WILLIAMSON COUNTY, TEXAS

CHANGE ORDER NUMBER: 1

Project:	*1809-261*
Roadway:	*CR 110 Middle*
CSJ Number:	

1. CONTRACTOR: **James Construction Group**
2. Change Order Work Limits: Sta. **207+34** to Sta. **323+50**
3. Type of Change(on federal-aid non-exempt projects): **Minor** (Major/Minor)
4. Reasons: **1A, 3F** (3 Max. - In order of importance - Primary first)
5. Describe the work being revised:

1A: Design Error or Omission. Incorrect PS&E. This Change Order revises items and quantities for the traffic signals. **3F: County Convenience. Additional work desired by the County.** This Change Order adds items for temporary sediment control fencing (install and remove) and documents the credit to the contract for materials (6'x4' box culvert) furnished by the County.

6. Work to be performed in accordance with Items: **see attached**
7. New or revised plan sheet(s) are attached and numbered: **5,14,132,137,137B-C,137E,137G,145,148A**
8. New Special Provisions/Specifications to the contract are attached: ☐ Yes ☑ No
9. New Special Provisions to Item N/A No. N/A, Special Specification Item N/A are attached.

Each signatory hereby warrants that each has the authority to execute this Change Order (CO).

The contractor must sign the Change Order and, by doing so, agrees to waive any and all claims for additional compensation due to any and all other expenses; additional changes for time, overhead and profit; or loss of compensation as a result of this change.

THE CONTRACTOR Date 9/24/19

By: [signature]

Typed/Printed Name: Rick Lewis

Typed/Printed Title: Division Mgr

The following information must be provided

Time Ext. #: **N/A** Days added on this CO: **0**

Amount added by this change order: **$66,291.83**

RECOMMENDED FOR EXECUTION:

[signature] PE 9/30/19
Project Manager Date

N/A
Design Engineer Date

[signature] 9/30/2019
Program Manager Date

City of Austin Program Manager Date

Design Engineer's Seal:

see attached plan sheets

County Commissioner Precinct 1 Date
☐ APPROVED ☐ REQUEST APPROVAL

County Commissioner Precinct 2 Date
☐ APPROVED ☐ REQUEST APPROVAL

County Commissioner Precinct 3 Date
☐ APPROVED ☐ REQUEST APPROVAL

County Commissioner Precinct 4 Date
☐ APPROVED ☐ REQUEST APPROVAL

County Judge Date
☐ APPROVED

WILLIAMSON COUNTY, TEXAS

CHANGE ORDER NUMBER: ***1*** ***Project #*** ***1809-261***

TABLE A: Force Account Work and Materials Placed into Stock

	LABOR	HOURLY RATE			HOURLY RATE
	Costs for additional work tracked by force account.				

TABLE B: Contract Items:

				ORIGINAL + PREVIOUSLY REVISED		ADD or (DEDUCT)	NEW		
ITEM	**DESCRIPTION**	**UNIT**	**UNIT PRICE**	**QUANTITY**	**ITEM COST**	**QUANTITY**	**QUANTITY**	**ITEM COST**	**OVERRUN/ UNDERRUN**
416-6032	DRILL SHAFT (TRF SIG POLE)(36")	LF	$308.83	66.00	$20,382.78	26.00	92.00	$28,412.36	$8,029.58
462-6011	CONC BOX CULV (6' X 4')	LF	$344.50	182.00	$62,699.00	(182.00)	0.00	$0.00	($62,699.00)
462-WC01	CONC BOX CULV (6' X 4')(LESS CREDIT FOR MATERIAL FURNISHED BY COUNTY)	LF	$207.31	0.00	$0.00	182.00	182.00	$37,730.42	$37,730.42
506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	$3.10	0.00	$0.00	15,000.00	15,000.00	$46,500.00	$46,500.00
506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	$0.49	0.00	$0.00	15,000.00	15,000.00	$7,350.00	$7,350.00
681-6001	TEMPORARY TRAFFIC SIGNALS	EA	$5,088.54	0.00	$0.00	1.00	1.00	$5,088.54	$5,088.54
686-6002	INS TRF SIG PL AM (S) ILSN ARM (9')	EA	$1,651.35	1.00	$1,651.35	1.00	2.00	$3,302.70	$1,651.35
686-6007	INS TRF SIG PL AM (S)STR)TY B)	EA	$4,590.91	4.00	$18,363.64	(4.00)	0.00	$0.00	($18,363.64)
686-6008	INS TRF SIG PL AM (S)STR(TY B)LUM	EA	$6,738.39	1.00	$6,738.39	(1.00)	0.00	$0.00	($6,738.39)
686-6020	INS TRF SIG PL AM (S)STR(TY D)LUM	EA	$7,484.00	0.00	$0.00	6.00	6.00	$44,904.00	$44,904.00
6090-6002	ILSN (LED)(8D)	EA	$2,838.97	1.00	$2,838.97	1.00	2.00	$5,677.94	$2,838.97
TOTALS					$112,674.13			$178,965.96	$66,291.83

CHANGE ORDER REASON(S) CODE CHART

1. Design Error or Omission	1A. Incorrect PS&E 1B. Other
2. Differing Site Conditions (unforeseeable)	2A. Dispute resolution (expense caused by conditions and/or resulting delay) 2B. Unavailable material 2C. New development (conditions changing after PS&E completed) 2D. Environmental remediation 2E. Miscellaneous difference in site conditions (unforeseeable)(Item 9) 2F. Site conditions altered by an act of nature 2G. Unadjusted utility (unforeseeable) 2H. Unacquired Right-of-Way (unforeseeable) 2I. Additional safety needs (unforeseeable) 2J. Other
3. County Convenience	3A. Dispute resolution (not resulting from error in plans or differing site conditions) 3B. Public relations improvement 3C. Implementation of a Value Engineering finding 3D. Achievement of an early project completion 3E. Reduction of future maintenance 3F. Additional work desired by the County 3G. Compliance requirements of new laws and/or policies 3H. Cost savings opportunity discovered during construction 3I. Implementation of improved technology or better process 3J. Price adjustment on finished work (price reduced in exchange for acceptance) 3K. Addition of stock account or material supplied by state provision 3L. Revising safety work/measures desired by the County 3M. Other
4. Third Party Accommodation	4A. Failure of a third party to meet commitment 4B. Third party requested work 4C. Compliance requirements of new laws and/or policies (impacting third party) 4D. Other
5. Contractor Convenience	5A. Contractor exercises option to change the traffic control plan 5B. Contractor requested change in the sequence and/or method of work 5C. Payment for Partnering workshop 5D. Additional safety work/measures desired by the contractor 5E. Other
6. Untimely ROW/Utilities	6A. Right-of-Way not clear (third party responsibility for ROW) 6B. Right-of-Way not clear (County responsibility for ROW) 6C. Utilities not clear 6D. Other

Williamson County Road Bond Program

CR 110 Middle
Williamson County Project No. 1809-261

Change Order No. 1

Reason for Change

This Change Order revises items and quantities related to the traffic signals, adds items for temporary sediment control fencing (install and remove) and credits the contract for materials (6' x 4' box culvert) furnished by the County.

Type D signal poles replaces the Type B signal poles originally called out in the plans. The Type B poles are not sufficient for the length of the mast arm. The Type D poles require deeper drill shaft foundations, adding quantity to the drill shafts. Additionally, street name signs will be added to the signals at Limmer Loop.

Item 681-6001 Temporary Traffic Signals is added to the contract to compensate the Contractor to maintain the traffic signals during the construction of the project. This Item was not originally included in the contract.

The bid tab did not include a pay item for the installation and removal of temporary sediment control fence (silt fence). These items were added to reduce erosion during construction. This Change Order adds Item 506-6038 Temporary Sediment Control Fence (Install) and Item 506-6039 Temporary Sediment Control Fence (Remove) to the contract.

The County furnished 165.5 feet of 6' x 4' Box Culvert precast materials for the project. The precast materials were called out to be installed on the previous CR 110 South contract, but due to right of way acquisition issues the culvert could not be installed. The County retained possession of the box culverts, from the previous contract. The bid price submitted by the Contractor included the full cost for furnishing and installing the box culvert. Since the County furnished the materials, a credit is due the County. This Change Order documents the credit to the County for the materials furnished.

Following is a summary of the new items required for this change order.

ITEM	DESCRIPTION	QTY	UNIT
462-WC01	CONC BOX CULV (6' X 4') (LESS CREDIT FOR MATERIAL FURNISHED BY COUNTY)	182.00	LF

506-6038	TEMPORARY SEDIMENT CONTROL FENCE (INSTALL)	15000.00	LF
506-6039	TEMPORARY SEDIMENT CONTROL FENCE (REMOVE)	15000.00	LF
681-6001	TEMPORARY TRAFFIC SIGNALS	1.00	EACH
686-6020	INS TRF SIG PL AM (S)STR(TY D)LUM	6.00	EACH

This Change Order results in a net increase of $66,291.83 to the Contract amount, for an adjusted Contract total of $8,977,154.56. The original Contract amount was $8,910,862.73. As a result of this and all Change Orders to-date, $66,291.83 has been added to the Contract, resulting in a .74% net increase in the Contract cost. Zero (0) additional days will be added to the Contract as a result of this Change Order.

HNTB Corporation

James Klotz, P.E.

Dawn Haggard

From: Clayton Weber
Sent: Thursday, June 06, 2019 4:47 PM
To: Amber Basonic
Cc: James Klotz; 62811_1809-261_CR110Middle; David Thomas; Eddie R. Church
Subject: RE: CR 110 Middle BC invoice

We are in agreement with the proposal to add a deductive line for the material credit to the County for the 165.5 LF at $150.87. We will probably add two lines as you describe.

Clayton K. Weber
Construction Manager
Tel (512) 539-9342 **Email** cweber@hntb.com

From: Amber Basonic <ABasonic@prim.com>
Sent: Thursday, June 6, 2019 9:30 AM
To: Clayton Weber <cweber@HNTB.com>
Cc: James Klotz <jklotz@HNTB.com>; 62811_1809-261_CR110Middle <34275_RB_CR110?Middle_KHA?@HNTB.com>; David Thomas <dathomas@HNTB.com>; Eddie R. Church <erchurch@HNTB.com>
Subject: RE: CR 110 Middle BC invoice

Clayton,

As only 165.5 LF of the Chasco boxes were available for use, and our contract quantity is 182 LF, please confirm my understanding of your proposition, below.

Original Contract:

ITEM	QTY	UP	TOTAL
6x4 RCB	182 LF	344.50	$62,699

Mat'l Credit to County:

ITEM	QTY	UP	TOTAL	
6x4 RCB	165.5 LF	(150.87)	($24,968.99)	*This would be the net savings to the County.

Revised Contract (CO Item)

ITEM	QTY	UP	TOTAL
6x4 RCB	182 LF	207.31	$37,730.01

This change can be reflected as a new deductive line for a material credit to the County of ($24,968.99), or as two lines, one reducing the existing bid item to 0 LF and the second, a new item with the revised UP of $207.31.

If my understanding as described above is correct, JCG is agreeable to the change proposed. JCG is not agreeable to reducing the unit price for all 182 LF by $150.87/LF. Please advise.

Thank you,

Amber Basonic
James Construction Group
C: (254) 718-8755
www.prim.com

"No business objective is so important that it will be pursued at the sacrifice of safety."

From: Clayton Weber [mailto:cweber@HNTB.com]
Sent: Wednesday, June 05, 2019 4:50 PM
To: Amber Basonic <ABasonic@prim.com>
Cc: James Klotz <jklotz@HNTB.com>; 62811_1809-261_CR110Middle <34275_RB_CR110?Middle_KHA?@HNTB.com>; David Thomas <dathomas@HNTB.com>; Eddie R. Church <erchurch@HNTB.com>
Subject: CR 110 Middle BC invoice

EXTERNAL EMAIL

Chasco's cost for the 6 x 4 box culvert sections is $150.87. We can accept this deduction to JCG bid price if this is acceptable.

Clayton K. Weber
Construction Manager
Tel (512-744-9082 **Cell** (512) 539-9342 **Email** cweber@hntb.com
HNTB CORPORATION
101 E. Old Settlers Blvd, Ste 100 | Round Rock, Texas 78664 | hntb.com

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5880 West Highway 190
Belton, Texas 76513
Job Phone: (254) 939-8610
Job Fax: (254) 939-8611

Primoris Services Corporation
James Construction Group

6/11/2019

JCG Letter# 10743-03

Eddie Church, P.E.
HNTB CORPORATION
101 E Old Settlers Blvd Suite 100
Round Rock, TX 78664

WILLIAMSON Co. - CR 110 MIDDLE SECTION
Job #: 1809-261
RE: Change Order Pricing/Req for Change Order(Signal Items)

Dear Mr. Church:

James Construction Group respectfully submits the following new item change order pricing for consideration:

CO ITEM	BID ITEM	DESCRIPTION	QTY CHANGE	UM	UP	TOTAL
4	0686 6020	INS TRF SIG PL AM (S)STR(TY D)LUM	6.00	EA	7,484.00	44,904.00
5	0681 6001	TEMPORARY TRAFFIC SIGNAL	1.00	EA	5,088.54	5,088.54

When compared to the March 2019 Statewide average low bid prices (item not listed in Austin District's current average low bid data), James Construction Group's price for Item 0686 6020 INS TRF SIG PL AM (S)STR(TY D)LUM is 25% higher than the average low bid and item 0681 6001 TEMPORARY TRAFFIC SIGNAL is 88% below the statewide average low bid. The higher than average unit price for the TY D STRAIN poles is a result of lower quantities than those used to calculate the average low bid. The lower than average unit price for the TEMPORARY SIGNAL at University is because no materials are anticipated to be used. This price is for the scope described in the contract documents including moving the signal heads for the three movements of traffic during construction of the University Blvd culvert crossing, maintenance and 24-Hour On-Call support during the course of construction.

When combined with the other signal item changes generated by responses to RFIs 10743-01 (Foundation Depths), 10743-02 (Add Pole C1 to Quantity), 10743-03 (Bid Item Omission (Temp Signal)), 10743-11 (ILSN at Limmer Loop Facing South), and 10743-12 (ILSN Arm Standard & Clamp Type), the proposed change order should reflect the below:

CO ITEM	BID ITEM	DESCRIPTION	QTY CHANGE	UM	UP	TOTAL
1	0416 6032	DRILL SHAFT (TRF SIG POLE)(36")	26.00	LF	308.83	8,029.58
2	0686 6007	INS TRF SIG PL AM (S)STR(TY B)	(4.00)	EA	4,590.91	(18,363.64)
3	0686 6008	INS TRF SIG PL AM (S)STR(TY B)LUM	(1.00)	EA	6,738.39	(6,738.39)
4	0686 6020	INS TRF SIG PL AM (S)STR(TY D)LUM	6.00	EA	7,484.00	44,904.00
5	0681 6001	TEMPORARY TRAFFIC SIGNAL	1.00	EA	5,088.54	5,088.54
6	0686 6002	INS TRF SIG PL AM (S) ILSN ARM (9')	1.00	EA	1,651.35	1,651.35
7	6090 6002	ILSN (LED)(8D)	1.00	EA	2,838.97	2,838.97
						$37,410.41

Please also let this change order acknowledge added Sheet 148A and revised Sheets 5, 132 (previously only redlined), 137, (previously only redlined), 137B, 137C, 137E, 137G and 145.

Respectfully yours,
James Construction Group

Amber Basonic
Project Manager

5880 W HWY 190
BELTON, TEXAS 76513
Job Phone: (254) 939-8610
Job Fax: (254) 939-8611

Primoris Services Corporation
James Construction Group

5/02/2019

JCG Letter# 10743-01

Eddie Church, P.E.
HNTB CORPORATION
101 E Old Settlers Blvd Suite 100
Round Rock, TX 78664

WILLIAMSON Co. - CR 110 MIDDLE SECTION
Job #: 1809-261
RE: Change Order Pricing – Add Temporary Sediment Control Fence Items

Dear Mr. Church:

James Construction Group respectfully submits the following change order item pricing for consideration:

BID ITEM	ITEM DESCRIPTION	QUANTITY	UM	UNIT PRICE	TOTAL
506 6038	TEMP SEDMT CONT FENCE (INSTALL)	15,000	LF	$3.10	$46,500.00
506 6039	TEMP SEDMT CONT FENCE (REMOVE)	15,000	LF	$.49	$7,350.00

As described in RFI 10743-14 Erosion Control - Add TSCF, temporary sediment control fence was omitted from the contract quantities, but is called out in the project Storm Water Pollution Prevention Plan.

When compared to the March 2019 average low bid prices for TxDOT's Austin District, James Construction Group's price for Item 506 6038 TEMP SEDMT CONT FENCE (INSTALL) is 15% higher than the average low bid and Item 506 6039 TEMP SEDMT CONT FENCE (REMOVE) is 14% higher than the average low bid. The higher unit prices are a result of lower quantities than those used to calculate the average low bid prices.

Respectfully yours,
James Construction Group

Amber Basonic
Project Manager

CC: Project files

FILENAME: G:\068501503*CR 110\Design\CR110summ02.dgn
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SIGNING AND PAVEMENT MARKINGS SUMMARY

SPEC ITEM #	0644 6002	0644 6060	0644 6061	0644 6068	0644 6071	0644 6076	0658 6008	0658 6046	0666 6036	0666 6048	0666 6054	0666 6078	0666 6147	0666 6303	0666 6312	0666 6315	0672 6007	0672 6009
ITEM DESCRIPTION	IN SM RD SN SUP&AM TY10BWG(1) SA(P-BM)	IN SM RD SN SUP&AM TYTWT(1) WS(P)	IN SM RD SN SUP&AM TYTWT(1) WS(T)	RELOCATE SM RD SN SUP&AM TY 10BWG	RELOCATE SM RD SN SUP&AM TY TWT	REMOVE SM RD SN SUP&AM	INSTL DEL ASSM (D-SW)SZ1 (FLX)(GF2)(BI)	INSTL OM ASSM (OM-2X)(WC) GND	REFL PAV MRK TY I (W) 8" (SLD) (100MIL)	REFL PAV MRK TY I (W) 24" (SLD) (100MIL)	REFL PAV MRK TY I (W) (ARROW) (100MIL)	REFL PAV MRK TY I (W) (WORD) (100MIL)	REFL PAV MRK TY I (Y) 24"(SLD) (100MIL)	RE PM W/RET REQ TY 1(W)4" (SLD)(100MIL)	RE PM W/RET REQ TY I (Y) 4" (BRK) (100MIL)	RE PM W/RET REQ TY I (Y) 4" (SLD)(100MIL)	REFL PAV MRKR TY I-C	REFL PAV MRKR TY II-A-A
UNITS	EA	EA	EA	EA	EA	EA	EA	EA	LF	LF	EA	EA	LF	LF	LF	LF	EA	EA
SIGNING AND PAVEMENT MARKINGS																		
SHEET 1 OF 5	0	5	0	0	1	1	0	4	284	0	1	1	0	3572	1050	4937	15	165
SHEET 2 OF 5	1	5	2	1	0	4	12	15	0	15	0	0	0	2319	1160	4638	0	116
SHEET 3 OF 5	1	5	0	0	0	0	3	5	0	40	0	0	0	2397	1200	4811	0	120
SHEET 4 OF 5	0	2	3	4	0	11	3	8	1518	104	8	8	0	5387	680	6544	80	187
SHEET 5 OF 5	3	13	1	0	0	2	0	4	1337	298	0	0	90	2892	460	4994	0	117
SHEET 6 OF 6	0	4	2	1	0	3	8	2	1540	75	6	6	0	4300	0	5710	80	280
TOTAL	5	34	8	6	1	21	26	38	4679	532	15	15	90	20867	4550	31634	175	985

SIGNAL SUMMARY

SPEC ITEM #	0416 6032	0618 6046	0618 6053	0620 6007	0620 6008	0620 6009	0620 6010	0624 6010	0625 6003	0628 6213	0636 6001	0680 6002	0680 6004	0682 6001	0682 6002	0682 6003	0682 6004	0682 6005
ITEM DESCRIPTION	DRILL SHAFT (TRF SIG POLE (36 IN)	CONDT (PVC) (SCH 80) (2")	CONDT (PVC) (SCH 80) (3")	ELEC CONDR (NO. 8) BARE	ELEC CONDR (NO. 8) INSULATED	ELEC CONDR (NO. 6) BARE	ELEC CONDR (NO. 6) INSULATED	GROUND BOX TY D (162922) W/APRON	ZINC-COAT STL WIRE STRAND (3/8")	ELC SRV TY D 120/240 100(NS)AL (E)PS(U)	ALUMINUM SIGNS (TY A)	INSTALL HWY TRF SIG (ISOLATED)	REMOVING TRAF SIGNALS	VEH SIG SEC (12") LED (GRN)	VEH SIG SEC (12") LED (GRN ARW)	VEH SIG SEC (12") LED (YEL)	VEH SIG SEC (12") LED (YEL ARW)	VEH SIG SEC (12") LED (RED)
UNITS	LF	LF	LF	LF	LF	LF	LF	EA	LF	EA	SF	EA	EA	EA	EA	EA	EA	EA
CR110/UNIVERSITY	31	30	15	125	1390				760		26	1	1	8	6	8	6	8
CR110/LIMMER LOOP	61	245	45	160	1900	130	816	1	1024	1		1		8	5	8	9	8
TOTAL	92	275	60	285	3290	130	816	1	1784	1	26	2	1	16	11	16	15	16

△1

* FOR CONTRACTORS INFORMATION ONLY
SUBSIDIARY TO ITEM 680

SIGNAL SUMMARY CONT.

SPEC ITEM #	0682 6006	0682 6023	0682 6024	0682 6025	0684 6008	0684 6031	0684 6033	0684 6049	0686 6001	0686 6002	0686 6007	0686 6008	0686 6020	6002 6001	6002 6002	6002 6003
ITEM DESCRIPTION	VEH SIG SEC (12") LED (RED ARW)	BACK PLATE (12") (3 SEC)	BACK PLATE (12") (4 SEC)	BACK PLATE (12") (5 SEC)	TRF SIG CBL (TY A) (12 AWG) (3 CONDR)	TRF SIG CBL (TY A) (14 AWG) (5 CONDR)	TRF SIG CBL (TY A) (14 AWG) (7 CONDR)	TRF SIG CBL (TY A) (16 AWG) (3 CONDR)	INS TRF SIG PL AM (S)ILSN ARM(7')	INS TRF SIG PL AM (S)ILSN ARM(9'	INS TRF SIG PL AM (S)STR(TY B)	INS TRF SIG PL AM (S)STR(TY B)LUM	INS TRF SIG PL AM (S) STR(TY D)LUM	VIVDS PROCESSOR SYSTEM	VIVDS CAMERA ASSEMBLY	VIVDS SET-UP SYSTEM
UNITS	EA	EA	EA	EA	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	EA
CR110/UNIVERSITY	4	10	2		685	720	1005					0	2			1
CR110/LIMMER LOOP		7	4	1	930	1062	1039	1392	2	2	0		4	1	4	1
TOTAL	4	17	6	1	1615	1782	2044	1392	2	2	0	0	6	1	4	2

△2

△1 ADJUSTED SIGNAL FOUNDATION QTY
△2 ADDITIONAL ILSN

SIGNAL SUMMARY CONT.

SPEC ITEM #	6002 6004	6002 6005	6057 6001	6089 6001	6090 6001	6090 6002	CORR 001	CORR 002	CORR 003	CORR 004	CORR 005	CORR 006	CORR 007
ITEM DESCRIPTION	VIVDS CENTRAL CONTROL	VIVDS COMMUNICATION CABLE (COAXIAL)	RADAR ADVANCED DETECTION DEVICE	ETHERNET CABLE AND CONNECTORS	ILSN (LED) (6D)	ILSN (LED) (8D)	BATTERY BACK-UP SYSTEM	HARDENED ETHERNET SWITCH	5.8 GHz WIRELESS ETHERNET RADIO	OPTICOM DETECTOR GTT MODEL 722	OPTICOM PHASE SELECTOR GTT MODEL 764	OPTICOM CARD RACK GTT MODEL 760	OPTICOM CABLE GTT MODEL 138
UNITS	EA	LF	EA	LF	EA	EA	EA	EA	EA	EA	EA	EA	LF
CR110/UNIVERSITY		930	2										335
CR110/LIMMER LOOP	1	1392	2	60	2	2	1	1	1	2	1	1	455
TOTAL	1	2322	4	60	2	2	1	1	1	2	1	1	790

△2

CR 110 (MIDDLE SECTION)

QUANTITY SUMMARIES

SHEET 2 OF 3

DES: ASH	WILLIAMSON COUNTY JOB NO.	SHEET NO.
CK: TAN		5

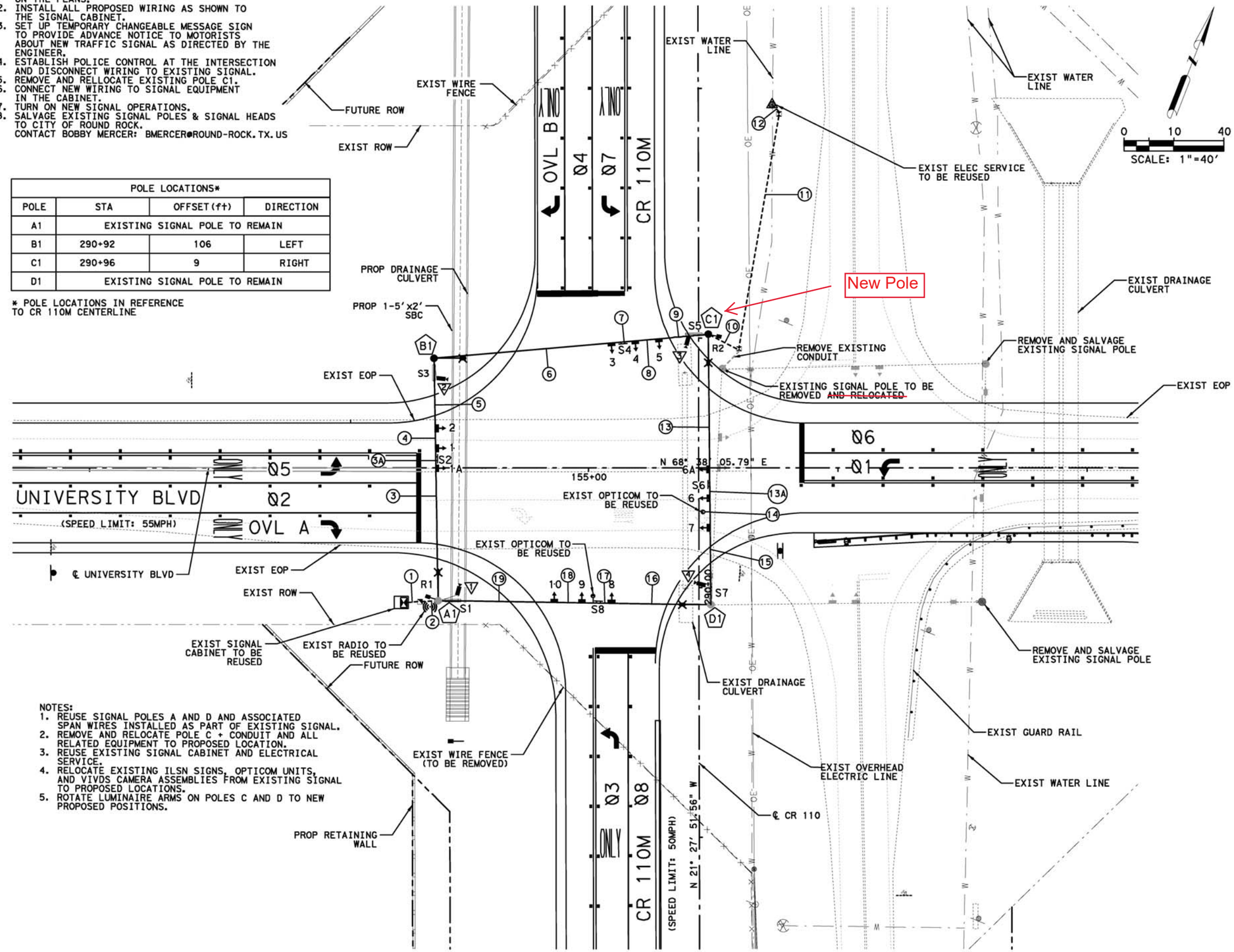
FILENAME: G:\068501503*CR 110\Design\CR110Msig02.dgn
PLOTTED: 10/29/2018 8:49:54 AM

SEQUENCE OF CONSTRUCTION

1. INSTALL TRAFFIC SIGNAL EQUIPMENT AS SHOWN ON THE PLANS.
2. INSTALL ALL PROPOSED WIRING AS SHOWN TO THE SIGNAL CABINET.
3. SET UP TEMPORARY CHANGEABLE MESSAGE SIGN TO PROVIDE ADVANCE NOTICE TO MOTORISTS ABOUT NEW TRAFFIC SIGNAL AS DIRECTED BY THE ENGINEER.
4. ESTABLISH POLICE CONTROL AT THE INTERSECTION AND DISCONNECT WIRING TO EXISTING SIGNAL.
5. REMOVE AND RELLOCATE EXISTING POLE C1.
6. CONNECT NEW WIRING TO SIGNAL EQUIPMENT IN THE CABINET.
7. TURN ON NEW SIGNAL OPERATIONS.
8. SALVAGE EXISTING SIGNAL POLES & SIGNAL HEADS TO CITY OF ROUND ROCK.
CONTACT BOBBY MERCER: BMERCER@ROUND-ROCK.TX.US

POLE LOCATIONS*			
POLE	STA	OFFSET (ft)	DIRECTION
A1	EXISTING SIGNAL POLE TO REMAIN		
B1	290+92	106	LEFT
C1	290+96	9	RIGHT
D1	EXISTING SIGNAL POLE TO REMAIN		

* POLE LOCATIONS IN REFERENCE TO CR 110M CENTERLINE



NOTES:
1. REUSE SIGNAL POLES A AND D AND ASSOCIATED SPAN WIRES INSTALLED AS PART OF EXISTING SIGNAL.
2. REMOVE AND RELOCATE POLE C + CONDUIT AND ALL RELATED EQUIPMENT TO PROPOSED LOCATION.
3. REUSE EXISTING SIGNAL CABINET AND ELECTRICAL SERVICE.
4. RELOCATE EXISTING ILSN SIGNS, OPTICOM UNITS, AND VIVDS CAMERA ASSEMBLIES FROM EXISTING SIGNAL TO PROPOSED LOCATIONS.
5. ROTATE LUMINAIRE ARMS ON POLES C AND D TO NEW PROPOSED POSITIONS.

LEGEND

- STRAIN POLE
- EXIST SIGNAL POLE
- SIGNAL HEAD & LABEL
- EXIST VIVDS CAMERA
- EXIST ELECTRICAL SERVICE
- EXIST SIGNAL CABINET
- EXIST TYPE A GROUND BOX
- EXIST TYPE D GROUND BOX
- EXIST ILSN SIGN
- EXIST RADIO
- EXIST CONDUIT-TRENCHED
- SIGNAL POLE LABEL
- VIVDS LABEL
- CONDUIT LABEL
- LUMINAIRE
- OPTICOM
- PROP SIGN
- EXIST GAS LINE
- EXIST OVERHEAD ELECTRIC
- EXIST STORM SEWER
- EXIST WATER LINE
- EXIST WASTE WATER LINE
- FIRE HYDRANT
- VALVE
- RIGHT OF WAY
- FENCE LINE
- EXISTING SIGN
- RADAR DETECTOR

STATE OF TEXAS
SANTIAGO A. ARAGUE ROJAS
125247
LICENSED PROFESSIONAL ENGINEER

10/29/2018

Kimley»Horn F-928

CR 110M AND UNIVERSITY BLVD TRAFFIC SIGNAL

PROPOSED SIGNAL LAYOUT

DES: BTS	WILLIAMSON COUNTY JOB NO.	SHEET NO.
CK: SAA		132

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ESTIMATED QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
0416	6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	31
0618	6046	CONDT (PVC) (SCH 80) (2")	LF	30
0618	6053	CONDT (PVC) (SCH 80) (3")	LF	15
0620	6007	ELEC CONDR (NO.8) BARE	LF	125
0620	6008	ELEC CONDR (NO.8) INSULATED	LF	1,390
0625	6003	ZINC-COAT STL WIRE STRAND (3/8")	LF	760
0636	6001	ALUMINUM SIGNS (TY A)+	SF	26 +
0680	6002	INSTALL HWY TRF SIG (ISOLATED)	EA	1
0680	6004	REMOVING TRAFFIC SIGNALS	EA	1
0682	6001	VEH SIG SEC (12")LED(GRN)	EA	8
0682	6002	VEH SIG SEC (12")LED(GRN ARW)	EA	6
0682	6003	VEH SIG SEC (12")LED(YEL)	EA	8
0682	6004	VEH SIG SEC (12")LED(YEL ARW)	EA	6
0682	6005	VEH SIG SEC (12")LED(RED)	EA	8
0682	6006	VEH SIG SEC (12")LED(RED ARW)	EA	4
0682	6023	BACK PLATE (12")(3 SEC)	EA	10
0682	6024	BACK PLATE (12")(4 SEC)	EA	2
0684	6008	TRF SIG CBL (TY A)(12 AWG)(3 CONDR)	LF	685
0684	6031	TRF SIG CBL (TY A)(14 AWG)(5 CONDR)	LF	720
0684	6033	TRF SIG CBL (TY A)(14 AWG)(7 CONDR)	LF	1,005
0686	6020	INS TRF SIG PL AM (S)STR(TY D)LUM	EA	~~1~~
0686	6283	RELOC TRF SG PL AM (S) (STRAIN POLE)	EA	1
6002	6003	VIVDS SET-UP SYSTEM	EA	1
6002	6005	VIVDS COMMUNICATION CABLE (COAXIAL)	LF	930
6057	6001	RADAR ADVANCED DETECTION DEVICE	EA	2
CORR	007	OPTICOM CABLE - GTT MODEL 138	LF	335

2

+ SUBSIDIARY TO ITEM 680

NOTE:
1. RELOCATION OF EXISTING VIVDS CAMERAS, OPTICOM UNITS, ILSN SIGNS, & SIGNAL POLE SHALL BE SUBSIDIARY TO ITEM 680-6004.

1 ADJUSTED SIGNAL FOUNDATION QTY

04/12/2019

Kimley»Horn

F-928

CR 110M AND UNIVERSITY BLVD
TRAFFIC SIGNAL

ITEM SUMMARY

DES: BTS	WILLIAMSON COUNTY JOB NO.	SHEET NO.
CK: SAA		137

FILENAME: G:\068501503*CR 110\Design\CR110LLsig102.dgn
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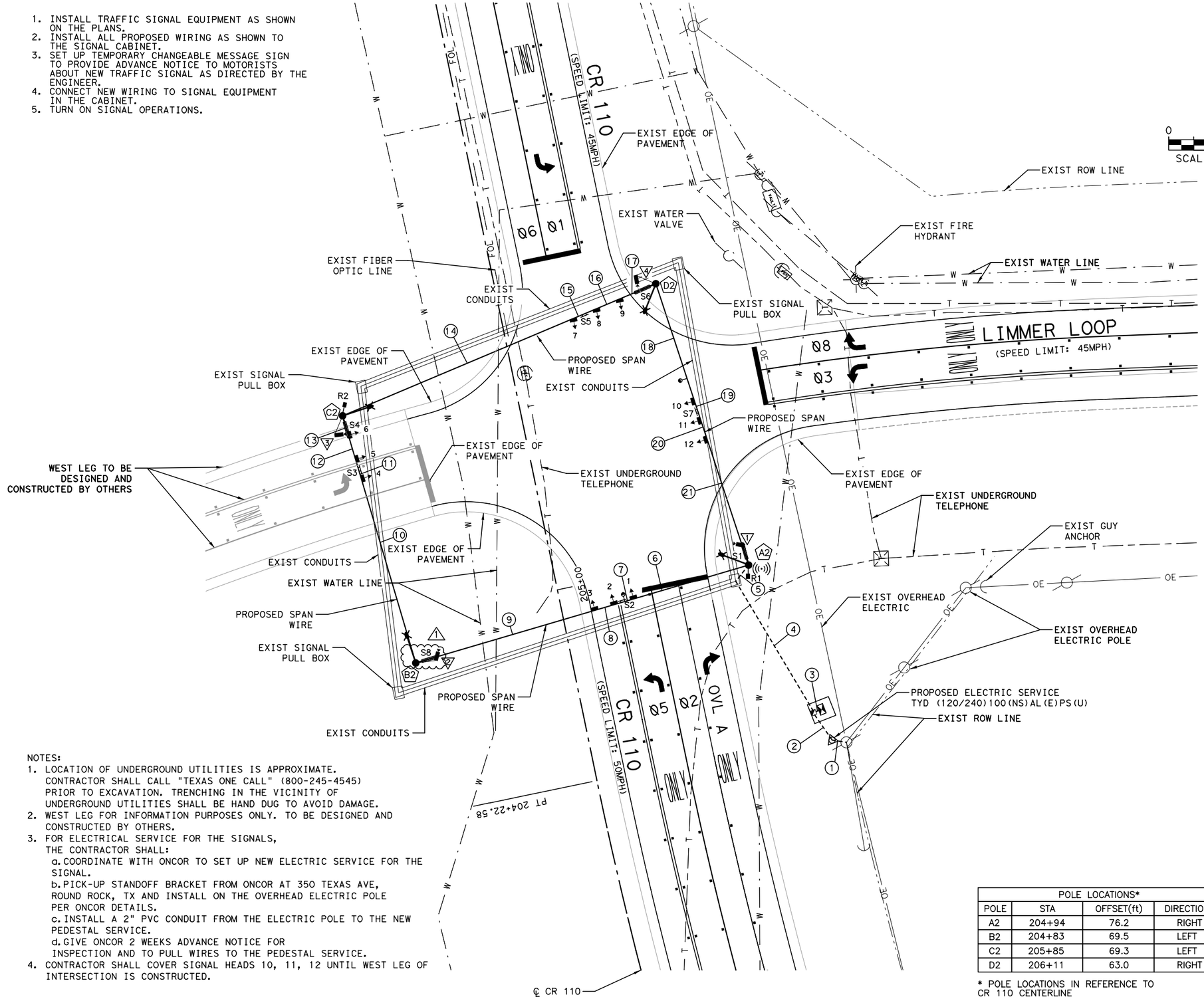
SEQUENCE OF CONSTRUCTION

1. INSTALL TRAFFIC SIGNAL EQUIPMENT AS SHOWN ON THE PLANS.
2. INSTALL ALL PROPOSED WIRING AS SHOWN TO THE SIGNAL CABINET.
3. SET UP TEMPORARY CHANGEABLE MESSAGE SIGN TO PROVIDE ADVANCE NOTICE TO MOTORISTS ABOUT NEW TRAFFIC SIGNAL AS DIRECTED BY THE ENGINEER.
4. CONNECT NEW WIRING TO SIGNAL EQUIPMENT IN THE CABINET.
5. TURN ON SIGNAL OPERATIONS.



0 20 40
SCALE: 1"=40'

LEGEND

- SIGNAL POLE
- SIGNAL HEAD & LABEL
- VIVDS CAMERA
- ELECTRICAL SERVICE
- SIGNAL CABINET
- TYPE D GROUND BOX
- ILSN SIGN
- RADIO
- CONDUIT-TRENCHED
- SIGNAL POLE LABEL
- VIVDS LABEL
- RADAR DETECTOR
- CONDUIT LABEL
- LUMINAIRE
- OPTICOM
- SIGN
- G — EXIST GAS LINE
- OE — EXIST OVERHEAD ELECTRIC
- SS — EXIST STORM SEWER
- W — EXIST WATER LINE
- WW — EXIST WASTE WATER LINE
- FIRE HYDRANT
- VALVE
- RIGHT OF WAY
- FENCE LINE
- EXISTING SIGN
- EXIST SIGNAL GROUND BOX
- EXIST CONDUITS
- EXIST OVERHEAD ELECTRIC POLE

NOTES:
1. LOCATION OF UNDERGROUND UTILITIES IS APPROXIMATE. CONTRACTOR SHALL CALL "TEXAS ONE CALL" (800-245-4545) PRIOR TO EXCAVATION. TRENCHING IN THE VICINITY OF UNDERGROUND UTILITIES SHALL BE HAND DUG TO AVOID DAMAGE.
2. WEST LEG FOR INFORMATION PURPOSES ONLY. TO BE DESIGNED AND CONSTRUCTED BY OTHERS.
3. FOR ELECTRICAL SERVICE FOR THE SIGNALS, THE CONTRACTOR SHALL:
   a. COORDINATE WITH ONCOR TO SET UP NEW ELECTRIC SERVICE FOR THE SIGNAL.
   b. PICK-UP STANDOFF BRACKET FROM ONCOR AT 350 TEXAS AVE, ROUND ROCK, TX AND INSTALL ON THE OVERHEAD ELECTRIC POLE PER ONCOR DETAILS.
   c. INSTALL A 2" PVC CONDUIT FROM THE ELECTRIC POLE TO THE NEW PEDESTAL SERVICE.
   d. GIVE ONCOR 2 WEEKS ADVANCE NOTICE FOR INSPECTION AND TO PULL WIRES TO THE PEDESTAL SERVICE.
4. CONTRACTOR SHALL COVER SIGNAL HEADS 10, 11, 12 UNTIL WEST LEG OF INTERSECTION IS CONSTRUCTED.

POLE LOCATIONS*			
POLE	STA	OFFSET(ft)	DIRECTION
A2	204+94	76.2	RIGHT
B2	204+83	69.5	LEFT
C2	205+85	69.3	LEFT
D2	206+11	63.0	RIGHT

* POLE LOCATIONS IN REFERENCE TO CR 110 CENTERLINE

1 ADDITIONAL ILSN

STATE OF TEXAS
SANTIAGO A. ARAQUE ROJAS
125247
LICENSED PROFESSIONAL ENGINEER

05/08/2019

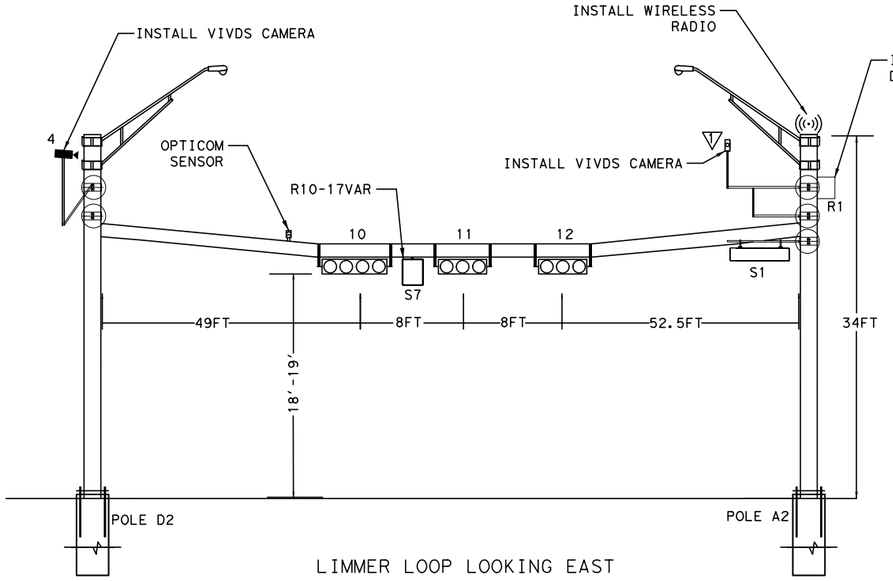
Kimley»Horn F-928

CR 110M AND LIMMER LOOP TRAFFIC SIGNAL

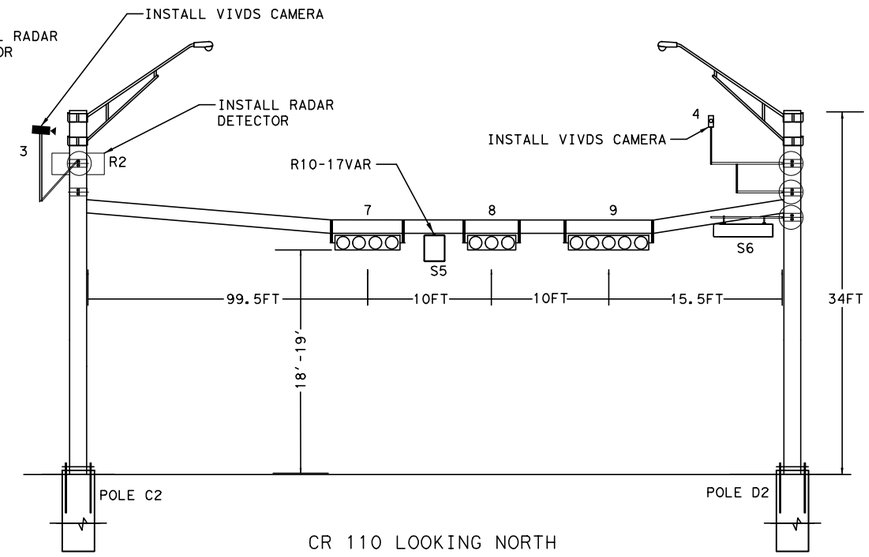
PROPOSED SIGNAL LAYOUT

SCALE: 1" = 40'

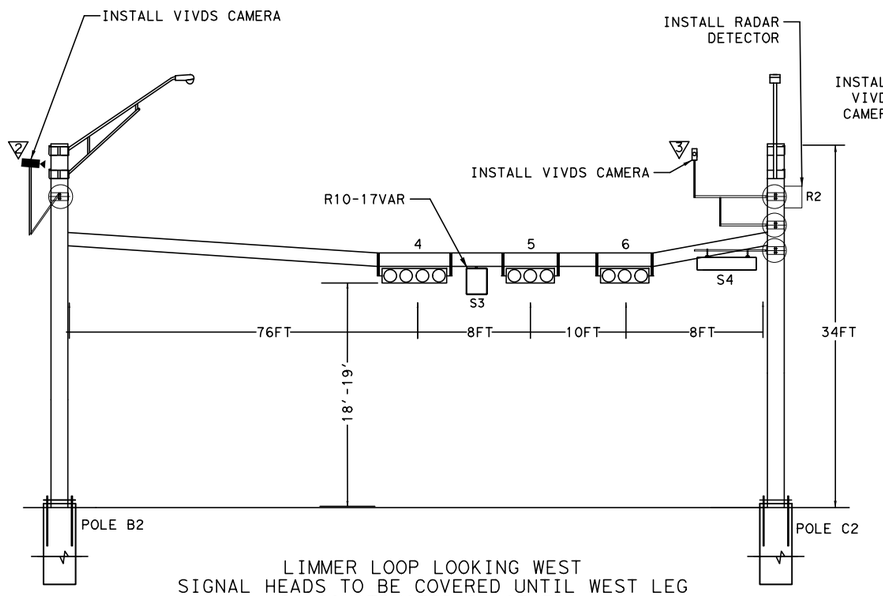
DES: BTS	WILLIAMSON COUNTY JOB NO.	SHEET NO.
CK: SAA		137B



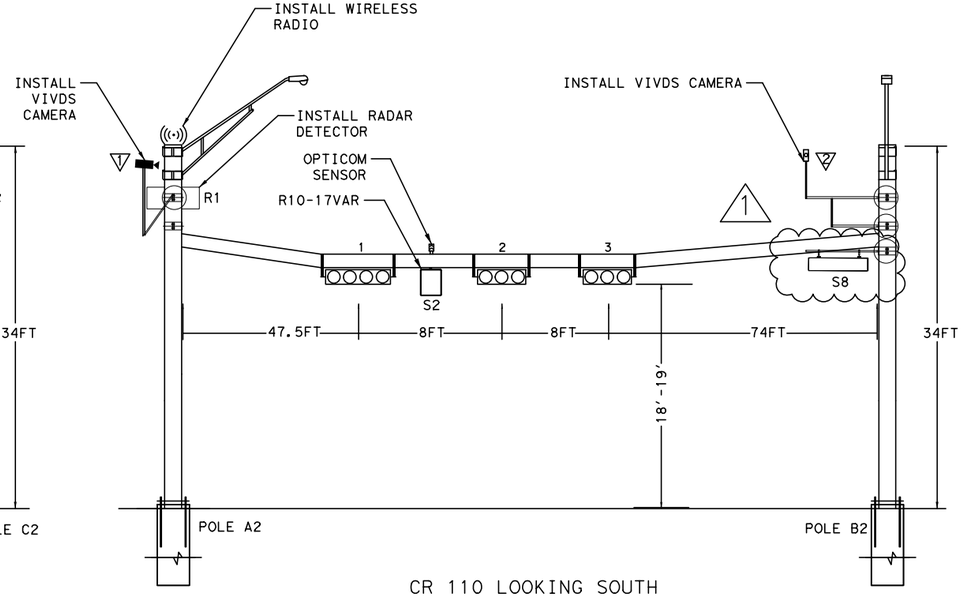
LIMMER LOOP LOOKING EAST



CR 110 LOOKING NORTH



LIMMER LOOP LOOKING WEST
SIGNAL HEADS TO BE COVERED UNTIL WEST LEG
IS CONSTRUCTED BY OTHERS.



CR 110 LOOKING SOUTH

NOTES:
1. ORIENT ALL SIGNAL HEADS TO FACE ONCOMING TRAFFIC.

⚠1 ADDITIONAL ILSN

NOT TO SCALE

STATE OF TEXAS
SANTIAGO A. ARAQUE ROJAS
125247
LICENSED PROFESSIONAL ENGINEER

05/08/2019

Kimley»Horn F-928

CR 110M AND LIMMER LOOP TRAFFIC SIGNAL

SIGNAL ELEVATIONS

DES: BTS	WILLIAMSON COUNTY JOB NO.	SHEET NO.
CK: SAA		137C

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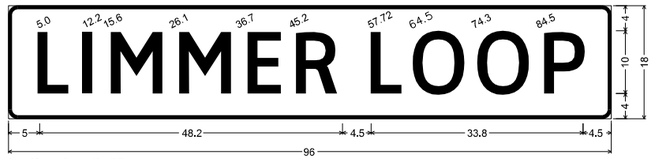
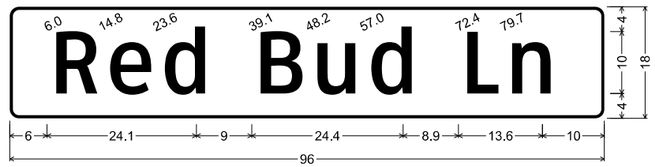
ILSN SIGNS S6



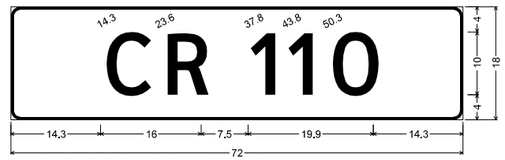
Identifier : D1-1 6in RT;
1.5" Radius, 0.5" Border, White on Green;
[LIMMER LOOP] ClearviewHwy-3-W;

ILSN SIGNS S8



D1-1 8in LT;
1.5" Radius, 0.5" Border, White on, Green;
"Red Bud Ln", ClearviewHwy-3-W;

ILSN SIGNS S1, S4



D1-1 8in LT; 1.5" Radius, 0.5" Border, White on Green;
[CR 110] ClearviewHwy-3-W;

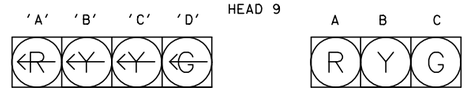
SIGNAL HEADS TO BE COVERED UNTIL WEST LEG IS CONSTRUCTED.

HEAD 10 (HANGERS NOT SHOWN)

HEADS 11, 12 (HANGERS NOT SHOWN)

PROPOSED SIGNAL

HEAD 9



HEAD 1, 4, 7 (HANGERS NOT SHOWN)

HEADS 2, 3, 5, 6, 8 (HANGERS NOT SHOWN)

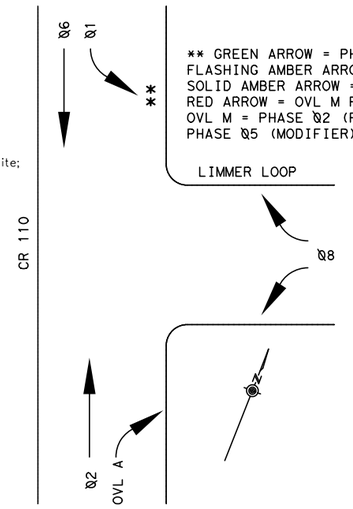
S2, S3, S5, S7

Identifier : R10-17T;
1.5" Radius, 0.6" Border, 0.4" Indent, Black on White;
[LEFT TURN] C 146} spacing;
[YIELD] C 97} spacing;
[ON FLASHING] C 145} spacing;
[YELLOW] C 145} spacing;
[ARROW] C 145} spacing;

LEGEND

- SIGNAL HEAD & LABEL
- RADAR DETECTOR
- VIVDS CAMERA
- ILSN SIGN
- LUMINAIRE
- RADIO
- OPTICOM
- WIRING IN POLE & MAST ARM
- WIRING IN CONDUIT/SPAN

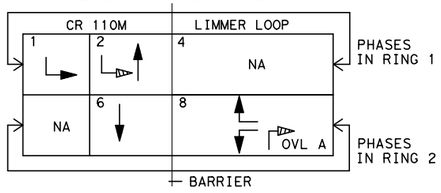
INTERIM PHASING
T-INTERSECTION



** GREEN ARROW = PHASE Ø1 GREEN
FLASHING AMBER ARROW = OVL GREEN
SOLID AMBER ARROW = OVL M AMBER
RED ARROW = OVL M RED
OVL M = PHASE Ø2 (PRIMARY) +
PHASE Ø5 (MODIFIER) FYA PPLT

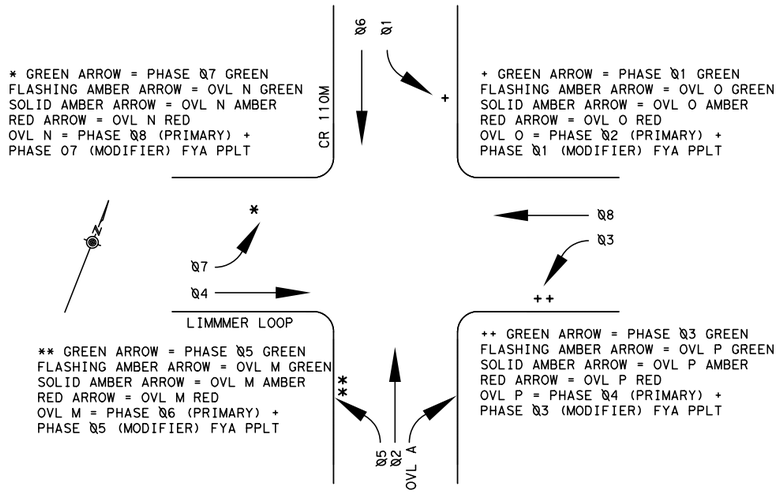
PHASING TO BE UPDATED WHEN EAST LEG IS CONSTRUCTED

INTERIM PHASING DIAGRAM



NOTES:
1. DISPLAY 'D' IS GREEN ARROW FOR THE PROTECTED LEFT-TURN PHASE.
2. DISPLAY 'C' IS TO BE CONFIGURED AS A FLASHING AMBER ARROW FOR PERMISSIVE LEFT-TURN AND IS RUN AS AN OVERLAP TIED TO THE OPPOSING THROUGH PHASE.
3. DISPLAY 'B' IS THE AMBER CLEARANCE FOR THE PROTECTED AND PERMISSIVE PHASE (OVERLAP) OF THE LEFT-TURN MOVEMENT.
4. PROVIDE MMU THAT SHALL SUPPORT THE FLASHING YELLOW ARROW OPERATION.
5. CONFIGURE MMU FOR FLASHING YELLOW ARROW PER MANUFACTURER INSTRUCTIONS.

FINAL PHASING 4-LEG INTERSECTION



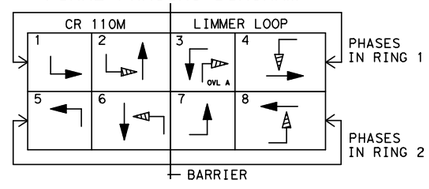
* GREEN ARROW = PHASE Ø7 GREEN
FLASHING AMBER ARROW = OVL N GREEN
SOLID AMBER ARROW = OVL N AMBER
RED ARROW = OVL N RED
OVL N = PHASE Ø8 (PRIMARY) +
PHASE Ø7 (MODIFIER) FYA PPLT

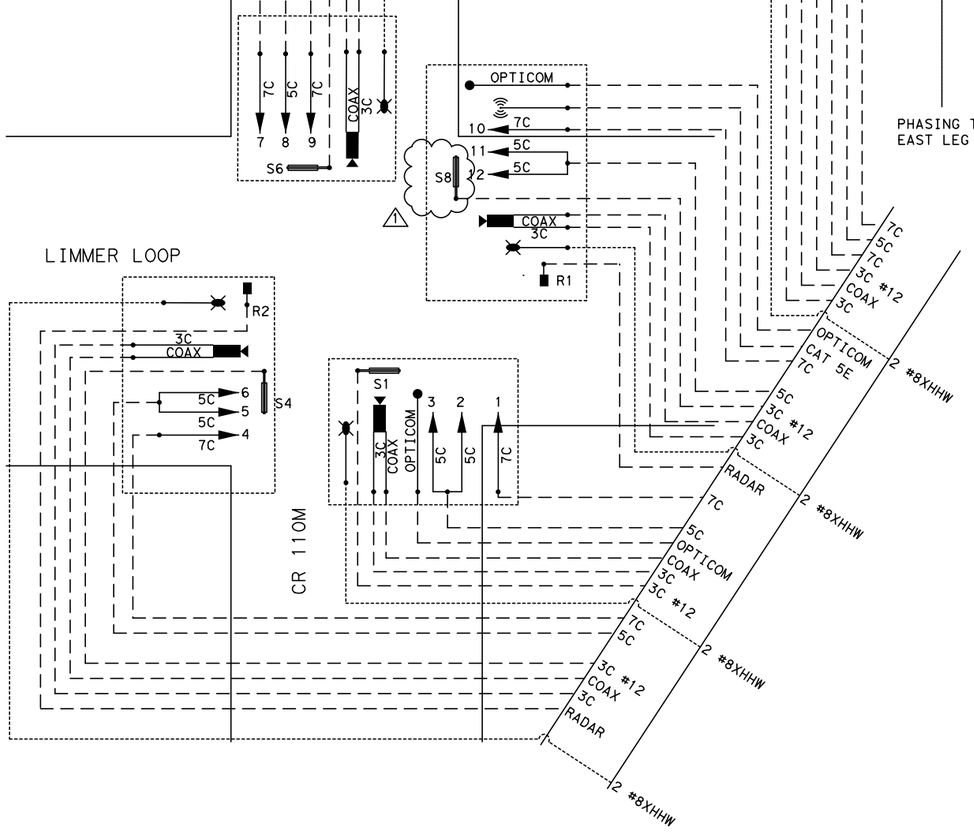
+ GREEN ARROW = PHASE Ø1 GREEN
FLASHING AMBER ARROW = OVL O GREEN
SOLID AMBER ARROW = OVL O AMBER
RED ARROW = OVL O RED
OVL O = PHASE Ø2 (PRIMARY) +
PHASE Ø1 (MODIFIER) FYA PPLT

** GREEN ARROW = PHASE Ø5 GREEN
FLASHING AMBER ARROW = OVL M GREEN
SOLID AMBER ARROW = OVL M AMBER
RED ARROW = OVL M RED
OVL M = PHASE Ø6 (PRIMARY) +
PHASE Ø5 (MODIFIER) FYA PPLT

++ GREEN ARROW = PHASE Ø3 GREEN
FLASHING AMBER ARROW = OVL P GREEN
SOLID AMBER ARROW = OVL P AMBER
RED ARROW = OVL P RED
OVL P = PHASE Ø4 (PRIMARY) +
PHASE Ø3 (MODIFIER) FYA PPLT

FINAL PHASING DIAGRAM





⚠1 ADDITIONAL ILSN

STATE OF TEXAS
SANTIAGO A. ARAQUE ROJAS
125247
LICENSED PROFESSIONAL ENGINEER

05/08/2019

Kimley»Horn F-928

CR 110M AND LIMMER LOOP
TRAFFIC SIGNAL

PHASING AND SIGNS

DES: BTS	WILLIAMSON COUNTY JOB NO.	SHEET NO.
CK: SAA		137E

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ESTIMATED QUANTITIES				
ITEM	CODE	DESCRIPTION	UNIT	QUANTITY
0416	6032	DRILL SHAFT (TRF SIG POLE) (36 IN)	LF	61
0618	6046	CONDT (PVC) (SCH 80) (2")	LF	245
0618	6053	CONDT (PVC) (SCH 80) (3")	LF	45
0620	6007	ELEC CONDR (NO. 8) BARE	LF	160
0620	6008	ELEC CONDR (NO. 8) INSULATED	LF	1,900
0620	6009	ELEC CONDR (NO. 6) BARE	LF	130
0620	6010	ELEC CONDR (NO. 6) INSULATED	LF	816
0624	6010	GROUND BOX TY D (162922)W/APRON	EA	1
0625	6003	ZINC-COAT STL WIRE STRAND (3/8")	LF	1,024
0680	6002	INSTALL HWY TRF SIG (ISOLATED)	EA	1
0682	6001	VEH SIG SEC (12")LED(GRN)	EA	8
0682	6002	VEH SIG SEC (12")LED(GRN ARW)	EA	5
0682	6003	VEH SIG SEC (12")LED(YEL)	EA	8
0682	6004	VEH SIG SEC (12")LED(YEL ARW)	EA	9
0682	6005	VEH SIG SEC (12")LED(RED)	EA	8
0682	6023	BACK PLATE (12")(3 SEC)	EA	7
0682	6024	BACK PLATE (12")(4 SEC)	EA	4
0682	6025	BACK PLATE (12")(5 SEC)	EA	1
0684	6008	TRF SIG CBL (TY A)(12 AWG)(3 CONDR)	LF	930
0684	6031	TRF SIG CBL (TY A)(14 AWG)(5 CONDR)	LF	1,062
0684	6033	TRF SIG CBL (TY A)(14 AWG)(7 CONDR)	LF	1,039
0684	6049	TRF SIG CBL (TY A)(16 AWG)(3 CONDR)	LF	1,392
0686	6001	INS TRF SIG PL AM (S)ILSN ARM(7')	EA	2
0686	6002	INS TRF SIG PL AM (S)ILSN ARM(9')	EA	1
0686	6020	INS TRF SIG PL AM (S)STR(TY D)LUM	EA	4
6002	6001	VIVDS PROCESSOR SYSTEM	EA	1
6002	6002	VIVDS CAMERA ASSEMBLY	EA	4
6002	6003	VIVDS SET-UP SYSTEM	EA	1
6002	6004	VIVDS CENTRAL CONTROL	EA	1
6002	6005	VIVDS COMMUNICATION CABLE (COAXIAL)	LF	1,392
6057	6001	RADAR ADVANCED DETECTION DEVICE	EA	2
6089	6001	ETHERNET CABLE AND CONNECTORS	LF	60
6090	6001	ILSN (LED) (6D)	EA	2
6090	6002	ILSN (LED) (8D)	EA	2
CORR	001	BATTERY BACK-UP SYSTEM	EA	1
CORR	002	HARDENED ETHERNET SWITCH	EA	1
CORR	003	5.8 GHz WIRELESS ETHERNET RADIO	EA	1
CORR	004	OPTICOM DETECTOR - GTT MODEL 722	EA	2
CORR	005	OPTICOM PHASE SELECTOR - GTT MODEL 764	EA	1
CORR	006	OPTICOM CARD RACK - GTT MODEL 760	EA	1
CORR	007	OPTICOM CABLE - GTT MODEL 138	LF	455

1 ADJUSTED SIGNAL FOUNDATION QTY
2 ADJUSTED ILSN SIGN QUANTITY

05/08/2019

Kimley»Horn F-928

CR 110M AND LIMMER LOOP
TRAFFIC SIGNAL

ITEM SUMMARY

DES: BTS	WILLIAMSON COUNTY JOB NO.	SHEET NO.
CK: SAA		137G

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 (FEET) ⑥ 1				
				24-A	30-A	36-A	36-B	42-A
B1	10	36-B	1				15.2	
C1	10	36-B	1				15.2	
A2	10	36-B	1				15.2	
B2	10	36-B	1				15.2	
C2	10	36-B	1				15.2	
D2	10	36-B	1				15.2	
TOTAL DRILLED SHAFT LENGTHS							91.2	

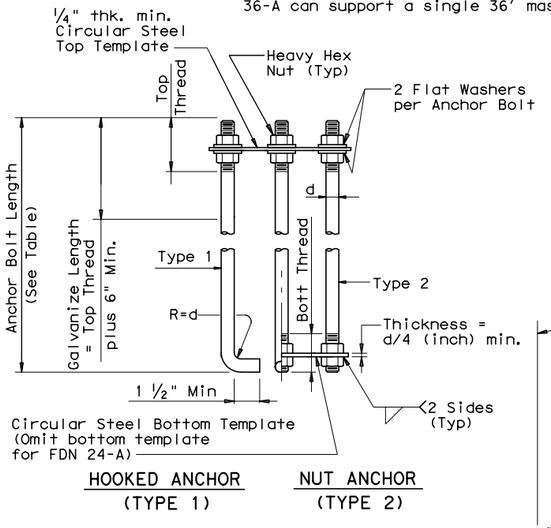
1 ADJUSTED SIGNAL FOUNDATION QTY

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'

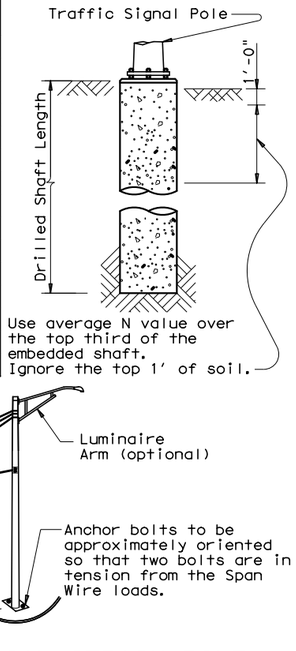
EXAMPLE:
1. For 80mph design wind speed, foundation 30-A can support up to a 32' arm with another arm up to 28'

2. For 100mph design wind speed, foundation 36-A can support a single 36' mast arm.

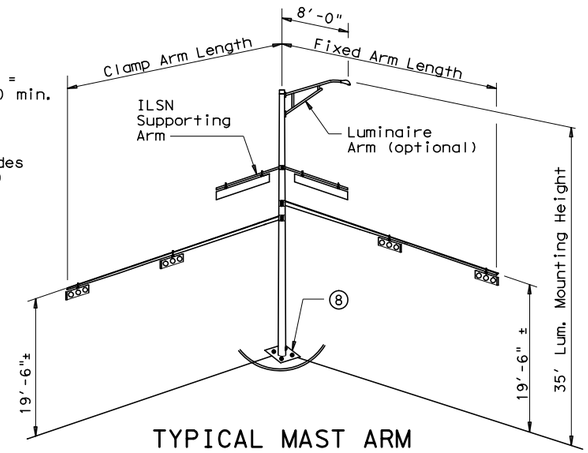


HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)

ANCHOR BOLT ASSEMBLY



TYPICAL STRAIN POLE ASSEMBLY



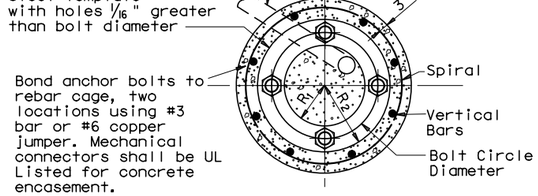
TYPICAL MAST ARM ASSEMBLY

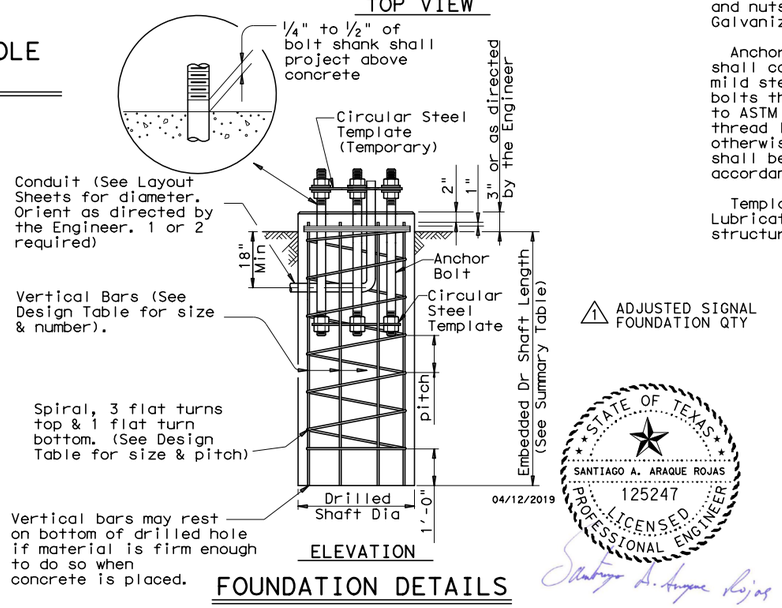
⑧ Orient anchor bolts orthogonal with the fixed arm direction to ensure that two bolts are in tension under dead load.

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.





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".

STATE OF TEXAS
SANTIAGO A. ARAQUE ROJAS
125247
LICENSED PROFESSIONAL ENGINEER

Texas Department of Transportation
Traffic Operations Division

TRAFFIC SIGNAL POLE FOUNDATION

TS-FD-12

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.
.	WILLIAMSON	145

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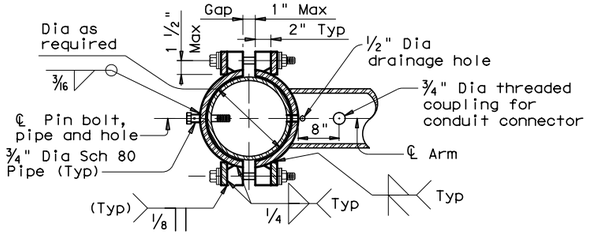
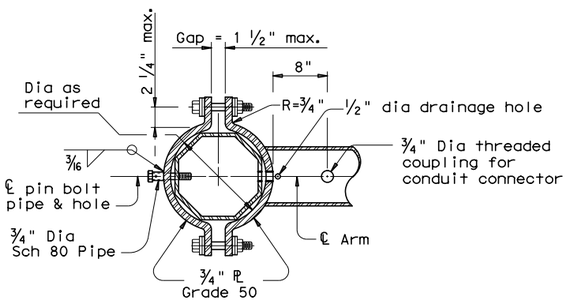
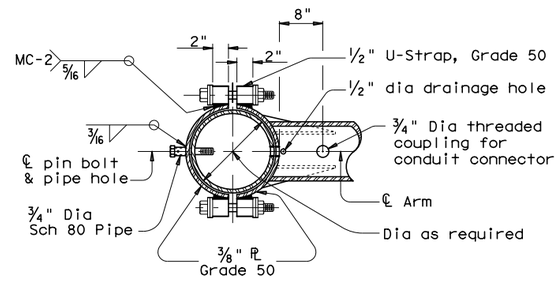
TABLE OF DIMENSIONS for ILSN Support Arm Clamp-on Details 1, 2 and 3						
ILSN ARM SIZE	A	F	CONN. BOLTS		PIN BOLTS	
			No.	Dia	No.	Dia
3 in. dia Schedule 40 Pipe	in.	in.	ea.	in.	ea.	in.
	10	4	4	¾	2	⅝



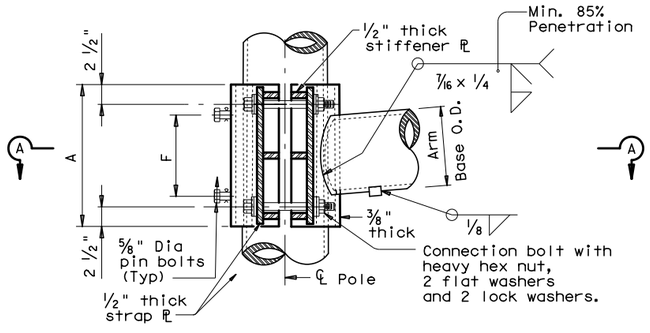
SECTION A-A



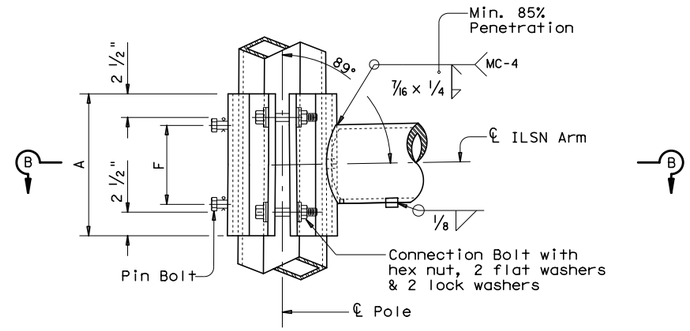
SECTION B-B



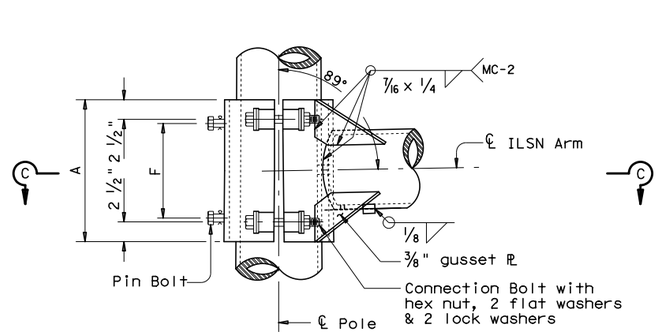
SECTION C-C



ILSN CLAMP-ON DETAIL 1



ILSN CLAMP-ON DETAIL 2



ILSN CLAMP-ON DETAIL 3

GENERAL NOTES:

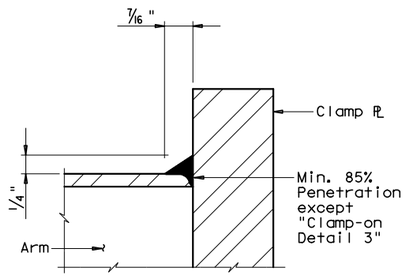
Clamp-on details shall be used for ILSN support arm assemblies. A 1 ½" inch diameter hole shall be cut in the front clamp plate for wiring access. A matched hole shall be field drilled through the pole to provide wire access after arm is oriented. Deburr both holes.

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

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

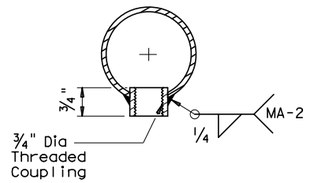
NOTE:

Pin bolts shall be A325 with threads excluded from the shear plane. Pin bolt and ¾" dia pipe shall have 3/16" 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 ARM

ARM BASE WELD DETAILS



ILSN ARM COUPLING DETAIL

Texas Department of Transportation
Traffic Operations Division

STANDARD ASSEMBLY FOR TRAFFIC SIGNAL SUPPORT STRUCTURES

MAST-ARM CONNECTIONS

MA-C(ILSN)-12

DN: MS	CK: JSY	DW: MMF	CK: JSY

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5-96
1-12

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