



U.S. Department
of Transportation
**Federal Highway
Administration**

1200 New Jersey Ave., SE
Washington, D.C. 20590

May 18, 2016

In Reply Refer To:
HSST/CC-92B

Mr. Ron Faulkenberry
Gibraltar
4303 Innovation Loop
Marble Falls, TX 78654

Dear Mr. Faulkenberry:

This letter is in response to your July 20, 2015 request for the Federal Highway Administration (FHWA) to review a roadside safety device, hardware, or system for eligibility for reimbursement under the Federal-aid highway program. This FHWA letter of eligibility is assigned FHWA control number CC-92B and is valid until a subsequent letter is issued by FHWA that expressly references this device.

Decision

The following devices are eligible, with details provided in the form which is attached as an integral part of this letter:

- Modified Gibraltar Driven Cable Terminal

Scope of this Letter

To be found eligible for Federal-aid funding, modified roadside safety devices should meet the crash test and evaluation criteria contained in the National Cooperative Highway Research Program (NCHRP) Report 350. However, the FHWA, the Department of Transportation, and the United States Government do not regulate the manufacture of roadside safety devices. Eligibility for reimbursement under the Federal-aid highway program does not establish approval, certification or endorsement of the device for any particular purpose or use.

This letter is not a determination by the FHWA, the Department of Transportation, or the United States Government that a vehicle crash involving the device will result in any particular outcome, nor is it a guarantee of the in-service performance of this device. Proper manufacturing, installation, and maintenance are required in order for this device to function as tested.

This finding of eligibility is limited to the crashworthiness of the system and does not cover other structural features, nor conformity with the Manual on Uniform Traffic Control Devices.

Eligibility for Reimbursement

FHWA previously issued an eligibility letter for the roadside safety system described in your pending request. Your pending request now identifies a modification to that roadside safety system.

The original roadside safety device information is provided here:

Name of system: Modified Gibraltar Driven Cable Terminal
Type of system: Cable Barrier Terminal

Date of original request: June 7, 2005
Date of original FHWA eligibility letter: June 23, 2005
FHWA Control number: CC-92
Test level : NCHRP 350 Test Level 3

Date of first modification request: May 17, 2007
Date of first modification FHWA eligibility letter: September 10, 2007
FHWA Control number: CC-92A

The pending modification(s) consists of the following changes:

1. Replacing the steel tube foundation with a steel I-Beam.

FHWA concurs with the recommendation of the accredited crash testing laboratory as stated within the attached form.

Full Description of the Eligible Device

The device and supporting documentation, including reports of the crash tests or other testing done, videos of any crash testing, and/or drawings of the device, are described in the attached form.

Notice

If a manufacturer makes any modification to any of their roadside safety hardware that has an existing eligibility letter from FHWA, the manufacturer must notify FHWA of such modification with a request for continued eligibility for reimbursement. The notice of all modifications to a device must be accompanied by:

- Significant modifications – For these modifications, crash test results must be submitted with accompanying documentation and videos.
- Non-signification modifications – For these modifications, a statement from the crash test laboratory on the potential effect of the modification on the ability of the device to meet the relevant crash test criteria.

You are expected to supply potential users with sufficient information on design, installation and maintenance requirements to ensure proper performance.

You are expected to certify to potential users that the hardware furnished has the same chemistry, mechanical properties, and geometry as that submitted for review, and that it will meet the test and evaluation criteria of the NCHRP Report 350.

Issuance of this letter does not convey property rights of any sort or any exclusive *privilege*. This letter is based on the premise that information and reports submitted by you are accurate and correct. We reserve the right to modify or revoke this letter if: (1) there are any inaccuracies in the information submitted in support of your request for this letter, (2) the qualification testing was flawed, (3) in-service performance or other information reveals safety problems, (4) the system is significantly different from the version that was crash tested, or (5) any other information indicates that the letter was issued in error or otherwise does not reflect full and complete information about the crashworthiness of the system.

Standard Provisions

- To prevent misunderstanding by others, this letter of eligibility designated as FHWA control number CC-92B shall not be reproduced except in full. This letter and the test documentation upon which it is based are public information. All such letters and documentation may be reviewed upon request.
- This letter shall not be construed as authorization or consent by the FHWA to use, manufacture, or sell any patented system for which the applicant is not the patent holder.
- If the subject device is a patented product it may be considered to be proprietary. If proprietary systems are specified by a highway agency for use on Federal-aid projects: (a) they must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with the existing highway facilities or that no equally suitable alternative exists; or (c) they must be used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes. Our regulations concerning proprietary products are contained in Title 23, Code of Federal Regulations, Section 635.411.

Sincerely yours,



Michael S. Griffith
Director, Office of Safety Technologies
Office of Safety

Enclosures

Request for Federal Aid Reimbursement Eligibility of Highway Safety Hardware

Submitter	Date of Request:	July 20, 2015	<input type="radio"/> New <input checked="" type="radio"/> Resubmission
	Name:	Ron Faulkenberry	
	Company:	Gibraltar	
	Address:	4303 Innovation Loop, Marble Falls, TX 78654	
	Country:	USA	
To:	Michael S. Griffith, Director FHWA, Office of Safety Technologies		

I request the following devices be considered eligible for reimbursement under the Federal-aid highway program.

System Type	Submission Type	Device Name / Variant	Testing Criterion	Test Level
'CC': Crash Cushions, Attenuators, & Terminals	<input type="radio"/> Physical Crash Testing	Modified Driven Cable Terminal	NCHRP Report 350	TL3
	<input checked="" type="radio"/> Engineering Analysis			

By submitting this request for review and evaluation by the Federal Highway Administration, I certify that the product(s) was (were) tested in conformity with the NCHRP Report 350 (Report 350) and that the evaluation results meet the appropriate evaluation criteria in the Report 350.

Identification of the individual or organization responsible for the product:

Contact Name:	Ron Faulkenberry	Same as Submitter <input checked="" type="checkbox"/>
Company Name:	Gibraltar	Same as Submitter <input checked="" type="checkbox"/>
Address:	4303 Innovation Loop, Marble Falls, TX 78654	Same as Submitter <input checked="" type="checkbox"/>
Country:	USA	Same as Submitter <input checked="" type="checkbox"/>
Enter below all disclosures of financial interests as required by the FHWA 'Federal-Aid Reimbursement Eligibility Process for Safety Hardware Devices' document.		
Testing for Gibraltar Cable Barrier Systems was conducted by Karco Engineering in Adelanto, CA. Compensation for conducting the tests were paid to Karco as professional fees for services. There are no other commissions, nor royalties, nor research funding or other forms of research support paid or owed to Karco. Karco has no patents, copyrights, nor any other intellectual property interests in any Gibraltar products. Karco has no licenses or contractual relationships, nor business ownership, nor investment interests in Gibraltar or any of its products.		

PRODUCT DESCRIPTION

<input type="radio"/> New Hardware or Significant Modification	<input checked="" type="radio"/> Modification to Existing Hardware	Non-Significant
<p>Gibraltar Cable Barrier Driven I-Beam End Terminal - This request is to modify the original end terminal design to use a multiple I-Beam driven post foundation instead of the original concrete foundation design. Original design was with concrete foundations, as presented in FHWA eligibility letter CC-92. (Original system drawing included with submission for comparison purposes.) FHWA eligibility letter CC-92A addressed modifications in the original foundation design; the modification of the system involves replacing the one 8"x8"x3/8"x8' anchor tube and four 3"x4"x3/16" tube sockets connected by a 2"x4"x3/8" angle iron ground struts with three W8x31x8' sections connected with dual C6x13 ground struts. The resulting system is significantly stiffer and not expected to alter the impact performance of the system. Engineering design calculations prepared by G2 Engineering Consulting Group for a static design load deflection of not more than 1-inch movement in AASHTO Standard soil has been submitted and reviewed by Karco Engineering and determined that the steel driven I-Beam terminal foundation design uses multiple 8" I-Beams to make it stronger than the single 8"x8" steel tube design in poorer soils. All changes were underground; no above ground items were modified and does not effect the crashworthiness of the end terminal design.</p>		

CRASH TESTING

A brief description of each crash test and its result:

Required Test Number	Narrative Description	Evaluation Results
3-30 (820C)	This test originally run for FHWA eligibility letter CC-92; the modified foundation design with steel driven I-beams does not effect the crashworthiness of the end terminal.	Non-Critical, not conducted
S3-30 (700C)	non-critical; NCHRP 350 optional test	Non-Critical, not conducted
3-31 (2000P)	This test was determined to be non-critical on our original design when FHWA eligibility letter CC-92 was issued. This underground modification does not effect the crashworthiness of the terminal.	Non-Critical, not conducted
3-32 (820C)	Originally tested with concrete foundations; FHWA eligibility letter CC-92; modified foundation design only with steel driven tube, FHWA eligibility letter CC-92A; modified foundation design with steel driven I-beams, stronger design. This modification does not effect the crashworthiness of the end terminal.	Non-Critical, not conducted
S3-32 (700C)	non-critical; NCHRP 350 optional test	Non-Critical, not conducted
3-33 (2000P)	This test was determined to be non-critical on our original design when eligibility letter CC-92 was issued. This underground modification does not effect the crashworthiness of the terminal.	Non-Critical, not conducted
3-34 (820C)	This test was determined to be non-critical on our original design when FHWA eligibility letter CC-92 was issued. This underground modification does not effect the crashworthiness of the terminal.	Non-Critical, not conducted
S3-34 (700C)	non-critical; NCHRP 350 optional test	Non-Critical, not conducted

Required Test Number	Narrative Description	Evaluation Results
3-35 (2000P)	Originally tested with concrete foundations; FHWA eligibility letter CC-92; modified foundation design only with steel driven tube, FHWA eligibility letter CC-92A; modified foundation design with steel driven I-beams, stronger design. This modification does not effect the crashworthiness of the end terminal.	Non-Critical, not conducted
3-36 (820C)	test does not apply to a gating terminal	Non-Critical, not conducted
S3-36 (700C)	non-critical; NCHRP 350 optional test	Non-Critical, not conducted
3-37 (2000P)	test does not apply to a gating terminal	Non-Critical, not conducted
3-38 (2000P)	test does not apply to a gating terminal	Non-Critical, not conducted
3-39 (2000P)	Originally tested with concrete foundations; FHWA eligibility letter CC-92; modified foundation design with steel driven tube, FHWA eligibility letter CC-92A; modified foundation design with steel driven I-beams, stronger design. This modification does not effect the crashworthiness of the end terminal.	Non-Critical, not conducted
3-40 (2000P)	test does not apply to a re-directive terminal	Non-Critical, not conducted
S3-40 (700C)	non-critical; NCHRP 350 optional test	Non-Critical, not conducted
3-41 (2000P)	test does not apply to a re-directive terminal	Non-Critical, not conducted
3-42 (820C)	test does not apply to a re-directive terminal	Non-Critical, not conducted
S3-42 (700C)	non-critical; NCHRP 350 optional test	Non-Critical, not conducted
3-43 (2000P)	test does not apply to a re-directive terminal	Non-Critical, not conducted
3-44 (2000P)	test does not apply to a re-directive terminal	Non-Critical, not conducted

Full Scale Crash Testing was done in compliance with NCHRP Report 350 by the following accredited crash test Laboratory. By signature below, the Laboratory agrees in support of this submission that all critical and relevant crash tests for the device listed above were conducted. (cite the laboratory's accreditation status as noted in the crash test reports.):

Testing Laboratory's signature concurs that these modifications are considered Non-Significant.		
Laboratory Name:	KARCO Engineering, INC	
Laboratory Signature:	Steven Matsusaka <small>Digitally signed by Steven Matsusaka DN: cn=Steven Matsusaka, o=KARCO Engineering, LLC., ou, email=smatsusaka@karco.com, c=US Date: 2016.01.22 14:14:54 -08'00'</small>	
Address:	9270 Holly Road, Adelanto, CA 92301	Same as Submitter <input type="checkbox"/>
Country:	USA	Same as Submitter <input type="checkbox"/>
Accreditation Certificate Number and Dates of current Accreditation period :	KARCO Engineering, LLC TL-371 Revised May 30, 2014; new certificate commencing December 18, 2015; certification audited every two years.	

Submitter Signature*:


Digitally signed by Ron
Faulkenberry
Date: 2016.01.21 15:09:57 -06'00'

ATTACHMENTS

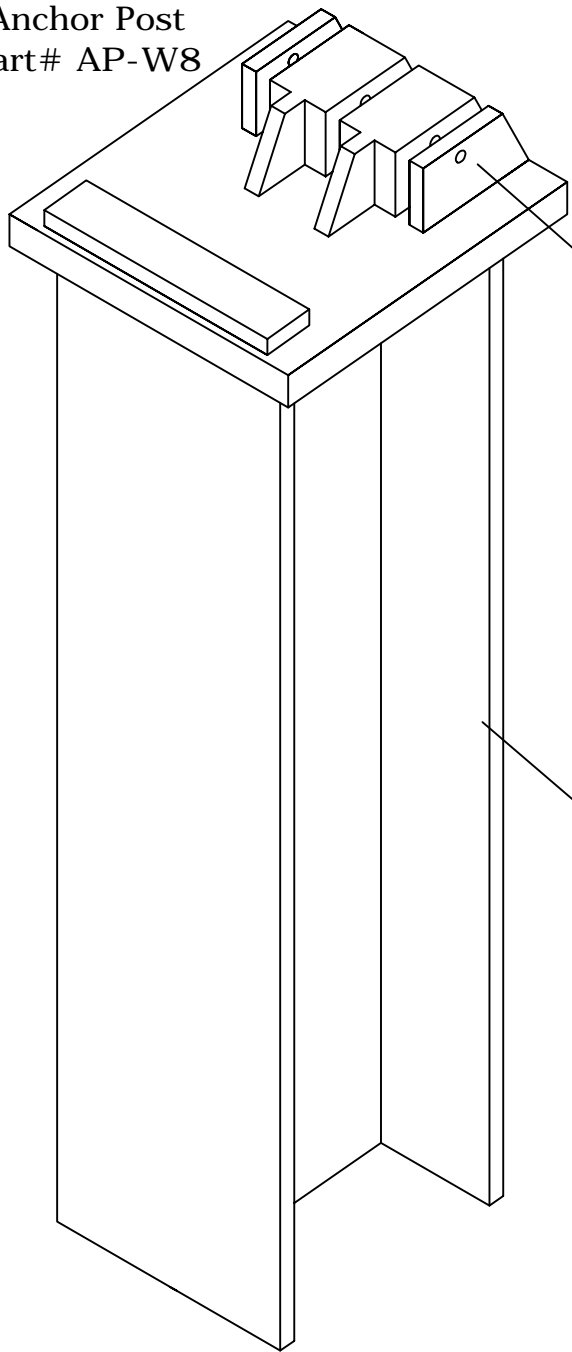
Attach to this form:

- 1) Additional disclosures of related financial interest as indicated above.
- 2) A copy of the full test report, video, and a Test Data Summary Sheet for each test conducted in support of this request.
- 3) A drawing or drawings of the device(s) that conform to the Task Force-13 Drawing Specifications [[Hardware Guide Drawing Standards](#)]. For proprietary products, a single isometric line drawing is usually acceptable to illustrate the product, with detailed specifications, intended use, and contact information provided on the reverse. Additional drawings (not in TF-13 format) showing details that are relevant to understanding the dimensions and performance of the device should also be submitted to facilitate our review.

FHWA Official Business Only:


Eligibility Letter		AASHTO TF13	
Number	Date	Designator	Key Words
CC-92B	May 18, 2016		Cable Barrier Terminal

TL-3 & TL-4
Anchor Post
Part# AP-W8

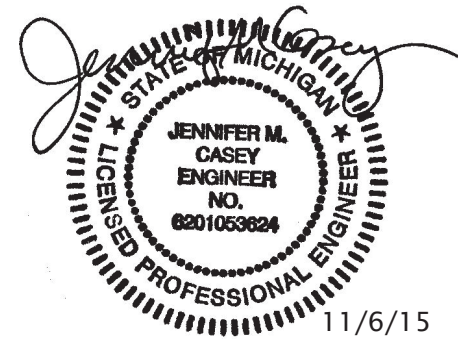
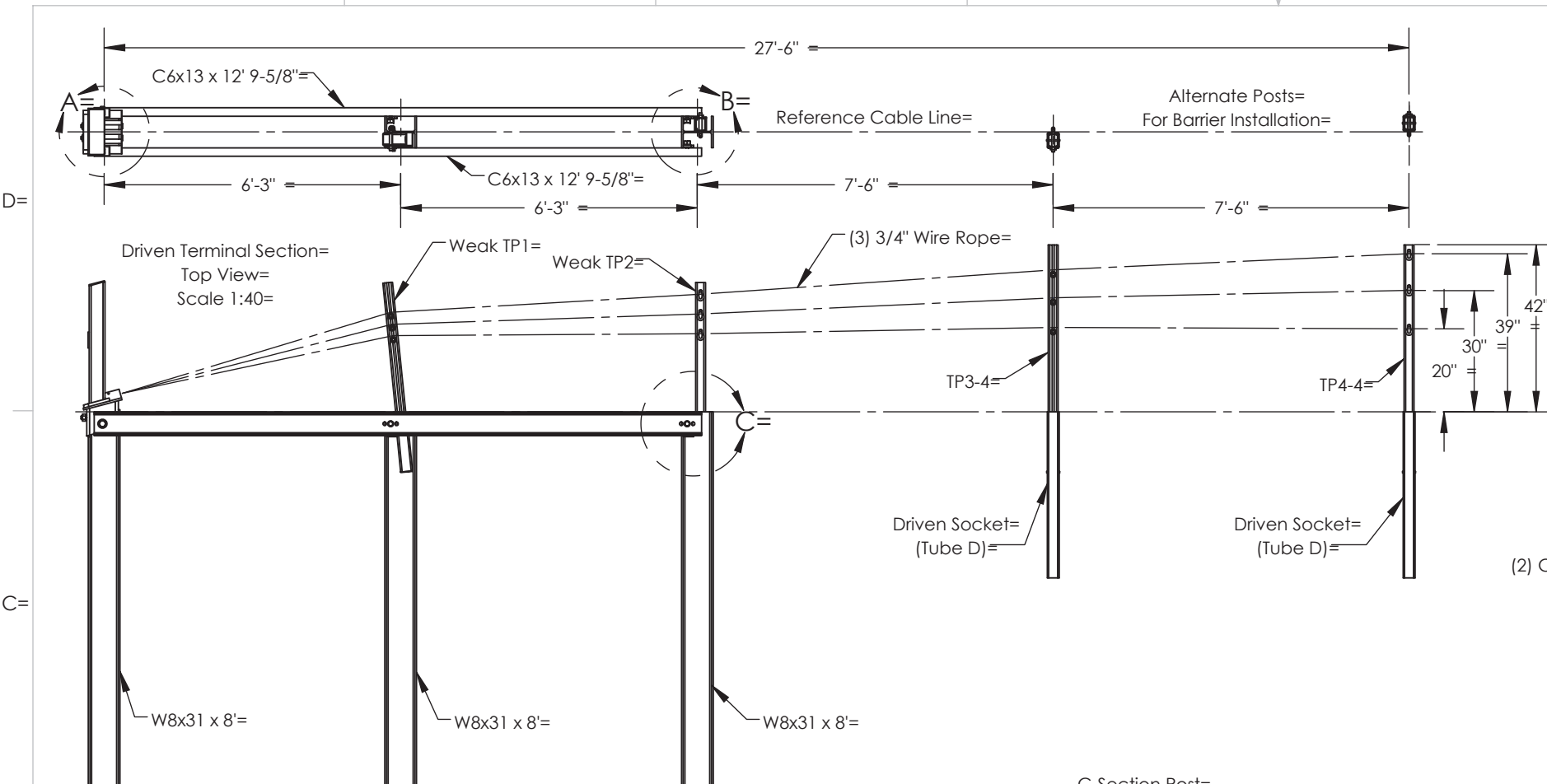


Terminal Keeper Wire
Part# TKW

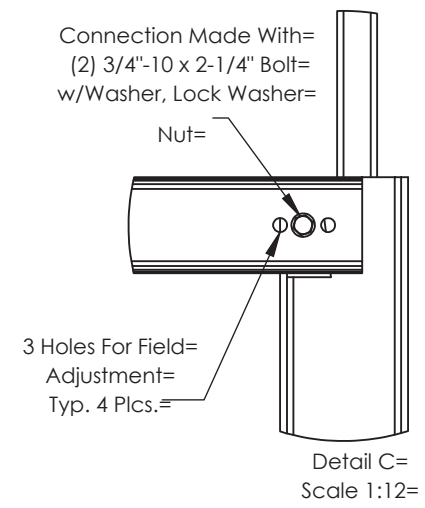
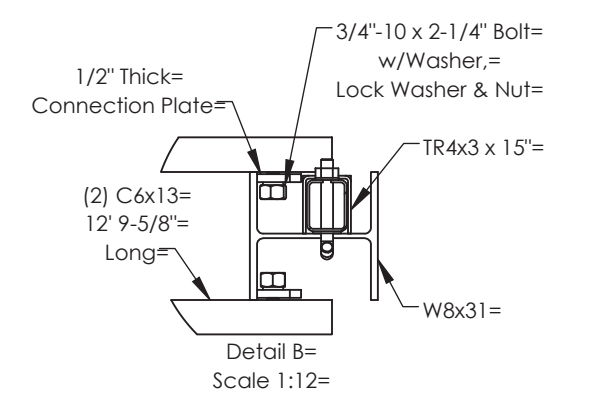
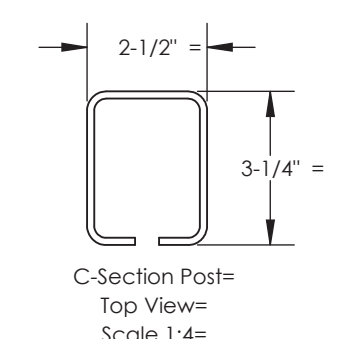
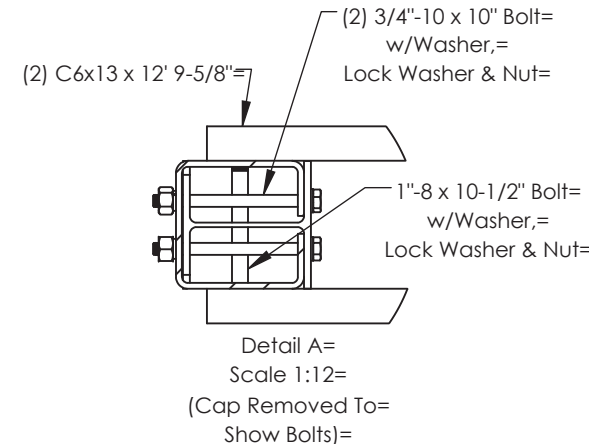
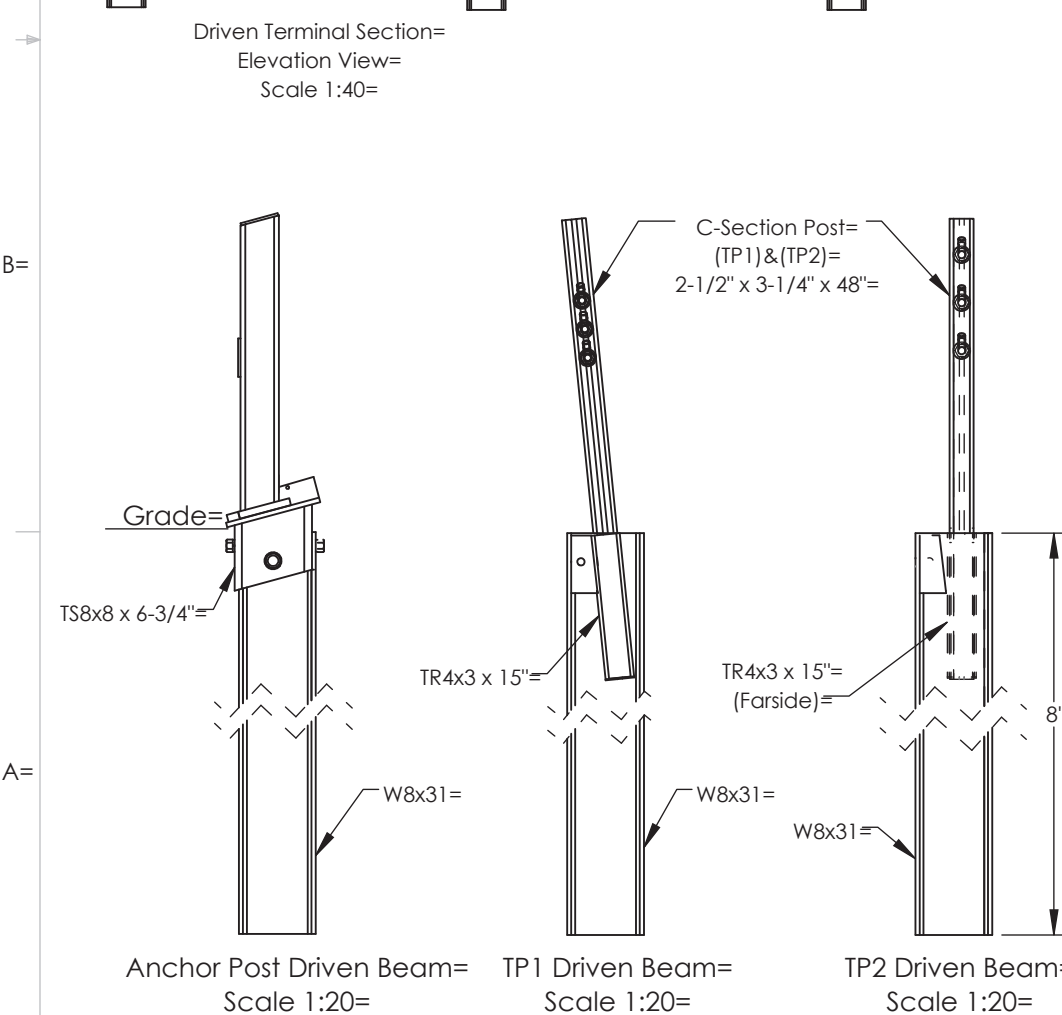
30" W8X31 Beam

	W8X31 Anchor Post	
	For Part Reference	
	SCALE: NTS	DATE: 07-01-15
	LAYOUT: ANSI A	DRAFTER: EJ

8= 7 6 5 4 3 2= 1=

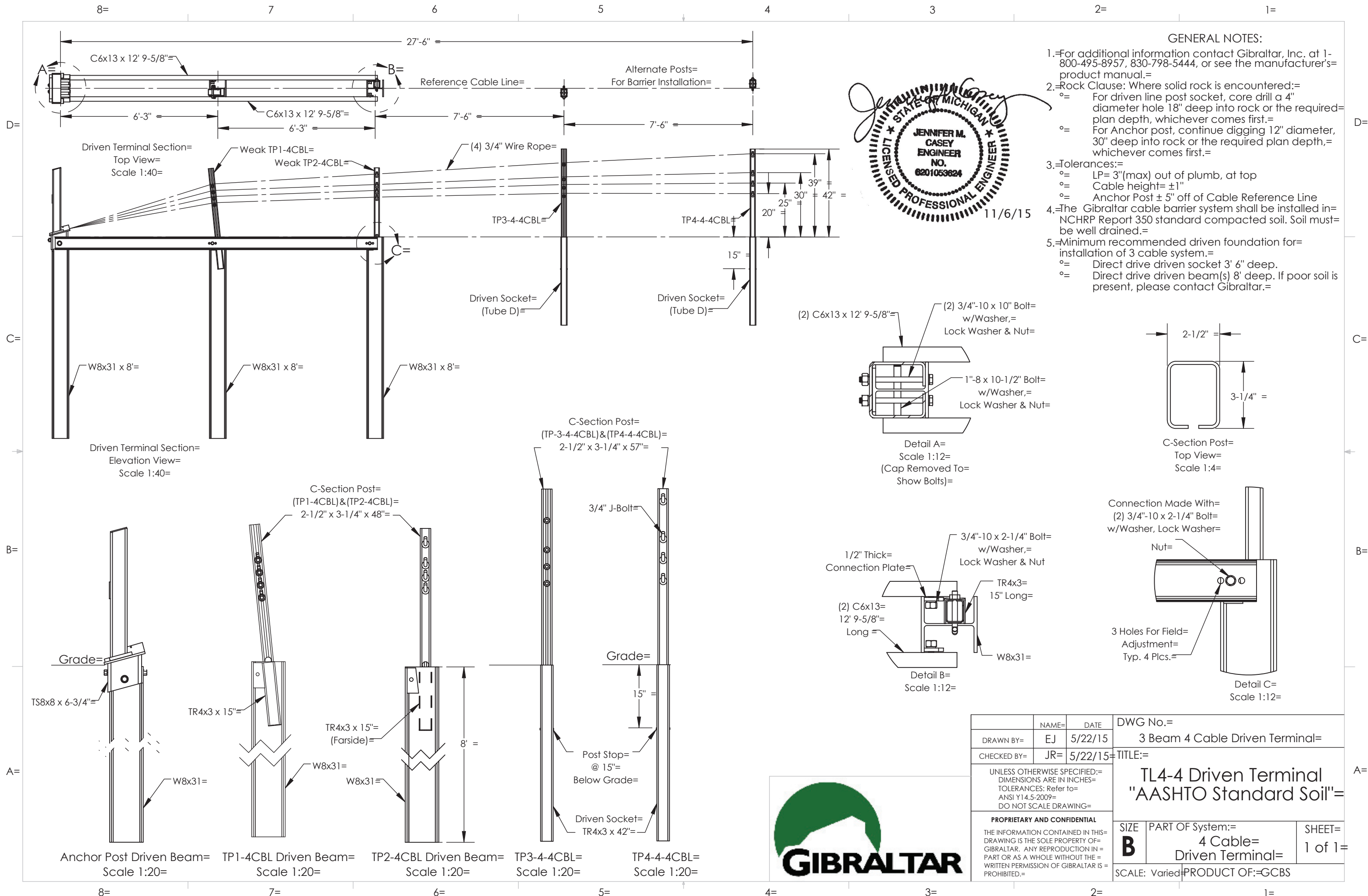


- GENERAL NOTES:**
- For additional information contact Gibraltar, Inc. at 1-800-495-8957, 830-798-5444, or see the manufacturer's product manual.
 - Rock Clause: Where solid rock is encountered:
 - For driven line post socket, core drill a 4" diameter hole 18" deep into rock or the required plan depth, whichever comes first.
 - For Anchor post, continue digging 12" diameter, 30" deep into rock or the required plan depth, whichever comes first.
 - Tolerances:
 - LP= 3"(max) out of plumb, at top
 - Cable height= ±1"
 - Anchor Post ± 5" off of Cable Reference Line
 - The Gibraltar cable barrier system shall be installed in NCHRP Report 350 standard compacted soil. Soil must be well drained.
 - Minimum recommended driven foundation for installation of 3 cable system:
 - Direct drive driven socket 3' 6" deep.
 - Direct drive driven beam(s) 8' deep. If poor soil is present, please contact Gibraltar.



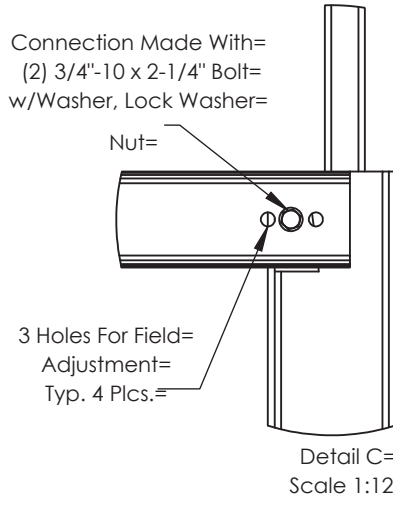
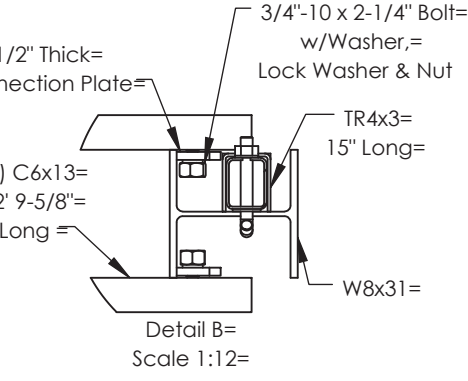
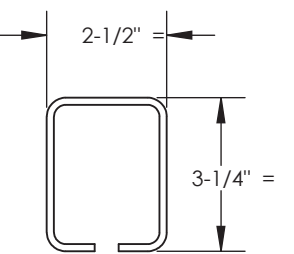
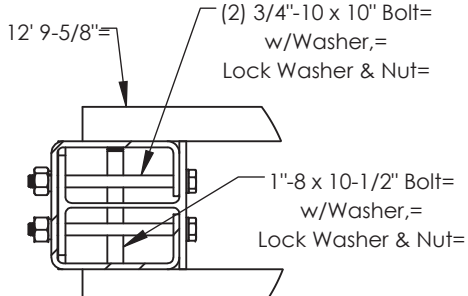
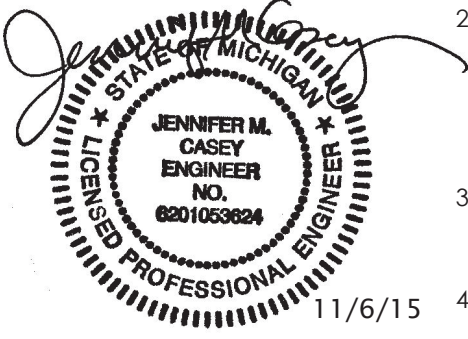
	NAME=	DATE=	DWG No.=
DRAWN BY=	EJ	5/22/15	3 Beam 3 Cable Driven Terminal=
CHECKED BY=	JR=	5/22/15	TITLE=
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES= TOLERANCES: Refer to= ANSI Y14.5-2009= DO NOT SCALE DRAWING=			TL4 Driven Terminal "AASHTO Standard Soil"=
PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF GIBRALTAR. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF GIBRALTAR IS PROHIBITED.			
SIZE	PART OF System:	SHEET	
B	3 Cable= Driven Terminal	1 of 1	
SCALE: Varied		PRODUCT OF: GCBS	

8= 7= 6= 5= 4= 3= 2= 1=



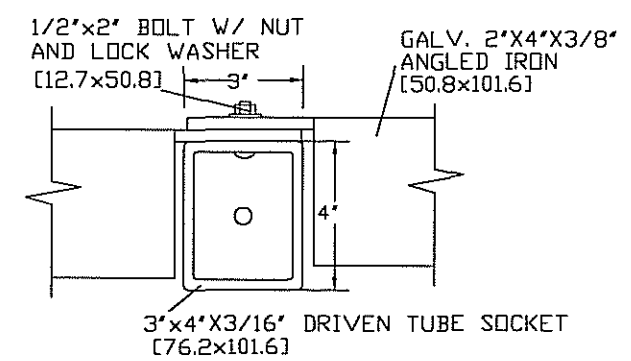
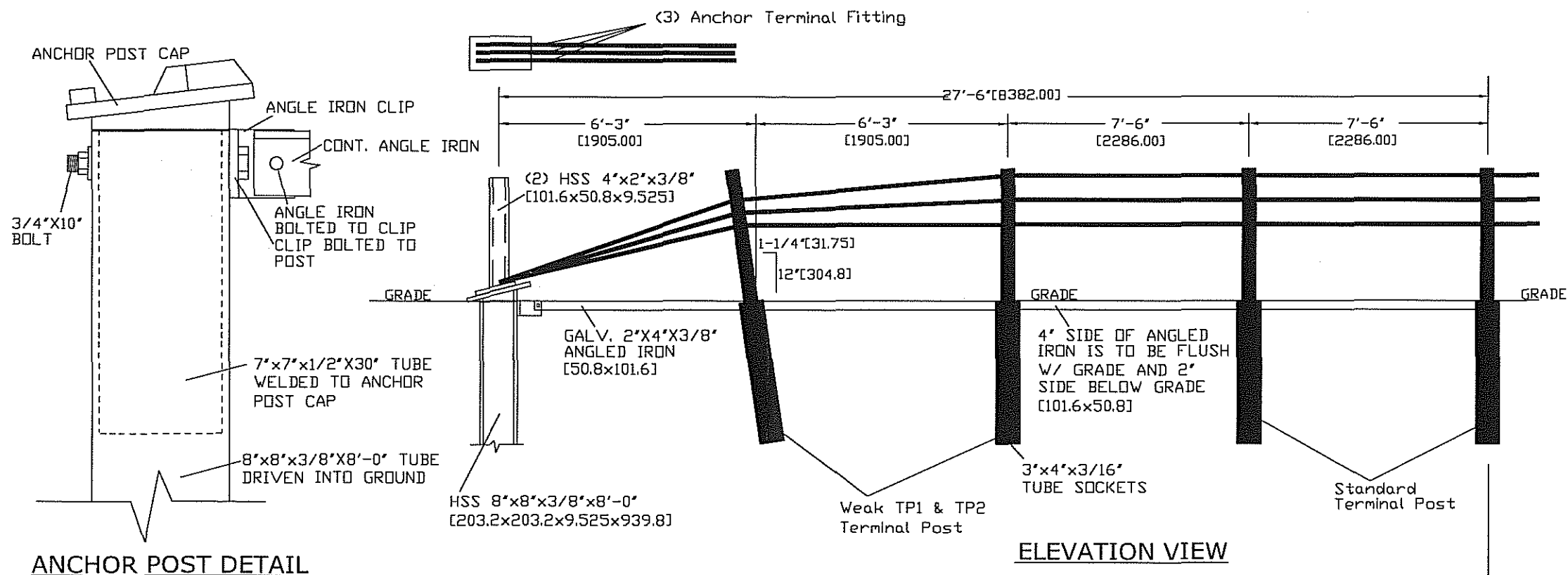
GENERAL NOTES:

1. For additional information contact Gibraltar, Inc. at 1-800-495-8957, 830-798-5444, or see the manufacturer's product manual.
2. Rock Clause: Where solid rock is encountered:
 - o For driven line post socket, core drill a 4" diameter hole 18" deep into rock or the required plan depth, whichever comes first.
 - o For Anchor post, continue digging 12" diameter, 30" deep into rock or the required plan depth, whichever comes first.
3. Tolerances:
 - o LP = 3"(max) out of plumb, at top
 - o Cable height = ± 1"
 - o Anchor Post ± 5" off of Cable Reference Line
4. The Gibraltar cable barrier system shall be installed in NCHRP Report 350 standard compacted soil. Soil must be well drained.
5. Minimum recommended driven foundation for installation of 3 cable system:
 - o Direct drive driven socket 3' 6" deep.
 - o Direct drive driven beam(s) 8' deep. If poor soil is present, please contact Gibraltar.

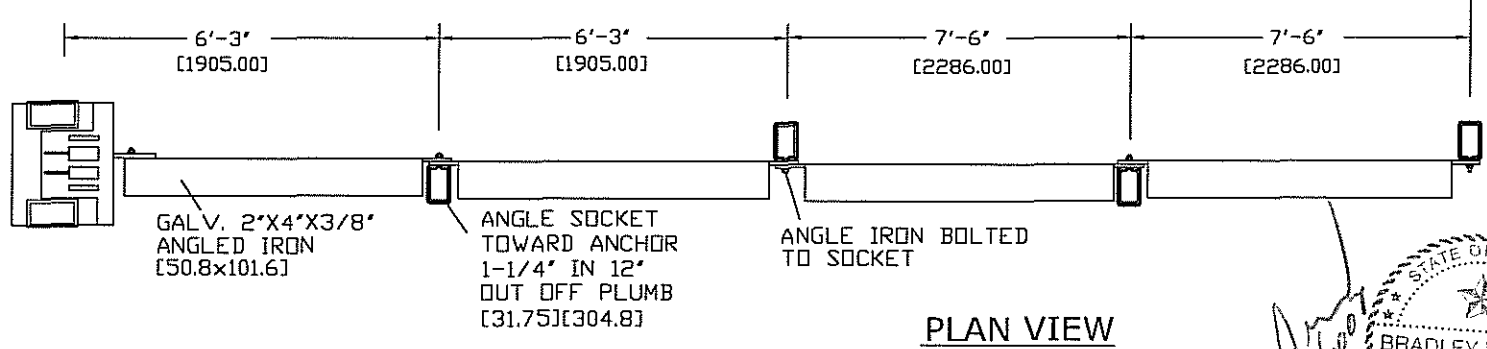


NAME =	DATE =	DWG No. =
EJ	5/22/15	3 Beam 4 Cable Driven Terminal =
CHECKED BY =	JR =	5/22/15
UNLESS OTHERWISE SPECIFIED: = DIMENSIONS ARE IN INCHES = TOLERANCES: Refer to = ANSI Y14.5-2009 = DO NOT SCALE DRAWING =		TITLE: =
PROPRIETARY AND CONFIDENTIAL		TL4-4 Driven Terminal "AASHTO Standard Soil" =
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF GIBRALTAR. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF GIBRALTAR IS PROHIBITED. =	SIZE =	SHEET =
B	PART OF System: = 4 Cable = Driven Terminal =	1 of 1 =
SCALE: Varied	PRODUCT OF: = GCBS	





SOCKET CONNECTION DETAIL



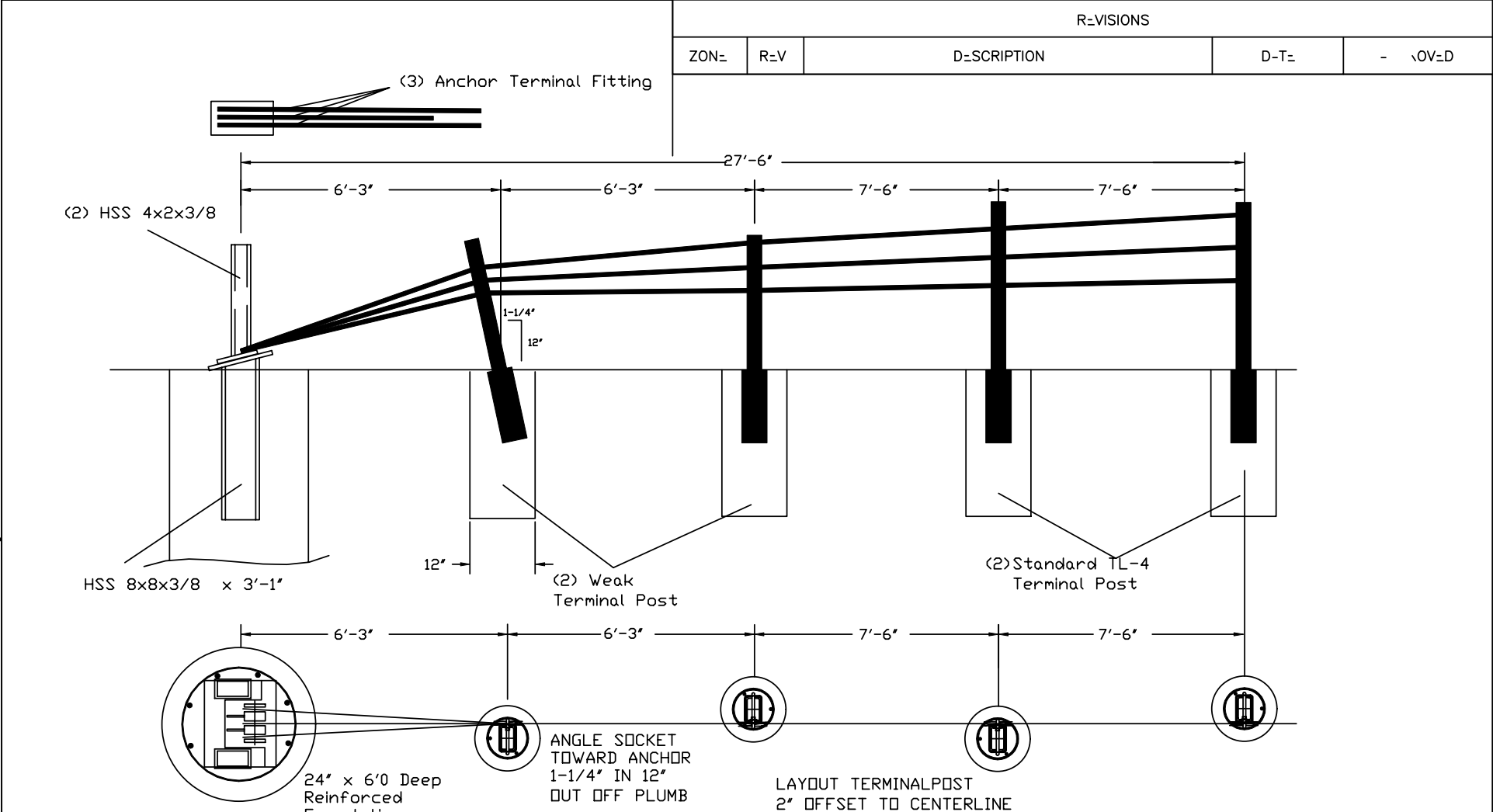
PLAN VIEW

NOTES:

- 1.) When poor soil (expansive clay) is encountered use 8"x8"x10'-0" tube driven into ground.
- 2.) When solid rock is encountered drill a 12" dia. hole 3' deep into rock or to required plan depth, whichever comes first. Then backfill and tamp the 8"x8" tube in the augered hole.
- 3.) When undrivable soil is encountered drill 8' deep hole and backfill and tamo the 8"x8" tube in the augered hole.
- 4.) SANDY SOILS WILL REQUIRE CONCRETED ANNULUS.

AS/12/2007

	Driven Terminal	
	Gibraltar Cable Barrier Systems	
SCALE: NTS	DATE: 05-17-07	
LAYOUT: ANSI B	DRAFTER: E	



R-VISIONS				
ZON=	R=V	D=SCRIPTION	D=T=	NOV=D

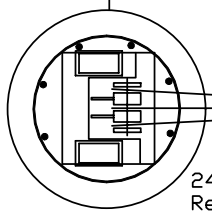
(3) Anchor Terminal Fitting

(2) HSS 4x2x3/8

HSS 8x8x3/8 x 3'-1"

(2) Weak Terminal Post

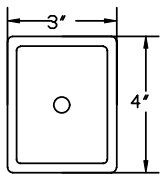
(2) Standard TL-4 Terminal Post



24' x 6'0" Deep Reinforced Foundation

ANGLE SOCKET TOWARD ANCHOR 1-1/4" IN 12" OUT OFF PLUMB

LAYOUT TERMINALPOST 2" OFFSET TO CENTERLINE



3'x4' SOCKET

Gibraltar
320 Southland Rd.
Burnet TX, 78611

Gibraltar Cable Barrier System

TL-4 TERMINAL SECTION

DATE 1/18/06

DRAWN BY: TJ

SIZ= - . DWG NO. 4-TERM R=V

SC = SH=T

