

**QUEST® SYSTEM (Permanent)
S544-0035**

1. The energy absorbing system represented on these Qualified Products List (QPL) drawings is a proprietary design by Energy Absorption Systems, of Trinity Industries, Inc., and marketed under the name QUEST® System .
2. The QUEST® is a non-gating, redirective crash cushion which is well suited for use shielding hazards. The QUEST is used for permanent installations. The beginning length of need shall be at the point of intersection between the face of the crash cushion and the departure line.
3. The QUEST® is an NCHRP-350 crash cushion suitable for Test Level 2 and Test Level 3 crash cushion applications.
4. The QUEST® shall be assembled and installed in accordance with the manufacturer's detailed drawings, procedures, specifications and installation guide. Information and copies of the above manual are available on the Qualified Products List (QPL).
5. The QUEST® is available in a 24" nominal width. The system width will be as called out in the plans, permit or other contract document for each location.
6. Metallic components shall meet the galvanizing requirements for guardrail, section 967 of the FDOT specifications.
7. A yellow Type 1 Object Marker shall be centered 3' in front of the nose of the QUEST®. Mounting hardware shall be in conformance with Section 993 of the FDOT Specification. The cost of the Object Marker shall be included in the cost of the QUEST®.

As an option, the contractor may install reflective sheeting on the nose of the crash cushion. The sheeting to be used must be solid yellow, Type III or better and must be a product listed on the Department's Qualified Products List (QPL). The sheeting to be applied to the nose of the crash cushion shall be a minimum of 360 square inches with a minimum height of 15 inches.



8. Quantity for payment is based on each independent location as called for in the plans or as directed by the Engineer. The cost of foundations, subgrade preparation and other appurtenant construction will be included in the cost of the QUEST® System.
9. In compliance with AASHTO 2011 Roadside Design Guide, remove all curbs and islands to ensure proper impact performance.
10. Supply adequate transition from the QUEST® system to the object being shielded for bidirectional traffic.
11. Units of measure are in English units.
12. Provision shall be made for rear rails to slide rearward upon impact 5'-0" min.
13. See the QUEST® System Product Manual for a description of its impact performance characteristics and design limitations before placing a system at a given site. Information and copies of current manual are available on the QPL.
14. The QUEST® shall be placed on a 6" min. reinforced 4000 psi P.C concrete pad or on roadway measuring at least 12'-0" wide by 50'-0" long.

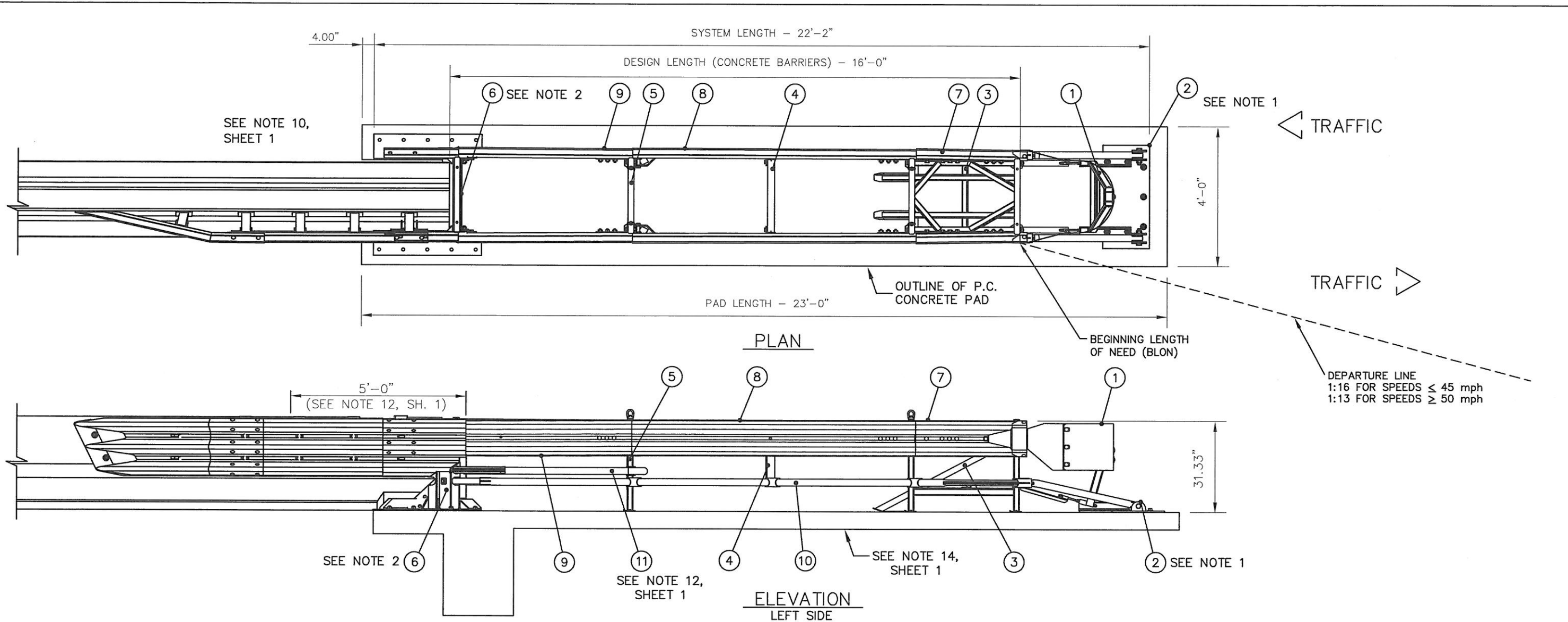
TABLE OF CONTENTS	
TITLE	SHEET
QUEST SYSTEM® W/ 7" OFFSET TRANS	2
QUEST SYSTEM® W/ THRIE BEAM TRANS	3
QUEST SYSTEM® ASSEMBLY	4-5
CONCRETE PAD ASSEMBLY	6-7
ANCHOR/FOUNDATION ASSEMBLY	8
TRANSITION ASSEMBLY, 7" OFFSET	9
TRANSITION ASSEMBLY, THRIE BEAM	10

BRET R. ECKERT P.E.
Florida License No. 75191
3617 Cincinnati Avenue
Rocklin California 95765

REFERENCES

Revisions	Date	Rev.	By	Ckd.	App.

DRAWN: S. Trageser	DATE: 12/4/12		 ENERGY ABSORPTION SYSTEMS ENGINEERING AND RESEARCH DEPARTMENT	
DESIGNED:	DATE:			
CHECKED: <i>B. Eckert</i>	DATE: 12-18-12		QUEST® SYSTEM (PERMANENT) DRAWING SET FOR QPL S544-0035	
APPROVED: <i>Bret Eckert</i>	DATE: 12/19/12			
CAD FILE: 62-01-49 SH01.dwg	SCALE:	DWG. 62-01-49	SHEET 1 OF 10	REV
NEXT ASSEMBLY:				



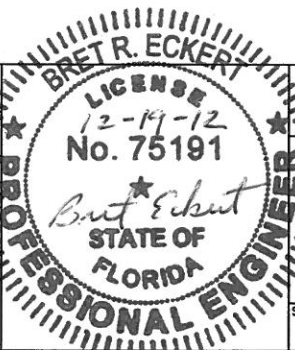
- NOTES:
1. TRANSITION ASSEMBLIES AND ANCHOR BOLTS NOT INCLUDED IN MODEL NUMBER. ORDER SEPARATELY. TRANSITION ASSEMBLIES ARE ACCESSORY ITEMS.
 2. STEEL BACKUP AND CONCRETE PAD SPECIFICALLY DESIGNED TO NEST AROUND 24" WIDE HAZARDS, PLACE SYSTEM ACCORDINGLY TO ENSURE PROPER IMPACT PERFORMANCE. ZERO CLEARANCE BETWEEN BACKUP AND BARRIER WALL RECOMMENDED.
 3. CAUTION: ϕ OF QUEST[®] SYSTEM SHALL BE ALIGNED WITH ϕ OF HAZARD $\pm 1'$.
 4. SUITABLE FOR ALL DESIGN SPEEDS

SYSTEM WIDTH	SYSTEM LENGTH	DESIGN LENGTH	PAD LENGTH	DESIGN SPEED	TESTED TO
24"	22'-2"	16'-0"	23'-0"	60 mph	TL-3

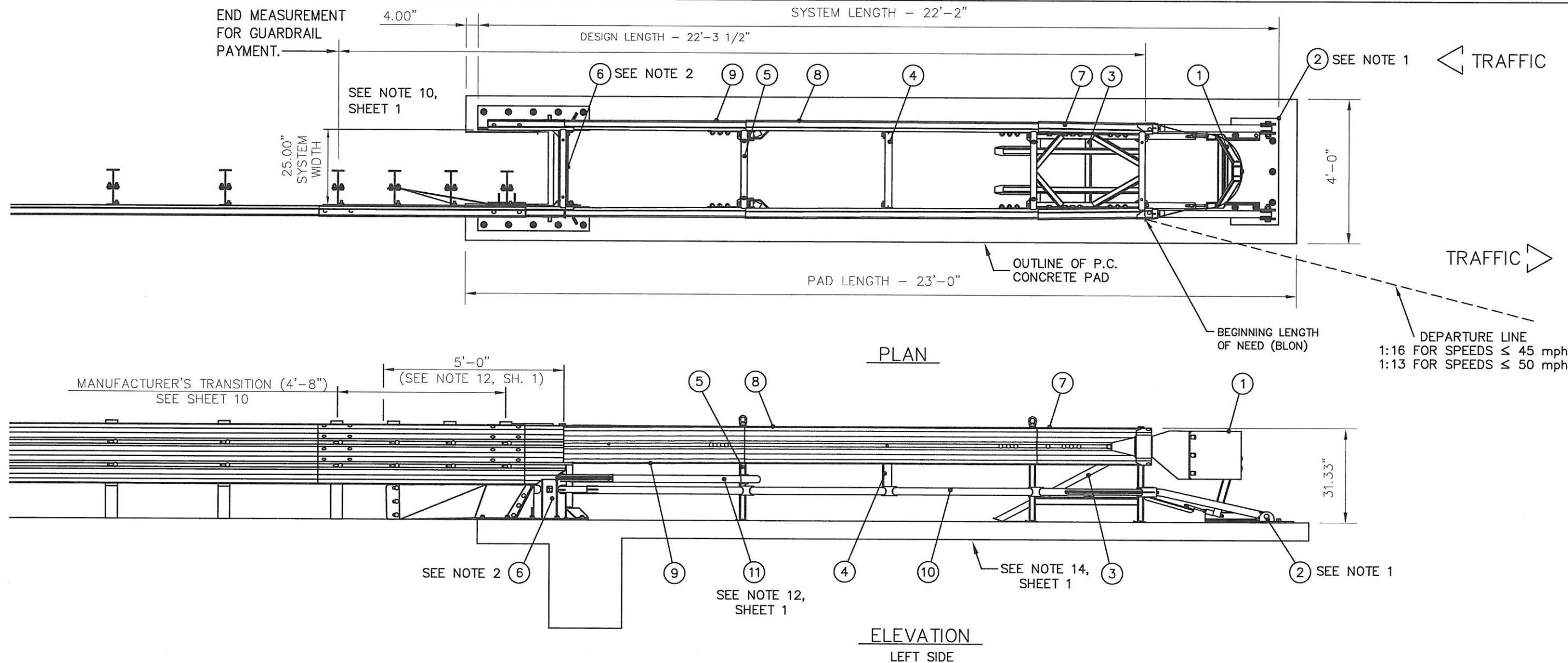
BRET R. ECKERT P.E.
 Florida License No. 75191
 3617 Cincinnati Avenue
 Rocklin California 95765

KEY	① NOSE	⑤ DIAPHRAGM	⑨ BAY 3 PANEL		
	② FRONT ANCHOR	⑥ BACKUP	⑩ SHAPER RAIL		
	③ BAY 1	⑦ BAY 1 PANEL	⑪ REAR RAIL		
	④ BRIDGE	⑧ BAY 2 PANEL			
Revisions	Date	Rev.	By	Ckd.	App.

DRAWN: S. Trageser DATE: 12/5/12
 DESIGNED: DATE:
 CHECKED: *[Signature]* DATE: 12/18/12
 APPROVED: *[Signature]* DATE: 12/19/12
 CAD FILE: 62-01-49 SH03.dwg



ASSEMBLY NO. 613490B
ENERGY ABSORPTION SYSTEMS
 ENGINEERING AND RESEARCH DEPARTMENT
 QUEST[®] SYSTEM (PERMANENT)
 FOR 24" WIDE HAZARDS W/7" OFFSET TRANSITION
 QPL S544-0035



- NOTES:
1. TRANSITION ASSEMBLIES AND ANCHOR BOLTS NOT INCLUDED IN MODEL NUMBER. ORDER SEPARATELY. TRANSITION ASSEMBLIES ARE ACCESSORY ITEMS.
 2. STEEL BACKUP AND CONCRETE PAD SPECIFICALLY DESIGNED TO NEST AROUND 24" WIDE HAZARDS, PLACE SYSTEM ACCORDINGLY TO ENSURE PROPER IMPACT PERFORMANCE. ZERO CLEARANCE BETWEEN BACKUP AND BARRIER WALL RECOMMENDED.
 3. CAUTION: ϕ OF QUEST® SYSTEM SHALL BE ALIGNED WITH ϕ OF HAZARD $\pm 1'$.
 4. SUITABLE FOR ALL DESIGN SPEEDS

SYSTEM WIDTH	SYSTEM LENGTH	DESIGN LENGTH	PAD LENGTH	DESIGN SPEED	TESTED TO
24"	22'-2"	22-3 1/2"	23'-0"	60 mph	TL-3

BRET R. ECKERT P.E.
 Florida License No. 75191
 3617 Cincinnati Avenue
 Rocklin California 95765

ASSEMBLY NO. 613490B

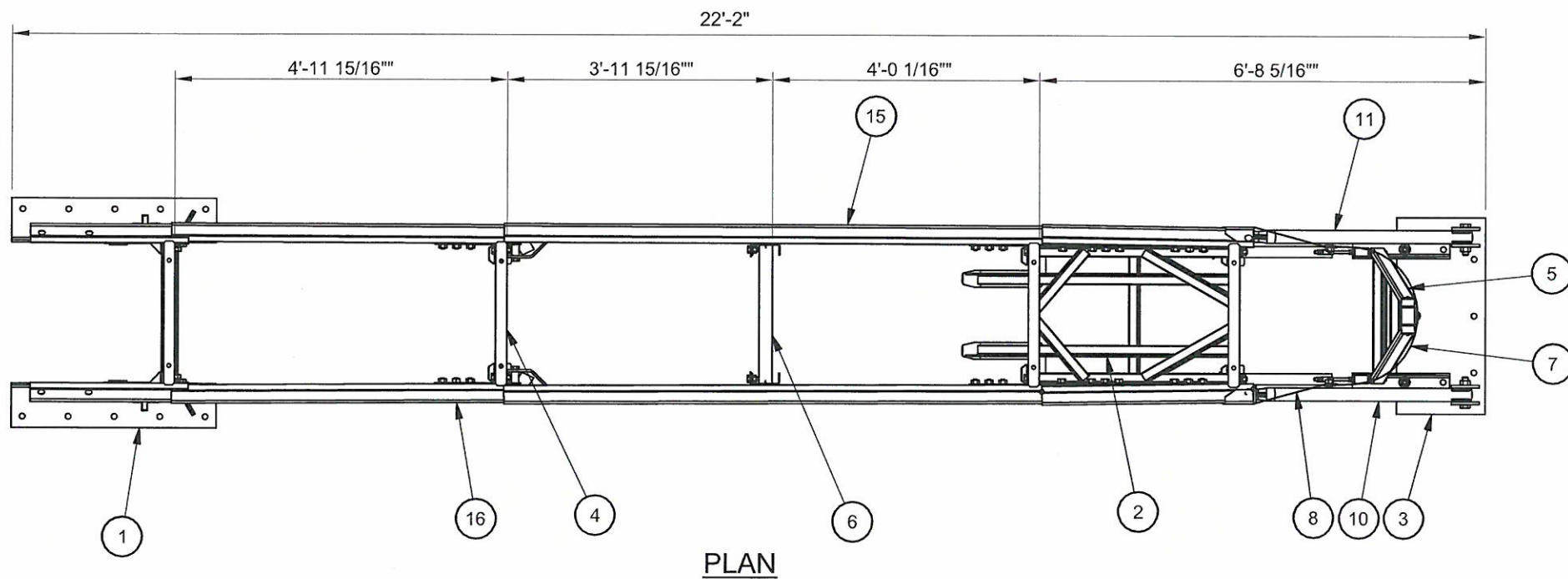
KEY	① NOSE	⑤ DIAPHRAGM	⑨ BAY 3 PANEL
	② FRONT ANCHOR	⑥ BACKUP	⑩ SHAPER RAIL
	③ BAY 1	⑦ BAY 1 PANEL	⑪ REAR RAIL
	④ BRIDGE	⑧ BAY 2 PANEL	

Revisions	Date	Rev.	By	Ckd.	App.

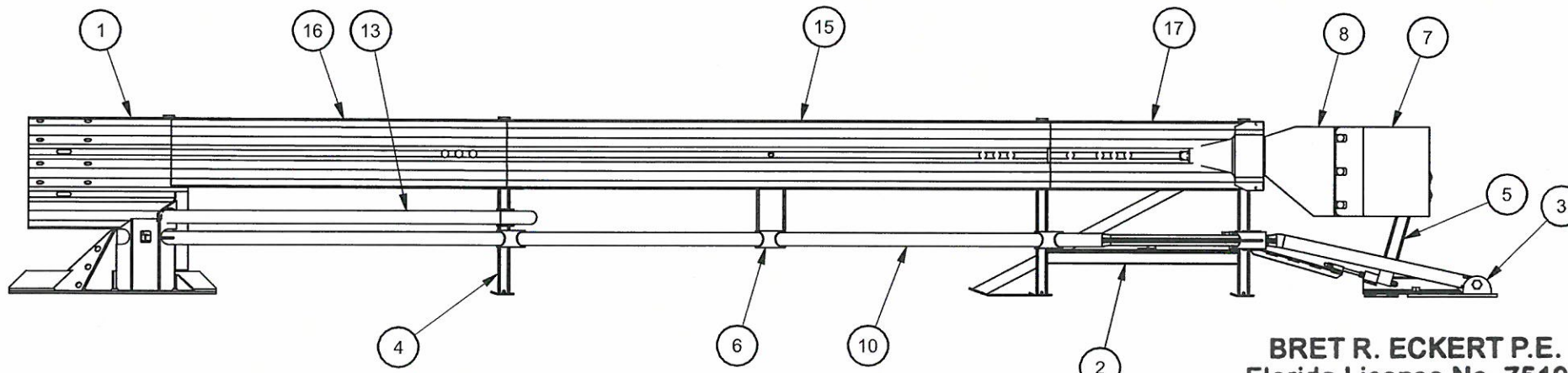
DRAWN: S. Trageser DATE: 12/5/12
 DESIGNED: DATE:
 CHECKED: DATE: 12/18/12
 APPROVED: Bret Eckert DATE: 12/19/12
 CAD FILE: 62-01-49 SH03.dwg



ENERGY ABSORPTION SYSTEMS
 ENGINEERING AND RESEARCH DEPARTMENT
 QUEST® SYSTEM (PERMANENT)
 W/TRANSITION TO THRIE BEAM GUARDRAIL
 QPL S544-0035



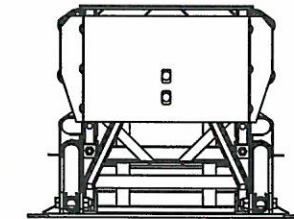
PLAN



ELEVATION
LEFT SIDE

BRET R. ECKERT P.E.
 Florida License No. 75191
 3617 Cincinnati Avenue
 Rocklin California 95765

PARTS LIST			
ITEM	STOCK NO.	DESCRIPTION	QTY.
1	604486B	BACKUP ASSEMBLY,24,QUEST	1
2	615461B	SUPPORT FRAME ASSY,BAY 1,24,QUEST	1
3	617605G	ANCHOR,FRONT,QUEST,24,G	1
4	606804B	DIAPHRAGM ASSEMBLY,24,BAY 3,QUEST	1
5	616211B	TRIGGER ASSEMBLY.QUEST	1
6	605656B	BRIDGE,24,BAY 2,QUEST	1
7	611678W	NOSE,QUEST,G,PT	1
8	611641W	NOSE TRANSITION,L,QUEST,G,PT	1
9	611642W	NOSE TRANSITION,R,QUEST,G,PT	1
10	614028G	SHAPER RAIL,L,QUEST,G	1
11	614034G	SHAPER RAIL,R,QUEST,G	1
12	605529G	BRACKET,PANEL,DIAPHRAGM,G	2
13	613661G	REAR RAIL,QUEST,G	2
14	616230G	TRIGGER STRAP,QUEST,G	2
15	611794G	PANEL,BAY 2,QUEST,G	2
16	611795G	PANEL,BAY 3,QUEST,G	2
17	611791G	PANEL,BAY 1,QUEST,G	2
18	113558G	BOLT,HX,3/4X3 1/2,G5,G	16
19	113538G	BOLT,HX,1X5,G8,G	2
20	003360G	BOLT,RAIL,5/8X1 1/4,G	38
21	113547G	BOLT,HX,3/4X1 1/2,G5,G	4
22	003340G	NUT,HX,5/8,G,RAIL	38
23	115953G	NUT,HX,3/4,G	20
24	115931G	NUT,HX,1,G	2
25	617010G	WASHER,BAR,2X2X1/4,G	2
26	617005G	WASHER,BAR,1/8X1 1/4X2,ROUNDED,G	8
27	115311B	INSTALL INSTRUCTIONS,QUEST	1
28	115674G	MATERIAL SAFETY INFO NOTICE	1
29	118026G	WASHER,FLAT,3/4 X 1 1/2,G	16
30	113530G	BOLT,HX,1X3 1/2,G5,G	2
31	614533B	SPACER,RAIL TENSION,QUEST	2
32	115954G	NUT,HX,3/4",GR DH	2
33	118027G	WASHER,FLAT,3/4X2,HVY,G	2

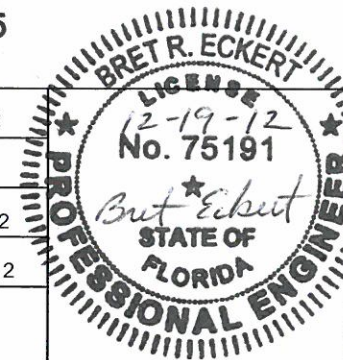


ASSEMBLY NO. 613490B

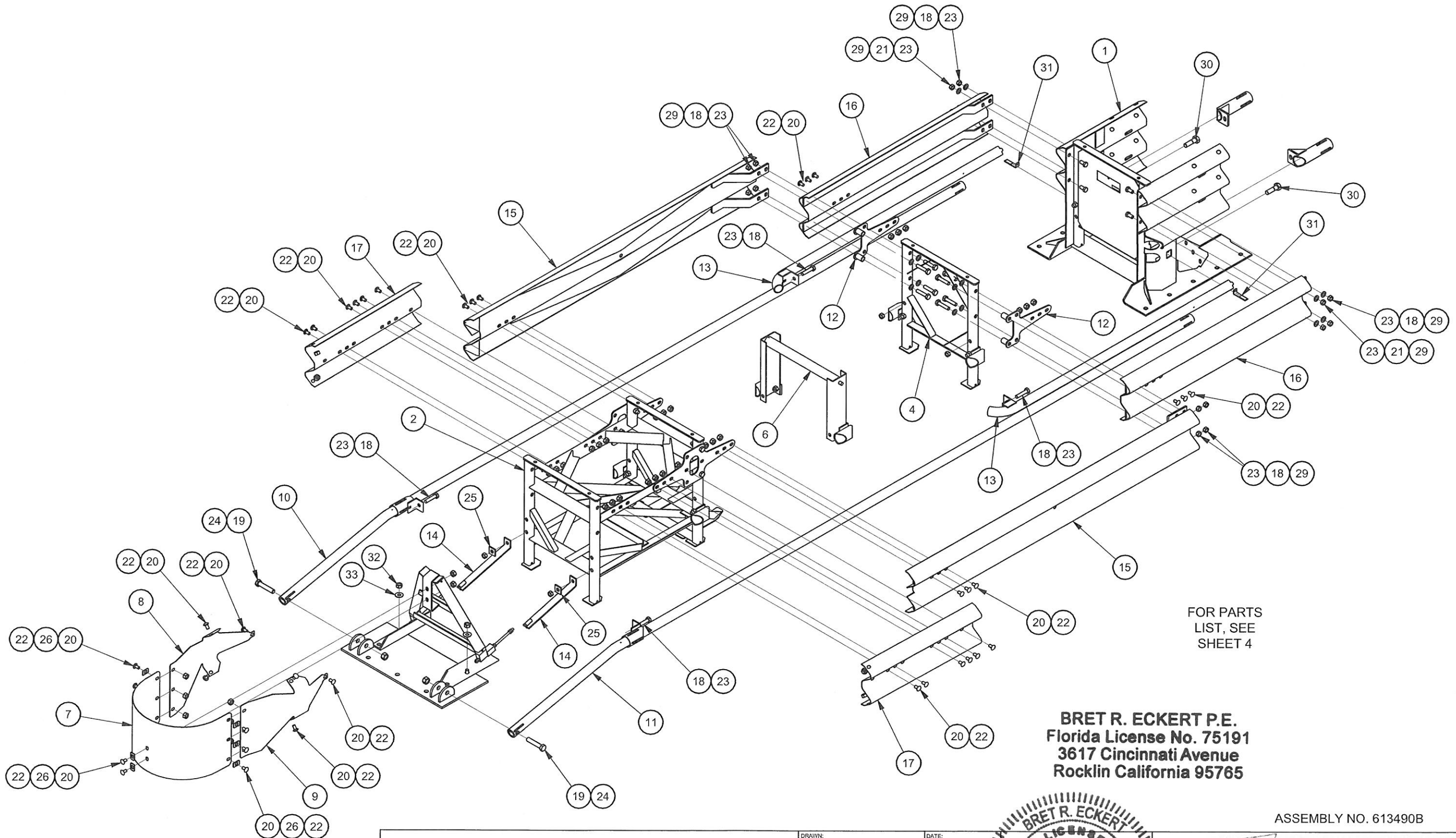


QUEST® SYSTEM (PERMANENT)
 FOR 24" WIDE HAZARDS
 QPL S544-0035

DRAWN: K. Mortensen	DATE: 8/28/2012
DESIGNED:	DATE:
CHECKED: S. Trageser	DATE: 07/31/2012
APPROVED: K. Looney	DATE: 07/31/2012
FILE: /62-01-49 SH 04.pdf	
NEXT ASSEMBLY:	

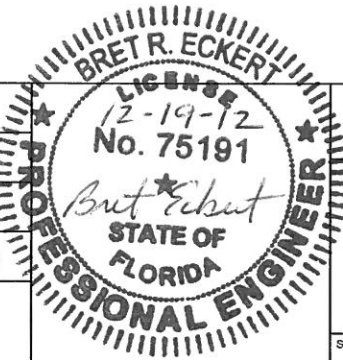


SCALE: Do Not Scale	DRAWING: 62-01-49	SHEET: 4 of 10	REV
------------------------	----------------------	-------------------	-----



FOR PARTS LIST, SEE SHEET 4

BRET R. ECKERT P.E.
 Florida License No. 75191
 3617 Cincinnati Avenue
 Rocklin California 95765



ASSEMBLY NO. 613490B

ENERGY ABSORPTION SYSTEMS
 ENGINEERING AND RESEARCH DEPARTMENT

QUEST® SYSTEM (PERMANENT)
 FOR 24" WIDE HAZARDS
 QPL S544-0035

DRAWN: K. Mortensen	DATE: 8/28/2012
DESIGNED:	DATE:
CHECKED: S. Trageser	DATE: 7/30/2012
APPROVED: K. Looney	DATE: 7/30/2012
FILE: 62-01-49 SH05	
NEXT ASSEMBLY:	

SCALE: Do Not Scale	DRAWING: 62-01-49	SHEET: 5 of 10	REV
------------------------	----------------------	-------------------	-----

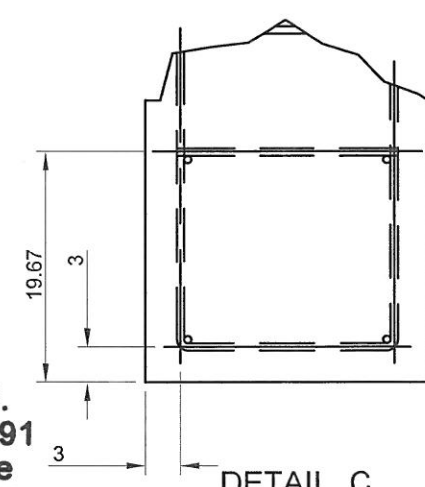
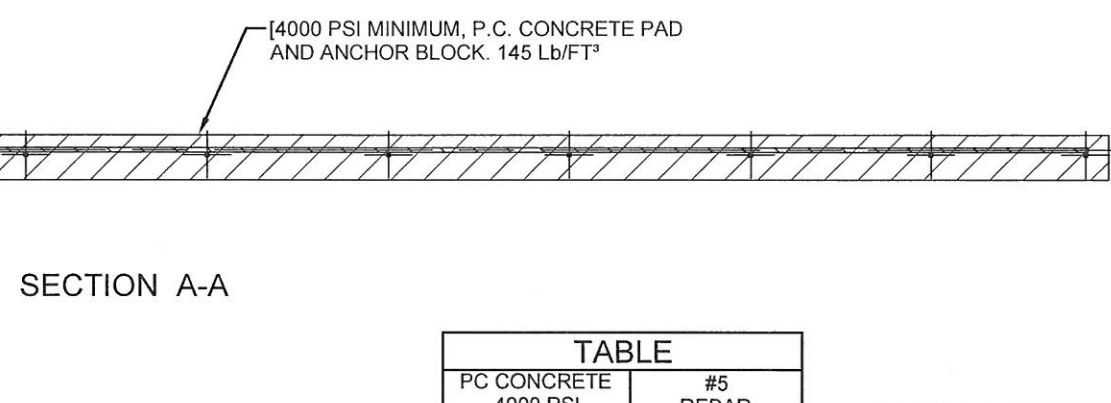
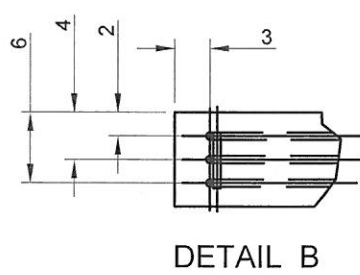
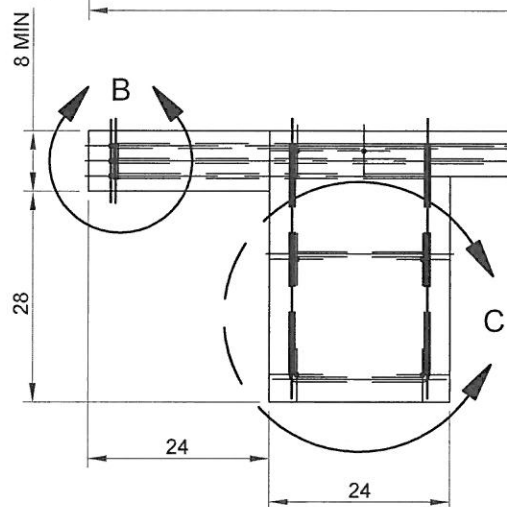
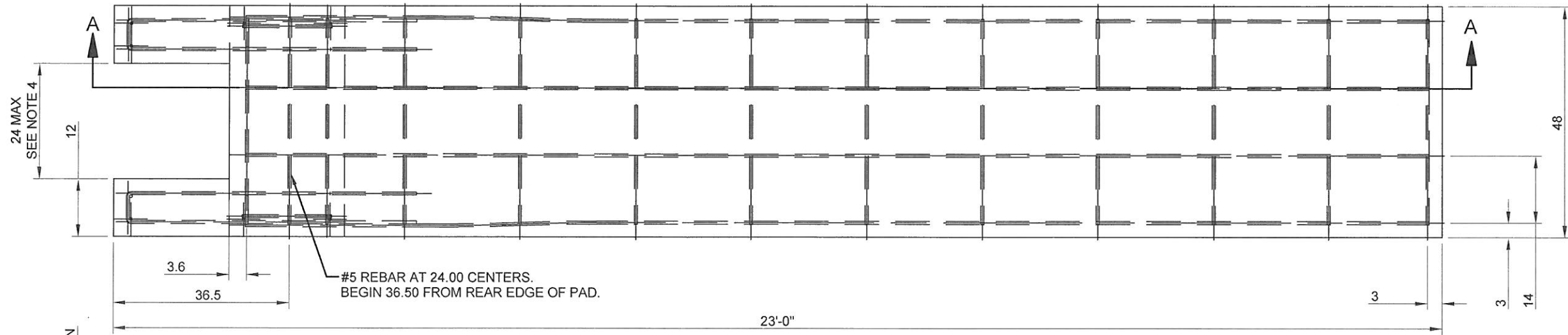


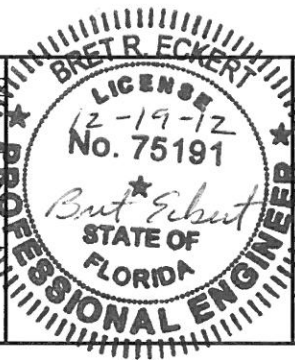
TABLE	
PC CONCRETE 4000 PSI	#5 REBAR
2.39 yd ³	222' 1"

BRET R. ECKERT P.E.
 Florida License No. 75191
 3617 Cincinnati Avenue
 Rocklin California 95765

- NOTES:
- CROSS SLOPE OF PAD SHALL NOT EXCEED 1:10 AND NOT VARY MORE THAN 2% FROM FRONT TO BACK.
 - UNITS OF MEASUREMENT ARE INCHES UNLESS OTHERWISE NOTED.
 - SEE SHEET 7 FOR REBAR DETAIL.
 - THE CONCRETE PAD SHOWN IS DESIGNED TO NEST AROUND HAZARDS 24.00 IN WIDTH OR LESS. MAKE PREPARATIONS TO POUR THE REAR PORTION OF THE PAD AROUND THE HAZARD.

REFERENCES

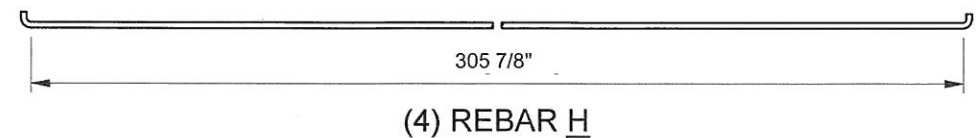
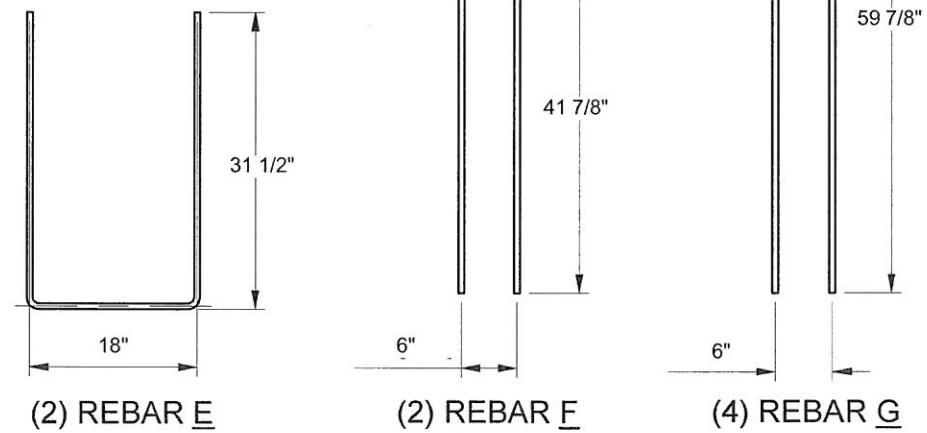
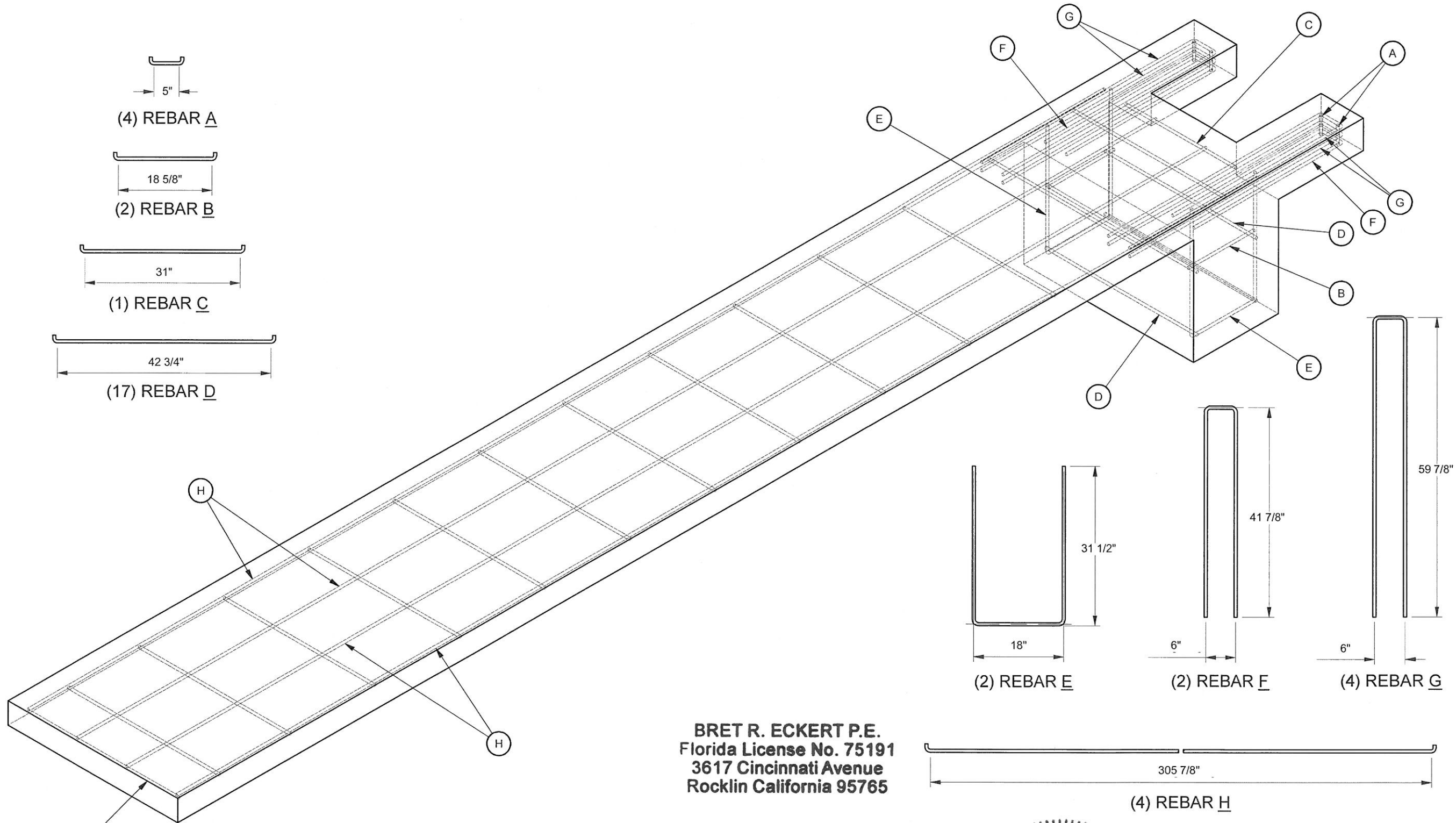
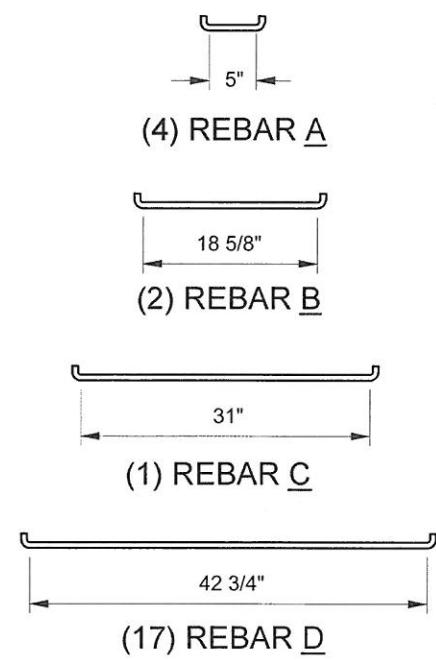
DRAWN:	S. Trageser	DATE:	8/28/2012
DESIGNED:		DATE:	
CHECKED:	A. Franklin	DATE:	3/8/2005
APPROVED:	J. LaTurner	DATE:	3/8/2012
CAD FILE:	62-01-49 SHT 06.dwg		
NEXT ASSEMBLY:			



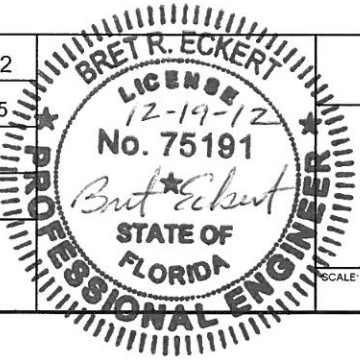
ENERGY ABSORPTION SYSTEMS
 ENGINEERING AND RESEARCH DEPARTMENT

QUEST[®] SYSTEM (PERMANENT)
 CONCRETE PAD ASSEMBLY
 FOR QPL S544-0035

Revisions	Date	Rev.	By	Ckd.	App.



BRET R. ECKERT P.E.
 Florida License No. 75191
 3617 Cincinnati Avenue
 Rocklin California 95765

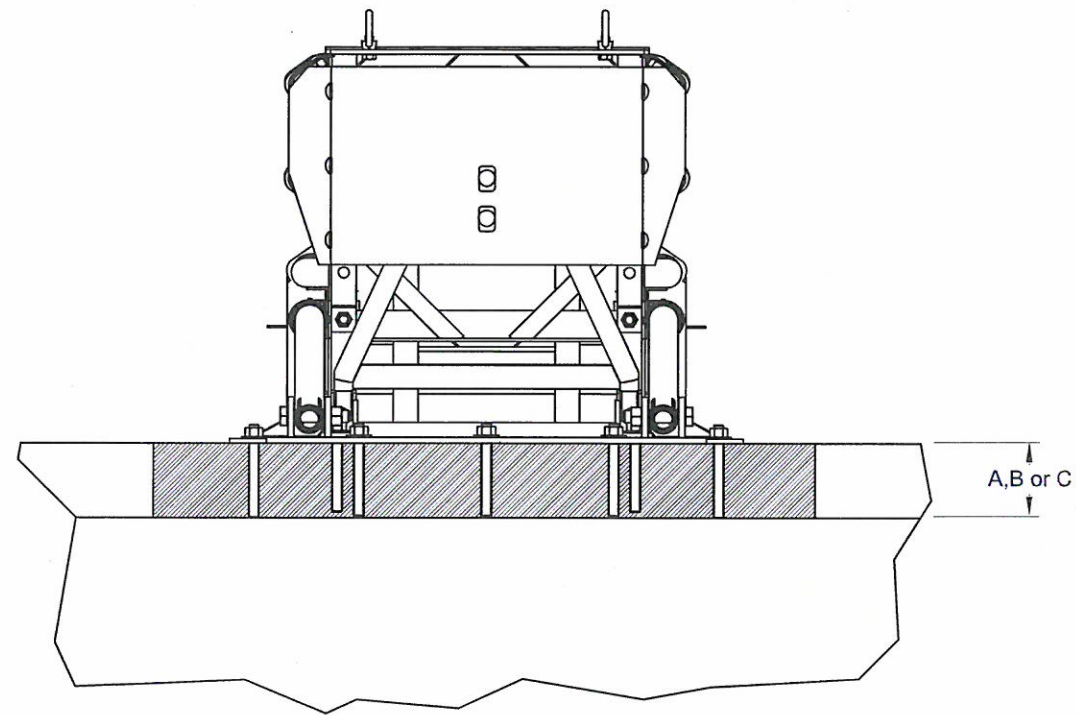


ENERGY ABSORPTION SYSTEMS, INC.
 ENGINEERING AND RESEARCH DEPARTMENT

QUEST® SYSTEM (PERMANENT)
 CONCRETE PAD REINFORCEMENT
 FOR QPL S544-0035

Revision	Date	Rev	By	Chk.	App.

DRAWN: S. Trageser	DATE: 8/28/2012
DESIGNED: D. Wilkinson	DATE: 12/26/2005
CHECKED: JME	DATE: 9/8/2006
APPROVED: K. Looney	DATE: 9/12/2006
FILE: 35-01-49 SH07 pdf	
NEXT ASSEMBLY:	



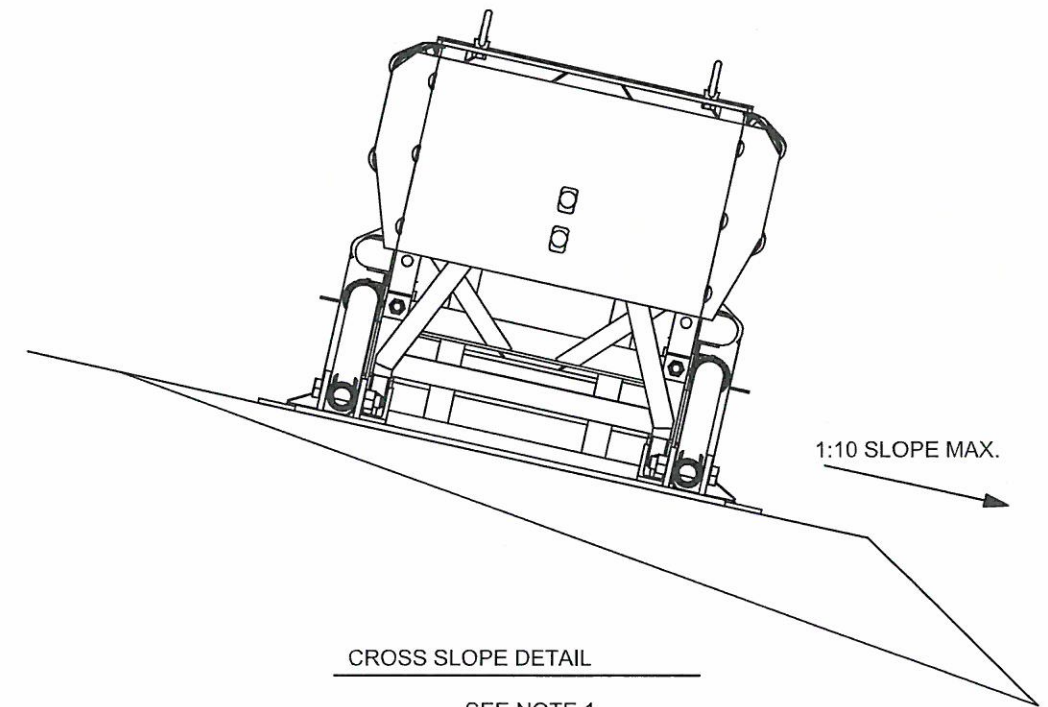
QUEST SECTION VIEW

REFER TO THE QUEST INSTALLATION AND SAFETY INSTRUCTIONS FOR FURTHER INFORMATION.

7" REQUIRED STUD LENGTH
CONCRETE ANCHOR ASSY.: 3562009-0000

MATERIALS:

- A - 6.00" REINFORCED PAD PER SHEET 10.
- B - 8.00" NON-REINFORCED PAD. MEASURING AT LEAST 12'-0" WIDE BY 50'-0" LONG, NOT SHOWN.
- C - 7.00" REINFORCED DECK STRUCTURE, NOT SHOWN.



CROSS SLOPE DETAIL

SEE NOTE 1

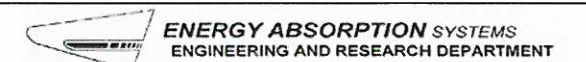
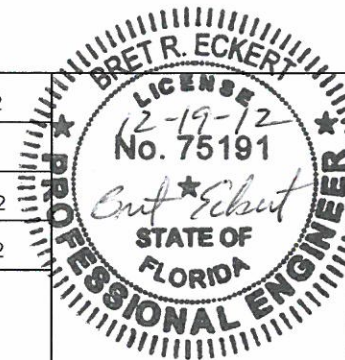
ANCHOR SYSTEM:

1. CROSS SLOPE OF FOUNDATION SHALL NOT EXCEED 1:10 AND NOT VARY MORE THAN 2% FROM FRONT TO BACK.
2. USE THE ANCHOR PLATES AND BACKUP AS A TEMPLATE FOR DRILLING HOLES.
3. USE MP-3 POLYESTER ANCHOR SYSTEM, SUPPLIED BY ENERGY ABSORPTION SYSTEMS, OR APPROVED EQUAL. QUEST SYSTEMS INSTALLED ON CONCRETE MUST BE INSPECTED TO ENSURE THE ANCHORS ARE STILL PROPERLY SET FOLLOWING EACH IMPACT. RE-ANCHOR AS NECESSARY.
4. EVERY ANCHOR HOLE IN THE BACKUP AND ANCHOR PLATE LOCATIONS MUST HAVE AN MP-3 STUD ANCHORING IT.

BRET R. ECKERT P.E.
Florida License No. 75191
3617 Cincinnati Avenue
Rocklin California 95765

DRAWN: S. Trageser	DATE: 8/28/2012
DESIGNED:	DATE:
CHECKED: K. Mortensen	DATE: 8/28/2012
APPROVED: K. Looney	DATE: 8/28/2012

62-01-47 SH 08.pdf



QUEST® SYSTEM (PERMANENT)
ANCHOR/FOUNDATION ASSEMBLY
FOR QPL S544-0035

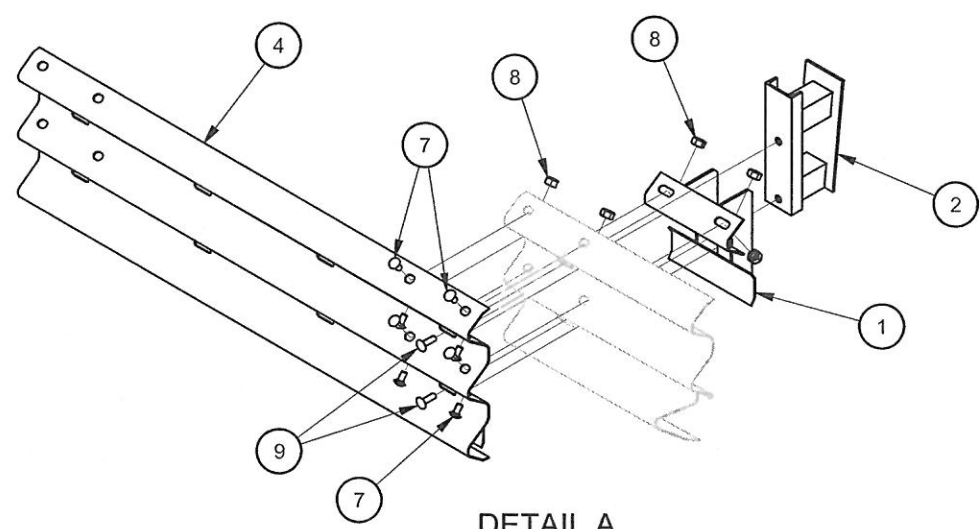
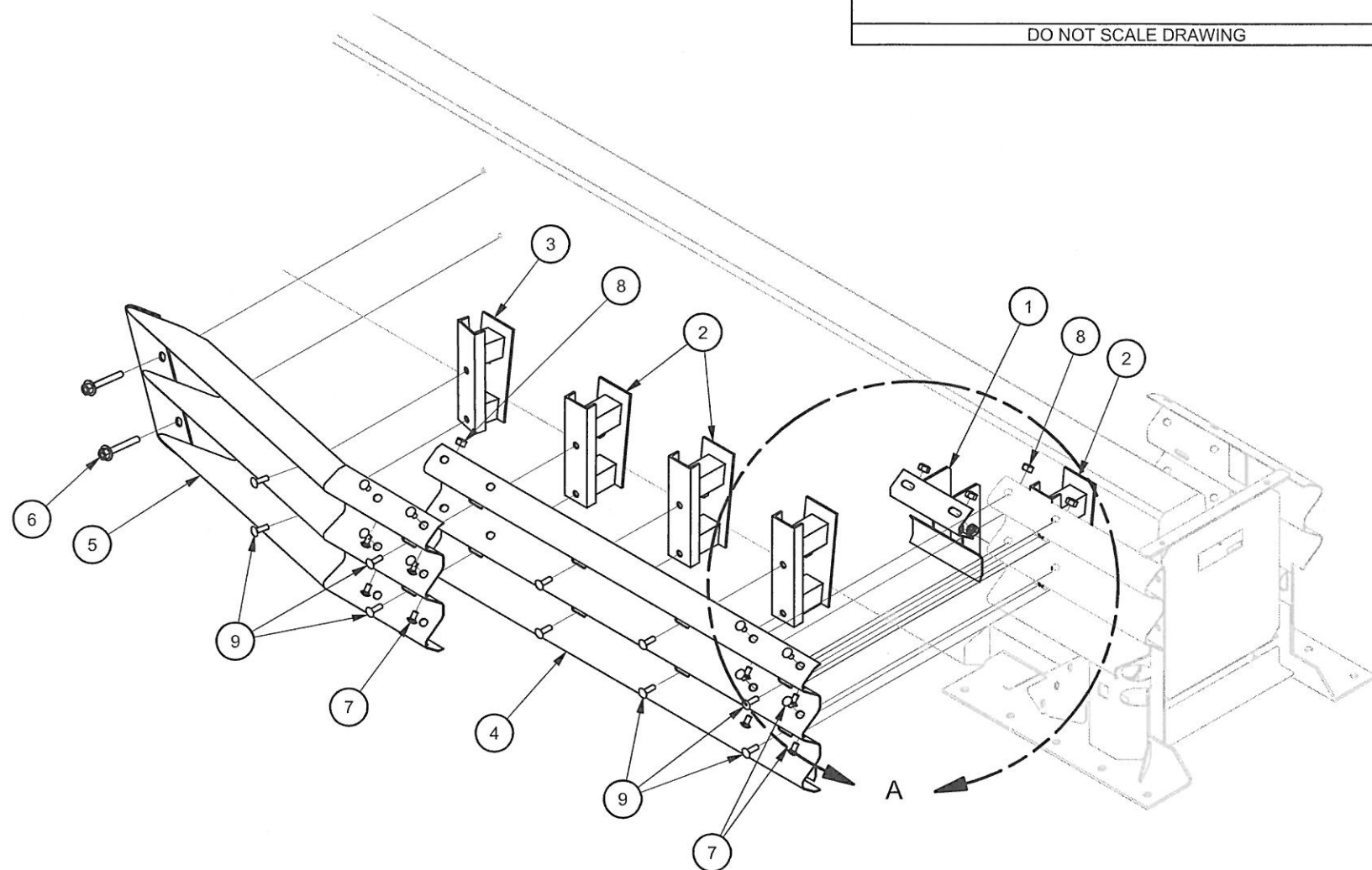
SCALE: Do Not Scale	DRAWING: 62-01-49	SHEET: 8 of 10	REV
------------------------	----------------------	-------------------	-----

MATERIAL:
SEE PARTS LIST

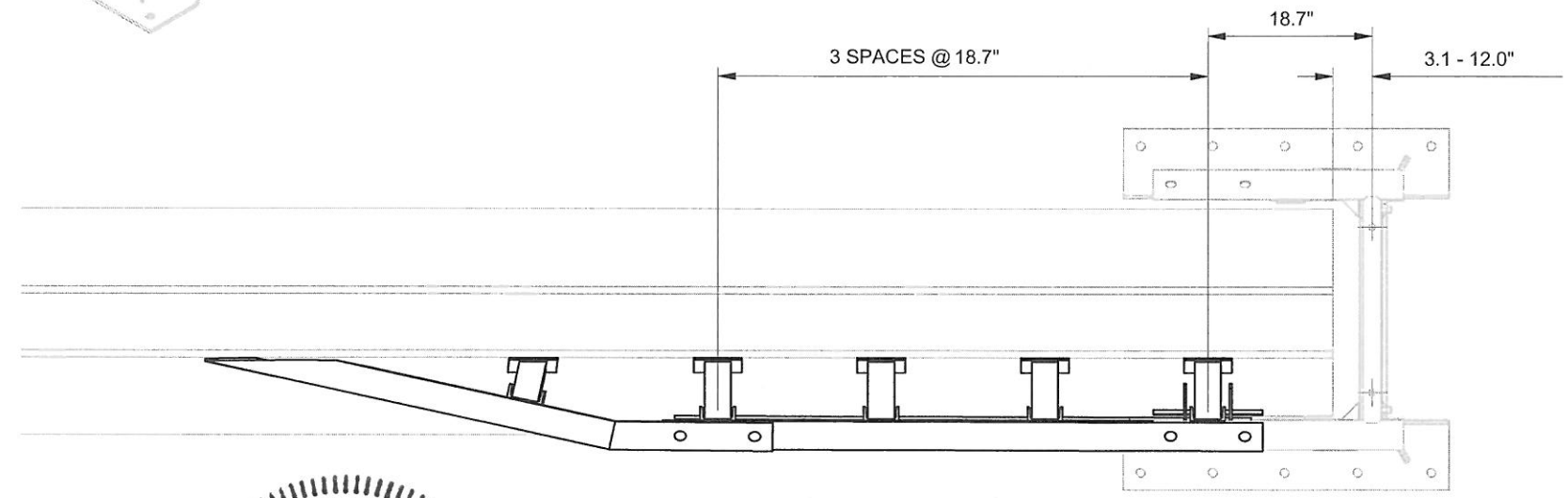
DO NOT SCALE DRAWING

TOL ANGULAR: $\pm 1'$
TOL FRACTIONAL: $\pm 1/16$
TOL DECIMAL: .XX $\pm .01$
TOL DECIMAL: .XXX $\pm .005$
UNLESS OTHERWISE SPECIFIED

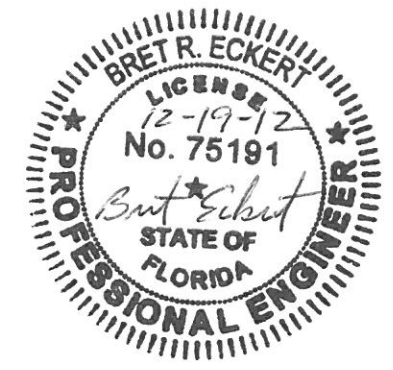
PARTS LIST			
ITEM	STOCK NO.	DESCRIPTION	QTY.
1	605339G	BRACE,EXTENSION,TRANS,QUEST,G	1
2	605611G	BRACKET,TRANS SUPPORT,7,QUEST,G	4
3	605607G	BRACKET,TRANS SUP,7,ANG,L,QUEST,G	1
4	611828G	PANEL,EXTENSION,68 11/16,QUEST,G	1
5	611970G	PANEL,TRANSITION,7,L,QUEST,G	1
6	603670B	ANCHOR,MP-3,PT KIT,3/4X6 1/2 HOR	1
7	003360G	BOLT,RAIL,5/8X1 1/4,G	16
8	003340G	NUT,HX,5/8,G,RAIL	26
9	003400G	BOLT,RAIL,5/8X2,G	10



DETAIL A
TRANSITION BRACE (ITEM 1), PANEL (ITEM 4)
& BACKUP CONNECTION DETAIL.

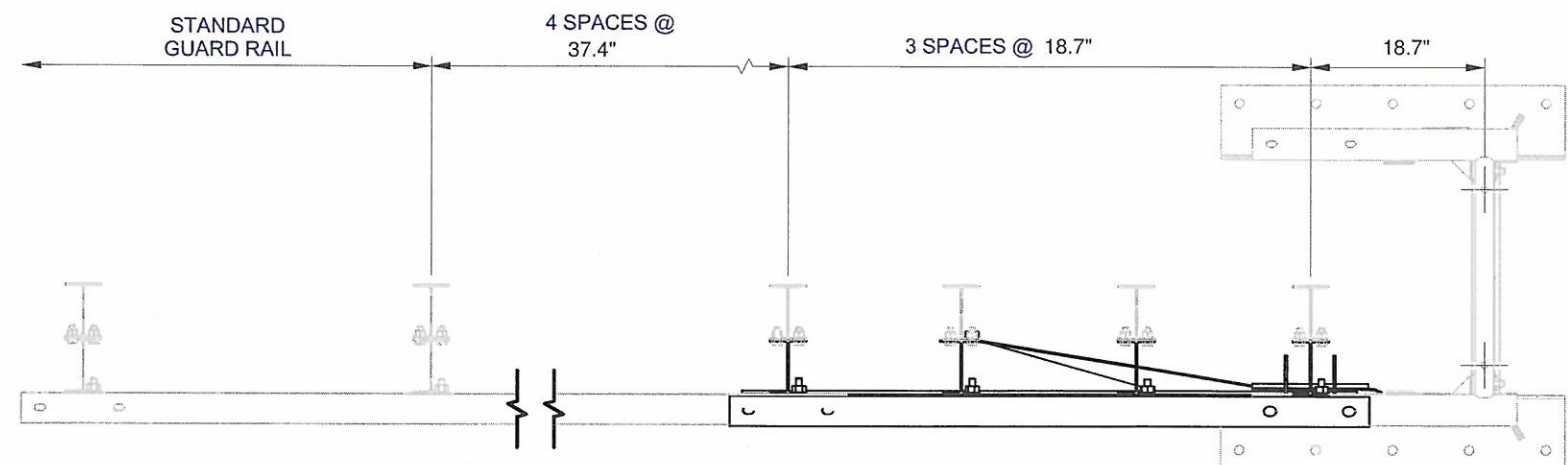
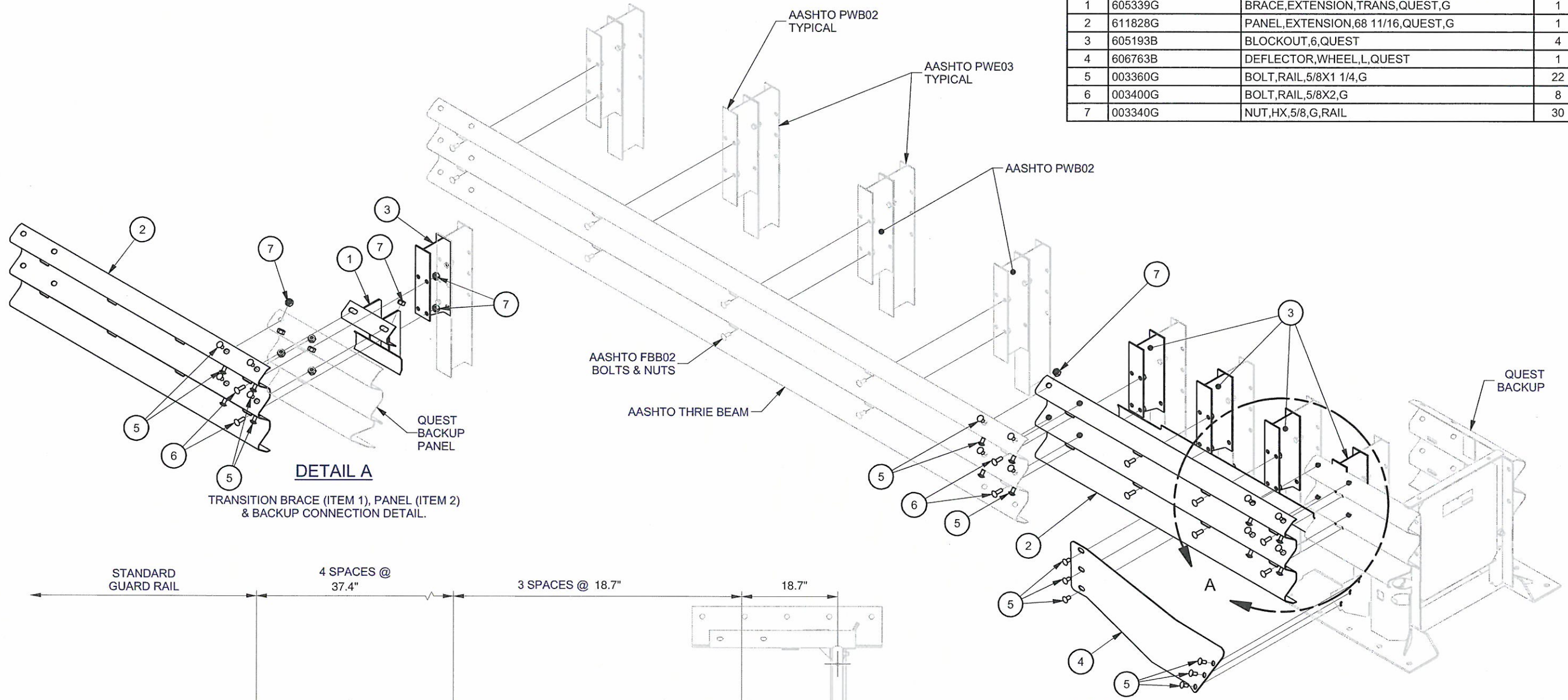


BRET R. ECKERT P.E.
Florida License No. 75191
3617 Cincinnati Avenue
Rocklin California 95765



DRAWN: K. Mortensen		DATE: 07/31/2012		PART NO. 616063B		267.19 lbmass	
DESIGNED:		DATE:		ENERGY ABSORPTION SYSTEMS ENGINEERING AND RESEARCH DEPARTMENT			
CHECKED: S. Trageser		DATE: 7/31/2012					
APPROVED: K. Looney		DATE: 7/31/2012		QUEST SYSTEM (PERMANENT) TRANSITION ASSEMBLY, 7" OFFSET,L FOR QPL S544-0035			
UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES. DIMENSIONS ACCORDING TO ASME Y14.5M-1994 UNLESS OTHERWISE SPECIFIED.							

PARTS LIST			
ITEM	STOCK NO.	DESCRIPTION	QTY.
1	605339G	BRACE,EXTENSION,TRANS,QUEST,G	1
2	611828G	PANEL,EXTENSION,68 11/16,QUEST,G	1
3	605193B	BLOCKOUT,6,QUEST	4
4	606763B	DEFLECTOR,WHEEL,L,QUEST	1
5	003360G	BOLT,RAIL,5/8X1 1/4,G	22
6	003400G	BOLT,RAIL,5/8X2,G	8
7	003340G	NUT,HX,5/8,G,RAIL	30

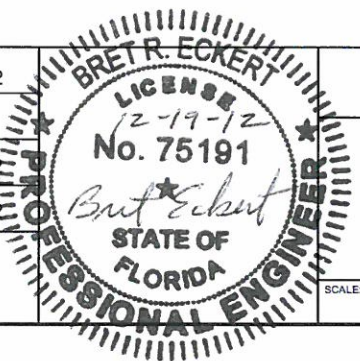


BRET R. ECKERT P.E.
 Florida License No. 75191
 3617 Cincinnati Avenue
 Rocklin California 95765

ASSEMBLY NO. 616124B 182.79 lbmass

Revision	Date	Rev	By	Chk.	App.

DRAWN: K. Mortensen	DATE: 7/30/2012
DESIGNED:	DATE:
CHECKED: S. Trageser	DATE: 7/31/2012
APPROVED: K. Looney	DATE: 7/31/2012
FILE: 62-01-49 SH10.pdf	



ENERGY ABSORPTION SYSTEMS, INC.
 ENGINEERING AND RESEARCH DEPARTMENT

QUEST[®] SYSTEM (PERMANENT)
 TRANSITION ASSEMBLY, THRIE, QUEST
 FOR QPL S544-0035

SCALE: Do Not Scale	DRAWING: 62-01-49	SHEET: 10 of 10	REV
---------------------	-------------------	-----------------	-----