



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

400 Seventh St., S.W.
Washington, D.C. 20590

November 2, 2005

In Reply Refer To: HSA-10/CC-26H

Mr. Barry D. Stephens, P.E.
Sr. Vice President Engineering
Energy Absorption Systems, Inc.
3617 Cincinnati Avenue
Rocklin, California 95678

Dear Mr. Stephens:

In your September 29, 2005, letter to former Associate Administrator for Safety George Ostensen, you requested formal Federal Highway Administration (FHWA) acceptance of a modified anchorage design for your REACT 350 crash cushion. This proposed design requires fewer anchors than the design originally accepted by the FHWA in a letter to Mr. Scott Walter dated June 25, 1997, (reference letter CC-26E). You explained that Energy typically specifies an anchoring system called "MP-3" which utilizes either 7-inch or 18-inch long 3/4-inch diameter threaded rods placed in appropriate depth holes in concrete or asphalt, respectively, and anchored using a rigid two-part polyester grout. The *self-contained* REACT base track was redesigned to reduce the number of anchors from 56 to 34, while the number of anchors for *concrete backed systems* was reduced from 40 to 28. The modified designs for each of these applications are shown in the enclosure to this letter.

To verify acceptable crash performance of the REACT 350 with fewer anchors you conducted the National Cooperative Highway Research Program (NCHRP) Report 350 Tests 3-31 and 3-37 when the unit was anchored in a worst-case application, i.e., a self contained unit positioned on 6 inches (150 mm) of asphalt over an 8-inch (200-mm) compacted sub base. It was anchored with thirty-four 3/4-inch diameter x 18-inch long (19-mm x 457-mm) ASTM A193 B7 threaded rods and your two-part MP-3 polyester grout. Both tests met the NCHRP Report 350 evaluation criteria and the REACT 350 base remained stationary with no lifting or bending noted. I agree that these tests on asphalt represent a worst case anchoring condition and validate the acceptable performance of the self-contained and the concrete-backed the REACT systems when attached to either asphalt or concrete foundations as per your specifications.

Based upon the information presented, I agree that the REACT 350 system with your modified anchor designs remains acceptable as an NCHRP Report 350 TL-3 crash cushion and may continue to be used on the National Highway System (NHS) when selected by a transportation agency.



Please note also the following provisions that apply to all the FHWA letters of acceptance:

- Any additional design changes that may adversely influence the crashworthiness of the REACT 350 will require a new acceptance letter.
- Should the FHWA discover that the qualification testing was flawed, that any in-service performance evaluations reveal unacceptable safety problems, or that the device being marketed is significantly different from the version that was crash tested, we reserve the right to modify or revoke this acceptance.
- You will be expected to supply potential users with sufficient information on design and installation requirements to ensure proper performance.
- You will be expected to certify to potential users that the hardware furnished has essentially the same chemistry, mechanical properties, and geometry as that submitted for acceptance.
- To prevent misunderstanding by others, this letter of acceptance, designated as acceptance letter CC-26H, shall not be reproduced except in full. This letter, and test documentation upon which this letter is based, is public information. All acceptance letters and related support documentation may be reviewed at our office upon request.
- The REACT 350 is a patented product and is considered proprietary. Under Title 23, Code of Federal Regulations, Section 635.411, proprietary devices can be *specified by a highway agency* for use on a Federal-aid project, except exempt, non-NHS projects, if: (a) they are selected as a result of competitive bidding with equally suitable unpatented items; (b) the highway agency certifies that they are essential for synchronization with the existing highway facilities or that no equally suitable alternative exists or; (c) they are used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes. If the type of crash cushion used in a work zone is *selected by the contractor* rather than specified by the contracting authority, it can be presumed to meet requirement (a) above.

Sincerely yours,

/original signed by/

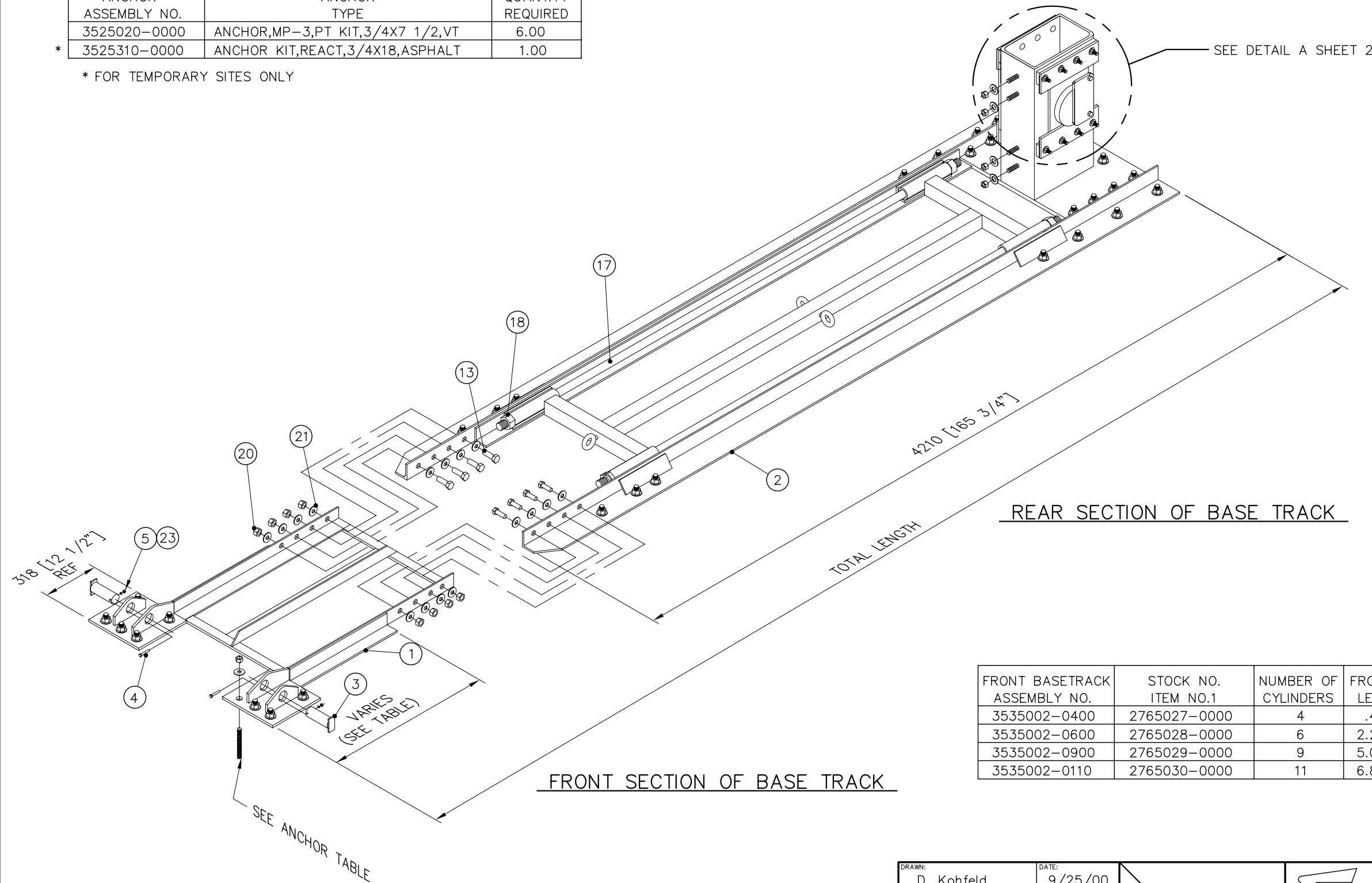
John R. Baxter, P.E.
Director, Office of Safety Design
Office of Safety

ANCHOR TABLE OPTIONS

SEE SHEET 2 FOR DETAILS AND PARTS LIST

ANCHOR ASSEMBLY NO.	ANCHOR TYPE	QUANTITY REQUIRED
3525020-0000	ANCHOR,MP-3,PT KIT,3/4X7 1/2,VT	6.00
* 3525310-0000	ANCHOR KIT,REACT,3/4X18,ASPHALT	1.00

* FOR TEMPORARY SITES ONLY



FRONT BASETRACK ASSEMBLY NO.	STOCK NO. ITEM NO.1	NUMBER OF CYLINDERS	FRONT BASETRACK LENGTH (ITEM 1)	TOTAL LENGTH
3535002-0400	2765027-0000	4	.43 m [1'-5"]	4.64 m [15'-2 3/4"]
3535002-0600	2765028-0000	6	2.26 m [7'-5"]	6.47 m [21'-2 3/4"]
3535002-0900	2765029-0000	9	5.00 m [16'-5"]	9.21 m [30'-2 3/4"]
3535002-0110	2765030-0000	11	6.83 m [22'-5"]	11.04 m [36'-2 3/4"]

Revisions	Date	Rev.	By	Ckd.	App.
REV CHANGE TO MATCH SHEET 2	07/16/03	F	RGC	JME	ACF
PCN 1977, UPDATED ITEMS 1 & 2	03/24/05	G	RGC	KRM	ACF
CHGD TO MATCH SHEET 2	10/17/02	E	CDB	DMW	SPT

DRAWN: D. Kohfeld	DATE: 9/25/00
DESIGNED:	DATE:
CHECKED:	DATE:
APPROVED: DEAN ALBERSON	DATE: 09/28/00
CAD FILE: STJ3535002-0000.dwg	

ASSEMBLY NO. SEE TABLE

ENERGY ABSORPTION SYSTEMS, INC.
ENGINEERING AND RESEARCH DEPARTMENT

REACT 350[®] SYSTEM
SELF CONTAINED BACKUP AND
BASETRACK ASSEMBLY
FOR 36" WIDE UNITS

SCALE: 1:25 DWG: 3535002-0000 SHEET: 1 of 2 REV: G

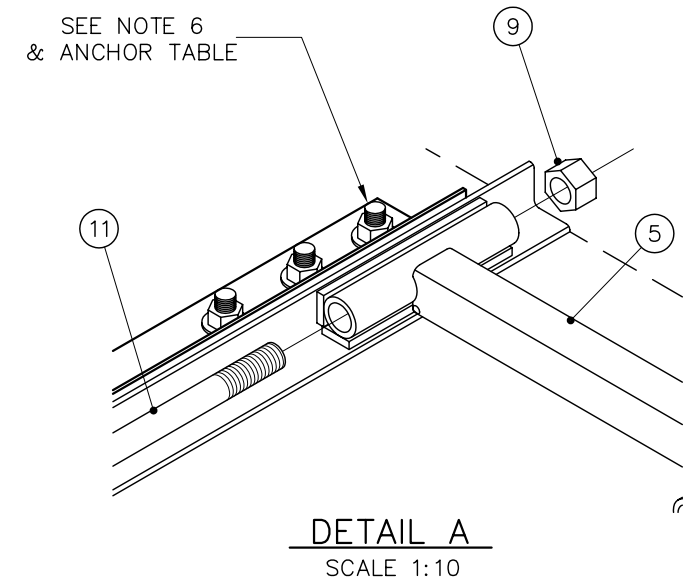
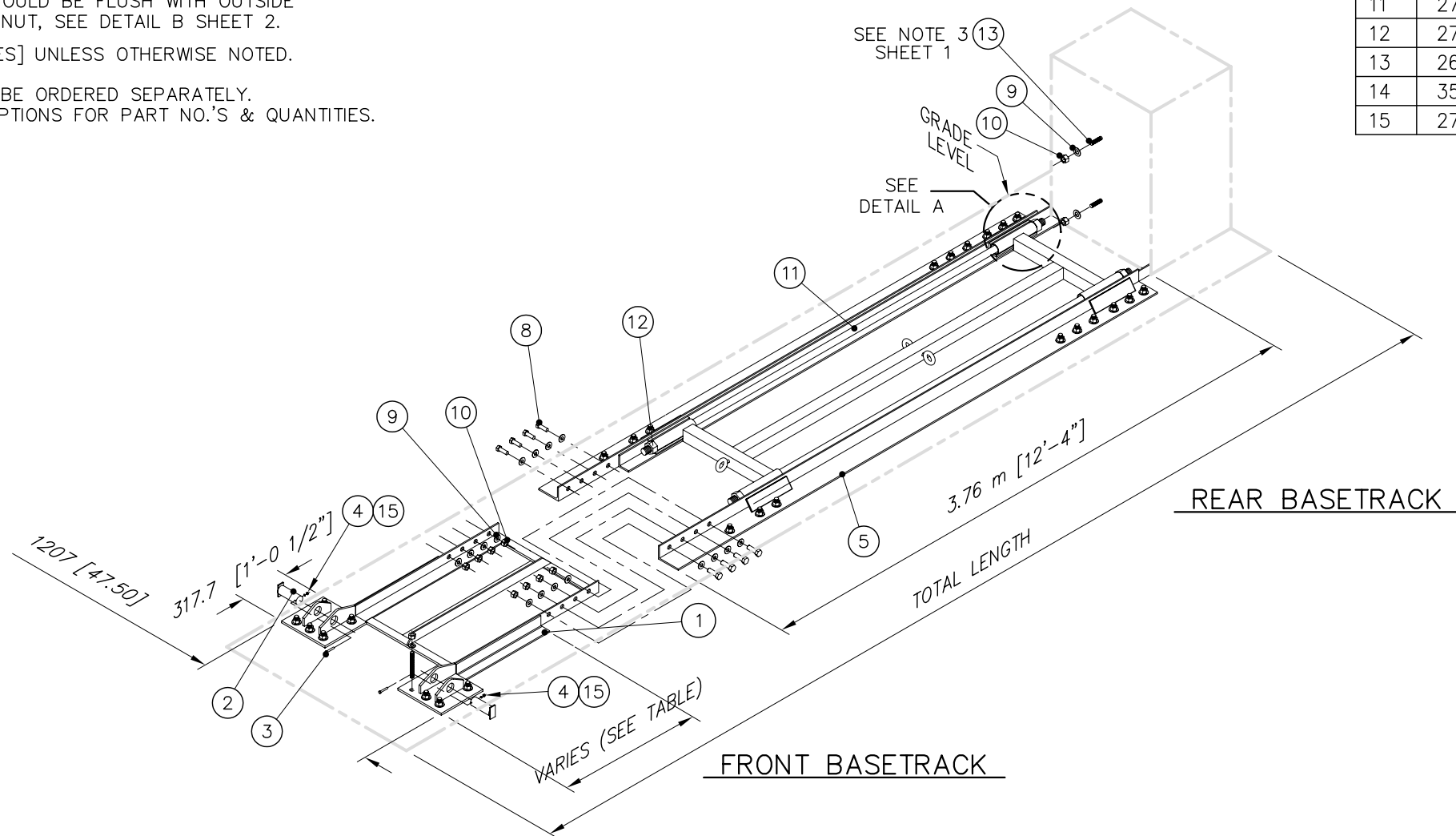
NOTES:

1. BACKUP MUST BE ABLE TO WITHSTAND A MAXIMUM OVERTURNING MOMENT OF 226 kNm [2000 KIP-IN.] AT DECK LINE FOR DURATIONS 40± ms.
2. IMPACT FORCES COULD BE TRANSFERRED INTO STRUCTURE THROUGH SYSTEM. ADEQUATE ANCHORAGE IS REQUIRED FOR PROPER IMPACT PERFORMANCE.
3. USE ITEMS 1, 5 AND 6 AS TEMPLATES FOR DRILLING CONCRETE. INSTALL ITEM 13 USING MP-3 EPOXY ITEM 14 TO SECURE. USE NUTS AND WASHERS ITEMS 9 & 10.
4. ANCHOR STUD END SHOULD BE FLUSH WITH OUTSIDE SURFACE OF ANCHOR NUT, SEE DETAIL B SHEET 2.
5. UNITS ARE mm [INCHES] UNLESS OTHERWISE NOTED.
6. ANCHOR BOLTS MUST BE ORDERED SEPARATELY. SEE ANCHOR TABLE OPTIONS FOR PART NO.'S & QUANTITIES.

ANCHOR TABLE OPTIONS

	ANCHOR ASSEMBLY NO.	ANCHOR TYPE	QUANTITY REQUIRED
BASETRACK	3525020-0000	ANCHOR,MP-3,PT KIT,3/4X7 1/2,VT	6.00
SIDE CABLE ANCHOR	3525130-0000	ANCHOR,MP-3,PT KIT,3/4X6 1/2 HOR	4.00

PARTS LIST			
ITEM	STOCK NO.	DESCRIPTION	REQ'D
1	SEE TABLE	BASETRACK,FRONT	1.00
2	2765003-0000	PIN,RESTRAINING CABLE	2.00
3	2700371-0000	BOLT,HX,1/4X2 1/2,G2,G	2.00
4	2704151-0000	NUT,HX,1/4,G	2.00
5	2765031-0000	WELDMNT,REAR BASETRACK,CONC(React)	1.00
6	2765019-0000	WELDMNT,CABLE ANCHOR,CONC,(React)	2.00
8	2701381-0000	BOLT,HX,3/4X2,G2,G	8.00
9	2708081-0000	WASHER,FLAT,3/4X2,HVY,G	18.00
10	2704091-0000	NUT,HX,3/4,G	10.00
11	2765020-0000	RRD ST 1 1/2X120,THREADED BOTH ENDS	2.00
12	2704121-0000	NUT,HX,1 1/2,G	4.00
13	2699941-0000	STUD,3/4X8 1/2,G5,G	2.00
14	3525110-0000	MP-3,PINT PACKAGE	1.00
15	2708281-0000	WASHER,LOCK,1/4,G	2.00



TABLE

BASETRACK ASSEMBLY NO.	STOCK NO. ITEM NO.1	NUMBER OF CYLINDERS	FRONT BASETRACK LENGTH (ITEM 1)	TOTAL LENGTH
3535015-0400	2765027-0000	4	0.43 m [1'-5"]	5.06 m [16'-7"]
3535015-0600	2765028-0000	6	2.26 m [7'-5"]	6.88 m [22'-7"]
3535015-0900	2765029-0000	9	5.00 m [16'-5"]	9.63 m [31'-7"]
3535015-0110	2765030-0000	11	6.83 m [22'-5"]	10.59 m [34'-9"]

Revisions	Date	Rev.	By	Ckd.	App.
PCN 1977, UPDATE ITEM 5	03/24/05	E	RGC	KRM	ACF
ITEM 6 WAS 3535049-0000, QTY # 9 WAS 16.0, QTY # 10 WAS 8.0 REMOVED ITEMS 6B AND 7, REVISED NOTE 3, ADDED ITEM 14	10/18/01	C	LWC	DMO	SPT
ITEMS 3 & 4 WERE PLATED. ADDED ITEM 15	04/30/02	D	JT	JME	RCB

DRAWN: L. CORKER	DATE: 12/22/99
DESIGNED:	DATE:
CHECKED:	DATE:
APPROVED: DEAN ALBERSON	DATE: 09/28/00
CAD FILE: 3535015-0000.dwg	

ASSEMBLY NO. SEE TABLE

ENERGY ABSORPTION SYSTEMS, INC.
ENGINEERING AND RESEARCH DEPARTMENT

REACT 350® SYSTEM
CONCRETE BACKUP
BASETRACK ASSEMBLY
36" WIDE SYSTEMS

SCALE 1:40	DWG. 3535015-0000	SHEET 1 of 3	REV E
---------------	----------------------	-----------------	----------