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K & E
LEVEL BOOK
372 A

KEUFFEL & ESSER CO.
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AND
SURVEYING INSTRUMENTS.
NEW YORK.
CHICAGO. ST. LOUIS. SAN FRANCISCO. MONTREAL.

MICROFILMED
JAN 15 1982

# TABLES FOR EXCAVATIONS AND EMBANKMENTS.

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.
ROADWAY 18 FEET WIDE. SIDE SLOPES 1 TO 1.
FOR SINGLE TRACK EXCAVATION.

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| | 0 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 9.0 | 9.1 | 9.2 | 9.3 | 9.4 | 9.5 | 9.6 | 9.7 | 9.8 | 9.9 | 0 |
| 1 | 10.0 | 10.1 | 10.2 | 10.3 | 10.4 | 10.5 | 10.6 | 10.7 | 10.8 | 10.9 | 1 |
| 2 | 11.0 | 11.1 | 11.2 | 11.3 | 11.4 | 11.5 | 11.6 | 11.7 | 11.8 | 11.9 | 2 |
| 3 | 12.0 | 12.1 | 12.2 | 12.3 | 12.4 | 12.5 | 12.6 | 12.7 | 12.8 | 12.9 | 3 |
| 4 | 13.0 | 13.1 | 13.2 | 13.3 | 13.4 | 13.5 | 13.6 | 13.7 | 13.8 | 13.9 | 4 |
| 5 | 14.0 | 14.1 | 14.2 | 14.3 | 14.4 | 14.5 | 14.6 | 14.7 | 14.8 | 14.9 | 5 |
| 6 | 15.0 | 15.1 | 15.2 | 15.3 | 15.4 | 15.5 | 15.6 | 15.7 | 15.8 | 15.9 | 6 |
| 7 | 16.0 | 16.1 | 16.2 | 16.3 | 16.4 | 16.5 | 16.6 | 16.7 | 16.8 | 16.9 | 7 |
| 8 | 17.0 | 17.1 | 17.2 | 17.3 | 17.4 | 17.5 | 17.6 | 17.7 | 17.8 | 17.9 | 8 |
| 9 | 18.0 | 18.1 | 18.2 | 18.3 | 18.4 | 18.5 | 18.6 | 18.7 | 18.8 | 18.9 | 9 |
| 10 | 19.0 | 19.1 | 19.2 | 19.3 | 19.4 | 19.5 | 19.6 | 19.7 | 19.8 | 19.9 | 10 |
| 11 | 20.0 | 20.1 | 20.2 | 20.3 | 20.4 | 20.5 | 20.6 | 20.7 | 20.8 | 20.9 | 11 |
| 12 | 21.0 | 21.1 | 21.2 | 21.3 | 21.4 | 21.5 | 21.6 | 21.7 | 21.8 | 21.9 | 12 |
| 13 | 22.0 | 22.1 | 22.2 | 22.3 | 22.4 | 22.5 | 22.6 | 22.7 | 22.8 | 22.9 | 13 |
| 14 | 23.0 | 23.1 | 23.2 | 23.3 | 23.4 | 23.5 | 23.6 | 23.7 | 23.8 | 23.9 | 14 |
| 15 | 24.0 | 24.1 | 24.2 | 24.3 | 24.4 | 24.5 | 24.6 | 24.7 | 24.8 | 24.9 | 15 |
| 16 | 25.0 | 25.1 | 25.2 | 25.3 | 25.4 | 25.5 | 25.6 | 25.7 | 25.8 | 25.9 | 16 |
| 17 | 26.0 | 26.1 | 26.2 | 26.3 | 26.4 | 26.5 | 26.6 | 26.7 | 26.8 | 26.9 | 17 |
| 18 | 27.0 | 27.1 | 27.2 | 27.3 | 27.4 | 27.5 | 27.6 | 27.7 | 27.8 | 27.9 | 18 |
| 19 | 28.0 | 28.1 | 28.2 | 28.3 | 28.4 | 28.5 | 28.6 | 28.7 | 28.8 | 28.9 | 19 |
| 20 | 29.0 | 29.1 | 29.2 | 29.3 | 29.4 | 29.5 | 29.6 | 29.7 | 29.8 | 29.9 | 20 |
| 21 | 30.0 | 30.1 | 30.2 | 30.3 | 30.4 | 30.5 | 30.6 | 30.7 | 30.8 | 30.9 | 21 |
| 22 | 31.0 | 31.1 | 31.2 | 31.3 | 31.4 | 31.5 | 31.6 | 31.7 | 31.8 | 31.9 | 22 |
| 23 | 32.0 | 32.1 | 32.2 | 32.3 | 32.4 | 32.5 | 32.6 | 32.7 | 32.8 | 32.9 | 23 |
| 24 | 33.0 | 33.1 | 33.2 | 33.3 | 33.4 | 33.5 | 33.6 | 33.7 | 33.8 | 33.9 | 24 |
| 25 | 34.0 | 34.1 | 34.2 | 34.3 | 34.4 | 34.5 | 34.6 | 34.7 | 34.8 | 34.9 | 25 |
| 26 | 35.0 | 35.1 | 35.2 | 35.3 | 35.4 | 35.5 | 35.6 | 35.7 | 35.8 | 35.9 | 26 |
| 27 | 36.0 | 36.1 | 36.2 | 36.3 | 36.4 | 36.5 | 36.6 | 36.7 | 36.8 | 36.9 | 27 |
| 28 | 37.0 | 37.1 | 37.2 | 37.3 | 37.4 | 37.5 | 37.6 | 37.7 | 37.8 | 37.9 | 28 |
| 29 | 38.0 | 38.1 | 38.2 | 38.3 | 38.4 | 38.5 | 38.6 | 38.7 | 38.8 | 38.9 | 29 |
| 30 | 39.0 | 39.1 | 39.2 | 39.3 | 39.4 | 39.5 | 39.6 | 39.7 | 39.8 | 39.9 | 30 |
| 31 | 40.0 | 40.1 | 40.2 | 40.3 | 40.4 | 40.5 | 40.6 | 40.7 | 40.8 | 40.9 | 31 |
| 32 | 41.0 | 41.1 | 41.2 | 41.3 | 41.4 | 41.5 | 41.6 | 41.7 | 41.8 | 41.9 | 32 |
| 33 | 42.0 | 42.1 | 42.2 | 42.3 | 42.4 | 42.5 | 42.6 | 42.7 | 42.8 | 42.9 | 33 |
| 34 | 43.0 | 43.1 | 43.2 | 43.3 | 43.4 | 43.5 | 43.6 | 43.7 | 43.8 | 43.9 | 34 |
| 35 | 44.0 | 44.1 | 44.2 | 44.3 | 44.4 | 44.5 | 44.6 | 44.7 | 44.8 | 44.9 | 35 |
| 36 | 45.0 | 45.1 | 45.2 | 45.3 | 45.4 | 45.5 | 45.6 | 45.7 | 45.8 | 45.9 | 36 |

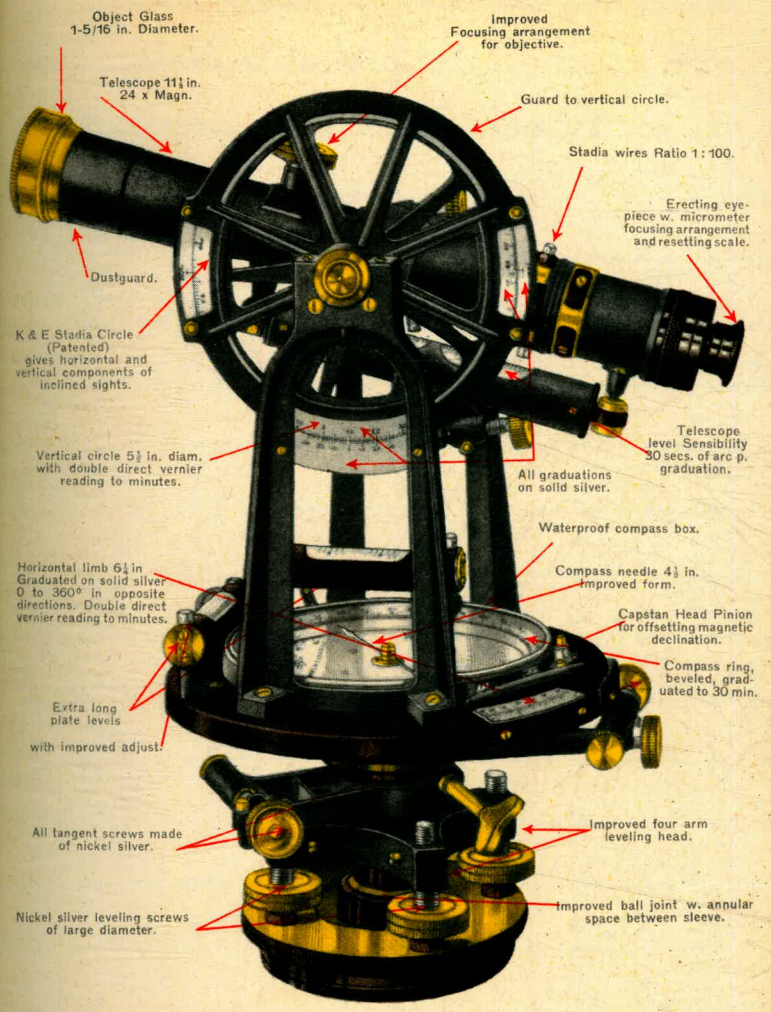
Calculated by Julion A. Hall, M. Am. Soc. C. E.

465

# EXTRA FINE ENGINEERS' TRANSIT

## No. 5060 S

## KEUFFEL & ESSER CO., N.Y.




ALSO MADE WITH

INTERNAL FOCUSING TELESCOPE

PRACTICALLY DUST AND MOISTURE PROOF.

1899454

EL CAPITAN DAM

Final Rock Blank 9-79

Computations for final Rock Embankment

from N 4070 to N P.I-

Cont. from Book 464 page 78

| East | | N4070 D.S. | No rock Emb. below El. 700 |
|---|---|---|---|

| East | | N4070 U.S. | Ht | Mean Ht. | Dist | Area in sq. ft |
|---|---|---|---|---|---|---|
| 5102.17 | 700.4 | 700.4 | 0.0 | | | |
| | | | | 13.9 | × 43.5 | = 600.3 |
| 5145.67 | 700.4 | 672.6 | 27.8 | | | |
| | | | | 28.2 | × 3 | = 84.6 |
| 48.7 | 699.2 | 70.6 | 28.6 | | | |
| | | | | 26.85 | × 11.3 | = 303.4 |
| 60 | 94.6 | 69.5 | 25.1 | | | |
| | | | | 22.3 | × 15. | = 334.5 |
| 75 | 88.6 | 69.1 | 19.5 | | | |
| | | | | 19.95 | × 5 | = 99.7 |
| 80 | 686.6 | 666.2 | 20.4 | | | |



J.W.W. July 1934

1339484

| East | | N4070 U.S. | Ht | Mean Ht. | Dist. | Area in sq. ft |
|---|---|---|---|---|---|---|
| 5190 | 682.5 | 661.0 | 21.5 | | | |
| 5200 | 78.5 | 62.1 | 16.4 | | | |
| | | | | 82.15 | × 10 | = 821.5 |
| 10 | 74.5 | 60.2 | 14.3 | | | |
| 20 | 70.4 | 56.2 | 14.2 | | | |
| 30 | 66.4 | 55.3 | 11.1 | | | |
| 35 | 64.4 | 59.7 | 4.7 | 12.6 | × 5. | = 63.0 |
| 40 | 62.4 | 57.7 | 4.7 | | | |
| | | | | 4.15 | × 10. | = 41.5 |
| 50 | 58.3 | 54.7 | 3.6 | | | |
| | | | | 3.2 | × 5. | = 16.0 |
| 55 | 56.3 | 53.5 | 2.8 | | | |
| | | | | 4.9 | × 9. | = 44.1 |
| 64 | 52.7 | 45.7 | 7.0 | | | |
| | | | | 6.05 | × 6. | = 36.3 |
| 70 | 50.3 | 45.2 | 5.1 | | | |
| | | | | 5.15 | × 0.67 | = 3.5 |
| 70.67 | 650.0 | 44.8 | 5.2 | | | |
| | | | | 5.2 | × 10. | = 52.0 |
| 80.67 | 650.0 | 644.8 | 5.2 | 3.7 | × 8.33 | = 30.8 |

| East | | N4070 U.S. | Ht | Mean Ht. | Dist. | Area in Sq. ft |
|---|---|---|---|---|---|---|
| 5289 | 646.7 | 644.5 | 2.2 | | | |
| | | | | 3.4 | × 6 = | 20.4 |
| 95 | 44.3 | 39.7 | 4.6 | | | |
| | | | | 3.6 | × 5 = | 18.0 |
| 5300 | 42.3 | 39.7 | 2.6 | | | |
| | | | | 1.3 | × 7.6 = | 9.9 |
| 07.6 | 639.3 | 639.3 | 0.0 | | | |
| | ✓ | ✓ | ✓ | ✓ | ✓ | 2579.5 |

| | | N4080 D.S. | No rock emb. below El. 700 |
|---|---|---|---|

| East | | N4080 U.S. | Ht. | Mean Ht. | Dist. | Area in Sq. ft |
|---|---|---|---|---|---|---|
| 5102.17 | 700.3 | 700.3 | 0.0 | | | |
| | | | | 6.2 | × 19.33 = | 119.8 |
| 5121.5 | 700.3 | 687.9 | 12.4 | | | |
| | | | | 11.95 | × 5.5 = | 65.7 |
| 27 | 700.3 | 88.8 | 11.5 | | | |
| | | | | 14.65 | × 3 = | 44.0 |
| 30 | 700.3 | 82.5 | 17.8 | | | |
| | | | | 20.95 | × 10 = | 209.5 |
| 40 | 700.3 | 76.2 | 24.1 × | | | |
| | | | | 25.9 | × 5.7 = | 147.6 |
| 45.7 | 700.3 | 72.6 | 27.7 | | | |
| | | | | 27.75 | × 0.3 = | 8.3 |
| 46 | 700.2 | 72.4 | 27.8 | | | |
| | | | | 26.4 | × 14 = | 369.6 |
| 60 | 694.5 | 669.5 | 25.0 | | | |
| | ✓ | ✓ | ✓ | 23.25 | × 9 = | 209.2 |

| East | | N4080 U.S. | Ht | Mean Ht. | Dist | Area in Sq. ft |
|---|---|---|---|---|---|---|
| 5169 | 690.9 | 669.4 | 21.5 | | | |
| | | | | 21.5 | x 1. = | 21.5 |
| 70 | 90.5 | 69.0 | 21.5 | | | |
| 80 | 86.5 | 63.3 | 23.2 | | | |
| 90 | 82.4 | 63.2 | 19.2 | | | |
| 5200 | 78.4 | 66.3 | 12.1 | 78.75 | x 10 = | 787.5 |
| 10 | 74.4 | 67.2 | 7.2 | | | |
| 20 | 70.3 | 66.2 | 4.1 | | | |
| 30 | 66.3 | 64.1 | 2.2 | | | |
| 40 | 662.3 | 662.3 | 0.0 | | | |
| | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | | | | | | 1982.7 |

| East | | N4090 D.S. | No rock emb. below El. 700 | | | |
|---|---|---|---|---|---|---|
| East | | N4090 U.S. | Ht | Mean Ht. | Dist. | Area |
| 5102.17 | 700.2 | 700.2 | 0.0 | | | |
| | | | | 9.3 | x 29. = | 269.7 |
| 31.2 | 700.2 | 681.6 | 18.6 | | | |
| | | | | 20.25 | x 8.8 = | 178.2 |
| 40 | 700.2 | 78.3 | 21.9 | | | |
| | | | | 22.65 | x 5.67 = | 128.4 |
| 45.67 | 700.2 | 76.8 | 23.4 | | | |
| | | | | 23.15 | x 4.33 = | 100.2 |
| 50 | 698.5 | 75.6 | 22.9 | | | |
| 60 | 94.4 | 70.5 | 23.9 | | | |
| 70 | 90.4 | 69.9 | 20.5 | | | |
| 80 | 86.4 | 69.6 | 16.8 | 96.45 | x 10 = | 964.5 |
| 90 | 682.4 | 669.6 | 12.8 | | | |
| | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

| East | | N4090 U.S. | Ht. | Mean Ht. | Dist | Area in Sq. ft |
|---|---|---|---|---|---|---|
| 5200 | 678.4 | 669.7 | 8.7 | | | |
| 10 | 74.4 | 69.8 | 4.6 × | | | |
| | | | | 2.3 × | 10.8 = | 24.8 |
| 20.8 | 670.1 | 670.1 | 0.0 | | | |
| | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| | | | | | | 1665.8 |

N 4100 D.S. Horock Emb. below El. 700

| East | | N4100 U.S. | Ht | Mean Ht. | Dist. | Area in Sq. ft |
|---|---|---|---|---|---|---|
| 5104.0 | 700.1 | 700.1 | 0.0 | | | |
| | | | | 1.55 × | 6 = | 9.3 |
| 10 | 700.1 | 697.0 | 3.1 | | | |
| 20 | 700.1 | 90.7 | 9.4 | | | |
| | | | | 33.65 × | 10 = | 336.5 |
| 30 | 700.1 | 86.3 | 13.8 | | | |
| 40 | 700.1 | 82.3 | 17.8 × | | | |
| | | | | 18.6 × | 5.67 = | 105.5 |
| 45.67 | 700.1 | 80.7 | 19.4 | | | |
| | | | | 19.2 × | 4.33 = | 83.1 |
| 50 | 698.4 | 79.4 | 19.0 × | | | |
| 60 | 94.3 | 76.4 | 17.9 | | | |
| 70 | 90.3 | 73.5 | 16.8 | | | |
| | | | | 67.95 × | 10 = | 679.5 |
| 80 | 86.3 | 71.2 | 15.1 | | | |
| 90 | 82.3 | 74.4 | 7.9 | | | |
| 5200 | 78.3 | 76.8 | 1.5 × | | | |
| | | | | 0.75 × | 3.6 = | 2.7 |
| 03.6 | 676.9 | 676.9 | 0.0 | | | |
| | | | ✓ | ✓ | ✓ | 1216.6 |
| | ✓ | ✓ | | | | |

| East | | N4110 D.S. | No rock emb. below El. 700.0 |
|---|---|---|---|

| East | | N4110 U.S. | Ht. | Mean Ht. | Dist. | Area in Sq. ft. |
|---|---|---|---|---|---|---|
| 5110 | 700.2 | 700.2 | 0.0 | | | |
| 20 | 700.2 | 695.7 | 4.5 | | | |
| | | | | 2.05 | × 10 = | 210.5 |
| 30 | 700.2 | 90.4 | 9.8 | | | |
| | | | | 11.65 | × 5.7 = | 82.4 |
| 40 | 700.2 | 86.7 | 13.5 | | | |
| | | | | 15.25 | × 4.3 = | 65.6 |
| 45.7 | 700.2 | 84.8 | 15.4 | | | |
| | | | | 15.2 | × 4.3 = | 65.6 |
| 50 | 698.5 | 83.4 | 15.1 | | | |
| | | | | 14.4 | × 4.3 = | 61.9 |
| 60 | 94.4 | 80.0 | 14.4 | | | |
| | | | | 54.2 | × 10 = | 542.0 |
| 70 | 90.4 | 76.4 | 14.0 | | | |
| 80 | 686.4 | 677.0 | 9.4 | | | |
| | ✓ | ✓ | ✓ | | | |

1339434



| East. | | N4110 U.S. | Ht. | Mean Ht. | Dist. | Area in Sq. ft. |
|---|---|---|---|---|---|---|
| 5190 | 682.4 | 675.9 | 6.5 | | | |
| | | | | 5.6 | × 1.35 = | 7.6 |
| 5200 | 78.4 | 73.7 | 4.7 | | | |
| | | | | 2.35 | × 6.6 = | 15.5 |
| 06.6 | 675.8 | 675.8 | 0.0 | | | |
| | ✓ | ✓ | ✓ | | | |

915.9

| East | | N4120 U.S. | Ht. | Mean Ht. | Dist. | Area in Sq. ft. |
|---|---|---|---|---|---|---|
| 5104 | 700.1 | 700.1 | 0.0 | | | |
| | | | | 0.15 | × 6 = | 0.9 |
| 5110 | 700.1 | 699.8 | 0.3 | | | |
| | | | | 0.15 | × 4 = | 0.1 |
| 5110.4 | 700.1 | 700.1 | 0.0 | | | |
| | ✓ | ✓ | | | | |

| East | | N 4120 U.S. | Ht | Mean Ht | Dist | Area in Sq. ft |
|---|---|---|---|---|---|---|
| 5123.9 | 700.1 | 700.1 | 0.0 | | | |
| | | | | 1.05 | × 1.1 | = 1.1 |
| 25 | 700.1 | 698.0 | 2.1 | | | |
| | | | | 3.0 | × 5 | = 15.0 |
| 30 | 700.1 | 96.2 | 3.9 | | | |
| | | | | 5.65 | × 10 | = 56.5 |
| 40 | 700.1 | 92.7 | 7.4 | | | |
| | | | | 8.4 | × 5.7 | = 47.9 |
| 45.7 | 700.1 | 90.7 | 9.4 | | | |
| | | | | 9.3 | × 4.3 | = 40.0 |
| 50 | 698.4 | 89.2 | 9.2 | | | |
| 60 | 94.3 | 85.7 | 8.6 | | | |
| | | | | 23.8 | × 10 | = 238.0 |
| 70 | 90.3 | 82.3 | 8.0 | | | |
| | | | | 2.6 | × 9.5 | = 24.7 |
| 80 | 86.3 | 81.1 | 5.2 | | | |
| 89.5 | 82.5 | 82.5 | 0.0 | | | |
| | | | | | | 424.2 □' ✓ |

| East | | N 4130 U.S. | Ht | Mean Ht | Dist | Area in Sq. ft |
|---|---|---|---|---|---|---|
| 5110 | 700.0 | 700.0 | 0.0 | | | |
| | | | | 1.0 | 6.85 | × 10 = 68.5 |
| 20 | " | 699.0 | 1.0 | | | |
| | | | | 1.2 | | |
| 30 | " | 98.8 | 1.2 | | | |
| | | | | 9.3 | | |
| 40 | " | 90.7 | 9.3 | | | |
| | | | | 9.6 | × 5.7 | = 54.7 |
| 45.7 | " | 90.1 | 9.9 | | | |
| | | | | 9.35 | × 4.3 | = 40.2 |
| 50 | 698.4 | 89.6 | 8.8 | | | |
| | | | | 6.0 | 11.95 | × 10 = 119.5 |
| 60 | 94.3 | 88.3 | 6.0 | | | |
| | | | | 3.1 | | |
| 70 | 90.3 | 87.2 | 3.1 | | | |
| | | | | 1.55 | × 5.8 | = 9.0 |
| 5175.8 | 688.0 | 688.0 | 0.0 | | | |
| | | | | | | 291.9 □' ✓ |

East N 41 40 U.S.

| | | | Ht | Mean Ht. | Dist. | Area in sq. ft. |
|---|---|---|---|---|---|---|
| 51 70 | 700.° | 700.° | 0.° | | | |
| 30 | " | 699.3 | 0.7 | 1.15 | × 10 = | 11.5 |
| 40 | " | 99.1 | 0.9 | | | |
| | | | | 0.85 | × 5.7 = | 4.8 |
| 45.7 | " | 99.2 | 0.8 | | | |
| | | | | 0.4 | × 1.9 = | 0.8 |
| 47.6 | 699.3 | 699.3 | 0.° | | | |
| | | | | | | 17.1 □ ✓ |

East

N 4150
U.S.

| | | | Ht. | Mean Ht. | Dist. | Area in Sq. ft. |
|---|---|---|---|---|---|---|
| 5140 | 700° | 700.0 | 0.0 | | | |
| | | | | 0.1 | × 5.7 = | 0.6 |
| 45.7 | " | 699.8 | 0.2 | | | |
| | | | | 0.1 | × 1.3 = | 0.1 |
| 46 | 699.8 | 699.8 | 0.0 | | | |
| | | | | | | 0.7 □' |

## DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

ROADWAY 14 FEET WIDE. SIDE SLOPES $1^1/_2$ TO 1.

FOR SINGLE TRACK EMBANKMENT.

| | 0 | .1 | .2 | .3 | .4 | .5 | .6 | .7 | .8 | .9 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 7.0 | 7.2 | 7.3 | 7.5 | 7.6 | 7.8 | 7.9 | 8.1 | 8.2 | 8.4 | 0 |
| 1 | 8.5 | 8.7 | 8.8 | 9.0 | 9.1 | 9.3 | 9.4 | 9.6 | 9.7 | 9.9 | 1 |
| 2 | 10.0 | 10.2 | 10.3 | 10.5 | 10.6 | 10.8 | 10.9 | 11.1 | 11.2 | 11.4 | 2 |
| 3 | 11.5 | 11.7 | 11.8 | 12.0 | 12.1 | 12.3 | 12.4 | 12.6 | 12.7 | 12.9 | 3 |
| 4 | 13.0 | 13.2 | 13.3 | 13.5 | 13.6 | 13.8 | 13.9 | 14.1 | 14.2 | 14.4 | 4 |
| 5 | 14.5 | 14.7 | 14.8 | 15.0 | 15.1 | 15.3 | 15.4 | 15.6 | 15.7 | 15.9 | 5 |
| 6 | 16.0 | 16.2 | 16.3 | 16.5 | 16.6 | 16.8 | 16.9 | 17.1 | 17.2 | 17.4 | 6 |
| 7 | 17.5 | 17.7 | 17.8 | 18.0 | 18.1 | 18.3 | 18.4 | 18.6 | 18.7 | 18.9 | 7 |
| 8 | 19.0 | 19.2 | 19.3 | 19.5 | 19.6 | 19.8 | 19.9 | 20.1 | 20.2 | 20.4 | 8 |
| 9 | 20.5 | 20.7 | 20.8 | 21.0 | 21.1 | 21.3 | 21.4 | 21.6 | 21.7 | 21.9 | 9 |
| 10 | 22.0 | 22.2 | 22.3 | 22.5 | 22.6 | 22.8 | 22.9 | 23.1 | 23.2 | 23.4 | 10 |
| 11 | 23.5 | 23.7 | 23.8 | 24.0 | 24.1 | 24.3 | 24.4 | 24.6 | 24.7 | 24.9 | 11 |
| 12 | 25.0 | 25.2 | 25.3 | 25.5 | 25.6 | 25.8 | 25.9 | 26.1 | 26.2 | 26.4 | 12 |
| 13 | 26.5 | 26.7 | 26.8 | 27.0 | 27.1 | 27.3 | 27.4 | 27.6 | 27.7 | 27.9 | 13 |
| 14 | 28.0 | 28.2 | 28.3 | 28.5 | 28.6 | 28.8 | 28.9 | 29.1 | 29.2 | 29.4 | 14 |
| 15 | 29.5 | 29.7 | 29.8 | 30.0 | 30.1 | 30.3 | 30.4 | 30.6 | 30.7 | 30.9 | 15 |
| 16 | 31.0 | 31.2 | 31.3 | 31.5 | 31.6 | 31.8 | 31.9 | 32.1 | 32.2 | 32.4 | 16 |
| 17 | 32.5 | 32.7 | 32.8 | 33.0 | 33.1 | 33.3 | 33.4 | 33.6 | 33.7 | 33.9 | 17 |
| 18 | 34.0 | 34.2 | 34.3 | 34.5 | 34.6 | 34.8 | 34.9 | 35.1 | 35.2 | 35.4 | 18 |
| 19 | 35.5 | 35.7 | 35.8 | 36.0 | 36.1 | 36.3 | 36.4 | 36.6 | 36.7 | 36.9 | 19 |
| 20 | 37.0 | 37.2 | 37.3 | 37.5 | 37.6 | 37.8 | 37.9 | 38.1 | 38.2 | 38.4 | 20 |
| 21 | 38.5 | 38.7 | 38.8 | 39.0 | 39.1 | 39.3 | 39.4 | 39.6 | 39.7 | 39.9 | 21 |
| 22 | 40.0 | 40.2 | 40.3 | 40.5 | 40.6 | 40.8 | 40.9 | 41.1 | 41.2 | 41.4 | 22 |
| 23 | 41.5 | 41.7 | 41.8 | 42.0 | 42.1 | 42.3 | 42.4 | 42.6 | 42.7 | 42.9 | 23 |
| 24 | 43.0 | 43.2 | 43.3 | 43.5 | 43.6 | 43.8 | 43.9 | 44.1 | 44.2 | 44.4 | 24 |
| 25 | 44.5 | 44.7 | 44.8 | 45.0 | 45.1 | 45.3 | 45.4 | 45.6 | 45.7 | 45.9 | 25 |
| 26 | 46.0 | 46.2 | 46.3 | 46.5 | 46.6 | 46.8 | 46.9 | 47.1 | 47.2 | 47.4 | 26 |
| 27 | 47.5 | 47.7 | 47.8 | 48.0 | 48.1 | 48.3 | 48.4 | 48.6 | 48.7 | 48.9 | 27 |
| 28 | 49.0 | 49.2 | 49.3 | 49.5 | 49.6 | 49.8 | 49.9 | 50.1 | 50.2 | 50.4 | 28 |
| 29 | 50.5 | 50.7 | 50.8 | 51.0 | 51.1 | 51.3 | 51.4 | 51.6 | 51.7 | 51.9 | 29 |
| 30 | 52.0 | 52.2 | 52.3 | 52.5 | 52.6 | 52.8 | 52.9 | 53.1 | 53.2 | 53.4 | 30 |
| 31 | 53.5 | 53.7 | 53.8 | 54.0 | 54.1 | 54.3 | 54.4 | 54.6 | 54.7 | 54.9 | 31 |
| 32 | 55.0 | 55.2 | 55.3 | 55.5 | 55.6 | 55.8 | 55.9 | 56.1 | 56.2 | 56.4 | 32 |
| 33 | 56.5 | 56.7 | 56.8 | 57.0 | 57.1 | 57.3 | 57.4 | 57.6 | 57.7 | 57.9 | 33 |
| 34 | 58.0 | 58.2 | 58.3 | 58.5 | 58.6 | 58.8 | 58.9 | 59.1 | 59.2 | 59.4 | 34 |
| 35 | 59.5 | 59.7 | 59.8 | 60.0 | 60.1 | 60.3 | 60.4 | 60.6 | 60.7 | 60.9 | 35 |
| 36 | 61.0 | 61.2 | 61.3 | 61.5 | 61.6 | 61.8 | 61.9 | 62.1 | 62.2 | 62.4 | 36 |

Calculated by Julien A. Hall, M. Am. Soc. C. E.

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