

TABLES

Table 1 Temperature in Jakarta

Station: Jakarta, Soekarno-Hatta International Airport

Monthly Mean Temperature

(unit: Celcius degree)

| Month | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | Mean |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| Jan. | 26.0 | 25.8 | 26.5 | 26.2 | 25.8 | 26.1 | 26.2 | 25.9 | 25.0 | 26.5 | 25.9 | 26.0 |
| Feb. | 26.1 | 25.8 | 26.5 | 25.4 | 26.4 | 25.9 | 26.3 | 25.9 | 26.2 | 26.2 | 26.0 | 26.1 |
| Mar. | 26.4 | 26.7 | 26.9 | 26.3 | 26.5 | 26.7 | 26.8 | 26.3 | 26.0 | 26.2 | 26.6 | 26.5 |
| Apr. | 26.9 | 27.0 | 27.3 | 26.8 | 27.3 | 26.7 | 26.8 | 26.5 | 26.6 | 27.0 | 27.0 | 26.9 |
| May | 27.1 | 27.2 | 27.3 | 26.8 | 27.0 | 27.0 | 27.1 | 27.0 | 26.4 | 27.3 | 27.1 | 27.0 |
| Jun. | 26.8 | 27.2 | 26.6 | 26.5 | 26.6 | 26.8 | 26.9 | 26.7 | 26.5 | 26.9 | 27.0 | 26.8 |
| July | 26.0 | 26.6 | 26.4 | 26.5 | 26.1 | 26.5 | 26.2 | 26.6 | 25.6 | 26.4 | 27.0 | 26.4 |
| Aug. | 25.7 | 26.2 | 26.4 | 26.5 | 26.2 | 26.2 | 26.3 | 26.5 | 25.8 | 26.6 | 26.8 | 26.3 |
| Sep. | 26.1 | 26.9 | 26.9 | 26.8 | 26.7 | 26.8 | 26.5 | 26.6 | 26.3 | 26.6 | 26.9 | 26.6 |
| Oct. | 26.7 | 27.9 | 26.9 | 29.0 | 27.5 | 27.4 | 26.3 | 27.0 | 27.4 | 27.0 | - | 27.3 |
| Nov. | 26.3 | 27.7 | 27.1 | 27.2 | 27.7 | 27.4 | 26.3 | 26.7 | 27.6 | 26.4 | - | 27.0 |
| Dec. | 26.8 | 26.8 | 25.9 | 26.4 | 26.5 | 26.6 | 26.2 | 26.6 | 27.1 | 26.3 | - | 26.5 |

Monthly Maximum Temperature

(unit: Celcius degree)

| Month | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | Max |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| Jan. | 31.6 | 32.2 | 32.4 | 31.4 | 32.1 | 31.4 | 32.4 | 31.8 | 31.2 | 32.4 | 32.1 | 32.4 |
| Feb. | 32.6 | 32.0 | 32.4 | 30.2 | 32.8 | 31.4 | 33.5 | 31.6 | 32.0 | 32.0 | 31.0 | 33.5 |
| Mar. | 32.6 | 33.2 | 33.4 | 32.8 | 33.6 | 31.8 | 32.2 | 33.7 | 33.0 | 32.0 | 32.1 | 33.7 |
| Apr. | 33.4 | 32.8 | 33.5 | 34.2 | 34.5 | 33.4 | 33.4 | 33.2 | 32.4 | 33.2 | 34.8 | 34.8 |
| May | 33.4 | 34.2 | 33.3 | 32.2 | 34.9 | 33.4 | 33.0 | 33.2 | 32.8 | 33.2 | 33.1 | 34.9 |
| Jun. | 33.6 | 33.2 | 33.1 | 33.4 | 33.0 | 34.4 | 32.8 | 33.2 | 32.7 | 32.9 | 33.2 | 34.4 |
| July | 33.9 | 32.8 | 32.5 | 33.2 | 32.6 | 33.2 | 32.4 | 32.4 | 32.3 | 32.1 | 32.7 | 33.9 |
| Aug. | 32.6 | 33.6 | 33.2 | 32.6 | 32.2 | 33.2 | 32.1 | 33.0 | 33.0 | 33.2 | 32.8 | 33.6 |
| Sep. | 32.7 | 33.4 | 33.8 | 33.9 | 32.8 | 34.2 | 32.7 | 33.5 | 34.2 | 33.2 | 33.2 | 34.2 |
| Oct. | 33.2 | 35.2 | 34.2 | 34.2 | 34.0 | 34.9 | 33.0 | 33.2 | 35.0 | 33.1 | - | 35.2 |
| Nov. | 33.5 | 35.2 | 34.4 | 33.6 | 35.2 | 33.4 | 33.0 | 33.6 | 34.4 | 32.8 | - | 35.2 |
| Dec. | 32.8 | 33.5 | 33.5 | 31.8 | 32.5 | 33.6 | 33.2 | 33.0 | 33.6 | 33.4 | - | 33.6 |
| Max. | 33.9 | 35.2 | 34.4 | 34.2 | 35.2 | 34.9 | 33.5 | 33.7 | 35.0 | 33.4 | 34.8 | 35.2 |

Monthly Minimum Temperature

(unit: Celcius degree)

| Month | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | Min |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| Jan. | 20.2 | 22.0 | 21.9 | 20.0 | 22.2 | 22.8 | 22.1 | 22.4 | 22.0 | 22.6 | 22.0 | 20.0 |
| Feb. | 21.6 | 21.6 | 22.4 | 22.0 | 22.6 | 22.8 | 22.0 | 22.0 | 21.6 | 22.4 | 21.4 | 21.4 |
| Mar. | 22.4 | 22.8 | 22.9 | 21.8 | 22.7 | 22.8 | 23.0 | 22.0 | 22.7 | 22.6 | 22.0 | 21.8 |
| Apr. | 22.3 | 22.9 | 21.0 | 22.4 | 22.8 | 22.6 | 22.9 | 22.1 | 22.6 | 22.8 | 22.7 | 21.0 |
| May | 20.5 | 22.6 | 23.2 | 22.0 | 22.5 | 22.3 | 22.4 | 22.4 | 21.0 | 22.2 | 22.1 | 20.5 |
| Jun. | 21.3 | 22.2 | 21.6 | 21.6 | 21.0 | 20.3 | 21.6 | 22.0 | 21.0 | 22.9 | 21.6 | 20.3 |
| July | 18.5 | 21.3 | 21.3 | 21.2 | 20.7 | 20.6 | 21.0 | 21.6 | 18.6 | 21.8 | 22.0 | 18.5 |
| Aug. | 18.5 | 19.9 | 21.4 | 21.2 | 21.8 | 21.2 | 21.5 | 21.4 | 17.4 | 21.4 | 21.7 | 17.4 |
| Sep. | 20.0 | 20.6 | 21.2 | 21.9 | 21.6 | 20.8 | 21.8 | 21.3 | 19.7 | 21.4 | 21.6 | 19.7 |
| Oct. | 21.4 | 22.4 | 22.4 | 22.2 | 22.0 | 21.4 | 22.5 | 22.0 | 21.2 | 22.8 | - | 21.2 |
| Nov. | 21.8 | 23.0 | 22.9 | 22.0 | 22.0 | 22.6 | 22.1 | 22.0 | 22.8 | 22.5 | - | 21.8 |
| Dec. | 22.2 | 22.0 | 21.0 | 22.4 | 22.4 | 22.3 | 21.7 | 22.2 | 22.6 | 22.3 | - | 21.0 |
| Min | 18.5 | 19.9 | 21.0 | 20.0 | 20.7 | 20.3 | 21.0 | 21.3 | 17.4 | 21.4 | 21.4 | 17.4 |

Table 2 Relative Humidity in Jakarta

Station : Jakarta, Soekarno-Hatta International Airport

Monthly Mean Relative Humidity

(unit: %)

| Month | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | Mean |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| Jan. | 85 | 87 | 86 | 87 | 88 | 88 | 88 | 88 | 88 | 87 | 86 | 87 |
| Feb. | 86 | 88 | 85 | 88 | 87 | 89 | 88 | 87 | 86 | 87 | 88 | 87 |
| Mar. | 85 | 84 | 85 | 84 | 86 | 87 | 87 | 83 | 87 | 87 | 85 | 85 |
| Apr. | 85 | 84 | 84 | 82 | 83 | 87 | 86 | 85 | 85 | 85 | 80 | 84 |
| May | 83 | 82 | 86 | 86 | 83 | 84 | 86 | 84 | 82 | 84 | 81 | 84 |
| Jun. | 83 | 81 | 83 | 83 | 83 | 93 | 83 | 84 | 80 | 85 | 79 | 83 |
| July | 82 | 79 | 80 | 81 | 83 | 80 | 82 | 81 | 78 | 83 | 79 | 81 |
| Aug. | 82 | 76 | 81 | 83 | 85 | 80 | 82 | 82 | 76 | 80 | 80 | 81 |
| Sep. | 83 | 76 | 78 | 80 | 82 | 77 | 83 | 79 | 75 | 80 | 80 | 79 |
| Oct. | 83 | 76 | 81 | 79 | 80 | 77 | 85 | 80 | 75 | 83 | - | 80 |
| Nov. | 84 | 77 | 81 | 80 | 80 | 83 | 83 | 83 | 79 | 85 | - | 82 |
| Dec. | 83 | 84 | 85 | 86 | 87 | 86 | 85 | 84 | 82 | 84 | - | 85 |

Monthly Maximum Relative Humidity

(unit: %)

| Month | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | Max |
|-------|------|------|------|------|------|------|------|------|------|------|------|-----|
| Jan. | 98 | 98 | 100 | 100 | 98 | 99 | 98 | 98 | 98 | 98 | 98 | 100 |
| Feb. | 98 | 98 | 98 | 100 | 98 | 98 | 98 | 98 | 99 | 98 | 99 | 100 |
| Mar. | 97 | 98 | 98 | 98 | 99 | 98 | 98 | 98 | 98 | 98 | 99 | 99 |
| Apr. | 98 | 98 | 98 | 98 | 100 | 98 | 98 | 98 | 98 | 97 | 98 | 100 |
| May | 98 | 98 | 98 | 99 | 98 | 99 | 98 | 100 | 98 | 98 | 97 | 100 |
| Jun. | 98 | 98 | 99 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 99 |
| July | 98 | 98 | 99 | 98 | 98 | 97 | 98 | 98 | 98 | 98 | 97 | 99 |
| Aug. | 98 | 97 | 98 | 98 | 98 | 99 | 98 | 98 | 97 | 97 | 98 | 99 |
| Sep. | 100 | 97 | 98 | 98 | 98 | 98 | 98 | 98 | 98 | 97 | 98 | 100 |
| Oct. | 98 | 97 | 98 | 98 | 98 | 97 | 99 | 98 | 98 | 97 | - | 99 |
| Nov. | 98 | 97 | 97 | 97 | 98 | 99 | 98 | 98 | 98 | 98 | - | 99 |
| Dec. | 98 | 98 | 98 | 98 | 99 | 98 | 99 | 97 | 98 | 97 | - | 99 |
| Max. | 100 | 98 | 100 | 100 | 100 | 99 | 99 | 100 | 99 | 98 | 99 | 100 |

Monthly Minimum Relative Humidity

(unit: %)

| Month | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | Min |
|-------|------|------|------|------|------|------|------|------|------|------|------|-----|
| Jan. | 64 | 62 | 53 | 63 | 64 | 65 | 67 | 66 | 59 | 60 | 57 | 53 |
| Feb. | 56 | 62 | 59 | 68 | 60 | 65 | 59 | 62 | 57 | 59 | 65 | 56 |
| Mar. | 58 | 58 | 55 | 58 | 63 | 63 | 54 | 54 | 57 | 58 | 57 | 54 |
| Apr. | 60 | 58 | 49 | 48 | 52 | 59 | 50 | 57 | 54 | 56 | 49 | 48 |
| May | 57 | 49 | 63 | 60 | 41 | 55 | 52 | 51 | 53 | 54 | 51 | 41 |
| Jun. | 53 | 50 | 49 | 49 | 53 | 49 | 51 | 54 | 51 | 58 | 56 | 49 |
| July | 46 | 43 | 47 | 45 | 54 | 47 | 50 | 52 | 39 | 50 | 44 | 39 |
| Aug. | 42 | 42 | 51 | 52 | 54 | 49 | 50 | 49 | 36 | 49 | 48 | 36 |
| Sep. | 55 | 44 | 48 | 43 | 51 | 47 | 55 | 41 | 40 | 45 | 52 | 40 |
| Oct. | 55 | 46 | 49 | 49 | 54 | 48 | 58 | 49 | 43 | 56 | - | 43 |
| Nov. | 53 | 40 | 50 | 52 | 51 | 50 | 55 | 53 | 52 | 59 | - | 40 |
| Dec. | 55 | 53 | 51 | 61 | 62 | 59 | 51 | 56 | 51 | 59 | - | 51 |
| Min | 42 | 40 | 47 | 43 | 41 | 47 | 50 | 41 | 36 | 45 | 44 | 36 |

Table 3 Prevailing Wind in Jakarta

Station: Jakarta, Soekarno-Hatta International Airport

Monthly Mean Speed of Prevailing Wind

(unit: Knots, 1Knot=1.852m/h)

| Month | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | Mean |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| Jan. | 6 | 5 | 4 | 4 | 5 | 7 | 5 | 6 | 7 | 6 | 7 | 6 |
| Feb. | 4 | 4 | 5 | 6 | 5 | 7 | 5 | 6 | 7 | 6 | 7 | 6 |
| Mar. | 5 | 4 | 5 | 8 | 6 | 5 | 5 | 5 | 5 | 6 | 5 | 5 |
| Apr. | 4 | 4 | 6 | 7 | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 5 |
| May | 4 | 5 | 5 | 5 | 6 | 5 | 5 | 4 | 5 | 5 | 5 | 5 |
| Jun. | 4 | 4 | 5 | 6 | 5 | 5 | 6 | 5 | 5 | 5 | 5 | 5 |
| July | 4 | 4 | 5 | 6 | 5 | 6 | 6 | 5 | 5 | 5 | 5 | 5 |
| Aug. | 4 | 4 | 5 | 5 | 6 | 6 | 5 | 6 | 7 | 5 | 6 | 5 |
| Sep. | 4 | 5 | 6 | 5 | 6 | 6 | 5 | 5 | 5 | 5 | 5 | 5 |
| Oct. | 4 | 5 | 6 | 5 | 7 | 6 | 4 | 5 | 6 | 5 | - | 5 |
| Nov. | 5 | 5 | 5 | 7 | 6 | 5 | 4 | 5 | 5 | 5 | - | 5 |
| Dec. | 4 | 6 | 7 | 5 | 6 | 5 | 7 | 6 | 6 | 7 | - | 6 |

Monthly Maximum Speed of Prevailing Wind

(unit: Knots, 1Knot=1.852m/h)

| Month | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | Max |
|-------|------|------|------|------|------|------|------|------|------|------|------|-----|
| Jan. | 18 | 18 | 18 | 28 | 38 | 42 | 50 | 54 | 60 | 52 | 46 | 60 |
| Feb. | 24 | 18 | 18 | 28 | 22 | 46 | 50 | 54 | 60 | 52 | 52 | 60 |
| Mar. | 24 | 16 | 28 | 42 | 32 | 50 | 34 | 44 | 44 | 42 | 38 | 50 |
| Apr. | 16 | 18 | 22 | 36 | 26 | 44 | 50 | 42 | 40 | 58 | 38 | 58 |
| May | 18 | 20 | 40 | 18 | 38 | 40 | 36 | 38 | 46 | 60 | 52 | 60 |
| Jun. | 25 | 20 | 22 | 28 | 20 | 49 | 36 | 42 | 40 | 46 | 38 | 49 |
| July | 18 | 16 | 22 | 26 | 36 | 28 | 44 | 36 | 38 | 46 | 42 | 46 |
| Aug. | 20 | 18 | 24 | 28 | 40 | 36 | 36 | 38 | 42 | 34 | 46 | 46 |
| Sep. | 20 | 18 | 24 | 24 | 40 | 26 | 44 | 38 | 34 | 42 | 44 | 44 |
| Oct. | 20 | 24 | 34 | 22 | 46 | 28 | 39 | 44 | 42 | 44 | - | 46 |
| Nov. | 28 | 22 | 28 | 26 | 52 | 38 | 46 | 52 | 40 | 56 | - | 56 |
| Dec. | 16 | 20 | 34 | 30 | 48 | 70 | 48 | 56 | 50 | 46 | - | 70 |
| Max. | 28 | 24 | 40 | 42 | 52 | 70 | 50 | 56 | 60 | 60 | 52 | 70 |

Direction of Prevailing Wind

| Month | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|-------|------|------|------|------|------|------|------|------|------|------|------|
| Jan. | NW | NW | NW | N | W | W | N | W | NW | W | N |
| Feb. | NW | NW | W | W | W | SW | N | W | NW | W | NW |
| Mar. | NW | NW | W | W | W | E | NE | N | W | W | NE |
| Apr. | NE | E | E | W | NE | W | NE | SW | N | E | NE |
| May | SE | S | SW | S | NE | E | NE | E | E | N | NE |
| Jun. | E | E | E | SW | SE | E | NE | E | NE | N | NE |
| July | E | E | E | E | S | E | E | E | NE | E | NE |
| Aug. | NE | E | S | N | NE | E | S | E | E | NE | NE |
| Sep. | NW | E | NE | N | S | E | SW | NE | NE | NE | NE |
| Oct. | NW | NE | SW | S | S | NE | W | NE | NE | NE | - |
| Nov. | W | W | W | W | SW | S | N | W | NE | SW | - |
| Dec. | NW | SW | W | N | W | SW | W | W | W | W | - |

Table 4 Rainfall in Jakarta

Station: Jakarta, Soekarno-Hatta International Airport

Monthly Rainfall

(unit: mm/month)

| Month | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | Mean |
|-------|-------|------|-------|-------|-------|------|-------|-------|------|-------|------|-------|
| Jan. | 503 | 644 | 371 | 209 | 533 | 349 | 398 | 494 | 392 | 403 | 346 | 422 |
| Feb. | 369 | 384 | 227 | 441 | 174 | 394 | 198 | 345 | 328 | 328 | 546 | 339 |
| Mar. | 195 | 104 | 106 | 155 | 73 | 197 | 255 | 88 | 341 | 198 | 116 | 166 |
| Apr. | 164 | 116 | 73 | 68 | 106 | 241 | 108 | 108 | 146 | 131 | 172 | 130 |
| May | 77 | 89 | 276 | 208 | 162 | 22 | 140 | 74 | 34 | 98 | 124 | 119 |
| Jun. | 23 | 13 | 67 | 41 | 57 | 30 | 78 | 54 | 40 | 112 | 57 | 52 |
| July | 93 | 68 | 17 | 51 | 124 | - | 35 | 41 | - | 115 | 74 | 69 |
| Aug. | 268 | - | 50 | 4 | 153 | 10 | 114 | 60 | - | 18 | 36 | 79 |
| Sep. | 124 | 5 | 17 | 64 | 57 | - | 88 | 36 | - | 48 | 105 | 60 |
| Oct. | 58 | 5 | 98 | 35 | 35 | 6 | 107 | 71 | 1 | 102 | - | 52 |
| Nov. | 114 | 81 | 52 | 35 | 29 | 91 | 131 | 102 | 102 | 244 | - | 98 |
| Dec. | 237 | 280 | 313 | 284 | 325 | 117 | 278 | 177 | 55 | 250 | - | 232 |
| Total | 2,225 | - | 1,667 | 1,595 | 1,828 | - | 1,930 | 1,650 | - | 2,047 | - | 1,818 |

Maximum Daily Rainfall

(unit: mm/day)

| Month | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | Max |
|-------|-----------|------|------|---------|------|----------|----------|------|------|------|------|-------|
| Jan. | 175 | 189 | 101 | 56 | 83 | 58 | 116 | 101 | 58 | 77 | 86 | 189 |
| Feb. | 133 | 118 | 47 | 71 | 36 | 98 | 50 | 136 | 85 | 50 | 107 | 136 |
| Mar. | 110 | 35 | 43 | 40 | 20 | 91 | 58 | 17 | 85 | 44 | 42 | 110 |
| Apr. | 46 | 45 | 27 | 15 | 27 | 58 | 48 | 25 | 31 | 35 | 55 | 58 |
| May | 58 | 55 | 57 | 78 | 56 | 15 | 41 | 37 | 21 | 39 | 55 | 78 |
| Jun. | 6 | 10 | 30 | 14 | 29 | 24 | 16 | 18 | 27 | 37 | 26 | 37 |
| July | 32 | 27 | 14 | 22 | 39 | - | 15 | 18 | - | 76 | 73 | (76) |
| Aug. | 77 | - | 22 | 2 | 43 | 10 | 67 | 39 | - | 18 | 15 | (77) |
| Sep. | 47 | 4 | 7 | 50 | 55 | - | 36 | 18 | - | 22 | 35 | (55) |
| Oct. | 26 | 5 | 23 | 23 | 19 | 6 | 25 | 50 | 1 | 38 | - | (50) |
| Nov. | 23 | 34 | 15 | 8 | 11 | 52 | 22 | 39 | 42 | 67 | - | (67) |
| Dec. | 79 | 71 | 87 | 86 | 77 | 28 | 108 | 39 | 16 | 80 | - | (108) |
| Max | 175 (189) | 101 | 86 | 83 (98) | 116 | 136 (85) | 80 (107) | 189 | | | | |

Rainy Days

(unit: days/month)

| Month | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | Mean |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| Jan. | 22 | 27 | 21 | 14 | 26 | 25 | 16 | 23 | 25 | 24 | 16 | 22 |
| Feb. | 14 | 22 | 12 | 25 | 15 | 21 | 16 | 14 | 16 | 23 | 24 | 18 |
| Mar. | 13 | 11 | 13 | 16 | 10 | 10 | 14 | 12 | 19 | 23 | 11 | 14 |
| Apr. | 12 | 12 | 6 | 12 | 12 | 13 | 8 | 13 | 14 | 13 | 14 | 12 |
| May | 4 | 5 | 13 | 13 | 13 | 4 | 11 | 7 | 3 | 9 | 8 | 8 |
| Jun. | 8 | 2 | 7 | 7 | 8 | 3 | 11 | 7 | 5 | 11 | 4 | 7 |
| July | 8 | 4 | 2 | 8 | 9 | - | 4 | 6 | - | 9 | 3 | (6) |
| Aug. | 9 | - | 9 | 3 | 12 | 1 | 7 | 7 | - | 3 | 7 | (6) |
| Sep. | 12 | 2 | 3 | 3 | 2 | - | 6 | 6 | - | 6 | 8 | (5) |
| Oct. | 8 | 1 | 11 | 7 | 5 | 1 | 17 | 7 | 2 | 10 | - | 7 |
| Nov. | 16 | 7 | 14 | 10 | 7 | 11 | 16 | 11 | 9 | 19 | - | 12 |
| Dec. | 9 | 16 | 19 | 20 | 21 | 15 | 16 | 15 | 12 | 14 | - | 16 |
| Total | 135 | - | 130 | 138 | 140 | - | 142 | 128 | - | 164 | - | 140 |

Table 5 Elevation of Bench Marks (I)

| Bench Mark No. | Elevation (m) | Remarks |
|------------------|---------------|-----------------|
| TTG.281 | 14.131 | Reference point |
| TTG.280(NWP.514) | 11.969 | Reference point |
| TTG.177(NWP.60) | 40.138 | Reference point |
| TTG.279 | 13.090 | Recovered point |
| TTG.278 | 6.841 | Recovered point |
| TTG.276 | 5.144 | Recovered point |
| TTG.275(PP.743) | 3.503 | Recovered point |
| TTG.271(PB.012) | 2.137 | Recovered point |
| TTG.270A | 3.414 | Recovered point |
| TTG.260(PP.809) | 2.507 | Recovered point |
| PP.101A | 1.348 | Recovered point |
| PP.103A | 0.932 | Recovered point |
| PP.107A | 0.772 | Recovered point |
| PP.1088B | 11.566 | Recovered point |
| PP.108A | 1.124 | Recovered point |
| PP.1110B | 5.368 | Recovered point |
| PP.1114B | 2.910 | Recovered point |
| PP.1271B | 2.342 | Recovered point |
| PP.1299B | 3.014 | Recovered point |
| PP.1302B | 3.345 | Recovered point |
| PP.316 | 0.012 | Recovered point |
| PP.407 | 58.453 | Recovered point |
| PP.701 | 1.881 | Recovered point |
| PP.707 | 2.256 | Recovered point |
| PP.716 | 3.132 | Recovered point |
| PP.722A | 2.947 | Recovered point |
| PP.733B | 5.250 | Recovered point |
| PP.745A | 4.153 | Recovered point |
| PP.765 | 2.484 | Recovered point |
| PP.767 | 3.097 | Recovered point |
| PP.814B | 4.031 | Recovered point |
| PP.815B | 3.304 | Recovered point |
| PP.822 | 6.454 | Recovered point |
| PP.823B | 5.774 | Recovered point |
| PP.824B | 4.355 | Recovered point |
| PP.845A | 6.313 | Recovered point |
| PP.876A | 9.642 | Recovered point |
| PP.1290B | 3.146 | Recovered point |
| PP.1291B | 2.149 | Recovered point |
| PP.1296B | 3.282 | Recovered point |
| PP.1300B | 3.232 | Recovered point |
| BATAS(TP) | 5.550 | Recovered point |
| DKI.1058 | 4.607 | Recovered point |
| DKI.1082 | 4.219 | Recovered point |
| DKI.1167 | 3.213 | Recovered point |
| DKI.127 | 3.026 | Recovered point |
| DKI.389 | 4.783 | Recovered point |

Table 6 Elevation of Bench Marks (2)

| | | |
|-----------------|--------|-------------------|
| DKI.521 | 5.959 | Recovered point |
| DKI.535 | 1.034 | Recovered point |
| DKI.580 | 4.333 | Recovered point |
| DKI.671 | 4.474 | Recovered point |
| DKI.701 | 3.515 | Recovered point |
| DKI.704 | 2.472 | Recovered point |
| DTK.094 | 3.350 | Recovered point |
| DTK.258 | 0.403 | Recovered point |
| DTK.372 | 8.489 | Recovered point |
| DTK.384 | 10.064 | Recovered point |
| DTK.960 | 3.118 | Recovered point |
| CF.0 | 2.418 | Recovered point |
| BM.01 | 1.703 | Recovered point |
| BM.02 | 0.574 | Recovered point |
| BM.06 | 3.204 | Recovered point |
| BM.09 | 0.641 | Recovered point |
| GPS.1005 | 1.968 | Recovered point |
| GPS.1005A | 3.577 | Established point |
| GPS.2034 | 9.320 | Established point |
| 96001 | 1.574 | Established point |
| 96002 | 1.679 | Established point |
| 96003 | 2.178 | Established point |
| 96004 | 3.898 | Established point |
| 960041 | 4.194 | Established point |
| 96006 | 2.452 | Established point |
| 96007 | 1.547 | Established point |
| 96008 | 0.891 | Established point |
| 96009 | 1.348 | Established point |
| 96010 | 1.948 | Established point |
| 96011 | 0.013 | Established point |
| 96012(BATAS) | 0.918 | Recovered point |
| 96014 | 2.074 | Established point |
| 96015 | 1.950 | Established point |
| 96016 | 1.933 | Established point |
| 96017 | 0.853 | Established point |
| 96018 | 3.270 | Established point |
| 96019 | 2.717 | Established point |
| 96020 | 1.846 | Established point |
| 96021(GPS.2030) | 5.656 | Established point |
| 96022(GPS.2031) | 4.074 | Established point |
| 96023 | 5.621 | Established point |
| 96024 | 7.037 | Established point |
| 96025 | 11.194 | Established point |
| 96026(HL.23) | 1.906 | Recovered point |
| 96027(HW.2) | 1.411 | Recovered point |

Table 7 Coordinates of GPS Points

| Point No. | North(m) | East(m) | Height(m)* | Remarks |
|------------------|-----------------|----------------|-------------------|------------------|
| 1002 | 9,319,222.72 | 688,525.64 | 3.54 | Reference Point |
| 1005 | 9,318,745.17 | 691,122.74 | 1.00 | Reference Point |
| 1006 | 9,322,254.90 | 694,141.55 | 0.62 | Reference Point |
| 1008 | 9,326,097.42 | 690,431.26 | 0.06 | Reference Point |
| 1011 | 9,312,998.14 | 699,713.56 | 9.63 | Reference Point |
| 2026 | 9,322,291.24 | 691,443.37 | 1.55 | |
| 2027 | 9,321,833.06 | 691,433.31 | 1.18 | |
| 2028 | 9,318,285.96 | 693,504.96 | 3.26 | |
| 2029 | 9,318,129.35 | 693,165.65 | 1.20 | |
| 2030 | 9,315,714.29 | 693,216.78 | 3.32 | |
| 2031 | 9,315,445.60 | 693,155.15 | 4.77 | |
| 2032 | 9,312,193.22 | 694,474.77 | 16.73 | |
| 2033 | 9,312,235.48 | 694,095.31 | 10.86 | |
| 2034 | 9,314,571.85 | 691,155.41 | 8.30 | |
| 2035 | 9,314,879.80 | 691,394.48 | 10.87 | |
| 2036 | 9,320,707.80 | 687,981.99 | 3.73 | |
| 2037 | 9,321,090.58 | 688,117.23 | 4.10 | |
| 2038 | 9,323,301.89 | 688,023.13 | 2.22 | |
| 2039 | 9,322,785.00 | 688,578.89 | 2.20 | |
| 1005A | 9,319,235.24 | 691,098.80 | 1.63 | |
| 1006A | 9,321,936.63 | 694,056.50 | 0.79 | |
| 1008A | 9,325,962.77 | 690,175.47 | 0.10 | |
| W1-1-1 | 9,323,208.91 | 691,590.29 | -0.52 | Recovered Point |
| W1-1-2 | 9,323,347.95 | 691,679.05 | -0.31 | Additional Point |
| W2-1R | 9,314,855.14 | 691,763.67 | 9.15 | Recovered Point |
| W2-2R | 9,314,619.89 | 691,869.78 | 7.40 | Recovered Point |

Note: * Height of GPS points is indirect level to calculated using the earth ellipsoid (WGS-84)

Table 8 Physical Properties of Soils

| Soil | Depth (m) | Type of Soil | G _s (%) | W _n (%) | w _n (m ³) | g _d (t/m ³) | g _{sat} (t/m ³) | e _n | n (%) | S _r (%) | W _{sat} (%) | % Fines (%) | % Clay (%) | L.I. (%) | P.I. (%) |
|------|-------------|--------------------|--------------------|--------------------|----------------------------------|------------------------------------|--------------------------------------|----------------|--------|--------------------|----------------------|-------------|------------|----------|----------|
| A-1 | 6-4.5-7 | sandy silt | 2.752 | 43.85 | 1.56 | 1.087 | 1.692 | 1.553 | 60.5 | 78.73 | 55.7 | 62.1 | 22 | 59.7 | 24.3 |
| | 8.4-5.9 | clay | 2.729 | 98.07 | 1.462 | 0.738 | 1.468 | 2.697 | 72.953 | 99.226 | 98.8 | 94.1 | 34 | 145.4 | 35.9 |
| | 14.4-5-15 | sandy silt | 2.738 | 47.44 | 1.676 | 1.137 | 1.722 | 1.409 | 58.48 | 92.21 | 51.45 | 64.4 | 6 | 55.3 | 26.2 |
| | 18.4-5-19 | silty clay | 2.711 | 57.93 | 1.676 | 1.061 | 1.67 | 1.555 | 60.86 | 101.02 | 57.34 | 97.5 | 41 | 95.6 | 29.4 |
| | 21-22 | silty sand | 2.71 | 42.2 | 1.54 | 1.085 | 1.685 | 1.498 | 59.96 | 76.38 | 55.26 | 92.2 | 52 | 106.5 | 48.2 |
| | 25-45-24 | silty clay | 2.661 | 42.79 | 1.819 | 1.274 | 1.795 | 1.089 | 52.13 | 104.57 | 40.9 | 92.8 | 41 | 84.2 | 30 |
| | 28.4-5-29 | clay | 2.768 | 41.14 | 1.846 | 1.308 | 1.835 | 1.116 | 52.75 | 102.40 | 53 | 95.1 | 42 | 112.4 | 27.7 |
| | 33.4-5-34 | clay | 2.57 | 45.44 | 1.789 | 1.25 | 1.751 | 1.089 | 52.14 | 107.2 | 42.59 | 97.6 | 40 | 129 | 27.8 |
| B-1 | 2-4-2-9 | silty sand | 2.755 | 28 | 1.65 | 1.29 | 1.8 | 1.136 | 53.17 | 67.9 | 41.22 | 30 | 11 | 40.7 | 16.1 |
| | 4.4-5-5 | sandy silt | 2.666 | 45.16 | 1.907 | 1.332 | 1.832 | 1.001 | 50.04 | 115 | 37.56 | 54.8 | 4 | 113.1 | 34.7 |
| | 9.4-5-10 | silty clay | 2.78 | 71.52 | 1.43 | 0.834 | 1.534 | 2.334 | 70.01 | 85.17 | 83.97 | 92.7 | 39 | 91.1 | 24.1 |
| | 14.4-5-15 | clayey silt | 2.688 | 65.09 | 1.606 | 0.975 | 1.611 | 1.763 | 63.81 | 99.23 | 65.59 | 92.7 | 38 | 104.6 | 45.7 |
| | 17-17.5 | silty clay | 2.662 | 52.18 | 1.699 | 1.116 | 1.697 | 1.384 | 58.06 | 100.34 | 52 | 76.6 | 18 | 117.4 | 38.6 |
| | 21.5-21.7 | silty clay | 2.685 | 41.44 | 1.685 | 1.191 | 1.743 | 1.231 | 55.18 | 89.5 | 46.3 | 94.9 | 60 | 132.6 | 36.4 |
| | 28.4-5-29 | clay/silt | 2.629 | 25.86 | 1.895 | 1.53 | 1.948 | 0.781 | 41.8 | 87.3 | 27.3 | 95.8 | 60 | 94.5 | 24.2 |
| B-2 | 4.4-5-5 | clay | 2.48 | 59.62 | 1.617 | 1.013 | 1.605 | 1.448 | 59.15 | 102.1 | 58.59 | 97.6 | 44 | 84.5 | 28.8 |
| | 10-10-55 | clay | 2.665 | 52.11 | 1.661 | 1.092 | 1.682 | 1.439 | 59 | 96.45 | 54.02 | 69 | 16 | 70.9 | 29 |
| | 11-11.7 | clayey silt | 2.686 | 49.9 | 1.501 | 1.002 | 1.629 | 1.682 | 62.7 | 79.6 | 62.62 | 78.9 | 35 | 82.1 | 40.4 |
| | 15-15-35 | sand/clay/silt | 2.722 | 44.9 | 1.71 | 1.18 | 1.747 | 1.307 | 56.6 | 93.54 | 48 | 64.5 | 8 | 66.2 | 26.5 |
| | 22.4-5-22.9 | clay + silt, sandy | 2.633 | 55.56 | 1.669 | 1.075 | 1.665 | 1.454 | 59.25 | 100.6 | 55.23 | 76.9 | 24 | 95.4 | 27.7 |
| | 25-25-35 | clay + silt | 2.753 | 64.7 | 1.636 | 0.995 | 1.63 | 1.751 | 63.66 | 101 | 64.01 | 90 | 37 | 101 | 32.3 |
| C-1 | 5.5-5.9 | clay | 2.554 | 63.08 | 1.607 | 0.985 | 1.6 | 1.592 | 61.42 | 101.2 | 62.53 | 95.2 | 38 | 91.1 | 30.4 |
| | 10.6 | silty sand | 2.727 | 26.23 | 1.753 | 1.389 | 1.879 | 0.964 | 49.1 | 74.23 | 35.34 | 36.4 | 5 | | |
| | 15-15.3 | silty clay | 2.571 | 55.15 | 1.651 | 1.064 | 1.65 | 1.416 | 58.61 | 100.1 | 55.08 | 85.8 | 20 | 91.7 | 28.1 |
| | 19-19.25 | silty clay | 2.428 | 59.25 | 1.558 | 0.978 | 1.575 | 1.482 | 59.7 | 97.1 | 61.03 | 90.9 | 18 | 108.9 | 38.8 |
| D-1 | 5-5.3 | silt + clay, sandy | 2.454 | 78.61 | 1.495 | 0.837 | 1.496 | 1.932 | 65.9 | 99.8 | 78.72 | 83 | 18 | 72.3 | 34.8 |
| | 12-13 | silty sand | 2.775 | 30.1 | 1.879 | 1.445 | 1.924 | 0.921 | 47.94 | 90.61 | 33.19 | 21.8 | 3 | | |
| O-1 | 5-5-45 | silty clay | 2.574 | 57.21 | 1.671 | 1.063 | 1.65 | 1.422 | 58.7 | 103.6 | 55.23 | 94.4 | 42 | 128 | 33 |
| | 10-10-35 | silty clay | 2.438 | 84.84 | 1.442 | 0.78 | 1.46 | 2.125 | 68 | 97.3 | 87.17 | 95.8 | 41 | 138.6 | 54.2 |
| | 14.4-15 | sandy siltstone | 2.57 | 30.5 | 1.696 | 1.3 | 1.794 | 0.978 | 49.43 | 80.19 | 38.04 | 61.5 | 22 | 59.5 | 32.7 |
| B-2 | proctor | clay + silt, sandy | 2.556 | 28.96 | 1.985 | | | 13.6 | 93.15 | 5.45 | 5.32 | 72.9 | 36 | 55.7 | 19.1 |

Table 9 Results of Unconfined and Triaxial Compression Tests

| Sample Hole | Depth (m) | Soil nature Type of Soil | % Fines (%) | % Clay (%) | Unconf. compression | | | Triaxial Tests | | | CD | |
|-------------|------------|-----------------------------|-------------|------------|--------------------------|-------------------------------------|--------------|------------------------------|--------------|------------------------------|------|--------------|
| | | | | | qu kg/cm ² | ϵ (kg/cm ²) | ϕ° | UU c(kg/cm ²) | ϕ° | CU c(kg/cm ²) | | ϕ° |
| A-1 | 8.45-9 | clay | 94.1 | 34 | 0.19 | 0.095 | 0.11 | 3.8 | | | | |
| | 14.45-15 | sandy silt | 64.4 | 6 | 0.34 | 0.17 | 0.62 | 27 | | | | 0.62 27 |
| | 18.45-19 | silty clay | 97.5 | 41 | 0.34 | 0.17 | | | 1.01 | 9.3 | 0.28 | 27 |
| | 23.45-24 | silty clay | 92.8 | 41 | 0.47 | 0.235 | 0.36 | 8.5 | | | | |
| | 28.45-29 | clay | 95.1 | 42 | 0.64 | 0.32 | 0.66 | 4.6 | | | | |
| B-1 | 33.45-34 | clay | 97.6 | 40 | 0.51 | 0.255 | 0.194 | 2.5 | | | | |
| B-2 | 4.45-5 | sandy silt | 54.8 | 4 | 0.24 | 0.12 | | | | | | 0.25 29 |
| | 9.45-10 | silty clay | 92.7 | 39 | 0.2 | 0.1 | 0.401 | 6.7 | | | | |
| | 14.45-15 | clayey silt | 92.7 | 38 | 0.67 | 0.335 | 0.46 | 8.6 | | | | |
| | 17.17-5 | silty clay | 76.6 | 18 | 0.61 | 0.305 | 0.6 | 2.5 | | | | |
| | 21.3-21.7 | silty clay | 94.9 | | 0.63 | 0.315 | 0.4 | 3.3 | | | | |
| C-1 | 28.45-29 | clay/silt | 95.8 | | 0.7 | 0.35 | 0.6 | 3.9 | | | | |
| | 4.45-5 | clay | 97.6 | 44 | 0.35 | 0.175 | 0.28 | 9.7 | | | | |
| | 10-10.55 | clay | 69 | 16 | 0.28 | 0.14 | 0.3 | 6.9 | | | | |
| | 15-15.35 | sand/clay/silt | 64.5 | 8 | 0.35 | 0.175 | | | | | | 0.36 25 |
| | 22.45-22.9 | clay + silt, sandy | 76.9 | 24 | 0.17 | 0.085 | 0.09 | 17.1 | 0.07 | 21.4 | | |
| D-1 | 25-25.35 | clay + silt | 90 | 37 | 0.19 | 0.095 | 0.5 | 9 | | | | |
| | 5.5-5.9 | clay | 95.2 | 38 | 0.17 | 0.085 | 0.181 | 9 | | | | |
| | 10.6 | silty sand | 36.4 | | 0.23 | 0.115 | | | | | | |
| | 15-15.3 | silty clay | 85.8 | 30 | | 0 | 0.3 | 8.1 | | | | |
| | 19.19.25 | silty clay | 90.9 | 18 | 0.24 | 0.12 | 0.85 | 3.7 | | | | |
| O-1 | 5-5.3 | silt + clay, sandy | 83 | 18 | 0.15 | 0.075 | 0.47 | 9.1 | 0.33 | 9.8 | 0.14 | 32.3 |
| | 5-5.45 | silty clay | 94.4 | 42 | 0.25 | 0.125 | 0.214 | 9.2 | | | | |
| B-2 | 10-10.35 | silty clay | 95.8 | 41 | 0.17 | 0.085 | 0.47 | 9.1 | | | | |
| | proctor | clay + silt, sandy | 72.9 | | | | 0.34 | 20.6 | 0.4 | 25.4 | | |
| D-1 | proctor | clay + silt, sandy | 88.4 | | | | 0.45 | 13.4 | 0.31 | 35.3 | | |

Table 10 Results of Consolidation Tests

| Hole | Depth (m) | Soil | LL (%) | Wn (%) | eo (%) | Pc Kg/cm ² | Cc | Cv cm ² /day | OCR % |
|------|------------|--------------------|--------|--------|--------|-----------------------|-------|-------------------------|-------|
| A-1 | 8.45-9 | clay | 145.4 | 98.07 | 2.697 | 0.64 | 0.874 | 382.9 | 0.91 |
| | 14.45-15 | sandy silt | 55.3 | 47.44 | 1.409 | 2.2 | 0.35 | 711.0 | 1.2 |
| | 18.45-19 | silty clay | 99.6 | 57.93 | 1.555 | 1.7 | 0.4 | 324.8 | 1.1 |
| | 23.45-24 | silty clay | 84.2 | 42.79 | 1.089 | 2.2 | 0.2 | 380.9 | 1 |
| | 28.45-29 | clay | 112.4 | 41.14 | 1.116 | 1.8 | 0.25 | 323.9 | 0.87 |
| | 33.45-34 | clay | 129 | 45.44 | 1.089 | 1.7 | 0.31 | 536.8 | 0.62 |
| B-1 | 4.45-5 | sandy silt | 113.1 | 43.16 | 1.001 | 0.67 | 0.58 | 230.3 | 2.2 |
| | 9.45-10 | silty clay | 91.1 | 71.52 | 2.334 | 2.7 | 0.62 | 205.1 | 3.5 |
| | 14.45-15 | clayey silt | 104.6 | 65.09 | 1.763 | 3.6 | 0.45 | 630.8 | 3.7 |
| | 17-17.5 | silty clay | 117.4 | 52.18 | 1.384 | 2.1 | 0.43 | 469.9 | 1.85 |
| | 21.3-21.7 | silty clay | 132.6 | 41.44 | 1.231 | 2 | 0.36 | 472.0 | 1.36 |
| | 28.45-29 | clay/silt | 94.5 | 23.86 | 0.781 | 1.8 | 0.22 | 541.5 | 0.87 |
| B-2 | 4.45-5 | clay | 84.5 | 59.62 | 1.448 | 1.55 | 0.66 | 287.5 | 2.63 |
| | 10-10.55 | clay | 70.9 | 52.11 | 1.439 | 2.1 | 0.38 | 450.8 | 2.1 |
| | 15-15.35 | sand/clay/silt | 66.2 | 44.9 | 1.307 | 2.05 | 0.31 | 562.7 | 1.62 |
| | 22.45-22.9 | clay + silt, sandy | 95.4 | 55.56 | 1.454 | 2.1 | 0.49 | 496.3 | 1.3 |
| | 25-25.35 | clay + silt | 101 | 64.7 | 1.751 | 2 | 0.39 | 423.9 | 1.04 |
| C-1 | 5.5-5.9 | clay | 91.1 | 63.08 | 1.592 | 1.9 | 0.32 | 505.6 | 2.6 |
| | 15-15.3 | silty clay | 91.7 | 55.15 | 1.416 | 3 | 0.3 | 476.2 | 2.27 |
| | 19-19.25 | silty clay | 108.9 | 59.25 | 1.482 | 2.8 | 0.34 | 557.5 | 1.7 |
| D-1 | 5-5.3 | silt + clay, sandy | 72.3 | 78.61 | 1.932 | 2.1 | 0.92 | 584.8 | 5.3 |
| O-1 | 5-5.45 | silty clay | 128 | 57.21 | 1.422 | 2.9 | 0.39 | 473.6 | 3.28 |
| | 10-10.35 | silty clay | 138.6 | 84.84 | 2.125 | 2.2 | 0.37 | 410.1 | 1.5 |
| B-2 | proctor | clay + silt, sandy | 55.2 | 28.96 | 13.6 | 2.6 | 0.31 | 559.5 | |
| D-1 | proctor | clay + silt, sandy | 93.6 | 50.2 | 26.19 | 3 | 0.31 | 505.3 | |

Table 11 Result of Fresh Water Quality Analysis

| Item | Parameter | Unit | Maximum Limit | ST-A | ST-B | ST-C | ST-D | ST-E | ST-F | ST-G | ST-H | ST-I |
|----------|------------------------|-------|---------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| A | | | | | | | | | | | | |
| Physical | | | | | | | | | | | | |
| 1 | Temperature | C | | 28 | 29 | 27 | 28 | 28 | 27 | 27 | 27 | 27 |
| 2 | Total Dissolved Solids | mg/l | | 734 | 118 | 113 | 252 | 1696 | 1040 | 1433 | 516 | 472 |
| B | | | | | | | | | | | | |
| Chemical | | | | | | | | | | | | |
| 1 | Mercury | mg/l | 0.002 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| 2 | Ammonia Nitrogen | mg/l | 0.02 | 5.44 | 1.14 | 1.33 | 2.13 | 7.19 | 5.83 | 5.74 | 3.36 | 3.05 |
| 3 | Arsenic | mg/l | 0.5 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 |
| 4 | Fluoride | mg/l | 1.5 | 0.4 | 0.13 | 0.12 | 0.23 | 0.45 | 0.42 | 1.68 | 0.41 | 0.35 |
| 5 | Cadmium | mg/l | 0.01 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 |
| 6 | Chlorine | mg/l | 0.003 | 0.02 | 0.02 | 0.04 | 0.06 | 0.03 | 0.03 | 0.02 | 0.14 | 0.15 |
| 7 | Chromium | mg/l | zero | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| 8 | Nitrite | mg/l | 0.06 | 0.038 | 0.101 | 0.212 | <0.005 | <0.002 | <0.005 | <0.005 | <0.005 | 0.091 |
| 9 | Dissolved Oxygen | mg/l | >3 | 0 | 2.5 | 1.7 | 1.5 | 0 | 0 | 0 | 0 | 0 |
| 10 | pH | units | 6.0 - 8.5 | 6.5 | 6.6 | 6.7 | 6.8 | 7.1 | 6.9 | 7.2 | 7 | 6.8 |
| 11 | Selenium | mg/l | 0.05 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| 12 | Zinc | mg/l | 0.02 | 0.57 | 0.01 | 0.02 | 0.04 | 0.04 | 0.05 | 0.03 | 0.06 | 0.05 |
| 13 | Cyanide | mg/l | 0.01 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 | <0.005 |
| 14 | Hydrogen Sulfide | mg/l | 0.002 | 1.468 | <0.002 | <0.002 | <0.002 | 1.244 | 0.308 | 0.549 | <0.002 | <0.002 |
| 15 | Copper | mg/l | 0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| 16 | Lead | mg/l | 0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 |
| 17 | Phenol | mg/l | 0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.787 | 0.685 | 0.85 | 0.203 | 0.114 |
| 18 | Oil & Grease | mg/l | 0.5 | 5.2 | 2 | 3.2 | 4.8 | 6.4 | 4 | 2.4 | 4.8 | 4.4 |
| 19 | Detergents | mg/l | 2.00E-01 | 3.42 | 2.48 | 1.69 | 1.31 | 12.88 | 7.45 | 6.22 | 2.78 | 2.06 |
| 20 | BOD | mg/l | | 35.8 | 7.6 | 8.5 | 19 | 47 | 32.8 | 45.5 | 15.2 | 23.8 |
| 21 | COD | mg/l | | 83.6 | 17.6 | 21 | 46.2 | 118.8 | 70.4 | 96.8 | 45.1 | 63.8 |

ST : Sampling Station
 Maximum Limit : Standard Decree of DKI Jakarta for Surface Water, Fisheries, and Aquaculture
 Source : UNILAB PERDANA pt - Environmental Laboratory
 Cengkay Barat, December 21, 1996

Table 12 Result of Oceanic Water Analysis

| Item | Parameter | Unit | SEA WATER STANDARD | ST-J | ST-K | ST-L |
|------|------------------|-------|--------------------|--------|--------|--------|
| A | Physical | | | | | |
| 1 | Temperature | C | | 29 | 29 | 29 |
| 2 | Salinity | 0/00 | 10% Dev.N | 3.06 | 3.03 | |
| 3 | Suspended Solids | mg/l | < 80 | 2 | 3 | |
| B | Chemical | | | | | |
| 1 | Mercury | mg/l | 0.003 | <0.001 | <0.001 | <0.001 |
| 2 | Ammonia Nitrogen | mg/l | <1 | 0.16 | 0.21 | 1.41 |
| 3 | Arsenic | mg/l | 0.01 | <0.005 | <0.005 | <0.005 |
| 4 | Niquel | mg/l | <0.002 | <0.002 | <0.002 | |
| 5 | Cadmium | mg/l | <0.01 | <0.005 | <0.005 | <0.005 |
| 6 | Silver | mg/l | <0.05 | <0.02 | <0.02 | |
| 7 | Chromium | mg/l | <0.01 | <0.01 | <0.01 | <0.01 |
| 8 | Nitrite | mg/l | 0 | <0.005 | <0.005 | <0.005 |
| 9 | Dissolved Oxygen | mg/l | >4 | 5.6 | 6.1 | 2.5 |
| 10 | pH | units | 6 - 9 | 7.6 | 7.7 | 7 |
| 11 | Selenium | mg/l | <0.005 | <0.002 | <0.002 | <0.002 |
| 12 | Zinc | mg/l | <0.1 | 0.05 | 0.05 | 0.05 |
| 13 | Cyanide | mg/l | 0.2 | <0.005 | <0.005 | <0.005 |
| 14 | Hydrogen Sulfide | mg/l | <0.03 | <0.002 | <0.002 | <0.002 |
| 15 | Copper | mg/l | <0.06 | <0.02 | <0.02 | <0.02 |
| 16 | Lead | mg/l | <0.01 | <0.01 | <0.01 | <0.03 |
| 17 | Phenol | mg/l | | <0.001 | <0.01 | <0.001 |
| 18 | Oil & Grease | mg/l | <5 | 2 | 1.2 | 2.8 |
| 19 | Detergents | mg/l | | 0.12 | 0.08 | 1.48 |
| 20 | BOD | mg/l | <45 | 15.4 | 12.2 | 10 |
| 21 | COD | mg/l | <80 | 41.3 | 37.5 | 24.2 |

ST : Sampling Station

Sea Water Standard : Kcp. 02/MenKLH/1988, for biotic life.

Source : UNILAB PERDANA pt - Environmental Laboratory

Jakarta Bay, December 21, 1996.

FIGURES



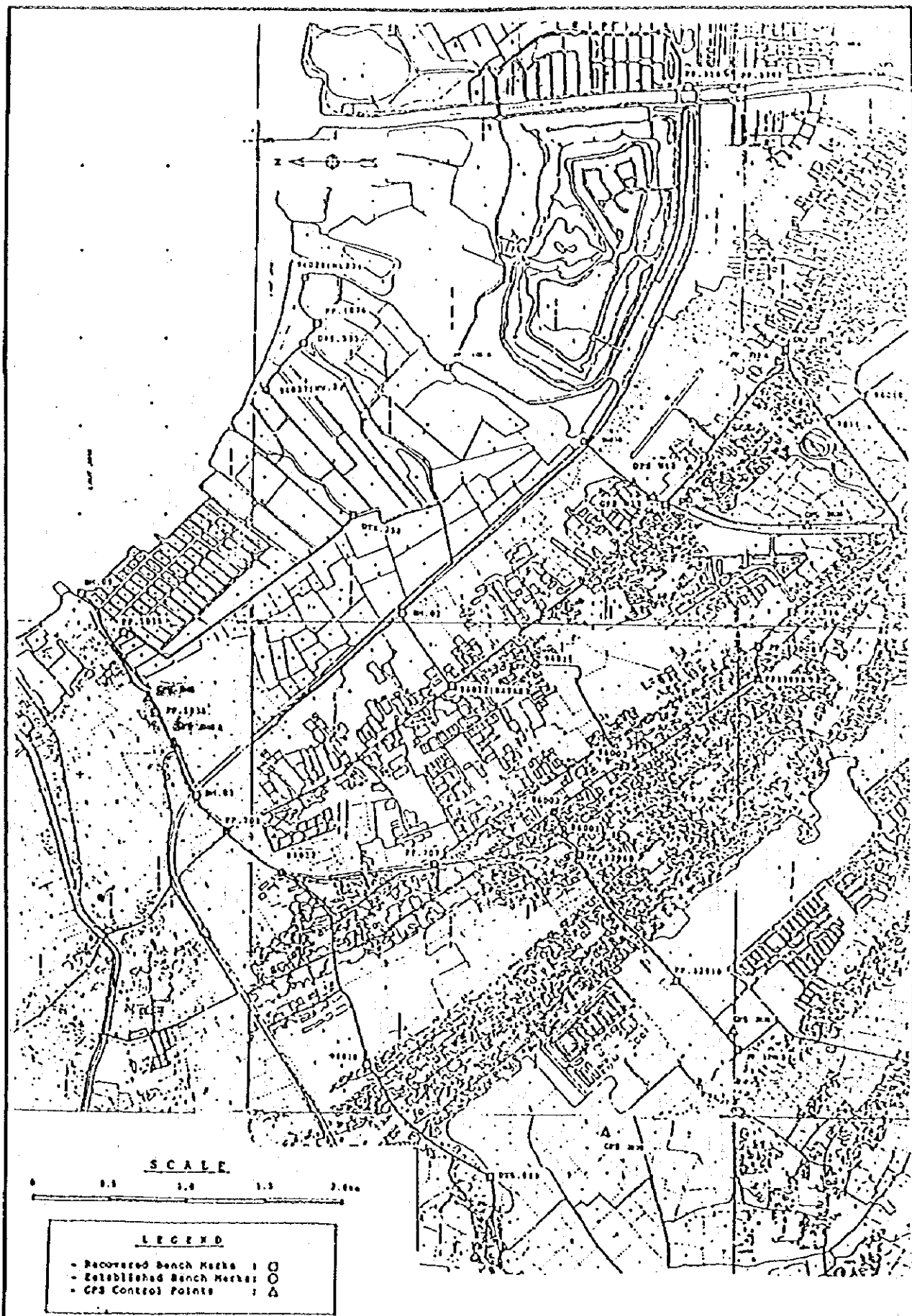


Fig. 1 Location Map of Bench Marks and GPS Control Points (1)



Fig. 2 Location Map of Bench Marks and GPS Control Points (2)

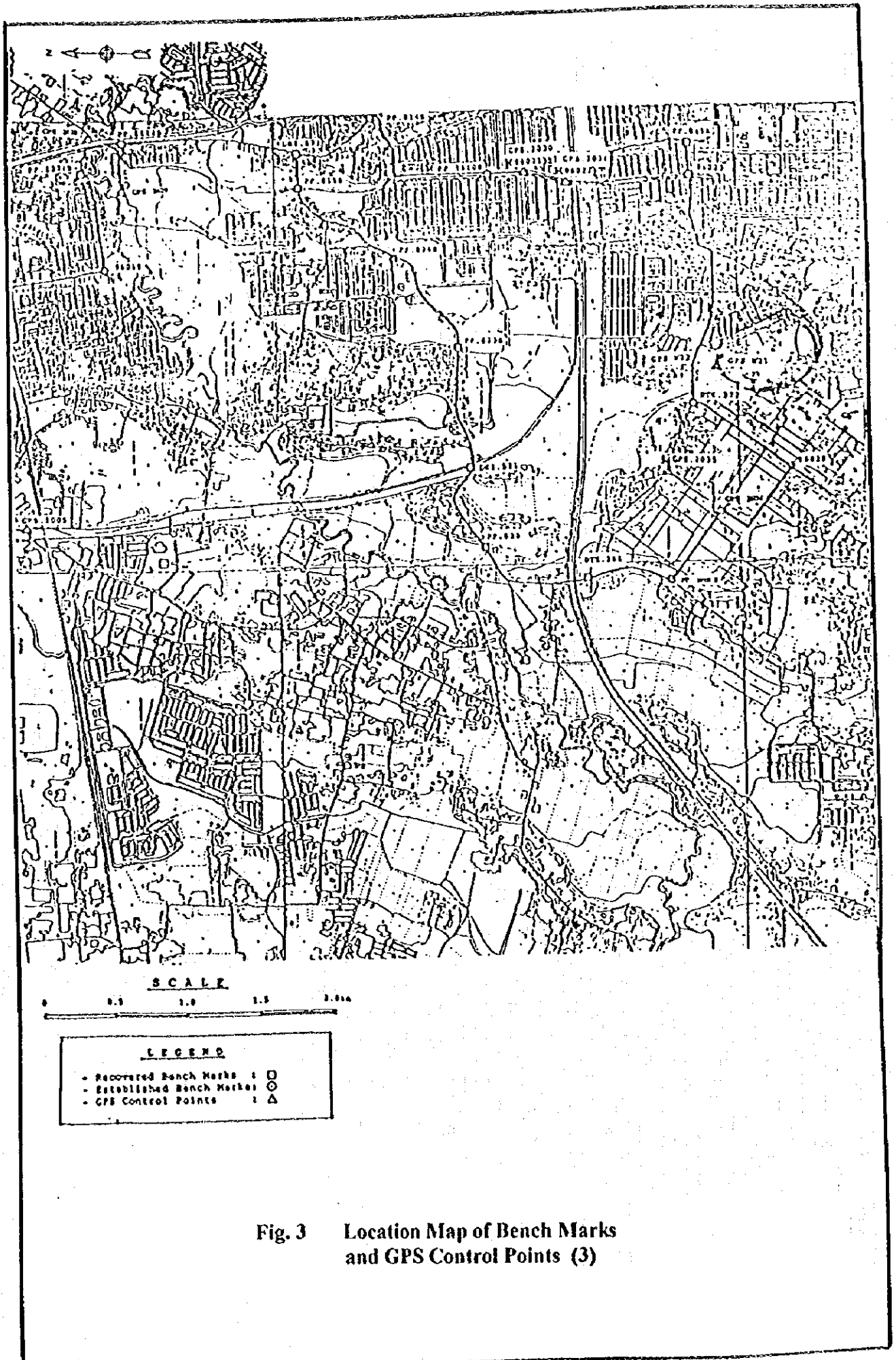


Fig. 3 Location Map of Bench Marks and GPS Control Points (3)

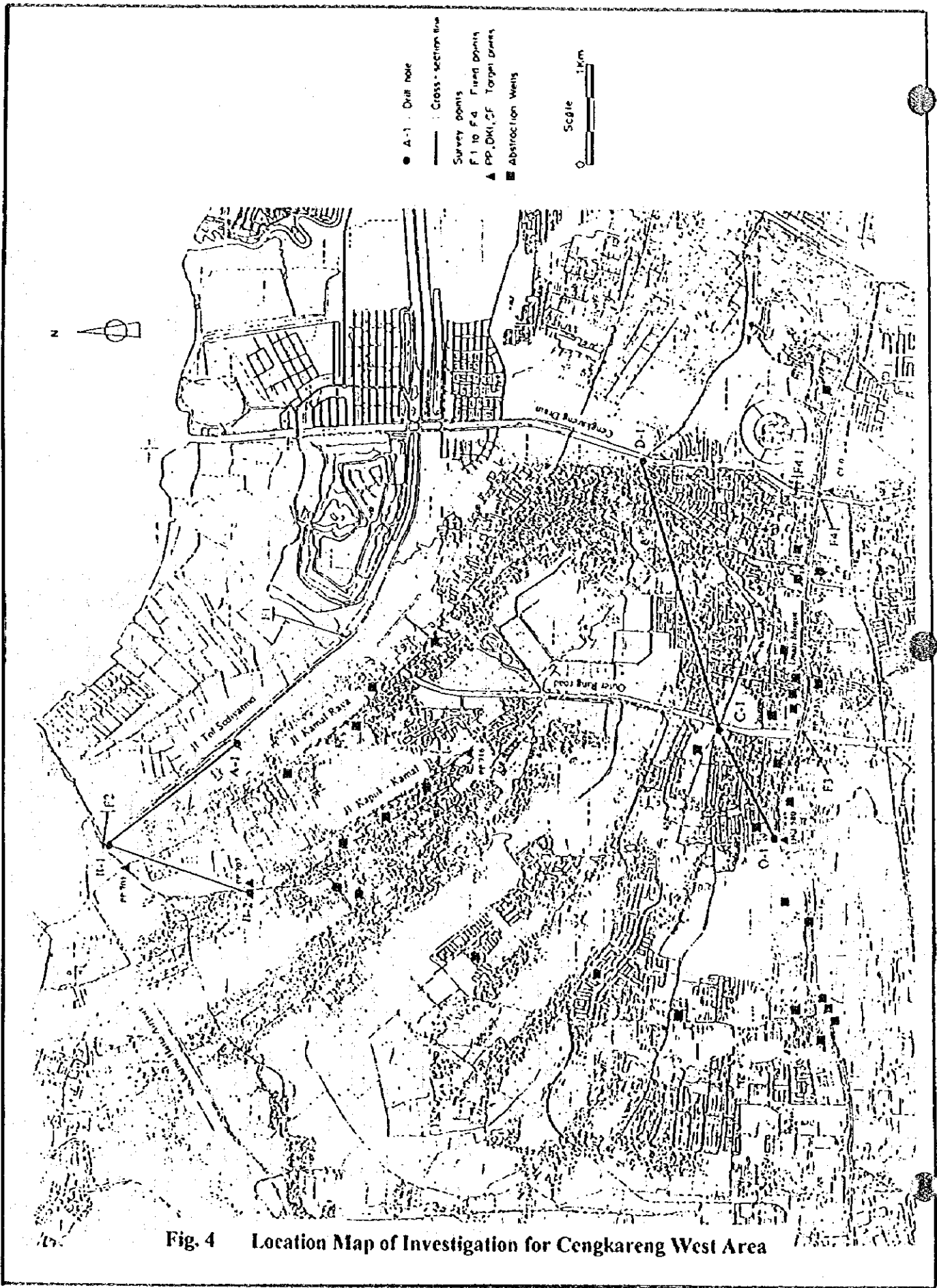


Fig. 4 Location Map of Investigation for Cengkareng West Area

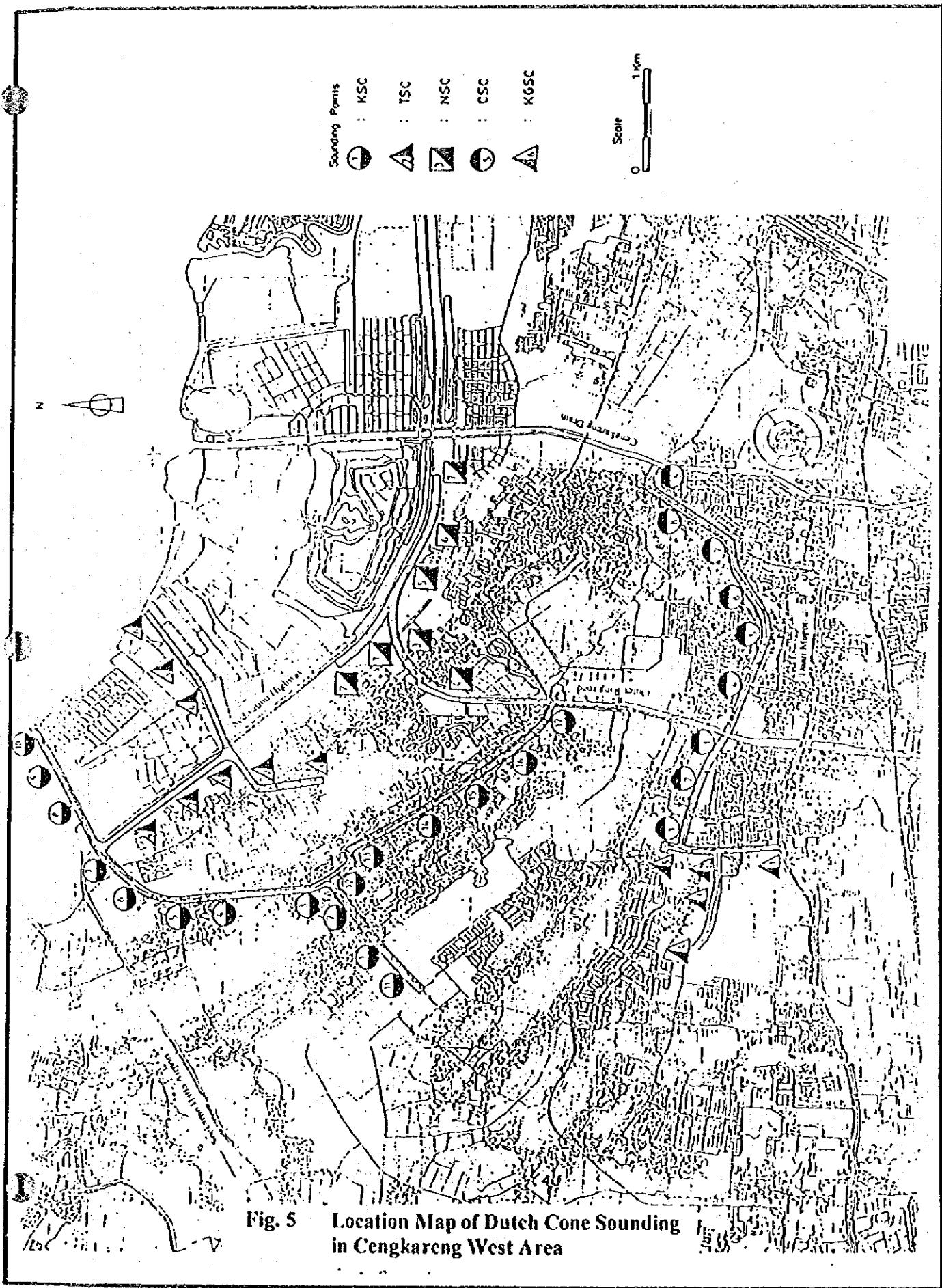


Fig. 5 Location Map of Dutch Cone Sounding in Cengkareng West Area

Fig. 6 Drill Log, Hole No. A - 1

| Project | | JAKARTA URBAN DRAINAGE | | | Depth: 35 M | | Elevation: 0.57 m | | | | | |
|-----------|---------------|------------------------|---------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------------------|-----------------------|-----------------|----|----|--|
| Depth (m) | Elevation (m) | Soil type or Formation | Site: Tanjung River | | Drilled: YALIA | | Drilling: KOEN OC 2L | | | | | |
| | | | Date | Column Section | USBR | Recovery (%) | GWL (m) | N ₆₀ value | Number of Blows | | | |
| | | | | DESCRIPTION | | | | 10 | 20 | 30 | 40 | |
| 1 | 1.6 | -1.03 | EARTH FILL | | Silty CLAY, dark brown, soft | CL | 80 | | | | | |
| 2 | | | CLAY | | Silty and sandy CLAY, brown to greenish grey, red spots, soft, moist, medium plastic, rock fragments and shell fragments | CL | 70 | 4 | | | | |
| 3 | | | | 90 | | | 4 | | | | | |
| 4 | 3.7 | -3.13 | SAND & CLAY | | SAND, dark grey-brown, very silty, fine to medium, sticky, contains roots of plants and shell fragments, becomes black at 5 m depth, soft | SC | 90 | 2 | | | | |
| 5 | | | | 100 | | | 4 | | | | | |
| 6 | | | | 100 | | | 4 | | | | | |
| 7 | | | | 100 | | | 2 | | | | | |
| 8 | 8.3 | -7.73 | | 100 | | | 2 | | | | | |
| 9 | | | | 100 | | | 2 | | | | | |
| 10 | 10.3 | -9.73 | Cemented SANDS | | SAND & CLAY, gradual change of color to green, low plastic, very fine, with shells and organic material, medium dense | CH | 100 | 16 | | | | |
| 11 | 11.0 | -10.43 | | 100 | | | 17 | | | | | |
| 12 | | | CLAY | | Coarse SAND, silty, well distributed grain size, some cemented portion, aspect of disintegrated rock, black High plastic CLAY, greenish with inclusions of coarse sand, derived from disintegrated rock, contains organic material (dark coal), some shell fragments, very stiff. - from 11.6 m to 12 m pebbles of CaCO ₃ and iron concretions, 1.5 cm Ø - from 14 m to 14.5 m fine brown sand, silty, passes into green clay - 14.5 m to 15 m green, plastic clay | CH | 100 | 19 | | | | |
| 13 | | | | 100 | | | 32 | | | | | |
| 14 | | | | 100 | | | 27 | | | | | |
| 15 | 15.0 | -14.43 | | 100 | | | 34 | | | | | |
| 16 | | | | 100 | | | 36 | | | | | |
| 17 | | | | 100 | | | 42 | | | | | |
| 18 | | | SAND & SILT | | Alternation of light green-brown silty fine SAND and SILT, contains thin levels of organic material, dense. - 15.5 m to 16.45 m green, plastic clay - 18.45 m to 19.8 m color becomes dark and the sediment contains more clay | SC | 100 | 29 | | | | |
| 19 | | | | 100 | | | 35 | | | | | |
| 20 | 20.4 | -19.83 | | 100 | | | 29 | | | | | |
| 21 | 21.4 | -20.83 | CLAY | | Black, fat high plastic CLAY, - 21m to 21.4 m passage from clay to greenish, silty sand | CH | 100 | 34 | | | | |
| 22 | | | | 100 | | | 30 | | | | | |
| 23 | | | SAND & CLAY | | Brown-green intercallations of silty, fine SAND and CLAY sand is dense and the clay is hard. 21.4 m to 22 m silty fine sand or silt 22 m to 22.7 m fine to medium sand, with hard rock fragments, 3 cm Ø 22.7 m to 24.4 m silty green clay, low plastic 24.4 m to 25 m silty fine sand with brown zones (iron) and small pebbles of white rock 25 m to 27 m sand derived from disintegrated rock, fine to coarse, silty | SC/CH | 100 | 35 | | | | |
| 24 | | | | 100 | | | 32 | | | | | |
| 25 | | | | 100 | | | 30 | | | | | |
| 26 | | | | 100 | | | 33 | | | | | |
| 27 | 27.0 | -26.43 | | 100 | | | 35 | | | | | |
| 28 | | | | 100 | | | 35 | | | | | |
| 29 | | | CLAY | | Greenish brown CLAY, hard brown, colored by iron oxide From 20 to 30 m From 30 to 35 m Predominantly CLAY, brown, high plastic, very stiff to hard, thin levels or pockets of brown fine to medium sand, irregularly intercalated | CH | 97 | 37 | | | | |
| 30 | 30.0 | -29.43 | | 100 | | | 40 | | | | | |
| 31 | | | | 100 | | | 41 | | | | | |
| 32 | | | | 100 | | | 31 | | | | | |
| 33 | | | | 100 | | | 35 | | | | | |
| 34 | | | 100 | 42 | | | | | | | | |
| 35 | 35.0 | -34.43 | | | | | 100 | 42 | | | | |

Fig. 7 Drill Log, Hole No. B - 1

| Project | | JAKARTA URBAN DRAINAGE | | | Depth: 35M | | Elevation: 045M | | | | | | |
|-----------|---------------|------------------------|------------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------------|----|----|----|----|-----|--|
| Depth (m) | Elevation (m) | Soil type or Formation | Site : Tanjungan River | | Drilled: YALIA | | Drilling : YSO - 1 | | | | | | |
| | | | Date | Column Section | USBR | Recovery (%) | Number of Blows | | | | | | |
| | | | | DESCRIPTION | | | | 10 | 20 | 30 | 40 | | |
| 1 | 09 | -045 | | Earth Fill | Red SILT, with black zones of organic material, sandy, silty and clayey soil | USBR | 70 | | | | | | |
| 2 | | | | SAND | SAND, gray, black with yellow veins, fine to medium, very loose to loose in some portion wet, contains many shell fragments, white, which break down easily, fragments of wood fibers, up to 12 cm and some gravel 1-2 cm Ø, sub-angular to rounded | SM/ML | 70 | 2 | | | | | |
| 3 | | | SM/ML | | | 100 | 6 | | | | | | |
| 4 | 4.45 | -400 | | | | SM/ML | 100 | 5 | | | | | |
| 5 | | | | | | SM/ML | 100 | 3 | | | | | |
| 6 | | | | SILT | Clayey SILT, gray, soft consistency, slightly plastic, contains shells and thick organic material, traces of fine to medium sand | ML | 100 | 2 | | | | | |
| 7 | | | | | | ML | 100 | 4 | | | | | |
| 8 | | | | | | ML | 100 | 2 | | | | | |
| 9 | | | | | | ML | 100 | 3 | | | | | |
| 10 | 9.5 | -906 | | CLAY | Predominantly CLAY, green-yellow and white, product of rock weathering, medium to high plastic, very stiff, contains hard fragments and pebbles 3-5 mm Ø, iron concretions, brown or yellow and carbonaceous rock | CH | 100 | 10 | | | | | |
| 11 | | | | | | CH | 97 | 21 | | | | | |
| 12 | | | | | | CH | 97 | 26 | | | | | |
| 13 | | | | | | CH | 95 | 21 | | | | | |
| 14 | 14.5 | -806 | | SILT | SILT, compact, yellow to green brown and red, plastic, very stiff, contains fine sand | MH | 100 | 25 | | | | | |
| 15 | | | | | | MH | 95 | 28 | | | | | |
| 16 | | | | | | MH | 100 | 28 | | | | | |
| 17 | 17.0 | -655 | | CLAY & SILT | Alternation of SAND and CLAY, the sand is fine, silty or clayey, brown, medium dense contains organic material (coal), the clay is high plastic, green, very stiff | CH/SC | 100 | 24 | | | | | |
| 18 | | | | | | CH/SC | 95 | 31 | | | | | |
| 19 | 19.45 | -600 | | Cemented SANDS | SANDSTONE, medium grained, dark brown, recovered as core fragments coated by silt Medium SAND and SILT, brown, contains iron concretions, very dense | SM | 100 | 21 | | | | 150 | |
| 20 | 20.0 | -656 | | | | SM | 100 | 21 | | | | | |
| 21 | 20.2 | -673 | | CLAY & SILT | Silty CLAY green or grey, passing to light grey, low to medium plastic, very stiff, slightly carbonaceous, from 21 to 22.2 m it passes progressively into dark grey soil CLAY and SILT 22.2-24 m fat, high plastic clay, dark grey, contains small pebbles of white, hard material and iron concretions 24-24.4 m sandy silty grey clay with shell fragments 24.4-27.4 m alternation of sandy and silty clay, green, with brown zones (weathered iron oxide), low plastic and green clay, predominant from 25 m, lightly plastic, very stiff, contains thin levels of organic material (grass) and 1 cm Ø iron concretions 27.4-28 m brown grey clay, high plastic, very stiff, contains small pebbles 28-29 brown grey sandy clay, sand is derived from deintegrated carbonate rock and concentrated in pockets | CL | 100 | 23 | | | | | |
| 22 | 22.2 | -2175 | | | | CL | 100 | 20 | | | | | |
| 23 | | | | | | CL | 100 | 25 | | | | | |
| 24 | | | | | | CL | 100 | 33 | | | | | |
| 25 | | | | | | CL | 100 | 34 | | | | | |
| 26 | | | | | | CL | 100 | 34 | | | | | |
| 27 | | | | | | CL | 100 | 27 | | | | | |
| 28 | | | | | | CL | 100 | 39 | | | | | |
| 29 | 29.0 | -2856 | | SAND | Silty SAND, fine, firm, non plastic dense, contains iron concretions, responsible for the brown color and plastic clay pockets | SM | 100 | 46 | | | | | |
| 30 | 30.0 | -2936 | | | | SM | 100 | 26 | | | | | |
| 31 | | | | CLAY | CLAY, pure or silty, brown-green with thin levels of hematite (iron oxide) 10-10.45 m silty, sandy clay, hard 10.45-11 m pure clay, very stiff 11-11.45 m silty clay, very stiff 11.45-15 m pure, dark grey clay, very stiff | CL | 100 | 26 | | | | | |
| 32 | | | | | | CL | 100 | 26 | | | | | |
| 33 | | | | | | CL | 100 | 23 | | | | | |
| 34 | | | | | | CL | 100 | 31 | | | | | |
| 35 | 35.0 | -2456 | | | | CL | 100 | | | | | | |

Fig. 8 Drill Log, Hole No. B - 2

| Project | | JAKARTA URBAN DRAINAGE | | | | Depth: 30 M | | Elevation: 2.25 M | | | | | | | | | | | |
|-----------|---------------|------------------------|-----------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------|-----------------------|-----------------|----|----|----|----|--|--|--|--|--|--|
| Depth (m) | Elevation (m) | Soil type or Formation | Site : Cengkong Timur | | USBR | Recovery (%) | GWL (m) | N ₆₀ value | Number of Blows | | | | | | | | | | |
| | | | Date | Column Section | | | | | DESCRIPTION | 10 | 20 | 30 | 40 | | | | | | |
| 1 | 09 | 135 | Earth Fill | | | 100 | | | | | | | | | | | | | |
| 2 | 24 | 015 | SAND | | SAND, loose, fine to coarse, includes dark green clay pockets from 0.9-2.0 m dark brown from 2.0-2.4 m yellow-brown, silty | 100 | 8 | | | | | | | | | | | | |
| 3 | | | | | | 100 | 11 | | | | | | | | | | | | |
| 4 | 44.5 | 220 | | | SAND, loose to medium dense, brown grey, very fine, contains shell fragments | 100 | 13 | | | | | | | | | | | | |
| 5 | | | CLAY | | CLAY, stiff, pure or silty, medium plastic, contains shells and traces of organic material | 100 | 8 | | | | | | | | | | | | |
| 6 | 6.4 | 4.15 | | | | 100 | 10 | | | | | | | | | | | | |
| 7 | 7.0 | 4.75 | SAND | | SAND, fine, gray, silty | 100 | 12 | | | | | | | | | | | | |
| 8 | | | CLAY | | Sandy CLAY, stiff to very stiff, iron oxide inclusions, with sand from desintegrated rock - 7.8 m gray-green, with red zones, colored by iron oxide - 8.9 m green brown, low plastic, very sandy | 100 | 17 | | | | | | | | | | | | |
| 9 | 9.0 | 6.75 | | | | 100 | 17 | | | | | | | | | | | | |
| 10 | | | SAND & CLAY | | SAND, mainly derived from weathered/desintegrated rock, CLAY in the lower levels - 9-10 m gradual passage from clay to sand, low plastic material, calcareous, sand is coarse, white - 10-11 m fine, clean, brown sand - 11-11.4 m brown-green coarse sand (from weathered rock) - 11.4-12 m silty, brown-green, fine sand - 12-13 m brown, fine, clean or silty, with black zones, colored by iron - 13-14 m clay, light brown, low plastic, intercalated with thin levels of clean sand, becomes gradually clayey at the bottom, hard | 100 | 18 | | | | | | | | | | | | |
| 11 | | | | | | 100 | 24 | | | | | | | | | | | | |
| 12 | | | | | | 100 | 26 | | | | | | | | | | | | |
| 13 | | | | | | 100 | 22 | | | | | | | | | | | | |
| 14 | | | | | | 100 | 39 | | | | | | | | | | | | |
| 15 | 15.35 | 13.10 | | | | 100 | 36 | | | | | | | | | | | | |
| 16 | | | Cemented SAND | | SAND/ SANDSTONE - 15-16 m partly consolidated sand- or siltstone, brown-green, hard - 16-18 m brown-green silt, sand and clay, low plastic, rich in iron oxide - 18-19 m sand coarse to fine, brown, partly consolidated and recovered as hard, sandstone fragments - 19.7-20 m light-brown silty sand, medium dense | 100 | 39 | | | | | | | | | | | | |
| 17 | | | | | | 100 | 39 | | | | | | | | | | | | |
| 18 | | | | | | 100 | 46 | | | | | | | | | | | | |
| 19 | | | | | | 100 | 22 | | | | | | | | | | | | |
| 20 | 20.0 | 17.75 | SILT & CLAY | | SILT and CLAY - 20-21 m light brown grey silt, non plastic - 21-22 m fat, high plastic gray-green clay - 22-23 m silty, light colored clay | 100 | 30 | | | | | | | | | | | | |
| 21 | | | | | | 100 | 22 | | | | | | | | | | | | |
| 22 | 23.0 | 21.75 | | | | 100 | 23 | | | | | | | | | | | | |
| 23 | | | CLAY | | CLAY, fat, high plastic, hard with sand pockets from desintegrated rock. - 23-27.5 m dark grey, sandy, brown zones colored by iron oxide, white calcareous pebbles and coarse sand - 27.5-29 m reddish green, very rich in iron oxide, silty - 29-30 m brown-green clay intercalated with silt | 100 | 31 | | | | | | | | | | | | |
| 24 | | | | | | 100 | 32 | | | | | | | | | | | | |
| 25 | | | | | | 100 | 42 | | | | | | | | | | | | |
| 26 | | | | | | 100 | 36 | | | | | | | | | | | | |
| 27 | | | | | | 100 | 35 | | | | | | | | | | | | |
| 28 | | | | | | 100 | 35 | | | | | | | | | | | | |
| 29 | | | | | | 100 | 35 | | | | | | | | | | | | |
| 30 | 30.0 | 21.75 | | | | 100 | 35 | | | | | | | | | | | | |

Fig. 9 Drill Log, Hole No. C - 1

| Project | | JAKARTA URBAN DRAINAGE | | | | Depth: 20 M | | | Elevation 2.19 M | | | | | | |
|-----------|---------------|------------------------|-----------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|--------------|--------|------------------|-----------------|----|----|-----|-----|--|
| Depth (m) | Elevation (M) | Soil type or Formation | Site : Cengkong Timur | | DESCRIPTION | USBR | Recovery (%) | GWL(m) | N-value | Number of Blows | | | | | |
| | | | Date | Column Section | | | | | | 10 | 20 | 30 | 40 | | |
| 1 | 0.9 | 129 | EARTH FILL | | SAND and silty CLAY, reddish-brown, soft, moist, with round pebbles | CH | 90 | | | | | | | | |
| 2 | | | CLAY | | CLAY, dark grey, medium consistency, little silt, medium plasticity, traces of brown, organic material | CH | 100 | 5 | | | | | | | |
| 3 | 2.8 | 061 | | | Silty CLAY, brownish grey, moist, medium consistency, medium plastic, sand pockets, sand derived from weathered rock | CH | 100 | 7 | | | | | | | |
| 4 | 3.5 | 131 | CLAY | | CLAY, light grey, soft to very stiff, medium plastic, sandy and silty portions are irregularly distributed and low plastic | CH | 100 | 8 | | | | | | | |
| 5 | | | | | | CLAY, light grey, soft to very stiff, medium plastic, sandy and silty portions are irregularly distributed and low plastic | CH | 100 | 12 | | | | | | |
| 6 | | | | | | CLAY, light grey, soft to very stiff, medium plastic, sandy and silty portions are irregularly distributed and low plastic | CH | 82 | 18 | | | | | | |
| 7 | 6.8 | 461 | | | | Sandy CLAY, green to dark grey, very stiff, contains sandy portions, yellow, fine grained, derived from weathered rock | CH | 98 | 30 | | | | | | |
| 8 | 7.8 | 561 | Cemented SANDS | | Partially cemented SANDS, aspect of a weathered sandstone, fine to medium grained, very dense, greenish-grey. | CH | 90 | | | | | | 150 | | |
| 9 | | | | | | - 7.8-9.7 m sharp, thin rock fragments in sandy silt, sticky (drilling sludge) | CH | 100 | | | | | | 150 | |
| 10 | | | | | | - 9.7-11 m black, thin fragments of fine sandstone | CH | 95 | | | | | | 150 | |
| 11 | | | | | | - 11-12 m predominantly green sandy silt with angular rock fragments | CH | 98 | | | | | | 150 | |
| 12 | | | | | | - 12-13 m only rock fragments, few cm thick, black, RQD 10% | CH | 96 | | | | | | 150 | |
| 13 | 13.0 | 1061 | | | | | CH | 100 | | | | | | 150 | |
| 14 | | | CLAY | | Predominantly CLAY, fat, high plastic, green, very stiff, irregularly distributed zones of fine sand, olive-green, resulting from weathering of rock. | CH | 100 | 36 | | | | | | | |
| 15 | | | | | | | CH | 100 | 35 | | | | | 150 | |
| 16 | | | | | | | CH | 82 | 45 | | | | | 150 | |
| 17 | | | | | | 19-19.6 m gradual passage to grey clay | CH | 100 | 30 | | | | | | |
| 18 | | | | | | | CH | 100 | 30 | | | | | | |
| 19 | 19.6 | 1741 | | | | | CH | 100 | 15 | | | | | | |
| 20 | 20.0 | 1781 | | | CLAY, pure fat, dark grey, stiff | CH | 97 | | | | | | | | |
| 21 | | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | |
| 32 | | | | | | | | | | | | | | | |
| 33 | | | | | | | | | | | | | | | |
| 34 | | | | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | | | |

Fig. 10 Drill Log, Hole No. D - 1

| Project | | JAKARTA URBAN DRAINAGE | | | Depth: 20 M | | Elevation 0.45 m | | | | | | | | | | | | |
|-----------|---------------|------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------|------------------|-----------------------|-----------------|-----|----|----|--|--|--|--|--|--|--|
| Depth (m) | Elevation (m) | Soil type or Formation | Column Section | DESCRIPTION | US BR | Recovery (%) | CWC (cm) | N ₆₀ value | Number of Blows | | | | | | | | | | |
| | | | | | | | | | 10 | 20 | 30 | 40 | | | | | | | |
| 1 | | CLAY | | Silty CLAY, light brown and black, soft, moist, low plastic, contains organic material, becomes light grey from 1.2 m and it contains small crystals of gypsum and trash | CL | 80 | | | | | | | | | | | | | |
| 2 | 20 | | | | | | | | -1.55 | 100 | 4 | | | | | | | | |
| 3 | | SILT & SAND | | Sands SILT or silty SAND, grey-brown or green, contains coarse sand from desintegrated rock and small fragments of coal from 4 m coarse, silty sand, loose | MH / SM | 100 | | | 4 | | | | | | | | | | |
| 4 | | | | | | | | | 100 | 4 | | | | | | | | | |
| 5 | 6.0 | | | | | | | | -4.55 | 100 | 4 | | | | | | | | |
| 6 | | | | | | | | | | 100 | 4 | | | | | | | | |
| 7 | | CLAY | | Predominantly CLAY, greenish, low plastic - 5.6-6 m silty sandy clay, medium - 6.4-7 m silty sand - 6.4-7 m green silty clay - 7.2-8 clayey silt - 7.4-8.2 clay, silt and sand mixture with wood fragments, 5 cm long, low plastic, stiff | CH | 100 | 100 | 130 | 5 | | | | | | | | | | |
| 8 | 8.2 | | | | | | | | -7.75 | 100 | 13 | | | | | | | | |
| 9 | 8.6 | | | | | | | | -8.15 | 100 | 13 | | | | | | | | |
| 10 | 100 | | | | | | | | -9.55 | 100 | 21 | | | | | | | | |
| 11 | | | | | | | | | | 100 | 24 | | | | | | | | |
| 12 | | SAND & GRAVEL | | SAND and GRAVEL, well graded, clean, medium grain size predominates, grains of quartz, rock frag and gypsum, gravel is 1-2 cm Ø, small pebbles, sub-angular or core fragments fill 4 cm thick of consolidated sandstone, probably an irregularly consolidated deposit. - from 14.5 predominantly fine sand, clean or silty, yellow-green with iron concretions | SM - SM | 100 | 100 | 100 | | | | | | | | | | | |
| 13 | | | | | | | | | | 100 | | | | | | | | | |
| 14 | | | | | | | | | | 100 | | | | | | | | | |
| 15 | | | | | | | | | | 100 | 36 | | | | | | | | |
| 16 | 16.5 | | | | | | | | -16.05 | 100 | | | | | | | | | |
| 17 | | SILT & SAND | | Mix of SAND, fine, black and SILT, greenish, partly cemented to sand- or siltstone, very hard, recovered as fragments | SM | 100 | 100 | 100 | | | | | | | | | | | |
| 18 | 18.0 | | | | | | | | -17.55 | 100 | | | | | | | | | |
| 19 | | MARI | | MARI, greenish-white calcareous, very hard | SM | 100 | 100 | 100 | | | | | | | | | | | |
| 20 | 200 | | | | | | | | -19.55 | 100 | | | | | | | | | |
| 21 | | SAND | | Black or dark green SAND, fine, partly consolidated and recovered as sandstone fragments | SM | 100 | 100 | 100 | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | | | | | | | | |
| 32 | | | | | | | | | | | | | | | | | | | |
| 33 | | | | | | | | | | | | | | | | | | | |
| 34 | | | | | | | | | | | | | | | | | | | |
| 35 | | | | | | | | | | | | | | | | | | | |

Fig. 11 Drill Log, Hole No. O - 1

| Project | | JAKARTA URBAN DRAINAGE | | | | Depth: 25 M | | Elevation: 4.33 M | | | | | | | | | | | | | | |
|-----------|---------------|------------------------|-------------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------------------------------------------------------------------------------|----|-----|------------------------------------------------------------------------------------------------------|----|-----|--|----|----|--|--|--|
| Depth (M) | Elevation (M) | Soil type or Formation | Site : Cengkareng Barat | | USBR | Recovery (%) | GWL (m) | N ₆₀ value | Number of Blows | | | | | | | | | | | | | |
| | | | Date | Column Section | | | | | DESCRIPTION | 10 | 20 | 30 | 40 | | | | | | | | | |
| 1 | | Earth Fill | [Symbol] | From: 26 OCT 1996 to: 28 OCT 1996 | | 100 | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | | | | | |
| 3 | 3.0 | | | | | | | | +1.33 | | | | | 24 | | | | | | | | |
| 4 | 4.5 | -0.17 | CLAY | [Symbol] | CLAY, silty, grey-brown, moist, low plastic with lenses of fine sand, very stiff | 100 | | | 15 | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | 25 | | | | | | | | | |
| 6 | | | | | | | | | CLAY, brown-reddish or black, highly plastic, very stiff, very rich in organic material (roots, peat, coal), moist, weathered rock fragments in the lower part | CH | 100 | | | 19 | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | 19 | | | | |
| 8 | 7.7 | -3.37 | | | | | | | | | | | | | | | | 26 | | | | |
| 9 | | | | | | | | | | | | | | CLAY, silty or sandy, green-grey, very stiff, medium plastic, moist, derived from disintegrated rock | CH | 100 | | | 30 | | | |
| 10 | | | | | | | 30 | | | | | | | | | | | | | | | |
| 11 | 10.3 | -6.15 | Cemented SANDS | [Symbol] | Partially cemented SANDS, rock or soil, fine to medium grained, sand is silty, medium dense, grey | SM | 100 | | 50 | | | | | | | | | | | | | |
| 12 | 11.45 | -7.12 | CLAY | [Symbol] | Sandy CLAY, grey to greenish-grey, very stiff, high plastic, contains weathered rock fragments | CH | 100 | | 40 | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | 46 | | | | | | | | | |
| 14 | 13.9 | -9.57 | Cemented SANDS | [Symbol] | Gravely SAND, grey-green, very dense, fine to medium grained, poorly graded, looks like weathered sandstone, contains silty levels | SM | 100 | | 50 | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | 50 | | | | | | | | | |
| 16 | 15.7 | -11.37 | SILT | [Symbol] | Clayey and sandy SILT, brown-yellow, with traces of iron | MH | 100 | | 32 | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | 26 | | | | | | | | | |
| 18 | 17.7 | -13.37 | CLAY | [Symbol] | Silty CLAY grey to greenish grey, moist, high plastic, very stiff, becomes reddish from 11.2 m because of the iron oxide, close to 20 m it contains small pebbles of calcareous rock | CH | 100 | | 32 | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | 34 | | | | | | | | | |
| 20 | 20.0 | -15.67 | | | | | | | | | | | 32 | | | | | | | | | |
| 21 | | | | | | | | | | | | | 27 | | | | | | | | | |
| 22 | | | | | | | | | | | | | 16 | | | | | | | | | |
| 23 | 22.9 | -18.57 | | | | | | | | | Cemented fine SANDSTONE or SILTSTONE, very hard, dark grey, underlain by MRL | | 100 | | 50 | | | | | | | |
| 24 | 23.4 | -19.07 | | | Silty CLAY grey to brownish grey, moist very stiff, similar to residual soil | CH | 100 | | 38 | | | | | | | | | | | | | |
| 25 | 25.0 | -20.57 | | | | | 100 | | | | | | | | | | | | | | | |

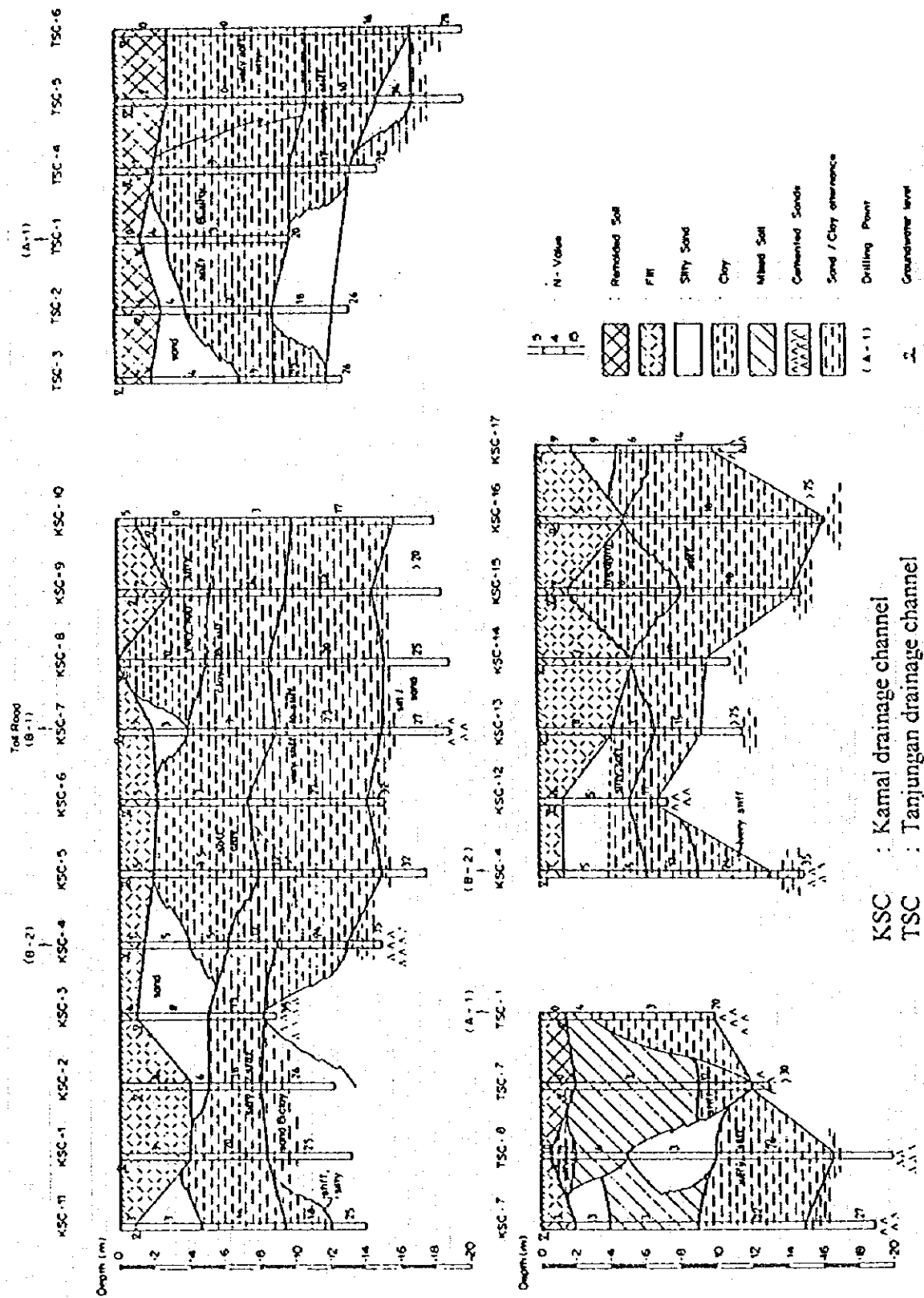


Fig. 12 Profiles of Dutch Cone Sounding for Kamal and Tanjung Drainage Channels

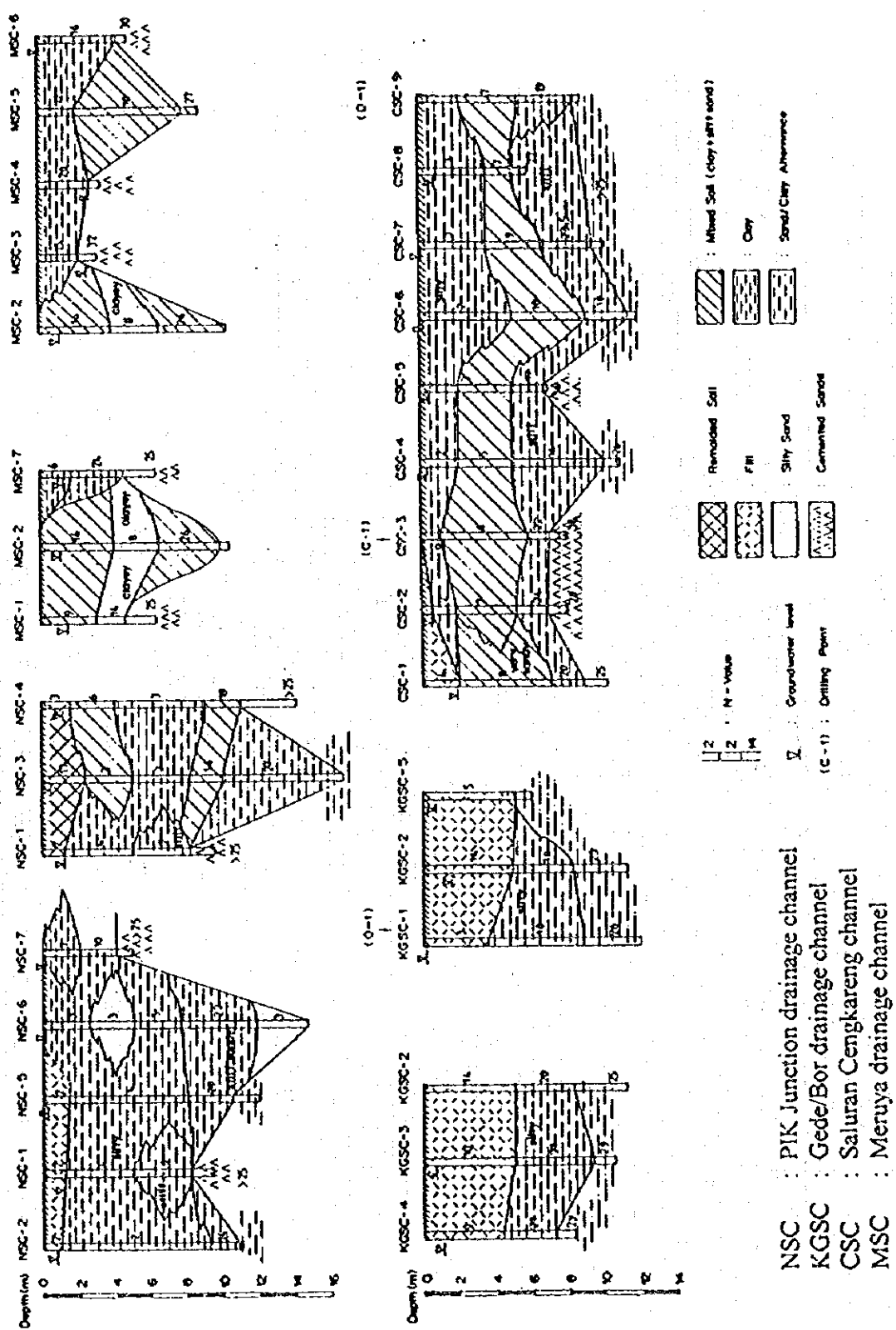


Fig. 13 Profiles of Dutch Cone Sounding for PIK Junction (New Channel), Gede/Bor, Saluran Cengkareng and Meruya Drainage Channels

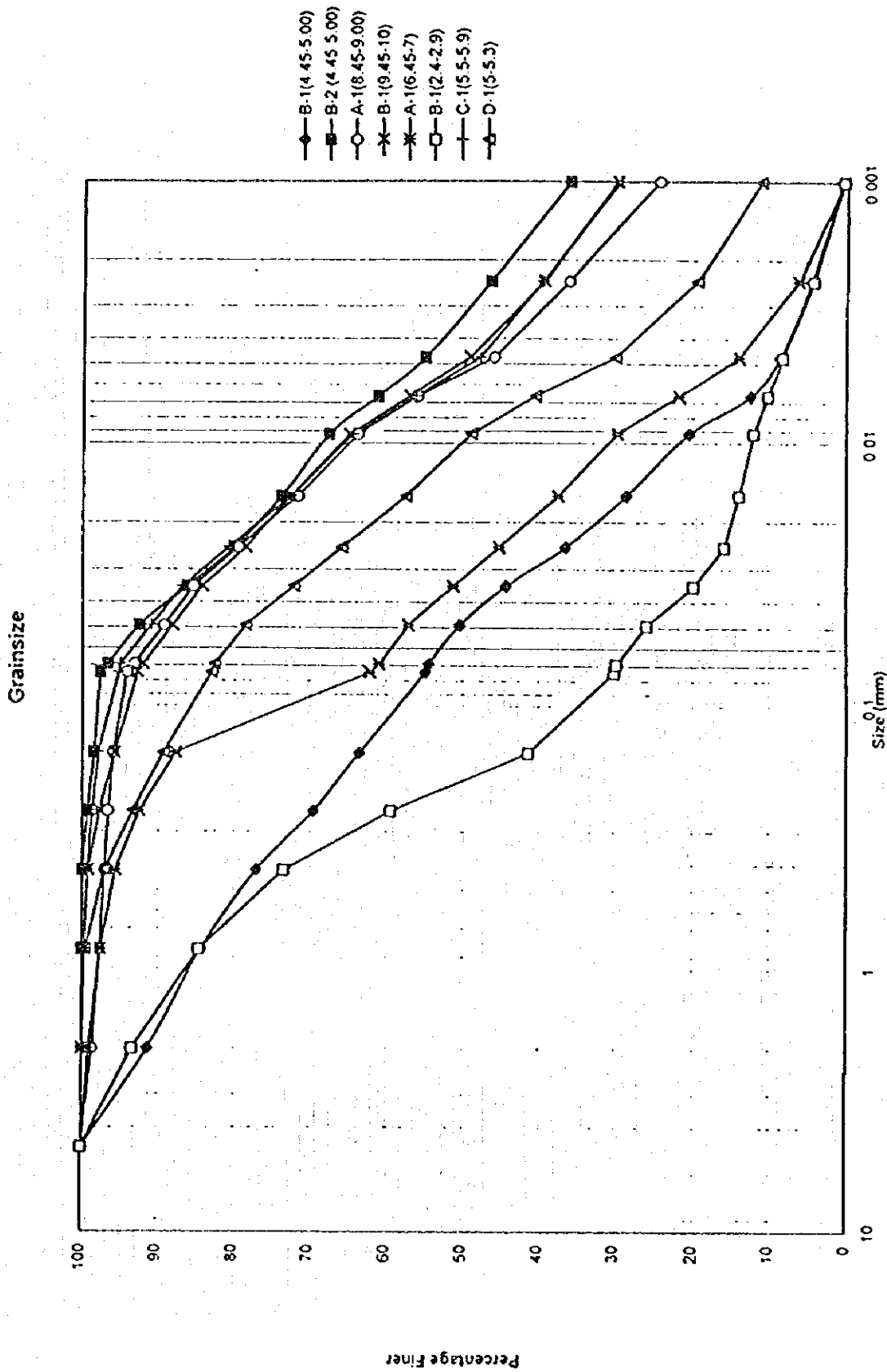


Fig. 14 Grain Size Curves, Shallow Soil

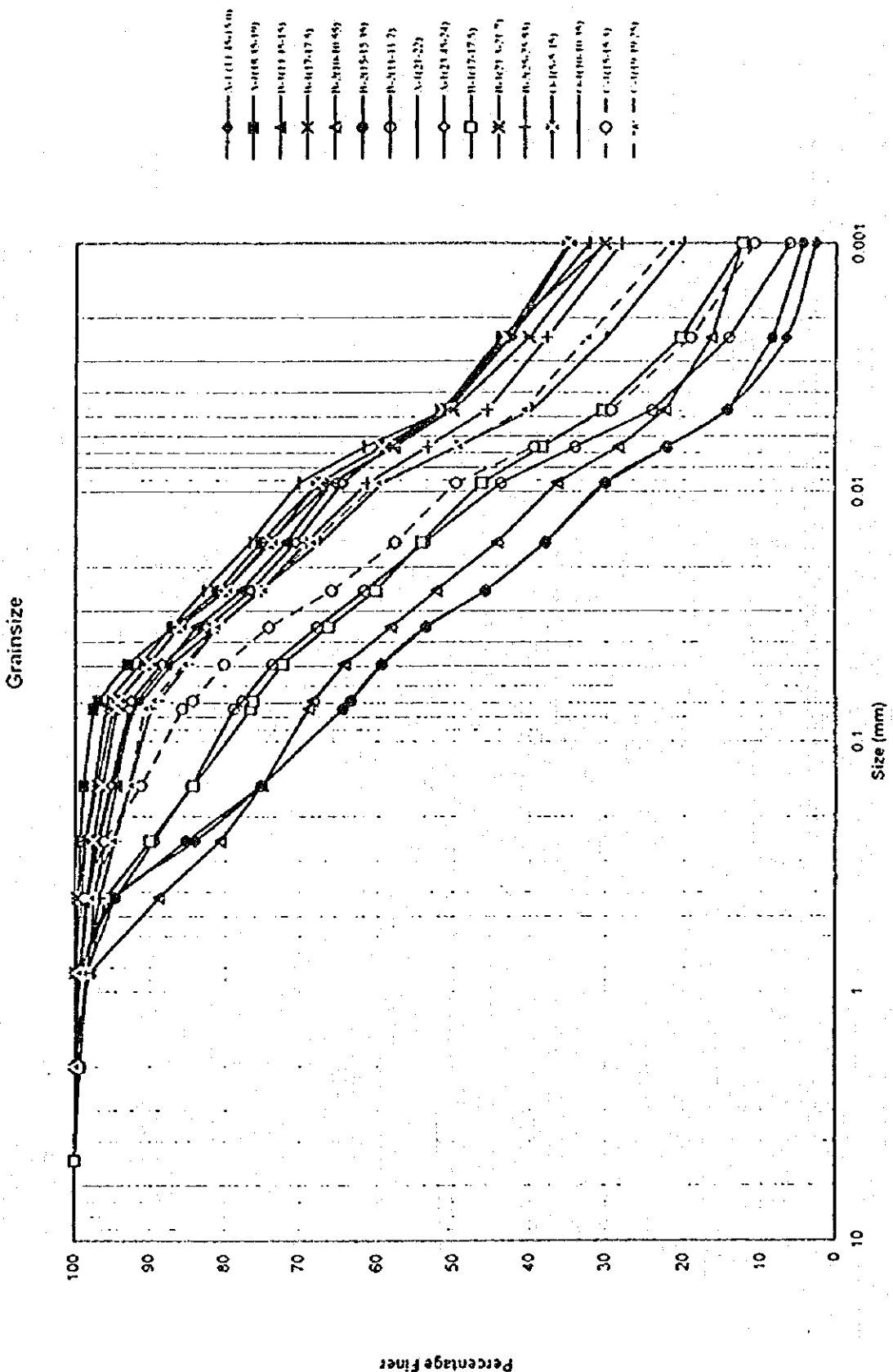
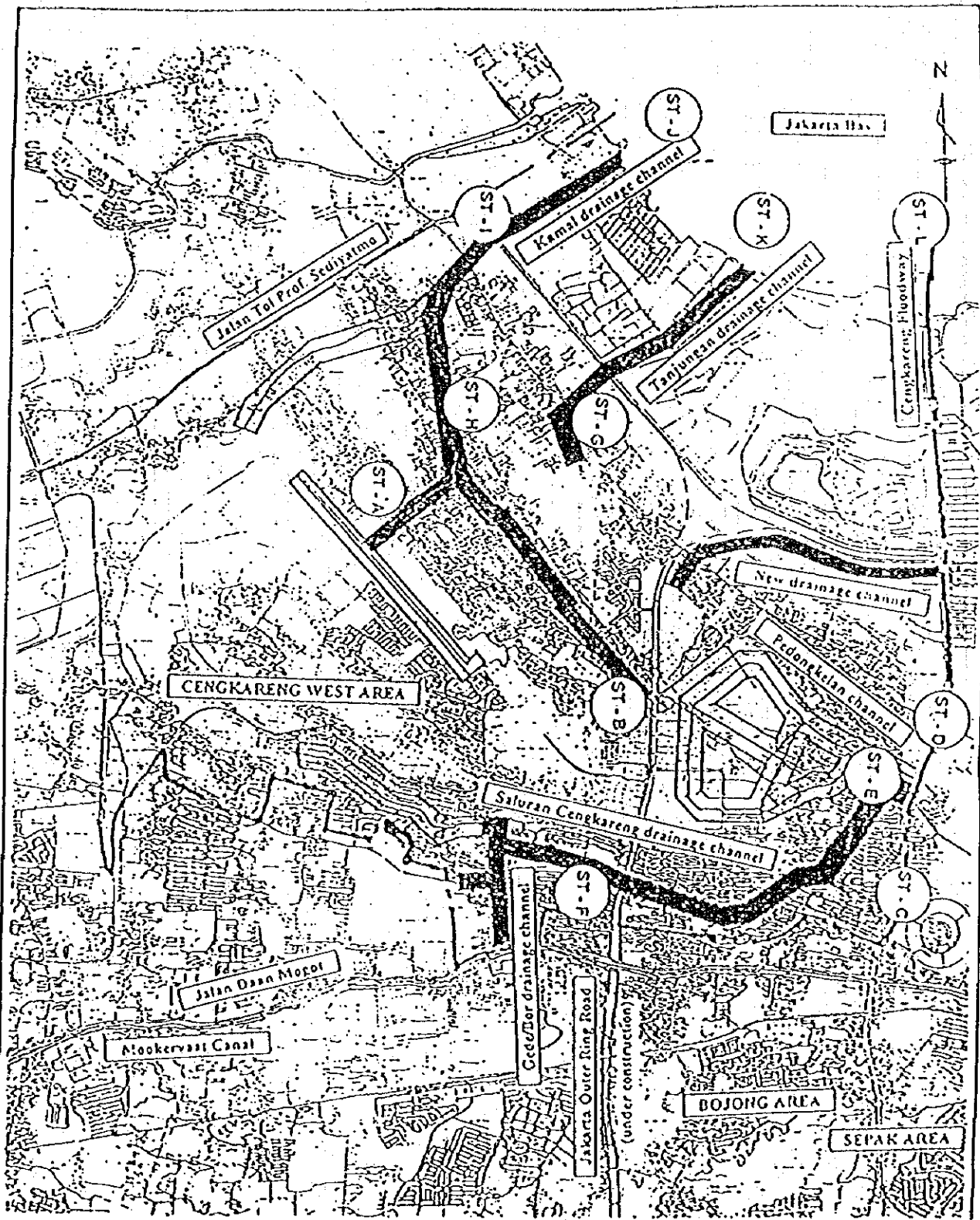


Fig. 15 Grain Size Curves, Deep Soil



| Legend | |
|--------|-----------------------------------------------|
| | Plot boundaries |
| | Drainage channel under studs |
| | Drainage channel developing by private sector |
| | Water Quality Stations |

Fig. 16 Sampling Locations for Water Quality

PART II - TECHNICAL SPECIFICATIONS



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1. TEMPORARY WORKS : COFFERING WORKS, CARE OF WATER AND DEWATERING WORKS

1.1 General

The works under this Chapter consist of but not limited to :

- The required coffering works, care of water and dewatering works during the construction of drainage channel works including new channel, levee embankment, foundations of bridges and other drainage structures such as parapet walls, revetments, concrete stairs, sluiceways, drainage connection canals and cross drains, etc., relocation of drainage pipes and relocation and construction of approach roads,
- Stream diversion of the existing drainage channels and local drain ditches which flow into the channels in the areas covered by this Project and other miscellaneous diversion works,
- The required temporary road works such as detours and service roads, stagings and temporary bridges, etc., and
- The removal and demolishing of the existing structures as directed by the Engineer.

These works shall be performed in the manner as specified hereinafter or as directed by the Engineer.

The Contractor shall furnish all labour, tools, equipment, spares and materials required for construction, operation and maintenance of the temporary cofferings, diversions, care of water, dewatering and water disposal from the Works including temporary roads, stagings and bridges, removal and demolishing of the existing structures shown on the approved construction drawings or as directed by the Engineer.

After these temporary facilities have achieved their purpose, the same shall, with the approval of the Engineer, be removed from the places or leveled to give a sightly appearance as there were and shall, if considered necessary, be left at the places during the period of Operation and Maintenance unless otherwise directed by the Engineer.

No interruption or interference or injurious contamination with natural water flow and drains shall,

without the approval of the Engineer, be made by such works as coffering, diverting, caring of water, dewatering and water disposal from the Works which shall be operated by the Contractor during the specified period.

Other Temporary Works such as concrete plant, water supply system, electric power supply system, telecommunication system, buildings including the Contractor's site office and the Engineer's site office, etc., shall conform to the requirements stipulated in Chapter G8 in Vol. III, Part I - General Specifications.

1.2 Construction Plans and Detailed Drawings

The Contractor shall prepare in accordance with the provisions of Sub-clauses G4.2 in Vol. III, Part I - General Specifications, the construction plans and detailed drawings on the coffering, diverting, caring of water, dewatering and water disposal from the Works and shall submit to the Engineer for his approval at least thirty (30) days before the commencement of the Works.

The plan may be placed in operation upon approval, but the approval shall not relieve the Contractor from full responsibility for the adequacy of the care and diversion works.

The Contractor shall be totally responsible for furnishing labour, equipment and materials needed in regard to the diversion and care of the water during the period such diversion and care is necessary. The works pertaining to the diversion and care of the water shall be performed in accordance with the Contractor's plan and all applicable specifications, drawings, procedures, safety programmes, etc.

Some physical data which are presented in the tables in Chapter G2 in Vol. III, Part I - General Specifications, are only for general information to be used by the Contractor in regard to work volume and timing of his construction operations.

The Employer will, however, not be responsible for any deductions, conclusions or interpretations which may be made by the Contractor from this information and for any damage and delay of the Works attributed to the Contractor's design and drawings which may have been reviewed and approved by the Engineer.

The diversion arrangements are designed to safely pass the floods during the construction period. The Contractor shall fully prepare his water control and handling plan against occurrence of the floods and shall assume the responsibility for the stability of the cofferings and other structures up

to the water levels anticipated.

1.3 Temporary Coffering Works

1.3.1 Coffering works

The works under this Clause shall consist of supply of all labour, materials, and equipment and the performance of all works in respect to the coffering works for the construction of all the drainage structures, bridges and revetments, etc. covered under this Contract. The coffering works shall be designed in detail by the Contractor. Not less than thirty (30) days before commencement of any part of the coffering works, the Contractor shall submit to the Engineer detailed construction drawings, construction programme and method for his approval. The coffering for bridge foundations shall be carried out in the dry season.

Notwithstanding the approval of his plans by the Engineer, the Contractor shall remain fully responsible for a proper design, construction, maintenance and removal of the cofferings.

Coffering works shall be executed in accordance with the provisions in Chapter 2, Earthwork, of these Technical Specifications and in such a manner as shown on the approved construction drawings or as directed by the Engineer.

1.3.2 Steel sheet piling for coffering works

Where the steel sheet piles may be used for the coffering works, the furnishing and installation of all steel sheet piles including all beams, tie-rods with turnbuckles, ring joints, nuts and washers shall conform to the following :

(1) Material requirements

The Contractor shall submit the mill certificates of all the material for the Engineer's approval. Materials used for steel sheet piling shall conform to the requirements of the following applicable standards or approved equivalent standard :

| | | |
|--------------------|---|--------------------------------------------------------------------|
| Steel sheet piles | : | JIS A5528 SY295 or SNI 005-87-A |
| Walling materials, | : | JIS G 3102 or SNI 0722-89-A for material and channel steel, and |
| H-beam | : | JIS G 3192 or SNI 2295-88 for dimension |

The steel sheet piles supplied shall be of U-shaped type, YSPF, W = 400 mm.

(2) Construction method

The Contractor shall not construct cofferdam or other obstacles totally stopping the stream water in the drainage channels in the Project area during construction.

Prior to driving the sheet piles, the Contractor shall provide and construct the access or temporary staging for piling equipment to the required alignment and properly set out and establish the centre of each pile position in accordance with the approved construction drawings or as directed by the Engineer.

The steel sheet piles shall be driven with a suitable equipment and in a manner as specified in Chapter 4, Piling Work, of these Technical Specifications. During driving sheet piles, the Contractor shall take the following records under supervision of the Engineer : tip depth of pile, number of blows per ten (10) cm for the last fifty (50) cm penetration and per fifty (50) cm for the last two (2) m penetration, accumulated number of blows and drop height of ram.

Walling and struts of steel sheet piles shall be made in such a manner as shown on the approved construction drawings or as directed by the Engineer on each row of piles.

1.4 Temporary Diversion Works

During the construction of sluiceways, drainage connection channels and relocation of drainage pipes and the likes, if necessary, the Contractor shall construct the temporary diversion channel not to damage the function of the existing drainage channels and pipes.

The temporary diversion channel as well as method of execution of the work shall be designed in detail by the Contractor and submitted to the Engineer for his approval. The diversion method shall be designed in such a way that none of the works are interrupted. The Contractor shall ensure that all diverted water shall be disposed without causing any damage or interference to the properties and operation of the Works.

The temporary diversion channel shall be maintained for the period directed by the Engineer. After the completion of the work for which it was constructed and under the direction of the Engineer, the temporary channel shall be backfilled with materials approved by the Engineer,

compacted and trimmed to the satisfaction of the Engineer.

The Contractor shall remain fully responsible for a proper design, construction, maintenance and removal of the temporary diversion channel and approval of his plans as well as method of execution of diversion channel by the Engineer shall in no way relieve the Contractor of his responsibility.

1.5 Dewatering During Construction

1.5.1 General

All excavated areas in open-air shall be drained-off. The required drainage facilities will consist of pits, trenches, pump sumps, pumps, pipe lines, generators and all auxiliary equipment and materials required for a safe and continuous operation of the dewatering system.

The Contractor shall furnish, install, maintain and operate all pumping and other equipment or methods which may be required for dewatering the various parts of the Works on the surface, in open-cut excavations and for keeping the foundation and other parts of the work free from water as necessary for constructing each part of the Works, and as may be required after any part of the Works is completed for such things as inspection, safety, installation by others or for any reason determined to be necessary by the Engineer.

The Contractor shall design temporary drainage facilities required for construction sites including for emergency in such a way that water originated from any source can be drained. The Contractor shall submit general design drawings, working procedures and time schedule to the Engineer for approval at least thirty (30) days prior to commencement of any works under this Clause. These documents shall state the quantity, type, capacity, arrangement and location of the required equipment. The Contractor shall submit, if so desired by the Engineer, detailed calculations carried out for arriving at the proposed dewatering system.

If the excavation should extend below the water table, the water table shall be lowered in advance of the excavation. The dewatering shall be accomplished in a manner that will maintain the stability of the slopes and the bottom of open-cut excavation, and will result in all construction operations being performed in the dry, where "in the dry" means that the construction operation will not be performed in an appreciable amount of free, running or standing water.

The Contractor shall pump all water from and shall keep the working areas free of water while

excavating, preparing foundations, placing embankment materials, backfilling, pouring concrete or as may otherwise be required for completing the Works. The Contractor shall be responsible for and shall repair at his own expense any damage to foundations, excavated slopes, structures or any other parts of the Works caused by water including flooding.

1.5.2 Construction method

The Contractor shall supply all labour, materials, equipment and installations for the temporary drainage facilities. The Contractor shall carry out all the works necessary for the construction and installation required for connecting, diverting and evacuating by free-flow or by pumping of all the water encountered.

If the Engineer judges that the temporary drainage facilities are not enough, he may order the Contractor to provide additional facilities.

The Contractor shall maintain and regularly clean all dewatering equipment and accessories during the construction time on all construction works and shall remain fully responsible for proper disposal of water at all times.

1.5.3 Starting and duration of water drainage

The duration of water drainage will be determined according to the construction time schedule.

Pump operation shall not be removed or altered in any way without the written permission of the Engineer. The pumps and water drainage facilities shall be kept in proper working conditions without extra payment, until the Engineer notifies the time of removal.

The removal shall be made in a manner that will have a slight appearance and will not interfere with the operation or usefulness of the Works. In such case, the removal and disposal of the structures including incidental repairs and adjustments of remaining structures shall be performed by the Contractor at no extra cost to the Employer.

1.6 Temporary Road and Bridge Works

1.6.1 General

The Contractor shall furnish, maintain, and remove on completion of the works for which they are

required, all temporary road works such as detours and service roads, stagings and temporary crossings or bridges over streams or unstable ground, and he shall make them suitable in every respect for carrying all Construction Plant and Equipment required for the Works, for providing access and traffic for himself or others, or for any other purposes.

Such temporary roads and bridges shall be constructed to the satisfaction of the Engineer, but the Contractor shall nevertheless be responsible for any damage done to or caused by such temporary road works.

1.6.2 Construction requirements

Before constructing temporary roads, the Contractor shall make all necessary arrangements, if required, with the public authorities or landowners concerned, for the use of the land and he shall obtain the approval of the Engineer. Such approval will not, however, relieve the Contractor of his responsibility. Upon completion of the Works, the Contractor shall clean up and restore the land to the satisfaction of the Engineer or the landowner concerned.

Where, in the opinion of the Engineer, a detour is not feasible or a sufficient area is not obtained for detour, construction shall be undertaken only over half of the full width and shall be permitted under the approval of the related authorities. The length of such half-width construction shall be kept as short as possible.

Stagings and temporary bridges shall be designed for D-Loading (Muatan-D) specified in Indonesian Standard, provided that allowable stress of fifty (50) percent can be increased for temporary load and force during construction.

1.7 Removal and Demolishing of Existing Structures

Prior to the execution of construction of the new channels, levee, revetments and the new sluiceways and bridges as well as extension of the existing sluiceways, etc., the Contractor, where directed, shall remove or demolish the existing structures such as channel revetment, culverts, bridges, levees, parapet walls and other related structures stated in the Bill of Quantities in the respective items of work or as directed by the Engineer excluding the following facilities :

- (1) Water supply pipe line under PDAM,
- (2) Electrical cable, pole, transmission and supply line under P.T. PLN,
- (3) Telephone cable under P.T. TELKOM,

- (4) Public utilities,
- (5) Private utilities, and
- (6) Existing irrigation facilities, if any, under DGWRD.

The Contractor shall submit the construction drawings, removal and demolishing plan, and time schedule to any public authority, company or person belonging to, controlling or concerning the above mentioned existing facilities, and negotiate with them in respect of various matters which may occur in the execution of the removal and demolishing works. The Contractor shall confirm in writing to the Engineer that he has obtained the consent of the concerned authority before taking up such demolition and removal. The Contractor shall fully indemnify the Employer against any claim, action, expense, loss, damage or injury incurred in this respect.

1.8 Measurement and Payment

1.8.1 Temporary coffering works, care of water including dewatering

The payment for temporary coffering works, care of water including dewatering stated in the respective items of works in the Bill of Quantities will be made at the lump sum prices tendered therefor which shall include the full compensation for the cost of construction, maintenance, removal of coffering work, furnishing materials, labour and equipment for coffering work including care of water and dewatering during construction and channel diversion works, if any. But those which are not itemized in the Bill of Quantities shall be deemed to be included in the cost of the respective works for which the coffering works is required.

Payment for the lump sum price shall be made upon the basis as follows:

- (i) Eighty (80) percent of the lump sum price will be paid after completion of dry up in the coffering works duly certified by the Engineer,
- (ii) The remaining twenty (20) percent of the lump sum price will be paid after completion of removal of the coffering works and the site restored to the original state duly certified by the Engineer.

No separate payment will be made for control and removal of water from the various foundations, all types of excavation and when placing embankment or backfill material during construction. All cost incurred from the works for control and removal of water shall be deemed to be included in the appropriate unit or lump sum prices for the respective work items for excavation, backfilling,

embankment, etc. tendered therefor in the Bill of Quantities.

1.8.2 Temporary road and bridge works

The payment for temporary road and bridge works will be made at the lump sum price tendered for Item No. 0/01 in the Bill of Quantities which shall include the full compensation for the cost of construction, maintenance and removal of temporary roads, stagings and bridges including furnishing materials, labour and equipment.

Payment for the lump sum price will be made upon the basis as follows :

- (i) Eighty (80) percent of the lump sum price will be paid after completion of the temporary roads, stagings and/or bridges duly certified by the Engineer,
- (ii) The remaining twenty (20) percent will be paid after completion of removal of the structures above and site restored to original state duly certified by the Engineer.

1.8.3 Removal and demolishing of existing structures

The payment for removal and demolishing of the existing structures stated in the respective items of works in the Bill of Quantities will be made at the lump sum prices tendered therefor in accordance with the Drawings, Specifications and/or as directed by the Engineer and duly certified by the Engineer in the Bi-Monthly Statement of Account.

The lump sum price shall include the full compensation for furnishing all the equipment and labour for removal and demolishing of the existing structures including any incidental works such as preparation and negotiation with the owners, authorities, etc. in accordance with the Specifications.

