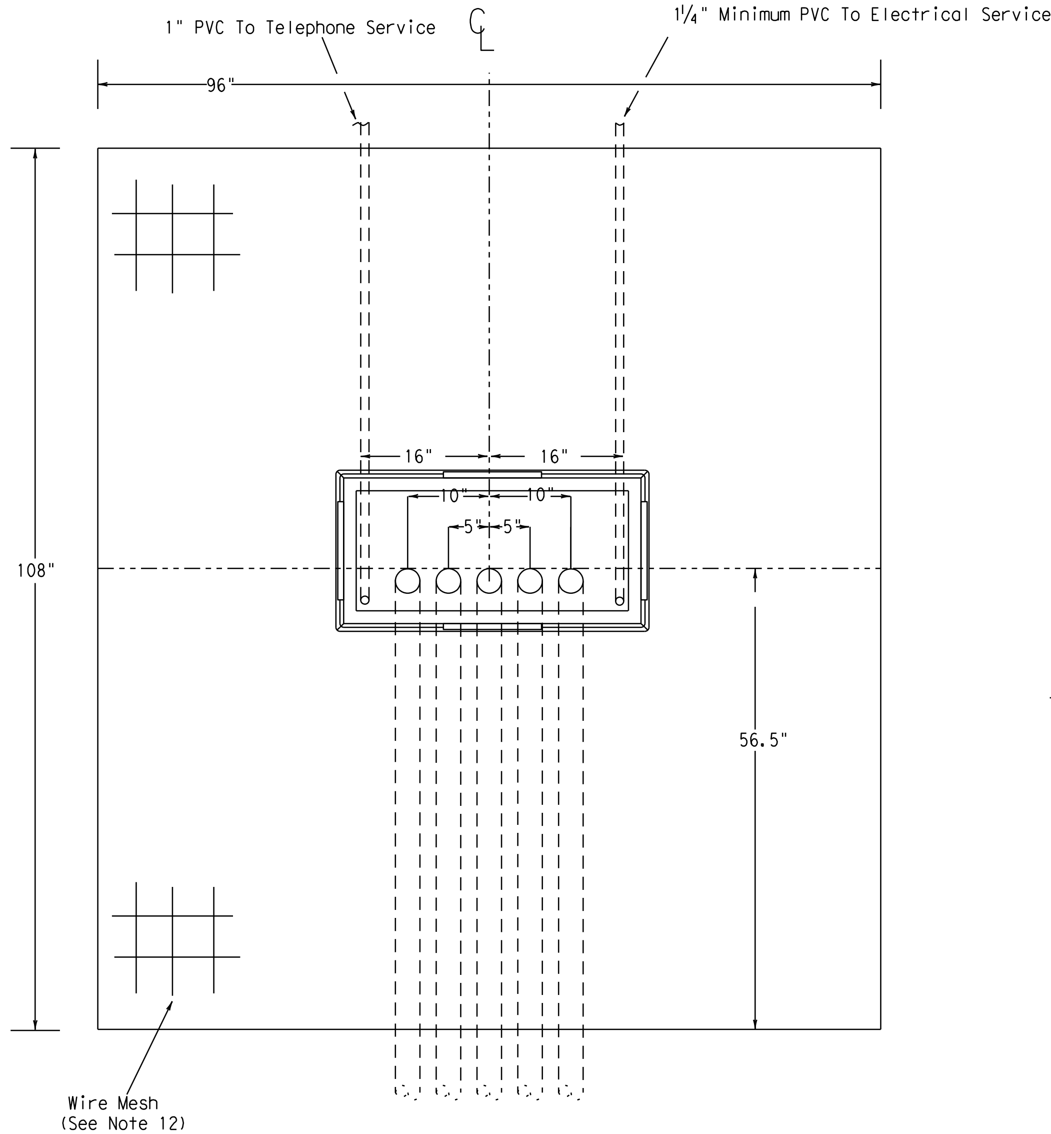
1. PEDESTRIAN SIGNAL HEADS SHALL BE MOUNTED WITH TYPE 1 CLAMPS AND APPROPRIATE TUBING.
2. ALL PEDESTRIAN SIGNAL HEADS SHALL BE INSTALLED ON THE AWAY-FROM-TRAFFIC SIDE OF THE PEDESTAL OR MAST ARM POLE.
3. ALL WIRING FOR PEDESTRIAN SIGNALS SHALL BE TOTALLY ENCLOSED WITHIN THE SIGNAL MOUNTING HARDWARE.
4. ALL PEDESTRIAN SIGNAL HEADS AND PUSH BUTTON SIGNS SHALL DISPLAY THE SYMBOLIZED MESSAGES SHOWN ABOVE.

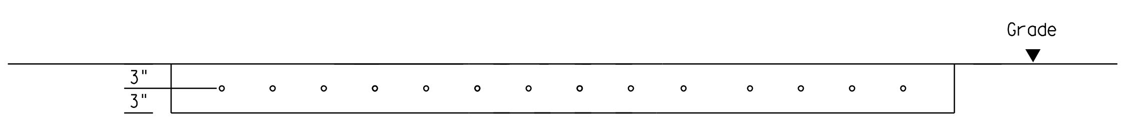
DALLAS DISTRICT STANDARD

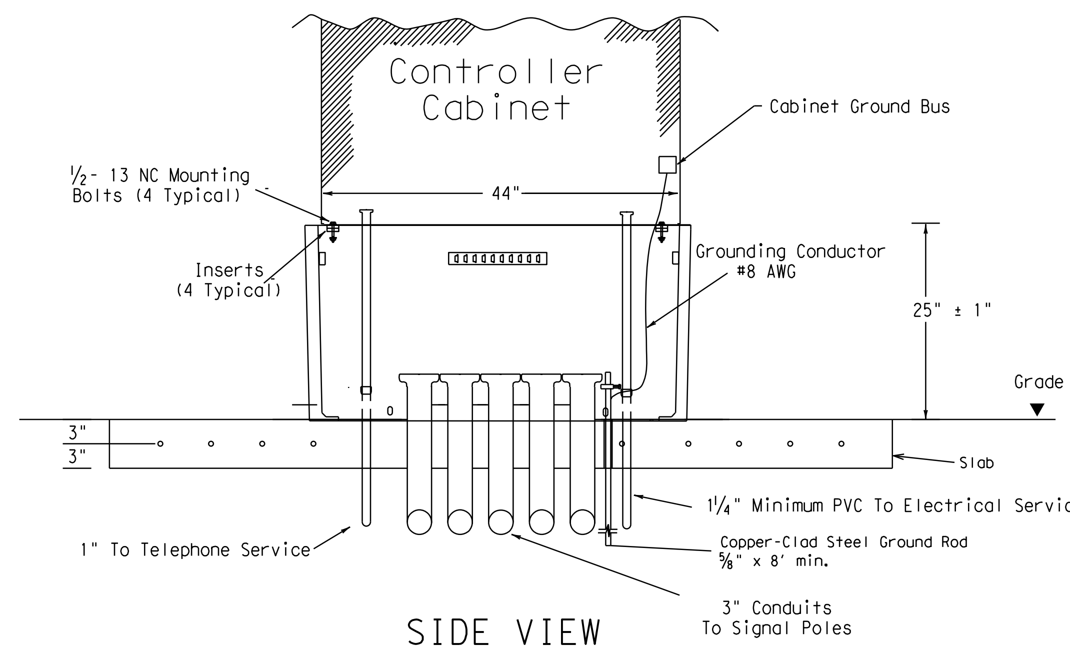
FED.RD. DIV.NO.	PROJECT NO.		SHEET NO.
6			66
STATE	STATE DIST.	COUNTY	
TEXAS			
CONT.	SECT.	JOB	HIGHWAY NO.

PEDESTRIAN SIGNAL HEAD IDENTIFICATION

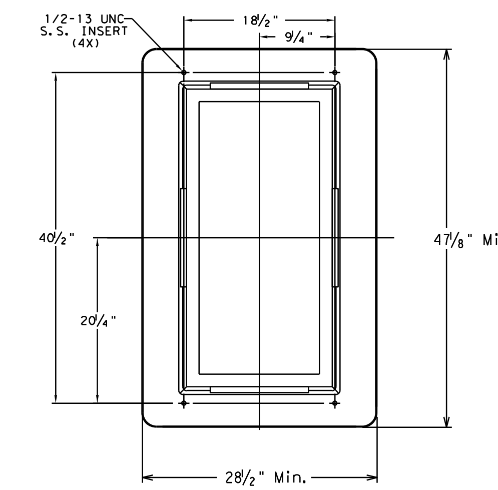
TOP VIEW
(Slab & Base)







SIDE VIEW
(Slab & Base)



CABINET BASE

TRAFFIC SIGNAL CONTROLLER BASE:

1. Provide a traffic signal controller base (cabinet base) manufactured of polymer concrete material consisting of calcareous and siliceous stone; glass fibers and thermoset polyester resin. The polymer concrete cabinet base must be reinforced on the inside of the cabinet base with fiberglass matting. Provide one of the following bases: Armorcast Part # A6001848X24, Quazite Model # PG3048B734, or other as approved by TxDOT Traffic Operation Division.
2. The polymer concrete material must have a minimum compressive strength of 10,300 pounds per square inch (psi), minimum flexural strength of 3600 psi, and minimum shear strength of 3600 psi.
3. The polymer concrete cabinet base must conform to the dimensions shown and must accommodate a standard TxDOT basemount cabinet.
4. Supply the cabinet base with four ½"-13 UNC stainless steel inserts for attachment of the cabinet to the base. Inserts must withstand a minimum torque of 50 ft-lb and a minimum straight pull out strength of 750 lbs.
5. Provide the cabinet base with 4 cable racks mounted one on each side of the base 2" to 7 " from the top edge of the base. Unless approved otherwise, cable racks must be 1-1/2 x 9/16 x 3/16 inch steel channel with eight T-slots spaced at 1-1/2 inches. The cable racks must easily accommodate the insertion of tie wraps to attach field wiring to the racks to serve as strain relief. Secure cable racks to the base using ½"-13 UNC stainless steel screws and inserts.
6. The cabinet base, when secured to the concrete slab with controller cabinet attached, must withstand a minimum wind load of 125 mph or a 850 lb force applied at 49" above the bottom of the base without causing the base or cabinet to come out of their anchored position or cause any permanent deformation. The manufacturer must supply certification by an independent testing laboratory or sealed by a Texas Licensed Professional Engineer. Provide the cabinet base with hardware for attachment to a concrete slab.
7. The traffic signal base must be permanently marked either by impress or by permanent ink with the manufacturer's model number and name or logo.
8. Seal the base to the concrete with a silicone caulk bead and fastened to the slab per manufacturer's instructions.

CONCRETE SLAB:

9. Traffic signal controller pad must be a portland cement concrete slab poured in place, must conform to the dimensions shown, and must be level.
10. Bond a #8 AWG copper ground wire and an 8 ft ground rod bonded to the reinforcing mesh by a suitable UL Listed clamp and terminated to the cabinet grounding bus for the purpose of providing a local ground for the electrical grounding conductor. The electrical grounding conductor specified in Item 680-3.A.4 is required and must be terminated to the cabinet ground bus.
11. Install a PVC sleeve to prevent the ground rod from direct embedment in the slab.
12. Provide welded wire mesh 6X6-W2.9 X W2.9 for reinforcement. Provide joints and splices in the mesh with a minimum 6-inch overlap. Center the mesh between top and bottom and provide a minimum 3 inch cover on the edges.
13. Provide Class B concrete minimum for the slab in accordance with Item 421. Construct the slab in accordance with Item 531.

CONDUITS:

14. Stub up and run 3-inch conduits through the slab to the various traffic signal poles and ground boxes as shown on the layouts. Install the number of conduits as shown on layouts plus two additional 3 inch conduits for future use. Terminate the conduits with a bushing between 2 and 4-inches above the slab.
15. Extend conduits for future use at least 18-inches from the edge of the slab, terminate underground with a coupling, and cap and seal so that the seal can be removed without damaging the coupling. This must also apply to unused telephone conduit.
16. Stub up two separate conduits through the slab from the electrical and telephone services. Run the conduit for the electrical feed directly to the electrical service enclosure. Run the conduit for the telephone line directly to the telephone service, usually located on the same pole as the electrical service. Telephone must not under any circumstance share a conduit with any other function.
17. Terminate electric and telephone conduits above the slab with a coupling. After the base is installed, extend the conduits above the top of the base and secure to the base using a steel one-hole strap or similar suitable substitute.

CONTROLLER CABINET:

18. Anchor the controller cabinet to the base using four stainless steel 1/2-13 NC bolts.
19. The silicone caulk bead specified in Item 680.3.B must be RTV 133.

PAYMENT:

20. Bid TS-CF as subsidiary to Item 680.

STANDARD PLANS
Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL CONTROLLER CABINET BASE AND PAD

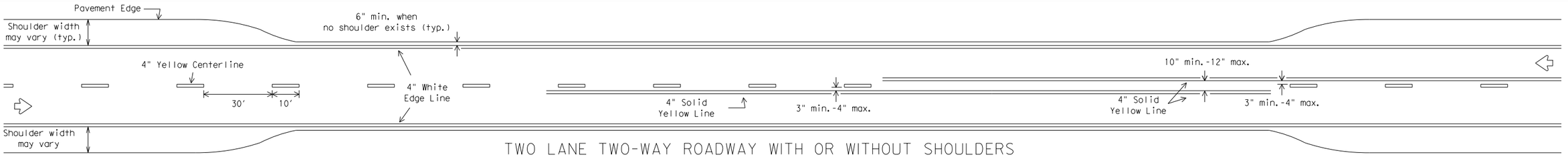
TS-CF-04

DN: HW	CK: -	DW: CJ	CK: CAL

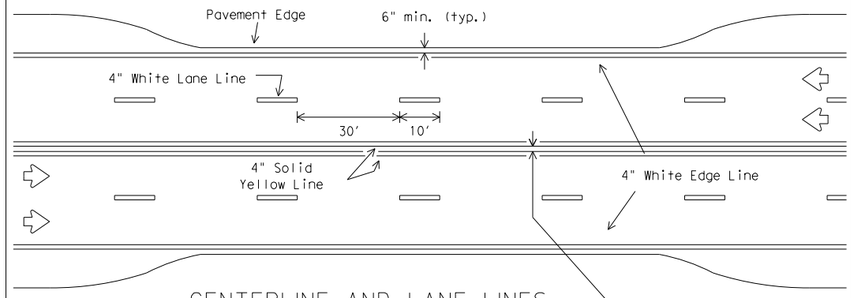
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
12-04		6		67

COUNTY	CONTROL	SECTION	JOB	HIGHWAY

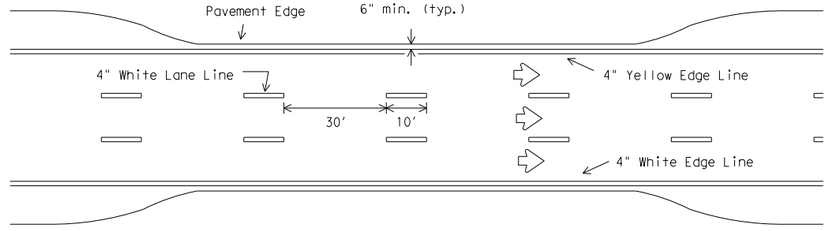
DATE:
FILE:



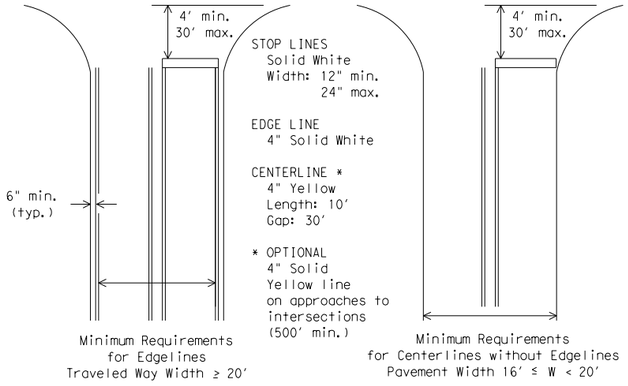
TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

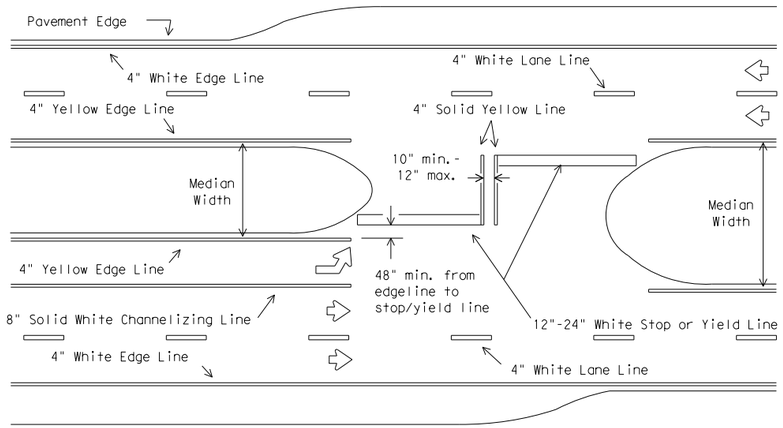


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



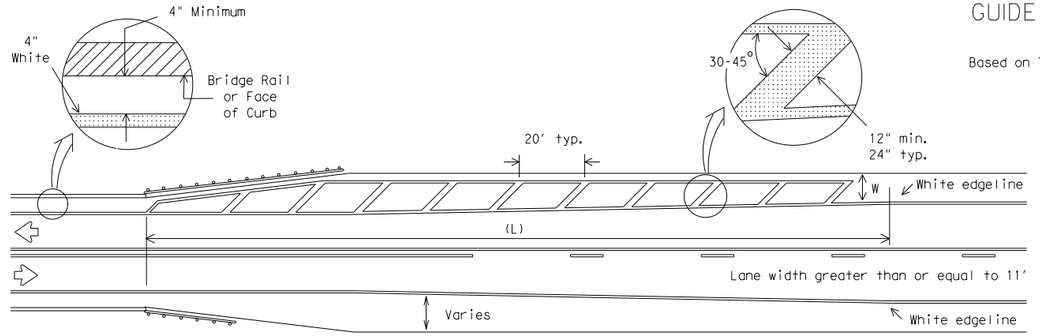
GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Highways



All medians shall be field measured to determine the location of necessary striping. Stop/Yield bars and centerlines shall be placed when the median width is greater than 30 ft. The median width is defined as the area between two roadways of a divided highway measured from edge of traveled way to edge of traveled way. The median excludes turn lanes. The median width might be different between intersections, interchanges and of opposite approaches of the same intersection. The narrow median width will be the controlling width to determine if markings are required.

FOUR LANE DIVIDED ROADWAY INTERSECTIONS



NOTES:

1. No-passing zone on bridge approach is optional but if used, it shall be a minimum 500 feet long.
2. For crosshatching length (L) see Table 1.
3. The width of the offset (W) and the required crosshatching width is the full shoulder width in advance of the bridge.
4. The crosshatching is not required if delineators or barrier reflectors are used along the structure.
5. For guard fence details, refer elsewhere in the plans.

ROADWAYS WITH REDUCED SHOULDER WIDTHS ACROSS BRIDGE OR CULVERT

TABLE 1 - TYPICAL LENGTH (L)

Posted Speed *	Formula
≤ 40	$L = \frac{WS^2}{60}$
≥ 45	L=WS

* 85th Percentile Speed may be used on roads where traffic speeds normally exceed the posted speed limit. Crosshatching length should be rounded up to nearest 5 foot increment.

L=Length of Crosshatching (FT.) W=Width of Offset (FT.)
S=Posted Speed (MPH)

EXAMPLES:

An 8 foot shoulder in advance of a bridge reduces to 4 feet on a 70 MPH roadway. The length of the cross-hatching should be:

$L = 8 \times 70 = 560$ ft.

A 4 foot shoulder in advance of a bridge reduces to 2 feet on a 40 MPH roadway. The length of the cross-hatching should be:

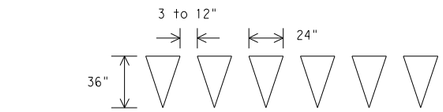
$L = 4(40)^2 / 60 = 106.67$ ft. rounded to 110 ft.

GENERAL NOTES

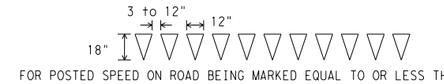
1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should typically be placed a minimum of 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel and not the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to inside of edgeline of a two lane roadway.

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.



FOR POSTED SPEED ON ROAD BEING MARKED EQUAL TO OR GREATER THAN 45 MPH



FOR POSTED SPEED ON ROAD BEING MARKED EQUAL TO OR LESS THAN 40 MPH

YIELD LINES

Texas Department of Transportation
Traffic Operations Division

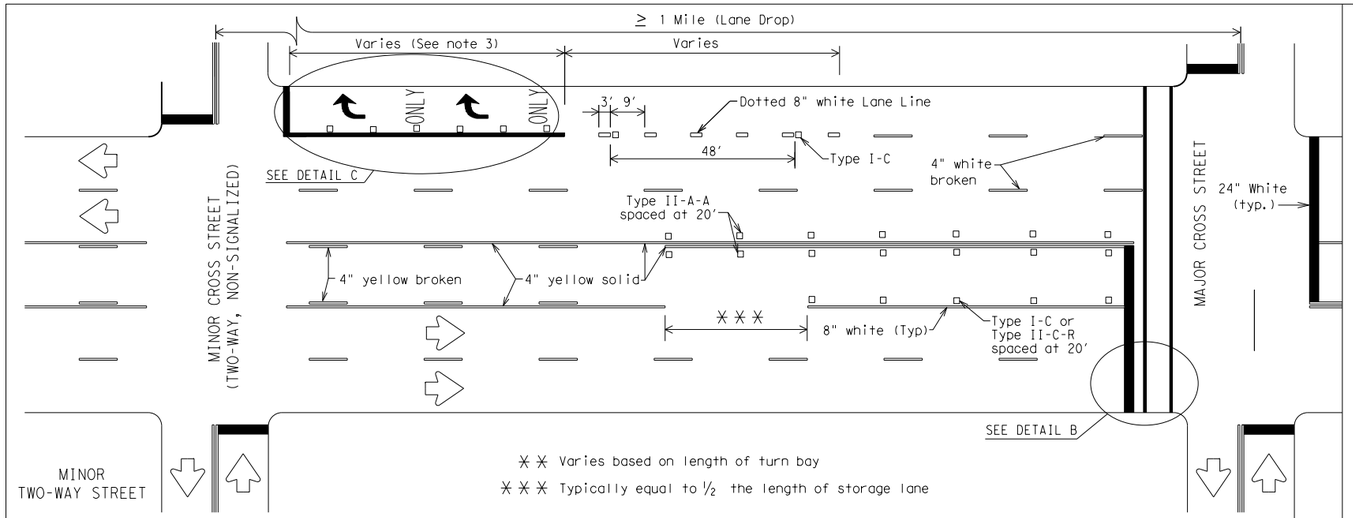
TYPICAL STANDARD PAVEMENT MARKINGS

PM(1)-12

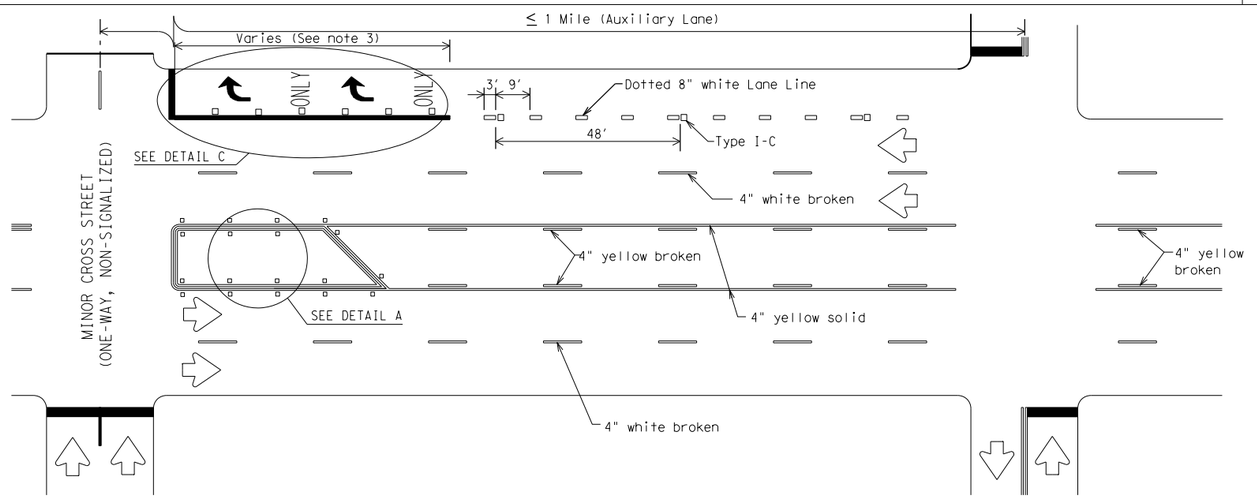
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
DIST	COUNTY		SHEET NO.
			68

REVISIONS
8-95 2-12
5-00
8-00
3-03

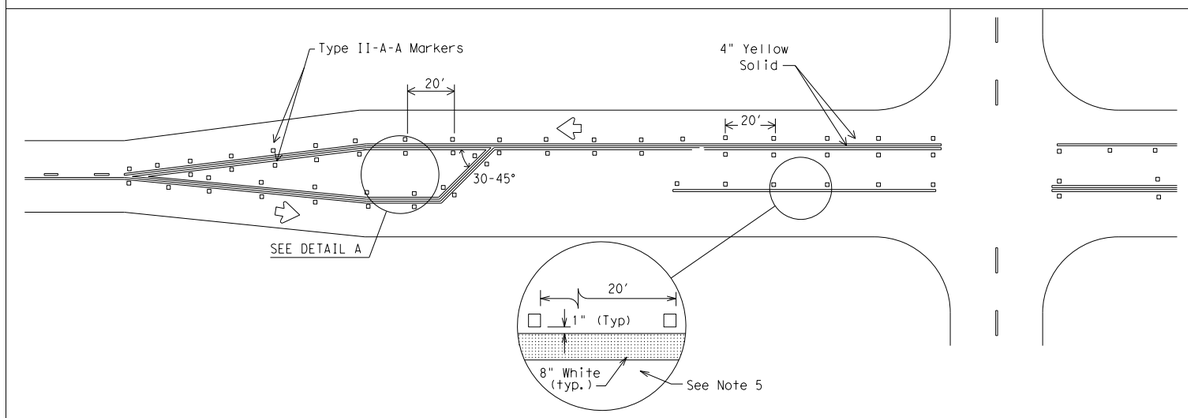
22A



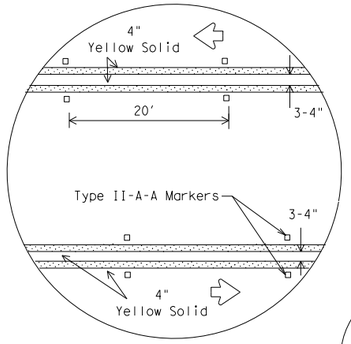
TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



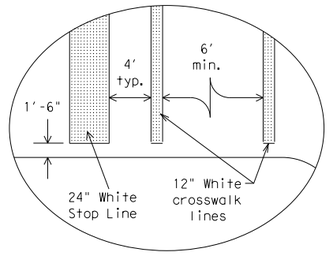
TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWO-LANE HIGHWAY INTERSECTION WITH LEFT TURN BAYS

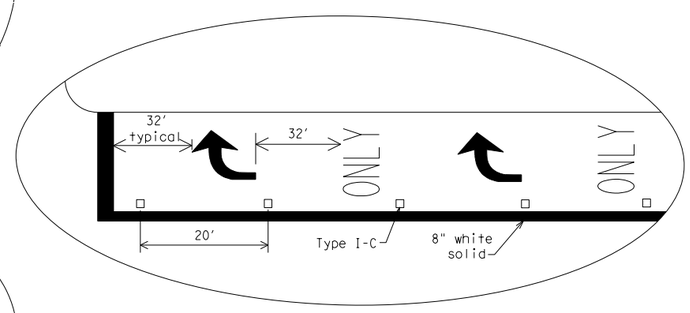


DETAIL A



Final placement of Stop Bar and Crosswalk shall be approved by the Engineer in the field.

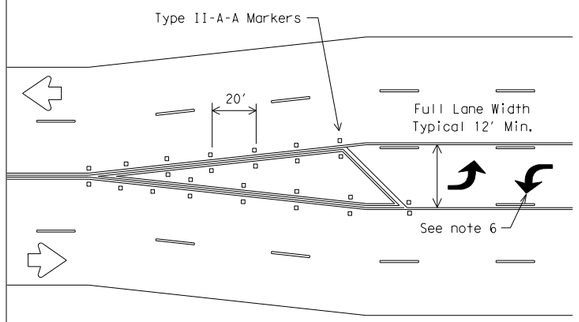
DETAIL B



DETAIL C

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.



TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

1. Refer elsewhere in plans for additional RPM placement and details.
2. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows as shown in the Standard Highway Sign Designs for Texas.
3. When lane used word and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
4. Other crosswalk paterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used.
5. Raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Raised pavement marker Type II-C-R with divided highways and raised medians.
6. A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

Texas Department of Transportation
Traffic Operations Division

PAVEMENT MARKINGS FOR TWO-WAY LEFT TURN LANES DIVIDED HIGHWAYS AND RURAL LEFT TURN BAYS

PM(3)-12

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

REVISIONS	CONT	SECT	JOB	HIGHWAY
5-00 2-12				
8-00				
3-03	DIST	COUNTY		SHEET NO.
2-10				69

22C

DATE:
FILE:

DATE:
FILE:

GENERAL NOTES FOR ALL ELECTRICAL WORK

1. The location of all conduits, junction boxes, ground boxes, and electrical services is diagrammatic and may be shifted to accommodate field conditions.

2. Provide new and unused materials. Ensure that all materials and installations comply with the applicable articles of the National Electrical Code (NEC), TxDOT standards and specifications, National Electrical Manufacturers Association (NEMA), and are listed by Underwriters Laboratories (UL) or a Nationally Recognized Testing Lab (NRTL). NRTLs such as Canadian Standard Association (CSA), Intertek Testing Services NA Inc., or FM Approvals LLC can be considered equivalent to UL. Where reference is made to NEMA listed devices, International Electrotechnical Commission (IEC) listed devices will not be considered an acceptable equal to a NEMA listed device. Acceptable devices may have both a NEMA and IEC listing. Faulty fabrication or poor workmanship in any material, equipment, or installation is justification for rejection. Replace or reinstall rejected material or equipment at no additional cost to the Department.

3. Miscellaneous nuts, bolts and hardware, except for high strength bolts, may be stainless steel when plans specify galvanized, provided the bolt size is ½ in. or less in diameter.

4. Provide the following test equipment as required by the Engineer to confirm compliance with the contract and the NEC: voltmeter, ammeter, megohm meter (1000 volt DC), ground resistance tester, torque wrenches, and torque screwdrivers. Ensure all equipment has been properly calibrated within the last year. Provide calibration certification to the Engineer upon request. Operate test equipment during inspection as requested by the Engineer.

5. Install grounding as shown on the plans and in accordance with the NEC. Ensure all metallic conduits; metal poles; luminaires; and metal enclosures are bonded to the equipment grounding conductor. Provide stranded bare copper or green insulated grounding conductors. Ground rods, connectors, and bonding jumpers are subsidiary to the various bid items.

6. When required by the Engineer, notify the Department in writing of materials from the Material Producers List (MPL) intended for use on each project. Prequalified materials are listed on the MPL on TxDOT's website under "Roadway Illumination and Electrical Supplies." No substitutions will be allowed for materials on this list.

CONDUIT

A. MATERIALS

1. Provide conduit, junction boxes, fittings, and hardware as per TxDOT Departmental Material Specification (DMS) 11030 "Conduit" and Item 618 "Conduit" of TxDOT's "Standard Specifications For Construction And Maintenance Of Highways, Streets, And Bridges," latest edition. Provide conduits listed under Item 618 on the MPL under "Roadway Illumination and Electrical Supplies." Provide conduit types according to the descriptive code or as shown on the plans. Do not substitute other types of conduits for those shown. Provide liquidtight flexible metal conduit (LFMC) when flexible conduit is called for on galvanized steel rigid metallic conduit (RMC) systems. Provide liquidtight flexible nonmetallic conduit (LFNC) when flexible conduit is called for on polyvinyl chloride (PVC) systems.

2. Provide galvanized steel RMC for all exposed conduits, unless otherwise shown on the plans. Properly bond all metal conduits.

3. Unless otherwise shown on the plans, provide junction boxes with a minimum size as shown in the following table, which applies to the greatest number of conductors entering the box through one conduit with no more than four conduits per box. When a mixture of conductor sizes is present, count the conductors as if all are of the larger size. For situations not applicable to the table, size junction boxes in accordance with NEC.

AWG	3 CONDUCTORS	5 CONDUCTORS	7 CONDUCTORS
#1	10" x 10" x 4"	12" x 12" x 4"	16" x 16" x 4"
#2	8" x 8" x 4"	10" x 10" x 4"	12" x 12" x 4"
#4	8" x 8" x 4"	10" x 10" x 4"	10" x 10" x 4"
#6	8" x 8" x 4"	8" x 8" x 4"	10" x 10" x 4"
#8	8" x 8" x 4"	8" x 8" x 4"	8" x 8" x 4"

4. Junction boxes with an internal volume of less than 100 cu. in. and supported by entering raceways must have threaded entries or hubs identified for the intended purpose and supported by connection of two or more rigid metal conduits. Secure conduit within 3 ft. of the enclosure or within 18 in. of the enclosure if all conduit entries are on the same side. Mechanically secure all junction boxes with an internal volume greater than 100 cu. inches.

5. Provide hot dipped galvanized cast iron or sand cast aluminum outlet boxes for junction boxes containing only 10 AWG or 12 AWG conductors. Do not use die cast aluminum boxes. Size outlet boxes according to the NEC.

6. Do not use intermediate metal conduit (IMC) or electrical metallic tubing (EMT) unless specifically required by the plan sheets. When EMT is called for, provide junction boxes made from galvanized steel sheeting, listed and approved for outdoor use, unless otherwise noted on the plans. Size all galvanized steel junction boxes in accordance with the NEC. Provide junction boxes for IMC conduit systems that meet the same requirements for junction boxes used with RMC systems.

7. Provide PVC junction boxes intended for outdoor use on PVC conduit systems, unless otherwise noted on the plans.

8. Provide PVC elbows in PVC conduit systems, unless otherwise shown on the plans. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the PVC conduit system. When galvanized steel RMC elbows are specifically called for in the plans and any portion of the RMC elbow is buried less than 18 in., ground the RMC elbow by means of a grounding bushing on a rigid metal extension. Grounding of the rigid metal elbow is not required if the entire RMC elbow is encased in a minimum of 2 in. of concrete. PVC extensions are allowed on these concrete encased rigid metal elbows. RMC or PVC elbows are subsidiary to various bid items.

9. When required, provide High-Density Polyethylene (HDPE) conduit with factory installed internal conductors according to Item 622 "Duct Cable." At the Contractor's request and with approval by the Engineer, substitute HDPE conduit with no conductors for bored schedule 40 or schedule 80 PVC conduit bid under Item 618. Ensure bored HDPE substituted for PVC is schedule 40 and of the same size PVC called for in the plans. Ensure the substituted HDPE meets the requirements of Item 622, except that the conduit is supplied without factory-installed conductors. Make the transition of the HDPE conduit to PVC (or RMC elbow when required) at the bore pit. Provide conduit of the size and schedule as shown on the plans. Do not extend substituted conduit into ground boxes or foundations. Provide PVC or galvanized steel RMC elbows as called for at all ground boxes and foundations.

10. Use two-hole straps when supporting 2 in. and larger conduits. On electrical service poles, properly sized stainless steel or hot dipped galvanized one-hole standoff straps are allowed on the service riser conduit.

B. CONSTRUCTION METHODS

1. Provide and install expansion joint conduit fittings on all structure-mounted conduits at the structure's expansion joints to allow for movement of the conduit. In addition, provide and install expansion joint fittings on all continuous runs of galvanized steel RMC conduit externally exposed on structures such as bridges at maximum intervals of 150 ft. When requested by the project Engineer, supply manufacturer's specification sheet for expansion joint conduit fittings. Repair or replace expansion joint fittings that do not allow for movement at no additional cost to the Department. Provide the method of determining the amount of expansion to the Engineer upon request. Do not use LFMC or LFNC as a substitute for the required expansion conduit fittings.

2. Space all conduit supports at maximum intervals of 5 ft. Install conduit spacers when attaching metal conduit to surface of concrete structures. See "Conduit Mounting Options" on ED(2). Install conduit support within 3 ft. of all enclosures and conduit terminations.

3. Do not attach conduit supports directly to pre-stressed concrete beams except as shown specifically in the plans or as approved by the Engineer.

4. Unless otherwise shown on the plans, jack or bore conduit placed beneath existing roadways, driveways, sidewalks, or after the base or surfacing operation has begun. Backfill and compact the bore pits below the conduit per Item 476 "Jacking, Boring, or Tunneling Pipe or Box" prior to installing conduit or duct cable to prevent bending of the connections.

5. When placing conduit in the sub-grade of new roadways, backfill all trenches with excavated material unless otherwise noted on the plans. When placing conduit in the sub-base of new roadways, backfill all trenches with cement-stabilized base as per requirements of Items 110 "Excavation", 400 "Excavation and Backfill for Structures", 401 "Flowable Backfill", 402 "Trench Excavation Protection", and 403 "Temporary Special Shoring."

6. Provide and place warning tape approximately 10 in. above all trenched conduit as per Item 618.

7. During construction, temporarily cap or plug open ends of all conduit and raceways immediately after installation to prevent entry of dirt, debris and animals. Temporary caps constructed of durable duct tape are allowed. Tightly fix the tape to the conduit opening. Clean out the conduit and prove it clear in accordance with Item 618 prior to installing any conductors.

8. Ensure conduit entry into the top of any enclosure is waterproof by installing conduit sealing hubs or using boxes with threaded bosses. This includes surface mounted safety switches, meter cans, service enclosures, auxiliary enclosures and junction boxes. Grounding bushings on water tight sealing hubs are not required.

9. Fit the ends of all PVC conduit terminations with bushings or bell end fittings. Provide and install a grounding type bushing on all metal conduit terminations.

10. Install a bonding jumper from each grounding bushing to the nearest ground rod, grounding lug, or equipment grounding conductor. Ensure all bonding jumpers are the same size as the equipment grounding conductor. Bonding of conduit used as a casing under roadways for duct cable is not required, if the duct extends the full length through the casing.

11. At all electrical services, install a 6 AWG solid copper grounding electrode conductor.

12. Place conduits entering ground boxes so that the conduit openings are between 3 in. and 6 in. from the bottom of the box. See the ground box detail on sheet ED(4).

13. Seal ends of all conduits with duct seal, expandable foam, or by other methods approved by the Engineer. Seal conduit immediately after completion of conductor installation and pull tests. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a conduit sealant.

14. File smooth the cut ends of all mounting strut and conduit. Before installing, paint the field cut ends of all mounting strut and RMC (threaded or non-threaded) with zinc rich paint (94% or more zinc content) to alleviate overspray. Use zinc rich paint to touch up galvanized material as allowed under Item 445 "Galvanizing." Do not paint non-galvanized material with a zinc rich paint as an alternative for materials required to be galvanized.

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS CONDUITS & NOTES

ED(1)-14

FILE:	ed1-14.dgn	DN:	CK:	DW:	CK:
© TxDOT	October 2014	CONT	SECT	JOB	HIGHWAY
REVISIONS					
		DIST	COUNTY		SHEET NO.
					70

71A

DATE:
FILE:

ELECTRICAL CONDUCTORS

A. MATERIAL INFORMATION

1. Provide Type XHHW insulated conductors in accordance with Departmental Material Specification (DMS)11040 "Conductors" and Item 620 "Electrical Conductors." Provide conductors as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies" Item 620. Color code insulated conductors in conformance with the NEC. Identify grounded (neutral) conductors with white insulation. Identify grounding conductors (ground wires) with green insulation or bare conductors. Identify ungrounded (hot) conductors with any color insulation except green, white, or gray. Keep color scheme consistent throughout the wiring system. Identify conductors 6 American Wire Gauge (AWG) and smaller by continuous color jacket. Identify electrical conductors 4 AWG and larger by continuous color jacket or by colored tape. When identifying conductors with colored tape, mark at least 6 in. of the conductor's insulation with half laps of tape.

2. Provide a solid copper 6 AWG grounding electrode conductor to bond the electrical service equipment to the concrete encased grounding electrode or the ground rod at the service location. Connect the grounding electrode conductor to the ground rod with a UL listed connector in accordance with DMS 11040. Connect the grounding electrode conductor to the concrete encased grounding electrode as shown in the plans.

3. Where two or more circuits are present in one conduit or enclosure, permanently identify the conductors of each branch circuit by attaching a non-metallic tag around both circuit conductors at each accessible location. Provide tags with two straps, large enough to indicate circuit number, letter, or other identification as shown in the plans. Print circuit identification on the tag with a permanent marker.

4. Use listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors for splicing as specified in DMS 11040. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Provide UL listed gel-filled insulating splice covers. Splicing materials, insulating materials, breakaway disconnects, splice covers, and fuse holders are subsidiary to various bid items.

B. CONSTRUCTION METHODS

1. Use only a flat, high tensile strength polyester fiber pull tape for pulling conductors through the conduit system. After installing conductors in conduit, perform conductor pull test. If a conductor cannot be freely pulled, make any needed alterations or repairs at no additional cost to the department. Perform insulation resistance tests in accordance with Item 620. Coordinate with the Engineer to witness the tests.

2. Leave 2 ft. minimum, 3 ft. maximum length for each conductor up to the splice in ground boxes. Leave 3 ft. minimum, 4 ft. maximum length of conductor in ground boxes when pulled through with no splice. Leave 1 ft. minimum, 1.5 ft. maximum length of conductor at enclosures, weatherheads and pole bases.

3. Make splices only in junction boxes, ground boxes, pole bases, or electrical enclosures and use only listed compression or screw type pressure connectors, terminal blocks, or split bolt connectors. Insulate splices with heavy wall heat shrink tubing or gel-filled insulating splice covers to provide a watertight splice. Overlap conductor insulation with heat shrink tubing a minimum of 2 in. past both sides of the splice. Where heat shrink tubing may not shrink sufficiently to provide a watertight seal around the individual conductors, prior to heating the tubing, increase the diameter of the conductor insulation using hot melt adhesive tape to provide a watertight seal between the individual conductors and the heat shrink tubing. Ensure the tape extends past the heat shrink tubing. Use hot melt adhesive tape to fill the gap and seal the ends of heat shrink tubing. Heat shrink tubing that appears to have been burned, or overheated, is considered defective and must be replaced.

4. Size and install gel-filled insulating splice covers according to manufacturer's specifications when used in place of heat shrink tubing.

5. Wire nuts with factory applied waterproof sealant may be used for 8 AWG or smaller conductors in above ground junction boxes, but not in pole bases or ground boxes. Install wire nuts in an upright position to prevent the accumulation of water.

6. Support conductors in illumination poles with a J-hook at the top of the pole.

7. When terminating conductors, remove the insulation and jacketing material without nicking the individual strands of the conductor. Conductors with nicked individual conductor strands or removed strands will be considered damaged.

8. Replace conductors and cables that are damaged beyond repair or that fail an insulation resistance test at no additional cost to the department.

9. Do not repair damaged conductors with duct tape, electrical tape, or wire nuts. Use only approved splicing methods.

10. Do not terminate more than one conductor under a single connector, unless the connector is rated for multiple conductors. Do not exceed the pressure connector's listing for maximum number and size of conductors allowed.

11. Install breakaway connectors on conductors bid under Item 620 whenever those conductors pass through a breakaway support device. Follow manufacturer's instructions when terminating conductors to breakaway connectors. Properly torque threaded connections. Proper terminations are critical to the safe operation of breakaway devices. Trim waterproofing boots on breakaway connectors to fit snugly around the conductor to ensure waterproof connection. Only one conductor may enter a single opening in a boot. Provide waterproof boots with the correct number of openings. Leave unused openings factory sealed. Use prequalified breakaway connectors as shown on the MPL.

12. Provide and install a separate stranded equipment grounding conductor (EGC) in all conduits that contain circuit wiring of 50 volts or more. Unless shown elsewhere, size the EGC to be the same size as the largest current carrying conductor contained in the conduit. Ensure all EGCs are bonded together at every accessible location. For traffic signal installations, provide a minimum size 8 AWG EGC. The EGC is paid for under Item 620.

C. TEMPORARY WIRING

1. Install temporary conductors and electrical equipment in accordance with the NEC article "Temporary Installations" and Department standard sheets.

2. Provide a ground fault circuit interrupter (GFCI) for power outlets for portable electrical equipment, power tools, ice machines, ice storage bins and refrigerators located outdoors at grade. GFCI may be any one of the following: molded cord and plug set, receptacle, or circuit breaker type.

3. Use listed wire nuts with factory applied sealant for temporary wiring where approved.

4. Enclose conductor splices within a listed enclosure or ground box, or ensure the splices are more than 10 ft. above grade vertically and more than 5 ft. horizontally from any metal structure. Where installing temporary conductors in areas subject to vehicle traffic or mobile construction equipment, ensure the vertical clearance to ground is at least 18 ft. when measured at the lowest point. Ground messenger wires that support power conductors in conformance with the NEC.

5. Protect and when necessary repair any existing electrical conduits uncovered during the construction process in a timely manner and in conformance with the NEC.

GROUND RODS & GROUNDING ELECTRODES

A. MATERIAL INFORMATION

1. Provide and install a grounding electrode at electrical services. Provide ground rods according to DMS 11040 and the plans. Larger diameter or longer length rods may be called for in some specific locations, see the individual plans sheets. Concrete encased grounding electrodes may be called for in specific locations including electrical service, see individual plan sheets.

B. CONSTRUCTION METHODS

1. Furnish auxiliary ground rods for lightning protection and install in soil, concrete, or both, as called for in the plans. For ground rods installed in concrete, ensure the connection of the conductor to the ground rod is readily accessible for inspection or repairs. For ground rods installed in soil, ensure that the upper end is between 2 to 4 in. below finished grade.

2. Do not place ground rods in the same drilled hole as a timber pole.

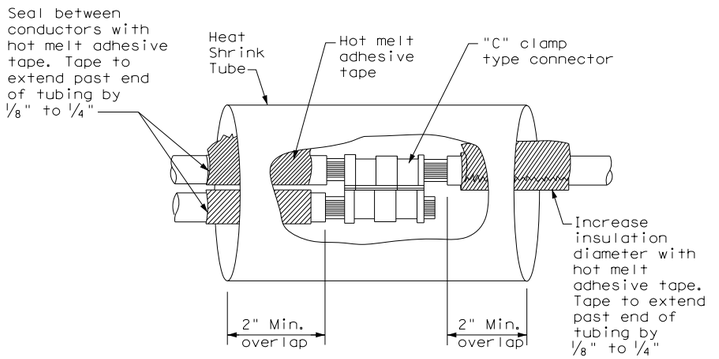
3. Install ground rods so the imprinted part number is at the upper end of the rod.

4. Remove all non-conductive coatings such as concrete splatter from the rod at the clamp location.

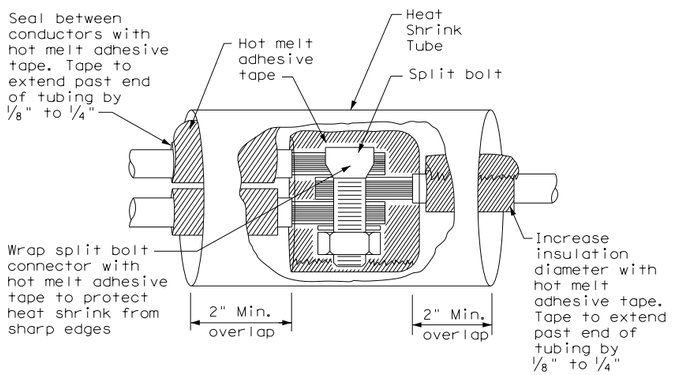
5. Route all conductors as short and straight as possible for connection to lightning protection ground rods. When a bend is required, ensure a minimum radius bend of four inches for these conductors.

6. Unless otherwise called for in the plans, protect grounding electrode conductors with non-metallic conduit. When protecting grounding electrode conductors with metal conduit, provide and install a grounding type bushing and properly sized bonding jumper on each end of the metal conduit.

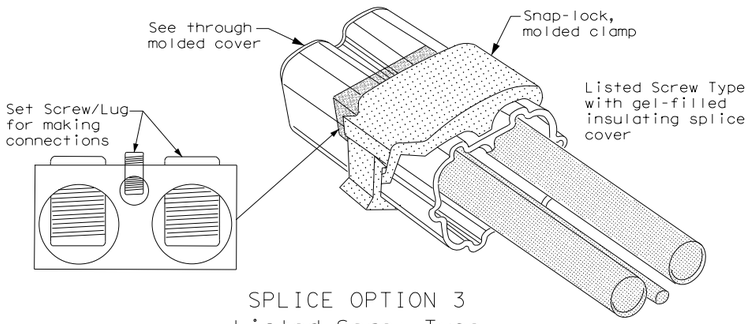
7. Written authorization is required before installing a ground rod in a horizontal trench for rocky soil or a solid rock bottom.



SPLICE OPTION 1
Compression Type



SPLICE OPTION 2
Split Bolt Type



SPLICE OPTION 3
Listed Screw Type

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ELECTRICAL DETAILS
CONDUCTORS

ED(3)-14

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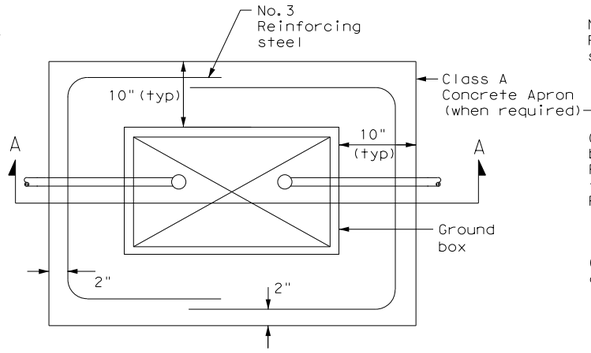
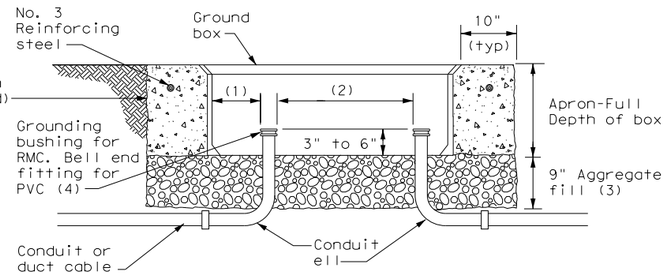


PLAN VIEW



SECTION A - A

APRON FOR GROUND BOX

(1) Uniformly space ends of conduits within the ground box. Position ends of conduits so that ground box walls do not interfere with the installation of grounding bushings or bell end fittings.

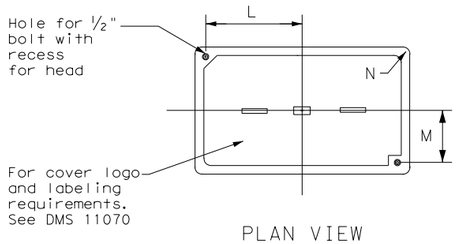
(2) Maintain sufficient space between conduits to allow for proper installation of bushings.

(3) Place aggregate under the box, not in the box. Aggregate should not encroach on the interior volume of the box.

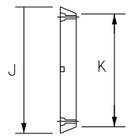
(4) Install a grounding bushing on the upper end of all RMC terminating in a ground box. Ground RMC elbows when any part of the elbow is less than 18 in. below the bottom of the ground box. Install a PVC bushing or bell end fitting on the upper end of all PVC conduits terminating in a ground box.

GROUND BOX DIMENSIONS	
TYPE	OUTSIDE DIMENSIONS (INCHES) (Width x Length X Depth)
A	12 X 23 X 11
B	12 X 23 X 22
C	16 X 29 X 11
D	16 X 29 X 22
E	12 X 23 X 17

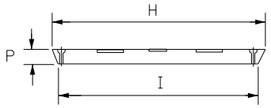
GROUND BOX COVER DIMENSIONS								
TYPE	DIMENSIONS (INCHES)							
	H	I	J	K	L	M	N	P
A, B & E	23 1/4	23	13 3/4	13 1/2	9 7/8	5 1/8	1 3/8	2
C & D	30 1/2	30 1/4	17 1/2	17 1/4	13 1/4	6 3/4	1 3/8	2



PLAN VIEW



END



SIDE

GROUND BOX COVER

GROUND BOXES

A. MATERIALS

1. Provide polymer concrete ground boxes measuring 16x30x24 in. (WxLxD) or smaller in accordance with Departmental Material Specification (DMS) 11070 "Ground Boxes" and Item 624 "Ground Boxes."

2. Provide Type A, B, C, D, and E ground boxes as shown in the plans, and as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 624.

3. Ensure ground box cover is correctly labeled in accordance with DMS 11070.

4. Provide larger ground boxes in accordance with Item 624 and as shown in the plans.

B. CONSTRUCTION METHODS

1. Remove all gravel and dirt from conduit. Cap all conduits prior to placing aggregate and setting ground box. Provide Grade 3 or 4 coarse aggregate as shown on Table 2 of Item 302 "Aggregates for Surface Treatments." Ensure aggregate bed is in place and at least 9 inches deep, prior to setting the ground box. Install ground box on top of aggregate.

2. Cast ground box aprons in place. Reinforcing steel may be field bent. Ensure the depth of concrete for the apron extends from finished grade to the top of the aggregate bed under the box. Ground box aprons, including concrete and reinforcing steel, are subsidiary to ground boxes when called for by descriptive code.

3. Keep bolt holes in the box clear of dirt. Bolt covers down when not working in ground boxes.

4. Install all conduits and ells in a neat and workmanlike manner. Uniformly space conduits so grounding bushings and bell end fittings can easily be installed.

5. Temporarily seal all conduits in the ground box until conductors are installed.

6. Permanently seal conduits immediately after the completion of conductor installation and pull tests. Permanently seal the ends of all conduits with duct seal, expandable foam, or other method as approved. Do not use duct tape as a permanent conduit sealant. Do not use silicone caulk as a sealant.

7. When a ground rod is present in a ground box, bond all equipment grounding conductors together and to the ground rod with listed connectors.

8. When a type B or D ground box is stacked to meet volume requirements, it is allowable to cut an appropriately sized hole for conduit entry in the side wall at least 18 inches below grade.

9. If an existing ground box in the contract has a metal cover, bond the cover to the equipment grounding conductor with a 3 ft. long stranded bonding jumper the same size as the grounding conductor. The bonding jumper is subsidiary to various bid items. Verify existing ground boxes with metal covers are shown on the plans, with notes fully describing the work required.

10. If other ground boxes with metal covers are within the project limits but are not part of the contract, the Engineer may direct the Contractor to bond the metal covers, identifying the specific boxes in writing. This work will be paid for separately.

11. Bond metal ground box covers to the grounding conductor with a tank ground type lug.

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Traffic Operations Division Standard

ELECTRICAL DETAILS
GROUND BOXES

ED(4)-14

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ELECTRICAL SERVICES NOTES

1. Provide new materials. Ensure installation and materials comply with the applicable provisions of the National Electrical Code (NEC) and National Electrical Manufacturers Association (NEMA) standards. Ensure material is Underwriters Laboratories (UL) listed. Provide and install electrical service conduits, conductors, disconnects, contactors, circuit breaker panels, and branch circuit breakers as shown on the Electrical Service Data chart in the plans. Faulty fabrication or poor workmanship in material, equipment, or installation is justification for rejection. Where manufacturers provide warranties and guarantees as a customary trade practice, furnish these to the State.

2. Provide electrical services in accordance with Electrical Details standard sheets, Departmental Material Specification (DMS) 11080 "Electrical Services,"DMS 11081 "Electrical Services-Type A," DMS 11082 "Electrical Services-Type C," DMS 11083 "Electrical Services-Type D," DMS 11084 "Electrical Services-Type T," DMS 11085 "Electrical Services-Pedestal (PS)", and Item 628 "Electrical Services" of the Standard Specifications. Provide electrical service types A, C, and D, as listed on the Material Producers List (MPL) on the Department web site under "Roadway Illumination and Electrical Supplies," Item 628. Provide other service types as detailed on the plans.

3. Provide all work, materials, services, and any incidentals needed to install a complete electrical service as specified in the plans.

4. Coordinate with the Engineer and the utility provider for metering and compliance with utility requirements. Primary line extensions, connection charges, meter charges, and other charges by the utility company to provide power to the location are paid for in accordance with Item 628. Get approval for the costs associated with these charges prior to engaging the utility company to do the work. Consult with the utility provider to determine costs and requirements, and coordinate the work as approved.

5. The enclosure manufacturer will provide Master Lock Type 2 with brass tumblers keyed #2195 for all custom electrical enclosures. Installing Contractor is to provide Master Lock #2195 Type 2 with brass tumblers for "off the shelf" enclosures. Master Lock #2195 keys and locks become property of the State. Unless otherwise approved, do not energize electrical service equipment until locks are installed.

6. Enclosures with external disconnects that de-energize all equipment inside the enclosure do not need a dead front trim. Protect incoming line terminations from incidental contact as required by the NEC.

7. When galvanized is specified for nuts, screws, bolts or miscellaneous hardware, stainless steel may be used.

8. Provide wiring and electrical components rated for 75°C. Provide red, black, and white colored XHHW service entrance conductors of minimum size 6 American Wire Gauge (AWG). Identify size 6 AWG conductors by continuous color jacket. Identify electrical conductors sized 4 AWG and larger by continuous color jacket or by colored tape. Mark at least 6 inches of the conductor's insulation with half laps of colored tape, when identifying conductors. Ensure each service entrance conductor exits through a separately bushed non-metallic opening in the weatherhead. The lengths of the conductors outside the weatherhead are to be 12 inches minimum, 18 inches maximum, or as required by utility.

9. All electrical service conduit and conductors attached to the electrical service including the riser or the elbow below ground are subsidiary to the electrical service. For an underground utility feed, all service conduit and conductors after the elbow, including service conduit and conductors for the utility pole riser when furnished by the Contractor, will be paid for separately.

10. Provide rigid metal conduit (RMC) for all conduits on service, except for the ½ in. PVC conduit containing the electrical service grounding electrode conductor. Size the service entrance conduit as shown in the plans. Ensure conduit for branch circuit entry to enclosure is the same size as that shown on the layout sheets for branch circuit conduit. Extend all rigid metal conduits a minimum of 6 inches underground and then couple to the type and schedule of the conduit shown on the layout for that particular branch circuit. Install a grounding bushing on the RMC where it terminates in the service enclosure.

11. Use of liquidtight flexible metal conduit (LFMC) is allowed between the meter and service enclosure when they are mounted 90 to 180 degrees to each other. Size the LFMC the same size as service entrance conduit. LFMC must not exceed 3 feet in length. Strap LFMC within 1 foot of each end. LFMC less than 12 inches in length need not be strapped. Each end of LFMC must have a grounding bushing or be terminated with a grounding fitting. The LFMC must contain a grounded (neutral) conductor. Ensure any bend in LFMC never exceeds 180 degrees. A pull test is required on all installed conductors, with at least six inches of free conductor movement demonstrated to the satisfaction of the Engineer.

12. Ensure all mounting hardware and installation details of services conform to utility company specifications.

13. For all electrical service enclosures listed under Item 628 on the MPL, the UL 508 enclosure manufacturers will prepare and submit a schematic drawing unique to each service. Before shipment to the job site, place the applicable laminated schematic drawings and the laminated plan sheet showing the electrical service data chart used to build the enclosure in the enclosure's data pocket. The installing contractor will copy and laminate the actual project plan sheets detailing all equipment and branch circuits supplied by that service. The laminated plan sheets are to be placed in the service enclosure's document pocket. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in. before laminating. If the installation differs from the plan sheets, the installing contractor is to redline plan sheets before laminating.

14. When providing an "Off The Shelf" Type D or Type T service, provide laminated plan sheets detailing equipment and branch circuits supplied by that service. Reduce 11 in. x 17 in. plan sheets to 8 ½ in. x 11 in before laminating. Deliver these drawings before completion of the work to the Engineer, instead of placing in enclosure that has no door pocket.

15. Do not install conduit in the back wall of a service enclosure where it would penetrate the equipment mounting panel inside the enclosure. Provide grounding bushings on all metal conduits, and terminate bonding jumpers to grounding bus. Grounding bushings are not required when the end of the metal conduit is fitted with a conduit sealing hub or threaded boss, such as a meter base hub.

SERVICE ASSEMBLY ENCLOSURE

1. Provide threaded hub for all conduit entries into the top of enclosure.

2. Type galvanized steel (GS) enclosures may be used for Type C panelboards and for Type D and T services that do not use an enclosure mounted photocell or lighting contactor. Provide GS enclosures in accordance with DMS 11080, 11082, 11083, and 11084.

3. Provide aluminum (AL) and stainless steel (SS) enclosures for Types A, C, and D in accordance with DMS 11080, 11081, 11082, 11083, and 11084. Do not paint stainless steel.

4. Provide pedestal service (PS) enclosures in accordance with ED(9) and DMS 11080 and 11085. Do not provide GS pedestal services. If GS is shown in the PS descriptive code, provide an AL enclosure.

MAIN DISCONNECT & BRANCH CIRCUIT BREAKERS

1. Field drill flange-mounted remote operator handle if needed, to ensure handle is lockable in both the "On" and "Off" positions.

2. When the utility company provides a transformer larger than 50 KVA, verify that the available fault current is less than the circuit breaker's ampere interrupting capacity (AIC) rating and provide documentation from the electric utility provider to the Engineer.

PHOTOELECTRIC CONTROL

1. Provide photocell as listed on the MPL. Move, adjust, or shield the photocell from stray or ambient night time light to ensure proper operation. Mount photocell facing north when practical. Mount top of pole photocells as shown on Top Mounted Photocell Detail.

* ELECTRICAL SERVICE DATA

Elec. Service ID	Plan Sheet Number	Electrical Service Description	Service Conduit **Size	Service Conductors No./Size	Safety Switch Amps	Main Ckt. Bkr. Pole/Amps	Two-Pole Contractor Amps	Panelbd/ Loadcenter Amp Rating	Branch Circuit ID	Branch Ckt. Bkr. Pole/Amps	Branch Circuit Amps	KVA Load
SB 183	289	ELC SRV TY A 240/480 100(SS)AL(E)SF(U)	2"	3/#2	100	2P/100	100	N/A	Lighting NB	2P/40	26	28.1
									Lighting SB	2P/40	25	
									Underpass	1P/20	15	
NB Access	30	ELC SRV TY D 120/240 060(NS)SS(E)TS(O)	1 ¼"	3/#6	N/A	2P/60		100	Sig. Controller	1P/30	23	5.3
							30		Luminaires	2P/20	9	
									CCTV	1P/20	3	
2nd & Main	58	ELC SRV TY T 120/240 000(NS)GS(N)SP(O)	1 ¼"	3/#6	N/A	N/A	N/A	70	Flashing Beacon 1	1P/20	4	1.0
									Flashing Beacon 2	1P/20	4	

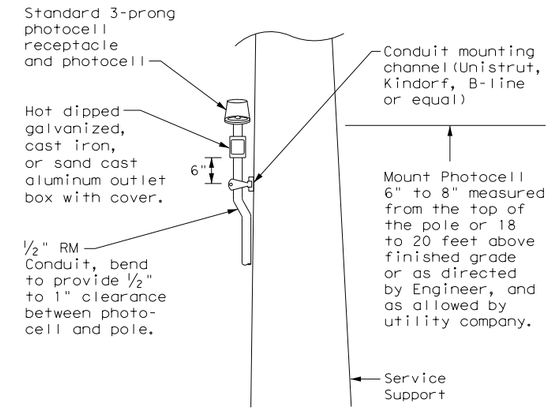
* Example only, not for construction. All new electrical services must have electrical service data chart specific to that service as shown in the plans.

** Verify service conduit size with utility. Size may change due to utility meter requirements. Ensure conduit size meets the National ELectrical Code.

EXPLANATION OF ELECTRICAL SERVICE DESCRIPTIVE CODE

ELEC SERV TY X XXX/XXX XXX (XX) XX (X) XX (X)

- Schematic Type
- Service Voltage V / V
- Disconnect Amp Rating
  000 indicates main lug only/
  Typically Type T
- (SS)= Safety Switch Ahead of Meter-Check with Utility
  (NS)= No safety Switch Ahead of Meter-Check with Utility
- Enclosure Type
  GS= Galvanized steel("off the shelf")
  SS= Stainless steel(Custom Enclosure)See MPL
  AL= Aluminum (Custom Enclosure)See MPL
- Photocell Mounting Location
  (E)= Inside Service/Enclosure Mounted
  (T)= Top of pole
  (L)= Luminaire mounted
  (N)= None/No Photocell or Lighting Contactor Required
- Service Support Type
  GC= Granite concrete
  OC= Other concrete
  TP= Timber pole
  SP= Steel pole
  SF= Steel frame
  OT= Pole by others or paid for separately
  EX= Existing pole
  TS= Service on traffic signal pole
  PS= Pedestal Service
- O= Overhead Service Feed from Utility
  U= Underground Service Feed from Utility



TOP MOUNTED PHOTOCELL

Install conduit strap maximum 3 feet from box. 5 foot maximum spacing between straps supporting conduit.

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ELECTRICAL DETAILS SERVICE NOTES & DATA

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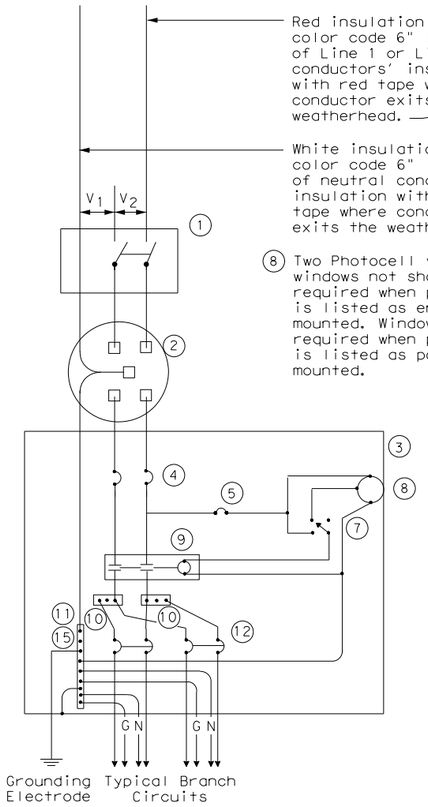
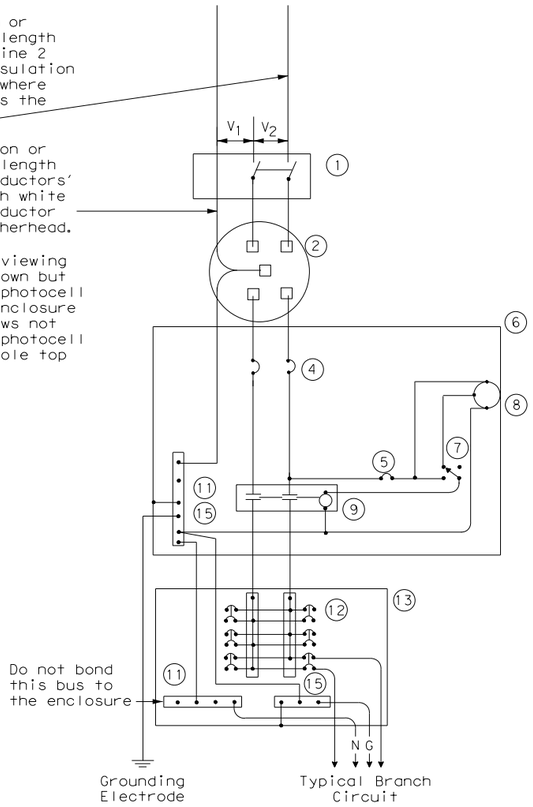
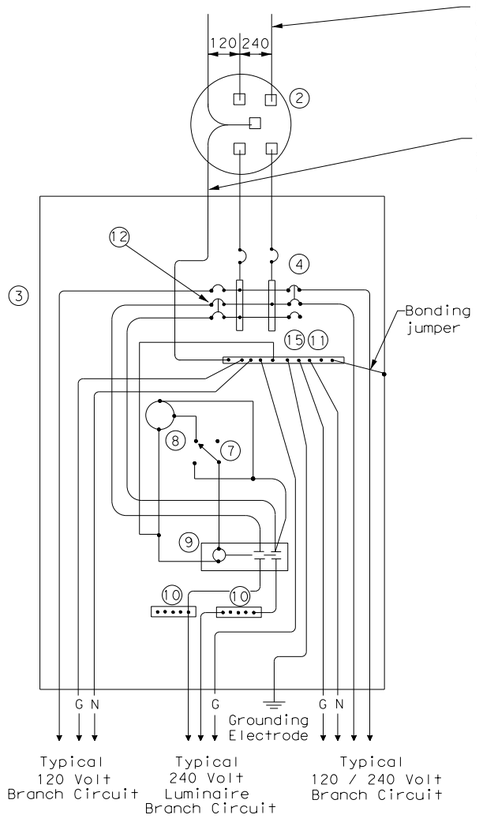


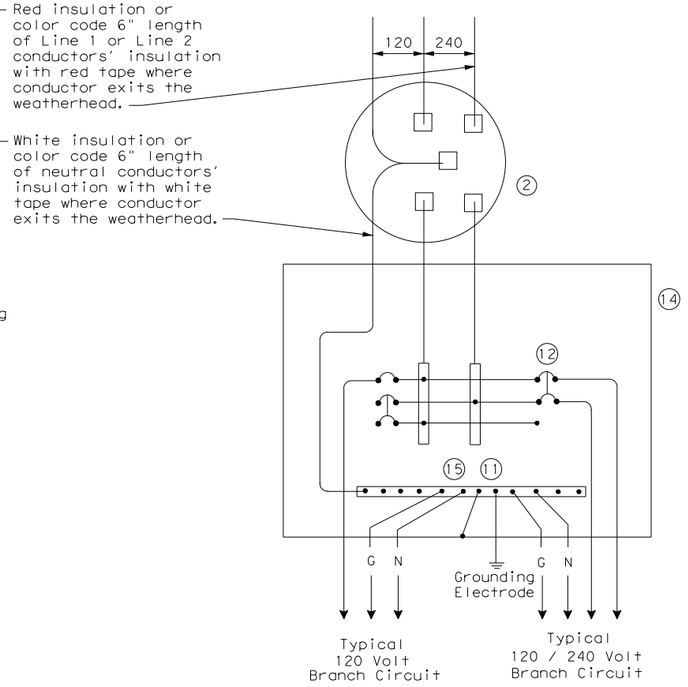
SCHEMATIC TYPE A
THREE WIRE



SCHEMATIC TYPE C
THREE WIRE



SCHEMATIC TYPE D - CUSTOM
120/240 VOLTS - THREE WIRE



SCHEMATIC TYPE T
120/240 VOLTS - THREE WIRE

Galvanized steel-"Buy Off The Shelf" only. When required install photocell top of the pole or on luminaire only, no lighting contractor will be installed.

WIRING LEGEND	
———	Power Wiring
———	Control Wiring
—N—	Neutral Conductor
—G—	Equipment grounding conductor-always required

SCHEMATIC LEGEND	
1	Safety Switch (when required)
2	Meter (when required-verify with electric utility provider)
3	Service Assembly Enclosure
4	Main Disconnect Breaker (See Electrical Service Data)
5	Circuit Breaker, 15 Amp (Control Circuit)
6	Auxiliary Enclosure
7	Control Station ("H-O-A" Switch)
8	Photo Electric Control (enclosure-mounted shown)
9	Lighting Contactor
10	Power Distribution Terminal Blocks
11	Neutral Bus
12	Branch Circuit Breaker (See Electrical Service Data)
13	Separate Circuit Breaker Panelboard
14	Load Center
15	Ground Bus

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ELECTRICAL DETAILS SERVICE ENCLOSURE AND NOTES

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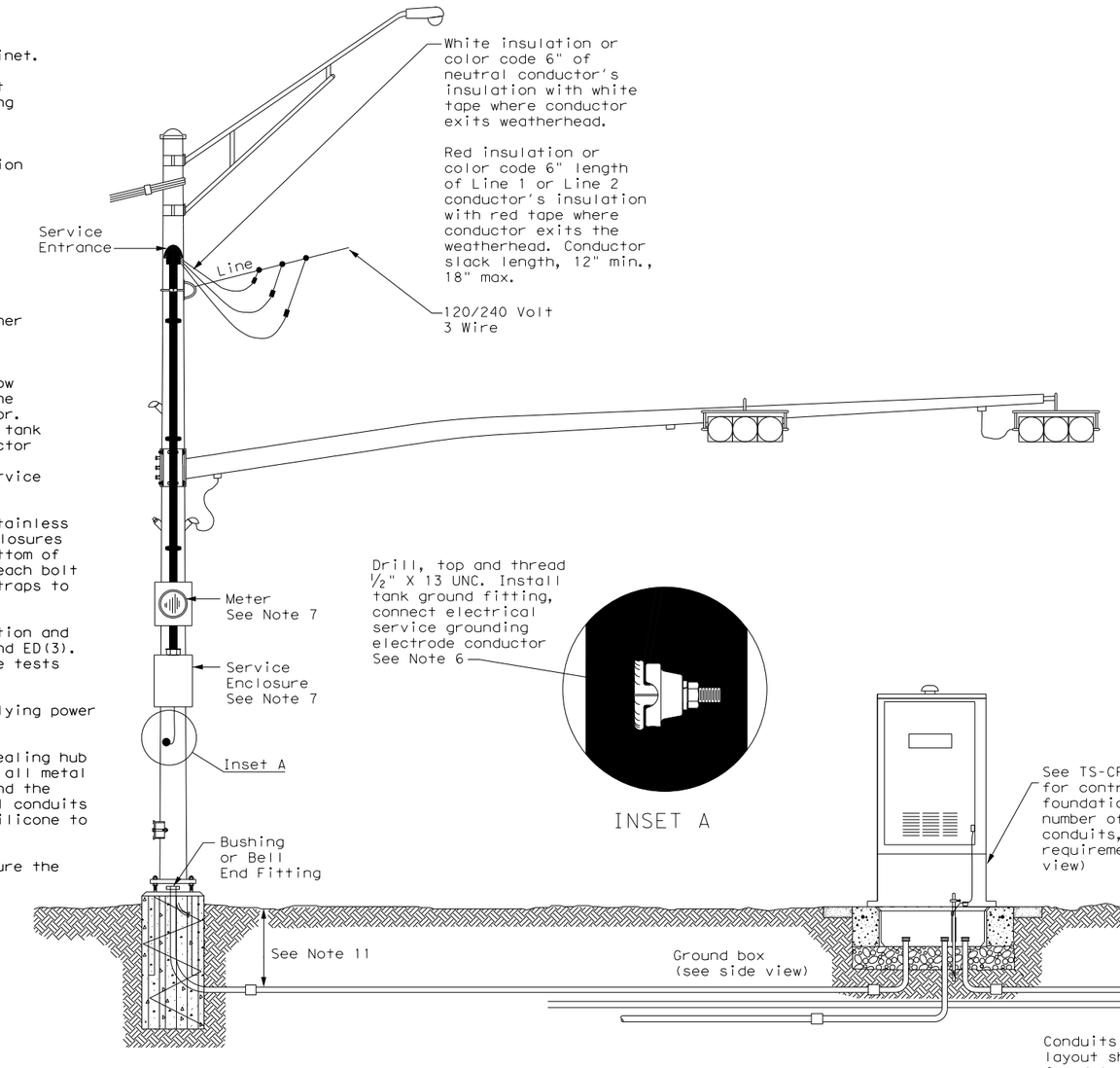
TRAFFIC SIGNAL NOTES

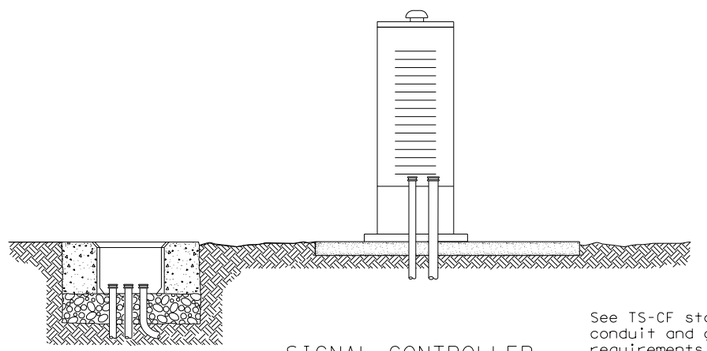
1. Do not pass luminaire conductors through the signal controller cabinet.
2. Include an equipment grounding conductor in all conduits throughout the electrical system. Bond all exposed metal parts to the grounding conductor.
3. Provide roadway luminaires, when required, in accordance with the material and construction sections of Item 610, "Roadway Illumination Assemblies," except for performance testing of luminaires. Test installed roadway luminaires for proper operation as a part of the associated traffic signal system test.
4. If internally illuminated street name signs are approved for use, ground the fixture to the pole with a 12 AWG green XHHW conductor.
5. Bond anchor bolts to rebar cage in two locations using #3 bars or 6 AWG stranded copper conductors. Use listed mechanical connectors rated for embedment in concrete. See TXDOT standard TS-FD for further details.
6. Drill and tap signal poles for ½ in. X 13 UNC tank ground fitting. Provide and install tank ground fitting 4 in. to 6 in. directly below electrical service enclosure. Provide properly sized hole through the bottom of the enclosure for the service grounding electrode conductor. Connect the electrical service grounding electrode conductor to the tank ground fitting. Ensure electrical service grounding electrode conductor is as short and straight as possible from the enclosure to the tank ground fitting. See Inset A detail for further information. Size service entrance conduit and branch circuit conduit as shown in the plans.
7. Mount electrical service enclosure and meter to signal pole with stainless steel bands. Ensure bands are a minimum width of ¾ in. Secure enclosures to bands using two-bolt brackets. Install brackets near top and bottom of each enclosure. Install properly sized stainless steel washers on each bolt in the enclosure. Band or drill and tap properly sized stand-off straps to signal pole for attaching conduit.
8. Conduct pull tests and insulation resistance tests on all illumination and power conductors as required in Item 620 "Electrical Conductors" and ED(3). To prevent electronics damage, do not conduct insulation resistance tests on traffic signal cables after termination.
9. Lock all enclosures and bolt down all ground box covers before applying power to the signal installation.
10. Terminate conduits entering the top of enclosures with a conduit-sealing hub or threaded boss such as meter hub. Install a grounding bushing on all metal conduits not connected to conduit-sealing hub or threaded boss. Bond the grounding bushing to the ground bus with a bonding jumper. Seal all conduits entering enclosures with duct seal or expanding foam. Do not use silicone to seal conduit ends.
11. For all conduits, ensure the burial depth is a minimum of 18". Ensure the minimum burial depth for conduit placed under a roadway is 24".



SIGNAL POLE WITH SERVICE

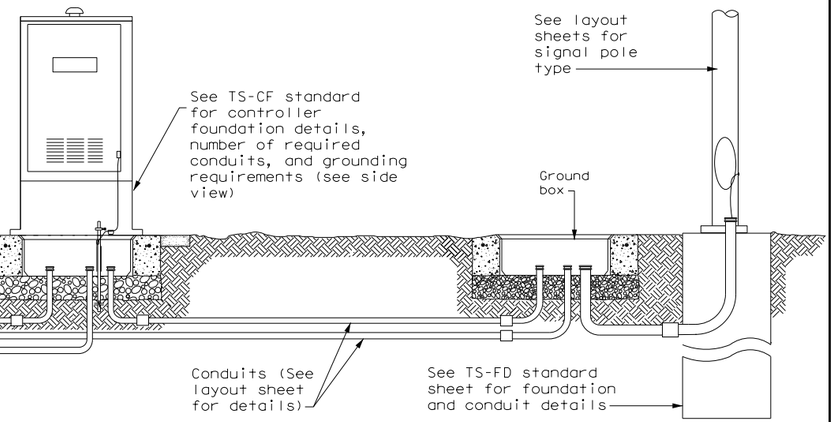
Type T electrical service mounted on signal pole shown as an example. See electrical details, layout sheets, and electrical service data chart for additional details.

INSET A



SIGNAL CONTROLLER SIDE VIEW

See TS-CF standard for conduit and grounding requirements. See layout sheets for ground box locations and any additional conduits that are required.



SIGNAL CONTROLLER FRONT VIEW

SIGNAL POLE

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
TYPICAL TRAFFIC SIGNAL SYSTEM DETAILS
ED(8)-14

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PEDESTAL SERVICE NOTES

1. Manufacture pedestal electrical services in accordance with Departmental Material Specifications (DMS)11080 "Electrical Services", 11085 "Electrical Services-Pedestal (PS)" and Item 628 "Electrical Services. "Provide pedestal electrical services as listed on the Material Producers list (MPL) on the Department's web site under "Roadway Illumination and Electrical Supplies," Item 628. Ensure all mounting hardware and installation details of services meet utility company specifications. Contact the local utility company for approval of pedestal details prior to installing the electrical pedestal service. Submit any changes required by the utility company prior to manufacturing the pedestal enclosure.

2. When a meter socket is required, provide a socket with a minimum 100 amp rating that complies with local utility requirements.

3. Provide Class A or C concrete for pedestal service foundations in accordance with Item 420, "Concrete Substructures," except that concrete will not be paid for directly but is considered subsidiary to Item 628.

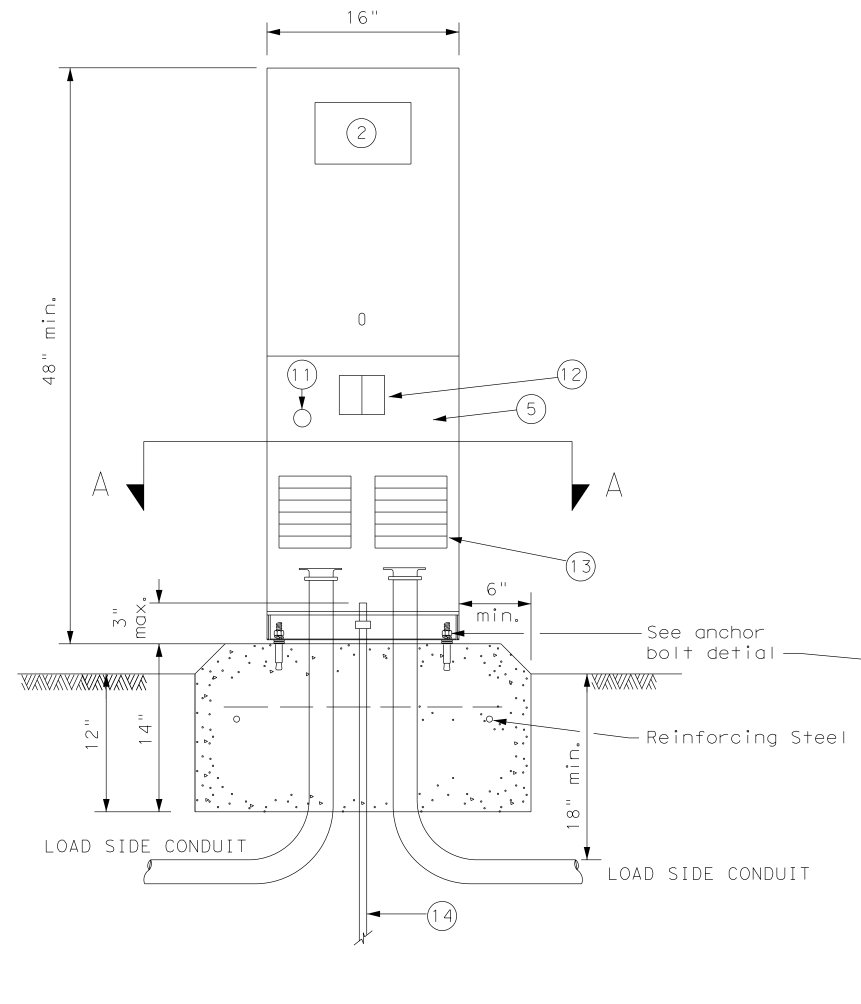
4. Provide #4 reinforcing steel for foundations in accordance with Item 440, "Reinforcement for Concrete."

5. Install 1/2 in. X 2 1/16 in. minimum length concrete single expansion type anchors for mounting pedestal enclosure to foundation. Anchor location to match mounting holes in each corner of enclosure. Secure each of the four corners of the pedestal enclosure to the anchors in the foundation with a 1/2 in. galvanized or stainless steel machine thread bolt, a properly sized locknut and a flat washer.

6. Finish top of concrete foundation in a neat and workmanlike manner. If leveling washers are used, ensure no more than 1/8 in. gap at any corner. Do not exceed a maximum dip or rise in the foundation of 1/8 in. per foot. When properly installed, ensure the top of the service enclosure is level front to back and side to side within 1/4 in. Repair rocking or movement of the service enclosure at no additional cost to the department.

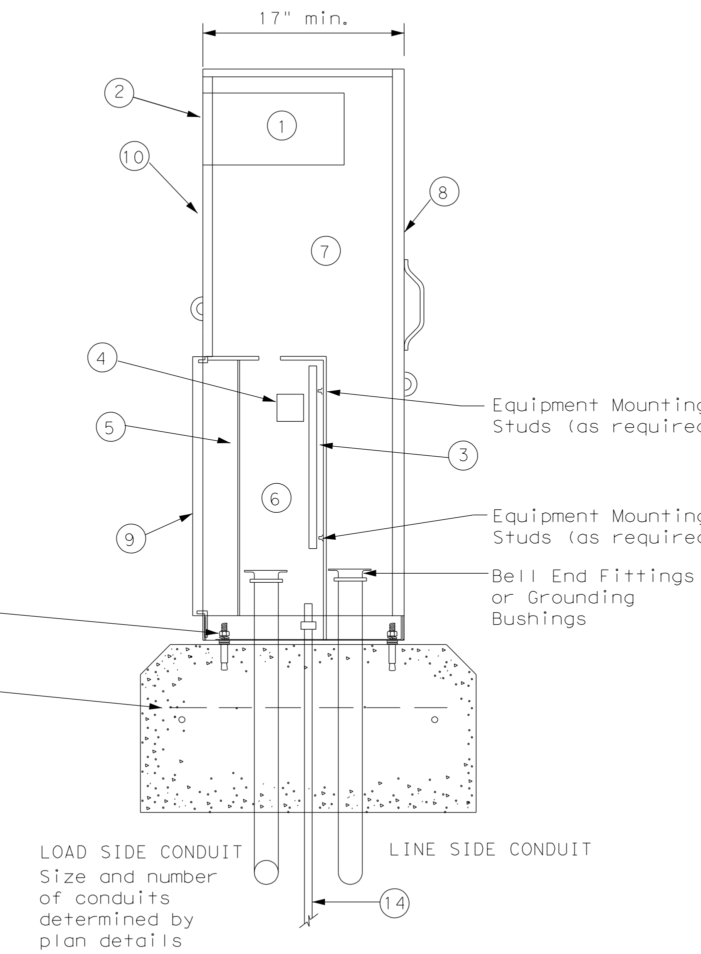
7. Do not use liquidtight flexible metal conduit (LFMC) on pedestal type services.

8. Ensure all elbows in the foundation are sized as per utility provider's conduit requirements for underground conduit and feeders. PVC extensions may be installed provided the ends of the rigid metal conduits are more than 2 in. below the top of the concrete foundation. Where extension conduits are metal, grounding bushings must be installed with a bonding jumper properly terminated.

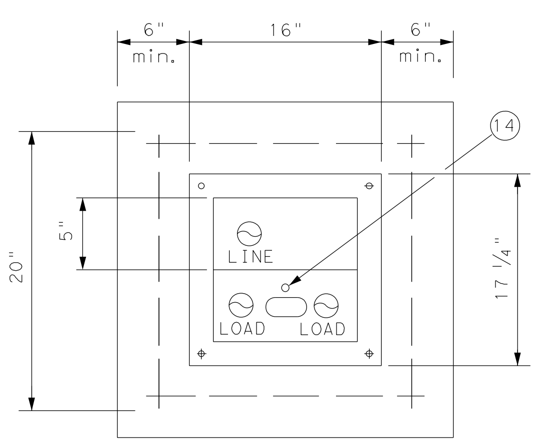


FRONT VIEW

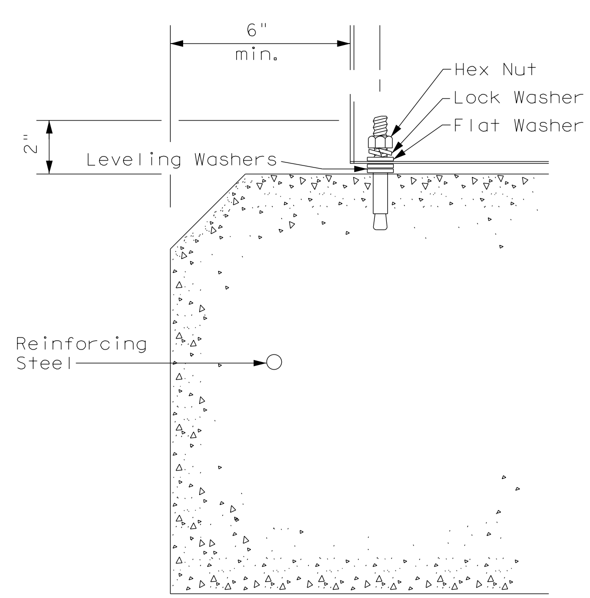
TYPE C shown, TYPE A similar except that TYPE A shall have individual circuit breakers (CB) mounted on an equipment mounting panel. CB Handles shall protrude through hinged deadfront trim.



SIDE VIEW



SECTION A-A



ANCHOR BOLT DETAIL

LEGEND	
1	Meter Socket, (when required)
2	Meter Socket Window, (when required)
3	Equipment Mounting Panel
4	Photo Electric Control Window, (When required)
5	Hinged Deadfront Trim
6	Load Side Conduit Trim
7	Line Side Conduit Area
8	Utility Access Door, with handle
9	Pedestal Door
10	Hinged Meter Access
11	Control Station (H-O-A Switch)
12	Main Disconnect
13	Branch Circuit Breakers
14	Copper Clad Ground Rod - 5/8" X 10'

Texas Department of Transportation

Traffic Operations Division Standard

ELECTRICAL DETAILS
ELECTRICAL SERVICE SUPPORT
PEDESTAL SERVICE TYPE PS

ED(9)-14

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