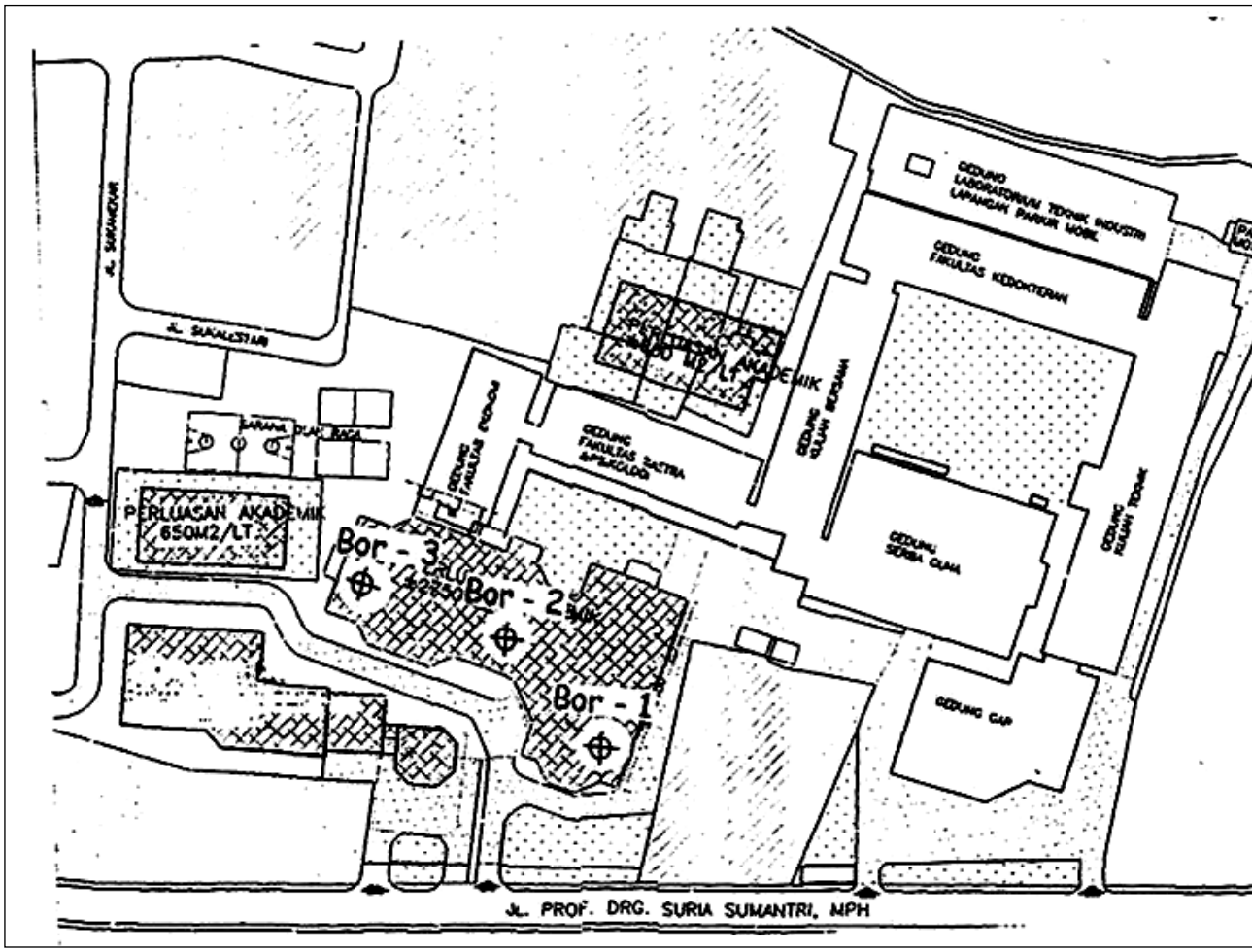

SKETSA LOKASI TITIK

PENYELIDIKAN LAPANGAN

No. Contoh Tanah		BH.1-U.1		BH.1-U.2		BH.1-U.3	
Depth		1,45-2,00 m		4,45-5,00 m		7,45-8,00 m	
Diameter Contoh	mm	38	38	38	38	38	38
Tinggi Contoh	mm	76	76	76	76	76	76
Luas Contoh	cm2	11,34	11,34	11,34	11,34	11,34	11,34
Volume Contoh	cm3	86,15	86,15	86,15	86,15	86,15	86,15
Berat Contoh	gr	125,6	127,7	138,3	139,1	144,5	145,2
Berat Jenis (γ)	t/m3	1,458	1,482	1,605	1,615	1,677	1,685
Berat Jenis Rata-rata (γrata-rata)	t/m3	1,47		1,61		1,681	

- Contoh perhitungan untuk **Pile No. 57**

1. Daya dukung ujung tiang/ Tahanan Ujung (*End-bearing Capacity, Q_p*)

   Untuk tanah dikohesi (*cohesionless*) atau nonplastis (*nonplastic silt*) :

   $$\mathbf{Q_P = (0{,}4\ \tilde{N}\ /B)\ D_f\ A_p \leq 3\tilde{N}\ A_p} \quad \text{.....(4.1)}$$

   Dimana,

   B = 128,9 cm = 4,229 ft

   L = 1920 cm = 62,992 ft

   D_f = 1680 cm = 55,118 ft

   $A_p = \frac{\pi}{4} B^2 = \frac{\pi}{4} \text{x } (4{,}229)^2 = 14{,}046 \text{ ft}^2$

   P = π x B = π x 4,229 = 13,286 ft

   σ_v' = ($\gamma_{rata\text{-}rata}$ - γ_{air}) x D_f

   = (0,045 – 0,028) x 55,118

   = 0,937 ton/ft^2

   C_N = $0{,}77\log_{10}$ ($20/\sigma'_v$)

   = $0{,}77\log_{10}$ (20/0,937) = 1,024

   N = Nilai N rata-rata pada ujung tiang tertanam

   = (100+100+100)/ 3 = 100

   Jadi Ñ = $C_N N$ = 1,024 x 100 = 102,4 ~ 103

   Dari persamaan (4.1), untuk tiang bor :

   $$Q_P = (0{,}4\ \tilde{N}\ /B)\ D_f\ A_p \leq 3\tilde{N}\ A_p$$

   $0{,}4\ \tilde{N}\ D_f\ A_p/B$ = 0,4 x 103 x 55,118 x 14,046/ 4,229

   = 7542,33 ton

   $3\ \tilde{N}\ A_p$ = 3 x 103 x 14,046

= 4340,214 ton

Q_P = 4340,214 ton

$1/3Q_P$ = 1/3 x 4340,214 = 1446,738 ton.

2. Daya dukung selimut/ Lengketan (*Friction Capacity on Perimeter Surface, Q_f*)

$$\mathbf{Q_f = f_s \, x \, P \, x \, L} \quad \text{..... (4.2)}$$

σ_v' = $\frac{0,937}{2}$ = 0,469 ton/ft^2

C_N = $0,77\log_{10}(20/0,469)$ = 1,255

N = Nilai N rata-rata pada sepanjang tiang tertanam

= (6+10+4+4+5+6+4+4+22+44+71+100+100+100)/14

= 34,286

Ñ = C_NN = 1,255 x 34,286 = 43,029

fs = Ñ/ 50 ≤ 1 ton/ft^2

= 43,029/ 50 = 0,861 ton/ft^2 ≤ 1 ton/ft^2

Dari persamaan (4.2) :

$Q_f = f_s$ x P x L

= 0,861 x 13,286 x 62,992

= 720,581 ton

$1/2Q_f$ = 1/2 x 720,581 = 360,291 ton

3. Daya Dukung Batas (*Bearing Capacity, Q_{ult}*)

$$\mathbf{(Q_u)_{ultimit} = Q_P + Q_f} \quad \text{.....(4.3)}$$

= 1446,738 + 360,291

= 1807,029 ton

- Contoh perhitungan untuk **Pile No. 58**

1. Daya dukung ujung tiang/ Tahanan Ujung (*End-bearing Capacity, Q_p*)

   Untuk tanah dikohesi (*cohesionless*) atau nonplastis (*nonplastic silt*) :

   $$\mathbf{Q_P = (0{,}4\ \tilde{N}\ /B)\ D_f\ A_p \leq 3\tilde{N}\ A_p} \quad \text{.....(4.1)}$$

   Dimana,

   B = 108,3 cm = 3,553 ft

   L = 1880 cm = 61,680 ft

   D_f = 1640 cm = 53,806 ft

   $A_p = \frac{\pi}{4} B^2 = \frac{\pi}{4} \text{x } (3{,}553)^2 = 9{,}915 \text{ ft}^2$

   $P = \pi \text{ x } B = \pi \text{ x } 3{,}553 = 11{,}162 \text{ ft}$

   $\sigma_v' = (\gamma_{\text{rata-rata}} - \gamma_{\text{air}}) \text{ x } D_f$

   $= (0{,}045 - 0{,}028) \text{ x } 53{,}806$

   $= 0{,}915 \text{ ton/ft}^2$

   $C_N = 0{,}77 \log_{10} (20/\sigma'_v)$

   $= 0{,}77 \log_{10} (20/0{,}915) = 1{,}032$

   N = Nilai N rata-rata pada ujung tiang tertanam

   $= (100+100+100)/ 3 = 100$

   Jadi $\tilde{N} = C_N N = 1{,}032 \text{ x } 100 = 103{,}2 \sim 104$

   Dari persamaan (4.1), untuk tiang bor :

   $$Q_P = (0{,}4\ \tilde{N}\ /B)\ D_f\ A_p \leq 3\tilde{N}\ A_p$$

   $0{,}4\ \tilde{N}\ D_f\ A_p/B = 0{,}4 \text{ x } 104 \text{ x } 53{,}806 \text{ x } 9{,}915/ 3{,}553$

   $= 6246{,}281 \text{ ton}$

   $3\ \tilde{N}\ A_p = 3 \text{ x } 104 \text{ x } 9{,}915$

= 3093,480 ton

Q_P = 3093,480 ton

$1/3Q_P$ = 1/3 x 3093,480 = 1031,160 ton.

2. Daya dukung selimut/ Lengketan (*Friction Capacity on Perimeter Surface, Q_f*)

$$\mathbf{Q_f = f_s \, x \, P \, x \, L} \quad \text{.....(4.2)}$$

σ_v' = $\frac{0,915}{2}$ = 0,458 ton/ft^2

C_N = $0,77\log_{10}(20/0,458)$ = 1,263

N = Nilai N rata-rata pada sepanjang tiang tertanam

= (6+10+4+4+5+6+4+4+22+44+71+100+100+100)/14

= 34,286

$\tilde{N}$ = $C_N N$ = 1,263 x 34,286 = 43,303

f_s = $\tilde{N}/ 50 \leq 1$ ton/ft^2

= 43,303/ 50 = 0,866 ton/ft^2 ≤ 1 ton/ft^2

Dari persamaan (4.2) :

$Q_f = f_s$ x P x L

= 0,866 x 11,162 x 61,680

= 596,217 ton

$1/2Q_f$ = 1/2 x 596,217 = 298,108 ton

3. Daya Dukung Batas (*Bearing Capacity, Q_{ult}*)

$$\mathbf{(Q_u)_{ultimit} = Q_P + Q_f} \quad \text{.....(4.3)}$$

= 1031,160 + 298,108

= 1329,268 ton

- Contoh perhitungan untuk **Pile No. 86**

1. Daya dukung ujung tiang/ Tahanan Ujung (*End-bearing Capacity*, Q_p)

   Untuk tanah dikohesi (*cohesionless*) atau nonplastis (*nonplastic silt*) :

   $$\mathbf{Q_P = (0{,}4\ \tilde{N}\ /B)\ D_f\ A_p \leq 3\tilde{N}\ A_p} \quad \text{.....(4.1)}$$

   Dimana,

   B = 89,170 cm = 2,926 ft

   L = 1840 cm = 60,368 ft

   D_f = 1630 cm = 53,478 ft

   $A_p = \frac{\pi}{4} B^2 = \frac{\pi}{4} \text{x } (2{,}926)^2 = 6{,}724 \text{ ft}^2$

   P = π x B = π x 2,926 = 9,192 ft

   σ_v' = ($\gamma_{rata\text{-}rata}$ - γ_{air}) x D_f

   = (0,045 – 0,028) x 53,478

   = 0,909 ton/ft^2

   C_N = $0{,}77\log_{10}$ ($20/\sigma'_v$)

   = $0{,}77\log_{10}$ (20/0,909) = 1,034

   N = Nilai N rata-rata pada ujung tiang tertanam

   = (100+100+100)/ 3 = 100

   Jadi Ñ = C_NN = 1,034 x 100 = 103,4 ~ 104

   Dari persamaan (4.1), untuk tiang bor :

   $$Q_P = (0{,}4\ \tilde{N}\ /B)\ D_f\ A_p \leq 3\tilde{N}\ A_p$$

   0,4 Ñ D_f A_p/B = 0,4 x 104 x 53,478 x 6,724 / 2,926

   = 5112,365 ton

   3 Ñ A_p = 3 x 104 x 6,724

   = 2097,888 ton

   Q_P = 2097,888 ton

$1/3Q_P$ = 1/3 x 2097,888 = 699,296 ton.

2. Daya dukung selimut/ Lengketan (*Friction Capacity on Perimeter Surface, Q_f*)

$$\mathbf{Q_f = f_s \times P \times L} \quad \text{.....(4.2)}$$

σ_v' = $\frac{0,909}{2}$ = 0,455 ton/ft^2

C_N = $0,77\log_{10}$ (20/0,455) = 1,265

N = Nilai N rata-rata pada sepanjang tiang tertanam

= (6+10+4+4+5+6+4+4+22+44+71+100+100+100)/14

= 34,286

$\tilde{N}$ = $C_N N$ = 1,265 x 34,286 = 43,372

f_s = $\tilde{N}$/ 50 ≤ 1 ton/ft^2

= 43,372/ 50 = 0,867 ton/ft^2 ≤ 1 ton/ft^2

Dari persamaan (4.2) :

$Q_f = f_s \times P \times L$

= 0,867 x 9,192 x 60,368

= 481,101 ton

$1/2Q_f$ = 1/2 x 481,101 = 240,551 ton

3. Daya Dukung Batas (*Bearing Capacity, Q_{ult}*)

$$\mathbf{(Q_u)_{ultimit} = Q_P + Q_f} \quad \text{.....(4.3)}$$

= 699,296 + 240,551

= 939,847 ton