

| DATE | SAMPLING | DEPTH | ELEVATION | COLUMN SECTION | DESCRIPTION | GROUND WATER LEVEL | ROCK GRADE | CORE RECO VERY % | R Q D % | VERTICAL | ELEVATION | M | DRILL RIG | LOGGED BY | M | |
|---------------|----------|-------|-----------|----------------|-------------------------------|--------------------|------------|------------------|---------|----------|-----------|---|-----------|-----------|---|-------|
| | | | | | | | | | | | | | | | | DEPTH |
| 1997 | | | | | | | | | | | | | | | | |
| DEC. 20, 1997 | | 0.00 | 135.254 | X | TOP SOIL, grey, soft | | | 100 | 0 | | | | | | | |
| DEC. 20, 1997 | | | | | SANDY TUFF, soft, light brown | | CL-L | 100 | 0 | | | | | | | |
| DEC. 20, 1997 | | 3.06 | 133.654 | | SANDSTONE, dense, light brown | | CL-L | 100 | 0 | | | | | | | |
| DEC. 20, 1997 | | 5.70 | 132.954 | | | | | 100 | 0 | | | | | | | |
| DEC. 20, 1997 | | 6.55 | 130.104 | | | | | 100 | 0 | | | | | | | |
| DEC. 20, 1997 | | 7.40 | 129.254 | | | | | 100 | 0 | | | | | | | |
| DEC. 20, 1997 | | 7.86 | 128.804 | | | | | 100 | 15 | | | | | | | |
| DEC. 20, 1997 | | 8.06 | 128.654 | | | | | 100 | 30 | | | | | | | |
| DEC. 20, 1997 | | 9.30 | 127.354 | | | | | 100 | 20 | | | | | | | |
| DEC. 20, 1997 | | 9.80 | 126.854 | | | | | 100 | 40 | | | | | | | |
| DEC. 20, 1997 | | 10.20 | 126.454 | | | | | 100 | 80 | | | | | | | |
| DEC. 20, 1997 | | 10.80 | 125.854 | | | | | 100 | 90 | | | | | | | |
| DEC. 20, 1997 | | 11.80 | 124.854 | | | | | 100 | 90 | | | | | | | |
| DEC. 20, 1997 | | 13.35 | 123.304 | | | | | 100 | 20 | | | | | | | |
| DEC. 20, 1997 | | 17.10 | 119.554 | | | | | 90 | 45 | | | | | | | |
| DEC. 20, 1997 | | 17.40 | 119.254 | | | | | 100 | 36 | | | | | | | |
| DEC. 20, 1997 | | | | | | | | 100 | 20 | | | | | | | |
| DEC. 20, 1997 | | | | | | | | 100 | 0 | | | | | | | |
| DEC. 20, 1997 | | | | | | | | 50 | 35 | | | | | | | |
| DEC. 20, 1997 | | | | | | | | 90 | 40 | | | | | | | |

Lugeon Value = 2.69
Critical Pressure = 2.80 kg/cm²

Lugeon Value = 185.04
Critical Pressure = kg/cm²

| | | | | | | | | | |
|----|---|-------|---------|---|---|------|-----|----|---|
| 16 | Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ | 17.40 | 119.554 | Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ | CONGLTIC SANDSTONE, compact, brown | CL-L | 100 | 25 | Lugeon Value = 2.69 Critical Pressure = 2.80 kg/cm ² |
| 17 | Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ | 17.40 | 119.554 | Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ | CONGLTIC SANDSTONE, compact, brown | CL-L | 100 | 36 | Lugeon Value = 2.69 Critical Pressure = 2.80 kg/cm ² |
| 18 | Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ | | | Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ | | | | | |
| 19 | Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ | | | Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ | | | | | |
| 20 | Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ | | | Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ | | | | | |
| 21 | Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ | | | Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ | | | | | |
| 22 | Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ | | | Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ | VOLCANIC BRECCIA, compact, greyish brown | CM-H | 90 | 40 | Lugeon Value = 1.23 Critical Pressure = 8.38 kg/cm ² |
| 23 | Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ | | | Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ | | | | | |
| 24 | Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ | | | Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ | | | | | |
| 25 | Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ | | | Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ | | | | | |
| 26 | Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ | 26.25 | 110.404 | Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ Δ | | | | | |
| 27 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | 26.35 | 109.896 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | CONGLTIC SANDSTONE, compact, brownish grey | CL-H | 100 | 24 | |
| 28 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | 28.05 | 108.604 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | SANDSTONE, c. grained, compact, greyish brown | CL-H | 100 | 20 | Lugeon Value = 3.41 Critical Pressure = 6.33 kg/cm ² |
| 29 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | | | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | SANDSTONE, fine grained, compact, greyish brown | CL-H | 100 | 27 | |
| 30 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | 30.30 | 106.454 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | | | | | |
| 31 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | 30.75 | 105.904 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | CONGLTIC SANDSTONE, compact, brownish grey | CL-H | 100 | 25 | |
| | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | 31.10 | 105.554 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | SANDSTONE, f. grained, compact, brownish grey | CL-H | 100 | 30 | |
| | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | 31.85 | 105.104 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | CONGLTIC SANDSTONE, compact, brownish grey | CL-H | 100 | 32 | |
| 32 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | 32.60 | 104.054 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | SANDSTONE, c. grained, dense, brownish grey | CL-H | 100 | 35 | Lugeon Value = 1.31 Critical Pressure = 4.19 kg/cm ² |
| 33 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | 33.20 | 103.454 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | CONGLTIC SANDSTONE, medium grained, brown | CL-H | 100 | 68 | |
| 34 | * * * * * * * * * * * * * * * | | | * * * * * * * * * * * * * * * | TUFF, compact, greyish brown | CL-H | 100 | 18 | |
| 35 | * * * * * * * * * * * * * * * | 34.80 | 102.154 | * * * * * * * * * * * * * * * | SANDSTONE, med. ~ c. grained, compact, grey | CL-H | 100 | 22 | |
| | * * * * * * * * * * * * * * * | 34.85 | 101.804 | * * * * * * * * * * * * * * * | SANDSTONE, fine grained, compact, grey | CL-H | 100 | 22 | |
| 36 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | 35.00 | 101.654 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | SANDSTONE, med. ~ c. grained, compact, grey | CL-H | 100 | 22 | |
| | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | 36.15 | 100.604 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | CONGLTIC SANDSTONE, dense, brownish grey | CL-H | 100 | 22 | |
| | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | 36.95 | 100.004 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | SANDSTONE, m. ~ c. grained, dense, dark grey | CL-H | 100 | 22 | |
| 37 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | 37.10 | 99.654 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | CONGLTIC SANDSTONE, compact, blackish grey | CM-L | 100 | 22 | Lugeon Value = 2.22 Critical Pressure = 11.65 kg/cm ² |
| 38 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | 37.80 | 98.854 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | SANDSTONE, c. grained, compact, blackish grey | CM-L | 100 | 25 | |
| | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | 38.00 | 98.654 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | | | | | |
| 39 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | 41.20 | 95.454 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | | | | | |
| | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | 41.35 | 95.204 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | SANDSTONE, m. grained, compact, brownish grey | CM-L | 100 | 67 | |
| | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | 41.85 | 94.804 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | CONGLTIC SANDSTONE, compact, blackish grey | CM-L | 100 | 67 | |
| 42 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | 42.05 | 94.604 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | TUFF, compact, light grey | CM-L | 100 | 54 | Lugeon Value = 2.15 Critical Pressure = 9.79 kg/cm ² |
| | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | 42.85 | 93.804 | ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ | CONGLTIC SANDSTONE, compact, blackish grey | CM-L | 100 | 20 | |
| 43 | * * * * * * * * * * * * * * * | 43.45 | 93.204 | * * * * * * * * * * * * * * * | SANDSTONE, f. grained, compact, blackish grey | CL-H | 100 | 20 | |
| 44 | * * * * * * * * * * * * * * * | 44.10 | 92.654 | * * * * * * * * * * * * * * * | TUFF SANDSTONE, f. grained, compact, dark grey | CL-H | 100 | 20 | |

| No. | Date | Time | Depth (m) | Interval (m) | Stratigraphic Unit | Remarks | Soil Type | Moisture (%) | Temperature (°C) | Water Content (%) | Lugeon Value | Critical Pressure (kg/cm ²) |
|-----|-------|--------|-----------|--------------|--|---------|-----------|--------------|------------------|---|--------------|---|
| 37 | 37.10 | 99.554 | 37.80 | 98.964 | CONGL/TIC SANDSTONE, compact, blackish grey | | CM-L | 22 | 100 | Lugeon Value = 2.22 Critical Pressure = 11.65 kg/cm ² | | |
| 38 | 38.00 | 98.654 | | | SANDSTONE, c. grained, compact, blackish grey | | CM-L | 25 | 100 | | | |
| 39 | | | | | | | | | | | | |
| 40 | | | | | CONGL/TIC SANDSTONE, compact, blackish grey | | CM-L | 27 | 100 | | | |
| 41 | 41.20 | 98.454 | | | | | | | | | | |
| 42 | 41.35 | 98.204 | 41.85 | 94.904 | SANDSTONE, m. grained, compact, brownish grey | | CM-L | 67 | 100 | | | |
| | 41.85 | 94.904 | | | CONGL/TIC SANDSTONE, compact, blackish grey | | CM-L | | | | | |
| | | | | | TUFF, compact, light grey | | CM-L | | | | | |
| 43 | 42.05 | 94.604 | 42.85 | 93.904 | CONGL/TIC SANDSTONE, compact, blackish grey | | CM-L | 54 | 100 | Lugeon Value = 2.15 Critical Pressure = 9.79 kg/cm ² | | |
| 44 | 43.45 | 93.204 | | | SANDSTONE, f. grained, compact, blackish grey | | CL-H | 20 | 100 | | | |
| | 44.10 | 92.854 | | | TUFF, SANDSTONE, f. grained, compact, dark grey | | CL-H | | | | | |
| 45 | | | | | | | | | | | | |
| 46 | | | | | SANDSTONE, f. m. grained, compact, blackish grey | | CL-L | 15 | 90 | | | |
| 47 | 46.30 | 89.754 | | | | | | | | | | |
| 48 | | | | | CONGL/TIC SANDSTONE, compact, blackish grey (partly sandstone) | | CL-H | 30 | 100 | Lugeon Value = 1.15 Critical Pressure = 7.97 kg/cm ² | | |
| 49 | 48.00 | 87.864 | 49.30 | 87.264 | SANDY TUFF, compact, light grey | | CL-H | | | | | |
| | 49.30 | 87.264 | | | SANDSTONE, f. grained, compact, blackish grey | | CL-H | 30 | 100 | | | |
| | 49.70 | 86.954 | | | TUFF, compact, light grey | | CL-H | | | | | |
| 50 | | | | | | | | | | | | |
| 51 | | | | | | | | | | | | |
| 52 | | | | | VOLCANIC BRECCIA, compact, blackish grey | | CM-H | 35 | 100 | Lugeon Value = 0.32 Critical Pressure = 7.26 kg/cm ² | | |
| 53 | | | | | | | | | | | | |
| 54 | 54.60 | 82.054 | | | | | | | | | | |
| 55 | | | | | TUFF, fine, compact, blackish grey | | CL-H | 25 | 100 | | | |
| 56 | 55.75 | 80.904 | | | | | | | | | | |
| 57 | | | | | | | | | | | | |
| 58 | | | | | | | | | | | | |
| 59 | | | | | VOLCANIC BRECCIA, compact, brownish grey | | CL-H | 0 | 100 | | | |
| 60 | | | | | | | | | | | | |
| 61 | | | | | | | | | | | | |
| 62 | | | | | | | | | | | | |
| 63 | | | | | CONGLOMERATE, poor cemented, blackish grey, Ø 12 cm | | D (IV) | 28 | 100 | Lugeon Value = 3.34 Critical Pressure = 7.38 kg/cm ² | | |
| 64 | | | | | | | | | | | | |
| 65 | | | | | | | | | | | | |
| 66 | | | | | VOLCANIC BRECCIA, compact, brownish grey, mixed with some gravel andesites Ø 5-10 cm | | CM-H | 20 | 100 | | | |

| DATE | DEPTH (m) | LOGON VALUE | CRITICAL PRESSURE (kg/cm ²) | REMARKS | DESIGNATION |
|------------------|-----------|-------------|---|--|-------------|
| JANUARY 03, 1998 | 61 | 100 | 3.54 | CONGLOMERATE, poor cemented, blackish grey, Ø 12 cm | D (IV) |
| | 62 | 100 | 3.54 | | |
| | 63 | 100 | 3.54 | | |
| | 64 | 100 | 3.54 | | |
| | 65 | 100 | 3.54 | | |
| | 66 | 100 | 3.54 | | |
| | 67 | 100 | 3.54 | | |
| | 68 | 100 | 3.54 | | |
| | 69 | 100 | 3.54 | | |
| | 70 | 100 | 3.54 | | |
| JANUARY 04, 1998 | 71 | 100 | 0.25 | VOLCANIC BRECCIA, compact, brownish grey, mixed with some gravel andesites Ø 5 ~ 10 cm | CM-H |
| | 72 | 100 | 0.25 | | |
| | 73 | 100 | 0.25 | | |
| | 74 | 100 | 0.25 | | |
| | 75 | 100 | 0.25 | | |
| | 76 | 100 | 0.25 | | |
| | 77 | 100 | 0.25 | | |
| | 78 | 100 | 0.25 | | |
| | 79 | 100 | 0.25 | | |
| | 80 | 100 | 0.25 | | |
| JANUARY 05, 1998 | 81 | 100 | 0.35 | TUFF STONE, c. grained, compact, grey | CL-E |
| | 82 | 100 | 0.35 | | |
| | 83 | 100 | 0.35 | | |
| | 84 | 100 | 0.35 | | |
| | 85 | 100 | 0.35 | | |
| | 86 | 100 | 0.35 | | |
| | 87 | 100 | 0.35 | | |
| | 88 | 100 | 0.35 | | |
| | 89 | 100 | 0.35 | | |
| | 90 | 100 | 0.35 | | |
| JANUARY 06, 1998 | 91 | 100 | 0.59 | VOLC. CONGLOMERATE, compact, brownish grey | CL-E |
| | 92 | 100 | 0.59 | | |
| | 93 | 100 | 0.59 | | |
| | 94 | 100 | 0.59 | | |
| | 95 | 100 | 0.59 | | |
| | 96 | 100 | 0.59 | | |
| | 97 | 100 | 0.59 | | |
| | 98 | 100 | 0.59 | | |
| | 99 | 100 | 0.59 | | |
| | 100 | 100 | 0.59 | | |
| JAN. 07, 98 | 101 | 100 | 0.82 | VOLCANIC BRECCIA, compact, grey | CM-H |
| | 102 | 100 | 0.82 | | |
| | 103 | 100 | 0.82 | | |
| | 104 | 100 | 0.82 | | |
| | 105 | 100 | 0.82 | | |
| | 106 | 100 | 0.82 | | |
| | 107 | 100 | 0.82 | | |
| | 108 | 100 | 0.82 | | |
| | 109 | 100 | 0.82 | | |
| | 110 | 100 | 0.82 | | |
| JAN. 08, 1998 | 111 | 100 | 0 | SANDSTONE, loose, blackish grey | CL-L |
| | 112 | 100 | 0 | | |
| | 113 | 100 | 0 | | |
| | 114 | 100 | 0 | | |
| | 115 | 100 | 0 | | |
| | 116 | 100 | 0 | | |
| | 117 | 100 | 0 | | |
| | 118 | 100 | 0 | | |
| | 119 | 100 | 0 | | |
| | 120 | 100 | 0 | | |

END OF DRILLING

R. Q. D. = Rock Quality Designation = (Total Length of Cylindric Cores longer than 10 cm) / (Total Core Length) x 100 %

LUGEON VALUE is ltr/min/mtr under injection water pressure by 10 kgf/cm²

G. W. L. = Ground Water Level = Height of Spring Water

SUBSURFACE EXPLORATION LOG

BORING NO : B-28
SHEET : 1 OF 5
TOTAL DEPTH : 115.00 m

PROJECT : ADDITIONAL GEOLOGICAL SURVEY FOR THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER REOURCES DEVELOPMENT IN SEMARANG, IN THE REPUBLIC OF INDONESIA
LOCATION : DAM SITE
FEATURE :
AREA DESIGNATION :
GROUND ELEVATION : Z = 124.774
COORDINATES : X = 428218.310 Y = 9222152.634
DEPTH OF GWL (m) : -24.20

COMMENCEMENT DATE : 20 August 1998
COMPLETION DATE : 12 September 1998
ANGLE : Vertical BEARING :
DRILLER : A.A. F. U.S.
SUPERVISOR : H. Oka
LOGGED : Rudy M. A. S.
DRILLING MACHINE : YBM-3ES

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|----------------|-------|----------------|---------------------|---------------------|---------------------|-----------------|---|---------------------|------------|----------|---------------|-------------------|---------------------|---------|----|
| DATE | SCALE | DEPTH IN METER | DEPTH OF WATER LOSS | DEPTH OF WATER LOSS | DEPTH OF WATER LOSS | GRAPH OF R.Q.D. | DESCRIPTION OF LITHOLOGY | ROCK CLASSIFICATION | WEATHERING | HARDNESS | JOINT SPACING | S.P.T. BLOW/30 CM | WATER PRESSURE TEST | REMARKS | |
| | | | | | | | | | | | | | | | |
| 20 AUGUST 1998 | | 0.50 | | | | | 0.00 - 0.83 m: COARSE SANDSTONE, dark grey to brownish grey, medium to coarse grained, loose to medium dense, poorly graded, poorly cemented. Containing some amount of gravel with dia. up to 2 cm. HW of tuff. | | | | | | | | |
| | | 1.40 | | | | | 0.83 - 1.49 m: TUFFACEOUS SANDSTONE. | | | | | | | | |
| | | 3.40 | | | | | 1.49 - 3.43 m: CONGLOMERATE. | | | | | | | | |
| | | 3.70 | | | | | 3.43 - 3.70 m: TUFF. | CL-L | | | | | | | |
| | | 5.33 | | | | | 3.70 - 5.30 m: CONGLOMERATIC SANDSTONE, medium cemented. Mafic Mt, brownish grey to grey, medium to coarse grained. Component: Andesite, pumice with dia. up to 2 cm. | | | | | | | | |
| | | 6.82 | | | | | 5.30 - 6.83 m: FINE SANDSTONE, brownish grey, medium cemented, fine grained, high porosity, well graded. | | | | | | | | |
| | | 8.10 | | | | | 6.83 - 8.70 m: TUFFACEOUS SANDSTONE, brownish grey, fine to medium sand grained, weak rock, poorly cemented. | CL-H | | | | | 26.37 | | |
| | | 9.70 | | | | | 8.70 - 20.50 m: VOLCANIC BRECCIA, medium to well cemented. Mafic tuffaceous sand, grey, medium to coarse grained. Component: andesite, grey to reddish brown, dia. up to 3 cm. | | | | | | | | |
| 21 AUGUST 1998 | | 13.75 | | | | | 13.75 - 14.43 m: SANDSTONE. | | | | | | | 2.48 | |
| | | 14.20 | | | | | 14.43 - 20.50 m: VOLCANIC BRECCIA. | | | | | | | | |
| 22 AUGUST 1998 | | 21.00 | | | | | 20.50 - 21.00 m: TUFF. | CM-H | | | | | | | |
| | | 21.70 | | | | | 21.00 - 21.70 m: SANDSTONE (GRAVELY). | CL-H | | | | | | | |
| | | 22.70 | | | | | 21.70 - 22.70 m: SANDSTONE (coarse). | CL-L | | | | | | 5.12 | |
| | | 24.20 | | | | | 22.70 - 24.20 m: FINE SANDSTONE, brownish grey, medium to coarse grained, medium cemented, well graded (matrix of breccia). | | | | | | | | |
| 25 AUGUST 1998 | | 24.70 | | | | | 24.70 - 25.20 m: TUFF, medium cemented. | CL-H | | | | | | | |

Fig. 1.1.27 Subsurface Exploration Log No. B - 28 (1 of 5)

SUBSURFACE EXPLORATION LOG

BORING NO : B-28
SHEET : 2 OF 5
TOTAL DEPTH : 115.00 m

PROJECT : ADDITIONAL GEOLOGICAL SURVEY FOR THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER REOURCES DEVELOPMENT IN SEMARANG, IN THE REPUBLIC OF INDONESIA
LOCATION : DAM SITE
FEATURE :
AREA DESIGNATION :
GROUND ELEVATION : Z = 124.774
COORDINATES : X = 428218.310 Y = 9222152.634
DEPTH OF GWL (m) : -24.20

COMMENCEMENT DATE : 20 August 1998
COMPLETION DATE : 12 September 1998
ANGLE : Vertical BEARING :
DRILLER : A.A. F. U.S.
SUPERVISOR : H. Oka
LOGGED : Rudy M. A. S.
DRILLING MACHINE : YBM-3ES

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|----------------|-------|----------------|---------------------|---------------------|---------------------|-----------------|--|---------------------|------------|----------|---------------|-------------------|---------------------|---------|----|
| DATE | SCALE | DEPTH IN METER | DEPTH OF WATER LOSS | DEPTH OF WATER LOSS | DEPTH OF WATER LOSS | GRAPH OF R.Q.D. | DESCRIPTION OF LITHOLOGY | ROCK CLASSIFICATION | WEATHERING | HARDNESS | JOINT SPACING | S.P.T. BLOW/30 CM | WATER PRESSURE TEST | REMARKS | |
| | | | | | | | | | | | | | | | |
| 26 AUGUST 1998 | | 25.20 | | | | | 24.70 - 25.20 m: TUFF. | CL-L | | | | | | | |
| | | 25.40 | | | | | 25.20 - 26.50 m: SANDSTONE (medium to coarse grained), dark grey, medium cemented. | | | | | | | | |
| | | 27.00 | | | | | 26.50 - 27.30 m: FINE SANDSTONE, grey to yellowish. | | | | | | 12.55 | | |
| | | 27.30 | | | | | 27.30 - 28.50 m: TUFF. | | | | | | | | |
| | | 28.50 | | | | | 28.50 - 30.00 m: COARSE SANDSTONE; in the depth of 29.10 - 29.70 m: loose. | CL-H | | | | | | | |
| | | 30.00 | | | | | 30.00 - 30.50 m: CONGLOMERATIC SANDSTONE. | CL-L | | | | | | | |
| | | 30.50 | | | | | 30.50 - 31.00 m: COARSE SANDSTONE, grey, medium to coarse grained, medium cemented, poorly to medium graded. | CL-H | | | | | | | |
| 27 AUGUST 1998 | | 31.00 | | | | | 31.00 - 32.50 m: CONGLOMERATIC SANDSTONE, medium cemented. | CM-L | | | | | | 2.87 | |
| | | 32.90 | | | | | 32.50 - 33.30 m: FINE SANDSTONE. | CL-H | | | | | | | |
| | | 33.30 | | | | | 33.30 - 34.20 m: CONGLOMERATIC SANDSTONE. | | | | | | | | |
| | | 34.20 | | | | | 34.20 - 34.43 m: FINE SANDSTONE. | | | | | | | | |
| | | 34.43 | | | | | 34.43 - 35.55 m: CONGLOMERATIC SANDSTONE. | CM-L | | | | | | | |
| | | 35.55 | | | | | 35.55 - 37.60 m: FINE SANDSTONE. | | | | | | | | |
| | | 37.60 | | | | | 37.60 - 38.50 m: TUFFACEOUS SANDSTONE. | | | | | | | 4.15 | |
| | | 38.50 | | | | | 38.50 - 39.00 m: FINE SANDSTONE. | | | | | | | | |
| | | 39.20 | | | | | 39.00 - 40.40 m: SANDSTONE (medium to coarse grained) with laminae. | | | | | | | | |
| 28 AUGUST 1998 | | 40.40 | | | | | 40.40 - 41.90 m: FINE SANDSTONE. | | | | | | | | |
| | | 41.90 | | | | | 41.90 - 42.40 m: CONGLOMERATIC SANDSTONE. | | | | | | | | |
| | | 42.40 | | | | | 42.40 - 43.40 m: FINE SANDSTONE with laminae. | CL-H | | | | | | 3.10 | |
| | | 43.40 | | | | | 43.40 - 46.10 m: VOLCANIC BRECCIA, dark grey to black. Mafic sand, grey to black, coarse grained. Component: andesite, dia. up to 5.0 cm. | | | | | | | | |
| | | 46.10 | | | | | 46.10 - 48.30 m: TUFFACEOUS SANDSTONE. | | | | | | | 6.20 | |
| 29 AUGUST 1998 | | 48.30 | | | | | 48.30 - 70.70 m: VOLCANIC BRECCIA, dark grey to black. Mafic sand, grey to black, coarse grained. Component: andesite, dia. up to 5.0 cm. | CM-H | | | | | | | |

Fig. 1.1.27 Subsurface Exploration Log No. B - 28 (2 of 5)

SUBSURFACE EXPLORATION LOG

BORING NO : B-28
SHEET : 3 OF 5
TOTAL DEPTH : 115.00 m

PROJECT : ADDITIONAL GEOLOGICAL SURVEY FOR THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG, IN THE REPUBLIC OF INDONESIA
LOCATION : DAM SITE
FEATURE :
AREA DESIGNATION : Z = 128.774
GROUND ELEVATION :
COORDINATES : X = 428218.310 Y = 922272.634
DEPTH OF GWL (m) : -24.29

COMMENCEMENT DATE : 20 August 1998
COMPLETION DATE : 12 September 1998
ANGLE : Vertical BEARING :
DRILLER : Agus F. Jus
SUPERVISOR : H. Oka
LOGGED : Rudy M. Wanto
DRILLING MACHINE : YEM - 3E

| DATE | SCALE | DEPTH IN METER | CORE NUMBER & BIT TYPE | DEPTH OF WATER LOSS | RECOVERY | R.O.D. IN % | LITHOLOGY | GRAPH OF ROD | METHOD OF SAMPLING | DESCRIPTION OF LITHOLOGY | ROCK CLASSIFICATION | WEATHERING | HARDNESS | JOINT SPACING | S.P.T. BLOW/30 CM | G.W. SECOND | LOGSON | REMARKS |
|----------------|-------|----------------|------------------------|---------------------|----------|-------------|-----------|--------------|--------------------|---|---------------------|------------|----------|---------------|-------------------|-------------|--------|---------|
| | | | | | | | | | | | | | | | | | | |
| 20 AUGUST 1998 | | 51 | | 58 | 58 | | | | △ | 38.00 - 80.00 m: VOLCANIC BRECCIA, dark grey. Matrix sand, grey to black, coarse grained. Component: andesite fragments, da. up to 5.0 cm. | | | | | | | | |
| 29 AUGUST 1998 | | 54 | | 59 | 59 | | | | △ | 56.50 - 60.00 m: Matrix consist of FINE TUFF. | | | | | | | 0.10 | |
| 30 AUGUST 1998 | | 56 | | 60 | 60 | | | | △ | | | | | | | | | |
| 31 AUGUST 1998 | | 59 | | 63 | 63 | | | | △ | 66.80 - 80.00 m: Horizontal Crack developed partly. | | | | | | | | |
| | | 60 | | 64 | 64 | | | | △ | | | | | | | | | |
| | | 61 | | 65 | 65 | | | | △ | | | | | | | | | |
| | | 62 | | 66 | 66 | | | | △ | | | | | | | | | |
| | | 63 | | 67 | 67 | | | | △ | | | | | | | | | |
| | | 64 | | 68 | 68 | | | | △ | | | | | | | | | |
| | | 65 | | 69 | 69 | | | | △ | | | | | | | | | |
| | | 66 | | 70 | 70 | | | | △ | | | | | | | | | |
| | | 67 | | 71 | 71 | | | | △ | 70.70 - 71.70 m: TUFF. | | | | | | | | |
| | | 68 | | 72 | 72 | | | | △ | | | | | | | | | |
| | | 69 | | 73 | 73 | | | | △ | | | | | | | | | |
| | | 70 | | 74 | 74 | | | | △ | | | | | | | | | |
| | | 71 | | 75 | 75 | | | | △ | | | | | | | | | |
| | | 72 | | 76 | 76 | | | | △ | | | | | | | | | |
| | | 73 | | 77 | 77 | | | | △ | | | | | | | | | |
| | | 74 | | 78 | 78 | | | | △ | | | | | | | | | |
| | | 75 | | 79 | 79 | | | | △ | | | | | | | | | |
| | | 76 | | 80 | 80 | | | | △ | | | | | | | | | |
| | | 77 | | 81 | 81 | | | | △ | | | | | | | | | |
| | | 78 | | 82 | 82 | | | | △ | | | | | | | | | |
| | | 79 | | 83 | 83 | | | | △ | | | | | | | | | |
| | | 80 | | 84 | 84 | | | | △ | | | | | | | | | |
| | | 81 | | 85 | 85 | | | | △ | | | | | | | | | |
| | | 82 | | 86 | 86 | | | | △ | | | | | | | | | |
| | | 83 | | 87 | 87 | | | | △ | | | | | | | | | |
| | | 84 | | 88 | 88 | | | | △ | | | | | | | | | |
| | | 85 | | 89 | 89 | | | | △ | | | | | | | | | |
| | | 86 | | 90 | 90 | | | | △ | | | | | | | | | |
| | | 87 | | 91 | 91 | | | | △ | | | | | | | | | |
| | | 88 | | 92 | 92 | | | | △ | | | | | | | | | |
| | | 89 | | 93 | 93 | | | | △ | | | | | | | | | |
| | | 90 | | 94 | 94 | | | | △ | | | | | | | | | |
| | | 91 | | 95 | 95 | | | | △ | | | | | | | | | |
| | | 92 | | 96 | 96 | | | | △ | | | | | | | | | |
| | | 93 | | 97 | 97 | | | | △ | | | | | | | | | |
| | | 94 | | 98 | 98 | | | | △ | | | | | | | | | |
| | | 95 | | 99 | 99 | | | | △ | | | | | | | | | |
| | | 96 | | 100 | 100 | | | | △ | | | | | | | | | |

Fig. 1.1.27 Subsurface Exploration Log No. B - 28 (3 of 5)

SUBSURFACE EXPLORATION LOG

BORING NO : B-28
SHEET : 4 OF 5
TOTAL DEPTH : 115.00 m

PROJECT : ADDITIONAL GEOLOGICAL SURVEY FOR THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG, IN THE REPUBLIC OF INDONESIA
LOCATION : DAM SITE
FEATURE :
AREA DESIGNATION : Z = 128.774
GROUND ELEVATION :
COORDINATES : X = 428218.310 Y = 922272.634
DEPTH OF GWL (m) : -24.29

COMMENCEMENT DATE : 20 August 1998
COMPLETION DATE : 12 September 1998
ANGLE : Vertical BEARING :
DRILLER : Agus F. Jus
SUPERVISOR : H. Oka
LOGGED : Rudy M. Wanto
DRILLING MACHINE : YEM - 3E

| DATE | SCALE | DEPTH IN METER | CORE NUMBER & BIT TYPE | DEPTH OF WATER LOSS | RECOVERY | R.O.D. IN % | LITHOLOGY | GRAPH OF ROD | METHOD OF SAMPLING | DESCRIPTION OF LITHOLOGY | ROCK CLASSIFICATION | WEATHERING | HARDNESS | JOINT SPACING | S.P.T. BLOW/30 CM | G.W. SECOND | LOGSON | REMARKS |
|------------------|-------|----------------|------------------------|---------------------|----------|-------------|-----------|--------------|--------------------|--|---------------------|------------|----------|---------------|-------------------|-------------|--------|---------|
| | | | | | | | | | | | | | | | | | | |
| 1 SEPTEMBER 1998 | | 75 | | 83 | 83 | | | | △ | 38.00 - 80.00 m: VOLCANIC BRECCIA, dark grey to black. Matrix sand, grey to black, coarse grained. Component: andesite, da. up to 5.0 cm. | | | | | | | | |
| 1 SEPTEMBER 1998 | | 80 | | 88 | 88 | | | | △ | 80.00 - 83.00 m: FINE SAND (loose), grey, fine to medium grained, moist to wet. | CM-H | | | | | | | 8.559 |
| 2 SEPTEMBER 1998 | | 83 | | 91 | 91 | | | | △ | 83.00 - 85.30 m: SILTSTONE, grey, dense, medium to strong rock, HW - MW. | | | | | | | | |
| 5 SEPTEMBER 1998 | | 85 | | 93 | 93 | | | | △ | 85.30 - 89.40 m: SAND, grey, loose, medium to coarse grained, well graded, wet. | | | | | | | | |
| 5 SEPTEMBER 1998 | | 89 | | 97 | 97 | | | | △ | 89.40 - 89.90 m: SILTSTONE, grey, dense, weak rock, HW. | | | | | | | | |
| 6 SEPTEMBER 1998 | | 92 | | 100 | 100 | | | | △ | 89.90 - 92.30 m: GRAVELLY SANDSTONE, grey, loose, coarse to medium grained, well graded, moist. | | | | | | | | |
| 6 SEPTEMBER 1998 | | 92 | | 100 | 100 | | | | △ | 92.30 - 94.60 m: CONGLOMERATE, grey, loose, wet graded, angular to subangular, da. up to 3.00 cm. | CL-L | | | | | | | |
| 7 SEPT. 1998 | | 94 | | 102 | 102 | | | | △ | 94.60 - 94.75 m: FINE SANDSTONE. | | | | | | | | |
| 7 SEPT. 1998 | | 94 | | 102 | 102 | | | | △ | 94.75 - 95.70 m: SILTSTONE, dark grey to black, dense, strong to medium strong; Medium weathered. | | | | | | | | |
| 8 SEPTEMBER 1998 | | 95 | | 103 | 103 | | | | △ | 95.70 - 96.20 m: FINE SANDSTONE, grey. | CL-H | | | | | | | |
| 8 SEPTEMBER 1998 | | 96 | | 104 | 104 | | | | △ | 96.20 - 99.10 m: CONGLOMERATE, loose. | | | | | | | | |
| 9 SEPT. 1998 | | 99 | | 107 | 107 | | | | △ | 99.10 - 101.40 m: FINE SANDSTONE (with TUFF LAYER), light brown, dense, medium cemented, highly to medium weathered, weak rock. | CL-L | | | | | | | |
| | | 100 | | 110 | 110 | | | | △ | | CL-H | | | | | | | |

Fig. 1.1.27 Subsurface Exploration Log No. B - 28 (4 of 5)

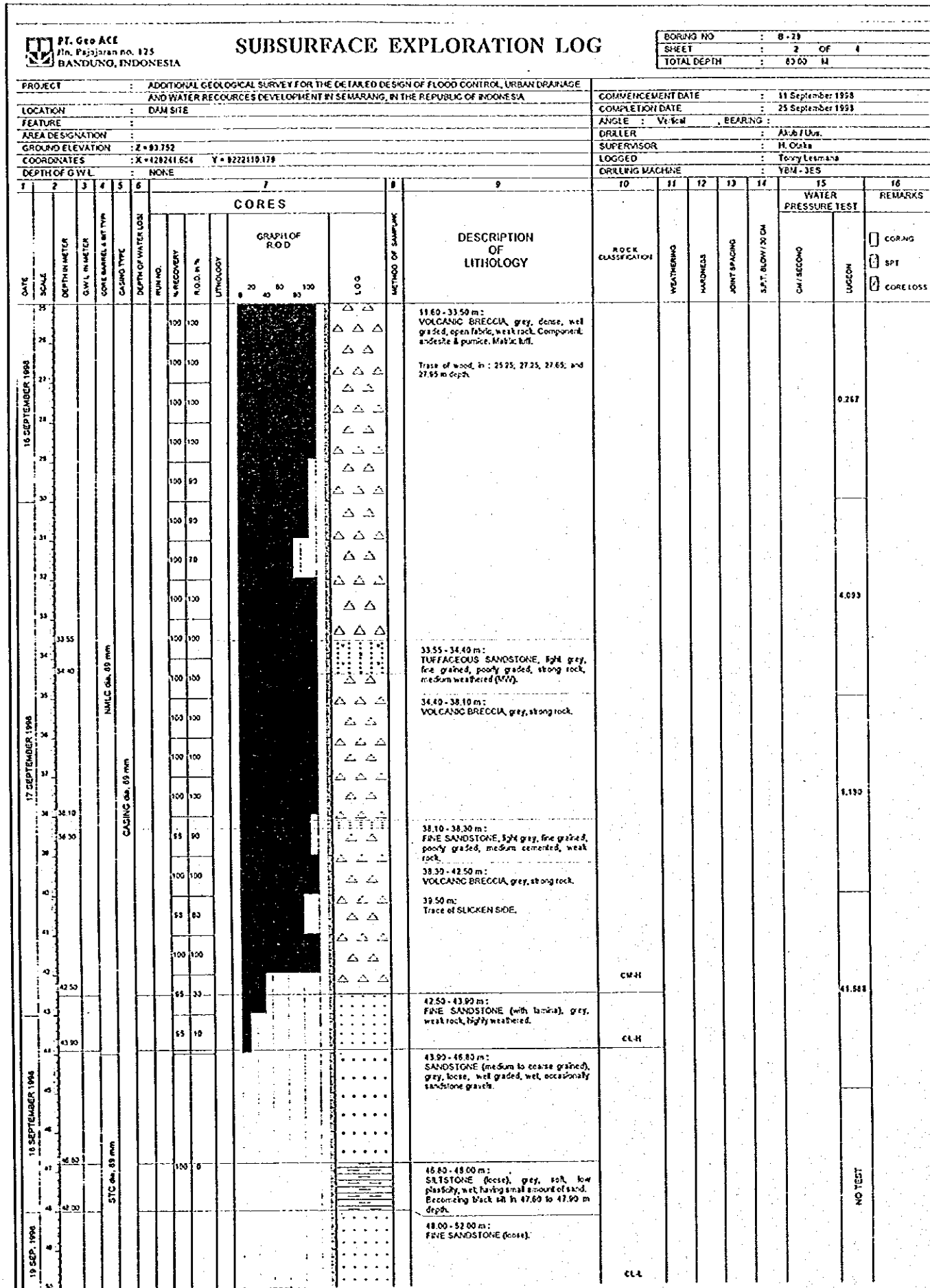


Fig. 1.1.28 Subsurface Exploration Log No. B - 29 (2 of 4)

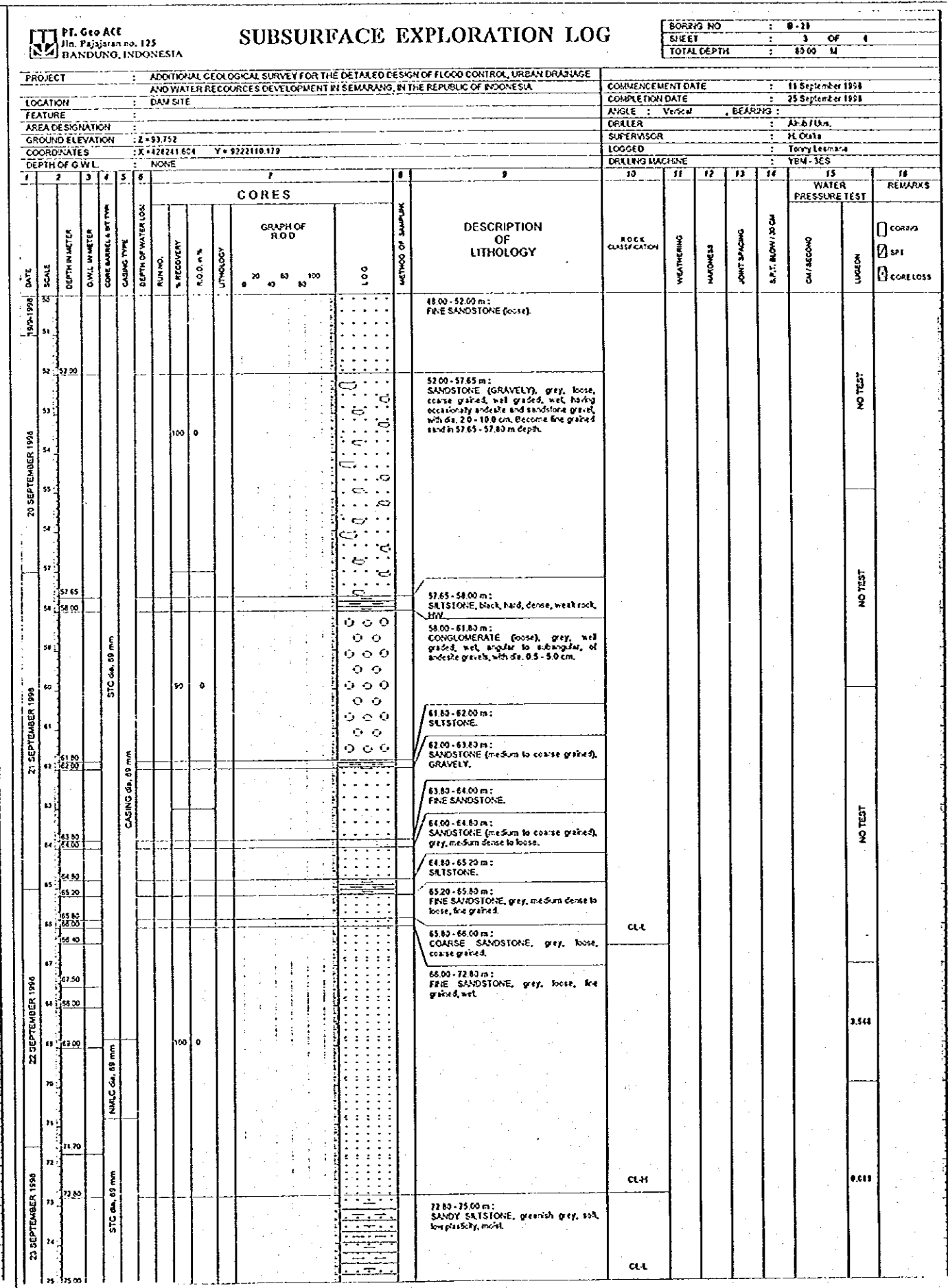


Fig. 1.1.28 Subsurface Exploration Log No. B - 29 (3 of 4)

SUBSURFACE EXPLORATION LOG

BORING NO : B-30
SHEET : 2 OF 5
TOTAL DEPTH : 125.00 M

PROJECT : ADDITIONAL GEOLOGICAL SURVEY FOR THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RECORCES DEVELOPMENT IN SEMARANG, IN THE REPUBLIC OF INDONESIA
LOCATION : DAM SITE
FEATURE :
AREA DESIGNATION :
GROUND ELEVATION : Z +134.819
COORDINATES : X +428290.243 Y + 9222122.153
DEPTH OF G.W.L.:

COMMENCEMENT DATE : 2 September 1998
COMPLETION DATE : 10 October 1998
ANGLE : Vertical BEARING :
DRILLER : Sachran F Ado K.
SUPERVISOR : H. Otaia
LOGGED : Tony Lesmana
DRILLING MACHINE : YBM - 3ES

| 1 | 2 | 3 | 4 | 5 | 6 | | | | 9 | 10 | 11 | 12 | 13 | 14 | 15 | | 16 | | | | | | | | | | | | | | | | | | | | | |
|-------------------|-------|----------------|-----------------|---------------------|---------------------|---------|------------|-------------|-----------|-----|---|---------------------|------------|----------|---------------------|-------------------|-----------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | | | | | CORES | | | | | | | | | | WATER PRESSURE TEST | | | REMARKS | | | | | | | | | | | | | | | | | | | | |
| DATE | SCALE | DEPTH IN METER | G.W.L. IN METER | CASE NO. & BIT TYPE | DEPTH OF WATER LOSS | RUN NO. | % RECOVERY | R.O.S. IN % | LITHOLOGY | LOG | DESCRIPTION OF LITHOLOGY | ROCK CLASSIFICATION | WEATHERING | HARDNESS | JOINT SPACING | S.P.T. BLOW/30 CM | CM/SECOND | LUGAN | | | | | | | | | | | | | | | | | | | | |
| 11 SEPTEMBER 1998 | | | | | | | | | | | 17.50 - 28.60 m: VOLCANIC BRECCIA, grey, weak to medium strong rock. Component: andesite & pumice fragments. Matrix: M.L. The rock material has been changed to the clay mineral's partly strong to weak. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 SEPTEMBER 1998 | | | | | | | | | | | 28.60 - 29.25 m: CORE LOSS. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 29.25 - 30.00 m: TUFFACEOUS SANDSTONE, grey, medium to coarse grained, medium strong. | CM-H | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 30.00 - 30.20 m: SANDSTONE (medium grained), medium strong. | D | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 30.20 - 30.40 m: TUFFACEOUS SANDSTONE, grey, poorly graded, medium strong. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 30.40 - 32.50 m: FINE SANDSTONE. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 32.50 - 33.35 m: SANDSTONE (medium to coarse grained), (in 33.00 - 33.20 m depth loose). | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 33.35 - 33.85 m: FINE SANDSTONE. | CL-H | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 33.85 - 34.95 m: GRAVELY SANDSTONE (medium grained), grey, poorly graded (34.00 - 34.50 m loose). | CL-H | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 34.95 - 35.70 m: FINE SANDSTONE. | CL-L | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 35.70 - 36.20 m: TUFF, yellow. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 36.20 - 36.80 m: TUFFACEOUS SANDSTONE, yellow, medium strong rock. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 36.80 - 38.40 m: CONGLOMERATIC SANDSTONE, grey. | CL-H | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 38.40 - 38.00 m: SANDSTONE (medium to coarse grained), with laminae. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 39.00 - 40.00 m: CONGLOMERATIC SANDSTONE, grey, poorly graded. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 40.00 - 40.30 m: SANDSTONE (medium to coarse grained). | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 40.30 - 41.20 m: CONGLOMERATIC SANDSTONE. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 41.20 - 41.40 m: SLTSTONE, grey, strong rock. | CML | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 41.40 - 41.90 m: FINE SANDSTONE, grey, fine grained, well graded. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 41.90 - 42.10 m: SANDSTONE (medium to coarse grained). | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 42.10 - 43.40 m: FINE SANDSTONE. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 43.40 - 43.60 m: SANDSTONE (medium to coarse grained). | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 43.60 - 44.30 m: FINE SANDSTONE. | CL-H | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 44.30 - 45.10 m: GRAVELY FINE SANDSTONE. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 45.10 - 46.70 m: SANDSTONE (medium to coarse grained), in 45.40 - 46.30 m depth loose. | CL-L | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 46.70 - 47.70 m: SLTSTONE (TUFFACEOUS). | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 47.70 - 48.50 m: CONGLOMERATIC SANDSTONE. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 48.50 - 49.70 m: FINE SANDSTONE. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | 49.70 - 51.50 m: BASIC TUFF. | CL-H | | | | | | | | | | | | | | | | | | | | | | | | | | |

Fig. 1.1.29 Subsurface Exploration Log No. B - 30 (2 of 5)

SUBSURFACE EXPLORATION LOG

BORING NO : B-30
SHEET : 3 OF 5
TOTAL DEPTH : 125.00 M

PROJECT : ADDITIONAL GEOLOGICAL SURVEY FOR THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RECORCES DEVELOPMENT IN SEMARANG, IN THE REPUBLIC OF INDONESIA
LOCATION : DAM SITE
FEATURE :
AREA DESIGNATION :
GROUND ELEVATION : Z +134.819
COORDINATES : X +428290.243 Y + 9222122.153
DEPTH OF G.W.L.:

COMMENCEMENT DATE : 2 September 1998
COMPLETION DATE : 10 October 1998
ANGLE : Vertical BEARING :
DRILLER : Sachran F Ado K.
SUPERVISOR : H. Otaia
LOGGED : Tony Lesmana
DRILLING MACHINE : YBM - 3ES

| 1 | 2 | 3 | 4 | 5 | 6 | | | | 9 | 10 | 11 | 12 | 13 | 14 | 15 | | 16 | | | | |
|-------------------|-------|----------------|-----------------|---------------------|---------------------|---------|------------|-------------|-----------|-----|---|---------------------|------------|----------|---------------------|-------------------|-----------|---------|--|--|-------|
| | | | | | CORES | | | | | | | | | | WATER PRESSURE TEST | | | REMARKS | | | |
| DATE | SCALE | DEPTH IN METER | G.W.L. IN METER | CASE NO. & BIT TYPE | DEPTH OF WATER LOSS | RUN NO. | % RECOVERY | R.O.S. IN % | LITHOLOGY | LOG | DESCRIPTION OF LITHOLOGY | ROCK CLASSIFICATION | WEATHERING | HARDNESS | JOINT SPACING | S.P.T. BLOW/30 CM | CM/SECOND | LUGAN | | | |
| 15 SEPTEMBER 1998 | | | | | | | | | | | 49.70 - 51.50 m: BASIC TUFF. | | | | | | | | | | |
| 10 SEPTEMBER 1998 | | | | | | | | | | | 51.50 - 79.40 m: VOLCANIC BRECCIA, open fabric, weak to strong rock. Fragments: andesite & pumice, angular. Matrix: M.L, sand grains, medium to coarse grained. | | | | | | | | | | 0.936 |
| 17th 1998 | | | | | | | | | | | 58.50 - 59.00 m: CORE LOSS. | | | | | | | | | | 0.811 |
| 22 SEPTEMBER 1998 | | | | | | | | | | | | | | | | | | | | | 0.274 |
| 25 SEPTEMBER 1998 | | | | | | | | | | | | | | | | | | | | | 0.164 |
| 24 SEPTEMBER 1998 | | | | | | | | | | | | | | | | | | | | | 0.313 |

Fig. 1.1.29 Subsurface Exploration Log No. B - 30 (3 of 5)

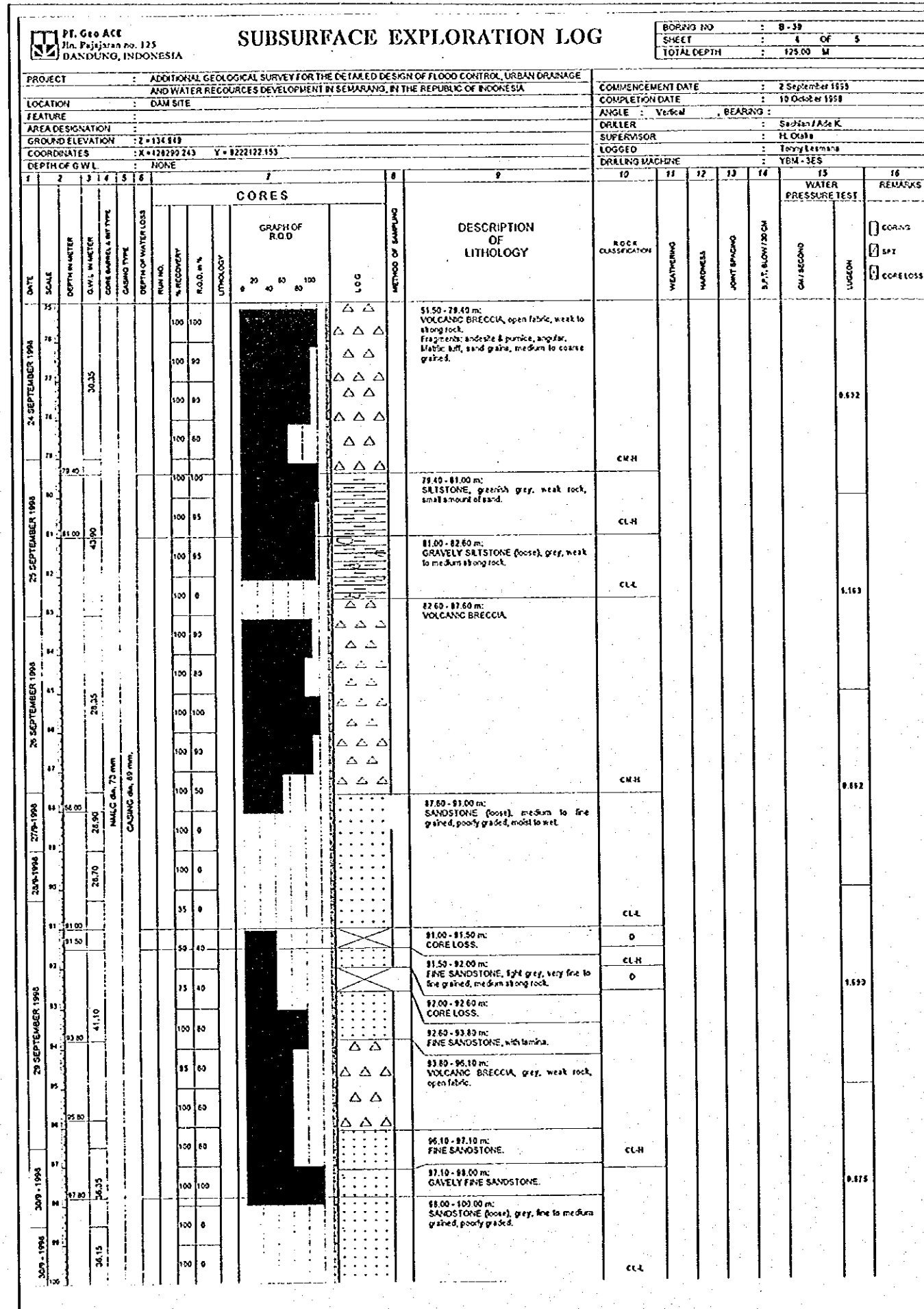


Fig. 1.1.29 Subsurface Exploration Log No. B - 30 (4 of 5)

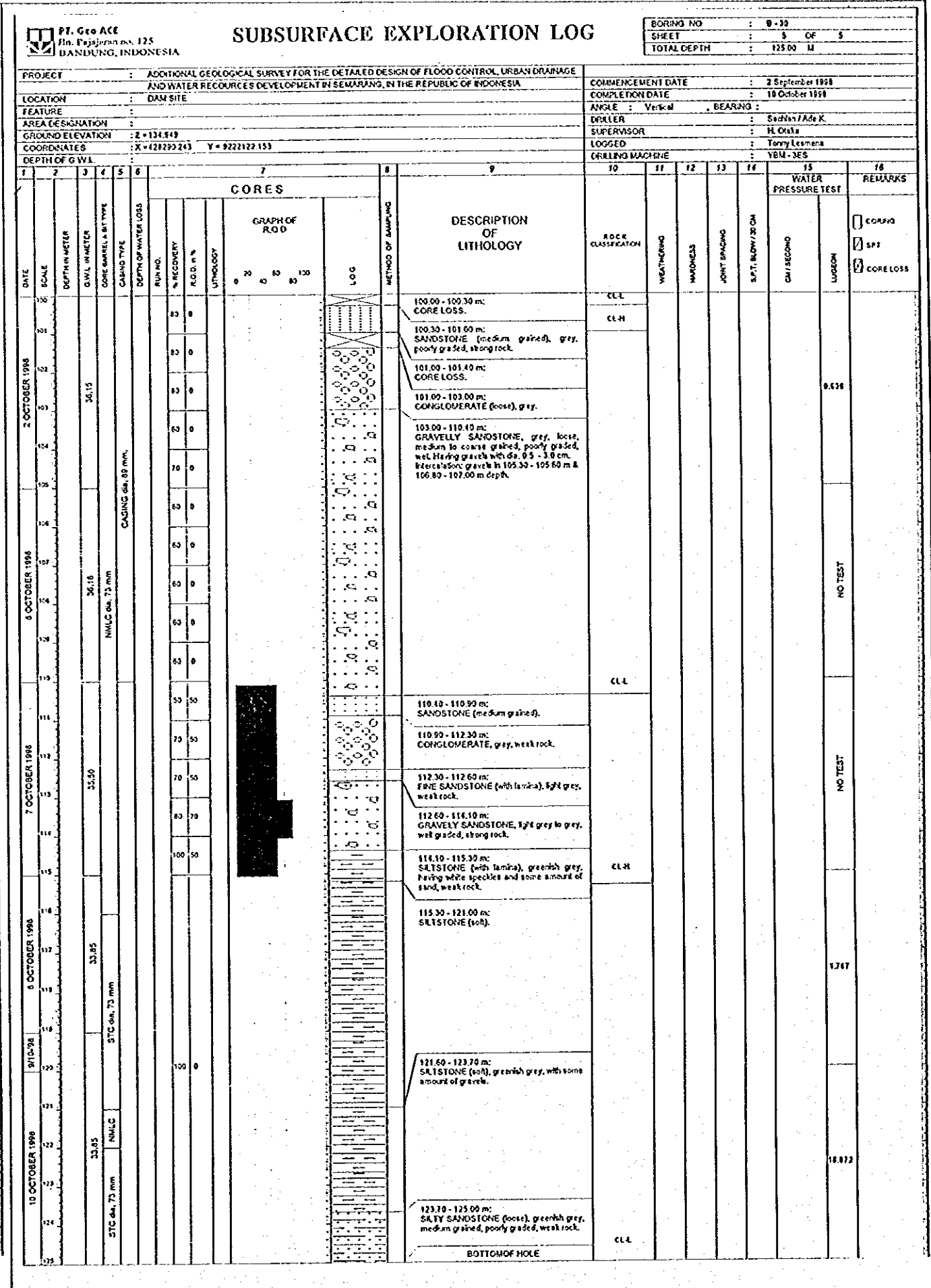


Fig. 1.1.29 Subsurface Exploration Log No. B - 30 (5 of 5)

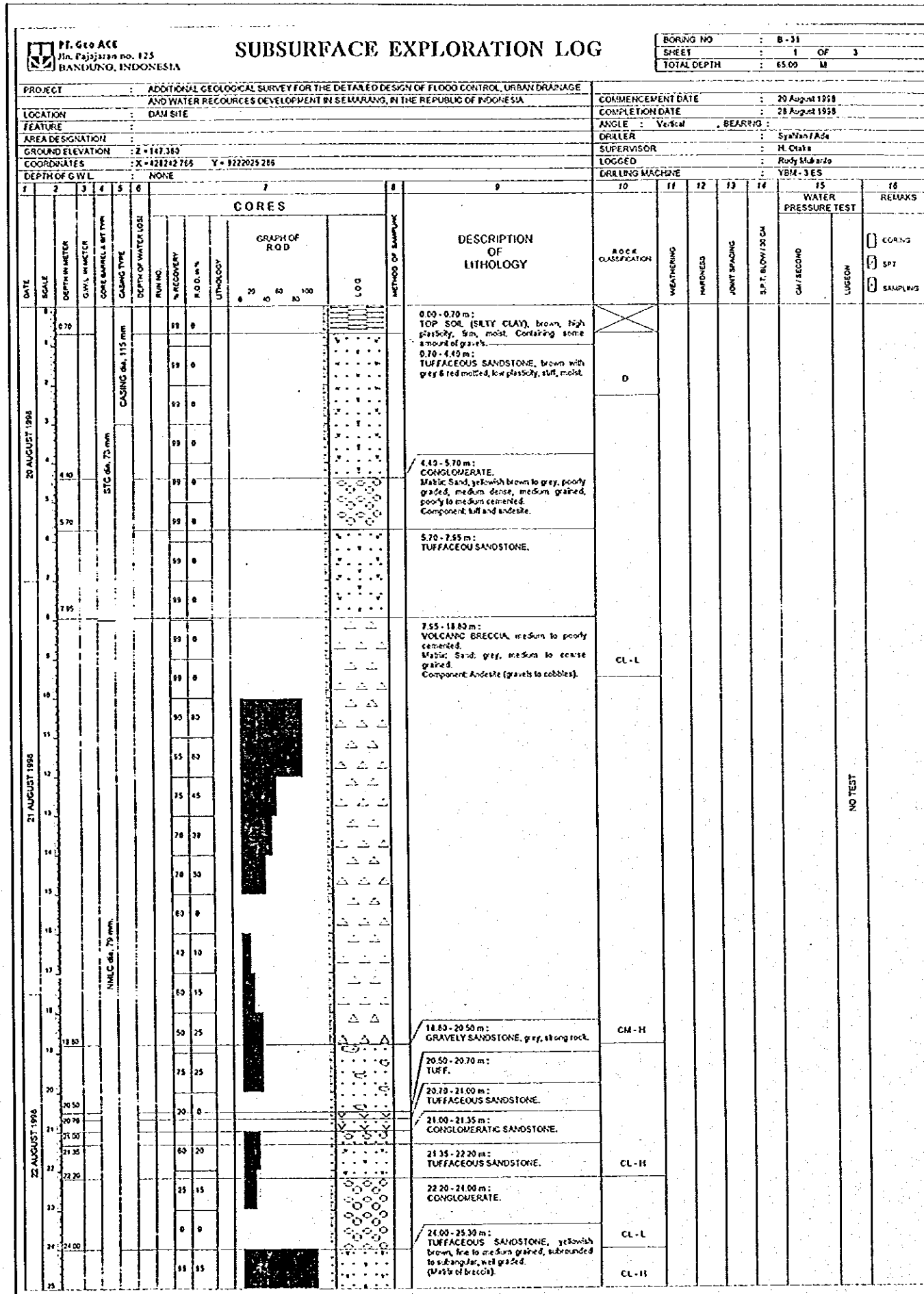


Fig. 1.1.30 Subsurface Exploration Log No. B-31 (1 of 3)

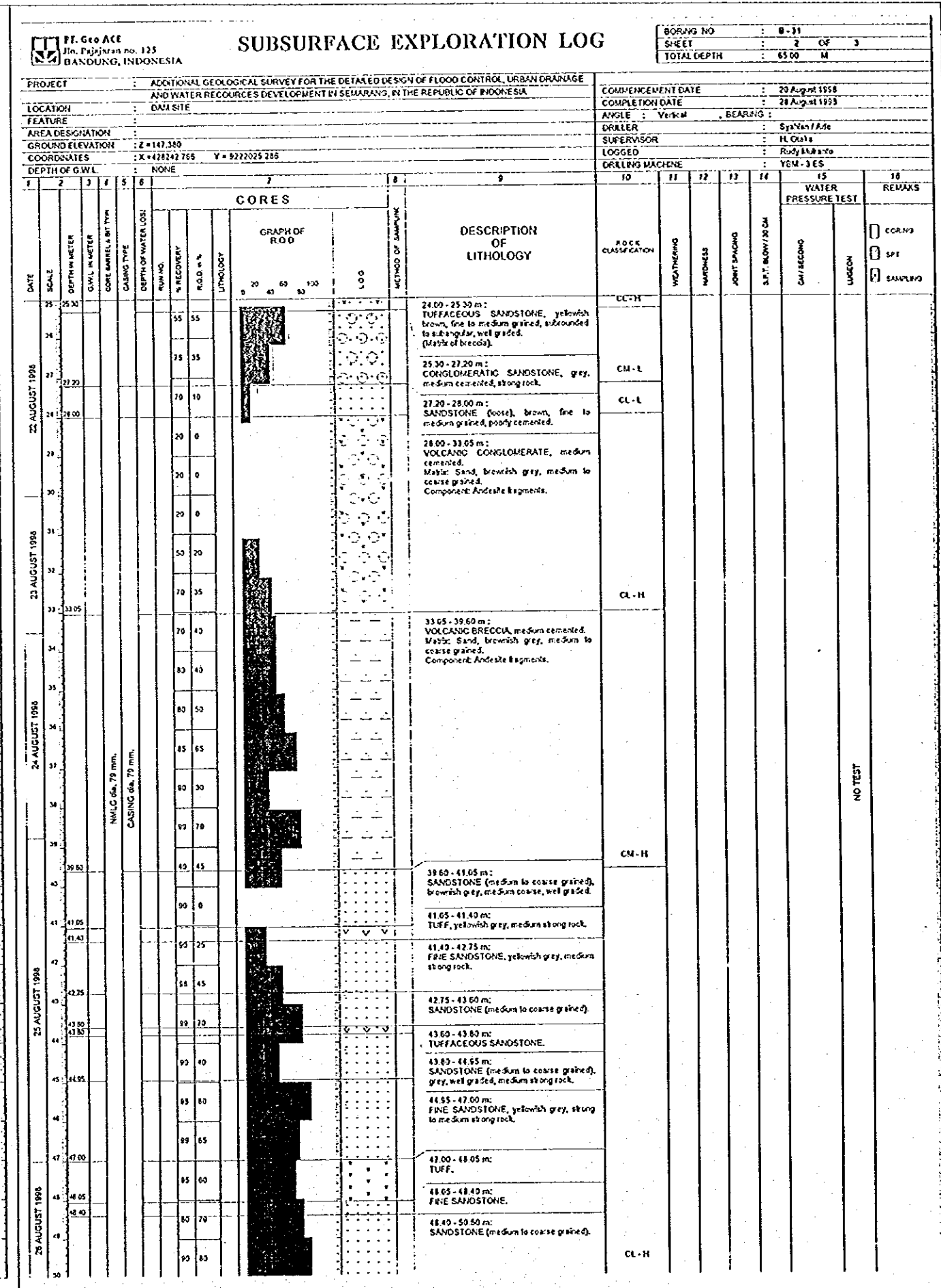


Fig. 1.1.30 Subsurface Exploration Log No. B-31 (2 of 3)

| PT. Geo ACE Jln. Pajajaran no. 125 DIANDUNG, INDONESIA | | SUBSURFACE EXPLORATION LOG | | | | | | | | | | BORING NO : B-31 SHEET : 3 OF 3 TOTAL DEPTH : 65.00 M | | | | | | | | | | | | | | | | | | | |
|--|-------|----------------------------------|-----------------|----------------------------------|-------------|--|------------|---------------------|----------|-----------------------|-----|---|--------------------------|----------------------------------|------------|-------------------------------------|---------------|------------------------|---------|-----------------------|---------|-----------------------|------------|-------------------------------|---------------|---------------------|---------|---------------------|---------|--|--|
| PROJECT : ADDITIONAL GEOLOGICAL SURVEY FOR THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER REOURCES DEVELOPMENT IN SEMARANG, IN THE REPUBLIC OF INDONESIA | | COMPLETION DATE : 28 August 1998 | | COMPLETION DATE : 28 August 1998 | | DRILLER : Syahen / Ade | | SUPERVISOR : H. Ota | | LOGGED : Rudy Murno | | DRILLING MACHINE : YEM - 3 ES | | COMPLETION DATE : 20 August 1998 | | COMPLETION DATE : 24 September 1998 | | DRILLER : Aspi / Sohan | | SUPERVISOR : H. Ota | | LOGGED : Tony Lismana | | DRILLING MACHINE : YD14 - 3ES | | | | | | | |
| LOCATION : DAM SITE | | AREA DESIGNATION : Z = 147.380 | | GROUND ELEVATION : Z = 147.380 | | COORDINATES : X = 428242.766 Y = 9222025.286 | | DEPTH OF GWL : NONE | | DATE : 20 AUGUST 1998 | | DATE : 23 AUGUST 1998 | | DATE : 24 AUGUST 1998 | | DATE : 26 AUGUST 1998 | | DATE : 27 AUGUST 1998 | | DATE : 28 AUGUST 1998 | | DATE : 29 AUGUST 1998 | | DATE : 30 AUGUST 1998 | | | | | | | |
| CORES | | | | | | | | | | WATER PRESSURE TEST | | REMARKS | | ROCK CLASSIFICATION | | WEATHERING | | HARDNESS | | JOINT SPACING | | S.P.T. BLOW/30 CM | | CMT/SEC | | WATER PRESSURE TEST | | REMARKS | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | | |
| DATE | SCALE | DEPTH IN METER | G.W.L. IN METER | CORE MARKL. & BT TYPE | CASING TYPE | DEPTH OF WATER LOSS | R.P.M. NO. | % RECOVERY | R.O.D. % | LITHOLOGY | LOG | METHOD OF SAMPLING | DESCRIPTION OF LITHOLOGY | ROCK CLASSIFICATION | WEATHERING | HARDNESS | JOINT SPACING | S.P.T. BLOW/30 CM | CMT/SEC | WATER PRESSURE TEST | REMARKS | ROCK CLASSIFICATION | WEATHERING | HARDNESS | JOINT SPACING | S.P.T. BLOW/30 CM | CMT/SEC | WATER PRESSURE TEST | REMARKS | | |
| 20 AUGUST 1998 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27 AUGUST 1998 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 AUGUST 1998 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29 AUGUST 1998 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 AUGUST 1998 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Fig. 1.1.30 Subsurface Exploration Log No. B - 31 (3 of 3)

| PT. Geo ACE Jln. Pajajaran no. 125 DIANDUNG, INDONESIA | | SUBSURFACE EXPLORATION LOG | | | | | | | | | | BORING NO : B-32 SHEET : 1 OF 4 TOTAL DEPTH : 85.00 M | | | | | | | | | | | | | | | | | | | |
|--|-------|----------------------------------|-----------------|----------------------------------|-------------|--|------------|---------------------|----------|-----------------------|-----|---|--------------------------|----------------------------------|------------|-------------------------------------|---------------|------------------------|---------|-----------------------|---------|-----------------------|------------|-------------------------------|---------------|---------------------|---------|---------------------|---------|--|--|
| PROJECT : ADDITIONAL GEOLOGICAL SURVEY FOR THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER REOURCES DEVELOPMENT IN SEMARANG, IN THE REPUBLIC OF INDONESIA | | COMPLETION DATE : 28 August 1998 | | COMPLETION DATE : 28 August 1998 | | DRILLER : Syahen / Ade | | SUPERVISOR : H. Ota | | LOGGED : Rudy Murno | | DRILLING MACHINE : YEM - 3 ES | | COMPLETION DATE : 20 August 1998 | | COMPLETION DATE : 24 September 1998 | | DRILLER : Aspi / Sohan | | SUPERVISOR : H. Ota | | LOGGED : Tony Lismana | | DRILLING MACHINE : YD14 - 3ES | | | | | | | |
| LOCATION : DAM SITE | | AREA DESIGNATION : Z = 173.143 | | GROUND ELEVATION : Z = 173.143 | | COORDINATES : X = 428359.885 Y = 9222172.417 | | DEPTH OF GWL : NONE | | DATE : 20 AUGUST 1998 | | DATE : 23 AUGUST 1998 | | DATE : 24 AUGUST 1998 | | DATE : 26 AUGUST 1998 | | DATE : 27 AUGUST 1998 | | DATE : 28 AUGUST 1998 | | DATE : 29 AUGUST 1998 | | DATE : 30 AUGUST 1998 | | | | | | | |
| CORES | | | | | | | | | | WATER PRESSURE TEST | | REMARKS | | ROCK CLASSIFICATION | | WEATHERING | | HARDNESS | | JOINT SPACING | | S.P.T. BLOW/30 CM | | CMT/SEC | | WATER PRESSURE TEST | | REMARKS | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | | |
| DATE | SCALE | DEPTH IN METER | G.W.L. IN METER | CORE MARKL. & BT TYPE | CASING TYPE | DEPTH OF WATER LOSS | R.P.M. NO. | % RECOVERY | R.O.D. % | LITHOLOGY | LOG | METHOD OF SAMPLING | DESCRIPTION OF LITHOLOGY | ROCK CLASSIFICATION | WEATHERING | HARDNESS | JOINT SPACING | S.P.T. BLOW/30 CM | CMT/SEC | WATER PRESSURE TEST | REMARKS | ROCK CLASSIFICATION | WEATHERING | HARDNESS | JOINT SPACING | S.P.T. BLOW/30 CM | CMT/SEC | WATER PRESSURE TEST | REMARKS | | |
| 20 AUGUST 1998 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23 AUGUST 1998 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 AUGUST 1998 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 AUGUST 1998 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 27 AUGUST 1998 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 AUGUST 1998 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 29 AUGUST 1998 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 AUGUST 1998 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Fig. 1.1.31 Subsurface Exploration Log No. B - 32 (1 of 4)

SUBSURFACE EXPLORATION LOG

BORING NO : B-32
SHEET : 2 OF 4
TOTAL DEPTH : 85.00 M

| PROJECT : ADDITIONAL GEOLOGICAL SURVEY FOR THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG, IN THE REPUBLIC OF INDONESIA | | COMPLETION DATE : 24 September 1998 | | | | | | | | | | | | | |
|---|-------|-------------------------------------|-----------------|---------------------|---------------------|-------|--|----------------|------------|----------|---------------|-------------------|-----------|-------|---------|
| LOCATION : DAM SITE | | COMPLETION DATE : 24 September 1998 | | | | | | | | | | | | | |
| FEATURE : DAM SITE | | ANGLE : Vertical BEARING : | | | | | | | | | | | | | |
| AREA DESIGNATION : Z = 171.143 | | DRILLER : Asep / Soband | | | | | | | | | | | | | |
| GROUND ELEVATION : Z = 171.143 | | SUPERVISOR : H. Ota | | | | | | | | | | | | | |
| COORDINATES : X = 428339.855 Y = 9222172.417 | | LOGGED : Tony Lesmana | | | | | | | | | | | | | |
| DEPTH OF GWL : NONE | | DRILLING MACHINE : YBM-3ES | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| DATE | SCALE | DEPTH IN METER | G.W.L. IN METER | DEPTH OF WATER LOGS | DEPTH OF WATER LOGS | CORES | DESCRIPTION OF LITHOLOGY | ROCK STRUCTURE | WEATHERING | HARDNESS | JOINT SPACING | S.P.T. BLOW/30 CM | CH/RECORD | LOGON | REMARKS |
| 27 AUGUST 1998 | | | | | | | 22.80 - 27.00 m : TUFF, reddish brown, high to medium plasticity, 45% moist, having white speckles of kuff materials. | | | | | | | | |
| 27 | | | | | | | 27.00 - 29.00 m : LAPILY TUFF. | | | | | | | | |
| 28 AUGUST 1998 | | | | | | | 29.00 - 38.80 m : VOLCANIC BRECCIA, light grey, strong to weak rock, matrix sandy kuff, component andite (mostly). | CL-L | | | | | | | |
| 29 | | | | | | | | CM-L | | | | | | | |
| 30 AUGUST 1998 | | | | | | | 38.80 - 45.50 m : VOLCANIC CONGLOMERATE. | | | | | | | | |
| 30 | | | | | | | | CM-H | | | | | | | |
| 31 | | | | | | | | CL-L | | | | | | | |
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| 30 AUGUST 1998 | | | | | | | | | | | | | | | |
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| 30 AUGUST 1998 | | | | | | | | | | | | | | | |
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Fig. 1.1.31 Subsurface Exploration Log No. B - 32 (2 of 4)

SUBSURFACE EXPLORATION LOG

BORING NO : B-32
SHEET : 3 OF 4
TOTAL DEPTH : 85.00 M

| PROJECT : ADDITIONAL GEOLOGICAL SURVEY FOR THE DETAILED DESIGN OF FLOOD CONTROL, URBAN DRAINAGE AND WATER RESOURCES DEVELOPMENT IN SEMARANG, IN THE REPUBLIC OF INDONESIA | | COMPLETION DATE : 24 September 1998 | | | | | | | | | | | | | |
|---|-------|-------------------------------------|-----------------|---------------------|---------------------|-------|---|---------------------|------------|----------|---------------|-------------------|-----------|-------|---------|
| LOCATION : DAM SITE | | COMPLETION DATE : 24 September 1998 | | | | | | | | | | | | | |
| FEATURE : DAM SITE | | ANGLE : Vertical BEARING : | | | | | | | | | | | | | |
| AREA DESIGNATION : Z = 171.143 | | DRILLER : Asep / Soband | | | | | | | | | | | | | |
| GROUND ELEVATION : Z = 171.143 | | SUPERVISOR : H. Ota | | | | | | | | | | | | | |
| COORDINATES : X = 428339.855 Y = 9222172.417 | | LOGGED : Tony Lesmana | | | | | | | | | | | | | |
| DEPTH OF GWL : NONE | | DRILLING MACHINE : YBM-3ES | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| DATE | SCALE | DEPTH IN METER | G.W.L. IN METER | DEPTH OF WATER LOGS | DEPTH OF WATER LOGS | CORES | DESCRIPTION OF LITHOLOGY | ROCK CLASSIFICATION | WEATHERING | HARDNESS | JOINT SPACING | S.P.T. BLOW/30 CM | CH/RECORD | LOGON | REMARKS |
| 6 SEPTEMBER 1998 | | | | | | | 49.35 - 51.50 m : VOLCANIC BRECCIA, grey. | | | | | | | | |
| 51 | | | | | | | 51.50 - 51.80 m : TUFFACEOUS SANDSTONE, yellow, weak rock. | | | | | | | | |
| 52 | | | | | | | 51.80 - 53.60 m : SANDSTONE (medium to coarse grained). | | | | | | | | |
| 53 | | | | | | | | | | | | | | | |
| 54 | | | | | | | 53.60 - 54.60 m : TUFF. | CL-H | | | | | | | |
| 55 | | | | | | | 54.60 - 56.70 m : ANDESITE LAVA, grey, strong rock, vesicular. | | | | | | | | |
| 56 | | | | | | | | CM-H | | | | | | | |
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| 30 AUGUST 1998 | | | | | | | | | | | | | | | |
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Fig. 1.1.31 Subsurface Exploration Log No. B - 32 (3 of 4)

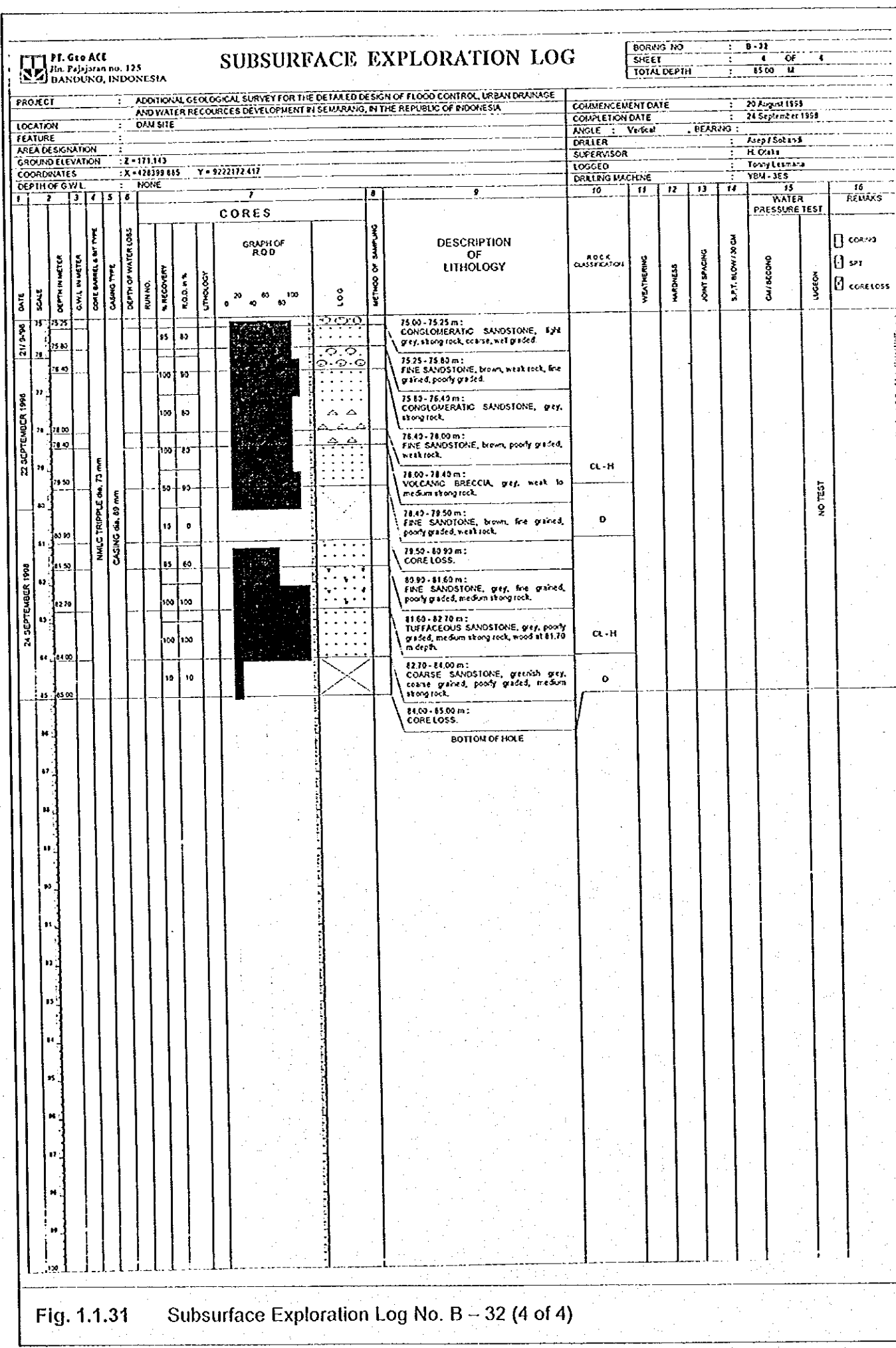


Fig. 1.1.31 Subsurface Exploration Log No. B - 32 (4 of 4)

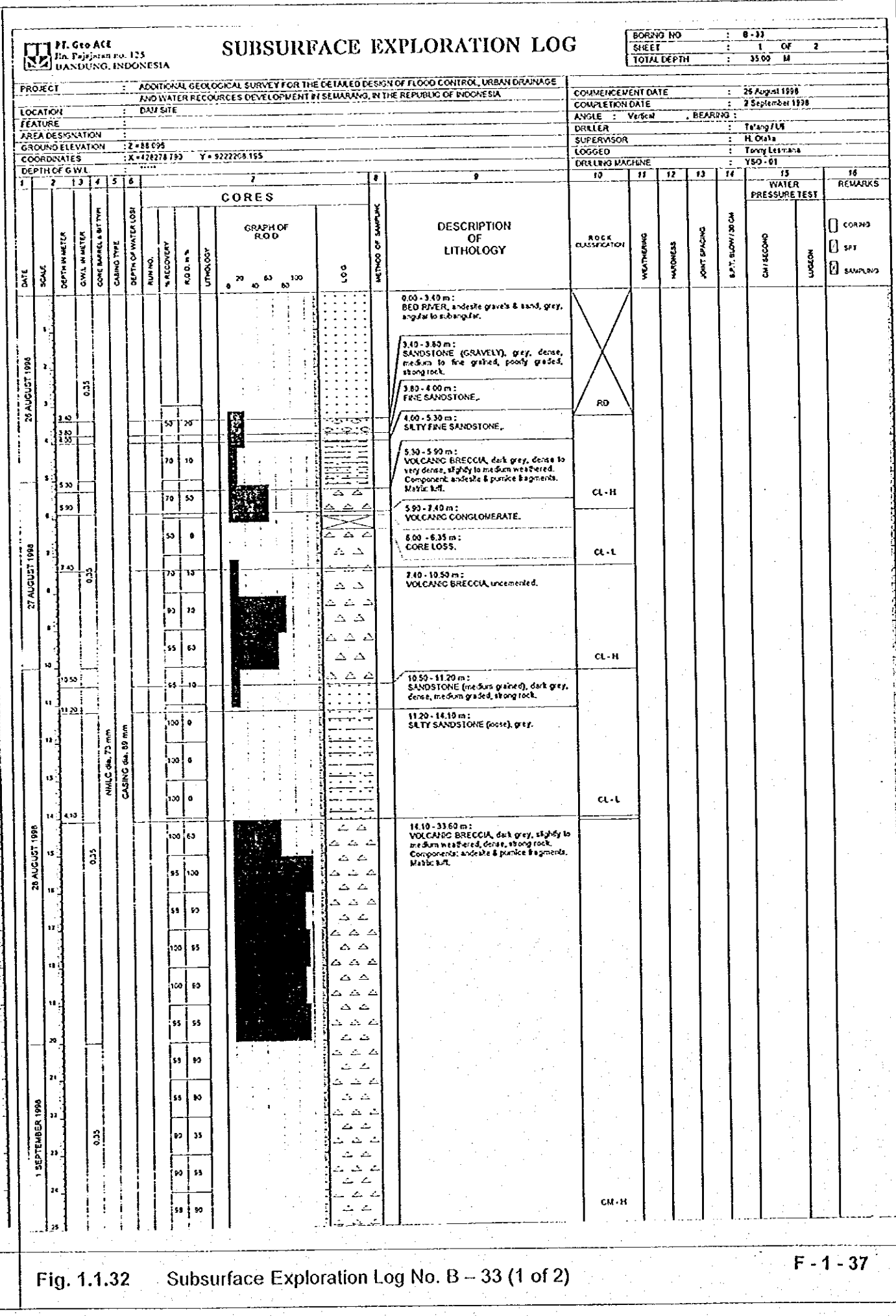


Fig. 1.1.32 Subsurface Exploration Log No. B - 33 (1 of 2)