

REVISION:	
No.	DATE

Dwg No. 0614E9

EXCAVATION & SOIL PROTECTION	
PROJECT NAME	THAI PROJECT NAME

DRAWING TITLE:	
DRAWING NO.	TOTAL
SH-01	01
NOT TO SCALE	
SCALE	
A4	1:400
A3	1:400

DATE: 21/06/2011

PLAN PLATFORM 1

SH-01

01

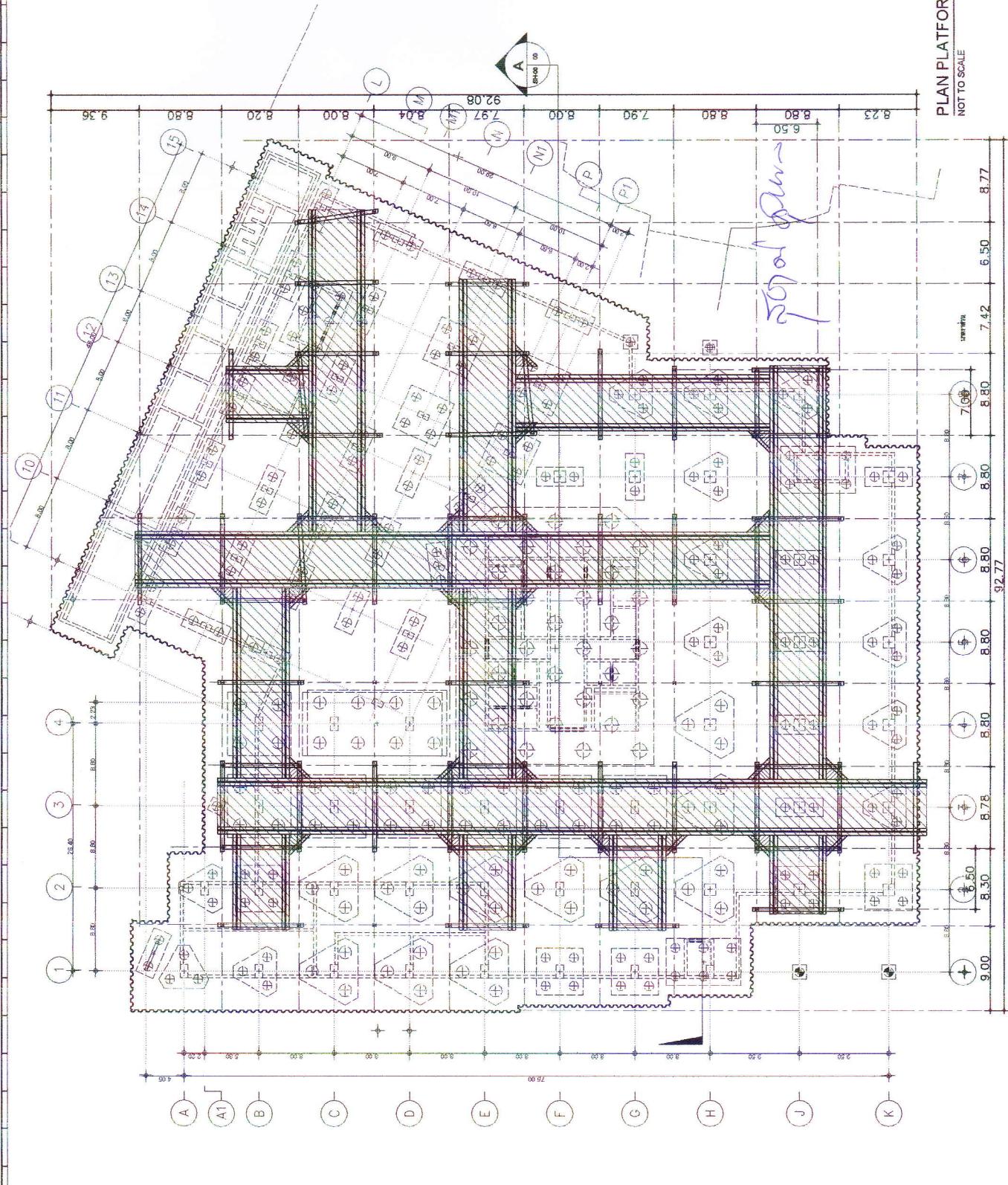
NOT TO SCALE

SCALE

A4 1:400

A3 1:400

DATE 21/06/2011



REVISION	ISL.	DATE	DESCRIPTION

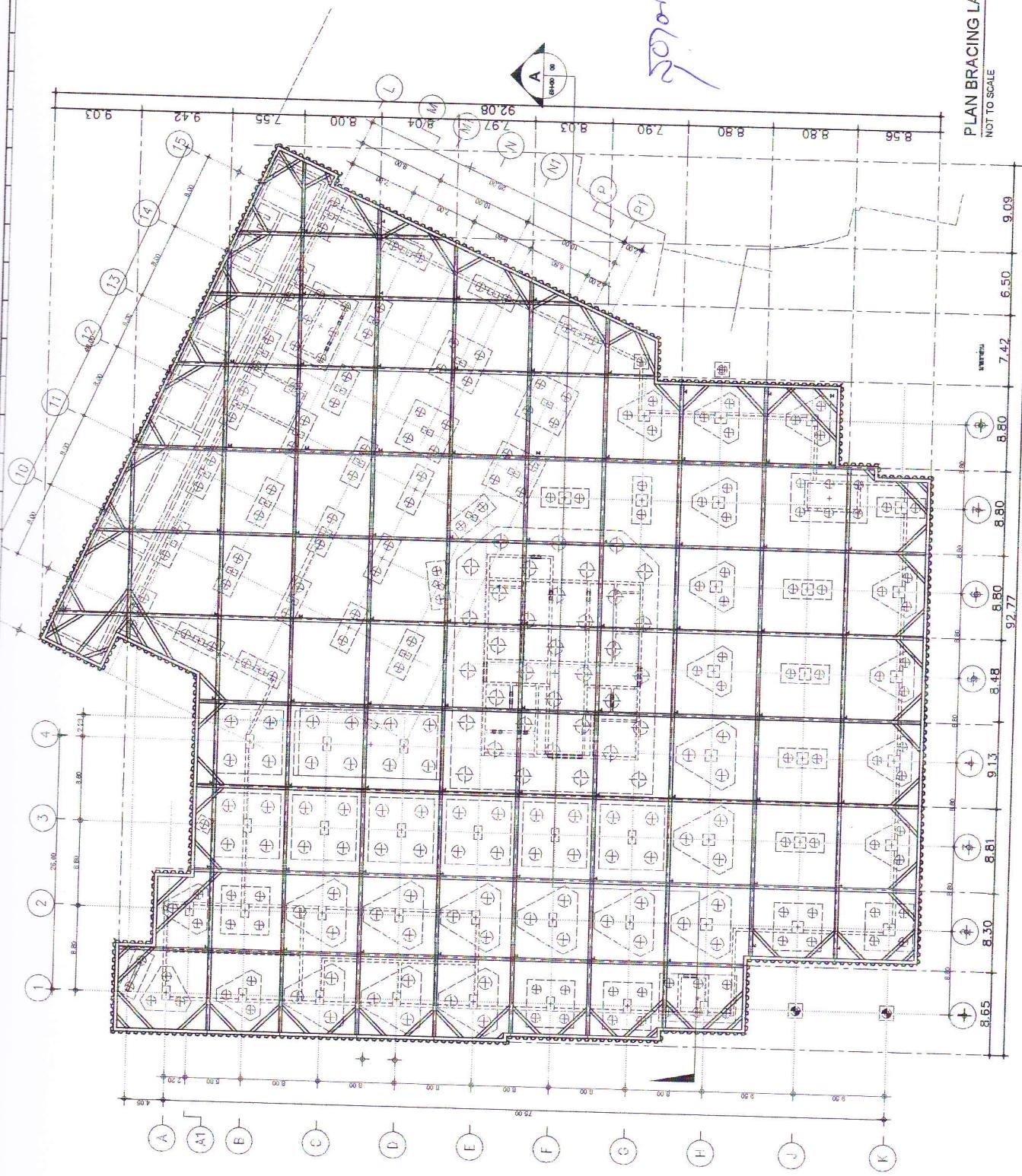
Draw No. 0614E9
SICAVATION & SOIL PROTECTION
PROJECT NAME: စာရင်းကြပ်ပေါ်အားလုံး
တော်ဝိုင် ဒေသရှိခိုင်မား

DRAWING TITLE: PLAN BRACING
LAYER 1
DRAWN BY: K.P.
CHECKED:
APPROVED:
SCALE: A3 : 1:500
NOT TO SCALE
DRAWING NO. SH-01 TOTAL 01
DATE: 21/04/2011

SH-01
1

NOT TO SCALE

PLAN BRACING LAYER 1



REVISION:	DATE:	DESCRIPTION:
Rev.	Date	

Draw No. 0614E9

EXCAVATION & SOIL PROTECTION
စာမျက်နှာပြင်အတွက် ထုတေသနလုပ်မှုကိုယ်စုံပေး

PROJECT NAME:
စာမျက်နှာပြင်အတွက် ထုတေသနလုပ်မှုကိုယ်စုံပေး

DRAWING TITLE:
PLAN BRACING

LAYER 2

DRAWN BY:
R.P.

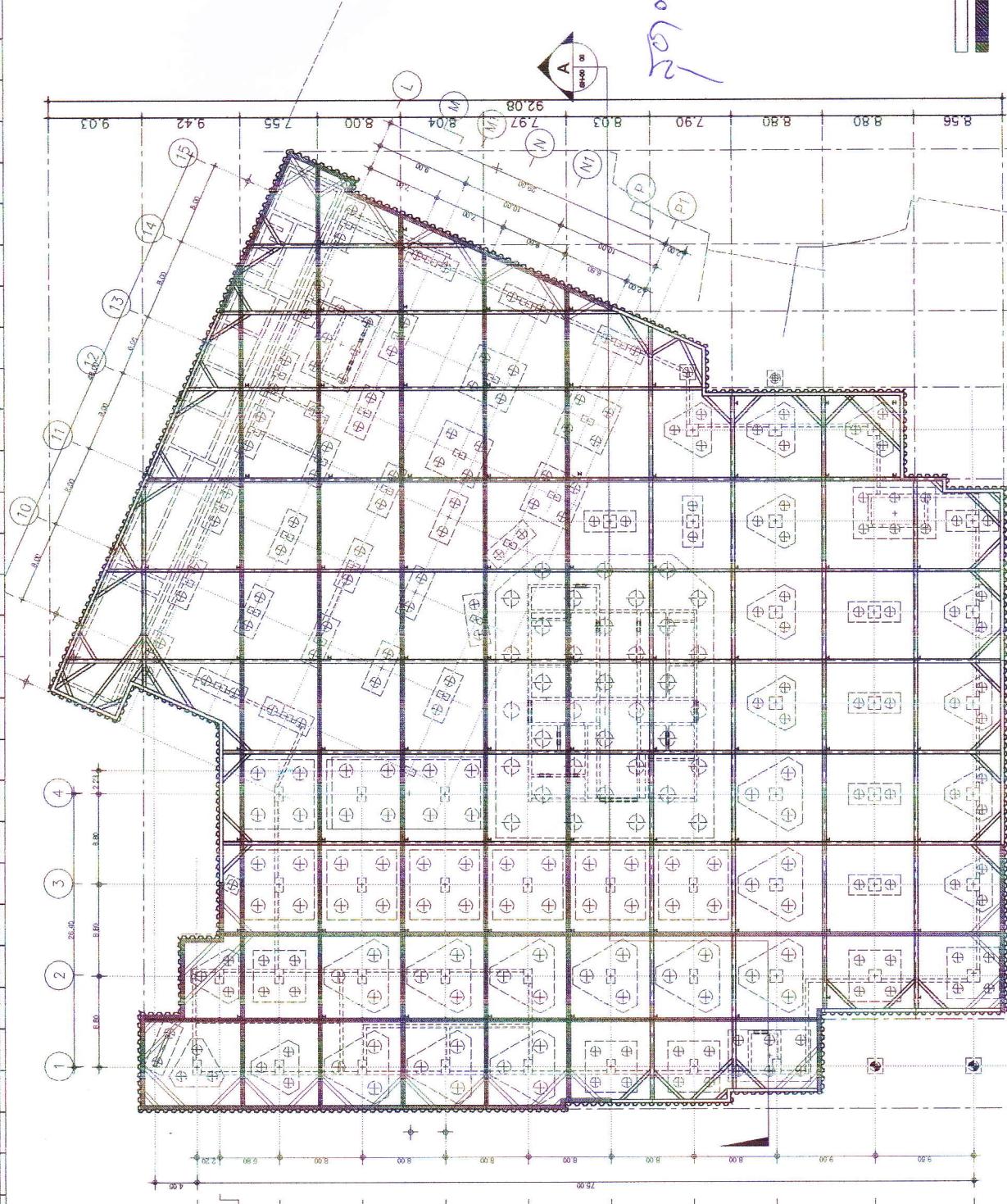
SCALE:
WF 350 WF 400

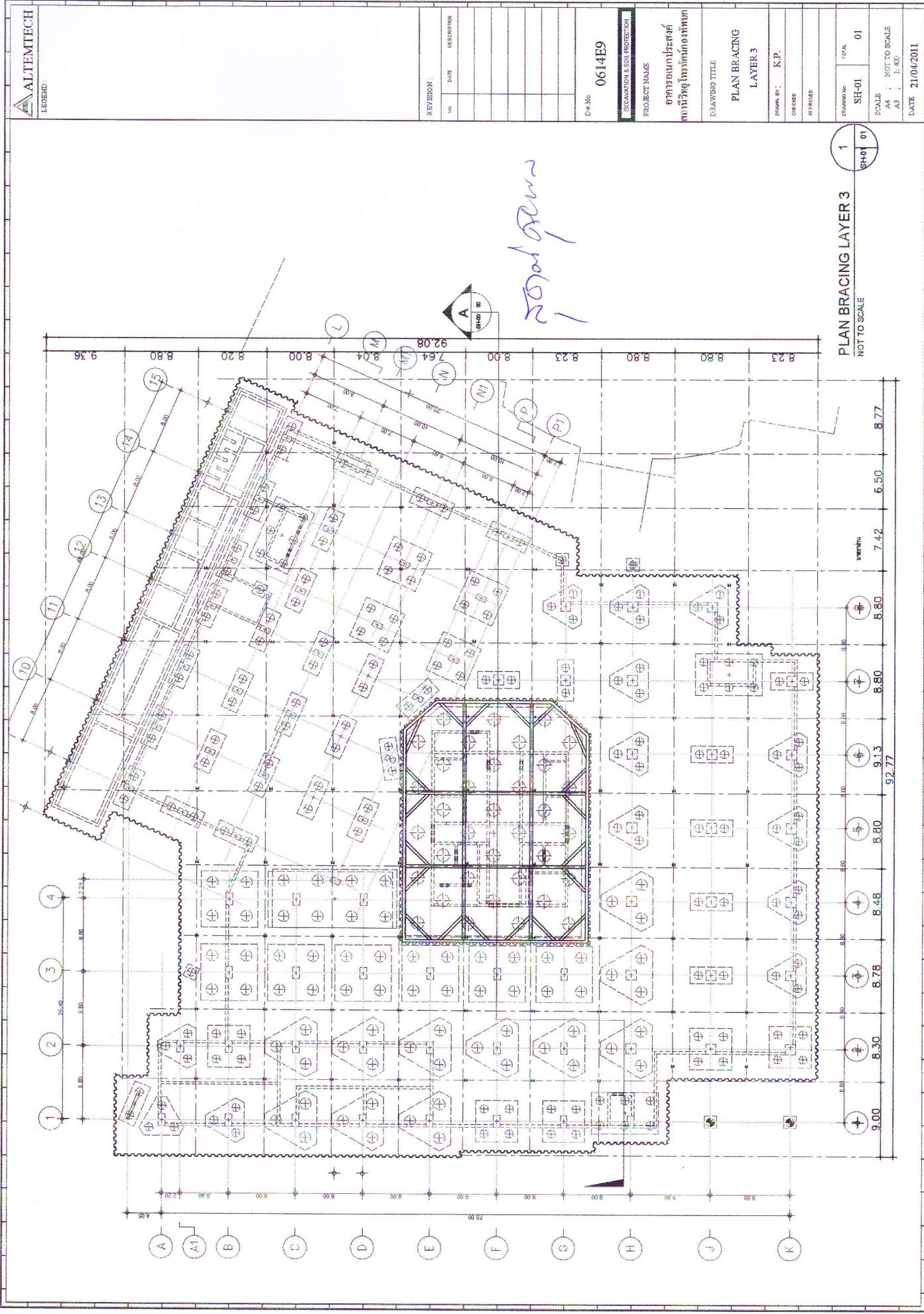
DRAWING NO.:	SCALE:	DATE:
SH-01	WF 350 WF 400	21/04/2011

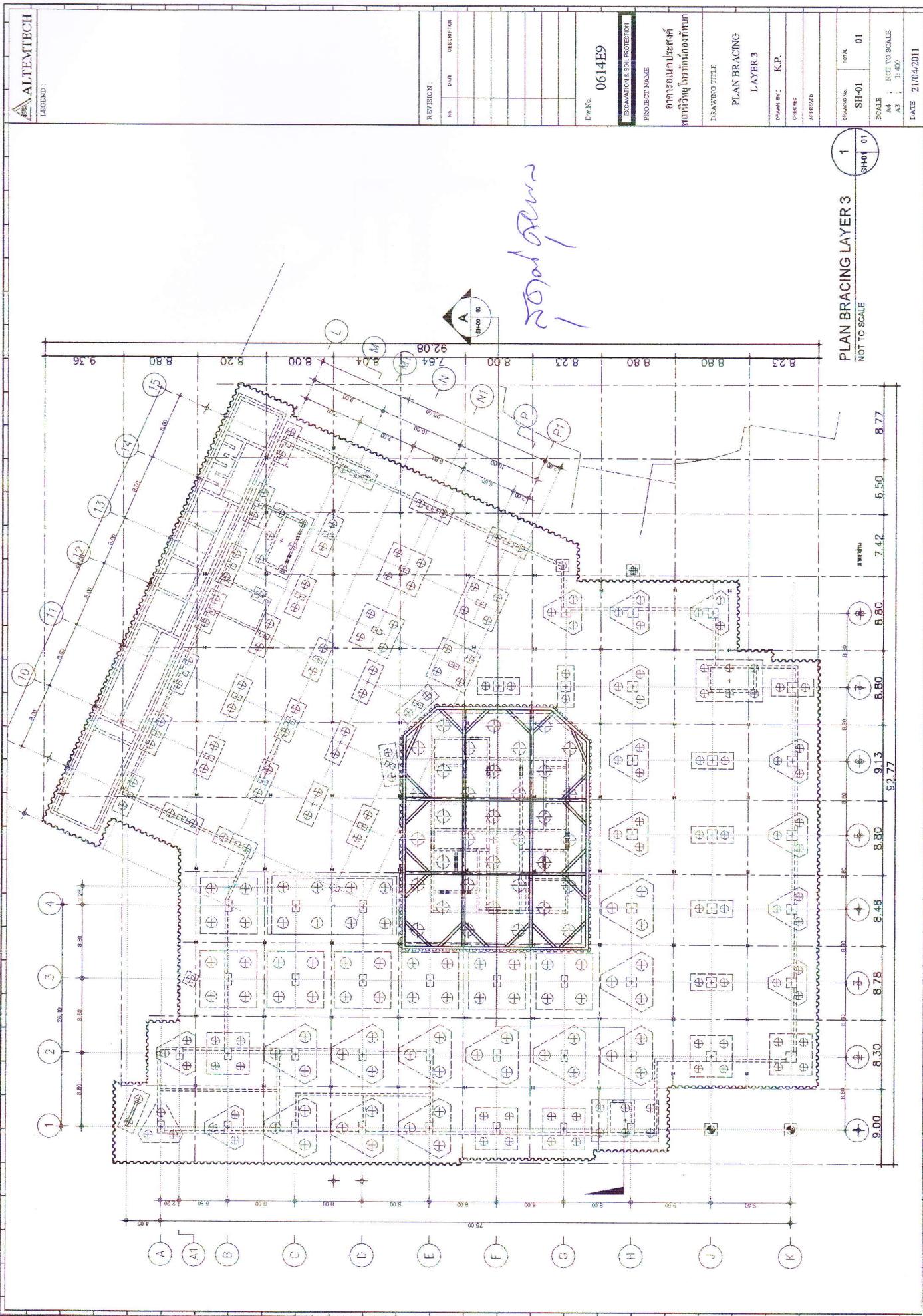


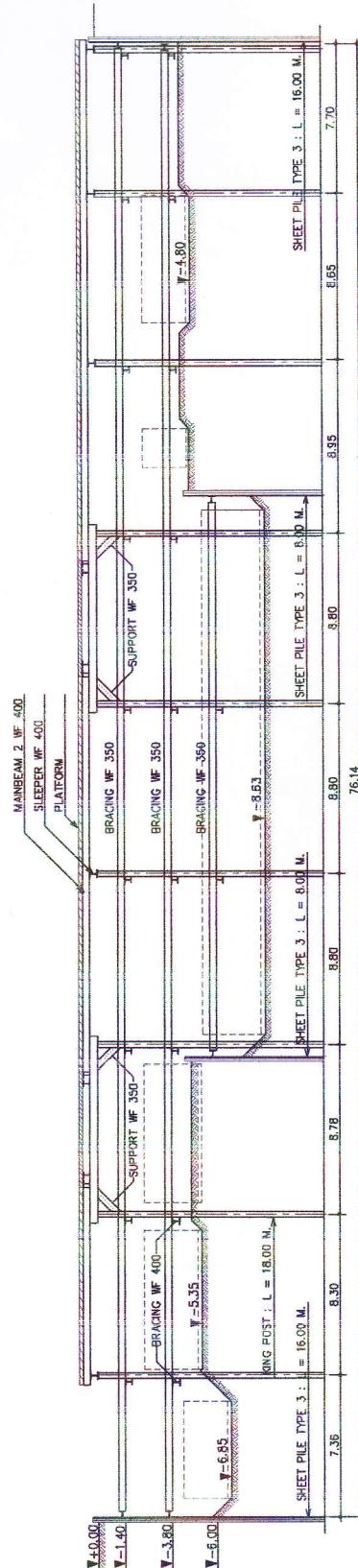
PLAN BRACING LAYER 2
NOT TO SCALE

W.F. 350	W.F. 400
9.09	
6.50	
7.42	
8.80	
8.80	
8.80	
9.13	
8.81	
8.30	
8.65	
9.277	









Drawn No. 0614E9

EXCAVATION & SOIL PROTECTION

PROJECT NAME

การก่อสร้างสะพาน
กาญจนบุรี-ห้วยเขียวพาก

DRAWING TITLE

SECTION A-A

DRAWN BY:

K.P.

CHECKED

APPROVED

ISSUED BY:

SH-01

01

SCALE :

NOT TO SCALE

A4 ; 1:250

A3 ; 1:250

DATE 21/01/2011

SEQUENCE OF INCLINOMETER READING		SEE CONSTRUCTION SEQUENCE STEP	REMARKS: PLEASE SEND THE RESULT OF EVERY INCLINOMETER READING TO DESIGNER
1.	INITIAL READING	1	
2.	AFTER EXCAVATION & INSTALL STRUT LAYER 1	2.1	
3.	AFTER PRELOAD STRUT LAYER 1	2.2	
4.	AFTER EXCAVATION & INSTALL STRUT LAYER 2	3.1	
5.	AFTER PRELOAD STRUT LAYER 2	3.2	
6.	AFTER FINAL EXCAVATION ZONE 1	7	
7.	AFTER CONSTRUCTION OF FOOTING ZONE 1	7.1	
8.	AFTER FINAL EXCAVATION ZONE 2	8	
9.	AFTER CONSTRUCTION OF FOOTING ZONE 2	8.1	
10.	AFTER FINAL EXCAVATION ZONE 3	9	
11.	AFTER CONSTRUCTION OF FOOTING ZONE 3	9.1	
12.	AFTER FINAL EXCAVATION ZONE 4	10.1	
13.	AFTER REMOVE STRUT LAYER 2 ZONE 4	10.3	
14.	AFTER REMOVE STRUT LAYER 2	11	
15.	AFTER CONSTRUCTION OF RC. WALL TO -1.95 M.	11.3	
16.	AFTER REMOVE STRUT LAYER 1	12	

LEGEND:

REVISION :
No. DATE DESCRIPTION

Dw.No. 0614E9

EXCAVATION & SOIL PROTECTION
PROJECT NAME: โครงการก่อสร้างสิ่งก่อสร้าง
สถานที่: จังหวัดเชียงใหม่
DRAWING TITLE: แบบรากฐานโครงสร้าง

INCLINOMETER POINT

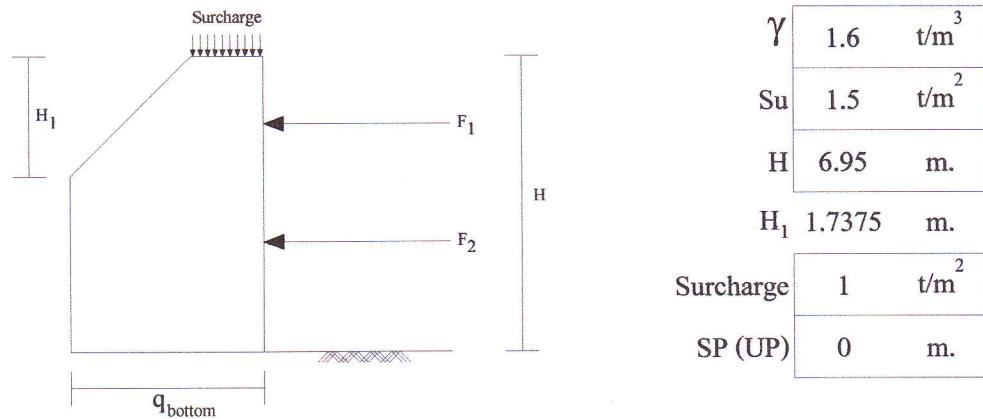
DRAWN BY: K.P.
CHECKED:
APPROVED:

POLAROID NO. 01
SH-01

SCALE: A4 : NOT TO SCALE
A3 : 1:350
DATE: 21/04/2011

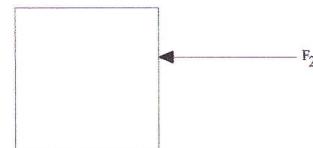
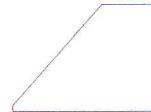
INCLINOMETER POINT 1
SCALE 1:350 SH-02 3

PRESSURE DIAGRAM & FORCE IN STRUT



$$q_{\text{bottom}} = \gamma H + q - 4S_u$$

$$= 6.12 \quad t/m^2$$



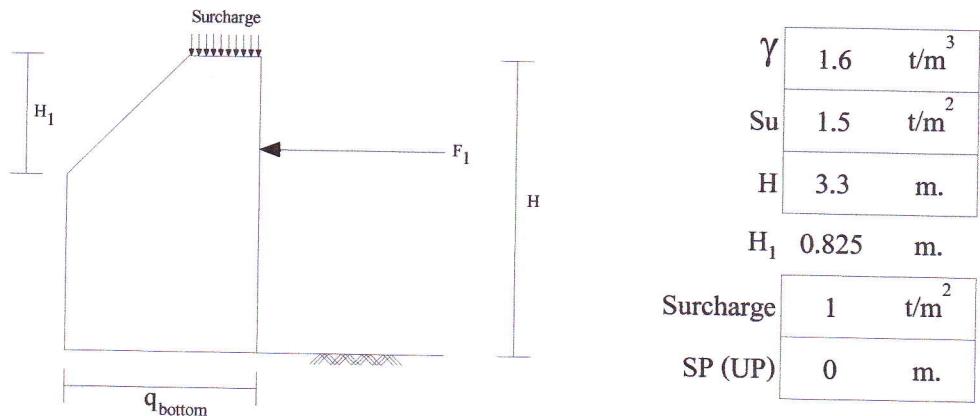
L_1	1.4	m.
L_2	2.4	m.
L_3	3.15	m.

$$F_1 = 11.46 \quad t/m.$$

$$F_2 = 16.98 \quad t/m.$$

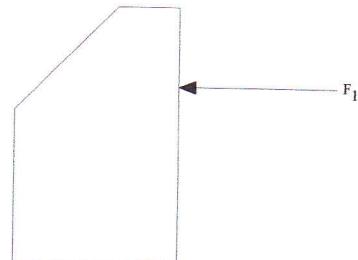
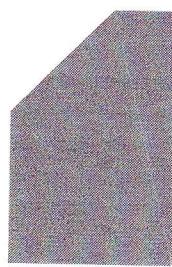
Total force

PRESSURE DIAGRAM & FORCE IN STRUT



$$q_{\text{bottom}} = \gamma H + q - 2S_u$$

$$= 3.28 \quad \text{t/m}^2$$

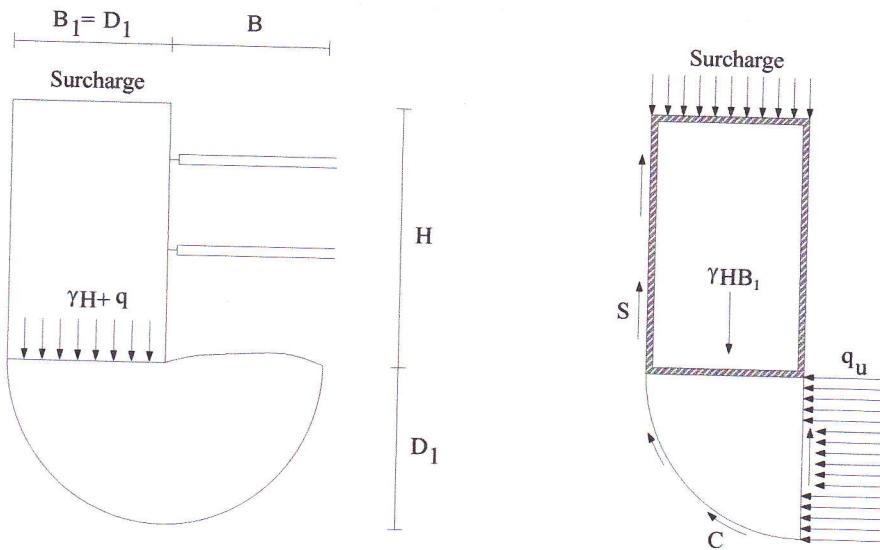


L_1	0.65	m.
L_2	2.65	m.

$$F_1 = 5.538 \quad \text{t/m.}$$

total force

DESIGN SHEET PILE



HEAVE EFFECT BY TENG'S (1980)

CHECK HEAVING EFFECT

SELECT SHEET PILE LENGTH 16 M.

γ	1.6	t/m^3
Su_1	1.5	t/m^2
H	6.95	m.
Surcharge	1	t/m^2
Length of SP	16	m.
SP (up)	0.3	m.
SP (down)	2.7	m.

$$\begin{aligned}
 S &= Su_1(H - 2Su_1/\gamma) \\
 &= 7.6125 \\
 B_1 &= 8.75 \quad m. \\
 Su_2 \text{ average} &= 4.1229 \quad t/m^2
 \end{aligned}$$

L_1	13
L_2	3

Su_1	1.5
Su_2	10

$$\begin{aligned}
 SF &= [(2S) + (Su_2 \pi B_1) + (2Su_2 B_1)] / (\gamma H + q) B_1 \\
 &= 1.892 > 1.00 \quad \text{O.K.}
 \end{aligned}$$

CHECK SECTION OF SHEET PILE

SELECT SHEET PILE TYPE FSP 3

Maximum Length of Supports 3.05 m.

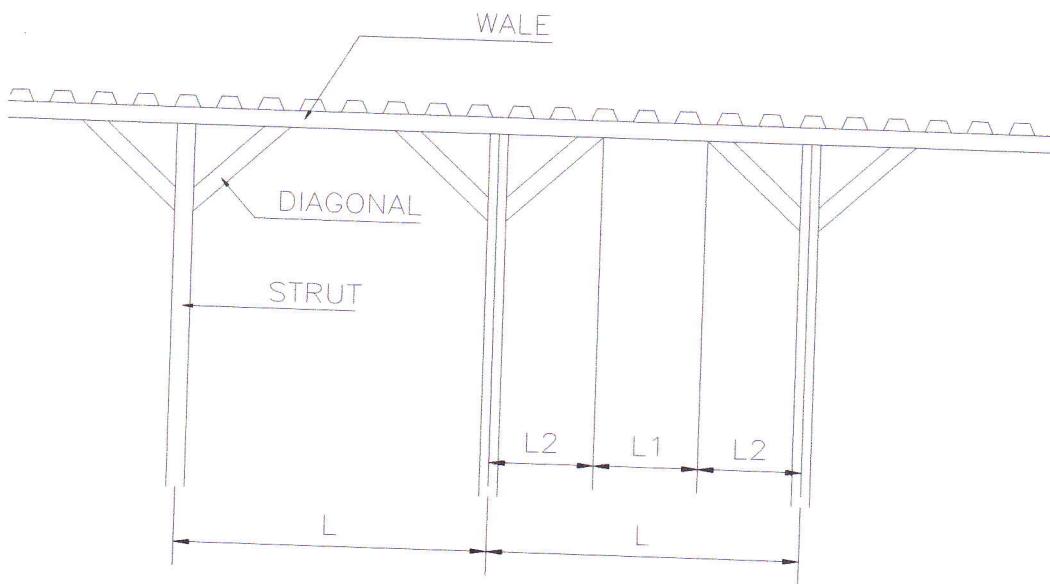
Maximum Moment 10.605 t-m.

$Sx_{(\text{require})} = 736.45 \quad \text{cm}^3/\text{m. of sheet pile} \quad \text{FSP 3}$

70% of Plan

CAN USE SHEET PILE LENGTH 16 M. TYPE FSP 3

DESIGN WALE



CHECK BENDING & COMPRESSION

$$\frac{f_a}{F_a} + \frac{f_b}{F_b} \leq 1.0 \quad \dots \dots \dots \text{(a)}$$

IF

$$KL/r < C_c$$

IF

$$KL/r > C_c$$

$$F_a = \frac{\left[1 - \frac{(KL/r)^2}{2C_c^2} \right] F_y}{\frac{5}{3} + \frac{3}{8} \frac{(KL/r)}{C_c} - \frac{1}{8} \frac{(KL/r)^3}{C_c^3}}$$

$$F_a = \frac{12 \pi^2 E}{23 (KL/r)^2}$$

F =	16.98	t/m
L ₁ =	2.5	m.
Axial Force	32.96	tons
Section Area	173.9	cm ²
Temperature	116	ksc.
Radius of Gyration	15.2	cm.
Effective Length		16.44737

Modulus of Section	2300	cm ³
F _a =	1389.792	ksc.
F _b =	1440	ksc.

TRY LAYER 1,2,3

WF 350x350x137 kg./m.

$$\frac{f_a}{F_a} + \frac{f_b}{F_b} = 0.62 \quad \dots \dots \dots \text{O.K.}$$

CHECK SHEAR FORCE

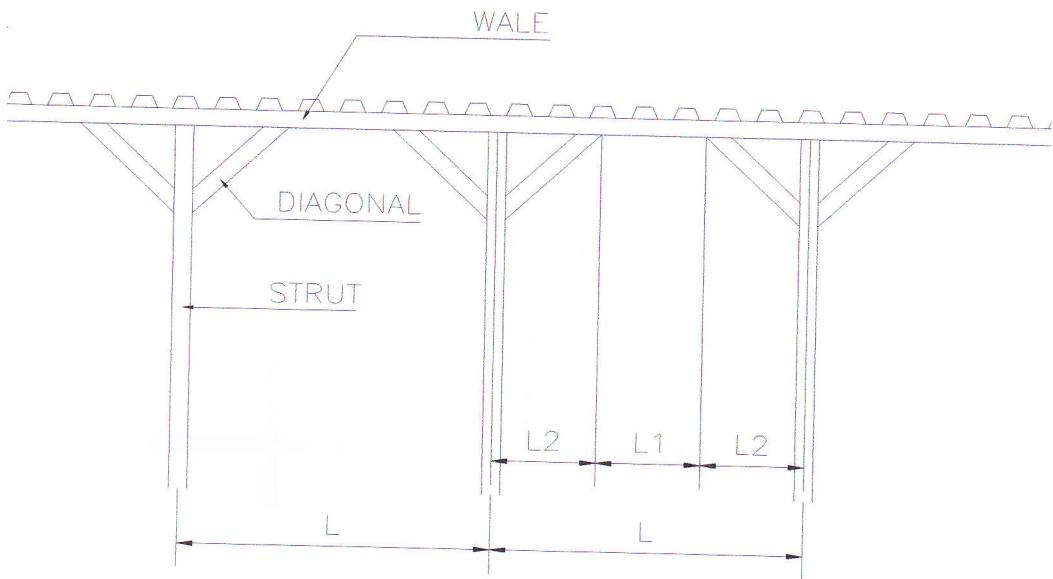
$$F_v = \frac{0.575 w L_1}{(H - 2t_f)(t_w)} = 651.94 \text{ ksc. O.K.}$$

Web thk.	1.2	cm.
Flange thk.	1.9	cm.
Depth of Section	35	cm.
F _v =	960	ksc.

CAN USE WF 350x350x137 kg./m.

Total sum

DESIGN WALE



CHECK BENDING & COMPRESSION

$$\frac{f_a}{F_a} + \frac{f_b}{F_b} \leq 1.0 \quad \dots \dots \dots \text{(a)}$$

IF
KL/r < Cc

$$F_a = \frac{\left[1 - \frac{(KL/r)^2}{2Cc^2} \right] F_y}{\frac{5}{3} + \frac{3}{8} \frac{(KL/r)}{Cc} - \frac{1}{8} \frac{(KL/r)^3}{Cc^3}}$$

IF
KL/r > Cc

$$F_a = \frac{12\pi^2 E}{23(KL/r)^2}$$

F =	16.98	t/m
L ₁ =	3	m.
Axial Force	32.96	tons
Section Area	218.7	cm ²
Temperature	116	ksc.
Radius of Gyration	17.5	cm.

Effective Length 17.14286

Modulus of Section	3330	cm ³
F _a =	1387.264	ksc.
F _b =	1440	ksc.

TRY LAYER 2

WF 400x400x172 kg./m.

$$\frac{f_a}{F_a} + \frac{f_b}{F_b} = 0.59 \quad \dots \dots \dots \text{O.K.}$$

CHECK SHEAR FORCE

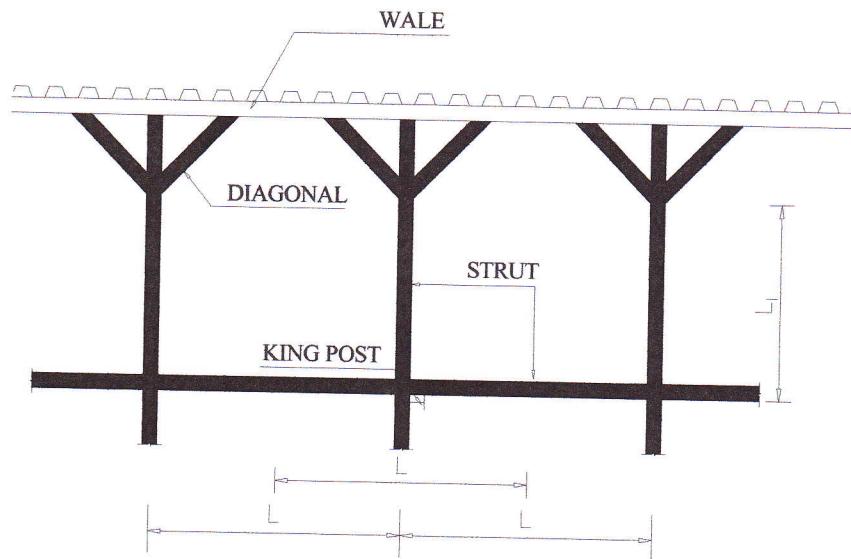
$$f_v = \frac{0.575 w L_1}{(H-2t_f)(t_w)} = 629.36 \text{ ksc. O.K.}$$

Web thk.	1.3	cm.
Flange thk.	2.1	cm.
Depth of Section	40	cm.
F _v =	960	ksc.

CAN USE WF 400x400x172 kg./m.

Total stress

DESIGN STRUT



TRY LAYER 1,2,3

WF 350x350x137 kg./m.

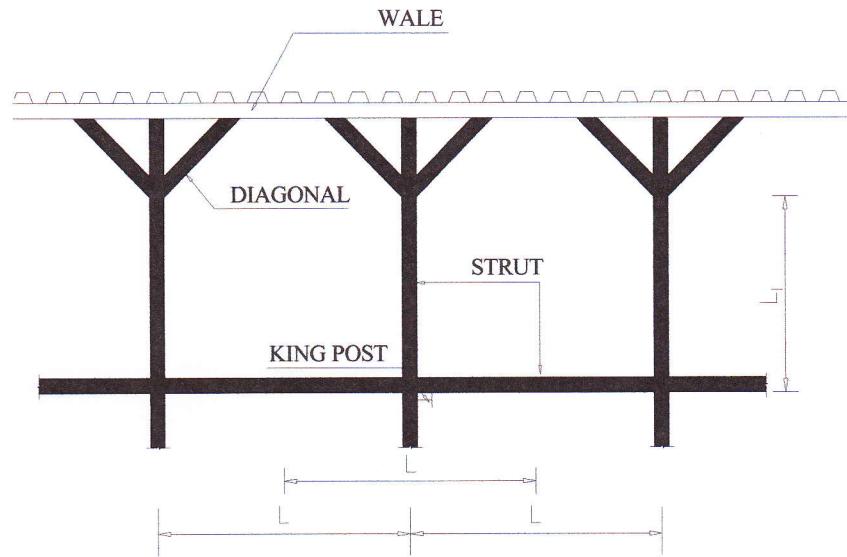
$$f_a = p/a = 966.74 \text{ ksc. O.K.}$$

F =	16.98	t/m
L =	8.8	m.
L ₁ =	8	m.
Section Area	173.9	cm ²
Temperature	116	ksc.
Radius of Gyration	8.84	cm.
Effective Length	90.49774	
F _a =	971.812	ksc.

CAN USE WF 350x350x137 kg./m.

Job done

DESIGN STRUT



TRY LAYER 2

WF 400x400x172 kg./m.

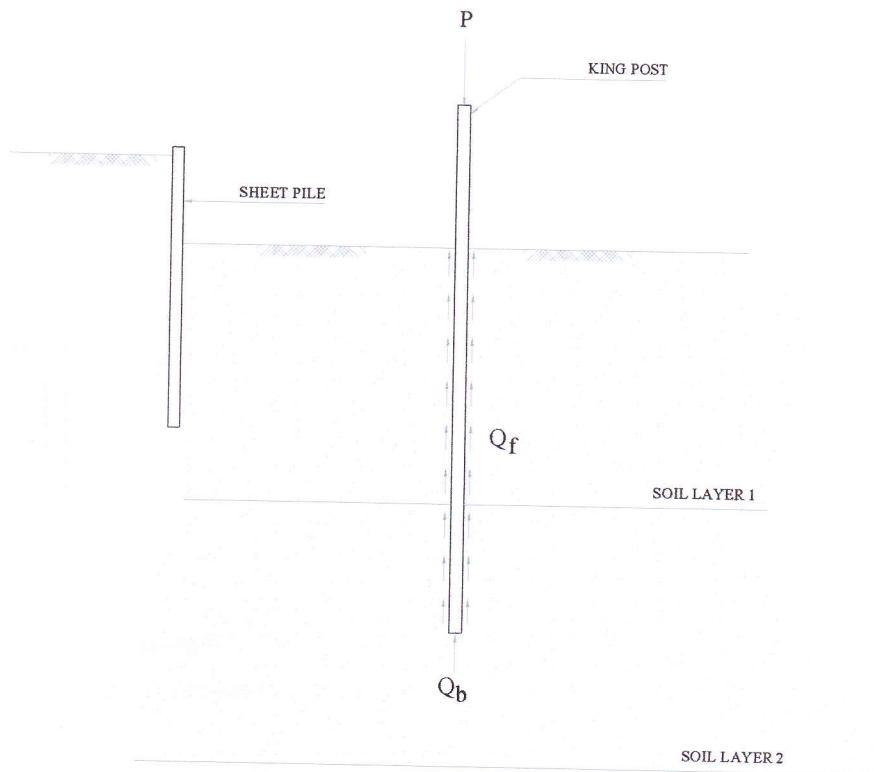
$$fa = p/a = 792.47 \text{ ksc. O.K.}$$

F =	16.98	t/m
L =	8.8	m.
L ₁ =	8.8	m.
Section Area	218.7	cm ²
Temperature	116	ksc.
Radius of Gyration	10.2	cm.
Effective Length	86.27451	
Fa =	1002.855	ksc.

CAN USE WF 400x400x172 kg./m.

70701 9/11/2018

DESIGN KING POST



TRY SECTION **WF 300x300x94 kg./m.** **LENGTH** **18 m.**

Surcharge on Platform	1.5 t/m ²
S_u_1	1.5 t/m ²
S_u_2	10 t/m ²
Depth of Section	0.3 m.

Excavation Depth	6.95 m.
Soil Layer 1	6.05 m.
End of Depth	5 m.

Load on King Post	39.6 tons
α_1	0.98
α_2	0.52
F.S.	1.25

$$Q_{all} = \frac{Q_f + Q_b}{F.S.} > P$$

When :

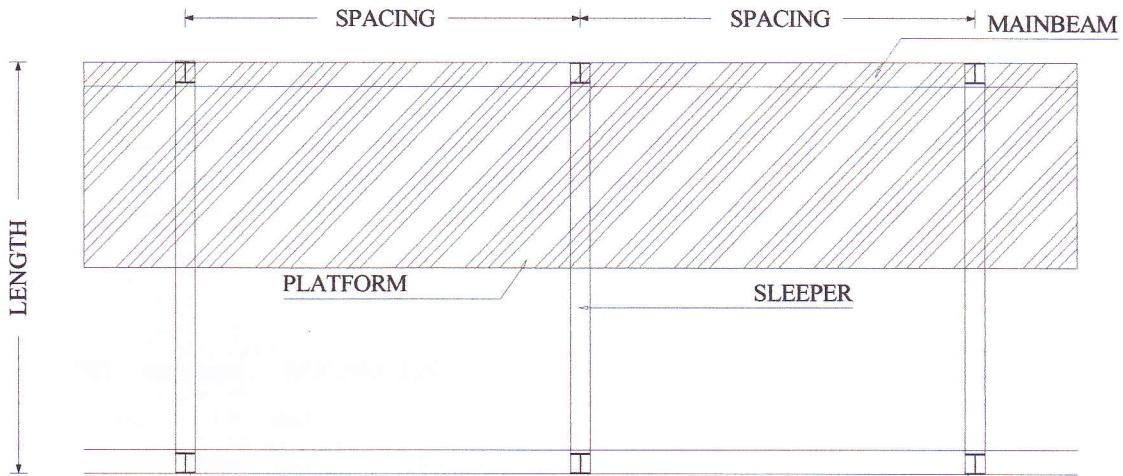
$$Q_f = \sum f_s \Delta L (p)$$

$$Q_b = 9 S_u (a)$$

$$Q_{all} = 39.97776 \text{ tons O.K.}$$

CAN USE KING POST WF 300x300x94 kg./m. LENGTH 18 M.

DESIGN MAINBEAM & SLEEPER

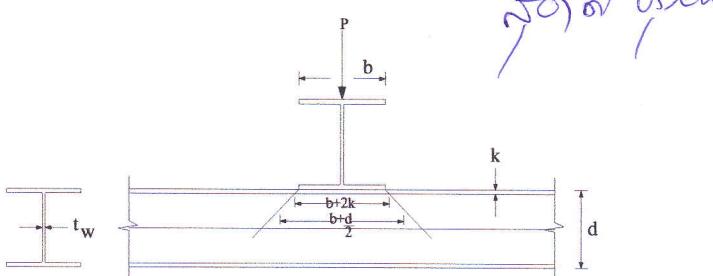


TRY	SECTION	2WF 400x400x172 kg./m.		Spacing	8.8 m.
Sx	6660 cm ³	Vmax	22.77 tons.	Length	6 m.
Lsd on Mainbeam	1.5 t/m ²	Vmainbeam	44.6784 tons.	O.K.
Maximum Moment	43.56 t-m.				
S _x require	3025 cm ³			O.K.

CAN USE MAINBEAM 2WF 400x400x172 kg./m.

$$\text{Web bucking stress} = \frac{P}{(b+d) \frac{t_w}{2}}$$

Thickness web	1.3 cm.
Flange width	80 cm.
Depth of SLEEPER	40 cm.
P =	39.6 tons



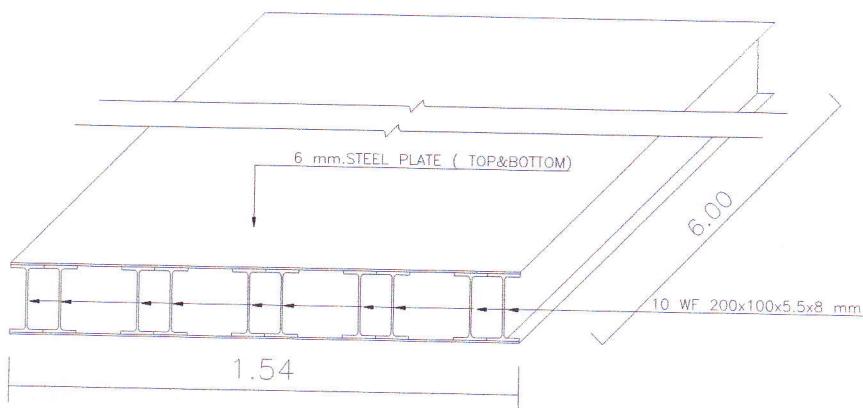
$$\text{Web bucking stress} = 304.6154 \text{ ksc.} \quad \dots \quad \text{O.K.}$$

Effective Length 125.5172

$$F_a = 681.3305 \text{ ksc.}$$

CAN USE SLEEPER WF 400x400x172 kg/m.

DESIGN PLATFORM



TRY SECTION **WF 200x100x21.3 kg./m.**

Surcharge on Platform	1.5 t/m ²
S _x	1104 cm ³

Length **6 m.**

f_v **444.664 ksc.**

F_v **960 ksc.** O.K.

H	20 cm.
t _f	0.8 cm.
t _w	0.55 cm.

Maximum Moment	6.75 t-m.
S _x _{require}	468.75 cm ³

..... O.K.

CAN USE PLATFORM WF 200x100x21.3 kg./m.

70% of Pw