

CONSTRUCTION

WATERLOO-EAGLE CENTER ROAD EAGLE TWP

1923

FIELD BOOK

331 A

42

#42

# KEUFFEL & ESSER CO.

## DRAWING MATERIALS AND SURVEYING INSTRUMENTS.

### NEW YORK.

CHICAGO. ST. LOUIS. SAN FRANCISCO. MONTREAL.

### 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 Julien A. Hall, M. Am. Soc. C. E.

For Keith's Railroad Curve Tables see end of book.

Property of  
County Engineers Office  
Court House  
Waterloo Iowa

BLACK HAWK COUNTY  
ENGINEER'S OFFICE  
COURT HOUSE  
WATERLOO, IOWA 50703

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Road - 1923

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WATERLOO, IOWA 50703  
COURT HOUSE  
ENGINEER'S OFFICE  
BLACK HAWK COUNTY





TILE STAKES - WATERLOO - EAGLE CENTER ROAD - (See 33.34) EAGLE TWP. - 1923.

West

Side

B.M. 7.27 210.35 203.11 Center E. H. Wall. 2x2x26 RGB Sta 286+50

Culv. H. 199.39

286+52 7.41 202.99 199.50 3.47

286 7.95 202.43 199.60 2.83

+50 7.22 203.16 199.70 3.46

285 5.89 204.49 199.80 4.69

+50 4.55 205.83 201.80 4.03

284 2.80 207.58 203.80 3.78

+50 10.48 220.33 0.53 209.85 205.40 4.45

283 8.75 211.58 207.00 4.58

+50 7.12 213.21 208.00 5.21

282 6.17 214.16 209.00 5.16

+50 5.68 214.65 210.00 4.65

281 4.92 215.41 211.00 4.41

+50 4.37 215.96 211.50 4.46

280 3.45 216.88 212.00 4.88

+50 2.82 217.51 212.50 5.01

End 279 1.74 218.59 213.00 5.59

Note: Use figures P 50 Book 37 for over cut.



EAST

(191.79)

|          |       |          |        |        |        |      |
|----------|-------|----------|--------|--------|--------|------|
| 311 + 50 |       | 7.79     | 182.00 | 177.05 | 4.95   |      |
| 312      |       | 8.96     | 182.63 | 178.55 | 4.08   |      |
| +50      |       | 7.48     | 184.31 | 180.05 | 4.26   |      |
| 313      |       | 5.76     | 186.03 | 181.55 | 4.48   | X    |
| +50      |       | 4.01     | 187.78 | 183.30 | 4.48   |      |
| 314      |       | 2.46     | 189.33 | 185.05 | 4.28   | X    |
| TP +50   | 11.91 | (203.12) | 0.58   | 191.21 | 187.05 | 4.16 |
| 315      |       | 9.83     | 193.29 | 189.05 | 4.24   |      |
| +50      |       | 7.38     | 195.71 | 191.05 | 4.69   |      |
| 316      |       | 5.63     | 197.49 | 193.05 | 4.44   | X    |
| +50      |       | 3.30     | 199.82 | 195.25 | 4.57   |      |
| 317      |       | (208.32) | 0.87   | 202.25 | 197.45 | 4.80 |
| +50      |       | 4.12     | 204.20 | 199.65 | 4.55   |      |
| End 318  |       | 1.34     | 206.98 | 201.85 | 5.13   |      |



West

BN #26 5.07 180 41

175 34

Center E Head rail - I-Beam BR Sta 305+93

Inet = 306+40 East Side

306+23

+50

9.03 171.38 167.05 4.33

307

8.17 172.24 167.55 4.69

+50

7.57 172.84 168.05 4.79

308

6.98 173.43 168.55 4.88

+50

6.02 174.39 169.55 4.84

309

5.00 175.41 170.55 4.86

+50

3.78 176.63 171.55 4.98

310

2.85 177.56 173.15 4.41

TP 180

12.59

(191.79)

1.21 179.20 174.45 4.75

311

11.12 180.67 175.75 4.92

+50

9.95 181.74 177.25 4.49

312

8.69 183.10 178.75 4.35

+50

7.45 184.34 180.25 4.09

313

5.84 185.96 181.75 4.20

+50

4.28 187.51 183.50 4.01

314

2.76 189.03 185.25 3.78

+50

(203.12)

0.89 190.90 187.25 3.65

315

10.53 192.59 189.25 3.84

+50

8.28 194.81 191.25 3.59

316

5.89 197.23 193.25 3.98

+50

3.55 199.57 195.45 4.12

TP 317

6.30

(208.32)

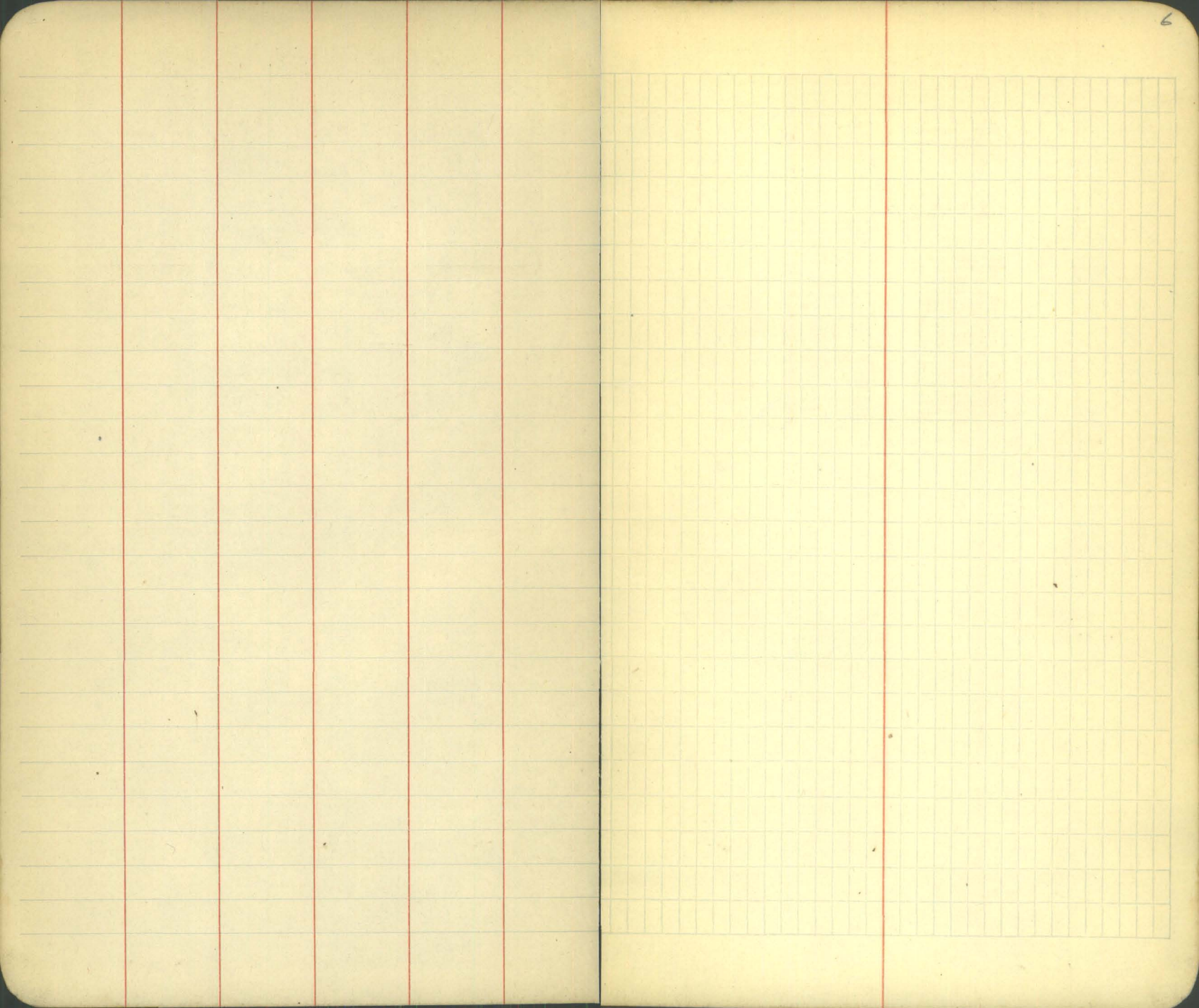
1.10 202.02 197.6 4.37

+50

3.92 204.40 199.8 4.55

318

1.75 206.57 202.94 4.52





West

BM 26 5.58 180.82

175.34

Center E Hand Rail I Beam Sta 305+96

305+26

11.04 169.78 166.75 3.03

305

10.75 170.07 167.00 3.07

+50

10.32 170.50 167.50 3.00

304

9.73 171.09 168.00 3.09

+50

8.57 172.23 168.50 3.73

303

7.60 173.22 169.00 4.22

+50

6.25 174.57 170.60 4.07

302

4.43 176.39 172.00 4.39

+50

2.35 178.47 174.50 4.47

301

11.35 191.83 0.34 180.48 176.00 4.48

+50

8.56 183.27 179.00 4.27

300

5.85 185.98 182.00 3.98

+50

3.31 188.52 185.00 3.52

299

14.67 205.50 0.97 190.86 188.00 2.86

+50

10.90 194.60 191.00 3.60

298

7.08 198.42 194.00 4.42

+50

3.39 202.11 197.00 5.11

End 297

0.03 205.47 200.00 5.47

Jct - 305+10 E side

1.00%

3.00%

4.00%

6.00%

Note: Use figures P 57 B 37 for over depths



$\text{Inlet} = 0 + 50$  Outlet Line



BM 5.75 169.86 164.11 C F Hwall Cone Col 129+90  
 Gro 6 8+K

129+90 Top 6 1/6 1.70 158.16 157.66  
 50

129+90 9.6 8.86 161.00 157.58 3.42

130 7.6 8.67 161.49 157.60 3.59

+50 9.2 8.62 161.24 157.70 3.54

131 8.6 7.77 162.29 157.80 4.29

+50 8.1 7.27 162.59 158.30 4.29

132 7.6 6.46 163.40 158.80 4.60

+50 6.7 5.63 164.23 159.40 4.83

133 6.1 5.19 164.67 160.00 4.67

+50 5.6 4.84 165.02 160.60 4.42

134 5.0 4.18 165.68 161.20 4.48

+50 4.4 3.57 166.29 161.80 4.49

135 3.8 2.92 166.94 162.40 4.54

+50 3.2 2.26 167.60 163.00 4.60

136 2.7 1.83 168.03 163.60 4.43

+40 2.2 1.09 168.77 164.08 4.69

1 20 1/2  
 120



# CONSTRUCTION CROSS SECTIONS and SLOPSTAKES WILD-EAGLE CENTER ROAD

EAGLE TWP GRADING 1923

PHILAN-SHIRLEY CONTRACT Mch 9 1923

B.M. Sta 649.5 ft. Trans Pole 30' Rt. - E. - 193.11

|     |  | Stakes    |      | Dist from<br>Left of Back<br>Slope to<br>Left of Road | Elev. of<br>Back<br>Slope | Elev. of<br>Road |        |        |                    |                    |                    |                     |                     |                     |                    |                    |                     |                    |                    |                    |                    |  |
|-----|--|-----------|------|-------------------------------------------------------|---------------------------|------------------|--------|--------|--------------------|--------------------|--------------------|---------------------|---------------------|---------------------|--------------------|--------------------|---------------------|--------------------|--------------------|--------------------|--------------------|--|
|     |  | Lt        | Rt   |                                                       |                           |                  | Lt     | Rt     | Elev.              |                    |                    |                     |                     |                     |                    |                    |                     |                    |                    |                    |                    |  |
| Sta |  | Cut       | Fill | Fill                                                  | Cut                       |                  |        |        |                    |                    |                    |                     |                     |                     |                    |                    |                     |                    |                    |                    |                    |  |
| 7   |  | 2.9<br>30 |      |                                                       | 2.0<br>30                 | 22.5             | 188.25 | 190.21 | 191.1<br>3.3<br>33 | 191.1<br>3.5<br>25 | 188.5<br>6.1<br>17 | 190.1<br>4.5<br>12  | 190.5<br>4.1<br>41  | 189.8<br>4.8<br>16  | 188.9<br>5.7<br>18 | 189.2<br>6.2<br>24 | 190.1<br>4.5<br>26  | 190.2<br>4.4<br>20 | 190.5<br>4.5<br>35 |                    |                    |  |
| +50 |  |           |      |                                                       |                           |                  |        | 189.44 | 190.5<br>4.1<br>33 | 190.5<br>4.1<br>25 | 187.9<br>6.7<br>20 | 187.8<br>6.8<br>18  | 189.6<br>5.0<br>12  | 189.5<br>5.1<br>51  | 189.0<br>4.6<br>16 | 189.2<br>6.4<br>20 | 189.8<br>4.5<br>25  | 189.9<br>4.7<br>30 | 189.6<br>5.0<br>33 |                    |                    |  |
| 6   |  | 3.2<br>30 |      |                                                       | 2.8<br>30                 | 22.5             | 186.75 | 188.40 | 189.6<br>5.0<br>33 | 189.6<br>5.0<br>24 | 187.2<br>7.4<br>20 | 187.2<br>7.4<br>18  | 188.7<br>5.9<br>12  | 188.4<br>6.2<br>62  | 188.1<br>6.5<br>15 | 187.0<br>7.6<br>21 | 187.6<br>6.7<br>24  | 187.9<br>5.6<br>26 | 189.0<br>5.6<br>30 | 189.2<br>5.4<br>33 |                    |  |
| +50 |  |           |      |                                                       |                           |                  |        | 187.15 | 188.5<br>6.1<br>33 | 188.5<br>6.1<br>26 | 188.5<br>6.1<br>24 | 186.0<br>8.6<br>18  | 187.4<br>7.2<br>12  | 187.4<br>7.2<br>76  | 186.8<br>7.8<br>16 | 185.9<br>8.1<br>22 | 186.5<br>8.0<br>24  | 186.6<br>6.7<br>27 | 187.9<br>6.6<br>30 | 188.0<br>6.6<br>33 |                    |  |
| 5   |  | 3.4<br>30 |      |                                                       | 3.4<br>30                 | 22.5             | 183.75 | 185.63 | 187.1<br>7.5<br>33 | 187.1<br>7.5<br>27 | 186.9<br>7.7<br>24 | 184.6<br>10.0<br>19 | 184.5<br>10.1<br>17 | 186.2<br>8.2<br>13  | 185.5<br>9.1<br>91 | 185.4<br>9.2<br>15 | 184.0<br>10.0<br>19 | 185.3<br>9.3<br>22 | 186.3<br>8.3<br>27 | 186.9<br>7.9<br>30 | 186.9<br>7.8<br>33 |  |
| T.P |  | 11.20     |      |                                                       | 194.64<br>3.8             | 2.79             | 183.44 |        |                    |                    |                    |                     |                     |                     |                    |                    |                     |                    |                    |                    |                    |  |
| 4   |  | 5.7<br>30 |      |                                                       | 3.0                       | 22.5             | 180.00 | 182.00 | 183.8<br>2.4<br>33 | 183.7<br>2.5<br>26 | 182.7<br>3.2<br>25 | 180.4<br>5.8<br>18  | 181.2<br>5.9<br>17  | 181.9<br>6.3<br>13  | 180.4<br>4.9<br>38 | 181.4<br>5.2<br>16 | 181.0<br>5.1<br>17  | 181.6<br>4.6<br>21 | 181.7<br>2.9<br>25 | 183.3<br>2.3<br>27 | 183.9<br>2.3<br>29 |  |
| 3   |  | 3.7<br>30 |      |                                                       | 3.1<br>30                 | 22.5             | 176.25 | 178.25 | 179<br>3.3<br>33   | 179.9<br>3.3<br>29 | 179.7<br>1.5<br>25 | 178.7<br>7.5<br>20  | 176.4<br>9.8<br>18  | 176.3<br>9.9<br>13  | 177.8<br>8.4<br>81 | 178.1<br>9.0<br>16 | 177.2<br>9.3<br>21  | 176.9<br>8.3<br>25 | 178.0<br>6.9<br>27 | 179.4<br>6.2<br>30 | 180.0<br>6.0<br>33 |  |
| T.P |  |           |      |                                                       | 186.23                    | 1.75             | 173.98 |        |                    |                    |                    |                     |                     |                     |                    |                    |                     |                    |                    |                    |                    |  |
| 2   |  | 3.0<br>30 |      |                                                       | 3.0<br>30                 | 22.5             | 172.84 | 174.50 | 175.5<br>0.2<br>33 | 175.2<br>0.5<br>29 | 172.8<br>2.9<br>25 | 172.7<br>3.0<br>19  | 173.7<br>3.0<br>17  | 173.7<br>2.9<br>14  | 172.8<br>2.9<br>16 | 172.2<br>3.5<br>15 | 174.9<br>0.9<br>27  | 175.4<br>0.9<br>30 | 175.6<br>0.1<br>33 |                    |                    |  |
| 1   |  | 2.3<br>30 |      |                                                       | 2.3<br>30                 | 22.5             | 168.92 | 170.75 | 170.7<br>5.0<br>33 | 171.2<br>4.5<br>29 | 171.0<br>4.7<br>26 | 168.7<br>7.2<br>18  | 169.0<br>5.2<br>14  | 170.5<br>5.2<br>13  | 169.7<br>6.0<br>59 | 168.9<br>6.0<br>17 | 168.9<br>6.7<br>18  | 170.1<br>6.6<br>22 | 170.0<br>4.9<br>25 | 170.0<br>4.3<br>28 | 170.0<br>4.3<br>33 |  |
| 0   |  | 2.1<br>30 |      |                                                       | 1.1<br>29                 | 22.5             | 165.00 | 167.00 | 167.9<br>5.0<br>33 | 167.9<br>5.0<br>28 | 167.1<br>8.6<br>14 | 165.9<br>9.5<br>10  | 166.1<br>10.6<br>9  | 166.2<br>9.5<br>6.5 | 166.5<br>8.7<br>92 | 167.0<br>9.4<br>10 | 166.3<br>9.9<br>23  | 166.5<br>9.6<br>27 | 167.1<br>8.2<br>29 | 167.5<br>8.2<br>32 | 167.1<br>7.9<br>33 |  |

BM #1 3.59 178.113 172.14

Top of Cone Cor Post 60' Rt Sta 0+00

Lt = E      &      Rt = W.



B.M. 301/19 Trans Poles (Transformer) Sta 14+10  $E/I = 190.54$

| 17   | $\frac{1.8}{30}$  | 24 22.5    | 177.63 | 179.23 | 179.0 | 177.5 | 177.7 | 178.5 | 178.9 | 178.9 | 178.0 | 178.3 | 179.3 | 179.6 | 179.6 |
|------|-------------------|------------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| T.P. |                   | 182.39     | 11.07  | 179.73 | 34    | 34    | 49    | 47    | 39    | 35    | 35    | 44    | 41    | 31    | 2.8   |
| 16   | $\frac{2.0}{30}$  | 29 30 22.5 | 180.36 | 182.13 | 33    | 25    | 20    | 17    | 15    | 11    | 15    | 24    | 26    | 31    | 2.8   |
| 15   | $\frac{1.0}{30}$  | 29 30 22.5 | 183.27 | 185.23 | 184.2 | 184.2 | 183.7 | 183.7 | 184.9 | 185.2 | 184.9 | 183.9 | 186.1 |       |       |
| 14   | $\frac{0.49}{30}$ | 190.80     | 7.81   | 190.35 | 66    | 6.6   | 7.1   | 7.1   | 39    | 56    | 59    | 69    | 4.7   |       |       |
| 13   | $\frac{3.2}{30}$  | 36 30 22.5 | 186.18 | 188.32 | 184.2 | 184.2 | 183.7 | 183.7 | 184.9 | 185.2 | 184.9 | 183.9 | 186.1 |       |       |
| 12   | $\frac{2.9}{30}$  | 29 30 19   | 191.59 | 193.52 | 188.4 | 188.4 | 187.0 | 187.3 | 187.4 | 188.2 | 187.8 | 187.3 | 189.4 | 189.9 |       |
| 11   | $\frac{1.7}{30}$  | 36 30 19   | 191.75 | 193.66 | 192.6 | 192.6 | 191.1 | 191.7 | 191.4 | 191.0 | 192.8 | 193.0 |       |       |       |
| 10   | $\frac{1.6}{30}$  | 36 30 22.5 | 190.50 | 192.83 | 193.7 | 193.7 | 192.5 | 192.4 | 193.1 | 193.3 | 193.0 | 192.4 | 193.7 | 193.8 |       |
| 9    | $\frac{1.4}{30}$  | 36 30 22.5 | 189.75 | 192.00 | 194.5 | 194.2 | 193.2 | 194.2 | 194.3 | 194.0 | 193.7 | 194.2 | 194.4 |       |       |
| 8    | $\frac{1.6}{30}$  | 36 30 22.5 | 189.00 | 191.16 | 194.3 | 194.1 | 193.5 | 192.9 | 193.4 | 194.2 | 193.9 | 192.4 | 194.1 |       |       |
|      |                   | 194.64     |        |        | 193.4 | 193.4 | 193.4 | 191.9 | 192.6 | 193.3 | 193.1 | 191.6 | 191.6 | 193.2 | 193.4 |



|       |          |           |           |        |        |                     |                     |                    |                    |                    |                    |                     |                     |                    |                      |
|-------|----------|-----------|-----------|--------|--------|---------------------|---------------------|--------------------|--------------------|--------------------|--------------------|---------------------|---------------------|--------------------|----------------------|
| B.M   | 10.53    | (202.22)  | 2.22      | 191.78 | 191.69 | 188.7               | 188.1               | 187.8              | 187.7              | 188.8              | 188.9              | 188.8               | 190.6               | 191.1              | 191.15               |
| 25    | 04<br>30 | 27<br>30  | 22.5      | 188.50 | 190.50 | 3 53<br>29          | 59 6 2<br>23 18     | 43 1901<br>12 39   | 42 51<br>14 21     | 52 30<br>27        | 52 30<br>27        | 30 29<br>30         | 2.9 2.86<br>30 33   |                    |                      |
| 24    |          |           | 19        | 187.60 | 187.25 | 87.5<br>6.5<br>33   | 182.0<br>6.4<br>27  | 187.6<br>6.4<br>20 | 188.4<br>8.6<br>18 | 189.5<br>4.5<br>12 | 189.6<br>4.1<br>12 | 188.8<br>5.2<br>15  | 188.8<br>6.2<br>22  | 189.5<br>4.5<br>24 | 191.83<br>2.17<br>33 |
| 23    | 26<br>30 | 56<br>30  | 19.0      | 185.38 | 187.44 | 187.6<br>6.4<br>32  | 188.5<br>5.3<br>27  | 186.6<br>7.4<br>19 | 187.5<br>6.5<br>17 | 188.2<br>5.8<br>11 | 188.4<br>5.7<br>12 | 187.2<br>6.8<br>18  | 187.2<br>6.8<br>20  | 190.9<br>3.1<br>28 | 191.57<br>2.43<br>33 |
| 22    | 20<br>30 | 52<br>30  | 19.0      | 182.55 | 184.50 | 186.4<br>7.6<br>33  | 186.4<br>7.6<br>25  | 1830<br>11.0<br>19 | 1839<br>10.1<br>17 | 189.3<br>9.7<br>12 | 1845<br>9.5<br>13  | 184.2<br>9.8<br>17  | 183.4<br>10.6<br>24 | 187.8<br>6.2<br>24 | 188.25<br>2.75<br>33 |
| T.P   | 8.75     | (194.00)  | 0.65      | 185.25 |        | 181.9<br>4.0<br>33  | 181.9<br>4.0<br>24  | 197.6<br>6.3<br>21 | 189.6<br>6.3<br>18 | 180.2<br>5.7<br>16 | 180.6<br>5.3<br>11 | 180.1<br>5.8<br>17  | 179.6<br>6.3<br>17  | 182.6<br>3.3<br>23 | 183.05<br>2.55<br>33 |
| 21    | 29<br>30 | 38<br>30  | 22.5      | 178.65 | 181.00 | 181.9<br>4.0<br>33  | 181.9<br>4.0<br>24  | 197.6<br>6.3<br>21 | 189.6<br>6.3<br>18 | 180.2<br>5.7<br>16 | 180.6<br>5.3<br>11 | 180.1<br>5.8<br>17  | 179.6<br>6.3<br>17  | 182.6<br>3.3<br>23 | 183.05<br>2.55<br>33 |
| +50   |          |           |           |        |        | 179.6<br>6.3<br>33  | 179.6<br>6.3<br>31  | 178.0<br>7.9<br>22 | 178.0<br>7.9<br>18 | 178.7<br>7.2<br>16 | 178.7<br>7.2<br>11 | 177.7<br>8.2<br>17  | 179.8<br>6.1<br>22  | 179.8<br>6.1<br>33 |                      |
| 20    | 07<br>30 | 12<br>20  | Fall only |        | 178.38 | 171.1<br>8.8<br>33  | 177.1<br>8.8<br>30  | 176.8<br>9.1<br>23 | 176.1<br>9.8<br>21 | 177.7<br>5.2<br>15 | 177.9<br>8.0<br>12 | 176.6<br>9.3<br>14  | 176.9<br>9.0<br>18  | 178.0<br>8.3<br>23 | 177.66<br>8.26<br>33 |
| +50   |          |           |           |        |        | 175.0<br>10.9<br>33 | 175.9<br>10.0<br>25 | 176.2<br>9.7<br>17 | 177.6<br>8.3<br>11 | 177.3<br>8.4<br>11 | 177.0<br>8.9<br>11 | 175.5<br>10.4<br>13 | 175.7<br>10.2<br>22 | 176.3<br>9.6<br>31 | 176.8<br>9.1<br>33   |
| 19    |          | 1.0       | Fall only |        | 177.50 | 173.1<br>9.3<br>33  | 174.1<br>9.3<br>25  | 176.4<br>6.0<br>14 | 177.0<br>6.0<br>14 | 176.6<br>5.8<br>9  | 173.7<br>8.7<br>14 | 173.9<br>8.5<br>17  | 175.3<br>7.1<br>19  | 176.2<br>5.9<br>25 | 176.5<br>5.9<br>31   |
| B.M   | 8.80     | (186.90)  | 5.29      | 177.10 |        | 174.1<br>8.3<br>33  | 174.1<br>8.3<br>33  | 172.0<br>5.4<br>11 | 176.8<br>5.7<br>13 | 176.7<br>5.7<br>13 | 174.9<br>7.5<br>17 | 175.0<br>7.4<br>25  | 177.0<br>6.26<br>33 |                    |                      |
| +50   |          |           |           |        |        | 175.4<br>7.0<br>33  | 175.4<br>7.0<br>30  | 176.0<br>6.4<br>24 | 176.8<br>6.6<br>18 | 177.0<br>5.4<br>13 | 177.1<br>5.3<br>11 | 176.5<br>5.9<br>12  | 176.0<br>6.4<br>19  | 176.3<br>6.1<br>24 | 177.4<br>5.0<br>27   |
| 18    | 03<br>30 | 1.7<br>30 | Fall only |        | 177.69 | 177.3<br>5.1<br>33  | 179.3<br>5.7<br>25  | 176.7<br>5.7<br>22 | 176.5<br>5.9<br>18 | 177.6<br>4.8<br>13 | 177.9<br>4.8<br>15 | 177.1<br>4.6<br>11  | 177.3<br>5.1<br>14  | 178.0<br>4.4<br>23 | 178.4<br>4.0<br>30   |
| 17+50 |          |           |           |        |        | 177.3<br>5.1<br>33  | 179.3<br>5.7<br>25  | 176.7<br>5.7<br>22 | 176.5<br>5.9<br>18 | 177.6<br>4.8<br>13 | 177.9<br>4.8<br>15 | 177.1<br>4.6<br>11  | 177.3<br>5.1<br>14  | 178.0<br>4.4<br>23 | 178.4<br>4.0<br>30   |
|       |          | (182.39)  |           |        |        |                     |                     |                    |                    |                    |                    |                     |                     |                    |                      |



|     |                  |                  |           |        |        |                           |                           |                           |                           |                           |                           |                           |                             |                             |                           |                             |  |
|-----|------------------|------------------|-----------|--------|--------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|-----------------------------|-----------------------------|---------------------------|-----------------------------|--|
| 34  | $\frac{26}{30}$  | $\frac{20}{30}$  | 22.5      | 192.00 | 194.00 | 194.6<br>$\frac{1.7}{33}$ | 194.6<br>$\frac{1.7}{30}$ | 192.3<br>$\frac{4.0}{18}$ | 193.4<br>$\frac{2.9}{13}$ | 1938<br>$\frac{2.5}{25}$  | 192.2<br>$\frac{4.1}{17}$ | 193.9<br>$\frac{2.1}{25}$ | 194.20<br>$\frac{2.09}{33}$ |                             |                           |                             |  |
| T.P | 0.80             | 196.29           | 12.02     | 195.49 | 98.7   | 156.6                     | 196.0                     | 195.9                     | 196.9                     | 197.4                     | 196.6                     | 196.2                     | 197.3                       | 197.3                       |                           |                             |  |
| 33  | $\frac{30}{30}$  | $\frac{2}{30}$   | 22.5      | 195.00 | 197.45 | $\frac{8.8}{33}$          | $\frac{5.9}{27}$          | $\frac{1.5}{19}$          | $\frac{1.6}{18}$          | $\frac{10.6}{15}$         | $\frac{10.9}{12}$         | $\frac{1.3}{20}$          | $\frac{10.2}{24}$           | $\frac{10.2}{30}$           |                           |                             |  |
| 32  | $\frac{38}{30}$  | $\frac{39}{30}$  | 22.5      | 198.00 | 200.29 | 202.1<br>$\frac{5.4}{33}$ | 202.1<br>$\frac{5.4}{28}$ | 199.9<br>$\frac{7.6}{18}$ | 200.4<br>$\frac{7.1}{15}$ | 200.6<br>$\frac{6.9}{13}$ | 200.4<br>$\frac{7.1}{13}$ | 199.6<br>$\frac{2.9}{17}$ | 201.2<br>$\frac{6.3}{23}$   | 201.08<br>$\frac{6.43}{33}$ |                           |                             |  |
| +50 |                  |                  |           |        |        | 203.4<br>$\frac{4.1}{33}$ | 203.2<br>$\frac{4.3}{26}$ | 201.3<br>$\frac{6.2}{20}$ | 201.2<br>$\frac{6.3}{18}$ | 202.2<br>$\frac{6.3}{15}$ | 202.2<br>$\frac{5.3}{5}$  | 201.9<br>$\frac{5.9}{16}$ | 201.4<br>$\frac{6.1}{16}$   | 201.3<br>$\frac{6.2}{18}$   | 202.8<br>$\frac{4.7}{23}$ | 202.9<br>$\frac{4.7}{33}$   |  |
| 31  | $\frac{84}{30}$  | $\frac{33}{30}$  | 22.5      | 200.62 | 203.01 | 204.4<br>$\frac{3.1}{23}$ | 204.4<br>$\frac{3.1}{27}$ | 202.6<br>$\frac{4.9}{21}$ | 202.4<br>$\frac{5.1}{19}$ | 203.5<br>$\frac{4.0}{15}$ | 203.9<br>$\frac{3.6}{13}$ | 203.6<br>$\frac{3.9}{16}$ | 202.7<br>$\frac{4.5}{18}$   | 202.9<br>$\frac{6.6}{18}$   | 204.3<br>$\frac{3.2}{24}$ | 204.84<br>$\frac{3.17}{33}$ |  |
| +50 |                  |                  |           |        |        | 204.5<br>$\frac{3.0}{33}$ | 204.5<br>$\frac{3.0}{26}$ | 203.1<br>$\frac{4.4}{21}$ | 203.1<br>$\frac{4.4}{17}$ | 204.0<br>$\frac{3.5}{15}$ | 204.7<br>$\frac{3.1}{28}$ | 204.4<br>$\frac{3.1}{13}$ | 203.7<br>$\frac{3.8}{16}$   | 205.2<br>$\frac{2.3}{25}$   | 205.2<br>$\frac{2.3}{33}$ |                             |  |
| 30  | $\frac{27}{30}$  | $\frac{37}{30}$  | 22.5      | 201.57 | 202.88 | 203.7<br>$\frac{3.8}{33}$ | 203.6<br>$\frac{3.9}{26}$ | 202.2<br>$\frac{5.3}{20}$ | 203.4<br>$\frac{4.1}{12}$ | 203.4<br>$\frac{4.1}{37}$ | 203.4<br>$\frac{4.1}{11}$ | 202.7<br>$\frac{4.8}{19}$ | 204.7<br>$\frac{2.8}{25}$   | 205.03<br>$\frac{2.48}{33}$ |                           |                             |  |
| +50 |                  |                  |           |        |        | 204.3<br>$\frac{3.2}{33}$ | 202.2<br>$\frac{5.3}{25}$ | 200.5<br>$\frac{7.0}{18}$ | 201.3<br>$\frac{6.2}{16}$ | 202.0<br>$\frac{5.5}{15}$ | 201.8<br>$\frac{5.7}{13}$ | 200.8<br>$\frac{6.7}{18}$ | 203.3<br>$\frac{1.2}{26}$   | 203.2<br>$\frac{4.3}{33}$   |                           |                             |  |
| T.P | 5.45             | 207.51           | 0.16      | 202.06 | 200.6  | 200.4                     | 195.0                     | 199.4                     | 199.6                     | 198.9                     | 198.9                     | 200.2                     | 200.8                       | 200.87                      |                           |                             |  |
| 29  | $\frac{26}{30}$  | $\frac{29}{30}$  | 22.5      | 197.96 | 199.86 | $\frac{1.6}{33}$          | $\frac{1.8}{26}$          | $\frac{4.2}{18}$          | $\frac{2.5}{12}$          | $\frac{19.8}{24}$         | $\frac{2.6}{12}$          | $\frac{3.3}{14}$          | $\frac{3.3}{17}$            | $\frac{1.6}{21}$            | $\frac{1.33}{33}$         |                             |  |
| 28  | $\frac{26}{30}$  | $\frac{24}{30}$  | 22.5      | 196.64 | 196.43 | $\frac{1.70}{28}$         | $\frac{1.67}{25}$         | $\frac{1.95.9}{26}$       | $\frac{1.94.1}{17}$       | $\frac{1.94.8}{16}$       | $\frac{1.95.5}{11}$       | $\frac{1.95.7}{65}$       | $\frac{1.94.8}{19}$         | $\frac{1.97.0}{24}$         | $\frac{1.97.39}{4.83}$    |                             |  |
| 27  | $\frac{19}{30}$  | $\frac{23}{30}$  | 22.5      | 191.50 | 193.27 | $\frac{92.7}{33}$         | $\frac{93.0}{30}$         | $\frac{92.9}{23}$         | $\frac{91.0}{17}$         | $\frac{91.9}{15}$         | $\frac{92.6}{11}$         | $\frac{92.8}{94}$         | $\frac{92.4}{13}$           | $\frac{91.6}{20}$           | $\frac{93.6}{24}$         | $\frac{1.93.67}{8.52}$      |  |
| 26  | $\frac{0.2}{30}$ | $\frac{1.5}{30}$ | Full only | 191.45 | 188.9  | $\frac{13.3}{33}$         | $\frac{13.0}{30}$         | $\frac{188.9}{19}$        | $\frac{188.9}{16}$        | $\frac{188.9}{13}$        | $\frac{188.9}{11.2}$      | $\frac{188.9}{14}$        | $\frac{188.9}{19}$          | $\frac{188.9}{14}$          | $\frac{188.9}{30}$        | $\frac{1.91.11}{33}$        |  |
|     |                  | 202.22           |           |        |        |                           |                           |                           |                           |                           |                           |                           |                             |                             |                           |                             |  |



T.P. 5.93 (189.22) 0.96 183.29  
+2 Fall only 179.92

+50

179.19

41

0.9  
22.5

7

22.5

176.25

178.71

+

+50

178.60

178.7 178.7 178.1 177.4 177.1 178.4 179.0 178.8 177.5 178.4 179.8 180.13  
58 58 61 68 71 58 52 54 69 68 64 412  
33 30 26 25 18 15 52 13 18 27 28 33

176.7 176.3 176.2 176.3 177.7 178.1 178.0 177.2 177.1 178.5 178.5  
75 79 80 79 65 61 62 70 71 67 67  
33 27 22 17 15 61 13 17 24 28 23

+

B.M.

5.16

(184.25)

6.61

179.09

Center E.H.W.  
4% 24x26R  
178.54

40

Fall only

179.69 175.5 175.3 176.1 176.2 176.3 175.6 177.1 175.1  
11.01 10.2 10.4 7.6 7.4 10.1 8.2 10.6  
33 31 16 9 75 15 27 33

39

Fall only

179.34

178.0 177.7 177.0 176.8 176.6 179.0 179.1 177.3 177.5 176.2 178.15  
77 80 87 89 71 67 66 82 8.2 7.5 7.3  
32 27 23 18 14 67 11 17 21 27 33

179.4 179.1 177.7 177.5 179.6 179.8 179.9 177.9 178.1 179.8 179.4  
63 66 80 82 61 69 58 28 7.6 59 6.3  
32 26 23 19 14 59 12 17 20 27 33

38

17  
3020  
30

22.5

179.12

181.12

181.1 180.7 179.4 179.0 180.5 180.7 180.8 178.7 180.8 181.3 181.12  
46 50 63 64 52 69 70 49 44 4.58  
32 26 22 18 14 50 12 17 26 28 33

37

21  
3021  
30

22.5

182.34

184.00

183.9 184.3 182.1 183.2 183.6 183.0 181.7 184.1 184.25  
1.8 1.4 2.6 2.5 2.9 2.7 4.0 1.6 1.45  
33 25 18 14 21 13 18 26 33

T.P.

0.90

(185.70)

11.49

184.80

187.34

187.1 185.4 185.2 186.3 186.7 186.3 184.9 187.4 186.6 186.96  
9.2 10.9 11.1 10.0 10.0 11.4 8.9 8.9 9.7 9.33  
33 27 19 17 15 96 15 19 27 29

36

13  
3013  
30

22.5

185.56

187.34

186.1 180.6 189.9 188.5 188.3 189.5 189.9 189.5 188.6 180.8 189.3 189.73  
26 21 64 78 80 68 64 68 77 55 7.0 6.56  
33 24 24 19 17 14 64 13 19 27 29 33

35

1.9  
300.6  
30

22.5

188.78

190.67

(196.29)



BM - Center E. Wall Cmc Coll Sta #6113 - E1 = 185.11

|     |           |          |           |        |        |                    |                    |                     |                     |                     |                    |                     |                     |                    |                      |                      |                      |                      |
|-----|-----------|----------|-----------|--------|--------|--------------------|--------------------|---------------------|---------------------|---------------------|--------------------|---------------------|---------------------|--------------------|----------------------|----------------------|----------------------|----------------------|
| 51  | 2.5<br>30 | 34<br>30 | 22.5      | 193.50 | 195.00 | 195.5<br>7.0<br>33 | 195.5<br>7.0<br>30 | 195.3<br>7.2<br>25  | 193.8<br>8.7<br>20  | 193.6<br>8.9<br>18  | 195.1<br>7.4<br>12 | 195.4<br>7.1<br>7   | 195.2<br>7.3<br>13  | 193.6<br>8.9<br>18 | 196.0<br>6.5<br>26   | 196.4<br>6.1<br>31   | 196.59<br>6.94<br>33 |                      |
| 50  |           |          | 22.5      | 190.63 | 192.50 | 193.5<br>9.0<br>32 | 193.5<br>9.0<br>28 | 191.3<br>11.2<br>20 | 190.8<br>11.7<br>17 | 192.1<br>10.4<br>13 | 192.7<br>9.8<br>9  | 192.2<br>10.3<br>13 | 190.9<br>11.6<br>19 | 193.9<br>9.6<br>25 |                      | 194.70<br>7.83<br>33 |                      |                      |
| T.P | 10.94     | (902.53) | 1.74      | 191.59 |        | 190.0<br>33        | 189.8<br>35        | 188.5<br>49         | 187.3<br>60         | 188.4<br>49         | 188.9<br>44        | 189.3<br>46         | 189.2<br>41         | 188.0<br>53        | 188.1<br>52          | 190.8<br>25          | 191.6<br>1.7<br>30   | 191.79<br>1.50<br>33 |
| 49  |           |          | 22.5      | 187.76 | 190.00 | 190.0<br>33        | 189.8<br>36        | 188.5<br>25         | 187.3<br>19         | 188.4<br>17         | 188.9<br>13        | 189.3<br>16         | 189.2<br>11         | 188.0<br>16        | 188.1<br>19          | 190.8<br>24          | 191.6<br>30          | 191.79<br>2.3        |
| 18  |           |          | Full only |        | 187.50 | 186.0<br>7         | 186.0<br>73        | 185.9<br>74         | 185.1<br>82         | 185.1<br>82         | 186.3<br>70        | 186.9<br>64         | 186.5<br>68         | 185.0<br>83        | 185.1<br>82          | 187.5<br>68          | 187.72<br>5.61<br>33 |                      |
| 450 |           |          |           |        |        | 184.3<br>70        | 184.4<br>69        | 184.1<br>72         | 183.3<br>70         | 185.2<br>81         | 185.9<br>74        | 185.8<br>75         | 184.5<br>88         | 184.6<br>87        | 185.4<br>79          | 185.8<br>75          | 185.5<br>78          |                      |
| 47  |           |          | 22.5      | 182.65 | 185.26 | 182.8<br>70        | 183.3<br>74        | 183.1<br>70         | 183.4<br>102        | 184.9<br>99         | 185.1<br>84        | 185.1<br>82         | 183.7<br>96         | 184.1<br>92        | 184.7<br>87          | 184.76<br>85.7<br>33 |                      |                      |
| 450 |           |          |           |        |        | 181.9<br>74        | 182.2<br>71        | 183.0<br>70         | 184.5<br>88         | 184.7<br>86         | 184.7<br>86        | 182.9<br>86         | 184.4<br>89         | 184.4<br>89        | 184.4<br>89          | 184.4<br>89          | 184.4<br>89          |                      |
| BM  | 8.13      | (193.33) | 4.02      | 185.20 | 185.11 | 182.0<br>72        | 182.7<br>65        | 182.3<br>69         | 184.0<br>52         | 184.1<br>51         | 184.2<br>50        | 182.5<br>67         | 183.0<br>62         | 184.1<br>51        | 184.58<br>46.4<br>33 |                      |                      |                      |
| 46  |           |          | 22.5      | 181.71 | 184.57 | 182.0<br>72        | 182.7<br>65        | 182.3<br>69         | 184.0<br>52         | 184.1<br>51         | 184.2<br>50        | 182.5<br>67         | 183.0<br>62         | 184.1<br>51        | 184.58<br>46.4<br>33 |                      |                      |                      |
| 45  |           |          | 22.5      | 181.43 | 184.14 | 182.0<br>72        | 182.6<br>66        | 182.3<br>69         | 183.9<br>63         | 183.9<br>63         | 183.8<br>54        | 182.7<br>62         | 184.2<br>50         | 184.2<br>50        | 184.2<br>50          | 184.2<br>50          | 184.2<br>50          |                      |
| 44  |           |          | 22.5      | 181.14 | 183.71 | 181.9<br>74        | 182.2<br>71        | 183.0<br>70         | 184.5<br>88         | 184.7<br>86         | 184.7<br>86        | 182.9<br>86         | 184.4<br>89         | 184.4<br>89        | 184.4<br>89          | 184.4<br>89          | 184.4<br>89          |                      |
| 450 |           |          |           |        | 183.21 | 184.7<br>44        | 184.7<br>45        | 184.3<br>49         | 182.4<br>68         | 184.2<br>50         | 184.9<br>43        | 184.5<br>47         | 182.9<br>63         | 186.2<br>30        | 186.8<br>2.4         | 186.96<br>2.26<br>33 |                      |                      |
| 43  |           |          | 22.5      | 179.90 | 182.14 | 184.8<br>44        | 184.8<br>46        | 183.2<br>60         | 182.0<br>72         | 184.2<br>50         | 184.9<br>43        | 184.2<br>47         | 182.7<br>63         | 182.7<br>63        | 185.1<br>41          | 186.6<br>2.6         | 186.6<br>2.6         |                      |
|     |           | (189.22) |           |        |        | 183.7<br>55        | 183.7<br>55        | 181.9<br>73         | 180.9<br>83         | 182.6<br>65         | 183.2<br>60        | 182.7<br>65         | 182.0<br>72         | 183.4<br>58        | 184.8<br>44          | 185.42<br>3.80<br>33 |                      |                      |



52

16  
308

19  
308

22.5

1954

197.28

|       |       |       |       |       |       |       |       |       |       |       |        |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 177.0 | 196.8 | 195.4 | 195.3 | 196.8 | 197.1 | 197.0 | 195.5 | 195.5 | 197.1 | 197.4 | 197.58 |
| 55    | 57    | 71    | 22    | 57    | 55    | 55    | 7.0   | 7.0   | 52    | 5.1   | 49.5   |
| 32    | 26    | 22    | 19    | 14    | 52    | 12    | 19    | 19    | 25    | 32    | 33     |



| BM   | 2.33 | 192.57 | 4.96      | 190.26 | 190.24 | 197.1    | 186.9 | 186.4 | 188.1 | 188.4 | 188.8 | 188.6 | 189.6 | 186.3 | 186.5 | 186.3 | 186.0 |
|------|------|--------|-----------|--------|--------|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| +50  |      |        |           |        |        | 6 8.1    | 29    | 27    | 20    | 21    | 65    | 12    | 64    | 66    | 76    | 89    | 87    |
| 66   | 0.7  | 00     | full only |        | 189.30 | 11 189.5 | 187.1 | 186.9 | 188.4 | 188.8 | 189.1 | 188.9 | 189.0 | 187.0 | 186.8 | 186.8 | 186.8 |
| +50  |      |        |           |        |        | 27 51    | 22    | 19    | 68    | 64    | 61    | 63    | 82    | 82    | 82    | 82    | 82    |
| 65   | 20   | 11     | full only |        | 191.29 | 30       | 22    | 19    | 16    | 12    | 61    | 63    | 82    | 82    | 82    | 82    | 82    |
| 64   | 20   | 67     | full only |        | 193.57 | 30       | 22    | 19    | 16    | 12    | 61    | 63    | 82    | 82    | 82    | 82    | 82    |
| T.P. | 255  | 195.22 | 12.25     | 192.67 |        | 30       | 22    | 19    | 16    | 12    | 61    | 63    | 82    | 82    | 82    | 82    | 82    |
| 63   | 3.1  | 28     | 22.5      | 193.   | 195.86 | 30       | 22    | 19    | 16    | 12    | 61    | 63    | 82    | 82    | 82    | 82    | 82    |
| 62   | 32   | 30     | 22.5      | 187.50 | 198.56 | 30       | 22    | 19    | 16    | 12    | 61    | 63    | 82    | 82    | 82    | 82    | 82    |
| 61   | 25   | 30     | 22.5      | 199.50 | 201.67 | 30       | 22    | 19    | 16    | 12    | 61    | 63    | 82    | 82    | 82    | 82    | 82    |
| T.D. | 144  | 204.92 | 10.76     | 203.48 |        | 30       | 22    | 19    | 16    | 12    | 61    | 63    | 82    | 82    | 82    | 82    | 82    |
| 60   | 20   | 21     | 22.5      | 202.50 | 204.78 | 30       | 22    | 19    | 16    | 12    | 61    | 63    | 82    | 82    | 82    | 82    | 82    |
| 59   | 19   | 17     | 22.5      | 205.50 | 207.89 | 30       | 22    | 19    | 16    | 12    | 61    | 63    | 82    | 82    | 82    | 82    | 82    |
| +50  |      |        |           |        |        | 30       | 22    | 19    | 16    | 12    | 61    | 63    | 82    | 82    | 82    | 82    | 82    |
| 58   | 37   | 27     | 22.5      | 207.22 | 209.65 | 30       | 22    | 19    | 16    | 12    | 61    | 63    | 82    | 82    | 82    | 82    | 82    |



B.M. Station 73 - Center of wall corner of E. 190.24

|     |                 |           |       |        |                                             |             |             |             |             |             |             |             |             |             |             |             |             |             |
|-----|-----------------|-----------|-------|--------|---------------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 75  | $\frac{24}{30}$ | 27<br>30  | 22.5  | 189.76 | 192.86 <sup>2</sup><br><del>192.72</del> 33 | 183.3<br>30 | 193.5<br>27 | 191.8<br>22 | 191.6<br>18 | 193.1<br>12 | 193.2<br>26 | 192.8<br>12 | 191.4<br>18 | 190.8<br>20 | 191.1<br>26 | 193.0<br>28 | 193.6<br>30 | 194.1<br>33 |
| +50 |                 |           |       |        |                                             | 194.4<br>30 | 194.3<br>26 | 192.9<br>22 | 192.6<br>16 | 193.6<br>14 | 194.2<br>11 | 194.1<br>12 | 193.8<br>15 | 192.5<br>19 | 192.5<br>23 | 194.1<br>26 | 194.6<br>30 | 194.6<br>33 |
| 74  | $\frac{26}{30}$ | 30<br>30  | 22.5  | 190.76 | 193.28<br><del>193.69</del> 33              | 194.4<br>30 | 194.3<br>26 | 194.2<br>22 | 193.8<br>20 | 193.8<br>17 | 194.4<br>13 | 194.6<br>12 | 193.9<br>16 | 192.9<br>19 | 192.1<br>22 | 194.4<br>26 | 194.7<br>30 | 194.6<br>33 |
| +50 |                 |           |       |        |                                             | 194.4<br>30 | 194.3<br>26 | 194.2<br>22 | 193.8<br>20 | 193.8<br>17 | 194.4<br>13 | 194.6<br>12 | 193.9<br>16 | 192.9<br>19 | 192.1<br>22 | 194.4<br>26 | 194.7<br>30 | 194.6<br>33 |
| 73  | $\frac{34}{30}$ | 24<br>30  | 22.5  | 190.07 | 192.70<br><del>192.81</del> 33              | 194.4<br>30 | 194.3<br>26 | 194.2<br>22 | 193.8<br>20 | 193.8<br>17 | 194.4<br>13 | 194.6<br>12 | 193.9<br>16 | 192.9<br>19 | 192.1<br>22 | 194.4<br>26 | 194.7<br>30 | 194.6<br>33 |
| 72  | $\frac{32}{30}$ | 24<br>30  | 22.5  | 188.64 | 191.17                                      | 194.4<br>30 | 194.3<br>26 | 194.2<br>22 | 193.8<br>20 | 193.8<br>17 | 194.4<br>13 | 194.6<br>12 | 193.9<br>16 | 192.9<br>19 | 192.1<br>22 | 194.4<br>26 | 194.7<br>30 | 194.6<br>33 |
| T.P | 8.55            | 198.84    | 2.28  | 190.27 |                                             |             |             |             |             |             |             |             |             |             |             |             |             |             |
| 71  | $\frac{29}{30}$ | 18<br>30  | 22.5  | 187.21 | 189.69                                      | 190.6<br>30 | 190.6<br>25 | 189.4<br>19 | 186.5<br>20 | 186.2<br>15 | 187.7<br>11 | 189.8<br>22 | 187.0<br>15 | 187.3<br>19 | 188.3<br>27 | 189.5<br>30 | 189.9<br>33 | 189.9<br>33 |
| 70  | $\frac{14}{30}$ | 01<br>30  | 25.28 | 186.0  | 189.40                                      | 187.7<br>33 | 187.8<br>30 | 189.4<br>25 | 186.5<br>20 | 186.2<br>15 | 187.7<br>11 | 189.8<br>22 | 187.0<br>15 | 187.3<br>19 | 188.3<br>27 | 189.5<br>30 | 189.9<br>33 | 189.9<br>33 |
| 69  | $\frac{12}{30}$ | 0.4<br>30 | 29.29 | 185.6  | 189.30                                      | 187.5<br>33 | 187.6<br>30 | 189.4<br>25 | 186.5<br>20 | 186.2<br>15 | 187.7<br>11 | 189.8<br>22 | 187.0<br>15 | 187.3<br>19 | 188.3<br>27 | 189.5<br>30 | 189.9<br>33 | 189.9<br>33 |
| 68  | $\frac{01}{30}$ | 03<br>30  | 30.30 | 185.5  | 189.20                                      | 187.1<br>30 | 187.2<br>24 | 189.4<br>19 | 186.5<br>19 | 186.2<br>17 | 187.7<br>12 | 189.8<br>13 | 187.0<br>15 | 187.3<br>19 | 188.3<br>22 | 189.5<br>26 | 189.9<br>30 | 189.9<br>33 |
| 67  | $\frac{12}{30}$ | 02<br>30  | 30.70 | 185.4  | 189.10                                      | 187.1<br>30 | 187.2<br>26 | 189.4<br>21 | 186.5<br>19 | 186.2<br>15 | 187.7<br>12 | 189.8<br>14 | 187.0<br>15 | 187.3<br>19 | 188.3<br>25 | 189.5<br>30 | 189.9<br>33 | 189.9<br>33 |
| +   |                 |           |       |        |                                             |             |             |             |             |             |             |             |             |             |             |             |             |             |

(192.57)



B.M. 56 52108 SpK Trans Pole R4 (Dangle Sign) - L1 = 185.60

|      |           |          |      |        |        |             |             |             |             |             |             |             |             |             |             |             |             |             |             |
|------|-----------|----------|------|--------|--------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 750  |           |          |      |        |        | 188.6<br>33 | 188.7<br>26 | 186.9<br>22 | 186.8<br>19 | 188.1<br>16 | 188.4<br>49 | 188.3<br>13 | 186.6<br>19 | 187.2<br>22 | 187.5<br>24 | 189.1<br>27 | 187.9<br>30 | 187.8<br>33 |             |
| 82   | 21<br>30  | 29<br>30 | 22.5 | 184.67 | 187.25 | 187.5<br>30 | 187.4<br>25 | 185.4<br>21 | 185.4<br>19 | 186.3<br>17 | 187.0<br>12 | 187.3<br>59 | 187.4<br>58 | 186.2<br>20 | 187.1<br>25 | 188.1<br>27 | 188.3<br>30 | 188.8<br>33 |             |
| 83   | 09<br>30  | 12<br>30 | 22.5 | 183.35 | 186.80 | 184.3<br>33 | 189.2<br>29 | 183.3<br>30 | 183.2<br>23 | 184.8<br>17 | 185.3<br>11 | 185.2<br>79 | 184.2<br>83 | 184.2<br>90 | 183.2<br>18 | 185.1<br>20 | 186.6<br>30 | 186.6<br>33 |             |
| 82   | 0.4<br>30 | 18<br>30 | 22.5 | 182.02 | 184.87 | 182.1<br>33 | 182.4<br>10 | 182.6<br>10 | 182.2<br>11 | 183.8<br>17 | 184.2<br>90 | 184.2<br>12 | 183.3<br>16 | 182.3<br>19 | 182.3<br>10 | 182.6<br>23 | 184.3<br>30 | 185.4<br>33 |             |
| B.M. | 7.60      | (193.20) | 6.21 | 185.68 | 185.60 | 182.0<br>33 | 182.5<br>29 | 182.6<br>23 | 181.9<br>21 | 182.2<br>15 | 183.8<br>11 | 184.4<br>76 | 184.2<br>11 | 183.6<br>16 | 182.3<br>20 | 183.4<br>25 | 183.8<br>30 | 184.9<br>33 |             |
| +50  |           |          |      |        |        | 182.2<br>33 | 182.2<br>30 | 182.7<br>26 | 181.9<br>21 | 182.3<br>17 | 183.9<br>11 | 184.2<br>74 | 183.2<br>10 | 182.7<br>14 | 182.5<br>19 | 182.6<br>21 | 183.5<br>24 | 183.9<br>30 | 184.3<br>33 |
| 81   | 0.9<br>30 | 18<br>30 | 22.5 | 181.45 | 184.55 | 182.1<br>33 | 182.9<br>29 | 182.9<br>23 | 182.3<br>21 | 183.9<br>17 | 184.5<br>12 | 184.7<br>74 | 183.1<br>11 | 182.7<br>18 | 182.5<br>24 | 183.4<br>26 | 183.9<br>30 | 184.5<br>33 |             |
| +50  |           |          |      |        |        | 182.1<br>33 | 182.9<br>29 | 182.9<br>23 | 182.3<br>21 | 183.9<br>17 | 184.5<br>12 | 184.7<br>74 | 183.1<br>11 | 182.7<br>18 | 182.5<br>24 | 183.4<br>26 | 183.9<br>30 | 184.5<br>33 |             |
| 80   | 0.6<br>30 | 17<br>30 | 22.5 | 182.26 | 185.20 | 182.1<br>33 | 182.9<br>29 | 182.9<br>23 | 182.3<br>21 | 183.9<br>17 | 184.5<br>12 | 184.7<br>74 | 183.1<br>11 | 182.7<br>18 | 182.5<br>24 | 183.4<br>26 | 183.9<br>30 | 184.5<br>33 |             |
| 79   | 1.1<br>30 | 22<br>30 | 22.5 | 183.80 | 186.65 | 182.1<br>33 | 182.9<br>29 | 182.9<br>23 | 182.3<br>21 | 183.9<br>17 | 184.5<br>12 | 184.7<br>74 | 183.1<br>11 | 182.7<br>18 | 182.5<br>24 | 183.4<br>26 | 183.9<br>30 | 184.5<br>33 |             |
| 78   | 1.1<br>30 | 29<br>30 | 22.5 | 185.34 | 188.22 | 182.1<br>33 | 182.9<br>29 | 182.9<br>23 | 182.3<br>21 | 183.9<br>17 | 184.5<br>12 | 184.7<br>74 | 183.1<br>11 | 182.7<br>18 | 182.5<br>24 | 183.4<br>26 | 183.9<br>30 | 184.5<br>33 |             |
| 77   | 10<br>30  | 23<br>30 | 22.5 | 186.88 | 189.79 | 182.1<br>33 | 182.9<br>29 | 182.9<br>23 | 182.3<br>21 | 183.9<br>17 | 184.5<br>12 | 184.7<br>74 | 183.1<br>11 | 182.7<br>18 | 182.5<br>24 | 183.4<br>26 | 183.9<br>30 | 184.5<br>33 |             |
| T.P. | 13        | (191.89) | 9.38 | 189.46 |        | 182.1<br>33 | 182.9<br>29 | 182.9<br>23 | 182.3<br>21 | 183.9<br>17 | 184.5<br>12 | 184.7<br>74 | 183.1<br>11 | 182.7<br>18 | 182.5<br>24 | 183.4<br>26 | 183.9<br>30 | 184.5<br>33 |             |
| 76   | 2.1<br>30 | 23<br>30 | 22.5 | 188.42 | 191.36 | 182.1<br>33 | 182.9<br>29 | 182.9<br>23 | 182.3<br>21 | 183.9<br>17 | 184.5<br>12 | 184.7<br>74 | 183.1<br>11 | 182.7<br>18 | 182.5<br>24 | 183.4<br>26 | 183.9<br>30 | 184.5<br>33 |             |
|      |           | (198.84) |      |        |        | 182.1<br>33 | 182.9<br>29 | 182.9<br>23 | 182.3<br>21 | 183.9<br>17 | 184.5<br>12 | 184.7<br>74 | 183.1<br>11 | 182.7<br>18 | 182.5<br>24 | 183.4<br>26 | 183.9<br>30 | 184.5<br>33 |             |



BM 3.51 176.11 3.51 172.60

94 ✓  $\frac{29}{30}$   $\frac{11}{30}$  22.5 172.66 175.17

T.P 0.80 176.07 11.75 175.27

93 ✓  $\frac{34}{30}$   $\frac{28}{30}$  22.5 176.00 178.50

92  $\frac{34}{30}$   $\frac{28}{30}$  19.0 179.57 181.67

+50

91  $\frac{33}{30}$   $\frac{36}{30}$  19.0 181.71 183.72

T.P 1.67 187.02 4.04 185.35

90  $\frac{33}{30}$   $\frac{36}{30}$  19.0 182.65 184.65

89 0.0  $\frac{22}{30}$  22.5 182.92 185.42

88  $\frac{00}{30}$   $\frac{31}{30}$  22.5 182.67 186.19

T.P 1.89 189.39 5.70 187.50

87  $\frac{00}{30}$   $\frac{22}{30}$  22.5 182.60 186.96

86  $\frac{26}{30}$   $\frac{39}{30}$  22.5 186.23 187.73

+50

85  $\frac{34}{30}$   $\frac{42}{30}$  22.5 187.48 187.99

176.1 175.6 172.8 172.3 173.0 171.2 171.5 174.4 174.3 173.8  
0.0 0.5 3.3 2.8 173.4 3.1 4.9 4.6 1.7 1.8 2.32  
30 23 17 14 27 14 21 25 28 30 33

179.8 179.9 180.0 176.7 177.6 177.0 176.1 177.8 178.4 176.5 178.05  
7.2 7.1 7.0 10.1 7.6 10.0 10.9 9.2 9.1 8.5 9.02  
33 30 23 16 13 15 20 24 27 30 33

183.1 182.1 183.0 180.5 181.1 181.2 180.0 180.5 182.0 182.5 182.3  
3.9 3.9 4.0 4.5 5.9 5.8 7.0 6.5 6.2 4.5 4.70  
33 29 22 16 13 12 19 24 25 30 33

184.3 184.4 182.3 182.8 183.3 182.8 181.6 181.5 183.8 184.3 183.9  
2.7 2.6 4.7 4.2 183.3 4.2 3.2 3.5 3.2 2.7 2.7 3.1  
30 24 18 13 37 12 19 22 24 28 30 33

185.0 185.0 184.4 183.2 182.9 184.2 184.5 184.0 182.8 185.3 185.3  
7.0 7.0 2.6 3.8 4.1 2.8 184.5 3.0 4.2 1.7 1.7  
30 24 22 20 17 14 25 13 18 27 30

183.4 183.4 184.0 182.8 182.6 184.2 185.1 184.4 183.6 186.1 186.5 186.7  
6.0 6.0 6.6 6.8 5.2 184.9 4.8 5.0 4.8 2.3 2.9 2.77  
33 30 24 21 16 12 4.5 12 17 20 30 33

181.9 182.7 182.2 182.4 183.3 184.4 184.6 183.4 183.6 185.2 185.6 185.9  
7.3 6.7 7.2 7.0 5.6 184.4 4.8 6.0 6.8 4.2 3.8 3.64  
36 25 22 16 13 30 13 18 22 27 30 33

182.6 182.8 183.1 182.4 182.7 184.3 184.7 184.1 183.8 184.5 186.3 186.5  
2.6 2.5 6.3 7.0 6.7 184.3 4.7 4.2 4.6 4.9 3.1 2.96  
33 30 26 20 16 13 4.7 12 16 24 30 33

184.5 184.8 184.0 183.9 185.4 186.0 186.1 185.0 185.9 186.8 187.2 187.5  
4.9 5.7 5.0 9.2 9.3 7.8 186.0 7.1 5.2 7.3 6.0 5.70  
33 30 25 20 17 14 7.2 12 17 23 27 30 33

181.1 188.3 188.4 186.8 186.8 187.9 188.5 188.3 187.4 189.9 189.6 190.0  
5.1 4.9 4.5 6.0 6.0 5.3 188.5 4.9 5.8 3.8 3.6 3.37  
73 30 24 20 17 13 4.7 12 18 24 30 33

187.3 189.4 189.4 187.7 187.7 189.1 189.4 187.0 188.2 189.3 190.4 190.5  
3.9 5.8 3.8 3.5 3.5 5.5 189.4 4.2 5.0 3.4 2.8 2.9  
33 30 25 22 19 13 38 11 16 22 30 33

189.4 189.4 187.5 187.5 188.8 189.6 189.3 188.1 189.4 190.2 190.5  
4.0 3.8 3.8 5.7 5.5 4.4 189.6 3.9 5.1 3.3 3.0 2.20  
33 30 25 21 19 15 36 12 19 25 30 33

17320



+50

|       |                  |                  |      |        |
|-------|------------------|------------------|------|--------|
| 103 ✓ | $\frac{2.6}{30}$ | $\frac{1.7}{30}$ | 22.5 | 149.70 |
|-------|------------------|------------------|------|--------|

|     |                 |                 |      |        |        |
|-----|-----------------|-----------------|------|--------|--------|
| 102 | $\frac{40}{30}$ | $\frac{29}{30}$ | 22.5 | 152.30 | 153.82 |
|-----|-----------------|-----------------|------|--------|--------|

|       |                 |                 |      |        |
|-------|-----------------|-----------------|------|--------|
| 100 ✓ | $\frac{40}{30}$ | $\frac{26}{30}$ | 22.5 | 157.50 |
|-------|-----------------|-----------------|------|--------|

|    |                        |                 |      |        |
|----|------------------------|-----------------|------|--------|
| 99 | $\sqrt{\frac{43}{30}}$ | $\frac{20}{30}$ | 22.5 | 167.63 |
|----|------------------------|-----------------|------|--------|

|     |           |           |       |        |
|-----|-----------|-----------|-------|--------|
| T.P | 0.66      | 163.95    | 12.82 | 163.29 |
| 98  | 4.1<br>20 | 1.2<br>30 | 22.5  | 161.95 |

|    |   |                 |                 |      |        |
|----|---|-----------------|-----------------|------|--------|
| 97 | ✓ | $\frac{33}{30}$ | $\frac{07}{30}$ | 22.5 | 163.88 |
|----|---|-----------------|-----------------|------|--------|

96 ✓  $\frac{28}{30}$   $\frac{93}{30}$  22.5 166.15

95 ✓  $\frac{20}{30}$  ~~21~~  $\frac{20}{30}$  22.5 169.34

(7611)

$$\begin{array}{cccccccccccccccc}
 147.92 & 146.9 & 146.8 & 146.0 & 146.1 & 147.2 & 147.3 & 145.8 & 146.0 & 146.8 & 146.6 & 146.67 \\
 147.92 & 146.9 & 146.8 & 146.0 & 146.1 & 147.2 & 147.3 & 145.8 & 146.0 & 146.8 & 146.6 & 146.67 \\
 33 & 30 & 25 & 28 & 18 & 14 & 12 & 19 & 25 & 27 & 30 & 33
 \end{array}$$

|       |       |       |       |       |       |       |       |       |       |        |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 148.3 | 148.0 | 147.5 | 146.4 | 148.0 | 148.3 | 148.1 | 146.2 | 147.3 | 147.1 | 146.84 |
| 35    | 38    | 43    | 52    | 35    | 38    | 37    | 52    | 45    | 47    | 47.5   |
| 33    | 28    | 25    | 18    | 14    | 35    | 14    | 19    | 25    | 30    | 33     |

|           |           |           |           |           |           |           |           |           |           |            |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|
| 149.3     | 148.9     | 148.1     | 147.3     | 146.0     | 145.8     | 147.0     | 147.3     | 148.2     | 147.8     | 147.94     |
| <u>25</u> | <u>29</u> | <u>31</u> | <u>45</u> | <u>28</u> | <u>30</u> | <u>48</u> | <u>45</u> | <u>36</u> | <u>40</u> | <u>388</u> |
| 33        | 30        | 25        | 18        | 15        | 28        | 12        | 19        | 25        | 30        | 33         |

|      |      |      |      |      |      |      |      |      |      |       |     |
|------|------|------|------|------|------|------|------|------|------|-------|-----|
| 1520 | 1518 | 1518 | 1493 | 1506 | 1506 | 1493 | 1502 | 1508 | 1507 | 15087 |     |
| - 02 | 00   | 00   | 25   | 12   | 1509 | 12   | 25   | 14   | 10   | 09    | 092 |
| 33   | 30   | 27   | 17   | 14   | 09   | 13   | 18   | 25   | 26   | 30    | 83  |

|                 |                 |                 |                  |                  |                  |                  |                  |                  |                 |                 |                  |
|-----------------|-----------------|-----------------|------------------|------------------|------------------|------------------|------------------|------------------|-----------------|-----------------|------------------|
| 155.8           | 156.2           | 155.9           | 151.8            | 152.8            | 152.2            | 152.6            | 151.5            | 152.0            | 159.5           | 154.1           | 159.25           |
| $\frac{81}{30}$ | $\frac{77}{27}$ | $\frac{80}{23}$ | $\frac{121}{17}$ | $\frac{111}{16}$ | $\frac{107}{15}$ | $\frac{113}{15}$ | $\frac{124}{19}$ | $\frac{119}{24}$ | $\frac{96}{29}$ | $\frac{92}{30}$ | $\frac{920}{33}$ |

|    |       |       |       |       |       |       |       |       |       |        |
|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 92 | 159.2 | 158.9 | 159.8 | 155.8 | 156.2 | 155.9 | 157.9 | 156.8 | 157.3 | 157.52 |
| 97 | 47    | 50    | 91    | 81    | 88    | 88    | 90    | 71    | 66    | 643    |
| 83 | 30    | 26    | 17    | 14    | 77    | 15    | 19    | 25    | 20    | 33     |

162.0 161.5 159.5 157.6 158.7 159.4 159.2 158.6 159.7 159.9 159.95  
 1.9 24 41 6.3 5.2 4.7 5.3 4.2 4.0 4.0  
 28 24 22 17 15 15 19 25 30 33

$\begin{array}{r} 164.4 \\ \underline{125} \\ 39 \end{array}$ 
 $\begin{array}{r} 164.2 \\ \underline{103} \\ 61 \end{array}$ 
 $\begin{array}{r} 163.8 \\ \underline{01} \\ 25 \end{array}$ 
 $\begin{array}{r} 160.5 \\ \underline{34} \\ 18 \end{array}$ 
 $\begin{array}{r} 161.8 \\ \underline{21} \\ 14 \end{array}$ 
 $\begin{array}{r} 161.7 \\ \underline{22} \\ 13 \end{array}$ 
 $\begin{array}{r} 160.6 \\ \underline{33} \\ 17 \end{array}$ 
 $\begin{array}{r} 161.8 \\ \underline{21} \\ 24 \end{array}$ 
 $\begin{array}{r} 161.9 \\ \underline{20} \\ 30 \end{array}$ 
 $\begin{array}{r} 161.80 \\ \underline{2.15} \\ 23 \end{array}$

|   |       |       |      |       |       |       |       |       |       |       |        |
|---|-------|-------|------|-------|-------|-------|-------|-------|-------|-------|--------|
| 9 | 166.3 | 165.2 | 162. | 163.5 | 164.0 |       | 163.6 | 162.6 | 162.9 | 163.4 | 163.43 |
| 1 | 98    | 109   | 134  | 126   | 121   | 164.1 | 12.5  | 12.5  | 13.2  | 12.7  | 13.08  |
| 3 | 30    | 25    | 19   | 16    | 12    | 160   | 12    | 17    | 22    | 20    | 32.    |

|     |       |       |       |       |       |       |       |       |       |       |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 7.7 | 167.6 | 168.9 | 165.3 | 164.5 | 166.1 | 165.9 | 164.4 | 164.9 | 165.0 | 164.9 |
| 8.7 | 8.5   | 9.2   | 10.8  | 11.6  | 10.0  | 10.7  | 11.7  | 11.2  | 11.1  | 11.2  |
| 9.3 | 20    | 25    | 24    | 18    | 13    | 14    | 18    | 22    | 20    | 33    |

|      |       |       |       |       |       |       |       |       |       |       |  |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--|
| 69.5 | 169.5 | 168.8 | 168.1 | 166.5 | 167.7 | 167.3 | 166.1 | 166.9 | 167.0 | 167.0 |  |
| 66   | 66    | 23    | 20    | 26    | 24    | 28    | 100   | 92    | 91    | 91.18 |  |
| 32   | 30    | 26    | 23    | 17    | 15    | 14    | 18    | 25    | 30    | 39    |  |

|      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |        |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--------|
| 1768 | 1769 | 1770 | 1771 | 1772 | 1773 | 1774 | 1775 | 1776 | 1777 | 1778 | 1779 | 1780 | 1781 | 1782 | 1783 | 1784 | 1785 | 1786 | 1787 | 1788 | 1789 | 1790 | 1791 | 1792 | 1793 | 1794 | 1795 | 1796 | 1797 | 1798 | 1799 | 1800 | 1801 | 1802 | 1803 | 1804 | 1805 | 1806 | 1807 | 1808 | 1809 | 1810 | 1811 | 1812 | 1813 | 1814 | 1815 | 1816 | 1817 | 1818 | 1819 | 1820 | 1821 | 1822 | 1823 | 1824 | 1825 | 1826 | 1827 | 1828 | 1829 | 1830 | 1831 | 1832 | 1833 | 1834 | 1835 | 1836 | 1837 | 1838 | 1839 | 1840 | 1841 | 1842 | 1843 | 1844 | 1845 | 1846 | 1847 | 1848 | 1849 | 1850 | 1851 | 1852 | 1853 | 1854 | 1855 | 1856 | 1857 | 1858 | 1859 | 1860 | 1861 | 1862 | 1863 | 1864 | 1865 | 1866 | 1867 | 1868 | 1869 | 1870 | 1871 | 1872 | 1873 | 1874 | 1875 | 1876 | 1877 | 1878 | 1879 | 1880 | 1881 | 1882 | 1883 | 1884 | 1885 | 1886 | 1887 | 1888 | 1889 | 1890 | 1891 | 1892 | 1893 | 1894 | 1895 | 1896 | 1897 | 1898 | 1899 | 1900 | 1901 | 1902 | 1903 | 1904 | 1905 | 1906 | 1907 | 1908 | 1909 | 1910 | 1911 | 1912 | 1913 | 1914 | 1915 | 1916 | 1917 | 1918 | 1919 | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | 1930 | 1931 | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 | 2052 | 2053 | 2054 | 2055 | 2056 | 2057 | 2058 | 2059 | 2060 | 2061 | 2062 | 2063 | 2064 | 2065 | 2066 | 2067 | 2068 | 2069 | 2070 | 2071 | 2072 | 2073 | 2074 | 2075 | 2076 | 2077 | 2078 | 2079 | 2080 | 2081 | 2082 | 2083 | 2084 | 2085 | 2086 | 2087 | 2088 | 2089 | 2090 | 2091 | 2092 | 2093 | 2094 | 2095 | 2096 | 2097 | 2098 | 2099 | 2100 | 2101 | 2102 | 2103 | 2104 | 2105 | 2106 | 2107 | 2108 | 2109 | 2110 | 2111 | 2112 | 2113 | 2114 | 2115 | 2116 | 2117 | 2118 | 2119 | 2120 | 2121 | 2122 | 2123 | 2124 | 2125 | 2126 | 2127 | 2128 | 2129 | 2130 | 2131 | 2132 | 2133 | 2134 | 2135 | 2136 | 2137 | 2138 | 2139 | 2140 | 2141 | 2142 | 2143 | 2144 | 2145 | 2146 | 2147 | 2148 | 2149 | 2150 | 2151 | 2152 | 2153 | 2154 | 2155 | 2156 | 2157 | 2158 | 2159 | 2160 | 2161 | 2162 | 2163 | 2164 | 2165 | 2166 | 2167 | 2168 | 2169 | 2170 | 2171 | 2172 | 2173 | 2174 | 2175 | 2176</ |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--------|



End B<sup>5</sup> 111+19End P<sup>4</sup> 80

110

 $\frac{15}{30}$  $\frac{1.9}{30}$  $\frac{2.1}{30}$ 

142.00

147.00

109

 $\frac{1.1}{30}$  $\frac{1.0}{30}$  $\frac{2.1}{30}$ 

143.00

147.00

BM

4.30

151.05

4.96

142.83

146.75

5+60

+40

D<sup>1</sup>

S+16

108

 $\frac{0.5}{30}$  $\frac{0.5}{30}$ 

Fellowsy

147.00

107

 $\frac{0.5}{30}$  $\frac{0.5}{30}$ 

Fellowsy

147.08

+50

151.79

|       |       |       |       |       |       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 142.4 | 142.2 | 142.2 | 141.0 | 146.9 | 147.1 | 147.2 | 140.6 | 140.6 | 142.5 | 142.9 | 143.3 |
| 56    | 58    | 58    | 100   | 41    | 39    | 38    | 104   | 104   | 52    | 51    | 27    |
| 32    | 26    | 21    | 19    | 11    | 5     | 5     | 19    | 21    | 21    | 30    | 32    |

|      |       |       |       |       |       |       |       |       |       |       |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 13.8 | 143.9 | 141.7 | 143.0 | 146.5 | 147.4 | 147.2 | 147.3 | 140.4 | 142.4 | 143.7 |
| 72   | 71    | 53    | 50    | 45    | 36    | 37    | 37    | 106   | 56    | 73    |
| 33   | 28    | 22    | 18    | 13    | 8     | 8     | 8     | 19    | 21    | 32    |

|      |       |       |       |       |       |       |       |       |       |       |        |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 13.8 | 143.8 | 143.9 | 142.3 | 142.1 | 145.1 | 145.4 | 145.4 | 142.2 | 143.8 | 144.1 | 144.19 |
| 72   | 72    | 71    | 57    | 59    | 59    | 56    | 56    | 58    | 72    | 69    | 68     |
| 33   | 30    | 27    | 25    | 20    | 12    | 12    | 12    | 21    | 27    | 30    | 33     |

|      |       |       |       |       |       |       |       |       |       |       |       |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 13.7 | 143.7 | 143.8 | 142.5 | 142.6 | 144.5 | 145.4 | 145.1 | 142.9 | 144.3 | 144.3 | 144.3 |
| 72   | 73    | 72    | 55    | 52    | 65    | 54    | 59    | 51    | 67    | 67    | 67    |
| 33   | 30    | 27    | 25    | 19    | 15    | 16    | 15    | 21    | 25    | 30    | 33    |

|       |       |       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 144.1 | 144.2 | 143.0 | 142.9 | 144.6 | 145.6 | 145.1 | 143.6 | 144.0 |
| 77    | 76    | 88    | 59    | 72    | 62    | 67    | 52    | 78    |
| 33    | 30    | 26    | 23    | 18    | 12    | 12    | 25    | 33    |

|       |       |       |       |       |
|-------|-------|-------|-------|-------|
| 144.5 | 145.1 | 145.5 | 145.1 | 145.0 |
| 73    | 67    | 67    | 67    | 68    |
| 33    | 16    | 63    | 27    | 35    |

|       |       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 144.3 | 144.4 | 143.8 | 145.1 | 145.5 | 145.4 | 144.1 | 144.1 |
| 75    | 71    | 50    | 67    | 63    | 61    | 77    | 77    |
| 33    | 26    | 25    | 12    | 63    | 12    | 19    | 33    |

|     |       |       |       |       |       |       |       |       |       |        |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 145 | 144.3 | 144.7 | 143.8 | 144.1 | 145.1 | 145.5 | 145.4 | 143.9 | 144.4 | 144.49 |
| 73  | 75    | 71    | 50    | 77    | 67    | 63    | 61    | 79    | 74    | 730    |
| 33  | 30    | 25    | 23    | 17    | 15    | 12    | 12    | 19    | 30    | 33     |

|       |       |       |       |       |       |       |       |       |       |        |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 145.2 | 145.3 | 145.5 | 144.7 | 146.0 | 146.4 | 146.1 | 144.7 | 144.9 | 145.3 | 145.35 |
| 66    | 65    | 63    | 71    | 58    | 54    | 57    | 71    | 69    | 65    | 64     |
| 33    | 30    | 25    | 20    | 15    | 12    | 12    | 18    | 25    | 30    | 33     |

|     |       |       |       |       |       |       |       |       |       |       |       |       |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 158 | 146.0 | 146.2 | 145.5 | 145.4 | 146.6 | 146.7 | 146.6 | 145.4 | 145.4 | 145.9 | 146.0 | 145.8 |
| 60  | 58    | 56    | 63    | 64    | 52    | 49    | 52    | 64    | 64    | 59    | 58    | 60    |
| 33  | 28    | 24    | 23    | 17    | 13    | 13    | 13    | 17    | 24    | 27    | 30    | 33    |



120  $\frac{38}{30}$   $\frac{21}{80}$

+50

5.20

167.00

5.20 161.80

119

 $\frac{4.2}{30}$  $\frac{23}{30}$ 

+50

118

 $\frac{41}{30}$  $\frac{26}{30}$ 

T.P

8.74

167.00

0.01

158.26

117

 $\frac{38}{30}$  $\frac{36}{29}$ 

116

 $\frac{39}{30}$  $\frac{40}{30}$ 

115

 $\frac{39}{30}$  $\frac{31}{30}$ 

+50

T.P

10.99

158.27

3.77

147.28

114

 $\frac{45}{30}$  $\frac{13}{30}$ 

+50

113

 $\frac{09}{30}$  $\frac{08}{30}$ 

112

 $\frac{10}{30}$  $\frac{07}{30}$ 151.05

|        |        |       |       |        |       |       |       |       |       |        |
|--------|--------|-------|-------|--------|-------|-------|-------|-------|-------|--------|
| 161.46 | 163.2  | 163.3 | 161.3 | 162.4  | 162.7 | 162.1 | 160.9 | 162.3 | 162.0 | 162.38 |
| 36     | 37     | 38    | 37    | 46     | 43    | 49    | 61    | 47    | 60    | 462    |
| 33     | 30     | 23    | 15    | 4      | 13    | 17    | 23    | 30    | 33    | 33     |
| 163.3  | 163.3  | 161.1 | 162.3 | 162.6  | 162.1 | 161.0 | 162.6 | 161.9 |       |        |
| 17     | 37     | 37    | 59    | 47     | 49    | 60    | 44    | 51    |       |        |
| 3      | 22     | 20    | 14    | 9      | 14    | 18    | 26    | 33    |       |        |
| 163.2  | 163.2  | 163.1 | 161.0 | 161.6  | 161.9 | 161.5 | 160.5 | 161.4 | 161.3 | 161.40 |
| 38     | 38     | 39    | 60    | 34     | 51    | 55    | 65    | 56    | 57    | 5.60   |
| 33     | 30     | 23    | 16    | 11     | 13    | 18    | 23    | 30    | 33    | 33     |
| 162.6  | 162.1  | 160.4 | 160.9 | 161.1  | 160.9 | 160.2 | 161.0 | 161.0 |       |        |
| 5      | 44     | 49    | 65    | 61     | 59    | 68    | 60    | 60    |       |        |
| 5      | 26     | 22    | 16    | 12     | 14    | 18    | 26    | 33    |       |        |
| 161.4  | 160.5  | 158.9 | 159.9 | 160.0  | 159.9 | 159.9 | 159.9 | 159.9 |       |        |
| 56     | 65     | 51    | 71    | 70     | 71    | 71    | 71    | 71    |       |        |
| 30     | 19     | 15    | 12    | 18     | 18    | 30    | 30    | 33    |       |        |
| 158.97 | 158.4  | 156.2 | 156.6 | 157.2  | 156.8 | 156.0 | 157.9 |       |       |        |
| 0.2    | (-0.1) | 21    | 17    | 11     | 15    | 23    | 04    |       |       |        |
| 30     | 19     | 14    | 12    | 15     | 19    | 29    | 29    |       |       |        |
| 153.22 | 155.1  | 155.8 | 153.1 | 151.1  | 152.8 | 153.0 | 151.9 | 154.9 | 155.2 | 155.17 |
| 3      | 32     | 30    | 52    | 72     | 55    | 58.2  | 58    | 64    | 34    | 31     |
| 3      | 30     | 25    | 23    | 17     | 12    | 51    | 14    | 18    | 25    | 30     |
| 150.11 | 151.0  | 151.2 | 147.1 | 149.3  | 149.7 | 149.7 | 146.2 | 151.2 |       | 151.19 |
| 3      | 73     | 71    | 112   | 90     | 149.7 | 86    | 101   | 71    |       | 151.19 |
| 3      | 30     | 26    | 19    | 12     | 86    | 13    | 18    | 30    |       | 151.19 |
| 149.0  | 149.0  | 146.0 | 147.8 | 146.5  | 148.5 | 146.8 | 148.5 | 148.6 |       |        |
| 93     | 93     | 123   | 10.5  | 98     | 98    | 11.5  | 98    | 7.7   |       |        |
| 32     | 27     | 20    | 13    | 13     | 13    | 19    | 29    | 23    |       |        |
| 147.78 | 147.3  | 147.4 | 145.0 | 144.7  | 144.6 | 147.2 | 146.9 | 145.5 | 146.5 | 147.1  |
| 3      | 37     | 36    | 60    | 63     | 44    | 41    | 55    | 45    | 39    | 147.29 |
| 3      | 30     | 28    | 24    | 20     | 13    | 38    | 15    | 19    | 27    | 3.77   |
| 145.8  | 146.0  | 143.9 | 143.9 | 145.4  | 146.2 | 146.2 | 144.4 | 145.5 |       |        |
| 52     | 50     | 31    | 71    | 55     | 40.2  | 46.2  | 44.4  | 45.5  |       |        |
| 32     | 26     | 23    | 18    | 13     | 48    | 14    | 21    | 26    |       |        |
| 144.0  | 144.0  | 144.0 | 143.1 | 144.7  | 145.4 | 145.3 | 143.7 | 144.5 |       |        |
| 170    | 70     | 70    | 79    | 63     | 56    | 57    | 73    | 68    |       |        |
| 33     | 30     | 27    | 24    | 15     | 56    | 13    | 19    | 30    |       |        |
| 147.00 | 143.5  | 143.4 | 142.6 | 142.4  | 145.0 | 145.4 | 145.3 | 143.7 |       |        |
| 3      | 75     | 76    | 86    | 86     | 60    | 57    | 81    | 78    |       |        |
| 3      | 30     | 27    | 25    | 20     | 13    | 36    | 12    | 23    |       |        |
| 147.00 | 143.81 | 143.7 | 143.7 | 143.81 |       |       |       |       |       |        |
| 3      | 7.24   | 7.3   | 7.3   | 7.3    |       |       |       |       |       |        |
| 3      | 33     | 33    | 33    | 33     |       |       |       |       |       |        |



|      |                  |                  |      |        |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------|------------------|------------------|------|--------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 131  | $\frac{10}{30}$  | $\frac{11}{30}$  |      |        | 163.00 | $\begin{array}{r} 61.2 \\ 77 \\ 30 \end{array}$ $\begin{array}{r} 161.5 \\ 70 \\ 28 \end{array}$ $\begin{array}{r} 161.7 \\ 72 \\ 20 \end{array}$ $\begin{array}{r} 161.1 \\ 75 \\ 23 \end{array}$ $\begin{array}{r} 161.0 \\ 79 \\ 17 \end{array}$ $\begin{array}{r} 162.1 \\ 68 \\ 13 \end{array}$ $\begin{array}{r} 162.3 \\ 66 \\ 13 \end{array}$ $\begin{array}{r} 162.1 \\ 68 \\ 12 \end{array}$ $\begin{array}{r} 161.5 \\ 74 \\ 18 \end{array}$ $\begin{array}{r} 161.3 \\ 76 \\ 30 \end{array}$ $\begin{array}{r} 161.32 \\ 73.5 \\ 33 \end{array}$                                                                                                                                                  |
| 130  | $\frac{06}{30}$  | $\frac{07}{30}$  |      |        | 163.00 | $\begin{array}{r} 160.4 \\ 85 \\ 30 \end{array}$ $\begin{array}{r} 160.8 \\ 81 \\ 29 \end{array}$ $\begin{array}{r} 160.9 \\ 80 \\ 26 \end{array}$ $\begin{array}{r} 160.5 \\ 82 \\ 20 \end{array}$ $\begin{array}{r} 160.6 \\ 83 \\ 18 \end{array}$ $\begin{array}{r} 162.2 \\ 67 \\ 11 \end{array}$ $\begin{array}{r} 162.2 \\ 67 \\ 11 \end{array}$ $\begin{array}{r} 161.8 \\ 71 \\ 9 \end{array}$ $\begin{array}{r} 161.0 \\ 79 \\ 13 \end{array}$ $\begin{array}{r} 160.8 \\ 81 \\ 25 \end{array}$ $\begin{array}{r} 160.5 \\ 82 \\ 30 \end{array}$ $\begin{array}{r} 160.59 \\ 83.0 \\ 33 \end{array}$                                                                                                 |
| B.M. | 4.76             | <u>168.87</u>    | 3.37 | 164.11 |        | $\begin{array}{r} 160.5 \\ 70 \\ 33 \end{array}$ $\begin{array}{r} 160.8 \\ 67 \\ 29 \end{array}$ $\begin{array}{r} 160.9 \\ 71 \\ 26 \end{array}$ $\begin{array}{r} 160.4 \\ 71 \\ 17 \end{array}$ $\begin{array}{r} 160.4 \\ 71 \\ 17 \end{array}$ $\begin{array}{r} 162.0 \\ 55 \\ 9 \end{array}$ $\begin{array}{r} 162.0 \\ 55 \\ 9 \end{array}$ $\begin{array}{r} 161.8 \\ 57 \\ 11 \end{array}$ $\begin{array}{r} 160.0 \\ 75 \\ 18 \end{array}$ $\begin{array}{r} 160.1 \\ 74 \\ 29 \end{array}$ $\begin{array}{r} 160.2 \\ 73 \\ 33 \end{array}$                                                                                                                                                      |
| +50  |                  |                  |      |        |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 129  | $\frac{1.4}{30}$ | $\frac{08}{30}$  |      |        | 163.00 | $\begin{array}{r} 161.2 \\ 63 \\ 30 \end{array}$ $\begin{array}{r} 160.9 \\ 66 \\ 28 \end{array}$ $\begin{array}{r} 160.9 \\ 71 \\ 25 \end{array}$ $\begin{array}{r} 160.4 \\ 71 \\ 18 \end{array}$ $\begin{array}{r} 160.4 \\ 71 \\ 18 \end{array}$ $\begin{array}{r} 162.0 \\ 63 \\ 13 \end{array}$ $\begin{array}{r} 161.2 \\ 63 \\ 13 \end{array}$ $\begin{array}{r} 161.6 \\ 59 \\ 12 \end{array}$ $\begin{array}{r} 161.2 \\ 63 \\ 18 \end{array}$ $\begin{array}{r} 159.8 \\ 77 \\ 25 \end{array}$ $\begin{array}{r} 160.6 \\ 69 \\ 27 \end{array}$ $\begin{array}{r} 160.2 \\ 73 \\ 30 \end{array}$ $\begin{array}{r} 160.2 \\ 73 \\ 30 \end{array}$ $\begin{array}{r} 160.3 \\ 72 \\ 33 \end{array}$ |
| 128  | $\frac{2.1}{30}$ | $\frac{09}{30}$  |      |        | 163.00 | $\begin{array}{r} 162.7 \\ 48 \\ 30 \end{array}$ $\begin{array}{r} 162.6 \\ 49 \\ 28 \end{array}$ $\begin{array}{r} 162.1 \\ 52 \\ 24 \end{array}$ $\begin{array}{r} 160.9 \\ 66 \\ 18 \end{array}$ $\begin{array}{r} 161.5 \\ 60 \\ 13 \end{array}$ $\begin{array}{r} 162.3 \\ 62 \\ 11 \end{array}$ $\begin{array}{r} 161.8 \\ 57 \\ 11 \end{array}$ $\begin{array}{r} 160.3 \\ 72 \\ 19 \end{array}$ $\begin{array}{r} 161.4 \\ 61 \\ 26 \end{array}$ $\begin{array}{r} 161.5 \\ 60 \\ 30 \end{array}$ $\begin{array}{r} 161.66 \\ 58.2 \\ 33 \end{array}$                                                                                                                                                 |
| 127  | $\frac{2.6}{30}$ | $\frac{2.1}{30}$ |      |        | 163.00 | $\begin{array}{r} 163.4 \\ 41 \\ 33 \end{array}$ $\begin{array}{r} 163.4 \\ 41 \\ 30 \end{array}$ $\begin{array}{r} 163.0 \\ 45 \\ 23 \end{array}$ $\begin{array}{r} 161.6 \\ 59 \\ 17 \end{array}$ $\begin{array}{r} 162.3 \\ 52 \\ 13 \end{array}$ $\begin{array}{r} 163.1 \\ 44 \\ 13 \end{array}$ $\begin{array}{r} 162.4 \\ 51 \\ 13 \end{array}$ $\begin{array}{r} 161.1 \\ 64 \\ 19 \end{array}$ $\begin{array}{r} 161.9 \\ 56 \\ 22 \end{array}$ $\begin{array}{r} 162.9 \\ 46 \\ 30 \end{array}$ $\begin{array}{r} 163.05 \\ 44.3 \\ 33 \end{array}$                                                                                                                                                 |
| 126  | $\frac{2.0}{30}$ | $\frac{1.0}{30}$ |      |        | 163.00 | $\begin{array}{r} 163.1 \\ 44 \\ 33 \end{array}$ $\begin{array}{r} 163.0 \\ 45 \\ 30 \end{array}$ $\begin{array}{r} 162.9 \\ 46 \\ 24 \end{array}$ $\begin{array}{r} 161.2 \\ 63 \\ 19 \end{array}$ $\begin{array}{r} 162.1 \\ 63 \\ 13 \end{array}$ $\begin{array}{r} 162.8 \\ 47 \\ 13 \end{array}$ $\begin{array}{r} 162.2 \\ 63 \\ 13 \end{array}$ $\begin{array}{r} 161.0 \\ 65 \\ 20 \end{array}$ $\begin{array}{r} 162.0 \\ 65 \\ 26 \end{array}$ $\begin{array}{r} 162.0 \\ 65 \\ 30 \end{array}$ $\begin{array}{r} 162.12 \\ 51.36 \\ 33 \end{array}$                                                                                                                                                |
| 125  | $\frac{2.7}{30}$ | $\frac{1.2}{30}$ |      |        | 163.00 | $\begin{array}{r} 163.4 \\ 41 \\ 33 \end{array}$ $\begin{array}{r} 163.7 \\ 38 \\ 24 \end{array}$ $\begin{array}{r} 160.7 \\ 68 \\ 18 \end{array}$ $\begin{array}{r} 162.0 \\ 55 \\ 12 \end{array}$ $\begin{array}{r} 162.5 \\ 50 \\ 12 \end{array}$ $\begin{array}{r} 161.8 \\ 57 \\ 14 \end{array}$ $\begin{array}{r} 160.4 \\ 71 \\ 20 \end{array}$ $\begin{array}{r} 161.8 \\ 57 \\ 26 \end{array}$ $\begin{array}{r} 161.8 \\ 57 \\ 30 \end{array}$ $\begin{array}{r} 161.78 \\ 51.70 \\ 33 \end{array}$                                                                                                                                                                                                 |
| 124  | $\frac{2.1}{30}$ | $\frac{1.2}{30}$ |      |        | 162.70 | $\begin{array}{r} 162.8 \\ 47 \\ 33 \end{array}$ $\begin{array}{r} 162.8 \\ 47 \\ 30 \end{array}$ $\begin{array}{r} 162.6 \\ 49 \\ 24 \end{array}$ $\begin{array}{r} 160.4 \\ 71 \\ 17 \end{array}$ $\begin{array}{r} 161.7 \\ 58 \\ 10 \end{array}$ $\begin{array}{r} 162.1 \\ 54 \\ 10 \end{array}$ $\begin{array}{r} 161.4 \\ 61 \\ 16 \end{array}$ $\begin{array}{r} 160.0 \\ 75 \\ 20 \end{array}$ $\begin{array}{r} 161.4 \\ 61 \\ 25 \end{array}$ $\begin{array}{r} 161.4 \\ 61 \\ 30 \end{array}$ $\begin{array}{r} 161.54 \\ 51.94 \\ 33 \end{array}$                                                                                                                                                |
| T.P. | 6.05             | <u>167.48</u>    | 5.57 | 161.43 |        | $\begin{array}{r} 161.3 \\ 57 \\ 30 \end{array}$ $\begin{array}{r} 162.0 \\ 50 \\ 23 \end{array}$ $\begin{array}{r} 161.3 \\ 57 \\ 20 \end{array}$ $\begin{array}{r} 160.1 \\ 69 \\ 17 \end{array}$ $\begin{array}{r} 161.4 \\ 57 \\ 10 \end{array}$ $\begin{array}{r} 161.8 \\ 52 \\ 10 \end{array}$ $\begin{array}{r} 161.4 \\ 52 \\ 14 \end{array}$ $\begin{array}{r} 160.0 \\ 70 \\ 19 \end{array}$ $\begin{array}{r} 160.7 \\ 63 \\ 25 \end{array}$ $\begin{array}{r} 160.7 \\ 63 \\ 30 \end{array}$ $\begin{array}{r} 160.62 \\ 63.8 \\ 33 \end{array}$                                                                                                                                                 |
| 123  | $\frac{1.2}{30}$ | $\frac{07}{30}$  |      |        | 162.39 | $\begin{array}{r} 162.5 \\ 45 \\ 33 \end{array}$ $\begin{array}{r} 162.5 \\ 45 \\ 30 \end{array}$ $\begin{array}{r} 162.2 \\ 48 \\ 29 \end{array}$ $\begin{array}{r} 160.3 \\ 67 \\ 17 \end{array}$ $\begin{array}{r} 161.4 \\ 56 \\ 12 \end{array}$ $\begin{array}{r} 161.8 \\ 52 \\ 12 \end{array}$ $\begin{array}{r} 161.2 \\ 58 \\ 14 \end{array}$ $\begin{array}{r} 160.2 \\ 68 \\ 18 \end{array}$ $\begin{array}{r} 160.8 \\ 62 \\ 23 \end{array}$ $\begin{array}{r} 160.6 \\ 64 \\ 30 \end{array}$ $\begin{array}{r} 160.65 \\ 63.0 \\ 33 \end{array}$                                                                                                                                                 |
| 122  | $\frac{1.2}{30}$ | $\frac{05}{30}$  |      |        | 162.08 | $\begin{array}{r} 162.9 \\ 41 \\ 30 \end{array}$ $\begin{array}{r} 162.8 \\ 42 \\ 20 \end{array}$ $\begin{array}{r} 160.3 \\ 67 \\ 14 \end{array}$ $\begin{array}{r} 161.7 \\ 53 \\ 10 \end{array}$ $\begin{array}{r} 162.0 \\ 50 \\ 10 \end{array}$ $\begin{array}{r} 161.7 \\ 53 \\ 10 \end{array}$ $\begin{array}{r} 160.1 \\ 69 \\ 19 \end{array}$ $\begin{array}{r} 161.3 \\ 57 \\ 25 \end{array}$ $\begin{array}{r} 161.3 \\ 57 \\ 30 \end{array}$ $\begin{array}{r} 161.43 \\ 51.57 \\ 33 \end{array}$                                                                                                                                                                                                 |
| 121  | $\frac{0.1}{30}$ | $\frac{15}{30}$  |      |        | 161.77 | $\begin{array}{r} 162.9 \\ 41 \\ 30 \end{array}$ $\begin{array}{r} 162.8 \\ 42 \\ 20 \end{array}$ $\begin{array}{r} 160.3 \\ 67 \\ 14 \end{array}$ $\begin{array}{r} 161.7 \\ 53 \\ 10 \end{array}$ $\begin{array}{r} 162.0 \\ 50 \\ 10 \end{array}$ $\begin{array}{r} 161.7 \\ 53 \\ 10 \end{array}$ $\begin{array}{r} 160.1 \\ 69 \\ 19 \end{array}$ $\begin{array}{r} 161.3 \\ 57 \\ 25 \end{array}$ $\begin{array}{r} 161.3 \\ 57 \\ 30 \end{array}$ $\begin{array}{r} 161.43 \\ 51.57 \\ 33 \end{array}$                                                                                                                                                                                                 |
|      |                  | <u>167.00</u>    |      |        |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |



T.P 8.58 187.13 0.11 179.15  
141  $\frac{12}{30}$   $\frac{09}{30}$

178.40

140  $\frac{30}{30}$   $\frac{34}{30}$

176.70

139  $\frac{35}{30}$   $\frac{41}{30}$

174.41

138  $\frac{22}{30}$   $\frac{21}{30}$

171.60

137

TP 11.96 179.26 1.57 167.30  
136  $\frac{18}{30}$   $\frac{19}{30}$

169.46

135  $\frac{116}{30}$   $\frac{119}{30}$

168.09

134  $\frac{12}{30}$   $\frac{14}{30}$

166.82

133  $\frac{13}{30}$   $\frac{14}{30}$

165.54

132  $\frac{10}{30}$   $\frac{13}{30}$

163.87

|       |       |       |       |       |       |       |       |        |        |
|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|
| 177.2 | 177.6 | 176.8 | 176.0 | 177.3 | 176.2 | 177.9 | 176.6 | 177.1  | 177.3  |
| 21    | 17    | 25    | 33    | 20    | 11    | 16    | 27    | 22     | 20     |
| 30    | 25    | 24    | 18    | 16    | 11    | 13    | 19    | 30     | 23     |
| 177.8 | 177.7 | 175.9 | 174.6 | 176.5 | 177.5 | 177.1 | 175.9 | 173.1  | 178.3  |
| 15    | 16    | 34    | 27    | 28    | 18    | 22    | 34    | 12     | 10     |
| 33    | 30    | 24    | 19    | 15    | 18    | 12    | 17    | 30     | 33     |
| 177.5 | 176.8 | 174.1 | 172.9 | 175.2 | 176.1 | 175.7 | 174.8 | 177.1  | 178.0  |
| 18    | 23    | 52    | 64    | 41    | 16    | 32    | 45    | 22     | 13     |
| 30    | 27    | 19    | 17    | 14    | 32    | 17    | 20    | 22     | 28     |
| 175.5 | 174.5 | 171.8 | 173.5 | 174.2 | 174.1 | 173.3 | 175.7 | 176.5  | 176.7  |
| 35    | 38    | 47    | 75    | 58    | 51    | 60    | 36    | 28     | 26     |
| 33    | 30    | 24    | 17    | 15    | 12    | 18    | 25    | 30     | 33     |
| 172.1 | 172.1 | 168.9 | 170.5 | 171.1 | 171.0 | 169.6 | 171.7 | 171.61 | 171.61 |
| 72    | 72    | 104   | 88    | 74    | 82    | 97    | 76    | 76     | 76     |
| 33    | 30    | 17    | 14    | 82    | 72    | 19    | 30    | 33     | 33     |
| 171.3 | 171.1 | 168.1 | 169.5 | 169.9 | 169.9 | 166.4 | 170.0 | 169.8  | 169.8  |
| 80    | 82    | 112   | 98    | 94    | 94    | 109   | 93    | 95     | 95     |
| 33    | 29    | 17    | 14    | 13    | 20    | 20    | 30    | 33     | 33     |
| 170.0 | 170.0 | 167.2 | 168.9 | 169.1 | 169.0 | 168.1 | 168.5 | 168.9  | 169.03 |
| 3     | 93    | 93    | 121   | 104   | 103   | 122   | 108   | 104    | 102    |
| 33    | 30    | 28    | 18    | 11    | 102   | 12    | 19    | 26     | 30     |
| 167.9 | 168.1 | 167.0 | 165.5 | 167.4 | 167.7 | 167.5 | 165.5 | 167.4  | 167.71 |
| 10    | 08    | 19    | 34    | 15    | 12    | 14    | 34    | 15     | 16     |
| 30    | 28    | 24    | 16    | 12    | 12    | 11    | 18    | 26     | 30     |
| 166.4 | 166.4 | 166.3 | 165.8 | 164.1 | 166.2 | 166.9 | 166.2 | 164.3  | 165.7  |
| 35    | 25    | 26    | 31    | 48    | 27    | 26    | 27    | 46     | 32     |
| 30    | 30    | 28    | 24    | 17    | 11    | 26    | 11    | 18     | 25     |
| 164.7 | 164.8 | 163.9 | 162.9 | 165.0 | 165.1 | 164.9 | 163.2 | 165.0  | 164.9  |
| 12    | 42    | 41    | 60    | 39    | 38    | 38    | 37    | 39     | 40     |
| 33    | 30    | 28    | 18    | 12    | 38    | 11    | 17    | 27     | 30     |
| 163.5 | 163.5 | 163.7 | 162.3 | 162.0 | 163.6 | 163.6 | 162.3 | 162.5  | 163.8  |
| 24    | 54    | 52    | 66    | 69    | 51    | 48    | 53    | 66     | 51     |
| 33    | 30    | 28    | 22    | 17    | 13    | 48    | 14    | 16     | 19     |
| 162.2 | 162.3 | 161.9 | 161.6 | 162.8 | 163.1 | 162.6 | 162.0 | 162.2  | 162.7  |
| 23    | 67    | 66    | 70    | 73    | 61    | 63    | 69    | 67     | 62     |
| 33    | 30    | 28    | 24    | 17    | 13    | 12    | 13    | 24     | 27     |
| 162.2 | 162.3 | 161.9 | 161.6 | 162.8 | 163.1 | 162.6 | 162.0 | 162.2  | 162.7  |
| 23    | 67    | 66    | 70    | 73    | 61    | 63    | 69    | 67     | 62     |
| 33    | 30    | 28    | 24    | 17    | 13    | 12    | 13    | 24     | 27     |
| 162.2 | 162.3 | 161.9 | 161.6 | 162.8 | 163.1 | 162.6 | 162.0 | 162.2  | 162.7  |
| 23    | 67    | 66    | 70    | 73    | 61    | 63    | 69    | 67     | 62     |
| 33    | 30    | 28    | 24    | 17    | 13    | 12    | 13    | 24     | 27     |

(168.87)



[illegible]



13/K Smith  
shop

|        |       |       |       |       |       |       |       |       |           |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-----------|
| 196.14 | 197.0 | 197.0 | 197.1 | 197.7 | 196.3 | 197.1 | 197.6 | 199.8 | 31K Smith |
| 25     | 107   | 107   | 130   | 120   | 114   | 106   | 101   | 79    | 5900      |
| 33     | 30    | 28    | 21    | 17    |       | 11    | 18    | 30    |           |
| 192.73 | 192.8 | 192.5 | 191.4 | 192.6 | 193.0 | 192.9 | 191.5 | 194.0 | 194.40    |
| 25     | 25    | 28    | 39    | 27    | 23    | 21    | 38    | 13    | 0900      |
| 33     | 30    | 25    | 20    | 15    | 23    | 16    | 21    | 30    | 33        |
| 190.65 | 189.7 | 189.8 | 188.9 | 190.1 | 190.4 | 190.3 | 189.7 | 188.2 | 189.0     |
| 57     | 56    | 65    | 64    | 52    | 50    | 50    | 56    | 71    | 63        |
| 33     | 30    | 26    | 19    | 12    | 49    | 13    | 16    | 20    | 27        |
| 189.31 | 189.1 | 189.9 | 187.4 | 188.9 | 188.7 | 188.5 | 187.0 | 187.5 | 187.5     |
| 69     | 82    | 76    | 79    | 69    | 66    | 68    | 83    | 28    | 78        |
| 33     | 30    | 25    | 18    | 12    | 66    | 13    | 22    | 26    | 30        |
| 187.89 | 186.2 | 186.0 | 187.0 | 186.1 | 187.2 | 187.9 | 187.9 | 186.5 | 186.5     |
| 71     | 81    | 83    | 92    | 81    | 71    | 74    | 74    | 88    | 88        |
| 30     | 26    | 20    | 17    | 10    | 10    | 13    | 19    | 25    | 33        |
| 188.94 | 186.2 | 186.2 | 185.4 | 186.3 | 187.6 | 187.6 | 185.7 | 185.1 | 186.1     |
| 50     | 79    | 87    | 95    | 86    | 73    | 73    | 92    | 98    | 88        |
| 30     | 25    | 20    | 18    | 16    | 10    | 11    | 26    | 30    | 33        |
| 189.61 | 183.9 | 185.3 | 185.7 | 185.3 | 187.3 | 187.7 | 187.7 | 186.7 | 187.1     |
| 110    | 96    | 92    | 96    | 96    | 92    | 92    | 92    | 82    | 78        |
| 33     | 26    | 12    | 14    | 10    | 72    | 10    | 23    | 35    | 35        |
| 187.93 | 186.3 | 186.4 | 186.6 | 187.9 | 188.0 | 188.2 | 186.6 | 187.3 | 187.7     |
| 59     | 86    | 87    | 83    | 90    | 89    | 67    | 83    | 76    | 720       |
| 37     | 30    | 24    | 16    | 9     | 69    | 12    | 21    | 30    | 33        |
| 192.02 | 189.2 | 189.3 | 189.1 | 188.6 | 189.9 | 190.2 | 188.7 | 189.0 | 191.1     |
| 57     | 56    | 58    | 63    | 50    | 48    | 47    | 62    | 59    | 58        |
| 33     | 30    | 24    | 17    | 11    | 48    | 12    | 20    | 28    | 30        |
| 195.18 | 195.2 | 195.6 | 195.4 | 192.5 | 193.8 | 193.5 | 192.7 | 196.6 | 196.8     |
| 109    | 105   | 107   | 136   | 123   | 123   | 126   | 134   | 95    | 93        |
| 30     | 26    | 22    | 17    | 10    | 122   | 16    | 20    | 25    | 30        |
| 198.30 | 200.3 | 200.2 | 198.7 | 197.6 | 199.7 | 199.5 | 199.1 | 202.5 | 202.6     |
| 58     | 58    | 69    | 74    | 65    | 64    | 64    | 71    | 36    | 35        |
| 33     | 30    | 24    | 18    | 10    | 64    | 10    | 18    | 25    | 30        |
| 204.2  | 203.9 | 201.6 | 202.2 | 202.0 | 203.8 | 204.0 | 203.8 | 204.0 | 203.8     |
| 19     | 23    | 45    | 39    | 41    | 25    | 21    | 25    | 21    | 23        |
| 33     | 25    | 16    | 14    | 20    | 27    | 27    | 31    | 31    | 38        |

206.12



+50

BAA 0.14 220.65 0.88

166 167  $\frac{47}{30}$   $\frac{56}{30}$

+50

165  $\frac{40}{30}$   $\frac{67}{30}$

164  $\frac{20}{30}$   $\frac{39}{30}$

T.D 14.44 221.40 0.72

163  $\frac{1.2}{30}$   $\frac{42}{30}$

162  $\frac{1.6}{30}$   $\frac{47}{30}$

+ s+60

~~D + 60~~

x Rd +35 ←

D +

161  $\frac{1.4}{30}$

207.68

220.52 <sup>low</sup> 220.5

216.41

214.37

210.72

207.08

203.48

199.79

|                     |                     |                     |                     |                     |                     |                     |                     |                    |
|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|--------------------|
| $\frac{217.4}{33}$  | $\frac{217.6}{25}$  | $\frac{215.7}{19}$  | $\frac{216.0}{11}$  | $\frac{216.1}{43}$  | $\frac{216.0}{13}$  | $\frac{215.8}{19}$  | $\frac{218.0}{26}$  | $\frac{218.0}{33}$ |
| $\frac{219.1}{33}$  | $\frac{219.0}{22}$  | $\frac{217.1}{17}$  | $\frac{218.2}{13}$  | $\frac{218.8}{26}$  | $\frac{218.6}{11}$  | $\frac{217.7}{16}$  | $\frac{219.9}{23}$  | $\frac{220.0}{30}$ |
| $\frac{218.5}{29}$  | $\frac{218.6}{29}$  | $\frac{218.4}{22}$  | $\frac{216.6}{17}$  | $\frac{218.3}{12}$  | $\frac{218.7}{27}$  | $\frac{218.9}{10}$  | $\frac{218.7}{14}$  | $\frac{219.9}{16}$ |
| $\frac{216.2}{52}$  | $\frac{216.4}{33}$  | $\frac{216.1}{30}$  | $\frac{213.7}{25}$  | $\frac{215.5}{17}$  | $\frac{215.7}{57}$  | $\frac{215.8}{12}$  | $\frac{214.9}{16}$  | $\frac{217.8}{25}$ |
| $\frac{210.7}{107}$ | $\frac{210.4}{105}$ | $\frac{210.4}{110}$ | $\frac{208.5}{129}$ | $\frac{210.1}{113}$ | $\frac{210.3}{111}$ | $\frac{210.5}{109}$ | $\frac{209.9}{120}$ | $\frac{212.5}{89}$ |
| $\frac{206.3}{33}$  | $\frac{206.3}{30}$  | $\frac{205.0}{25}$  | $\frac{206.7}{21}$  | $\frac{206.7}{17}$  | $\frac{206.7}{12}$  | $\frac{206.9}{08}$  | $\frac{206.5}{11}$  | $\frac{205.9}{19}$ |
| $\frac{203.0}{48}$  | $\frac{203.0}{47}$  | $\frac{203.0}{26}$  | $\frac{201.7}{60}$  | $\frac{203.7}{10}$  | $\frac{201.0}{37}$  | $\frac{203.9}{38}$  | $\frac{202.4}{19}$  | $\frac{201.7}{26}$ |
| $\frac{201.7}{50}$  | $\frac{201.9}{58}$  | $\frac{200.7}{22}$  | $\frac{202.1}{56}$  | $\frac{202.7}{50}$  | $\frac{202.9}{18}$  | $\frac{202.7}{26}$  | $\frac{202.5}{31}$  | $\frac{201.6}{30}$ |

|                    |                    |                    |                    |                    |                    |                    |                    |                      |
|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|----------------------|
| $\frac{199.3}{54}$ | $\frac{199.2}{85}$ | $\frac{198.7}{90}$ | $\frac{199.5}{81}$ | $\frac{199.9}{78}$ | $\frac{199.9}{80}$ | $\frac{202.4}{55}$ | $\frac{202.7}{50}$ | $\frac{203.26}{443}$ |
| $\frac{201.2}{65}$ | $\frac{201.2}{35}$ | $\frac{201.2}{21}$ | $\frac{201.9}{58}$ | $\frac{202.2}{55}$ | $\frac{202.7}{19}$ | $\frac{202.7}{35}$ | $\frac{202.7}{35}$ |                      |



[illegible]



BM 51610137 Center of Huallancallo. El 187.48

187  $\frac{41}{30}$   $\frac{13}{30}$ 186  $\frac{61}{30}$   $\frac{1.8}{30}$ 185  $\frac{34}{30}$   $\frac{17}{30}$ 184  $\frac{15}{30}$   $\frac{00}{30}$ 

+50

183  $\frac{10}{30}$   $\frac{07}{30}$ 

+50

B.M. 4.76  $\frac{02}{30}$   $\frac{02}{30}$   $\frac{02}{30}$ 182  $\frac{02}{30}$   $\frac{02}{30}$ 181  $\frac{05}{30}$   $\frac{25}{30}$ 180  $\frac{20}{30}$   $\frac{30}{30}$ T. 12 1.03  $\frac{28}{30}$   $\frac{39}{30}$   $\frac{39}{30}$ 179  $\frac{28}{30}$   $\frac{39}{30}$ 178  $\frac{28}{30}$   $\frac{49}{30}$  $\frac{20240}{30}$ 

|                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                   |        |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-------------------|--------|
| 187.48          | 189.6           | 188.8           | 186.2           | 187.5           | 187.7           | 187.8           | 187.6           | 185.7           | 186.4           | 186.8             | 186.60 |
| $\frac{27}{30}$ | $\frac{34}{25}$ | $\frac{61}{19}$ | $\frac{48}{14}$ | $\frac{46}{11}$ | $\frac{45}{10}$ | $\frac{47}{10}$ | $\frac{66}{15}$ | $\frac{69}{21}$ | $\frac{53}{30}$ | $\frac{56.5}{33}$ |        |

|                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                   |        |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-------------------|--------|
| 187.15          | 190.3           | 190.3           | 189.5           | 186.6           | 187.9           | 188.2           | 187.5           | 186.1           | 185.3           | 186.5           | 187.0             | 186.91 |
| $\frac{20}{33}$ | $\frac{20}{30}$ | $\frac{28}{26}$ | $\frac{57}{18}$ | $\frac{44}{12}$ | $\frac{41}{10}$ | $\frac{45}{10}$ | $\frac{62}{10}$ | $\frac{70}{19}$ | $\frac{58}{22}$ | $\frac{63}{30}$ | $\frac{63.4}{33}$ |        |

|                 |                 |                 |                 |                 |                 |                |                 |                 |                 |                 |                   |        |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------|-----------------|-----------------|-----------------|-----------------|-------------------|--------|
| 186.82          | 188.2           | 188.5           | 186.9           | 185.0           | 186.3           | 186.7          | 186.1           | 185.6           | 183.9           | 186.2           | 186.5             | 186.15 |
| $\frac{41}{30}$ | $\frac{38}{29}$ | $\frac{54}{23}$ | $\frac{73}{18}$ | $\frac{60}{11}$ | $\frac{56}{10}$ | $\frac{62}{9}$ | $\frac{67}{12}$ | $\frac{82}{17}$ | $\frac{61}{21}$ | $\frac{55}{30}$ | $\frac{61.9}{33}$ |        |

|                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |       |       |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-------|-------|
| 186.49          | 186.0           | 186.0           | 186.1           | 184.3           | 184.9           | 185.3           | 185.8           | 185.3           | 184.0           | 184.6           | 184.1 | 184.2 |
| $\frac{63}{30}$ | $\frac{62}{28}$ | $\frac{50}{19}$ | $\frac{70}{17}$ | $\frac{70}{11}$ | $\frac{65}{10}$ | $\frac{70}{12}$ | $\frac{83}{16}$ | $\frac{77}{22}$ | $\frac{92}{30}$ | $\frac{81}{33}$ |       |       |

|                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |       |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-------|
| 185.8           | 185.8           | 186.0           | 184.0           | 185.4           | 185.6           | 185.2           | 184.9           | 184.6           | 184.0           | 183.1 |
| $\frac{65}{30}$ | $\frac{63}{27}$ | $\frac{83}{18}$ | $\frac{69}{11}$ | $\frac{67}{12}$ | $\frac{71}{12}$ | $\frac{82}{18}$ | $\frac{77}{25}$ | $\frac{83}{31}$ | $\frac{92}{33}$ |       |

|                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                   |        |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-------------------|--------|
| 186.25          | 185.5           | 185.3           | 185.1           | 184.0           | 185.7           | 185.6           | 185.6           | 183.6           | 184.5           | 184.3             | 184.02 |
| $\frac{68}{33}$ | $\frac{70}{30}$ | $\frac{72}{26}$ | $\frac{53}{18}$ | $\frac{66}{11}$ | $\frac{67}{12}$ | $\frac{67}{12}$ | $\frac{87}{20}$ | $\frac{78}{25}$ | $\frac{80}{30}$ | $\frac{82.3}{33}$ |        |

|                 |                 |                 |                 |                 |                 |                 |                 |                 |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 185.4           | 184.4           | 183.6           | 185.7           | 184.0           | 185.9           | 183.6           | 184.1           | 183.5           |
| $\frac{69}{30}$ | $\frac{77}{26}$ | $\frac{87}{20}$ | $\frac{66}{11}$ | $\frac{63}{10}$ | $\frac{64}{11}$ | $\frac{87}{23}$ | $\frac{82}{27}$ | $\frac{88}{33}$ |

|                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                   |       |        |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-------------------|-------|--------|
| 187.48          | 185.5           | 185.0           | 185.0           | 185.8           | 184.5           | 185.8           | 186.4           | 186.5           | 184.8           | 185.4             | 185.0 | 185.17 |
| $\frac{51}{33}$ | $\frac{80}{30}$ | $\frac{86}{27}$ | $\frac{78}{26}$ | $\frac{91}{19}$ | $\frac{78}{12}$ | $\frac{71}{12}$ | $\frac{58}{18}$ | $\frac{82}{23}$ | $\frac{86}{30}$ | $\frac{84.2}{33}$ |       |        |

|                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |        |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|--------|
| 188.14          | 186.6           | 186.9           | 186.2           | 185.9           | 187.2           | 187.5           | 187.3           | 186.1           | 187.2           | 188.7           | 188.6           | 188.38 |
| $\frac{14}{30}$ | $\frac{70}{30}$ | $\frac{67}{28}$ | $\frac{70}{25}$ | $\frac{47}{16}$ | $\frac{64}{13}$ | $\frac{63}{12}$ | $\frac{73}{18}$ | $\frac{64}{23}$ | $\frac{49}{29}$ | $\frac{50}{30}$ | $\frac{50}{33}$ |        |

|                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                   |        |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-------------------|--------|
| 189.57          | 189.1           | 189.2           | 189.1           | 187.2           | 189.8           | 189.0           | 188.8           | 187.3           | 189.9           | 190.7           | 190.6             | 190.94 |
| $\frac{45}{33}$ | $\frac{44}{30}$ | $\frac{43}{26}$ | $\frac{64}{20}$ | $\frac{48}{15}$ | $\frac{46}{11}$ | $\frac{48}{11}$ | $\frac{63}{16}$ | $\frac{37}{23}$ | $\frac{29}{28}$ | $\frac{30}{30}$ | $\frac{2.65}{33}$ |        |

|                  |                  |                  |                  |                  |                  |                  |                  |                  |                 |                 |                   |        |
|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|-----------------|-----------------|-------------------|--------|
| 191.15           | 191.7            | 192.0            | 191.8            | 189.5            | 191.3            | 191.2            | 190.8            | 189.7            | 192.0           | 193.3           | 193.1             | 193.24 |
| $\frac{107}{33}$ | $\frac{104}{30}$ | $\frac{106}{25}$ | $\frac{129}{20}$ | $\frac{111}{16}$ | $\frac{112}{11}$ | $\frac{116}{11}$ | $\frac{127}{14}$ | $\frac{104}{22}$ | $\frac{91}{29}$ | $\frac{93}{30}$ | $\frac{91.6}{33}$ |        |

|                 |                 |                 |                  |                 |                 |                 |                  |                  |                 |                 |                 |                   |        |
|-----------------|-----------------|-----------------|------------------|-----------------|-----------------|-----------------|------------------|------------------|-----------------|-----------------|-----------------|-------------------|--------|
| 193.64          | 194.2           | 194.4           | 194.5            | 192.1           | 194.0           | 193.9           | 193.7            | 191.9            | 191.9           | 195.5           | 196.1           | 196.5             | 196.68 |
| $\frac{82}{33}$ | $\frac{80}{30}$ | $\frac{79}{26}$ | $\frac{103}{20}$ | $\frac{81}{15}$ | $\frac{81}{15}$ | $\frac{87}{10}$ | $\frac{105}{19}$ | $\frac{105}{16}$ | $\frac{69}{19}$ | $\frac{63}{27}$ | $\frac{57}{30}$ | $\frac{57.2}{33}$ |        |



75v

|     |                 |                 |
|-----|-----------------|-----------------|
| 195 | $\frac{21}{30}$ | $\frac{00}{30}$ |
|-----|-----------------|-----------------|

182

|     |                        |                 |
|-----|------------------------|-----------------|
| 194 | $\frac{2 \cdot 1}{30}$ | $\frac{07}{30}$ |
|-----|------------------------|-----------------|

T.P. = B.M. 2.90 (195.82)

|     |                 |                 |
|-----|-----------------|-----------------|
| 193 | $\frac{35}{30}$ | $\frac{11}{30}$ |
|-----|-----------------|-----------------|

|     |                 |                |
|-----|-----------------|----------------|
| 192 | $\frac{45}{30}$ | $\frac{70}{3}$ |
|-----|-----------------|----------------|

f s d

|     |                 |                 |
|-----|-----------------|-----------------|
| 191 | $\frac{43}{30}$ | $\frac{23}{30}$ |
|-----|-----------------|-----------------|

|     |                 |                 |
|-----|-----------------|-----------------|
| 190 | $\frac{24}{30}$ | $\frac{25}{30}$ |
|-----|-----------------|-----------------|

TP 11.90 (198.92)

|     |                  |                  |
|-----|------------------|------------------|
| 189 | $\frac{1.5}{30}$ | $\frac{0.0}{30}$ |
|-----|------------------|------------------|

+ 52

|     |                 |                 |
|-----|-----------------|-----------------|
| 188 | $\frac{29}{30}$ | $\frac{08}{30}$ |
|-----|-----------------|-----------------|

192.25

191.70

192.50

193.72

19467

194.03

191.72

189.2

1878

|                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |       |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-------|
| 92.0            | 191.6           | 191.2           | 189.8           | 189.7           | 190.8           | 190.9           | 190.4           | 188.9           | 189.3           | 189.3           | 188.6           | 188.4 |
| $\frac{38}{33}$ | $\frac{42}{30}$ | $\frac{46}{26}$ | $\frac{60}{22}$ | $\frac{61}{19}$ | $\frac{50}{12}$ | $\frac{54}{10}$ | $\frac{69}{16}$ | $\frac{65}{22}$ | $\frac{65}{28}$ | $\frac{72}{30}$ | $\frac{74}{33}$ |       |

|       |       |       |       |       |       |       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 192.2 | 191.8 | 191.0 | 189.2 | 191.3 | 191.0 | 190.5 | 188.7 | 188.4 | 189.6 | 189.2 | 188.2 | 188.3 |
| 36    | 40    | 48    | 66    | 48    | 53    | 71    | 74    | 62    | 66    | 76    | 75    |       |
| 33    | 30    | 26    | 21    | 15    | 48    | 10    | 15    | 19    | 23    | 28    | 35    | 33    |

|           |           |           |           |           |           |           |           |           |           |           |           |           |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 192.4     | 192.1     | 191.5     | 189.9     | 190.8     | 190.9     | 190.4     | 189.0     | 188.9     | 189.4     | 189.6     | 189.1     | 189.0     |
| <u>34</u> | <u>37</u> | <u>43</u> | <u>61</u> | <u>50</u> | <u>44</u> | <u>34</u> | <u>68</u> | <u>69</u> | <u>64</u> | <u>62</u> | <u>67</u> | <u>68</u> |
| 33        | 30        | 25        | 109       | 15        | 49        | 0         | 13        | 18        | 21        | 78        | 30        | 33        |

|       |       |       |       |       |       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 143.0 | 142.6 | 142.0 | 140.1 | 141.3 | 140.8 | 140.3 | 140.3 | 140.1 | 140.4 | 140.8 | 140.0 |
| 28    | 32    | 38    | 57    | 45    | 50    | 55    | 62    | 67    | 62    | 60    | 58    |
| 33    | 30    | 26    | 20    | 18    | 9     | 12    | 15    | 19    | 21    | 28    | 33    |

|      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1954 | 1957 | 1951 | 1929 | 1937 | 1937 | 1932 | 1916 | 1916 | 1928 | 1931 | 1934 | 1928 | 1929 |
| 36   | 38   | 39   | 68   | 53   | 53   | 38   | 24   | 26   | 62   | 59   | 56   | 62   | 61   |
| 93   | 50   | 28   | 20   | 15   | 53   | 11   | 14   | 16   | 20   | 25   | 27   | 30   | 23   |

|        |        |        |        |        |        |        |        |        |        |        |         |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| 1997.4 | 1997.2 | 1997.0 | 1996.1 | 1996.0 | 1996.0 | 1995.6 | 1994.0 | 1994.0 | 1995.0 | 1994.7 | 1994.36 |
| 16     | 18     | 20     | 39     | 32     |        | 34     | 50     | 50     | 40     | 43     | 46      |
| 33     | 30     | 27     | 21     | 16     | 30     | 11     | 14     | 18     | —      | 30     | 33      |

|       |       |       |       |       |       |       |       |       |        |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 199.1 | 196.9 | 194.7 | 196.0 | 196.0 | 195.2 | 193.3 | 194.8 | 195.2 | 194.47 |
| 19    | 21    | 43    | 30    | 38    | 57    | 42    | 38    | 430   |        |
| 33    | 27    | 21    | 14    | 30    | 12    | 16    | 23    | 30    | 33     |

|      |       |       |       |       |       |       |       |       |       |       |       |       |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1616 | 196.3 | 196.1 | 194.2 | 195.6 | 195.3 | 194.7 | 192.5 | 194.8 | 195.1 | 194.4 | 194.3 | 193.8 |
| 21   | 27    | 29    | 48    | 36    | 37    | 43    | 65    | 42    | 39    | 46    | 47    | 49    |
| 33   | 30    | 27    | 21    | 16    |       | 12    | 15    | 19    | 27    | 29    | 32    | 33    |

|       |       |       |       |       |       |       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 192.1 | 192.2 | 191.9 | 190.0 | 191.3 | 191.1 | 191.2 | 189.4 | 192.6 | 192.9 | 193.3 | 192.4 | 192.1 |
| 69    | 68    | 71    | 90    | 77    | 79    | 75    | 96    | 64    | 61    | 57    | 61    | 62    |
| 33    | 30    | 26    | 19    | 12    | 10    | 14    | 20    | 25    | 27    | 30    | 33    | 33    |

|       |       |       |       |       |       |       |       |       |       |       |        |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 188.8 | 188.8 | 187.2 | 187.2 | 188.3 | 188.5 | 188.1 | 187.1 | 187.0 | 187.3 | 186.8 | 187.07 |
| 35    | 35    | 21    | 21    | 40    | 38    | 42    | 52    | 33    | 50    | 55    | 51.8   |
| 30    | 26    | 21    | 18    | 12    | 38    | 9     | 16    | 2     | 30    | 33    | 23     |

|       |       |       |       |       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 188.6 | 188.6 | 188.0 | 186.1 | 187.8 | 187.9 | 187.4 | 188.2 | 186.7 | 186.3 | 186.1 |
| 37    | 37    | 43    | 52    | 45    | 49    | 49    | 61    | 56    | 60    | 62    |
| 33    | 30    | 25    | 20    | 15    | 44    | 12    | 18    | 22    | 30    | 39    |

|       |       |       |       |       |       |       |       |       |       |        |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 188.6 | 188.7 | 188.8 | 186.4 | 187.3 | 187.4 | 187.4 | 186.1 | 186.9 | 186.6 | 186.01 |
| 37    | 36    | 35    | 59    | 60    | 49    | 49    | 62    | 52    | 57    | 6.22   |
| 33    | 30    | 27    | 20    | 15    | 44    | 11    | 16    | 21    | 36    | 3.22   |



BM 56 202+16-3pk ms Gate Pad 44 - E1 = 189.94

|          |                 |                  |        |                   |                   |                    |                   |                   |                   |                   |                   |                   |                   |                   |                   |                    |
|----------|-----------------|------------------|--------|-------------------|-------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|--------------------|
| 204      | $\frac{31}{30}$ | $\frac{33}{20}$  | 186.25 | 187.4<br>37<br>33 | 187.5<br>37<br>30 | 187.4<br>38<br>28  | 184.8<br>64<br>21 | 186.3<br>49<br>15 | 186.2<br>50<br>50 | 186.1<br>41<br>72 | 184.9<br>63<br>13 | 189.9<br>63<br>17 | 187.7<br>35<br>24 | 189.2<br>30<br>27 | 187.7<br>35<br>30 | 187.1<br>354<br>33 |
| +50      |                 |                  |        | 189.2<br>20<br>33 | 189.0<br>22<br>27 | 186.5<br>45<br>21  | 188.2<br>30<br>15 | 188.2<br>30<br>30 | 188.2<br>30<br>4  | 187.1<br>41<br>14 | 187.2<br>41<br>17 | 189.9<br>13<br>26 | 190.2<br>10<br>27 | 189.9<br>13<br>33 |                   |                    |
| BM       | 122             | (91.18)          | 9.86   | 189.91            | 189.94            | 189.94             | 189.94            | 189.94            | 189.94            | 189.94            | 189.94            | 189.94            | 189.94            | 189.94            | 189.94            | 189.94             |
| 202=203  | $\frac{21}{30}$ | $\frac{33}{30}$  | 189.98 | 189.98            | 189.98            | 189.98             | 189.98            | 189.98            | 189.98            | 189.98            | 189.98            | 189.98            | 189.98            | 189.98            | 189.98            | 189.98             |
| +50      |                 |                  |        | 191.2<br>56<br>30 | 191.2<br>56<br>28 | 189.6<br>102<br>22 | 190.7<br>81<br>19 | 191.4<br>82<br>15 | 191.5<br>82<br>83 | 191.2<br>86<br>10 | 190.2<br>96<br>14 | 193.1<br>67<br>21 | 193.0<br>68<br>26 | 193.5<br>63<br>28 | 193.3<br>65<br>33 |                    |
| 201      | $\frac{13}{30}$ | $\frac{25}{30}$  | 192.68 | 192.68            | 192.68            | 192.68             | 192.68            | 192.68            | 192.68            | 192.68            | 192.68            | 192.68            | 192.68            | 192.68            | 192.68            | 192.68             |
| 200      | $\frac{13}{30}$ | $\frac{34}{30}$  | 194.84 | 194.84            | 194.84            | 194.84             | 194.84            | 194.84            | 194.84            | 194.84            | 194.84            | 194.84            | 194.84            | 194.84            | 194.84            | 194.84             |
| +50      |                 |                  |        | 195.6<br>42<br>33 | 195.7<br>41<br>27 | 194.2<br>56<br>21  | 195.6<br>42<br>16 | 196.1<br>37<br>37 | 195.9<br>39<br>9  | 194.7<br>51<br>12 | 194.9<br>51<br>15 | 196.5<br>33<br>21 | 196.8<br>30<br>26 | 197.3<br>25<br>28 | 197.2<br>26<br>30 | 196.9<br>29<br>33  |
| 199      | $\frac{24}{30}$ | $\frac{31}{30}$  | 196.06 | 196.06            | 196.06            | 196.06             | 196.06            | 196.06            | 196.06            | 196.06            | 196.06            | 196.06            | 196.06            | 196.06            | 196.06            | 196.06             |
| +50      |                 |                  |        | 197.1<br>27<br>33 | 196.8<br>30<br>30 | 196.7<br>31<br>26  | 195.3<br>45<br>20 | 196.5<br>33<br>15 | 196.7<br>31<br>31 | 196.4<br>34<br>10 | 195.8<br>40<br>12 | 194.9<br>49<br>14 | 194.9<br>49<br>16 | 196.4<br>34<br>20 | 197.0<br>25<br>28 | 196.5<br>33<br>30  |
| 198      | $\frac{31}{30}$ | $\frac{23}{30}$  | 195.40 | 195.40            | 195.40            | 195.40             | 195.40            | 195.40            | 195.40            | 195.40            | 195.40            | 195.40            | 195.40            | 195.40            | 195.40            | 195.40             |
| T.P.     | 4.44            | (199.72)         | 0.49   | 195.33            | 195.33            | 195.33             | 195.33            | 195.33            | 195.33            | 195.33            | 195.33            | 195.33            | 195.33            | 195.33            | 195.33            | 195.33             |
| 197      | $\frac{26}{30}$ | $\frac{1,2}{30}$ | 193.80 | 193.80            | 193.80            | 193.80             | 193.80            | 193.80            | 193.80            | 193.80            | 193.80            | 193.80            | 193.80            | 193.80            | 193.80            | 193.80             |
| 196      | $\frac{16}{30}$ | $\frac{25}{30}$  | 192.78 | 192.78            | 192.78            | 192.78             | 192.78            | 192.78            | 192.78            | 192.78            | 192.78            | 192.78            | 192.78            | 192.78            | 192.78            | 192.78             |
| (195.82) |                 |                  |        | 191.8<br>40<br>30 | 191.7<br>36<br>27 | 190.2<br>56<br>22  | 190.2<br>56<br>19 | 191.2<br>46<br>15 | 191.2<br>46<br>15 | 190.9<br>51<br>9  | 189.5<br>63<br>13 | 194<br>64<br>17   | 190.0<br>58<br>20 | 190.4<br>58<br>21 | 189.9<br>59<br>30 | 191.4<br>58<br>33  |



|      |                  |                  |        |       |        |        |                                                                                                                                                                                                                                                                                            |
|------|------------------|------------------|--------|-------|--------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 214  | $\frac{0.1}{30}$ | $\frac{0.0}{30}$ |        |       |        | 156.85 | $\frac{155.3}{47}$<br>$\frac{155.3}{47}$<br>$\frac{154.8}{52}$<br>$\frac{154.9}{51}$<br>$\frac{155.6}{40}$<br>$\frac{156.2}{40}$<br>$\frac{156.0}{42}$<br>$\frac{154.8}{52}$<br>$\frac{154.7}{53}$<br>$\frac{155.4}{53}$<br>$\frac{155.4}{53}$                                             |
| 213  | $\frac{1.2}{30}$ | $\frac{0.2}{30}$ |        |       |        | 158.00 | $\frac{157.4}{26}$<br>$\frac{157.2}{28}$<br>$\frac{156.9}{31}$<br>$\frac{156.0}{40}$<br>$\frac{156.2}{38}$<br>$\frac{156.9}{31}$<br>$\frac{157.6}{27}$<br>$\frac{157.3}{27}$<br>$\frac{156.7}{38}$<br>$\frac{156.1}{39}$<br>$\frac{156.2}{38}$<br>$\frac{157.4}{33}$                       |
| T.P. | 2.65             |                  | 160.02 | 11.21 | 157.37 |        |                                                                                                                                                                                                                                                                                            |
| 212  | $\frac{1.7}{30}$ | $\frac{2.6}{30}$ |        |       |        | 159.75 | $\frac{159.4}{92}$<br>$\frac{159.1}{92}$<br>$\frac{157.6}{20}$<br>$\frac{157.8}{108}$<br>$\frac{158.5}{101}$<br>$\frac{159.1}{95}$<br>$\frac{159.0}{96}$<br>$\frac{159.4}{112}$<br>$\frac{159.5}{91}$<br>$\frac{160.0}{86}$<br>$\frac{159.7}{88}$                                          |
| 211  | $\frac{1.9}{30}$ | $\frac{2.6}{30}$ |        |       |        | 161.50 | $\frac{161.5}{71}$<br>$\frac{161.3}{73}$<br>$\frac{161.2}{74}$<br>$\frac{159.5}{21}$<br>$\frac{159.4}{92}$<br>$\frac{160.6}{80}$<br>$\frac{161.1}{75}$<br>$\frac{161.0}{76}$<br>$\frac{159.1}{95}$<br>$\frac{161.4}{72}$<br>$\frac{161.7}{69}$<br>$\frac{161.8}{83}$                       |
| 210  | $\frac{2.1}{30}$ | $\frac{2.2}{30}$ |        |       |        | 163.25 | $\frac{163.5}{51}$<br>$\frac{163.4}{52}$<br>$\frac{161.5}{71}$<br>$\frac{161.4}{74}$<br>$\frac{162.8}{68}$<br>$\frac{163.5}{51}$<br>$\frac{163.1}{55}$<br>$\frac{161.7}{69}$<br>$\frac{163.0}{86}$<br>$\frac{163.5}{51}$<br>$\frac{163.8}{83}$                                             |
| +50  |                  |                  |        |       |        |        | $\frac{165.3}{33}$<br>$\frac{164.7}{39}$<br>$\frac{162.6}{60}$<br>$\frac{162.7}{57}$<br>$\frac{164.1}{43}$<br>$\frac{164.6}{40}$<br>$\frac{164.3}{43}$<br>$\frac{162.8}{58}$<br>$\frac{163.0}{66}$<br>$\frac{164.3}{43}$<br>$\frac{164.8}{38}$<br>$\frac{164.8}{38}$                       |
| 209  | $\frac{3.0}{30}$ | $\frac{2.4}{30}$ |        |       |        | 165.62 | $\frac{166.9}{17}$<br>$\frac{166.6}{20}$<br>$\frac{166.5}{21}$<br>$\frac{164.5}{41}$<br>$\frac{164.3}{43}$<br>$\frac{165.6}{51}$<br>$\frac{165.9}{32}$<br>$\frac{165.4}{32}$<br>$\frac{164.1}{45}$<br>$\frac{164.1}{45}$<br>$\frac{165.5}{31}$<br>$\frac{166.0}{26}$<br>$\frac{166.2}{33}$ |
| +50  |                  |                  |        |       |        |        | $\frac{168.6}{00}$<br>$\frac{168.6}{06}$<br>$\frac{165.5}{31}$<br>$\frac{167.0}{16}$<br>$\frac{167.3}{13}$<br>$\frac{167.1}{15}$<br>$\frac{165.8}{28}$<br>$\frac{165.8}{28}$<br>$\frac{167.1}{13}$<br>$\frac{168.0}{06}$<br>$\frac{167.8}{58}$                                             |
| T.P. | 2.20             |                  | 168.58 | 12.26 | 166.38 |        |                                                                                                                                                                                                                                                                                            |
| 208  | $\frac{3.5}{30}$ | $\frac{3.0}{30}$ |        |       |        | 169.25 | $\frac{170.4}{82}$<br>$\frac{170.0}{56}$<br>$\frac{169.0}{96}$<br>$\frac{166.9}{117}$<br>$\frac{168.5}{101}$<br>$\frac{168.7}{99}$<br>$\frac{168.5}{101}$<br>$\frac{166.1}{119}$<br>$\frac{168.9}{97}$<br>$\frac{169.4}{92}$<br>$\frac{169.7}{89}$<br>$\frac{169.8}{83}$                   |
| 207  | $\frac{3.5}{30}$ | $\frac{3.1}{30}$ |        |       |        | 173.50 | $\frac{174.1}{45}$<br>$\frac{173.9}{47}$<br>$\frac{173.6}{60}$<br>$\frac{170.4}{82}$<br>$\frac{170.0}{64}$<br>$\frac{172.1}{65}$<br>$\frac{171.8}{68}$<br>$\frac{170.5}{81}$<br>$\frac{170.5}{51}$<br>$\frac{172.8}{68}$<br>$\frac{173.6}{50}$<br>$\frac{172.2}{53}$                       |
| 206  | $\frac{3.7}{30}$ | $\frac{3.6}{30}$ |        |       |        | 177.75 | $\frac{178.4}{04}$<br>$\frac{178.6}{00}$<br>$\frac{178.4}{02}$<br>$\frac{174.9}{37}$<br>$\frac{176.2}{21}$<br>$\frac{176.2}{24}$<br>$\frac{176.1}{25}$<br>$\frac{174.8}{38}$<br>$\frac{174.7}{39}$<br>$\frac{177.7}{09}$<br>$\frac{178.3}{03}$<br>$\frac{178.4}{02}$<br>$\frac{177.9}{33}$ |
| T.P. | 0.13             |                  | 178.64 | 12.65 | 178.51 |        |                                                                                                                                                                                                                                                                                            |
| 205  | $\frac{3.5}{30}$ | $\frac{3.1}{30}$ |        |       |        | 182.00 | $\frac{183.8}{14}$<br>$\frac{183.6}{76}$<br>$\frac{183.3}{79}$<br>$\frac{180.8}{104}$<br>$\frac{182.0}{92}$<br>$\frac{181.6}{96}$<br>$\frac{181.4}{98}$<br>$\frac{180.4}{103}$<br>$\frac{181.6}{84}$<br>$\frac{182.3}{79}$<br>$\frac{183.2}{80}$<br>$\frac{183.0}{83}$                     |
|      |                  |                  | 191.16 |       |        |        |                                                                                                                                                                                                                                                                                            |



B.M. Sta 220 - C. of E. Wall of Port I B B. E. 151.92

+50

220 On Bridge

B.M. 4.51 156.43 4.34 151.91

+50

219

0.5  
300.5  
30

218

1.4  
201.4  
20

217

1.4  
301.4  
30

3+50

+

XRA +28

D +

T.P. 0.93

216

1.4  
30

215

0.3  
30156.25 4.70155.32162.02

152.00

151.92

151.92

152.28

152.83

153.39

154.65

155.70

|       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 148.0 | 148.1 | 149.5 | 149.1 | 151.1 | 151.0 | 151.2 | 149.5 | 147.9 | 146.4 | 146.4 | 147.6 | 149.0 | 149.4 |
| 82    | 83    | 69    | 73    | 63    | 50    | 52    | 69    | 85    | 100   | 100   | 88    | 74    | 76    |
| 33    | 22    | 21    | 15    | 1     | 50    | 15    | 21    | 24    | 25    | 27    | 28    | 31    | 33    |

|       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 146.7 | 146.8 | 148.8 | 148.4 | 150.5 | 151.2 | 151.7 | 151.1 | 151.5 | 150.7 | 147.9 | 147.1 | 147.1 | 147.1 |
| 76    | 95    | 75    | 79    | 58    | 51    | 46    | 52    | 48    | 56    | 51    | 92    | 92    | 92    |
| 33    | 31    | 26    | 23    | 16    | 12    | 46    | 15    | 16    | 21    | 29    | 30    | 33    | 33    |

|       |       |       |       |       |       |       |       |       |       |       |       |        |        |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|
| 146.2 | 148.3 | 148.9 | 149.9 | 150.8 | 151.2 | 151.7 | 151.2 | 149.1 | 148.1 | 148.0 | 148.0 | 148.11 | 148.11 |
| 81    | 80    | 76    | 66    | 55    | 51    | 46    | 51    | 72    | 82    | 83    | 83    | 81     | 81     |
| 33    | 30    | 21    | 14    | 12    | 9     | 46    | 14    | 22    | 26    | 30    | 30    | 33     | 33     |

|       |       |       |       |       |       |       |       |       |       |       |       |        |        |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|
| 150.7 | 149.8 | 149.1 | 148.5 | 148.6 | 151.5 | 152.0 | 151.7 | 149.4 | 149.1 | 150.0 | 150.0 | 149.81 | 149.81 |
| 56    | 65    | 72    | 78    | 77    | 48    | 43    | 46    | 69    | 72    | 63    | 63    | 64     | 64     |
| 31    | 30    | 27    | 25    | 22    | 13    | 43    | 12    | 18    | 23    | 25    | 24    | 33     | 33     |

|       |       |       |       |       |       |       |       |       |       |       |       |        |        |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|
| 152.1 | 151.8 | 151.4 | 150.9 | 150.9 | 152.7 | 153.2 | 152.9 | 150.9 | 150.8 | 151.0 | 151.7 | 152.56 | 152.56 |
| 64    | 50    | 49    | 25    | 24    | 36    | 31    | 34    | 54    | 55    | 49    | 46    | 36     | 36     |
| 31    | 28    | 25    | 23    | 19    | 14    | 31    | 12    | 18    | 22    | 25    | 30    | 33     | 33     |

|       |       |       |       |       |       |       |       |       |       |       |       |        |        |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|
| 154.1 | 154.0 | 152.0 | 152.0 | 153.9 | 153.9 | 153.7 | 153.0 | 152.4 | 153.8 | 153.8 | 153.8 | 155.18 | 155.18 |
| 22    | 23    | 43    | 43    | 21    | 24    | 26    | 33    | 39    | 25    | 25    | 25    | 46     | 46     |
| 35    | 30    | 27    | 23    | 20    | 24    | 13    | 21    | 23    | 35    | 35    | 35    | 33     | 33     |

|       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 153.6 | 154.0 | 154.1 | 154.1 | 154.5 | 154.5 | 154.5 | 154.5 | 154.5 | 154.5 | 154.5 | 154.5 | 154.5 | 154.5 |
| 27    | 21    | 21    | 22    | 18    | 18    | 18    | 18    | 18    | 18    | 18    | 18    | 18    | 18    |
| 35    | 16    | 22    | 13    | 35    | 35    | 35    | 35    | 35    | 35    | 35    | 35    | 35    | 35    |

|       |       |       |       |       |       |       |       |       |       |       |       |        |        |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|
| 154.1 | 154.0 | 154.1 | 153.0 | 152.6 | 154.1 | 154.2 | 154.1 | 152.8 | 152.8 | 153.8 | 153.8 | 155.18 | 155.18 |
| 39    | 60    | 59    | 20    | 24    | 39    | 59    | 59    | 22    | 72    | 62    | 62    | 46     | 46     |
| 33    | 20    | 25    | 22    | 19    | 12    | 38    | 13    | 20    | 24    | 30    | 33    | 33     | 33     |

|       |       |       |       |       |       |       |       |       |       |       |        |        |        |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|
| 153.9 | 154.0 | 153.8 | 153.1 | 154.4 | 154.4 | 154.8 | 153.8 | 153.8 | 154.3 | 154.5 | 154.99 | 154.99 | 154.99 |
| 63    | 6     | 62    | 63    | 52    | 52    | 52    | 62    | 62    | 57    | 55    | 50     | 50     | 50     |
| 33    | 30    | 24    | 23    | 18    | 23    | 48    | 11    | 18    | 22    | 24    | 30     | 33     | 33     |



T.P. 8.79 179.80 0.33 171.01 168.36

NO. 1 M.F.P.  
344 231

231  $\frac{35}{30}$   $\frac{56}{30}$

230  $\frac{29}{30}$   $\frac{46}{30}$

229  $\frac{20}{30}$   $\frac{40}{30}$

T.P. 12.36 171.34 0.12 168.98

228  $\frac{35}{30}$   $\frac{45}{30}$

227  $\frac{20}{30}$   $\frac{20}{30}$

+50

226  $\frac{1.2}{30}$

T.P. 7.01 159.10 4.34 152.09

225  $\frac{07}{30}$

224  $\frac{13}{30}$

223  $\frac{10}{30}$

222  $\frac{10}{30}$

221  $\frac{10}{30}$

156.43

|                  |                  |                  |                  |                  |                  |                 |                  |                  |                  |                   |                   |                   |
|------------------|------------------|------------------|------------------|------------------|------------------|-----------------|------------------|------------------|------------------|-------------------|-------------------|-------------------|
| 169.8            | 169.9            | 167.5            | 166.8            | 169.0            | 169.4            | 169.2           | 168.7            | 169.4            | 168.7            | 171.3             | 172.0             | 172.0             |
| $\frac{15}{33}$  | $\frac{14}{30}$  | $\frac{35}{23}$  | $\frac{45}{22}$  | $\frac{23}{18}$  | $\frac{21}{19}$  | $\frac{26}{12}$ | $\frac{35}{16}$  | $\frac{26}{14}$  | $\frac{0.0}{24}$ | $\frac{-0.7}{30}$ | $\frac{-0.7}{33}$ | $\frac{-0.7}{33}$ |
| 164.72           | 165.4            | 165.4            | 162.9            | 162.4            | 164.4            | 164.8           | 164.9            | 163.3            | 165.0            | 167.1             | 167.3             | 167.8             |
| $\frac{39}{30}$  | $\frac{39}{28}$  | $\frac{39}{28}$  | $\frac{59}{23}$  | $\frac{59}{21}$  | $\frac{69}{16}$  | $\frac{65}{12}$ | $\frac{60}{12}$  | $\frac{50}{16}$  | $\frac{63}{22}$  | $\frac{43}{27}$   | $\frac{40}{30}$   | $\frac{34.0}{33}$ |
| 161.09           | 159.1            | 158.8            | 158.2            | 160.4            | 160.9            | 161.2           | 160.9            | 159.1            | 159.6            | 162.7             | 163.6             | 163.6             |
| $\frac{113}{27}$ | $\frac{125}{25}$ | $\frac{125}{22}$ | $\frac{131}{20}$ | $\frac{109}{15}$ | $\frac{104}{10}$ | $\frac{101}{9}$ | $\frac{106}{12}$ | $\frac{122}{15}$ | $\frac{117}{20}$ | $\frac{86}{30}$   | $\frac{76.6}{33}$ | $\frac{76.6}{33}$ |
| 157.4            | 158.5            | 158.0            | 156.2            | 155.5            | 156.5            | 157.1           | 157.1            | 155.3            | 155.4            | 156.5             | 159.10            | 160.40            |
| $\frac{06}{30}$  | $\frac{11}{30}$  | $\frac{29}{27}$  | $\frac{36}{26}$  | $\frac{36}{17}$  | $\frac{26}{15}$  | $\frac{20}{9}$  | $\frac{38}{16}$  | $\frac{37}{14}$  | $\frac{26}{27}$  | $\frac{09}{30}$   | $\frac{-12}{33}$  | $\frac{-12}{33}$  |
| 154.05           | 150.1            | 150.2            | 153.3            | 153.8            | 153.8            | 152.5           | 152.9            | 154.0            | 154.1            | 154.5             | 154.5             | 154.5             |
| $\frac{7}{33}$   | $\frac{58}{33}$  | $\frac{89}{30}$  | $\frac{58}{11}$  | $\frac{53}{11}$  | $\frac{53}{11}$  | $\frac{66}{17}$ | $\frac{62}{27}$  | $\frac{52}{29}$  | $\frac{50}{30}$  | $\frac{45}{33}$   | $\frac{45}{33}$   | $\frac{45}{33}$   |
| 148.7            | 148.8            | 151.1            | 152.4            | 150.8            | 152.6            | 151.3           | 151.2            | 151.9            | 152.4            | 152.4             | 152.4             | 152.4             |
| $\frac{102}{33}$ | $\frac{103}{21}$ | $\frac{80}{10}$  | $\frac{67}{8}$   | $\frac{63}{12}$  | $\frac{63}{12}$  | $\frac{78}{17}$ | $\frac{79}{25}$  | $\frac{72}{30}$  | $\frac{67}{31}$  | $\frac{67}{33}$   | $\frac{67}{33}$   | $\frac{67}{33}$   |
| 152.2            | 147.3            | 147.6            | 148.6            | 150.7            | 150.8            | 151.8           | 150.1            | 151.7            | 151.3            | 150.5             | 150.3             | 150.8             |
| $\frac{118}{33}$ | $\frac{115}{26}$ | $\frac{105}{18}$ | $\frac{80}{14}$  | $\frac{83}{12}$  | $\frac{73}{10}$  | $\frac{70}{10}$ | $\frac{70}{12}$  | $\frac{78}{14}$  | $\frac{26}{16}$  | $\frac{88}{24}$   | $\frac{83}{29}$   | $\frac{80}{30}$   |
| 152.00           | 147.7            | 147.8            | 148.6            | 150.0            | 150.5            | 151.6           | 151.6            | 151.4            | 149.3            | 149.0             | 149.2             | 149.8             |
| $\frac{97}{33}$  | $\frac{86}{26}$  | $\frac{78}{26}$  | $\frac{60}{19}$  | $\frac{59}{16}$  | $\frac{59}{13}$  | $\frac{43}{10}$ | $\frac{48}{11}$  | $\frac{50}{16}$  | $\frac{21}{23}$  | $\frac{74}{30}$   | $\frac{70}{30}$   | $\frac{66}{33}$   |
| 152.00           | 148.7            | 148.6            | 148.9            | 150.8            | 150.6            | 151.6           | 151.9            | 151.3            | 149.3            | 149.1             | 149.6             | 150.14            |
| $\frac{77}{33}$  | $\frac{78}{28}$  | $\frac{75}{19}$  | $\frac{56}{14}$  | $\frac{58}{12}$  | $\frac{48}{10}$  | $\frac{47}{10}$ | $\frac{51}{12}$  | $\frac{71}{18}$  | $\frac{73}{24}$  | $\frac{68}{30}$   | $\frac{62}{33}$   | $\frac{62}{33}$   |
| 152.00           | 148.2            | 148.4            | 148.6            | 150.9            | 150.3            | 151.4           | 151.8            | 151.4            | 149.6            | 149.5             | 148.9             | 148.6             |
| $\frac{82}{33}$  | $\frac{80}{25}$  | $\frac{78}{19}$  | $\frac{55}{14}$  | $\frac{61}{12}$  | $\frac{50}{10}$  | $\frac{46}{10}$ | $\frac{50}{12}$  | $\frac{68}{15}$  | $\frac{69}{17}$  | $\frac{75}{18}$   | $\frac{78}{22}$   | $\frac{73}{30}$   |
| 152.00           | 148.7            | 149.1            | 150.9            | 150.7            | 151.5            | 151.7           | 151.5            | 150.1            | 150.7            | 148.8             | 148.2             | 148.5             |
| $\frac{77}{33}$  | $\frac{73}{28}$  | $\frac{55}{14}$  | $\frac{57}{12}$  | $\frac{49}{10}$  | $\frac{47}{10}$  | $\frac{49}{7}$  | $\frac{49}{7}$   | $\frac{63}{13}$  | $\frac{63}{14}$  | $\frac{76}{17}$   | $\frac{82}{21}$   | $\frac{79}{30}$   |
| 152.00           | 149.9            | 149.2            | 149.4            | 149.6            | 151.2            | 151.4           | 151.1            | 149.9            | 148.9            | 149.5             | 149.6             | 149.2             |
| $\frac{85}{33}$  | $\frac{82}{20}$  | $\frac{70}{16}$  | $\frac{69}{14}$  | $\frac{52}{10}$  | $\frac{50}{10}$  | $\frac{53}{10}$ | $\frac{53}{10}$  | $\frac{65}{14}$  | $\frac{75}{19}$  | $\frac{84}{21}$   | $\frac{98}{26}$   | $\frac{82}{30}$   |
| 156.43           | 148.9            | 148.9            | 149.4            | 149.6            | 151.2            | 151.4           | 151.1            | 149.9            | 148.9            | 149.5             | 149.6             | 149.2             |
| $\frac{85}{33}$  | $\frac{82}{20}$  | $\frac{70}{16}$  | $\frac{69}{14}$  | $\frac{52}{10}$  | $\frac{50}{10}$  | $\frac{53}{10}$ | $\frac{53}{10}$  | $\frac{65}{14}$  | $\frac{75}{19}$  | $\frac{84}{21}$   | $\frac{98}{26}$   | $\frac{82}{30}$   |







252  $\frac{31}{30}$   $\frac{00}{30}$

251  $\frac{24}{30}$   $\frac{07}{30}$

250  $\frac{21}{30}$   $\frac{00}{30}$

BM 8.00  $\frac{1.2}{30}$   $\frac{00}{30}$

250

248  $\frac{24}{30}$   $\frac{00}{30}$

247  $\frac{41}{30}$   $\frac{05}{30}$

246  $\frac{47}{30}$   $\frac{12}{30}$

T.P 3.29  $\frac{32}{30}$   $\frac{04}{30}$

245  $\frac{32}{30}$   $\frac{04}{30}$

244  $\frac{42}{30}$   $\frac{14}{30}$

250

243  $\frac{53}{30}$   $\frac{37}{30}$

193.12

187.00  $\frac{186.1}{51}$   $\frac{187.2}{50}$   $\frac{186.7}{55}$   $\frac{185.4}{68}$   $\frac{185.3}{69}$   $\frac{186.4}{58}$   $\frac{186.7}{55}$   $\frac{186.6}{56}$   $\frac{184.9}{73}$   $\frac{185.4}{68}$   $\frac{186.1}{61}$   $\frac{186.3}{62}$   $\frac{185.0}{72}$   $\frac{185.09}{75}$

185.00  $\frac{185.4}{51}$   $\frac{185.1}{50}$   $\frac{184.1}{55}$   $\frac{183.9}{68}$   $\frac{184.8}{69}$   $\frac{184.8}{58}$   $\frac{184.5}{55}$   $\frac{183.8}{56}$   $\frac{182.9}{73}$   $\frac{184.2}{68}$   $\frac{183.7}{61}$   $\frac{183.7}{62}$   $\frac{183.50}{72}$   $\frac{183.50}{75}$

183.50  $\frac{183.4}{51}$   $\frac{183.5}{50}$   $\frac{182.4}{55}$   $\frac{182.5}{68}$   $\frac{183.4}{69}$   $\frac{183.4}{58}$   $\frac{182.8}{55}$   $\frac{182.0}{56}$   $\frac{181.3}{73}$   $\frac{182.0}{68}$   $\frac{182.3}{61}$   $\frac{181.1}{62}$   $\frac{181.08}{72}$   $\frac{181.08}{75}$

183.00  $\frac{182.5}{51}$   $\frac{182.2}{50}$   $\frac{181.9}{55}$   $\frac{181.2}{68}$   $\frac{182.1}{69}$   $\frac{182.1}{58}$   $\frac{181.8}{55}$   $\frac{180.4}{56}$   $\frac{180.4}{73}$   $\frac{180.6}{68}$   $\frac{179.9}{61}$   $\frac{179.88}{62}$   $\frac{179.88}{72}$   $\frac{179.88}{75}$

$\frac{183.2}{51}$   $\frac{182.9}{50}$   $\frac{181.4}{55}$   $\frac{181.5}{68}$   $\frac{182.0}{69}$   $\frac{181.7}{58}$   $\frac{180.5}{55}$   $\frac{180.9}{56}$   $\frac{180.0}{73}$   $\frac{179.7}{68}$   $\frac{179.88}{61}$   $\frac{179.88}{62}$   $\frac{179.88}{72}$   $\frac{179.88}{75}$

183.00  $\frac{183.4}{51}$   $\frac{183.1}{50}$   $\frac{182.3}{55}$   $\frac{181.4}{68}$   $\frac{182.5}{69}$   $\frac{182.4}{58}$   $\frac{181.7}{55}$   $\frac{180.5}{56}$   $\frac{180.7}{73}$   $\frac{179.9}{68}$   $\frac{179.88}{61}$   $\frac{179.88}{62}$   $\frac{179.88}{72}$   $\frac{179.88}{75}$

183.47  $\frac{183.4}{51}$   $\frac{183.4}{50}$   $\frac{182.5}{55}$   $\frac{182.2}{68}$   $\frac{183.3}{69}$   $\frac{182.8}{58}$   $\frac{181.2}{55}$   $\frac{182.3}{56}$   $\frac{181.8}{73}$   $\frac{181.8}{68}$   $\frac{181.8}{61}$   $\frac{181.8}{62}$   $\frac{181.8}{72}$   $\frac{181.8}{75}$

184.85  $\frac{187.9}{51}$   $\frac{187.4}{50}$   $\frac{185.1}{55}$   $\frac{185.7}{68}$   $\frac{186.6}{69}$   $\frac{186.6}{58}$   $\frac{186.2}{55}$   $\frac{184.2}{56}$   $\frac{184.7}{73}$   $\frac{184.7}{68}$   $\frac{184.7}{61}$   $\frac{184.7}{62}$   $\frac{184.7}{72}$   $\frac{184.7}{75}$

186.7  $\frac{187.9}{51}$   $\frac{187.4}{50}$   $\frac{185.1}{55}$   $\frac{185.7}{68}$   $\frac{186.6}{69}$   $\frac{186.6}{58}$   $\frac{186.2}{55}$   $\frac{184.2}{56}$   $\frac{184.7}{73}$   $\frac{184.7}{68}$   $\frac{184.7}{61}$   $\frac{184.7}{62}$   $\frac{184.7}{72}$   $\frac{184.7}{75}$

188.57  $\frac{190.8}{51}$   $\frac{190.8}{50}$   $\frac{190.5}{55}$   $\frac{189.7}{68}$   $\frac{189.0}{69}$   $\frac{188.5}{58}$   $\frac{187.8}{55}$   $\frac{187.8}{56}$   $\frac{187.1}{73}$   $\frac{188.6}{68}$   $\frac{188.0}{61}$   $\frac{188.0}{62}$   $\frac{188.0}{72}$   $\frac{188.0}{75}$

$\frac{191.7}{51}$   $\frac{191.6}{50}$   $\frac{189.6}{55}$   $\frac{189.1}{68}$   $\frac{190.4}{69}$   $\frac{189.9}{58}$   $\frac{189.9}{55}$   $\frac{189.9}{56}$   $\frac{189.9}{73}$   $\frac{189.9}{68}$   $\frac{189.9}{61}$   $\frac{189.9}{62}$   $\frac{189.9}{72}$   $\frac{189.9}{75}$

188.22  $\frac{192.0}{51}$   $\frac{191.7}{50}$   $\frac{189.7}{55}$   $\frac{189.5}{68}$   $\frac{190.5}{69}$   $\frac{189.7}{58}$   $\frac{189.7}{55}$   $\frac{189.7}{56}$   $\frac{189.7}{73}$   $\frac{189.7}{68}$   $\frac{189.7}{61}$   $\frac{189.7}{62}$   $\frac{189.7}{72}$   $\frac{189.7}{75}$

$\frac{192.3}{51}$   $\frac{189.1}{50}$   $\frac{188.8}{55}$   $\frac{189.9}{68}$   $\frac{190.4}{69}$   $\frac{189.9}{58}$   $\frac{189.9}{55}$   $\frac{189.9}{56}$   $\frac{189.9}{73}$   $\frac{189.9}{68}$   $\frac{189.9}{61}$   $\frac{189.9}{62}$   $\frac{189.9}{72}$   $\frac{189.9}{75}$

BM Center F Hwa II (New) Calc Sta 245+96 - E1 = 184.17



|     |                 |                 |        |                                                                                                                                                                                                                                         |
|-----|-----------------|-----------------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 263 | $\frac{21}{30}$ | $\frac{23}{30}$ | 217.86 | $\frac{60}{33}$ $\frac{218.0}{30}$ $\frac{217.7}{33}$ $\frac{215.3}{37}$ $\frac{216.4}{35}$ $\frac{217.2}{37}$ $\frac{217.8}{32}$ $\frac{217.3}{34}$ $\frac{216.4}{38}$ $\frac{217.9}{36}$ $\frac{218.2}{30}$ $\frac{218.9}{33}$        |
| 262 | $\frac{20}{30}$ | $\frac{22}{30}$ | 215.29 | $\frac{215.4}{33}$ $\frac{215.3}{30}$ $\frac{215.3}{25}$ $\frac{214.6}{18}$ $\frac{214.4}{12}$ $\frac{215.1}{39}$ $\frac{214.7}{34}$ $\frac{213.7}{18}$ $\frac{215.9}{24}$ $\frac{216.5}{30}$ $\frac{215.8}{33}$                        |
| 261 | $\frac{23}{30}$ | $\frac{23}{30}$ | 212.33 | $\frac{212.6}{30}$ $\frac{212.5}{26}$ $\frac{211.3}{24}$ $\frac{210.1}{18}$ $\frac{211.5}{10}$ $\frac{212.4}{11}$ $\frac{211.8}{14}$ $\frac{211.1}{19}$ $\frac{212.8}{25}$ $\frac{212.6}{30}$ $\frac{212.9}{35}$                        |
| T.P | 13.10           | 223.98          | 0.30   | 210 88                                                                                                                                                                                                                                  |
| 260 | $\frac{29}{30}$ | $\frac{28}{30}$ | 209.00 | $\frac{209.9}{33}$ $\frac{209.9}{30}$ $\frac{209.0}{24}$ $\frac{206.8}{17}$ $\frac{207.9}{14}$ $\frac{208.9}{25}$ $\frac{208.4}{12}$ $\frac{206.9}{18}$ $\frac{208.5}{24}$ $\frac{209.8}{30}$ $\frac{209.88}{33}$                       |
| 259 | $\frac{25}{30}$ | $\frac{30}{30}$ | 205.61 | $\frac{206.0}{33}$ $\frac{206.2}{30}$ $\frac{205.4}{24}$ $\frac{203.4}{18}$ $\frac{205.0}{14}$ $\frac{205.3}{59}$ $\frac{204.7}{15}$ $\frac{203.7}{18}$ $\frac{205.4}{23}$ $\frac{205.0}{25}$ $\frac{206.7}{30}$ $\frac{206.66}{33}$    |
| 258 | $\frac{24}{30}$ | $\frac{24}{30}$ | 202.33 | $\frac{202.7}{33}$ $\frac{202.9}{30}$ $\frac{201.0}{26}$ $\frac{200.0}{21}$ $\frac{201.3}{14}$ $\frac{201.9}{15}$ $\frac{201.5}{93}$ $\frac{200.2}{12}$ $\frac{202.2}{18}$ $\frac{202.7}{24}$ $\frac{202.76}{30}$ $\frac{202.76}{33}$   |
| 257 | $\frac{16}{30}$ | $\frac{26}{30}$ | 199.00 | $\frac{198.6}{33}$ $\frac{198.2}{30}$ $\frac{196.3}{26}$ $\frac{198.0}{14}$ $\frac{198.5}{15}$ $\frac{198.0}{127}$ $\frac{198.2}{15}$ $\frac{199.1}{18}$ $\frac{199.2}{24}$ $\frac{199.6}{30}$ $\frac{199.33}{33}$                      |
| T.P | 12.66           | 211.18          | 0.92   | 198.52                                                                                                                                                                                                                                  |
| 256 | $\frac{23}{30}$ | $\frac{22}{30}$ | 195.68 | $\frac{196.2}{33}$ $\frac{196.0}{30}$ $\frac{195.9}{25}$ $\frac{193.8}{18}$ $\frac{195.2}{14}$ $\frac{195.2}{11}$ $\frac{194.8}{14}$ $\frac{193.6}{17}$ $\frac{195.1}{23}$ $\frac{195.8}{28}$ $\frac{195.9}{30}$ $\frac{195.95}{33}$    |
| +50 |                 |                 |        | $\frac{195.1}{33}$ $\frac{194.4}{24}$ $\frac{192.5}{18}$ $\frac{193.9}{15}$ $\frac{194.0}{54}$ $\frac{193.8}{11}$ $\frac{193.4}{14}$ $\frac{192.6}{18}$ $\frac{193.9}{24}$ $\frac{194.3}{30}$ $\frac{194.0}{33}$                        |
| 255 | $\frac{25}{30}$ | $\frac{16}{30}$ | 193.00 | $\frac{193.5}{33}$ $\frac{193.1}{30}$ $\frac{191.7}{25}$ $\frac{191.6}{19}$ $\frac{192.4}{17}$ $\frac{192.4}{14}$ $\frac{192.5}{66}$ $\frac{192.0}{11}$ $\frac{191.6}{14}$ $\frac{191.9}{17}$ $\frac{192.6}{30}$ $\frac{192.67}{33}$    |
| 254 | $\frac{32}{30}$ | $\frac{09}{30}$ | 191.00 | $\frac{192.2}{33}$ $\frac{191.1}{30}$ $\frac{190.5}{24}$ $\frac{189.1}{21}$ $\frac{190.3}{17}$ $\frac{190.6}{14}$ $\frac{190.3}{88}$ $\frac{190.0}{11}$ $\frac{188.9}{15}$ $\frac{189.9}{18}$ $\frac{190.11}{30}$ $\frac{190.11}{33}$   |
| T.P | 8.76            | 199.44          | 1.56   | 190.68                                                                                                                                                                                                                                  |
| 253 | $\frac{32}{30}$ | $\frac{00}{30}$ | 189.00 | $\frac{191.0}{33}$ $\frac{190.9}{31}$ $\frac{190.2}{30}$ $\frac{187.1}{19}$ $\frac{188.7}{14}$ $\frac{188.7}{35}$ $\frac{188.4}{12}$ $\frac{187.0}{16}$ $\frac{187.5}{24}$ $\frac{187.0}{28}$ $\frac{186.9.9}{30}$ $\frac{186.9.9}{33}$ |
|     |                 | 192.24          |        |                                                                                                                                                                                                                                         |



271  $\frac{11}{30}$   $\frac{13}{30}$   
 T.P. 3.51 207.62 12.67 20 4.11  
 270  $\frac{29}{30}$   $\frac{27}{30}$

+ 5+45

+ 4+19

269  $\frac{12}{30}$   $\frac{03}{30}$

268  $\frac{16}{30}$   $\frac{25}{30}$

267  $\frac{18}{30}$   $\frac{21}{30}$

T.P. 1.37 216.78 8.50 21 5.41

266  $\frac{27}{30}$   $\frac{22}{30}$

+ 50

265 0.16 223.91 0.16 223 82 223.75  
 $\frac{36}{30}$   $\frac{33}{30}$

+ 50

264  $\frac{21}{30}$   $\frac{27}{30}$

208.628 202.6 202.3 201.9 201.3 202.8 203.1 202.9 203.2 200.9 201.8 202.8 202.8 202.9  
~~203.1~~ 18 50 51 64 63 48 45 47 64 67 58 48 48 47  
 33 3 26 21 18 15 45 8 12 12 19 22 30 33

206.20 207.5 206.7 204.9 204.4 205.3 205.6 205.3 204.9 204.0 205.2 206.7 207.3 207.3  
~~206.5~~ 93 101 119 124 115 115 121 128 116 106 75 79  
 30 23 20 16 13 12 12 15 17 20 23 25 30

207.1 207.5 202.6 207.8 207.8 207.6 207.2 206.8 207.7 209.2 209.2  
 97 93 92 90 90 92 96 10 91 76 73  
 30 28 24 14 90 14 22 23 28 31 33

208.8 209.1 209.4 209.6 209.8  
 80 97 74 72 70  
 33 14 12 33

209.56 209.7 209.8 209.8 210.4 210.2 210.6 210.3 210.2 210.2  
~~209.86~~ 76 75 70 67 66 62 61 66 66  
 33 30 20 12 66 11 2 30 33

219.42 212.7 212.5 211.3 211.1 212.3 212.4 212.7 212.7 211.6 211.1 213.6 214.25  
~~213.14~~ 13 41 43 55 57 45 41 46 41 46 52 37 32 253  
 33 30 24 22 18 14 44 43 16 18 25 30 33

216.28 215.9 216.2 216.3 216.4 216.4 216.5 216.2 216.2 216.5 216.5  
~~216.43~~ 09 06 06 25 14 14 15 16 12 06 03 03  
 30 30 26 18 14 14 15 18 24 27 30 33

219.47 220.2 219.1 218.9 218.2 219.1 219.3 219.1 218.5 217.5 219.8 219.7 219.95  
~~219.47~~ 57 37 48 50 57 48 46 46 54 64 41 42 396  
 30 28 23 21 18 15 12 48 14 18 25 30 33

221.9 221.7 219.7 221.0 221.0 220.5 220.0 220.0 221.3 221.4  
~~221.9~~ 20 22 42 29 29 34 39 39 26 21  
 33 28 20 14 29 16 30 25 23

220.81 220.4 221.3 220.6 220.5 221.6 221.1 221.5 221.0 221.7 220.8 221.4 221.3 222.59  
~~220.81~~ 16 16 27 34 35 24 19 22 20 23 32 16 17 139  
 30 27 25 22 19 15 12 15 12 15 18 25 30 33

221.7 221.6 220.0 221.0 221.5 221.4 221.0 221.2 222.1 222.3 222.59  
~~221.7~~ 23 24 40 30 29 26 30 30 19 17 17 17  
 33 24 18 14 12 23 12 15 19 25 33

220.19 220.3 220.5 218.9 219.4 219.4 220.2 220.1 220.1 220.6 220.9 220.9 221.4  
~~220.19~~ 37 35 5 46 46 35 34 39 46 34 31 31 263  
 30 24 18 15 13 11 34 15 19 24 25 30 33

223.98



150

279

12  
3020  
30

150

278

20  
3035  
30

T.D

7.20

(270.98)

3.78

213.78

277

34  
3036  
30

276

35  
3030  
30

275

27  
3023  
30

T.D

10.67

(217.56)

0.74

206.89

274

10  
3025  
30

273

05  
2017  
30

150

BM

5.14

(207.63)

5.14

202.48

272

00  
3006  
30

150

216.1 216.5 215.9 214.8 216.1 217.0 217.1 216.9 216.5 215.2 216.8 217.4 217.4 217.4  
 21 22 22 18 13 8 39 13 15 19 22 21 30 33

217.20 217.0 217.0 215.6 217.4 217.7 217.7 217.1 216.1 217.9 218.2 218.5  
 217.82 33 30 22 17 10 33 13 15 19 22 30 33

217.2 217.3 216.8 216.8 217.3 217.2 218.0 217.3 216.3 217.5 218.4 218.4 218.5  
 38 37 42 42 37 30 37 47 35 26 26 26 33

216.01 217.3 217.4 216.8 216.1 216.0 216.8 217.3 217.3 217.0 215.7 217.6 217.8 218.0  
 37 36 42 42 40 42 37 40 53 30 32 30 33

213.42 215.0 215.0 214.5 213.4 214.2 214.9 214.7 213.9 213.0 214.4 215.1 215.2 215.4  
 33 30 25 22 19 12 27 10 14 17 22 24 30 33

210.64 212.3 212.3 212.2 210.1 211.2 211.6 211.1 209.8 210.9 211.5 211.8 211.8  
 53 53 54 21 50 62 62 78 67 61 58 58 33

207.85 208.3 208.3 208.3 205.6 206.5 206.9 206.6 205.1 205.0 207.4 207.5  
 93 93 93 120 11 20 110 12 5 116 102 101 33

205.87 203.5 203.2 202.0 201.4 202.5 203.3 204.0 203.4 202.7 202.1 202.1 204.6 205.2  
 33 30 25 20 18 16 13 3 38 42 49 53 45 30 21 33

203.05 199.8 199.8 200.0 201.6 202.3 201.9 201.2 200.2 200.2 200.9 201.3 201.9 201.9  
 33 30 29 18 15 5 20 3 3 7 13 16 17 21 3 33

202.49 199.0 199.1 199.2 199.6 201.7 202.1 201.8 201.6 200.9 200.1 199.7 199.9 200.7  
 33 30 25 20 15 5 3 3 6 11 15 19 33

202.57 199.0 199.1 199.2 199.6 201.7 202.1 201.8 201.6 200.9 200.1 199.7 199.9 200.7  
 33 30 25 20 15 5 3 3 6 11 15 19 33

200.1 201.0 200.5 200.5 201.9 202.3 201.6 200.5 200.7  
 33 26 23 19 16 3 6 8 14 21 33

207.62



|      |                 |                 |      |        |        |        |
|------|-----------------|-----------------|------|--------|--------|--------|
| 290  | $\frac{00}{30}$ | $\frac{12}{20}$ |      |        |        |        |
| T.F  | 11.22           | 217.39          | 2.25 | 206.16 | 208.61 | corr   |
| 8/19 | 5:30            | 208.41          | 5:30 | 203.10 | 203.11 |        |
| 289  | $\frac{05}{30}$ | $\frac{18}{30}$ |      |        |        | 206.15 |

$$\begin{array}{r} 288 \\ 0 \overline{) 30} \end{array} \qquad \begin{array}{r} 38 \\ 30 \end{array}$$

|     |                |                 |
|-----|----------------|-----------------|
| 287 | $\frac{0}{30}$ | $\frac{14}{30}$ |
|-----|----------------|-----------------|

+ 45

286  $\frac{04}{30}$  18  
30

|      |                 |                 |       |        |
|------|-----------------|-----------------|-------|--------|
| T.P. | 5.65            | 208.45          | 11.00 | 202.80 |
| 285  | $\frac{24}{30}$ | $\frac{12}{30}$ |       |        |

|     |                 |                 |
|-----|-----------------|-----------------|
| 284 | $\frac{36}{30}$ | $\frac{23}{20}$ |
|-----|-----------------|-----------------|

|                 |                 |                 |                 |
|-----------------|-----------------|-----------------|-----------------|
| T.D             | 1.72            | 213.80          | 8-90            |
| 28 <sup>3</sup> | $\frac{30}{30}$ | $\frac{23}{30}$ | <del>8-90</del> |

|     |                 |   |
|-----|-----------------|---|
| 282 | $\frac{25}{30}$ | 3 |
|-----|-----------------|---|

|     |    |    |
|-----|----|----|
| 281 | 09 | 21 |
|     | 30 | 30 |

|     |                 |                |
|-----|-----------------|----------------|
| 280 | $\frac{07}{30}$ | $\frac{20}{3}$ |
|-----|-----------------|----------------|

220.98)

|        |                     |                     |                     |                     |                     |                       |                     |                     |                     |                     |                     |                     |
|--------|---------------------|---------------------|---------------------|---------------------|---------------------|-----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| 208.61 | 206.3<br>11.1<br>30 | 206.2<br>11.2<br>24 | 206.0<br>11.1<br>18 | 206.3<br>11.1<br>14 | 206.5<br>10.9<br>10 | 207.1<br>10.3<br>16.3 | 206.9<br>10.5<br>13 | 205.5<br>11.9<br>18 | 206.3<br>11.1<br>21 | 206.9<br>10.3<br>25 | 207.6<br>11.8<br>38 | 207.6<br>11.8<br>33 |
| 203.11 | 202.8<br>5.7<br>30  | 202.9<br>5.6<br>21  | 202.5<br>6.3<br>18  | 203.4<br>5.1<br>14  | 204.1<br>4.6<br>14  | 205.2<br>3.3<br>33    | 204.9<br>3.6<br>13  | 203.6<br>4.9<br>17  | 205.0<br>3.5<br>22  | 206.0<br>2.5<br>30  | 206.0<br>2.5<br>32  |                     |

|     |    |   |    |      |      |      |      |      |      |      |      |      |      |      |      |
|-----|----|---|----|------|------|------|------|------|------|------|------|------|------|------|------|
| 203 | 69 | 5 | 30 | 2016 | 2017 | 2011 | 2004 | 2023 | 2031 | 2029 | 2026 | 2017 | 2045 | 2055 | 2054 |
|     |    |   |    | 68   | 74   | 74   | 81   | 62   | 62   | 57   | 68   | 40   | 30   | 30   | 26   |
|     |    |   |    | 25   | 20   | 20   | 9    | 14   | 14   | 14   | 17   | 24   | 30   | 33   | 33   |

|        |       |       |       |       |       |       |       |       |       |       |       |
|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 202.15 | 198.6 | 198.9 | 199.5 | 200.3 | 201.4 | 201.9 | 201.5 | 200.6 | 201.0 | 201.6 | 201.9 |
|        | 29    | 26    | 20    | 82    | 21    | 20    | 20    | 29    | 73    | 69    | 66    |
|        | 33    | 30    | 16    | 14    | 11    | 66    | 14    | 18    | 22    | 30    | 33    |

198.6 199.4 199.7 199.9 201.8 202.2 202.2 201.6 200.2 200.9 201.7 ✓  
 $\frac{99}{33}$   $\frac{91}{24}$   $\frac{88}{19}$   $\frac{86}{16}$   $\frac{67}{11}$  202.2  $\frac{63}{11}$   $\frac{67}{14}$   $\frac{83}{18}$   $\frac{26}{25}$   $\frac{68}{23}$

|        |                  |                   |             |                   |             |                   |             |            |            |             |             |            |            |            |
|--------|------------------|-------------------|-------------|-------------------|-------------|-------------------|-------------|------------|------------|-------------|-------------|------------|------------|------------|
| 202.50 | 199<br>768<br>33 | 200.4<br>81<br>21 | 200.7<br>78 | 200.2<br>83<br>17 | 201.0<br>75 | 201.7<br>68<br>12 | 202.2<br>63 | 2019<br>66 | 2016<br>69 | 200.5<br>80 | 200.9<br>76 | 2018<br>67 | 2018<br>67 | 202.<br>61 |
|--------|------------------|-------------------|-------------|-------------------|-------------|-------------------|-------------|------------|------------|-------------|-------------|------------|------------|------------|

|    |       |       |       |       |       |       |       |       |       |       |       |       |
|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 18 | 205.1 | 205.5 | 204.3 | 202.7 | 203.3 | 204.1 | 203.9 | 203.5 | 202.4 | 203.9 | 203.6 | 203.6 |
| 32 | 87    | 83    | 95    | 111   | 105   | 99    | 99    | 103   | 114   | 99    | 102   | 102   |
| 23 | 30    | 24    | 21    | 11    | 14    | 97    | 12    | 14    | 18    | 20    | 30    | 33    |

|        |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
|--------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|        | 9.51            | 209.5           | 209.8           | 206.8           | 207.3           | 207.4           | 206.8           | 205.4           | 208.1           | 208.2           | 208.3           |
| 207.86 | $\frac{42}{33}$ | $\frac{43}{30}$ | $\frac{40}{26}$ | $\frac{70}{20}$ | $\frac{61}{13}$ | $\frac{61}{66}$ | $\frac{70}{11}$ | $\frac{54}{18}$ | $\frac{57}{21}$ | $\frac{58}{32}$ | $\frac{58}{22}$ |

|           |      |      |      |      |      |      |      |      |      |      |      |      |
|-----------|------|------|------|------|------|------|------|------|------|------|------|------|
| Row 11/14 | 2120 | 2124 | 2111 | 2100 | 2100 | 2111 | 2111 | 2107 | 2090 | 2113 | 2113 | 2115 |
| 510 283   | 20   | 86   | 99   | 110  | 100  | 2111 | 99   | 103  | 120  | 97   | 97   | 95   |
| 211.00    | 30   | 25   | 24   | 19   | 14   | 96   | 12   | 14   | 19   | 21   | 21   | 33   |

|        |           |             |             |             |             |             |             |             |             |             |             |             |             |
|--------|-----------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 213.00 | 135<br>23 | 213.5<br>23 | 212.1<br>29 | 212.6<br>22 | 211.6<br>19 | 213.2<br>78 | 213.7<br>73 | 213.1<br>76 | 213.0<br>80 | 211.5<br>95 | 214.0<br>70 | 214.1<br>69 | 214.3<br>67 |
|        | 30        | 26          | 25          | 22          | 19          | 15          | 73          | 12          | 14          | 19          | 25          | 30          | 33          |

|       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 215.0 | 215.9 | 214.0 | 213.5 | 212.7 | 214.1 | 214.8 | 215.1 | 214.9 | 214.5 | 213.0 | 215.0 | 215.1 | 215.2 |
| 71    | 70    | 75    | 83    | 69    | 62    | 69    | 63    | 65    | 80    | 60    | 59    | 58    |       |
| 30    | 26    | 22    | 18    | 17    | 12    | 69    | 63    | 14    | 14    | 21    | 30    | 23    |       |

|        |     |       |       |       |       |       |       |       |       |       |       |       |       |       |
|--------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 216.80 | 104 | 215.5 | 215.2 | 214.1 | 215.4 | 215.6 | 216.3 | 216.4 | 215.8 | 214.4 | 215.5 | 216.7 | 216.8 | 216.8 |
| 217.00 | 49  | 53    | 57    | 69    | 58    | 54    | 48    | 48    | 52    | 66    | 55    | 43    | 42    | 42    |
|        | 33  | 30    | 21    | 14    | 14    | 2     | 47    | 2     | 21    | 21    | 25    | 3     | 3     | 33    |

20 22 10 19 10 11 12 14 10 21 2 20



T.P 0.61 204.90 12.19 204.29

297  $\frac{54}{30}$   $\frac{47}{30}$

+50

296  $\frac{45}{30}$   $\frac{45}{30}$

+50

295  $\frac{26}{30}$   $\frac{31}{30}$

+50

T.P 2.06 216.48 296 214.42

294  $\frac{21}{30}$   $\frac{23}{30}$

+50

293  $\frac{26}{30}$   $\frac{29}{30}$

+50

292  $\frac{32}{30}$   $\frac{39}{30}$

291  $\frac{20}{30}$   $\frac{32}{30}$

217.38

204.46 3 207.9 209.7 204.0 204.8 205.2 206.0 205.4 203.9 205.2 207.0 207.2 207.2  
 204.46 3 30 26 18 15 13 10 5 11 12 11 13 9 9 3 3  
 210.0 209.7 206.9 208.1 209.8 209.9 206.6 208.3 209.6 209.6  
 63 68 96 84 77 12 15 19 23 69 69  
 33 25 17 14 77 12 15 19 23 33 33  
 211.1 211.1 210.2 209.2 209.9 210.4 211.1 210.5 208.6 209.5 210.5 211.3 211.1 211.1  
 208.84 3 30 26 22 18 15 13 10 11 15 18 22 24 30 34 33  
 211.7 211.6 211.5 211.5 212.1 212.6 212.1 211.5 211.3 212.2 212.2  
 33 27 22 19 16 14 39 9 13 18 22 43 43  
 212.7 212.5 211.1 212.2 212.9 213.4 213.2 211.7 211.7 213.1 212.9 213.2 213.5  
 212.12 3 30 26 19 16 13 31 10 15 18 24 29 30 33  
 213.7 213.4 213.2 212.8 212.0 213.3 214.1 213.9 213.3 212.0 213.8 213.6 214.1 214.3  
 3 28 26 25 23 19 16 24 10 14 17 23 28 30 33  
 214.4 214.0 213.6 212.7 213.9 214.3 214.7 214.5 214.0 212.6 213.5 214.5 214.4 214.6 215.1  
 214.33 3 26 24 22 18 15 13 27 11 14 17 19 23 28 30 33  
 215.4 214.9 214.7 213.7 214.8 215.6 215.2 214.7 213.3 214.3 215.2 215.3 215.6 215.6  
 215.6 215.8 215.3 215.0 214.0 215.2 216.1 216.0 215.0 213.8 215.0 215.7 215.6 215.9 215.6  
 3 28 26 25 23 18 15 13 10 14 17 21 25 28 30 33  
 214.97 3 30 26 25 23 18 15 13 10 14 17 21 25 28 30 33  
 215.3 215.9 214.8 213.0 215.1 215.8 215.6 215.2 213.9 214.9 215.1 215.9 215.6 215.6  
 21 15 26 23 19 15 16 14 14 17 21 24 26 30 33  
 33 28 23 19 15 16 14 14 17 21 24 26 30 33  
 214.7 214.7 214.0 212.8 214.3 214.8 214.6 213.0 215.1 215.0 215.4  
 213.53 3 27 26 23 19 15 16 12 17 25 28 30 33  
 211.1 211.5 210.8 209.5 210.4 211.0 210.5 209.8 209.3 210.8 211.8 211.9 212.3 212.3  
 211.07 3 30 25 22 18 14 6 4 6 7 8 11 14 17 20 23  
 211.07 3 30 25 22 18 14 6 4 6 7 8 11 14 17 20 23



|     |                 |                 |      |
|-----|-----------------|-----------------|------|
| 305 | $\frac{00}{30}$ | $\frac{00}{30}$ |      |
| B/M | 1.72            | 177.06          | 6.64 |

|     |                 |                 |
|-----|-----------------|-----------------|
| 304 | $\frac{00}{30}$ | $\frac{00}{30}$ |
|-----|-----------------|-----------------|

203  $\begin{array}{r} 05 \\ \hline 30 \end{array}$   $\begin{array}{r} 07 \\ \hline 33 \end{array}$

|     |                 |                 |
|-----|-----------------|-----------------|
| 302 | $\frac{20}{30}$ | $\frac{23}{30}$ |
|-----|-----------------|-----------------|

|     |                 |                 |
|-----|-----------------|-----------------|
| 301 | $\frac{24}{30}$ | $\frac{21}{30}$ |
|-----|-----------------|-----------------|

T.P 1.34 (182.02) 12.36

|     |                 |                 |
|-----|-----------------|-----------------|
| 300 | $\frac{23}{30}$ | $\frac{21}{30}$ |
|-----|-----------------|-----------------|

299400  $\frac{30}{30}$   $\frac{30}{30}$

T.P 0.99 (193.04) 12.85 192.05

298       $\frac{42}{30}$        $\frac{31}{30}$

207. 90

$$\begin{array}{r} 166.6 \\ 105 \\ \hline 33 \end{array}$$

$$\begin{array}{r} 167.7 \\ 24 \\ \hline 28 \end{array}$$

$$\begin{array}{r} 168.8 \\ 83 \\ \hline 14 \end{array}$$

$$\begin{array}{r} 170.0 \\ 61 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 171.5 \\ 02 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 171.5 \\ 56 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 171.1 \\ 60 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 167.6 \\ 95 \\ \hline 21 \end{array}$$

$$\begin{array}{r} 168.2 \\ 89 \\ \hline 26 \end{array}$$

$$\begin{array}{r} 168.3 \\ 88 \\ \hline 33 \end{array}$$

$$\begin{array}{r} 58.7 \\ 84 \\ \hline 33 \end{array}$$

$$\begin{array}{r} 168.7 \\ 52 \\ \hline 30 \end{array}$$

$$\begin{array}{r} 168.3 \\ 88 \\ \hline 18 \end{array}$$

$$\begin{array}{r} 168.6 \\ 85 \\ \hline 14 \end{array}$$

$$\begin{array}{r} 169.2 \\ 79 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 170.1 \\ 70 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 170.5 \\ 66 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 170.1 \\ 70 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 168.5 \\ 86 \\ \hline 14 \end{array}$$

$$\begin{array}{r} 168.5 \\ 86 \\ \hline 28 \end{array}$$

$$\begin{array}{r} 168.3 \\ 88 \\ \hline 30 \end{array}$$

$$\begin{array}{r} 168.2 \\ 89 \\ \hline 33 \end{array}$$

|       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 175.3 | 168.2 | 168.5 | 169.1 | 169.5 | 170.8 | 170.9 | 170.6 | 169.9 | 169.5 | 169.6 | 169.2 | 169.1 | 169.2 |
| 135   | 135   | 129   | 125   | 112   | 111   | 114   | 121   | 125   | 122   | 128   | 129   | 128   | 128   |
| 30    | 29    | 29    | 13    | 8     |       | 12    | 16    | 18    | 27    | 29    | 30    | 33    |       |

|   |       |       |       |       |       |       |       |       |       |       |       |       |       |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 4 | 169.8 | 170.1 | 170.6 | 170.9 | 171.9 | 171.6 | 171.3 | 170.2 | 170.4 | 170.8 | 170.8 | 170.4 | 170.3 |
| 6 | 122   | 119   | 114   | 111   | 106   | 107   | 116   | 116   | 112   | 112   | 116   | 117   |       |
| 3 | 30    | 29    | 17    | 12    | 103   | 13    | 14    | 17    | 26    | 25    | 27    | 28    | 33    |

|        |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|--------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|        | 11.9 | 12.2 | 12.1 | 11.4 | 11.6 | 12.2 | 12.9 | 12.5 | 12.2 | 11.1 | 11.5 | 11.8 | 11.9 | 11.8 |
|        | 101  | 98   | 99   | 106  | 104  | 98   | 122  | 95   | 98   | 109  | 105  | 102  | 101  | 102  |
| 173.68 | 30   | 29   | 23   | 20   | 17   | 14   | 91   | 13   | 12   | 18   | 25   | 26   | 30   | 33   |

|                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 173.5           | 173.9           | 172.9           | 174.0           | 174.4           | 174.0           | 173.5           | 172.2           | 172.2           | 174.2           | 174.0           |
| $\frac{85}{33}$ | $\frac{81}{34}$ | $\frac{93}{18}$ | $\frac{80}{14}$ | $\frac{80}{13}$ | $\frac{85}{14}$ | $\frac{98}{18}$ | $\frac{98}{21}$ | $\frac{98}{27}$ | $\frac{98}{27}$ | $\frac{80}{33}$ |

|        |    |       |       |       |       |       |       |       |       |       |       |       |       |       |       |
|--------|----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 176.68 | 85 | 176.6 | 176.6 | 175.8 | 174.2 | 175.9 | 175.9 | 175.1 | 175.0 | 173.5 | 174.8 | 173.0 | 173.7 | 176.0 | 176.5 |
|        | 55 | 56    | 62    | 78    | 63    | 63    | 66    | 80    | 72    | 20    | 61    | 60    | 67    |       |       |
|        | 30 | 25    | 21    | 18    | 14    | 61    | 13    | 14    | 19    | 23    | 24    | 27    | 30    | 33    |       |

|               |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |                 |
|---------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| $\frac{3}{3}$ | $\frac{30}{34}$ | $\frac{39}{42}$ | $\frac{42}{20}$ | $\frac{26}{18}$ | $\frac{57}{17}$ | $\frac{45}{14}$ | $\frac{42}{13}$ | $\frac{41}{41}$ | $\frac{41}{12}$ | $\frac{44}{14}$ | $\frac{65}{19}$ | $\frac{54}{21}$ | $\frac{39}{26}$ | $\frac{33}{27}$ | $\frac{32}{33}$ |
|---------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|

|  |   |        |    |    |    |    |    |    |    |    |    |    |    |    |    |
|--|---|--------|----|----|----|----|----|----|----|----|----|----|----|----|----|
|  | 3 | 181.18 | 07 | 18 | 35 | 20 | 19 | 22 | 40 | 36 | 21 | 13 | 10 | 07 | 07 |
|  | 3 | 30     | 25 | 21 | 18 | 14 | 19 | 14 | 19 | 21 | 26 | 27 | 28 | 32 | 33 |

|       |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|-------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 18700 | 65 | 66 | 82 | 90 | 77 | 75 | 77 | 85 | 97 | 79 | 76 | 68 | 69 | 69 |
| 3     | 30 | 26 | 21 | 18 | 14 | 13 | 75 | 12 | 14 | 18 | 21 | 23 | 20 | 23 |

|        |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|--------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 193.00 | 30 | 27 | 23 | 19 | 16 | 13 | 15 | 11 | 12 | 35 | 35 | 23 | 07 | 00 | 00 | 00 |
|        | 12 | 11 | 28 | 16 | 16 | 12 | 11 | 11 | 18 | 20 | 28 | 2  | 06 | 00 | 06 | 06 |

|        |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|--------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 199.00 | 37 | 38 | 49 | 63 | 81 | 66 | 62 | 69 | 64 | 71 | 79 | 56 | 42 | 43 | 42 |
|        | 30 | 26 | 25 | 22 | 19 | 15 | 13 | 6  | 10 | 12 | 14 | 18 | 22 | 30 | 33 |



T.P 12.86 (212.69) 0.35 199.83

316  $\frac{38}{30}$   $\frac{13}{30}$ 315  $\frac{36}{30}$   $\frac{18}{30}$ 314  $\frac{32}{30}$   $\frac{16}{30}$ 

T.P 12.66 (200.18) 0.90 187.52

313  $\frac{18}{30}$   $\frac{06}{30}$ 312  $\frac{34}{30}$   $\frac{13}{30}$ 311  $\frac{35}{30}$   $\frac{13}{30}$ 310  $\frac{2.7}{30}$   $\frac{28}{30}$ 

T.P 11.88 (188.42) 0.52 176.54

309  $\frac{16}{30}$   $\frac{14}{30}$ 308  $\frac{07}{30}$   $\frac{11}{30}$ 307  $\frac{00}{30}$   $\frac{00}{30}$ 

+20

306

(177.06)

3 197.9 98.9 197.8 196.1 194.9 192.1 191.2 196.5 195.8 194.7 195.9 196.4 197.4 196.9 195.5  
 197.6  $\frac{13}{30}$   $\frac{13}{30}$   $\frac{26}{28}$   $\frac{27}{27}$   $\frac{21}{21}$   $\frac{53}{20}$   $\frac{31}{14}$   $\frac{30}{19}$   $\frac{37}{15}$   $\frac{44}{15}$   $\frac{53}{18}$   $\frac{43}{20}$   $\frac{38}{22}$   $\frac{25}{25}$   $\frac{33}{30}$   $\frac{47}{33}$

193.4 194.0 194.8 193.3 192.0 191.9 190.1 192.8 192.6 192.1 191.5 190.0 190.8 191.9 192.6 192.2 192.0  
 $\frac{62}{30}$   $\frac{52}{28}$   $\frac{69}{26}$   $\frac{52}{23}$   $\frac{83}{22}$   $\frac{101}{20}$   $\frac{72}{14}$   $\frac{76}{13}$   $\frac{81}{15}$   $\frac{57}{18}$   $\frac{102}{19}$   $\frac{94}{24}$   $\frac{53}{25}$   $\frac{76}{30}$   $\frac{50}{25}$   $\frac{82}{33}$

189.21 189.9 189.9 188.7 187.8 189.0 186.4 189.1 185.4 187.8 186.4 187.6 188.0 189.8 189.3 187.8  
 $\frac{103}{30}$   $\frac{103}{26}$   $\frac{115}{24}$   $\frac{122}{20}$   $\frac{132}{18}$   $\frac{113}{13}$   $\frac{111}{11}$   $\frac{118}{13}$   $\frac{124}{15}$   $\frac{138}{19}$   $\frac{126}{20}$   $\frac{122}{22}$   $\frac{142}{25}$   $\frac{119}{30}$   $\frac{125}{33}$

186.3 185.6 185.9 185.2 184.2 183.4 185.0 185.6 186.5 185.1 184.3 183.5 184.3 184.8 185.3 184.4 184.9  
 $\frac{28}{30}$   $\frac{25}{29}$   $\frac{32}{24}$   $\frac{41}{21}$   $\frac{50}{19}$   $\frac{32}{14}$   $\frac{29}{11}$   $\frac{33}{13}$   $\frac{41}{15}$   $\frac{49}{18}$   $\frac{41}{20}$   $\frac{36}{25}$   $\frac{31}{26}$   $\frac{40}{30}$   $\frac{35}{33}$

183.4 184.4 184.1 183.9 181.2 180.4 182.8 182.9 182.4 181.9 180.1 180.1 181.3 181.3 181.4 181.4  
 $\frac{40}{30}$   $\frac{40}{31}$   $\frac{43}{30}$   $\frac{45}{29}$   $\frac{22}{19}$   $\frac{50}{18}$   $\frac{61}{13}$   $\frac{56}{11}$   $\frac{60}{13}$   $\frac{65}{15}$   $\frac{53}{19}$   $\frac{53}{21}$   $\frac{71}{22}$   $\frac{63}{24}$   $\frac{70}{26}$   $\frac{70}{33}$

180.6 179.4 178.7 178.5 177.8 177.6 179.7 180.0 180.3 180.1 179.5 179.5 179.4 179.9 180.0 179.4 179.0  
 $\frac{58}{30}$   $\frac{57}{25}$   $\frac{97}{23}$   $\frac{99}{20}$   $\frac{106}{19}$   $\frac{108}{17}$   $\frac{87}{14}$   $\frac{84}{12}$   $\frac{81}{13}$   $\frac{89}{15}$   $\frac{107}{19}$   $\frac{100}{20}$   $\frac{95}{23}$   $\frac{92}{25}$   $\frac{90}{26}$   $\frac{94}{33}$

177.73 177.9 175.3 175.3 174.4 176.1 176.5 177.1 177.0 176.5 174.6 175.8 176.5 177.8 177.4 176.8  
 $\frac{105}{30}$   $\frac{131}{27}$   $\frac{131}{22}$   $\frac{131}{21}$   $\frac{140}{18}$   $\frac{123}{14}$   $\frac{119}{12}$   $\frac{113}{11}$   $\frac{114}{11}$   $\frac{119}{14}$   $\frac{138}{19}$   $\frac{126}{21}$   $\frac{119}{23}$   $\frac{111}{25}$   $\frac{112}{26}$   $\frac{116}{33}$

174.99 174.9 174.6 172.8 172.6 173.7 173.9 174.6 174.8 174.8 174.3 172.7 172.6 173.4 173.9 174.4 174.6  
 $\frac{22}{30}$   $\frac{23}{29}$   $\frac{43}{27}$   $\frac{45}{23}$   $\frac{34}{17}$   $\frac{32}{14}$   $\frac{23}{11}$   $\frac{23}{13}$   $\frac{23}{11}$   $\frac{23}{12}$   $\frac{23}{14}$   $\frac{20}{19}$   $\frac{22}{20}$   $\frac{22}{22}$   $\frac{27}{26}$   $\frac{23}{33}$

173.08 171.6 171.2 171.1 171.8 172.3 172.9 173.0 173.0 172.5 171.3 171.4 172.3 172.2 172.0  
 $\frac{55}{30}$   $\frac{55}{24}$   $\frac{59}{23}$   $\frac{60}{17}$   $\frac{53}{13}$   $\frac{48}{12}$   $\frac{42}{10}$   $\frac{44}{14}$   $\frac{41}{12}$   $\frac{46}{14}$   $\frac{58}{19}$   $\frac{57}{25}$   $\frac{48}{27}$   $\frac{49}{30}$   $\frac{51}{33}$

172.12 170.4 170.5 170.1 170.2 170.5 171.9 172.1 171.7 171.3 170.3 170.0 169.9 169.7 169.7  
 $\frac{67}{30}$   $\frac{66}{27}$   $\frac{66}{26}$   $\frac{69}{24}$   $\frac{66}{14}$   $\frac{66}{12}$   $\frac{52}{9}$   $\frac{50}{12}$   $\frac{54}{12}$   $\frac{58}{14}$   $\frac{68}{19}$   $\frac{71}{25}$   $\frac{67}{27}$   $\frac{70}{30}$   $\frac{74}{33}$

169.6 169.9 169.7 169.9 170.5 171.0 172.1 171.6 170.6 170.3 169.9 169.6 169.0 169.1  
 $\frac{75}{30}$   $\frac{72}{29}$   $\frac{74}{28}$   $\frac{73}{20}$   $\frac{66}{14}$   $\frac{56}{12}$   $\frac{56}{11}$   $\frac{50}{10}$   $\frac{55}{13}$   $\frac{65}{14}$   $\frac{68}{19}$   $\frac{72}{28}$   $\frac{75}{29}$   $\frac{81}{29}$   $\frac{80}{33}$

172.00

Bridge



BM  
+10 End of Proj

1.60

222.08

222.14

30K in N.C.W. tree Lt 54322+10

322

30 224.3 224.9 220.7 219.7 219.6 220.3 220.9 220.0 219.3 219.4 221.0  
 220.8 30 29 23 20 17 14 28 37 44 43 27 22.6  
 33 30 25 19 17 13 63 14 18 25 30 33

321

39 218.2 218.2 216.0 216.2 217.3 217.4 217.1 216.6 217.3 218.1 218.1  
 217.6 30 25 19 17 13 63 14 18 25 30 33

End of Proj at 320

320

10  
30

T.P. 11.71

(223.68)

0.72

211.97

319

32  
301.1  
30

318

31  
3020  
30

317

34  
3020  
30

(212.69)

214.4 214.5 214.9 212.7 214.1 214.1 214.1 214.1 214.1 214.1 214.1  
 214.36 30 28 18 14 93 10 13 17 20 30 33

210.2 210.2 210.2 210.2 210.2 210.2 210.2 210.2 210.2 210.2 210.2  
 210.2 30 28 26 23 20 15 12 17 10 13 17 20 30 33

207.8 207.8 207.8 207.8 207.8 207.8 207.8 207.8 207.8 207.8 207.8  
 207.8 30 28 26 23 20 15 12 17 10 13 17 20 30 33

201.8 201.8 201.8 201.8 201.8 201.8 201.8 201.8 201.8 201.8 201.8  
 201.8 30 28 25 22 19 14 10 13 17 20 30 33







Semi Final X Sec Sta 83-6+50 - To get extra dirt for fill stuff ~~sta~~  
to culv.

6/14/23

47

~~750~~

86

+50

85-

+50

84

83

60

51

50

1915  

$$\begin{array}{r} 46 \\ 33 \end{array} \quad \begin{array}{r} 43 \\ 28 \end{array} \quad \begin{array}{r} 66 \\ 23 \end{array} \quad \begin{array}{r} 63 \\ 18 \end{array} \quad \begin{array}{r} 52 \\ 13 \end{array} \quad 50 \quad \begin{array}{r} 49 \\ 13 \end{array} \quad \begin{array}{r} 59 \\ 16 \end{array} \quad 60 \quad \begin{array}{r} 51 \\ 21 \end{array} \quad \begin{array}{r} 31 \\ 25 \end{array} \quad \begin{array}{r} 28 \\ 30 \end{array} \quad \begin{array}{r} 28 \\ 33 \end{array}$$

188.0  

$$\begin{array}{r} 34 \\ 32 \end{array} \quad \begin{array}{r} 32 \\ 28 \end{array} \quad \begin{array}{r} 61 \\ 22 \end{array} \quad \begin{array}{r} 61 \\ 10 \end{array} \quad \begin{array}{r} 47 \\ 13 \end{array} \quad 46 \quad \begin{array}{r} 49 \\ 13 \end{array} \quad \begin{array}{r} 55 \\ 17 \end{array} \quad 59 \quad \begin{array}{r} 36 \\ 26 \end{array} \quad \begin{array}{r} 30 \\ 29 \end{array} \quad \begin{array}{r} 21 \\ 30 \end{array} \quad \begin{array}{r} 21 \\ 33 \end{array}$$

1879  

$$\begin{array}{r} 34 \\ 33 \end{array} \quad \begin{array}{r} 33 \\ 28 \end{array} \quad \begin{array}{r} 40 \\ 27 \end{array} \quad \begin{array}{r} 60 \\ 23 \end{array} \quad \begin{array}{r} 59 \\ 18 \end{array} \quad \begin{array}{r} 48 \\ 14 \end{array} \quad 47 \quad \begin{array}{r} 47 \\ 14 \end{array} \quad \begin{array}{r} 56 \\ 18 \end{array} \quad 57 \quad \begin{array}{r} 42 \\ 26 \end{array} \quad \begin{array}{r} 32 \\ 29 \end{array} \quad \begin{array}{r} 21 \\ 30 \end{array} \quad \begin{array}{r} 22 \\ 32 \end{array}$$

1877  

$$\begin{array}{r} 36 \\ 31 \end{array} \quad \begin{array}{r} 41 \\ 29 \end{array} \quad \begin{array}{r} 50 \\ 28 \end{array} \quad \begin{array}{r} 60 \\ 25 \end{array} \quad \begin{array}{r} 62 \\ 19 \end{array} \quad \begin{array}{r} 51 \\ 14 \end{array} \quad 49 \quad \begin{array}{r} 48 \\ 14 \end{array} \quad \begin{array}{r} 59 \\ 18 \end{array} \quad 60 \quad \begin{array}{r} 32 \\ 24 \end{array} \quad \begin{array}{r} 28 \\ 29 \end{array} \quad \begin{array}{r} 28 \\ 33 \end{array}$$

1874  

$$\begin{array}{r} 55 \\ 31 \end{array} \quad \begin{array}{r} 51 \\ 30 \end{array} \quad \begin{array}{r} 53 \\ 28 \end{array} \quad \begin{array}{r} 71 \\ 22 \end{array} \quad \begin{array}{r} 71 \\ 19 \end{array} \quad \begin{array}{r} 52 \\ 13 \end{array} \quad 52 \quad \begin{array}{r} 54 \\ 23 \end{array} \quad \begin{array}{r} 67 \\ 23 \end{array} \quad 67 \quad \begin{array}{r} 60 \\ 25 \end{array} \quad \begin{array}{r} 43 \\ 27 \end{array} \quad \begin{array}{r} 40 \\ 30 \end{array} \quad \begin{array}{r} 40 \\ 33 \end{array}$$

184.1  

$$\begin{array}{r} 55 \\ 33 \end{array} \quad \begin{array}{r} 184.4 \\ 52 \end{array} \quad \begin{array}{r} 183.5 \\ 91 \end{array} \quad \begin{array}{r} 183.3 \\ 93 \end{array} \quad \begin{array}{r} 186.0 \\ 66 \end{array} \quad \begin{array}{r} 185.8 \\ 12 \end{array} \quad 68 \quad \begin{array}{r} 185.8 \\ 14 \end{array} \quad \begin{array}{r} 18.34 \\ 21 \end{array} \quad \begin{array}{r} 18.38 \\ 25 \end{array} \quad \begin{array}{r} 18.43 \\ 26 \end{array} \quad \begin{array}{r} 18.51 \\ 29 \end{array} \quad \begin{array}{r} 18.4 \\ 30 \end{array} \quad \begin{array}{r} 18.4 \\ 33 \end{array}$$

BM

7.04

(192.64)

185.60

SpK in Block

Pole

82+08







X-Sec- Twp Rd N 5/4 21-

For Barron

South 6/22/23

B.M. 7.91 (159.83) 157.92  
0+33 N

1 28/31 2.8/31

2 27/31 1.7/31

3 28/31 1.5/31

T.P. 4.09 (160.86) 3.06 156.77

4 28/31 1.9/31

5 29/31 1.6/31

6 45/31 2.0/31

7 05/31 0.0/31

8

9

North  
155.3 158.1 158.5 158.3 154.3 154.3 154.4 153.5 152.9 153.1 153.0  
45 47 63 65 65 65 64 63 69 67 68  
33 26 20 17 12 55 6 13 17 24 33

156.4 156.6 156.6 155.7 154.2 153.8 153.6 153.6 153.9 153.4 154.3 154.8 155.0 155.5 155.5 155.5  
34 32 32 27 35 60 42 42 42 59 52 55 50 48 43 43 46  
31 27 26 22 18 15 7 42 6 14 16 20 22 23 24 31 33

157.4 157.6 156.6 155.6 155.4 155.1 155.1 155.9 156.5 156.5 156.4 155.8 154.8 155.2 155.3 156.6 156.1 156.4 156.1 156.4  
27 22 32 42 44 47 47 39 33 32 40 52 46 45 42 37 34 37 37  
33 27 23 20 17 16 14 12 7 33 7 11 15 17 18 20 22 27 31 33

157.4 157.5 157.0 155.6 155.2 156.4 156.6 156.3 155.8 154.9 156.0 155.9 155.8  
6 24 23 25 43 46 34 35 40 51 35 39 40  
33 31 29 25 21 16 12 3 6 10 14 20 31 33

157.6 157.4 157.0 156.7 156.4 156.4 156.7 156.4 155.5 155.6 156.6 156.4 156.4  
6 34 35 39 52 35 47 42 46 45 44 43 44 43 45  
33 31 28 26 22 16 13 7 41 5 11 17 21 24 31 33

157.2 156.6 155.4 155.1 154.7 154.7 155.4 156.2 155.8 154.7 153.7 153.8 154.6 155.1 155.4 156.4  
38 37 43 53 58 62 62 30 47 51 62 72 71 63 52 55 55  
31 29 27 24 19 15 16 4 7 5 10 12 16 17 21 31 33

157.6 157.6 156.6 154.8 152.5 152.6 154.2 155.4 155.8 155.6 153.9 152.6 152.4 155.3 154.6 154.6  
37 33 41 61 84 83 67 52 51 53 70 83 85 66 63 64  
33 29 26 22 18 16 14 10 51 4 8 13 16 20 31 33

153.3 153.5 152.7 152.3 152.4 152.8 153.2 152.5 151.5 151.4 151.3 151.3 151.2  
76 74 82 82 85 81 163 84 94 96 96 96 96  
33 31 26 19 15 10 77 7 11 14 23 31 33

152.6

83

152.1

82

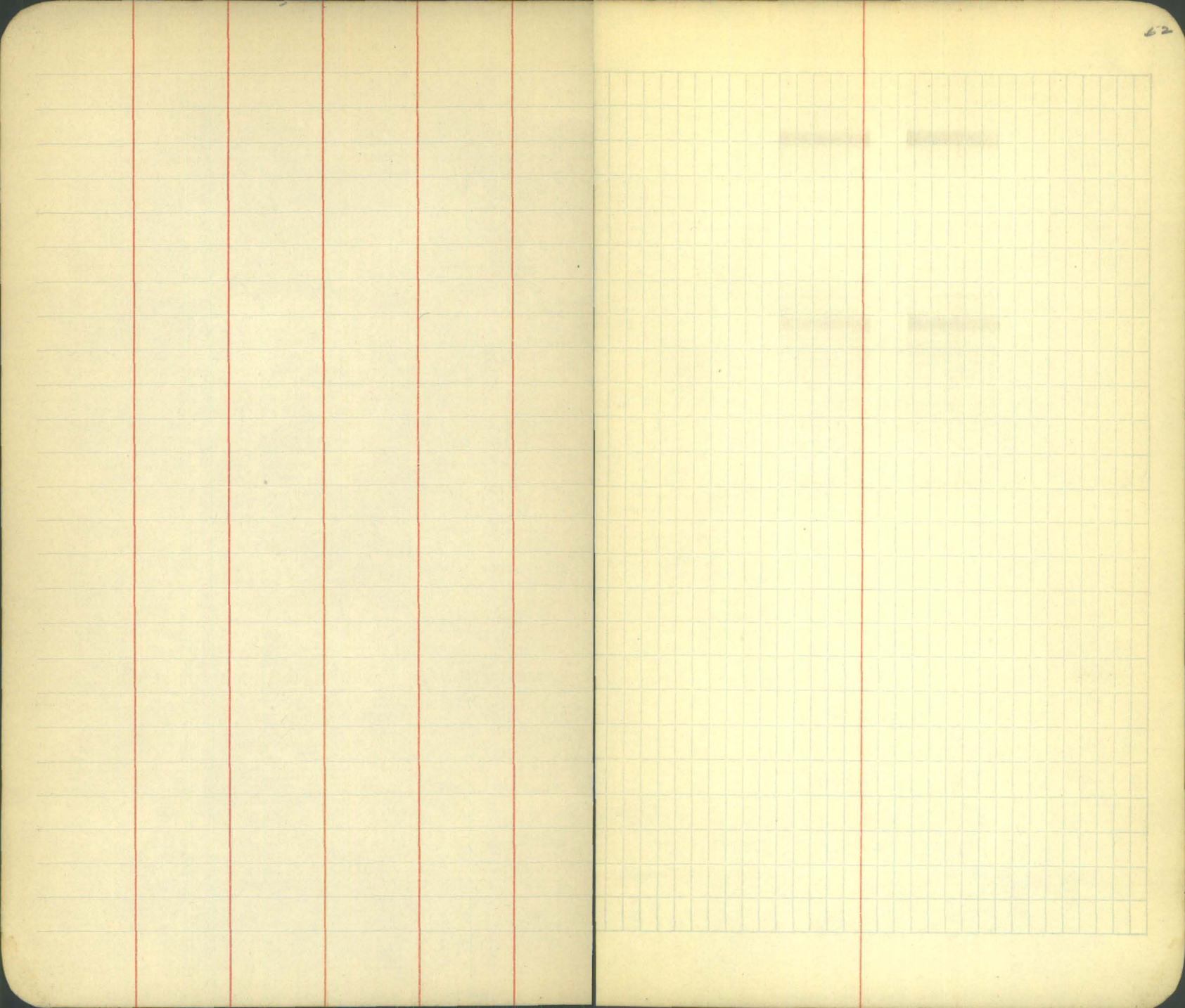




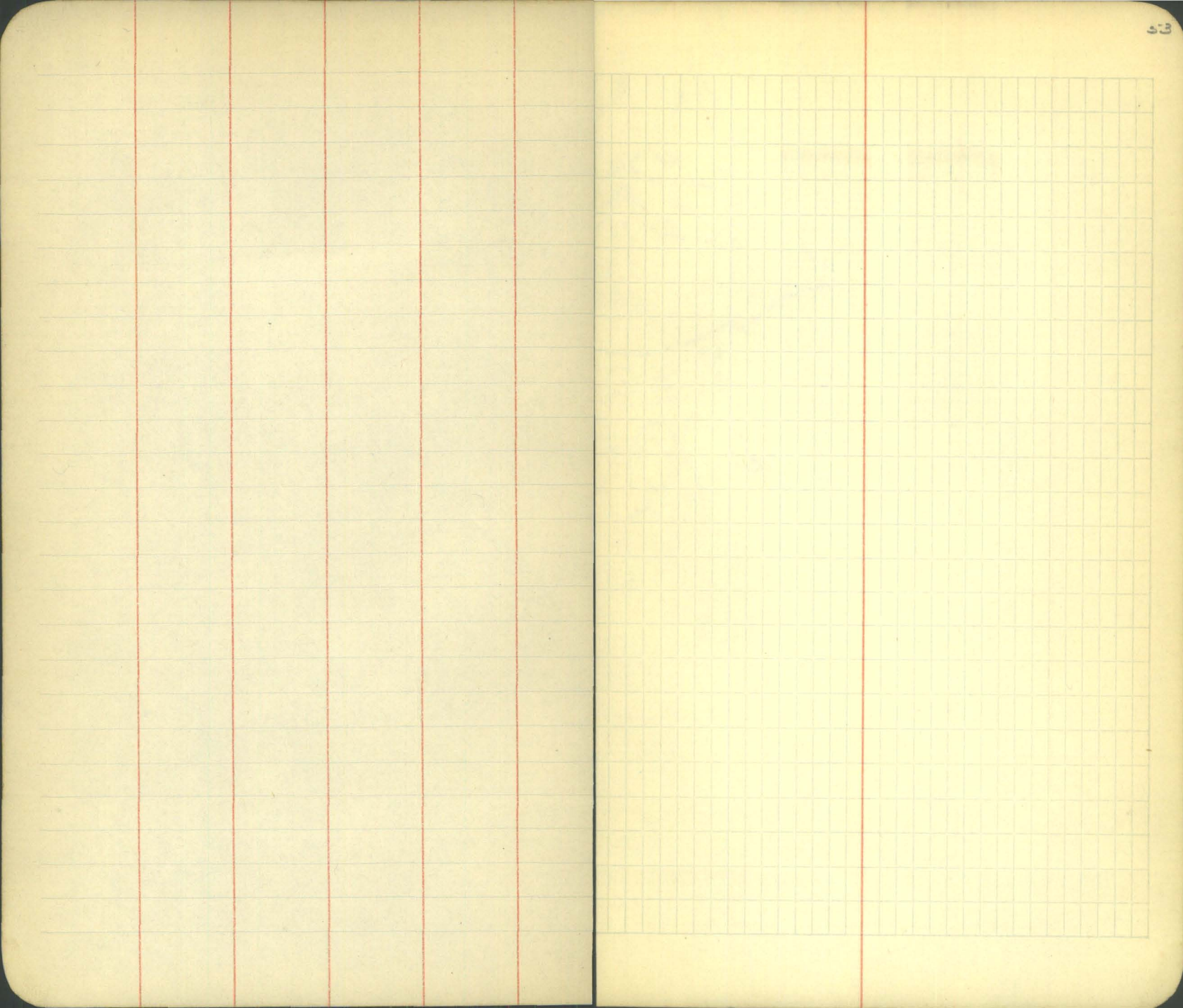




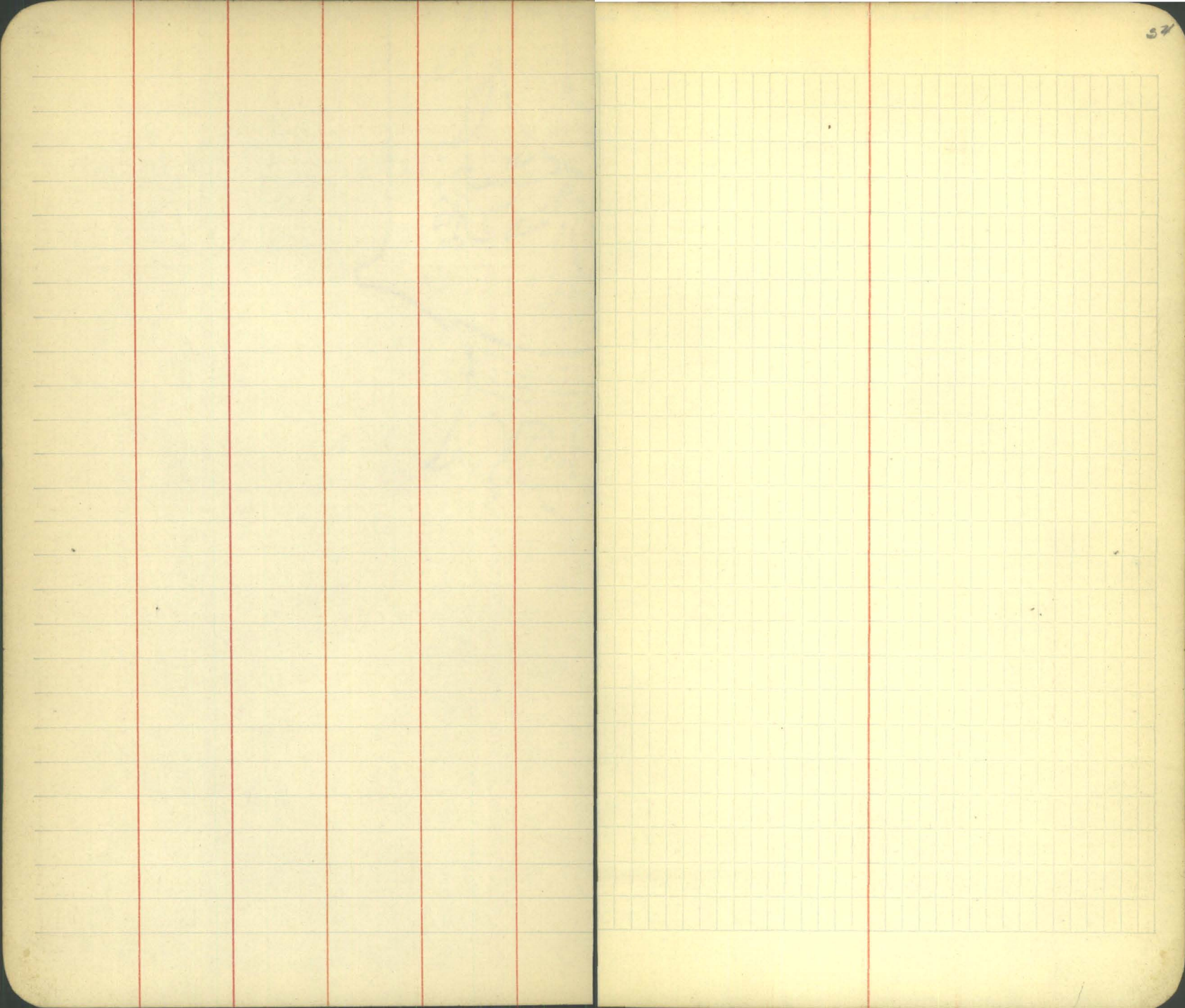














## Estimate Data

Exc. By West Sub Contractor -

| Sta to Sta              | Complete or Ditch | Cy.            | Est No 5 to Sta | Complete Ditch | Cy given Est No 2 |
|-------------------------|-------------------|----------------|-----------------|----------------|-------------------|
| 0 to 3+50               | "                 | 430            | 1               | 21+00 - 123+00 | 310               |
| 15 to 19+50             | "                 | 100            | 1               | 41+00 - 145+00 | 852               |
| 19+60 to 26+75          | "                 | 742            | 1               | 51+00 - 155+80 | 254               |
| 26+75 to 29+50          | "                 | 326            | 1               | 65+80 - 158+00 | 672               |
| 34 to 39+20             | "                 | 85             | 1               | 67+50 - 172+00 | 17                |
| 39+20 to 44+90          | "                 | 592            | 1               | 77+00 - 182+00 | 111               |
| 44+90 to 48+75          | "                 | 230            | 1               | 82+00 - 185+00 | 362               |
| 48+75 to 52             | "                 | 102            | 1               | 88 - 190       | 62                |
| 57+90 to 63+90          | "                 | 405            | 1               | 92 - 213+80    | 100               |
| 63+90 to 71             | "                 | 140            | 1               | 13+80 - 227    | 2251              |
| 75 to 80                | "                 | 313            | 1               | 34 - 241       | 497               |
| 80 to 85+20             | "                 | 482            | 1               | 44 - 261       | 540               |
| 85+20 to 89+50          | "                 | 539            | 1               | 66 - 272       | 762               |
| 94+50 to 97             | "                 | 162            | 1               | 79 - 286+50    | 533               |
| 101 to 108+20           | "                 | 222            | 1               | 16+80 - 288    | 651               |
| Total Est #1 May 5 1923 |                   | 4890 cy Est #1 |                 | 66 - 322+10    | 69                |

Force Act

|        |                |      |                      |
|--------|----------------|------|----------------------|
| Apr 30 | 1/2 day @ 4.00 | 2.00 | Grubbing Mowing F    |
| May 1  | 1 " " " 4.00   |      | Grubbing Brush 1/2   |
| " 2    | 1 " " " 4.00   |      | 1/2 Poles Fence      |
| " 3    | 1 " " " 4.00   |      | 1/2 Willows - Sterna |
| " 4    | 1 " " " 4.00   |      | Brush (Sterna)       |
| " 4    | 1 " " " 4.00   |      | Willows (" )         |

+1590 - Est #1  
Given Est #2

Total Est #2 June 2/23 9739 cy.

Force Act Est #2

18 days Grubbing Cutting etc 72.00  
22 " Dismantling 110.00

Exp #3  
12 cy loose rock west = 18.00



Est #4 6/30/23

56

Jameson -  
Estimated Yardage = 30,513 ✓  
10% 3051  
33564

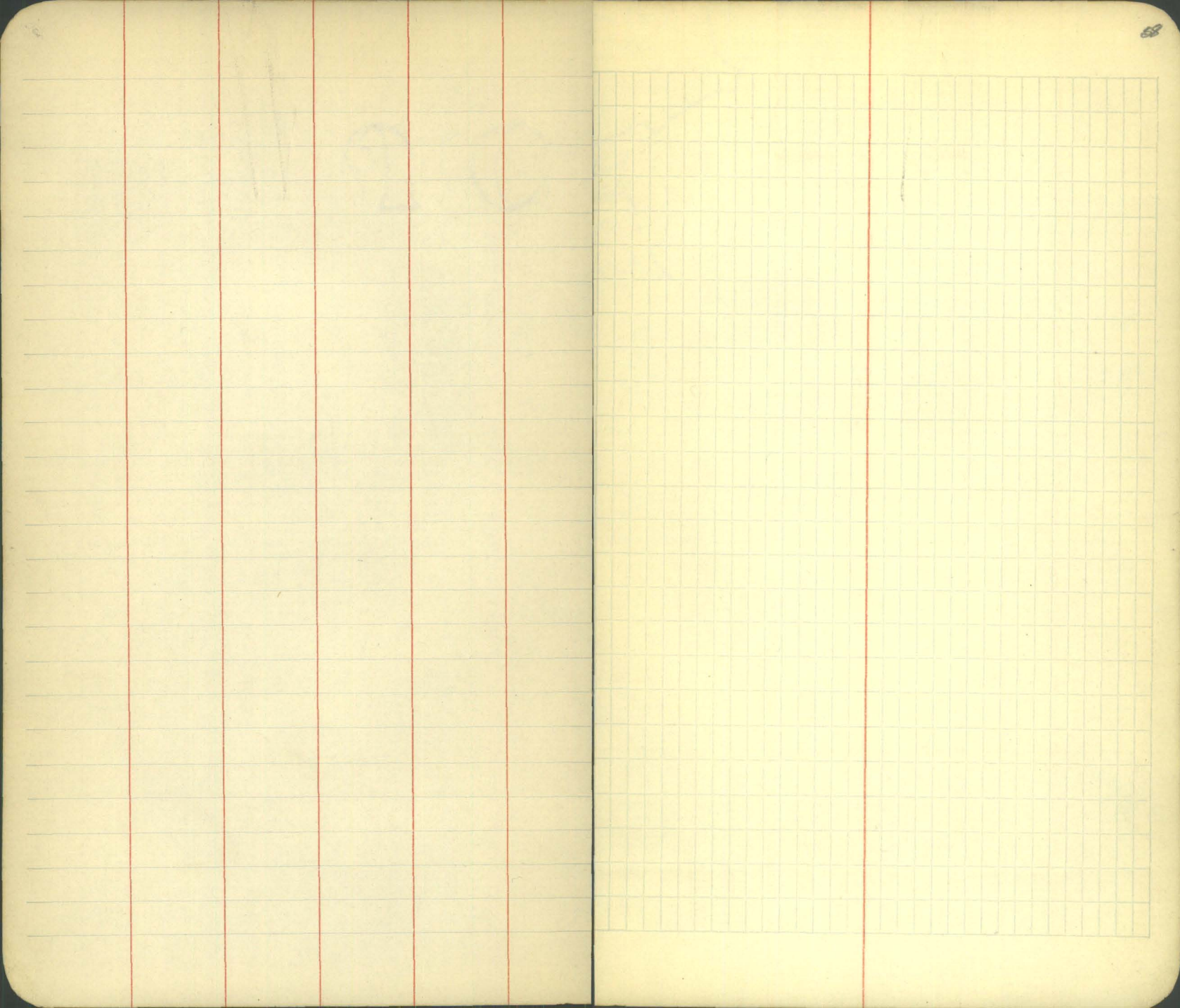
Deduct Est #2 as given West 14609 ✓  
Aint given Jameson Est #3 18966  
@ 33¢ = \$6255.15

also 50 cylonirak @ 1.20 = \$5.00











Approx Size of Cube

[illegible]

|        |         |         |         |         |
|--------|---------|---------|---------|---------|
| 282    | 156     | 73      | 20      | 23      |
| 60,912 | 113,724 | 126,144 | 116,640 | 317,952 |

| Sta | Number |
|-----|--------|
| 1   | 1      |
| 2   | 2      |
| 3   | 3      |
| 4   | 4      |
| 5   | 5      |
| 6   | 6      |
| 7   | 7      |
| 8   | 8      |
| 9   | 9      |
| 10  | 10     |
| 11  | 11     |
| 12  | 12     |
| 13  | 13     |
| 14  | 14     |
| 15  | 15     |
| 16  | 16     |
| 17  | 17     |
| 18  | 18     |
| 19  | 19     |
| 20  | 20     |
| 21  | 21     |
| 22  | 22     |
| 23  | 23     |
| 24  | 24     |
| 25  | 25     |
| 26  | 26     |
| 27  | 27     |
| 28  | 28     |
| 29  | 29     |
| 30  | 30     |
| 31  | 31     |
| 32  | 32     |
| 33  | 33     |
| 34  | 34     |
| 35  | 35     |
| 36  | 36     |
| 37  | 37     |
| 38  | 38     |
| 39  | 39     |
| 40  | 40     |
| 41  | 41     |
| 42  | 42     |
| 43  | 43     |
| 44  | 44     |
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| 84  | 84     |
| 85  | 85     |
| 86  | 86     |
| 87  | 87     |
| 88  | 88     |
| 89  | 89     |
| 90  | 90     |
| 91  | 91     |
| 92  | 92     |
| 93  | 93     |
| 94  | 94     |
| 95  | 95     |
| 96  | 96     |
| 97  | 97     |
| 98  | 98     |
| 99  | 99     |
| 100 | 100    |

Equiv 17 Canchos - Total 772, 028 w/in  
Equiv 10 Canyds - 16.56



## Diff Levels - Outlet tile

G. Heintz Sta. 235 Eagle Center Rd

|         |      |          |        |
|---------|------|----------|--------|
| BM      | 1.62 | (152.92) | 151.30 |
| At Tile | 4.65 | 148.27   |        |
|         | 5.2  | 147.7    |        |
|         | 6.2  | 146.7    |        |
|         | 6.5  | 146.4    |        |
|         | 7.5  | 145.4    |        |
|         | 7.7  | 145.2    |        |
| 5.16    | 6.40 | 146.5    |        |
|         | 5.4  | 147.6    |        |
|         | 7.7  | 145.2    |        |

Center E Hwall Coll Sta 223+40

E End (Outlet) 6" Road Tile Constr 1922

Gro Level E F line Rd

Low spot in field 100' E of Fence

" " " " 250' " " "

" " " " 500' " " "

" " " " E-W Fence Line

~~Gro Level (Ditch bank) 100' E of Lone Willow in Pass~~

Gro Level (Ditch bank) 100' E of Lone Willow in Pass

Water level (Prop Outlet) " " " " " " "



# KEITH'S RAILROAD CURVE TABLES.

Published by KEUFFEL & ESSER CO., New York.

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## HOW TO USE KEITH'S TABLES.

### EXAMPLE.

Wanted a Curve with an Ext. of about 12 ft. Angle  
of Intersection or I. P. =  $23^{\circ} 20'$  to the R. at Station  
542+72.

Ext. in Tab. IV opposite  $23^{\circ} 20' = 120.87$   
 $120.87 + 12 = 10.07$ . Say a  $10^{\circ}$  Curve.

Tan. in Tab. IV opp.  $23^{\circ} 20' = 1183.1$   
 $1183.1 + 10 = 118.31$ .

Tab. V. correction for A.  $23^{\circ} 20'$  for a  $10^{\circ}$  Cur. = 0.16  
 $118.31 + 0.16 = 118.47 = \text{corrected Tangent}$ .

(If corrected Ext. is required find in same way)

Ang.  $23^{\circ} 20' = 23.33^{\circ} + 10 = 2.3333 = \text{L. C.}$

|                                                       |                        |
|-------------------------------------------------------|------------------------|
| $2^{\circ} 19\frac{1}{2}' = \text{def. for sta. 542}$ | I. P. = sta. 542+72    |
| $4^{\circ} 49\frac{1}{2}' = \text{" " " +50}$         | Tan. = 1.18.47         |
| $7^{\circ} 19\frac{1}{2}' = \text{" " " 543}$         | B. C. = sta. 541+53.53 |
| $9^{\circ} 49\frac{1}{2}' = \text{" " " +50}$         | L. C. = 2.33.33        |
| $11^{\circ} 40' = \text{" " " 543+}$                  | E. C. = sta. 543+86.86 |
| 86.86                                                 |                        |

$100 - 53.53 = 46.47 \times 3' (\text{def. for 1 ft. of } 10^{\circ} \text{ Cur.}) = 139.41' =$   
 $2^{\circ} 19\frac{1}{2}' = \text{def. for sta. 542.}$

Def. for 50 ft. =  $2^{\circ} 30'$  for a  $10^{\circ}$  Curve.

Def. for 86.86 ft. =  $1^{\circ} 50\frac{1}{2}'$  for a  $10^{\circ}$  Curve

(These tables are published in Field Books of  
KEUFFEL & ESSER Co., New York, N. Y.)

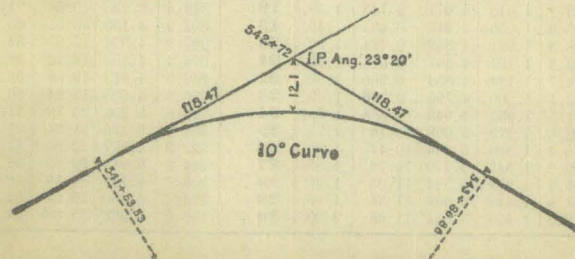




TABLE I. — Minutes in Decimals of a Degree.

|    |       |     |       |     |       |     |       |     |       |     |        |
|----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|--------|
| 1' | .0167 | 11' | .1833 | 21' | .3500 | 31' | .5167 | 41' | .6833 | 51' | .8500  |
| 2  | .0333 | 12  | .2000 | 22  | .3667 | 32  | .5333 | 42  | .7000 | 52  | .8667  |
| 3  | .0500 | 13  | .2167 | 23  | .3833 | 33  | .5500 | 43  | .7167 | 53  | .8833  |
| 4  | .0667 | 14  | .2333 | 24  | .4000 | 34  | .5667 | 44  | .7333 | 54  | .9000  |
| 5  | .0833 | 15  | .2500 | 25  | .4167 | 35  | .5833 | 45  | .7500 | 55  | .9167  |
| 6  | .1000 | 16  | .2667 | 26  | .4333 | 36  | .6000 | 46  | .7667 | 56  | .9333  |
| 7  | .1167 | 17  | .2833 | 27  | .4500 | 37  | .6167 | 47  | .7833 | 57  | .9500  |
| 8  | .1333 | 18  | .3000 | 28  | .4667 | 38  | .6333 | 48  | .8000 | 58  | .9667  |
| 9  | .1500 | 19  | .3167 | 29  | .4833 | 39  | .6500 | 49  | .8167 | 59  | .9833  |
| 10 | .1667 | 20  | .3333 | 30  | .5000 | 40  | .6667 | 50  | .8333 | 60  | 1.0000 |

TABLE II. — Inches in Decimals of a Foot.

|       |       |       |       |       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1-16  | 3-32  | 1/8   | 3-16  | 1/4   | 5-16  | 3/8   | 1/2   | 5/8   | 3/4   | 7/8   |
| .0052 | .0078 | .0104 | .0156 | .0208 | .0260 | .0313 | .0417 | .0521 | .0625 | .0729 |
| 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | 11    |
| .0833 | .1667 | .2500 | .3333 | .4167 | .5000 | .5833 | .6667 | .7500 | .8333 | .9167 |

TABLE III. — Radii, Ordinates and Deflections.

| Deg.   | Radius  | Mid. Ord. | Tan. Def. | Chd. Def. | Def. for 1 Foot | Deg. | Radius | Mid. Ord. | Tan. Def. | Chd. Def. | Def. for 1 Foot |
|--------|---------|-----------|-----------|-----------|-----------------|------|--------|-----------|-----------|-----------|-----------------|
| 0° 10' | 34377.7 | .036      | .145      | .291      | 0.05'           | 7°   | 819.0  | 1.528     | 6.105     | 12.21     | 2.10            |
| 20     | 17189.  | .073      | .291      | .582      | 0.10            | 20'  | 781.8  | 1.600     | 6.395     | 12.79     | 2.20            |
| 30     | 11459.  | .109      | .436      | .873      | 0.15            | 30   | 764.5  | 1.637     | 6.540     | 13.08     | 2.25            |
| 40     | 8594.4  | .145      | .582      | 1.164     | 0.20            | 40   | 747.9  | 1.673     | 6.685     | 13.37     | 2.30            |
| 50     | 6875.5  | .182      | .727      | 1.454     | 0.25            | 50   | 716.8  | 1.746     | 6.976     | 13.95     | 2.40            |
| 1      | 5729.6  | .218      | .873      | 1.745     | 0.30            | 20   | 698.2  | 1.819     | 7.266     | 14.53     | 2.50            |
| 10     | 4911.2  | .255      | 1.018     | 2.036     | 0.35            | 30   | 674.7  | 1.855     | 7.411     | 14.82     | 2.55            |
| 20     | 4297.3  | .291      | 1.164     | 2.327     | 0.40            | 40   | 661.7  | 1.892     | 7.556     | 15.11     | 2.60            |
| 30     | 3819.8  | .327      | 1.309     | 2.618     | 0.45            | 50   | 637.3  | 1.965     | 7.846     | 15.69     | 2.70            |
| 40     | 3437.9  | .364      | 1.454     | 2.909     | 0.50            | 20   | 614.6  | 2.037     | 8.136     | 16.27     | 2.80            |
| 50     | 3125.4  | .400      | 1.600     | 3.200     | 0.55            | 30   | 603.8  | 2.074     | 8.281     | 16.56     | 2.85            |
| 2      | 2864.9  | .436      | 1.745     | 3.490     | 0.60            | 40   | 593.4  | 2.110     | 8.426     | 16.85     | 2.90            |
| 10     | 2644.6  | .473      | 1.891     | 3.781     | 0.65            | 50   | 573.7  | 2.183     | 8.716     | 17.43     | 3.00            |
| 20     | 2455.7  | .509      | 2.036     | 4.072     | 0.70            | 10   | 546.4  | 2.292     | 9.150     | 18.30     | 3.15            |
| 30     | 2292.0  | .545      | 2.181     | 4.363     | 0.75            | 20   | 521.7  | 2.402     | 9.585     | 19.16     | 3.30            |
| 40     | 2148.8  | .582      | 2.327     | 4.654     | 0.80            | 30   | 499.1  | 2.511     | 10.02     | 20.04     | 3.45            |
| 50     | 2022.4  | .618      | 2.472     | 4.945     | 0.85            | 40   | 478.3  | 2.620     | 10.45     | 20.91     | 3.60            |
| 3      | 1910.1  | .655      | 2.618     | 5.235     | 0.90            | 50   | 459.3  | 2.730     | 10.89     | 21.77     | 3.75            |
| 10     | 1809.6  | .691      | 2.763     | 5.526     | 0.95            | 10   | 441.7  | 2.839     | 11.32     | 22.64     | 3.90            |
| 20     | 1719.1  | .727      | 2.908     | 5.817     | 1.00            | 20   | 425.4  | 2.949     | 11.75     | 23.51     | 4.05            |
| 30     | 1637.3  | .764      | 3.054     | 6.108     | 1.05            | 30   | 410.3  | 3.058     | 12.18     | 24.37     | 4.20            |
| 40     | 1562.9  | .800      | 3.199     | 6.398     | 1.10            | 40   | 396.2  | 3.168     | 12.62     | 25.24     | 4.35            |
| 50     | 1495.0  | .836      | 3.345     | 6.689     | 1.15            | 50   | 383.1  | 3.277     | 13.05     | 26.11     | 4.50            |
| 4      | 1432.7  | .873      | 3.490     | 6.980     | 1.20            | 10   | 370.8  | 3.387     | 13.49     | 26.97     | 4.65            |
| 10     | 1375.4  | .909      | 3.635     | 7.271     | 1.25            | 20   | 359.3  | 3.496     | 13.92     | 27.84     | 4.80            |
| 20     | 1322.5  | .945      | 3.718     | 7.561     | 1.30            | 30   | 348.5  | 3.606     | 14.35     | 28.70     | 4.95            |
| 30     | 1273.6  | .982      | 3.926     | 7.852     | 1.35            | 40   | 338.3  | 3.716     | 14.78     | 29.56     | 5.10            |
| 40     | 1228.1  | 1.018     | 4.071     | 8.143     | 1.40            | 50   | 319.6  | 3.935     | 15.64     | 31.29     | 5.40            |
| 50     | 1185.8  | 1.055     | 4.217     | 8.433     | 1.45            | 10   | 302.9  | 4.155     | 16.51     | 33.01     | 5.70            |
| 5      | 1146.3  | 1.091     | 4.362     | 8.724     | 1.50            | 20   | 287.9  | 4.374     | 17.37     | 34.73     | 6.00            |
| 10     | 1109.3  | 1.127     | 4.507     | 9.014     | 1.55            | 30   | 274.4  | 4.594     | 18.22     | 36.44     | 6.30            |
| 20     | 1074.7  | 1.164     | 4.653     | 9.305     | 1.60            | 40   | 262.0  | 4.814     | 19.08     | 38.16     | 6.60            |
| 30     | 1042.1  | 1.200     | 4.798     | 9.596     | 1.65            | 50   | 250.8  | 5.025     | 19.94     | 39.87     | 6.90            |
| 40     | 1011.5  | 1.237     | 4.943     | 9.886     | 1.70            | 10   | 240.5  | 5.255     | 20.79     | 41.58     | 7.20            |
| 50     | 982.6   | 1.273     | 5.088     | 10.18     | 1.75            | 20   | 231.0  | 5.476     | 21.64     | 43.28     | 7.50            |
| 6      | 955.4   | 1.309     | 5.234     | 10.47     | 1.80            | 30   | 222.3  | 5.697     | 22.50     | 44.99     | 7.80            |
| 10     | 929.6   | 1.346     | 5.379     | 10.76     | 1.85            | 40   | 214.2  | 5.918     | 23.35     | 46.69     | 8.10            |
| 20     | 905.1   | 1.382     | 5.524     | 11.05     | 1.90            | 50   | 206.7  | 6.139     | 24.19     | 48.38     | 8.40            |
| 30     | 881.9   | 1.418     | 5.669     | 11.34     | 1.95            | 10   | 199.7  | 6.360     | 25.04     | 50.07     | 8.70            |
| 40     | 859.9   | 1.455     | 5.814     | 11.63     | 2.00            | 20   | 193.2  | 6.583     | 25.88     | 51.76     | 9.00            |

TABLE IV. — Tangents and Externals to a 1° Curve.

| Angle | Tangent | External | Angle | Tangent | External | Angle | Tangent | External |
|-------|---------|----------|-------|---------|----------|-------|---------|----------|
| 1°    | 50.00   | .22      | 11°   | 551.70  | 26.50    | 21°   | 1061.9  | 97.57    |
| 10'   | 58.34   | .30      | 10'   | 560.11  | 27.31    | 10'   | 1070.6  | 99.16    |
| 20    | 66.67   | .39      | 20    | 568.53  | 28.14    | 20    | 1079.2  | 100.75   |
| 30    | 75.01   | .49      | 30    | 576.95  | 28.97    | 30    | 1087.8  | 102.35   |
| 40    | 83.34   | .61      | 40    | 585.36  | 29.82    | 40    | 1096.4  | 103.97   |
| 50    | 91.68   | .73      | 50    | 593.79  | 30.68    | 50    | 1105.1  | 105.60   |
| 2     | 100.01  | .87      | 12    | 602.21  | 31.56    | 22    | 1113.7  | 107.24   |
| 10    | 108.35  | 1.02     | 10    | 610.64  | 32.45    | 10    | 1122.4  | 108.90   |
| 20    | 116.68  | 1.19     | 20    | 619.07  | 33.35    | 20    | 1131.0  | 110.57   |
| 30    | 125.02  | 1.36     | 30    | 627.50  | 34.26    | 30    | 1139.7  | 112.25   |
| 40    | 133.36  | 1.55     | 40    | 635.93  | 35.18    | 40    | 1148.4  | 113.95   |
| 50    | 141.70  | 1.75     | 50    | 644.37  | 36.12    | 50    | 1157.0  | 115.66   |
| 3     | 150.04  | 1.96     | 13    | 652.81  | 37.07    | 23    | 1165.7  | 117.38   |
| 10    | 158.38  | 2.19     | 10    | 661.25  | 38.03    | 10    | 1174.4  | 119.12   |
| 20    | 166.72  | 2.43     | 20    | 669.70  | 39.01    | 20    | 1183.1  | 120.87   |
| 30    | 175.06  | 2.67     | 30    | 678.15  | 39.99    | 30    | 1191.8  | 122.63   |
| 40    | 183.40  | 2.93     | 40    | 686.60  | 40.99    | 40    | 1200.5  | 124.41   |
| 50    | 191.74  | 3.21     | 50    | 695.06  | 42.00    | 50    | 1209.2  | 126.20   |
| 4     | 200.08  | 3.49     | 14    | 703.51  | 43.03    | 24    | 1217.9  | 128.00   |
| 10    | 208.43  | 3.79     | 10    | 711.97  | 44.07    | 10    | 1226.6  | 129.82   |
| 20    | 216.77  | 4.10     | 20    | 720.44  | 45.12    | 20    | 1235.3  | 131.65   |
| 30    | 225.12  | 4.42     | 30    | 728.90  | 46.18    | 30    | 1244.0  | 133.50   |
| 40    | 233.47  | 4.76     | 40    | 737.37  | 47.25    | 40    | 1252.8  | 135.35   |
| 50    | 241.81  | 5.10     | 50    | 745.85  | 48.34    | 50    | 1261.5  | 137.23   |
| 5     | 250.16  | 5.46     | 15    | 754.32  | 49.44    | 25    | 1270.2  | 139.11   |
| 10    | 258.51  | 5.83     | 10    | 762.80  | 50.55    | 10    | 1279.0  | 141.01   |
| 20    | 266.86  | 6.21     | 20    | 771.29  | 51.68    | 20    | 1287.7  | 142.93   |
| 30    | 275.21  | 6.61     | 30    | 779.77  | 52.89    | 30    | 1296.5  | 144.85   |
| 40    | 283.57  | 7.01     | 40    | 788.26  | 53.97    | 40    | 1305.3  | 146.79   |
| 50    | 291.92  | 7.43     | 50    | 796.75  | 55.13    | 50    | 1314.0  | 148.75   |
| 6     | 300.29  | 7.86     | 16    | 805.25  | 56.31    | 26    | 1322.8  | 150.71   |
| 10    | 308.64  | 8.31     | 10    | 813.75  | 57.50    | 10    | 1331.6  | 152.69   |
| 20    | 316.99  | 8.76     | 20    | 822.25  | 58.70    | 20    | 1340.4  | 154.69   |
| 30    | 325.35  | 9.23     | 30    | 830.76  | 59.91    | 30    | 1349.2  | 156.70   |
| 40    | 333.71  | 9.71     | 40    | 839.27  | 61.14    | 40    | 1358.0  | 158.72   |
| 50    | 342.08  | 10.20    | 50    | 847.78  | 62.38    | 50    | 1366.8  | 160.76   |
| 7     | 350.44  | 10.71    | 17    | 856.30  | 63.63    | 27    | 1375.6  | 162.81   |
| 10    | 358.81  | 11.22    | 10    | 864.82  | 64.90    | 10    | 1384.4  | 164.86   |
| 20    | 367.17  | 11.75    | 20    | 873.35  | 66.18    | 20    | 1393.2  | 166.95   |
| 30    | 375.54  | 12.29    | 30    | 881.88  | 67.47    | 30    | 1402.0  | 169.04   |
| 40    | 383.91  | 12.85    | 40    | 890.41  | 68.77    | 40    | 1410.9  | 171.15   |
| 50    | 392.28  | 13.41    | 50    | 898.95  | 70.09    | 50    | 1419.7  | 173.27   |
| 8     | 400.66  | 13.99    | 18    | 907.49  | 71.42    | 28    | 1428.6  | 175.41   |
| 10    | 409.03  | 14.58    | 10    | 916.03  | 72.76    | 10    | 1437.4  | 177.55   |
| 20    | 417.41  | 15.18    | 20    | 924.58  | 74.12    | 20    | 1446.3  | 179.72   |
| 30    | 425.79  | 15.80    | 30    | 933.13  | 75.49    | 30    | 1455.1  | 181.89   |
| 40    | 434.17  | 16.43    | 40    | 941.69  | 76.86    | 40    | 1464.0  | 184.08   |
| 50    | 442.55  | 17.07    | 50    | 950.25  | 78.26    | 50    | 1472.9  | 186.29   |
| 9     | 450.93  | 17.72    | 19    | 958.81  | 79.67    | 29    | 1481.8  | 188.51   |
| 10    | 459.32  | 18.38    | 10    | 967.38  | 81.09    | 10    | 1490.7  | 190.74   |
| 20    | 467.71  | 19.06    | 20    | 975.96  | 82.53    | 20    | 1499.6  | 192.99   |
| 30    | 476.10  | 19.75    | 30    | 984.53  | 83.97    | 30    | 1508.5  | 195.25   |
| 40    | 484.49  | 20.45    | 40    | 993.12  | 85.43    | 40    | 1517.4  | 197.53   |
| 50    | 492.88  | 21.16    | 50    | 1001.7  | 86.90    | 50    | 1526.3  | 199.82   |
| 10    | 501.28  | 21.89    | 20    | 1010.3  | 88.39    | 30    | 1535.3  | 202.12   |
| 10    | 509.68  | 22.62    | 10    | 1018.9  | 89.89    | 10    | 1544.2  | 204.44   |
| 20    | 518.08  | 23.38    | 20    | 1027.5  | 91.40    | 20    | 1553.1  | 206.77   |
| 30    | 526.48  | 24.14    | 30    | 1036.1  | 92.92    | 30    | 1562.1  | 209.12   |
| 40    | 534.89  | 24.91    | 40    | 1044.7  | 94.46    | 40    | 1571.0  | 211.48   |
| 50    | 543.29  | 25.70    | 50    | 1053.3  | 96.01    | 50    | 1580.0  | 213.86   |



TABLE IV. — Tangents and Externals to a 1° Curve.

| Angle      | Tangent | External | Angle      | Tangent | External | Angle      | Tangent | External |
|------------|---------|----------|------------|---------|----------|------------|---------|----------|
| <b>31°</b> | 1589.0  | 216.3    | <b>41°</b> | 2142.2  | 387.4    | <b>51°</b> | 2732.9  | 618.4    |
| 10'        | 1598.0  | 218.7    | 10'        | 2151.7  | 390.7    | 10'        | 2743.1  | 622.8    |
| 20         | 1606.9  | 221.1    | 20         | 2161.2  | 394.1    | 20         | 2753.4  | 627.2    |
| 30         | 1615.9  | 223.5    | 30         | 2170.8  | 397.4    | 30         | 2763.7  | 631.7    |
| 40         | 1624.9  | 226.0    | 40         | 2180.3  | 400.8    | 40         | 2773.9  | 636.2    |
| 50         | 1633.9  | 228.4    | 50         | 2189.9  | 404.2    | 50         | 2784.2  | 640.7    |
| <b>32°</b> | 1643.0  | 230.9    | <b>42°</b> | 2199.4  | 407.6    | <b>52°</b> | 2794.5  | 645.2    |
| 10         | 1652.0  | 233.4    | 10         | 2209.0  | 411.1    | 10         | 2804.9  | 649.7    |
| 20         | 1661.0  | 235.9    | 20         | 2218.6  | 414.5    | 20         | 2815.2  | 654.3    |
| 30         | 1670.0  | 238.4    | 30         | 2228.1  | 418.0    | 30         | 2825.6  | 658.8    |
| 40         | 1679.1  | 241.0    | 40         | 2237.7  | 421.4    | 40         | 2835.9  | 663.4    |
| 50         | 1688.1  | 243.5    | 50         | 2247.3  | 425.0    | 50         | 2846.3  | 668.0    |
| <b>33°</b> | 1697.2  | 246.1    | <b>43°</b> | 2257.0  | 428.5    | <b>53°</b> | 2856.7  | 672.7    |
| 10         | 1706.3  | 248.7    | 10         | 2266.6  | 432.0    | 10         | 2867.1  | 677.3    |
| 20         | 1715.3  | 251.3    | 20         | 2276.2  | 435.6    | 20         | 2877.5  | 682.0    |
| 30         | 1724.4  | 253.9    | 30         | 2285.9  | 439.2    | 30         | 2888.0  | 686.7    |
| 40         | 1733.5  | 256.5    | 40         | 2295.6  | 442.8    | 40         | 2898.4  | 691.4    |
| 50         | 1742.6  | 259.1    | 50         | 2305.2  | 446.4    | 50         | 2908.9  | 696.1    |
| <b>34°</b> | 1751.7  | 261.8    | <b>44°</b> | 2314.9  | 450.0    | <b>54°</b> | 2919.4  | 700.9    |
| 10         | 1760.8  | 264.5    | 10         | 2324.6  | 453.6    | 10         | 2929.9  | 705.7    |
| 20         | 1770.0  | 267.2    | 20         | 2334.3  | 457.3    | 20         | 2940.4  | 710.5    |
| 30         | 1779.1  | 269.9    | 30         | 2344.1  | 461.0    | 30         | 2951.0  | 715.3    |
| 40         | 1788.2  | 272.6    | 40         | 2353.8  | 464.6    | 40         | 2961.5  | 720.1    |
| 50         | 1797.4  | 275.3    | 50         | 2363.5  | 468.4    | 50         | 2972.1  | 725.0    |
| <b>35°</b> | 1806.6  | 278.1    | <b>45°</b> | 2373.3  | 472.1    | <b>55°</b> | 2982.7  | 729.9    |
| 10         | 1815.7  | 280.8    | 10         | 2383.1  | 475.8    | 10         | 2993.3  | 734.8    |
| 20         | 1824.9  | 283.6    | 20         | 2392.8  | 479.6    | 20         | 3003.9  | 739.7    |
| 30         | 1834.1  | 286.4    | 30         | 2402.6  | 483.8    | 30         | 3014.5  | 744.6    |
| 40         | 1843.3  | 289.2    | 40         | 2412.4  | 487.2    | 40         | 3025.2  | 749.6    |
| 50         | 1852.5  | 292.0    | 50         | 2422.3  | 491.0    | 50         | 3035.8  | 754.6    |
| <b>36°</b> | 1861.7  | 294.9    | <b>46°</b> | 2432.1  | 494.8    | <b>56°</b> | 3046.5  | 759.6    |
| 10         | 1870.9  | 297.7    | 10         | 2441.9  | 498.7    | 10         | 3057.2  | 764.6    |
| 20         | 1880.1  | 300.6    | 20         | 2451.8  | 502.5    | 20         | 3067.9  | 769.7    |
| 30         | 1889.4  | 303.5    | 30         | 2461.7  | 506.4    | 30         | 3078.7  | 774.7    |
| 40         | 1898.6  | 306.4    | 40         | 2471.5  | 510.3    | 40         | 3089.4  | 779.8    |
| 50         | 1907.9  | 309.3    | 50         | 2481.4  | 514.3    | 50         | 3100.2  | 784.9    |
| <b>37°</b> | 1917.1  | 312.2    | <b>47°</b> | 2491.3  | 518.2    | <b>57°</b> | 3110.9  | 790.1    |
| 10         | 1926.4  | 315.2    | 10         | 2501.2  | 522.2    | 10         | 3121.7  | 795.2    |
| 20         | 1935.7  | 318.1    | 20         | 2511.2  | 526.1    | 20         | 3132.6  | 800.4    |
| 30         | 1945.0  | 321.1    | 30         | 2521.1  | 530.1    | 30         | 3143.4  | 805.6    |
| 40         | 1954.3  | 324.1    | 40         | 2531.1  | 534.2    | 40         | 3154.2  | 810.9    |
| 50         | 1963.6  | 327.1    | 50         | 2541.0  | 538.2    | 50         | 3165.1  | 816.1    |
| <b>38°</b> | 1972.9  | 330.2    | <b>48°</b> | 2551.0  | 542.2    | <b>58°</b> | 3176.0  | 821.4    |
| 10         | 1982.2  | 333.2    | 10         | 2561.0  | 546.3    | 10         | 3186.9  | 826.7    |
| 20         | 1991.5  | 336.3    | 20         | 2571.0  | 550.4    | 20         | 3197.8  | 832.0    |
| 30         | 2000.9  | 339.3    | 30         | 2581.0  | 554.5    | 30         | 3208.8  | 837.3    |
| 40         | 2010.2  | 342.4    | 40         | 2591.0  | 558.6    | 40         | 3219.7  | 842.7    |
| 50         | 2019.6  | 345.5    | 50         | 2601.1  | 562.8    | 50         | 3230.7  | 848.1    |
| <b>39°</b> | 2029.0  | 348.6    | <b>49°</b> | 2611.2  | 566.9    | <b>59°</b> | 3241.7  | 853.5    |
| 10         | 2038.4  | 351.8    | 10         | 2621.2  | 571.1    | 10         | 3252.7  | 858.9    |
| 20         | 2047.8  | 354.9    | 20         | 2631.3  | 575.3    | 20         | 3263.7  | 864.3    |
| 30         | 2057.2  | 358.1    | 30         | 2641.4  | 579.5    | 30         | 3274.8  | 869.8    |
| 40         | 2066.6  | 361.3    | 40         | 2651.5  | 583.8    | 40         | 3285.8  | 875.3    |
| 50         | 2076.0  | 364.5    | 50         | 2661.6  | 588.0    | 50         | 3296.9  | 880.8    |
| <b>40°</b> | 2085.4  | 367.7    | <b>50°</b> | 2671.8  | 592.3    | <b>60°</b> | 3308.0  | 886.4    |
| 10         | 2094.9  | 371.0    | 10         | 2681.9  | 596.6    | 10         | 3319.1  | 892.0    |
| 20         | 2104.3  | 374.2    | 20         | 2692.1  | 600.9    | 20         | 3330.3  | 897.5    |
| 30         | 2113.8  | 377.5    | 30         | 2702.3  | 605.3    | 30         | 3341.4  | 903.2    |
| 40         | 2123.3  | 380.8    | 40         | 2712.5  | 609.6    | 40         | 3352.6  | 908.8    |
| 50         | 2132.7  | 384.1    | 50         | 2722.7  | 614.0    | 50         | 3363.8  | 914.5    |

TABLE IV. — Tangents and Externals to a 1° Curve.

| Angle      | Tangent | External | Angle      | Tangent | External | Angle      | Tangent | External |
|------------|---------|----------|------------|---------|----------|------------|---------|----------|
| <b>61°</b> | 3375.0  | 920.2    | <b>71°</b> | 4086.9  | 1308.2   | <b>81°</b> | 4893.6  | 1805.3   |
| 10'        | 3386.3  | 925.9    | 10'        | 4099.5  | 1315.6   | 10'        | 4908.0  | 1814.7   |
| 20         | 3397.5  | 931.6    | 20         | 4112.1  | 1322.9   | 20         | 4922.5  | 1824.1   |
| 30         | 3408.8  | 937.3    | 30         | 4124.8  | 1330.3   | 30         | 4937.0  | 1833.6   |
| 40         | 3420.1  | 943.1    | 40         | 4137.4  | 1337.7   | 40         | 4951.5  | 1843.1   |
| 50         | 3431.4  | 948.9    | 50         | 4150.1  | 1345.1   | 50         | 4966.1  | 1852.6   |
| <b>62°</b> | 3442.7  | 954.8    | <b>72°</b> | 4182.8  | 1352.6   | <b>82°</b> | 4980.7  | 1862.2   |
| 10         | 3454.1  | 960.6    | 10         | 4175.6  | 1360.1   | 10         | 4995.4  | 1871.8   |
| 20         | 3465.4  | 966.5    | 20         | 4188.5  | 1367.6   | 20         | 5010.0  | 1881.5   |
| 30         | 3476.8  | 972.4    | 30         | 4201.2  | 1375.2   | 30         | 5024.8  | 1891.2   |
| 40         | 3488.3  | 978.3    | 40         | 4214.0  | 1382.8   | 40         | 5039.5  | 1900.9   |
| 50         | 3499.7  | 984.3    | 50         | 4226.8  | 1390.4   | 50         | 5054.3  | 1910.7   |
| <b>63°</b> | 3511.1  | 990.2    | <b>73°</b> | 4239.7  | 1398.0   | <b>83°</b> | 5069.2  | 1920.5   |
| 10         | 3522.6  | 996.2    | 10         | 4252.6  | 1405.7   | 10         | 5084.0  | 1930.4   |
| 20         | 3534.1  | 1002.3   | 20         | 4265.6  | 1413.5   | 20         | 5099.0  | 1940.3   |
| 30         | 3545.6  | 1008.3   | 30         | 4278.5  | 1421.2   | 30         | 5113.9  | 1950.3   |
| 40         | 3557.2  | 1014.4   | 40         | 4291.5  | 1429.0   | 40         | 5129.9  | 1960.2   |
| 50         | 3568.7  | 1020.5   | 50         | 4304.6  | 1436.8   | 50         | 5143.9  | 1970.3   |
| <b>64°</b> | 3580.3  | 1026.6   | <b>74°</b> | 4317.6  | 1444.6   | <b>84°</b> | 5159.0  | 1980.4   |
| 10         | 3591.9  | 1032.8   | 10         | 4330.7  | 1452.5   | 10         | 5174.1  | 1990.5   |
| 20         | 3603.5  | 1039.0   | 20         | 4343.8  | 1460.4   | 20         | 5189.3  | 2000.6   |
| 30         | 3615.1  | 1045.2   | 30         | 4356.9  | 1468.4   | 30         | 5204.4  | 2010.8   |
| 40         | 3626.8  | 1051.4   | 40         | 4370.1  | 1476.4   | 40         | 5219.7  | 2021.1   |
| 50         | 3638.5  | 1057.7   | 50         | 4383.3  | 1484.4   | 50         | 5234.9  | 2031.4   |
| <b>65°</b> | 3650.2  | 1063.9   | <b>75°</b> | 4396.5  | 1492.4   | <b>85°</b> | 5250.3  | 2041.7   |
| 10         | 3661.9  | 1070.2   | 10         | 4409.8  | 1500.5   | 10         | 5265.6  | 2052.1   |
| 20         | 3673.7  | 1076.6   | 20         | 4423.1  | 1508.6   | 20         | 5281.0  | 2062.5   |
| 30         | 3685.4  | 1082.9   | 30         | 4436.4  | 1516.7   | 30         | 5296.4  | 2073.0   |
| 40         | 3697.2  | 1089.3   | 40         | 4449.7  | 1524.9   | 40         | 5311.9  | 2083.5   |
| 50         | 3709.0  | 1095.7   | 50         | 4463.1  | 1533.1   | 50         | 5327.4  | 2094.1   |
| <b>66°</b> | 3720.9  | 1102.2   | <b>76°</b> | 4476.5  | 1541.4   | <b>86°</b> | 5343.0  | 2104.7   |
| 10         | 3732.7  | 1108.6   | 10         | 4489.9  | 1549.7   | 10         | 5358.6  | 2115.3   |
| 20         | 3744.6  | 1115.1   | 20         | 4503.4  | 1558.0   | 20         | 5374.2  | 2126.0   |
| 30         | 3756.5  | 1121.7   | 30         | 4516.9  | 1566.3   | 30         | 5389.9  | 2136.7   |
| 40         | 3768.5  | 1128.2   | 40         | 4530.4  | 1574.7   | 40         | 5405.6  | 2147.5   |
| 50         | 3780.4  | 1134.8   | 50         | 4544.0  | 1583.1   | 50         | 5421.4  | 2158.4   |
| <b>67°</b> | 3792.4  | 1141.4   | <b>77°</b> | 4557.6  | 1591.6   | <b>87°</b> | 5437.2  | 2169.2   |
| 10         | 3804.4  | 1148.0   | 10         | 4571.2  | 1600.1   | 10         | 5453.1  | 2180.2   |
| 20         | 3816.4  | 1154.7   | 20         | 4584.8  | 1608.6   | 20         | 5469.0  | 2191.1   |
| 30         | 3828.4  | 1161.3   | 30         | 4598.5  | 1617.1   | 30         | 5484.9  | 2202.2   |
| 40         | 3840.5  | 1168.1   | 40         | 4612.2  | 1625.7   | 40         | 5500.9  | 2213.2   |
| 50         | 3852.6  | 1174.8   | 50         | 4626.0  | 1634.4   | 50         | 5517.0  | 2224.3   |
| <b>68°</b> | 3864.7  | 1181.6   | <b>78°</b> | 4639.8  | 1643.0   | <b>88°</b> | 5533.1  | 2235.5   |
| 10         | 3876.8  | 1188.4   | 10         | 4653.6  | 1651.7   | 10         | 5549.2  | 2246.7   |
| 20         | 3889.0  | 1195.2   | 20         | 4667.4  | 1660.5   | 20         | 5565.4  | 2258.0   |
| 30         | 3901.2  | 1202.0   | 30         | 4681.3  | 1669.2   | 30         | 5581.6  | 2269.3   |
| 40         | 3913.4  | 1208.9   | 40         | 4695.2  | 1678.1   | 40         | 5597.8  | 2280.6   |
| 50         | 3925.6  | 1215.8   | 50         | 4709.2  | 1686.9   | 50         | 5614.2  | 2292.0   |
| <b>69°</b> | 3937.9  | 1222.7   | <b>79°</b> | 4723.2  | 1695.8   | <b>89°</b> | 5630.5  | 2303.5   |
| 10         | 3950.2  | 1229.7   | 10         | 4737.2  | 1704.7   | 10         | 5646.9  | 2315.0   |
| 20         | 3962.5  | 1236.7   | 20         | 4751.2  | 1713.7   | 20         | 5663.4  | 2326.6   |
| 30         | 3974.8  | 1243.7   | 30         | 4765.3  | 1722.7   | 30         | 5679.9  | 2338.2   |
| 40         | 3987.2  | 1250.8   | 40         | 4779.4  | 1731.7   | 40         | 5696.4  | 2349.8   |
| 50         | 3999.5  | 1257.9   | 50         | 4793.6  | 1740.8   | 50         | 5713.0  | 2361.5   |
| <b>70°</b> | 4011.9  | 1265.0   | <b>80°</b> | 4807.7  | 1749.9   | <b>90°</b> | 5729.7  | 2373.3   |
| 10         | 4024.4  | 1272.1   | 10         | 4822.0  | 1759.0   | 10         | 5746.3  | 2385.1   |
| 20         | 4036.8  | 1279.3   | 20         | 4836.2  | 1768.2   | 20         | 5763.1  | 2397.0   |
| 30         | 4049.3  | 1286.5   | 30         | 4850.5  | 1777.4   | 30         | 5779.9  | 2408.9   |
| 40         | 4061.8  | 1293.6   | 40         | 4864.8  | 1786.7   | 40         | 5796.7  | 2420.9   |
| 50         | 4074.4  | 1300.9   | 50         | 4879.2  | 1796.0   | 50         | 5813.6  | 2432.9   |



TABLE IV. — Tangents and External to a 1° Curve.

| Angle       | Tangent | External | Angle       | Tangent | External | Angle       | Tangent | External |
|-------------|---------|----------|-------------|---------|----------|-------------|---------|----------|
| <b>91°</b>  | 5830.5  | 2444.9   | <b>101°</b> | 6950.6  | 3278.1   | <b>111°</b> | 8336.7  | 4386.1   |
| 10°         | 5847.5  | 2457.1   | 10°         | 6971.3  | 3294.1   | 10°         | 8362.7  | 4407.6   |
| 20°         | 5864.6  | 2469.3   | 20°         | 6992.0  | 3310.1   | 20°         | 8388.9  | 4429.2   |
| 30°         | 5881.7  | 2481.5   | 30°         | 7012.7  | 3326.1   | 30°         | 8415.1  | 4450.9   |
| 40°         | 5898.8  | 2493.8   | 40°         | 7033.6  | 3342.3   | 40°         | 8441.5  | 4472.7   |
| 50°         | 5916.0  | 2506.1   | 50°         | 7054.5  | 3358.5   | 50°         | 8468.0  | 4494.6   |
| <b>92°</b>  | 5933.2  | 2518.5   | <b>102°</b> | 7075.5  | 3374.9   | <b>112°</b> | 8494.6  | 4516.6   |
| 10°         | 5950.5  | 2531.0   | 10°         | 7096.6  | 3391.2   | 10°         | 8521.3  | 4538.8   |
| 20°         | 5967.9  | 2543.5   | 20°         | 7117.8  | 3407.7   | 20°         | 8548.1  | 4561.1   |
| 30°         | 5985.3  | 2556.0   | 30°         | 7139.0  | 3424.3   | 30°         | 8575.0  | 4583.4   |
| 40°         | 6002.7  | 2568.6   | 40°         | 7160.3  | 3440.9   | 40°         | 8602.1  | 4606.0   |
| 50°         | 6020.2  | 2581.3   | 50°         | 7181.7  | 3457.6   | 50°         | 8629.3  | 4628.6   |
| <b>93°</b>  | 6037.8  | 2594.0   | <b>103°</b> | 7203.2  | 3474.4   | <b>113°</b> | 8656.6  | 4651.8   |
| 10°         | 6055.4  | 2606.8   | 10°         | 7224.7  | 3491.3   | 10°         | 8684.0  | 4674.2   |
| 20°         | 6073.1  | 2619.7   | 20°         | 7246.3  | 3508.2   | 20°         | 8711.5  | 4697.2   |
| 30°         | 6090.8  | 2632.6   | 30°         | 7268.0  | 3525.2   | 30°         | 8739.2  | 4720.3   |
| 40°         | 6108.6  | 2645.5   | 40°         | 7289.8  | 3542.4   | 40°         | 8767.0  | 4743.6   |
| 50°         | 6126.4  | 2658.5   | 50°         | 7311.7  | 3559.6   | 50°         | 8794.9  | 4766.9   |
| <b>94°</b>  | 6144.3  | 2671.6   | <b>104°</b> | 7333.6  | 3576.8   | <b>114°</b> | 8822.9  | 4790.4   |
| 10°         | 6162.6  | 2684.7   | 10°         | 7355.6  | 3594.2   | 10°         | 8851.0  | 4814.1   |
| 20°         | 6180.2  | 2697.9   | 20°         | 7377.8  | 3611.7   | 20°         | 8879.3  | 4837.8   |
| 30°         | 6198.3  | 2711.2   | 30°         | 7399.9  | 3629.2   | 30°         | 8907.7  | 4861.7   |
| 40°         | 6216.4  | 2724.5   | 40°         | 7422.2  | 3646.8   | 40°         | 8936.3  | 4885.7   |
| 50°         | 6234.6  | 2737.9   | 50°         | 7444.6  | 3664.5   | 50°         | 8965.0  | 4909.9   |
| <b>95°</b>  | 6252.8  | 2751.3   | <b>105°</b> | 7467.0  | 3682.3   | <b>115°</b> | 8992.8  | 4934.1   |
| 10°         | 6271.1  | 2764.8   | 10°         | 7489.6  | 3700.2   | 10°         | 9022.7  | 4958.6   |
| 20°         | 6289.4  | 2778.3   | 20°         | 7512.2  | 3718.2   | 20°         | 9051.7  | 4983.1   |
| 30°         | 6307.9  | 2792.0   | 30°         | 7534.9  | 3736.2   | 30°         | 9080.9  | 5007.8   |
| 40°         | 6326.3  | 2805.6   | 40°         | 7557.7  | 3754.4   | 40°         | 9110.3  | 5032.6   |
| 50°         | 6344.8  | 2819.4   | 50°         | 7580.5  | 3772.6   | 50°         | 9139.8  | 5057.6   |
| <b>96°</b>  | 6363.4  | 2833.2   | <b>106°</b> | 7603.5  | 3791.0   | <b>116°</b> | 9169.4  | 5082.7   |
| 10°         | 6382.1  | 2847.0   | 10°         | 7626.6  | 3809.4   | 10°         | 9199.1  | 5107.9   |
| 20°         | 6400.8  | 2861.0   | 20°         | 7649.7  | 3827.9   | 20°         | 9229.0  | 5133.3   |
| 30°         | 6419.5  | 2875.0   | 30°         | 7672.9  | 3846.5   | 30°         | 9259.0  | 5158.8   |
| 40°         | 6438.4  | 2889.0   | 40°         | 7696.3  | 3865.2   | 40°         | 9289.2  | 5184.5   |
| 50°         | 6457.3  | 2903.1   | 50°         | 7719.7  | 3884.0   | 50°         | 9319.5  | 5210.3   |
| <b>97°</b>  | 6476.2  | 2917.3   | <b>107°</b> | 7743.2  | 3902.9   | <b>117°</b> | 9349.9  | 5236.2   |
| 10°         | 6495.2  | 2931.6   | 10°         | 7766.8  | 3921.9   | 10°         | 9380.5  | 5262.3   |
| 20°         | 6514.3  | 2945.9   | 20°         | 7790.5  | 3940.9   | 20°         | 9411.3  | 5288.6   |
| 30°         | 6533.4  | 2960.3   | 30°         | 7814.3  | 3960.1   | 30°         | 9442.2  | 5315.0   |
| 40°         | 6552.6  | 2974.7   | 40°         | 7838.1  | 3979.4   | 40°         | 9473.2  | 5341.5   |
| 50°         | 6571.9  | 2989.2   | 50°         | 7862.1  | 3998.7   | 50°         | 9504.4  | 5368.2   |
| <b>98°</b>  | 6591.2  | 3003.8   | <b>108°</b> | 7886.2  | 4018.2   | <b>118°</b> | 9535.7  | 5395.1   |
| 10°         | 6610.6  | 3018.4   | 10°         | 7910.4  | 4037.8   | 10°         | 9567.2  | 5422.1   |
| 20°         | 6630.1  | 3033.1   | 20°         | 7934.6  | 4057.4   | 20°         | 9598.9  | 5449.2   |
| 30°         | 6649.6  | 3047.9   | 30°         | 7959.0  | 4077.2   | 30°         | 9630.7  | 5476.5   |
| 40°         | 6669.2  | 3062.8   | 40°         | 7983.5  | 4097.1   | 40°         | 9662.6  | 5504.0   |
| 50°         | 6688.8  | 3077.7   | 50°         | 8008.0  | 4117.0   | 50°         | 9694.7  | 5531.7   |
| <b>99°</b>  | 6708.6  | 3092.7   | <b>109°</b> | 8032.7  | 4137.1   | <b>119°</b> | 9727.0  | 5559.4   |
| 10°         | 6728.4  | 3107.7   | 10°         | 8057.4  | 4157.3   | 10°         | 9759.4  | 5587.4   |
| 20°         | 6748.2  | 3122.9   | 20°         | 8082.3  | 4177.5   | 20°         | 9792.0  | 5615.5   |
| 30°         | 6768.1  | 3138.1   | 30°         | 8107.3  | 4197.9   | 30°         | 9824.8  | 5643.8   |
| 40°         | 6788.1  | 3153.3   | 40°         | 8132.3  | 4218.4   | 40°         | 9857.7  | 5672.3   |
| 50°         | 6808.2  | 3168.7   | 50°         | 8157.5  | 4239.0   | 50°         | 9890.8  | 5700.9   |
| <b>100°</b> | 6828.3  | 3184.1   | <b>110°</b> | 8182.8  | 4259.7   | <b>120°</b> | 9924.0  | 5729.7   |
| 10°         | 6848.5  | 3199.6   | 10°         | 8208.2  | 4280.5   | 10°         | 9957.5  | 5758.6   |
| 20°         | 6868.8  | 3215.1   | 20°         | 8233.7  | 4301.4   | 20°         | 9991.0  | 5787.7   |
| 30°         | 6889.2  | 3230.8   | 30°         | 8259.3  | 4322.4   | 30°         | 10025.0 | 5817.0   |
| 40°         | 6909.6  | 3246.5   | 40°         | 8285.0  | 4343.6   | 40°         | 10059.0 | 5846.5   |
| 50°         | 6930.1  | 3262.3   | 50°         | 8310.8  | 4364.8   | 50°         | 10093.0 | 5876.1   |

Table V. Corrections for use with table IV,

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|       |       | For Tangents Add |     |      |      |      |      |      |      |      |      |      |      |      |      |
|-------|-------|------------------|-----|------|------|------|------|------|------|------|------|------|------|------|------|
| ANGLE | CURVE | 5°               | 10° | 15°  | 20°  | 25°  | 30°  | 35°  | 40°  | 45°  | 50°  | 55°  | 60°  | 65°  | 70°  |
| 10°   |       | .03              | .06 | .09  | .13  | .16  | .19  | .22  | .25  | .28  | .31  | .34  | .38  | .42  | .46  |
| 15°   |       | .04              | .10 | .14  | .19  | .24  | .29  | .34  | .39  | .45  | .51  | .53  | .58  | .63  | .68  |
| 20°   |       | .06              | .13 | .19  | .26  | .32  | .39  | .45  | .51  | .58  | .65  | .72  | .79  | .84  | .90  |
| 25°   |       | .08              | .16 | .24  | .33  | .40  | .49  | .58  | .67  | .75  | .83  | .90  | .99  | 1.06 | 1.14 |
| 30°   |       | .10              | .19 | .29  | .39  | .49  | .59  | .69  | .79  | .89  | .99  | 1.09 | 1.20 | 1.29 | 1.39 |
| 35°   |       | .11              | .22 | .34  | .47  | .58  | .69  | .79  | .81  | .92  | 1.04 | 1.29 | 1.42 | 1.54 | 1.66 |
| 40°   |       | .13              | .26 | .40  | .53  | .67  | .80  | .93  | 1.06 | 1.20 | 1.34 | 1.49 | 1.64 | 1.79 | 1.94 |
| 45°   |       | .15              | .30 | .44  | .60  | .76  | .91  | 1.06 | 1.21 | 1.37 | 1.52 | 1.70 | 1.87 | 2.04 | 2.21 |
| 50°   |       | .17              | .34 | .51  | .68  | .85  | 1.02 | 1.19 | 1.36 | 1.54 | 1.72 | 1.91 | 2.10 | 2.29 | 2.48 |
| 55°   |       | .19              | .38 | .57  | .76  | .95  | 1.14 | 1.32 | 1.52 | 1.72 | 1.92 | 2.14 | 2.35 | 2.56 | 2.77 |
| 60°   |       | .21              | .42 | .63  | .84  | 1.05 | 1.27 | 1.49 | 1.71 | 1.94 | 2.17 | 2.38 | 2.60 | 2.83 | 3.07 |
| 65°   |       | .23              | .46 | .69  | .93  | 1.16 | 1.40 | 1.64 | 1.88 | 2.13 | 2.38 | 2.63 | 2.88 | 3.13 | 3.39 |
| 70°   |       | .25              | .51 | .76  | 1.02 | 1.28 | 1.54 | 1.80 | 2.06 | 2.33 | 2.60 | 2.88 | 3.16 | 3.44 | 3.72 |
| 75°   |       | .27              | .56 | .83  | 1.12 | 1.40 | 1.69 | 1.98 | 2.27 | 2.57 | 2.87 | 3.16 | 3.47 | 3.78 | 4.09 |
| 80°   |       | .30              | .61 | .91  | 1.22 | 1.53 | 1.84 | 2.15 | 2.46 | 2.78 | 3.10 | 3.44 | 3.78 | 4.12 | 4.46 |
| 85°   |       | .33              | .66 | 1.00 | 1.33 | 1.68 | 2.02 | 2.36 | 2.70 | 3.05 | 3.40 | 3.77 | 4.14 | 4.55 | 4.89 |
| 90°   |       | .36              | .72 | 1.09 | 1.45 | 1.83 | 2.20 | 2.57 | 2.94 | 3.32 | 3.70 | 4.10 | 4.50 | 4.91 | 5.32 |
| 95°   |       | .39              | .79 | 1.19 | 1.55 | 2.00 | 2.40 | 2.80 | 3.20 | 3.61 | 4.02 | 4.40 | 4.85 | 5.38 | 5.83 |
| 100°  |       | .43              | .86 | 1.30 | 1.74 | 2.18 | 2.62 | 3.06 | 3.50 | 3.95 | 4.40 | 4.88 | 5.37 | 5.85 | 6.34 |

For External Add

| ANGLE | CURVE | 5°   | 10°  | 15°  | 20°  | 25°  | 30°  | 35°  | 40°  | 45°  | 50°  | 55°  | 60°  | 65°  | 70°  |
|-------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 10°   |       | .001 | .003 | .004 | .006 | .007 | .008 | .009 | .011 | .012 | .014 | .015 | .017 | .018 | .020 |
| 15°   |       | .003 | .007 | .010 | .014 | .018 | .023 | .027 | .032 | .037 | .043 | .049 | .053 | .057 | .061 |
| 20°   |       | .006 | .011 | .017 | .022 | .028 | .034 | .038 | .045 | .051 | .057 | .063 | .070 | .076 | .083 |
| 25°   |       | .009 | .018 | .027 | .036 | .046 | .056 | .065 | .074 | .083 | .093 | .106 | .120 | .127 | .135 |
| 30°   |       | .013 | .025 | .038 | .051 | .065 | .078 | .090 | .103 | .116 | .129 | .149 | .170 | .179 | .188 |
| 35°   |       | .018 | .035 | .054 | .072 | .086 | .109 | .131 | .153 | .175 | .197 | .213 | .230 | .247 | .264 |
| 40°   |       | .023 | .045 | .070 | .093 | .117 | .141 | .172 | .203 | .234 | .265 | .277 | .290 | .315 | .341 |
| 45°   |       | .030 | .060 | .093 | .119 | .153 | .184 | .216 | .254 | .289 | .325 | .351 | .378 | .411 | .445 |
| 50°   |       | .037 | .075 | .116 | .151 | .189 | .227 | .266 | .305 | .345 | .384 | .425 | .467 | .508 | .550 |
| 55°   |       | .046 | .093 | .142 | .188 | .236 | .283 | .332 | .381 | .420 | .479 | .530 | .582 | .641 | .700 |
| 60°   |       | .056 | .112 | .168 | .225 | .283 | .340 | .398 | .457 | .516 | .575 | .636 | .697 | .774 | .851 |
| 65°   |       | .067 | .135 | .204 | .273 | .343 | .412 | .483 | .554 | .625 | .697 | .771 | .845 | .922 | 1.01 |
| 70°   |       | .080 | .159 | .240 | .321 | .403 | .485 | .568 | .652 | .735 | .819 | .906 | .994 | 1.08 | 1.17 |
| 75°   |       | .095 | .182 | .266 | .353 | .440 | .528 | .617 | .707 | .797 | .887 | .977 | 1.07 | 1.18 | 1.29 |
| 80°   |       | .110 | .220 | .332 | .445 | .558 | .671 | .787 | .903 | 1.02 | 1.13 | 1.25 | 1.38 | 1.50 | 1.62 |
| 85°   |       | .128 | .259 | .391 | .524 | .657 | .790 | .926 | 1.06 | 1.20 | 1.34 | 1.47 | 1.62 | 1.76 | 1.91 |
| 90°   |       | .149 | .299 | .450 | .603 | .756 | .910 | 1.07 | 1.22 | 1.38 | 1.54 | 1.70 | 1.87 | 2.03 | 2.20 |
| 95°   |       | .174 | .350 | .522 | .706 | .885 | 1.06 | 1.25 | 1.43 | 1.62 | 1.80 | 1.99 | 2.18 | 2.38 | 2.58 |
| 100°  |       | .200 | .401 | .604 | .809 | 1.01 | 1.22 | 1.43 | 1.64 | 1.85 | 2.06 | 2.28 | 2.50 | 2.73 | 2.96 |



Table VI. Deflections for Sub Chords for Short Radius Curves.

| Degree of Curve | Radius 50<br>sin. def. ang. | $\frac{1}{2}$ sub chord<br>R = sin of def. angle |        |        |        | Length of arc<br>for 100 ft. |
|-----------------|-----------------------------|--------------------------------------------------|--------|--------|--------|------------------------------|
|                 |                             | 12.5 Ft.                                         | 15 Ft. | 20 Ft. | 25 Ft. |                              |
| 30°             | 193.18                      | 1° 51'                                           | 2° 17' | 2° 58' | 3° 43' | 101.15                       |
| 32°             | 181.39                      | 1° 59'                                           | 2° 25' | 3° 10' | 3° 58' | 101.33                       |
| 34°             | 171.01                      | 2° 06'                                           | 2° 33' | 3° 21' | 4° 12' | 101.48                       |
| 36°             | 161.80                      | 2° 13'                                           | 2° 41' | 3° 33' | 4° 26' | 101.66                       |
| 38°             | 153.58                      | 2° 20'                                           | 2° 49' | 3° 44' | 4° 40' | 101.85                       |
| 40°             | 146.19                      | 2° 27'                                           | 2° 57' | 3° 55' | 4° 54' | 102.06                       |
| 42°             | 139.52                      | 2° 34'                                           | 3° 05' | 4° 07' | 5° 08' | 102.29                       |
| 44°             | 133.47                      | 2° 41'                                           | 3° 13' | 4° 18' | 5° 22' | 102.53                       |
| 46°             | 127.97                      | 2° 48'                                           | 3° 21' | 4° 29' | 5° 36' | 102.76                       |
| 48°             | 122.92                      | 2° 55'                                           | 3° 29' | 4° 40' | 5° 50' | 103.00                       |
| 50°             | 118.31                      | 3° 02'                                           | 3° 38' | 4° 51' | 6° 04' | 103.24                       |
| 52°             | 114.06                      | 3° 09'                                           | 3° 46' | 5° 02' | 6° 17' | 103.54                       |
| 54°             | 110.11                      | 3° 16'                                           | 3° 54' | 5° 13' | 6° 31' | 103.84                       |
| 56°             | 106.50                      | 3° 22'                                           | 4° 02' | 5° 23' | 6° 44' | 104.14                       |
| 58°             | 103.14                      | 3° 29'                                           | 4° 10' | 5° 34' | 6° 57' | 104.43                       |
| 60°             | 100.00                      | 3° 35'                                           | 4° 18' | 5° 44' | 7° 11' | 104.72                       |

## CURVE FORMULAS.

|                                             |                                         |                                         |
|---------------------------------------------|-----------------------------------------|-----------------------------------------|
| $T = R \tan \frac{1}{2} I$                  | $R = T \cot. \frac{1}{2} I$             | Chord def. = $\frac{\text{chord}^2}{R}$ |
| $T = 50 \tan. \frac{1}{2} I$                | $R = 50$                                |                                         |
| $\text{Sin. } D = \frac{\text{Sin. } D}{R}$ | $\text{Sin. } D$                        | No. chords = $\frac{1}{2} I$            |
| $\text{Sin. } D = 50 \tan. \frac{1}{2} I$   | $E = R \text{ ex. sec. } \frac{1}{2} I$ | $D$                                     |
| $T$                                         | $E = T \tan \frac{1}{2} I$              | Tan. def. = $\frac{1}{2}$ chord def     |

The square of any distance, divided by twice the radius, will equal the distance from tangent to curve, very nearly.

Table IV. contains Tangents and Externals to a 1° curve. Tan. and Ext. to any other radius may be found nearly enough, by dividing the Tan. or Ext. opposite the given Central Angle by the given degree of curve.

To find Deg. of Curve, having the Central Angle and Tangent: Divide Tan. opposite the given Central Angle by the given Tangent.

To find Deg. of Curve, having the Central Angle and Tangent: Divide Ext. opposite the given Central Angle by the given External.

To find Nat. Tan. and Nat. Ex. Sec. for any angle by Table IV.: Tan. or Ext. of twice the given angle divided by the radius of a 1° curve will be the Nat. Tan. or Nat. Ex. Sec.

To find angle for a given distance and deflection.

Rule 1. Multiply the given distance by .01745 (def. for 1° for 1 ft.), and divide given deflection by the product.

Rule 2. Multiply given deflection by 57.3, and divide the product by the given distance.

To find deflection for a given angle and distance. Multiply the angle by .01745, and the product by the distance.

RIGHT ANGLE TRIANGLES. - Square the altitude, divide by twice the base Add quotient to base for hypotenuse.

Given Base 100, Alt 10  $10^2 \div 200 = .5$ .  $100 + .5 = 100.5$  hyp.

Given Hyp. 100, Alt. 25.  $25^2 \div 200 = 3.125$ .  $100 - 3.125 = 96.875 =$  Base

Error in first example, .002; in last, .045.

To find Tons of Rail in one mile of track: multiply weight per yard by 11, and divide by 2.

## Natural Sines

| deg. | 0'   | 10'  | 20'  | 30'  | 40'  | 50'  | deg. | 0'  | 10'  | 20'  | 30'  | 40'  | 50'  | deg. |
|------|------|------|------|------|------|------|------|-----|------|------|------|------|------|------|
| 0    | 0000 | 0029 | 0058 | 0087 | 0116 | 0145 | 89   | 140 | 6428 | 6450 | 6472 | 6494 | 6517 | 6539 |
| 1    | 0175 | 0204 | 0233 | 0262 | 0291 | 0320 | 88   | 41  | 6561 | 6583 | 6604 | 6626 | 6648 | 6670 |
| 2    | 0349 | 0378 | 0407 | 0436 | 0465 | 0494 | 87   | 42  | 6691 | 6713 | 6734 | 6756 | 6777 | 6799 |
| 3    | 0523 | 0552 | 0581 | 0610 | 0640 | 0669 | 86   | 43  | 6820 | 6841 | 6862 | 6884 | 6905 | 6926 |
| 4    | 0698 | 0727 | 0756 | 0785 | 0814 | 0843 | 85   | 44  | 6947 | 6967 | 6988 | 7009 | 7030 | 7050 |
| 5    | 0872 | 0901 | 0929 | 0958 | 0987 | 1016 | 84   | 45  | 7071 | 7092 | 7112 | 7133 | 7153 | 7173 |
| 6    | 1045 | 1074 | 1103 | 1132 | 1161 | 1190 | 83   | 46  | 7193 | 7214 | 7234 | 7254 | 7274 | 7294 |
| 7    | 1219 | 1248 | 1279 | 1305 | 1334 | 1363 | 82   | 47  | 7314 | 7333 | 7353 | 7373 | 7392 | 7412 |
| 8    | 1392 | 1421 | 1449 | 1478 | 1507 | 1536 | 81   | 48  | 7431 | 7451 | 7470 | 7490 | 7509 | 7528 |
| 9    | 1564 | 1592 | 1622 | 1650 | 1679 | 1708 | 80   | 49  | 7547 | 7566 | 7585 | 7604 | 7623 | 7642 |
| 10   | 1736 | 1765 | 1794 | 1822 | 1851 | 1880 | 79   | 50  | 7660 | 7679 | 7698 | 7716 | 7735 | 7753 |
| 11   | 1908 | 1937 | 1965 | 1994 | 2022 | 2051 | 78   | 51  | 7771 | 7790 | 7808 | 7826 | 7844 | 7862 |
| 12   | 2079 | 2108 | 2136 | 2164 | 2193 | 2221 | 77   | 52  | 7880 | 7898 | 7916 | 7934 | 7951 | 7969 |
| 13   | 2250 | 2278 | 2306 | 2334 | 2363 | 2391 | 76   | 53  | 7986 | 8004 | 8021 | 8039 | 8056 | 8073 |
| 14   | 2419 | 2447 | 2476 | 2504 | 2532 | 2560 | 75   | 54  | 8090 | 8107 | 8124 | 8141 | 8158 | 8175 |
| 15   | 2588 | 2616 | 2644 | 2672 | 2700 | 2728 | 74   | 55  | 8192 | 8208 | 8225 | 8241 | 8258 | 8274 |
| 16   | 2756 | 2784 | 2812 | 2840 | 2868 | 2896 | 73   | 56  | 8290 | 8307 | 8323 | 8339 | 8355 | 8371 |
| 17   | 2924 | 2952 | 2979 | 3007 | 3035 | 3063 | 72   | 57  | 8387 | 8403 | 8418 | 8434 | 8450 | 8465 |
| 18   | 3090 | 3118 | 3145 | 3173 | 3201 | 3228 | 71   | 58  | 8480 | 8496 | 8511 | 8526 | 8542 | 8557 |
| 19   | 3256 | 3283 | 3311 | 3338 | 3365 | 3393 | 70   | 59  | 8572 | 8587 | 8601 | 8616 | 8631 | 8646 |
| 20   | 3420 | 3448 | 3475 | 3502 | 3529 | 3557 | 69   | 60  | 8660 | 8675 | 8689 | 8704 | 8718 | 8732 |
| 21   | 3584 | 3611 | 3638 | 3665 | 3692 | 3719 | 68   | 61  | 8746 | 8760 | 8774 | 8788 | 8802 | 8816 |
| 22   | 3746 | 3773 | 3800 | 3827 | 3854 | 3881 | 67   | 62  | 8829 | 8843 | 8857 | 8870 | 8884 | 8897 |
| 23   | 3907 | 3934 | 3961 | 3987 | 4014 | 4041 | 66   | 63  | 8910 | 8923 | 8936 | 8949 | 8962 | 8975 |
| 24   | 4067 | 4094 | 4120 | 4147 | 4173 | 4200 | 65   | 64  | 8988 | 9001 | 9013 | 9026 | 9038 | 9051 |
| 25   | 4226 | 4253 | 4279 | 4305 | 4331 | 4358 | 64   | 65  | 9063 | 9075 | 9088 | 9100 | 9112 | 9124 |
| 26   | 4384 | 4410 | 4436 | 4462 | 4488 | 4514 | 63   | 66  | 9135 | 9147 | 9159 | 9171 | 9182 | 9194 |
| 27   | 4540 | 4566 | 4592 | 4617 | 4643 | 4669 | 62   | 67  | 9205 | 9216 | 9228 | 9239 | 9250 | 9261 |
| 28   | 4695 | 4720 | 4746 | 4772 | 4797 | 4823 | 61   | 68  | 9272 | 9283 | 9293 | 9304 | 9315 | 9325 |
| 29   | 4848 | 4874 | 4899 | 4924 | 4950 | 4975 | 60   | 69  | 9336 | 9346 | 9356 | 9367 | 9377 | 9387 |
| 30   | 5000 | 5025 | 5050 | 5075 | 5100 | 5125 | 59   | 70  | 9397 | 9407 | 9417 | 9426 | 9436 | 9446 |
| 31   | 5150 | 5175 | 5200 | 5225 | 5250 | 5275 | 58   | 71  | 9455 | 9465 | 9474 | 9483 | 9492 | 9502 |
| 32   | 5299 | 5324 | 5348 | 5373 | 5398 | 5422 | 57   | 72  | 9511 | 9520 | 9528 | 9537 | 9546 | 9555 |
| 33   | 5446 | 5471 | 5495 | 5519 | 5544 | 5568 | 56   | 73  | 9563 | 9572 | 9580 | 9588 | 9596 | 9605 |
| 34   | 5592 | 5616 | 5640 | 5664 | 5688 | 5712 | 55   | 74  | 9613 | 9621 | 9628 | 9636 | 9644 | 9652 |
| 35   | 5736 | 5760 | 5783 | 5807 | 5831 | 5854 | 54   | 75  | 9659 | 9667 | 9674 | 9681 | 9689 | 9696 |
| 36   | 5878 | 5901 | 5925 | 5948 | 5972 | 5995 | 53   | 76  | 9703 | 9710 | 9717 | 9724 | 9730 | 9737 |
| 37   | 6018 | 6041 | 6065 | 6088 | 6111 | 6134 | 52   | 77  | 9744 | 9750 | 9757 | 9763 | 9769 | 9775 |
| 38   | 6157 | 6180 | 6202 | 6225 | 6248 | 6271 | 51   | 78  | 9781 | 9787 | 9793 | 9799 | 9805 | 9811 |
| 39   | 6293 | 6316 | 6338 | 6361 | 6383 | 6406 | 50   | 79  | 9816 | 9822 | 9827 | 9833 | 9838 | 9843 |

| deg. | 0'   | 10'  | 20'  | 30'  | 40'    | 50'    | deg. |
|------|------|------|------|------|--------|--------|------|
| 80   | 9848 | 9853 | 9858 | 9863 | 9868   | 9872   | 9    |
| 81   | 9877 | 9881 | 9886 | 9890 | 9894   | 9898   | 8    |
| 82   | 9903 | 9907 | 9911 | 9914 | 9918   | 9922   | 7    |
| 83   | 9925 | 9929 | 9932 | 9936 | 9939   | 9942   | 6    |
| 84   | 9945 | 9948 | 9951 | 9954 | 9957   | 9959   | 5    |
| 85   | 9962 | 9964 | 9967 | 9969 | 9971   | 9974   | 4    |
| 86   | 9976 | 9978 | 9980 | 9981 | 9983   | 9985   | 3    |
| 87   | 9986 | 9988 | 9989 | 9990 | 9992   | 9993   | 2    |
| 88   | 9994 | 9995 | 9996 | 9997 | 9997   | 9998   | 1    |
| 89   | 9998 | 9999 | 9999 | 9999 | 1.0000 | 1.0000 | 0    |

## Natural Cosines



## Natural Tangents

| deg. | 0'   | 10'  | 20'  | 30'  | 40'  | 50'  | deg. | 0'   | 10'    | 20'    | 30'    | 40'    | 50'    | deg. |
|------|------|------|------|------|------|------|------|------|--------|--------|--------|--------|--------|------|
| 0    | 0000 | 0029 | 0058 | 0087 | 0116 | 0145 | 90   | 8391 | 8441   | 8491   | 8541   | 8591   | 8642   | 49   |
| 1    | 0175 | 0204 | 0233 | 0262 | 0291 | 0320 | 88   | 41   | 8693   | 8744   | 8796   | 8847   | 8899   | 48   |
| 2    | 0349 | 0378 | 0407 | 0437 | 0466 | 0495 | 87   | 42   | 9004   | 9057   | 9110   | 9163   | 9217   | 47   |
| 3    | 0524 | 0553 | 0582 | 0612 | 0641 | 0670 | 86   | 43   | 9325   | 9380   | 9435   | 9490   | 9545   | 46   |
| 4    | 0699 | 0729 | 0758 | 0787 | 0816 | 0846 | 85   | 44   | 9657   | 9713   | 9770   | 9827   | 9884   | 45   |
| 5    | 0875 | 0904 | 0934 | 0963 | 0992 | 1022 | 84   | 45   | 1.0000 | 1.0058 | 1.0117 | 1.0176 | 1.0235 | 44   |
| 6    | 1051 | 1080 | 1110 | 1139 | 1169 | 1198 | 83   | 46   | 1.0355 | 1.0416 | 1.0477 | 1.0533 | 1.0599 | 43   |
| 7    | 1228 | 1257 | 1287 | 1317 | 1346 | 1376 | 82   | 47   | 1.0724 | 1.0786 | 1.0850 | 1.0913 | 1.0977 | 42   |
| 8    | 1405 | 1435 | 1465 | 1495 | 1524 | 1554 | 81   | 48   | 1.1106 | 1.1171 | 1.1237 | 1.1303 | 1.1369 | 41   |
| 9    | 1584 | 1614 | 1644 | 1673 | 1703 | 1733 | 80   | 49   | 1.1504 | 1.1571 | 1.1640 | 1.1708 | 1.1778 | 40   |
| 10   | 1763 | 1793 | 1823 | 1853 | 1883 | 1914 | 79   | 50   | 1.1918 | 1.1988 | 1.2059 | 1.2131 | 1.2203 | 39   |
| 11   | 1944 | 1974 | 2004 | 2035 | 2065 | 2095 | 78   | 51   | 1.2349 | 1.2423 | 1.2497 | 1.2572 | 1.2647 | 38   |
| 12   | 2126 | 2156 | 2186 | 2217 | 2247 | 2278 | 77   | 52   | 1.2799 | 1.2876 | 1.2954 | 1.3032 | 1.3111 | 37   |
| 13   | 2309 | 2339 | 2370 | 2401 | 2432 | 2462 | 76   | 53   | 1.3270 | 1.3351 | 1.3435 | 1.3514 | 1.3597 | 36   |
| 14   | 2493 | 2524 | 2555 | 2586 | 2617 | 2648 | 75   | 54   | 1.3764 | 1.3848 | 1.3934 | 1.4019 | 1.4106 | 35   |
| 15   | 2679 | 2711 | 2742 | 2773 | 2805 | 2836 | 74   | 55   | 1.4281 | 1.4370 | 1.4460 | 1.4550 | 1.4641 | 34   |
| 16   | 2867 | 2899 | 2931 | 2962 | 2994 | 3026 | 73   | 56   | 1.4826 | 1.4919 | 1.5013 | 1.5108 | 1.5204 | 33   |
| 17   | 3057 | 3089 | 3121 | 3153 | 3185 | 3217 | 72   | 57   | 1.5399 | 1.5497 | 1.5597 | 1.5697 | 1.5798 | 32   |
| 18   | 3249 | 3281 | 3314 | 3346 | 3378 | 3411 | 71   | 58   | 1.6003 | 1.6107 | 1.6212 | 1.6319 | 1.6426 | 31   |
| 19   | 3443 | 3476 | 3508 | 3541 | 3574 | 3607 | 70   | 59   | 1.6643 | 1.6753 | 1.6864 | 1.6977 | 1.7090 | 30   |
| 20   | 3640 | 3673 | 3706 | 3739 | 3772 | 3805 | 69   | 60   | 1.7321 | 1.7437 | 1.7556 | 1.7675 | 1.7797 | 29   |
| 21   | 3839 | 3872 | 3906 | 3939 | 3973 | 4006 | 68   | 61   | 1.8040 | 1.8165 | 1.8291 | 1.8418 | 1.8546 | 28   |
| 22   | 4040 | 4074 | 4108 | 4142 | 4176 | 4210 | 67   | 62   | 1.8807 | 1.8940 | 1.9074 | 1.9210 | 1.9347 | 27   |
| 23   | 4245 | 4279 | 4314 | 4348 | 4383 | 4417 | 66   | 63   | 1.9626 | 1.9768 | 1.9912 | 2.0057 | 2.0204 | 26   |
| 24   | 4452 | 4487 | 4522 | 4557 | 4592 | 4626 | 65   | 64   | 2.0503 | 2.0655 | 2.0809 | 2.0965 | 2.1123 | 25   |
| 25   | 4663 | 4699 | 4734 | 4770 | 4806 | 4841 | 64   | 65   | 2.1445 | 2.1609 | 2.1775 | 2.1943 | 2.2113 | 24   |
| 26   | 4877 | 4913 | 4950 | 4986 | 5022 | 5059 | 63   | 66   | 2.2460 | 2.2637 | 2.2817 | 2.2998 | 2.3183 | 23   |
| 27   | 5095 | 5132 | 5169 | 5206 | 5243 | 5280 | 62   | 67   | 2.3559 | 2.3750 | 2.3945 | 2.4142 | 2.4342 | 22   |
| 28   | 5317 | 5354 | 5392 | 5430 | 5467 | 5505 | 61   | 68   | 2.4751 | 2.4960 | 2.5172 | 2.5386 | 2.5605 | 21   |
| 29   | 5543 | 5581 | 5619 | 5658 | 5696 | 5735 | 60   | 69   | 2.6051 | 2.6279 | 2.6511 | 2.6746 | 2.6985 | 20   |
| 30   | 5774 | 5812 | 5851 | 5890 | 5930 | 5969 | 59   | 70   | 2.7475 | 2.7725 | 2.7980 | 2.8239 | 2.8502 | 19   |
| 31   | 6009 | 6048 | 6088 | 6128 | 6168 | 6208 | 58   | 71   | 2.9042 | 2.9310 | 2.9600 | 2.9887 | 3.0178 | 18   |
| 32   | 6249 | 6289 | 6330 | 6371 | 6412 | 6453 | 57   | 72   | 3.0777 | 3.1084 | 3.1397 | 3.1716 | 3.2041 | 17   |
| 33   | 6494 | 6536 | 6577 | 6619 | 6661 | 6703 | 56   | 73   | 3.2709 | 3.3052 | 3.3402 | 3.3759 | 3.4124 | 16   |
| 34   | 6745 | 6787 | 6830 | 6873 | 6916 | 6959 | 55   | 74   | 3.4874 | 3.5261 | 3.5656 | 3.6059 | 3.6470 | 15   |
| 35   | 7002 | 7046 | 7090 | 7133 | 7177 | 7221 | 54   | 75   | 3.7321 | 3.7760 | 3.8208 | 3.8657 | 3.9136 | 14   |
| 36   | 7265 | 7310 | 7355 | 7400 | 7445 | 7490 | 53   | 76   | 4.0108 | 4.0611 | 4.1126 | 4.1653 | 4.2193 | 13   |
| 37   | 7536 | 7581 | 7627 | 7673 | 7720 | 7766 | 52   | 77   | 4.3315 | 4.3897 | 4.4494 | 4.5107 | 4.5736 | 12   |
| 38   | 7813 | 7860 | 7907 | 7954 | 8002 | 8050 | 51   | 78   | 4.7046 | 4.7729 | 4.8430 | 4.9152 | 4.9894 | 11   |
| 39   | 8098 | 8146 | 8195 | 8243 | 8292 | 8342 | 50   | 79   | 5.1446 | 5.2257 | 5.3093 | 5.3955 | 5.4845 | 10   |
| deg. | 60'  | 50'  | 40'  | 30'  | 20'  | 10'  | deg. | 60'  | 50'    | 40'    | 30'    | 20'    | 10'    | deg. |

## Natural Cotangents

| deg. | 0'     | 10'    | 20'    | 30'     | 40'     | 50'     | deg. |
|------|--------|--------|--------|---------|---------|---------|------|
| 80   | 5.6713 | 5.7694 | 5.8708 | 5.9758  | 6.0844  | 6.1970  | 9    |
| 81   | 6.3138 | 6.4348 | 6.5606 | 6.6912  | 6.8269  | 6.9682  | 8    |
| 82   | 7.1154 | 7.2687 | 7.4287 | 7.5958  | 7.7704  | 7.9530  | 7    |
| 83   | 8.1443 | 8.3450 | 8.5555 | 8.7769  | 9.0098  | 9.2553  | 6    |
| 84   | 9.5144 | 9.7882 | 10.078 | 10.385  | 10.7111 | 11.059  | 5    |
| 85   | 11.430 | 11.826 | 12.250 | 12.706  | 13.197  | 13.727  | 4    |
| 86   | 14.300 | 14.924 | 15.605 | 16.350  | 17.169  | 18.075  | 3    |
| 87   | 19.081 | 20.206 | 21.470 | 22.903  | 24.542  | 26.432  | 2    |
| 88   | 28.636 | 31.242 | 34.368 | 38.189  | 42.064  | 49.104  | 1    |
| 89   | 57.290 | 68.750 | 85.940 | 114.588 | 171.885 | 343.770 | 0    |
| deg. | 60'    | 50'    | 40'    | 30'     | 20'     | 10'     | deg. |

|        |        |        |        |
|--------|--------|--------|--------|
| 179.09 | 187.53 | 181.53 | 187.53 |
| 8.44   | 178.71 | 177.92 | 182.10 |
| 41     | 8.82   | 7.61   | 6.39   |
| 40     | 178.52 |        |        |
|        | 8.99   |        |        |
| 187.53 | 187.53 | 187.53 | 187.53 |
| 183.71 | 184.11 | 184.11 | 184.11 |
| 3.82   | 3.39   | 2.176  | 2.2    |
| 41     |        |        |        |
| 42     |        |        |        |
| 43     |        |        |        |
| 44     |        |        |        |
| 45     |        |        |        |
| 46     |        |        |        |
| 47     |        |        |        |
| 48     |        |        |        |
| 49     |        |        |        |
| 50     |        |        |        |
| 51     |        |        |        |
| 52     |        |        |        |
| 53     |        |        |        |
| 54     |        |        |        |
| 55     |        |        |        |
| 56     |        |        |        |
| 57     |        |        |        |
| 58     |        |        |        |
| 59     |        |        |        |
| 60     |        |        |        |



30000  
 123  
 90000  
 90000  
 6 ) 990000  
 1650

33  
 6000  
 165000  
 7000  
 29  
 63000  
 14000  
 20301

# DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

ROADWAY 14 FEET WIDE. SIDE SLOPES 1½ 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.

MADE IN GERMANY.