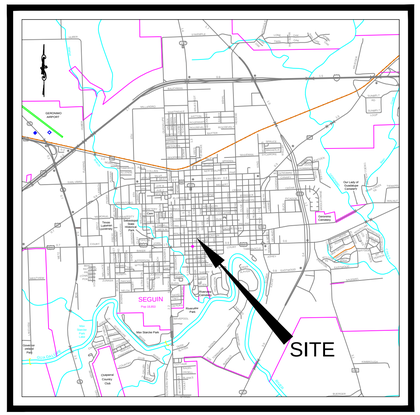
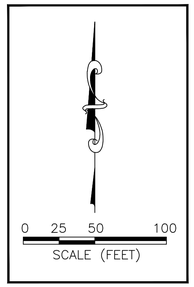


LOCATION MAP
× N.T.S.



**ALL NEW POLES WILL BE A MINIMUM 45' IN HEIGHT.

** CHANGE OF EXISTING 3-PHASE CONDUCTOR TO 795 AAC PRIMARY & 336 ACSR NEUTRAL

** EXISTING POLES ARE LOCATED 18" WITHIN TxDOT R.O.W.

** PROFLE OF 3-PHASE ELECTRIC CROSSINGS SHOWN ON DWG.

**NO CHANGE OF ROUTE OF EXISTING 3-PHASE ELECTRIC LINE.

**CITY OF SEGUIN CONNECTION POLICY SHALL BE FOLLOWED FOR ALL INSTALLLATION OF ELECTRIC EQUIPMENT IN SCOPE OF PROJECT.

** ALL INSPECTIONS SHALL BE PERFORMED BY CITY OF SEGUIN ELECTRIC DEPARTMENT.

**ANY CHANGES IN SCOPE OF PROJECT SHALL BE COORDINATED WITH AND APPROVED BY CITY OF SEGUIN ELECTRIC DEPARTMENT BEFORE WORK IS DONE.

**CONTRACTOR SHALL BE RESPONSIBLE FOR CALLING IN FOR ALL LINE LOCATES BEFORE ANY DIGGING IS INITIATED IN SCOPE OF PROJECT.

**ALL REQUIRED CUSTOMER OUTAGES FOR TRANSFER OR INSTALLATION OF NEW/EXISTING ELECTRIC EQUIPMENT IN SCOPE OF PROJECT SHALL BE COORDINATED WITH AND APPROVED BY CITY OF SEGUIN ELECTRIC DEPARTMENT BEFORE DISCONNECTING CUSTOMER ELECTRIC POWER SERVICE.

THESE PLANS ARE PREPARED BASED ON THE OWNER (CITY OF SEGUIN) ACQUIRING EASEMENTS ON THE NORTH AND SOUTH SIDE OF IH 10 FOR THE LOCATIONS OF THE ELECTRICAL MANHOLES. SHOULD THE CITY OF SEGUIN BE UNABLE TO PROCURE THESE EASEMENTS, THE PLANS WILL NEED TO BE REVISED ACCORDINGLY.

THESE PLANS ARE PREPARED USING HDPE CASING FOR THE CROSSING OF IH 10. AS PER THE DATE OF ISSUE OF THESE DRAWINGS, APPROVAL OF THE HDPE CASING HAS NOT BEEN GRANTED BY TxDOT. SHOULD TxDOT NOT GRANT APPROVAL THE DRAWINGS WILL NEED TO BE REVISED ACCORDINGLY.

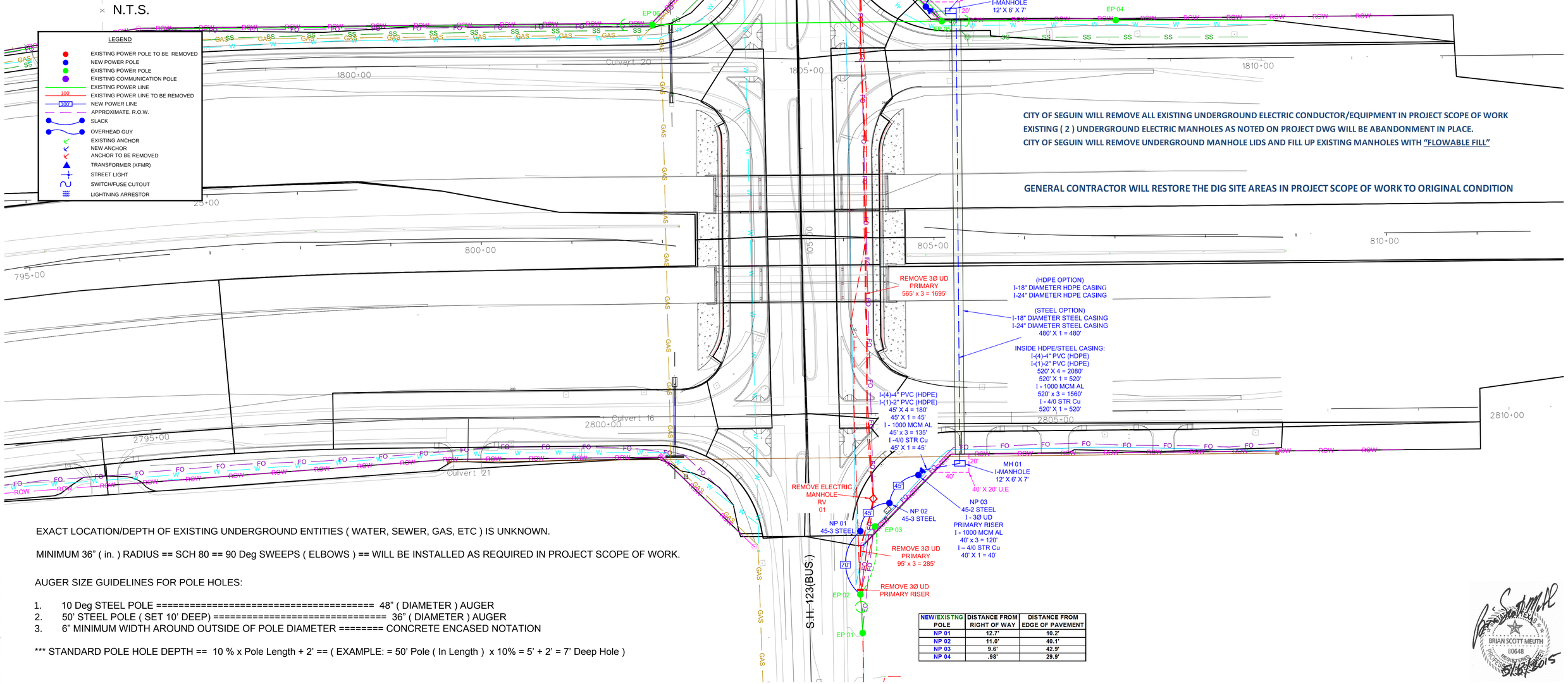
CITY OF SEGUIN WILL REMOVE ALL EXISTING UNDERGROUND ELECTRIC CONDUCTOR/EQUIPMENT IN PROJECT SCOPE OF WORK.

EXISTING (2) UNDERGROUND ELECTRIC MANHOLES AS NOTED ON PROJECT DWG WILL BE ABANDONMENT IN PLACE.

CITY OF SEGUIN WILL REMOVE UNDERGROUND MANHOLE LIDS AND FILL UP EXISTING MANHOLES WITH "FLOWABLE FILL"

SURFACE MATERIAL SHALL BE EQUAL TO MATERIAL REMOVED. MINIMUM AMOUNTS: 2 Inch HMAC (TxDOT Item 340, Type D); 8 Inch FLEX (Crushed Stone) BASE (TxDOT Item 247, Type A Grade 2) COMPACTED IN 6" LIFTS TO 95% Density BY TEX 113E. EXISTING ASPHALT TO BE SAW CUT.

CONTRACTOR SHALL PROVIDE MATERIAL MEETING C-33 Crushed Stone # 57 FOR BACKFILL OF ALL MATERIALS REMOVED WITHIN THE LIMITS OF THE PROPOSED/EXISTING PAVEMENT.



CITY OF SEGUIN WILL REMOVE ALL EXISTING UNDERGROUND ELECTRIC CONDUCTOR/EQUIPMENT IN PROJECT SCOPE OF WORK
EXISTING (2) UNDERGROUND ELECTRIC MANHOLES AS NOTED ON PROJECT DWG WILL BE ABANDONMENT IN PLACE.
CITY OF SEGUIN WILL REMOVE UNDERGROUND MANHOLE LIDS AND FILL UP EXISTING MANHOLES WITH "FLOWABLE FILL"

GENERAL CONTRACTOR WILL RESTORE THE DIG SITE AREAS IN PROJECT SCOPE OF WORK TO ORIGINAL CONDITION

LEGEND

- EXISTING POWER POLE TO BE REMOVED
- NEW POWER POLE
- EXISTING POWER POLE
- EXISTING COMMUNICATION POLE
- EXISTING POWER LINE
- 100' EXISTING POWER LINE TO BE REMOVED
- 100' NEW POWER LINE
- APPROXIMATE. R.O.W.
- SLACK
- OVERHEAD GUY
- EXISTING ANCHOR
- NEW ANCHOR
- ANCHOR TO BE REMOVED
- TRANSFORMER (XFMR)
- STREET LIGHT
- SWITCH/FUSE CUTOUT
- LIGHTNING ARRESTOR

EXACT LOCATION/DEPTH OF EXISTING UNDERGROUND ENTITIES (WATER, SEWER, GAS, ETC) IS UNKNOWN.

MINIMUM 36" (in.) RADIUS == SCH 80 == 90 Deg SWEEPS (ELBOWS) == WILL BE INSTALLED AS REQUIRED IN PROJECT SCOPE OF WORK.

AUGER SIZE GUIDELINES FOR POLE HOLES:

1. 10 Deg STEEL POLE ========== 48" (DIAMETER) AUGER
2. 50' STEEL POLE (SET 10' DEEP) ========== 36" (DIAMETER) AUGER
3. 6" MINIMUM WIDTH AROUND OUTSIDE OF POLE DIAMETER ======== CONCRETE ENCASED NOTATION

*** STANDARD POLE HOLE DEPTH == 10 % x Pole Length + 2' == (EXAMPLE: = 50' Pole (In Length) x 10% = 5' + 2' = 7' Deep Hole)

NEW/EXISTNG POLE	DISTANCE FROM RIGHT OF WAY	DISTANCE FROM EDGE OF PAVEMENT
NP 01	12.7'	10.2'
NP 02	11.0'	40.1'
NP 03	9.6'	42.9'
NP 04	.98'	29.9'

*CONTRACTOR SHALL USE DYNAMETER EQUIPMENT TO SAG NEW 3Ø OVERHEAD PRIMARY CONDUCTOR

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M & S ENGINEERING
ENGINEERS, PLANNERS AND SURVEYORS
TEXAS REGISTERED ENGINEERING FIRM F-1094

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PHONE# (830) 228-5446
FAX # (830) 885-2170

BRANCH OFFICE:
P.O. BOX 391
McQUEENEY, TEXAS 78123
PHONE # (830) 560-3200
FAX # (830) 560-3203

The City of Seguin
816 Fred Byrd Drive Seguin, Texas 78155

PROJ TITLE / LOCATION: IH10 UD CROSSING

REV NO	REV BY	ISSUE DATE
		05/08/2015
SCALE 1" = 50'		TECH M. E. BURCH
PAGE 1 OF 7		REV #

BRIAN SCOTT MEUTH 80648 REGISTERED PROFESSIONAL ENGINEER 5/8/2015

Date: 5/7/2015 3:33 PM User: MARTY BURCH
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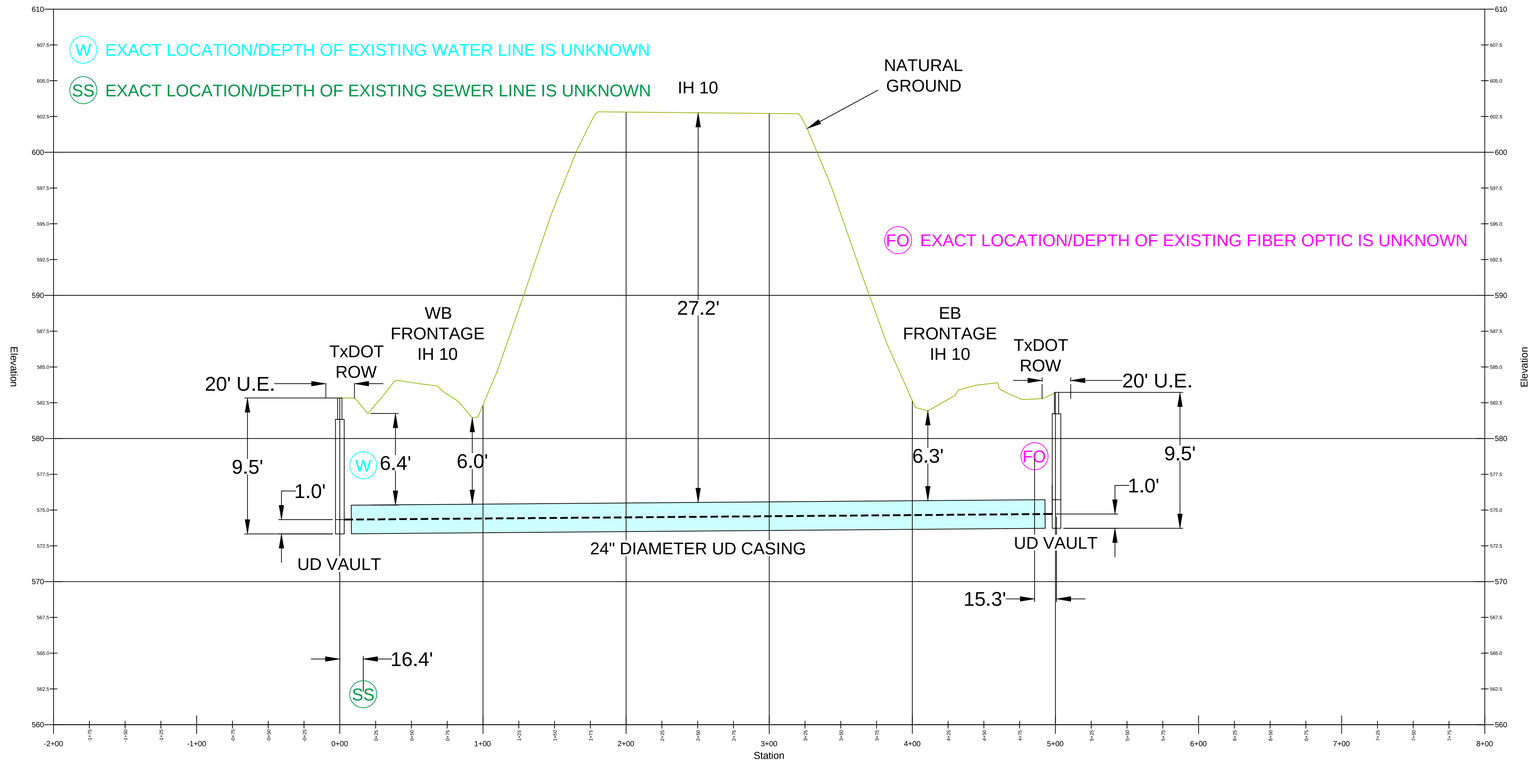
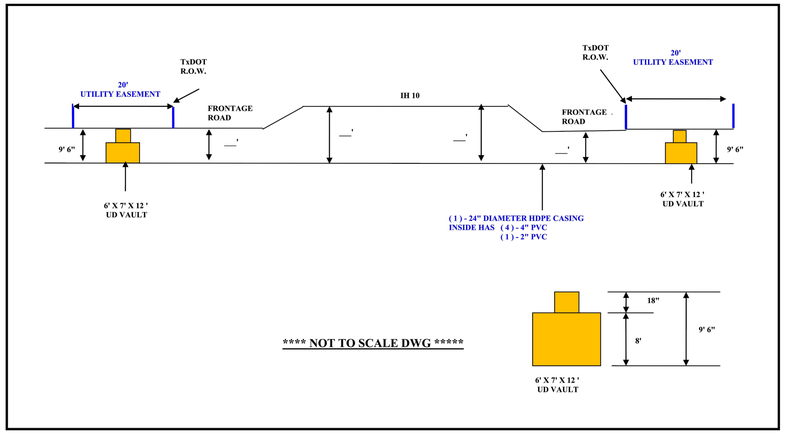
IH 10 PROFILE VIEW



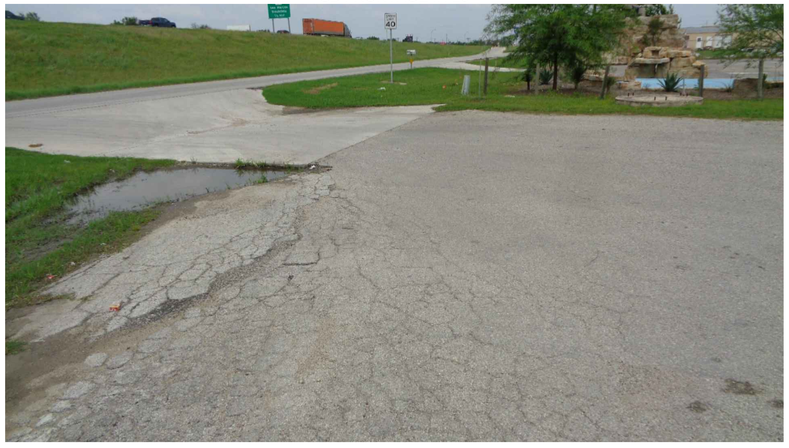
FOR INFORMATION PURPOSES ONLY

SCALE = 1" = 50'

WB FRONTAGE IH 10



SB FRONTAGE IH 10



EXACT LOCATION/DEPTH OF EXISTING UNDERGROUND ENTITIES (WATER, SEWER, GAS, FIBER OPTIC, ETC) IS UNKNOWN.

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PROJ TITLE / LOCATION	IH10 UD CROSSING
REV NO / REV BY	ISSUE DATE 05/08/2015
SCALE NOT TO SCALE	TECH M. E. BURCH
PAGE 2 OF 7	REV #

Date: 5/7/2015 3:33 PM User: MARTY BURCH
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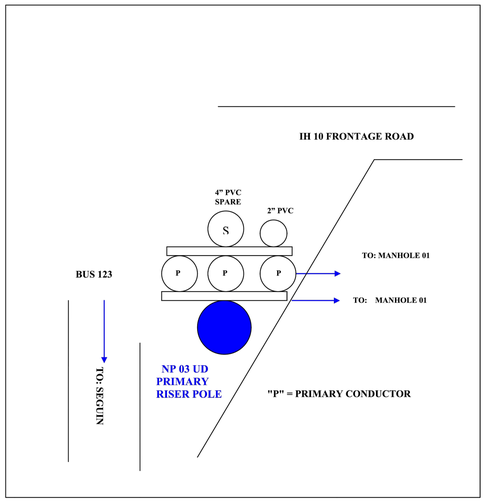
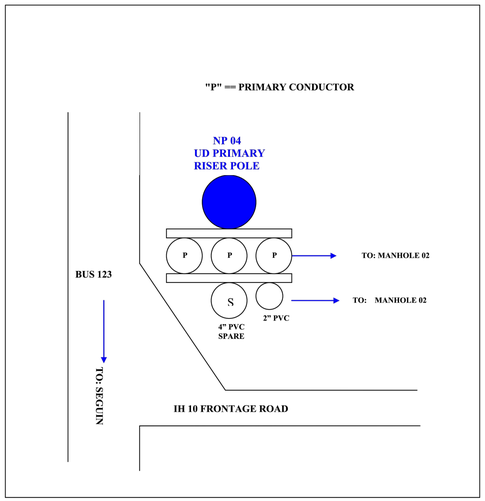
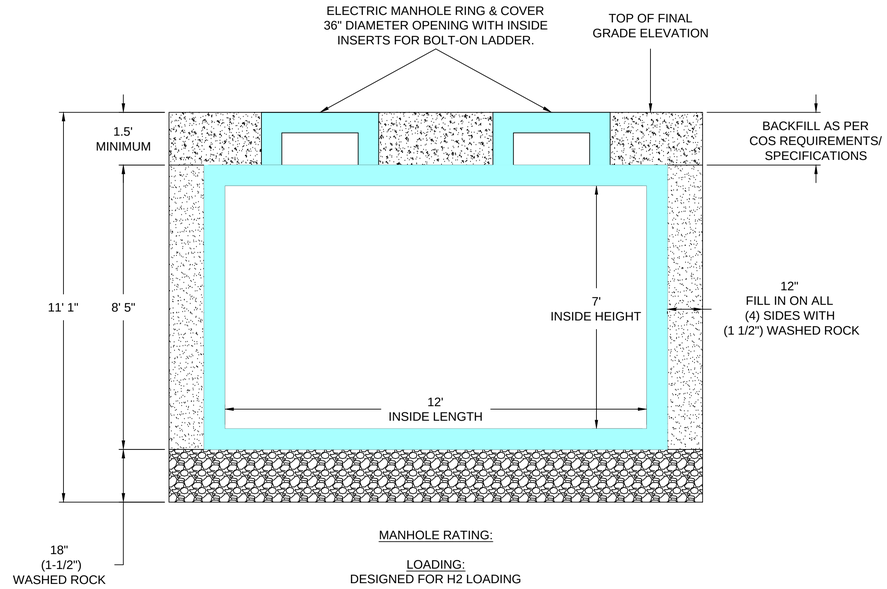


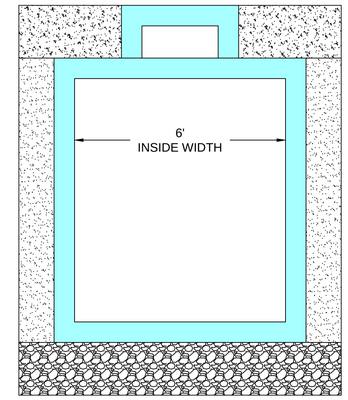




MANHOLE RATING:

LOADING:
DESIGNED FOR H2 LOADING

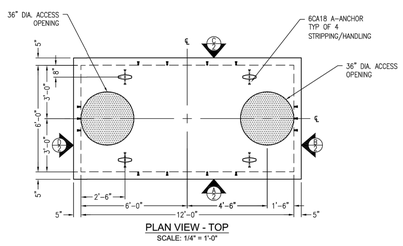
(N.T.S.)

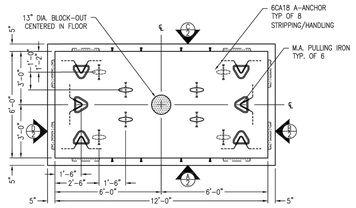


END VIEW

(N.T.S.)

SUBMITTAL DRAWING





VOLUME AND WEIGHTS

SECTION	WEIGHT			
TOP	16,942	LBS	4.68	CYDS
BASE	13,870	LBS	3.38	CYDS
TOTAL	32,812	LBS	8.0600	CYDS

CONTRACTOR APPROVAL:

NAME:
FIRST LAST

TITLE

SIGNATURE DATE

STRUCTURAL NOTES:

1. CONCRETE: 28 DAY COMPRESSIVE STRENGTH f'C = 6,000 psi
2. REBAR: ASTM A-615 GRADE 60
3. MESH: ASTM A-185 GRADE 65
4. LOADS
   - 4.1. AASHTO HS-20
   - 4.2. ASTM C-857 "MINIMUM STRUCTURAL DESIGN LOADING FOR UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES"
   - 4.3. LIVE LOAD IMPACT APPLIED FOR LESS THAN 3'-0" OF SOIL COVER.
   - 4.4. SOIL DENSITY 120 pcf
   - 4.5. 40 pcf E.F.P. LATERAL SOIL PRESSURE ABOVE WATER TABLE
   - 4.6. 80 psf LIVE LOAD SURCHARGE
   - 4.7. TOP OF VAULT 1'-0" BELOW FINISHED GRADE (MAXIMUM)
   - 4.8. WATER TABLE 7'-0" BELOW FINISHED GRADE (ASSUMED)

Oldcastle Precast®
1505 RELIANCE, SAN ANTONIO, TX 78214
PHONE: 210-635-4333 FAX: 210-927-3479

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6'-0" x 12'-0" x 7'-0" Manhole (2 Access Holes)

—

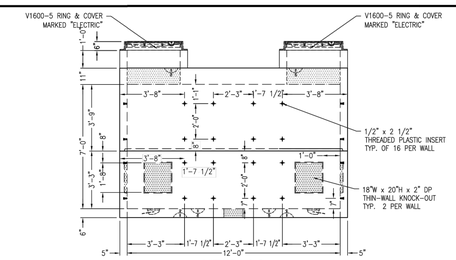
SEGUIN TXDOT PROJECT

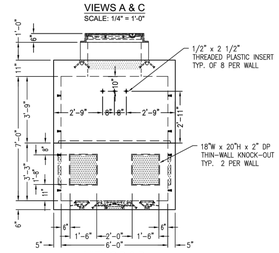
CUSTOMER
SEGUIN TXDOT PROJECT

DATE	SALES	DRAWN	ENGINEER	CHECKED	SALES ORDER
4/27/15	GU	GC	PS	PS	—

DRAWING NUMBER	REVISION	SHEET
282-6X12X7 (2 HOLES)-GC		1 OF 2

SUBMITTAL DRAWING





CONTRACTOR APPROVAL:

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TITLE

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6'-0" x 12'-0" x 7'-0" Manhole (2 Access Holes)

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SEGUIN TXDOT PROJECT

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SEGUIN TXDOT PROJECT

DATE	SALES	DRAWN	ENGINEER	CHECKED	SALES ORDER
4/27/15	GU	GC	PS	PS	—

DRAWING NUMBER	REVISION	SHEET
282-6X12X7 (2 HOLES)-GC		2 OF 2

FOR INFORMATION PURPOSES ONLY

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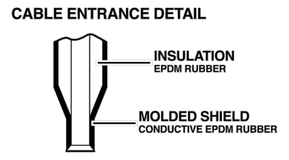
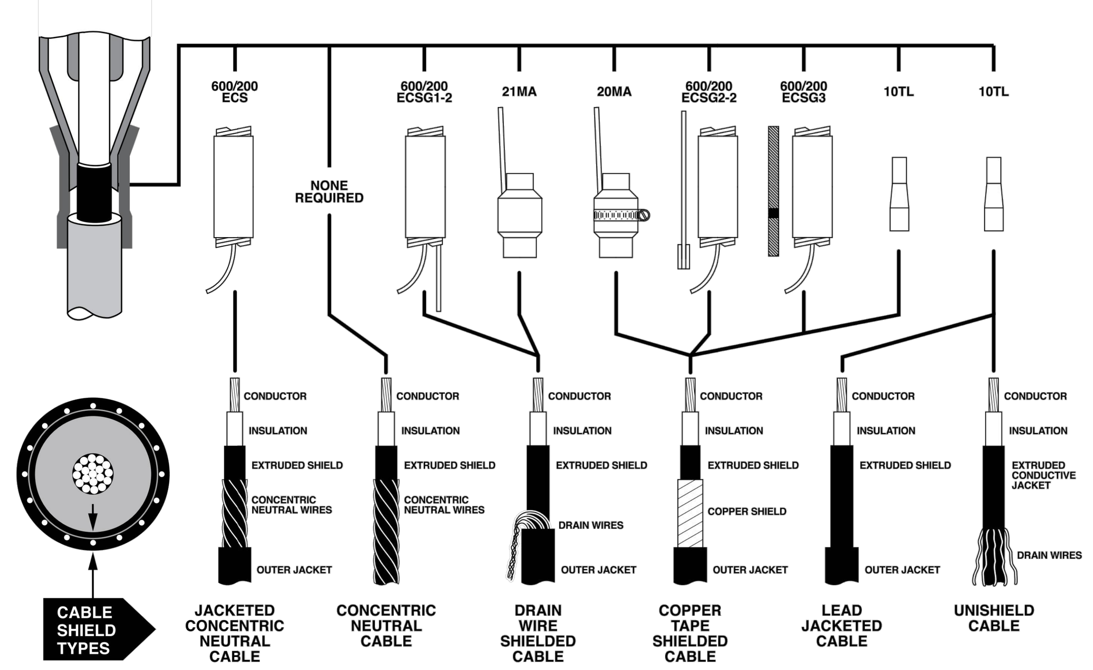
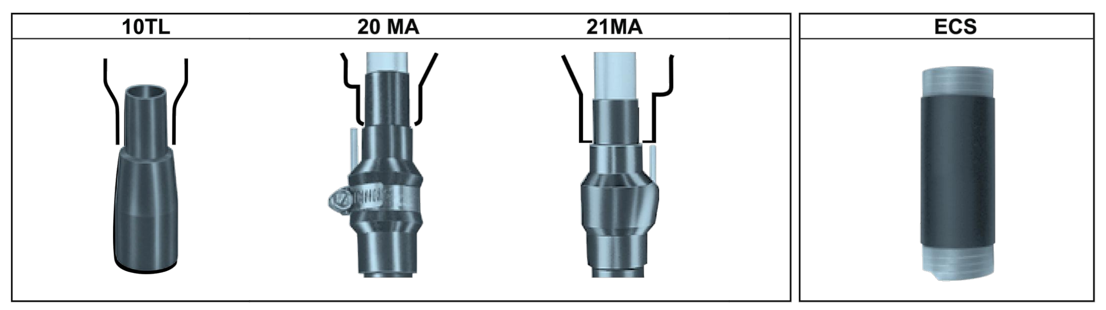
PROJ TITLE / LOCATION	
IH10 UD CROSSING	
REV NO	REV BY	ISSUE DATE 05/08/2015
SCALE NONE	TECH M. E. BURCH
PAGE 3 OF 7	REV #

Date: 5/7/2015 3:33 PM User: MARTY BURCH
File: S:\SEGUIN\2015\IH10 UD CROSSING\IH10 UD CROSSING.DWG

Elastimold elbows, cable joints and terminators have been designed for use on XLP, EPR or similar solid dielectric insulated power cables. These cables are available with a variety of optional shielding and jacket constructions. In order to properly mate and install the cable to an Elastimold product, the use of a shield adaptor, grounding kit or jacket seal may be required. The diagram below provides information concerning the application and selection of various shield adaptors, grounding kits and jacket seals for the most popular cable types. Consult the factory for recommendations concerning other cable constructions.





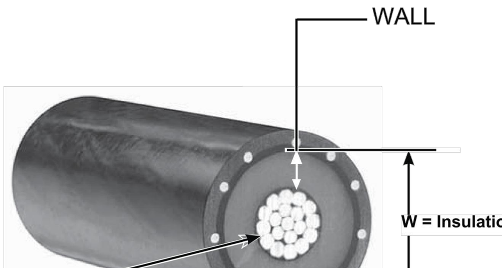


CABLE SHIELD ADAPTERS			
Cable Insulation Dia.	10TL inches	20MA inches	21MA inches
min.	.495	.530	.530
max.	1.875	1.780	1.780

JACKET SEALS		
Jacket O.D.	200ECS inches	600ECS inches
min.	.80	1.28
max.	1.50	2.30

Shield Adapters, Grounding Kits and Jacket Seals

15kV 100% – 175 mil Insulation (.175")
15kV 133% – 220 mil Insulation (.220")
25kV 100% – 260 mil Insulation (.260")
35kV 100% – 345 mil Insulation (.345")



AEIC CS8-06

Specification for Extruded Dielectric, Shielded Power Cable Rated 5 - 46kV

AEIC-Calulated Diameters - Solid and Compressed Stranding from Tables C-4 & C-6 and Compact Stranding from Tables C-5 & C-7

ANSI/ICEA S-94-649-2004 & S-97-682-2000

Standard for Concentric Neutral Cables & Utility Shielded Power Cables Rated 5 - 46kV

ICEA-Concentric Stranding Table C-3, Compressed Stranding Table C-4, Compact Stranding Table C-5

ICEA Abbreviated, for additional cables please refer to the standard.

Reference

15kV Cable (100% level, 175 mil)

Aluminum & Copper Conductor Size	Industry Standard	Solid Conductor Diameter in Inches Over Insulation Min.	Solid Max.	Stranded Conductor Diameter in Inches Over Insulation Min.	Stranded Max.	Compressed Conductor Diameter in Inches Over Insulation Min.	Compressed Max.	Compact Conductor Diameter in Inches Over Insulation Min.	Compact Max.
#2	AEIC	0.610	0.700	–	–	0.635	0.725	0.620	0.710
	ICEA	0.610	0.695	0.645	0.730	0.635	0.720	0.620	0.705
#1	AEIC	0.645	0.730	–	–	0.675	0.765	0.655	0.740
	ICEA	0.645	0.725	0.685	0.770	0.675	0.760	0.655	0.735
1/0	AEIC	0.680	0.770	–	–	0.715	0.805	0.690	0.775
	ICEA	0.680	0.760	0.725	0.810	0.715	0.800	0.690	0.775
2/0	AEIC	–	–	–	–	0.760	0.850	0.730	0.815
	ICEA	–	–	0.775	0.855	0.760	0.845	0.730	0.815
3/0	AEIC	–	–	–	–	0.810	0.900	0.775	0.865
	ICEA	–	–	0.825	0.905	0.810	0.895	0.775	0.860
4/0	AEIC	–	–	–	–	0.865	0.955	0.830	0.915
	ICEA	–	–	0.880	0.965	0.865	0.950	0.830	0.910
250	AEIC	–	–	–	–	–	–	–	–
	ICEA	–	–	0.935	1.020	0.920	1.005	0.880	0.965
350	AEIC	–	–	–	–	1.025	1.115	0.980	1.065
	ICEA	–	–	1.045	1.130	1.025	1.110	0.980	1.065
500	AEIC	–	–	–	–	1.150	1.245	1.100	1.185
	ICEA	–	–	1.175	1.260	1.150	1.235	1.100	1.185
750	AEIC	–	–	–	–	1.340	1.440	1.280	1.370
	ICEA	–	–	1.370	1.455	1.340	1.425	1.280	1.365
1000	AEIC	–	–	–	–	1.485	1.590	1.430	1.520
	ICEA	–	–	1.520	1.610	1.485	1.575	1.430	1.515

ICEA NOTE: Diameters specified in the above table are different than specified by AEIC CS8-00. Consult Accessory Manufacturer for proper selection of accessories. Diameters to be measured in accordance with 9.6.

15kV Cable (133% level, 220 mil)

Aluminum & Copper Conductor Size	Industry Standard	Solid Conductor Diameter in Inches Over Insulation Min.	Solid Max.	Stranded Conductor Diameter in Inches Over Insulation Min.	Stranded Max.	Compressed Conductor Diameter in Inches Over Insulation Min.	Compressed Max.	Compact Conductor Diameter in Inches Over Insulation Min.	Compact Max.
#2	AEIC	0.700	0.790	–	–	0.725	0.815	0.710	0.800
	ICEA	0.700	0.790	0.735	0.825	0.725	0.815	0.710	0.800
#1	AEIC	0.735	0.820	–	–	0.765	0.855	0.745	0.830
	ICEA	0.735	0.820	0.775	0.865	0.765	0.855	0.745	0.830
1/0	AEIC	0.770	0.860	–	–	0.805	0.895	0.780	0.865
	ICEA	0.770	0.855	0.815	0.905	0.805	0.895	0.780	0.865
2/0	AEIC	–	–	–	–	0.850	0.940	0.820	0.905
	ICEA	–	–	0.865	0.950	0.850	0.935	0.820	0.905
3/0	AEIC	–	–	–	–	0.900	0.990	0.865	0.955
	ICEA	–	–	0.915	1.000	0.900	0.985	0.865	0.955
4/0	AEIC	–	–	–	–	0.955	1.045	0.920	1.005
	ICEA	–	–	0.970	1.060	0.955	1.045	0.920	1.005
250	AEIC	–	–	–	–	–	–	–	–
	ICEA	–	–	1.025	1.115	1.010	1.100	0.970	1.060
350	AEIC	–	–	–	–	1.115	1.205	1.070	1.155
	ICEA	–	–	1.135	1.220	1.115	1.200	1.070	1.155
500	AEIC	–	–	–	–	1.240	1.335	1.190	1.275
	ICEA	–	–	1.265	1.355	1.240	1.330	1.190	1.275
750	AEIC	–	–	–	–	1.430	1.530	1.370	1.460
	ICEA	–	–	1.460	1.550	1.430	1.520	1.370	1.460
1000	AEIC	–	–	–	–	1.575	1.680	1.520	1.610
	ICEA	–	–	1.610	1.705	1.575	1.670	1.520	1.610

25kV Cable (100% level, 260 mil)

Aluminum & Copper Conductor Size	Industry Standard	Solid Conductor Diameter in Inches Over Insulation Min.	Solid Max.	Stranded Conductor Diameter in Inches Over Insulation Min.	Stranded Max.	Compressed Conductor Diameter in Inches Over Insulation Min.	Compressed Max.	Compact Conductor Diameter in Inches Over Insulation Min.	Compact Max.
#1	AEIC	0.805	0.900	–	–	0.835	0.935	0.815	0.910
	ICEA	0.805	0.895	0.845	0.935	0.835	0.925	0.815	0.905
1/0	AEIC	0.840	0.940	–	–	0.875	0.975	0.850	0.945
	ICEA	0.840	0.930	0.885	0.980	0.875	0.965	0.850	0.940
2/0	AEIC	–	–	–	–	0.920	1.020	0.890	0.985
	ICEA	–	–	0.935	1.025	0.920	1.010	0.890	0.980
3/0	AEIC	–	–	–	–	0.970	1.070	0.935	1.035
	ICEA	–	–	0.985	1.075	0.970	1.060	0.935	1.030
4/0	AEIC	–	–	–	–	1.025	1.125	0.990	1.085
	ICEA	–	–	1.040	1.135	1.025	1.115	0.990	1.080
250	AEIC	–	–	–	–	–	–	–	–
	ICEA	–	–	1.095	1.190	1.080	1.175	1.040	1.135
350	AEIC	–	–	–	–	1.185	1.295	1.140	1.245
	ICEA	–	–	1.205	1.295	1.185	1.275	1.140	1.230
500	AEIC	–	–	–	–	1.310	1.425	1.260	1.365
	ICEA	–	–	1.335	1.430	1.310	1.405	1.260	1.350
750	AEIC	–	–	–	–	1.500	1.620	1.440	1.550
	ICEA	–	–	1.530	1.625	1.500	1.595	1.440	1.535
1000	AEIC	–	–	–	–	1.645	1.770	1.590	1.700
	ICEA	–	–	1.680	1.775	1.645	1.740	1.590	1.685

ICEA NOTE: Diameters specified in the above tables are different than specified by AEIC CS8-00. Consult Accessory Manufacturer for proper selection of accessories. Diameters to be measured in accordance with 9.6.

Reference

Carlon® Rigid Nonmetallic Conduit (RNC), Fittings & Accessories

Carlon® manufactures the most complete line of nonmetallic conduits and fittings in the electrical industry. Carlon Schedule 40 and Schedule 80 conduits are designed for use aboveground and underground as described in the National Electrical Code. Specify only Carlon conduits and fittings to insure raceway system integrity.

Features

Ease of Installation Nonmetallic conduits are 1/4 to 1/5 the weight of metallic systems, can be installed in less than half the time, and are easily fabricated on the job.

Safety Nonmetallic conduits are nonconductive, assuring a safe system.

Impact Resistant Carlon Schedule 40 and Schedule 80 nonmetallic conduits are resistant to sunlight and are listed for exposed or outdoor usage. The use of expansion fittings allows the system to expand and contract with temperature variations.

Corrosion Resistant Carlon conduits and fittings are nonmetallic and will not rust or corrode.

Carlon nonmetallic Schedule 40 and Schedule 80 conduits and elbows are manufactured to NEMA TC-2, Federal specification WC1094A and UL 651 specifications. Fittings are manufactured to NEMA TC-3, Federal specification WC1094A and UL514B. Both conduit and fittings carry respective UL or ETL Listings and UL or ETL labels.

Schedule 40 PVC Rigid Nonmetallic Conduit (RNC).

(Heavy Wall EPC)

ETL Listed to UL 651 in compliance to the NEC
LISTED E35297
RUS Listed

Listed for underground applications encased in concrete or direct burial. Also for use in exposed or concealed applications aboveground.

- Sunlight resistant • Rated for use with 90°C conductors • Superior weathering characteristics

With Integral Bell*

Schedule 40 Heavy Wall

Part No. 10'	Part No. 20'	Nom. Size	Std. Crate Qty. 10'	Std. Crate Qty. 20'	Wt. Per 100'	Dimensions O.D.	Dimensions I.D.	Wall
49005-010		1/2"	6000'		17	.840	.622	.109
49007-010	49007-020	3/4"	4400'	8800'	23	1.050	.824	.113
49008-010	49008-020	1"	3600'	7200'	34	1.315	1.049	.133
49009-010	49009-020	1 1/4"	3300'	6600'	46	1.660	1.380	.140
49010-010	49010-020	1 1/2"	2250'	4500'	55	1.900	1.610	.145
49011-010	49011-020	2"	1400'	2800'	73	2.375	2.067	.154
49012-010	49012-020	2 1/2"	930'	1860'	124	2.875	2.469	.203
49013-010	49013-020	3"	880'	1760'	163	3.500	3.068	.216
49014-010	49014-020	3 1/2"	630'	1260'	196	4.000	3.548	.226
49015-010	49015-020	4"	570'	1140'	232	4.500	4.026	.237
49016-010	49016-020	5"	380'	760'	315	5.563	5.047	.258
49017-010	49017-020	6"	260'	520'	409	6.625	6.065	.280

Rigid nonmetallic conduit is normally supplied in standard 10' lengths, with one belled end per length. For specific requirements, it may be produced in lengths shorter or longer than 10', with or without belled ends.

Use RNC Fittings with Schedule 40 and Schedule 80 Conduit.

Notes: 1. Special fittings and conduit sizes will be quoted on request.
2. DON'T FORGET TO ORDER CEMENT.
3. Carlon reserves the right to ship to the nearest unitized quantity.

Typical Properties of Conduit Raw Material Compound

Thermal

	ASTM Test	Typical Values
Co-efficient of Thermal Expansion-inch/inch/°F (properties @ 73.4°F)	D696	3.38×10^{-5}
Heat Distortion °F at 264 psi	D648	160°F
Thermal Conductivity BTU (hr.) (ft.) (°F/in.)	N/A	1.3

Mechanical

	ASTM Test	Typical Values
Specific Gravity	D792	1.43 - 1.6
Tensile Strength (psi) @ 73.4°F	D638	5,000-6,500
Izod Impact ft lbs./in. of notch	D256	0.65 - 1.5
Flexural Strength (psi)	D790	12,500
Compressive Strength (psi)	D695	9,000
Hardness (Durometer D)	D2240	85

Electrical

	ASTM Test	Typical Values
Dielectrical Strength volts/mil	D149	1100
Dielectric Constant 60 CPS @ 30°C	D150	4.00
Power Factor 60 CPS @ 30°C	D150	1.93

Impedance (Volts lost per ampere per 100 feet)

	3∅90% P.F.	80% P.F.	1∅90% P.F.	80% P.F.
Steel Conduit	.0118	.0123	.0136	.0142
Schedule 40®	.0105	.0106	.0121	.0122

Using 250 KCmil Cu. conductor. comparable values for other conductor sizes.

Wire Fill

Maximum number of conductors in Schedule 40 PVC conduit
(Based on Table 1, Chapter 9 of the NEC)

Type Letters	Conductor Size AWG, MCM	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/4	5	6	8
THWN	14	13	24	39	69	94	154								
	12	10	18	29	51	79	114	164							
	10	6	11	18	32	44	73	194	160						
	8	3	5	9	19	22	36	51	71	106	136				
	6	1	4	6	11	15	26	37	57	76	98	125	154		
THHN	4	1	2	4	7	9	16	22	35	47	60	75	94	137	236
FEP (14 thru 2)	3	1	1	3	6	8	13	19	29	39	51	64	90	116	201
	2	1	1	3	5	7	11	16	25	33	43	54	67	97	169
FEPB (14 thru 8)	1		1	1	3	5	9	12	18	25	32	49	59	72	125
	1/0		1	1	3	4	7	10	15	21	27	33	42	61	105
PFA (14 thru 4/0)	2/0		1	1	2	3	6	8	13	17	22	28	35	51	88
	3/0		1	1	1	3	5	7	11	14	18	23	29	42	73
PFAH (14 thru 4/0)	4/0		1	1	1	2	4	6	9	12	15	19	24	35	61
	250			1	1	1	3	4	7	10	12	16	20	28	49
Z (14 thru 4/0)	300			1	1	1	3	4	6	8	11	13	17	24	42
	350			1	1	1	2	3	5	7	9	12	15	21	37
XHHW (4 thru 500MCM)	400				1	1	1	3	5	6	8	10	13	19	33
	500				1	1	1	2	4	5	7	9	11	16	27
	600				1	1	1	1	3	4	5	7	9	13	22
	700					1	1	1	3	4	5	6	8	11	19
	750					1	1	1	2	3	4	6	7	11	19
	6	1	3	5	9	13	21	30	47	63	81	102	128	185	320
	600				1	1	1	1	3	4	5	7	9	13	22
XHHW	700					1	1	1	3	4	5	6	7	11	19
	750					1	1	1	2	3	4	6	7	10	18

Maximum number of conductors in Schedule 80 PVC conduit
(Based on Table 1, Chapter 9 of the NEC)

Conductor Size AWG, MCM		1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5
# 14	THW	4	8	13	24	34	57	82	128		
	THHN	10	19	33	58	81	135	194	0		
12	THW	3	6	11	20	28	47	67	105	183	
	THHN	8	14	24	43	60	100	144	0		
10	THW	3	5	9	16	22	37	54	85	148	
	THHN	5	9	15	27	38	64	92	143		
8	THW	1	2	4	8	11	19	28	44	77	121
	THHN	1	4	7	13	18	31	45	70	123	195
6	THW	1	1	3	6	8	14	20	32	56	88
	THHN	1	3	5	9	13	22	32	50	88	140
4	THW	0	1	2	4	6	10	15	24	42	66
	THHN	1	1	3	6	8	13	20	31	54	86
3	THW	0	1	1	4	5	9	13	20	36	57
	THHN	1	1	2	5	7	11	17	26	46	73
2	THW	0	1	1	3	4	8	11	17	31	49
	THHN	1	1	1	4	5	9	14	22	38	61
1	THW	0	1	1	1	3	5	8	13	22	35
	THHN	0	1	1	3	4	7	10	16	28	45
0	THW	0	0	1	1	2	4	7	11	19	30
	THHN	0	1	1	2	3	6	8	13	24	38
00	THW	0	0	1	1	1	4	6	9	16	26
	THHN	0	1	1	1	3	5	7	11	20	32
000	THW	0	0	1	1	1	3	5	8	14	22
	THHN	0	0	1	1	2	4	6	9	16	26
0000	THW	0	0	1	1	1	3	4	6	11	18
	THHN	0	0	1	1	1	3	5	8	14	22
250	THW	0	0	0	1	1	1	3	5	9	14
	THHN	0	0	0	1	1	2	4	6	11	18
300	ThW	0	0	0	1	1	1	3	4	8	13
	THHN	0	0	0	1	1	1	3	5	9	15
350	THW	0	0	0	1	1	1	2	4	7	11
	THHN	0	0	0	1	1	1	3	4	8	13
400	THW	0	0	0	0	1	1	1	3	6	10
	THHN	0	0	0	1	1	1	2	4	7	12
500	THW	0	0	0	0	1	1	1	3	5	8
	THHN	0	0	0	0	1	1	1	3	6	10
600	THW	0	0	0	0	0	1	1	1	4	7
	THHN	0	0	0	0	1	1	1	3	5	8
700	THW	0	0	0	0	0	1	1	1	3	6

Weight Comparison

Carlon Schedule 40® rigid nonmetallic conduit compared to other rigid conduit in pounds per 100 feet (approx.)

Nom. Size	Carlon Schedule 40® Rigid Nonmetallic Conduit	Carlon Schedule 80® Rigid Nonmetallic Conduit	Aluminum	Electrical Metallic Tubing (EMT)	Intermediate Metal Conduit (IMC)	Rigid Metal Conduit (RMC)
1/2	18	22	27	30	57	79
3/4	23	29	36	46	78	105
1	35	43	53	66	112	153
1 1/4	48	60	70	96	114	201
1 1/2	57	72	86	112	176	246
2	76	100	116	142	230	334
2 1/2	125	153	183	230	393	527
3	164	212	239	270	483	690
3 1/2	198		288	350	561	831
4	234	310	340	400	625	982
5	317	431	465	Not Made	Not Made	1344
6	412	592	612	Not Made	Not Made	1770

Expansion and Contraction

Temperature Considerations for Rigid Nonmetallic Conduit Compensation for Linear Expansion

Like all construction materials, PVC will expand or contract with variations in temperatures. The coefficient of linear expansion in PVC conduit is 3.38×10^{-5} in./in./°F as compared to 1.2×10^{-5} for aluminum and 0.6×10^{-5} for steel. An expansion coupling is needed whenever the change in length due to temperature variation will exceed 1/2 in.

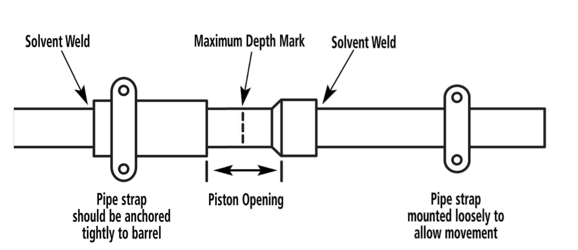
Add 30°F to the estimated temperature range when conduit is installed in direct sunlight to allow for radiant heating.

An expansion coupling consists of two sections of conduit, one telescoping inside another. When installing expansion couplings, alignment of piston and barrel is important. Be sure to mount expansion joint level for best performance.

For a vertical run, the expansion coupling must be installed close to the top of the run with the barrel jointing down, in order that rain water does not run into the opening. The lower end of the conduit run must be secured at the bottom so that any length change due to temperature variation will result in an upward movement.

Expansion Characteristics of PVC Rigid Nonmetallic Conduit
Coefficient of Thermal Expansion = 3.38×10^{-5} in./in./°F

Temperature Change in Degrees F	Length Change in inches per 100 Ft. of PVC Conduit	Temperature Change in Degrees F	Length Change in inches per 100 Ft. of PVC Conduit	Temperature Change in Degrees F	Length Change in inches per 100 Ft. of PVC Conduit	Temperature Change in Degrees F	Length Change in inches per 100 Ft. of PVC Conduit
5	0.2	55	2.2	105	4.2	155	6.3
10	0.4	60	2.4	110	4.5	160	6.5
15	0.6	65	2.6	115	4.7	165	6.7
20	0.8	70	2.8	120	4.9	170	6.9
25	1.0	75	3.0	125	5.1	175	7.1
30	1.2	80	3.2	130	5.3	180	7.3
35	1.4	85	3.4	135	5.5	185	7.5
40	1.6	90	3.6	140	5.7	190	7.7
45	1.8	95	3.8	145	5.9	195	7.9
50	2.0	100	4.1	150	6.1	200	8.1



Determine the Piston Opening

The expansion joint must be installed to allow both expansion and contraction of the conduit run. The correct piston opening for any installation condition should use the following formula:

$$O = \left[\frac{T\,max - T\,installed}{\Delta T} \right] E$$

Where:
- O = Piston opening (in.)
- T max = Maximum anticipated temperature of conduit (°F)
- T inst. = Temperature of conduit at time of installation (°F)
- ΔT = Total change in temperature of conduit (°F)
- E = Expansion allowance built into each expansion coupling (in.)

Example

380 ft. of conduit is to be installed on the outside of a building exposed to the sun in a single straight run. It is expected that the conduit will vary in temperature from 0°F in the winter to 140°F in the summer (this includes the 30°F for radiant heating from the sun.) The installation is to be made at a conduit temperature of 90°F. From the table, a 140°F temperature change will cause a 5.7 in. length change in 100 ft. of conduit. The total change for this example is 5.7" x 3.8 = 21.67" which should be rounded to 22". The number of expansion couplings will be 22" x coupling range (4" for Carlon trade sizes 1/2" through 1-1/2", and 8" for sizes 2" through 6".) If the E945D coupling is used, the number will be 22" x 4 = 5.50 which should be rounded to 6. The coupling should be placed at 62 ft. intervals (380 x 6). the proper piston setting at the time of installation is calculated as explained above.

$$O = \left[\frac{140 - 90}{140} \right] 4.0 = 1.4 \text{ in.}$$

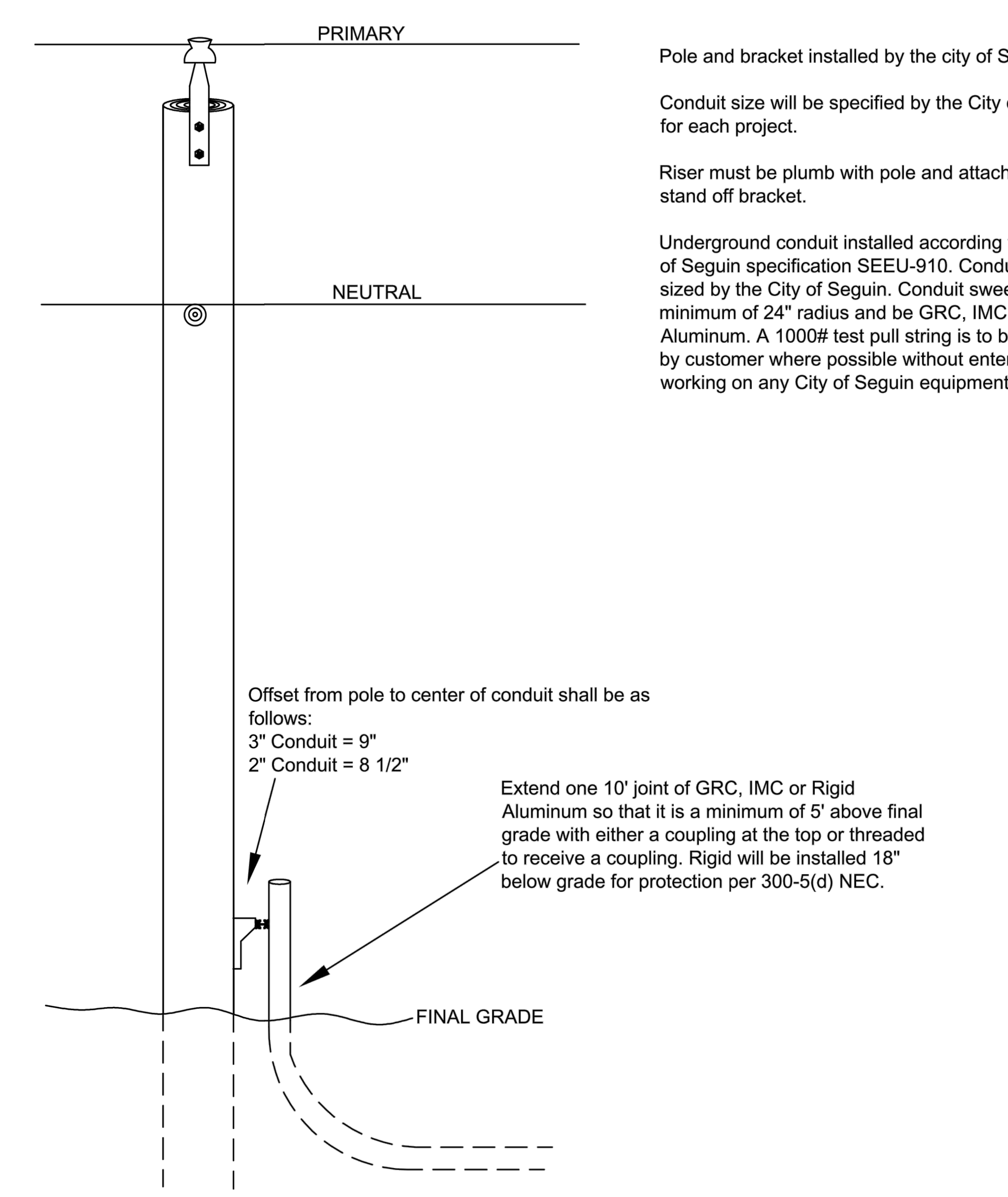
Insert the piston into the barrel to the maximum depth. Place a mark on the piston at the end of the barrel. To properly set the piston, pull the piston out of the barrel to correspond to the 2.1 in. calculated above. See drawing at lower left.

Summary

1. Anticipate expansion and contraction of PVC conduit in aboveground, exposed installation.
2. Use an expansion coupling when length change due to temperature variation will exceed 1/2".
3. PVC conduit expands 4.1" for each 100 feet of run and a 100°F temperature change.
4. Align expansion coupling with the conduit run to prevent binding.
5. Follow the instructions to set the piston opening.
6. Rigidly fix the outer barrel of the expansion coupling so it cannot move. Mount the conduit connected to the piston loosely enough to allow the conduit to move as the temperature changes.

This specification shall be used only in conjunction with the City of Seguin Electrical Connection Policy and may not reflect all requirements of a specific installation.

Locations are determined by the City of Seguin. All customer installations require inspection by the City of Seguin..



Pole and bracket installed by the city of Seguin.

Conduit size will be specified by the City of Seguin for each project.

Riser must be plumb with pole and attached to a stand off bracket.

Underground conduit installed according to the City of Seguin specification SEEU-910. Conduit to be sized by the City of Seguin. Conduit sweep to be a minimum of 24" radius and be GRC, IMC or Rigid Aluminum. A 1000# test pull string is to be installed by customer where possible without entering or working on any City of Seguin equipment.

Offset from pole to center of conduit shall be as follows:
3" Conduit = 9"
2" Conduit = 8 1/2"

Extend one 10' joint of GRC, IMC or Rigid Aluminum so that it is a minimum of 5' above final grade with either a coupling at the top or threaded to receive a coupling. Rigid will be installed 18" below grade for protection per 300-5(d) NEC.

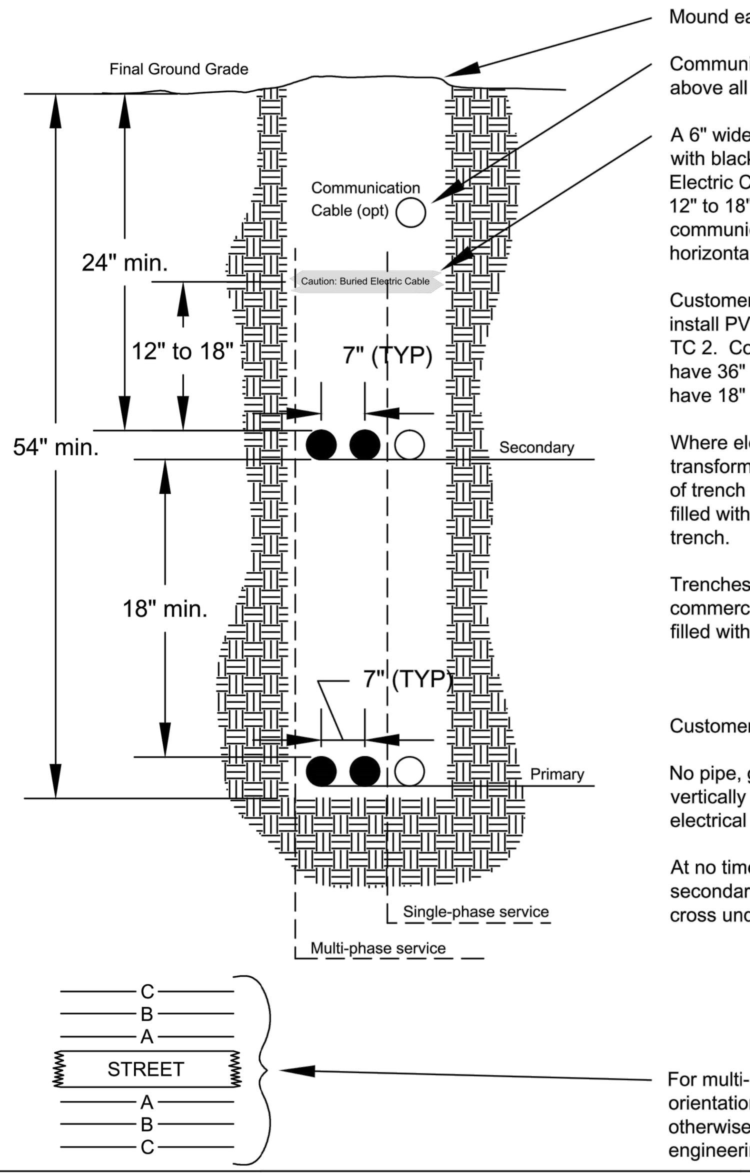
The City of Seguin
816 Fred Byrd Drive Seguin, Texas 78155

DATE ISSUED: 09/28/2010			TITLE: STUB OUT ON POLE RISER	
REV.	DATE	BY	SCALE: NTS	DRAWING NO.: SEEU-800

This specification shall be used only in conjunction with the City of Seguin Electrical Connection Policy and may not reflect all requirements of a specific job.

Locations are determined by the City of Seguin electrical engineering department. All customer installations require inspection by the City of Seguin electrical engineering department.

All Primary and Secondary stubouts shall be 5' minimum.



Mound earth 3" to 4" above final ground grade.

Communication cable/conduit shall be installed above all electrical conduit(s) and caution tape.

A 6" wide plastic caution tape, red or yellow in color with black lettering reading, "Caution: Buried Electric Cable Below", will be placed in the trench 12" to 18" above electrical conduit but below any communication cables. For more than 2 conduits horizontally in trench, 2 tapes shall be installed.

Customer shall excavate trench to proper depth and install PVC Schedule 40 Electrical Conduit NEMA TC 2. Conduit elbows (sweeps) for primary shall have 36" radius. Conduit elbows for secondary shall have 18" radius. Conduit shall be sized by NBU.

Where electrical equipment foundations (for transformers, junctions boxes, switchgear) lie on top of trench line, the foundation area shall be back filled with compacted base for the entire depth of the trench.

Trenches which cross or will be under streets, commercial driveways, or parking lots shall be back filled with compacted base material or washed sand.

Customer to furnish and install 1000# test pull string.

No pipe, gas, or water line shall be closer than 36" vertically or horizontally from any underground electrical conductor.

At no time shall any electric line, primary or secondary, be connected for service if found to cross under any building foundation.

For multi-phase service, conductor phase orientation shall be as shown unless approved otherwise by the City of Seguin electrical engineering department.

The City of Seguin
816 Fred Byrd Drive Seguin, Texas 78155

DATE ISSUED: 09/28/2010			TITLE: UNDERGROUND CONDUIT INSTALLATION	
REV.	DATE	BY	SCALE: NTS	DRAWING NO.: SEEU-910

FOR INFORMATION PURPOSES ONLY

*** THE QUANTITIES SHOWN ON THE PLANS AND THE BID DOCUMENTS ARE ESTIMATED QUANTITIES AND BASED ON THE PLAN SET AND TO BE USED FOR BIDDING PURPOSE ONLY. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING ACTUAL QUANTITIES. THE CONTRACTOR SHALL BE RESPONSIBLE TO RESOLVE ANY PERCEIVED DISCREPANCIES IN THE QUANTITIES WITH THE OWNER PRIOR BEGINNING ANY CONSTRUCTION WORK.

M & S ENGINEERING
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The City of Seguin
816 Fred Byrd Drive Seguin, Texas 78155

PROJ TITLE / LOCATION	IH10 UD CROSSING
REV NO / REV BY	
ISSUE DATE	05/08/2015
SCALE	NONE
TECH	M. E. BURCH
PAGE	4 OF 7
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746 N. Coney Ave.
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INWESCO INCORPORATED

2824 N. Sylvania Avenue
Fort Worth, Texas 76111
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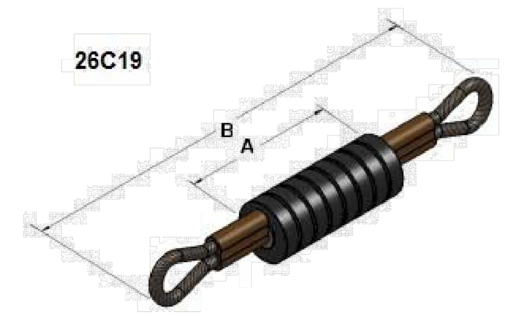
CONDUIT MANDRELS

Mandrels are used to prove the integrity of installed conduit runs. They will also remove small amounts of debris that may be in the conduit.

- Manufactured from high strength aluminum alloy tube
- Center rod is plated all thread steel
- Eye on each end is cast
- Optional neoprene rubber gasket and aluminum plate may be added so mandrel may be blown through conduct

Catalog Number	Conduit Size Inches	Mandrel O.D. Inches	Mandrel Length Inches	Blowing Package Catalog Number	Appx. Shipping Wt. Lbs. per 100 Pcs.
SC2	2	1-3/4	6	PK-1	200
SD2	2	1.315	6	PK-1	200
SC280	2	1-1/2	6	PK-1	200
SC25	2-1/2	2-1/4	6	- -	200
SC3	3	2-3/4	6	PK-2	200
SD3	3	2-3/8	6	PK-2	200
SC380	3	2-3/8	6	PK-2	200
GT532	3-1/2	3-5/32	12	PK-3	400
GT532-6	3-1/2	3-5/32	6	PK-3	200
SC35	3-1/2	3-1/4	6	PK-4	200
PT358	4	3-5/8	12	PK-6	400
PT358-6	4	3-5/8	6	PK-6	200
PT358-9	4	3-5/8	9	PK-6	300
SC4	4	3-3/4	6	PK-5	300
SD4	4	3.4	6	PK-5	300
SC480	4	3.4	6	PK-6	300
BD4	4	3-1/2	9	PK-6	300
SC5	5	4-3/4	6	PK-7	300
SD5	5	4.3	6	PK-7	300
SC580	5	4.4	6	PK-7	300
BD5	5	4-1/2	6/	PK-7	300
SC6	6	5-3/4	6	PK-8	400
SD6	6	5.2	6	PK-8	400
SC680	6	5.263	6	PK-8	400
BD6	6	5.563	6	PK-8	400



Flexible mandrels are available for innerduct and other type ducts

- Made of neoprene rubber discs spaced with steel washers
- Discs confined on a steel cable that forms an eye on each end

Catalog Number	Duct Sizes Inches	Mandrel O.D. Inches	Dimensions in Inches - A	Dimensions in Inches - B
26C19	1	7/8	2-5/8	7
26D19	1-1/4	1-1/8	2-7/8	7-1/4

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Polyester MULETAPE®

Description

Flat, woven, polyester tape used for installing fiber optic, copper, and coaxial cables in underground conduit.

Features & Benefits

- Lubricated for easy pulling and reduced friction
- Durably printed with sequential footage or meter markings*
- Available in a variety of pulling strengths from 200 to 6,000 lbs. (91-2727 kg)
- Low elongation for enhanced worker safety
- Lightweight and easily blown into conduit or innerduct
- Available in splice-free lengths up to 100,000 ft. (30 km) for faster, easier installation
- Packaged on sturdy wooden or plastic reels
- Easily spliced using conventional methods or the MULEKNOT™

Please refer to NEPTCO's applications bulletin for instructions on splicing using a MULEKNOT.

POLYESTER MULETAPE PRODUCT ORDERING INFORMATION

PRODUCT	STRENGTH lbs (kg)	TYPICAL BOWLINE STRENGTH lbs (kg)	TYPICAL MULEKNOT STRENGTH lbs (kg)	MINIMUM REEL LENGTHS ft (km)	MAXIMUM REEL LENGTHS ft (km)	APPROX. WIDTH
WP200N**	200 (91)	110 (50)	150 (68)	3000 (1)	100,000 (31)	1/8"
WP400P	400 (182)	190 (86)	300 (136)	3000 (1)	100,000 (31)	1/4"
WP600P	600 (273)	360 (164)	468 (213)	3000 (1)	100,000 (31)	3/8"
WP900P	900 (409)	480 (218)	770 (350)	3000 (1)	100,000 (31)	1/2"
WP1250P	1250 (568)	760 (345)	900 (409)	3000 (1)	70,000 (21)	1/2"
WP1800P	1800 (818)	830 (377)	1400 (636)	3000 (1)	50,000 (15)	5/8"
RP1800P	1800 (818)	830 (377)	1400 (636)	3000 (1)	3,000 (1)	3/8"
WP2500P	2500 (1136)	1300 (591)	1800 (818)	3000 (1)	25,000 (8)	3/4"
RP3300P	3300 (1500)	1900 (864)	2900 (1318)	1000 (.3)	3,000 (1)	1/2"
RP4000P	4000 (1818)	2300 (1045)	3500 (1591)	1000 (.3)	3,000 (1)	5/8"
RP6000P	6000 (2727)	3080 (1400)	5000 (2273)	1000 (.3)	3,000 (1)	3/4"

* All products are also available unprinted
** Product is only available unprinted

PLEASE SEE REVERSE SIDE FOR ADDITIONAL INFORMATION

NEPTCO

NEPTCO • 30 Hamlet Street, Pawtucket, Rhode Island 02861
Phone: 401.722.5500 • Toll-free: 800.354.5445 • Fax: 401.722.6378 • Web: www.muletape.com

Recommended MULETAPE® For Outside Plant Fiber Optic Cable Installation

In order to avoid damaging delicate fiber optic cables during installation, it is crucial that the cables not be subjected to excessive strain. The charts below will assist you in selecting the appropriate MULETAPE product for your application.

All Dielectric Fiber Optic Cable

NEPTCO Product	Fiber Type	Fiber Count	Approx. lbs/MFT kg (km)	Approx. Cable Diameter in. (mm)
WP900P	LOOSE TUBE	2-24 FIBERS	70 (104)	.39 (10.0)
WP1250P	LOOSE TUBE	25-96 FIBERS	130 (193)	.58 (14.7)
WP1800P	LOOSE TUBE	97-288 FIBERS	200 (297)	.79 (20.1)
WP1250P	RIBBON	12-96 FIBERS	115 (171)	.59 (15.0)
WP1800P	RIBBON	108-216 FIBERS	180 (268)	.69 (17.5)
WP1800P	RIBBON	288-432 FIBERS	280 (417)	.96 (24.3)
WP2500P	RIBBON	864 FIBERS	290 (431)	1.05 (27.0)

Armored Fiber Optic Cable

NEPTCO Product	Fiber Type	Fiber Count	Approx. lbs/MFT kg (km)	Approx. Cable Diameter in. (mm)
WP900P	LOOSE TUBE	2-24 FIBERS	124 (185)	.51 (13.0)
WP1250P	LOOSE TUBE	25-96 FIBERS	197 (293)	.66 (16.7)
WP1800P	LOOSE TUBE	97-288 FIBERS	325 (484)	.89 (22.6)
WP1250P	RIBBON	12-96 FIBERS	150 (223)	.59 (15.0)
WP1800P	RIBBON	108-216 FIBERS	200 (298)	.69 (17.5)
WP1800P	RIBBON	288-432 FIBERS	363 (540)	.98 (25.0)
WP2500P	RIBBON	864 FIBERS	431 (641)	1.10 (28.0)

Note:
- The duct fill ratio should be less than 50% by cross-sectional area.
- The area of the cable divided by the area of the innerduct should be less than or equal to 0.50 for ease of installation.

MULETAPE®

WARNING MULETAPE®: For cable installation only. Do not strap, bind or lift items with this product.

NEPTCO warrants that its products will work in a manner consistent with the capabilities described in the data sheet. This warranty shall be void if the product has been tampered with or improperly used. Except for the express warranty and limited remedies described above, NEPTCO disclaims all other warranties including implied warranties. NEPTCO and its authorized agents shall have no other liability beyond the price of the product for damages to a purchaser, including consequential damages, occurring in connection with the use or performance of the product.

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ISO9001:2008 KEMA CERTIFIED

Suspension Grips Ring & Conduit Riser

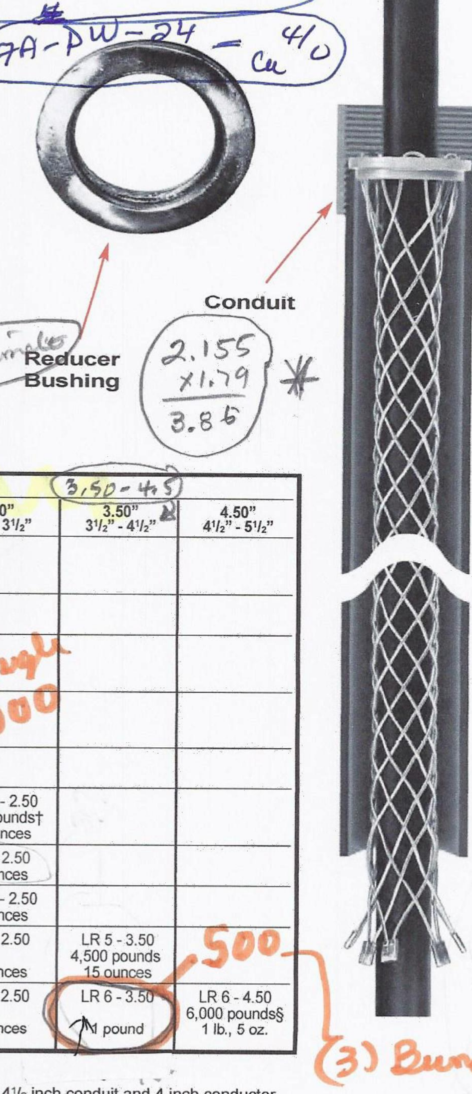
For Cable Suspension

Conduit Ring Grips

E-TW-46 = (3) 500 Bun
C-TW-32 = (1) 1000 mcm
AA-DW-24 – Cu 4/0

CONDUIT RISER RING GRIPS are specially designed to suspend conductor by using the conduit as a means of support. With the conductor approximately one-half inch above the "in place" position, the grip is slipped into position and seats on the conduit edge, thus completing the installation. Ring size permits conduit couplings to be used. The ring and its components are constructed of investment cast, powder coated bronze. The plastic coated Aircraft Strand cable – plus the flexibility of design – permits a maximum of line surge without conductor damage. Patent No's. 3,216,682 and 3,399,853. Foreign and other patents are pending.

outside diameter
1000 – 2.20"
500 – 1.79"



2.155
x1.79
3.85

CONDUIT SIZE	GRIP SIZE .75" ¾" - 1⅛"	1.12" 1⅛" - 1⅝"	1.62" 1⅝" - 2½"	2.50" 2½" - 3½"	3.50" 3½" - 4½"	4.50" 4½" - 5½"
1¼"	LR 1¼ - .75 1,000 pounds 2½ ounces					
1½"	LR 1½ - .75 3 ounces					
2"	LR 2 - .75 3 ounces	LR 2 1.12 1,250 pounds 3½ ounces				
2½"	LR 2½ - .75 3½ ounces	LR 2½ - 1.12 4 ounces	LR 2½ - 1.62 2,250 pounds* 4½ ounces			
3"	LR 3 - .75 4 ounces	LR 3 - 1.12 4½ ounces	LR 3 - 1.62 6 ounces			
3½"	LR 3½ - .75 4½ ounces	LR 3½ - 1.12 5 ounces	LR 3½ - 1.62 6½ ounces	LR 3½ - 2.50 3,000 pounds† 9½ ounces		
4"	LR 4 - .75 4½ ounces	LR 4 - 1.12 4¾ ounces	LR 4 - 1.62 6¾ ounces	LR 4 - 2.50 10 ounces		
4½"	LR 4½ - .75 5 ounces	LR 4½ - 1.12 5½ ounces	LR 4½ - 1.62 7½ ounces	LR 4½ - 2.50 10 ounces		
5"	LR 5 - .75 5½ ounces	LR 5 - 1.12 6 ounces	LR 5 - 1.62 8 ounces	LR 5 - 2.50 11 ounces	LR 5 - 3.50 4,500 pounds 15 ounces	
6"	LR 6 - .75 7 ounces	LR 6 - 1.12 8 ounces	LR 6 - 1.62 11½ ounces	LR 6 - 2.50 13 ounces	LR 6 - 3.50 1 pound	LR 6 - 4.50 6,000 pounds§ 1 lb., 5 oz.

(3.50 - 4.5) Single 1000 500 (3) Bundled

* Maximum in 2½ inch conduit and 2 inch conductor
† Maximum in 3½ inch conduit and 3 inch conductor
Maximum in 4½ inch conduit and 4 inch conductor
§ Maximum in 6 inch conduit and 5½ inch conductor

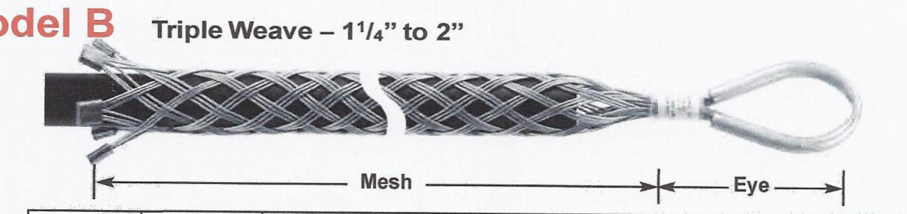
OVER 70 YEARS

Standard Pulling Grips

Patent No. 3,122,806

The following Lewis pulling grips are available in triple weave configuration and are made of High-Fatigue Aircraft Strand steel cable that is coated with a UV resistant plastic coating. This plastic coating increases the life of the grip, provides a bearing surface on underground pulls and increases the ease and SAFETY of installation and removal for workmen. The Pulling Eye on these Standard Pulling Grips is covered with Aluminum Tubing for a more durable attachment point. Eye can also be ordered with our exclusive Patented, Flexible, Stress relieving, plastic tubing eye for use in less abrasive inner conduit pulls. Copper tabs on tail end of grip add reinforcement to tail end of grip strands and ensure quick loading of product to be pulled.

Model B Triple Weave – 1¼" to 2"



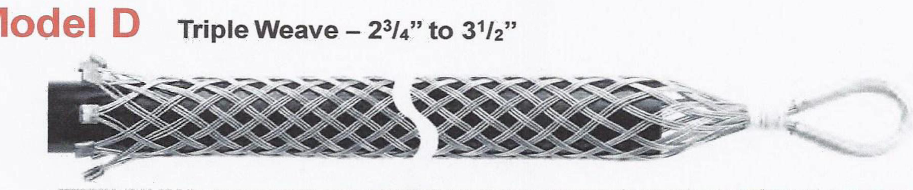
Part No.	Size Range	Work Load	Approx. Brk. Stgth.	Weight	Weave	Mesh Length	Eye
B-TW-26	1¼" - 2"	2,500 lbs.	7,500 lbs.	1 lb., 1 oz.	Triple	26"	3¼"
B-TW-32	1¼" - 2"	3,500 lbs.	10,500 lbs.	1 lb., 1 oz.	Triple	32"	3¼"

Model C Triple Weave – 2" to 2¾"

1000 mcm

Part No.	Size Range	Work Load	Approx. Brk. Stgth.	Weight	Weave	Mesh Length	Eye
C-TW-32	2" - 2¾"	3,500 lbs.	10,500 lbs.	1 lb., 4 oz.	Triple	32"	3½"
C-TW-38	2" - 2¾"	4,500 lbs.	13,500 lbs.	1 lb., 11 oz.	Triple	38"	3½"

Model D Triple Weave – 2¾" to 3½"



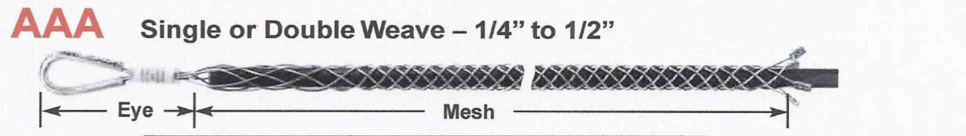
Part No.	Size Range	Work Load	Approx. Brk. Stgth.	Weight	Weave	Mesh Length	Eye
D-TW-38	2¾" - 3½"	4,500 lbs.	13,500 lbs.	1 lb., 12 oz.	Triple	38"	3¾"
D-TW-46	2¾" - 3½"	5,500 lbs.	16,500 lbs.	2 lb., 2 oz.	Triple	46"	3¾"

Standard Pulling Grips

(Aluminum Tubing Eye & Copper Tabs)

The following Lewis pulling grips are manufactured in single, double or triple weave configurations (as indicated) of High-Fatigue Aircraft Strand steel cable that is coated with a UV resistant plastic coating. This plastic coating increases the life of the grip, provides a bearing surface on underground pulls and increases the ease and SAFETY of installation and removal for workmen. The Pulling Eye on each Pulling Grip is covered with Aluminum Tubing for a more durable attachment point. Eye can also be ordered with our exclusive Patented, Flexible, Stress relieving, plastic tubing eye for use in less abrasive inner conduit pulls. Copper tabs on tail end of grip add reinforcement to tail end of grip strands and ensure quick loading of product to be pulled.

Model AAA Single or Double Weave – 1/4" to 1/2"



Part No.	Range	Wk.Ld.	Approx. Brk. Stgth.	Weave	Mesh	Eye
AAA-SW-18	¼" - ½"	750 lbs.	1,500 lbs.	single	18"	5½"
AAA-SW-24	¼" - ½"	750 lbs.	1,500 lbs.	single	24"	6"
AAA-DW-18	¼" - ½"	1,700 lbs.	3,500 lbs.	double	18"	5½"
AAA-DW-24	¼" - ½"	1,700 lbs.	3,500 lbs.	double	24"	6"

Model AA Single, Double or Triple Weave – 1/2" to 3/4"

INS 4/0 Cu

Part No.	Range	Wk.Ld.	Approx. Brk. Stgth.	Weave	Mesh	Eye
AA-SW-18	½" - ¾"	750 lbs.	1,500 lbs.	single	18"	5½"
AA-SW-24	½" - ¾"	750 lbs.	1,500 lbs.	single	24"	6"
AA-DW-18	½" - ¾"	2,000 lbs.	4,000 lbs.	double	18"	5½"
AA-DW-24	½" - ¾"	2,000 lbs.	4,000 lbs.	double	24"	6"
AA-TW-12	½" - ¾"	2,600 lbs.	5,200 lbs.	triple	12"	6"
AA-TW-18	½" - ¾"	2,600 lbs.	5,200 lbs.	triple	18"	6"
AA-TW-24	½" - ¾"	2,600 lbs.	5,200 lbs.	triple	24"	6"
AA-TW-36	½" - ¾"	2,600 lbs.	5,200 lbs.	triple	36"	6"

Model A Single, Double or Triple Weave – 3/4" to 1¼"

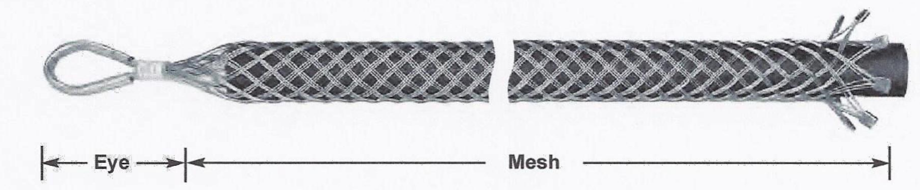
Part No.	Size Range	Work Load	Approx Brk. Stgth.	Weight	Weave	Mesh Length	Eye
A-SW-18	¾" - 1¼"	1,000 lbs.	3,000 lbs.	5½ oz.	Single	18"	3"
A-SW-24	¾" - 1¼"	1,000 lbs.	3,000 lbs.	5½ oz.	Single	24"	3"
A-DW-18	¾" - 1¼"	2,000 lbs.	6,000 lbs.	8½ oz.	Double	18"	3"
A-DW-24	¾" - 1¼"	2,000 lbs.	6,000 lbs.	8½ oz.	Double	24"	3"
A-TW-18	¾" - 1¼"	3,500 lbs.	10,000 lbs.	12 oz.	Triple	18"	3"
A-TW-24	¾" - 1¼"	3,500 lbs.	10,000 lbs.	12 oz.	Triple	24"	3"

Standard Pulling Grips

Patent No. 3,122,806

The following Lewis pulling grips are available in triple weave configuration and are made of High-Fatigue Aircraft Strand steel cable that is coated with a UV resistant plastic coating. This plastic coating increases the life of the grip, provides a bearing surface on underground pulls and increases the ease and SAFETY of installation and removal for workmen. The Pulling Eye on these Standard Pulling Grips is covered with Aluminum Tubing for a more durable attachment point. Eye can also be ordered with our exclusive Patented, Flexible, Stress relieving, plastic tubing eye for use in less abrasive inner conduit pulls. Copper tabs on tail end of grip add reinforcement to tail end of grip strands and ensure quick loading of product to be pulled.

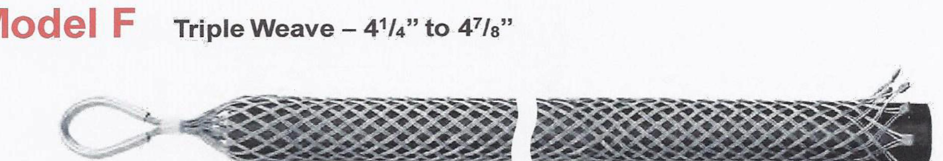
Model E Triple Weave – 3½" to 4¼"



500 mcm

Part No.	Size Range	Work Load	Approx. Brk. Stgth.	Weight	Weave	Mesh Length	Eye
E-TW-46	3½" - 4¼"	5,500 lbs.	16,500 lbs.	2 lb., 5 oz.	Triple	46"	4"
E-TW-52	3½" - 4¼"	6,500 lbs.	19,500 lbs.	2 lb., 13 oz.	Triple	52"	4"

Model F Triple Weave – 4¼" to 4⅞"



Part No.	Size Range	Work Load	Approx. Brk. Stgth.	Weight	Weave	Mesh Length	Eye
F-TW-52	4¼" - 4⅞"	6,000 lbs.	18,000 lbs.	2 lb., 5 oz.	Triple	52"	4"
F-TW-58	4¼" - 4⅞"	7,000 lbs.	21,000 lbs.	2 lb., 13 oz.	Triple	58"	4"

FOR INFORMATION PURPOSES ONLY

*** THE QUANTITIES SHOWN ON THE PLANS AND THE BID DOCUMENTS ARE ESTIMATED QUANTITIES AND BASED ON THE PLAN SET AND TO BE USED FOR BIDDING PURPOSE ONLY. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING ACTUAL QUANTITIES. THE CONTRACTOR SHALL BE RESPONSIBLE TO RESOLVE ANY PERCEIVED DISCREPANCIES IN THE QUANTITIES WITH THE OWNER PRIOR BEGINNING ANY CONSTRUCTION WORK.

M & S ENGINEERING
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The City of Seguin
816 Fred Byrd Drive Seguin, Texas 78155

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UNDERGROUND DEVICES INCORPORATED
3304 COMMERCIAL AVENUE
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Technical Data

BNT-S9 STANCHIONS & MOUNTING HARDWARE

TABLE 1: STANCHION FEATURES & DIMENSIONS

CATALOG NUMBER	DISTANCE BETWEEN ARM MOUNTING HOLES (INCHES)	MAX QUANTITY OF ARMS ACCOMMODATED	QUANTITY OF WALL MOUNTING HOLES	DIMENSIONS (INCHES) L	M	A	B
BNT-S952A	9	5	2	50.00	46.00	2.00	4.00
BNT-S942A	9	4	2	41.00	37.00	2.00	4.00
BNT-S932A	9	3	2	32.00	28.00	2.00	4.00
BNT-S922A	9	2	2	23.00	19.00	2.00	4.00
BNT-S912A	—	1	2	14.00	10.00	2.00	4.00

STANCHION CONFIGURATION
QUANTITY OF WALL MOUNTING HOLES
QUANTITY OF ARM MOUNTING HOLES
DISTANCE BETWEEN ARMS
S=STANCHION
CABLE SUPPORT FAMILY

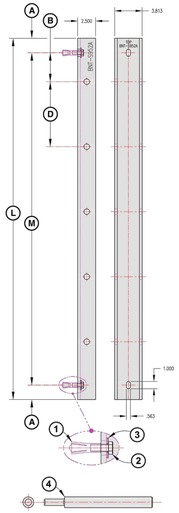
NOTE: Stanchions that accommodate more arms and that have other distance between arms are available. Consult Underground Devices sales engineering.

TABLE 2: STANCHION HARDWARE

MATERIAL	ITEM No.	CATALOG NUMBER	DESCRIPTION
316 STAINLESS STEEL	1	FSRM-12-316	1/2-13 DROP-IN ANCHOR
	2	FHC316-16-40	1/2-13 X 1-1/4" LONG HEX HEAD CAP SCREW
	3	FFW316-17-44	FLAT WASHER ID=.531, OD=1.375, THICKNESS=.135
18-8 STAINLESS STEEL	1	FSRM-12-188	1/2-13 DROP-IN ANCHOR
	2	FHC188-16-40	1/2-13 X 1-1/4" LONG HEX HEAD CAP SCREW
	3	FFW188-17-44	FLAT WASHER ID=.531, OD=1.375, THICKNESS=.135
STEEL	4	FRT-112	SETTING TOOL - Use to install FSRM-12-316 and FSRM-12-188 Drop-in Anchors

TABLE 3: STANDARD CARTON INFORMATION

CATALOG NUMBER	STANDARD CARTON QUANTITY	LBS	LENGTH (INCHES)	WIDTH (INCHES)	HEIGHT (INCHES)	CUBIC FEET
BNT-S952A	4	43	51	9.375	3.625	1.003
BNT-S942A	4	35	42	9.375	3.625	.826
BNT-S932A	4	28	33	9.375	3.625	.649
BNT-S922A	8	40	47	9.375	3.625	.924
BNT-S912A	12	36	43	9.375	3.625	.845
FSRM-12-316	40	4.75	4.562	4.250	2.188	.025
FHC316-16-40	40	4.20	4.562	4.250	2.188	.025
FFW316-17-44	40	2.12	4.562	4.250	2.188	.025
FSRM-12-188	40	4.75	4.562	4.250	2.188	.025
FHC188-16-40	40	4.20	4.562	4.250	2.188	.025
FFW188-17-44	40	2.12	4.562	4.250	2.188	.025
FRT-112	1	.40	6.000	.750	.750	.002



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FORM: 071309AA (PAGE 1 OF 1)

UNDERGROUND DEVICES INCORPORATED
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NORTHBROOK, ILLINOIS 60062
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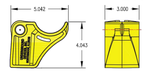
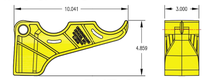
Technical Data

BNT ARMS & PINS



BNT-A1



BNT-A2

BNT-A3

BNT-P4
(SEE NOTES 1 & 2)

BNT-P5
(SEE NOTES 1 & 3)

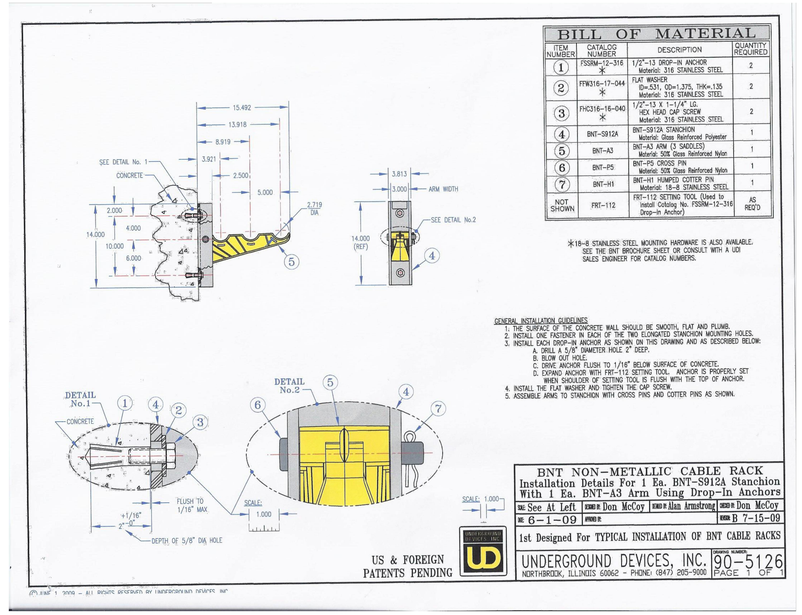
BNT-H1
(SEE NOTE 1)

CATALOG NUMBER	DESCRIPTION	STANDARD CARTON QUANTITY	LBS	LENGTH (INCHES)	WIDTH (INCHES)	HEIGHT (INCHES)	CUBIC FEET
BNT-A1	ONE SADDLE CABLE SUPPORT ARM	10	8	15.250	8.250	4.750	.346
BNT-A2	TWO SADDLE CABLE SUPPORT ARM	10	16	15.250	13.250	5.500	.643
BNT-A3	THREE SADDLE CABLE SUPPORT ARM	10	23	15.250	15.250	7.500	1.009
BNT-P4	4" CROSS PIN WITH HUMPED COTTER	10	2	5.750	4.250	4.250	.060
BNT-P5	5" CROSS PIN WITH HUMPED COTTER	10	2	5.750	4.250	4.250	.060
BNT-H1	HUMPED COTTER PIN	40	.6	3.75	3.125	2.125	.014

NOTES:
1) 1 each BNT-H1 humped cotter pin is included with each BNT-P pin.
2) Use the BNT-P4 pin with existing steel stanchions.
3) Use the BNT-P5 cross pin with BNT-S non-metallic stanchions.

NEMA MEMBER

FORM: 071309BA (PAGE 1 OF 1)



BILL OF MATERIAL

ITEM NUMBER	CATALOG NUMBER	DESCRIPTION	QUANTITY REQUIRED
1	FSSRM-12-316 *	1/2"-13 DROP-IN ANCHOR Material: 316 STAINLESS STEEL	2
2	FFW316-17-044 *	FLAT WASHER ID=.531, OD=1.375, THK=.135 Material: 316 STAINLESS STEEL	2
3	FHC316-16-040 *	1/2"-13 X 1-1/4" LG. HEX HEAD CAP SCREW Material: 316 STAINLESS STEEL	2
4	BNT-S912A	BNT-S912A STANCHION Material: Glass Reinforced Polyester	1
5	BNT-A3	BNT-A3 ARM (3 SADDLES) Material: 50% Glass Reinforced Nylon	1
6	BNT-P5	BNT-P5 CROSS PIN Material: 50% Glass Reinforced Nylon	1
7	BNT-H1	BNT-H1 HUMPED COTTER PIN Material: 18-8 STAINLESS STEEL	1
NOT SHOWN	FRT-112	FRT-112 SETTING TOOL (Used to install Cobalog No. FSSRM-12-316 Drop-in Anchor)	AS REQ'D

*18-8 STAINLESS STEEL MOUNTING HARDWARE IS ALSO AVAILABLE. SEE THE BNT BROCHURE SHEET OR CONSULT WITH A UDI SALES ENGINEER FOR CATALOG NUMBERS.

GENERAL INSTALLATION GUIDELINES
1. THE SURFACE OF THE CONCRETE WALL SHOULD BE SMOOTH, FLAT AND PLUMB.
2. INSTALL ONE FASTENER IN EACH OF THE TWO ELONGATED STANCHION MOUNTING HOLES.
3. INSTALL EACH DROP-IN ANCHOR AS SHOWN ON THIS DRAWING AND AS DESCRIBED BELOW:
   A. DRILL A 5/8" DIAMETER HOLE 2" DEEP.
   B. BLOW OUT HOLE.
   C. DRIVE ANCHOR FLUSH TO 1/16" BELOW SURFACE OF CONCRETE.
   D. EXPAND ANCHOR WITH FRT-112 SETTING TOOL. ANCHOR IS PROPERLY SET WHEN SHOULDER OF SETTING TOOL IS FLUSH WITH THE TOP OF ANCHOR.
4. INSTALL THE FLAT WASHER AND TIGHTEN THE CAP SCREW.
5. ASSEMBLE ARMS TO STANCHION WITH CROSS PINS AND COTTER PINS AS SHOWN.

BNT NON-METALLIC CABLE RACK
Installation Details For 1 Ea. BNT-S912A Stanchion
With 1 Ea. BNT-A3 Arm Using Drop-In Anchors

DATE See At Left	DRAWN BY Don McCoy	REVISED BY Alan Armstrong	DESIGN BY Don McCoy
DATE 6-1-09	APPROVED BY		REVISED B 7-15-09

1st Designed For TYPICAL INSTALLATION OF BNT CABLE RACKS

US & FOREIGN PATENTS PENDING

UNDERGROUND DEVICES, INC.
NORTHBROOK, ILLINOIS 60062 - PHONE: (847) 205-9000

DRAWING NUMBER 90-5126
PAGE 1 OF

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FOR INFORMATION PURPOSES ONLY

*** THE QUANTITIES SHOWN ON THE PLANS AND THE BID DOCUMENTS ARE ESTIMATED QUANTITIES AND BASED ON THE PLAN SET AND TO BE USED FOR BIDDING PURPOSE ONLY. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING ACTUAL QUANTITIES. THE CONTRACTOR SHALL BE RESPONSIBLE TO RESOLVE ANY PERCEIVED DISCREPANCIES IN THE QUANTITIES WITH THE OWNER PRIOR BEGINNING ANY CONSTRUCTION WORK.

M & S ENGINEERING
ENGINEERS, PLANNERS AND SURVEYORS
TEXAS REGISTERED ENGINEERING FIRM F-1394

MAIN OFFICE
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McQUEENEY, TEXAS 78123
PHONE # (830) 560-3200
FAX # (830) 560-3203

The City of Seguin
816 Fred Byrd Drive Seguin, Texas 78155

PROJ TITLE / LOCATION: IH10 UD CROSSING

REV NO	REV BY	ISSUE DATE
		05/08/2015
SCALE: NONE		TECH: M. E. BURCH
PAGE: 6 OF 7		REV #:

Date: 5/7/2015 3:34 PM User: MARTY BURCH
File: S:\SEGUIN\2015\IH10 UD CROSSING\IH10 UD CROSSING.DWG

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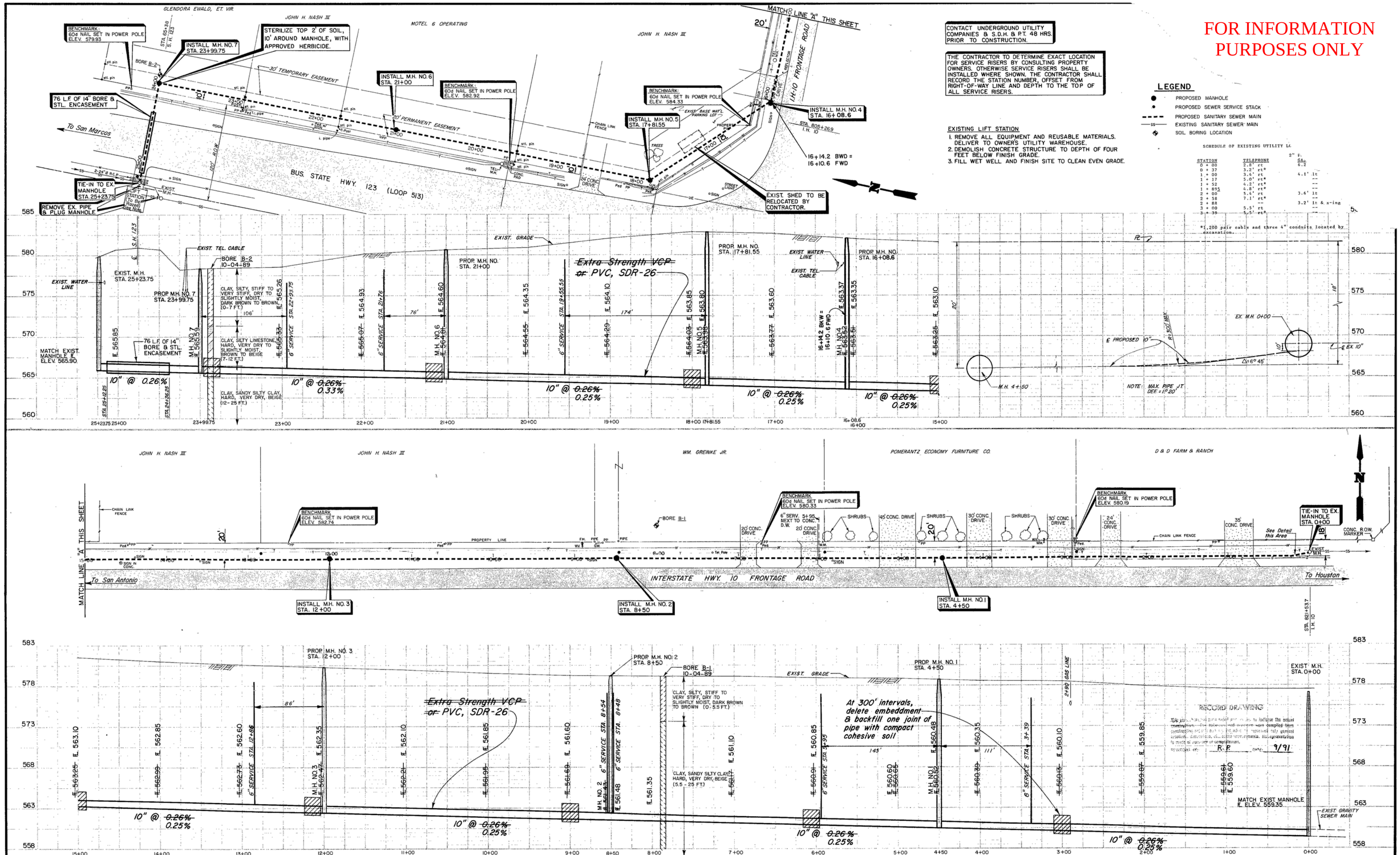

CONTACT UNDERGROUND UTILITY COMPANIES & S.D.H. & P.T. 48 HRS. PRIOR TO CONSTRUCTION.

THE CONTRACTOR TO DETERMINE EXACT LOCATION FOR SERVICE RISERS BY CONSULTING PROPERTY OWNERS. OTHERWISE SERVICE RISERS SHALL BE INSTALLED WHERE SHOWN. THE CONTRACTOR SHALL RECORD THE STATION NUMBER, OFFSET FROM RIGHT-OF-WAY LINE AND DEPTH TO THE TOP OF ALL SERVICE RISERS.

EXISTING LIFT STATION

1. REMOVE ALL EQUIPMENT AND REUSABLE MATERIALS. DELIVER TO OWNER'S UTILITY WAREHOUSE.
2. DEMOLISH CONCRETE STRUCTURE TO DEPTH OF FOUR FEET BELOW FINISH GRADE.
3. FILL WET WELL AND FINISH SITE TO CLEAN EVEN GRADE.

LEGEND

- PROPOSED MANHOLE
- PROPOSED SEWER SERVICE STACK
- PROPOSED SANITARY SEWER MAIN
- SS EXISTING SANITARY SEWER MAIN
- SOIL BORING LOCATION

SCHEDULE OF EXISTING UTILITY L

STATION	TELEPHONE	2" F. GA.
0 + 00	2.8' rt	6.2
0 + 37	3.2' rt*	
1 + 00	3.4' rt	4.1' lt
1 + 17	5.0' rt*	--
1 + 52	4.2' rt*	--
1 + 895	4.8' rt*	--
2 + 00	5.4' rt	3.6' lt
2 + 58	7.1' rt*	--
2 + 88	--	3.2' lt & x-ing
3 + 00	5.5' rt	--
3 + 39	6.5' rt*	--

*1,200 pair cable and three 4" conduits located by excavation.

NO.	REVISION	DATE	NO.	REVISION	DATE

SCALE: HOR.: 1"=50'; VERT.: 1"=5'

DRAWN BY: A.N. DATE: 7/89

CHECKED BY: R.C.C. DATE: 7/89

R.C. Collins 6-1-90

SOUTHWEST ENGINEERS, INC.

ENGINEERS – SURVEYORS – PLANNERS

GONZALES TEXAS

WASTEWATER COLLECTION IMPROVEMENTS

CITY OF SEGUIN

GUADALUPE COUNTY, TEXAS

PROJECT NO. 060-45-89

DRAWING NO. WW-1

SHEET 2 of 3 SHEET