

# **INFORMATION HANDOUT**

**For Contract No. 06-0Q2404**

**At 06-Fre-41-R3.0/M6.1**

**Identified by**

**Project ID 0613000047**

## **MATERIALS INFORMATION**

Cold In-Place Recycling Hot Mix Asphalt Report, Contract Number 06-0Q2404, dated 3/07/14  
Alternative Flared Terminal Systems

# Memorandum

*Flex your power!  
Be energy efficient!*

**To:** GETACHEW ESHETE, Chief  
Design Senior  
Department of Transportation-District 6  
Design1, Branch L

**Date:** March 7, 2014

**File:** 06-Fre-41-PM R3.0/M6.1  
**EA:** 06-0Q2401  
**Project No:** 0613000047

**Attention:** Paul Jensen

**From:** TED MOORADIAN, Chief  
District Materials Engineer  
Materials Engineering Branch – Fresno  
Central Region Construction Deflection Testing



**Subject:** Materials Information Handout

This is in response to your request for a Materials Information Handout (MIH) for the rehabilitation project in Fresno County on State Route 41 from Harlan Avenue to Elkhorn Avenue. The project includes cold-in-place recycling (CIR), cold planing, digging out and replacing localized failed structural section and sub-base material areas with an equivalent depth of hot mix asphalt (HMA), base and sub-base then cap with 0.15 foot of HMA. The Materials Engineering Branch has conducted a pavement investigation and obtained pavement cores on February 3, 2014 for the referenced project.

The results of the pavement investigation are summarized in the attached Materials Information Handout. If you have any questions regarding the Materials Information Handout, please call me at 488-4148 or Ahmad Shokrpour at 488-4119.

# MATERIALS INFORMATION HANDOUT

Contract Number  
06-0Q2404

06-Fre-41  
PM R 3.0 / R 6.1

Cold In-Place Recycling  
Hot Mix Asphalt



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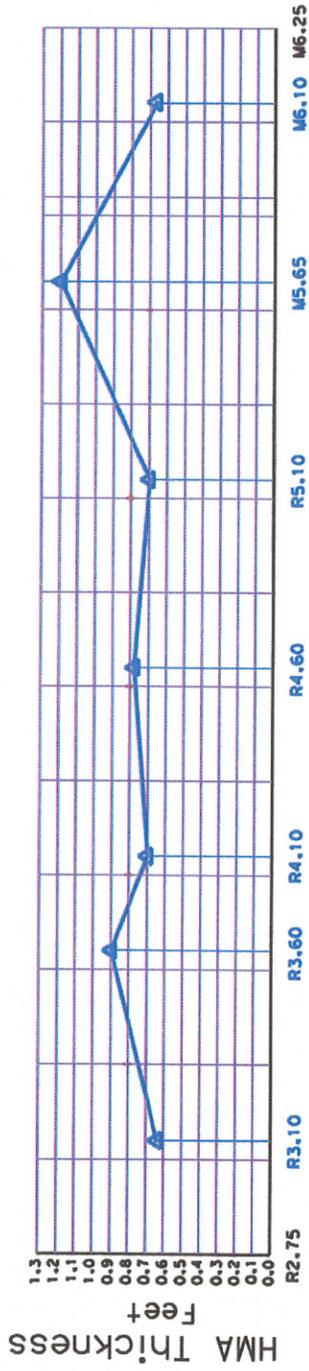
## **Summary of Investigations**

Pavement investigations were conducted on Route 41 from PM R3.0 to PM M 6.1 for cold-in-place recycling. Cores indicate that the engineering properties of these materials may be improved to provide sufficient strength required to extend the life of this pavement for a few years by recycling the upper portion with asphalt emulsion and capping with hot mix asphalt (HMA).

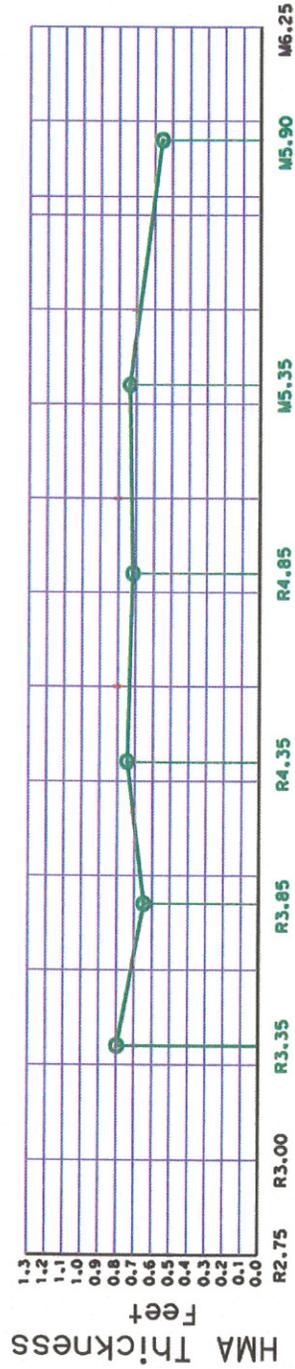
The general structural section is HMA over aggregate base. At some locations, the base material is Aggregate Base material or cement treated base. Cores indicated a depth of HMA that range from 0.56 foot to 1.22 foot. Core samples taken were not uniform in appearance. The top layers are chip seal over dense graded hot mix asphalt with 0.25 foot to 0.30 foot of cement treated base in the locations as shown in the attached pictures.

The existing HMA appears to have some rutting, pumping failures, transverse and longitudinal cracking. There are some occasional dig outs in the wheel path, and isolated alligator cracking within the project limits.

Any reliance placed by the contractor on this information shall be at their own risk and they shall undertake their own separate testing program to determine the materials present and conditions prevailing at the time of construction.



Fre-41PM R3.0/M6.1 Northbound Cores



Fre-41PM R3.0/M6.1 Southbound Cores

Division of Engineering Services  
 Materials Engineering and Testing Services District-County Route-PM/PM: Fer-41 PM R3.0/ M6.10  
Expense Authorization (EA): EA\_06-0Q2404 Project ID# 0613000047

**LOG OF MAINLINE CORE HOLES** DeflctTrack Number:

Core Rig Operator: A,Shokrhoor/ J, Blasé/ J,Beak Date of Coring: 3/3/2014 No. of Cores: 13  
 Deflection Test Operator: Date of Deflection Test:

Test Section	Core Hole Location (PM, Lane No., Direction)	Layer 1 (Seal Coat?)	Layer 2 (Struct. Sect.)	Layer 3 (Struct. Sect.)	Layer 4 (Struct. Sect.)	Layer 5 (Base Matrl)	Total Core Thickness	Remarks
1	Fre-41 NORTHBOUND LANE 1 - PM M6.10	Chip Seal	0.67'-DGAC			Aggregate Base	0.67'	The Core was taken at PM M6.09 NORTHBOUND. The total core was 0.67' in thickness. The top layer was chip seal and the rest of the core was DGAC, core was intact. The base materials was Aggregate Base.
2	Fre-41 SOUTHBOUND LANE 1 - PM M 5.90	Chip Seal	0.56'-DGAC			Aggregate Base	0.56'	The Core was taken at PM M5.90 Southbound. The total core was 0.56' in thickness. The top layer was chip seal and the rest of the core was DGAC, core was Intact. The base materials was Aggregate Base.
3	Fre-41 NORTHBOUND LANE - PM M 5.65	Chip Seal	1.22'-DGAC			Aggregate Base	1.22'	The Core was taken at PM M 5.65 Northbound. The total core was 1.22' in thickness the top layer was chip seal core was Delaminated @ 0.65' and 0.98' from the top. The base materials was Original Ground.
4	Fre-41 SOUTHBOUND LANE 1 - PM M 5.35	Chip Seal	0.74'-DGAC		0.66'-CTB	Aggregate Base	1.40'	The Core was taken at PM M5.35 Southbound. The total core was 1.40' in thickness. The top layer was chip seal and 0.74' of the core was DGAC, remaining 0.66' was CTB. Core was Delaminated @ 0.74' and 1.04' from the top. The base materials was Aggregate Base.
5	Fre-41 NORTHBOUND LANE - PM R 5.10	Chip Seal	0.70'-DGAC			Aggregate Base	0.70'	The Core was taken at PM R 5.10 northbound. The total core was 0.70' in thickness. The top layer was chip seal and the rest of the core was DGAC, core was Intact. The base materials was Aggregate Base.
6	Fre-41 SOUTHBOUND LANE 1 - PM R 4.85	Chip Seal	0.72'-DGAC			Aggregate Base	0.72'	The Core was taken at PM R4.85 Southbound. The total core was 0.72' in thickness. The top layer was chip seal the rest was DGAC, and intact. The base materials was Aggregate Base.
7	Fre-41 NORTHBOUND LANE - PM R4.60	Chip Seal	0.78'-DGAC			Aggregate Base	0.78'	The Core was taken at PM R4.60 Northbound. The total core was 0.78' in thickness. The top layer was chip seal and the rest of the core was DGAC, core was Intact. The base materials was Aggregate Base.
8	Fre-41 SOUTHBOUND LANE 1 - PM R4.35	Chip Seal	0.75'-DGAC		0.25'-CTB	Aggregate Base	1.0'	The Core was taken at PM R 4.35 Southbound. The total core was 1.0' in thickness. The top layer was chip seal and 0.75' of the core was DGAC, remaining 0.25' was CTB. Core was Delaminated @ 0.75' from the top. The base materials was Aggregate Base.
9	Fre-41 NORTHBOUND LANE - PM R 4.10	Chip Seal	0.70'-DGAC		0.25'-CTB	Aggregate Base	0.95'	The Core was taken at PM R 4.10 Northbound. The total core was 0.95' in thickness. The top layer was chip seal and 0.70' of the core was DGAC, remaining 0.25' was CTB. Core was Delaminated @ 0.75' from the top. The base materials was Aggregate Base.
10	Fre-41 SOUTHBOUND LANE 1 - PM R 3.85	Chip Seal	0.65'-DGAC		0.30'-CTB	Aggregate Base	0.95'	The Core was taken at PM R 4.10 Northbound. The total core was 0.95' in thickness. The top layer was chip seal and 0.65' of the core was DGAC, remaining 0.30' was CTB. Core was Delaminated @ 0.38' from the top. The base materials was Aggregate Base.
11	Fre-41 NORTHBOUND LANE - PM R 3.60	Chip Seal	0.90'-DGAC		0.30'-CTB	Aggregate Base	1.20'	The Core was taken at PM R 3.60 Northbound. The total core was 1.20' in thickness. The top layer was chip seal and 0.90' of the core was DGAC, remaining 0.30' was CTB. Core was Delaminated @ 0.26' and 0.90' from the top. The base materials was Aggregate Base.
12	Fre-41 SOUTHBOUND LANE 1 - PM R 3.35	Chip Seal	0.80'-DGAC		0.38'-CTB	Aggregate Base	1.18'	The Core was taken at PM R 3.35 Southbound. The total core was 1.18' in thickness. The top layer was chip seal and 0.80' of the core was DGAC, remaining 0.38' was CTB. Core was Delaminated @ 0.24' and 0.80' from the top. The base materials was Aggregate Base.
13	Fre-41 NORTHBOUND LANE - PM R 3.10	Chip Seal	0.64'-DGAC		0.30'-CTB	Aggregate Base	0.94'	The Core was taken at PM R 3.10 Northbound. The total core was 0.94' in thickness. The top layer was chip seal and 0.64' of the core was DGAC, remaining 0.30' was CTB. Core was Delaminated @ 0.32' and 0.65' from the top. The base materials was Aggregate Base.

Core Log Prepared A, Shokrhoor-3/10/2014  
(Name and Date)

Pavement Condition Core Photos

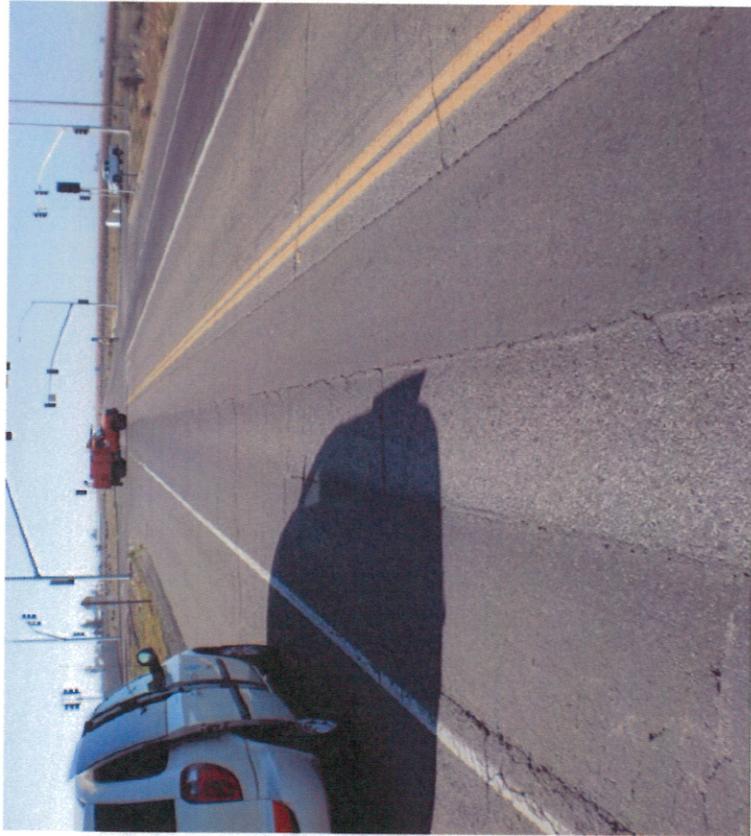
DEPARTMENT OF TRANSPORTATION  
CENTRAL REGION CONSTRUCTION  
MATERIALS ENGINEERING AND DEFLECTION TESTING



Fre-41\_EA-06-0Q2401 PM R 3.0 -M 6.10  
5

**Core -1 -NB Mainline -PM 6.10**

**Pavement Condition Picture**



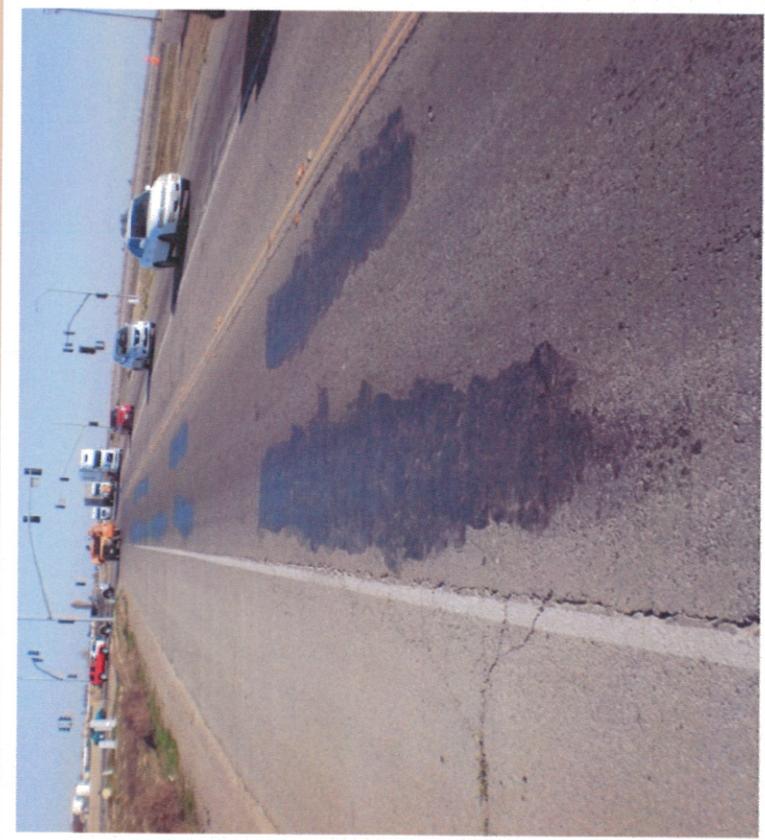
**Core Condition Picture**



**Fre-41\_EA-06-0Q2401 PM R 3.0 -M 6.10**

**Core -2-SB Mainline -PM 5.90**

**Pavement Condition Picture**



**Core Condition Picture**



**Fre-41\_EA-06-0Q2401 PM R 3.0 -M 6.10**

## Core -3-NB Mainline -PM 5.65

**Pavement Condition Picture**



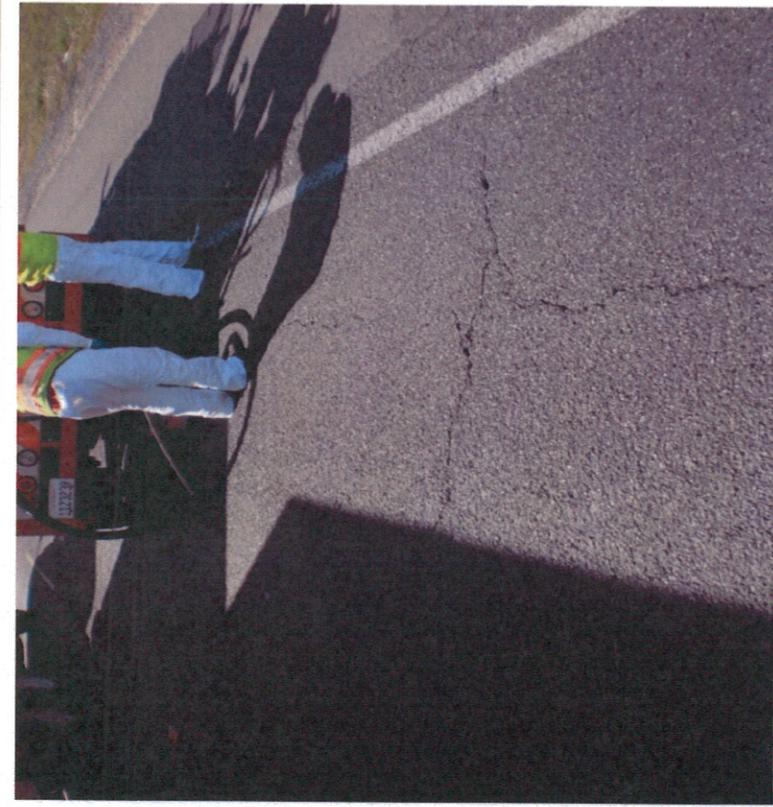
**Core Condition Picture**



**Fre-41\_EA-06-0Q2401 PM R 3.0 -M 6.10**

**Core -4-SB Mainline -PM 5.35**

**Pavement Condition Picture**



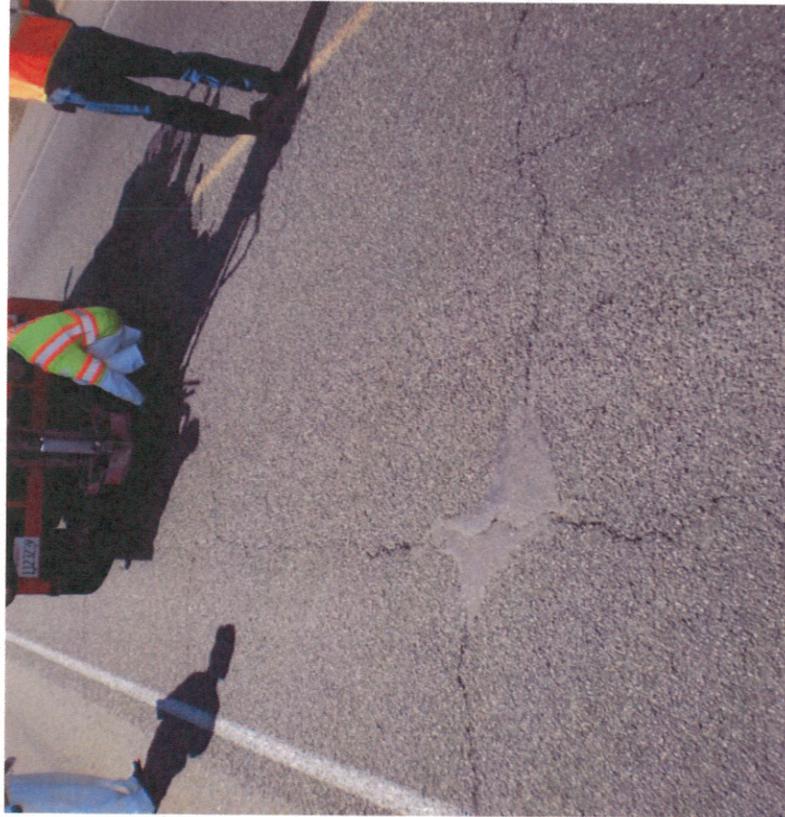
**Core Condition Picture**



**Fre-41\_EA-06-0Q2401 PM R 3.0 -M 6.10**

## Core -5-NB Mainline -PM 5.10

Pavement Condition Picture



Core Condition Picture



Fre-41\_EA-06-0Q2401 PM R 3.0 -M 6.10

**Core -6-SB Mainline -PM 4.85**

**Pavement Condition Picture**



**Core Condition Picture**



**Fre-41\_EA-06-0Q2401 PM R 3.0 -M 6.10**

**Core -7-NB Mainline -PM 4.60**

**Pavement Condition Picture**



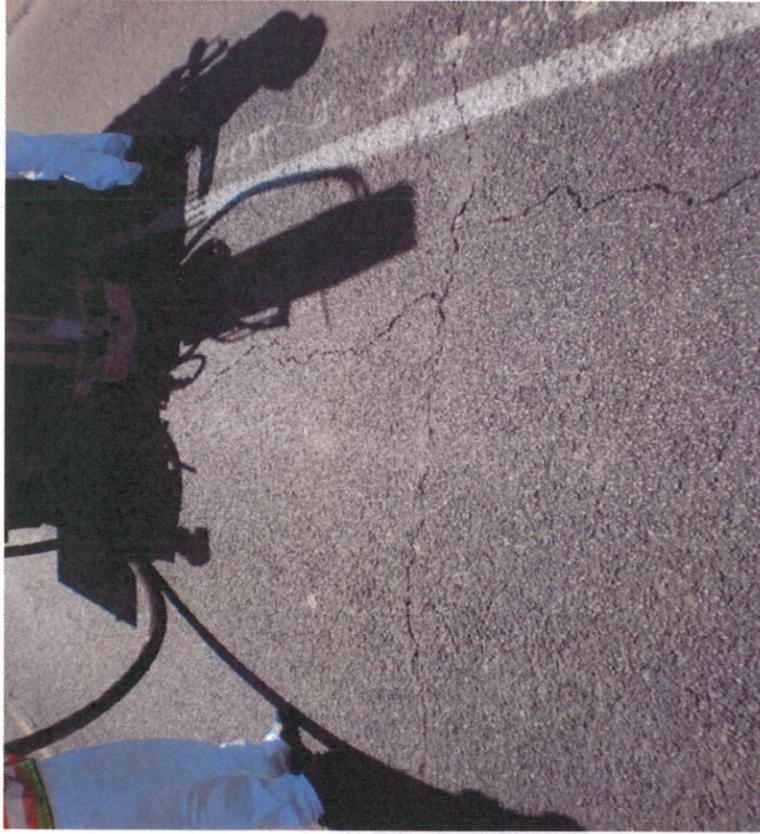
**Core Condition Picture**



**Fre-41\_EA-06-0Q2401 PM R 3.0 -M 6.10**

**Core -8-SB Mainline -PM 4.35**

**Pavement Condition Picture**



**Core Condition Picture**



**Fre-41\_EA-06-0Q2401 PM R 3.0 -M 6.10**

**Core -9-NB Mainline -PM 4.10**

**Pavement Condition Picture**



**Core Condition Picture**



**Fre-41\_EA-06-0Q2401 PM R 3.0 -M 6.10**

**Core -10-SB Mainline -PM 3.85**

**Pavement Condition Picture**



**Core Condition Picture**



**Fre-41\_EA-06-0Q2401 PM R 3.0 -M 6.10**

**Core -11-NB Mainline -PM 3.60**

**Pavement Condition Picture**



**Core Condition Picture**



**Fre-41\_EA-06-0Q2401 PM R 3.0 -M 6.10**

**Core -12-SB Mainline -PM 3.35**

**Pavement Condition Picture**



**Core Condition Picture**



**Fre-41\_EA-06-0Q2401 PM R 3.0 -M 6.10**

**Core -13-NB Mainline -PM 3.10**

**Pavement Condition Picture**



**Core Condition Picture**



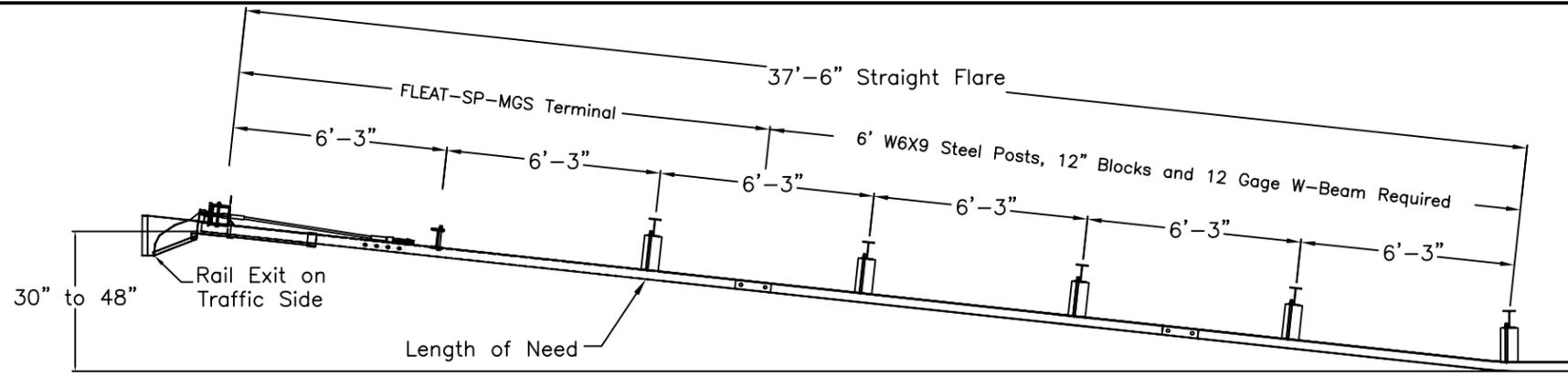
**Fre-41\_EA-06-0Q2401 PM R 3.0 -M 6.10**

**FOR ALL CORE INFORMATION, PLEASE  
CHECK THE ATTACHED CORE LOG**

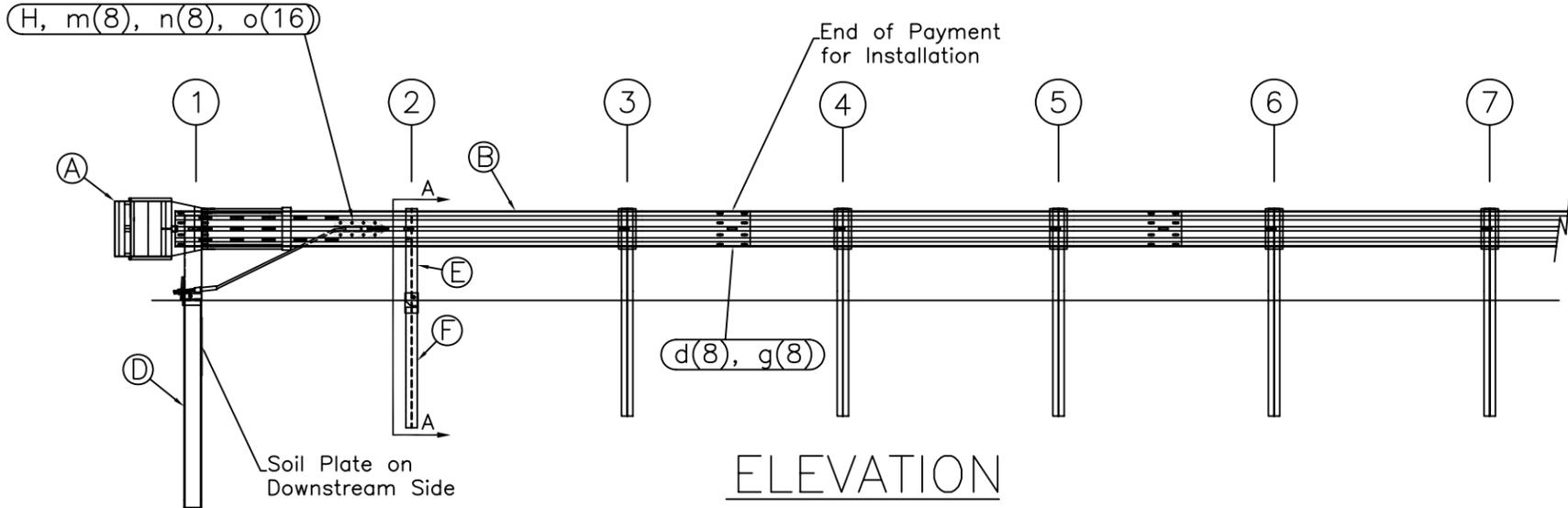
**Fre-41\_PM R 3.0 / M6.10 Mainline**

**EA-06-0Q2404**

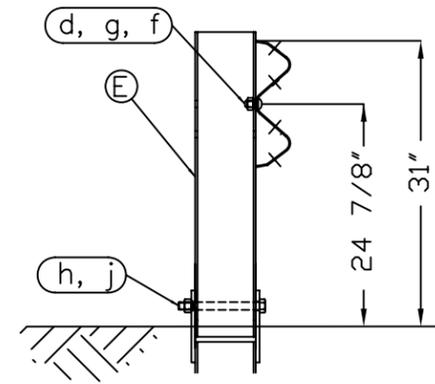
**Project No. 0613000047 March 3/2014**



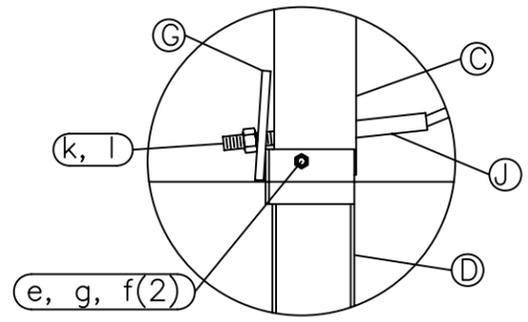
PLAN



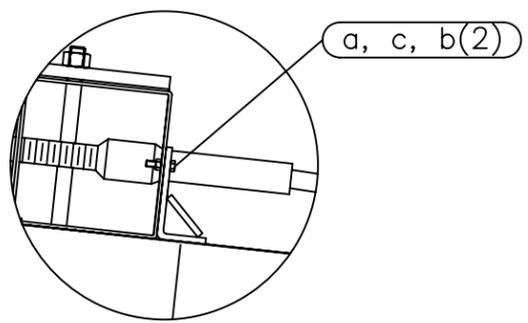
ELEVATION



SECTION A-A  
Post #2



Post #1 Connection Detail



Impact Head Connection Detail

ITEM	QTY	BILL OF MATERIALS	ITEM NO.
A	1	IMPACT HEAD	F3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	MGS-SF1303
C	1	FIRST POST TOP (6X6X $\frac{1}{8}$ " Tube)	TPHP1A
D	1	FIRST POST BOTTOM (6' W6X15)	TPHP1B
E	1	SECOND POST ASSEMBLY TOP	UHP2A
F	1	SECOND POST ASSEMBLY BOTTOM	HP3B
G	1	BEARING PLATE	E750
H	1	CABLE ANCHOR BOX	S760
J	1	BCT CABLE ANCHOR ASSEMBLY	E770

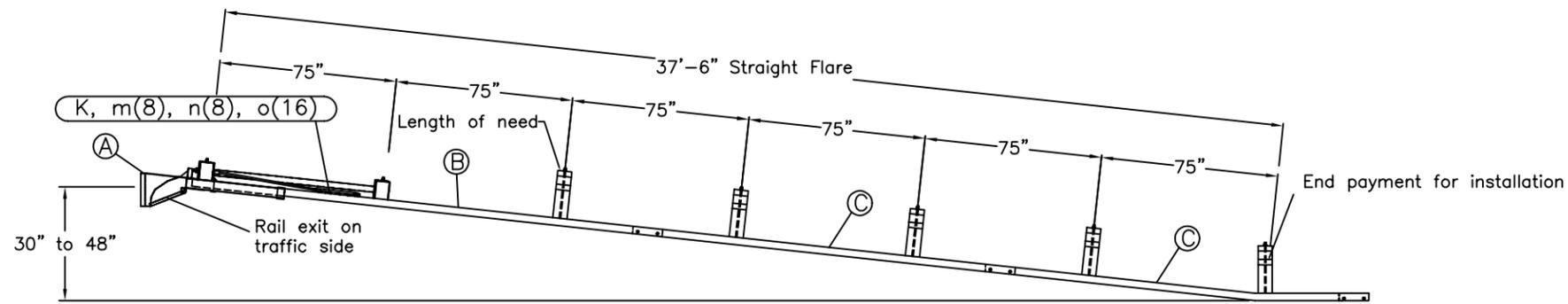
HARDWARE (ALL DIMENSIONS IN INCHES)			
a	2	5/16 x 1 HEX BOLT GRD 5	B5160104A
b	4	5/16 WASHER	W0516
c	2	5/16 HEX NUT	N0516
d	9	5/8 Dia. x 1 1/4 SPLICE BOLT (POST #2)	B580122
e	1	5/8 Dia. x 9 HEX BOLT GRD 5	B580904A
f	3	5/8 WASHER	W050
g	10	5/8 Dia. H.G.R NUT	N050
h	1	3/4 Dia. x 8 1/2 HEX BOLT GRD A449	B340854A
j	1	3/4 Dia. HEX NUT	N030
k	2	1 ANCHOR CABLE HEX NUT	N100
l	2	1 ANCHOR CABLE WASHER	W100
m	8	CABLE ANCHOR BOX SHOULDER BOLT	SB58A
n	8	1/2 A325 STRUCTURAL NUT	N055A
o	16	1 1/16 OD x 9/16 ID A325 STR. WASHER	W050A

GENERAL NOTES:

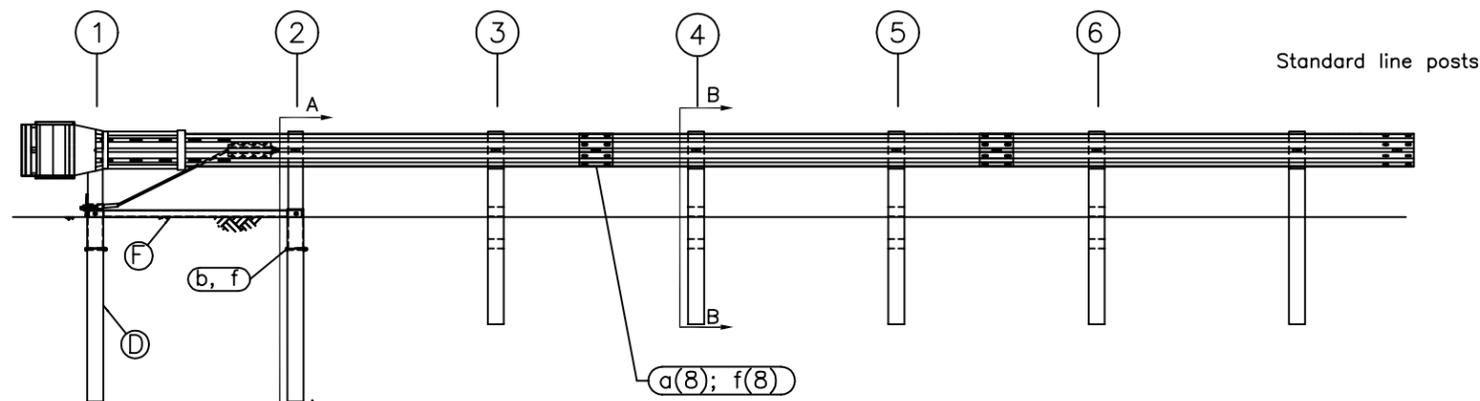
- All bolts, nuts, cable assemblies, cable anchors and bearing plates shall be galvanized.
- The lower sections of the Posts 1&2 shall not protrude more than 4 in above the ground (measured along a 5' cord). Site grading may be necessary to meet this requirement.
- The lower sections of the hinged posts should not be driven with the upper post attached. If the post is placed in a drilled hole, the backfill material must be satisfactorily compacted to prevent settlement.
- When competent rock is encountered, a 12" Ø post hole, 20 in. deep cored into the rock surface may be used if approved by the engineer for post 1. Granular material will be placed in the bottom of the hole, approximately 2.5" deep to provide drainage. The first post can be field cut to length, placed in the hole and backfilled with suitable backfill. The soil plate may be trimmed if required.
- The breakaway cable assembly must be taut. A locking device (vice grips or channel lock pliers) should be used to prevent the cable from twisting when tightening nuts.

Big Spring, TX  
Phone: 432-263-2435  
or Phone: 330-346-0721

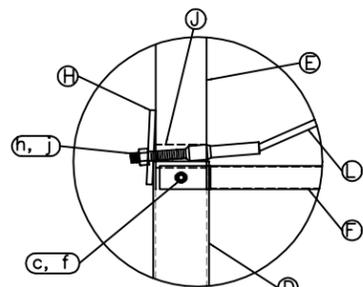
<b>FLEAT-SP-MGS Terminal Midwest Guardrail System 31" Top of Rail</b>		Sheet:	1
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Drawing Name: <b>FLT-SP-S-MGS</b>		By:	JRR
		Scale:	None
		Rev:	0



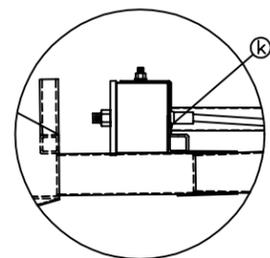
TRAFFIC → PLAN



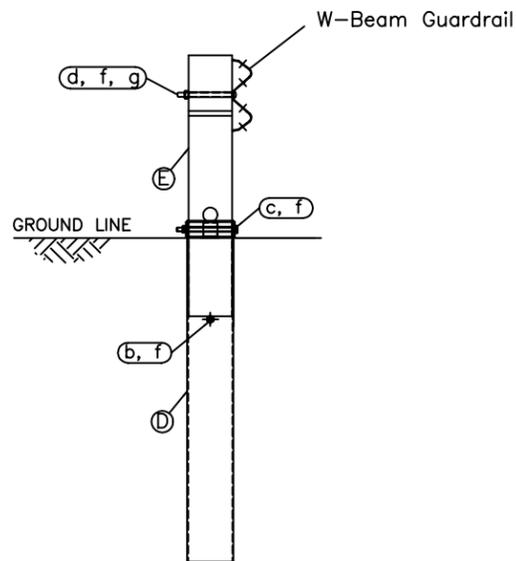
ELEVATION



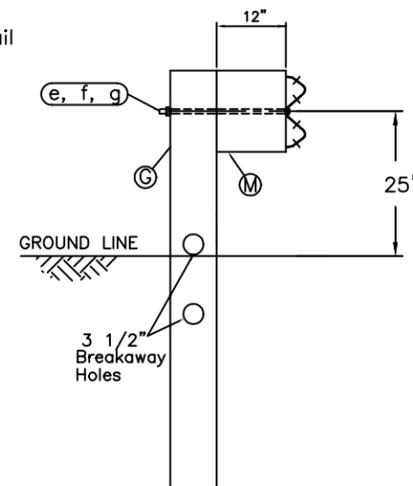
POST #1 CONNECTION DETAILS



IMPACT HEAD CONNECTION DETAIL



SECTION A-A  
Post #2



SECTION B-B  
Posts 3 thru 6

ITEM	QTY	BILL OF MATERIALS	ITEM NO.
A	1	IMPACT HEAD	F3000
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga.	F1303 MGS
C	2	W-BEAM GUARDRAIL, 12 Ga.	G1203 MGS
D	2	FOUNDATION TUBE	E731
E	2	BCT WOOD POST	P650 MGS
F	1	GROUND STRUT	E780
G	4	CRT WOOD POST	P671 MGS
H	1	BEARING PLATE	E750
J	1	PIPE SLEEVE	E740
K	1	CABLE ANCHOR BOX	S760
L	1	BCT CABLE ANCHOR ASSEMBLY	E770
M	4	MGS TIMBER BLOCKOUT OR RECYC. EQUIV.	P618
HARDWARE (ALL DIMENSIONS IN INCHES)			
a	16	5/8 $\phi$ x 1 1/4 SPLICE BOLT	B580122
b	2	5/8 $\phi$ x 7 1/2 HEX BOLT	B580754
c	2	5/8 $\phi$ x 10 HEX BOLT	B581004
d	1	5/8 $\phi$ x 10 H.G.R. BOLT	B581002
e	4	5/8 $\phi$ x 22 H.G.R. BOLT	B582202
f	25	5/8 $\phi$ H.G.R. NUT	N050
g	5	H.G.R. WASHER	W050
h	1	ANCHOR CABLE HEX NUT	N100
j	2	ANCHOR CABLE WASHER	W100
k	2	3/8 x 3 LAG SCREW	E350
m	8	CABLE ANCHOR BOX SHOULDER BOLT	SB58A
n	8	1/2 A325 STRUCTURAL NUT	N055A
o	16	1 1/16 OD x 9/16 ID A325 STR. WASHER	W050A

GENERAL NOTES:

- Breakaway posts are required with the FLEAT.
- All bolts, nuts, cable assemblies, cable anchors and bearing plates shall be galvanized.
- The foundation tubes shall not protrude more than 4 in above the ground (measured along a 5' cord). Site grading may be necessary to meet this requirement.
- When rock is encountered, a 12"  $\phi$  post hole, 20 in into the rock surface may be used if approved by the engineer. Granular material will be placed in the bottom of the hole, approximately 2.5" deep to provide drainage. The first two posts can be field cut to length, placed in the hole and backfilled with adequately compacted material excavated from the hole.
- The breakaway cable assembly must be taut. A locking device (vice grips or channel lock pliers) should be used to prevent the cable from twisting when tightening nuts.
- The soil tubes may be driven with an approved driving head. They shall not be driven with the post in the tube.
- The wood blockouts should be "toe-nailed" to the rectangular wood posts to prevent them from turning when the wood shrinks.



**Road Systems, Inc.**

Big Spring, TX  
Phone: 432-263-2435  
or Phone: 330-346-0721

Flared Energy Absorbing  
Terminal - FLEAT Assembly  
Midwest Guardrail System

Wood Post System

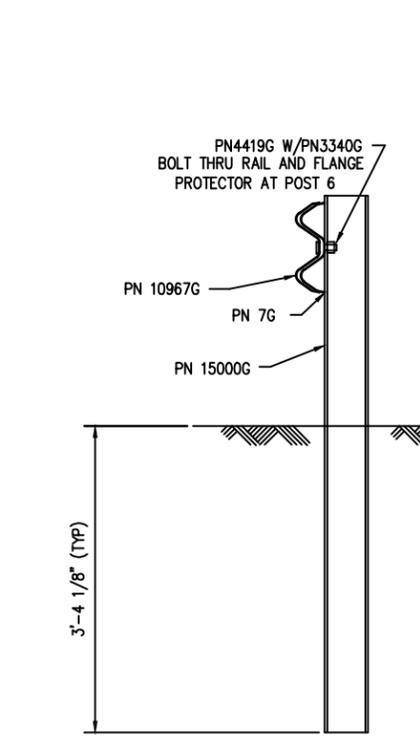
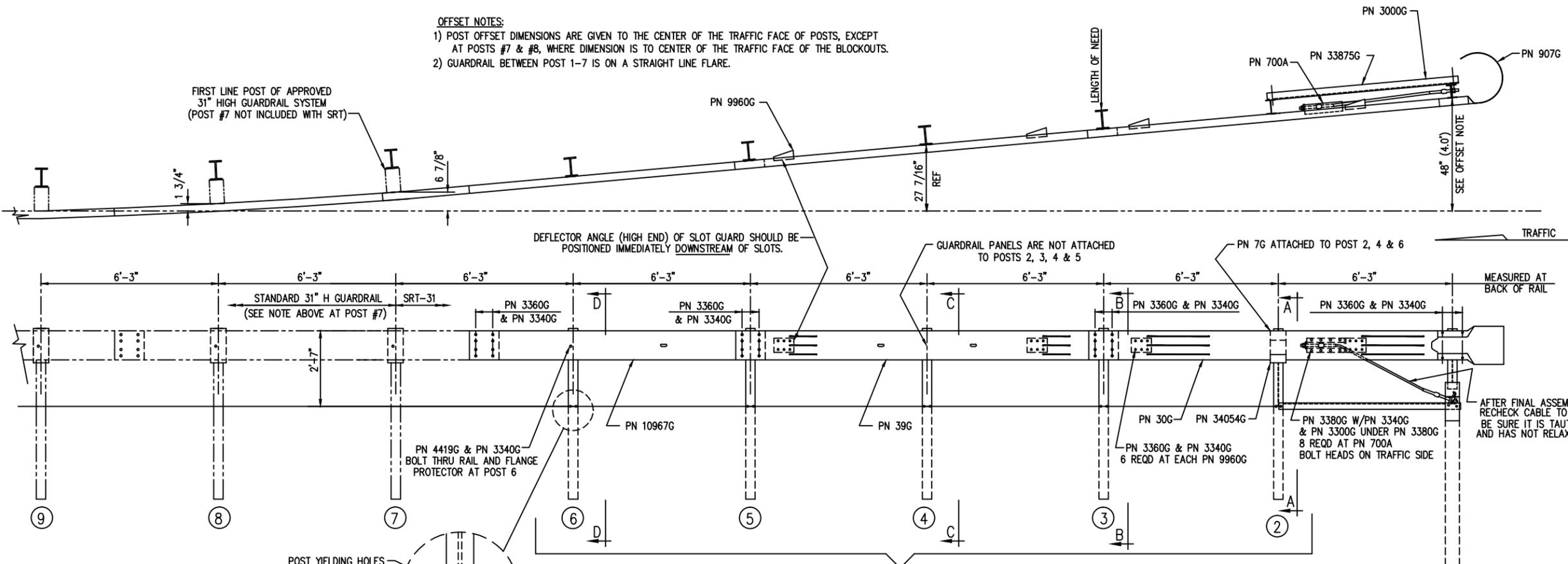
Drawing Name:  
FLT-MGS-W-US

Scale:  
None

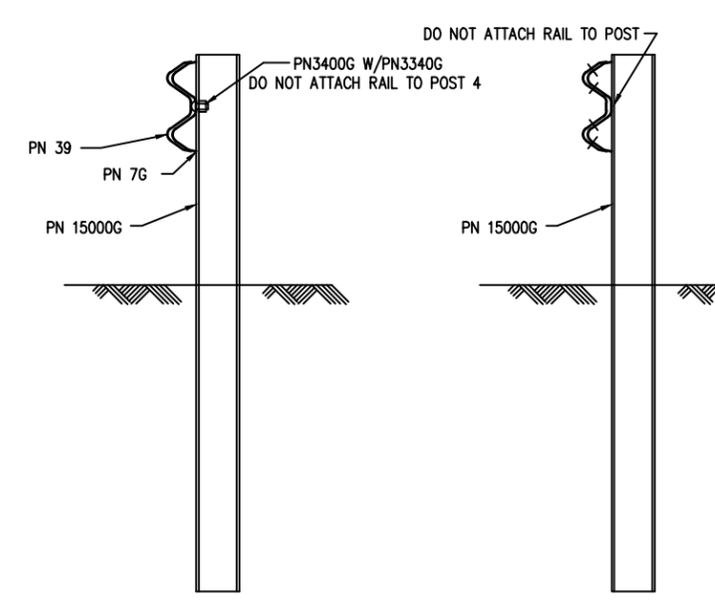
Sheet:  
A1  
Date:  
12/01/2004  
By:  
JRR  
Rev:  
0

**OFFSET NOTES:**  
 1) POST OFFSET DIMENSIONS ARE GIVEN TO THE CENTER OF THE TRAFFIC FACE OF POSTS, EXCEPT AT POSTS #7 & #8, WHERE DIMENSION IS TO CENTER OF THE TRAFFIC FACE OF THE BLOCKOUTS.  
 2) GUARDRAIL BETWEEN POST 1-7 IS ON A STRAIGHT LINE FLARE.

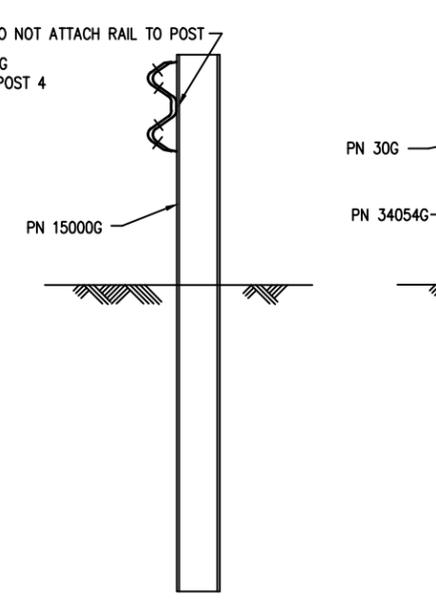
FIRST LINE POST OF APPROVED 31" HIGH GUARDRAIL SYSTEM (POST #7 NOT INCLUDED WITH SRT)



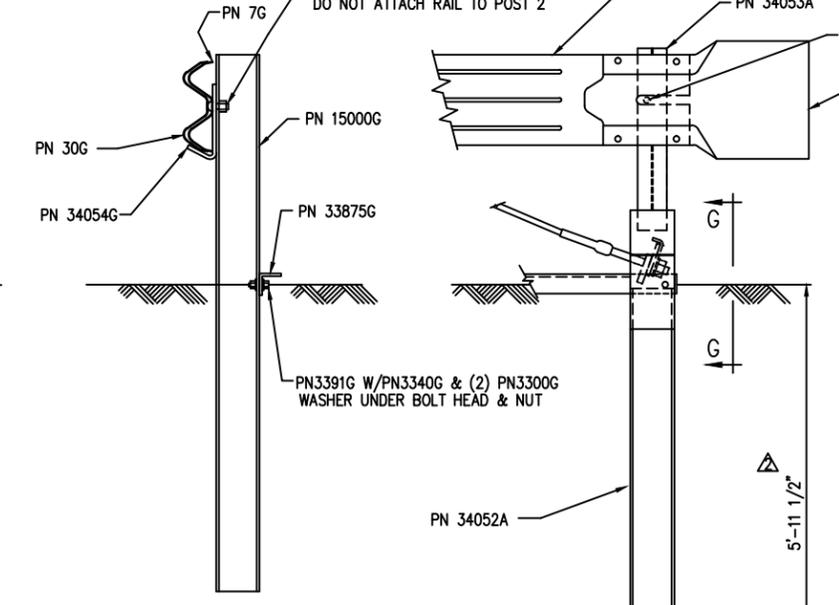
SECTION "D-D"  
( @ POST #6)



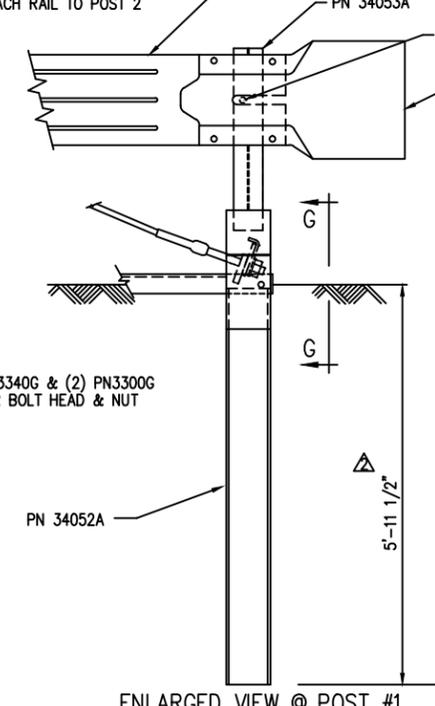
SECTION "C-C"  
( @ POST #4)



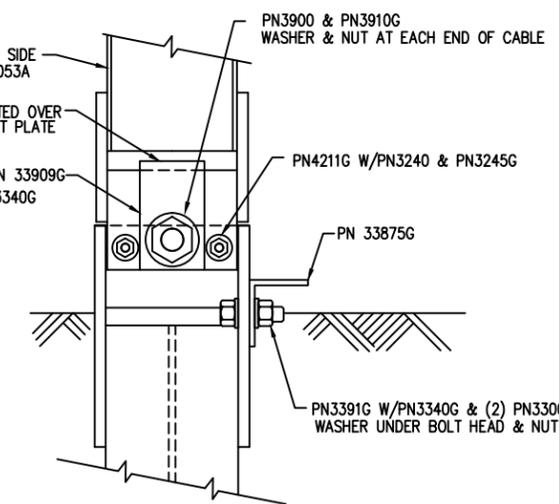
SECTION "B-B"  
( @ POST #3 & #5)



SECTION "A-A"  
( @ POST #2)



ENLARGED VIEW @ POST #1



VIEW "G-G"  
( @ POST #1)

BILL OF MATERIAL		
PN	QTY	DESCRIPTION
7G	3	12/6"/FLG PROTECTOR (AT POST 2, 4 & 6)
30G	1	12/12/6"/S SRT-1 (GUARDRAIL)
39G	1	12/12/6"/S SRT-2 (GUARDRAIL)
700A	1	CABLE ANCHOR BRACKET
907G	1	12/BUFFER/ROLLED (TERMINAL)
3000G	1	3/4 x 6'-6" CABLE
<b>HARDWARE</b>		
3240G	2	5/16" WASHER (AT POST 1)
3245G	2	5/16" HEX NUT (AT POST 1)
3300G	12	5/8" WASHER
3340G	67	5/8" HEX HGR NUT
3360G	52	5/8" x 1 1/4" HGR SPLICE BOLT
3380G	8	5/8" x 1 1/2" HEX HD BOLT
3400G	4	5/8" x 2" HGR POST BOLT (AT POSTS 1, 2 & 4)
3391G	2	5/8" x 1 3/4" HEX BOLT (A325) (AT STRUT)
3900G	2	1" WASHER (AT CABLE)
3910G	2	1" HEX NUT (AT CABLE)
4211G	2	5/16" x 1 3/4" HEX BOLT (AT POST 1)
4419G	1	5/8" x 1 3/4" COUNTERSUNK HD BOLT (AT POST 6)
9960G	4	SLOT GUARD BRACKET
10967G	1	12/9/4.5/31.5/S SRT-3 (GUARDRAIL)
15000G	5	6'-0" SYT POST (W6 X 8.5)
33909G	1	CABLE ANCHOR BRACKET (AT POST 1)
33875G	1	ANGLE STRUT 3 x 3 x 1/4
34052A	1	CR POST 1 BOT (W6 X 15)
34053A	1	CR POST 1 TOP (W6 X 8.5)
34054G	1	POST SHELF ANGLE (AT POST 2)

REV.	CHK'D	BY	DATE	REMARKS
4	BT	LH	10/6/10	OFFSET POSTS #7 & #8
3	BT	LH	2/26/09	REVISED HARDWARE
2	SG	LH	7/28/08	REVISED POST #1 LENGTH IN GROUND
1	SG	LH	1/16/08	REVISED HARDWARE QUANTITY IN BILL OF MATERIAL

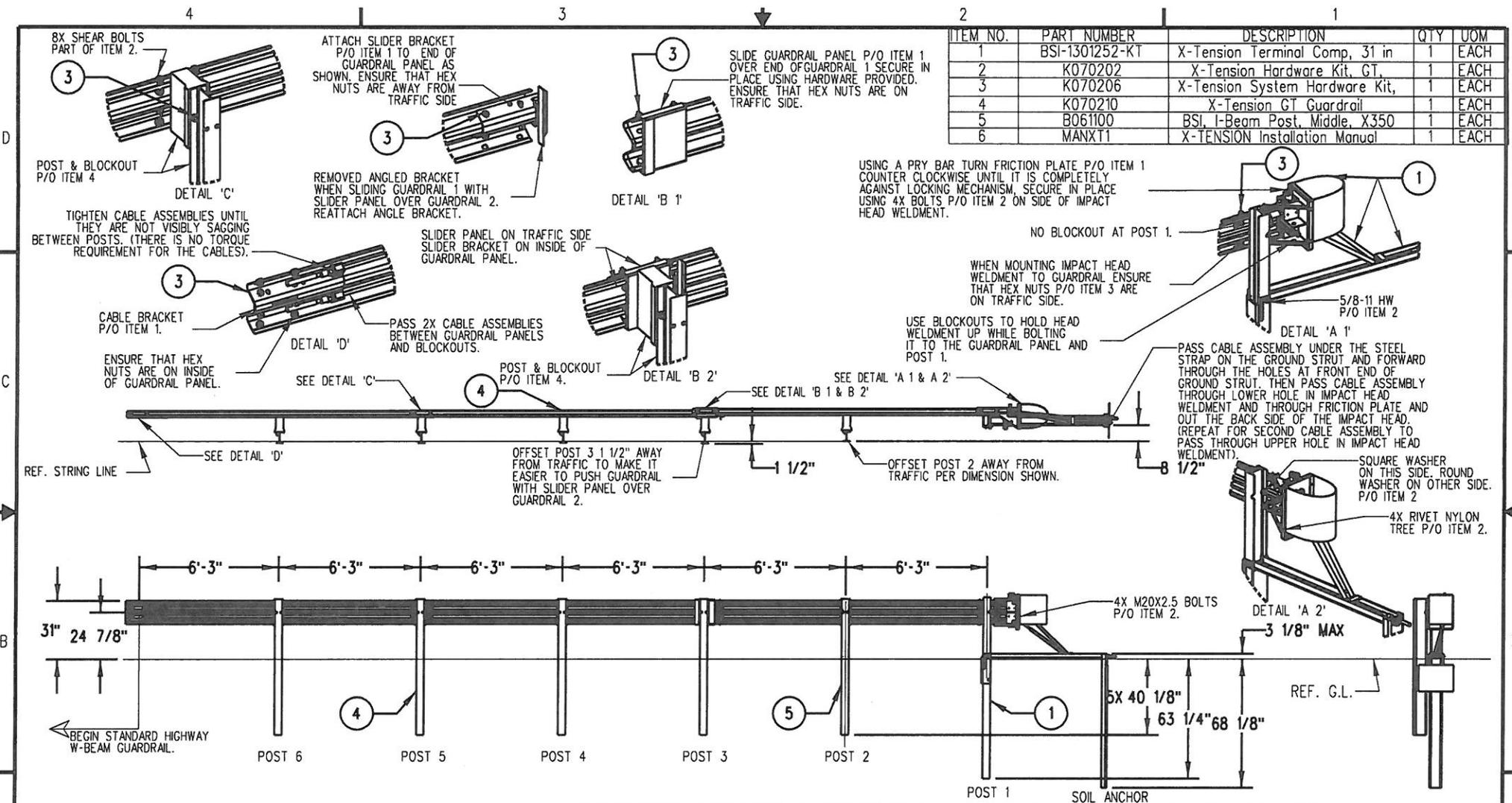
**SRT-31**

SLOTTED RAIL TERMINAL SRT-31 (31" H)  
ERECTION DETAILS  
(3 PANELS, CR AND SYT POSTS)

DRAWN	BT
CHECKED	SG
SCALE	NTS
DATE	10/30/07
ENG. FILE #	SS436-01E
SHT.No.	E1 OF 1
DRAWING NO.	SS 436
REV.	4

TRINITY HIGHWAY PRODUCTS, LLC.  
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DALLAS, TX 75207

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ITEM NO.	PART NUMBER	DESCRIPTION	QTY	UOM
1	BSI-1301252-KT	X-Tension Terminal Comp, 31 in	1	EACH
2	K070202	X-Tension Hardware Kit, GT.	1	EACH
3	K070206	X-Tension System Hardware Kit,	1	EACH
4	K070210	X-Tension GT Guardrail	1	EACH
5	B061100	BSL I-Beam Post, Middle, X350	1	EACH
6	MANXT1	X-TENSION Installation Manual	1	EACH

- NOTES: UNLESS OTHERWISE SPECIFIED.
- SYSTEM TO BE INSTALLED PER MANUFACTURER SPECIFICATIONS.
  - ONLY TIGHTEN THE CABLE ASSEMBLIES USING THE NUTS AT THE CABLE BRACKET (SEE DETAIL 'D'). DO NOT TIGHTEN THE CABLES AT THE FRONT OF THE GROUND ANCHOR.
  - WHEN DRIVING STEEL POST, ENSURE THAT A DRIVING CAP WITH TIMBER OR PLASTIC INSERT IS USED TO PREVENT DAMAGE TO THE GALVANIZING TO THE TOP OF THE POST.

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<b>APPROVALS</b>			
DRAWN BY:	NMV	THIRD ANGLE PROJECTION	
DRAWN DATE:	2/08/13		
APPR'D BY:	JMT		
APPR'D DATE:	2/08/13		

		<small>BARRIER SYSTEMS INC. 3333 Voco Valley Parkway, Ste 800 Vacaville, CA 95688 Tel: 800-800-5691 www.barriersystemsinc.com</small>	
<b>TITLE</b> X-TENSION GUARDRAIL TERMINAL SYSTEM STEEL POST WITH COMPOSITE BLOCKOUT 31" RAIL HEIGHT			
SIZE	DWG NO.	REV.	
B	XGTGSS5	B	
SCALE	1:50	SHEET	1 OF 1