DESIGN OF SHORING Date: [illegible] Sheet 1 of 14

Project: Project [illegible]

Supporting Calculations
By: [illegible] Job Numb [illegible]

Design Criteria:

AISC Manual for Steel Construction, 9th Edition
NDS for Wood Construction, 1985 Edition
Title 8, Chapter 4, Section 1541.1 of the California State Safety Orders
Caltrans Trenching and Shoring Manual
LACDPW Standard Plan 3090

Allowable stresses in steel increased 33% for temporary loading
Allowable stresses in timber increased 33% for temporary loading

Shoring Designs Loads:

From: Contract Specifications
Line "A" 39+07 to 51+60

Active Pressure, Kw =	36 pcf
Surcharge	72 psf

Job Name Project 5037, Unit 2
Job No.: 99-142

2-Strut Shoring System
Shoring Case No: 11

Soil Parameters: Active Earth Pressure: Kw = 36.0 pcf

Rail Dimensions and Strut Locations:

L1=	2.26	ft.
L2=	6.33	ft.
L3=	9.45	ft.
Total Rail Height, Lt =	18.04	ft.

Rail Spacing, Tributary Width 15.76 ft.

Pressure Diagram:

Trench Depth, H =	28.00	ft.		
Active Earth Pressure		0.8 x Kw x H =	806.4	psf
Surcharge Depth, Hs	-	ft.		
Surcharge Pressure		0.8 x Kw x Hs =	-	psf
Additional Surcharge Pressure			72.0	psf
Total Active Pressure, P =			878.4	psf

Loading Diagram:

	lbs/ft	kips/ft	kips
Active Load, W = P x Tributary Width =	13,844	13.844	249.74

Beam Force Solution:

Reactions	kips	Shears	kips	Moments	ft-kips		
R1=	(16.96)	V1=	(31.29)	M1 =	(35.35)	X1 =	-3.485
R2=	266.70	V2=	(48.25)	M2 =	48.74		
		V3 =	(135.88)	M3 =	(618.13)		
		V4 =	130.82				

Rmax = 266.70 Vmax = 135.88 Mmax = 618.13

Check Rail: Shape: Icon XXHDSR Fy = 50.0 ksi

Section Modulus:	195.68	$in.^3$	
Shear Area: (d)(tw)	6.88	$in.^2$	
d =	16.383	in.	
tw =	0.420	in.	

fb = M / S =	37.91	ksi
fv = V / d tw =	19.75	ksi

Load Duration Factor: 1.33 (33% increase is allowable for temporary loading)

Fb = 0.6 Fy x LDF =	39.90	ksi >=	37.91	ksi [OK]
Fv = 0.4 Fy x LDF =	26.60	ksi >=	19.75	ksi [OK]

Maximum Strut Reaction, R = 266.70 kips
Refer to sheet(s) 5 for strut stress checks.

Job Name Project 9037, Unit 2
Job No.: 99-142

2-Strut Shoring System
Shoring Case No: 11

Soil Parameters: Active Earth Pressure: Kw = 36.0 pcf

Rail Dimensions and Strut Locations:

L1=	2.84	ft.
L2=	4.00	ft.
L3=	3.00	ft.
Total Rail Height, Lt =	9.84	ft.

Rail Spacing, Tributary Width 15.76 ft.

Pressure Diagram:

Trench Depth, H =	28.00	ft.		
Active Earth Pressure		0.8 x Kw x H =	806.4	psf
Surcharge Depth, Hs	-	ft.		
Surcharge Pressure		0.8 x Kw x Hs =	-	psf
Additional Surcharge Pressure			72.0	psf
Total Active Pressure, P =			878.4	psf

Loading Diagram:

	lbs/ft	kips/ft	kips
Active Load, W = P x Tributary Width =	13,844	13.844	136.22

Beam Force Solution:

Reactions	kips	Shears	kips	Moments	ft-kips		
R1=	65.39	V1=	(39.32)	M1 =	(55.83)	X1 =	1.883
R2=	70.83	V2=	26.07	M2 =	(31.28)		
		V3 =	(29.30)	M3 =	(62.30)		
		V4 =	41.53				

Rmax = 70.83 Vmax = 41.53 Mmax = 62.30

Check Rail: Shape: Icon SDSR Fy = 50.0 ksi

Section Modulus:	93.45	$in.^3$	
Shear Area: (d)(tw)	6.39	$in.^2$	
d =	16.383	in.	
tw =	0.390	in.	

fb = M / S =	8.00	ksi
fv = V / d tw =	6.50	ksi

Load Duration Factor: 1.33 (33% increase is allowable for temporary loading)

Fb = 0.6 Fy x LDF =	39.90	ksi >=	8.00	ksi [OK]
Fv = 0.4 Fy x LDF =	26.60	ksi >=	6.50	ksi [OK]

Maximum Strut Reaction, R = 70.83 kips
Refer to sheet(s) 5 for strut stress checks.

Job Name:
Job No.:

LAGGING
Shoring Case No: 11

Check stresses in Steel Lagging Panels:

Lagging design Load = 1 x Shoring Design Load

1.00 x Pmax of	878 psf =	878	psf
Use lagging earth pressure =		878	psf
Additional pressure =		-	psf
Total Lagging Pressure =		878	psf = W

Slide Rail Spacing = 15.76 ft. center to center
Slide Rail Width = 1.00 ft.

Check Steel Plate Lagging, (A500 Grade B): Load Duration Factor 1.33

Per AISC, Allowable Steel Stresses: Fy = 46 ksi

Fb = 0.66 Fy =	30.4 ksi x L.D.F. =	40.4	ksi
Fv = 0.40 Fy =	18.4 ksi x L.D.F. =	24.5	ksi

Design Span = Slide Rail Spacing - Rail Width
Span = 14.76 ft. = L

Load for 7.00 inch width = 512 lbs/ft.

$M = W L^2 / 8$ =	13,947	ft.-lbs
$V = W L / 2$ =	3,780	lbs

Steel Tubing Section: TS 5x7x3/16

S =	7.10	$in.^3$
d =	5.00	in.
tw =	0.19	in.

fb = M / S =	23.6	ksi <	40.4	ksi [OK]
fv = V / d tw =	4.0	ksi <	24.5	ksi [OK]

Woodcrest Engineering

Job Name: Project 9037, Unit A
Job No.: 99-142

Steel Member Stress Check
Shoring Case No: 11

Member Length = 14.00 ft.
Axial Load = 266.70 kips

Check Compressive Stress in Cross Struts:

Member Shape: TS 8x8x1/2
Area = 14.40 in^2
Section Modulus, Sy = 32.90 in^3
Radius of Gyration, ry = 3.03 in.

Material Data:
Modulus of E 29000 ksi
Fy 46 ksi

L/r = 55.45
K = 1
C'c = 111.6

From Table 3, Page 5-119 AISC 9th Ed
K l/r / Cc = 0.497
Ca = 0.477

		Plus 33% Increase
Fa =	21.94 ksi	29.18 ksi
F'e =	48.58 ksi	64.61 ksi
Fb = .66 Fy =	30.36 ksi	40.38 ksi

Calculate Design Moment:

Dead Load of Strut: W = 49.1 lbs/ft

M = WL^2/8 = 0.049 k/ft x 14.00 ^2/8 = 1.20 ft. kips
M = PL/4 = 0.4 kips x 14.00 / 4 = 1.40 ft. kips
(all struts are assumed to have a 400# concentrated load at midspan)

Total Design Moment = 2.60 ft-k = 31.2 in. kips

fa = P / A = 18.52 ksi
fb = M / S = 0.95 ksi

fa/Fa = 0.63 > .15 Therefore use Formula H1-1 & H1-2:

H1-1: fa / Fa + fb / (1 - fa / F'e) Fb = 0.67 < 1 OK

H1-2: fa / 1.33 x .6 Fy + fb / Fb = 0.53 < 1 OK

Job Name: Project 9037, Unit 2
Job No.: 99-142

LAGGING
Shoring Case No: 11

Check stresses in Lagging per Caltrans Trenching and Shoring Manual, 12/96

Per 10-6, Lagging design Load = 0.75 x Shoring Design Load < 660 psf Max.

0.75 x Pmax of 878 psf = 659 psf

Use lagging earth pressure =	659	psf
Additional pressure =	-	psf
Total Lagging Pressure =	659	psf = W

Soldier Beam Spacing = 8.33 ft. center to center
Soldier Beam Width = 1.17 ft.

Allowable Timber Design Stresses per: Douglas Fir Grade 2
National Design Specifications, 1986 (NDS), Grade 2, Dimension Lumber

Flexural Stress, Fb = 1,250 psi
Shear Stress, Fv = 95 psi

Adjustment Factors:

Load Duration, Cd =	1.33
Flatwise Use, Cfu =	1.11
Size Factor, Cf =	1.00
Rep. Member, Cr =	1.00

Allowable Flexural Stress = Fb x Cd x Cfu x Cf x Cr = 1,845 psi
Allowable Shear Stress = Fv x Cd = 126 psi

Design Span = Soldier Beam Spacing - Beam Width + Minimum Bearing Length (1")
Span = 7.24 ft. = L

$M = W L^2 / 8$ = 4,319 ft.-lbs
$V = W L / 2$ = 2,385 lbs

Nominal Thickness	4.00 in.
Actual Thickness	4.00 in.
Number of Boards	1 each

Section Properties per Foot

S =	32.0 $in.^3$
A =	48.0 $in.^2$

fb = M / S =	1,619 psi <	1,845 psi	[OK]
fv = 1.5 V / A =	75 psi <	126 psi	[OK]

Check Steel Plate Lagging, (A36): Load Duration Factor 1.33

Per AISC, Allowable Steel Stresses: Fy = 36 ksi

Fb = 0.75 Fy =	27.0 ksi x L.D.F. =	35.9	ksi
Fv = 0.40 Fy =	14.4 ksi x L.D.F. =	19.2	ksi

Design Span = Soldier Beam Spacing - Beam Width
Span = 7.16 ft. = L

$M = W L^2 / 8$ = 4,220 ft.-lbs
$V = W L / 2$ = 2,357 lbs

Plate Thickness	1.00 in.
Number of Plates	1 each

Section Properties per Foot

S =	2.0 $in.^3$
A =	12.0 $in.^2$

fb = M / S =	25.3 ksi <	35.9	ksi [OK]
fv = 1.5 V / A =	0.3 ksi <	19.2	ksi [OK]

7/14

TABLE "F"--ICON SHEETING SYSTEM ALLOWABLE LOADS
(FOR SLIDE RAILS - INCLUDING CORNER & EXTENSION RAILS)

RAIL SECTION	ASTM 572, GR 50 STEEL Mr (k-ft)	Vr (kips)
ICON STANDARD SINGLE SLIDE RAIL	86.9	91.7
ICON STANDARD DOUBLE SLIDE RAIL	311.5	170.0
ICON HEAVY DUTY DOUBLE SLIDE RAIL	385.8	176.7
ICON EXTRA HEAVY DUTY DOUBLE SLIDE RAIL	469.2	183.3

NOTE: LOADS SHOWN IN TABLE "F" INCLUDE 33 1/3% OVERSTRESS FOR TEMPORARY USE.

DESIGN HAS BEEN REVIEWED BY THE PROFESSIONAL ENGINEERING FIRM OF RAYMOND E. PRYMUS P.C., N.Y. LICENSE #050457.

$F_y = 50$ KSI

$F_{b\,MAX} = 0.6 \times F_y \times LDF$

$= 0.6 \times 50_{KSI} \times 4/3 = 40$ KSI

LG#: 12/13/99

SSSR $S = 86.9^{K} \times 12/40 = 26.07\ IN^3$

SDSR $S = 311.5^{K} \times 12/.40 = 93.45\ IN^3$

HDDSR $S = 385.8 \times 12/40 = 115.74\ IN^3$ ✓

XHDDSR $S = 469.2 \times 12/40 = 140.76\ IN^3$

XXHDDSR $S = = 195.68\ IN^3$

$F_{v\,MAX} = 0.4 \times 50_{KSI} \times 4/3 = 26.67$ KSI

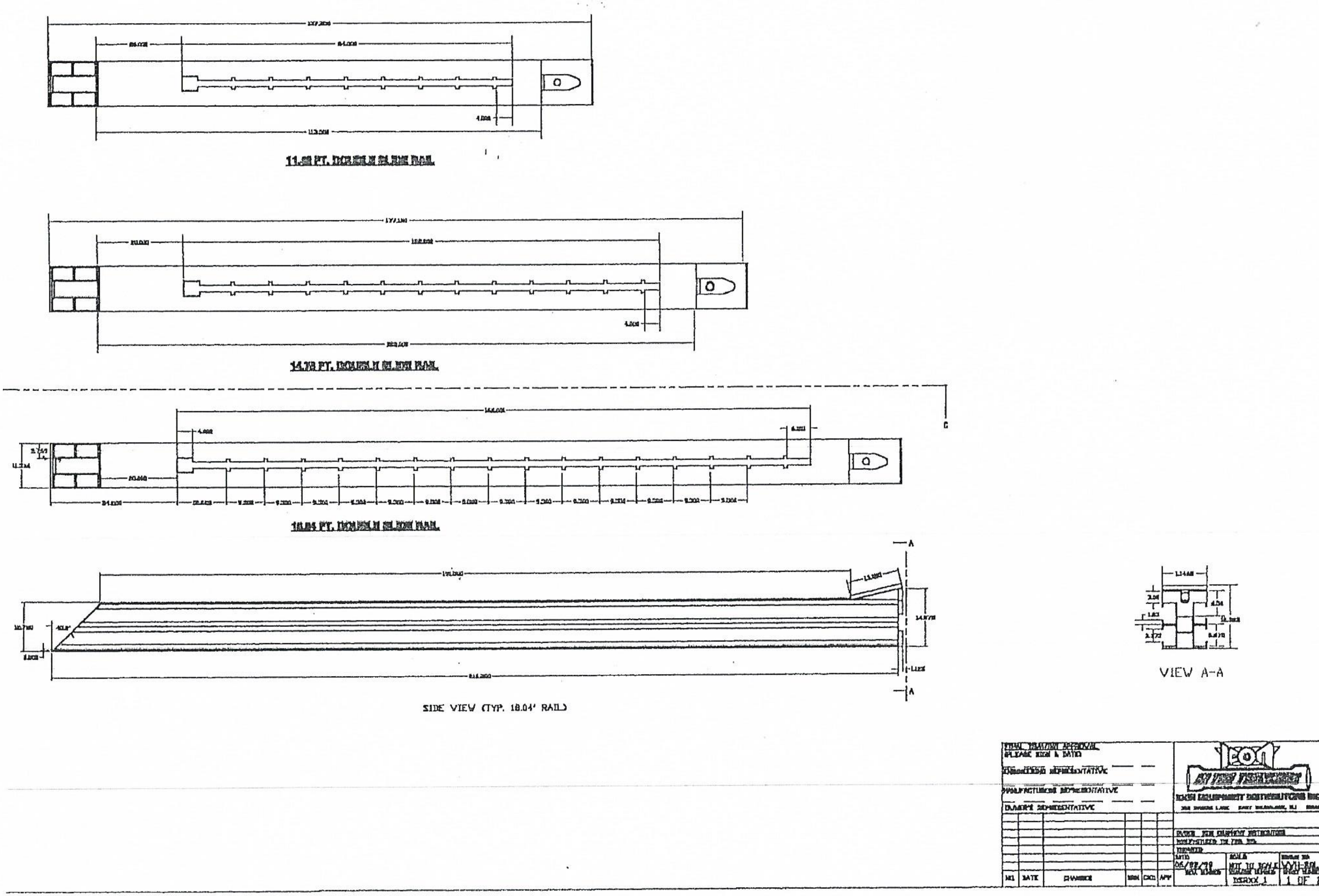
SSSR	$d t_w = 91.7^{K}/26.67_{KSI}$	$= 3.44\ IN^2$	$d = 16.383"$, $t_w = 0.21"$
SDSR	$d t_w = 170.0/26.67$	$= 6.37\ IN^2$	$d = 16.383"$, $t_w = 0.39"$
HDDSR	$d t_w = 176.7/26.67$	$= 6.63\ IN^2$	" $t_w = 0.40"$
XHDDSR	$d t_w = 183.3/26.67$	$= 6.87\ IN^2$	" $t_w = 0.42"$
XXHDDSR	USE	6.87	" $t_w = 0.42"$

ICON EQUIPMENT DISTRIBUTORS INC.
208 RYDERS LANE EAST BRUNSWICK, NJ 08816

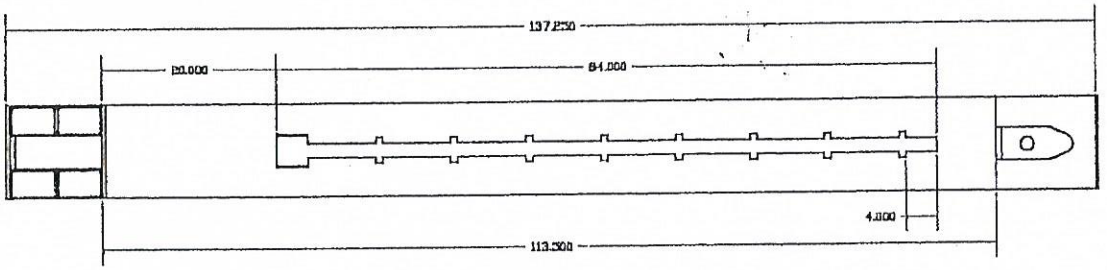
ICON TEMPORARY SHEETING SYSTEM

STRUCTURE				
CONTRACTOR		FABRICATOR	ICON INDUSTRIES	
B.S.G.	K.C.L.	NTS	N/A	N/A
ICON				B-3

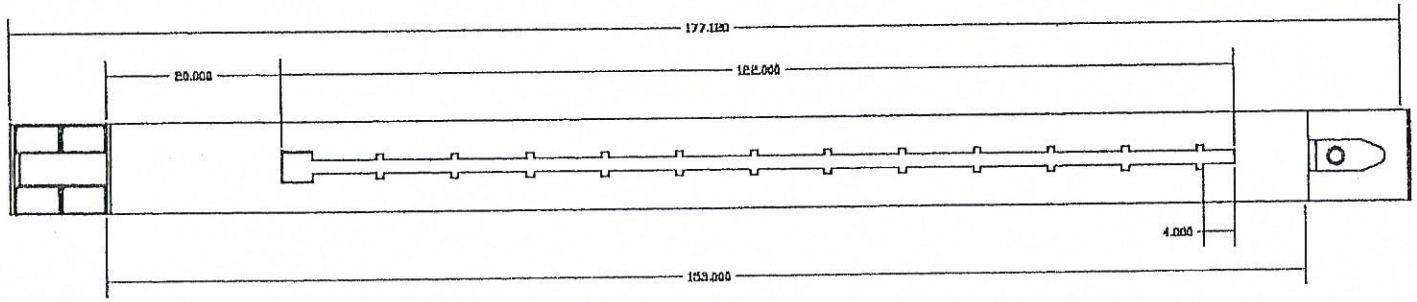
DOUBLE SLIDE RAIL



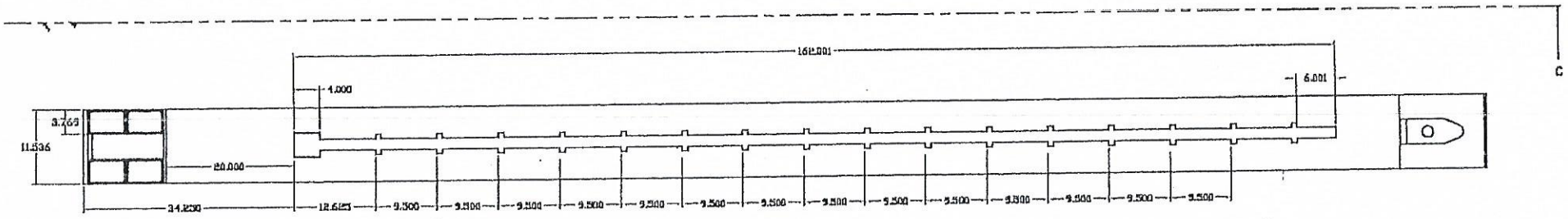
9/14



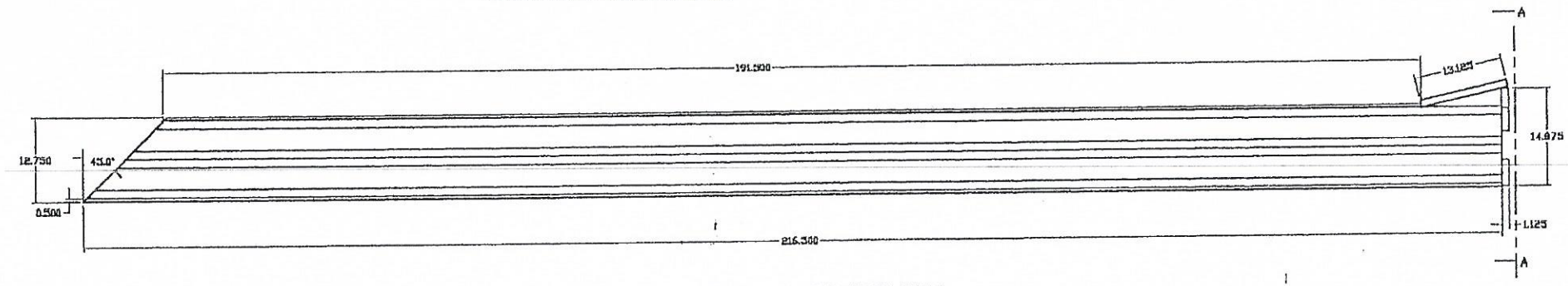
11.49 FT. DOUBLE SLIDE RAIL



14.78 FT. DOUBLE SLIDE RAIL

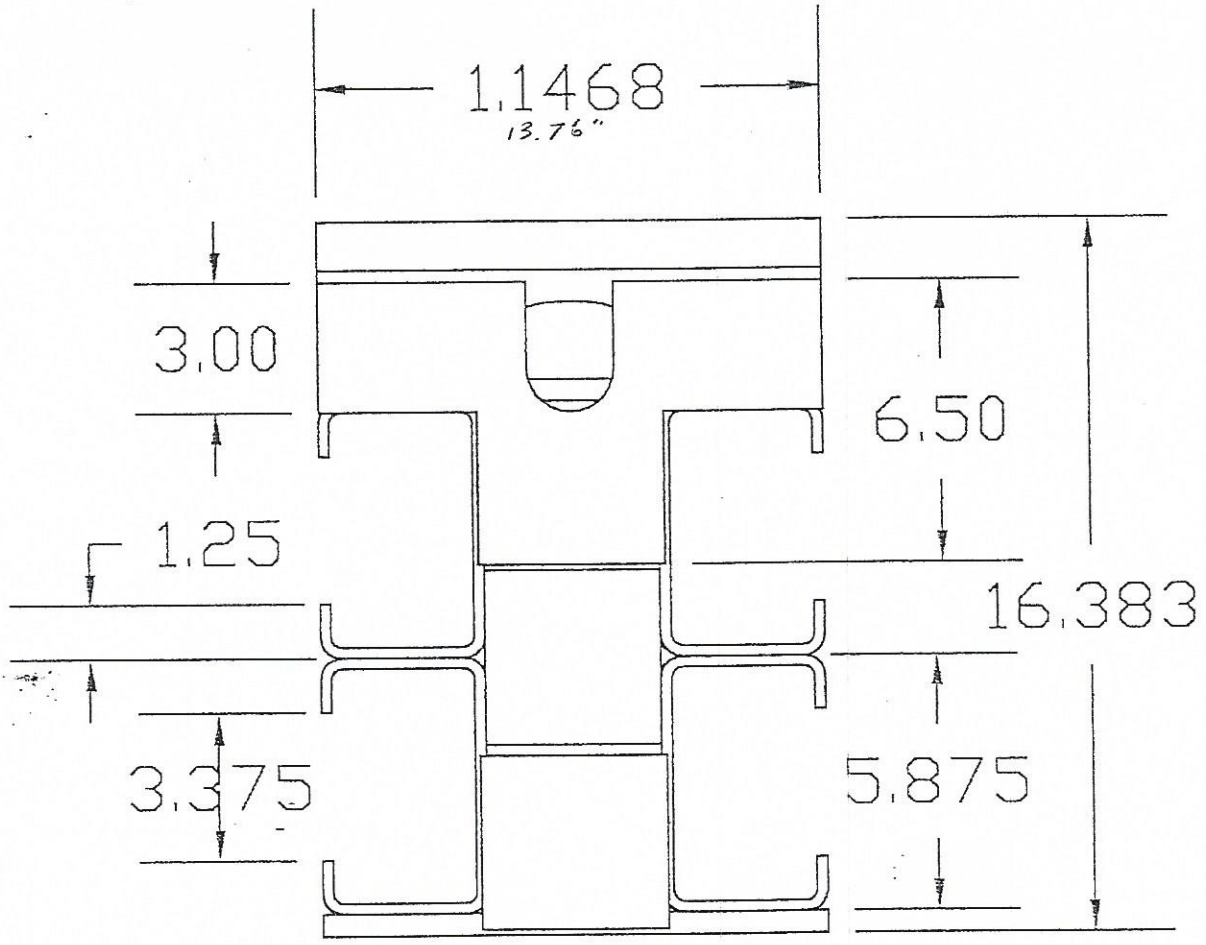


18.04 FT. DOUBLE SLIDE RAIL



SIDE VIEW (TYP. 18.04' RAIL)

10/14



VIEW A-A

12/14

TABLE 'E'--ICON SHEETING SYSTEM ALLOWABLE LOADS
(FOR 4" x 4" x 1/2" BRACES)

EXT LENGTH (ft.)	TRENCH WIDTH INSIDE SLIDE RAILS (ft.)	(GRADE 50 STEEL) Fa (ksi)	Pr (kips)
1.64	3.10	27.82	176.9
3.28	4.74	25.99	165.3
4.92	6.38	23.82	151.5
6.56	8.02	21.34	135.7
8.20	9.66	18.55	118.0
9.84	11.30	15.44	98.2
11.48	12.94	12.07	76.7
13.12	14.58	9.45	60.1
14.76	16.22	7.60	48.3

MAXIMUM ALLOWABLE TENSION ON SLIDE RAIL BRACING = 52.9 kips

TABLE 'E'--ICON SHEETING SYSTEM ALLOWABLE LOADS
(FOR 8" x 8" x 1/2" BRACES)

EXT. LENGTH (ft.)	TRENCH WIDTH INSIDE SLIDE RAILS (ft.)	(GRADE 50 STEEL) Fa (ksi)	Pr (kips)
1.64	3.10	29.17	420.1
3.28	4.74	28.56	411.3
4.92	6.38	27.87	401.3
6.56	8.02	27.10	390.2
8.20	9.66	26.25	378.1
9.84	11.30	25.34	364.9
11.48	12.94	24.36	350.8
13.12	14.58	23.32	335.8
14.76	16.22	22.21	319.9
16.40	17.86	21.04	303.0
18.04	19.50	19.82	285.3
19.69	21.14	18.53	266.8
21.33	22.78	17.17	247.3
22.97	24.42	15.75	226.8
24.61	26.06	14.26	205.4
26.25	27.71	12.71	183.0
27.89	29.35	11.31	162.9

$< 267^k$ OK.

MAXIMUM ALLOWABLE TENSION ON SLIDE RAIL BRACING = 52.9 kips

MAX. TENSION = 17^k FROM CASE 2

$17^k < 52.9^k$ OK.

ICON EQUIPMENT DISTRIBUTORS INC.
200 RYDERS LANE EAST BRUNSWICK, NJ 08816

ICON TEMPORARY SHEETING SYSTEM

STRUCTURE				
CONTRACTOR		FABRICATOR	ICON INDUSTRIES	
B.S.G.	K.C.L.	NTS	N/A	N/A
ICON				B-2

Job Name: Project 9037, Unit 2
Job No.: 99-142

Slide Rail Dimensions
Shoring Case No: 11

Total Rail Length: 18.04 ft.

	in.	Distance from Bottom in.	Distance from Bottom ft.	Position	Distance from Top ft.
Toe to Bottom Hole		34.250	2.85		15.19
Bottom hole to Strut	12.625	46.875	3.91	1	14.13
Spacing	9.500	56.375	4.70	2	13.34
		65.875	5.49	3	12.55
		75.375	6.28	4	11.76
		84.875	7.07	5	10.97
		94.375	7.86	6	10.18
		103.875	8.66	7	9.38
		113.375	9.45	8	8.59
		122.875	10.24	9	7.80
		132.375	11.03	10	7.01
		141.875	11.82	11	6.22
		151.375	12.61	12	5.43
		160.875	13.41	13	4.63
		170.375	14.20	14	3.84
		179.875	14.99	15	3.05
		189.375	15.78	16	2.26

Total Rail Length: 14.76 ft.

	in.	Distance from Bottom in.	Distance from Bottom ft.	Position	Distance from Top ft.
Toe to Bottom Hole		34.250	2.85		11.91
Bottom hole to Strut	12.625	46.875	3.91	1	10.85
Spacing	9.500	56.375	4.70	2	10.06
		65.875	5.49	3	9.27
		75.375	6.28	4	8.48
		84.875	7.07	5	7.69
		94.375	7.86	6	6.90
		103.875	8.66	7	6.10
		113.375	9.45	8	5.31
		122.875	10.24	9	4.52
		132.375	11.03	10	3.73
		141.875	11.82	11	2.94
		151.375	12.61	12	2.15

Total Rail Length: 11.48 ft.

	in.	Distance from Bottom in.	Distance from Bottom ft.	Position	Distance from Top ft.
Toe to Bottom Hole		34.250	2.85		8.63
Bottom hole to Strut	12.625	46.875	3.91	1	7.57
Spacing	9.500	56.375	4.70	2	6.78
		65.875	5.49	3	5.99
		75.375	6.28	4	5.20
		84.875	7.07	5	4.41
		94.375	7.86	6	3.62
		103.875	8.66	7	2.82
		113.375	9.45	8	2.03

Extension Rail Length 9.84 ft.

	in.	Distance from Bottom in.	Distance from Bottom ft.	Position	Distance from Top ft.
Toe to Bottom Hole		24.000	2.00		7.84
Bottom hole to Strut	12.000	36.000	3.00	1	6.84
Spacing	12.000	48.000	4.00	2	5.84
		60.000	5.00	3	4.84
		72.000	6.00	4	3.84
		84.000	7.00	5	2.84

14/14

TABLE "D"--ICON SHEETING SYSTEM ALLOWABLE LOADS
(FOR SHORING & EXTENSION PLATES)

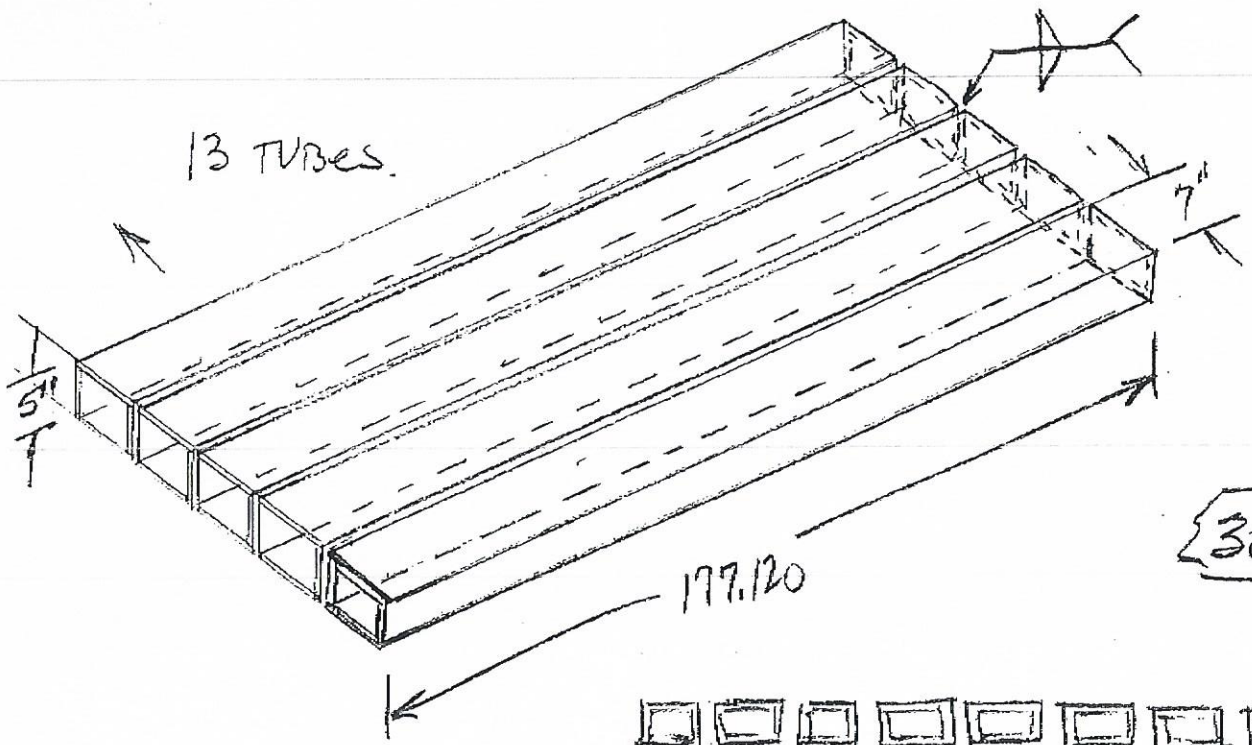
CATALOGUE NO.	PLATE NO.	L (ft.)	H (ft.)	W (in.)	ALLOWABLE SOIL PRESSURE A-36 (psf)	GR 50 (psf)
ECONO PLATE	I25E	8.20	8.00	4.00	2,837	3,941
STD PLATE	I25S	8.20	8.00	5.00	3,999	5,554
HD PLATE	I25HD	8.20	8.00	5.00	4,785	6,646
XHD PLATE	I25XHD	8.20	8.00	5.00	6,104	8,478
ECONO PLATE	I30E	9.84	8.00	4.00	1,970	2,737
STD PLATE	I30S	9.84	8.00	5.00	2,777	3,857
HD PLATE	I30HD	9.84	8.00	5.00	3,323	4,615
XHD PLATE	I30XHD	9.84	8.00	5.00	4,239	5,888
ECONO PLATE	I35E	11.48	8.00	4.00	1,448	2,011
STD PLATE	I35S	11.48	8.00	5.00	2,040	2,834
HD PLATE	I35HD	11.48	8.00	5.00	2,441	3,391
XHD PLATE	I35XHD	11.48	8.00	5.00	3,115	4,326
ECONO PLATE	I40E	13.12	8.00	4.00	1,108	1,539
STD PLATE	I40S	13.12	8.00	5.00	1,562	2,169
HD PLATE	I40HD	13.12	8.00	5.00	1,869	2,596
XHD PLATE	I40XHD	13.12	8.00	5.00	2,385	3,312
ECONO PLATE	I45E	14.76	8.00	4.00	876	1,216
STD PLATE	I45S	14.76	8.00	5.00	1,234	1,714
HD PLATE	I45HD	14.76	8.00	5.00	1,477	2,061
XHD PLATE	I45XHD	14.76	8.00	5.00	1,884	2,617
ECONO PLATE	I50E	16.4	8.00	4.00	709	985
STD PLATE	I50S	16.4	8.00	5.00	1,000	1,388
HD PLATE	I50HD	16.4	8.00	5.00	1,196	1,661
XHD PLATE	I50XHD	16.4	8.00	5.00	1,526	2,120
ECONO PLATE	I55E	18.04	8.00	4.00	586	814
STD PLATE	I55S	18.04	8.00	5.00	826	1,147
HD PLATE	I55HD	18.04	8.00	5.00	989	1,373
XHD PLATE	I55XHD	18.04	8.00	5.00	1,261	1,752
ECONO PLATE	I625E	20.51	8.00	4.00	454	631
STD PLATE	I625S	20.51	8.00	5.00	640	889
HD PLATE	I625HD	20.51	8.00	5.00	766	1,063
XHD PLATE	I625XHD	20.51	8.00	5.00	977	1,357

ICON EQUIPMENT DISTRIBUTORS INC.
308 RYDERS LANE EAST BRUNSWICK, NJ 08816

ICON TEMPORARY SHEETING SYSTEM

STRUCTURE				
CONTRACTOR		FABRICATOR	ICON INDUSTRIES	
ADDRESS		COUNTY		STATE
B.S.G.	K.C.L.	NTS	N/A	N/A
ISSUED BY	APPROVED BY	SCALE	CONTRACT NO.	ECP NO.
DWG NO.	ICON			B-1
			DATE	ECN	SHEET NO.

CONSTRUCTION



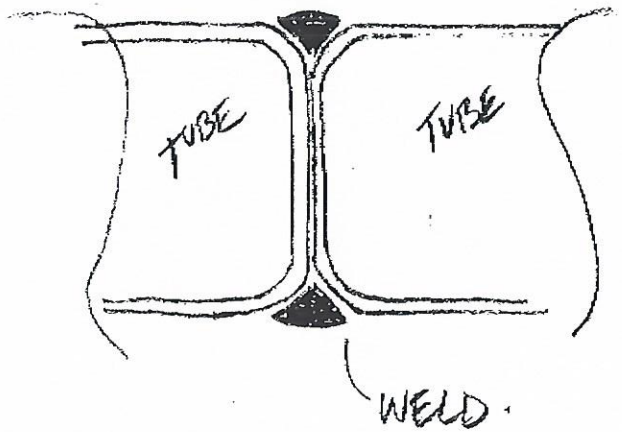
A500 GRADE C

5"X7"X3/16 TUBE.
GRADE 50 M/S

30 UNITS

WELD TOGETHER 100% CONTINOUS.

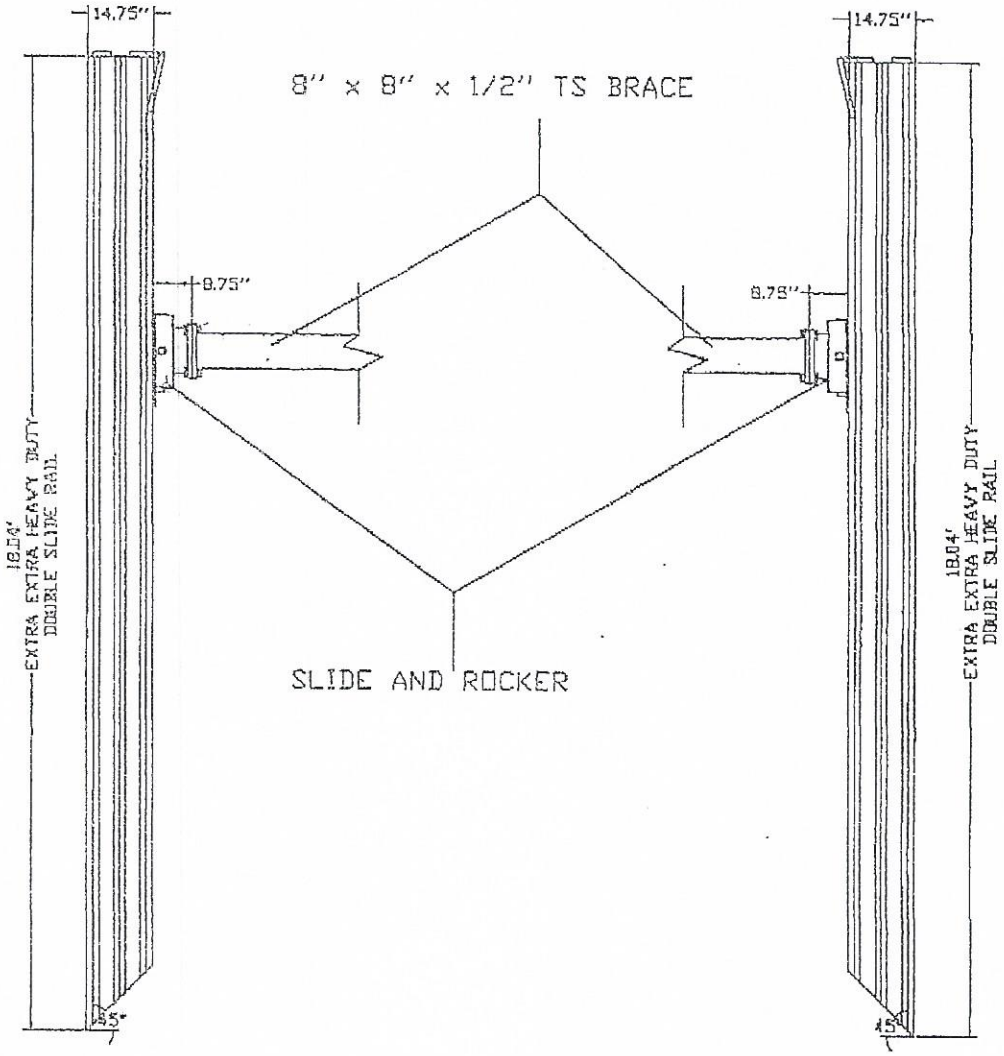
13 TUBES TOTAL.



PRICING $4,436.00 ea
FOB CSM.

APROX = APR 15, 2000 DELIVERY

APPROX 100"



ICON EQUIPMENT DISTRIBUTORS
389 RYDERS LANE EAST BRUNSWICK, NJ

ICON TEMPORARY SHEETING SYSTE

STRUCTURE	EXTRA EXTRA HEAVY DUTY DOUBLE SLIDE RAI			
CONTRACTOR	ANDREW PAPAC & SONS	FABRICATOR	ICON INDUSTRIES	
ADDRESS		DIV		YEAR
S.Q.L.	K.C.L.	NTS		N/A
DRAWN BY	APPROVED BY	SCALE	PROJECT No.	APP NO.
DWG NO.			N/A	1 OF
		DATE	REV	SHEET

From: Larry Haase 909-780-1791

To: Richard Kordich Andrew Papac and Sons
Sent by the Award Winning Cheyenne Bitware

FINAL DRAWING APPROVAL
(PLEASE SIGN & DATE)

ENGINEERING REPRESENTATIVE

MANUFACTURER'S REPRESENTATIVE

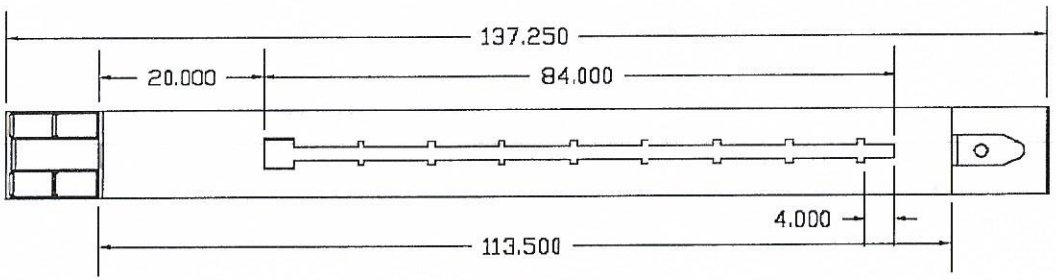
OWNER'S REPRESENTATIVE

NO.	DATE	CHANGES	DRN	CKD	APP

IN THE TRENCHES
ICON EQUIPMENT DISTRIBUTORS INC.
310 ROBERT LANE EAST BRUNSWICK, NJ 08816

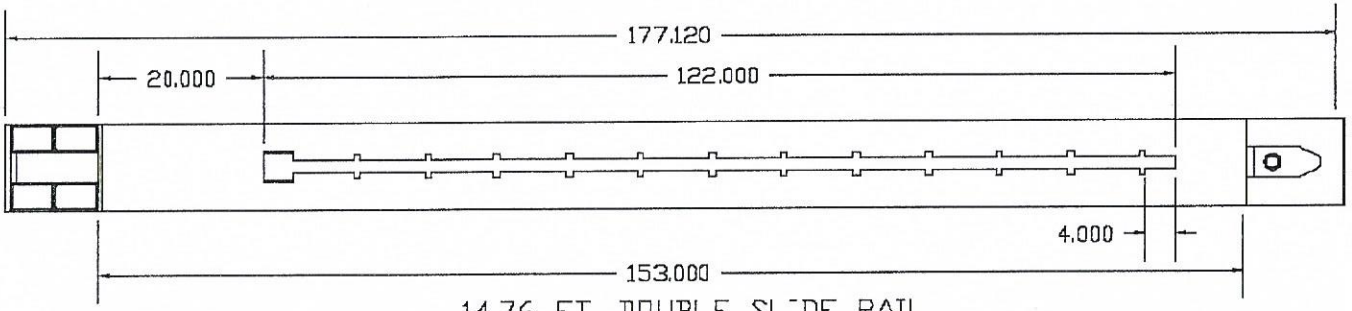
OWNER ICON EQUIPMENT DISTRIBUTORS
MANUFACTURER TRE FAB, INC.
ENGINEER

DATE	SCALE	DRAWN BY
06/22/99	NOT TO SCALE	VVH-SOL
REV. NUMBER	DRAWING NUMBER	SHEET NUMBER
	IISRXX.1	1 OF 2

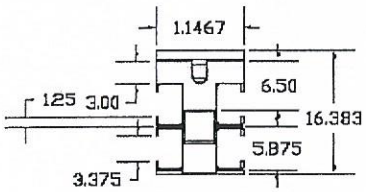


11.48 FT. DOUBLE SLIDE RAIL

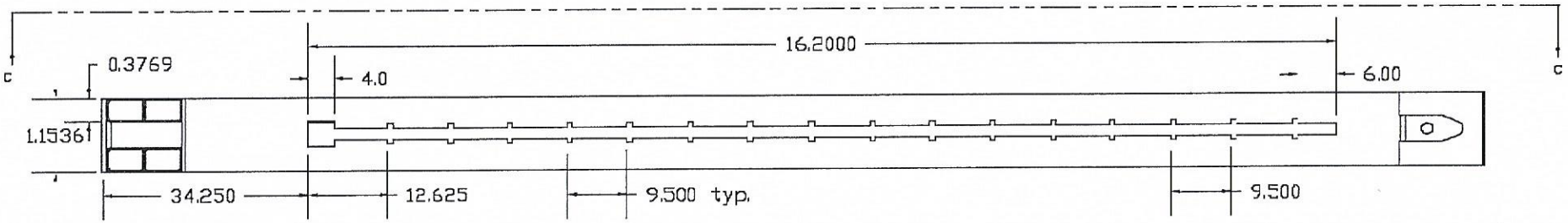
DOUBLE SLIDE RAIL



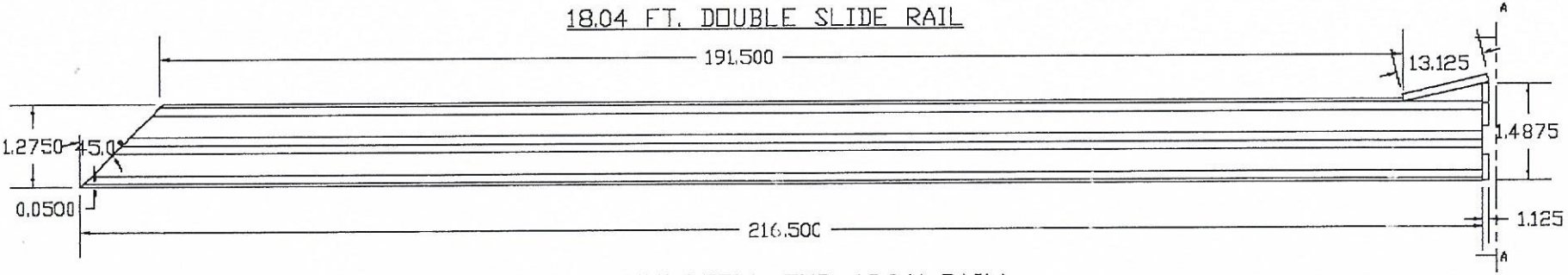
14.76 FT. DOUBLE SLIDE RAIL



VIEW A-A



18.04 FT. DOUBLE SLIDE RAIL



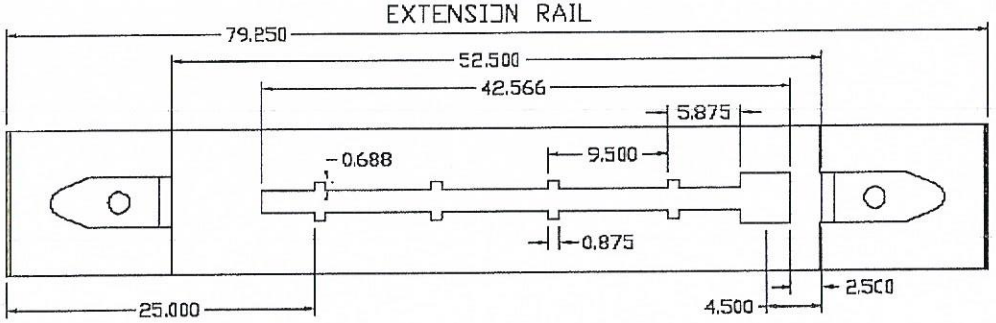
SIDE VIEW (TYP. 18.04' RAIL)

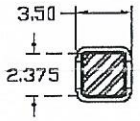
From: Larry Haase 909-780-1791

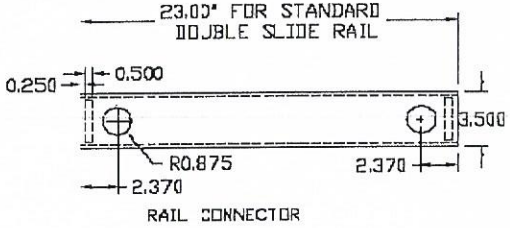
To: Richard Kordich Andrew Papac and Sons
Sent by the Award Winning Cheyenne Bitware

DOUBLE SLIDE RAIL EXTENSION

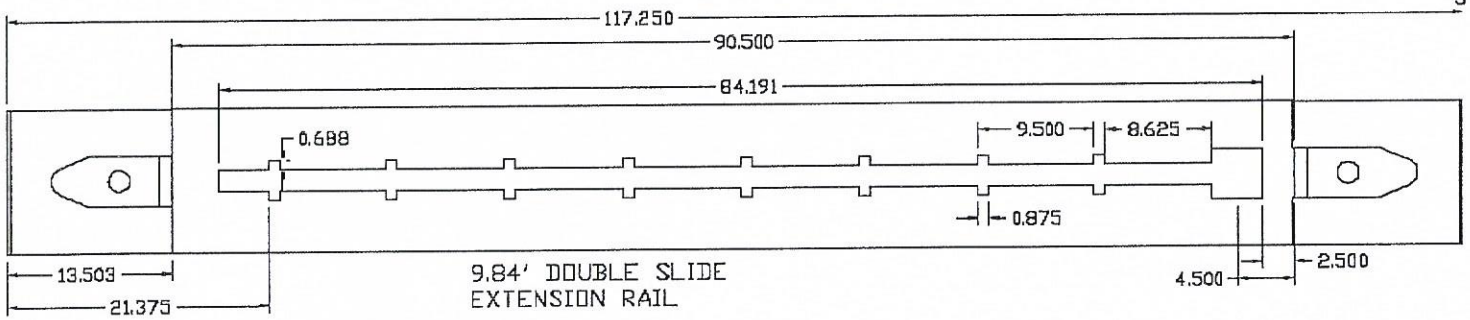
6.56' DOUBLE SLIDE EXTENSION RAIL



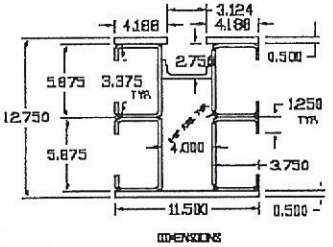




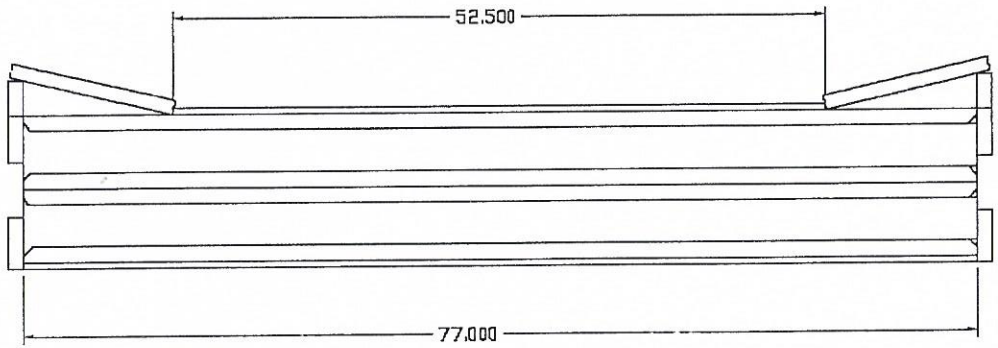
STANDARD RAIL - DIMENSIONS

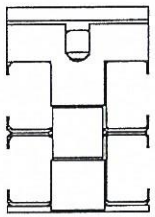


9.84' DOUBLE SLIDE EXTENSION RAIL



DIMENSIONS





			WVH		
			WVH		
			WVH		
NO.	DATE	CHANGES	DRN	CKD	APP

CDKN DRAWING APPROVAL (PLEASE SIGN & DATE)

ENGINEERING REPRESENTATIVE

MANUFACTURERS REPRESENTATIVE

OWNER'S REPRESENTATIVE

KOCH EQUIPMENT DISTRIBUTORS INC.

DRAWN KOCH EQUIPMENT

MANUFACTURER THE FWDL CO.

ENGINEER

DATE 06/22/99

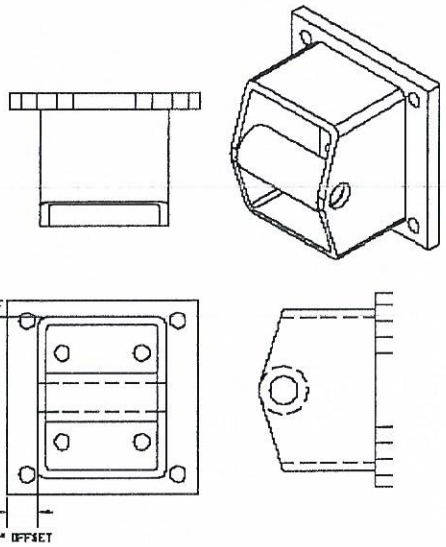
SCALE

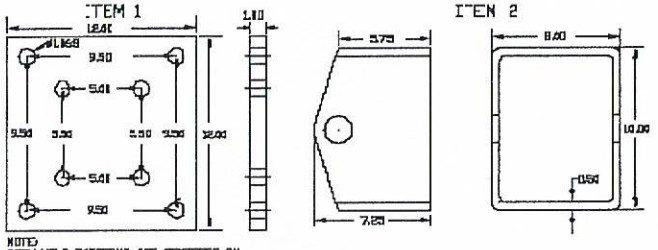
DRAWN BY WVH

REVISION NUMBER

SHEET NUMBER 1 OF 1

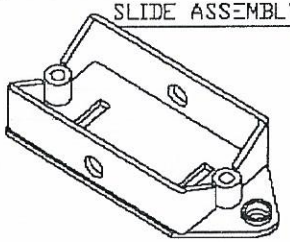
BRACE/ROCKER ASSEMBLY

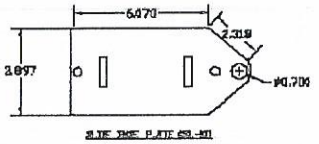


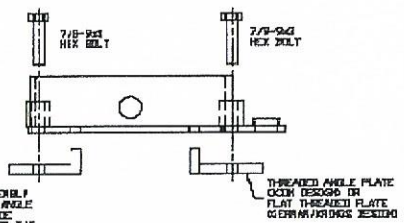


NOTES
BOTH HOLE PATTERNS ARE CENTERED ON RUNNERS.
ALL HOLES ARE 1-1/16" DIAMETER

SLIDE ASSEMBLY (GERMAN DESIGN)

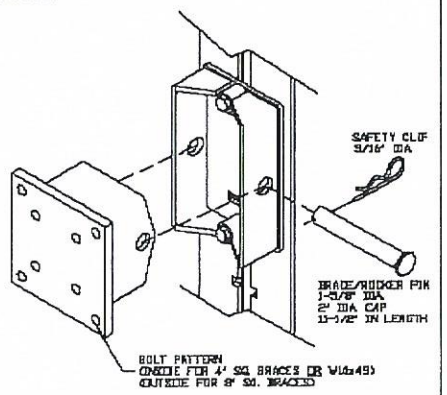




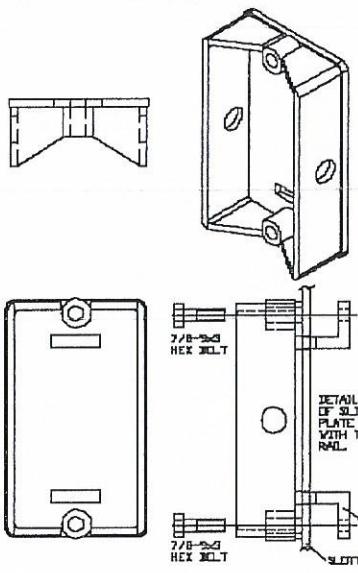


DETAIL VIEW SHOWING ASSEMBLY OF SLIDE WITH RAIL. THE ANGLE PLATE INTERLOCKS THE SLIDE WITH THE SLOTTED PLATE ON THE RAIL.

BRACE/ROCKER-SLIDE ASSEMBLY



SLIDE ASSEMBLY (ICON DESIGN)



ICON EQUIPMENT DISTRIBUTORS INC.
EQUIPMENT DESIGNED & MANUFACTURED BY ICON INDUSTRIES INC.

NOTES
ALL PLATE STEEL IS A-572 GRADE 50
ALL TUBE STEEL IS A-500 GRADE C
ALL BOLTS ARE A-325 STRUCTURAL
ALL WELDING DONE WITH E100xx ELECTRODES OR EQUIVALENT

				CKD	

DRAWING: BRACE/ROCKER-SLIDE ASSEMBLY VIEWS
SCALE:
DATE: DJH
PROJECT:
CONTRACTOR:
ICON NO:

I35S BASE PLATE

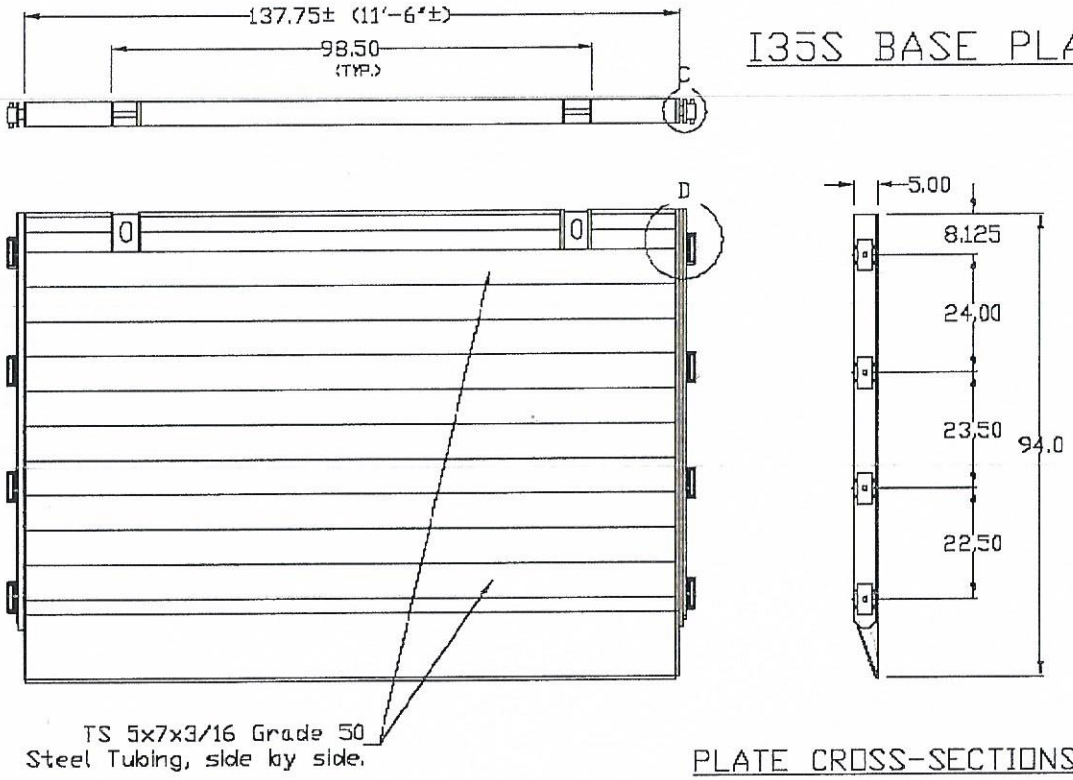
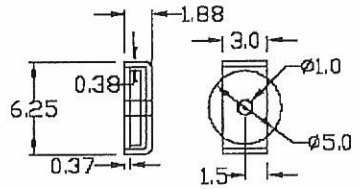
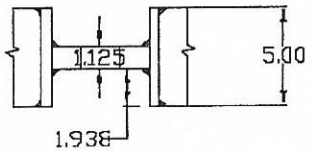
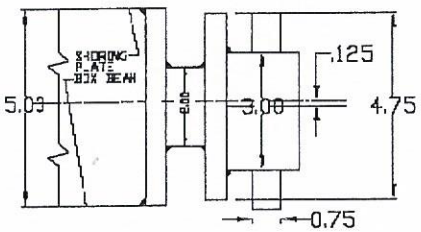


PLATE CROSS-SECTIONS

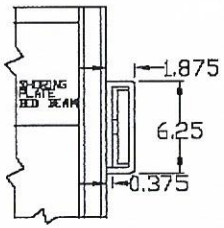


WHEEL ASSEMBLY

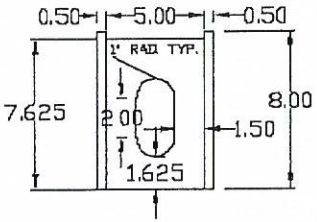




VIEW C



VIEW D



LIFTEYE ASSEMBLY

FINAL DRAWING APPROVAL (PLEASE SIGN & DATE)	
ENGINEERING REPRESENTATIVE	
MANUFACTURERS REPRESENTATIVE	
OWNER'S REPRESENTATIVE	

IN THE TRENCHES
ICON EQUIPMENT DISTRIBUTORS INC.
300 RYDERS LANE EAST BRUNSWICK, NJ 08816

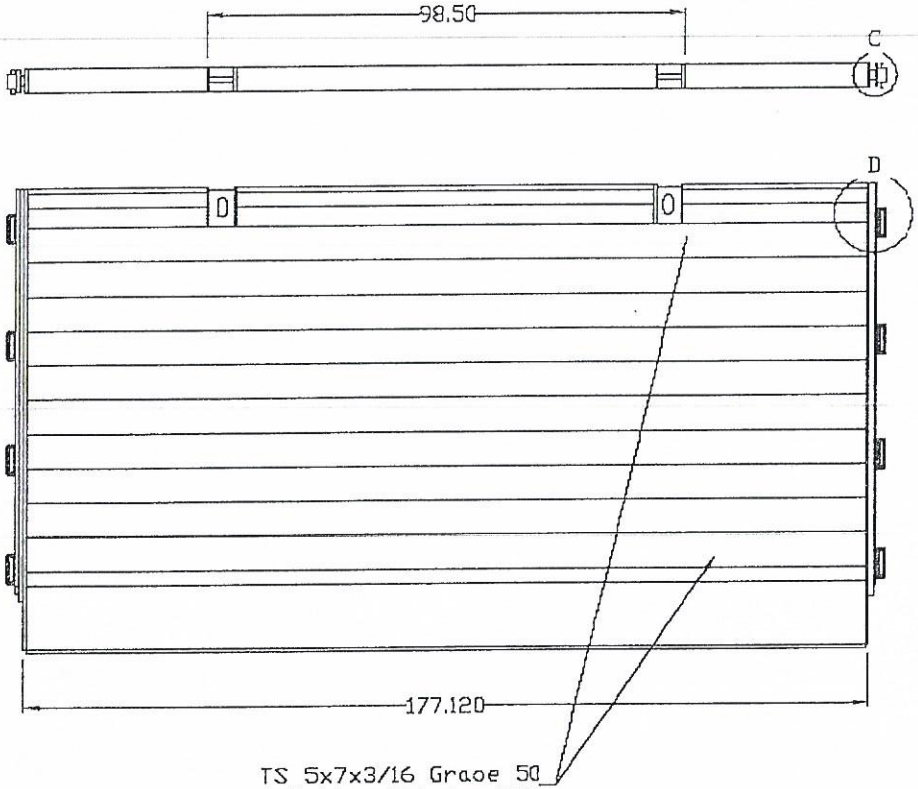
NO.	DATE	CHANGES	DRN	CKD	APP

PLATE I35S

OWNER: ICON EQUIPMENT DISTRIBUTORS
MANUFACTURER: TRI FAB, INC.
ENGINEER:

DATE	SCALE	DRAWN BY
01/12/00	NOT TO SCALE	S.G.L.
REV. NUMBER	DRAWING NUMBER	SHEET NUMBER
0	P|I35S	1 OF 1

I45S BASE PLATE



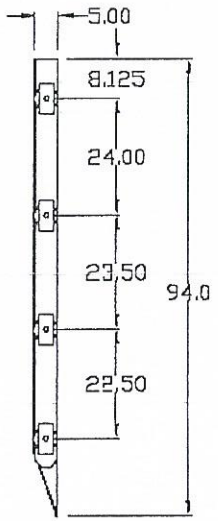
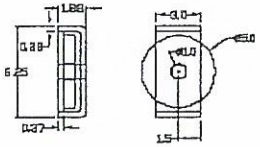
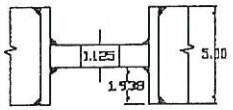
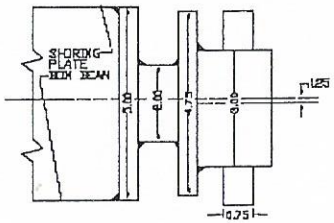


PLATE CROSS-SECTIONS

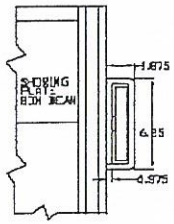


WHEEL ASSEMBLY

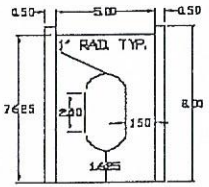




VIEW C



VIEW D



LIFTEYE ASSEMBLY

FINAL DRAWING APPROVAL
(PLEASE SIGN & DATE)

ENGINEERING REPRESENTATIVE

MANUFACTURERS REPRESENTATIVE

OWNER'S REPRESENTATIVE

IN THE TRENCHES®
ICON EQUIPMENT DISTRIBUTORS INC.
300 RYDERS LANE EAST BRUNSWICK, NJ 08816

NO	DATE	CHANGES	DRN	CKD	APP

PLATE I50S

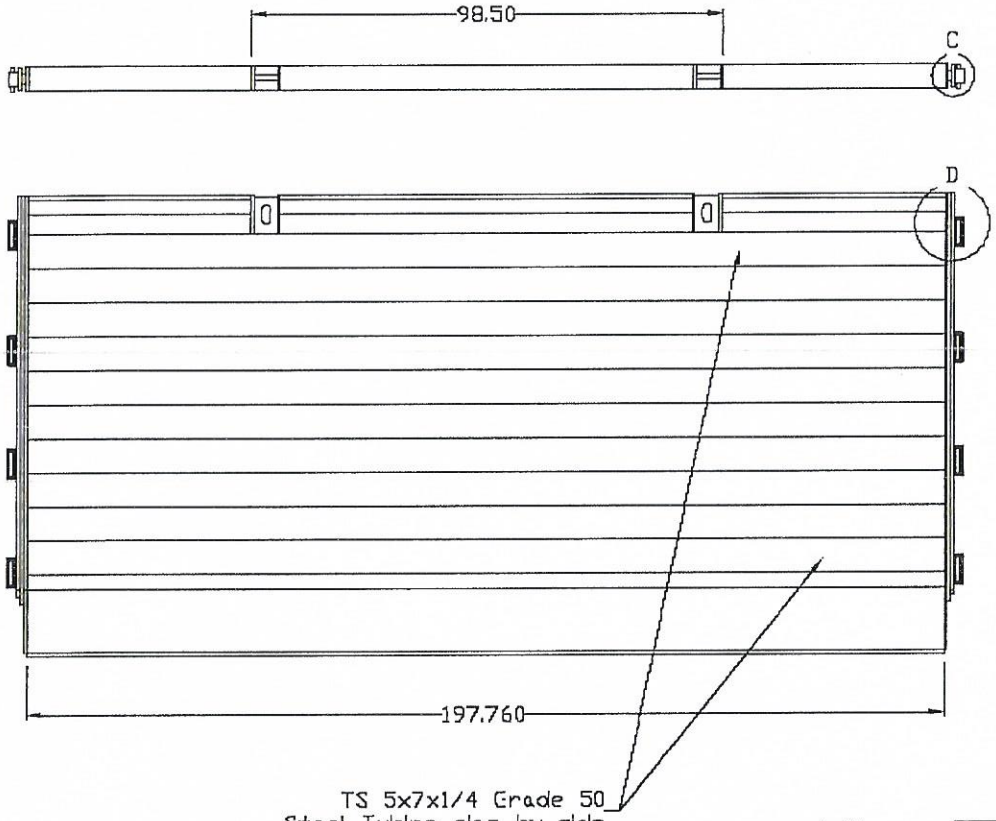
OWNER: ICON EQUIPMENT DISTRIBUTORS

MANUFACTURER: TRI FAB, INC.

ENGINEER:

DATE	SCALE:	DRAWN BY:
01/12/00	NOT TO SCALE	S.G.L.
REV. NUMBER: 0	DRAWING NUMBER: PBI45SLT95	SHEET NUMBER: 1 OF 1

I50S BASE PLATE



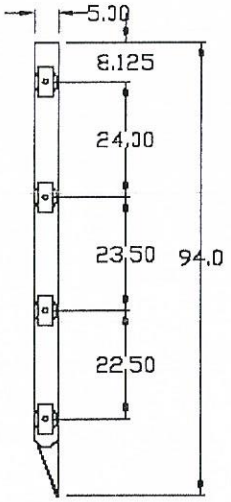
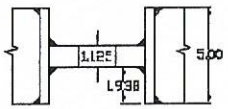
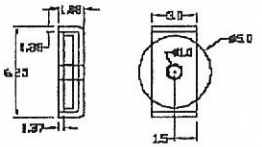
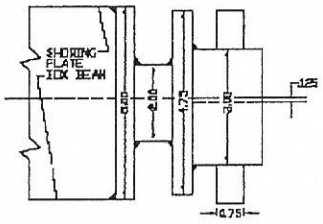


PLATE CROSS-SECTIONS

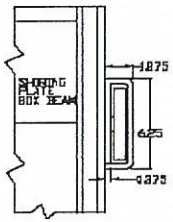




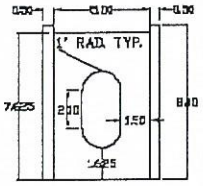
WHEEL ASSEMBLY



VIEW C



VIEW D



LIFTEYE ASSEMBLY

FINAL DRAWING APPROVAL (PLEASE SIGN & DATE)	
ENGINEERING REPRESENTATIVE	
MANUFACTURERS REPRESENTATIVE	
OWNER'S REPRESENTATIVE	

NO.	DATE	CHANGES	DRN	CKD	APP

IN THE TRENCHES

ICON EQUIPMENT DISTRIBUTORS INC.
300 RYDERS LANE EAST BRUNSWICK, NJ 08816

PLATE I50S

OWNER ICON EQUIPMENT DISTRIBUTORS		
MANUFACTURER TRI FAB, INC.		
ENGINEER		
DATE 01/12/00	SCALE NOT TO SCALE	DRAWN BY S.G.L.
REV. NUMBER 0	DRAWING NUMBER PBI50S	SHEET NUMBER 1 OF 1

APPENDIX C

STANDARD INSTALLATION INSTRUCTIONS FOR SLIDE RAIL SHEETING SYSTEMS:

1. DETERMINE THE PROPER INSIDE TRENCH WIDTH REQUIRED FROM THE CONTRACT DRAWINGS AND CONSULT THE TRENCH WIDTH TABLES INDICATING THE PROPER BRACE CONFIGURATIONS. ALSO, CHECK CONTRACT PLANS TO DETERMINE THE TRENCH DEPTH REQUIRED AND THE TYPE OF SOIL TO BE EXCAVATED. THESE ITEMS WILL DETERMINE THE SOIL PRESSURE ON THE SYSTEM AND ALSO DETERMINE THE PROPER LINING PLATES TO USE BASED UPON THAT SOIL PRESSURE. SINGLE SLIDE RAIL SYSTEMS ARE USED FOR EXCAVATIONS UP TO 12 FEET (3.7m) AND DOUBLE SLIDE RAIL SYSTEMS ARE FOR EXCAVATIONS TO 28 FEET (8.2m). ADDITIONALLY, THE SIZE OF PIPE, BOX CULVERT OR STRUCTURE WILL DICTATE THE CLEAR SPAN (CANTILEVER) BELOW THE BOTTOM BRACE REQUIRED FOR INSTALLATION. SEVERAL SLIDE RAIL DESIGNS ARE AVAILABLE TO PROVIDE THE REQUIRED RAIL STRENGTH TO SUPPORT THE LINING PLATES IN CANTILEVER. GENERALLY, SINGLE SLIDE RAILS ARE FOR SMALL PIPE INSTALLATIONS, STANDARD DOUBLE SLIDE RAIL SYSTEMS ARE FOR SMALL TO MEDIUM SIZE PLATES, HEAVY DUTY (ICON) OR KOMBI SL (KRINGS) DOUBLE SLIDE RAIL SYSTEMS ARE FOR SMALL TO LARGE PIPES, AS, HIGH EARTH PRESSURES COMBINED WITH LARGE PIPE OR BOX CULVERT INSTALLATIONS. FINALLY, TRIPLE SLIDE RAIL SYSTEMS ARE FOR DEEP EXCAVATIONS (GENERALLY 24 FEET (7.1m) TO 32 FEET (9.8m0 WITH HIGH SOIL PRESSURES AND LARGE PIPE OR BOX CULVERT INSTALLATIONS. TYPICALLY THE TRIPLE SLIDE RAIL SYSTEM WILL PROVIDE UP TO 13.5 FEET (4.1m) BELOW THE BOTTOM BRACE FOR WORKING ROOM. UPON DECIDING THE PROPER PLATES, RAILS AND BRACES TO USE, ASSEMBLE THE SPINDLE BRACES, TUBE STEEL BRACES OR H-BEAM BRACES WITH EXTENSIONS WHERE REQUIRED, TO FIRM THE SLIDE RAIL PAIR CONFORMING TO THE INNER TRENCH WIDTH FOR YOUR PROJECT.

2. BEFORE EXCAVATING, LOCATE EXISTING UTILITIES THAT CROSS YOUR TRENCH BY CALLING THE UTILITY COMPANIES FOR EXISTING UTILITY LOCATIONS (SEE ONE CALL PHONE NUMBER ON COVER SHEET), OR REVIEWING AS BUILT PLANS. IT IS BEST TO USE PLATE LENGTHS THAT WILL ALLOW YOU TO INSTALL THE MOST MODULES PER LINEAR FOOT OF TRENCH. FOR EXAMPLE WITH UTILITIES AT 25 FOOT (7.6m) SPACING ON AVERAGE THE 9.84 (3.0m), 11.48 (3.5m), AND 13.12 (4.0m) FOOT PLATES WOULD BE THE BEST SIZES TO SELECT. AREAS THAT ALLOW UTILITY RELOCATION OR WITH VERY FEW UTILITIES LEND THEMSELVES TO THE USE OF 14.76 (4.5m) AND 16.40 (5.0M) FOOT LINING PLATES SO THAT PRODUCTIVITY CAN BE INCREASED. UTILITY LINES PARALLEL TO THE PROPOSED TRENCHES SHALL BE IDENTIFIED AND LOCATED. DETERMINE THE INNER TRENCH DIMENSION REQUIRED BASED UPON THE CONTRACT DOCUMENTS AND ADD 14 INCHES (35.56 cm) FOR SINGLE SLIDE RAILS AND 24 INCHES (60.69 cm) FOR DOUBLE SLIDE RAILS TO THAT DIMENSION TO DETERMINE THE OUTSIDE DIMENSION SO THE SLIDE RAIL SYSTEM. WHEN TRIPLE SLIDE RAILS ARE USED, ADD 4.0' (1.23m) TO THE INSIDE WIDTH TO DETERMINE OUTSIDE WIDTH OF SHEETING SYSTEM. PROPER USE OF THE EQUIPMENT DURING INSTALLATION WILL INSURE THAT NO SOIL ADJACENT TO THE SYSTEM IS LOST AND THEREFORE PARALLEL UTILITY LINES WILL BE SUPPORTED AT ALL TIMES.

3. EXCAVATION AND INSTALLATION OF THE TRENCH SUPPORT SYSTEM MAY NOW BEGIN. EXCAVATE THE LENGTH OF ONE MODULE [6.56 - 16.40 FT. (2.0 - 5.0m)] AND THE OUTSIDE WIDTH OF THE SYSTEM ALLOWING EXTRA ROOM FOR SOME ADJUSTMENT IN THE SHEETING POSITION. WHEN SAW CUTTING PAVEMENT, ALLOW DISTANCE FOR OUTSIDE WIDTH OF SYSTEM PLUS AN ADDITIONAL 0.5 FEET (0.15m) (MINIMUM). DEPENDING UPON THE SOIL, LOCATION AND CONDITION OF PARALLEL UTILITY LINES, THE PILOT CUT SHOULD BE TO SUCH A DEPTH THAT THERE ARE NO BREAKS IN THE VERTICAL TRENCH WALLS BUT IN NO CASE SHALL THE INITIAL TRENCH DEPTH EXCEED 5 FEET (1.5m) [29 CFR 1926.650 - .653 (SUBPART P)]. IF NO UTILITY LINES ARE UNCOVERED CROSSING THE TRENCH OR ARE INDICATED ON AS-BUILT PLANS OR BY THE UTILITY COMPANIES THEN FOLLOW DIRECTIONS FOR LINING PLATE INSTALLATION (SEE STEP 5). IF UTILITY LINES ARE UNCOVERED OR INDICATED ON PLANS OR BY UTILITY COMPANIES THEN PROCEED WITH STEP 4 FOR UTILITY LINE SHORING AND SUPPORT INSTRUCTIONS.

4. SEVERAL METHODS FOR UTILITY LINE SHORING ARE INDICATED ON ICON SHOP DRAWINGS STD 01, 02 AND 03 AND ARE INCLUDED HERE ON PAGES 4 & 5. PLEASE REFER TO APPROPRIATE DETAILS FOR THE CHOSEN METHOD. UPON ENCOUNTERING UTILITY LINE CROSSING THAT ARE PERPENDICULAR TO THE TRENCH CENTERLINE AND ARE WITHIN 5-6 FEET (1.5-1.8m) FROM THE LAST SLIDE RAIL PAIR PLACED INTO THE TRENCH YOU MAY INSTALL HORIZONTAL WOOD LAGGING ON BOTH SIDES OF THE TRENCH AS PER THE DISCUSSION ON PAGE 4 (ICON STD. 03) AND IN ACCORDANCE WITH THE WOOD LAGGING TABLE INDICATED ON THE ICON SLIDE RAIL SHEETING SYSTEM PROJECT DETAIL SHOP DRAWING. IN THE CASE OF MULTIPLE UTILITY LINE CROSSINGS WHICH SPAN A DISTANCE GREATER THAN 5-6 FEET (1.5-1.8m) ALONG THE PIPE CENTERLINE YOU MAY INSTALL AN INTERNAL WALER OR KKP FRAME AND UTILITY PANELS IN ACCORDANCE WITH THE DETAILS ON THIS PAGE AND REFERENCES ON THE ICON SLIDE RAIL SHEETING SYSTEM PROJECT DETAIL SHOP DRAWING.

ICON EQUIPMENT DISTRIBUTORS INC.
200 RYDERS LANE EAST BRUNSWICK, NJ 08816

ICON TEMPORARY SHEETING SYSTEM

STRUCTURE				
CONTRACTOR		FABRICATOR	ICON INDUSTRIES	
S.Q.L.	K.C.L.	NTS	N/A	N/A
DRAWN BY	APPROVED BY	SCALE	CONTRACT NO.	REF NO.
DWG NO. ICON 0-002		01-04-00		C-1
		DATE	REV.	SHEET NO.

STANDARD INSTALLATION INSTRUCTIONS FOR SLIDE RAIL SHEETING SYSTEMS:

5. ASSUMING NO UTILITY LINES WILL BE ENCOUNTERED, PROCEED WITH LINING PLATE INSTALLATION. TO START THE FIRST BAY OF SHEETING, PICK A PRE-ASSEMBLED SLIDE RAIL PAIR AND PLACE IT IN THE PILOT CUT PERPENDICULAR TO THE CENTERLINE OF THE TRENCH. MAKE SURE THE RAIL PAIR IS CENTERED. USE A LARGE TIMBER, H-BEAM OR LINING PLATE LAID ACROSS THE TRENCH TO LEAN THE RAIL PAIR AGAINST UNTIL THE FIRST LINING PLATE IS INTERLOCKED AND THE RAIL PAIR CAN STAND BY ITSELF. USE THE LONGEST LINING PLATE POSSIBLE CONFORMING TO PROJECT CONDITIONS SO THAT THE SHEETED TRENCH IS MAXIMIZED WITH EACH MODULE INSTALLED. PICK UP A BASE PLATE (WITH CUTTING EDGE) AND INTERLOCK THE PLATE END WITH THE SLIDE RAIL JUST PLACED IN THE TRENCH. INTERLOCK ANOTHER BASE PLATE OF IDENTICAL SIZE IN THE OTHER RAIL (THE BASE PLATES MUST BE INSERTED IN THE OUTERMOST TRACK FIRST IN THE CASE OF DOUBLE AND TRIPLE SLIDE RAIL SYSTEMS). POSITION BOTH PLATES SO THAT THEY ARE CENTERED AROUND THE TRENCH CENTERLINE AND THEY ARE THE PROPER DISTANCE APART TO ALLOW THE NEXT SLIDE RAIL PAIR TO BE LOWERED OVER THE TOP OF THERE END SECTIONS. A WOODEN TEMPLATE CAN BE CUT TO CONFORM TO THE PROPER PLATE SPREAD AND A TARGET CAN BE PLACED IN THE CENTER OF THE TEMPLATE TO INDICATE THE CENTERLINE. THIS PROCEDURE IS ESPECIALLY HELPFUL TO EXCAVATOR OPERATORS AND SURVEYORS, UPON PROPER PLACEMENT OF THE TWO PLATES, PICK UP A PRE-ASSEMBLED SLIDE RAIL PAIR AND PLACE IT OVER THE END OF THE TWO PLATES INTERLOCKING THE RAILS AND PLATES.

6. AFTER INSTALLING THE SECOND SLIDE RAIL PAIR, BEGIN EXCAVATING INSIDE THE SHEETING. INITIALLY, EXCAVATED MATERIAL MUST BE DEPOSITED BEHIND THE LINING PLATES TO STABILIZE THE SYSTEM. BACK FILLING THE PILOT CUT PREVENTS THE SIDES OF EXCAVATION FROM FAILING AND CAUSING THE TRENCH SIDES TO CRACK AND MOVE. ONCE THE SPACE BETWEEN THE PLATES AND THE PILOT CUT WALL HAS BEEN FILLED THE LINING PLATES CAN BE PUSHED INTO THE GROUND AS THE EXCAVATION PROCEEDS. IT IS SUGGESTED THAT A FULL BACK HOE BUCKET BE USED TO PUSH THE RAILS AND PLATES INTO THE GROUND AS EXCAVATION PROCEEDS. PLATE AND RAIL PROTECTORS ARE PROVIDED WITH EVERY SLIDE RAIL SHEETING SYSTEM. PROTECTORS SHOULD BE IN PLACE PRIOR TO PUSHING PLATES AND RAILS INTO THE EXCAVATION TO PREVENT EQUIPMENT DAMAGE. THE BACK HOE SHOULD EXCAVATE MATERIAL, PUSH THE SYSTEM DOWN AND THEN CAST THE MATERIAL ASIDE OR LOAD A WAITING TRUCK. THIS METHOD WILL ALLOW THE TRENCH SUPPORT SYSTEM TO LOWER INTO THE GROUND AS EXCAVATION PROCEEDS THUS REDUCING STRESS AND WILL MAKE INSTALLATION AND REMOVAL OF THE EQUIPMENT EASIER. THE INITIAL PLATES AND RAILS SHOULD BE PUSHED TO TA DEPTH OF 7.5 FEET (2.3m). AT THIS TIME IF AN UNEXPECTED UTILITY IS ENCOUNTERED A KKP FRAME OR INTERNAL WALER FRAME CAN BE INSERTED IN THE INNER RAIL AND UTILITY PANELS CAN BE USED TO SHEET AROUND THE UTILITY. ALTERNATIVELY, THE UTILITY CAN BE TEMPORARILY DISCONNECTED, WITH APPROVAL OF THE RESPONSIBLE UTILITY, TO ALLOW INSTALLATION OF ADDITIONAL LINING PLATES.

7. IF A SINGLE SLIDE RAIL SYSTEM IS USED, (THE MAXIMUM ALLOWABLE DEPTH IS 12 FEET (3.7m)) THEN PICK UP TWO EXTENSION PLATES (4 FEET (1.2m) HIGH) AND PLACE THEM ON TOP OF THE PREVIOUSLY PLACED LINING BASE PLATES ONE AT A TIME. IF YOU ARE TO EXCAVATE TO 20 FEET (6.1m) OR MORE WITH A DOUBLE SLIDE RAIL SYSTEM, AN EXTENSION PLATE MUST BE INSTALLED IN THE OUTSIDE RAIL ON TOP OF THE FIRST LINING BASE PLATE. REMEMBER, THE PURPOSE OF DOUBLE AND TRIPLE SLIDE RAIL SYSTEM IS TO LIMIT THE AREA OF PLATE IN ANY ONE RAIL SO THAT INSTALLATION AND WITHDRAWAL IS AS EASY AS POSSIBLE.

8. EXCAVATIONS FROM 12 TO 16 FEET (3.7 TO 4.9m) REQUIRE 8 FOOT (2.4m) BASE PLATES TO BE INSTALLED IN BOTH INNER AND OUTER RAILS. EXCAVATIONS TO 20 FEET (6.1m) DEEP REQUIRE 4 FOOT (1.2m) EXTENSION PLATES TO BE INSTALLED IN THE OUTER SLIDE RAIL AND 8 FOOT (2.4m) BASE PLATES TO BE INSTALLED IN THE INNER SLIDE RAIL AS SHOWN ON THE SLIDE RAIL SHEETING SYSTEM PROJECT DETAILS SHOP DRAWING. WHEN INSTALLING EXTENSION PLATES IT IS VERY IMPORTANT THAT THE INTERCONNECTION PINS AND SAFETY CLIPS BE INSTALLED ALSO. FAILURE TO DO THIS WILL RESULT IN UNSAFE CONDITIONS AND DIFFICULTY IN REMOVING THE LINING PLATES DURING BACK FILL OPERATIONS.

ICON EQUIPMENT DISTRIBUTORS INC.
300 RYDERS LANE EAST BRUNSWICK, NJ 08816

ICON TEMPORARY SHEETING SYSTEM

STRUCTURE	---			
CONTRACTOR	---	FABRICATOR	ICON INDUSTRIES	
--- ADDRESS		--- COUNTY		--- STATE
S.G.L. DRAWN BY	K.C.L. APPROVED BY	NTS SCALE	N/A CONTRACT NO.	N/A REF. NO.
DWG NO.	ICON 0-002	01-04-00 DATE	REV.	C-2 SHEET NO.

STANDARD INSTALLATION INSTRUCTIONS FOR SLIDE RAIL SHEETING SYSTEMS:

9. SLIDE RAILS COME IN MANY LENGTHS FOR DIFFERENT APPLICATIONS. SINGLE SLIDE RAILS OF 9.84 (3.0m) AND 11.48 FOOT (3.5m) LENGTHS ARE FOR SHALLOW EXCAVATIONS. DOUBLE SLIDE RAILS OF 14.76 (4.5m) AND 18.04 FOOT (5.5m) LENGTHS ARE FOR DEEPER EXCAVATIONS. WHEN THE EXCAVATION EXCEEDS 16 FEET AND 14.76 FOOT (4.5m) RAILS ARE BEING USED EXTENSION RAILS OF 6.56 FEET (2.0m) MUST BE PLACED ON TOP OF THE BASE RAILS TO ALLOW MORE PLATES TO BE INSTALLED. FOR EXCAVATIONS OVER 20 FEET (6.1m), 6.56 FOOT (2.0m) EXTENSIONS MUST BE USED WITH 18.04 FOOT (5.5m) LONG BASE RAILS. THE PROCEDURE OF EXCAVATING AND PUSHING TO THE SYSTEM PLATES AND RAILS INTO THE GROUND IS ALWAYS THE SAME, REGARDLESS OF DEPTH, WIDTH OR CONFIGURATION OF THE SYSTEM.

10. MOST SLIDE RAIL SHEETING CAN BE INSTALLED USING A TRACK EXCAVATOR. PACKED GRAVEL, CLAY OR SMALL ROCKS MAY BECOME LODGED IN THE SLIDE RAIL PREVENTING THE PLATE FROM MOVING DOWN THE RAIL INTO THE EXCAVATION. WHEN THIS OCCURS, HAND WORK WITH A PICK IS REQUIRED TO CLEAN THE RAIL. OBSTRUCTIONS SUCH AS TIMBER AND BOULDERS MUST ALSO BE REMOVED BEFORE ATTEMPTING TO PUSH THE SHEETING INTO THE GROUND. *IF THE EXCAVATOR HAS TROUBLE PUSHING THE SYSTEM INTO THE GROUND THERE IS REASON FOR THIS. CHECK FOR ALIGNMENT, BOULDER, CLOGGED RAILS OR OTHER OBSTRUCTION PROBLEMS*.

11. VERY LARGE STRUCTURES OR PIPES MAY REQUIRE THAT A SYSTEM BRACE BE REMOVED PRIOR TO INSTALLATION OF THE STRUCTURE. THIS CAN BE ACCOMPLISHED BY INSTALLING A STRUT BELOW THE PROPOSED STRUCTURE WHICH SPANS BETWEEN THE SLIDE RAILS LOCATED ON OPPOSITE SIDES OF THE TRENCH. ONCE THE STRUT HAS BEEN INSTALLED THE BOTTOM BRACE CAN BE REMOVED. THE LARGE STRUCTURE CAN BE PLACED WITHOUT OBSTRUCTION. THE EXCAVATION SHALL BE BACK FILLED AND THE SYSTEM EXTRACTED.

12. IN ALL CASES AFTER THE SHEETING SYSTEM HAS BEEN INSTALLED AND EXCAVATION IS COMPLETE TO SUB GRADE, THE PIPE AND/OR STRUCTURE(S) SHALL BE CONSTRUCTED OR INSTALLED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

13. REMOVAL OF THE SLIDE RAIL SHEETING SYSTEM IS ACCOMPLISHED BY REVERSING ALL INSTALLATION PROCEDURES AND PROPERLY COMPACTING THE TRENCH IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. INNER LINING PLATES ARE REMOVED FIRST AND SLIDE RAIL PAIRS ARE WITHDRAWN AS BACK FILL PROCEEDS. OUTER PLATES ARE REMOVED LAST AND, UPON REACHING A BACK FILL DEPTH OF LESS THAN 5 FEET (1.5m) IN STABLE GROUND, THE LAST PLATES AND SLIDE RAIL PAIRS ARE REMOVED FROM THE TRENCH.

14. IF THE SURCHARGE EXCEEDS 3 FEET (0.9m) OF SOIL THE CONTRACTOR SHALL REINFORCE THE SHEETING SYSTEM AND PROTECT IT FROM DAMAGE. ADDITIONALLY, ALL SLIDE RAIL DESIGNS ASSUME THAT THE CONTRACTOR SHALL PROPERLY DEWATER THE EXCAVATION.

15. ALL MANUFACTURER'S INSTRUCTION AS WELL AS APPLICABLE CONTRACT PROVISIONS SHALL BE OBSERVED IN CONNECTION WITH SHEETING INSTALLATION AND REMOVAL.

16. EXCAVATIONS DEEPER THAN 20' (6.1m) REQUIRE SITE SPECIFIC ENGINEERING BY A PROFESSIONAL ENGINEER.

ICON EQUIPMENT DISTRIBUTORS INC.
300 RYDERS LANE EAST BRUNSWICK, NJ 08816

ICON TEMPORARY SHEETING SYSTEM

STRUCTURE:	-----			
CONTRACTOR	------	FABRICATOR	ICON INDUSTRIES	
------				-----
ADDRESS		COUNTY		STATE
S.Q.L.	K.C.L.	NTS	N/A	N/A
DRAWN BY	APPROVED BY	SCALE	CONTRACT NO.	REF. NO.
DWG NO.	ICON 0-002	01-04-00		C-3
		DATE	REV	SHEET NO.

STANDARD INSTALLATION INSTRUCTIONS FOR SLIDE RAIL SHEETING SYSTEMS:

9. SLIDE RAILS COME IN MANY LENGTHS FOR DIFFERENT APPLICATIONS. SINGLE SLIDE RAILS OF 9.84 (3.0m) AND 11.48 FOOT (3.5m) LENGTHS ARE FOR SHALLOW EXCAVATIONS. DOUBLE SLIDE RAILS OF 14.76 (4.5m) AND 18.04 FOOT (5.5m) LENGTHS ARE FOR DEEPER EXCAVATIONS. WHEN THE EXCAVATION EXCEEDS 16 FEET AND 14.76 FOOT (4.5m) RAILS ARE BEING USED EXTENSION RAILS OF 6.56 FEET (2.0m) MUST BE PLACED ON TOP OF THE BASE RAILS TO ALLOW MORE PLATES TO BE INSTALLED. FOR EXCAVATIONS OVER 20 FEET (6.1m), 6.56 FOOT (2.0m) EXTENSIONS MUST BE USED WITH 18.04 FOOT (5.5m) LONG BASE RAILS. THE PROCEDURE OF EXCAVATING AND PUSHING TO THE SYSTEM PLATES AND RAILS INTO THE GROUND IS ALWAYS THE SAME, REGARDLESS OF DEPTH, WIDTH OR CONFIGURATION OF THE SYSTEM.

10. MOST SLIDE RAIL SHEETING CAN BE INSTALLED USING A TRACK EXCAVATOR. PACKED GRAVEL, CLAY OR SMALL ROCKS MAY BECOME LODGED IN THE SLIDE RAIL PREVENTING THE PLATE FROM MOVING DOWN THE RAIL INTO THE EXCAVATION. WHEN THIS OCCURS, HAND WORK WITH A PICK IS REQUIRED TO CLEAN THE RAIL. OBSTRUCTIONS SUCH AS TIMBER AND BOULDERS MUST ALSO BE REMOVED BEFORE ATTEMPTING TO PUSH THE SHEETING INTO THE GROUND. *IF THE EXCAVATOR HAS TROUBLE PUSHING THE SYSTEM INTO THE GROUND THERE IS REASON FOR THIS. CHECK FOR ALIGNMENT, BOULDER, CLOGGED RAILS OR OTHER OBSTRUCTION PROBLEMS*.

11. VERY LARGE STRUCTURES OR PIPES MAY REQUIRE THAT A SYSTEM BRACE BE REMOVED PRIOR TO INSTALLATION OF THE STRUCTURE. THIS CAN BE ACCOMPLISHED BY INSTALLING A STRUT BELOW THE PROPOSED STRUCTURE WHICH SPANS BETWEEN THE SLIDE RAILS LOCATED ON OPPOSITE SIDES OF THE TRENCH. ONCE THE STRUT HAS BEEN INSTALLED THE BOTTOM BRACE CAN BE REMOVED. THE LARGE STRUCTURE CAN BE PLACED WITHOUT OBSTRUCTION. THE EXCAVATION SHALL BE BACK FILLED AND THE SYSTEM EXTRACTED.

12. IN ALL CASES AFTER THE SHEETING SYSTEM HAS BEEN INSTALLED AND EXCAVATION IS COMPLETE TO SUB GRADE, THE PIPE AND/OR STRUCTURE(S) SHALL BE CONSTRUCTED OR INSTALLED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

13. REMOVAL OF THE SLIDE RAIL SHEETING SYSTEM IS ACCOMPLISHED BY REVERSING ALL INSTALLATION PROCEDURES AND PROPERLY COMPACTING THE TRENCH IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. INNER LINING PLATES ARE REMOVED FIRST AND SLIDE RAIL PAIRS ARE WITHDRAWN AS BACK FILL PROCEEDS. OUTER PLATES ARE REMOVED LAST AND, UPON REACHING A BACK FILL DEPTH OF LESS THAN 5 FEET (1.5m) IN STABLE GROUND, THE LAST PLATES AND SLIDE RAIL PAIRS ARE REMOVED FROM THE TRENCH.

14. IF THE SURCHARGE EXCEEDS 3 FEET (0.9m) OF SOIL THE CONTRACTOR SHALL REINFORCE THE SHEETING SYSTEM AND PROTECT IT FROM DAMAGE. ADDITIONALLY, ALL SLIDE RAIL DESIGNS ASSUME THAT THE CONTRACTOR SHALL PROPERLY DEWATER THE EXCAVATION.

15. ALL MANUFACTURER'S INSTRUCTION AS WELL AS APPLICABLE CONTRACT PROVISIONS SHALL BE OBSERVED IN CONNECTION WITH SHEETING INSTALLATION AND REMOVAL.

16. EXCAVATIONS DEEPER THAN 20' (6.1m) REQUIRE SITE SPECIFIC ENGINEERING BY A PROFESSIONAL ENGINEER.

CONTRACTOR: ———			FABRICATOR: ICON INDUSTRIES	
———			———	
S.O.L.	K.C.L.	NTS	N/A	N/A
DRAWN BY	APPROVED BY	SCALE	CONTRACT NO.	SLIP NO.
DWG NO. ICON 0-002			01-04-00	C-3
			DATE	REV / SHEET NO.

SUGGESTED UTILITY CROSSING INSTRUCTIONS

1. DETERMINE LOCATION OF ALL UTILITY LINES CROSSING TRENCH.

2. WHERE UTILITY LINES CROSS TRENCH, PLACE ONE SLIDE RAIL PAIR ON EITHER SIDE OF THE UTILITY LINE OR LINES. STABILIZE THE SLIDE RAIL PAIRS AND LAG WITH WOOD BETWEEN THE FLANGES OF THE SLIDE RAIL TRACKS.

3. MOVE THE BACKHOE BACK ALONG CENTERLINE AND EXCAVATE FOR THE NEXT MODULE OF SHEETING AND FOLLOW DIRECTIONS FOR SLIDE RAIL LINING INSTALLATIONS. AS THE RAILS AND LININGS ARE PUSHED INTO THE EXCAVATION LAG THE AREA BETWEEN THE ADJACENT RAILS AND AROUND THE UTILITIES.

4. SUPPORT THE UTILITY LINE AS EXCAVATION PROCEEDS AS REQUIRED BY THE RESPONSIBLE UTILITY COMPANY.

SEWER HOUSE CONNECTION FLUME PROCEDURE

1. DETERMINE THE LOCATION AND APPROXIMATE DEPTH OF THE EXISTING HOUSE CONNECTION. IF THE HOUSE CONNECTION IS WITHIN 8.5 FEET OF EXISTING GRADE AND THE PROPOSED TRENCH SUBGRADE PROCEED WITH THIS METHOD.

2. PILOT CUT TO 5 FOOT MAXIMUM. INSTALL SLIDE RAIL SYSTEM AND PROCEED AS USUAL WITH THE EXCAVATION WHILE PUSHING THE SLIDE RAIL SYSTEM INTO THE SOIL.

3. ADVANCE THE EXCAVATION UNTIL THE UTILITY IS EXPOSED AND STOP LOWERING THE SHEETING SYSTEM.

4. EXPOSE THE HOUSE CONNECITON, CUT THE PIPE AND INSTALL THE INNER LINING PLATES TO PROCEED WITH THE EXCAVATION. ADVANCE THE INNER PLATES TO SUCH AN ELEVATION (BEYOND PROPOSED SUBGRADE IF NECESSARY) UNTIL THE TOP OF THE PLATE IS LOWER THAN THE HOUSE CONNECTION INVERT. THE SPACE BETWEEN THE UPPER AND LOWER PLATE MUST NOT EXCEED 18 INCHES.

5. INSTALL 2 INCH WOOD LAGGING BY HAND BEHIND THE TWO PLATES AT THE EXPOSED FACE.

6. INSTALL TEMPORARY PIPE OR FLUME, IF NECESSARY, TO HANDLE DISCHARGE FROM THE HOUSE CONNECTION.

7. CONSTRUCT THE SANITARY SEWER AND RISER PIPE FOR THE HOUSE CONNECTION.

8. WHEN BACKFILLING IS TO BEGIN, REMOVE ANY TEMPORARY CONNECTIONS, DEPOSIT SOIL, COMPACT AND RAISE LOWER (INNER PLATE TO AN ELEVARION JUST ABOVE THE HOUSE CONNECITON CROWN.

9. COMPLETE THE NEW HOUSE CONNECTION TIE IN AND RESUME BACKFILLING.

ICON EQUIPMENT DISTRIBUTORS INC.
200 RYDERS LANE EAST BRUNSWICK, NJ 08816

ICON TEMPORARY SHEETING SYSTEM

STRUCTURE	———			
CONTRACTOR	———	FABRICATOR	ICON INDUSTRIES	
———	———	———	———	———
S.G.L.	K.C.L.	NTS	N/A	N/A
DRAWN BY	APPROVED BY	SCALE	CONTRACT NO.	REF NO.
DWG NO. ICON 0-002	01-04-00			C-4
	DATE	REV		SHEET NO.

INTERNAL WALER/UTILITY FRAME PROCEDURE

1. STEP A: EXCAVATE THE PILOT CUT, NOT TO EXCEED 5 FEET, AND EXPOSE ANY EXISTING UTILITY LINES. WHEN USING THE KKP FRAME IN CONJUCTION WITH THE SLIDE RAIL SYSTEMS LIFT A FRAME SIDE PANEL AND INTERLOCK THE PANEL WITH THE KRINGS SLIDE RAIL. IF THE UTILITY LINES CROSS THE TRENCH PLACE ANOTHER SIDE PANEL IN THE RAIL ON THE OPPOSITE SIDE OF THE TRENCH AND IF THE UTILITY ONLY ENTERS THE TRENCH ON ONE SIDE PLACE KRINGS LINING PLATES ON THE OPPOSITE SIDE. PICK UP A PREASSEMBLED SLIDE RAIL PAIR AND PLACE IT OVER THE END OF THE SIDE PANELS TO COMPLETE THE FRAME. IF YOU ARE USING THE KKP FRAMES INDEPENDENTLY OF THE SLIDE RAIL SYSTEM PLACE THE ASSEMBLED KKP FRAME IN THE PILOT CUT AND TIGHTEN THE FRAME SIDE PANELS AGAINST THE TRENCH WALLS BY MEANS OF THE SPINDLES.

2. STEP B: THE KD6S UTILITY PANELS ARE INSERTED IN THE FRAME SO THAT THEY CONFORM TO THE TEMPLATE IN THE FRAME AND OVERLAP THE ADJOINING PANEL THE PANELS THAT CONFLICT WITH CROSSSING UTILITIES ARE LEFT OUT AND WOOD LAGGING IS INSTALLED TO CLOSE THE 2 FOOT GAP IN THE SHEETING. UTILITY SUPPORT MEASURES MUST BE INSTALLED AT THIS TIME IN ACCORDANCE WITH THE CONTRACT REQUIREMENTS AND UTILITY COMPANIES DIRECTION. AS EXCAVATION PROCEEDS THE UTILITY PANELS ARE PUSHED VERTICALLY MAKING SURE THE TRENCH WALLS ARE SUPPORTED AT ALL TIMES.

3. STEP C: THE UTILITY PANELS ARE SUPPORTED IN THE UPPER SECTION OF THE TRENCH BY THE KKP FRAME AND IN THE LOWER SECITON OF THE TRENCH BY THE UNEXCAVATED SOIL. AS THE EXCAVATION CONTINUES THE UNSUPPORTED SPAN FROM THE BOTTTOM OF THE KKP FRAME TO THE BOTTOM OF THE EXCAVATION LENGTHENS AND MAY REQUIRE WALERS AND CROSS BRACES TO LEND ADDITIONAL SUPPORT TO THE UTILITY PANELS. THESE ADDITIONAL WALER AND BRACE SETS CAN BE HUNG FROM THE KKP FRAME BY CHAINS (SEE YOUR PROJECT DESIGN CALCULATIONS FOR WALER AND BRACE LOCATIONS AND SIZES).

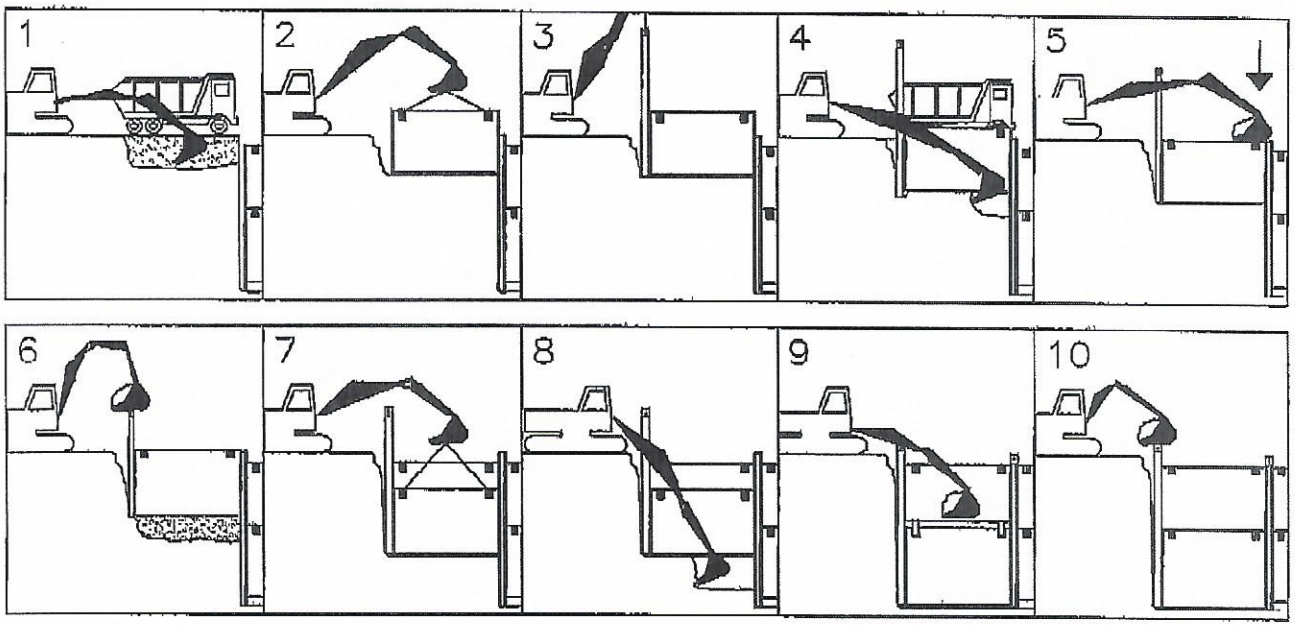
4. UPON INSTALLAITON OF ALL PIPES AND STRUCTURES AND COMPLETION OF ALL UNDERGROUND WORK THE KD6S UTILITY PANELS CAN BE LIFTED AS BACKFILL AND COMPACTION IS ACCCOMPLISHED IN ACCORDANCE WITH CONTRACT REQUIREMENTS. THE UTILITY PANELS SHALL NOT BE WITHDRAWN AHEAD OF THE BACKFILL.

ICON EQUIPMENT DISTRIBUTORS INC.
300 RYDERS LANE EAST BRUNSWICK, NJ 08816

ICON TEMPORARY SHEETING SYSTEM

STRUCTURE	---			
CONTRACTOR	---	FABRICATOR	ICON INDUSTRICS	

ADDRESS		COUNTY		STATE
S.G.L. (DRAWN BY)	K.C.L. (APPROVED BY)	NTS (SCALE)	N/A (CONTRACT NO.)	N/A (REF NO.)
DWG NO.	ICON 0-002	01-04-00 (DATE)	REV	C-5 (SHEET NO.)



INSTALLATION SKETCHES:

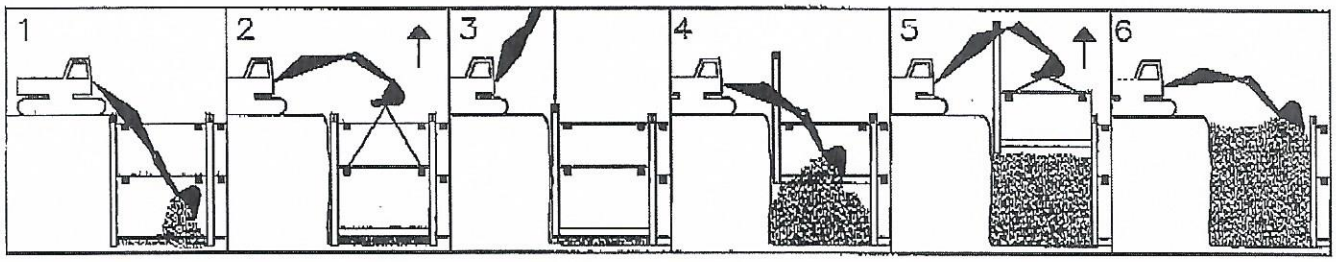
SKETCH #1	PILOT CUT
SKETCH #2	SET PLATES
SKETCH #3	SET RAIL PAIRS
SKETCH #4&5	EXCAVATE TO 7.5 FEET
SKETCH #6	PUSH RAILS
SKETCH #7	SET INNER PLATES OR EXTENSION PLATES
SKETCH #8	EXCAVATE
SKETCH #9&10	PUSH SHEETING AND ESCAVATE TO 16 FEET*

* THE SAME SEQUENCES AND WORK APPLY TO ALL SLIDE RAIL SYSTEMS WHETHER THE TRENCH DEPTH IS 8, 12, 16, 20, 24 OR 28 FEET.

ICON EQUIPMENT DISTRIBUTORS INC.
300 RYDERS LANE EAST BRUNSWICK, NJ 08816

ICON TEMPORARY SHEETING SYSTEM

STRUCTURE	---			
CONTRACTOR	---	FABRICATOR	ICON INDUSTRIES	
-----				----
		COUNTY		STATE
S.Q.L.	K.C.L.	NTS	N/A	N/A
DRAWN BY	APPROVED BY	SCALE	CONTRACT NO.	REV NO.
DWG NO.	ICON 0-002	01-04-00		C-6
		DATE	REV	SHEET NO.



SLIDE RAIL REMOVAL SKETCHES:

SKETCH #1 BACKFILL THE TRENCH IN SPECIFIED LAYER AS PER CONTRACT.
SKETCH #2 LIFT LOWER PLATE TO THE TOP OF THE BACKFILL.
SKETCH #3 LIFT RAIL PAIR TO THE TOP OF THE BACKFILL.
COMPACT BACKFILL UNDER AND AROUND STRUCTURE AS PER CONTRACT.
SKETCH #4 REPEAT STEPS 1–3 UNTIL THE LOWER PLATE CAN BE REMOVED.
SKETCH #5 CONTINUE IN THE SAME MANNER UNTIL UPPER PLATE IS REMOVED.
BOTTOM OF RAIL SHOULD BE EXTRACTED TO BOTTOM OF PILOT CUT, (SEE SLIDE RAIL INSTALLATION NOTE #3). DO NOT EXTRACT RAIL PAIR BEYOND BOTTOM OF PILOT CUT BEFORE REMOVING PLATE.
SKETCH #6 REMOVE SLIDE RAIL PAIR AND COMPLETE BACKFILLING AS PER CONTRACT.

* THE SAME SEQUENCES AND WORK APPLY TO ALL SLIDE RAIL SYSTEMS WHETHER THE TRENCH DEPTH IS 8, 12, 16, 20, 24 OR 28 FEET.

ICON IN THE TRENCHES

ICON EQUIPMENT DISTRIBUTORS INC.
300 RYDERS LANE EAST BRUNSWICK, NJ 08816

ICON TEMPORARY SHEETING SYSTEM

STRUCTURE	-----		
CONTRACTOR	-----	FABRICATOR	ICON INDUSTRIES
-----			-----
ADDRESS		COUNTY	STATE
S.Q.L. DRAWN BY	K.C.L. APPROVED BY	NTS SCALE	N/A CONTRACT NO.
DWG NO. ICON 0-002	01-04-00 DATE	REV	C-7 SHEET NO.

RECOMMENDED EQUIPMENT

SLIDE RAIL SYSTEMS :	MACHINE NEEDED ;	BRIDLE REQUIRED :	SHACKLES:
8' TO 12' DEEP TRENCH	CAT 215 OR SIMILAR	2 LEGGED BRIDLE 7/8" CABLE 8' LEGS - HOOKS	2. 7 TONS
8' TO 12' DEEP PIT	CAT 215 OR SIMILAR	2 LEGGED BRIDLE 7/8" CABLE 8' LEGS - HOOKS	2. 7 TONS
12' TO 16' DEEP TRENCH	CAT 225 OR SIMILAR	2 LEGGED BRIDLE 7/8" CABLE 8' LEGS - HOOKS	2. 10 TONS
12' TO 16' DEEP PIT	CAT 225 OR SIMILAR	2 LEGGED BRIDLE 7/8" CABLE 8' LEGS - HOOKS	2. 10 TONS
16' TO 20' DEEP TRENCH	CAT 235 OR SIMILAR	2 LEGGED BRIDLE 1" CABLE 8' LEGS - HOOKS	2. 17 TONS
16' TO 20' DEEP PIT	CAT 235 OR SIMILAR	2 LEGGED BRIDLE 1" CABLE 8' LEGS - HOOKS	2. 17 TONS
20' TO 24' DEEP TRENCH	CAT 245 OR SIMILAR	2 LEGGED BRIDLE 1 1/4" CABLE 8' LEGS - HOOKS	2. 20 TONS
20' TO 24' DEEP PIT	CAT 245 OR SIMILAR	2 LEGGED BRIDLE 1 1/4" CABLE 8' LEGS - HOOKS	2. 20 TONS
20' WIDE X 16' DEEP TANK PIT	CAT 235 OR SIMILAR	2 LEGGED BRIDLE 7/8" CABLE 16' LEGS - HOOKS	2. 17 TONS
24' TO 28' WIDE X 16' DEEP TANK PIT	CAT 245 OR SIMILAR	2 LEGGED BRIDLE 7/8" CABLE 20' LEGS - HOOKS	2. 17 TONS
TRIPLE SLIDE RAILS	CAT 245 OR SIMILAR & 100 TON CRANE	2 LEGGED BRIDLE 1 1/2" CABLE 12' LEGS - HOOKS	2. 25 TONS

All rebraced pits must have concrete or wood deadman to bear on bottom of rails.....

NOTE*** ON ALL TANK PITS YOU WE BE REQUIRED TO HAVE AT LEAST 90' OF 3/4 " CABLE ALONG WITH 12 CABLE CLAMPS *****

NOTE***** ON ALL WIDE PITS WE RECOMMEND THAT YOU USE A 50 TON CRANE OR EQUIVALENT CABLES , SHACKLES AND ROAD PLATES ARE AVAILABLE UPON REQUEST

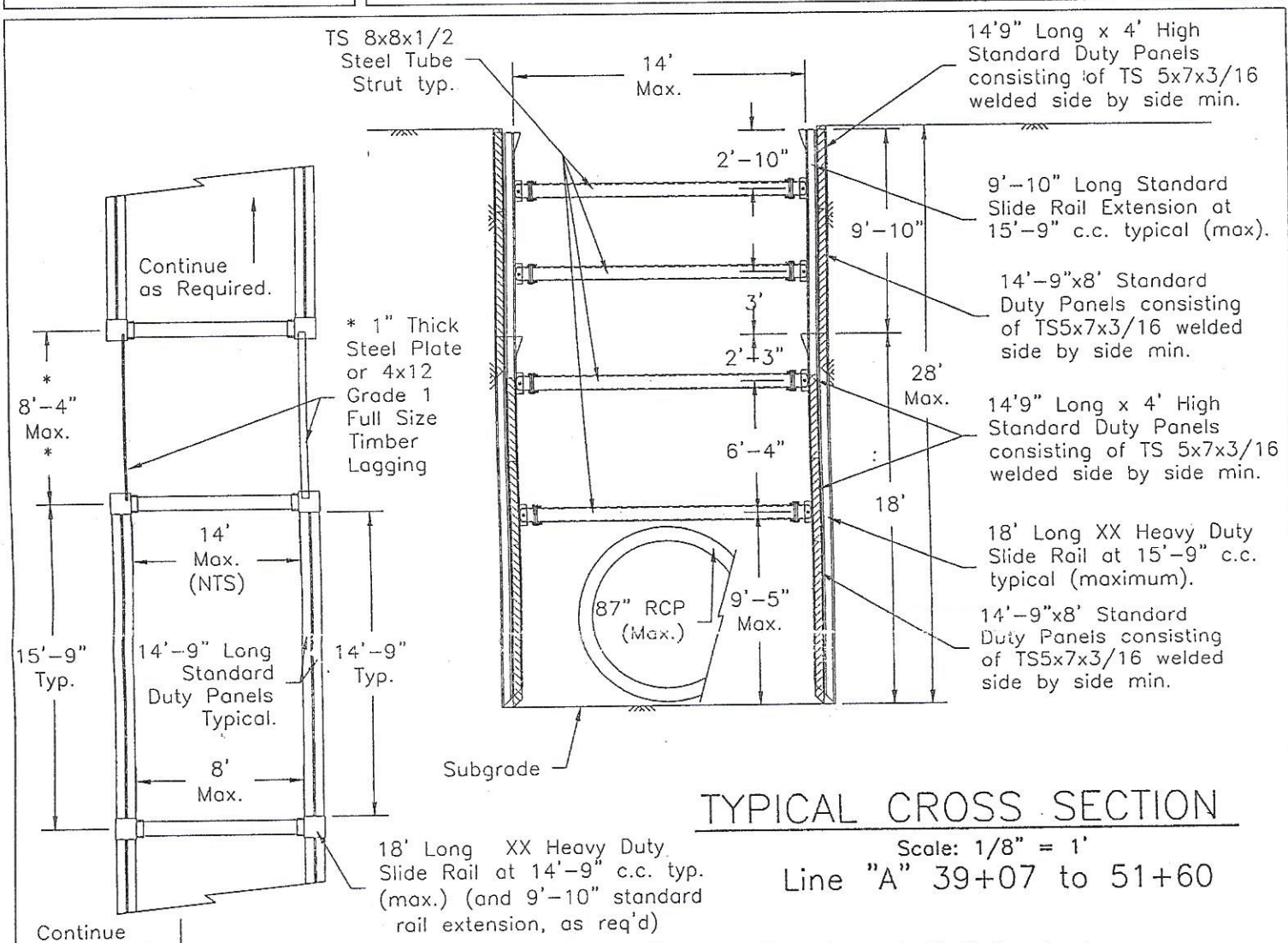
PLEASE SIGN AND RETURN :

1-732-254-0101 (FAX)

1. Design Loads are based on LACDPW Standard Plan 3090, "Criteria for the Design of Shoring for Excavations".
2. All steel members shall be ASTM A-36 or better with allowable stresses per the "AISC Manual of Steel Construction" increased 33% for temporary loading.
3. All timber members shall be Douglas Fir Grade 2 unless otherwise specified with allowable stresses per the "NDS for Wood Construction" increased 33% for temporary loading.
   Fb = 1250 psi x 1.33 x (...)
   Fv = 95 psi x 1.33 x (...)
   Fc = 480,000/(L/d)^2 (1600 max.)
   E = 1.6E6 psi
4. Soil Type: Silty Sand to Silty Clay per borings.
   Note: Excavation shall be dewatered to subgrade.
   Earth Pressure, Kw = 36 pcf
5. Max. Depth of Cut = 28 ft.

NOTES:

1. This shoring plan is to be implemented by the contractors competent person as defined by Title 8, Chapter 4, Section 1504(a) of the State of California Safety Orders adopted 9/25/91. Shoring shall be installed in accordance with Title 8, Chapter 4, Section 1541.1(e).
2. Reaches shown are approximate. If a type of soil is encountered within these reaches which requires the use of a different method of shoring, then shoring details will be revised and resubmitted for approval as necessary.
3. This shoring plan has been prepared in accordance with the provisions of Title 8, Chapter 4, Section 1541.1(c)(4) of the State of California Safety Orders adopted 9/25/91.
4. All materials used with this shoring plan shall conform to Title 8, Chapter 4, Section 1541.1(d).
5. Calculations not shown hereon are on file at the office of the accepting agency and/or the office of the shoring design engineer.
6. All shoring components (excaept timber lagging and 1" steel plates) shall be as manufactured by ICON Equipment
7. No-one shall be exposed where shoring has been removed or is ineffective.
8. Larger members with correspondingly larger section moduli may be substituted.
9. Spacings between members may be decreased.
10. Sheeting panels shall be installed such that the bottom of teh lagging is within 2' of the bottom of the excavation at all times.
11. Extra care shall betaken when using steel plates or timber lagging (8'-4" c.c. maximum rail spacing) to insure that the lagging does not slip out from behind the slide rail flanges.
12. The maximum trench width shown on this plan is based on the strength of the shoring materials. All provisions of the contract specifications and Standard Plan No. 3080-0 shall be adhered to as pertains to allowable trench width.
13. The Contractor has reviewed this plan and found it to be compatible with his proposed construction methods.



TYPICAL CROSS SECTION

Scale: 1/8" = 1'

Line "A" 39+07 to 51+60

PLAN VIEW

Scale: 1/8" = 1'

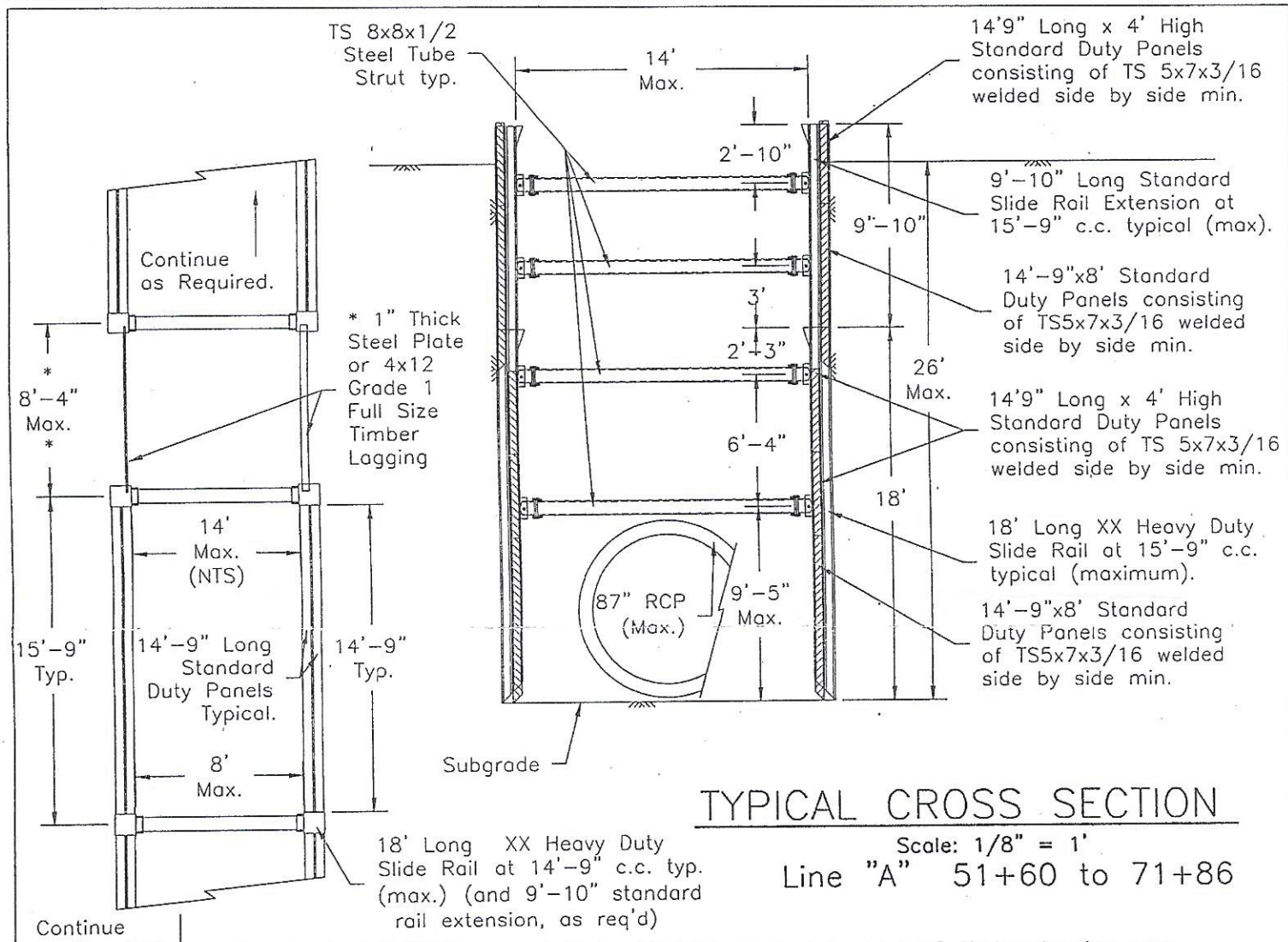
* Note: 1" thick steel plate or 4x12 timber lagging may be used for rail spacings of 8'-4" c.c. or less to allow for utility crossings, etc.

Design Criteria:

1. Design Loads are based on LACDPW Standard Plan 3090, "Criteria for the Design of Shoring for Excavations".
2. All steel members shall be ASTM A-36 or better with allowable stresses per the "AISC Manual of Steel Construction" increased 33% for temporary loading.
3. All timber members shall be Douglas Fir Grade 2 unless otherwise specified with allowable stresses per the "NDS for Wood Construction" increased 33% for temporary loading.
   Fb = 1250 psi x 1.33 x (...)
   Fv = 95 psi x 1.33 x (...)
   Fc = 480,000/(L/d)^2 (1600 max.)
   E = 1.6E6 psi
4. Soil Type: Silty Sand to Silty Clay per borings.
   Note: Excavation shall be dewatered to subgrade.
   Earth Pressure, Kw = 40 pcf
5. Max. Depth of Cut = 26 ft.

NOTES:

1. This shoring plan is to be implemented by the contractors competent person as defined by Title 8, Chapter 4, Section 1504(a) of the State of California Safety Orders adopted 9/25/91. Shoring shall be installed in accordance with Title 8, Chapter 4, Section 1541.1(e).
2. Reaches shown are approximate. If a type of soil is encountered within these reaches which requires the use of a different method of shoring, then shoring details will be revised and resubmitted for approval as necessary.
3. This shoring plan has been prepared in accordance with the provisions of Title 8, Chapter 4, Section 1541.1(c)(4) of the State of California Safety Orders adopted 9/25/91.
4. All materials used with this shoring plan shall conform to Title 8, Chapter 4, Section 1541.1(d).
5. Calculations not shown hereon are on file at the office of the accepting agency and/or the office of the shoring design engineer.
6. All shoring components (excaept timber lagging and 1" steel plates) shall be as manufactured by ICON Equipment Distributors and installed per the manufacturers recommended installation instructions.
7. No-one shall be exposed where shoring has been removed or is ineffective.
8. Larger members with correspondingly larger section moduli may be substituted.
9. Spacings between members may be decreased.
10. Sheeting panels shall be installed such that the bottom of teh lagging is within 2' of the bottom of the excavation at all times.
11. Extra care shall betaken when using steel plates or timber lagging (8'-4" c.c. maximum rail spacing) to insure that the lagging does not slip out from behind the slide rail flanges.
12. The maximum trench width shown on this plan is based on the strength of the shoring materials. All provisions of the contract specifications and Standard Plan No. 3080-0 shall be adhered to as pertains to allowable trench width.
13. The Contractor has reviewed this plan and found it to be compatible with his proposed construction methods.



TYPICAL CROSS SECTION

Scale: 1/8" = 1'

Line "A" 51+60 to 71+86

PLAN VIEW

Scale: 1/8" = 1'

* Note: 1" thick steel plate or 4x12 timber lagging may be used for rail spacings of 8'-4" c.c. or less to allow for utility crossings, etc.