

**MATERIAL LIST - R-117 REGULATOR STATION**

ITEM	QUANTITY	STOCK NO.	DESCRIPTION
1.	4	NONE	3" Mooney Flowgrid Single port regulator, 100% cage (change to 50% item 7), <sup>*</sup> FG 18, ANSI 600 (Special order)
2.	4	NONE	Mooney Series 20H Pilot c/w Black spring 200-520 P.S.I.G., Stock No.FP-41 (PRV) (Special order)
3.	1	R-397	6" Mooney Flowgrid Single port regulator, FG 45, ANSI 300
4.	1	NONE	Mooney Series 20H Pilot c/w Black spring 200-520 P.S.I.G., Stock No.FP-43 (BPV) (Special order)
5.	5	R-370	Mooney Type 24 restrictor
6.	4	R-375	1/4" Mooney Series 30S pilot supply filter, 1500 P.S.I.G.
7.	4	NONE	50% Capacity throttle plate for 3" Mooney regulator FG18, #103-110-01 (Special order)
8.	4'	PB-451	3"x0.216" w.t., Bare steel pipe, API 5L, Grade B, PO # _____
9.	32'	PB-552X42	4"x0.237" w.t., Bare steel pipe, API 5L, Grade X42, PO # _____
10.	27'	PB-653X52	6"x0.280" w.t. Bare steel pipe, API 5L, Grade X52, PO # _____
11.	8'	NONE	8"x0.322" w.t. Bare steel pipe, API 5L, Grade X65, P.O. # _____ (Special order)
12.	-	-	-
13.	1	CA-651X52	6" Weld cap, Grade Y52
14.	2	CS-455	Standard brass padlock to lock valves (District purchase)
15.	2	EL-555X52	4" 90° Weld elbow, Grade Y52
16.	2	EL-557X52	4"x3" 90° Weld reducing elbow, Grade Y52
17.	3	EL-657X52	6" 90° Weld elbow, Grade Y52
18.	2	EL-702X52	8"x6" 90° Weld reducing elbow, Grade Y52
19.	2	NONE	8"x4" 90° Weld reducing elbow, Std. wght., Grade Y65 (Special order)
20.	10	FL-449	3" Type "E" gasket, ANSI-600
21.	8	FL-453	3" W.N., R.F. flange, ANSI-600
22.	2	FL-553	4" W.N., R.F. flange, ANSI-600
23.	2	FL-562	4" Type "E" gasket, ANSI-600
24.	3	FL-651	6" W.N., R.F. flange, ANSI-300
25.	2	FL-658	6" W.N., R.F. flange, ANSI-600
26.	3	FL-660	6" Type "E" gasket, ANSI-300
27.	2	FL-661	6" Type "E" gasket, ANSI-600
28.	12	NP-104XH	1/2"x3" X.H. Nipple
29.	3	PL-025	1/4" Pipe plug, Square head, Solid, 3,000#
30.	13	PL-101	1/2" Pipe plug, Square head, Solid, 3,000#
31.	2	RE-653X52	6"x3" Weld reducer, Grade Y52
32.	1	SA-150	1"x6" Weld saddle
33.	1	TE-651X52	6"x6"x6" Weld tee, Grade Y52
34.	2	NONE	8"x8"x8" Weld tee, Std. wght., Grade Y65 (Special order)
35.	2	NONE	8"x8"x4" Weld tee, Std. wght., Grade Y65 (Special order)
36.	1	TE-711X52	8"x8"x6" Weld tee, Grade Y52
37.	12	VA-110	1/2" Ball valve, WKM #1/2R-B136-CS2-43-S2-WR, Threaded, 3,000#
38.	3	VA-210	1" Ball valve, WKM# 1F-B138-CS2-43-S2-WR, Threaded, 3,000#
39.	1	NONE	6" Nordstrom Plug valve, WxW, #2045 1/4, ANSI-300 - short pattern (Special order)
40.	1	VA-557	4" Nordstrom Plug valve, WxW, #2245 1/2, ANSI-600 - regular pattern
41.	2	VA-565	4" Nordstrom Plug valve, WxW, #2245 1/4, ANSI-600 - regular pattern (Special order)
42.	2	VA-668	6" Nordstrom Plug valve, WxW, #2249 1/4, ANSI-600 (Special order)
43.	1	H-5	6" Weathercap c/w flag
44.	18	H-11	1/2" Bonney Thred-O-Let, 3,000#
45.	3	H-34	1"x1/4" Steel hexagon bushing
46.	3	H-114	1"x3" Mueller Save-A-Valve body only #63494, 1440#
47.	1	H-153	4" UHMW Polyethylene pipe guide
48.	3	H-154	6" UHMW Poly pipe guide
49.	2	H-159	3" UHMW Polyethylene pipe guide
50.	36	H-181	3/4"x4 1/2" Cap screw
51.	232	H-266	3/4" Heavy hex nut
52.	32	H-267	7/8" Heavy hex. nut
53.	48	H-296	1" Heavy hex. nut
54.	80	H-332	3/4"-10x5" Stud bolt, ASTM A193, Gr B7
55.	16	H-333	7/8"-9x5 3/4" Stud bolt, ASTM A193, Gr B7
56.	24	H-334	1"-9x6 3/4" Stud bolt, ASTM A193, Gr B7
57.	2	H-537	3" Keckely strainer, FxF, SGFV, ANSI-600
58.	2	NONE	3" Pipe guide w/ 4" Pipe support assy. w/ 18" dia. conc. foundation (Fab shop fabricate) ref sh 8/10
59.	1	NONE	4" Pipe guide w/ 4" Pipe support assy. w/ 18" dia. conc. foundation (Fab shop fabricate) ref sh 9/10
60.	3	NONE	6" Pipe guide w/ 6" Pipe support assy. w/ 24" dia. conc. foundation (Fab shop fabricate) ref sh 10/10

\*Field to install new 50% throttle plates item 7  
 All 6" or above X52 pipe/fittings: Fabrication requirements

NOTE: All bare underground pipe to be field wrapped during installation

**MATERIAL LIST - Site O11Ken Gate main interconnets**

ITEM	QUANTITY	STOCK NO.	DESCRIPTION
70.	2'	NONE	8"x.322" w.t. Bare steel pipe, API 5L, Grade X65, P.O. _____ (Special order)
71.	3'	PFBE-550X42	4"x0.188" w.t. FBE coated steel pipe, API 5L, Grade X42, DRL, ERW, P.O. # _____
72.	100'	NONE	8"x0.322" w.t. FBE coated steel pipe, API 5L, Grade X65, PSL2, DRL, P.O. # _____ (Special order)
73.	1	CA-551X52	4" Weld cap, Std. wght., Grade Y52
74.	2	CA-701X52	8" Weld cap, Std. wght., Grade Y52
75.	4	NONE	8" 90° Weld elbow, Std. wght., Grade Y65 (Special order)
76.	1	FL-703	8" W.N., R.F. flange, ANSI-600
77.	1	FL-823	8" Type "E" gasket, ANSI-600
78.	12	FL-906	1 1/8"x2 13/16" G-10 Insulated sleeve & washer assy.
79.	3	NP-210	1"x3" Save-A-Valve w/steel cap, Mueller #H-17491300, 1440 PSIG
80.	3	SA-210	1"x8" Weld saddle
81.	1	TE-707X52	8"x8"x4" Weld tee, Std. wght., Grade Y52
82.	1	TE-701X52	8"x8"x8" Weld tee, Std. wght., Grade X52
83.	12	NONE	1 1/8"-7x 8 1/4" Stud bolt, ASTM A193, Gr B7, (Special order)
84.	24	H-297	1 1/8"-7 Heavy hex nut
85.	30'	PFBE-710X52	8"x0.250" w.t. FBE coated steel pipe, API 5L, Grade X52, PSL2, DRL, P.O. # _____ (Special order)

**MATERIAL LIST - Site O11Ken Gate corrosion protection**

ITEM	QUANTITY	STOCK NO.	DESCRIPTION
90.	1	CP-717	8"x0.322" w.t., Monolithic insulatin joint, Zunt, ANSI-300
91.	2	CS-880	Test station, Colt Big Fink, Std. terminal, Yellow, 3" PE PST
92.	1	H-48	17-LB HP Mag anode, 17D3, Pre-packaged w/ 25 ft #12 THHN Solid blk lead

**MATERIAL LIST - 8" HP Odorizer Injection Assy. sh 6**

Field Test- R117- Inlet Main  
 Test through all new 8" HP main upstream of R-117, including through V-154 with the outlet to R-117 capped.

STEP 1

TEST	TEST
TEST PRESSURE	100 P.S.I.G.
TEST MEDIUM	NITROGEN
TEST DURATION	1 HOURS
LEAK SURVEY BY	
DATE	TIME

STEP 2

TEST	TEST
CERTIFICATION PRESSURE	815 P.S.I.G.
TEST PRESSURE	1225 P.S.I.G.
TEST MEDIUM	NITROGEN
TEST DURATION	8 HOURS
DATE COMPLETED	
BY	
ATTESTED	CASCADE NATURAL GAS CORP.

Field Test- R117- Outlet Main

Testing Instructions: Test through all new 8" HP main downstream of R117 including through V-155 and the relief stack from the R-117 tie-in point to the capped end of Outlet main.  
 All valves to be in the open position, with a blind flange installed atop the relief stack valve.

STEP 1

TEST	TEST
TEST PRESSURE	100 P.S.I.G.
TEST MEDIUM	NITROGEN
TEST DURATION	1 HOURS
LEAK SURVEY BY	
DATE	TIME

STEP 2

TEST	TEST
CERTIFICATION PRESSURE	500 P.S.I.G.
TEST PRESSURE	750 P.S.I.G.
TEST MEDIUM	NITROGEN
TEST DURATION	8 HOURS
DATE COMPLETED	
BY	
ATTESTED	CASCADE NATURAL GAS CORP.

Sheet Index:  
 Sh 1 Material list- regulator, RV & mains  
 Sh 2 Site plan  
 Sh 3 R117 plan & profile  
 Sh 4 R117 inlet & bypass profiles  
 Sh 5 Relief valve assy. plan & profile  
 Sh 6 Odorant injection assy materials  
 Sh 7 Odorant injection assy plan & profile  
 Sh 8 3" pipe support details  
 Sh 9 4" pipe support details  
 Sh 10 6" pipe support details

Southridge Gate:  
 Coordinate with R117Ken installation  
 Coordinate with V154Ken installation  
 Coordinate with V155Ken installation  
 Coordinate with H1Ken (V167-9) installation  
 Coordinate with future O11Ken installation  
 Coordinate with future Telemetry bldg installation following V-155  
 Coordinate with future R120Ken installation  
 Coordinate with future V172Ken installation  
 Coordinate with future V173Ken installation

O-11 Odorizer & R-120 Secondary regulator to be future installs  
 Rev A: Revised material list & added Odorant injection assy

1/2 SIZE DRAWING- Scaled to 1/2 indicated

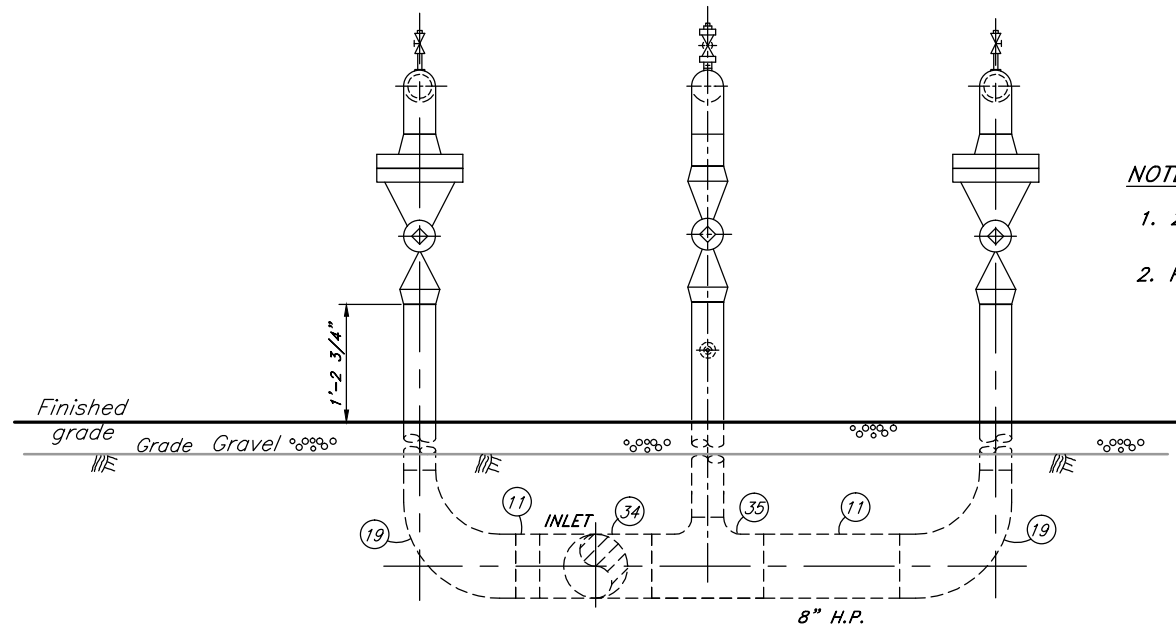
INLET CERTIFIED FOR 811 P.S.I.G.

WO# 214539

Scale	NONE	Drawn	SB	CASCADE NATURAL GAS CORPORATION 8113 W Grandridge Blvd Kennewick, WA 99336 R-117 Primary Reg at O-11 Southridge 6300 Brinkley Rd Kennewick, WA
Date	3-3-15	Check	N/A	
Eng.	JF	Meas.	N/A	
Dwg. Name	R117Ken A 1 10			



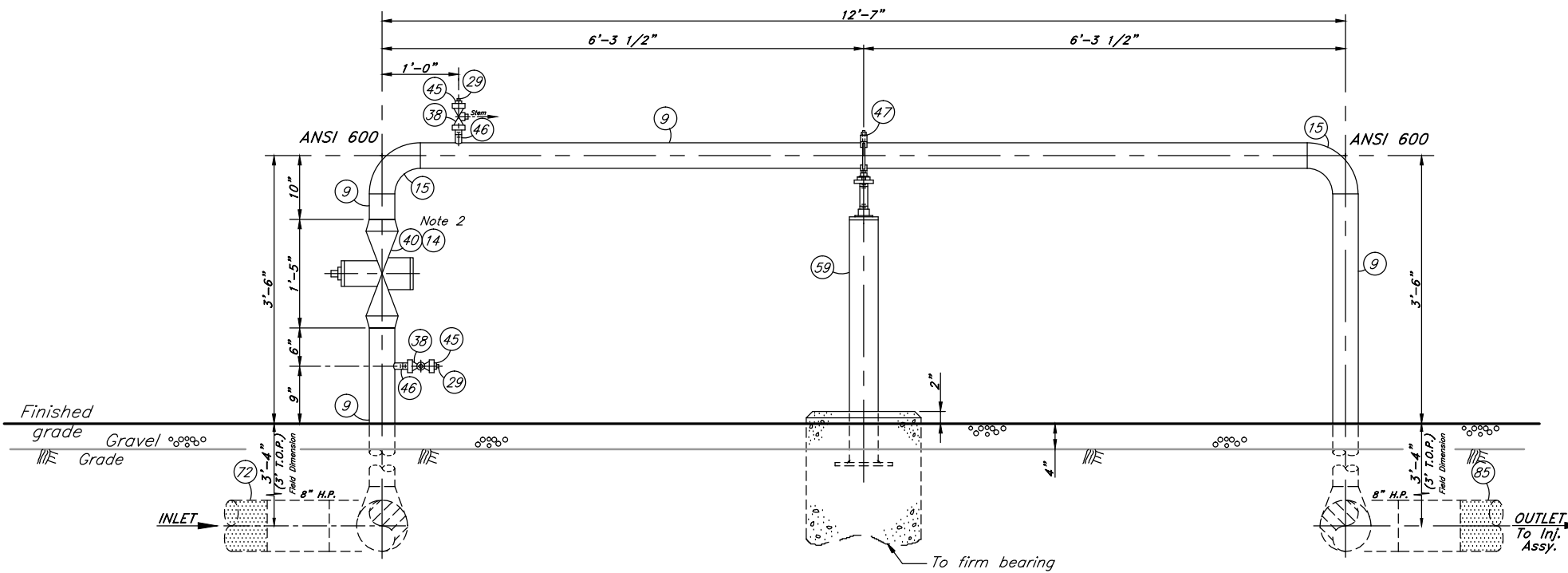




**NOTE**

1. 20' Minimum separation is preferred, contact Engineering if this is not practical.
2. Padlock relief block valve in OPEN position, By-pass valve in CLOSED position.

**DETAIL "C-C" INLET HEADER**



**DETAIL "B-B" BY-PASS RUN**

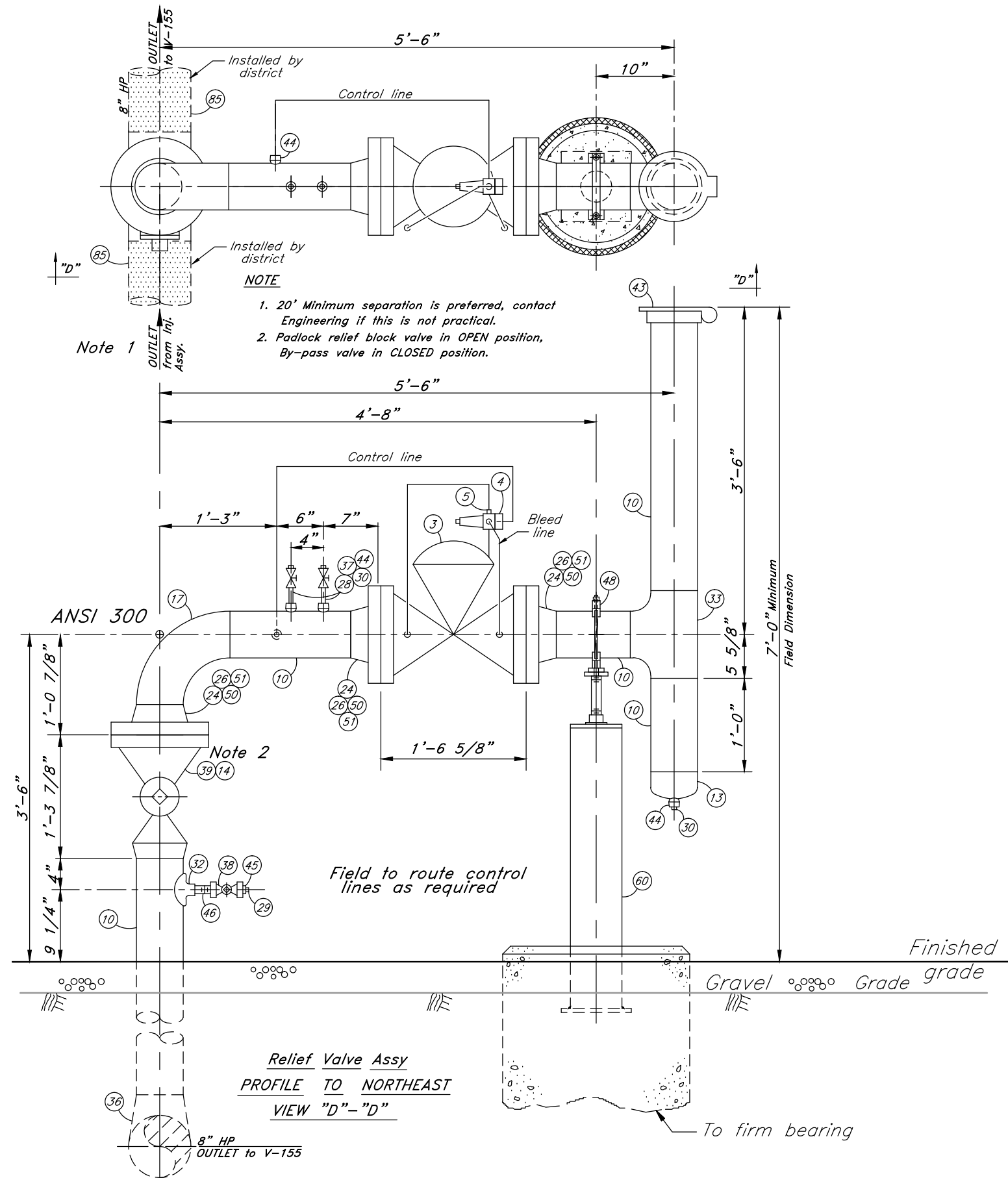
1/2 SIZE DRAWING— Scaled to 1/2 indicated

INLET CERTIFIED FOR 811 P.S.I.G.

WO# 214539

Scale 1"=1'-0"	Drawn SB	CASCADE NATURAL GAS CORPORATION
Date 3-3-15	Check N/A	8113 W Grandridge Blvd Kennewick, WA 99336
Eng. JF	Meas. N/A	R-117 Primary Reg at 0-11 Southridge
Dwg. Name R117Ken A 4 10		6300 Brinkley Kennewick, WA

NOTE: All bare underground pipe to be field wrapped during installation



Note 1  
OUTLET from Inl. Assy.

NOTE  
1. 20' Minimum separation is preferred, contact Engineering if this is not practical.  
2. Padlock relief block valve in OPEN position, By-pass valve in CLOSED position.

Note 2

Relief Valve Assy  
PROFILE TO NORTHEAST  
VIEW "D"-"D"

FAB SHOP TEST	
RELIEF VALVE TEST	
STEP 1	
PRESSURE TEST	
TEST PRESSURE	100 P.S.I.G.
TEST MEDIUM	NITROGEN
TEST DURATION	1 HR HOURS
BY	
DATE	
STEP 2	
PRESSURE TEST	
CERTIFICATION PRESSURE	500 P.S.I.G.
TEST PRESSURE	750 P.S.I.G.
TEST MEDIUM	NITROGEN
TEST DURATION	4 HOURS
DATE COMPLETED	
BY	
ATTESTED	
CASCADE NATURAL GAS CORP.	
INITIAL FIELD SETTINGS	
RELIEF VALVE SET POINT	248 P.S.I.G.
OPERATING WORKER REGULATOR LOCKUP	240 P.S.I.G.
OPERATING MONITOR REGULATOR LOCKUP	250 P.S.I.G.
STANDBY WORKER REGULATOR LOCKUP	235 P.S.I.G.
STANDBY MONITOR REGULATOR LOCKUP	250 P.S.I.G.
MAXIMUM ALLOWABLE SETTINGS	
RELIEF VALVE SET POINT	248 P.S.I.G.
OPERATING WORKER REGULATOR LOCKUP	245 P.S.I.G.
OPERATING MONITOR REGULATOR LOCKUP	250 P.S.I.G.
STANDBY WORKER REGULATOR LOCKUP	240 P.S.I.G.
STANDBY MONITOR REGULATOR LOCKUP	250 P.S.I.G.
SYSTEM PRESSURES	
INLET MAOP	811 P.S.I.G.
DESIGN	811 P.S.I.G.
OUTLET MAOP	250 P.S.I.G.
DESIGN	250 P.S.I.G.

1/2 SIZE DRAWING— Scaled to 1/2 indicated

WO# 214539

Scale 1 1/2"=1'-0"	Drawn SB	CASCADE NATURAL GAS CORPORATION
Date 3-3-15	Check N/A	8113 W Grandridge Blvd Kennewick, WA 99336
Eng. JF	Meas. N/A	R-117 Primary Reg at 0-11 Southridge
Dwg. Name R117Ken A 5 10		6300 Brinkley Rd Kennewick, WA

Note: All underground bare steel pipe to be field wrapped during installation.

**MATERIAL LIST - 8" HP Odorizer Injection Assy. sh 7**

<u>ITEM</u>	<u>QUANTITY</u>	<u>STOCK NO.</u>	<u>DESCRIPTION</u>
100.	16'	PB-705X52	8"X0.322"w.t., Bare steel pipe, API5L, Gr X52, PSL2, DRL, PO# _____
101.	4	EL-701X52	8" 90° Weld elbow, L.R., Gr Y52
102.	1	NP-104XH	1/2"x3" X.H. Nipple
103.	3	PL-025	1/4" Pipe plug, Square head, Solid, 3000#
104.	1	PL-101	1/2" Pipe plug, Square head, Solid, 3,000#
105.	3	SA-210	1"x8" Weld saddle
106.	1	VA-110	1/2" Ball valve, WKM# 1/2R-B136-CS2-43-S2-WR, Threaded, 3,000#
107.	2	VA-210	1" WKM Ball Valve #1F-B138-CS2-43-S2-WR, Threaded, 3,000#
108.	1	VA-214	1" SS WKM Ball Valve #1F-B138-S8-43-S2-WR, Threaded, 3,000#
109.	1	H-11	1/2" Bonney Thred-0-Let, 8-3x1/2, 3,000#
110.	3	H-34	1"x1/4" Steel hexagon bushing
111.	3	H-114	1"x3" Mueller Save-A-Valve body only #63494, 1440#

FAB SHOP TEST- Odorant Injection Assy.

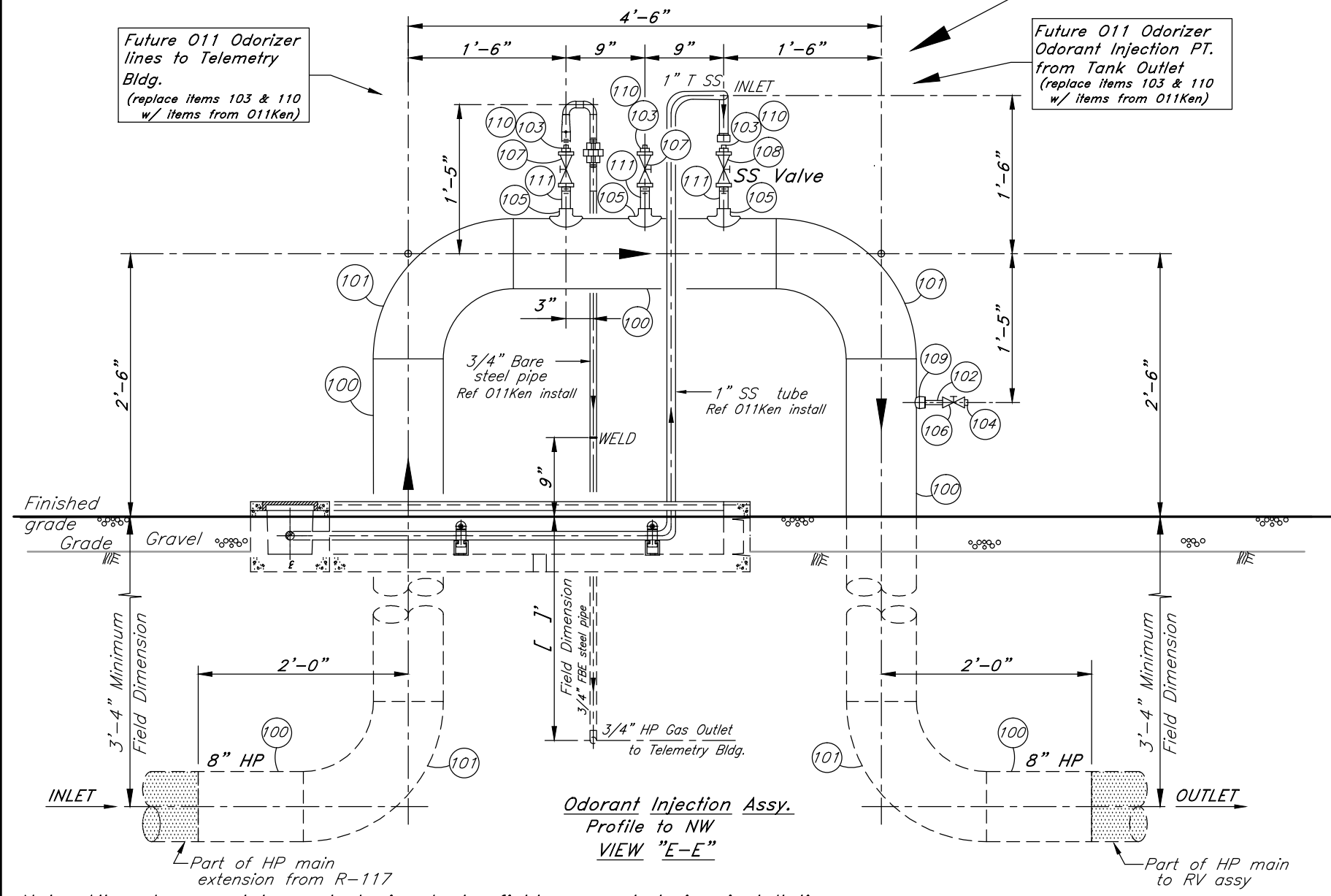
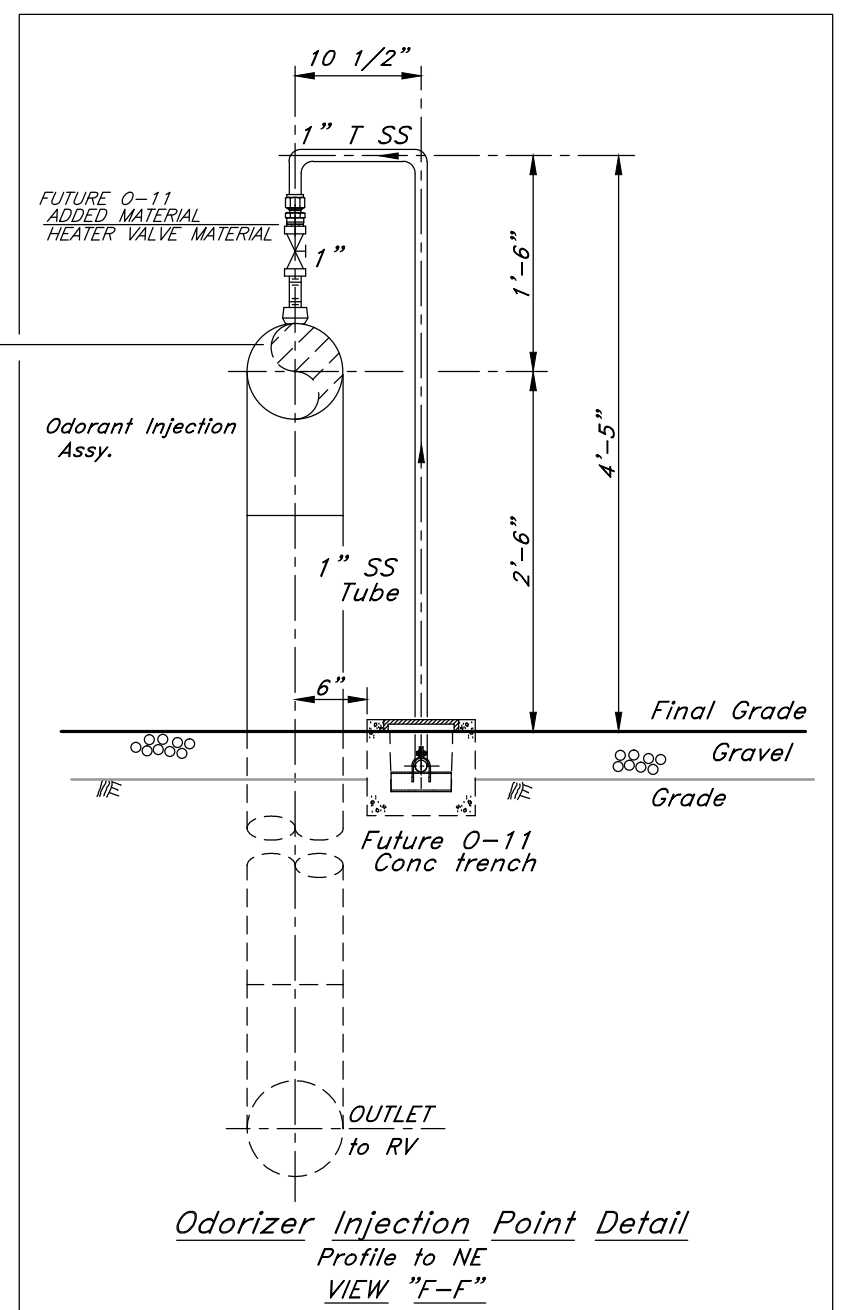
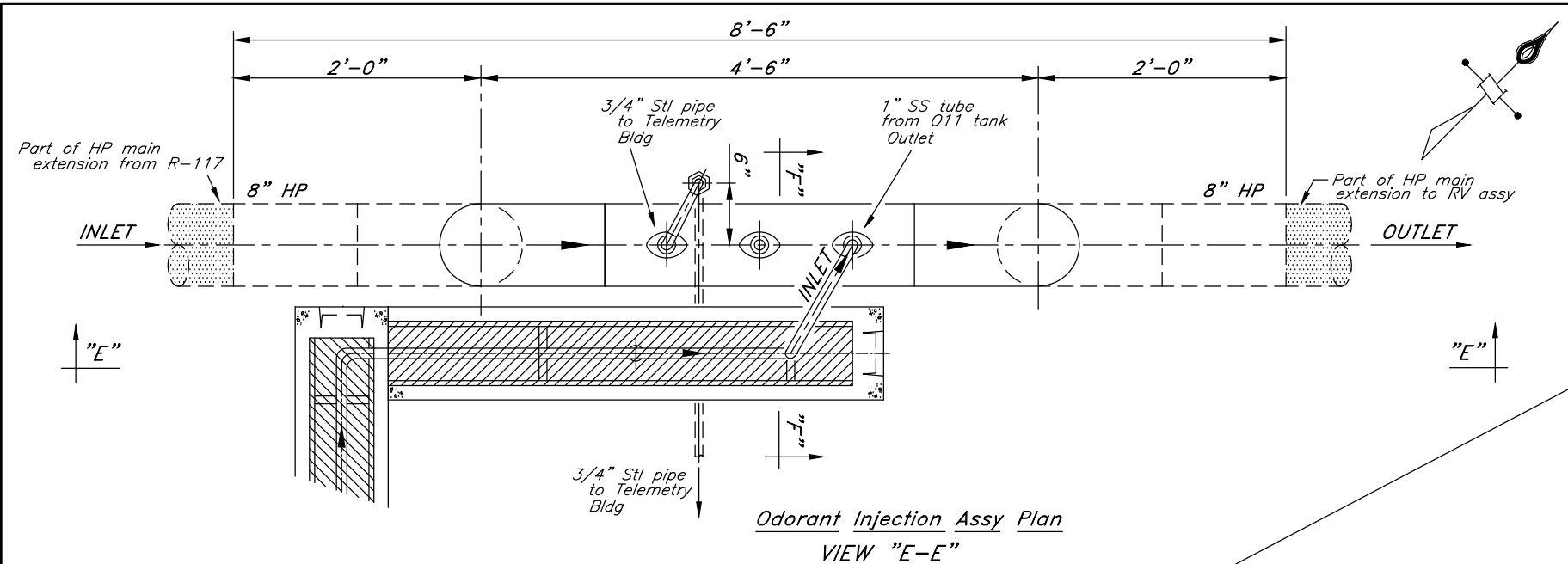
PRESSURE TEST	
CERTIFICATION PRESSURE . . . . .	500 . . . . . P.S.I.G.
TEST PRESSURE . . . . .	750 . . . . . P.S.I.G.
TEST MEDIUM . . . . .	NITROGEN . . . . .
TEST DURATION . . . . .	1 . . . . . HOURS
DATE COMPLETED . . . . .	
BY . . . . .	
ATTESTED . . . . .	CONTRACTOR
	CASCADE NATURAL GAS CORP.

1/2 SIZE DRAWING- Scaled to 1/2 indicated

WO# 214539

Note: All underground bare steel pipe to be field wrapped during installation.

Scale 1/2"=1'-0"	Drawn SB	CASCADE NATURAL GAS CORPORATION 8113 W Grandridge Blvd Kennewick, WA 99336 R-117 Primary Reg at 0-11 Southridge 6300 Brinkley Rd Kennewick, WA
Date 3-3-15	Check N/A	
Eng. JF	Meas. N/A	
Dwg. Name R117Ken A 6 10		



1/2 SIZE DRAWING— Scaled to 1/2 indicated

WO# 214539

Scale 1 1/2"=1'-0"	Drawn SB	CASCADE NATURAL GAS CORPORATION
Date 3-3-15	Check N/A	8113 W Grandridge Blvd Kennewick, WA 99336
Eng. JF	Meas. N/A	R-117 Primary Reg at O-11 Southridge 6300 Brinkley Rd Kennewick, WA
Dwg. Name R117Ken A 7 10		

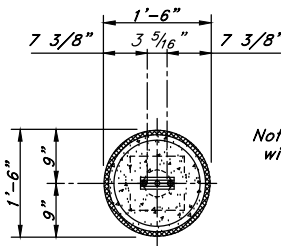
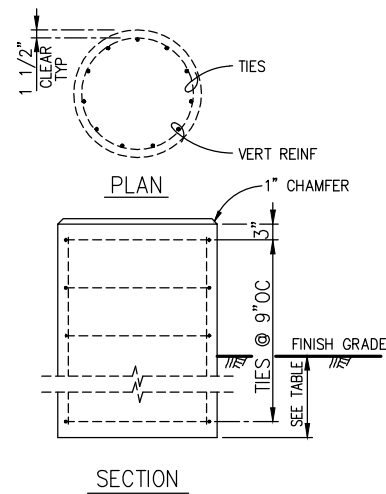
Note: All underground bare steel pipe to be field wrapped during installation.

### 3" GUIDE- 4" Pipe Leg Material

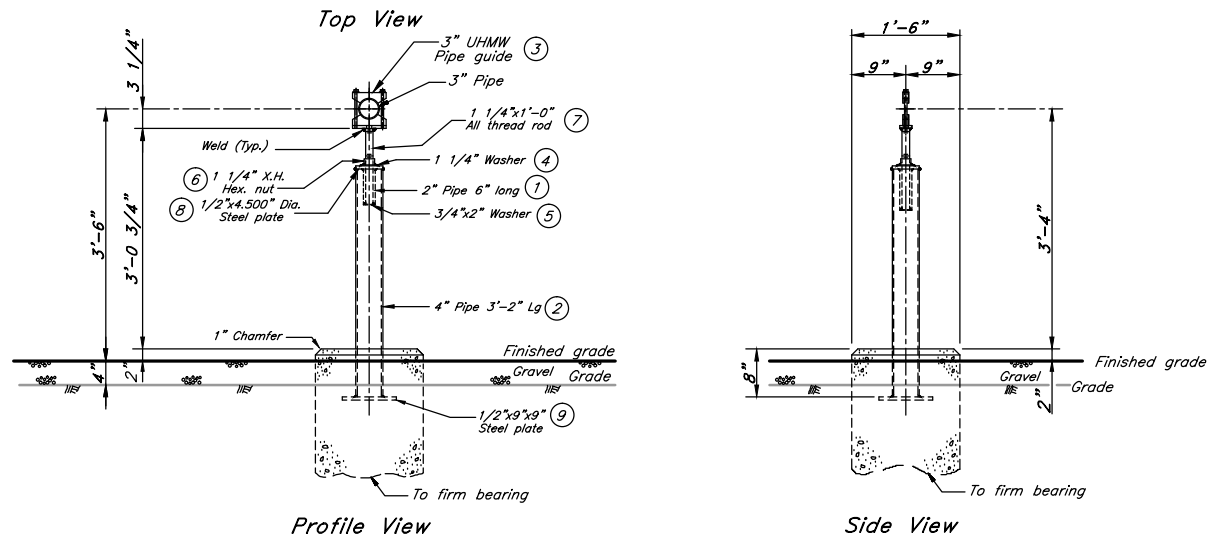
ITEM	QUAN.	STOCK NO.	DESCRIPTION
1.	1'	PB-350	2"x0.154" w.t. Bare steel pipe, Grade B, ASTM A106
2.	4'	PB-552X42	4"x0.237" w.t., Bare steel pipe, Grade X42, SRL, API 5L
3.	1	H-159	3" UHMW Polyethylene pipe guide
4.	1	NONE	1 1/4" High strength flat washer, galvanized
5.	1	NONE	3/4"x2" High strength flat washer
6.	1	H-298	1 1/4"-8 Heavy hex nut, ASTM A194 Grade 2H
7.	1	NONE	1 1/4"-8 x12" Continuous thread steel rod
8.	1	NONE	1/2"x4.500" Steel plate (Fab shop fabricate)
9.	1	NONE	1/2"x9"x9" Steel plate (Fab shop fabricate)

PIER REINFORCING TABLE			
PLAN DIM	VERT REINF	TIES	MAXIMUM LOAD (LBS.)
12" DIA	4 - #5	#3	1,100
18" DIA	4 - #5	#3	2,400
24" DIA	11 - #6	#4	4,400
30" DIA	12 - #7	#4	6,800
36" DIA	13 - #8	#4	9,900
42" DIA	14 - #9	#4	13,400
48" DIA	18 - #9	#4	17,600

- NOTES:
- FOR SOIL BEARING CAPACITY AND CONCRETE AND REINFORCING STEEL CRITERIA, SEE FOUNDATION PLAN & DETAILS.
  - FORM SIDEWALLS OF PIER TO A POINT 6" BELOW FINISH GRADE.
  - IF A SITE SPECIFIC GEOTECHNICAL REPORT IS NOT PROVIDED, EXTEND FOUNDATION TO 3' DEPTH FROM GRADE IN GROUND USING 3' SONOTUBE.



Note: Piers to be installed with appropriate rebar



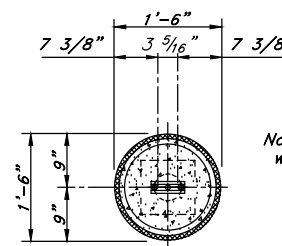
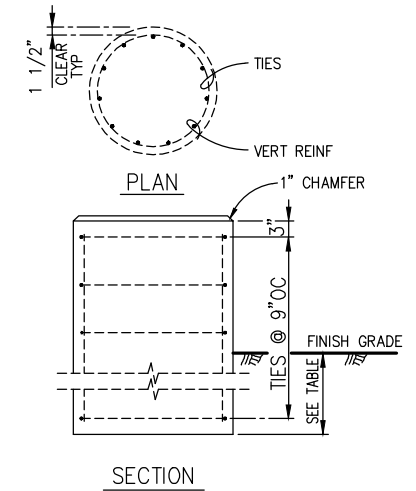
3" GUIDE- 4" PIPE LEG & 18" DIA. PIER DETAIL No. 1

### 3" GUIDE- 4" Pipe Leg Material

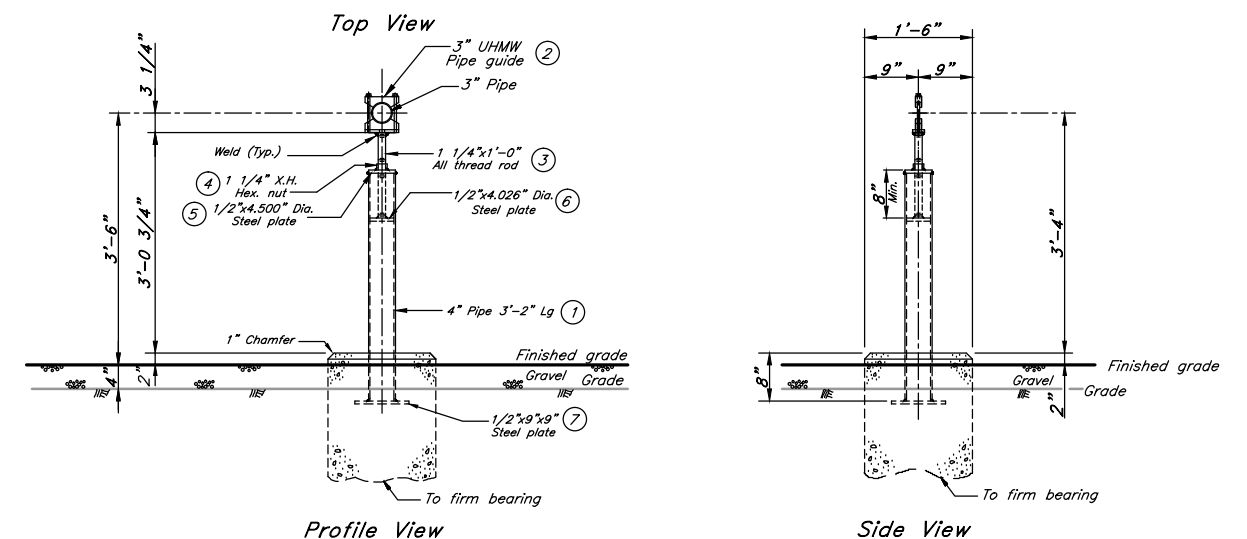
ITEM	QUAN.	STOCK NO.	DESCRIPTION
1.	4'	PB-552X42	4"x0.237" w.t., Bare steel pipe, Grade X42, SRL, API 5L
2.	1	H-159	3" UHMW Polyethylene pipe guide
3.	1	NONE	1 1/4"-8 x12" Continuous thread steel rod
4.	1	H-298	1 1/4"-8 Heavy hex nut, ASTM A194 Grade 2H
5.	1	NONE	1/2"x4.500" Steel plate (Fab shop fabricate)
6.	1	NONE	1/2"x4.026" Steel plate (Fab shop fabricate)
7.	1	NONE	1/2"x9"x9" Steel plate (Fab shop fabricate)

PIER REINFORCING TABLE			
PLAN DIM	VERT REINF	TIES	MAXIMUM LOAD (LBS.)
12" DIA	4 - #5	#3	1,100
18" DIA	4 - #5	#3	2,400
24" DIA	11 - #6	#4	4,400
30" DIA	12 - #7	#4	6,800
36" DIA	13 - #8	#4	9,900
42" DIA	14 - #9	#4	13,400
48" DIA	18 - #9	#4	17,600

- NOTES:
- FOR SOIL BEARING CAPACITY AND CONCRETE AND REINFORCING STEEL CRITERIA, SEE FOUNDATION PLAN & DETAILS.
  - FORM SIDEWALLS OF PIER TO A POINT 6" BELOW FINISH GRADE.
  - IF A SITE SPECIFIC GEOTECHNICAL REPORT IS NOT PROVIDED, EXTEND FOUNDATION TO 3' DEPTH FROM GRADE IN GROUND USING 3' SONOTUBE.



Note: Piers to be installed with appropriate rebar



3" GUIDE- 4" PIPE LEG & 18" DIA. PIER DETAIL No. 1a

1/2 SIZE DRAWING- Scaled to 1/2 indicated

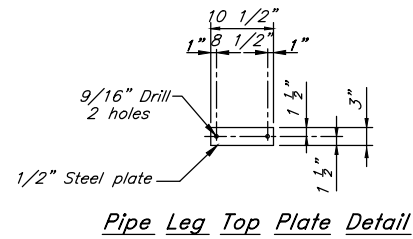
Scale 3/4"=1'-0"  
 Date 3-3-15  
 Eng. JF  
 Drawing Number R117Ken A 8 10

WO# 214539  
 CASCADe NATURAL GAS CORPORATION  
 8113 W Grandridge Blvd  
 R-117 Primary Reg at 0-11 Southridge  
 6300 Brinkley Rd  
 Kennewick, WA 9936



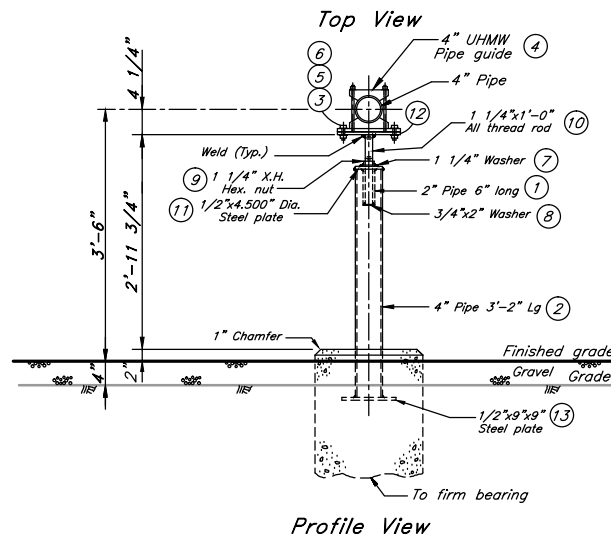
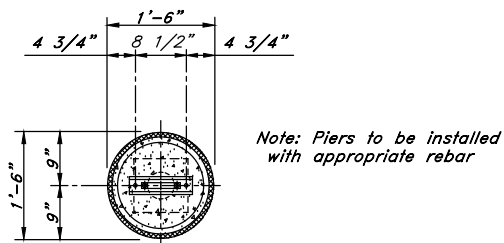
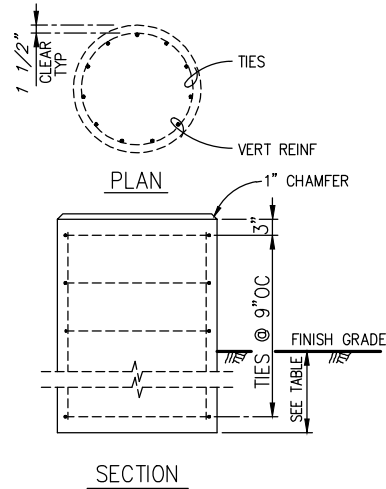
### 4" GUIDE- 4" Pipe Leg Material

ITEM	QUAN.	STOCK NO.	DESCRIPTION
1.	1'	PB-350	2"x0.154" w.t. Bare steel pipe, Grade B, ASTM A106
2.	4'	PB-552X42	4"x0.237" w.t., Bare steel pipe, Grade X42, SRL, API 5L
3.	2	NONE	1/2"- [ ]x2 1/4" Cap screw, ASTM A307, Grade B
4.	1	H-153	4" UHMW Polyethylene pipe guide
5.	2	NONE	1/2" Heavy hex nut, ASTM A194 Grade 2H
6.	2	NONE	1/2" Heavy galvanized lock washer
7.	1	NONE	1 1/4" High strength flat washer, galvanized
8.	1	NONE	3/4"x2" High strength flat washer
9.	1	H-298	1 1/4"-8 Heavy hex nut, ASTM A194 Grade 2H
10.	1	NONE	1 1/4"-8 x12" Continuous thread steel rod
11.	1	NONE	1/2"x4.500" Steel plate (Fab shop fabricate)
12.	1	NONE	1/2"x3"x10 1/2" Zinc coated steel plate (Fab shop fabricate)
13.	1	NONE	1/2"x9"x9" Steel plate (Fab shop fabricate)



PIER REINFORCING TABLE			
PLAN DIM	VERT REINF	TIES	MAXIMUM LOAD (LBS.)
12" DIA	4 - #5	#3	1,100
18" DIA	4 - #5	#3	2,400
24" DIA	11 - #6	#4	4,400
30" DIA	12 - #7	#4	6,800
36" DIA	13 - #8	#4	9,900
42" DIA	14 - #9	#4	13,400
48" DIA	18 - #9	#4	17,600

- NOTES:
- FOR SOIL BEARING CAPACITY AND CONCRETE AND REINFORCING STEEL CRITERIA, SEE FOUNDATION PLAN & DETAILS.
  - FORM SIDEWALLS OF PIER TO A POINT 6" BELOW FINISH GRADE.
  - IF A SITE SPECIFIC GEOTECHNICAL REPORT IS NOT PROVIDED, EXTEND FOUNDATION TO 3' DEPTH FROM GRADE IN GROUND USING 3' SONOTUBE.



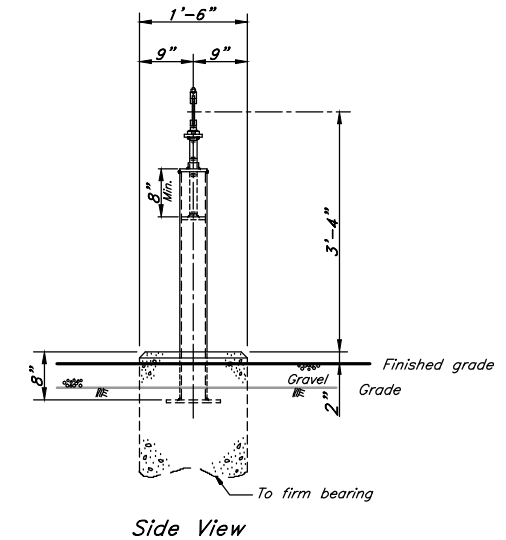
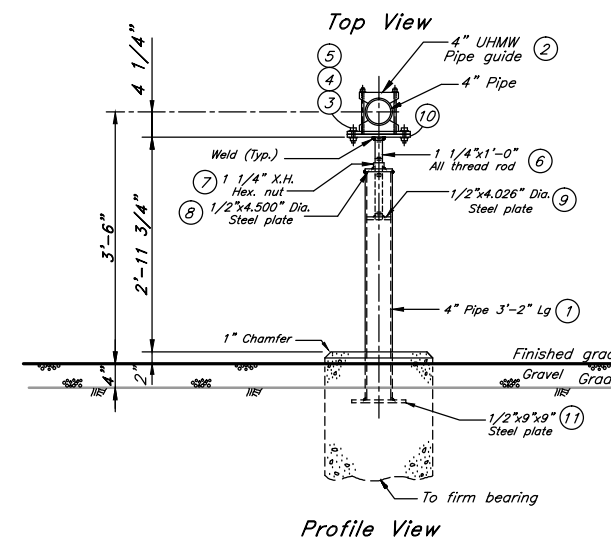
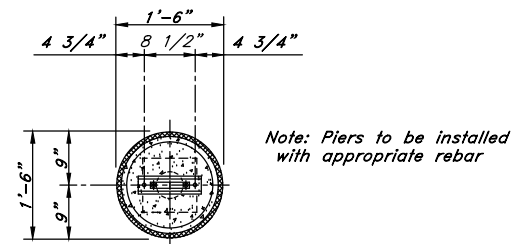
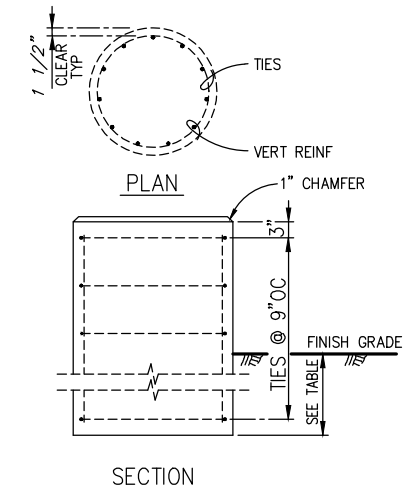
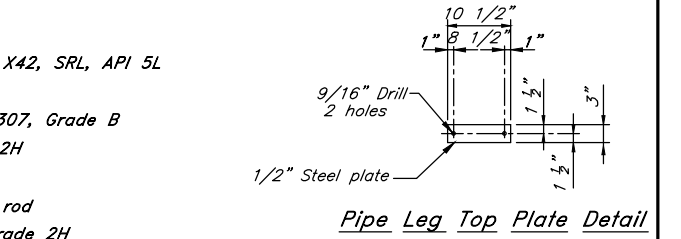
4" GUIDE- 4" PIPE LEG & 18" DIA. PIER DETAIL No. 2

### 4" GUIDE- 4" Pipe Leg Material

ITEM	QUAN.	STOCK NO.	DESCRIPTION
1.	4'	PB-552X42	4"x0.237" w.t., Bare steel pipe, Grade X42, SRL, API 5L
2.	1	H-153	4" UHMW Polyethylene pipe guide
3.	2	NONE	1/2"- [ ]x2 1/4" Cap screw, ASTM A307, Grade B
4.	2	NONE	1/2" Heavy hex nut, ASTM A194 Grade 2H
5.	2	NONE	1/2" Heavy galvanized lock washer
6.	1	NONE	1 1/4"-8 x12" Continuous thread steel rod
7.	1	H-298	1 1/4"-8 Heavy hex nut, ASTM A194 Grade 2H
8.	1	NONE	1/2"x4.500" Steel plate (Fab shop fabricate)
9.	1	NONE	1/2"x4.026" Steel plate (Fab shop fabricate)
10.	1	NONE	1/2"x3"x10 1/2" Zinc coated steel plate (Fab shop fabricate)
11.	1	NONE	1/2"x9"x9" Steel plate (Fab shop fabricate)

PIER REINFORCING TABLE			
PLAN DIM	VERT REINF	TIES	MAXIMUM LOAD (LBS.)
12" DIA	4 - #5	#3	1,100
18" DIA	4 - #5	#3	2,400
24" DIA	11 - #6	#4	4,400
30" DIA	12 - #7	#4	6,800
36" DIA	13 - #8	#4	9,900
42" DIA	14 - #9	#4	13,400
48" DIA	18 - #9	#4	17,600

- NOTES:
- FOR SOIL BEARING CAPACITY AND CONCRETE AND REINFORCING STEEL CRITERIA, SEE FOUNDATION PLAN & DETAILS.
  - FORM SIDEWALLS OF PIER TO A POINT 6" BELOW FINISH GRADE.
  - IF A SITE SPECIFIC GEOTECHNICAL REPORT IS NOT PROVIDED, EXTEND FOUNDATION TO 3' DEPTH FROM GRADE IN GROUND USING 3' SONOTUBE.



4" GUIDE- 4" PIPE LEG & 18" DIA. PIER DETAIL No. 2a

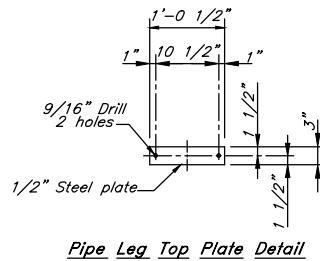
1/2 SIZE DRAWING- Scaled to 1/2 indicated

Scale 3/4"=1'-0"	Drawn SB	CASCADE NATURAL GAS CORPORATION 8113 W. Grandridge Blvd R-117 Primary Reg at 0-11 Southridge 6300 Brinkley Rd Kennewick, WA 9936
Date 3-3-15	Check N/A	
Eng. JF	Meas. N/A	
Drawing Number R117Ken A 9 10		

WO# 214539

**6" Guide- 6" Pipe Leg Material**

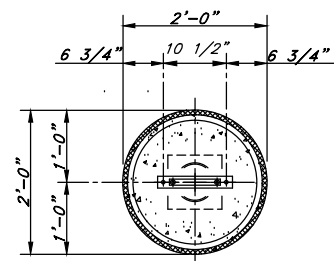
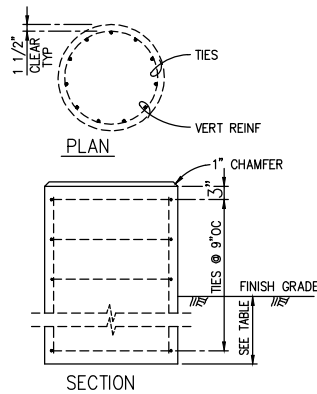
ITEM	QUAN.	STOCK NO.	DESCRIPTION
1.	1'	PB-350	2"x0.154" w.t. Bare steel pipe, Grade B, ASTM A106
2.	4'	PB-653X52	6"x0.280" w.t., Bare steel pipe, Gr X52, API5L
3.	2	NONE	1/2"x2 1/4" Cap screw, ASTM A307, Grade B
4.	1	H-154	6" UHMW Polyethylene pipe guide
5.	2	NONE	1/2" Heavy hex nut, ASTM A194 Grade 2H
6.	2	NONE	1/2" Heavy galvanized lock washer
7.	1	NONE	1 1/4" High strength flat washer, galvanized
8.	1	NONE	3/4"x2" Flat washer, galvanized
9.	1	H-298	1 1/4"- 8 Heavy Hex. nut
10.	1	NONE	1 1/4"-8 x12" Continuous thread steel rod
11.	1	NONE	1/2"x6.625" Steel plate (Fab shop fabricate)
12.	1	NONE	1/2"x3"x12 1/2" Steel plate (Fab shop fabricate)
13.	1	NONE	1/2"x9"x9" Steel plate (Fab shop fabricate)



Pipe Leg Top Plate Detail

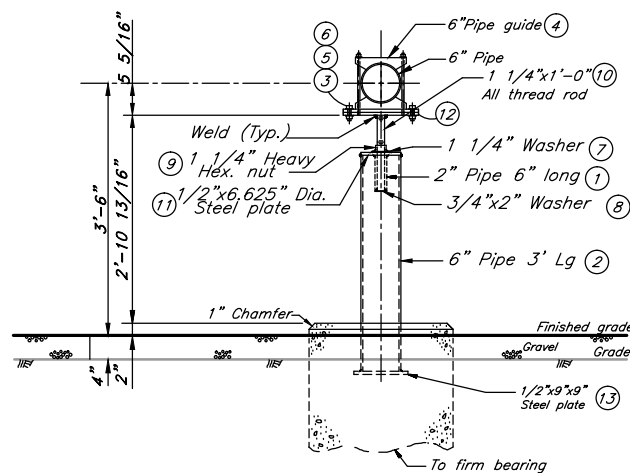
PIER REINFORCING TABLE			
PLAN DIM	VERT REINF	TIES	MAXIMUM LOAD (LBS.)
12" DIA	4 - #5	#3	1,100
18" DIA	4 - #5	#3	2,400
24" DIA	11 - #6	#4	4,400
30" DIA	12 - #7	#4	6,800
36" DIA	13 - #8	#4	9,900
42" DIA	14 - #9	#4	13,400
48" DIA	18 - #9	#4	17,600

- NOTES:  
 1. FOR SOIL BEARING CAPACITY AND CONCRETE AND REINFORCING STEEL CRITERIA, SEE FOUNDATION PLAN & DETAILS.  
 2. FORM SIDEWALLS OF PIER TO A POINT 6" BELOW FINISH GRADE.  
 3. IF A SITE-SPECIFIC GEOTECHNICAL REPORT IS NOT PROVIDED, EXTEND FOUNDATION TO 3' DEPTH FROM GRADE IN GROUND USING 3" SONOTUBE.

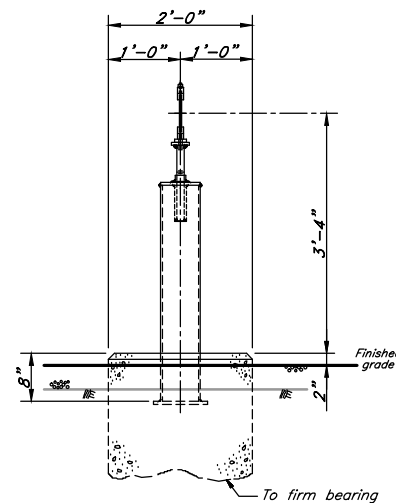


Top View

Note: Piers to be installed with appropriate rebar.



Profile View



Side View

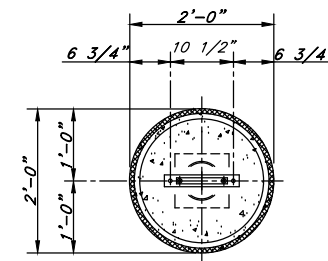
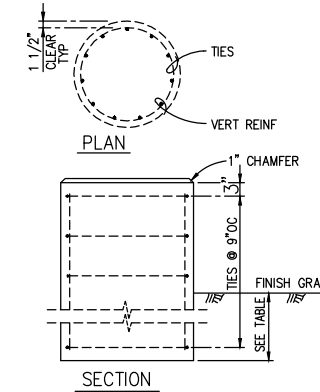
6" GUIDE- 6" PIPE LEG & 24" PIER DETAIL No. 3

**6" Guide- 6" Pipe Leg Material**

ITEM	QUAN.	STOCK NO.	DESCRIPTION
1.	4'	PB-653X52	6"x0.280" w.t., Bare steel pipe, Gr X52, API5L
2.	1	H-154	6" UHMW Polyethylene pipe guide
3.	2	NONE	1/2"x2 1/4" Cap screw, ASTM A307, Grade B
4.	2	NONE	1/2" Heavy hex nut, ASTM A194 Grade 2H
5.	1	NONE	1 1/4"- 8x12" Continuous thread steel rod
6.	1	H-298	1 1/4" Heavy Hex. nut
7.	2	NONE	1/2" Heavy galvanized lock washer
8.	1	NONE	1/2"x6.625" Dia. Steel plate (Fab shop fabricate)
9.	1	NONE	1/2"x6.065" Dia. Steel plate (Fab shop fabricate)
10.	1	NONE	1/2"x3"x12 1/2" Steel plate (Fab shop fabricate)
11.	1	NONE	1/2"x9"x9" Steel plate (Fab shop fabricate)

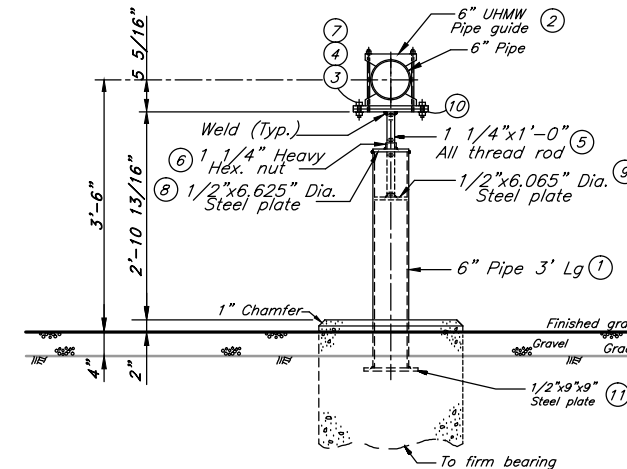
PIER REINFORCING TABLE			
PLAN DIM	VERT REINF	TIES	MAXIMUM LOAD (LBS.)
12" DIA	4 - #5	#3	1,100
18" DIA	4 - #5	#3	2,400
24" DIA	11 - #6	#4	4,400
30" DIA	12 - #7	#4	6,800
36" DIA	13 - #8	#4	9,900
42" DIA	14 - #9	#4	13,400
48" DIA	18 - #9	#4	17,600

- NOTES:  
 1. FOR SOIL BEARING CAPACITY AND CONCRETE AND REINFORCING STEEL CRITERIA, SEE FOUNDATION PLAN & DETAILS.  
 2. FORM SIDEWALLS OF PIER TO A POINT 6" BELOW FINISH GRADE.  
 3. IF A SITE-SPECIFIC GEOTECHNICAL REPORT IS NOT PROVIDED, EXTEND FOUNDATION TO 3' DEPTH FROM GRADE IN GROUND USING 3" SONOTUBE.

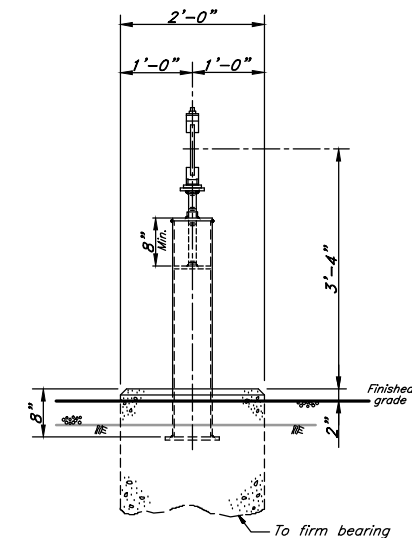


Top View

Note: Piers to be installed with appropriate rebar.



Profile View



Side View

6" GUIDE- 6" PIPE LEG & 24" PIER DETAIL No. 3a

1/2 SIZE DRAWING- Scaled to 1/2 indicated

Scale	3/4"=1'-0"	Drawn	SB
Date	3-3-15	Check	N/A
Eng.	JF	Meas.	N/A
Drawing Number	R117Ken A 10 10		

WO# 214539

CASCADE NATURAL GAS CORPORATION  
 8113 W Grandridge Blvd  
 R-117 Primary Reg at 0-11 Southridge  
 6300 Brinkley Rd  
 Kennewick, WA 9936