

J.M. TURNER ENGINEERING, INC. CONSULTING ENGINEERS

CIVIL, STRUCTURAL, & CONSTRUCTION ENGINEERING

1325 College Avenue * Santa Rosa, CA 95404 * Phone (707) 528-4503 * Fax (707) 528-4505

E-MAIL TRANSMITTAL COVER SHEET

TO: John Eichhorst
COMPANY: Trebor Shoring Rentals
PHONE: 619-520-9275
E-MAIL: john@tsrca.com

FROM: Hans Vermeulen
DATE: 04/24/2014
PAGES: 14 including cover sheet
RE: Tab Data

E-MAILED BY: HS TIME: 1:15 pm

MESSAGE:

Please note that mailed copies can be provided upon request.

Thank you for your business!

MANUFACTURERS TABULATED DATA

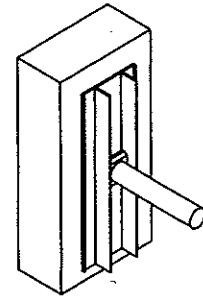
2" CYLINDER HYDRAULIC JACK

TYPE B-45 SOIL					
DEPTH (FT)	SOIL LOADING W/ SURCHARGE (PSF)	HORIZONTAL SPACING (FT)			NO. OF CYLINDERS VERTICAL
		WIDTH 0 TO 8'	WIDTH 8' TO 12'	WIDTH* 12' TO 15'	
6-8	460	8.0	8.0	8.0	2
8-10	550	8.0	6.5	6.5	2
10-12	640	6.0	7.0	7.0	3
12-14	730	6.0	5.0	5.0	3
MAXIMUM CYLINDER LOADING		23,000#	18,000#	18,000#	

* REQUIRES 3" X 3" X 3/16" STEEL OVERSLEEVE.

NOTES:

1. SOIL TO BE DETERMINED BY COMPETENT PERSON.
2. ALL SPACING CENTER TO CENTER.
3. SPACING CHART IS BASED ON OSHA TYPE B SOIL AS DEFINED IN OSHA, CFR 29 SUB-PART P. SOIL CONDITIONS ARE TO BE DETERMINED BY A COMPETENT PERSON AT THE SITE AS THEY ARE ENCOUNTERED. ALLOWABLE CYLINDER LOADING IS NOT TO BE EXCEEDED.
4. PLYWOOD IS TO BE 1-1/8" APA RATED STURDY FLOOR OR BETTER, OR 3/4" THICK PLY FIN. FORM OR 1" STEEL PLATES IS FOR SLOUGHING OR RAVELING ONLY.
5. TIMBER TO BE DOUGLAS FIR #2 OR BETTER.
6. SHORING MUST BE INSTALLED PRIOR TO ENTERING THE TRENCH.
7. THERE MUST BE AT LEAST 3 COLUMNS OF SHORING IN THE TRENCH AT ALL TIMES, AT THE HORIZONTAL SPACING INDICATED, (OR LESS), TO FORM A SHORING SYSTEM. IN TRENCHES OVER 12 FEET DEEP, AND IF POSSIBLE, A MINIMUM OF 4 SHORES SHOULD BE USED. FOR EXCAVATIONS THAT ARE TOO SHORT TO PLACE 3 OR 4 SHORES AT THE REQUIRED SPACING, THERE SHALL BE 2 SHORES, 1 EACH WITHIN 2'-6" OF THE ENDS OF THE EXCAVATION.
8. SPACING CHARTS ALLOW FOR SURCHARGE LOADING FROM EQUIPMENT WEIGHING 20,000 LBS AND LESS (100 PSF LATERAL SURCHARGE), FOR LARGER EQUIPMENT THE SURCHARGE LOADING SHOULD BE INCREASED AS DETERMINED BY A REGISTERED CIVIL ENGINEER.
9. NO VERTICAL LOADS ARE TO BE APPLIED TO THE SHORES.
10. TRENCH WALL ARE TO BE VERTICAL, PARALLEL AND WITHOUT VOIDS BEHIND THE CYLINDERS.
11. SPOILS AND WHEEL LOADS ARE TO BE KEPT A MINIMUM OF 2 FEET FROM THE EDGE OF THE TRENCH.
12. TRENCHES LESS THAN 5' DEEP MAY REQUIRE SHORING.
13. FOR VERTICAL SPACING THERE MUST BE A CYLINDER WITHIN 4' OF THE BOTTOM OF THE EXCAVATION AND WITHIN 2' FROM THE TOP OF THE EXCAVATION.
14. RAILS ARE MADE OF 6061-T6 ALUMINUM.

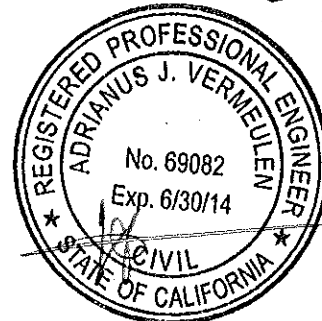
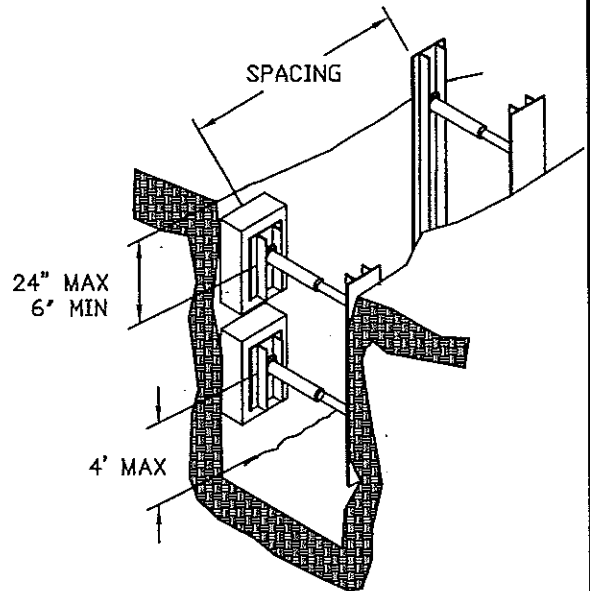


**2" CYLINDER HYDRAULIC JACK
ON 8" X 12" X 24" TIMBER**



STANDARD DUTY SECTION MODULUS

LEG SIDE .408 IN.³
BLADE SIDE 1.404 IN.³

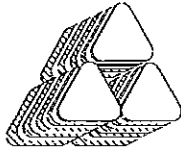


TREBOR SHORING RENTALS
663 GREENFIELD DRIVE
EL CAJON, CA. 92021

TITLE:
**2" SINGLE CYLINDER HYDRAULIC
TRENCH JACK TAB DATA SHEET**

J.M. TURNER ENGINEERING, INC.
CONSULTING ENGINEERS
1325 COLLEGE AVE., SANTA ROSA, CA. 95404
(707) 528-4503 FAX (707) 528-4505

DATE: 04/24/14	REVISED:	JOB NO: 13948-1/P1
-------------------	----------	-----------------------



J.M. TURNER ENGINEERING, INC.

CONSULTING ENGINEERS

CIVIL ENGINEERING
STRUCTURAL ENGINEERING
CONSTRUCTION ENGINEERING

SINGLE 2" CYLINDER HYDRAULIC TRENCH JACK TABULATED DATA

DESIGN CALCULATIONS FOR SPACING OF TRENCH JACKS IN OSHA "TYPE B 45" SOILS

Trebor Shoring Rentals
663 Greenfield Drive
El Cajon, CA 92021



Design of tabulated data sheets for maximum allowable spacing of hydraulic trench jacks in type B 45 soil. Maximum allowable 2" cylinder loading of 23,000 lbs up to a trench width of 8', 18,000 lbs for trench widths up to 15'. Trenches from 12' to 15' require 3" x 3" x 3/16" oversleeves. Tabulated data includes 100 psf surcharge loading for adjacent equipment or traffic loads.

DATE: 04/23/2014
BY: A.J.V.
SHEET NO: 1 of 10
JOB NO.: 13948-1



Check Trench Jacks, Maximum Depth of 8':

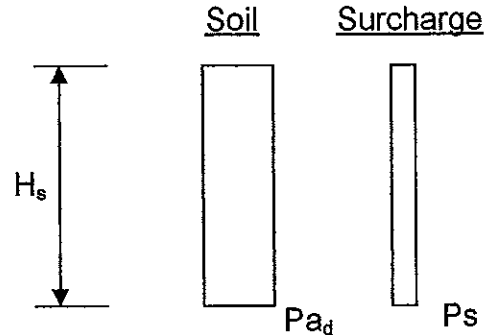
Active Pressure:

Maximum Height of System (ft): $H_s := 8$

Use Type B Soil: EFP := 45

$$Pa_d := EFP \cdot H_s$$

$$Pa_d = 360$$



Surcharge:

Surcharge used to account for traffic and/or construction equipment adjacent to excavation.

Surcharge (psf): $Ps := 100$

Total Pressure (psf): $Pt := Pa_d + Ps$

$$Pt = 460$$

Check Trench Jacks:

Trench Jack Spacing (ft): $S_{TJ} := 8.0$

Number Cylinders vertically : $No := 2$

Load per Cylinder (lbs): $P := \frac{Pt \cdot H_s \cdot S_{TJ}}{No} \quad P = 14720 \leq 23000 \text{ lbs } \text{OK}$

Use Trench Jacks (Min. 2 Cylinders vertically), spaced at 8' O.C.



Check Trench Jacks, Maximum Depth of 10':

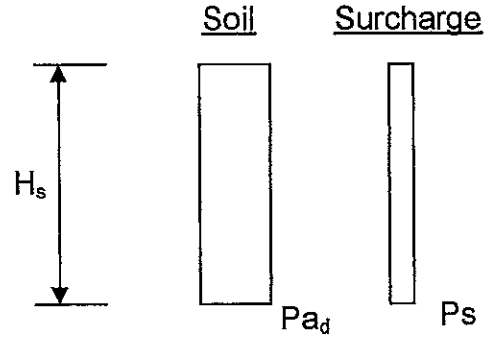
Active Pressure:

Maximum Height of System (ft): $H_s := 10$

Use Type B Soil: $EFP := 45$

$$Pa_d := EFP \cdot H_s$$

$$Pa_d = 450$$



Surcharge:

Surcharge used to account for traffic and/or construction equipment adjacent to excavation.

Surcharge (psf): $Ps := 100$

Total Pressure (psf): $Pt := Pa_d + Ps$

$$Pt = 550$$

Check Trench Jacks:

Trench Jack Spacing (ft): $S_{TJ} := 8.0$

Number Cylinders vertically: $No := 2$

$$Load\ per\ Cylinder\ (lbs): \quad P := \frac{Pt \cdot H_s \cdot S_{TJ}}{No} \quad P = 22000 \leq 23000\ lbs \quad \underline{OK}$$

Use Trench Jacks (Min. 2 Cylinders vertically), spaced at 8' O.C.



Check Trench Jacks, Maximum Depth of 12':

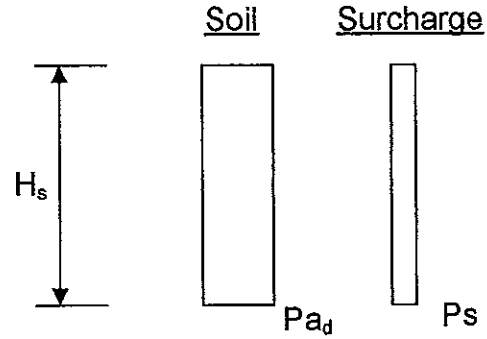
Active Pressure:

Maximum Height of System (ft): $H_s := 12$

Use Type B Soil: $EFP := 45$

$$Pa_d := EFP \cdot H_s$$

$$Pa_d = 540$$



Surcharge:

Surcharge used to account for traffic and/or construction equipment adjacent to excavation.

Surcharge (psf): $Ps := 100$

Total Pressure (psf): $Pt := Pa_d + Ps$

$$Pt = 640$$

Check Trench Jacks:

Trench Jack Spacing (ft): $S_{TJ} := 8.0$

Number Cylinders per Jack: $No := 3$

$$Load\ per\ Cylinder\ (lbs): \quad P := \frac{Pt \cdot H_s \cdot S_{TJ}}{No} \quad P = 20480 \leq 23000\ lbs \quad \underline{OK}$$

Use Trench Jacks (Min. 3 Cylinders vertically), spaced at 6' O.C.



Check Trench Jacks, Maximum Depth of 14':

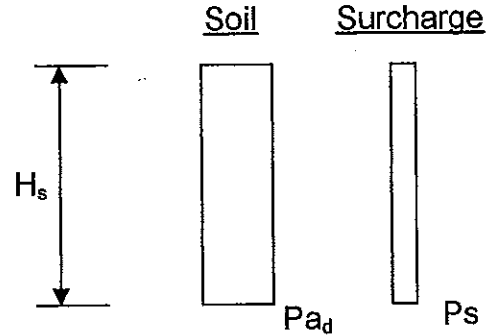
Active Pressure:

Maximum Height of System (ft): $H_s := 14$

Use Type B Soil: $EFP := 45$

$$Pa_d := EFP \cdot H_s$$

$$Pa_d = 630$$



Surcharge:

Surcharge used to account for traffic and/or construction equipment adjacent to excavation.

Surcharge (psf): $Ps := 100$

Total Pressure (psf): $Pt := Pa_d + Ps$

$$Pt = 730$$

Check Trench Jacks:

Trench Jack Spacing (ft): $S_{TJ} := 6.5$

Number Cylinders per Jack: $No := 3$

$$\text{Load per Cylinder (lbs): } P := \frac{Pt \cdot H_s \cdot S_{TJ}}{No} \quad P = 22143 \leq 23000 \text{ lbs } \underline{OK}$$

Use Trench Jacks (Min. 3 Cylinders vertically), spaced at 6.5' O.C.



Check Trench Jacks, Maximum Depth of 8':

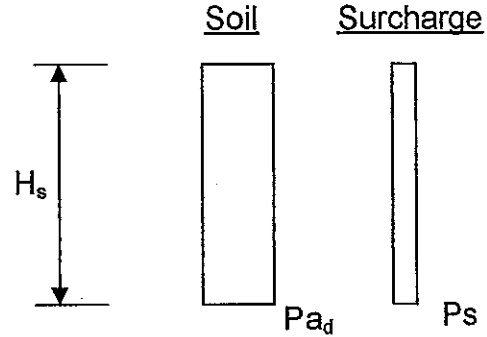
Active Pressure:

Maximum Height of System (ft): $H_s := 8$

Use Type B Soil: $EFP := 45$

$$Pa_d := EFP \cdot H_s$$

$$Pa_d = 360$$



Surcharge:

Surcharge used to account for traffic and/or construction equipment adjacent to excavation.

Surcharge (psf): $Ps := 100$

Total Pressure (psf): $Pt := Pa_d + Ps$

$$Pt = 460$$

Check Trench Jacks:

Trench Jack Spacing (ft): $S_{TJ} := 8.0$

Number Cylinders vertically : $No := 2$

$$Load\ per\ Cylinder\ (lbs): \quad P := \frac{Pt \cdot H_s \cdot S_{TJ}}{No} \quad P = 14720 \leq 18000\ lbs \quad \underline{OK}$$

Use Trench Jacks (Min. 2 Cylinders vertically), spaced at 8.0' O.C.



Check Trench Jacks, Maximum Depth of 10':

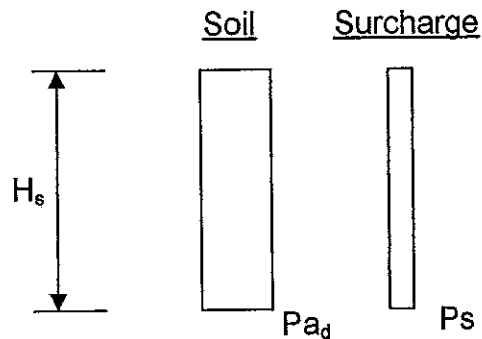
Active Pressure:

Maximum Height of System (ft): $H_s := 10$

Use Type B Soil: $EFP := 45$

$$P_{a_d} := EFP \cdot H_s$$

$$P_{a_d} = 450$$



Surcharge:

Surcharge used to account for traffic and/or construction equipment adjacent to excavation.

Surcharge (psf): $P_s := 100$

Total Pressure (psf): $P_t := P_{a_d} + P_s$

$$P_t = 550$$

Check Trench Jacks:

Trench Jack Spacing (ft): $S_{TJ} := 6.5$

Number Cylinders vertically : $N_o := 2$

$$\text{Load per Cylinder (lbs): } P := \frac{P_t \cdot H_s \cdot S_{TJ}}{N_o} \quad P = 17875 \leq 18000 \text{ lbs } \underline{OK}$$

Use Trench Jacks (Min. 2 Cylinders vertically), spaced at 6.5' O.C.



Check Trench Jacks, Maximum Depth of 12':

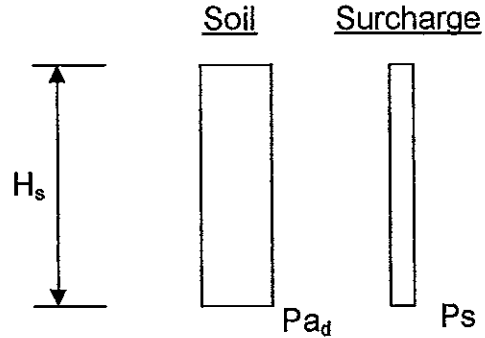
Active Pressure:

Maximum Height of System (ft): $H_s := 12$

Use Type B Soil: $EFP := 45$

$$Pa_d := EFP \cdot H_s$$

$$Pa_d = 540$$



Surcharge:

Surcharge used to account for traffic and/or construction equipment adjacent to excavation.

Surcharge (psf): $Ps := 100$

Total Pressure (psf): $Pt := Pa_d + Ps$

$$Pt = 640$$

Check Trench Jacks:

Trench Jack Spacing (ft): $S_{TJ} := 7.0$

Number Cylinders per Jack: $No := 3$

$$Load \ per \ Cylinder \ (lbs): \quad P := \frac{Pt \cdot H_s \cdot S_{TJ}}{No} \quad P = 17920 \leq 18000 \text{ lbs} \quad \underline{OK}$$

Use Trench Jacks (Min. 3 Cylinders vertically), spaced at 7' O.C.



Check Trench Jacks, Maximum Depth of 14':

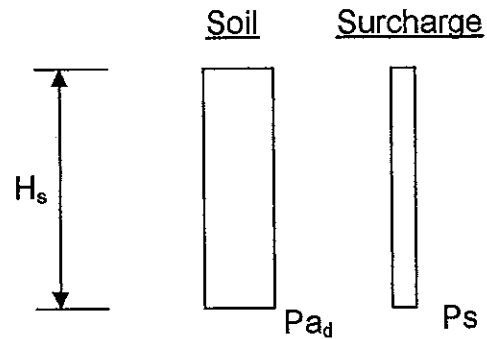
Active Pressure:

Maximum Height of System (ft): $H_s := 14$

Use Type B Soil: $EFP := 45$

$$Pa_d := EFP \cdot H_s$$

$$Pa_d = 630$$



Surcharge:

Surcharge used to account for traffic and/or construction equipment adjacent to excavation.

Surcharge (psf): $Ps := 100$

Total Pressure (psf): $Pt := Pa_d + Ps$

$$Pt = 730$$

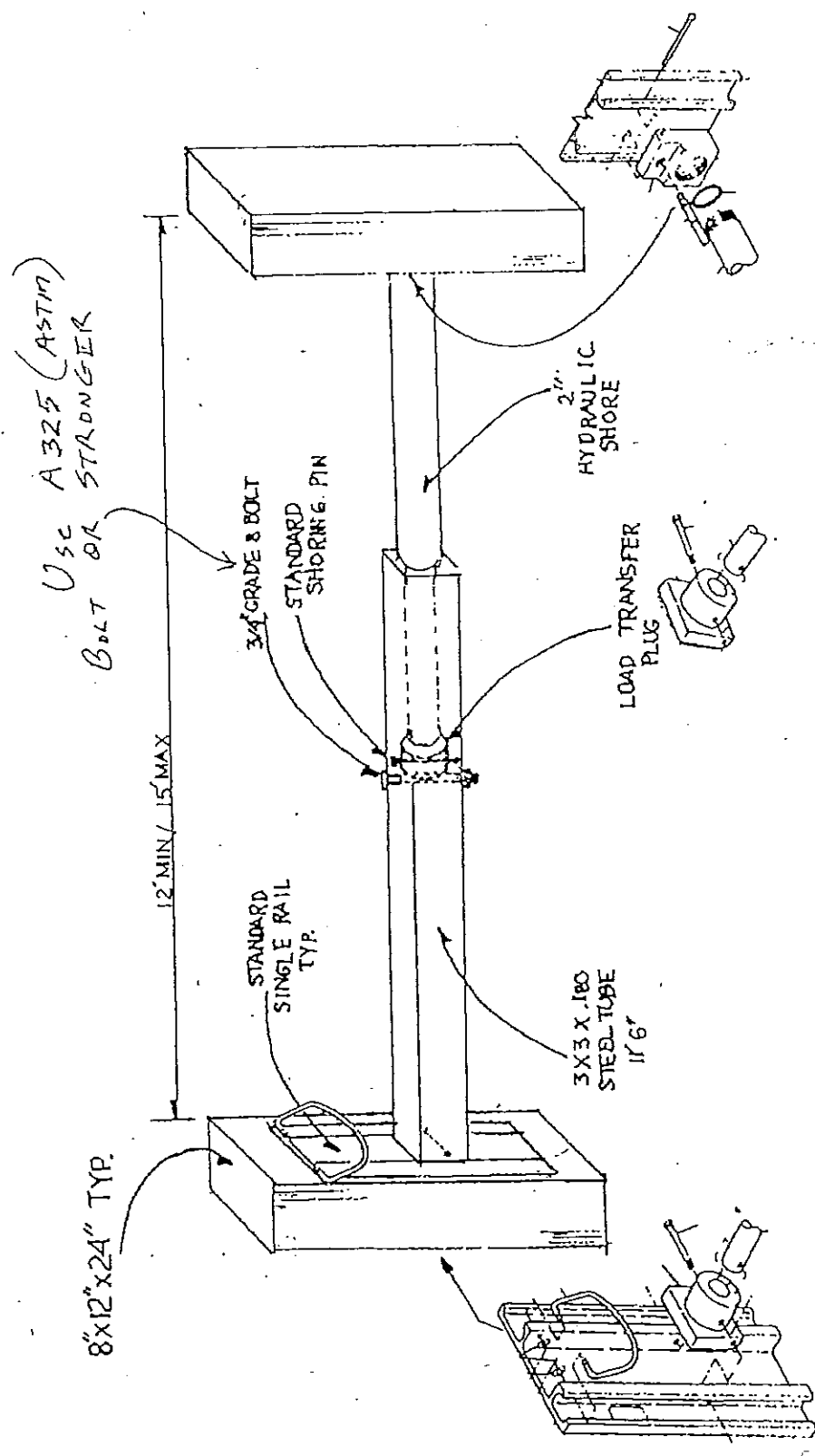
Check Trench Jacks:

Trench Jack Spacing (ft): $S_{TJ} := 5.0$

Number Cylinders per Jack: $No := 3$

$$Load\ per\ Cylinder\ (lbs): \quad P := \frac{Pt \cdot H_s \cdot S_{TJ}}{No} \quad P = 17033 \leq 18000\ lbs \quad \underline{OK}$$

Use Trench Jacks (Min. 3 Cylinders vertically), spaced at 5.0' O.C.



GENERAL NOTES

1. PROVIDE ACCESS AND BARRICADING PER OSHA REQUIREMENTS.
2. CONTRACTOR TO VERIFY THE LOCATION & SIZE OF ALL EXISTING UNDERGROUND UTILITIES AND/OR PIPES, PRIOR TO COMMENCING THE EXCAVATION, IN ORDER TO ELIMINATE ANY CONFLICTS WITH THE SHORING SYSTEM.
3. THIS PLAN IS DESIGNED FOR PROTECTION OF WORKERS, EXISTING UTILITIES, STRUCTURES, AND/OR SUBSTRUCTURES CLEARLY SPECIFIED ON PLANS. LAYOUT IS PER CONTRACT DRAWINGS, CONTRACTOR TO VERIFY THAT THERE IS SUFFICIENT CLEARANCE & WORKING SPACE.
4. THIS PLAN IS IN ACCORDANCE WITH FEDERAL AND/OR STATE OSHA REGULATIONS, DESIGN BY A REGISTERED CIVIL ENGINEER.
5. THESE PLANS ARE NOT INTENDED TO SHOW THE METHOD AND MEANS OF EXCAVATION OF THE WORK, WHICH IS THE RESPONSIBILITY OF THE CONTRACTOR.
6. CONTRACTOR SHALL HAVE A COMPETENT PERSON AT THE SITE WHERE THIS PLAN IS IN USE. HE/SHE SHALL BE RESPONSIBLE MAKING SURE THAT ALL ELEMENTS OF THIS PLAN ARE ADHERED TO AND SHALL NOTIFY THE ENGINEER IF CONDITIONS ENCOUNTERED ARE DIFFERENT THAN ANTICIPATED AND SHOWN ON THIS PLAN. IF CONDITIONS ARE DIFFERENT, THIS PLAN MUST BE MODIFIED TO COVER THOSE CONDITIONS OR A NEW PLAN SHALL BE USED.
7. IF ANY EXISTING STRUCTURE(S), BUILDING(S) OR RAILROAD(S), NOT ALREADY SHOWN ON THE SHORING PLANS, IS (ARE) WITHIN A DISTANCE EQUAL TO THE DEPTH OF EXCAVATION, (FROM EDGE OF EXCAVATION TO STRUCTURE) THE CONTRACTOR SHALL CONTACT J.M. TURNER ENGINEERING FOR PLAN REVIEW AND/OR POSSIBLE PLAN REVISIONS.
8. IF EXISTING PARALLEL UTILITIES, NOT ALREADY SHOWN ON THE SHORING PLANS, ARE 48" IN DIAMETER OR LARGER AND ARE CLOSER THAN 48" FROM THE EDGE OF THE EXCAVATION THE CONTRACTOR SHALL CONTACT J.M. TURNER ENGINEERING FOR PLAN REVIEW AND/OR PLAN REVISIONS.

TRENCH JACK NOTES:

9. TABULATED DATA FOR EQUIPMENT TO BE USED SHALL BE PROVIDED AT THE JOBSITE.
10. MANUFACTURERS TABULATED DATA APPLIES EXCEPT AS IS NOTED HERE.
11. SHORING MUST BE PROPERLY INSTALLED PRIOR TO ENTERING EXCAVATION. WORKERS MUST ENTER, EXIT AND WORK IN SHORED AREAS ONLY.
12. CONTRACTOR AGREES TO INSTALL SHORING IN ACCORDANCE WITH THIS PLAN.
13. THIS PLAN IS DESIGNED FOR WORKER PROTECTION ONLY.

TREBOR SHORING RENTALS
663 GREENFIELD DRIVE
EL CAJON, CA

TYPICAL 2" HYDRAULIC CYLINDER
TRENCH JACK SHORING PLAN

INDEX:

- SHEET S/1 COVER PAGE**
SHEET S/2 PLAN VIEW & SECTIONS

STEEL REQUIREMENTS

- PER MANUFACTURER'S TABULATED DATA SHEETS UNLESS OTHERWISE SPECIFIED ON PLANS.
- STEEL PLATES TO BE ASTM A36, MINIMUM $F_y=36$ KSI

WELDING REQUIREMENTS

- PER MANUFACTURER'S TABULATED DATA SHEETS UNLESS OTHERWISE SPECIFIED ON PLANS.

TIMBER REQUIREMENTS

- PER MANUFACTURER'S TABULATED DATA SHEETS UNLESS OTHERWISE SPECIFIED ON PLANS.

DEWATERING REQUIREMENTS

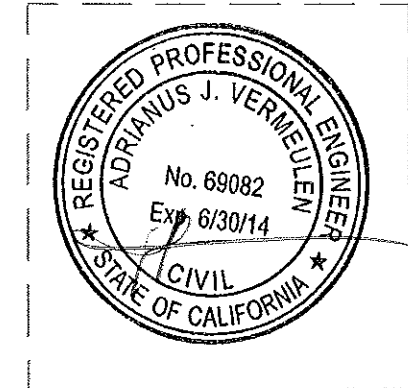
- DEWATER INSIDE THE EXCAVATION AS NEEDED TO ALLOW CONSTRUCTION AND/OR REQUIRED WORK OPERATIONS.
- DEWATERING IS THE RESPONSIBILITY OF THE CONTRACTOR. IF DEWATERING WELLS, SPECIAL SUMP PUMPS OR ANY REQUIREMENTS FOR DEWATERING ARE REQUIRED BY THE REVIEWING AGENCY, CONTRACTOR SHALL ADDRESS THIS IN A SEPARATE SUBMITTAL.
- DEWATERING WELLS MAY BE REQUIRED (AS MANY AS NEEDED) TO MAINTAIN THE WATER LEVEL AT THE BOTTOM OF THE EXCAVATION.

REVISIONS BY

TYPICAL 2" HYDRAULIC CYLINDER
 TRENCH JACK SHORING PLAN

TREBOR SHORING RENTALS
 663 GREENFIELD DRIVE
 EL CAJON CA 92021

J.M. TURNER ENGINEERING, INC.
CONSULTING ENGINEERS
 1325 COLLEGE AVE., SANTA ROSA, CA. 95404
 (707) 528-4503 FAX (707) 528-4505



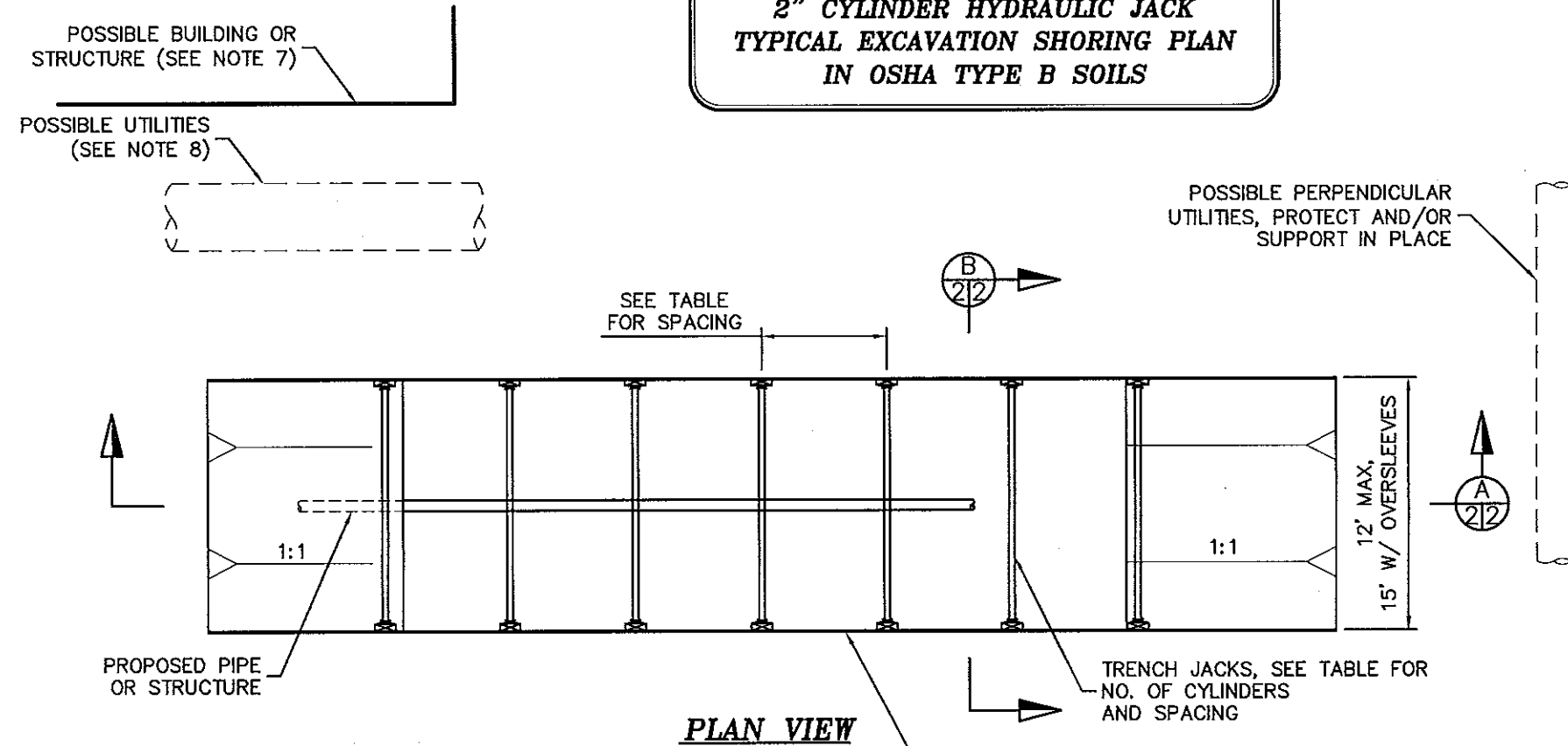
SCALE: N.T.S.
 DATE: 04/24/14
 DRAWN BY: A.B.B.
 CHECKED BY: A.J.V.
 DRAWING NO: 13948-1/S1
 SHEET: 1 OF 2

TREBOR SHORING RENTALS
2" CYLINDER HYDRAULIC JACK
TYPICAL EXCAVATION SHORING PLAN
IN OSHA TYPE B SOILS

TRENCH JACK SPACING TABLE

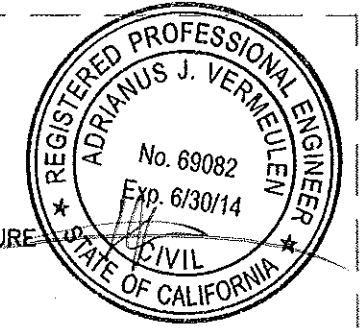
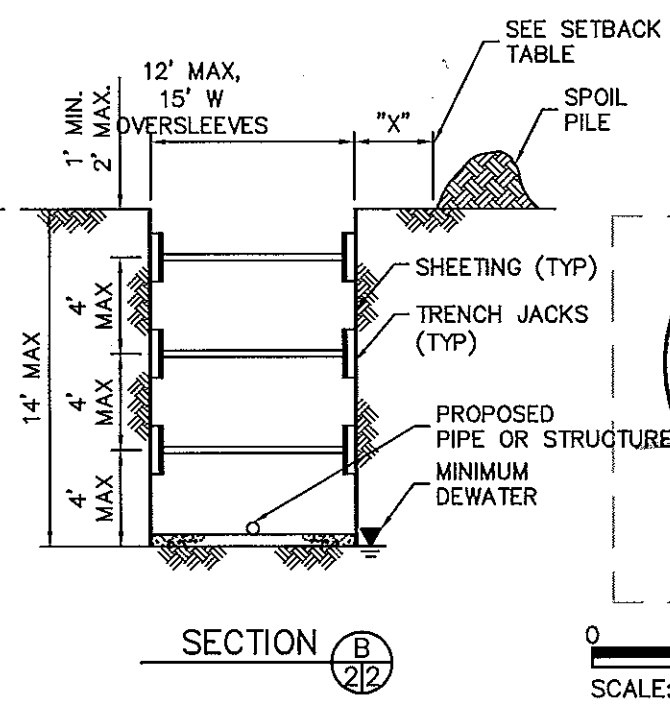
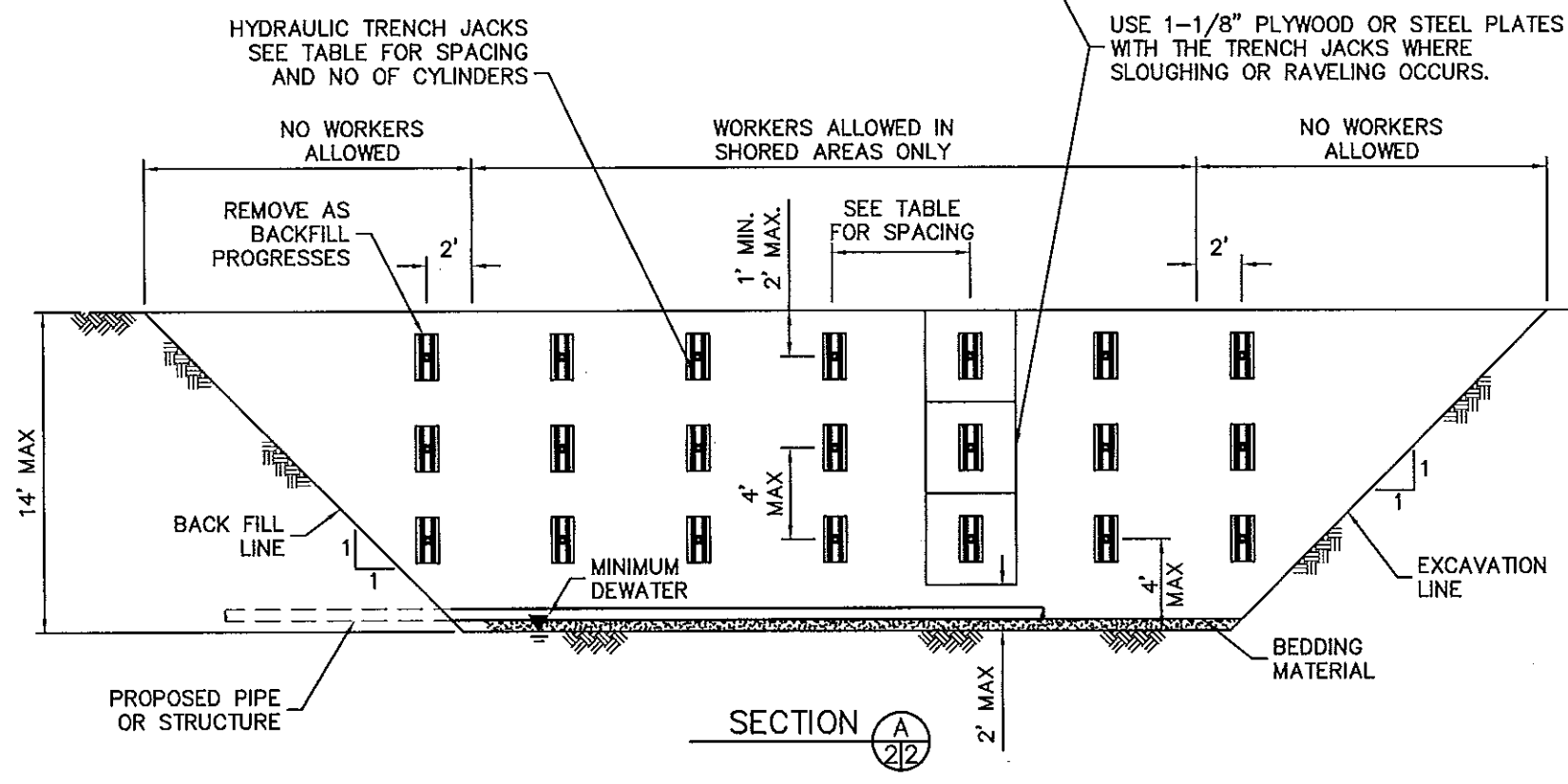
DEPTH (FT)	SOIL LOADING W/ SURCHARGE (PSF)	HORIZONTAL SPACING (FT)			NO. OF CYLINDERS VERTICAL
		WIDTH 0 TO 8'	WIDTH 8' TO 12'	WIDTH* 12' TO 15'	
6-8	480	8.0	8.0	8.0	2
8-10	550	8.0	6.5	6.5	2
10-12	640	6.0	7.0	7.0	3
12-14	730	6.0	5.0	5.0	3
MAXIMUM CYLINDER LOADING		23,000#	18,000#	18,000#	

* REQUIRES 3" X 3" X 3/16" STEEL OVERSLEEVE.



SETBACK TABLE
 100 PSF MAX SURCHARGE
 X = SETBACK

K-RAIL	X=1'
HS 20-44 TRAFFIC	X=4'
SPOIL PILE	X=4'
EXCAVATOR	X=4'
DUMP TRUCK	X=4'
3 CY LOADER	X=4'
5 CY LOADER	X=5'
CRANE TO 30 TON	X=8'
CONCRETE TRUCK	X=10'



REVISIONS BY

TYPICAL 2" HYDRAULIC CYLINDER
 TRENCH JACK SHORING PLAN

TREBOR SHORING RENTALS
 663 GREENFIELD DRIVE
 EL CAJON CA 92021

J.M. TURNER ENGINEERING, INC.
 CONSULTING ENGINEERS
 1325 COLLEGE AVE., SANTA ROSA, CA. 95404
 (707) 528-4503 FAX (707) 528-4505

SCALE: 1/8" = 1'
 DATE: 04/24/14
 DRAWN BY: A.B.B.
 CHECKED BY: A.J.V.
 DRAWING NO: 13948-1/S2
 SHEET: 2 OF 2